

EL DORADO LAKE MASTER PLAN

WALNUT RIVER BASIN
BUTLER COUNTY, KANSAS

JUNE 2021



**US Army Corps
of Engineers**

Tulsa District

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EXECUTIVE SUMMARY

El Dorado Lake Draft Master Plan

US Army Corps of Engineers

Prepared by Tulsa District and the Regional Planning and Environmental Center

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PURPOSE

The revision of the El Dorado Lake Master Plan (Plan or Master Plan) is a framework built collaboratively to guide appropriate stewardship of US Army Corps of Engineers (USACE) administered resources at El Dorado Lake over the next 25 years. The 1986 Supplement Number 10 (Land Use) was an update of the original 1976 Master Plan and served well past its intended 25-year planning horizon. In addition to the primary mission of flood risk management, water supply, water quality, recreation, and fish and wildlife, USACE also carries out the inherent mission of environmental stewardship on the Federal Lands and water surface at El Dorado Lake.

The 1986 Supplement to the 1976 Master Plan classified a total of 338 acres for Project Operations, 3,988 acres for Recreation, 3,718 acres for Wildlife Management, 284 acres for Highway and Railroad Rights of Way and 8,000 acres of surface water at the conservation pool for a total of 16,328 acres. Due to land changes from erosion and sedimentation since 1986 as well as more precise measurement technology, the total fee lands has increased by 40 acres. Currently, El Dorado Lake encompasses 8,411 acres of land and 7,957 acres of surface water, protecting lands downstream from the dam through flood mitigation on the Walnut River and Upper Arkansas flood control system, as well as conserving habitat for fish and wildlife and public recreation. This Plan with its supporting documentation, provides an inventory, analysis, goals, objectives, and recommendations for USACE lands and waters at El Dorado Lake, Kansas.

PUBLIC INPUT

To ensure a balance between operational, environmental, and recreational outcomes, public and agency input toward the Master Plan was obtained. An Environmental Assessment (EA) was completed in conjunction with the Master Plan Revision to evaluate the impacts of alternatives. The EA is included as Appendix B.

The USACE is dedicated to serving the public interests in support of the overall development of land uses related to land management for cultural, natural, and recreational resources of El Dorado Lake. The Plan also establishes a classification of surface waters related to outdoor recreation. An integral part of this effort is gathering public comments and engaging stakeholders in the process of planning. USACE policy guidance in ER and EP 1130-2-550 requires thorough public involvement and agency coordination throughout the master plan revision process including any associated environmental assessment process. Public involvement is especially important at El

Dorado Lake to ensure that future management actions are both environmentally sustainable and responsive to public outdoor recreation needs in a region. The following milestones provide a brief look at the overall process of revising the El Dorado Lake Master Plan.

The USACE began the revision process for the El Dorado Lake MP in the Fall of 2019. The objectives for the master plan revision are to (1) update land classifications and resource management objectives to reflect changes in USACE land management policies since 1976 and (2) update the 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.

RECOMMENDATIONS

The following land classifications changes (detailed in Chapter 8, Table 8.1) resulted from the inventory, analysis, and synthesis of data, documents, and public and agency input. In general, 16,368 total acres were reclassified, with fee and conservation pool acreage changes due in part to sediment deposition and improvements in measurement technology using Geographical Information System (GIS) technology. This software allows for more finely tuned measurements and thus acreages may vary slightly from official land acquisition records.

ES Table 1 - Prior and Current Land Classifications and Acreage

Prior Land Classifications (1986)	Acres	New Land Classifications (2021)	Acres	Net Difference
Project Operations	338	Project Operations (PO)	422	84
Recreation – Intensive Use	3,927	High Density Recreation (HDR)	3,722	(205)
		Environmentally Sensitive Areas (ESA)	138	138
Recreation – Low Density	61	Multiple Resource Management – Low Density Recreation (LDR)	31	(30)
Wildlife Management	3,718	Multiple Resource Management – Wildlife Management (WMA)	4,098	380
		Multiple Resource Management – Vegetation Management (VMA)	0	-
		Future/Inactive Recreation Areas	0	-
Transportation Rights-of-Way	284			(284)
TOTAL	8,328		8,411	83
Prior Water Surface Classifications (1986)	Acres	New Water Surface Classifications (2021)	Acres	Net Difference
Water Surface	8,000	Open Recreation	7,834	
		Designated No-Wake	117	
		Fish and Wildlife Sanctuary	0	
		Restricted	6	
TOTAL	8,000		7,957	(43)
TOTAL FEE	16,328		16,368	40

* Note: Acreage figures were measured using GIS technology and may vary slightly from official land acquisition records.

PLAN ORGANIZATION

Chapter 1 of the Master Plan presents an overall introduction of El Dorado Lake. Chapter 2 consists of an inventory and analysis of project resources. Chapters 3 and 4 lay out management goals, resource objectives, and land allocation and classification. Chapter 5 is the resource plan that identifies how project lands will be managed through a resource use plan for each land use classification. This includes current and projected park facility needs, an analysis of existing and anticipated resource use, and anticipated influences on overall project operation and management. Chapter 6 details topics that are unique to El Dorado Lake. Chapter 7 identifies the coordination efforts and stakeholder input gathered for the development of the Master Plan, and Chapter 8 gives a summary of the changes in land classification from the previous Master Plan to the present one. Finally, the appendices include information and supporting documents for this Master Plan revision, including Land Classification and Park Plate Maps (Appendix A).

An EA analyzing alternative management scenarios for El Dorado Lake has been prepared in accordance with the National Environmental Policy Act of 1969, as amended (NEPA); regulations of the Council on Environmental Quality; and USACE regulations, including Engineer Regulation 200-2-2: Procedures for Implementing NEPA. The EA is a separate document that informs this Master Plan and can be found in its entirety in Appendix B.

The EA evaluated two alternatives as follows: 1) No Action Alternative, and 2) Proposed Action. The EA analyzed the potential impact the No Action and Proposed Action would have on the natural, cultural, and human environments. Because the Master Plan is conceptual, any action proposed in the Plan that would result in significant disturbance to natural resources or result in significant public interest would require additional NEPA documentation at the time the action takes place.

TABLE OF CONTENTS

1	INTRODUCTION.....	2-1
1.1	GENERAL OVERVIEW.....	2-1
1.2	PROJECT AUTHORIZATION.....	2-1
1.3	PROJECT PURPOSE.....	2-2
1.4	PURPOSE AND SCOPE OF MASTER PLAN.....	2-2
1.5	BRIEF WATERSHED AND PROJECT DESCRIPTION.....	2-3
1.6	DESCRIPTION OF RESERVOIR.....	2-6
1.7	PROJECT ACCESS.....	2-7
1.8	PRIOR DESIGN MEMORANDA.....	2-8
1.9	PERTINENT PROJECT INFORMATION.....	2-9
2	PROJECT SETTING AND FACTORS INFLUENCING MANAGEMENT AND DEVELOPMENT.....	2-12
2.1	PHYSIOGRAPHIC REGION.....	2-12
2.1.1	Ecological Setting.....	2-12
2.1.2	Climate.....	2-13
2.1.3	Geology.....	2-16
2.1.4	Topography.....	2-17
2.1.5	Hydrology and Groundwater.....	2-18
2.1.6	Soils.....	2-18
2.2	ECOREGION AND NATURAL RESOURCE ANALYSIS.....	2-21
2.2.1	Vegetative Resources.....	2-21
2.2.2	Wetlands.....	2-23
2.2.3	Fish and Wildlife Resources.....	2-26
2.2.4	Threatened and Endangered Species.....	2-28
2.2.5	Invasive Species.....	2-29
2.2.6	Visual and Scenic Resources.....	2-29
2.2.7	Sedimentation.....	2-30
2.2.8	Water Quality.....	2-33
2.2.9	Sustainability.....	2-33
2.3	CULTURAL RESOURCES.....	2-34
2.3.1	Historical Resources in Kansas.....	2-41
2.3.2	Long-term Cultural Resources Objectives.....	2-44

2.4	DEMOGRAPHIC AND ECONOMIC RESOURCES	2-45
2.4.1	Zone of Interest	2-45
2.4.2	Population.....	2-45
2.4.3	Population by Gender and Age.....	2-46
2.4.4	Education and Employment.....	2-48
2.4.5	Households, Income, Poverty.....	2-52
2.5	RECREATION FACILITIES, ACTIVITIES, NEEDS AND TRENDS.....	2-55
2.5.1	Zone of Interest	2-56
2.5.2	Visitation	2-56
2.5.3	Recreation Areas and Facilities	2-60
2.5.4	Commercial Concession Leases	2-64
2.5.5	Recreation Analysis – Trends.....	2-64
2.5.6	Recreation Analysis – Needs.....	2-65
2.5.7	Summary Discussion – Needs and Trends.....	2-68
2.5.8	Recreation Carrying Capacity.....	2-68
2.6	REAL ESTATE.....	2-68
2.6.1	Encroachments and Trespass	2-69
2.6.2	Outgrants.....	2-70
3	RESOURCE GOALS AND OBJECTIVES	3-78
3.1	INTRODUCTION.....	3-78
3.2	RESOURCE GOALS	3-78
3.3	RESOURCE OBJECTIVES.....	3-79
4	LAND ALLOCATION, LAND CLASSIFICATION, WATER SURFACE, AND PROJECT EASEMENT LANDS	4-84
4.1	LAND ALLOCATION.....	4-84
4.2	LAND CLASSIFICATION	4-84
4.2.1	General.....	4-84
4.2.2	Prior Land Classifications	4-84
4.2.3	Current Land Classifications.....	4-84
4.2.4	Project Operations	4-85
4.2.5	High Density Recreation (HDR).....	4-85
4.2.6	Mitigation	4-86
4.2.7	Environmentally Sensitive Areas	4-86

4.2.8	Multiple Resource Management Lands (MRML)	4-86
4.2.9	Water Surface.....	4-87
4.3	PROJECT EASEMENT LANDS.....	4-89
5	RESOURCE PLAN.....	5-90
5.1	RESOURCE PLAN OVERVIEW	5-90
5.2	PROJECT OPERATIONS.....	5-90
5.3	HIGH DENSITY RECREATION	5-91
5.3.1	El Dorado State Park Lease	5-91
5.3.2	Trails.....	5-93
5.4	ENVIRONMENTALLY SENSITIVE AREAS	5-95
5.5	MULTIPLE RESOURCE MANAGEMENT LANDS.....	5-96
5.5.1	MRML - Low Density Recreation	5-96
5.5.2	MRML - Wildlife Management	5-96
5.5.3	MRML-Vegetative Management.....	5-98
5.5.4	Future or Inactive Recreation Areas	5-98
5.6	WATER SURFACE	5-98
5.6.1	Restricted	5-99
5.6.2	Designated No-Wake	5-99
5.6.3	Fish and Wildlife Sanctuary	5-99
5.6.4	Open Recreation	5-99
5.7	RECREATIONAL SEAPLANE OPERATIONS.....	5-100
6	SPECIAL TOPICS/ISSUES/CONSIDERATIONS.....	6-102
6.1	SEDIMENTATION.....	6-102
6.2	WATERSHED RESTORATION AND PROTECTION STRATEGY	6-102
6.3	POOL ELEVATION.....	6-103
6.4	MOTORIZED VEHICLES.....	6-104
6.5	BLUE GREEN ALGAE AND HARMFUL ALGAL BLOOMS.....	6-104
7	PUBLIC AND AGENCY COORDINATION.....	7-106
7.1	PUBLIC AND AGENCY COORDINATION.....	7-106
7.2	INITIAL STAKEHOLDER INPUT AND PUBLIC MEETINGS.....	7-106
7.3	PUBLIC AND AGENCY REVIEW OF DRAFT MP, EA AND FONSI	7-113
8	SUMMARY OF RECOMMENDATIONS.....	8-114
8.1	SUMMARY OVERVIEW	8-114

8.2	LAND RECLASSIFICATION PROPOSAL	8-114
9	BIBLIOGRAPHY	9-118

LIST OF APPENDICES

APPENDIX A - LAND CLASSIFICATION, MANAGING AGENCIES, AND RECREATION MAPS.....	A-1
APPENDIX B - NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) DOCUMENTATION.....	B-1
APPENDIX C - WILDLIFE HABITAT APPRAISAL PROCEDURE (WHAP) REPORT	C-1
APPENDIX D - FEDERAL AND STATE THREATENED AND ENDANGERED SPECIES LISTS.....	D-1
APPENDIX E - EL DORADO RESERVOIR – 9 ELEMENT WATERSHED PLAN SUMMARY	E-1
APPENDIX F - SEAPLANE MAP.....	F-1
APPENDIX G - ACRONYMS.....	G-1

LIST OF FIGURES

Figure 1-1 El Dorado Lake Vicinity Map (Source: ESRI data)	2-4
Figure 2-1 Ecoregions of El Dorado Lake (Source: Data from EPA).....	2-13
Figure 2-2 El Dorado Lake Topography (Source: ESRI)	2-17
Figure 2-3 General Soils Map, Butler County, KS (Source: NRCS)	2-20
Figure 2-4 USFWS Wetland Inventory for El Dorado Lake - North (Source: USFWS) ...	2-24
Figure 2-5 USFWS Wetland Inventory for El Dorado Lake - South (Source: USFWS) ..	2-25
Figure 2-6 Depth map from 2010 KBS bathymetric survey. Depths based on pool elevation 1,340.34 ft AMSL NGVD29	2-31
Figure 2-7 Difference map between 2010 KBS bathymetric survey and 2004 Oklahoma Water Resources Board bathymetric survey.	2-32
Figure 2-9 Percent of Population by Age Group, 2018 (U.S. Bureau of the Census, American Community Survey, 5 Year Estimate)	2-47
Figure 2-10 Percent Employment by Sector for Area of Interest (2018).....	2-50
Figure 2-11 Change in Visitation at State Parks 2008 - 2012 (Source Kansas SCORP)	2-58
Figure 2-12 Visitation differences impacted by temperature and drought (Source: Kansas SCORP)	2-59
Figure 2-13 USACE Tulsa District Managed Lakes – Kansas 2009-2012 (Source: Kansas SCORP)	2-59
Figure 2-14 Most Popular Individual Outdoor Activities 2009-2012 – KS Public Supplier’s Survey (Source: State of Kansas SCORP).....	2-65
Figure 2-15 Recreational Areas and Facilities Most Needed: State and Federal Parks (Source: 2015 Kansas SCORP).....	2-67
Figure 5-1 El Dorado State Park map, Walnut River Area, Shady Creek Area (Source: KDWPT).....	5-92
Figure 5-2 El Dorado State Park map, Boulder Bluff Area, Bluestem Point Area (Source: KDWPT).....	5-93

LIST OF TABLES

Table 1-1 El Dorado Lake Construction Activities	2-5
Table 1-2 El Dorado Lake Pertinent Data.....	2-9
Table 1-3 Acreage by Land Classification	2-10
Table 2-1 Climate Characteristics for El Dorado Lake (Source: El Dorado Water Control Manual)	2-14
Table 2-2 Average Monthly and Annual Rainfall and Runoff Data (Source: El Dorado Water Control Manual)	2-15
Table 2-3 Evaporation Data for El Dorado Lake 1980-1998 (Source: El Dorado Water Control Manual).....	2-16
Table 2-4 Soil Classes	2-18
Table 2-5 Vegetation Classification and Condition 2018 Inventory	2-21
Table 2-6 Wetland Classification 2019 Inventory	2-26
Table 2-7 Federal Threatened and Endangered Species for El Dorado Lake Area ...	2-29
Table 2-8 Invasive Species Found at El Dorado Reservoir	2-29
Table 2-10 2000 and 2018 Population Estimates and 2070 Projections	2-45
Table 2-11 2018 Population by Gender.....	2-46
Table 2-12 2018 Population by Race and Hispanic Origin	2-48
Table 2-13 2018 Population Estimate by Highest Level of Educational Attainment, Population 25 Years of Age and Older	2-49
Table 2-14 Employment by Sector (2018).....	2-50
Table 2-15 Civilian Labor Force, Employment and Unemployment (2018)	2-52
Table 2-16 Number of Households and Average Household Size (2018).....	2-52
Table 2-17 Median and Per Capita Income (2018)	2-53
Table 2-18 Percentage of Families and People Whose Income in the Past 12 Months is Below the Poverty Level (2018)	2-54
Table 2-19 Kansas State Park Reservation Profile	2-57
Table 2-20 Recreational Facilities and Operating Agencies	2-61
Table 3-1 Recreational Objectives	3-80
Table 3-2 Natural Resource Management Objectives.....	3-81
Table 3-3 Visitor Information, Education, and Outreach Objectives	3-82
Table 3-4 General Management Objectives.....	3-83
Table 3-5 Cultural Resources Management Objectives	3-83

Table 4-1 Acreage by Land Use and Water Classification	4-88
Table 7-1 Public Comments from May 11, 2020 through June 26, 2020.....	7-107
Table 8-1 Change in Land Classification.....	8-115
Table 8-2 Changes and Justifications for New Land Classifications (1).....	8-116

LIST OF PHOTOS

Photo 1-1 El Dorado Dam and In-take Structure (Source: KDWPT)	2-6
Photo 2-1 Shoreline at El Dorado Lake (Source: KDPWT)	2-23
Photo 2-2 Fisherman at El Dorado Lake (Source: KDWPT).....	2-27
Photo 2-3 White tail deer at El Dorado Lake (Source: KDWPT).....	2-28
Photo 2-4 Fishermen at Sunset - El Dorado Lake (Source: KDWPT)	2-30
Photo 2-5 El Dorado Lake (Source: MobileRVing.com)	2-55
Photo 2-6 Cabin at El Dorado State Park (Source: KDWPT)	2-56
Photo 2-7 El Dorado Trail Riders (Source: KDWPT).....	2-60
Photo 2-8 Family recreating at El Dorado Lake (Source: KDWPT).....	2-66
Photo 5-1 Walnut Ridge Trail (Source: Pinterest)	5-95
Photo 5-2 Turkeys at El Dorado Lake (Source: KDWPT).....	5-98

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1 INTRODUCTION

1.1 GENERAL OVERVIEW

El Dorado Lake is a multipurpose water resources project constructed and operated by the US Army Corps of Engineers (USACE), Tulsa District. The lake and associated federal lands are in Butler County, Kansas (KS). El Dorado Dam is situated at river mile 114.7 on the Walnut River, a tributary of the Arkansas River. The dam is located approximately two miles northeast of the town of El Dorado, KS and 36 miles northeast of Wichita, KS. The USACE is the operating and regulatory agency for El Dorado Lake.

El Dorado Lake is an integral unit of the multi-purpose plan of the Walnut River and Upper Arkansas flood control system. Projects on the Arkansas system above Keystone Lake, Oklahoma are Cheney, Kaw, and Great Salt Plains Lakes (all in operation). Construction on the lake and dam began in October 1973 and final water storage began in June 1981. The conservation pool was filled in February 1985.

During construction of the lake, two smaller existing lakes, Bluestem Lake and (Old) El Dorado Lake, were incorporated into the present lake. (Old) El Dorado Lake was completely inundated by the new, larger lake, but the dam of Bluestem Lake was breached, and the remnants of that dam can still be seen on the Shady Creek arm of the lake.

The five public areas developed are: (1) Walnut River Park, (2) Boulder Bluff, (3) Shady Creek Park, (4) Bluestem Point, and (5) Bemis Creek. A sixth area, Lost Lake Park, was originally kept for future development and was later absorbed into the wildlife management area. All recreation facilities are administered by the Kansas State Parks through the Kansas Department of Wildlife, Parks and Tourism. The El Dorado Wildlife Area consists of approximately 4,000 acres of public hunting lands.

This Master Plan is intended to serve as a comprehensive land and recreation management guide with an effective life of approximately 25 years. The focus of the Plan is to guide the stewardship of natural and cultural resources and make provision for outdoor recreation facilities and opportunities on federal land and water surface associated with El Dorado Lake. The Plan does not address the flood risk management, or water supply purposes of El Dorado Lake (these missions are described in the USACE Water Control Manual for El Dorado Lake which is not included in this Master Plan). The previous El Dorado Lake Master Plan was written in 1976 with subsequent supplements, which is well past the intended planning horizon.

1.2 PROJECT AUTHORIZATION

El Dorado Lake was originally authorized by Resolution, Committee on Public Works, House of Representatives dated 16 October 1951 and then by the Flood Control Act of 27 October 1965, Section 204 (Public Law 89-298, 89th Congress, 1st Session) substantially in accordance with the recommendations by the Chief of Engineers in House Document No. 232, 89th Congress, 1st Session.

Recreation facilities were authorized by the Flood Control Act of 22 December 1944, Section 4. El Dorado Lake was authorized for flood risk management, water supply, water quality, fish and wildlife, and recreation.

1.3 PROJECT PURPOSE

El Dorado Lake is a multi-purpose water resource project constructed and operated by USACE. This project is operated in conjunction with Cheney, Kaw, and Great Salt Plains lakes to the upper limits of Keystone Lake in Oklahoma. El Dorado Lake has the following primary purposes:

- Flood Risk Management
- Water Quality
- Water Supply
- Fish and Wildlife
- Recreation

Environmental stewardship, though not listed as a primary project purpose, is a major responsibility and inherent mission in the administration of federally owned lands. Other laws, including but not limited to Public Law 91-190, National Environmental Policy Act of 1969 (NEPA) and Public Law 86-717, Forest Cover Act, place emphasis on the environmental stewardship of Federal lands and USACE-administered Federal lands, respectively.

1.4 PURPOSE AND SCOPE OF MASTER PLAN

In accordance with Engineer Regulation (ER) 1130-2-550 Change 07, dated 30 January 2013 and Engineer Pamphlet (EP) 1130-2-550 Change 05, dated 30 January 2013, master plans are required for most USACE water resources development projects having a federally owned land base. This revision of the El Dorado Lake Master Plan is intended to bring the Master Plan up to date to reflect current ecological, socio-demographic, and outdoor recreation trends that are impacting the lake, as well as those anticipated to occur within the planning period of 2021 to 2046 (i.e., 25 years).

The El Dorado Lake Master Plan is the strategic land use management document that guides the efficient, cost-effective, comprehensive management, development, and use of recreation, natural resources, and cultural resources throughout the life of the El Dorado Lake project. It is a vital tool for responsible stewardship and sustainability of the project's natural and cultural resources. The Plan makes provision for outdoor recreation facilities and opportunities on federal land associated with El Dorado Lake for the benefit of present and future generations. The Plan guides and articulates USACE responsibilities pursuant to federal laws to preserve, conserve, restore, maintain, manage, and develop the land, water, and associated resources. It is a dynamic and flexible tool designed to address changing conditions. The Plan focuses on carefully crafted resource-specific goals and objectives. It ensures that equal attention is given to the economy, quality, and needs in the management of El Dorado Lake resources and facilities, and that goals and objectives are implemented at an appropriate scale.

The master planning process encompasses a series of interrelated and overlapping tasks involving the examination and analysis of past, present, and future environmental, recreational and socioeconomic conditions and trends. With a generalized conceptual framework, the process focuses on four primary components, as follows:

- Regional and ecosystem needs
- Project resource capabilities and suitability
- Expressed public interests that are compatible with El Dorado Lake's authorized purposes
- Environmental sustainability elements

It is important to note what the Master Plan does not address. As noted in Section 1.1, the Plan does not address the flood risk management or water supply purposes of El Dorado Lake. Also not addressed in this plan are details of design, management and administration, and implementation, but they are addressed in the El Dorado Lake Operational Management Plan (OMP). In addition, the Master Plan does not address the specifics of regional water quality, shoreline management (a term used by USACE to describe management of activities undertaken by adjacent private landowners), or water level management. The operation and maintenance of primary project operations facilities, including but not limited to the dam, spillway, and gate-controlled outlet, are not included in this Plan.

The 1976 Master Plan, with subsequent supplements, was sufficient for prior land use planning and management. Changes in outdoor recreation trends, regional land use, population, current legislative requirements, and USACE management policy have occurred over the past decades. Additionally, increasing fragmentation of wildlife habitat, national policies related to land management, and growing demand for recreational access and protection of natural resources are all factors affecting El Dorado Lake and the region in general. In response to these continually evolving trends, USACE determined that a full revision of the El Dorado Lake Master Plan is required as set forth in this Plan.

1.5 BRIEF WATERSHED AND PROJECT DESCRIPTION

El Dorado dam site is located on the Walnut River, at river mile 100.2 in Butler County, Kansas northeast of the City of El Dorado. The Walnut River flows southwest through the northern two-thirds of Butler County, Kansas, then southward through Cowley County to its confluence with the Arkansas River at river mile 696. The Walnut River Basin drains 1,955 square miles in southeastern Kansas, of which 234 square miles are above the El Dorado dam. The watershed above the dam is roughly rectangular in shape. Its maximum length and width are 20 miles and 15 miles, respectively. The watershed streambed elevation is 1,271.5 feet NGVD and ranges upward to an elevation 1,500 feet NGVD. Tributaries above the dam site are Cole, Durechen, Satchel, and Bemis Creeks, with Bemis Creek being the larger.

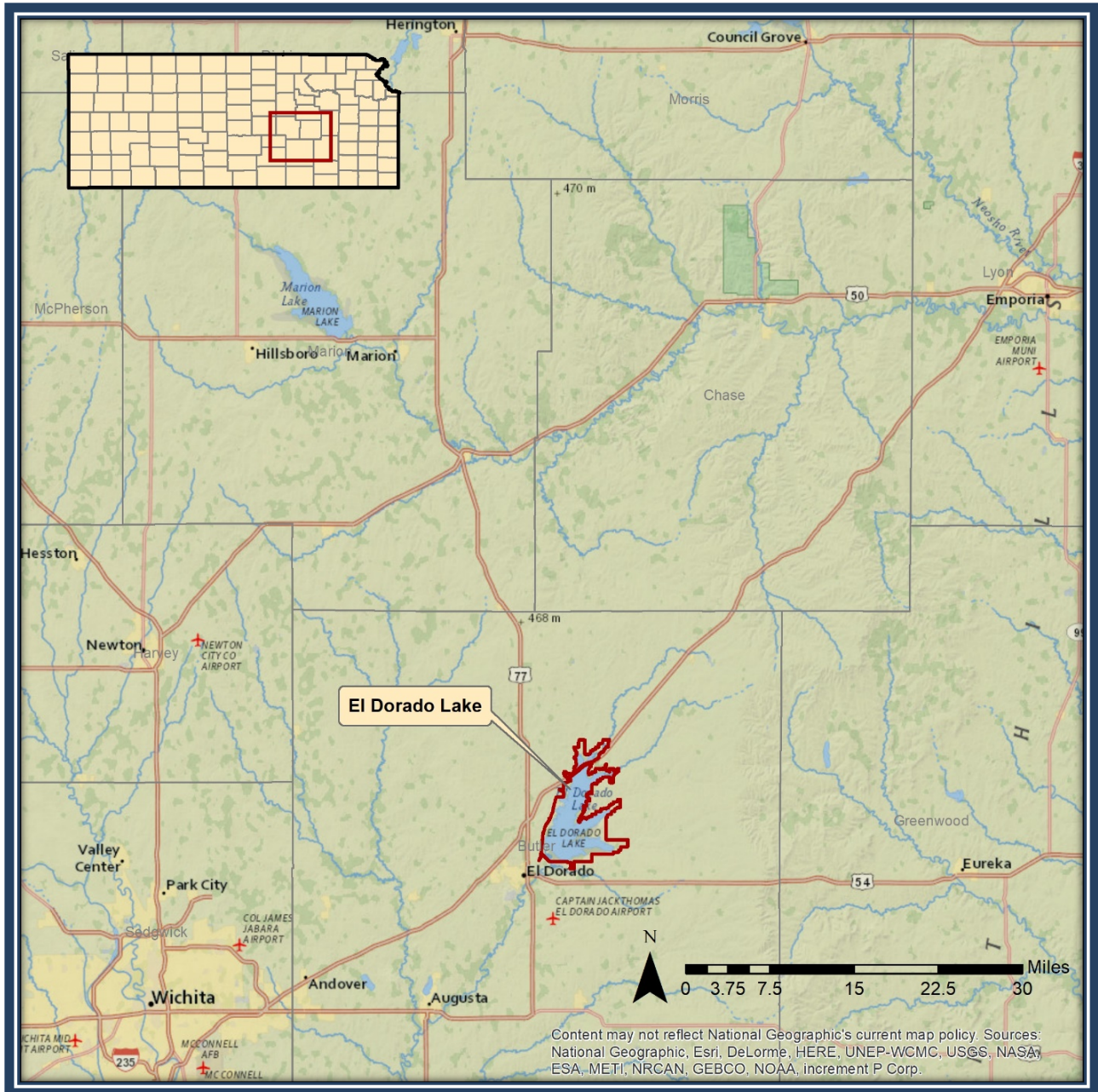


Figure 1-1 El Dorado Lake Vicinity Map (Source: ESRI data)

The structure of the dam consists of a rolled random and impervious earth-filled embankment including the spillway, and consists of three sections: main embankment, right abutment dike section, and the left abutment dike section.

The overall length of the embankment is 20,850 feet. The main embankment is 10,100 feet and has a maximum height above the streambed of 99 feet. The top of the dam is at 1,370.5 feet NGVD with a crest width of 32 feet to provide for two 12 foot wide traffic lanes plus four-foot shoulders. This portion contains an impervious earth core, and the upstream slope has 12-inch riprap on six-inch bedding material from crest to elevation

1,355.0 feet NGVD and 24-inch riprap on nine-inch bedding from elevation 1,355.0 to 1,324.0 feet NGVD. The downstream slope is grass covered.

The right abutment dike is 3,450 feet long and the left abutment is 7,300 feet long, including the spillway. The portion of the dikes upstream of the dam axis consists of impervious material and the downstream portion is random fill. The downstream sides are grass covered.

The 350 feet wide high-level emergency spillway is uncontrolled and is excavated through the left abutment about two miles east of the river channel. The crest is at elevation 1,353.0 feet NGVD and is protected by a concrete sill. The approach channel has a slope of one-half percent with an exit channel slope of 1.5% until discharge. The exit channel has a slope of 1.5% and discharges into Bird Creek, a tributary of the Walnut River.

The outlet works consist of reinforced concrete conduit located in the main embankment to the left of the Walnut River. The conduit discharges into a concrete stilling basin connected to the river channel by a riprap-lined channel 1,000 feet long. The intake structure is hydraulically operated service and wheel gates working in tandem with two passages. The intake structure contains dual wet wells. The outflow from the wet well for low-flow release is gated conduit in the splitter pier.

Table 1-1 El Dorado Lake Construction Activities

Activity	Date
Construction Began	October 1973
Date of Diversion	October 1979
Final Water Storage Began	29 June 1981
Conservation Pool Filled	26 February 1985

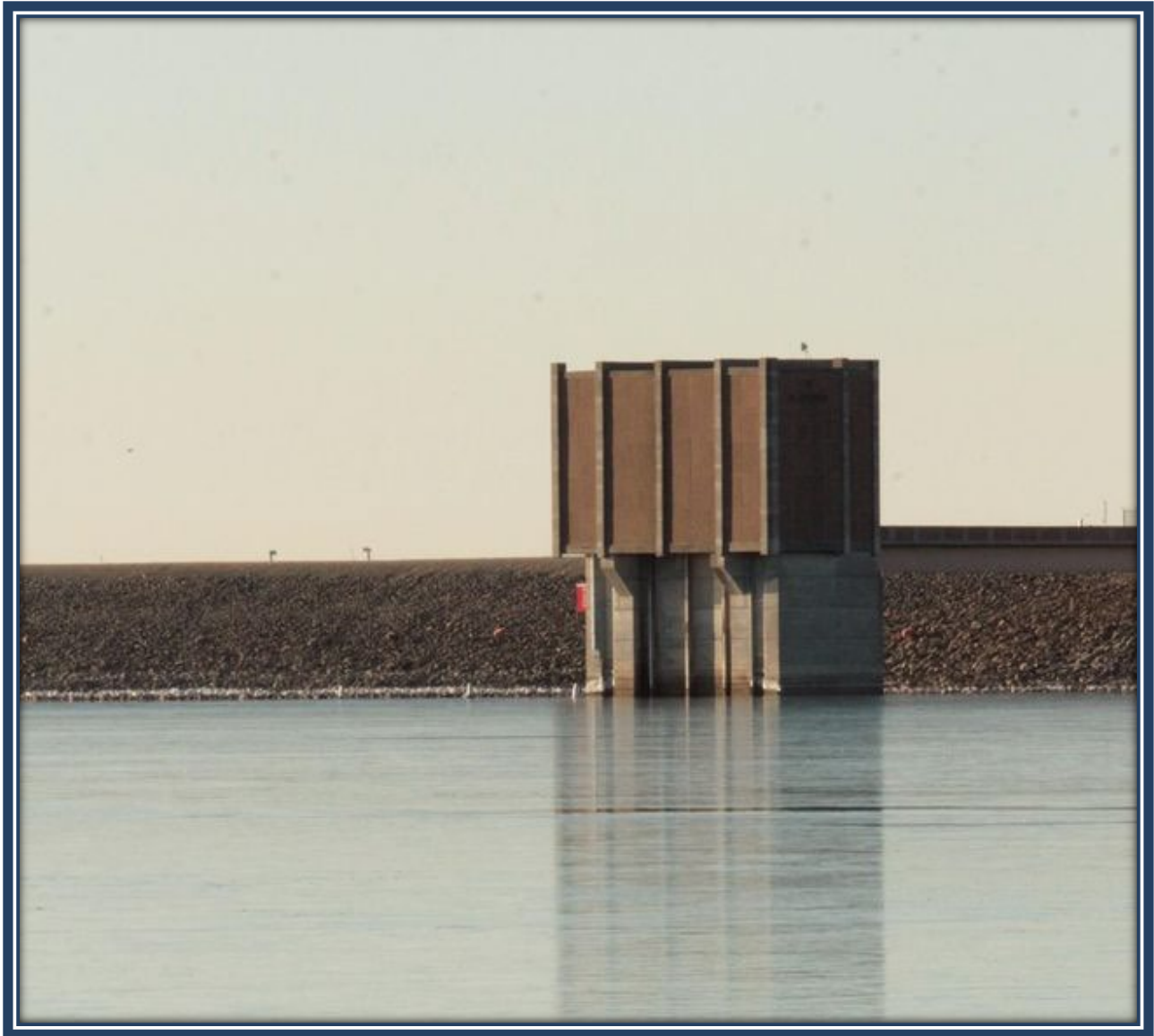


Photo 1-1 El Dorado Dam and In-take Structure (Source: KDWPT)

1.6 DESCRIPTION OF RESERVOIR

El Dorado Lake has a conservation pool covering 8,186 acres (elevation 1,339.0 feet NGVD) and inundates a total of 11,451 acres at flood control pool elevation 1,347.5 feet NGVD (Table 1-2) as calculated using GIS technology. The lake has approximately 112 miles of shoreline at the top of the conservation pool. The general character of the shoreline ranges from gently rolling to a maximum of 20% slopes with escarpments scattered along the western shore. The major portion of the shoreline has gentle rolling topography. Much of the shoreline offers excellent opportunities for protection from winds with coves dotting either side of the lake.

The flood control pool ranges between elevation 1,339.0 – 1,347.5 feet NGVD and covers between 8,186 and 11,451 water surface acres. The conservation storage totals

158,189 acre-feet. The flood risk management storage totals 82,471 acre-feet. The inactive storage pool totals 3,361 acre-feet at elevation 1,296.0 feet NGVD (Table 1-2). Streambed elevation is 1,271.5 feet NGVD.

1.7 PROJECT ACCESS

Primary roads furnishing access to the area in which the project is located are US Highway 54, US Highway 77, State Highway 177, and Interstate Highway 35. US Highway 54 is an east-west road located south of the lake and runs through El Dorado, Kansas. US Highway 77 is a north-south road located east of the lake. The Kansas Turnpike (I-35), a northeast-southwest road located north and west of the lake has a turnpike exit within 1 mile of the access road to the dam, it also runs just to the west of the City of El Dorado, Kansas. El Dorado Lake is easily accessible via several smaller roads maintained by the state or county, as well as the Kansas Department of Wildlife, Parks, and Tourism and USACE. At this time, no major new roads are planned for this area.

When the public-use areas are bordered by a wildlife management area they are separated with a fence. The railroad right-of-way adjacent to the Boulder Bluff Area is fenced for security, control, and safety purposes. Pedestrian access is permitted to all parts of the public-use areas which are not designated for project operations or maintenance.

Accessible ramps are provided to all shower facilities, toilets (waterborne and non-waterborne), washhouses, the administration building, the swimming beach in Walnut River Area, and at the overlook point.

There are approximately 1,000 campsites and 10 cabins in the 5 Park Areas which make up El Dorado State Park – Boulder Bluff, Bluestem Point, Shady Creek, Bemis Creek, and the Walnut River Area. All these parks are administered by the Kansas Department of Wildlife, Parks and Tourism.

Seven boat ramps with 12 total lanes are found in the Kansas State Park Areas surrounding the lake. El Dorado Lake has two developed swim beaches buoyed off for swimming areas. No boats are allowed in the swimming areas.

El Dorado Lake has approximately 30 miles of developed trail among seven separate trails including the 17-mile Boulder Bluff Horse Trail. Other trails are the 0.75-mile Teter Nature Trail, the 0.75-mile Walnut Ridge Trail, the 0.75-mile Shady Creek Nature Trail, the 2.0-mile Bike Trail, the 2.0-mile Walnut River Trail, and the Linear Trail which connects the lake to the city of El Dorado.

Nationwide, USACE manages private shoreline use of public property to provide maximum benefits to the public. There are no existing private facilities on El Dorado Lake. No future private facilities will be permitted in accordance with ER 1130-2-406, dated 13 December 1990.

1.8 PRIOR DESIGN MEMORANDA

Design Memorandum (DM) and planning reports approve and set forth design and development plans 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. Although the DM records system was discontinued by USACE in 1999, previously published DMs remain relevant. The El Dorado Lake, Walnut River, Kansas, Design Memorandum No 26, Master Plan, dated April 1976, presents a program for development and management of the El Dorado Lake for recreation and other land and water uses. The following are DMs for El Dorado Lake:

- Design Memorandum No. 1, Hydrology, dated February 1957
- Design Memorandum No. 2, Economics, dated March 1957
- Design Memorandum No. 3, General Design, dated March 1959. Supplement #1 dated March 1960
- Design Memorandum No 4, Geology, Soils & Structural Foundations, dated April 1959
- Supplement #1 dated March 1960
- Design Memorandum No. 6-1 Preliminary Master Plan, dated July 1959
- Design Memorandum No. 6b, Master Plan, dated June 1977
- Design Memorandum No. 7, Construction of Project Buildings & Access Road, dated January 1960
- Design Memorandum No. 8, Relocation of Sinclair Pipeline Company 8-Inch Products Line, dated July 1960
- Design Memorandum No. 9 & 10, Outlet Works & Embankment, dated December 1962
- Design Memorandum No. 11, Relocation of Atchison, Topeka & Santa Fe Railway Company Facilities, dated June 1962
- Design Memorandum No. 13, Rim Dike & Saddle Spillway, dated January 1963
- Design Memorandum No. 14, Relocation of Service Pipeline Company Facilities, dated June 1962
- Design Memorandum No. 16, Relocation of U.S. Highway 160, dated September 1962
- Design Memorandum No. 17, Relocation of Montgomery & Chautauqua County Roads, dated May 1963
- Design Memorandum No. 18, Relocation of Southwestern Bell Telephone Company Facilities, dated March 1963
- Design memorandum No. 19, Relocation of Kansas Gas & Electric Company Facilities, dated April 1963
- Design Memorandum No. 20, Relocation of Totah Telephone Company Facilities, dated September 1963

- Design memorandum No. 21, Protection for El Dorado, dated April 1963
- Design Memorandum No. 22, Relocation of Radiant Electric Cooperative Inc. Facilities, dated April 1963
- Design Memorandum No. TBD, Reservoir Clearing, dated July 1964
- Design Memorandum No. 27, Sedimentation & Degradation, dated May 1964
- Design Memorandum No. 28, Relocation of Caney Valley Electric COOP, INC Facilities, dated November 1964
- Design Memorandum No. 29, Relocation of Cities Service Gas Company Facilities, dated September 1965

1.9 PERTINENT PROJECT INFORMATION

Pertinent information regarding operational pool elevations and existing reservoir storage capacity at El Dorado Lake is provided in Table 1-2. The table is based on a 2011 sedimentation survey.

Table 1-2 El Dorado Lake Pertinent Data

Feature	Elevation (feet NGVD)	Area (acres)	Capacity (Acre-feet)	Equivalent Runoff (inches) (1)
Top of Dam	1370.5	-	-	-
Spillway Crest	1353.0	13,650	303,540	24.32
Top of Flood Control Pool	1347.5	11,451	240,660	19.28
Flood Control Storage	1339.0 - 1347.5	-	82,471	6.60
Initial	-	-	79,200	6.35
After 100-Year Sediment	-	-	75,200	6.03
Top of Conservation Pool	1339.0	8,186	161,550	12.94
Conservation Storage	1296.0 - 1339.0	-	158,189	12.67
Initial (2)	-	-	154,100	12.35
After 100-Year Sediment	-	-	142,800	11.44

Feature	Elevation (feet NGVD)	Area (acres)	Capacity (Acre-feet)	Equivalent Runoff (inches) (1)
Top of Inactive Pool	1296.0	599	3,361	0.27

(1) From a 234-square-mile drainage area.

(2) Provides a storage yield of 22.2 mgd (142,800 acre-feet after sedimentation) for water supply, including joint use of 5.2 mgd for interim water quality control

Current acreages for the various land classifications at El Dorado Lake are shown in Table 1-3. These land classifications are standard throughout USACE and are set forth in EP 1130-2-550 dated 15 November 1996, as amended. Acreages have been revised and updated from the previous 1976 Master Plan, as amended in 1986, to reflect current and projected land use and resource management objectives. These acreages were calculated using Geographic Information Systems (GIS).

Table 1-3 Acreage by Land Classification

Classification	Acres
Project Operations	422
High Density Recreation	3,722
Environmental Sensitive Areas	138
Multiple Resource Managed Lands:	
Low Density Recreation	31
Wildlife Management	4,098
Vegetative Management	0
Future/Inactive Recreation Areas	0
Water Surface:	
Restricted	6
Designated No-wake	117
Fish and Wildlife Sanctuary	0
Open Recreation	7,834
Total Acreage in Fee	16,368

Note: Acreages are approximate and are based on GIS data. Totals vary depending on changes in lake levels, sedimentation, and shoreline erosion.

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2 PROJECT SETTING AND FACTORS INFLUENCING MANAGEMENT AND DEVELOPMENT

2.1 PHYSIOGRAPHIC REGION

2.1.1 Ecological Setting

Ecoregions denote areas of general similarity in ecosystems and in the type, quantity, and quality of environmental resources. The Environmental Protection Agency (EPA) has developed a series of maps that categorizes these regions across the United States. Levels I and II divide the North American continent into 15 and 52 regions, respectively, while Level III ecoregions represent a subdivision of those into 104 unique regions and Level IV a finer sub-classification of those.

El Dorado Lake lies in the central section of the Flint Hills ecoregion (Level IV). The Flint Hills area is characterized by tall grasslands and is the smallest grassland ecoregion in North America. It covers the Flint Hills of Kansas and the Osage Plains of northeastern Oklahoma. It can be distinguished from other grasslands to the north by its low diversity of flora and fauna, and its thin soil layer spread over distinct beds of limestone. Abundant residual flint is eroding out of the bedrock in the rocky uplands. The Tallgrass Prairie National Preserve operated by the National Park Service (NPS) is located in the Flint Hills Ecoregion approximately 50 miles northeast of El Dorado Lake.

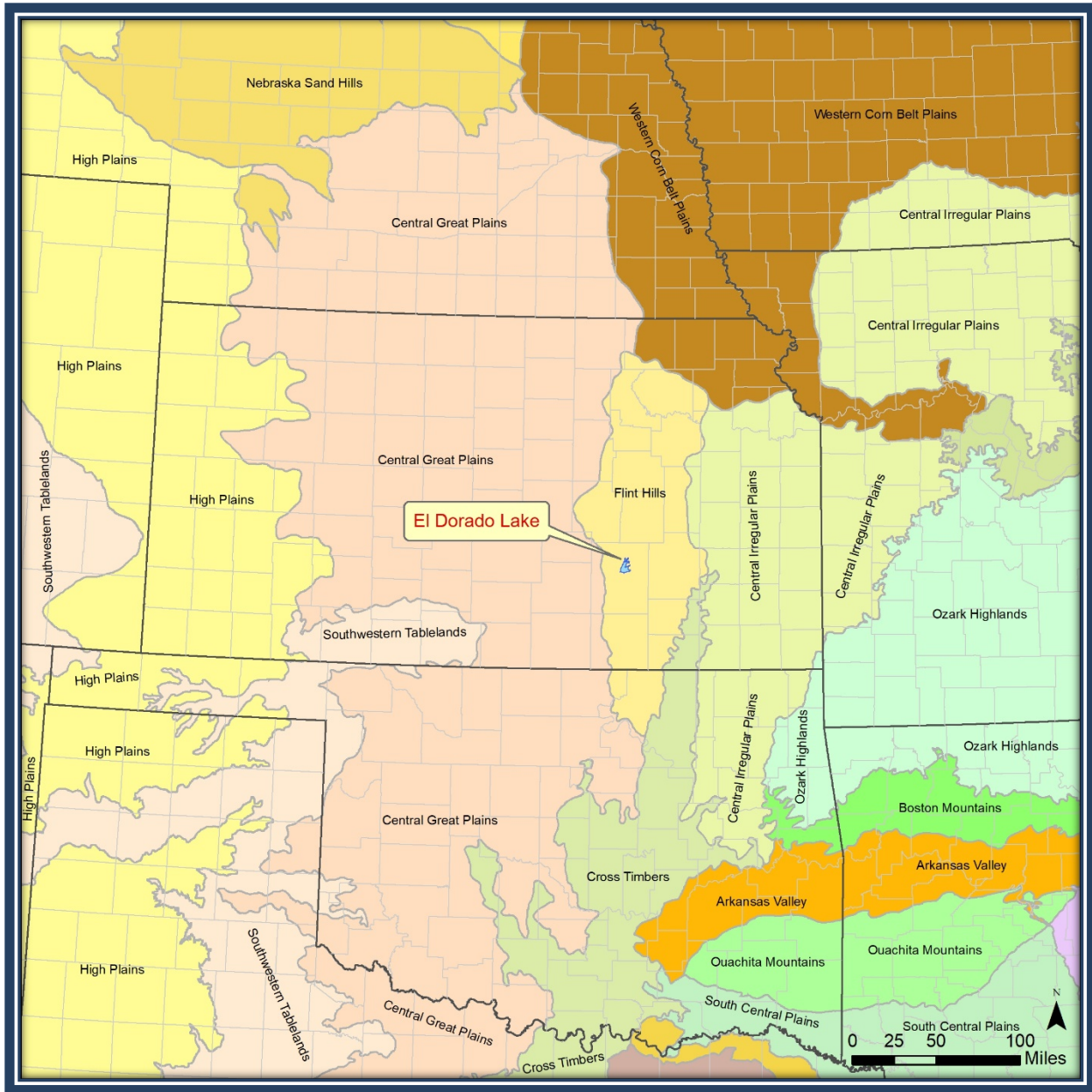


Figure 2-1 Ecoregions of El Dorado Lake (Source: Data from EPA)

2.1.2 Climate

The climate in the region of El Dorado Lake is characterized by moderate winters and comparatively long summers with relatively high temperatures. Summer rains generally occur as thunderstorms with very intense rainfall of short duration and limited coverage. The winter rains are generally of low intensity but cover a large area and are of considerably longer duration. The Gulf of Mexico is the source of much of the precipitation that falls on the basin.

Table 2-1 Climate Characteristics for El Dorado Lake (Source: El Dorado Water Control Manual)

Temperature	
Mean annual	56.6°F
Maximum (Winfield, KS 1936-08-12)	118° F (Year)
Minimum (El Dorado, KS 1905-02-13)	-28° F (Year)
Precipitation	
Mean Annual (Period of record 1954-1991, 1993 – 1998))	29.3 inches
Maximum Annual (record)	42.0 inches (1973)
Minimum Annual (record)	12.2 inches (1966)
Percent during growing season (April through September)	69.4%
Range of Annual Snowfall	0 – 19.7 inches
Mean Snowfall	15.7 inches

Table 2-2 Average Monthly and Annual Rainfall and Runoff Data (Source: El Dorado Water Control Manual)

Month	Average ⁽¹⁾ rainfall (inches)	Percent average annual rainfall	Average runoff ^{(2) (3)} El Dorado Dam Site		Percent of average annual runoff
			(acre-feet)	(inches)	
January	0.84	2.67	2,710	0.22	3.34
February	1.01	3.21	3,630	0.29	4.48
March	1.97	6.27	7,820	0.63	9.65
April	2.79	8.88	11,140	0.89	13.74
May	4.24	13.49	12,760	1.02	15.74
June	4.79	15.24	14,080	1.13	17.37
July	3.65	11.61	7,470	0.60	9.22
August	3.23	10.28	3,750	0.30	4.63
September	3.52	11.20	4,440	0.36	5.48
October	2.55	8.11	5,460	0.44	6.74
November	1.71	5.44	4,680	0.38	5.77
December	1.13	3.60	3,120	0.24	3.84
Total	31.43	100.00	81,060	6.50	100.00

(1) Period of Record 1930 - 1998

(2) Period of Record 1922 - 1998

(3) Drainage Area above El Dorado Dam = 234 square miles

Following the construction of the El Dorado project, evaporation data was collected from an evaporation pan on site. In 1996, the Tulsa District migrated from using an evaporation pan to using an empirical formula, which is based on meteorology data collected on site. The formula incorporates electronically collected data for solar radiation, wind speed, air temperature and relative humidity.

Table 2-3 Evaporation Data for El Dorado Lake 1980-1998 (Source: El Dorado Water Control Manual)

Month	Normal ^{(1) (2)} Evaporation (inches)
January	1.43
February	1.62
March	3.30
April	5.01
May	7.14
June	7.76
July	9.34
August	8.28
September	6.47
October	4.48
November	2.54
December	1.70
Annual	59.07

2.1.3 Geology

The El Dorado Lake area contains Barneston limestone formation and consists of the Fort Riley limestone and the Florence limestone members in descending order. The bedrock of the flood plain is Florence limestone and the Fort Riley limestone is the bedrock of the abutments. The Barneston formation dips to the northwest at 20 feet per mile, and the formation is thickest on the right side of the river. The right abutment is approximately 100' thick, and the left abutment is approximately 70' thick. Below the Barneston formation, core holes penetrated Blue Springs shale, Kinney limestone, and Wymore shale members of the Matfield formation. The overburden is predominantly moderately plastic clay. Most of these fountain soils, especially in abutment areas, have liquid limits ranging from 40' to 60'. Depth of clays in the flood plain is fairly uniform, averaging approximately 20', but clays in the abutments average only five feet in

thickness. A layer of coarse-grained soil underlies the clays across the entire width of the flood plain. This layer averages three feet in thickness and is predominately clayey sand or clayey gravel, which are relatively impervious.

2.1.4 Topography

El Dorado Lake is in the Osage Plains section of the Central Lowlands physiologic province. The streams are generally well entrenched into the flood plains, and the valleys are wide and flat with steep sides. Limestone outcrops form scarps and benches along the valley walls.

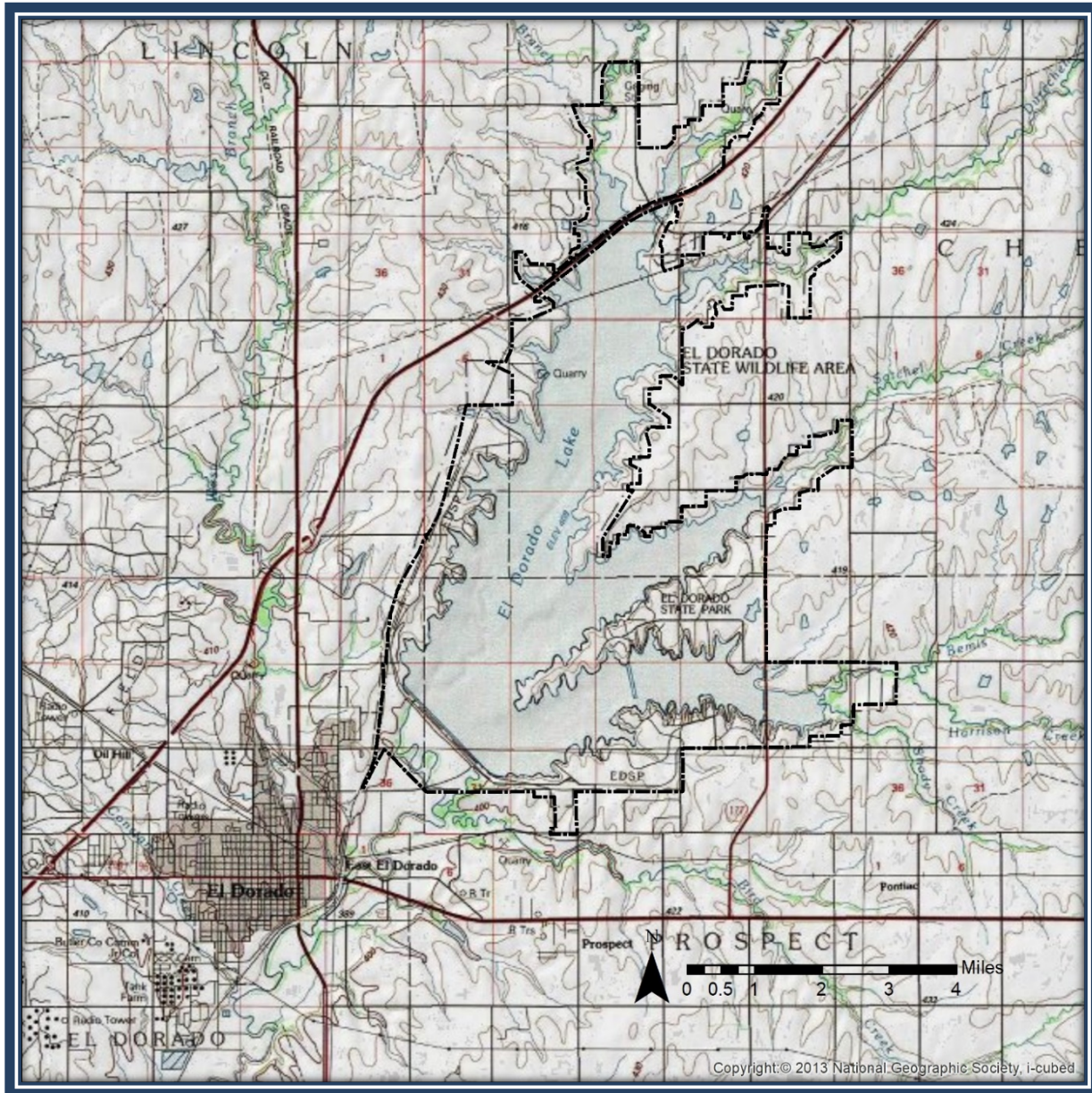


Figure 2-2 El Dorado Lake Topography (Source: ESRI)

2.1.5 Hydrology and Groundwater

The Walnut River is the main contributor to El Dorado Lake, with additional flows above the dam site from Cole, Durechen, Satchel, and Bemis Creeks, with Bemis Creek being the larger. The watershed above the dam site is approximately rectangular in shape. Its maximum length and width are 20 miles and 15 miles, respectively. The watershed streambed elevation is 1,271.0 and ranges upward to an elevation 1,500 (NGVD).

The Walnut River basin above El Dorado Lake produces moderately high runoff. During design studies, the rainfall needed to satisfy initial losses before significant runoff begins was one-inch initial loss and 0.5-inch infiltration. The time of concentration for major floods above the El Dorado dam site is approximately 9 hours. Stream gages pertinent to flood control operations for El Dorado Lake are El Dorado, Augusta, and Winfield, Kansas.

The maximum storm over the watershed above El Dorado Dam during the 68-year Period of Record was 9.5" from 14 to 17 November 1928.

Per the closest USGS monitoring well of the required depth, the current depth to groundwater for Butler County is 48.55'.

2.1.6 Soils

A soil survey by the Natural Resource Conservation Service (NRCS) shows there are eight possible general classifications (Classes I through 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. The soil class data for project lands is provided in Table 2-4. This data is compiled by the NRCS and is a standard component of natural resources inventories on USACE lands. This, and other inventory data, is recorded in the USACE Operations and Maintenance Business Information Link (OMBIL).

Table 2-4 Soil Classes

Soil Class	Acreage	Soil Class	Acreage
Class I	159	Class V	358
Class II	2,013	Class VI	1,667
Class III	3,145	Class VII	298
Class IV	697	Class VIII	77

A general description of the soils at El Dorado Lake and the land capability classes are described below.

- Class I soils have slight limitations that restrict their use.
- Class II soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.
- Class III soils have severe limitations that reduce the choice of plants or require special conservation practices, or both.
- Class IV soils have very severe limitations that restrict the choice of plants or require very careful management, or both.
- Class V 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 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 VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use mainly to grazing, forestland, or wildlife.
- 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.

The predominant soils at El Dorado Lake in order of prevalence are Class III, II, and VI. In general, the soils in the watershed have moderate to severe limitations reducing vegetation variety and which may require special conservation practices. Detailed information on all soil types surrounding El Dorado Lake is available on websites maintained by the NRCS, US Department of Agriculture.

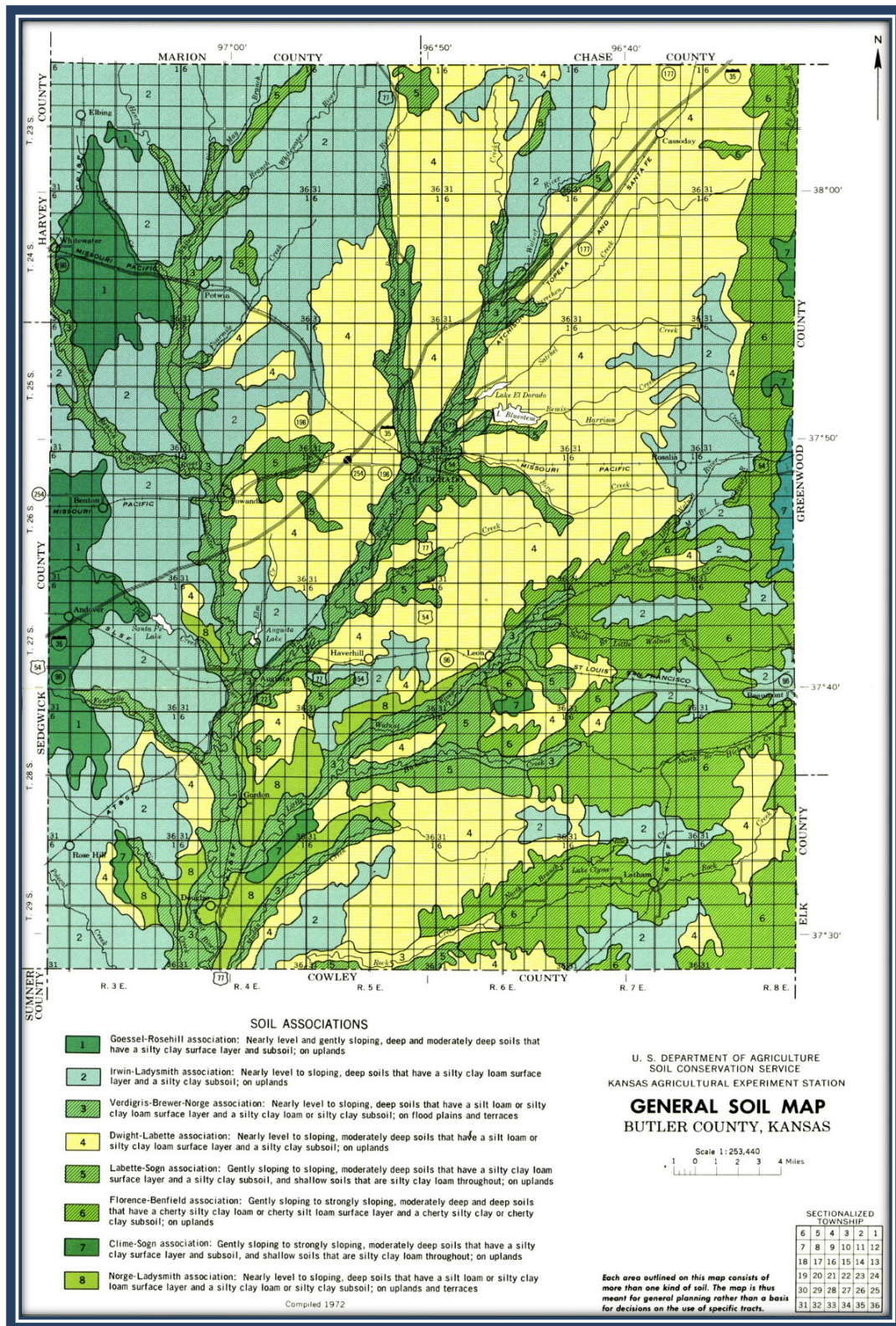


Figure 2-3 General Soils Map, Butler County, KS (Source: NRCS)

2.2 ECOREGION AND NATURAL RESOURCE ANALYSIS

Natural resources present at El Dorado Lake include the waters, wetlands, soils, vegetation, and fish and wildlife, including those species listed as endangered or threatened by the US Fish and Wildlife Service (USFWS) and the State of Kansas. The stewardship of natural resources on USACE administered lands adheres to ecosystem management principles as described in USACE regulations ER and EP 1130-2-540. Effective stewardship is imperative to the sustainability and use of project resources. The baseline analysis of the natural resources on USACE-administered lands relied heavily on the information provided in the 2016 Kansas Wildlife Action Plan (WAP).

2.2.1 Vegetative Resources

USACE regulations and policy require a basic inventory of the vegetation at all operational projects. This inventory, referred to in EP 1130-2-540 as a Level 1 inventory, classifies the vegetation in accordance with the National Vegetation Classification System (NVCS) down to the Sub-Class level, which is a very broad classification level. The inventory data, presented in Table 2-5, is recorded in the USACE national database referred to as the OMBIL and is useful in providing a general characterization of the vegetation on all operational projects. Daily management of USACE lands requires more detailed knowledge of the vegetation down to the Association level within the NVCS, and for most management prescriptions, down to the individual species level of dominant vegetation.

Table 2-5 Vegetation Classification and Condition 2018 Inventory

Division	Order	Class	Sub Class	Total Sub Class Acreage	Sustainable Areas	Transitioning Acres	Degraded Acres	Total Conditioned Acres
NON-VEGETATED (includes open water surface of the lake and eroded shoreline)	Non-Vegetated	Non-Vegetated	Non-Vegetated	8,435	8,435	0	0	8,435
VEGETATED	Herb Dominated	Herbaceous Vegetation	Annual graminoid or forb vegetation	314	0	314	0	314

Division	Order	Class	Sub Class	Total Sub Class Acreage	Sustainable Areas	Transitioning Acres	Degraded Acres	Total Conditioned Acres
VEGETATED	Herb Dominated	Herbaceous Vegetation	Perennial forb vegetation	5	5	0	0	5
VEGETATED	Herb Dominated	Herbaceous Vegetation	Perennial graminoid vegetation (grasslands)	3,500	3,150	350	0	3,500
VEGETATED	Shrub Dominated	Shrubland (Scrub)	Deciduous shrubland (scrub)	1,200	600	400	200	1,200
VEGETATED	Tree Dominated	Closed Tree Canopy	Deciduous closed tree canopy	160	124	16	20	160
VEGETATED	Tree Dominated	Open Tree Canopy	Deciduous open tree canopy	2,800	2,800	0	0	2,800
Totals				16,414	15,114	1,080	220	16,414

Note: Classification information derived from the National Vegetation Classification System

As described in the WAP, the Walnut Ecological Focus Area (EFA) is part of the Flint Hills ecoregion. The area can be characterized by rolling hills, rocky soils and humid wet summers. Due to the rocky surface, the region supports little cropland agriculture. The prairie is used for range and pastureland. Some cropland agriculture has been implemented in river valleys and along the periphery of the Flint Hills that contains level topography. The Walnut River is the major system in this EFA.



Photo 2-1 Shoreline at El Dorado Lake (Source: KDPWT)

The species diversity within this area and proximity to areas containing potential state and federally listed species is noteworthy.

2.2.2 Wetlands

In accordance with national USACE policy, wetlands at operational projects are inventoried using the protocol established by the USFWS in their Classification of Wetlands and Deepwater Habitats of the United States. The majority of wetlands in the vicinity of El Dorado Lake are Lake, Freshwater Forested / Shrub Wetland, and Freshwater Emergent Wetland. There are some Freshwater Ponds in the coves and up tributaries.

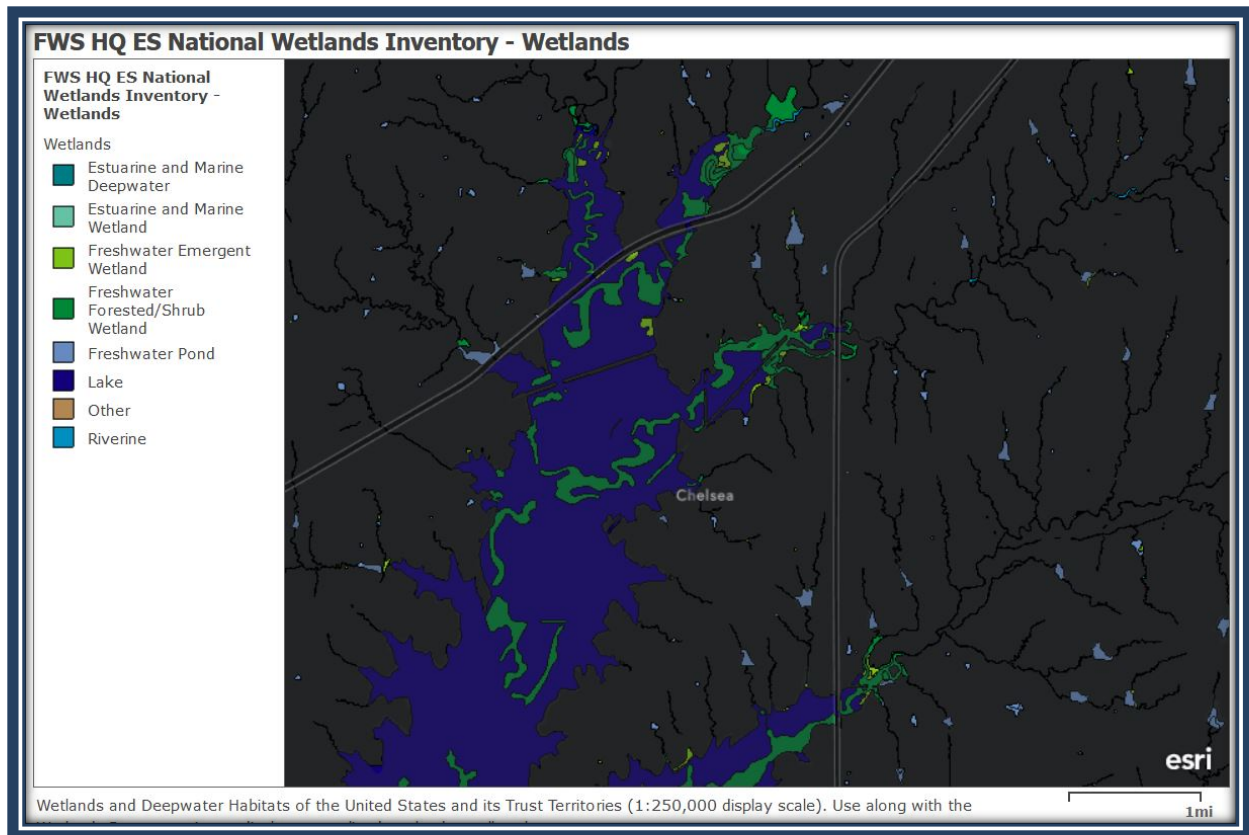


Figure 2-4 USFWS Wetland Inventory for El Dorado Lake - North (Source: USFWS)

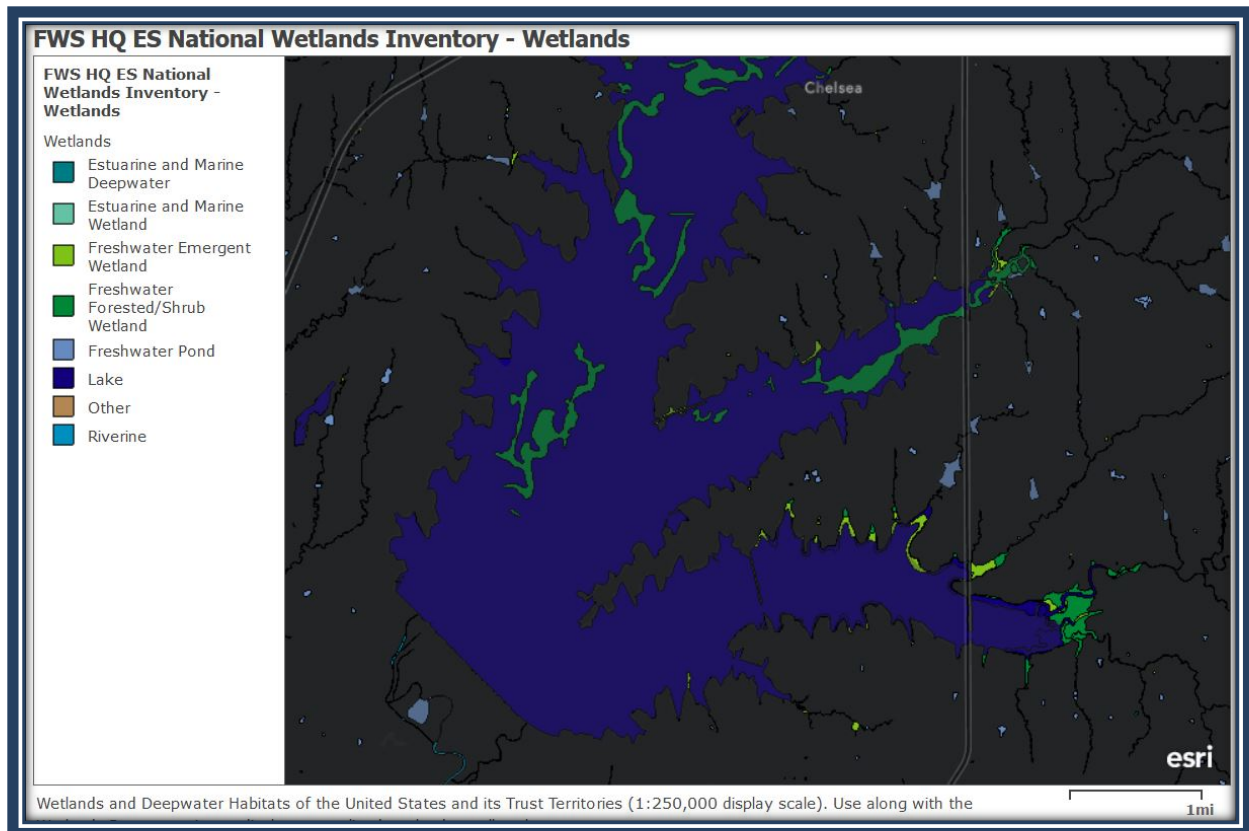


Figure 2-5 USFWS Wetland Inventory for El Dorado Lake - South (Source: USFWS)

Within these systems (palustrine, lacustrine, and riverine), wetlands have been further classified as limnetic and littoral (lacustrine); emergent aquatic vegetation, forested, scrub-shrub, unconsolidated bottom, and unconsolidated shore (palustrine); and lower perennial (riverine). Many of the wetland types have been further classified as diked/impounded or excavated, indicating that they formed under conditions created by humans. The wetlands in the vicinity of El Dorado Lake are also subject to different hydrologic regimes, including seasonally flooded, semi-permanently flooded, and permanently flooded.

Table 2-6 lists the acreages of various types of wetlands present at El Dorado Lake. Data was retrieved from the 2019 Project Wetland Classes reported in OMBIL. As noted, all USACE land at El Dorado Lake have been inventoried.

Table 2-6 Wetland Classification 2019 Inventory

System	Sub-System	Class	Class Acres
Lacustrine	Limnetic	Unconsolidated Bottom	10,179
Palustrine	NO SUB-SYSTEM	Scrub-Shrub Wetland	129
Lacustrine	Littoral	Unconsolidated Shore	1,342
Palustrine	NO SUB-SYSTEM	Emergent Wetland	177
Palustrine	NO SUB-SYSTEM	Forested Wetland	184
Riverine	Lower Perennial	Unconsolidated Bottom	22
Lacustrine	Littoral	Aquatic Bed	23
Palustrine	NO SUB-SYSTEM	Aquatic Bed	37
Palustrine	NO SUB-SYSTEM	Unconsolidated Bottom	5
Riverine	Lower Perennial	Unconsolidated Shore	5
Palustrine	NO SUB-SYSTEM	Unconsolidated Shore	5

Source: USACE

2.2.3 Fish and Wildlife Resources

El Dorado Lake provides habitat for an abundance of fish and wildlife species. The lake provides a quality fishery, as well as quality wildlife habitat on public land associated with the project. The following is a description of the fish and wildlife resources found at El Dorado Lake.

Fisheries Resources

In addition to hunting, El Dorado Lake also provides abundant fishing opportunities in many varying habitats including steep, rocky shorelines, shallow mudflats and submerged timber. The reservoir also connects to several creeks that feed into the lake, each varying in depth, width, and structure. El Dorado Lake offers more than 100 miles of shoreline and approximately 8,000 acres of open water.

Prominent populations of fish include walleye (*Sander vitreus*), largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomeieu*), crappie (*Pomoxis* spp.), white bass (*Morone chrysops*), Palmetto wiper (white bass x striped bass), bluegill (*Lepomis macrochirus*), channel catfish (*Ictalurus punctatus*), blue catfish (*Ictalurus furcatus*), and flathead catfish (*Pylodictis olivaris*). Trout are also regularly stocked each winter. A public fishing area is maintained below the dam at the reservoir outlet.

Specific information on fishing resources at El Dorado Lake can be found at the Kansas Wildlife, Parks and Tourism's website¹.



Photo 2-2 Fisherman at El Dorado Lake (Source: KDWPT)

Wildlife Resources

El Dorado Lake has a combination of steep rocky shoreline and shallow mudflats. Three boat ramps provide access to waters near the upper ends of the reservoir. Fair to excellent populations of walleye, channel catfish, smallmouth bass, crappie, largemouth bass, flathead catfish, white bass, bluegill, and wiper are found in the lake. Blue catfish have also been recently introduced into the lake. Wildlife area lands primarily consist of native grass prairie with some large tracts of woodlands and crops. Hunting is allowed and hunters may find fair to excellent populations of white-tailed deer, wild turkey, quail, prairie chicken, squirrel, rabbit, dove, and waterfowl. Ring-necked pheasants are present, but populations are generally low.

The El Dorado Wildlife Area, managed by KDWPT, under a license agreement with USACE is comprised of approximately 4,000 acres of public hunting land around El Dorado Lake. In addition, nearly 2,000 acres of state park is open to the hunting of upland game and waterfowl. Comprised of several diverse habitats, including native prairie, annual grasses and forbs, agricultural crops, and woodlands, El Dorado Wildlife Area is home to many different species. Prominent populations include quail, dove, rabbit, squirrel, turkey, deer and waterfowl. The wildlife area is also an occasional host to prairie chickens and pheasants. El Dorado Wildlife Area is also open for the hunting

¹ <https://ksoutdoors.com/Fishing/Where-to-Fish-in-Kansas/Fishing-Locations-Public-Waters/South-Central-Region/El-Dorado-Reservoir>

and trapping of furbearers, including beaver, raccoon, coyote, and bobcat. All hunting and trapping on the El Dorado Wildlife Area is subject to applicable state and federal wildlife regulations and is only permitted in areas marked “public hunting.” Areas open to hunting within the state park will require a state park vehicle permit. All blinds must be portable and temporary, or made of natural materials found on site. All blinds must be removed after each day’s use. Digging pit blinds is prohibited. Target practice is not allowed.



Photo 2-3 White tail deer at El Dorado Lake (Source: KDWPT)

2.2.4 Threatened and Endangered Species

Threatened species are those which are likely to become endangered within the foreseeable future. Endangered species are in danger of extinction throughout all or a significant portion of their range. USFWS also identifies species that are candidates for listing as a result of identified threats to their continued existence. The Candidate designation includes those species for which USFWS has sufficient information to support proposals to list as endangered or threatened under the Endangered Species Act: however, proposed rules have not yet been issued because such actions are precluded at present by other listing activity. The USFWS Information for Planning and Conservation (IPaC) report identified several species listed by the USFWS as Threatened or Endangered that could potential be found at El Dorado Lake. (Table 2-7 – See Appendix C for the IPAC report for El Dorado Lake).

Table 2-7 Federal Threatened and Endangered Species for El Dorado Lake Area

Common Name	Scientific Name	Federal Status	State Status
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	Not listed
Topeka Shiner	<i>Notropis topeka</i>	Endangered	Threatened

Source: USFWS 2020

2.2.5 Invasive Species

Invasive species are any kind of non-native living organism which, if uncontrolled, causes harm to the environment, economy, or human health. Invasive species generally grow and reproduce quickly and spread aggressively. Non-native, or exotic, species have been introduced, either intentionally or unintentionally, and can out-compete native species for resources or otherwise alter the ecosystem. Noxious native species are those species that spread aggressively due to an alteration in the ecosystem, such as lack of fire or the removal of a predator from the food chain. Table 2-8 lists invasive and exotic species, as well as the native, but aggressively spreading Eastern Red Cedar that occur at El Dorado Lake as identified by USACE.

Table 2-8 Invasive Species Found at El Dorado Reservoir

Common Name	Scientific Name	Prevalence
Zebra Mussel	<i>Dreissena polymorpha</i>	Major
Sericea Lespedeza	<i>Lespedeza cuneate</i>	Minor
Bull Thistle	<i>Cirsium vulgare</i>	Minor
Eastern Red Cedar	<i>Juniperus virginiana</i>	Major
Johnson Grass	<i>Sorgham halepense</i>	Major

Source: NRM Assessment Tool

2.2.6 Visual and Scenic Resources

El Dorado Lake is near the southern end of the Flint Hills National Scenic Byway which begins at Cassoday, KS, (22 miles to the north on State Highway 177) and follows State Highway 177 for 48 miles to its northern terminus at Council Grove, KS. This byway travels through vast expanses of rolling, grass covered hills, some of the best of the last remnants of the Tallgrass Prairie Ecosystem in North America. Along this scenic drive are a number of points of interest including the Cassoday Museum, the Chase County Courthouse, and the Roniger Native American Museum to name a few. El Dorado itself is a National Historic District with two dozen historic sites.

The feature point of the Flint Hills National Scenic Byway is the Tallgrass Prairie National Preserve a component of the National Park Service. This is located along State Highway 177 about 50 miles northeast of El Dorado. The preserve showcases the native tallgrass prairie as well as turn-of-the-century ranching practices. A feature of the preserve is the 11 room Second Empire style ranch house built in 1881 from hand-cut limestone. The Tallgrass Prairie National Preserve also offers a new visitor/interpretive center, ranch house tours, bus tours of the prairie, group tours, as well as front country and back country trails. For information, call 620-273-8494, or go to the website at www.nps.gov/tapr.



Photo 2-4 Fishermen at Sunset - El Dorado Lake (Source: KDWPT)

2.2.7 Sedimentation

In July-August 2010, the Kansas Biological Survey (KBS) performed a bathymetric survey of El Dorado Reservoir in Butler County, Kansas. The survey was carried out using acoustic echo sounding apparatus linked to a global positioning system. The 2010 bathymetric survey by KBS indicated that the area of the conservation pool at 1,339 ft was 7408 acres with a capacity of 153,641 acre-feet.

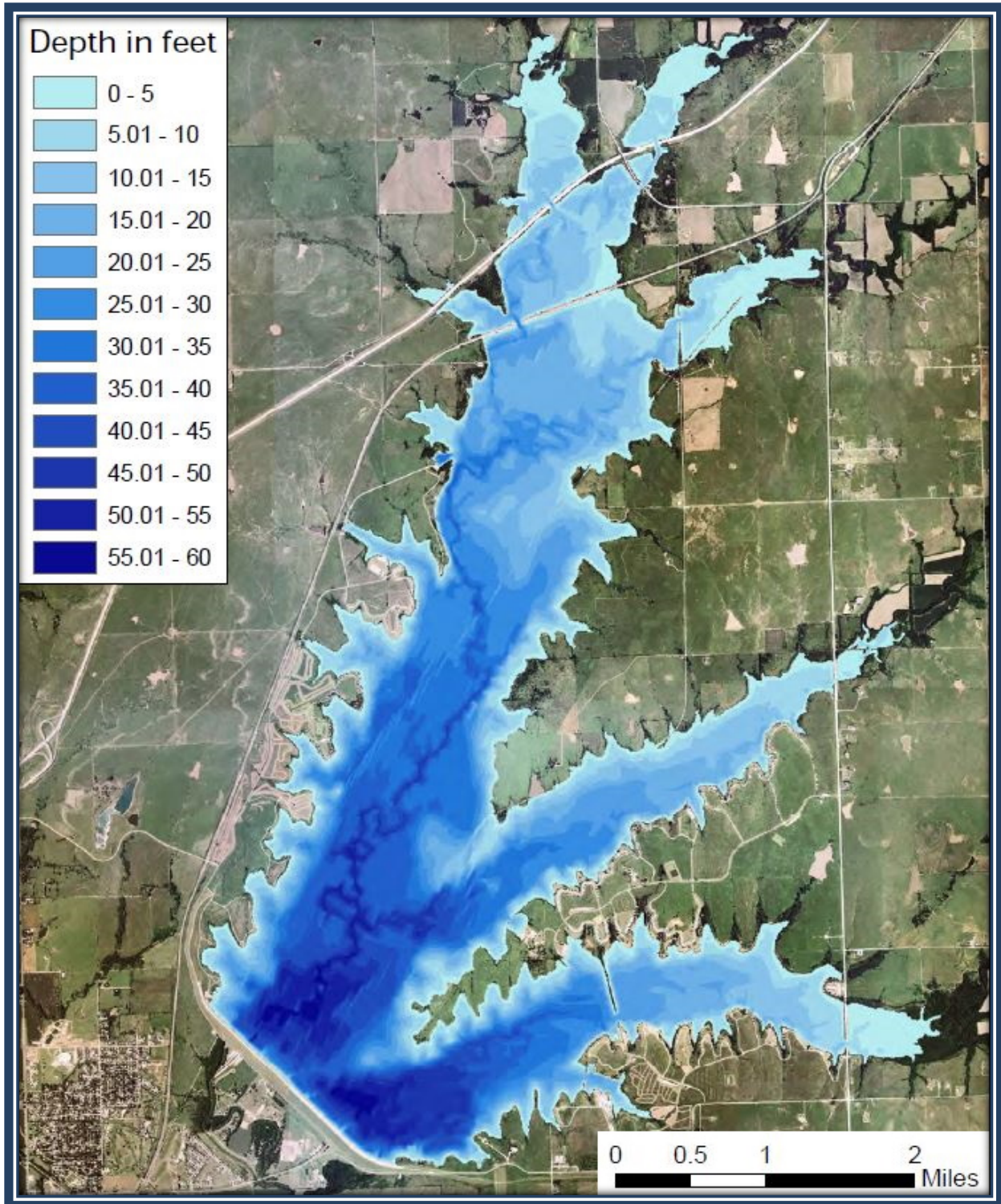


Figure 2-6 Depth map from 2010 KBS bathymetric survey. Depths based on pool elevation 1,340.34 ft AMSL NGVD29

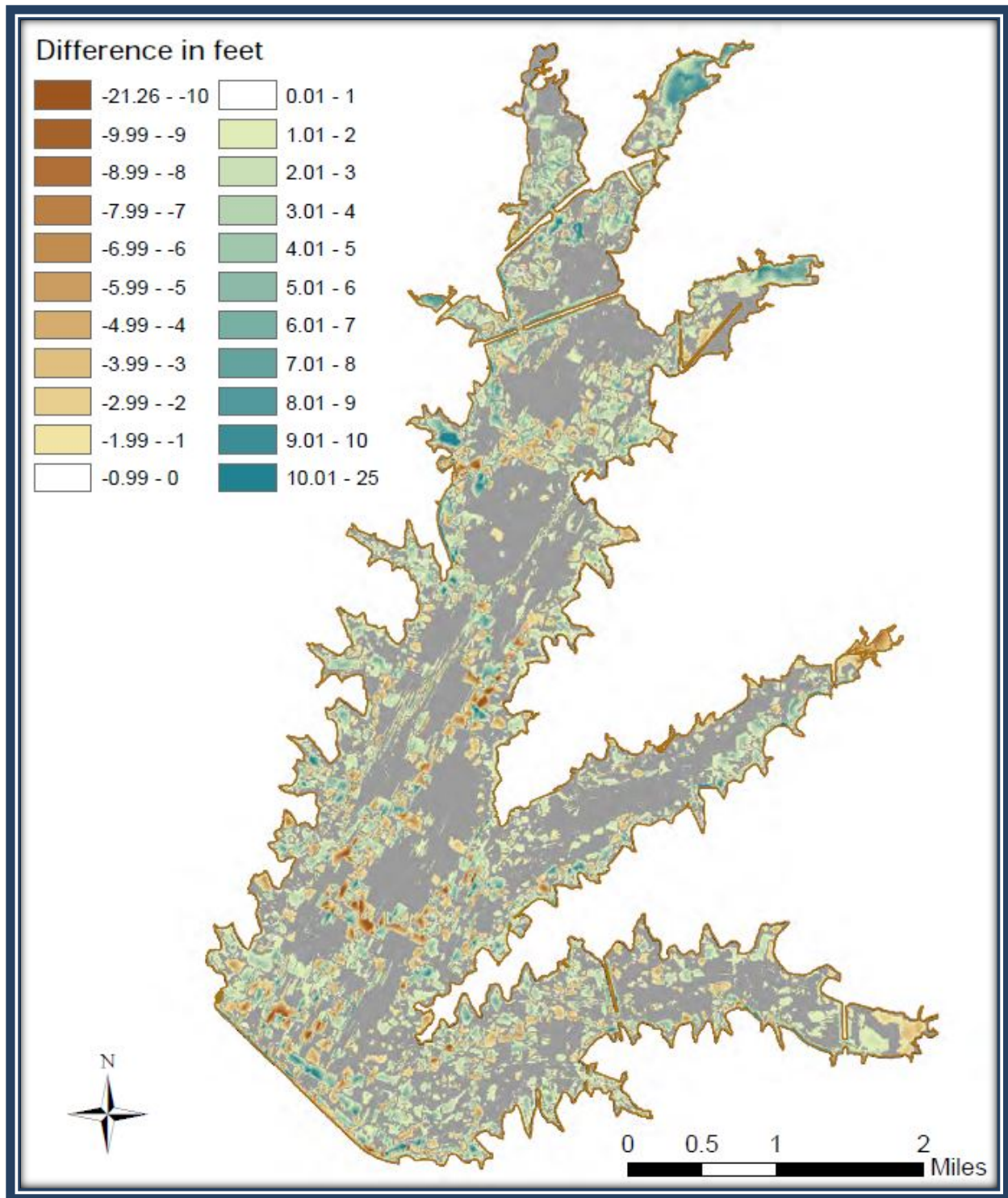


Figure 2-7 Difference map between 2010 KBS bathymetric survey and 2004 Oklahoma Water Resources Board bathymetric survey.

Data from a previous survey conducted by the Oklahoma Water Resources Board (OWRB) (2004) indicated that the area of the conservation pool at 1,339 ft in 2004 was 7,478 acres with a capacity of 158,159 acre-feet. Comparison of the 2010 capacity to

the 2004 OWRB data suggests that the capacity of the reservoir at the 1,339 ft. elevation pool has been reduced by 4518 acre-feet over 6 years (2.8%, or 753 acre-feet per year), and a loss of 70 acres in area.

Twenty-five sediment cores were extracted from the lake to determine accumulated sediment thickness at locations distributed across the reservoir. Positive values indicate increase in lake bottom elevation between surveys (sedimentation); negative values indicate lowering of lake bottom elevation (scouring or removal) between 2004 and 2010 (Figure 2-7). Sediment samples were taken from the top six inches of each core and analyzed for particle size distributions.

Road embankments and other slopes managed by USACE are protected from erosion through grass plantings.

A general discussion of sedimentation can be found in Chapter 6.

2.2.8 Water Quality

The State of Kansas has established Water Assurance Districts, authorized by the Kansas Office of Water Resources, to monitor flows and enforce the lawful withdrawal of water by contractual water customers on the Walnut River. The Kansas Water Assurance Plan (KWAP) is a basin-wide approach to meeting the municipal, industrial, and environmental needs of communities associated with those basins outlined in the 1986 MOU between the Assistant Secretary of the Army (Civil Works) and the State of Kansas.

Per the 2020 Kansas Department of Health and Environment Integrated Water Quality Assessment, the Upper Walnut River Basin near El Dorado Lake is impaired through selenium levels, low dissolved oxygen, E. coli loads, total phosphorus levels, and benthic macroinvertebrate bioassessment numbers.

2.2.9 Sustainability

National USACE missions associated with water resource development projects may include flood risk management, water conservation, navigation, recreation, fish and wildlife, and hydroelectric power generation. Most of these missions serve to protect the built environment and natural resources of a region from the climate extremes of drought and floods. This helps to create a more resilient and sustainable region for the health, welfare, and energy security of its citizens. Mitigation, while not a formal mission at USACE lakes, may be implemented to achieve the fish and wildlife and recreation missions. Maintaining a healthy vegetative cover and including a native prairie or tree cover where ecologically appropriate on Federal lands within the constraints imposed by primary project purposes helps reduce stormwater runoff and soil erosion, mitigates air pollution, and moderates' temperatures. To this end, USACE has developed the following statements.

The USACE Sustainability Policy and Strategic Plan states that:

“The U.S. Army Corps of Engineers strives to protect, sustain, and improve the natural and man-made environment of our Nation, and is

committed to compliance with applicable environmental and energy statutes, regulations, and Executive Orders. Sustainability is not only a natural part of the Corps' decision processes; it is part of the culture.

Sustainability is an umbrella concept that encompasses energy, climate change and the environment to ensure today's actions do not negatively impact tomorrow. The Corps of Engineers is a steward for some of the Nation's most valuable natural resources and must ensure customers receive products and services that provide sustainable solutions that address short and long-term environmental, social, and economic considerations.”

The USACE mission for the Responses to Climate Change Program is:

“To develop, implement, and assess adjustments or changes in operations and decision environments to enhance resilience or reduce vulnerability of USACE projects, systems, and programs to observed or expected changes in climate.”

2.3 CULTURAL RESOURCES

Cultural resources preservation and management is an equal and integral part of all resource management at USACE-administered operational projects. The term “cultural resources” is a broad term that includes, but is not limited to historic and prehistoric archaeological sites, deposits, and features; burials and cemeteries; historic and prehistoric districts comprised of groups of structures or sites; cultural landscapes; built environment resources such as buildings, structures (such as bridges), and objects; traditional cultural properties and sacred sites. These property types may be listed on the National Register of Historic Places (NRHP) if they meet the criteria specified by the NRHP, reflecting significance in architecture, history, archaeology, engineering, and culture. Cultural resources that are identified as eligible for listing in the NRHP are referred to as “historic properties,” regardless of category. A Traditional Cultural Property (TCP) is a property that is eligible for inclusion in the NRHP based on its associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community. Ceremonies, hunting practices, plant-gathering, and social practices which are part of a culture’s traditional lifeways, are also cultural resources.

Stewardship of cultural resources on USACE Civil Works water resources projects is an important part of the overall Federal responsibility. Numerous laws pertaining to identification, evaluation, and protection of cultural resources, Native American Indian rights, curation and collections management, and the protection of resources from looting and vandalism, establish the importance of cultural resources to our Nation’s heritage. With the passage of these laws, the historical intent of Congress has been to ensure that the Federal government protects cultural resources. Guidance is derived from a number of cultural resources laws and regulations, including but not limited to Sections 106 and 110 of the National Historic Preservation Act (NHPA) of 1966 (as amended); Archaeological Resources Protection Act (ARPA) of 1979; Native American Graves Protection and Repatriation Act (NAGPRA); and 36 CFR Part 79, Curation of

Federally-Owned and Administered Archeological Collections. Implementing regulations for Section 106 of the NHPA and NAGPRA are 36 CFR Part 800 and 43 CFR Part 10, respectively. All cultural resources laws and regulations should be addressed under the requirements of the National Environmental Policy Act (NEPA) of 1969 (as amended), as applicable. USACE summarizes the guidance provided in these laws in ER and EP 1130-2-540.

2.3.1 Archaeology

There are 81 known archaeological sites located wholly or in part on USACE fee lands associated with El Dorado Lake. Of these, ten sites are currently listed on or determined eligible for the NRHP, and another nine have been recommended as eligible.

More than half of the sites identified at El Dorado Lake do not have NRHP recommendations, and therefore their eligibility is unknown. Fifty-seven sites are prehistoric, fifteen are historic, and nine are both prehistoric and historic. In addition, 47 historic resources were given temporary site numbers, but were not assigned site trinomials by the State.

Archaeological investigations of the project area were undertaken in anticipation of the impoundment of El Dorado Lake. Investigations were initiated in 1967 by the Museum of Anthropology at the University of Kansas, under contract for the National Park Service (NPS). From 1967-1977 funding was provided by the NPS, Butler County Historical Society, and University of Kansas, and from 1977-1980 funding was provided by the USACE. Investigations included reconnaissance survey (Eoff and Johnson 1968; Fulmer 1976), testing (Bastian 1978; Fulmer 1977), and large-scale excavations (Bradley 1973; Fulmer 1976; Grosser 1970, 1973, 1977; Leaf, ed. 1979). The Milbourn site (14BU25) was excavated prior to USACE contract (Root 1982). From 1977-1980, KU conducted excavations at four prehistoric sites: 14BU4 (Nuttal site), 14BU9 (Snyder site), 14BU57, and 14BU55 (Two Deer site) (Johnson 1983). Excavations were also undertaken at five historic sites (Brockington 1982; Roberts 1981).

In the larger region there are hundreds of archaeological sites and historic standing structures on record with the Kansas State Historical Society (KSHS). Small surveys have been, and continue to be, conducted in and near El Dorado Lake for compliance with Section 106 of the NHPA.

2.3.2 Cultural History Sequence

Six broad cultural divisions are applicable to a discussion of the culture history of the region: Paleoindian, Archaic, Woodland, Plains Village, Protohistoric, and Historic. These general adaptation types are adopted in this Master Plan to characterize prehistoric cultural traditions, within the following regional chronology. Due to differential rates of change through time in different regions, the State of Kansas has subsumed three of the cultural divisions into the broader Ceramic Period. Due to the use of both systems of cultural divisions in the site records and literature, both systems are incorporated below.

- Paleoindian: 13,500 to 9000 BP
- Archaic: 9000 to 2000 BP

- Woodland (Early Ceramic): AD 1 to 1000
- Plains Village (Middle Ceramic): AD 1000 to 1500
- Protohistoric (Contact Period; Late Ceramic): AD 1500 to 1825
- Historic: AD 1825 to present

Paleoindian Period

While it is becoming increasingly evident that humans arrived in the Americas as early as 20,000 years ago, the Paleoindian Period is broadly accepted as spanning the end of the Pleistocene into the Early Holocene. The Clovis complex (11,500-11,000) is the earliest well substantiated archaeological period in the Central Plains. Paleoindian sites are usually identified by the presence of the remains of extinct Pleistocene megafauna and signature stone tools. The most visible tools are projectile points, and these are used to reference different archaeological complexes. Point types are unnotched lanceolate projectile points, fluted (Clovis and Folsom) and unfluted (Allen-Frederick, Agate Basin, Hell Gap, Meserve, Plainview, Cody, Dalton, Plano, and undesignated "Late Paleoindian"). Long characterized as specialized big game hunters, it has now been demonstrated that the archaeological complexes of the Paleoindian period represent diversified economies of small bands of hunters and gatherers, some more reliant on megafauna than others, and some hunting megafauna during specific seasons (Blackmar and Hofman 2006). The Dalton Complex is well represented in Eastern Kansas and spans the period from the end of the Paleoindian period and into the Early Archaic (Ballenger 2001; Blackmar and Hofman 2006; Meltzer 2009).

Dynamic landscape evolution throughout the Holocene has resulted in Paleoindian sites in the project area being deeply buried in alluvial stream deposits. Periods of cut and fill of sediments in the river and stream valleys has led to differential preservation of surfaces from this time period, resulting in flushing out of sediments in some locations and time periods, and deposition of large amounts of sediments in other contexts and times (Mandel 2006). Additionally, the arrival of Euro-Americans in the region and subsequent land clearing led to vastly increased volumes of alluvial sedimentation on floodplains, mantling prehistoric surfaces with thick layers of recent alluvial deposits in stream valleys (Weston 1992). In the uplands, wind deposited sediments and tallgrass prairie obscure even shallow sites (Mandel 2006). Where erosion and agriculture are sufficient to reveal very old surfaces, Paleoindian points have been found on the surface. These points are most often collected, which results in loss of archaeological context. For these reasons, a limited number of Paleoindian sites have been recorded in the project area, though sites with both Paleoindian and Archaic deposits are better represented. The small number of sites from this period is much more a product of archaeological visibility than an actual representation of prehistoric populations and patterns of land use (Mandel 2006; Blackmar and Hofman 2006).

Archaic Period

During the Archaic period, an increase in seasonal variability of resources and increasing populations resulted in changing settlement and subsistence patterns (Hawley and Vehik 2012). Repeated occupation of sites, often on a seasonal basis, and features such as rock-lined hearths, roasting pits, and grinding tools reflect intensive

plant processing and the cyclical exploitation of resources (Brogan 1981; Sabo and Early 1990). Increasing diversity of stone tools through time reflects the increasing variability of faunal and floral resources and diversity of activities taking place at habitation sites (Adair and Estep 1991). Projectile points from the Middle and Late Archaic are stylistically quite different (typically notched and stemmed) from those of the Paleoindian period. Archaic assemblages include a variety of large dart points, knives, drills, axes, gouges, scrapers, and grinding implements (such as manos and metates). The Archaic period is traditionally divided into Early, Middle, and Late periods, the overall extent of which was approximately 8,000 BP to 2,000 BP. While the Archaic period is considered pre-ceramic (in that pottery for storage and cooking is not present), a ceramic bead from the Coffey site (in Pottawatomie County north of the project area) and small effigy heads from the William Young site (located in Council Grove Lake) are the earliest ceramic figures currently identified in the United States, both from Archaic horizons (Witty 1982; Blackmar and Hofman 2006:64). Fiber tempered ceramics from the Nebo Hill phase in Northeast Kansas represent some of the earliest tempered pottery in the United States (Reid 1983).

The Early Archaic (9000-7000 BP) is best represented near the project area at the Stigenwalt site (14LT351) on Big Hill Creek in Labette County (Thies 1990). The site consisted of two deeply buried large burned rock concentrations, stemmed projectile points, and evidence of a diverse subsistence base that included small mammals such as prairie vole, and plant roots, such as wild onion. At the Snyder site (14BU9) at El Dorado Reservoir the deepest cultural deposit was not encountered until excavations were closing. Mechanical trenching revealed two burned limestone concentrations approximately 2.5 meters below the modern ground surface. No additional work was possible to further define this component, so it is unknown whether it dated to the Early or Middle Archaic.

The Middle Archaic is well represented in the project area. The Chelsea Phase was defined based on work from the Snyder site (14BU9) and is thought to date from 4800-4000 BP. Projectile points that define the phase are short, broad bladed, with distinct shoulders and expanding bases. Other artifacts include knives, drills, choppers, and grinding stones. Walnut and Chenopodium seeds were recovered, and identified features included two hearths, three post molds, and two storage pits (Grosser 1970, 1977; Haury and Leaf 1982; Johnson 1983).

The phase was also identified at the Milbourn site (14BU25) in El Dorado Reservoir (Root 1982), where burned limestone roasting pits, bifaces, grinding slabs, manos, hammer stones, and anvils were revealed (Williams 1988; Root 1982; Vehik and Hawley 2012). Detailed lithic analyses led to the interpretation of the Chelsea Phase component as a warm weather hunting camp that was repeatedly occupied by hunters of pronghorn, wapiti, and deer (Johnson 1983; Root 1981).

The Late Archaic El Dorado and Walnut Phases were also defined based upon University of Kansas excavations at the Snyder site (14BU9). The El Dorado phase preceded the slightly later Walnut Phase. Sites of the El Dorado phase are defined as more permanent habitation sites. Stemmed lanceolate points indicate use of the atlatl, and artifacts include knives, scrapers, choppers, drills, axes, hammerstones, and a large number of grinding stones (Grosser 1970, 1973). A number of cultural features

were identified at the Snyder site, including hearths, burned limestone concentrations, and shallow pits, and structures were indicated by post molds, daub, and mud daubers nests (Grosser 1970; Hawley and Vehik 2012). The remains of a variety of animals and the large number of grinding stones recovered indicate a diverse subsistence base.

The Walnut phase was also defined at the Snyder site, but has been identified a few other sites. No evidence of structures has been discovered, but hearths were identified at the Snyder site. Artifacts attributed to this phase include small triangular corner-notched bifaces as well as corner-notched and stemmed dart points. Five hearths and remains of four deer and three bison led Grosser to interpret this component as a temporary hunting camp (Grosser 1970). The interpretation of the Walnut phase as separate from the El Dorado phase at the Snyder site is questionable, as they are not stratigraphically separate and appear to be considered separate solely based upon the difference in projectile point sizes. A reexamination of biface function in the context of different technologies might lead to a reconceptualization of these phases (Haury and Leaf 1982).

The youngest component identified at the Snyder site was defined as the Butler phase, a Woodland period component discussed below. The Archaic components of the Snyder site extended from approximately half a meter below surface to at least 2.5 meters below the modern ground surface. Depositional context of sites from the Archaic period is a result of variable climatic conditions and dynamic landscape evolution. Stratified Archaic deposits have been found in the Flint Hills 10 meters below the surface of broad terraces (Mandel 2006).

Woodland (Early Ceramic)

The Woodland Period in Kansas can be defined as one of technological innovation, with ceramics, the bow and arrow, gradual intensification of horticulture and concomitant social changes differentiating this time period from more residentially mobile hunting and gathering populations of earlier times. This time is defined in the Eastern Woodlands as Early, Middle, and Late Woodland, all of which comprise the Early Ceramic Period in Kansas (Hoard and Banks 2006). Sites dated to the Early Woodland period are temporary camps with remains of shallow pits and ephemeral houses, and tools which indicate little change in lifeways from the Late Archaic. Like sites from the Late Archaic period, sites dating to the Early Woodland are expected to be deeply buried and rarely encountered (Mandel 2006). In contrast, some Middle and Late Woodland groups from this time constructed more substantial houses, including very large circular to oval grass or thatch covered houses with internal and external pits and hearths (Logan 2006, Marshall 1972, Reynolds 1984, Witty 1999). Extended time spent at habitation sites led to accumulation of large trash deposits. Archaeological assemblages from this period indicate people were living in semi-permanent villages and dispersed communities (Brogan 1981, Rowleson 1980), using settlement strategies such as seasonal mobility, targeted long distance resource procurement by portions of the community or household (such as hunting forays), and intensification of wild and domestic plants to meet their needs. Small game and aquatic resources remained essential in subsistence. Domestication of plants began during this period.

The appearance in the archaeological record of small corner notched projectile points indicates that the bow and arrow was in use. The presence of ceramic sherds indicates that ceramic use in the form of pottery for storage and cooking had become widespread. Projectile points from this period include, in addition to the small corner notched points, large contracting stem points and corner-notched projectile points in a variety of styles, indicating continued use of the atlatl and darts, as well as spears likely employed for symbolic political or religious effect (Logan 2006, Marshall 1972, Hawly and Vehik 2012, Witty 1999).

Woodland period sites in the Flint Hills have been attributed to various archaeological phases. Insufficient data (such as radiometric dates), over-reliance on typological distinctions that may not be meaningful, and a lack of consideration of differential preservation have resulted in an abundance of named archaeological phases. Cross dating of sites using typology is complicated by the differential rate at which groups of this time period adopted new technologies and consequent changes in social organization. There is a need for critical reevaluation of data gathered to date, reexamination of curated collections, and implementation of carefully selected methodology for data collection going forward (Logan 2006).

The late Woodland Butler phase was defined based on excavations at the Snyder site, and spanned the period from approximately 2000-1200 years ago. The cultural assemblage was comprised of two types of pottery- one cord-marked with a variety of tempering agents, and the other a zoned dentate stamped variety. Other tools included small, unnotched triangular points and small corner-notched points with serrated edges, large notched and stemmed dart points, bifaces that may have been spear points or knives, scrapers, chipped stone celts, and grinding stones.

The dentate stamped sherds and projectile point forms are identical to those identified at sites throughout southeastern Kansas and northeastern Oklahoma that are considered "Hopewellian." Cuesta Phase sites contain pottery decorated with dentate stamping, cross-hatching, punctations, and other decorative motifs common to the Middle Woodland Kansas City Hopewell. However, radiocarbon dating has yet to confirm contemporaneity of Cuesta with Kansas City Hopewell. Cuesta phase dates overlap with the Greenwood phase and the El Dorado phase. Brad Logan (2006) points out that the Greenwood phase and the Butler phase of the Southern Flint Hills are nearly indistinguishable and Thies (1990) suggested that El Dorado phase be subsumed within Greenwood.

Plains Village (Middle Ceramic)

People during the Plains Village period (A.D. 800 to 1500) grew crops and hunted and gathered wild resources. Artifact assemblages contain gardening tools along with triangular arrow points for hunting (Hawley and Vehik 2012). Sites from this time are often identified in lowland terraces of waterways where gardening with bone tools was viable (Roper 2002).

The Pomona variant is the Plains Village archaeological culture associated with watersheds in central and eastern Kansas. Witty defined the Pomona variant based upon work conducted at federal reservoirs in eastern Kansas, including Council Grove, John Redmond, Pomona, Elk City, Hillsdale, and Big Hill (Witty 1967, 1978). The

Pomona variant has been conceptualized as a phase, a focus, and a variant within which there are four subdivisions (phases). Distinguishing traits include shell-tempered pottery of types attributed by Kansas archaeologists to the Middle Ceramic period, remains of round wattle and daub houses, and a scarcity of cultigen remains such as maize, possibly reflecting less dependence on farming than in other geographic areas during this time (Brown 1985; Thies 1981, 1990; Hawley and Vehik 2012; Witty 1967, 1978). However, the scarcity of identified cultigens is also the result of poor preservation and excavation and processing methods not designed to recover native cultigens, the remains of which are much smaller than maize (Adair 1988, 2006; Roper 2006). Due to the differential rate of people's acceptance of new technologies and changing ways of life, sites attributed to the Pomona variant may overlap temporally with sites attributed to the Woodland period.

The Smoky Hill phase is documented to the north and west of the project area in the Kansas River basin (Wedel 1959). The Smoky Hill phase is part of what is broadly known as the Central Plains Tradition, which extends across northern Kansas and into Nebraska, portions of Iowa, Missouri, and South Dakota (Roper 2006; Hawley and Vehik 2012). These sites share similarities with the Pomona variant, but provide evidence of greater reliance on agriculture and more substantial housing in the form of rectangular earth lodges containing four interior support posts around a central hearth (Johnson 1973; Logan 1996; Roper 2006). No sites of the Smoky Hill phase have been documented in the El Dorado Lake area.

The Two Deer site at Eldorado Lake (14BU55) has yielded the earliest evidence for domestication of crops in the project area (Adair 1981). Adair and Brown (1981) provide analysis of the artifact classes from their 1978 and 1979 excavations and compare the site to known Woodland and Plains Village sites. Due to similarities and differences identified among the Two Deer site and both Woodland and Plains Village phases identified in the region, it was determined that the site is transitional from Late Plains Woodland to Early Plains Village, and the Bemis Creek phase was coined (Adair and Brown 1981).

Landscape evolution throughout the Holocene has resulted in most sites that are visible on the surface being those that date to the Middle Woodland or later. Plains Village sites can be exposed on the surface by modern landscape modifications much more readily and are therefore more subject to damage by plowing, construction, and looting.

The Protohistoric (Contact) Period (Late Ceramic)

The period from A.D. 1500-1825 is referred to as the Protohistoric (or Contact) Period (Late Ceramic). During this time, non-native explorers, trappers, and traders visited the region, and land claims by first the Spanish, and then the French brought great changes. This was a time of reorganization and relocation by native peoples in response to rapid culture change as European contacts brought new technologies, goods traded throughout the continent, diseases which spread ahead of them, the fur trade, and the horse. The pressures of these rapid changes led to increased inter-group conflict, including conflicts over access to, and control of, resources. People aggregated into large villages situated along major rivers, and in the later part of the period many of these villages were fortified (Vehik 2006). In the Flint Hills region, sites from this time

may be attributed to the Great Bend, Kansa, and, toward the late part of the period, the Osage.

The Great Bend Aspect is an archaeological complex divided into three major groups in Kansas: The Lower Walnut focus sites of Cowley County, the Little River focus sites of Rice and McPherson counties, and those from the site group in and around the city of Marion. Dated to between 1400 and 1700, the Great Bend aspect is ancestral to the Wichita and Affiliated tribes. Great Bend villagers lived in large, circular grass houses, grew crops, and hunted bison and small game. The archaeological record documents significant long-distance trade with the southwest. Items such as painted and glazed pottery, turquoise beads and pendants, and shell beads distinctive to the Southwest Pueblo cultures attest to the extent of the trade networks in place. The sites of the Little River focus represent the villages encountered by a Spanish expedition led by Francisco Vazquez de Coronado in 1541. The expedition was in search of gold they erroneously believed to be in the province of Quivira (Roper et al. 2008; Vehik 2006).

In 1682, Robert Cavellier, Sieur de la Salle, claimed the territory drained by the Mississippi as part of the French Empire in North America. By 1719, the Great Bend aspect sites in central Kansas were abandoned, as the occupants migrated southward within the Arkansas River basin. By 1700, French traders were established in the region and had developed trading relationships with Wichita groups in the Arkansas Valley of northern Oklahoma. The Caddoan language speaking Wichita and Affiliated Tribes were historically known as the Wichita Proper, Waco, Taovaya, Tawakoni, and Kichai. In the late 1700s, the Wichita abandoned their homes in northern Oklahoma and traveled south into southeastern Oklahoma and Texas (Vehik 2006).

2.3.1 Historical Resources in Kansas

What is now the state of Kansas was included in the Louisiana Purchase in 1803, becoming part of what was known as the Louisiana Territory (KSHS 2021c). When Louisiana joined the Union as a state in 1812, Louisiana Territory was renamed the Missouri Territory by the U.S. Congress to avoid confusion with the new state. In the 1820s, Kansas was designated Indian Territory and closed to white settlement.

The Osage began moving their villages into Kansas and Oklahoma after 1800, though they had long included the area in their territory. While the villages were to the east of the project area, the Osage hunted from southeast Kansas to areas on the Arkansas River northwest of the project area. The southern half of Butler county had been part of the Osage Reservation land prior to the Pre-emption Act. The Little Osage Trail, running generally east to west through Butler county, connected the villages to their hunting territory. The Wichita and Kansa continued to hunt in the project area as well.

Other trails that passed through or near the project area were the California Trail from Fayetteville, Arkansas, (which converged with numerous other trails along its route, and was not, in fact, part of the main California Trail), the Emporia Trail, and the Chisholm (Texas Cattle) Trail (Wilk 1981). The trails long used by the native inhabitants of the area became trails for merchants seeking trade, farmers seeking fertile land, and miners and other easterners seeking riches in California and Oregon (Wilk 1981).

Trails usually have reroutes and detours, and multiple paths may diverge between river crossings. The difficulty of travel led to deaths along the trail, and the dead would be buried nearby. Some travelers were buried in cemeteries in towns, but many more were buried along the route. Camps and burials associated with trails are expected in the project area.

The Nebraska-Kansas Act of 1854 delineated Kansas as an organized incorporated territory of the United States in May of 1854. The period between 1854 and 1859 was a time of violence between anti-slavery abolitionists and pro-slavery groups, which led to Kansas Territory being called “Bleeding Kansas” (KSHS 2021b; KSHS 2021d). The project area came to be occupied by immigrants from the east, among them members of the abolitionist Free State Company which had been active in the violent political campaigns against pro-slavery groups in eastern Kansas. The town of Chelsea was established, and later reestablished, in the project area. The multi-year investigations conducted by KU included research, informant interviews, field surveys, and test excavations in order to understand shifts in historic settlement patterns, building styles, and other material cultural traits. Focus on Chelsea, and its later manifestation, New Chelsea, provided a model for the El Dorado lake area, which itself is representative of the broader Kansas settlement experience (Wilk 1981).

The history of the town of Chelsea (later New Chelsea) illustrates the life cycle of pioneer towns in Kansas that did not achieve the growth desired by the town founders. In August of 1857, I.N. Barton led a group of settlers to the confluence of Cole and DeRacken (now spelled Derachen) Creeks (named after two of the group’s families) where they set up a temporary camp. From this camp the settlers staked their claims and constructed log cabins. Fertile river bottoms suitable to corn farming were claimed first, as the immigrants came from corn producing states of Ohio, Pennsylvania, Indiana, Illinois, and Iowa. In addition to pioneer families, many of the best claims were held by enterprising young women solely for speculation (Wilk 1981; Thomas 1982).

The Pre-emption Act permitted settlers to purchase 160 acres of land for \$1.25 an acre. Butler County was established in 1859, and in 1862 it was included under the Homestead Act, which allowed claims of 160 acres to be improved for five years, after which ownership could be acquired for a minimal filing fee. Additional settlers continued to arrive, and on February 11, 1858, the Chelsea town company was incorporated, and plats were drawn up. The town was located on 320 acres between the Emporia Trail and Durachen Creek (Wilk 1981).

Chelsea, being the only town in Butler County, had the advantage of being the county seat. However, Chelsea struggled. Between 1857 and 1867, the town consisted of only six buildings, including a general store, a town hall, and a post office. Other services such as a saw and grist mill, Sunday school, and a schoolhouse/church were located on adjoining farmsteads. Growth was stymied by severe drought, a grasshopper plague, and the Civil War.

On January 29, 1861, the eastern portion of Kansas Territory was admitted to the Union as the state of Kansas. Kansas was an important state for the Union, as transcontinental railroads were planned to cross through the area, and farmland was

highly desirable. By the time the Civil War commenced, Kansas had joined the Union and formally rejected slavery, therefore Kansas regiments joined the Union Army.

In response to the war, local men in Butler county organized into a company for local protection in 1861. Under direction of P.G.D. Morton, they constructed a fort on the bend of the Walnut River between El Dorado and Chelsea. Fort Bend consisted of log and earthen breastworks on one side, with the river protecting the remaining three sides. The fort was occupied by approximately 50 men during the winter of 1861-1862. Only one incident related to the war required the intervention of the company from Fort Bend. A government freight train comprised of approximately 30 ox-drawn wagons was abducted by its southern-sympathizing drivers in 1861. The men from Fort Bend recaptured the wagon train and transferred the prisoners to Fort Lincoln, Oklahoma. In the Spring of 1862, the soldiers at Fort Bend disbanded, with many of them joining the regular army at Ft. Leavenworth (Wilk 1981).

Throughout the Civil War years, bands from several tribes camped along the Walnut river, including the Cherokees (displaced by Confederate soldiers from their reservation lands), Kickapoos, Shawnee, and Delaware. In January of 1862 approximately 300 Creek Indians arrived, having been driven from their homes by secessionists. They were suffering from exposure and starvation. Chelsea residents provided oxen for beef and over 600 bushels of corn and advocated for them to receive help from the government as they aligned with the Union and were forced from their homes as a consequence. By the time a government agent arrived, more than 1,000 "Union Indians" had arrived. The agent purchased additional supplies of beef and corn from the area residents to distribute prior to arranging for the relocation of the refugees to the junction of the Neosho and Cottonwood rivers (Thomas 1982).

Another wave of migration occurred after the war, helped along by increased rainfall, government incentives, and renewed railroad construction (Wilk 1981). Newcomers were forced to establish their claims in the thin soiled uplands, and this, combined with reduced valley fertility due to monocropping, led to changes in crops. Sweet sorghum was introduced, providing forage for livestock and molasses for local use and export. Alfalfa and kafir corn followed, meeting the need for soil restoration and grain crop. Kafir corn in its hybridized forms is milo or grain sorghum, and kafir corn went on to surpass corn as the major grain crop produced in Butler county in the early 20th century (Wilk 1981). The cattle industry thrived as a result of concomitant upland settlement and a post-war beef shortage in the East. The county's location along the cattle trail from Texas to Wichita was advantageous (Wilk 1981). The Kansas cattle boom reached its zenith in 1884 and was heavily impacted by the blizzard of 1886 and a surplus of beef in the Eastern market, but Chelsea township continued to be a major cattle producer (Thomas 1982).

Like a great many pioneer towns, the town of Chelsea did not realize the dreams of the founders. El Dorado, on the other hand, prospered. Its location at the intersection of the Osage, California, and Emporia trails gave it the advantage over Chelsea. When El Dorado won the election for county seat in 1867, Chelsea's citizens decided to move the town of Chelsea to a more visible location closer to the Emporia Trail (which became the first county road in 1861). A new town company was formed and by 1868 the post office was relocated. The town consequently rapidly increased in size and

population between 1868 and 1870. However, other towns, including nearby El Dorado, also thrived, outpacing New Chelsea, which began to fail by 1875. After 1874, the town was no longer recorded in the list of Butler County towns. However, the post office remained in Chelsea until 1907 and the school until 1953. A Methodist-Episcopal church was built in 1902 and was in use until 1963. A general store and a blacksmith shop were also in operation.

The economy of Butler county continued to be based on farming and ranching until oil was discovered in 1915. Towns remaining in the area grew rapidly and prospered economically as a result of the oil boom.

The Butler County Historical Society took an active role in preserving the local history that was to be adversely impacted by the lake (Roberts 1981). Working with KU, they sought to fill a data gap in the archaeological record of Kansas. Sites were identified by informant interviews and documentary sources such as maps, atlases, land records, and histories (Roberts 1981). Once a site was identified, additional research and field checks were conducted. Ten historic sites underwent test excavation during the life of the project in order to acquire data helpful in understanding the adaptations of the settlers to their environment, the economic networks that were operating and the existing social systems (Brown 1981). The original town of Chelsea, Fort Bend, the Osborn log cabin, and the Donaldson stone house were chosen for testing. The town site was outside of federal project boundaries, and Fort Bend was found to no longer exist (Brockington 1982). Testing was conducted at three stone house locations, an icehouse, two log cabins, two town sites, a barn, and the no longer extant Civil War Fort (Johnson 1983).

Historic site types and related resources expected in the project area include homesteads and ranches, farmsteads, trails, cemeteries, wells, cisterns, privies, rock walls, foundations or foundation piers, cellar depressions, chimneys (stone or brick), stairs, railroad lines, cattle trails, roads, schools, dumps, and water diversion features.

2.3.2 Long-term Cultural Resources Objectives

Completion of a full inventory of cultural resources at El Dorado Lake is a long-term objective that is needed for compliance with Section 110 of the NHPA. Professional archaeologists have systematically surveyed all of fee owned lands above the conservation pool of the reservoir. Ultimately, all currently known sites, as well as those found in future inventories should be evaluated to determine their eligibility for the NRHP. Sites of currently unknown NRHP eligibility and those found in the future to be eligible for the NRHP must be protected from impacts caused by USACE or those having leases or easements on El Dorado Lake fee lands. In order to ensure compliance with the NHPA, ARPA, and NAGPRA cultural resource activities will be coordinated with the State Historic Preservation Officer at the Kansas State Historical Society and federally recognized tribes within whose areas of interest, historical homelands, or ancestral territory the work will occur. ARPA permits are required and issued by the Tulsa District for all archaeological work conducted on USACE fee lands, to ensure qualified professional archaeologists perform the work according to established standards.

2.4 DEMOGRAPHIC AND ECONOMIC RESOURCES

The following information covers the current demographic and economic data for counties near El Dorado Lake, Kansas (Zone of Interest). This basic information gives a snapshot of the current population and looks at growth trends for the area.

2.4.1 Zone of Interest

El Dorado Lake is located in Butler County in south-eastern Kansas. The zone of interest for the socioeconomic analysis of El Dorado Lake is defined as Butler, Greenwood, Harvey, Marion and Sedgwick Counties in Kansas.

2.4.2 Population

The total population for the zone of interest in 2018 was estimated at 631,275, as shown in Table 2-10. Approximately 81% of the zone of interest's total population is within Sedgwick County and 11% is within Butler County. Harvey County makes up 6%, Marion County 2%, and Greenwood County 1%. The zone of interest accounts for approximately 22% of the population for Kansas.

The zone of interest's population is projected to increase by just over 145,000 people by 2070, an annual growth rate of 0.4%. Most of the growth is projected to occur in Sedgwick County, which is projected to grow by 131,000 people in 2070, an annual growth rate of 0.4%. Harvey County is also expected to grow by 4,000 people, an annual rate of 0.2%. The remaining counties are expected to decline in population by 2070, with Marion County having the greatest loss of almost 4,000 persons.

Table 2-9 2000 and 2018 Population Estimates and 2070 Projections

Geographic Area	2000 Population Estimate	2018 Population Estimate	2070 Population Projection
Kansas	2,688,418	2,908,776	3,751,900
Butler County	59,482	66,468	84,091
Greenwood County	7,673	6,156	2,857
Harvey County	32,869	34,555	38,079
Marion County	13,361	12,032	7,996
Sedgwick County	452,869	512,064	643,186
Zone of Interest	566,254	631,275	776,209

2000 Population Estimates: U.S. Bureau of the Census, 2000 Decennial Census

2018 Population Estimates: U.S. Bureau of the Census, American Community Survey, 5 Year Estimate

2070 Projections: Center for Economic Development and Business Research, Wichita State University

2.4.3 Population by Gender and Age

The distribution of the population by gender is shown in Table 2-11. For the zone of interest, the population is 49.6% male and 50.4% female, similar to the state's 49.8% male and 50.2% female distribution. All the remaining counties are very similar to near 50%/50% distributions between male and female.

Table 2-10 2018 Population by Gender

Geographic Area	Male	Female
Kansas	1,449,413	1,459,363
Butler County	33,539	32,929
Greenwood County	3,106	3,050
Harvey County	17,200	17,355
Marion County	5,971	6,061
Sedgwick County	253,201	258,863
Zone of Interest	313,017	318,258

U.S. Bureau of the Census, American Community Survey, 5 Year Estimate

Figure 2-9 shows the population by age group expressed as a percent of total population for Kansas, the zone of interest and Butler County, where El Dorado Lake is located. While the percentages are roughly similar for most of the age groups, it can be seen that there is a larger percentage of 25-34 year olds in the zone of interest compared to Kansas and Butler County, with almost 14% of the zone of interest's population in this age group. The zone of interest also shows slightly larger percentages in the under 5 (7%), and 5 to 9 (7.2%) year age groups, when compared to the state and Butler County. Butler County shows to have higher percentages of its population in older age groups than the other two geographic areas.

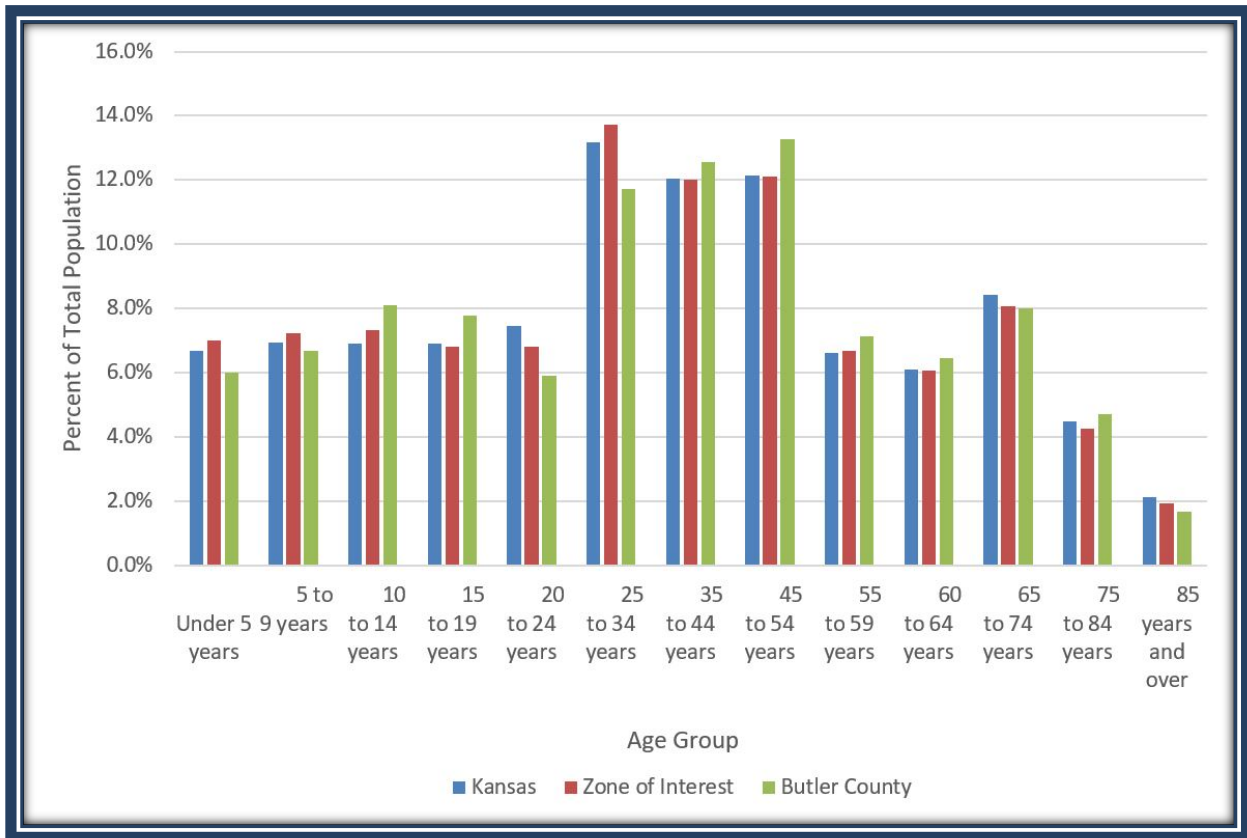


Figure 2-8 Percent of Population by Age Group, 2018 (U.S. Bureau of the Census, American Community Survey, 5 Year Estimate)

The 2018 population by race and Hispanic origin is shown in Table 2-12. In the zone of interest, approximately 72% of the population is White, 13% are Hispanic or Latino, 7% Black, 4% Asian, and 3% two or more races, 1% American Indian and Alaska Native, with each of the other races making up less than 1% each of the total population. The zone of interest is similar to the state’s breakdown. For the state, 76% are White, 12% are Hispanic or Latino, 6% Black, 3% Asian, and 3% two or more races, 1% American Indian and Alaska Native, with each of the remaining races making up less than 1% each.

Table 2-11 2018 Population by Race and Hispanic Origin

Geographic Area	Total	White	Black	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Hispanic or Latino	Some other race	Two or more races
Kansas	2,908,776	2,214,543	163,713	19,504	82,887	1,827	340,616	2,302	83,384
Butler County	66,468	59,255	1,481	497	750	31	3,142	10	1,302
Greenwood County	6,156	5,673	19	9	8	0	233	0	214
Harvey County	34,555	28,673	573	115	250	83	4,078	0	783
Marion County	12,032	11,172	59	11	28	0	430	0	332
Sedgwick County	512,064	349,985	44,285	3,459	22,005	169	73,527	473	18,161
Zone of Interest	631,275	454,758	46,417	4,091	23,041	283	81,410	483	20,792

U.S. Bureau of the Census, American Community Survey, 5 Year Estimate

2.4.4 Education and Employment

Table 2-13 shows the highest educational attainment for the 2018 population 25 years of age and older. In the zone of interest, 26% of the population had earned a high school diploma or equivalent, 25% had some college, but no degree, and 20% had earned a bachelor’s degree. Approximately 11% held a graduate degree or higher and 8% had earned an associate degree. About 7% of the population had attended school between the 9th and 12th grades but did not earn a diploma. Almost 4% of the population had less than a 9th grade education. Educational attainment in the area of interest is representative of the state overall. For Kansas, 26% had earned a high school diploma or equivalent, 23% had some college but no degree, and 21% had a bachelor’s degree. About 12% had a graduate degree or higher, and 8% had an associate degree. Only 6% had 9 to 12 years of education but without degree, twice the percentage of the area of interest, and 4% had less than 9 years of education.

Table 2-12 2018 Population Estimate by Highest Level of Educational Attainment, Population 25 Years of Age and Older

Educational Attainment	Kansas	Butler County	Greenwood County	Harvey County	Marion County	Sedgwick County	Zone of Interest
Population 25 years and over	1,894,675	43,560	4,466	22,635	8,255	330,375	409,291
Less than 9th grade	69,212	855	102	765	301	12,969	14,992
9th to 12th grade, no diploma	106,507	2,395	273	1,283	453	22,388	26,792
High school graduate (includes equivalency)	492,819	11,557	1,544	5,958	2,549	86,432	108,040
Some college, no degree	442,045	11,515	1,337	5,717	2,222	79,676	100,467
Associate degree	161,016	4,594	333	1,885	662	26,868	34,342
Bachelor's degree	394,462	8,410	639	4,286	1,442	65,704	80,481
Graduate or professional degree	228,614	4,234	238	2,741	626	36,338	44,177

U.S. Bureau of the Census, American Community Survey, 5 Year Estimate

Figure 2-10 shows the 2018 employment by sector expressed as a percent of total employment for the area of interest by sector for Kansas, the area of interest and the constituent counties is presented in Table 2-14. For the area of interest, 24% of the employment is in the educational, health care and social assistance services sector, followed by 18% in manufacturing, and 11% in retail trade. While most of the employment is in service sector jobs, manufacturing shows to be an important sector. Additional employment is about 9% in professional, scientific and management, 9% in arts, entertainment, recreation and accommodation services, and 7% in construction. The remaining sectors represent 5% or less each of total employment.

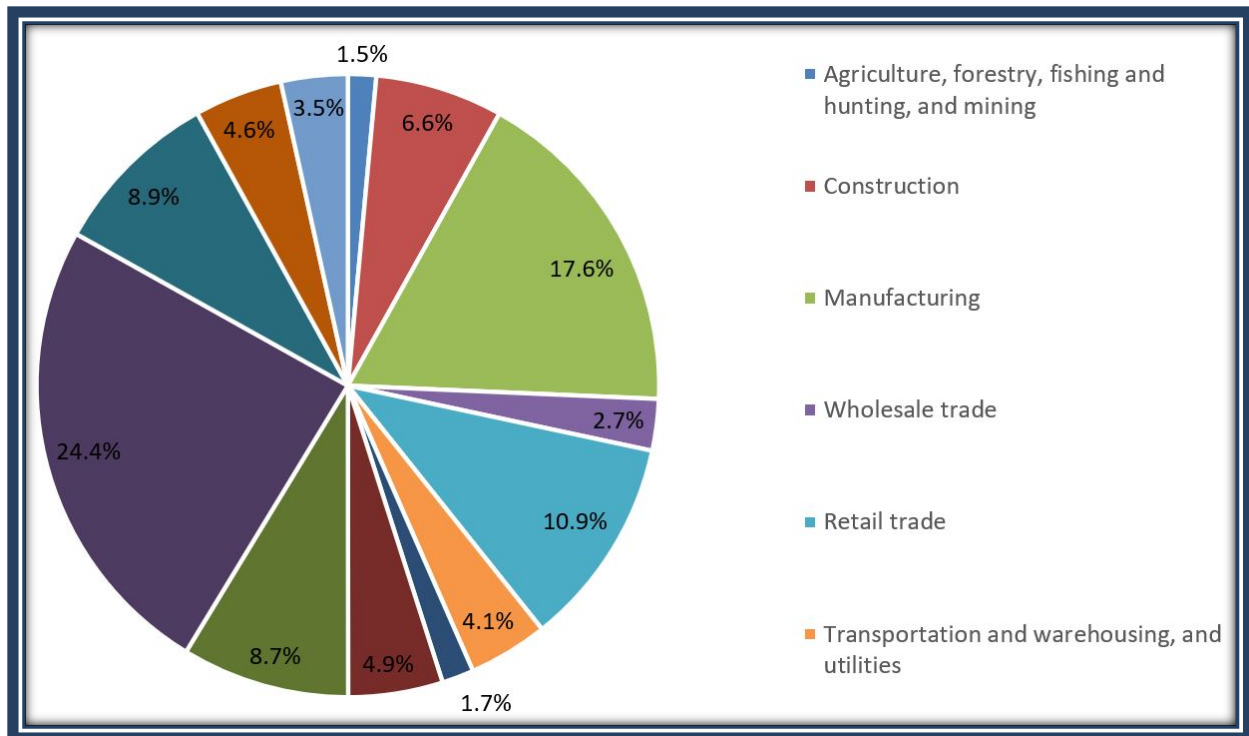


Figure 2-9 Percent Employment by Sector for Area of Interest (2018)

Table 2-13 Employment by Sector (2018)

Employment Sector	Kansas	Butler County	Greenwood County	Harvey County	Marion County	Sedgwick County	Zone of Interest
Civilian employed population 16 years and over	1,428,660	31,098	2,866	16,922	5,632	246,997	303,515
Agriculture, forestry, fishing and hunting, and mining	46,532	847	430	423	440	2,309	4,449
Construction	90,820	2,416	248	1,022	392	16,050	20,128
Manufacturing	176,981	4,822	307	3,149	1,131	43,958	53,367
Wholesale trade	40,345	1,020	66	288	236	6,505	8,115
Retail trade	153,119	2,804	266	1,346	597	28,142	33,155

Employment Sector	Kansas	Butler County	Greenwood County	Harvey County	Marion County	Sedgwick County	Zone of Interest
Transportation and warehousing, and utilities	69,792	1,673	111	755	238	9,781	12,558
Information	28,040	322	31	209	57	4,418	5,037
Finance and insurance, and real estate and rental and leasing	88,306	1,582	108	604	185	12,430	14,909
Professional, scientific, and management, and administrative and waste management services	136,580	2,271	90	1,056	132	22,904	26,453
Educational services, and health care and social assistance	352,931	8,446	681	5,418	1,420	58,086	74,051
Arts, entertainment, and recreation, and accommodation and food services	116,543	2,262	159	1,132	325	23,002	26,880
Other services, except public administration	64,254	1,232	187	841	295	11,341	13,896
Public administration	64,417	1,401	182	679	184	8,071	10,517

U.S. Bureau of the Census, American Community Survey, 5 Year Estimate

The civilian labor force for the area of interest makes up less than 21% of the civilian labor force for the entire state, as shown in Table 2-15. The unemployment rate for the zone of interest was 5.0%, noticeably higher than the state overall, which had an unemployment rate of 4.4%. The constituent counties ranged from 3.0% in Harvey County to 5.2% in Sedgwick County.

Table 2-14 Civilian Labor Force, Employment and Unemployment (2018)

Geographic Area	Civilian Labor Force	Number Employed	Number Unemployed	Unemployment Rate
Kansas	1,493,698	1,428,660	65,038	4.4%
Butler County	32,476	31,098	1,378	4.2%
Greenwood County	2,959	2,866	93	3.1%
Harvey County	17,444	16,922	522	3.0%
Marion County	5,891	5,632	259	4.4%
Sedgwick County	260,607	246,997	13,610	5.2%
Zone of Interest	319,377	303,515	15,862	5.0%

U.S. Bureau of the Census, American Community Survey, 5 Year Estimate

2.4.5 Households, Income, Poverty

Table 2-16 shows the number and size of households for Kansas and the zone of interest. The zone of interest has approximately 241,182 households, which makes up about 21% of the number of households statewide. About 81% of the households are in Sedgwick County (195,770) and about 10% are in Butler County (24,473). The average household size for the area of interest is 2.62 persons, with the constituent counties ranging from 2.20 to 2.60. The household size for the zone of interest is just slightly larger than the state overall, which has 2.52 persons per household.

Table 2-15 Number of Households and Average Household Size (2018)

Geographic Area	Total Households	Average Household Size
Kansas	1,124,549	2.52
Butler County	24,473	2.60
Greenwood County	2,758	2.20
Harvey County	13,383	2.48
Marion County	4,789	2.35
Sedgwick County	195,779	2.58

Geographic Area	Total Households	Average Household Size
Zone of Interest	241,182	2.62

U.S. Bureau of the Census, American Community Survey, 5 Year Estimate

Median household income and per capita income are shown in Table 2-17. While the median household income for the zone of interest was not available, for the constituent counties, it ranged from \$43 thousand in Greenwood County to \$63 thousand in Butler County. By comparison, the state’s median household income was \$57 thousand. All of the constituent counties were below the state, with the exception of Butler County, which had median household income greater than the state overall.

The per capita income for the zone of interest was approximately \$28,541 and fell below the state’s per capita income of \$30,757. All of the constituent counties were below the state’s per capita income, ranging from \$25,756 in Marion County to \$28,759 in Butler County.

Table 2-16 Median and Per Capita Income (2018)

Geographic Area	Median Household Income	Per Capita Income
Kansas	\$57,422	\$30,757
Butler County	\$63,272	\$28,759
Greenwood County	\$42,595	\$27,639
Harvey County	\$56,051	\$27,305
Marion County	\$51,262	\$25,756
Sedgwick County	\$54,974	\$28,673
Zone of Interest	N/A	\$28,541

U.S. Bureau of the Census, American Community Survey, 5 Year Estimate

Percentages of families and persons falling below the poverty level is shown in Table 2-18. The percent of all families for the zone of interest was not available, but for the constituent counties, it ranged from 5.3% in Marion County to 10.0% in Sedgwick County. Butler, Harvey and Marion Counties were below the state’s percentage, while Sedgwick and Greenwood were above.

Approximately 13% of all persons in the zone of interest had incomes below the poverty level, slightly higher than the state’s percentage of 12%. Butler, Harvey, and Marion

Counties had percentages lower than the state and the zone of interest overall. Sedgwick County had the highest, where almost 14% of the all persons have incomes below the poverty level.

Table 2-17 Percentage of Families and People Whose Income in the Past 12 Months is Below the Poverty Level (2018)

Geographic Area	All Families	All People
Kansas	8.2%	12.4%
Butler County	7.2%	10.5%
Greenwood County	8.4%	12.2%
Harvey County	7.8%	11.2%
Marion County	5.3%	9.3%
Sedgwick County	10.0%	14.0%
Zone of Interest	N/A	13.4%

U.S. Bureau of the Census, American Community Survey, 5 Year Estimate



Photo 2-5 El Dorado Lake (Source: MobileRVing.com)

2.5 RECREATION FACILITIES, ACTIVITIES, NEEDS AND TRENDS

El Dorado Lake is a Public Law 89-72 project therefore recreation area facilities originally constructed by USACE are operated and maintained by KDWPT under lease agreements. El Dorado State Park consists of six park areas, which are open to a variety of outdoor recreation opportunities. The facilities includes approximately 1,000 campsites that range from primitive to full utility hookups, 11 group picnic shelters, five camping cabins and five deluxe cabins, modern shower, laundry, restroom facilities, swim beaches, and an equestrian arena, as well as a trail system consisting of hiking, biking and equestrian trails. A hardened trail for wheelchair access is also available. Visitors should note that entry into any Kansas State Park requires a vehicle entry permit available at the state park office or gatehouses.

Located in the Flint Hills Ecoregion, El Dorado Lake recreational activities include canoeing, boating, hiking, swimming, bird watching, photography, fishing, hunting, picnicking, and camping.



Photo 2-6 Cabin at El Dorado State Park (Source: KDWPT)

For more information, call the El Dorado State Park office at (316) 321-7180, or go to the website at: <http://kdwpt.state.ks.us/news/State-Parks/Locations/El-Dorado>.

Much of the information in the following sub-sections come from the 2015 Kansas Statewide Comprehensive Outdoor Recreation Plan.

2.5.1 Zone of Interest

The visitation market area, or zone of interest, is the area from which the majority of visitors to the lake originate. This zone is the area within approximately a 100-mile radius of El Dorado Lake, with the majority of visitation from within 70-miles.

2.5.2 Visitation

Visits to parks and lakes nearest the Kansas City metro area (Clinton, Hillsdale, Perry) generally declined. Some of the greatest increases occurred in less populated areas (Cross Timbers, Fall River, Glen Elder, Webster, Cedar Bluff, Elk City, Eisenhower, and Pomona). Impacts at Cheney and El Dorado were drought based, and algae blooms were credited with temporarily closing several parks (e.g. Milford), but a full park-by-park explanation is not available. The data do suggest that change in population had less effect than would be anticipated.

For State-managed parks, the following visitation information was retrieved for El Dorado Lake from the 2015 Kansas SCORP. As can be seen, the average distance visitors travelled to the El Dorado State Park nearby, was 39 miles.

Table 2-18 Kansas State Park Reservation Profile

Park Name	Reservations	Minimum Distance Travelled	Maximum Distance Travelled	Average Distance Travelled
El Dorado State Park	2237	5.3	326.7	38.9
Elk City State Park	438	5.3	452.7	58.9
Fall River State Park	162	4.8	298.4	81.8

As illustrated in Figure 2-11, visitation to El Dorado State Park grew from 2008 - 2012 and is expected to continue growing. As discussed in the following sections, the recreation facilities, and opportunities at El Dorado Lake support many of the trends in outdoor recreation.

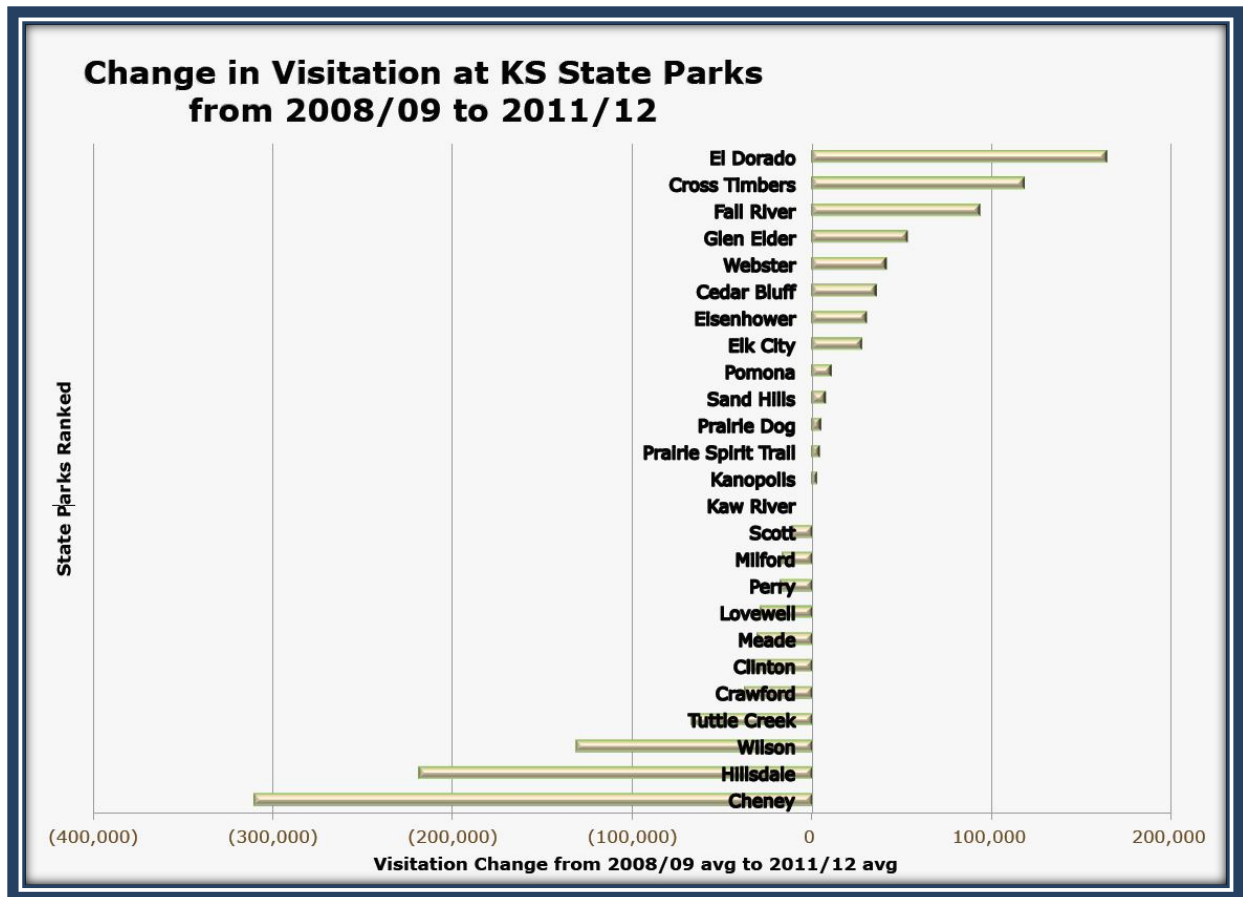


Figure 2-10 Change in Visitation at State Parks 2008 - 2012 (Source Kansas SCORP)

Temperature and drought conditions varied widely in two recent summers (2012 and 2013). The summer of 2012 was particularly hot and dry with drought and the resulting low water levels preventing boat use at some reservoirs. The summer of 2013 was much cooler and saw most of the reservoirs filled. The situation provided an opportunity to examine the impacts. This chart illustrates (green bars in chart reflect 2013 data, where the visitation was below 2012), and was confirmed by park staff, that while some visitors simply quit going, many found substitutes. The most obvious was the variation in attendance at El Dorado Lake (a 45-minute drive from the Wichita metro area). In 2012, visitors left Cheney (due to low lake levels as illustrated below) for El Dorado, but in 2013, they found other options. Participation increased at 75% of the parks over that two-year period.

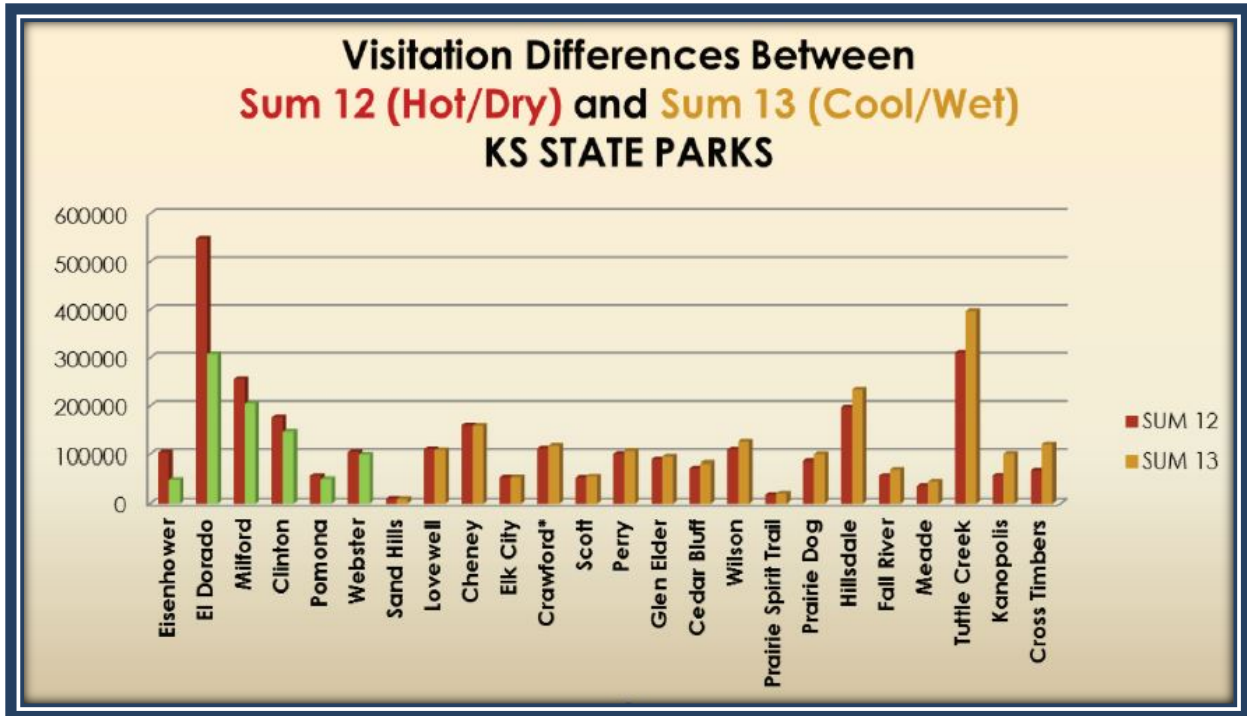


Figure 2-11 Visitation differences impacted by temperature and drought (Source: Kansas SCORP)

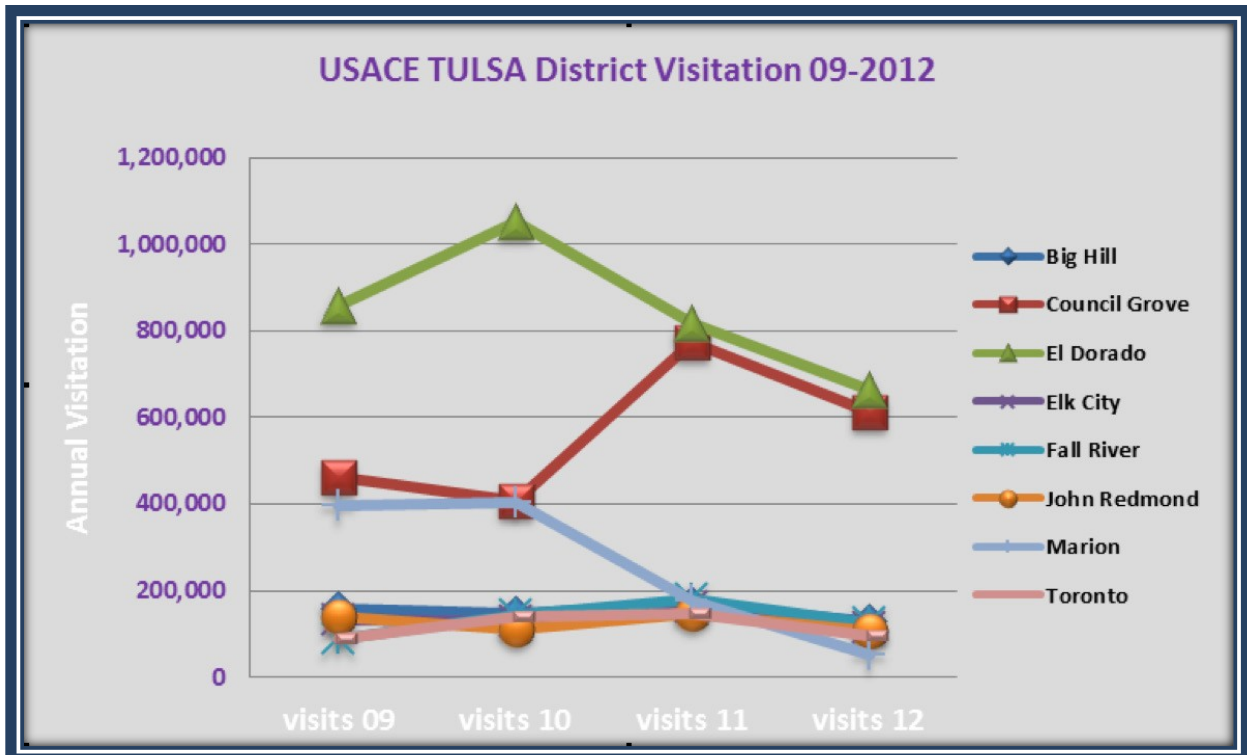


Figure 2-12 USACE Tulsa District Managed Lakes – Kansas 2009-2012 (Source: Kansas SCORP)

2.5.3 Recreation Areas and Facilities

The Spanish Conquistadors sought El Dorado, the fabled city of gold. Today's travelers will find golden experiences at El Dorado Lake. It is a busy lake in a rural setting within easy driving distance of numerous small communities as well as the city of Wichita, and offers a wide variety of services, facilities and amenities.



Photo 2-7 El Dorado Trail Riders (Source: KDWPT)

All of the recreational facilities at El Dorado Lake are managed and administered by the Kansas Department of Wildlife, Parks and Tourism. Table 2-20 lists the various parks with their associated services and managing agencies.

Currently, Kansas Department of Wildlife, Parks and Tourism manages Bluestem, Boulder Bluff, Overlook, Shady Creek, Bemis Creek, and Walnut River. Detailed descriptions of public use areas can be found in Chapter 5 of this Plan, where a listing of areas as well as a general summary of the primary facilities and future management is provided. Additionally, Appendix A of this Plan contains location maps.

Table 2-19 Recreational Facilities and Operating Agencies

FACILITIES	Designated	Boat Launching	Restrooms	Dump Stations	Group Shelter	Showers	Designated Picnic	Fishing Docks	Swimming Beach	Electrical (30 amp)	Electrical (50 amp)	Trails	Playground	Fishing Cleaning
LOCATION														
Bemis Creek	*		*		*		*			*				
Bluestem	*	*	*	*	*	*	*	*	*	*	*	*	*	
Boulder Bluff	*	*	*		*	*		*			*	*		
Overlook			*				*							
Shady Creek	*	*	*	*	*	*	*	*				*	*	*
Shady Creek Marina		*	*											
Walnut River	*		*	*	*	*	*		*	*	*	*	*	
Walnut Valley Sailing Club		*	*		*		*							

Kansas Department of Wildlife, Parks and Tourism

Fishing and Hunting

With approximately 8,000 acres of water, El Dorado Lake has fair to excellent populations of walleye, channel catfish, smallmouth bass, crappie, largemouth bass, flathead catfish, white bass, bluegill and wiper. Below the dam near the Walnut River campground, visitors can access a winter put-and-take trout fishery. Additional opportunities associated with hunting are the El Dorado State Park Shooting Range and El Dorado State Park Archery Range.

The El Dorado Wildlife Area consists of approximately 4,000 acres of public hunting lands. The area offers fair to excellent populations of white-tailed deer, wild turkey, quail, prairie chicken, squirrel, rabbit, doves and waterfowl.

Camping and Picnicking

There are approximately 1,000 campsites in the five primary Park Areas which make up El Dorado State Park – Boulder Bluff, Bluestem Point, Shady Creek, Bemis Creek and the Walnut River Area. All these parks are administered by the Kansas Department of

Wildlife, Parks and Tourism. In fact, El Dorado State Park is the largest state park in Kansas. These parks offer the full array of amenities including an equestrian campground and trails, a large amphitheater, and cabins.

Boating

Boaters at El Dorado Lake will find 8,000 acres of water to indulge their pleasure. Seven boat ramps (12 lanes) are found in the Kansas State Parks surrounding the lake. Shady Creek Marina offers a multitude of services. The Walnut Valley Sailing Club is located in the Boulder Bluff area of the lake.

Boating on the Reservoir is in accordance with the Kansas boating laws and USACE regulations.

Sightseeing and Birdwatching

El Dorado Lake is near the southern end of the Flint Hills National Scenic Byway which begins at Cassoday, KS, (22 miles to the north on State Highway 177) and follows State Highway 177 for 48 miles to its northern terminus at Council Grove, KS. This byway travels through vast expanses of rolling, grass covered hills, some of the best of the last remnants of the Tallgrass Prairie Ecosystem in North America and offers excellent opportunities for driving for pleasure. Numerous bird species abound at El Dorado lake for general bird watching enjoyment, many of which are seasonal visitors such as Bald Eagles and Pelicans.

Swimming

El Dorado Lake has two developed swim beaches located at Bluestem and Walnut River areas.

Trails

El Dorado Lake has seven developed trails (approximately 30 miles) covering a multitude of uses including the 17-mile Boulder Bluff Horse Trail. Other trails located within and outside of campgrounds offer a variety of trail use opportunities. These trails include the $\frac{3}{4}$ mile Teter Nature Trail, the $\frac{3}{4}$ mile Walnut Ridge Trail, the $\frac{3}{4}$ mile Shady Creek Nature Trail, the 2 mile Bike Trail, the 2 mile Walnut River Trail, Cross Country Course and the Linear Trail which connects the lake to the city of El Dorado.

Cross Country Course

- Length of Trail: 1 mile(s)
- Trail Activities: Walking
- There is camping located near the trail
- There is a permit required on the trail
- A meandering trail in the Flint Hills, used for cross country and walk/run competitions.

Tallgrass Prairie Trail

- Length of Trail: 0.5 mile(s)
- Trail Activities: Walking

- There is camping located near the trail
- This trail is ADA accessible
- A scenic trail displaying the wildflowers of the Flint Hills

Walnut River Trail

- Length of Trail: 2.5 mile(s)
- Trail Activities: Walking, Mountain Biking
- There is camping located near the trail
- There is a permit required on the trail
- This trail is ADA accessible
- A semi hardened trail that tours the scenic Walnut River campground.

Boulder Bluff Horse Trail

- Length of Trail: 12 mile(s)
- Trail Activities: Walking, Horse Riding, Mountain Biking
- There is camping located near the trail
- There is a permit required on the trail
- Trail is a scenic stroll through the Flint Hills along the shoreline of El Dorado Lake. An equestrian campground is available in Boulder Bluff Area 1.

Double Black Diamond Trail

- Length of Trail: 2 mile(s)
- Trail Activities: Walking, Mountain Biking
- There is camping located near the trail
- There is a permit required on the trail
- A challenging bike trail through the timber of the Walnut River.

Walnut Ridge Trail

- Length of Trail: 0.75 mile(s)
- Trail Activities: Walking
- There is camping located near the trail
- There is a permit required on the trail
- A scenic trail accessed from the campground that follows the Walnut River

Teter Nature Trail

- Length of Trail: 0.75 mile(s)
- Trail Activities: Walking
- There is a permit required on the trail
- A diverse nature trail winding through the Flint Hills down into a bottomland hardwood forest and a small stand of Paw Paw trees.

2.5.4 Commercial Concession Leases

Concessionaires provide valuable services to the public at USACE lakes across the United States. USACE makes efforts to attract concessionaires that are able to establish suitable, well-maintained businesses that will offer desirable water-related services to the general public. Presently, at El Dorado Lake commercial concession leases facilities are administered by the Kansas Department of Wildlife, Parks and Tourism, include: Shady Creek Marina and Walnut Valley Sailing Club.

2.5.5 Recreation Analysis – Trends

To help provide Kansas communities statewide with informational resources for recreational needs and trends across the state, KDWPT published the 2015 Kansas 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 2015 Kansas SCORP the following are activities showing significant participation increases:

- Wildlife based recreation show encouraging gains. Fishing and several forms of hunting saw new participants.
- Boating/Water Based Recreation (when grouped) all fared well. This includes paddleboards, kayaking, boardsailing, windsurfing, sailing and canoeing, as well as power boating.
- 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).

Figure 2-14 illustrates the survey results from the 2015 Kansas SCORP of the most popular individual outdoor recreational activities. As seen, the most popular activities are relaxing outdoors, picnicking and other social activities, all activities supported by El Dorado Lake.

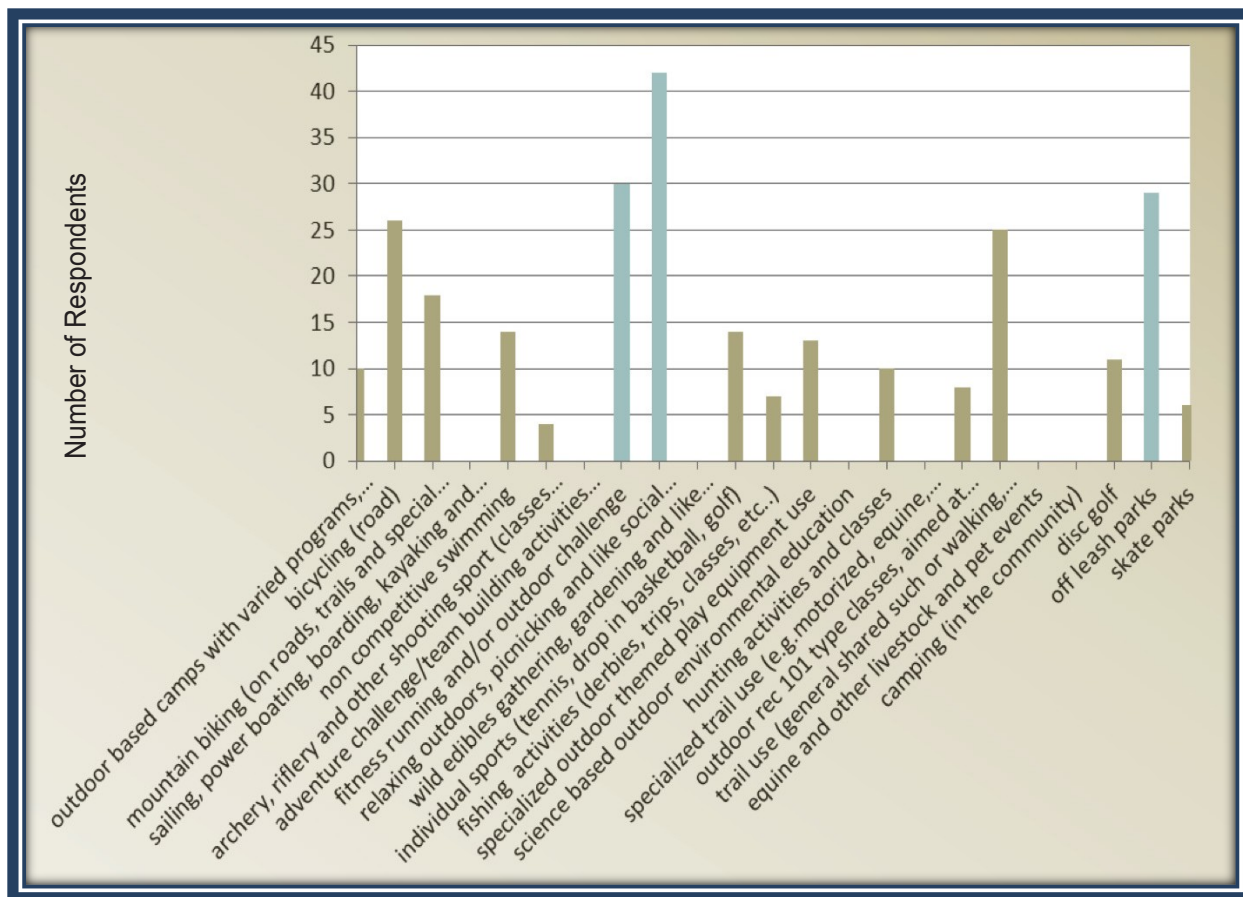


Figure 2-13 Most Popular Individual Outdoor Activities 2009-2012 – KS Public Supplier’s Survey (Source: State of Kansas SCORP)

2.5.6 Recreation Analysis – Needs

The activities addressed above are supported by KDWPT at El Dorado Lake. Wildlife based recreation accounts for a substantial amount of El Dorado Lake’s outdoor recreation demand, both by adjacent residents and by visitors. After a period of decline, more recent statistics show generally favorable growth in various sectors of this user group according to the SCORP. Boating in Kansas, like hunting and fishing, has been noticeably impacted by drought since 2011. The 2012 year was particularly severe, with several water bodies completely inaccessible. However, 2013 brought some relief 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 were 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 5 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. Figure 2-14

illustrates the areas and facilities identified as most needed in state and federal parks in Kansas.



Photo 2-8 Family recreating at El Dorado Lake (Source: KDWPT)

Areas and Facilities most needed: State and Federal Parks

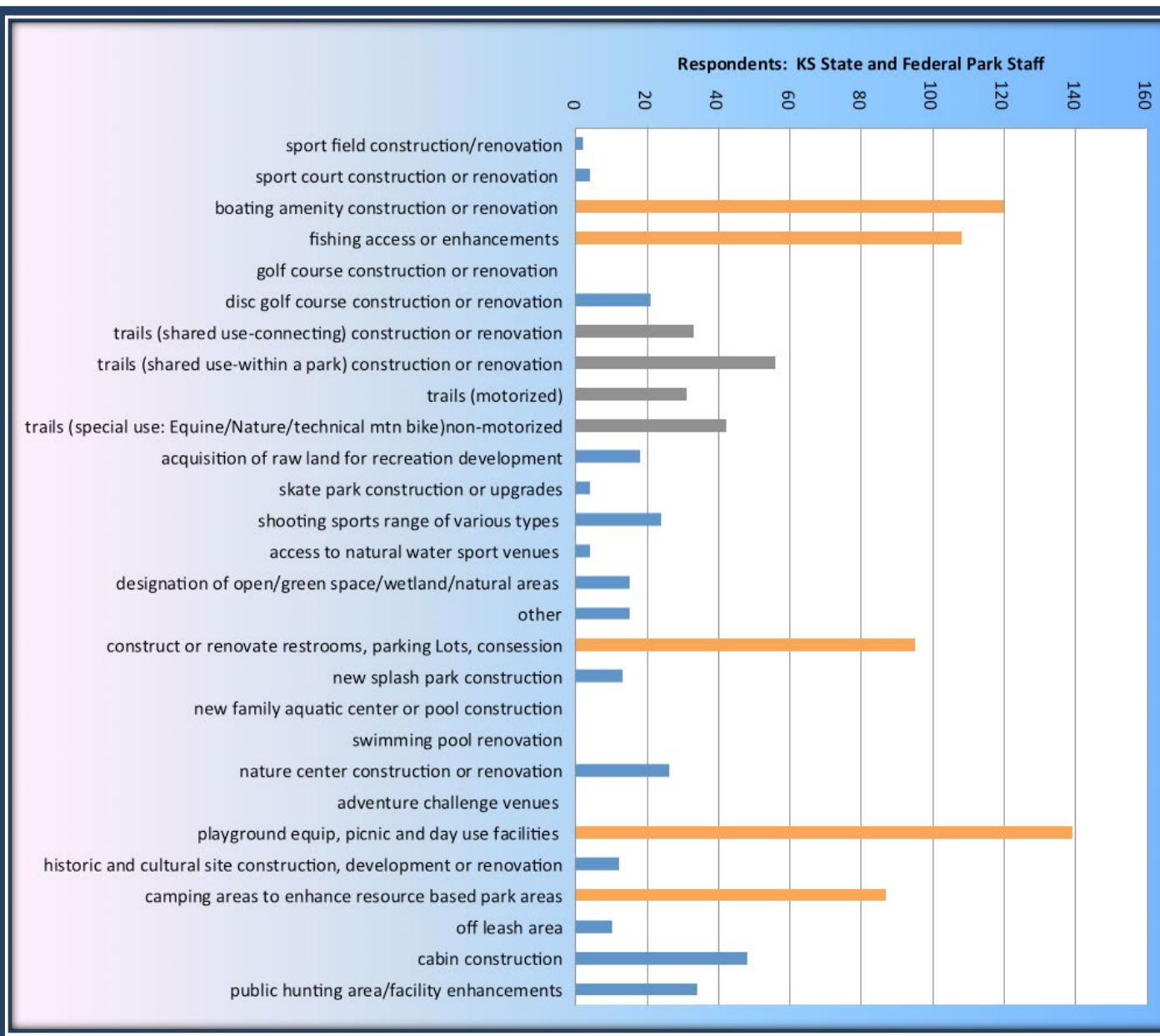


Figure 2-14 Recreational Areas and Facilities Most Needed: State and Federal Parks (Source: 2015 Kansas SCORP)

2.5.7 Summary Discussion – Needs and Trends

Given the outdoor recreation trends information shown in Figure 2-14 and Figure 2-15 above, it is evident that future recreation development at El Dorado Lake should focus on providing increased trail opportunities (of all kinds), more facilities for family and group gatherings, and more wildlife and nature-related viewing opportunities. A high priority should be placed on the protection and retention of large, undeveloped parcels of public land. Doing so responds to outdoor recreation needs expressed in the SCORP. The large expanses of natural habitat on public land are held in high regard by the citizens throughout the zone of interest for El Dorado Lake. This Plan responds to these needs through revised land classifications, new management objectives and conceptual management plans for each land classification.

2.5.8 Recreation Carrying Capacity

The plan formulated herein proposes to provide a variety of activities and to encourage optimal, safe use of present public use areas without causing irreparable harm to natural resources. The carrying capacity of the land is determined primarily by the distinct characteristics of the site including but not limited to soil type, steepness of topography and available moisture. Recreational carrying capacity of the lake's water surface is based primarily on available space and numbers of users. These characteristics, both natural and manmade, are development constraints that often determine the type and number of facilities that should be provided.

No recreation carrying capacity studies have been conducted at El Dorado Lake. Presently, USACE manages recreation areas using historic visitation data combined with best professional judgment to address recreation areas, including the water surface, considered to be overcrowded, overused, underused, or well balanced. Compared to other USACE lakes, El Dorado Lake experiences low to moderate visitation. This trend is expected to continue based on regional population projections. However, USACE will continue to work with KDWPT 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 as needed.

2.6 REAL ESTATE

The total project area at El Dorado Lake encompasses 16,414 acres acquired in fee simple title by USACE. Above the area acquired in fee simple title, 948 acres were encumbered with a perpetual flowage easement. These are the official acres and may differ from those in other parts of this plan due to better measurement technology, erosion and sedimentation.

Purchase of flowage easement by the Government constitutes payment for the right to flood and for the damage and expense to the landowner resulting from project operation. Construction of buildings or facilities for human habitation, or alteration of the existing terrain to the extent that storage of flood water is reduced, will not be permitted

on flowage easement lands. Construction of most structures and improvements on flowage easement lands will require formal written authorization from USACE.

Prospective buyers of property adjacent to El Dorado Lake are strongly encouraged to determine the location of the flowage easement line on any property they are considering purchasing. Flowage easements may or may not be located on deeds or plats provided by the seller(s).

Individuals and companies interested in leases to provide services to the public on public lands should be aware that there are specific restrictions and procedures they must follow. In many cases, individuals or companies will be encouraged to pursue a sublease with an existing lessee. In general, new leases that provide recreational amenities and services require market studies and competitive bidding before an award can be made. Questions regarding this topic should be directed to the USACE lake office at 2105 Pawnee Road, Marion, KS 66861.

2.6.1 Encroachments and Trespass

Individuals or entities without specific, written permission from the District Engineer are prohibited from conducting business on Government property under the Code of Federal Regulations, Title 36 CFR, 327.18. Government property is monitored by USACE 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 requiring violators 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, USACE 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 Tulsa District Real Estate Division and/or Office of Counsel. 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.

At El Dorado Lake, the most common encroachments are unauthorized mowing and paths, unauthorized structures such as fences and temporary structures, grazing, storage of personal property on USACE lands, and tree and vegetation removal. Placement of private property, including livestock, on public land without written authorization is prohibited.

2.6.2 Outgrants

The term “outgrant” is a broad term used by USACE to describe a variety of real estate instruments wherein an interest in real property has been conveyed by USACE to another party. Outgrants at El Dorado Lake include leases, licenses, easements, consents, permits, and others. Outgrants do not include the Shoreline Use Permits that authorize private structures and activities owned or conducted by adjacent landowners such as boat docks and vegetation modification. At present, there are 15 recorded outgrants in effect on USACE lands and 948 acres of flowage easement at El Dorado Lake. These outgrants include the following:

- 8 Easements
- 1 Fish/Wildlife License
- 1 Recreational/ Park Lease
- 1 Agricultural Lease
- 4 Consents

2.7 PERTINENT PUBLIC LAWS

The following Public Laws are applicable to El Dorado Lake. Additional information on Federal Statutes applicable to El Dorado Lake can be found in the Environmental Assessment for the El Dorado Lake Master Plan revision in 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 including construction of El Dorado Lake.
- Title 16 US 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. This law also authorized the creation of the Southwestern Power Administration (SWPA), then within the Dept. of the Interior and now within the Dept. of Energy, as the agency responsible for marketing and delivering the power generated at federal reservoir projects.
- 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.
- PL 79-526, Flood Control Act of 1946 (24 July 1946), amends PL78-534 to include authority to grant leases to non -profit organizations at recreational facilities in reservoir areas at reduced or nominal fees.
- 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 Cover Conservation Act, 6 Sept. 1960. - This act provides for the protection of forest and other vegetative 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. A USACE/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 USACE 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 plant 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 USACE 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 USACE, except policymaking or law or regulatory enforcement.
- Public Law 99-662, The Water Resources Development Act (WRDA) 1986. - Provides for the conservation and development of water and related resources and the improvement and rehabilitation of the Nation's water resources infrastructure. Establishes new requirements for cost sharing.
- PL101-233, North American Wetland Conservation Act (13 Dec 1989), directs the conservation of North American wetland ecosystems and requires agencies to manage their lands for wetland/waterfowl purposes to the extent consistent with missions.
- PL101-336, Americans with Disabilities Act of 1990 (ADA), 26 July 1990, as amended by the ADA Amendments Act of 2008 (PL110-325), prohibits discrimination based on disabilities in, among others, the area of public accommodations and requires reasonable accommodations for persons with disabilities.
- PL101-601, Native American Graves Protection and Repatriation Act (16 Nov 1990), requires Federal agencies to return Native American human remains and cultural items, including funerary objects and sacred objects, to their respective peoples.
- PL 102-580, Water Resources Development Act (WRDA) of 1992 (31 Oct 1992) authorizes USACE to accept contributions of funds, materials and services from non-Federal public and private entities to be used for managing recreational sites and facilities and natural resources.
- PL 103-66 Omnibus Reconciliation Act-Day use fees (10 Aug 1993), authorizes USACE to collect fees for the use of developed recreational sites and facilities, including campsites, swimming beaches and boat ramps.
- PL104-303, WRDA 1996. Authorizes recreation and fish and wildlife mitigation as purposes of a project, to the extent that the additional purposes do not adversely affect flood control, power generation, or other authorized purposes of a project.
- PL104-333, Omnibus Parks and Public Lands Management Act of 1996, (12 Nov 1996), created an advisory commission to review the current and anticipated demand for recreational opportunities at lakes or reservoirs managed by the Federal Government and to develop alternatives to enhance such opportunities for such use by the public.
- PL106-147, Neo-tropical Migratory Bird Conservation Act (20 July 2000), promotes the conservation of habitat for neo-tropical migratory birds.
- The Bald and Golden Eagle Protection Act (16 USC. 668-668c), enacted in 1940, and amended several times since then, 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, purchase or barter, 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."

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3 RESOURCE GOALS AND OBJECTIVES

3.1 INTRODUCTION

This chapter sets forth goals and objectives necessary to achieve the USACE vision for the future of El Dorado Lake. The terms “goals” and “objectives” are often defined as synonymous, but in the context of this Plan, goals express the overall desired end state of the cumulative land and recreation management programs at El Dorado Lake. Resource objectives specify task-oriented actions necessary to achieve the master plan goals.

3.2 RESOURCE GOALS

The following goals are the priorities for consideration when determining management objectives and development activities. 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 El Dorado Lake staff to provide a realistic approach to the management of all resources. The following statements, based on EP 1130-2-550, Chapter 3, express the goals for the El Dorado Lake Master Plan.

- GOAL A** Provide the best management practices to respond to regional needs, resource capabilities and capacities, and expressed public interests consistent with authorized project purposes.
- GOAL B** Protect and manage project natural and cultural resources through sustainable environmental stewardship programs.
- GOAL C** Provide public outdoor recreation opportunities that support project purposes and public interests while sustaining project natural resources.
- GOAL D** Recognize the unique qualities, characteristics, and potentials of the project.
- GOAL E** Provide consistency and compatibility with national objectives and other State and regional goals and programs.

In addition to the above goals, USACE management activities are guided by USACE-wide Environmental Operating Principles as follows:

- Strive to achieve environmental sustainability. An environment maintained in a healthy, diverse and sustainable condition is necessary to support life.

- Recognize the interdependence of life and the physical environment. Proactively consider environmental consequences of USACE programs and act accordingly in all appropriate circumstances.
- Seek balance and synergy among human development activities and natural systems by designing economic and environmental solutions that support and reinforce one another.
- Continue to accept corporate responsibility and accountability under the law for activities and decisions under our control that impact human health and welfare and the continued viability of natural systems.
- Seek ways and means to assess and mitigate cumulative impacts to the environment; bring systems approaches to the full life cycle of our processes and work.
- Build and share an integrated scientific, economic and social knowledge base that supports a greater understanding of the environment and impacts of our work.
- Respect the views of individuals and groups interested in USACE activities; listen to them actively and learn from their perspective in the search to find innovative win-win solutions to the nation's problems that also protect and enhance the environment.

3.3 RESOURCE OBJECTIVES

Resource objectives are defined as clearly written statements that respond to identified issues and that specify measurable and attainable activities for resource development and/or management of the lands and waters under the jurisdiction of the Tulsa District, El Dorado Lake Project Office. The objectives stated in this Master Plan support the goals of the Master Plan, USACE Environmental Operating Principles (EOPs), and applicable national performance measures. The objectives also incorporate findings and recommendations included in the 2016 Kansas Strategic Wildlife Action Plan (WAP) and the 2015 Kansas Statewide Comprehensive Outdoor Recreation Plan (SCORP). The objectives are consistent with authorized project purposes, federal laws and directives, regional needs, resource capabilities, and they take public input into consideration. Recreational and natural resources carrying capacities are also accounted for during development of the objectives found in this Master Plan, as well as regional and state planning documents.

The objectives in this Master Plan are intended to provide project benefits, meet public needs, and foster environmental sustainability for El Dorado Lake to the greatest extent possible. Implementation of the objectives will require close coordination between Kansas Department of Wildlife, Parks and Tourism and USACE and are dependent upon available funds. Table 3-1 through Table 3-5 list the objectives for El Dorado Lake.

Table 3-1 Recreational Objectives

Recreational Objectives	Goals				
	A	B	C	D	E
Support KDWPT efforts to renovate existing facilities to provide a quality recreation experience for visitors while protecting natural resources for use by others. Examples include development of high impact zones at campsites, provision of universally accessible facilities, separation of day use and camping facilities, improved electrical service at campsites.	*		*		
Provide opportunities for day use activities, especially picnicking. Provide enough campsites in popular areas.	*		*		
Optimize opportunities for hunting game wildlife species on all USACE and KDWPT managed lands where such activities are appropriate and in accordance with natural resource management objectives.	*		*	*	*
Monitor boating traffic and evaluate the need to conduct a comprehensive recreation boating use study to ensure visitor safety and enjoyment.	*		*		
Support KDWPT efforts to manage recreation facilities in accordance with public demand. Examples include universally accessible fishing docks, fish cleaning stations near boat ramps, playground equipment in day use and camping areas.	*		*		
Work with various partners to expand existing and develop new trails.	*		*		*
Consider pool fluctuations in design and placement of recreation facilities such as campsites, boat ramps, courtesy docks and restrooms, as well as tree planting and general landscaping.	*	*	*	*	
Ensure consistency with USACE Natural Resource Management (NRM) Strategic Plan.					*
Monitor the SCORP to ensure that USACE and partners are responsive to outdoor recreation trends, public needs and resource protection within a regional framework. All plans by others will be evaluated in light of USACE policy and operational aspects of El Dorado Lake.					*

*Denotes that the objective helps to meet the specified goal.

Table 3-2 Natural Resource Management Objectives

Natural Resource Management Objectives	Goals				
	A	B	C	D	E
Give priority to the preservation and improvement of wild land values in public use planning, design, development, and management activities. Give high priority to examining project lands for the presence of priority habitats identified for the Flint Hills Ecological Focus Areas described by KDWPT in the State Wildlife Action Plan (WAP).	*	*		*	*
Consider flood/conservation pool levels to ensure that natural resources are managed in ways that are compatible with project purposes.	*	*		*	
Actively manage and conserve fish and wildlife resources, especially threatened and endangered species and Species in Need of Conservation by implementing ecosystem management principles. Key among these principles is the use of native species adapted to the El Dorado Lake ecological regions in restoration and mitigation plans.	*	*		*	*
KDWPT through a license with USACE will actively manage principal game wildlife species by establishing means of taking within specified public hunting areas in accordance with the regulatory processes of KDWPT.	*	*	*		*
Manage high density and low-density recreation lands in ways that enhance benefits to wildlife while meeting recreation needs.					*
Optimize resources, labor, funds, and partnerships for protection and restoration of fish and wildlife habitats.		*			*
Minimize activities that disturb the scenic beauty and aesthetics of the lake.	*	*	*	*	
Ensure that adverse impacts resulting from land use actions, including outgrants, are appropriately mitigated to restore the value of the land to the nation.		*		*	*
Implement prescribed fire as a management tool to promote the vigor and health of Flint Hills forests, woodlands, and prairie.	*	*			*

Natural Resource Management Objectives	Goals				
Stop unauthorized uses of public lands such as off-road vehicle (ORV) use, trash dumping, unauthorized fires, fireworks, poaching, clearing of vegetation, agricultural trespass, timber theft, unauthorized trails and paths, and placement of advertising signs that create negative environmental impacts.	*	*	*	*	*
Monitor lands and waters for invasive, non-native and aggressively spreading native species and take action to prevent and/or reduce the spread of these species.	*	*		*	*
Protect and/or restore important native habitats such as prairies, bottomland hardwoods, riparian zones, and wetlands, where they occur, or historically occurred on project lands. Special emphasis should be taken to protect and/or restore special or rare plant communities. Emphasize actions that promote butterfly and /or pollinator habitat, migratory bird habitat, and habitat for birds listed by USFWS as Birds of Conservation Concern.	*	*		*	*

Table 3-3 Visitor Information, Education, and Outreach Objectives

Visitor Information, Education and Outreach Objectives	Goals				
	A	B	C	D	E
Provide opportunities (i.e. comment cards, updates to local municipalities, web page) for communication with agencies, special interest groups, and the general public. Utilize social media to inform visitors.	*			*	*
Provide educational, interpretive, and outreach programs at the lake office and around the lake. Topics to include history, lake operations (Flood Risk Management, and Water Supply), water safety, recreation, cultural resources, ecology, invasive species and USACE missions.	*	*	*	*	*
Work closely with interest groups.	*			*	*
Promote USACE Water Safety message.	*		*	*	*
Educate adjacent landowners on shoreline management policies and permit processes in order to reduce encroachment actions.	*	*	*	*	*

Table 3-4 General Management Objectives

General Management Objectives	Goals				
	A	B	C	D	E
Resurvey and maintain the public lands boundary line to ensure it is clearly marked and recognizable in all areas to reduce habitat degradation and encroachment actions.	*	*		*	
Identify safety hazards or unsafe conditions; correct infractions and implement safety standards in accordance with EM 385-1-1.					*
Ensure green design, construction, and operation practices, such as the Leadership in Energy and Environmental Design (LEED) criteria for government facilities, are considered as well as applicable Executive Orders.					*
Manage non-recreation outgrants such as utility and road easements in accordance with national guidance set forth in ER 1130-2-550 and applicable chapters in ER 405-1-12.	*				*
Manage project lands and recreational programs per USACE Climate Preparedness and Resilience guidance.					*

Table 3-5 Cultural Resources Management Objectives

Cultural Resources Management Objectives	Goals				
	A	B	C	D	E
As funding permits, complete an inventory in accordance with Section 110 NHPA and prepare a Cultural Resources Management Plan.	*	*		*	*
Increase public awareness and education of regional and local Tribal history.		*		*	*
Monitor and enforce Title 36 and ARPA to prevent unauthorized excavation and removal of cultural resources.		*		*	*
Provide access by Tribal Nations 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	*	*	*	*	*

*Denotes that the objective helps to meet the specified goal.

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

4.1 LAND ALLOCATION

All project lands at USACE water resource development projects are allocated by USACE into one of four categories in accordance with the congressionally authorized purpose for which the project lands were acquired. There are four possible categories of allocation identified in USACE regulations for acquisition: Operations, Recreation, Fish and Wildlife, and Mitigation. At El Dorado Lake, the only land allocation category that applies is Operations, which is defined as those lands that are required to operate the project for the primary authorized purposes of Flood Risk Management, Water Supply and navigation. The remaining allocations of Recreation, Fish and Wildlife, and Mitigation would apply only if lands had been acquired specifically for these purposes.

4.2 LAND CLASSIFICATION

4.2.1 General

The objective of classifying project lands is to identify how a given parcel of land shall be used now and in the foreseeable future. Land classification is a central component of this plan, and once a particular classification is established any significant change to that classification would require a formal process including public review and comment.

4.2.2 Prior Land Classifications

Previous versions of the El Dorado Lake Master Plan included land classification criteria that were similar, but not identical to the current criteria. These prior land classifications were based more on projected need than on actual experience, which resulted in some areas being classified for a type of use that has not or is not likely to occur. Additionally, in the 40 years since the previous Master Plan was published, USACE land management policy, wildlife habitat values, surrounding land use, and regional recreation trends have changed significantly giving rise to the need for revised land classifications. Refer to Table 8-1 in Chapter 8 for a summary of land classification changes from the prior classifications to the current classifications.

4.2.3 Current Land Classifications

USACE regulations require the project lands and water surface to be classified in accordance with the primary use for which project lands are managed. There are six primary categories and four subcategories of classification identified in USACE regulations including:

- Project Operations
- High Density Recreation

- Mitigation
- Environmentally Sensitive Areas
- Multiple Resource Management Lands
 - Low Density Recreation
 - Vegetation Management
 - Wildlife Management
 - Future/Inactive Recreation Areas
 - Water Surface

The land and water surface classifications for El Dorado Lake were established after considering public comments, input from key stakeholders including elected officials, city and county governments, and lessees operating on USACE land. Additionally, wildlife habitat values and concerns, as well as outdoor recreation trends analysis provided in the SCORP were used in decision making. Also included in the analysis were historical public use and land management patterns that have developed since publication of the 1976 Master Plan. Maps showing the various land classifications can be found in Appendix A. Each of the land classifications, including the acreage and description of allowable uses, is described in the following paragraphs.

4.2.4 Project Operations

This classification includes the lands managed for operation of the dam, project office, and maintenance yards, all of which must be maintained to carry out the authorized purpose of flood control. In addition to the operational activities taking place on these lands, limited recreational use may be allowed for activities such as public access to the fishing pier. Regardless of any limited recreation use allowed on these lands, the primary classification of Project Operations will take precedent over other uses. There are 422 acres of Project Operations land specifically managed for this purpose.

4.2.5 High Density Recreation (HDR)

These are lands developed for intensive recreational activities for the visiting public including day use areas, campgrounds, marinas and related concession areas. Recreation development by lessees operating on USACE lands must follow policy guidance contained in USACE regulations at ER 1130-2-550, Chapter 16. The policy includes the following statement:

“The primary rationale for any future recreation development must be dependent on the project’s natural or other resources. This dependency is typically reflected in facilities that accommodate or support water-based activities, overnight use, and day use such as marinas, campgrounds, picnic areas, trails, swimming beaches, boat launching ramps, and comprehensive resort facilities. Examples that do not rely on the project’s natural or other resources include theme parks or ride-type attractions, sports or concert stadiums, and standalone facilities such as restaurants, bars, motels, hotels, non-transient trailers, and golf courses. Normally, the

recreation facilities that are dependent on the project's natural or other resources, and accommodate or support water-based activities, overnight use, and day use, are approved first as primary facilities followed by those facilities that support them. Any support facilities (e.g., playgrounds, multipurpose sports fields, overnight facilities, restaurants, camp stores, bait shops, comfort stations, and boat repair facilities) must also enhance the recreation experience, be dependent on the resource-based facilities, and be secondary to the original intent of the recreation development..."

Lands classified for High Density Recreation are suitable for the development of comprehensive resorts. The regulation cited above defines Comprehensive Resort as follows:

"Typically, multi-faceted developments with facilities such as marinas, lodging, conference centers, golf courses, tennis courts, restaurants, and other similar facilities."

At El Dorado Lake there are 3,722 acres classified as High-Density Recreation land. Refer to Table 8-1 for a listing of the current High-Density Recreation Areas at El Dorado Lake. Each of the High-Density Recreation areas is described briefly in Chapter 5 of this Plan.

4.2.6 Mitigation

This classification is used only for lands allocated for mitigation for the purpose of offsetting losses associated with the development of the project. No Mitigation lands are allocated for El Dorado Lake; therefore, no lands are classified as Mitigation lands.

4.2.7 Environmentally Sensitive Areas

These are areas where scientific, ecological, cultural, and aesthetic features have been identified. There are 138 acres classified as Environmentally Sensitive Areas at El Dorado Lake.

4.2.8 Multiple Resource Management Lands (MRML)

This classification is divided into four sub-classifications identified as the following: 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 subclassifications, but the primary sub-classification should reflect the dominant use of the land. Typically, Multiple Resource Management Lands support only passive, non-intrusive uses with very limited facilities or infrastructure. Where needed, some areas may require basic facilities that include, but are not limited to minimal parking space, a small boat ramp, and/or primitive sanitary facilities. There are 4,129 acres of land under this classification at El Dorado Lake. The following is a list each of the sub-classifications, and the number of acres and primary uses of each.

Low Density Recreation. These are lands that may support passive public recreational use (e.g., fishing, hunting, wildlife viewing, natural surface trails, hiking, etc.). There are 31 acres under this classification at El Dorado Lake.

Wildlife Management. This land classification applies to those lands managed primarily for the conservation of fish and wildlife habitat. These lands generally include comparatively large contiguous parcels, most of which are located within the flood pool of the lake. Passive recreation uses such as natural surface trails, fishing, hunting, and wildlife observation are compatible with this classification unless restrictions are necessary to protect sensitive species or to promote public safety. There 4,098 acres of land included in this classification at El Dorado Lake.

Vegetative Management. These are lands designated for stewardship of forest, prairie, and other native vegetative cover. Passive recreation activities previously described may be allowed in these areas. There are zero acres of land included in this classification at El Dorado Lake.

Future or Inactive Recreation. These are lands with site characteristics compatible with High Density Recreation development. These are areas where High Density Recreation development was anticipated in prior land classifications, but the development either never took place or was minimal. These areas are typically closed to vehicular traffic and will be managed as multiple resource management lands until development takes place. There are zero acres of land included in this classification at El Dorado Lake.

4.2.9 Water Surface

USACE regulations specify four possible sub-categories of water surface classification. These classifications are intended to promote public safety, protect resources, or protect project operational features such as the dam and spillway. These areas are typically marked by USACE or lessees with navigational or informational buoys or signs or are denoted on public maps and brochures. The four sub-categories of water surface classification include the following:

Restricted. These areas are restricted to the extent that public access is not allowed for reasons of public safety, and for project operations and security purposes. The areas include water surface in front of the intake gate control tower and the two designated swimming beaches. Approximately six acres of water surface are classified as Restricted at El Dorado Lake. These areas are depicted on the land classification maps in Appendix A.

Designated No-Wake. There are eight boat ramps where approximately 117 acres of water surface are classified as Designated No-Wake for reasons of public safety and protection of property and shorelines. The water surface acreage in this classification can vary significantly depending on lake elevation. No-wake areas are typically denoted by buoys in appropriate areas.

Fish and Wildlife Sanctuary. These areas are managed with annual or seasonal boating access restrictions to protect fish and wildlife species during periods of migration, resting, feeding, nesting, and/or spawning. There are no Fish and Wildlife Sanctuary areas at El Dorado Lake.

Open Recreation. This classification encompasses the majority of the lake water surface and is open to general recreation with boats being the primary means of transport. Boaters are advised through maps, brochures, or signs at boat ramps and

marinas, that navigational hazards may be present at any time and at any location in these areas. Operation of a boat in these areas is at the owner's risk. Specific navigational hazards may or may not be marked with a buoy. Approximately 7,834 acres of water surface at El Dorado Lake are classified as Open Recreation.

A summary of land classifications at El Dorado Lake is provided in Table 4-1. Acreages were calculated using historical and GIS data. A map representing these areas can be found in Appendix A.

Table 4-1 Acreage by Land Use and Water Classification

Classification	Acres
Project Operations	422
High Density Recreation	3,722
Environmentally Sensitive Areas	138
Multiple Resource Managed Lands: Low Density Recreation	31
Multiple Resource Managed Lands: Wildlife Management	4,098
Multiple Resource Managed Lands: Vegetative Management	0
Future/Inactive Recreation	0
Water Surface: Restricted	6
Water Surface: Designated No-wake	117
Water Surface: Fish and Wildlife Sanctuary	0
Water Surface: Open Recreation	7,834

*** Note: These acreage figures were measured using GIS technology and may vary slightly from official land acquisition records.**

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. At El Dorado Lake, only flowage easements exist. A flowage easement, in general, grants to the government the perpetual right to temporarily flood/inundate private land during Flood Risk Management operations and to prohibit activities on the flowage easement that would interfere with Flood Risk Management operations such as placement of fill material or construction of habitable structures. There are 8 separate easements, totaling 948 acres of flowage easement lands, at El Dorado Lake.

5 RESOURCE PLAN

5.1 RESOURCE PLAN OVERVIEW

This chapter describes in broad terms how each land classification within the Master Plan will be managed. All management goals described in Section 3.2 apply to each of the land classification, but the primary goal(s) for each classification is listed below for emphasis. Refer to section 3.3 for a listing of resource objectives applicable to each management goal. Refer to Appendix A for maps showing the various land classifications.

Management of all lands, recreation facilities, and related infrastructure must take into consideration the effects of pool fluctuations associated with authorized project purposes. Management actions are dependent on congressional appropriations, the financial capability of lessees and other key stakeholders, and the contributions of labor and other resources by volunteers. The land classifications and applicable management goals for each classification for El Dorado Lake include the following:

Project Operations	Goal A
High Density Recreation	Goal C
Environmentally Sensitive Areas	Goal B, D, E
Multiple Resource Management Lands for:	
Low Density Recreation	Goal C
Wildlife Management	Goal B, E
Vegetation Management	Goal B, E

A more descriptive and detailed plan for managing project lands can be found in the El Dorado Lake OMP. The OMP is an annually updated, task and budget-oriented plan identifying tasks necessary to implement the Resource Plan and achieve the goals and objectives of the Master Plan.

5.2 PROJECT OPERATIONS

Project Operations is land associated with the dam, spillway, levees, lake office, maintenance facilities, and other areas solely for the operation of the project. There are 422 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 sustained operations of the dam and related facilities including restricting public access in hazardous locations near the dam and spillway.

5.3 HIGH DENSITY RECREATION

El Dorado Lake has 3,722 acres classified as High-Density Recreation (HDR). These lands were developed for intensive recreational activities for the visiting public including day use and campgrounds. National USACE policy set forth in ER and EP 1130-2-550, Chapter 16, limits recreation development on USACE lands to those activities that are dependent on a project's natural resources and typically include water-based activities, overnight use, and day use such as marinas, campgrounds, picnic areas, trails, swimming beaches, boat launching ramps and comprehensive resorts. Examples of activities that are not dependent on a project's natural resources include theme parks or ride-type attractions, sports or concert stadiums, and stand-alone facilities such as restaurants, bars, motels, hotels, and golf courses.

The High-Density Recreation areas at El Dorado Lake include 3,722 acres in 5 primary Park Areas that are managed by KDWPT, under a lease agreement with USACE. The USACE does not manage any HDR areas at El Dorado Lake. The KDWPT is responsible for the operation and maintenance of their leased areas, and although the USACE does not provide direct maintenance within any of the leased locations, it may occasionally lend support where appropriate. The USACE reviews requests and ensures compliance with applicable laws and regulations for proposed activities in all leased HDR areas. USACE works with partners to ensure that recreation areas are managed and operated in accordance with the objectives prescribed in Chapter 3.

The following is a description of the parks operated by KDWPT on USACE lands at El Dorado Lake, some of which are highly developed, while others have only basic facilities and limited development. Maps showing existing parks and facilities can be found in Appendix A.

5.3.1 El Dorado State Park Lease

El Dorado State Park stretches across 4,500 acres along the eastern and western shore of El Dorado Reservoir. The park features a shooting range, as well as an impressive amphitheater and stage specially designed for special events and concerts. Seven trails offer outdoor adventure for hikers, bikers and horse riders of all skill level. The park is divided into areas that each offer amenities for wide array of users. Overall, the park offers 10 modern cabins, approximately 1,000 campsites with over 500 designated primitive campsites, 307 standard hook-up campsites with electric and water, and 165 campsites with full hook-ups. Detailed descriptions of the park areas are as follows:

Bluestem Point Area – Within the 1,434-acre lease, Bluestem Point Campground has seven areas with over 250 individual campsites ranging from primitive to full hook-ups, one group camping area with 8 campsites. Park amenities include two boat ramps each with multiple launching lanes and courtesy docks for loading, a swim beach, dump station, general store with laundry services, playgrounds, group picnic sites, multiple restrooms, and shower facilities. Also available within the park is a youth fishing pond, and a multipurpose trail.

Boulder Bluff Area –The 987-acre Boulder Bluff area offers a diversity of recreation opportunities for both day use visitors and campers. The campground area

accommodates 160 individual campsites, including multiple restrooms, and shower facilities. Park amenities include a group picnic site, a playground, two boat ramps, courtesy dock, trails, an equestrian campground, and the Walnut Valley Sailing Club.

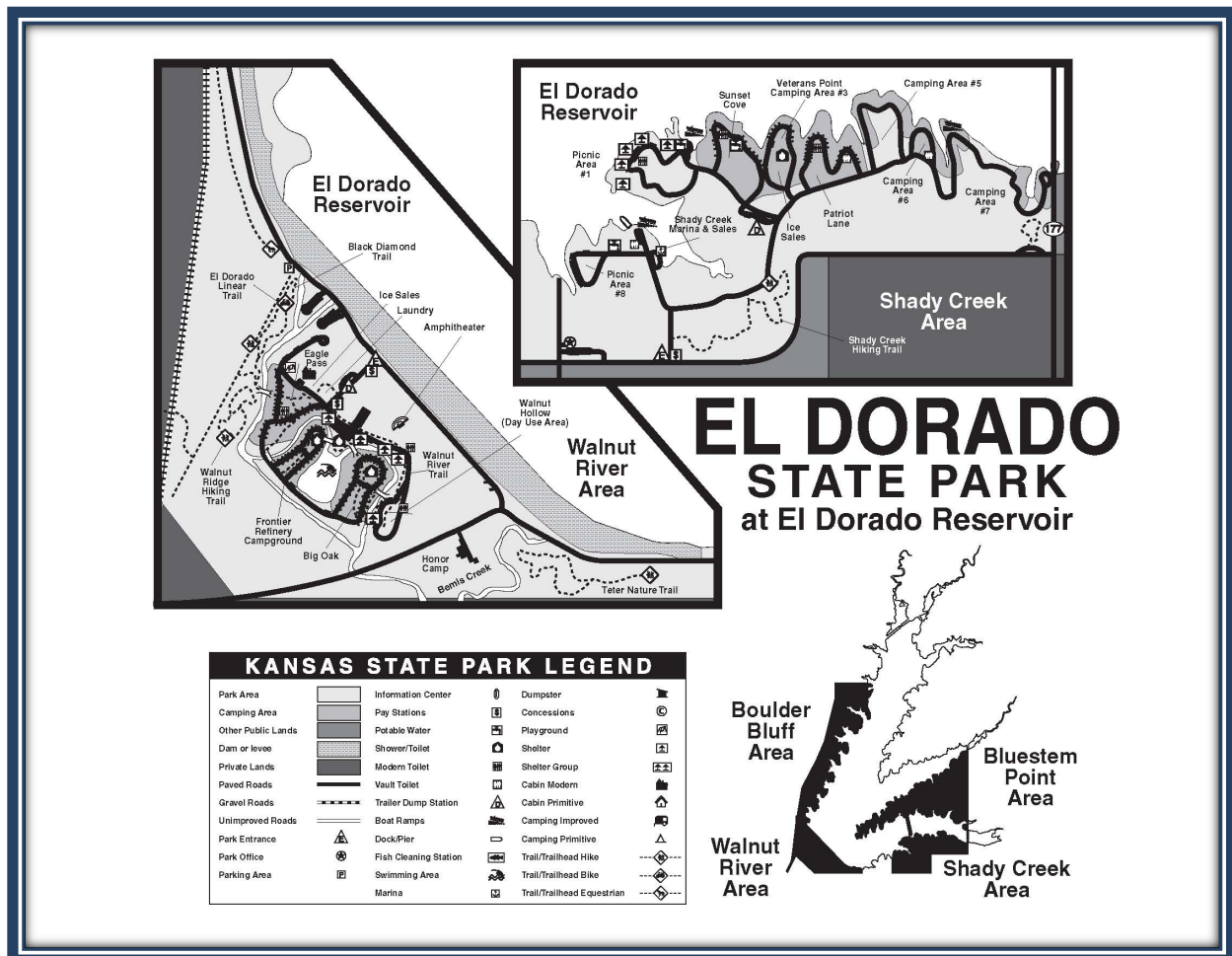


Figure 5-1 El Dorado State Park map, Walnut River Area, Shady Creek Area (Source: KDWP)

Shady Creek Area – The Shady Creek area is 845 acres and provides visitors both day use and camping opportunities. The camping area consists of 140 individual campsites with supporting restrooms, showers, and dump station. Additional amenities include picnic sites, shooting range, two boat ramps, courtesy dock, playground, trails, fish cleaning station, and the Shady Creek Marina.

Walnut River Area – Located on 485 acres the Walnut River area offers a complete package for all visitors. Camping consists of 158 individual site offering primitive and full-service hook-ups, restrooms, and showers. Amenities include a swim beach, playgrounds, group picnic shelters, cabins, archery range, store, amphitheater, and trails.

Bemis Creek Area – The Bemis Creek area is only 11 acres in size and is located between Shady Creek and Bluestem Point on the eastern shore of the lake. The

campground offers only 25 campsites with both electric and water hook-ups. The area also includes a large group picnic shelter and vault restrooms.

Overlook – The Overlook area is 14 acres in size and provides picturesque views of the lake and dam. There is no camping at the Overlook, but it does offer picnic sites and restrooms.

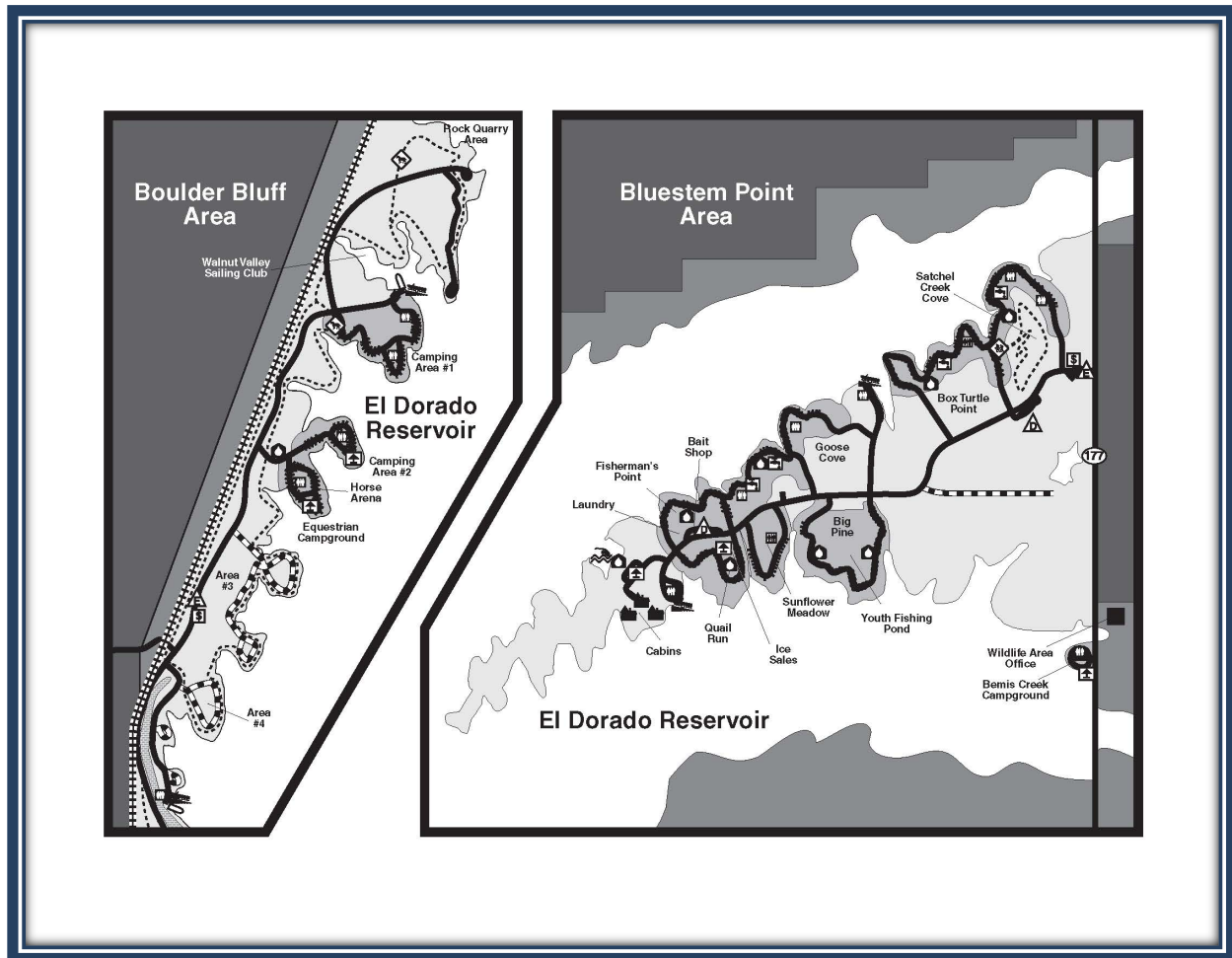


Figure 5-2 El Dorado State Park map, Boulder Bluff Area, Bluestem Point Area (Source: KDWPT)

5.3.2 Trails

There are seven developed trails covering a multitude of uses at El Dorado Lake all of which are managed by KDWPT within El Dorado State Park. All trails are open year-round and offer a variety of activities and experiences.

Teter Nature Trail is a 3/4-mile hiking/interpretive trail located at the east end of the Walnut River campground. The trail is named in honor of the Teter family, which owned and preserved the area for many years until it was purchased in 1974 for the construction of El Dorado Reservoir. It winds through 8-acres of land known for its riparian timber and contains one of the most diverse collections of plant life found

anywhere in Butler County. The site also provides a home for many kinds of birds and animals such as deer, raccoon, and turkey.

Walnut Ridge Trail is a 3/4-mile hiking/biking Trail located across the Walnut River from the Walnut River Campground. The trail takes the visitor on a scenic tour through dense timber and along the Walnut River. Wildlife is abundant with whitetail deer frequenting the area, especially during the spring. The trail also connects directly with the Linear Trail from El Dorado.

Walnut River Trail is an extension of the Linear Trail, which enters the campground from the west. The hardened trail is approximately 2-miles long and winds throughout the Walnut River Campground. It is open for hiking, biking, and especially wheelchair access. Along the course of the trail, the observer will see the entire campground, will cross over the Walnut River three times, and will get to spend time at the swim beach located in the center of the campground.

Linear Trail is a hardened multiuse trail constructed by the city of El Dorado. The trail starts from two locations in the city and ends as it crosses the bridge into the Walnut River Campground.

Double Black Diamond Mountain Bike Trail is a 2-mile hike/bike trail for those who like a little more of a challenge. Located just across the river from the Walnut River campground and connecting with the Linear Trail, the Double Black Diamond trail is a scenic tour through the uplands of the Flint Hills to the bottomlands of the Walnut River. Along the way, rock outcroppings and steep grade changes can be expected. The trail is narrow, winds through dense timber, and has two water crossings as an additional challenge.

Shady Creek Nature Trail is a hiking/interpretive trail which is about 3/4-mile long. The trail begins near the self-pay station in the Shady Creek Campground, extends across the prairie, and loops down into a unique and scenic wetland area. During the spring and fall, when rain is abundant, expect to see an abundance of waterfowl, shorebirds, and wading birds in the wetland. In the spring, the trail is a favorite birthing area for whitetail deer, so it is not uncommon to see several spotted fawns playing together.

Boulder Bluff Horse Trail begins at the Boulder Bluff Area One and Two horse camping areas. This 17-mile trail follows the shoreline of scenic El Dorado Reservoir through a variety of terrain. The horse camping areas have facilities for camping and care of your horses. The trail is also open to hiking and biking as well. Area 2 campground contains 23 utility campsites along with corrals, wash bay, manure bunker, a large riding arena, and a large picnic shelter with electricity.



Photo 5-1 Walnut Ridge Trail (Source: Pinterest)

5.4 ENVIRONMENTALLY SENSITIVE AREAS

ESAs are areas where scientific, ecological, cultural or aesthetic features have been identified to be protected and preserved. 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 or applicable state statutes. These areas must be managed 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 and management. These areas are typically distinct parcels located within another, and perhaps larger, land classification, area.

There are three areas totaling approximately 138 acres at El Dorado Lake under the ESA classification. The results of the Wildlife Habitat Appraisal Procedure conducted on August 31 – September 1, 2020, were used, in part, to assist in determining which areas should be classified as ESA. Other factors, including public and stakeholder comment, the presence of cultural resources, presence of species of conservation concern, and visual aesthetics were also included in the selection of ESA areas.

These acres are managed in cooperation with the State of Kansas for the protection of unique habitat, protected wildlife, or cultural resources. Management actions that may be implemented include planting suitable native vegetation, no tillage of the ground surface will be permitted, and the use of prescribed burns to maintain desired vegetative cover.

5.5 MULTIPLE RESOURCE MANAGEMENT LANDS

Multiple Resource Management Lands (MRML) are organized into four sub-classifications. These sub-classifications are: Low Density Recreation, Wildlife Management, Vegetative Management, and Future/Inactive Recreation Areas. The following is a description of each sub-classification's resource objectives, acreages, and description of use.

5.5.1 MRML - Low Density Recreation

These lands have minimal development or infrastructure that support passive public use such as hiking, nature photography, bank fishing, and hunting. Since these lands are typically adjacent to private residential developments, hunting is only allowed in select areas that are a reasonable and safe distance from adjacent residential properties. These lands are typically open to the public, including adjacent landowners, for pedestrian traffic and are frequently used by adjacent landowners for access to the shoreline near their homes. Prevention of unauthorized use on this land, such as trespassing or encroachment, is an important management and stewardship objective for all USACE lands but is especially important for lands in close proximity to private development. Future management of these lands calls for maintaining a healthy, ecologically adapted vegetative cover to reduce erosion and improve aesthetics. Maintenance of an identifiable property boundary is also a high priority in these areas. There are 31 acres of MRML – Low Density Recreation at El Dorado Lake.

5.5.2 MRML - Wildlife Management

There are 4,098 acres of MRML – Wildlife Management at El Dorado Lake. The management of these lands is by KDWPT. In general, this land classification calls for managing the habitat to support native, ecologically adapted vegetation, which in turn supports native game and non-game wildlife species, with special attention given to federal and state-listed threatened and endangered species (see Table 2-7 Chapter 2.). Future management practices by KDWPT may include such activities as placement of nesting structures, construction of water features or brush piles, prescribed fire, fencing, removal of invasive species, and planting of specific food-producing plants that may be necessary to support wildlife needs. KDWPT employs many of these management practices on the El Dorado Wildlife Area (ELDWA) but may also implement enhancement practices such as agricultural leases that may benefit waterfowl and planting sunflower fields to attract doves for hunters. The primary mission of the ELDWA is to provide suitable wildlife habitat to an array of game and non-game species and provide the public with recreational opportunities in such habitats.

KDWPT Management Objectives for ELDWA are identified below:

- Restore and enhance native herbaceous habitats, for the benefit of upland wildlife, by controlling woody invasion, noxious weeds, and other invasive species.
- Develop additional herbaceous habitats to improve habitat diversity and water quality within riparian areas currently dominated by woodland and agricultural habitats.
- Enhance upland wildlife benefits by converting existing smooth brome stands to early succession herbaceous habitats using burning, disking, and herbicide treatments.
- Improve riparian corridor width, function, and diversity by actively retiring agricultural lands adjacent to lake tributaries. Enhance woodland habitat quantity and quality (and water quality) by managing existing woody vegetation within riparian areas and manipulating resulting woody vegetation within retired agricultural lands.
- Improve woodland habitat diversity and burr oak, black walnut, and bitternut hickory stature and nut production by conducting timber stand improvement activities.
- Continue to enhance and maintain facilities and infrastructure to ensure safe and reasonable public access.
- Continue to work with other area governmental, constituency, and business groups to meet ELDWA objectives and the KDWPT mission.

There are federally listed threatened or endangered species that could and do utilize habitat within the El Dorado Lake area. Therefore, any work conducted on this project will be in accordance to the Endangered Species Act and will be appropriately coordinated with the USFWS. 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 2-7) will continue to receive attention to ensure they are managed in accordance to their habitat needs.

Additionally, agricultural leases for grazing or hay production may be employed when such actions are beneficial to long-term ecological management goals. Hunting and fishing activities are regulated by federal and state laws and special restrictions proposed by USACE and approved through state regulatory processes. Natural surface pedestrian trails are appropriate for most Wildlife Management areas.



Photo 5-2 Turkeys at El Dorado Lake (Source: KDWPT)

5.5.3 MRML-Vegetative Management

These are lands designated for stewardship of forest, prairie, and other native vegetative cover. Passive recreation activities, such as hiking on natural surface trails, wildlife photography, and hunting may be allowed in these areas. There are 0 acres of Vegetative Management at El Dorado Lake.

5.5.4 Future or Inactive Recreation Areas

These areas either have site characteristics compatible with potential future development or are currently closed recreation areas. These areas will be managed for multiple resources until opportunities to develop or reopen them arise. There are 0 acres of Future or Inactive Recreation at El Dorado Lake.

5.6 WATER SURFACE

Classifying the water surface is intended to ensure the security of key operations infrastructure, promote public safety and protect habitat. In accordance with national USACE policy set forth in EP 1130-2-550, the water surface of the lake at the conservation pool elevation may be classified using the following classifications:

- Restricted
- Designated No-Wake
- Fish and Wildlife Sanctuary
- Open Recreation

At conservation pool level of 1,339.0 feet NGVD there are 7,957 acres of surface water. Buoys are managed by USACE with close coordination with the KDWPT. These buoys help mark hazards, swim beaches, boats keep-out and no-wake areas. The following water surface classifications are designated at El Dorado Lake.

5.6.1 Restricted

Restricted water surface includes those areas where recreational boating is prohibited or restricted for project operations and safety and security purposes. The total acreage of Restricted water surface is approximately six acres. The Restricted water surface at El Dorado Lake includes areas near the dam and the two swim beaches. Future management calls for one or more of the following management measures: placement of buoys, placement of signs near boat ramps, and describing the areas on maps available to the public.

5.6.2 Designated No-Wake

Designated No-Wake areas are intended to protect environmentally sensitive shorelines and improve visitor safety near key recreation water access areas such as boat ramps and swim beaches. There are eight boat ramp areas at El Dorado Lake where no-wake restrictions are in place for public safety and protection of property. Designated No-Wake areas at El Dorado Lake include approximately 117 acres. Future management of these areas rests with the USACE and partner agencies at El Dorado Lake. Specific measures to be taken include placement of buoys, placement of signs near boat ramps, and describing the areas on maps available to the public.

5.6.3 Fish and Wildlife Sanctuary

This water surface classification applies to areas with annual or seasonal restrictions to protect fish and wildlife species during periods of migration, resting, feeding, nesting, and/or spawning. There are 0 acres of Fish and Wildlife Sanctuary water surface at El Dorado Lake.

5.6.4 Open Recreation

Open Recreation includes all water surface areas available for year-round or seasonal water-based recreational use. Approximately 7,834 acres of El Dorado Lake water surface is designated as Open Recreation. Signs at boat ramps warn boaters that navigation hazards such as standing dead timber, shallow water, and floating debris may be present at any time and location and it is incumbent upon boat operators to exercise caution. Boating on the lake is in accordance with USACE regulations and

water safety laws of Kansas. The USACE encourages all boaters and swimmers to wear their lifejackets at all times and to learn to swim well.

5.7 RECREATIONAL SEAPLANE OPERATIONS

Recreation seaplane landings and takeoffs may occur on water surface areas where this activity is not prohibited. Seaplane restrictions 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, Section 327.4. Restricted areas for seaplanes at USACE managed lakes were established through public meetings and an EA circa 1980. The seaplane policy for USACE Tulsa District is found in the Notice to Seaplane Pilots, which lays out the general restrictions as well as lake-specific restrictions for seaplane operation. Once on the water, seaplanes are considered to be water vessels and fall under guidelines for watercraft. Appendix E contains the seaplane map for El Dorado Lake.

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6 SPECIAL TOPICS/ISSUES/CONSIDERATIONS

6.1 SEDIMENTATION

By design, reservoirs constructed for flood control purposes drain extensive land areas and are therefore characterized by large watersheds. As a result, reservoirs may be subject to input and accumulation of large quantities of sediments transported from their watersheds, particularly when drainage areas are characterized by erodible soils and land uses which expose soils to erosion and transport during significant rainfall events. Such land uses may include agricultural practices such as row crop farming and other practices resulting in soil disturbance. Large federal reservoirs are designed to accommodate high sediment inputs over time, though sediment accumulation eventually decreases the capacity of these lakes for water storage. Typically, sedimentation is event-driven with most sediment loading occurring during major inflow events. The rate of storage loss varies by lake and sediment accumulation over time is typically monitored by periodic sedimentation surveys.

The conservation pool (the upper limit of which is sometimes referred to as “normal” pool level) contains all the water stored for project purposes such as Water Quality, Water Supply, fish and wildlife, and recreation. Over time, accumulation of sediment in the conservation pool decreases the capacity for water storage and, in extreme cases, may severely impact authorized project purposes. Watershed protection strategies which decrease soil erosion at the source are generally viewed as the most effective means of reducing reservoir sedimentation. Owing to prohibitively high costs and environmental effects, large-scale dredging of federal reservoirs is currently rarely employed as a means of restoring lost capacity. Details of sedimentation for El Dorado Lake can be found in Chapter 2.

6.2 WATERSHED RESTORATION AND PROTECTION STRATEGY

The WRAPS is a framework that allows for increased stakeholder involvement in issues that impact their watershed. Administered by the KDHE under the authority of the 1998 Clean Water Action Plan, this program helps communities identify protection needs and opportunities, create goals and action items to accomplish those goals, and funding to the stakeholders to implement the action items.

Each WRAPS group has a nine-element plan that guides their activities. The Upper Walnut/El Dorado Lake WRAPS Nine Element plan is written to address impairments relating to eutrophication and sedimentation. Best management practices will be put in place specifically to address impacts from croplands, rangelands, and other livestock activities.

Specifically, impairments addressed in the Upper Walnut/El Dorado Lake Twin Lakes WRAPS are the impacts of bacteria, nutrients, and sediment by targeting rangeland, livestock, cropland and streambank areas. Best management practices for reducing phosphorus and bacteria within crop and rangelands include vegetative buffers, relocating feeding pens, and implementing grazing management plans within the

watershed. Best management practices for reducing sediment includes no-till farming, terracing, buffers and streambank stabilization. The steps within the WRAPS program involve building awareness and education, engaging local leadership, monitoring and evaluation of watershed conditions, and assessment, planning, and implementation of the WRAPS process at the local level.

6.3 POOL ELEVATION

El Dorado Lake possesses two active zones or “pools” defined by elevation and established at the time the reservoir was designed by the USACE and authorized by Congress. The flood control pool at El Dorado Lake is normally kept empty but is periodically used to catch and control upstream flows, which, without the dam, could cause downstream flooding. Flood control storage at El Dorado Lake exists between elevations 1,339.0 and 1347.5 feet (ft.) NGVD. Storage in the flood control pool is only used to minimize downstream flooding during periods of rainfall and the objective of operating the lake is to evacuate this pool as quickly as possible while minimizing downstream flood impacts. The bottom elevation of the flood control pool (1,339.0 ft.) defines the transition point between flood control and conservation pools at El Dorado Lake.

The conservation pool stores water to support authorized project purposes. The top of the El Dorado Lake conservation pool (sometimes referred to as “normal” pool elevation) is 1,339.0 ft. NGVD as authorized by Congress. Based on the most recent sediment survey (2011), El Dorado Lake contains approximately 161,550 acre-feet (a unit of volume equal to one acre of surface area and a depth of 1 foot) of storage at the top of the conservation pool. While the lake level at any given time may vary depending upon withdrawals, reservoir releases, drought, or rainfall, which replenishes water in the conservation pool or fills portions of the flood control pool, the objective of operating the lake is to maintain a lake level as close to the top of the conservation pool as possible.

Changing the elevation of the top of the conservation pool of a federal reservoir from that authorized by Congress is not a simple, inexpensive, or trivial matter. This action requires redistribution or “reallocation” of storage between authorized pools, typically increasing the elevation of the conservation pool by reallocating from flood storage for some clearly identified and defined need – often an increase in storage for Water Supply. This requires detailed study of the impacts to authorized project purposes as well as associated environmental impacts. Depending upon the nature of the request, detailed studies and any mitigation required to change conservation pool elevations may require considerable cost sharing by non-federal entities requesting the changes. Finally, depending on the extent and nature of reallocation of storage, final approval of such changes may require Congressional authorization.

There are currently no identified needs or requests for reallocation of storage or changes to authorized pool elevations at El Dorado Lake. Accordingly, there are no current plans to study or implement changes to authorized pool levels or operations from those currently in place.

6.4 MOTORIZED VEHICLES

The operation of motorized vehicles on roadways within USACE managed property at El Dorado Lake is governed by applicable Federal, state, and local laws and regulated by authorized enforcement officials (36 CFR 327.2 and 327.26). Off-road operation of any motorized vehicle is prohibited.

6.5 BLUE GREEN ALGAE AND HARMFUL ALGAL BLOOMS

Blue Green Algae (BGA) and subsequent harmful algal blooms (HABs) have been occurring at El Dorado Lake and its negative impact on the recreational opportunities and public uses is known to the visitors of the reservoir. Blue-green algae are naturally present in most Kansas surface water resources but when certain conditions are present these organisms can reproduce rapidly. This dense growth of algae is called a bloom, sometimes leading to a HAB. HABs usually manifest in mid-June and extends through late August. HABs are typically triggered by several factors: temperature, sunlight, wind, and inflow; but the consistency of these occurrences is not entirely predictable. Wind can both concentrate and disburse the algal blooms, but due to the small size of the reservoir, blooms typically cover the entire surface to one degree or another, which significantly impacts visitation and recreational opportunities of the reservoir.

Harmful algal blooms are potentially toxic and may pose a direct threat to human and animal health. Recreational exposure to this toxin, cyanobacteria, can result in adverse human health effects such as hay fever-like symptoms, skin rashes, vomiting, diarrhea and respiratory distress. Freshwater blue-green algae under bloom conditions can produce potent toxins that cause specific and severe hepatic or neurological dysfunction. Although members of the public or USACE staff usually report the physical presence of blooms, KDHE is the agency responsible for issuing Watches, Warnings, and/or Closures when the cell count and/or toxin level is high. The USACE communicates these Watches, Warnings, and Closures by posting KDHE signs (available from their website) at launches, beaches, gate houses, bulletin boards and websites. In the worst cases KDHE issues closure and the USACE implements the requirements of closures as directed by KDHE.

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7 PUBLIC AND AGENCY COORDINATION

7.1 PUBLIC AND AGENCY COORDINATION

The USACE is dedicated to serving the public interests in support of the overall development of land uses related to land management for cultural, natural, and recreational resources of El Dorado Lake. An integral part of this effort is gathering public comment and engaging stakeholders in the process of planning. USACE policy guidance in ER and EP 1130-2-550 requires thorough public involvement and agency coordination throughout the master plan revision process including any associated environmental assessment process. Public involvement is especially important at El Dorado Lake to ensure that future management actions are both environmentally sustainable and responsive to public outdoor recreation needs in a region. The following milestones provide a brief look at the overall process of revising the El Dorado Lake Master Plan.

The USACE began planning to revise the El Dorado Lake Master Plan in the Fall of 2019. The objectives for a master plan revision were to (1) update land classifications to reflect changes in USACE land management policies since 1976 and (2) update the 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.

7.2 INITIAL STAKEHOLDER INPUT AND PUBLIC MEETINGS

In the interest of public health and well-being due to the Covid-19 pandemic, the public input process was changed from a face-to-face public meeting to a virtual presentation detailing the specifics of the master plan revision. The presentation and public input process remained open for 45 days. The public comment period began May 11, 2020 and ran through June 26, 2020.

The presentation included a description and definition of a master plan, descriptions of the new land use classification options, and instructions for commenting on the master plan. Presentation topics included:

- Public involvement process
- Project overview
- Overview of the National Environmental Policy Act (NEPA) process
- Master Plan and current land classifications
- Instructions for submitting comments

For El Dorado Lake, USACE received 37 comments from 3 individuals. While issues raised are important, most of the comments received do not pertain to land use issues of the master plan. Issues addressed in the comments included cultural resources, outdoor recreational trends, resource management objectives, land classification, and

more recreation opportunities. All the public comments received were noted and will be addressed as future funds and development are considered.

El Dorado Lake is a federally owned and managed public property, and it is the USACE’s goal to be a good neighbor, as well as stewards for public interest. As such, USACE is bound to the equal enforcement of policies and fees for this publicly held national asset. Table 7-1 provides a summary of the comments received during the initial scoping comment period for the Master Plan, followed by the USACE response.

Table 7-1 Public Comments from May 11, 2020 through June 26, 2020

Comment	Response
COMMENTS FROM OSAGE NATION	
<p>The Osage Nation Historic Preservation Office (ONHPO) has received notification of and associated documentation for the proposed revision of the Master Plans for the USACE Council Grove Lake in Morris County, Kansas; Elk City Lake in Montgomery County, Kansas; Marion Lake in Marion County, Kansas; and El Dorado Lake in Butler County, Kansas. These lakes are located within the Osage Nation’s Ancestral Territory and in some cases are located in regions that are very sensitive to the Osage.</p> <p>Management of Federal lands must be conducted in accordance with Sections 106 and 110 of the National Historic Preservation Act (NHPA), the National Environmental Policy Act, the Native American Graves Protection and Repatriation Act, the Archaeological Resources Protection Act, and the American Indian Religious Freedom Act. Consultation with the Osage Nation is a critical component in the USACE’s compliance with these laws. The Master Plans for USACE Projects, including the four presently under review, must specifically state that the USACE will comply with these laws. The ONHPO understands that compliance with Section 106 of the NHPA will be conducted on an individual basis.</p> <p>Due to the significance to the Osage Nation of the areas occupied by these projects, the Osage Nation requests a teleconference</p>	<p>Tulsa District will consult with the Osage Nation and other Tribal Nations, as appropriate, to identify to the furthest extent possible historic properties and historic sites and features of significance to these Nations. Similarly, Tulsa District will ensure compliance with Section 106 of the National Historic Preservation Act of 1966 for all actions approved for or conducted on government property in the future.</p>

Comment	Response
<p>meeting with USACE, Tulsa District Natural Resources and Recreation Branch and the Southwest Planning Division to discuss the Osage Nation’s concerns with the projects in general and the development of the Master Plans. The ONHPO appreciates the opportunity to participate at this stage and looks forward to working with the USACE throughout the process and requests an approximate timeline for each phase.</p> <p>Please let me know if you have any questions. Thank you for consulting with the Osage Nation on this matter.</p>	
COMMENTS FROM KDWPT	
<p>Possibly make the last few acres within the state park license high density recreational use.</p>	<p>Noted. USACE has made changes where applicable. The area around the dam will remain Project Operations for the flood control mission.</p>
<p>Possibly note along with expanding population in service area the significant development of homes near and adjacent to the project boundaries since the master plan was originally developed.</p>	<p>Noted. USACE recognizes the changes is land use development since the previous master plan was completed in 1976. More development has occurred closer to the project boundary. Any requested activity by adjacent landowners (such as mowing or creation of a firebreak) is governed by the Shoreline Management Policy for the lake.</p>
<p>Increased demand for trails for hikers, bikes, horseback riders and some limited motorized use.</p>	<p>Noted. Access to trails of all types is in high demand across the State of Kansas and USACE. Current State Park lease allows for most of this activity and development with USACE coordination.</p>
<p>Increased modern rental cabin development and availability within state parks.</p>	<p>Noted. Current HDR zoning and current State Park Lease allows for this activity and development with USACE coordination.</p>

Comment	Response
Increased non-motorized small watercraft increased use from kayaks and paddle boards.	Noted. Outdoor recreation trends have changed since the 1976 Master Plan was completed and the use of non-motorized watercraft is supported under the new plan.
Camping and especially utility camping has much higher use numbers than they predicted in the original master plan and we see that on the increase for the future.	Noted and concur. The demand for more utility hookups for camping is on the rise. Providing improvements by the State Park is not limited by the master plan as all camping areas are designated as High-Density Recreation. Coordination with USACE is required for approval.
Demand for public special events is up.	Noted. Current State Park Lease allows for this activity with USACE coordination.
Picnics were listed as a main activity for the lake in the original master plan and while day use is heavy the picnic aspect is minimal with boating, trails, angling, swimming, biking, archery, and firearms range all exceeding picnics.	Noted. The State Park provides a diversity of facilities supporting a wide array of outdoor recreation activities and users at El Dorado Lake including picnic sites. The amount of use for each type of activity will vary over time as trends change.
Seasonal Camping is less popular. Camp sites modeled after the USACE Kansas City District program is in demand.	Noted. Current USACE Policy and Regulation do not allow seasonal camping within the Tulsa District.
Shoreline erosion control in high use recreational developed areas.	Noted. This activity may be authorized where appropriate with USACE coordination.
Upgrade or replace existing facilities as needed and funds allow.	Noted. Facility upgrade is allowed in State Park Lease with proper coordination with USACE.
Maintain warm season grassland communities in non-developed areas.	Noted.

Comment	Response
Keep plan flexible enough to keep current on modern recreational needs and trends as they develop.	Noted and concur.
Continue to provide quality outdoor recreational opportunities and facilities to well over a million visitors annually.	Noted and concur.
Maintain forb communities from invasive plant species to increase pollinator potential.	Noted.
As a reservoir with occasional high-water events each event brings additional seed sources from the watershed of invasive species and state listed noxious weeds that must be controlled. Continue use of approved mechanical, chemical, and prescribed burning techniques including firebreaks to control these species.	Noted. USACE will continue with existing noxious weed programs. Noxious and Invasive species treatments are allowed within State lease agreements.
Additional trails.	Noted. This type of activity could potentially occur anywhere on the lake in HDR & LDR areas. Current State Park Lease allows for this activity and development with USACE coordination.
Kayak launching facilities.	Noted. This type of activity could potentially occur anywhere on the lake in HDR & LDR areas. Current State Park Lease allows for this activity and development with USACE coordination.
Archery 3D area near existing archery facility.	Noted. State Park Lease allows for this activity and development with USACE coordination.
Replace existing original open-air shower facilities with structures better suited to meet today's visitor's desires for showers in individual rooms and not one large open-air facility.	Noted. Facility upgrade is allowed in State Park Lease with proper coordination with USACE.

Comment	Response
Fish cleaning station.	Noted. Current zoning would support this type of facility. Current State Park Lease allows for this activity and development with USACE coordination.
Harden some existing utility campsites.	Noted.
Seasonal designated campsites for a percentage of lesser used sites modeled after the USACE Kansas City District Program.	Noted. Current USACE Policy and Regulation do not allow seasonal camping within the Tulsa District.
Stay on top of any new control methods that might be developed that would be practicable in such a large body of water for zebra mussels.	Noted.
Maintain plant communities from invasive woody species through mechanical, chemical and prescribed burning methods.	Noted. USACE will continue with existing herbicide application and prescribed burning practices.
Continue invasive plant and state listed noxious weed control efforts.	Noted. USACE will continue with existing noxious weed programs. Noxious and Invasive species treatments are allowed within State lease agreements.
HAB has not been a problem for El Dorado as of yet but continue to monitor and manage watershed and lake levels to prevent HAB's whenever possible.	Noted.
Land Classifications Map. Lands classified as Recreation - Intensive Use that lie east of Hwy. 177 and south of NE 40th Street are now classified as Wildlife Management. This change is reflected in the latest KDWPT license.	Concur. Change is reflected in 2021 revised Master Plan.
Page 180 - Section 4-05. Environmental and Scenic. Subsection d - Wildlife. The presence and abundance of species should be revised. Additional species that are now present and important to our constituency should be	Noted and concur.

Comment	Response
<p>added. Ecologically threatening species such as zebra mussels should be discussed.</p>	
<p>Page 236 - Section 11-02. Physical Characteristics. Subsection a - Existing Vegetation. I believe that it is important to note that agricultural lands under cultivation are no longer the prominent habitat type. Croplands comprise less than 15% of the wildlife area.</p>	<p>Noted and concur.</p>
<p>Page 240 - Section 13-01. Fish and Wildlife Management. The current prevalence of general habitat types and prominent KDWPT management objectives are provided below. This information was extracted from the annual management plan.</p> <p>Management Objectives: The primary mission of the ELDWA is to provide suitable wildlife habitat to an array of game and non-game species and provide the public with recreational opportunities in such habitats.</p> <p>Current management objectives are identified below:</p> <ul style="list-style-type: none"> *Restore and enhance native herbaceous habitats, for the benefit of upland wildlife, by controlling woody invasion, noxious weeds, and other invasive species. *Develop additional herbaceous habitats to improve habitat diversity and water quality within riparian areas currently dominated by woodland and agricultural habitats. *Enhance upland wildlife benefits by converting existing smooth brome stands to early succession herbaceous habitats using burning, disking, and herbicide treatments. *Improve riparian corridor width, function, and diversity by actively retiring agricultural lands adjacent to lake tributaries. *Enhance woodland habitat quantity and 	<p>Noted and concur. KDWPT management objectives are included in Chapter 5 – Resource Plan specifically for the WMA land classification type.</p>

Comment	Response
<p>quality (and water quality) by managing existing woody vegetation within riparian areas and manipulating resulting woody vegetation within retired agricultural lands.</p> <p>*Improve woodland habitat diversity and burr oak, black walnut, and bitternut hickory stature and nut production by conducting timber stand improvement activities.</p> <p>*Continue to enhance and maintain facilities and infrastructure to ensure safe and reasonable public access.</p> <p>*Continue to work with other area governmental, constituency, and business groups to meet ELDWA objectives and the KDWPT mission.</p>	
<p>Page 240 - Area Description: The ELDWA is primarily managed to provide hunting and angling opportunities and is administered by the Kansas Department of Wildlife, Parks and Tourism (KDWPT). The area contains approximately 4,000 acres of land and 258 acres of water. ELDWA lands primarily consist of native prairie uplands, with significant woodland (1,170 acres or 29%), agricultural lands (541 acres or 14%), and small cool-season herbaceous tracts dominated by smooth brome.</p>	<p>Noted and concur.</p>

7.3 PUBLIC AND AGENCY REVIEW OF DRAFT MP, EA AND FONSI

This section will be completed following the draft release public meeting and 30-day comment period.

8 SUMMARY OF RECOMMENDATIONS

8.1 SUMMARY OVERVIEW

The preparation of this Master Plan for El Dorado Lake followed the recent USACE master planning guidance in ER 1130-2-550 and EP 1130-2-550, both dated 30 January 2013. Three major requirements set forth in the new guidance include the preparation of contemporary Resource Objectives, Classification of project lands using the newly approved classification standards, and the preparation of a Resource Plan describing in broad terms how the land in each of the land classifications will be managed into the foreseeable future. Additional important requirements include rigorous public involvement throughout the process, and consideration of regional recreation and natural resource management priorities identified by other federal, state, and municipal authorities. The study team endeavored to follow this guidance to prepare a Master Plan that will provide for enhanced recreational opportunities for the public, improve environmental quality, and foster a management philosophy conducive to existing and projected USACE staffing levels at El Dorado Lake. Factors considered in the Plan development were identified through public involvement and review of regional and statewide planning documents including the SCORP.

8.2 LAND RECLASSIFICATION PROPOSAL

A key component in preparing this Master Plan was examining prior land classifications and addressing the needed transition to new land classification standards that reflect how lands are being managed now and in the foreseeable future. The new land classification standards will also comply with current USACE guidance. Public comment was solicited to assist in making these land reclassification decisions. Chapter 7 of this Plan describes the public involvement process and provides a summary of public comments received. After analyzing public comment, examining recreational trends, and taking into account regional natural resource management priorities, USACE team members reclassified the Federal lands associated with El Dorado Lake as described in Figure 41.

Table 8-1 Change in Land Classification

Prior Land Classifications (1986)	Acres	New Land Classifications (2021)	Acres	Net Difference
Project Operations	338	Project Operations (PO)	422	84
Recreation – Intensive Use	3,927	High Density Recreation (HDR)	3,722	(205)
		Environmentally Sensitive Areas (ESA)	138	138
Recreation – Low Density	61	Multiple Resource Management – Low Density Recreation (LDR)	31	(30)
Wildlife Management	3,718	Multiple Resource Management – Wildlife Management (WMA)	4,098	380
		Multiple Resource Management – Vegetation Management (VMA)	0	-
		Future/Inactive Recreation Areas	0	-
Transportation Rights-of-Way	284			(284)
TOTAL	8,328		8,411	83
Prior Water Surface Classifications (1986)	Acres	New Water Surface Classifications (2021)	Acres	Net Difference
Water Surface	8,000	Open Recreation	7,834	
		Designated No-Wake	117	
		Fish and Wildlife Sanctuary	0	
		Restricted	6	
TOTAL	8,000		7,957	(43)
TOTAL FEE	16,328		16,368	40

* Note: The new and total acreage figures were measured using GIS technology and may vary slightly from official land acquisition records.

Table 8-2 lists the descriptions and justifications for the reclassification of USACE lands at El Dorado Lake. Some variation in total acreages occurred due to better measuring technology and changes in landforms over the past 20 years.

Table 8-2 Changes and Justifications for New Land Classifications (1)

Land Classification	Description of Changes (2)	Justification
Project Operations (PO)	<p>The net increase in PO lands from 338 acres to 422 acres was due to the following:</p> <ul style="list-style-type: none"> ✓61 acres HDR reclassified to PO. 	<p>HDR acres were reclassified to capture PO components that were previously not classified as PO near the dam. In addition, land adjacent to the El Dorado State Park Shooting Range were reclassified as PO to aid in assuring public safety.</p>
High Density Recreation (HDR)	<p>The net decrease in HDR lands from 3,927 to 3,722 was due to the following:</p> <ul style="list-style-type: none"> ✓43 acres HDR reclassified as ESA. ✓61 acres HDR reclassified as PO. ✓68 acres HDR reclassified to WM. 	<p>ESA areas were designated to protect areas where scientific, ecological, cultural, or aesthetic features have been identified. Additionally, lands associated with KDWPT wildlife management areas removed from HDR to identify their current WM use under the current outgrant. HDR acres were reclassified to capture PO components that were previously not classified as PO near the dam</p>
Environmentally Sensitive Areas (ESA)	<p>The net increase in ESA of 138 acres was due to the following:</p> <ul style="list-style-type: none"> ✓43 acres HDR reclassified as ESA. ✓94 acres WM reclassified as ESA. 	<p>Created ESA areas to protect areas where scientific, ecological, cultural, or aesthetic features have been identified near Bemis Creek (ESA 3), Boulder Bluff Area (ESA 2), and the NW quadrant of El Dorado Lake.</p>
MRML – Low Density Recreation (LDR)	<p>The net decrease in LDR from 61 acres to 31 acres was due to the following:</p>	<p>Previous classifications failed to appropriately reflect current use of the area. Area was reclassified to capture the recreation uses created by KDWPT</p>

	✓94 acres LDR were reclassified as WM.	State Parks management in the area below the dam.
MRML – Wildlife Management (WM)	<p>The net increase in WM from 3,718 acres to 4,098 acres was due to the following:</p> <ul style="list-style-type: none"> ✓68 acres HDR were reclassified as WM. ✓94 acres WM were reclassified to ESA. ✓21 acres WM were reclassified to LDR. 	Created ESA areas to protect areas where scientific, ecological, cultural, or aesthetic features have been identified. Land classification alignment with KDWPT Wildlife Management Area was also necessary to reflect current uses.
MRML – Vegetation Management (VM)	There are no VM acres at El Dorado Lake.	N/A
Future/Inactive Recreation Areas	There are no Future/Inactive Recreation Areas at El Dorado Lake.	N/A

(1)The land classification changes described in this table are the result of changes to individual parcels of land ranging from a few acres to several hundred acres. New acreages were measured using more accurate GIS technology, thus total changes will not equal individual changes. The acreage numbers provided are approximate.

(2) Acreages are based on GIS measurements and may vary from Net Difference totals detailed in Table 8-1

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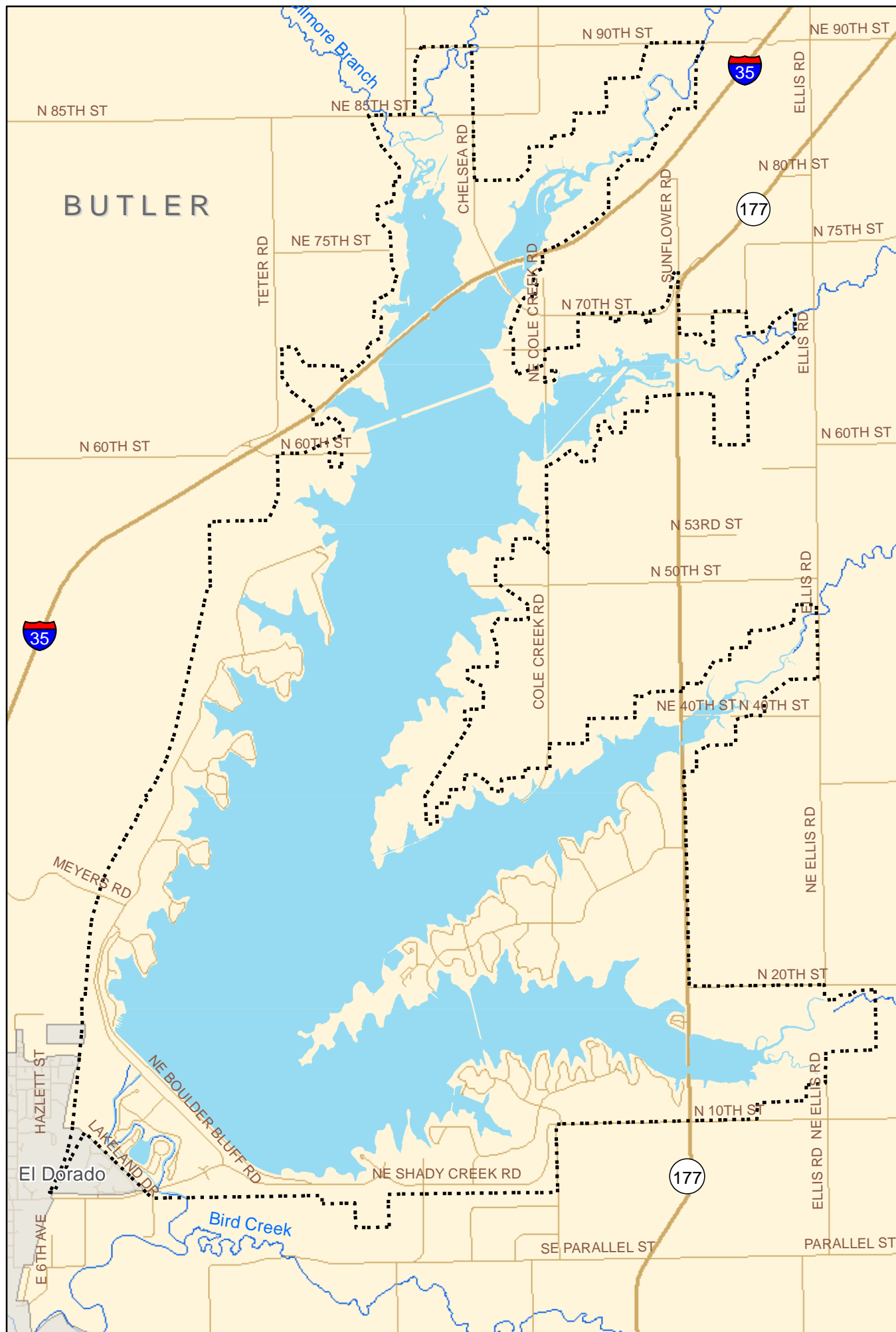
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APPENDIX A - LAND CLASSIFICATION, MANAGING AGENCIES, AND RECREATION MAPS



INDEX TO MASTER PLAN MAPS

GENERAL

MAP NO.	TITLE
ELD20MP-OI-00	PROJECT LOCATION & INDEX TO MAPS
ELD20MP-OM-01	LAND MANAGING ENTITIES
ELD20MP-OP-01	SEA PLANE GUIDE
ELD20MP-OW-01	WATER SURFACE CLASSIFICATIONS AND MARINAS

LAND CLASSIFICATION

MAP NO.	TITLE
ELD20MP-LC-01	MASTER PLAN REVISION LAND CLASSIFICATION CHANGES
ELD20MP-OC-00	LAND AND WATER CLASSIFICATIONS (00)
ELD20MP-OC-01	LAND AND WATER CLASSIFICATIONS (01)
ELD20MP-OC-02	LAND AND WATER CLASSIFICATIONS (02)
ELD20MP-OC-03	LAND AND WATER CLASSIFICATIONS (03)
ELD20MP-OC-04	LAND AND WATER CLASSIFICATIONS (04)
ELD20MP-OC-05	LAND AND WATER CLASSIFICATIONS (05)
ELD20MP-OC-06	LAND AND WATER CLASSIFICATIONS (06)
ELD20MP-OC-07	LAND AND WATER CLASSIFICATIONS (07)
ELD20MP-OC-08	LAND AND WATER CLASSIFICATIONS (08)

RECREATIONAL AREAS


MAP NO.	TITLE
ELD20MP-OR-0A	MANAGED RECREATIONAL AREAS
ELD20MP-OR-0B	PARK PLATE INDEX
ELD20MP-OR-01	WALNUT RIVER AREA
ELD20MP-OR-02	OVERLOOK AREA
ELD20MP-OR-03	SHADY CREEK AREA
ELD20MP-OR-04	BEMIS CREEK AREA
ELD20MP-OR-05	BLUESTEM POINT AREA
ELD20MP-OR-06	BOULDER BLUFF AREA

THIS PRODUCT IS REPRODUCED FROM GEOSPATIAL INFORMATION PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS. GIS DATA AND PRODUCT ACCURACY MAY VARY. THEY MAY BE DEVELOPED FROM SOURCES OF DIFFERING ACCURACY. ACCURATE ONLY FOR CERTAIN SCALES, BASED ON MODELING OR INTERPRETATION, INCOMPLETE WHILE BEING CREATED OR REVISED. USING GIS PRODUCTS FOR PURPOSES OTHER THAN THOSE FOR WHICH THEY WERE CREATED MAY YIELD INACCURATE OR MISLEADING RESULTS.



 FEE BOUNDARY

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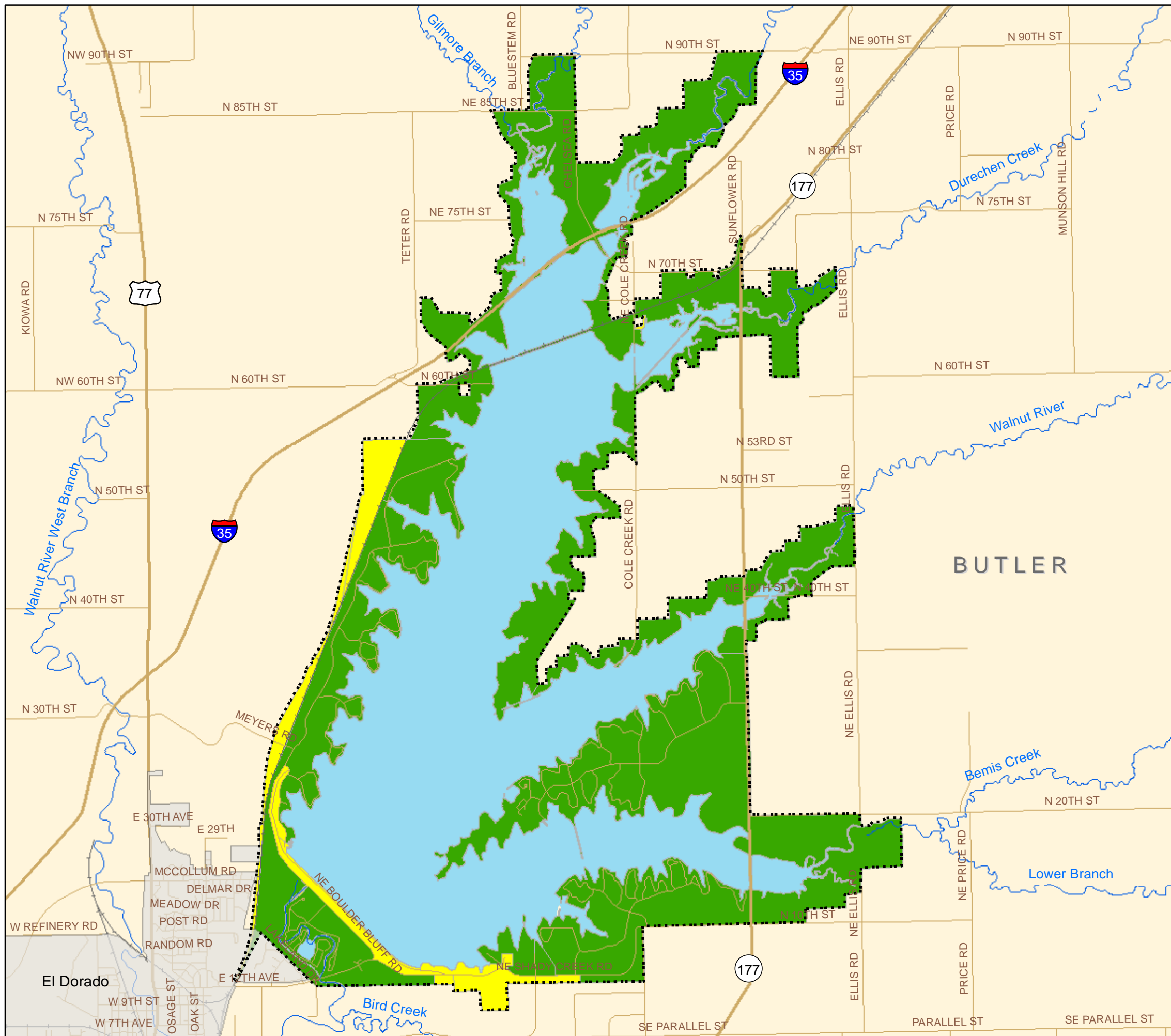


**U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT**


EL DORADO LAKE MASTER PLAN
LAND AND WATER CLASSIFICATIONS
(INDEX SHEET 00)

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DATE: FEBRUARY 2021	MAP NO. EDL20MP-OI-00
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- KANSAS DEPARTMENT OF WILDLIFE, PARKS, AND TOURISM (KDWP)
- U.S. ARMY CORPS OF ENGINEERS
- WATER SURFACE
- FEE BOUNDARY




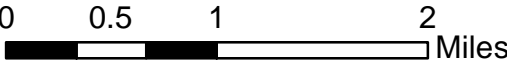
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TULSA DISTRICT**

EL DORADO LAKE
WALNUT RIVER, KANSAS

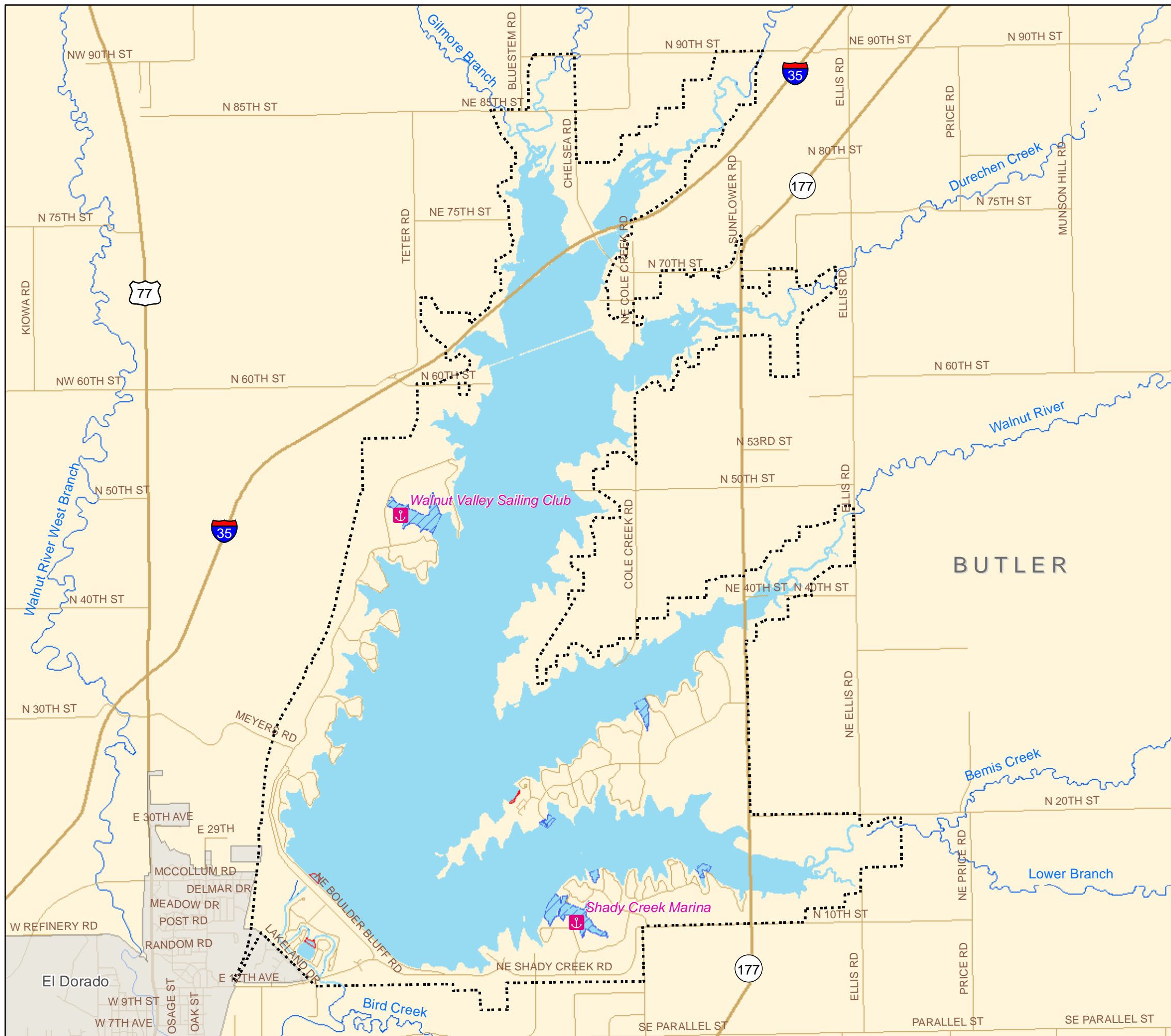
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LAND MANAGING ENTITIES






DATE: FEBRUARY 2021	MAP NO. EDL20MP-OM-01
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-  MARINAS
-  WATER SURFACE: RESTRICTED
-  WATER SURFACE: DESIGNATED NO WAKE AREAS
-  WATER SURFACE: OPEN RECREATION
-  FEE BOUNDARY




**U.S. ARMY CORPS
OF ENGINEERS
TULSA DISTRICT**

EL DORADO LAKE
WALNUT RIVER, KANSAS

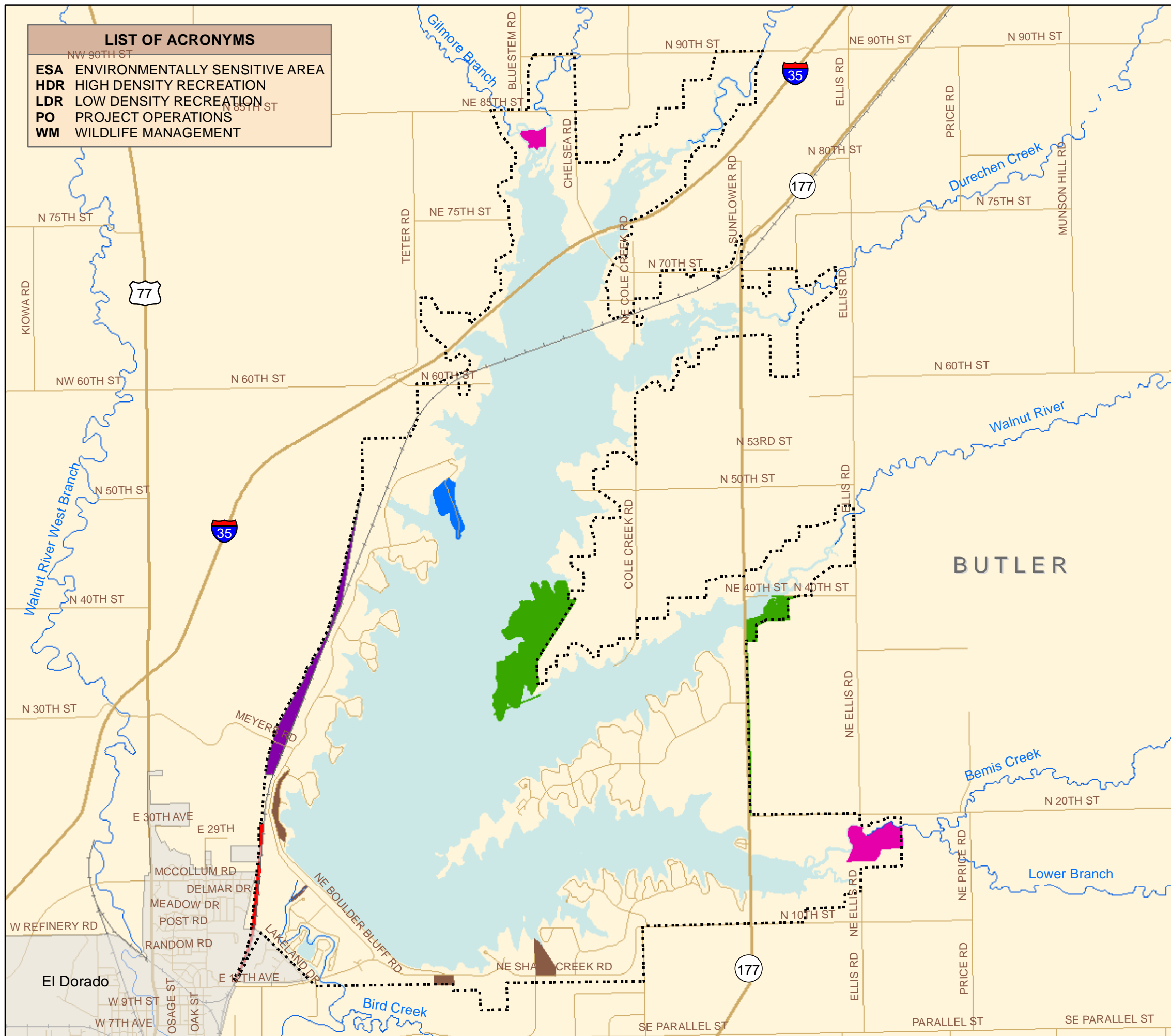
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**WATER SURFACE CLASSIFICATIONS
AND MARINAS**



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Miles

DATE: FEBRUARY 2021	MAP NO. EDL20MP-OW-01
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LIST OF ACRONYMS	
ESA	ENVIRONMENTALLY SENSITIVE AREA
HDR	HIGH DENSITY RECREATION
LDR	LOW DENSITY RECREATION
PO	PROJECT OPERATIONS
WM	WILDLIFE MANAGEMENT



LAND CLASSIFICATION CHANGES FROM 1976 MASTER PLAN TO

- FROM HDR TO ESA
- FROM HDR TO PO
- FROM HDR TO WM
- FROM LDR TO WM
- FROM WM TO ESA
- FROM WM TO LDR

USACE BASEMAP

- WATER SURFACE
- FEE BOUNDARY

U.S. ARMY CORPS OF ENGINEERS

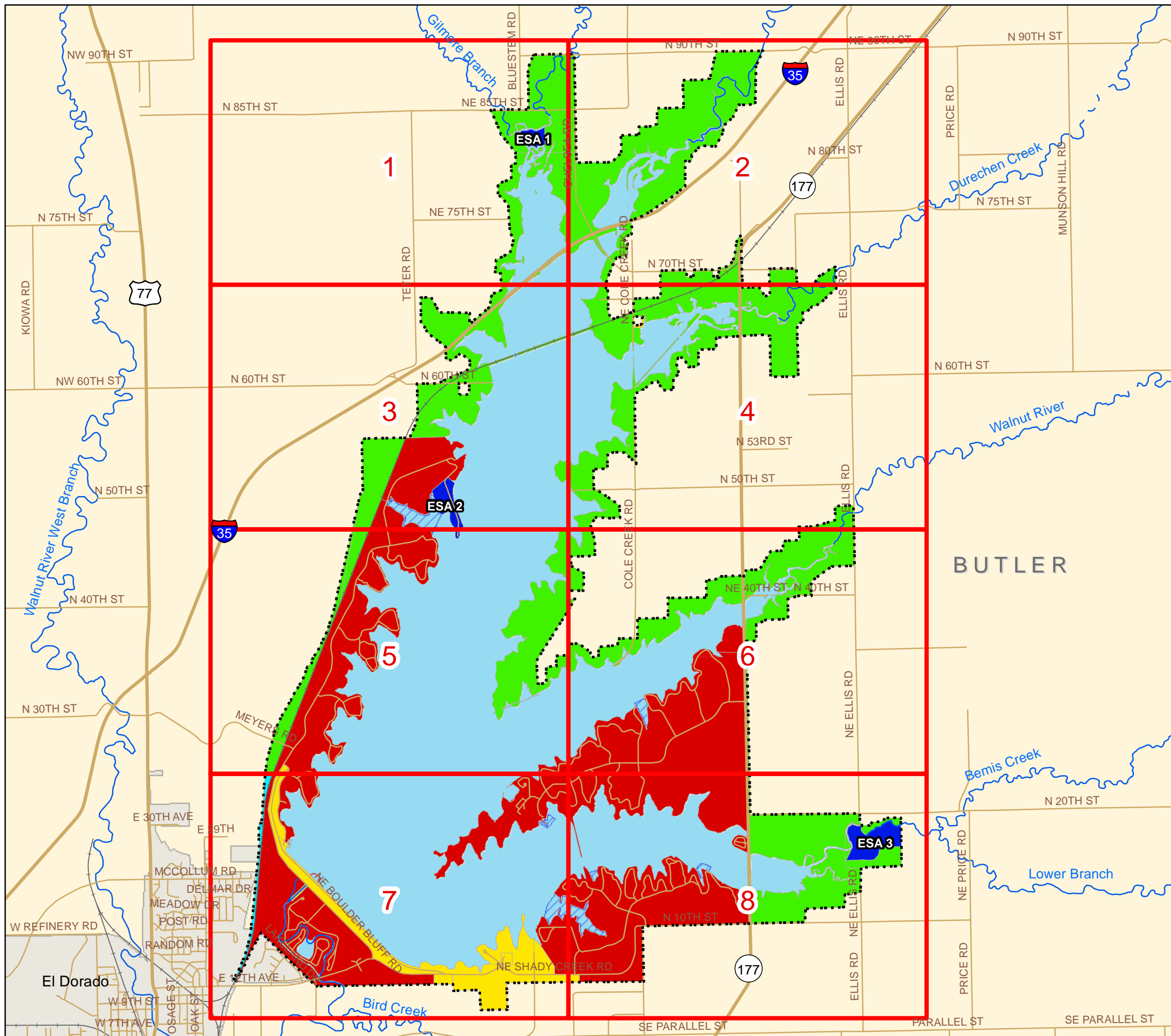
TULSA DISTRICT

EL DORADO LAKE
WALNUT RIVER, KANSAS

EL DORADO LAKE MASTER PLAN

MASTER PLAN REVISION LAND CLASSIFICATION CHANGES

DATE: FEBRUARY 2021	MAP NO. EDL20MP-LC-01
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- INDEX GRID
- FEE BOUNDARY
- ENVIRONMENTALLY SENSITIVE AREA
- HIGH DENSITY RECREATION
- LOW DENSITY RECREATION
- PROJECT OPERATIONS
- WILDLIFE MANAGEMENT
- WATER SURFACE: DESIGNATED NO WAKE AREAS
- WATER SURFACE: RESTRICTED
- WATER SURFACE: OPEN RECREATION

**U.S. ARMY CORPS
OF ENGINEERS
TULSA DISTRICT**

EL DORADO LAKE
WALNUT RIVER, KANSAS

EL DORADO LAKE MASTER PLAN

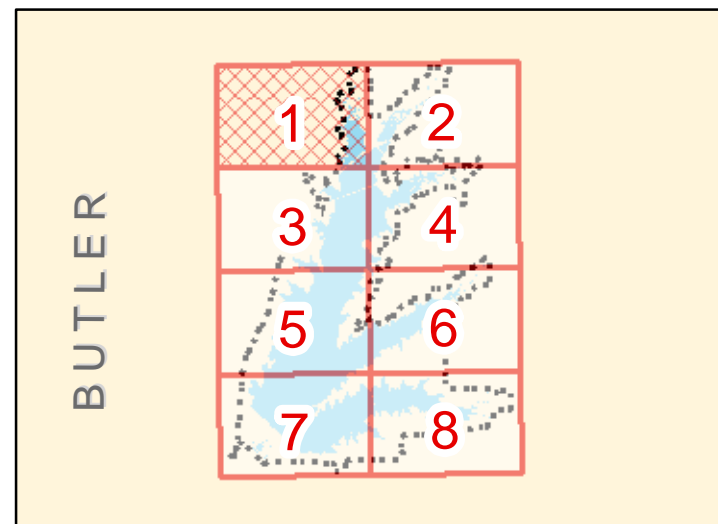
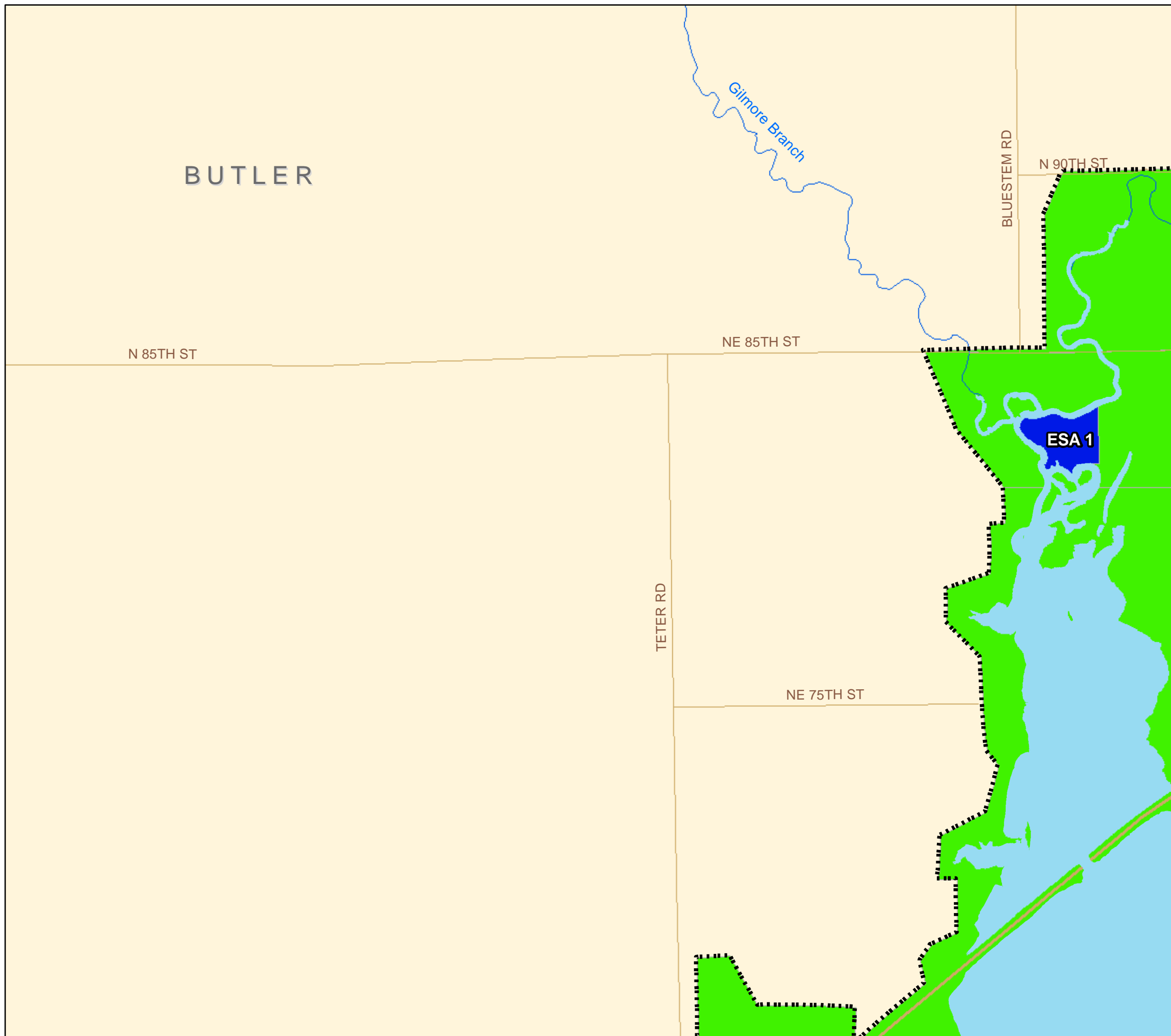
LAND AND WATER CLASSIFICATIONS

(INDEX SHEET 00)


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Miles

DATE: FEBRUARY 2021	MAP NO. EDL20MP-OC-00
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- ENVIRONMENTALLY SENSITIVE AREAS
- WILDLIFE MANAGEMENT
- WATER SURFACE: OPEN RECREATION
- FEE BOUNDARY




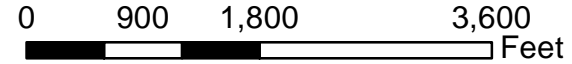
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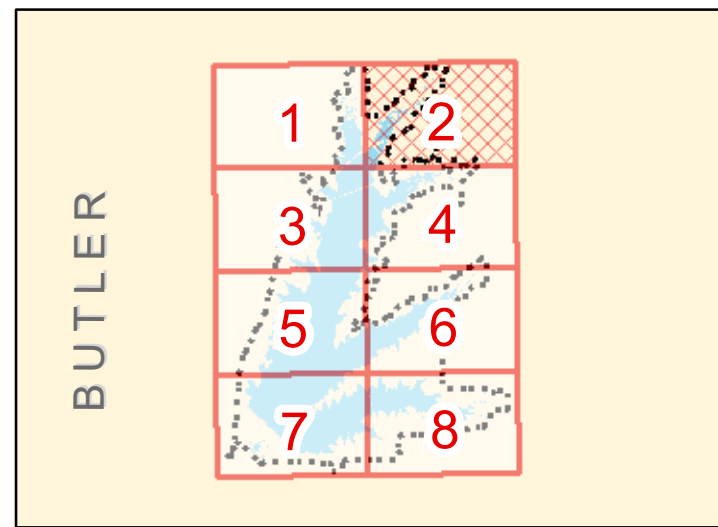
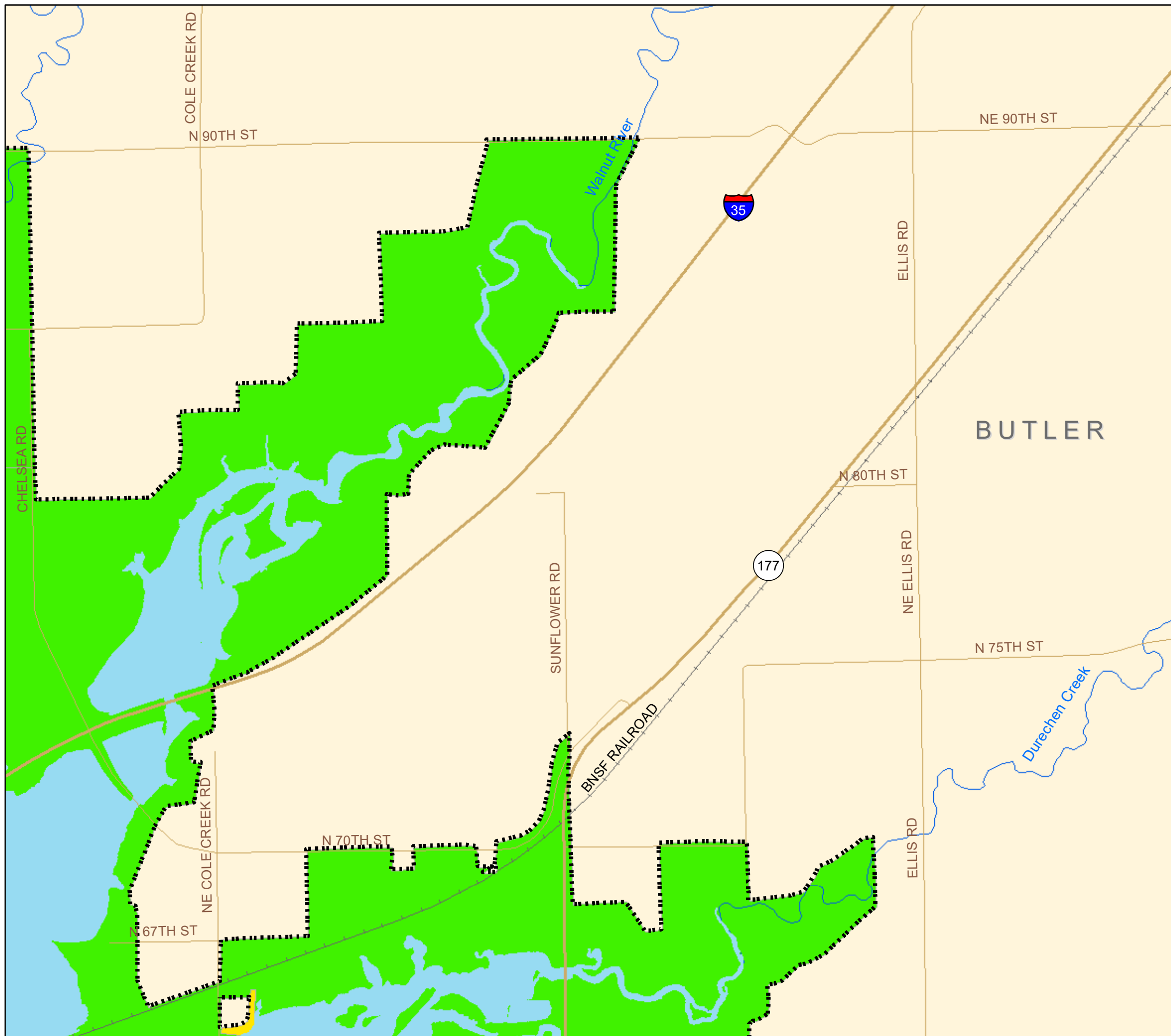
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LAND AND WATER CLASSIFICATIONS


(INDEX SHEET 01)

DATE: FEBRUARY 2021	MAP NO. EDL20MP-OC-01
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- PROJECT OPERATIONS
- WILDLIFE MANAGEMENT
- WATER SURFACE: OPEN RECREATION
- FEE BOUNDARY




**U.S. ARMY CORPS
OF ENGINEERS
TULSA DISTRICT**

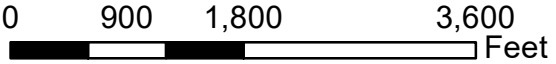
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WALNUT RIVER, KANSAS

EL DORADO LAKE MASTER PLAN

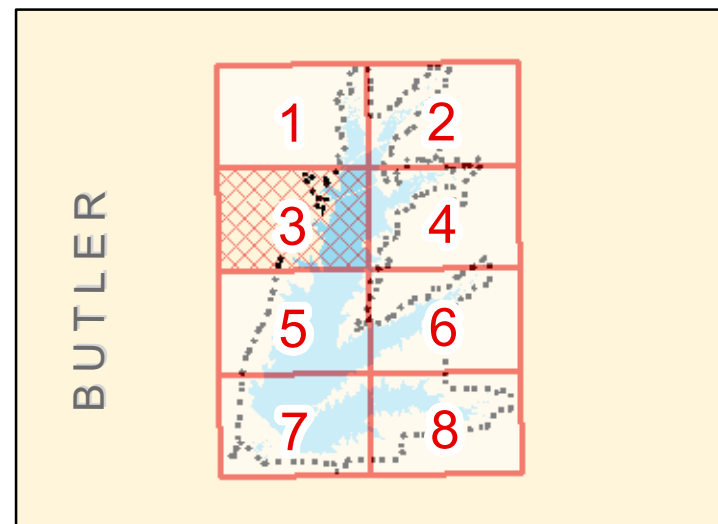
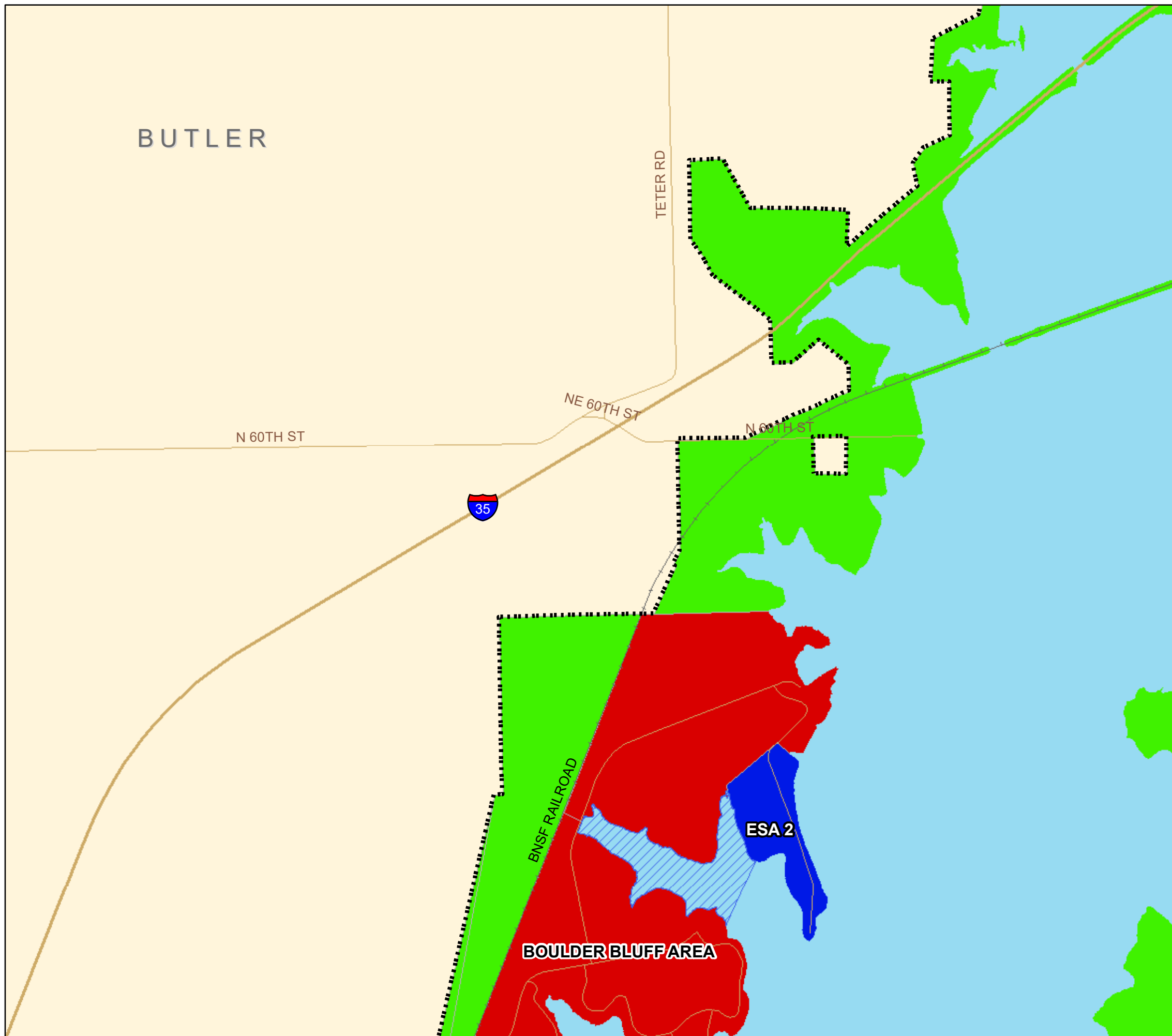
LAND AND WATER CLASSIFICATIONS

(INDEX SHEET 02)

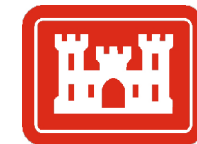




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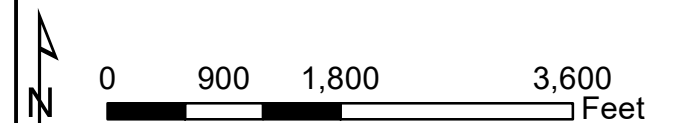
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- WILDLIFE MANAGEMENT
- WATER SURFACE: DESIGNATED NO WAKE AREAS
- WATER SURFACE: OPEN RECREATION
- FEE BOUNDARY



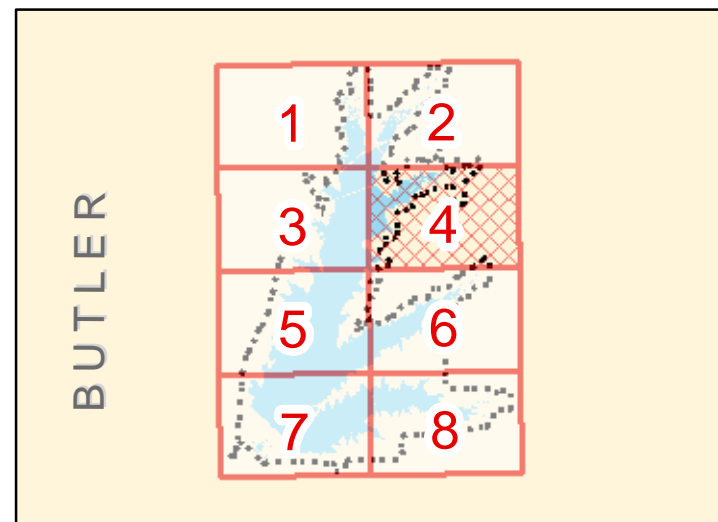
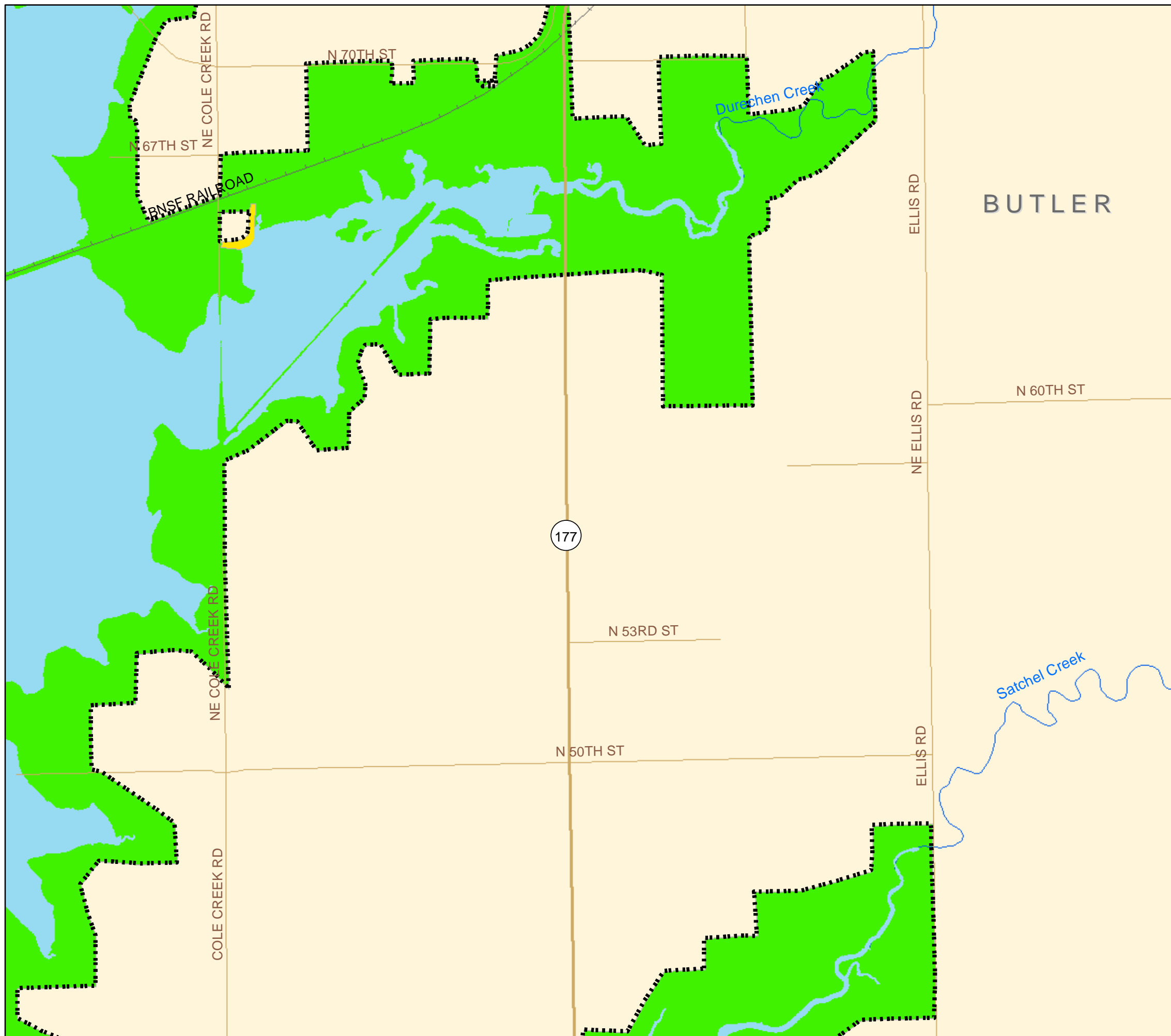
**U.S. ARMY CORPS
OF ENGINEERS
TULSA DISTRICT**

EL DORADO LAKE WALNUT RIVER, KANSAS


**EL DORADO LAKE MASTER PLAN
LAND AND WATER CLASSIFICATIONS
(INDEX SHEET 03)**



DATE: FEBRUARY 2021	MAP NO. EDL20MP-OC-03
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- PROJECT OPERATIONS
- WILDLIFE MANAGEMENT
- WATER SURFACE: OPEN RECREATION
- FEE BOUNDARY




**U.S. ARMY CORPS
OF ENGINEERS
TULSA DISTRICT**

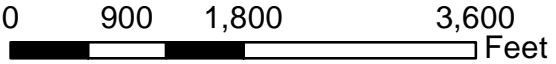
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EL DORADO LAKE MASTER PLAN

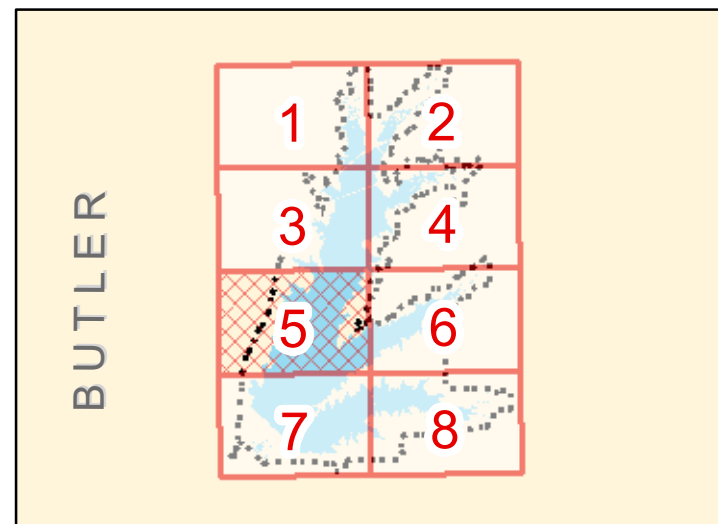
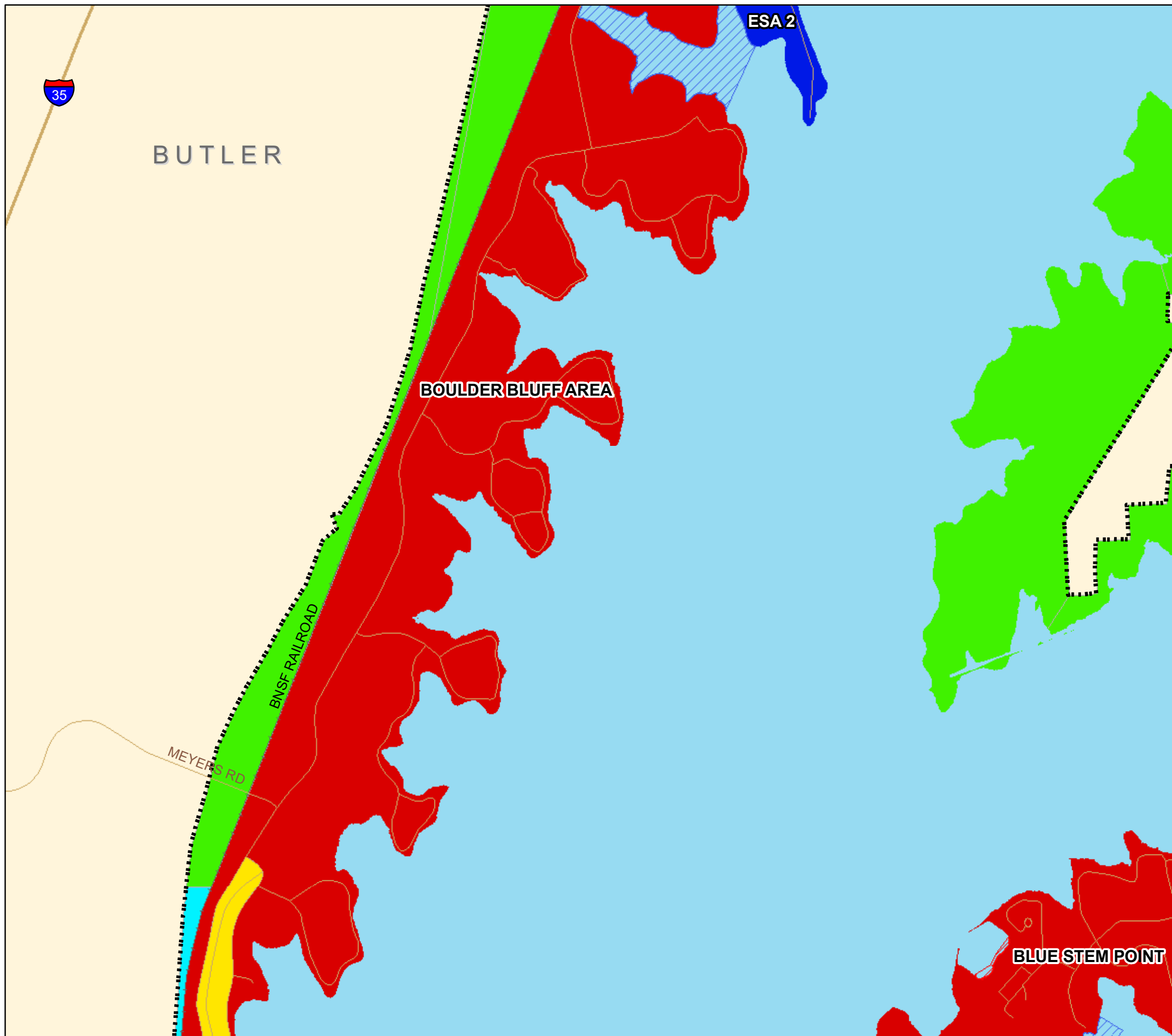
LAND AND WATER CLASSIFICATIONS










(INDEX SHEET 04)






DATE: FEBRUARY 2021	MAP NO. EDL20MP-OC-04
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-  LOW DENSITY RECREATION
-  PROJECT OPERATIONS
-  WILDLIFE MANAGEMENT
-  WATER SURFACE: DESIGNATED NO WAKE AREAS
-  WATER SURFACE: RESTRICTED
-  WATER SURFACE: OPEN RECREATION
-  FEE BOUNDARY




**U.S. ARMY CORPS
OF ENGINEERS
TULSA DISTRICT**

EL DORADO LAKE
WALNUT RIVER, KANSAS

EL DORADO LAKE MASTER PLAN

LAND AND WATER CLASSIFICATIONS

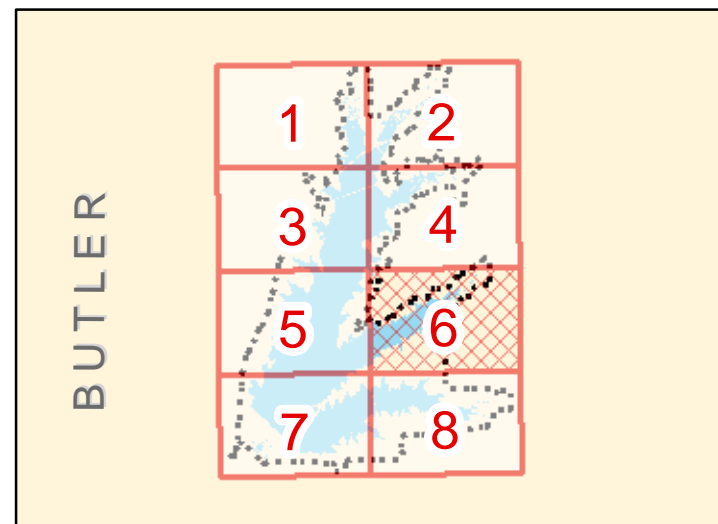
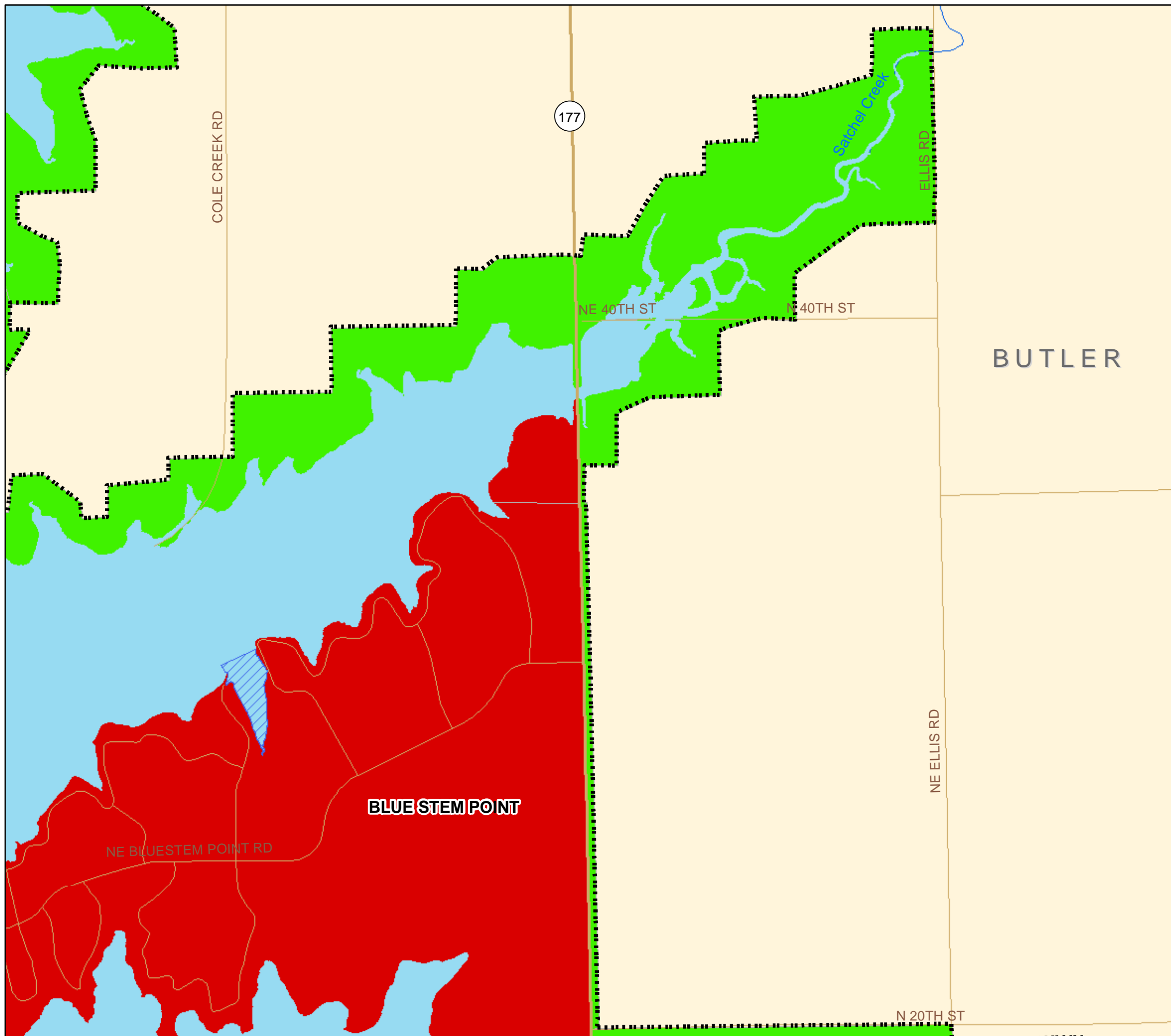
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DATE:	MAP NO.
FEBRUARY 2021	EDL20MP-OC-05



- HIGH DENSITY RECREATION
- WILDLIFE MANAGEMENT
- WATER SURFACE: DESIGNATED NO WAKE AREAS
- WATER SURFACE: OPEN RECREATION
- FEE BOUNDARY




**U.S. ARMY CORPS
OF ENGINEERS
TULSA DISTRICT**

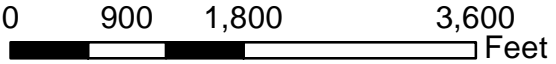
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WALNUT RIVER, KANSAS

EL DORADO LAKE MASTER PLAN

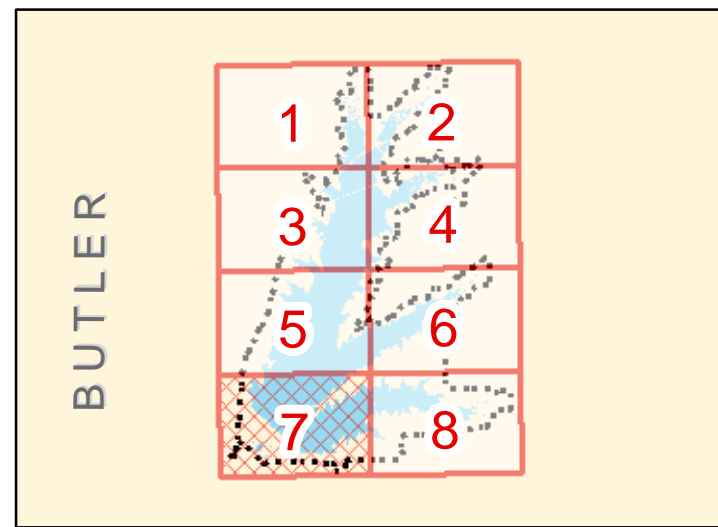
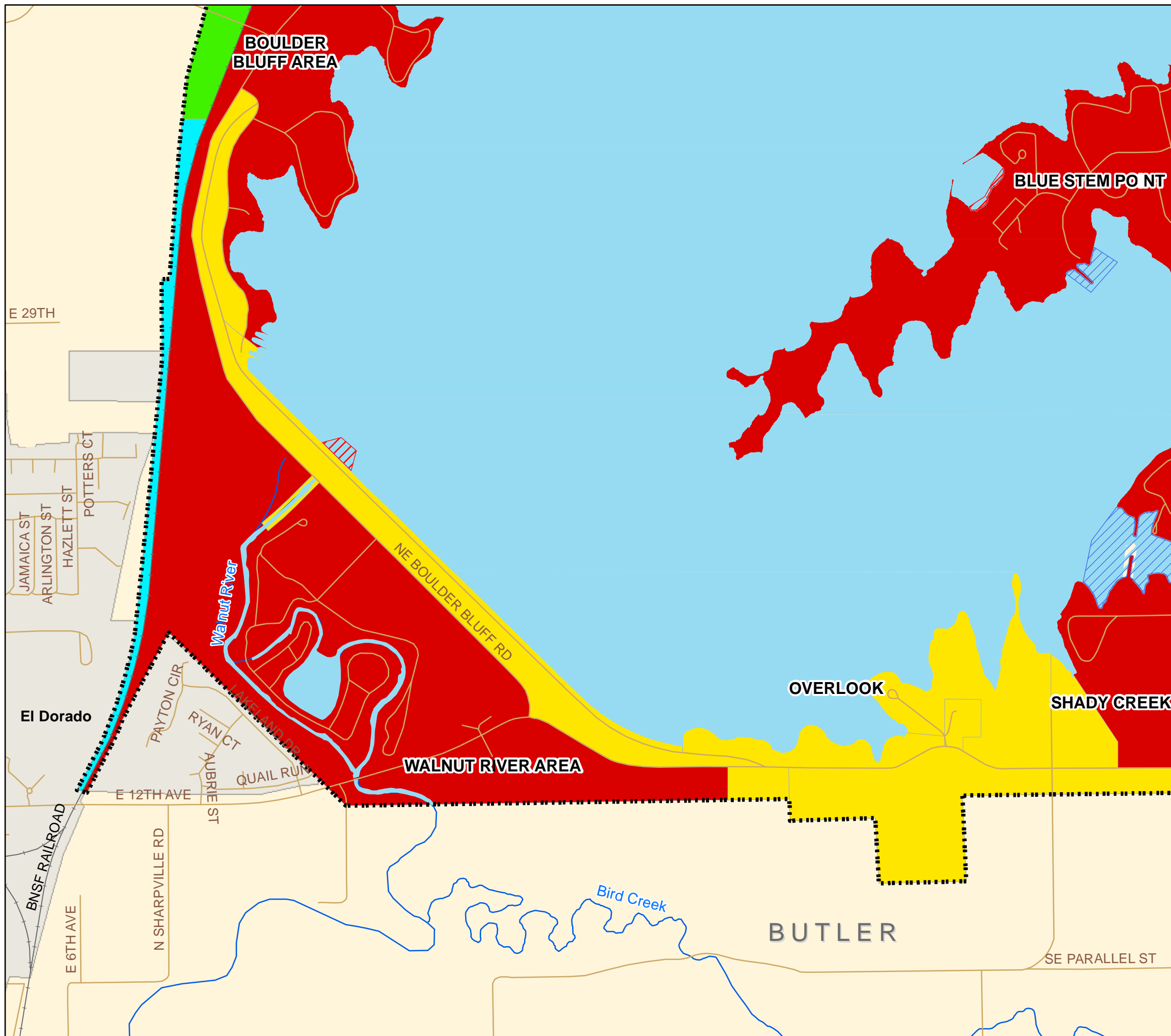
LAND AND WATER CLASSIFICATIONS

(INDEX SHEET 06)





DATE: FEBRUARY 2021	MAP NO. EDL20MP-OC-06
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- HIGH DENSITY RECREATION
- LOW DENSITY RECREATION
- PROJECT OPERATIONS
- WILDLIFE MANAGEMENT
- WATER SURFACE: DESIGNATED NO WAKE AREAS
- WATER SURFACE: RESTRICTED
- WATER SURFACE: OPEN RECREATION
- FEE BOUNDARY

**U.S. ARMY CORPS
OF ENGINEERS
TULSA DISTRICT**

EL DORADO LAKE
WALNUT RIVER, KANSAS

EL DORADO LAKE MASTER PLAN

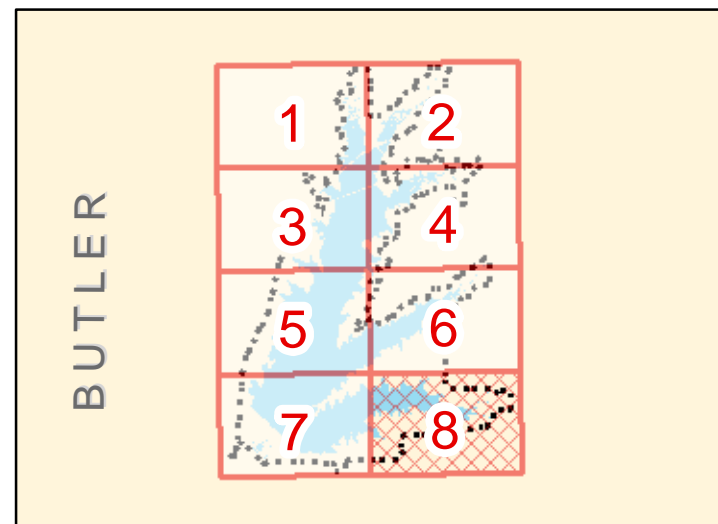
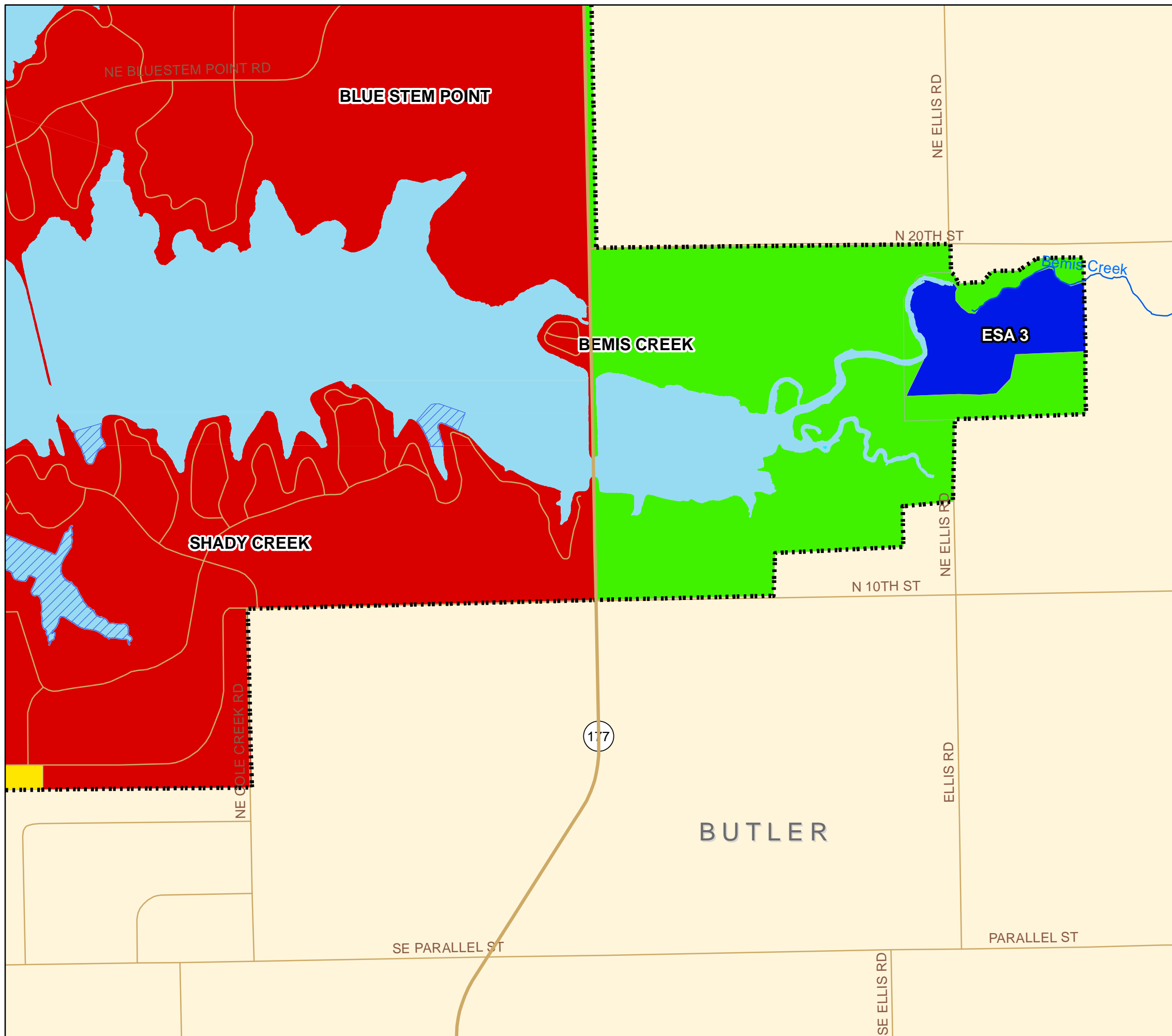
LAND AND WATER CLASSIFICATIONS

(INDEX SHEET 07)

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DATE: FEBRUARY 2021	MAP NO. EDL20MP-OC-07
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- ENVIRONMENTALLY SENSITIVE AREAS
- HIGH DENSITY RECREATION
- LOW DENSITY RECREATION
- PROJECT OPERATIONS
- WILDLIFE MANAGEMENT
- WATER SURFACE: DESIGNATED NO WAKE AREAS
- WATER SURFACE: OPEN RECREATION
- FEE BOUNDARY

**U.S. ARMY CORPS
OF ENGINEERS
TULSA DISTRICT**

EL DORADO LAKE
WALNUT RIVER, KANSAS

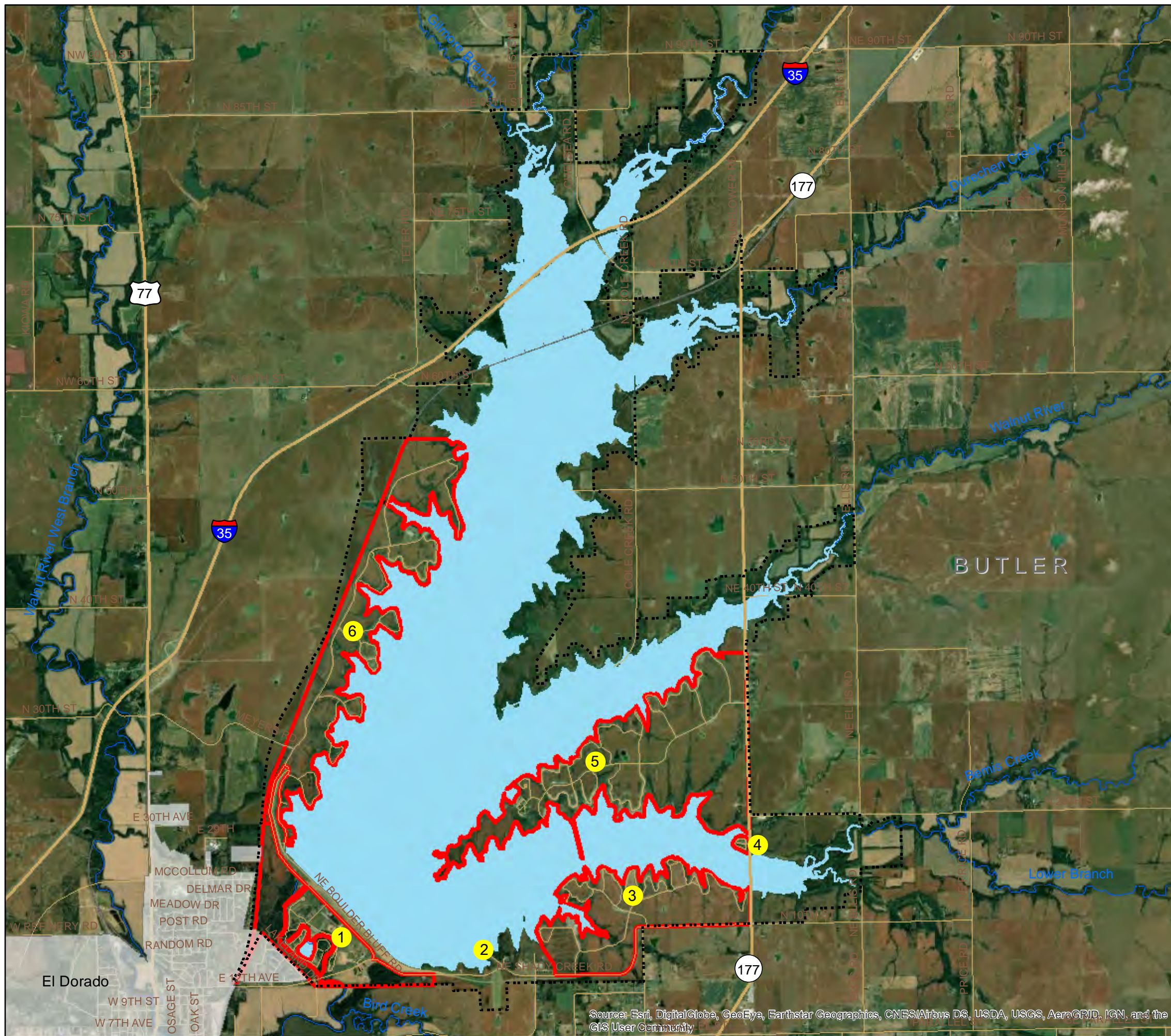
EL DORADO LAKE MASTER PLAN

LAND AND WATER CLASSIFICATIONS


(INDEX SHEET 08)

DATE:
FEBRUARY 2021

MAP NO.
EDL20MP-OC-08




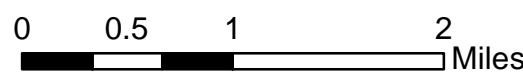
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ID #	NAME	SHEET #
1	WALNUT RIVER AREA	EDL20MP-OR-01
2	OVERLOOK AREA	EDL20MP-OR-02
3	SHADY CREEK AREA	EDL20MP-OR-03
4	BEMIS CREEK AREA	EDL20MP-OR-04
5	BLUE STEM POINT AREA	EDL20MP-OR-05
6	BOULDER BLUFF AREA	EDL20MP-OR-06



**U.S. ARMY CORPS
OF ENGINEERS
TULSA DISTRICT**

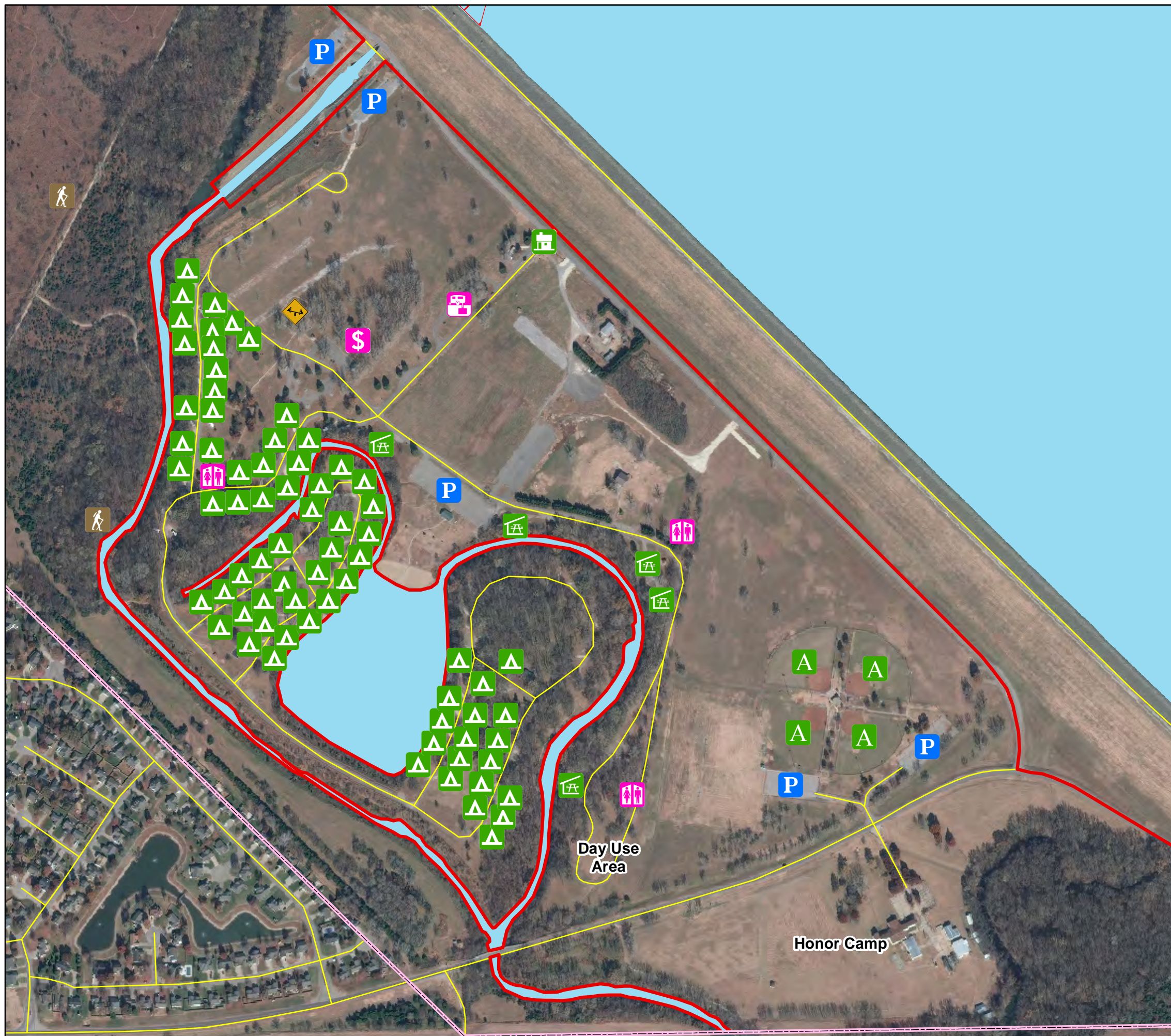
EL DORADO LAKE WALNUT RIVER, KANSAS














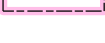
**EL DORADO LAKE MASTER PLAN
PARK PLATE INDEX**





DATE: FEBRUARY 2021	MAP NO. EDL20MP-OR-0B
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



-  ATHLETIC FIELD
-  CAMPSITE
-  ENTRANCE GATE
-  GROUP SHELTER
-  ICE SALES / LAUNDRY
-  PARKING
-  PLAYGROUND
-  RESTROOM
-  SANITARY DUMP STATION
-  TRAILHEAD
-  PARK LIMITS
-  WATER SURFACE: RESTRICTED
-  WATER SURFACE: OPEN RECREATION
-  FEE BOUNDARY




**U.S. ARMY CORPS
OF ENGINEERS
TULSA DISTRICT**

EL DORADO LAKE
WALNUT RIVER, KANSAS

EL DORADO LAKE MASTER PLAN






**RECREATIONAL AREAS
(WALNUT RIVER AREA)**



0 250 500 1,000
Feet

DATE: FEBRUARY 2021	MAP NO. EDL20MP-OR-01
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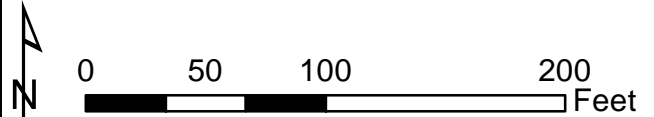
-  OBSERVATION SITE
-  PARKING
-  RESTROOM
-  WATER SURFACE: OPEN RECREATION
-  FEE BOUNDARY



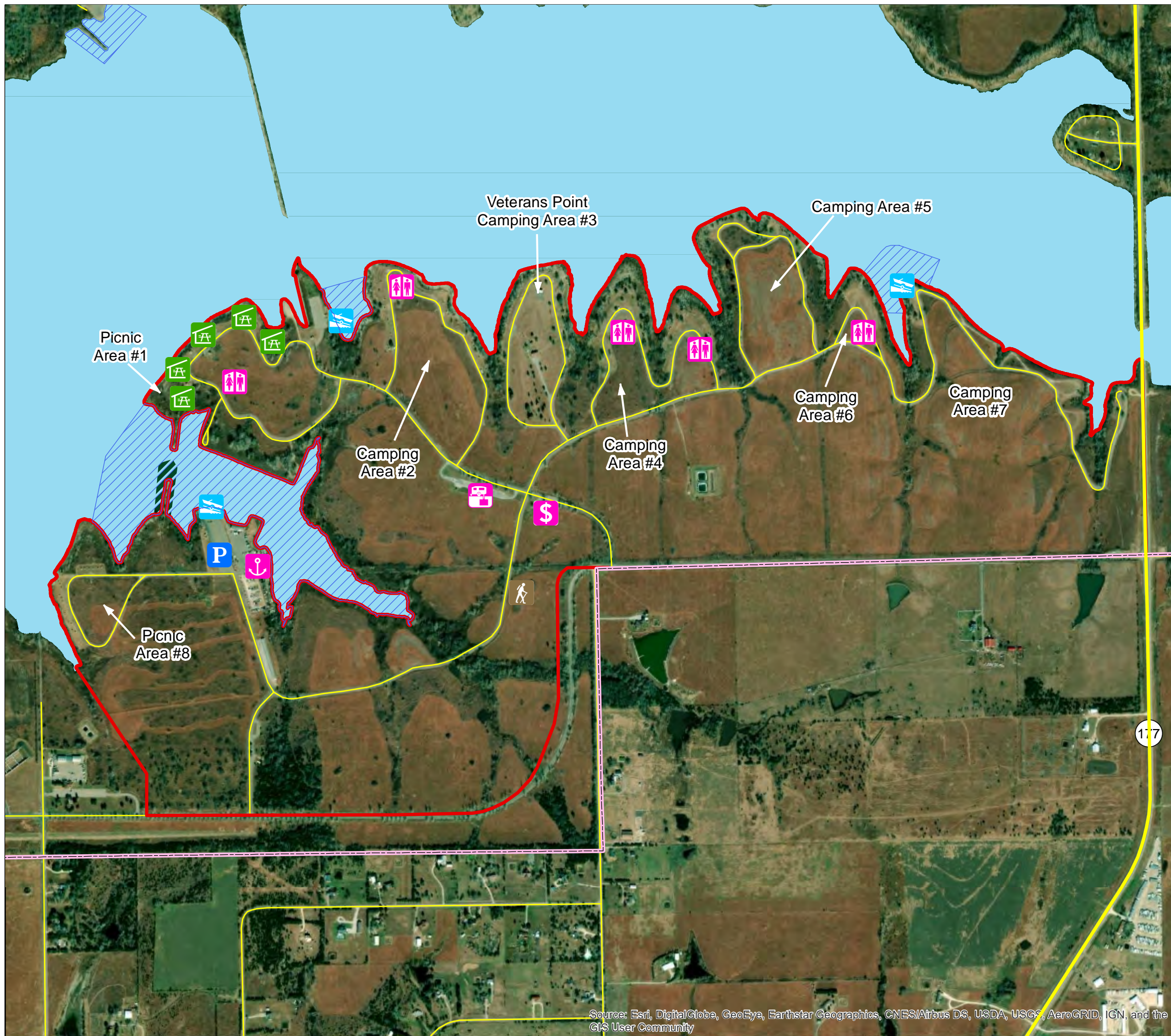
**U.S. ARMY CORPS
OF ENGINEERS
TULSA DISTRICT**













EL DORADO LAKE WALNUT RIVER, KANSAS


**EL DORADO LAKE MASTER PLAN
RECREATIONAL AREAS
(OVERLOOK AREA)**



DATE: FEBRUARY 2021	MAP NO. EDL20MP-OR-02
------------------------	--------------------------



-  BOAT RAMP
-  GROUP SHELTER
-  ICE SALES
-  MARINA
-  PARKING
-  RESTROOM
-  SANITARY DUMP STATION
-  TRAILHEAD
-  PARK LIMITS
-  WATER SURFACE: DESIGNATED NO WAKE AREAS
-  WATER SURFACE: OPEN RECREATION
-  FEE BOUNDARY




**U.S. ARMY CORPS
OF ENGINEERS
TULSA DISTRICT**

EL DORADO LAKE
WALNUT RIVER, KANSAS

EL DORADO LAKE MASTER PLAN

**RECREATIONAL AREAS
(SHADY CREEK AREA)**









0 475 950 1,900
Feet

DATE: FEBRUARY 2021	MAP NO. EDL20MP-OR-03
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



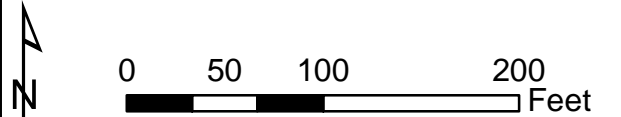
-  CAMPSITE
-  GROUP SHELTER
-  SHOWER HOUSE W/ RESTROOMS
-  PARK LIMITS
-  WATER SURFACE: OPEN RECREATION
-  FEE BOUNDARY



**U.S. ARMY CORPS
OF ENGINEERS
TULSA DISTRICT**

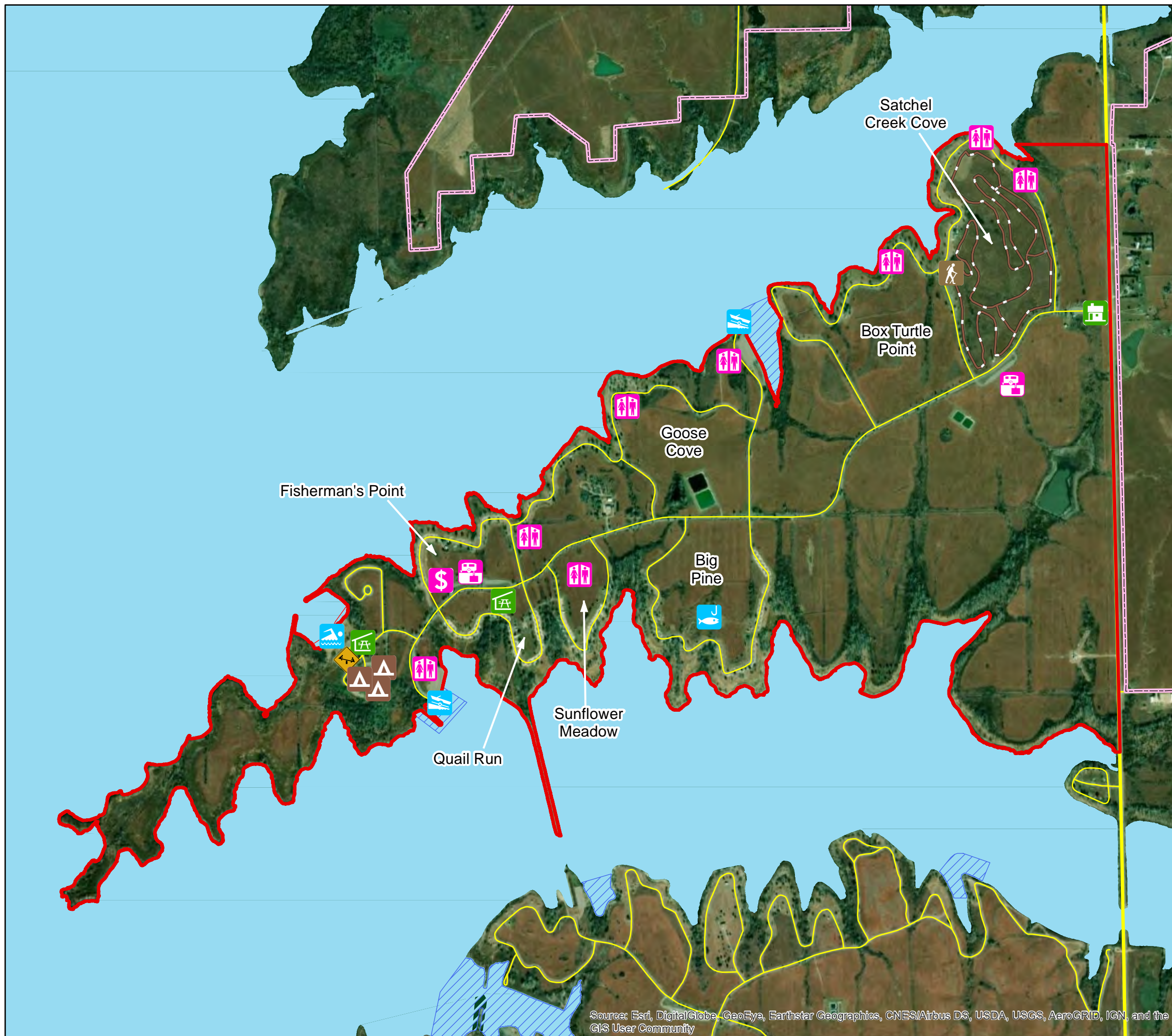
EL DORADO LAKE WALNUT RIVER, KANSAS


















EL DORADO LAKE MASTER PLAN
RECREATIONAL AREAS
(BEMIS CREEK AREA)




DATE: FEBRUARY 2021	MAP NO. EDL20MP-OR-04
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



-  BOAT RAMP
-  CABINS
-  ENTRANCE GATE
-  GROUP SHELTER
-  LAUNDRY / BAIT SHOP
-  PLAYGROUND
-  RESTROOM
-  SANITARY DUMP STATION
-  SWIM BEACH
-  TRAILHEAD
-  YOUTH FISHING POND
-  HIKING/NATURE TRAIL
-  PARK LIMITS
-  WATER SURFACE: DESIGNATED NO WAKE AREAS
-  WATER SURFACE: RESTRICTED
-  WATER SURFACE: OPEN RECREATION
-  FEE BOUNDARY




**U.S. ARMY CORPS
OF ENGINEERS
TULSA DISTRICT**

EL DORADO LAKE
WALNUT RIVER, KANSAS

EL DORADO LAKE MASTER PLAN

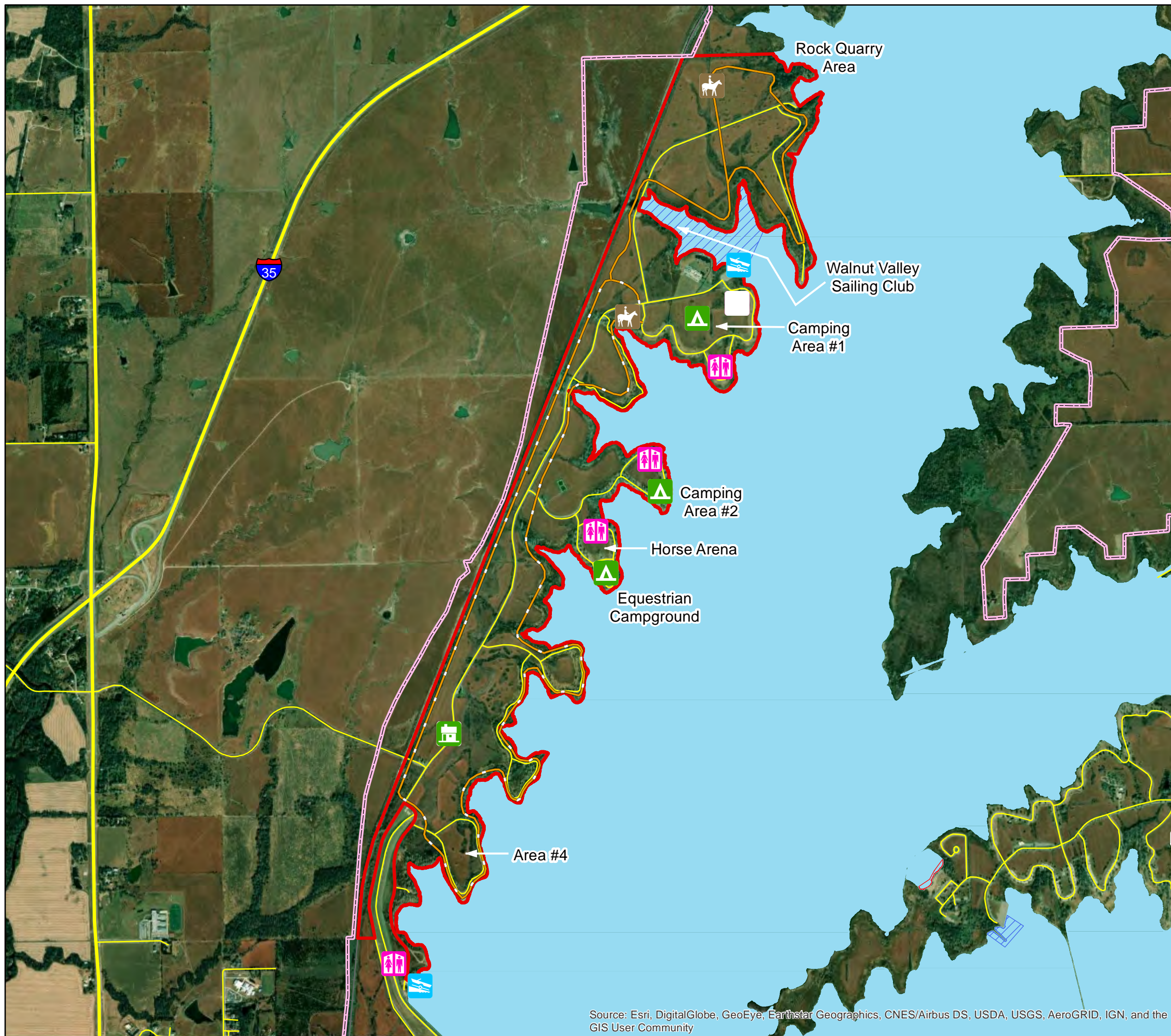
**RECREATIONAL AREAS
(BLUESTEM POINT AREA)**














0 700 1,400 2,800
Feet

DATE: FEBRUARY 2021	MAP NO. EDL20MP-OR-05
-------------------------------	---------------------------------

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



-  BOAT RAMP
-  CAMPSITES
-  ENTRANCE GATE
-  EQUESTRIAN TRAIL
-  RESTROOM
-  EQUESTRIAN TRAIL
-  PARK LIMITS
-  WATER SURFACE: DESIGNATED NO WAKE AREAS
-  WATER SURFACE: RESTRICTED
-  WATER SURFACE: OPEN RECREATION
-  FEE BOUNDARY




**U.S. ARMY CORPS
OF ENGINEERS
TULSA DISTRICT**

EL DORADO LAKE
WALNUT RIVER, KANSAS

EL DORADO LAKE MASTER PLAN

**RECREATIONAL AREAS
(BOULDER BLUFF AREA)**



0 1,000 2,000 4,000
Feet

DATE: FEBRUARY 2021	MAP NO. EDL20MP-OR-06
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

APPENDIX B - NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) DOCUMENTATION

Draft Environmental Assessment for the El Dorado Lake Draft 2021 Master Plan

Walnut River Basin
Butler County, Kansas



June 2021



US Army Corps
of Engineers®
Tulsa District

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ENVIRONMENTAL ASSESSMENT ORGANIZATION

This Environmental Assessment (EA) evaluates the potential environmental and socioeconomic impacts of the Master Plan of El Dorado Lake. This EA will facilitate the decision process regarding the Proposed Action and alternatives.

SECTION 1 *INTRODUCTION* 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 *PROPOSED ACTION AND ALTERNATIVES* 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

TABLE OF CONTENTS

SECTION 1: INTRODUCTION	6
1.1 PROJECT LOCATION AND SETTING.....	6
1.2 PURPOSE OF AND NEED FOR THE ACTION.....	7
1.3 SCOPE OF THE ACTION.....	8
SECTION 2: PROPOSED ACTION AND ALTERNATIVES	10
2.1 ALTERNATIVE 1: NO ACTION ALTERNATIVE	11
2.2 ALTERNATIVE 2: PROPOSED ACTION.....	12
2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER CONSIDERATION.....	15
SECTION 3: AFFECTED ENVIRONMENT AND CONSEQUENCES	17
3.1 LAND USE.....	18
3.1.1 Alternative 1: No Action Alternative	19
3.1.2 Alternative 2: Proposed Action	19
3.2 WATER RESOURCES	20
3.2.1 Alternative 1: No Action Alternative	22
3.2.2 Alternative 2: Proposed Action	22
3.3 CLIMATE	23
3.3.1 Alternative 1: No Action Alternative	23
3.3.2 Alternative 2: Proposed Action	23
3.4 CLIMATE CHANGE AND GHG	23
3.4.1 Alternative 1: No Action Alternative	24
3.4.2 Alternative 2: Proposed Action	24
3.5 AIR QUALITY	24
3.5.1 Alternative 1: No Action Alternative	24
3.5.2 Alternative 2: Proposed Action	24
3.6 TOPOGRAPHY, GEOLOGY, AND SOILS.....	25
3.6.1 Alternative 1: No Action Alternative	26
3.6.2 Alternative 2: Proposed Action	26
3.7 NATURAL RESOURCES	27
3.7.2 Alternative 2: Proposed Action	28
3.8 THREATENED AND ENDANGERED SPECIES	29
3.8.1 Alternative 1: No Action Alternative	31
3.8.2 Alternative 2: Proposed Action	31
3.9 INVASIVE SPECIES.....	32
3.9.1 Alternative 1: No Action Alternative	32
3.9.2 Alternative 2: Proposed Action	32
3.10 CULTURAL, HISTORICAL, AND ARCHAEOLOGICAL RESOURCES ...	33
3.10.1 Alternative 1: No Action Alternative	34
3.10.2 Alternative 2: Proposed Action	34
3.11 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE	35
3.11.1 Alternative 1: No Action Alternative	36

3.11.2	Alternative 2: Proposed Action	36
3.12	RECREATION	36
3.12.1	Alternative 1: No Action Alternative	37
3.12.2	Alternative 2: Proposed Action	37
3.13	AESTHETIC RESOURCES	37
3.13.1	Alternative 1: No Action Alternative	37
3.13.2	Alternative 2: Proposed Action	37
3.14	HAZARDOUS MATERIALS AND SOLID WASTE	38
3.14.1	Alternative 1: No Action Alternative	38
3.14.2	Alternative 2: Proposed Action	38
3.15	HEALTH AND SAFETY	38
3.15.1	Alternative 1: No Action Alternative	38
3.15.2	Alternative 2: Proposed Action	38
3.16	SUMMARY OF CONSEQUENCES AND BENEFITS	39
SECTION 4:	CUMULATIVE IMPACTS.....	44
4.1	PAST IMPACTS WITHIN THE ZONE OF INTEREST	44
4.2	CURRENT AND REASONABLY FORESEEABLE PROJECTS WITHIN AND NEAR THE ZONE OF INTEREST.....	44
4.3	ANALYSIS OF CUMULATIVE IMPACTS	45
4.3.1	Land Use	45
4.3.2	Water Resources.....	45
4.3.3	Climate	45
4.3.4	Climate Change and GHG.....	46
4.3.5	Air Quality.....	46
4.3.6	Topography, Geology, and Soils	46
4.3.7	Natural Resources.....	46
4.3.8	Threatened and Endangered Species.....	47
4.3.9	Invasive Species	47
4.3.10	Cultural, Historical, and Archaeological Resources.....	47
4.3.11	Socioeconomics and Environmental Justice	47
4.3.12	Recreation	48
4.3.13	Aesthetic Resources.....	48
4.3.14	Hazardous Materials and Solid Waste.....	48
4.3.15	Health and Safety.....	48
SECTION 5:	COMPLIANCE WITH ENVIRONMENTAL LAWS	50
SECTION 6:	IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES	53
SECTION 7:	PUBLIC AND AGENCY COORDINATION.....	55
SECTION 8:	REFERENCES.....	57
SECTION 9:	ACRONYMS/ABBREVIATIONS.....	59
SECTION 10:	LIST OF PREPARERS	61

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LIST OF FIGURES

	Page
Figure 3.2.1 Recent Water Level Data for El Dorado Lake.....	22
Figure 3.2.2 Map of Wetlands within USACE El Dorado Lake Federal Fee-Owned Property.....	24
Figure 3.6 Map of Soils within USACE El Dorado Lake Federal Fee-Owned Property.....	30

LIST OF TABLES

	Page
Table 1.1 El Dorado Lake Pertinent Data.....	6
Table 2.2.1 Proposed El Dorado Lake Land Classifications.....	13
Table 2.2.2 Proposed El Dorado Lake Water Surface Classifications.....	13
Table 2.2.3 Justification for the Proposed Reclassification.....	13
Table 3.2.2 Wetland Resources.....	19
Table 3.8.1 Federally Listed Endangered and Threatened Species with Potential to Occur at El Dorado Lake	28
Table 3.8.1 State Listed Endangered and Threatened Species with Potential to Occur at El Dorado Lake	29
Table 3.8.3 Kansas Listed Species in Need of Consercation with Potential to Occur at El Dorado Lake.....	29
Table 3.16 Summary of Consequences and Benefits.....	38

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ENVIRONMENTAL ASSESSMENT 2021 EL DORADO LAKE MASTER PLAN Draft BUTLER COUNTY, KANSAS

SECTION 1: INTRODUCTION

The United States Army Corps of Engineers (USACE) is proposing to adopt and implement the 2021 El Dorado Lake Master Plan as a revision of the 1976 Master Plan and the 1986 Supplement Number 10 (Land Use) Master Plan hereafter called the 1986 Master Plan. The 2021 Master Plan is the strategic land use management document that guides the efficient, cost-effective, comprehensive management, development, and use of recreation, natural resources, and cultural resources throughout the life of the El Dorado Lake project. It is a vital tool for responsible stewardship and sustainability of the project’s natural and cultural resources, as well as the provision of outdoor recreation facilities and opportunities on federal land associated with El Dorado Lake for the benefit of present and future generations.

Adoption and implementation of the 2021 Master Plan (Proposed Action) would create potential impacts on the natural and human environments, and as such, this EA was prepared pursuant to NEPA, Council on Environmental Quality (CEQ) regulations (40 CFR 1500–1508), and the USACE implementing regulations, Policy and Procedures for Implementing NEPA, ER 200-2-2 (USACE, 1988).

1.1 PROJECT LOCATION AND SETTING

El Dorado Lake is located in southcentral Kansas approximately 2 miles northeast of the town of El Dorado and 36 miles northeast of Wichita. The dam is located at mile 100.2 on the Walnut River, a tributary of the Arkansas River. The lake area extends throughout portions of Butler County. The lake is formed by the El Dorado Dam, which was constructed and designated in 1973 for the purpose of flood risk management, water supply, water quality, fish and wildlife, and recreation.

Figure 5 in the 2021 Master Plan outlines information regarding existing reservoir storage capacity at El Dorado Lake. Detailed descriptions are incorporated herein by reference (USACE, 2021).

Feature	Elevation (feet)	Area (acres)	Capacity (Acre-feet)	Equivalent Runoff (inches) ⁽¹⁾
Top of Dam	1370.5	-	-	-
Spillway Crest	1353.0	13,650	303,540	24.32

Top of Flood Control Pool	1347.5	11,451	240,660	19.28
Flood Control Storage	1339.0 - 1347.5	-	82,471	6.60
Initial	-	-	79,200	6.35
After 100-Year Sediment	-	-	75,200	6.03
Top of Conservation Pool	1339.0	7,957	161,550	12.94
Conservation Storage	1296.0 - 1339.0	-	158,189	12.67
Initial ⁽²⁾	-	-	154,100	12.35
After 100-Year Sediment	-	-	142,800	11.44
Top of Inactive Pool	1296.0	599	3,361	0.27

(1) From a 234-square-mile drainage area.

(2) Provides a storage yield of 22.2 mgd (142,800 acre-feet after sedimentation) for water supply, including joint use of 5.2 mgd for interim water quality control.

1.2 PURPOSE OF AND NEED FOR THE ACTION

The purpose of the Proposed Action is to ensure that future management of the land, water, and recreational resources on El Dorado Lake, through implementation of the Master Plan, are in compliance with applicable environmental laws and regulations and to maintain quality lands and water surface for future public use. The 2021 Master Plan is intended to serve as a comprehensive land and recreation management plan with an effective life of approximately 25 years.

The need for the Proposed Action is to bring the 1976 Master Plan up to date and to reflect ecological, socio-political, and socio-demographic changes that are currently impacting El Dorado Lake, as well as those changes anticipated to occur through 2046. In particular, changes in outdoor recreation trends, regional land use, population, current legislative requirements, and USACE management policy, have all indicated the need to revise the Master Plan. Additionally, increasing fragmentation of wildlife habitat, national policies related to climate change, growing demand for recreational access, and protection of natural resources are all factors affecting El Dorado Lake. In response to these continually evolving trends, the USACE determined that a full revision of the 1976 Master Plan would be required.

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

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

As part of the master planning process, the project delivery team evaluated public comments and current land uses, determined any necessary changes to land classifications, and formulated proposed alternatives. As a result of public coordination and a virtual public involvement process, alternatives were developed, and this EA was initiated.

1.3 SCOPE OF THE ACTION

This EA was prepared to evaluate existing conditions and potential impacts of proposed alternatives associated with the implementation of the 2021 Master Plan. The alternative considerations were formulated with special attention given to revised land classifications, new resource management objectives, and a conceptual resource plan for each land classification category. This EA was prepared pursuant to NEPA, Council on Environmental Quality (CEQ) regulations (40 CFR 1500–1508), and the USACE implementing regulations, Policy and Procedures for Implementing NEPA, ER 200-2-2 (USACE, 1988).

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SECTION 2: PROPOSED ACTION AND ALTERNATIVES

The project need is to revise the 1976 Master Plan so that it is compliant with current USACE regulations and guidance, incorporates public needs, and recognizes surrounding land use and recreational trends. As part of this process, which includes public outreach and comment, two alternatives were developed for evaluation including a No Action Alternative. The alternatives were developed using land classifications that indicate the primary use for which project lands would be managed. USACE regulations specify five possible categories of land classification: Project Operations (PO), High Density Recreation (HDR), Mitigation, Environmentally Sensitive Areas (ESA), and Multiple Resource Managed Lands (MRML). The MRML classification is divided into four subcategories: Low Density Recreation (MRML-LDR), Wildlife Management (MRML-WM), Vegetative Management (MRML-VM), and Future/Inactive Recreation (MRML-IFR) Areas.

The 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 resource objectives are specific task-oriented actions necessary to achieve the overall 2021 Master Plan 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 five project-wide management goals established for El Dorado Lake that were used in determining the Proposed Action, as well as the nationwide USACE Environmental Operating Principles, are discussed in detail “Chapter 3: Resource Goals and Objectives of the 2021 Master Plan”, and are incorporated herein by reference (USACE, 2021).

The goals for El Dorado Lake Master Plan include the following:

- Goal A: Provide the best management practices (BMPs) to respond to regional needs, resource capabilities and capacities, and expressed public interests consistent with authorized project purposes.
- Goal B: Protect and manage project natural and cultural resources through sustainable environmental stewardship programs.
- Goal C: Provide public outdoor recreation opportunities that support project purposes and public interests while sustaining project natural resources.
- Goal D: Recognize the unique qualities, characteristics, and potentials of the project.
- Goal E: Provide consistency and compatibility with natural objectives and other state and regional goals and programs.

In addition to the above goals, USACE management activities are also guided by USACE-wide Environmental Operating Principles as follows:

- Strive to achieve environmental sustainability. An environment maintained in a healthy, diverse and sustainable condition is necessary to support life.
- Recognize the interdependence of life and the physical environment. Proactively consider environmental consequences of USACE programs and act accordingly in all appropriate circumstances.
- Seek balance and synergy among human development activities and natural systems by designing economic and environmental solutions that support and reinforce one another.
- Continue to accept corporate responsibility and accountability under the law for activities and decisions under our control that impact human health and welfare and the continued viability of natural systems.
- Seek ways and means to assess and mitigate cumulative impacts on the environment; bring systems approaches to the full life cycle of our processes and work.
- Build and share an integrated scientific, economic, and social knowledge base that supports a greater understanding of the environment and impacts of our work.
- Respect the views of individuals and groups interested in USACE activities; listen to them actively, and learn from their perspective in the search to find innovative win-win solutions to the nation's problems that also protect and enhance the environment.

Specific resource objectives to accomplish these goals can be found in Chapter 3.3 of the 2021 Master Plan.

2.1 ALTERNATIVE 1: NO ACTION ALTERNATIVE

The No Action Alternative serves as a basis for comparison to the anticipated effects of the other action alternatives, and its inclusion in this EA is required by NEPA and CEQ regulations (40 CFR § 1502.14(d)). Under the No Action Alternative, the USACE would not approve the adoption or implementation of the 2021 Master Plan. Instead the USACE would continue to manage El Dorado Lake's natural resources as set forth in the 1976 Master Plan including the 1986 Supplement Number 10. The 1976 Master Plan would continue to provide the only source of comprehensive management guidelines and philosophy. However, the 1976 Master Plan is out of date and does not reflect the current ecological, socio-political, or socio-demographic conditions of El Dorado Lake. The No Action Alternative, while it does not meet the purpose of, or need for, the Proposed Action, serves as a benchmark of existing conditions against which federal actions can be evaluated, and as such, the No Action Alternative is included in this EA, as prescribed by CEQ regulations.

2.2 ALTERNATIVE 2: PROPOSED ACTION

Under the Proposed Action, the 2021 Master Plan would be reviewed, coordinated with the public, revised to comply with USACE regulations and guidance, and revised to reflect changes in the land management and land uses that have occurred over time or are desired in the near future. The keys to this alternative would be the revision of land classifications to USACE standards and the preparation of the resource objectives that would reflect current and projected needs and would be compatible with regional goals while sustaining El Dorado Lake's natural resources and providing recreational experiences for the next 25 years.

The proposed land classification categories are defined as follows:

- Project Operations (PO): Lands required for the dam, spillway, switchyard, levees, dikes, offices, maintenance facilities, and other areas used solely for the operation of El Dorado Lake.
- High Density Recreation (HDR): Lands developed for the intensive recreational activities for the visiting public including day use and campgrounds. These areas could also be for commercial concessions and quasi-public development.
- Environmentally Sensitive Areas (ESA): Areas where scientific, ecological, cultural, or aesthetic features have been identified.
- Multiple Resource Management Lands (MRML): Allows for the designation of a predominate use with the understanding that other compatible uses may also occur on these lands.
 - MRML Low Density Recreation (MRML-LDR): Lands with minimal development or infrastructure that support passive recreational use (primitive camping, fishing, hunting, trails, wildlife viewing, etc.).
 - MRML Wildlife Management (MRML-WM): Lands designated for stewardship of fish and wildlife resources.
 - Future/Inactive Recreation (MRML-IFR): Lands that are set aside for future High Density Recreation development and use.
 - Vegetative Management (MRML-VM): Lands designated for stewardship of forest, prairie, and other native Vegetative cover.
- Water Surface: Allows for surface water zones.
 - Restricted: Water areas restricted for El Dorado Lake operations, safety, and security.
 - Designated No-Wake: Water areas to protect environmentally sensitive shoreline areas, recreational water access areas from disturbance, and areas to protect public safety.
 - Open Recreation: Water areas available for year-round or seasonal water-based recreational use.
 - Fish and Wildlife Sanctuary: Water areas that have either annual or seasonal restrictions to protect fish and wildlife within a designated area.

Table 2.2.1 shows the proposed classifications and acres contained in each classification, Table 2.2.2 shows the water surface classifications, and Table 2.2.3 provides the justification for the proposed reclassification.

Table 2.2.1 Proposed El Dorado Lake Land Classifications

Prior Land Classifications (1986)	Acres	New Land Classifications (2021)	Acres	Net Difference
Project Operations	338	Project Operations (PO)	422	84
Recreation – Intensive Use	3,927	High Density Recreation (HDR)	3,722	(205)
		Environmentally Sensitive Areas (ESA)	138	138
Recreation – Low Density	61	Multiple Resource Management – Low Density Recreation (LDR)	31	(30)
Wildlife Management	3,718	Multiple Resource Management – Wildlife Management (WMA)	4,098	380
		Multiple Resource Management – Vegetation Management (VMA)	0	-
		Future/Inactive Recreation Areas	0	-
Transportation Rights-of-Way	284			(284)
TOTAL	8,328		8,411	83
Prior Water Surface Classifications (1986)	Acres	New Water Surface Classifications (2021)	Acres	Net Difference
Water Surface	8,000	Open Recreation	7,834	
		Designated No-Wake	117	

Prior Land Classifications (1986)		Acres	New Land Classifications (2021)		Acres	Net Difference
			Fish and Wildlife Sanctuary	0		
			Restricted	6		
TOTAL		8,000		7,957		(43)
TOTAL FEE		16,328		16,368		40
Prior Land Classifications (1986)		Acres	New Land Classifications (2021)		Acres	Net Difference
Project Operations		338	Project Operations (PO)	422		84
Recreation – Intensive Use		3,927	High Density Recreation (HDR)	3,722		(205)
			Environmentally Sensitive Areas (ESA)	138		138
Recreation – Low Density		61	Multiple Resource Management – Low Density Recreation (LDR)	31		(30)
Wildlife Management		3,718	Multiple Resource Management – Wildlife Management (WMA)	4,098		380
			Multiple Resource Management – Vegetation Management (VMA)	0		-
			Future/Inactive Recreation Areas	0		-
Transportation Rights-of-Way		284				(284)
TOTAL		8,328		8,411		83

Prior Land Classifications (1986)		Acres	New Land Classifications (2021)		Acres	Net Difference
Prior Water Surface Classifications (1986)	Acres		New Water Surface Classifications (2021)	Acres		Net Difference
Water Surface	8,000		Open Recreation	7,834		
			Designated No-Wake	117		
			Fish and Wildlife Sanctuary	0		
			Restricted	6		
TOTAL	8,000			7,957		(43)
TOTAL FEE	16,328			16,368		40

* Land classification acreages were derived using geographic information system technology and do not reflect the official land acquisition records.

* Source: USACE 2021

Table 2.2.2 Proposed El Dorado Lake Water Surface Classifications

Classification	Acres
Water Surface: Restricted	6
Water Surface: Designated No-Wake	117
Water Surface: Open Recreation	7,982
Water Surface: Fish and Wildlife Sanctuary	0

Source: USACE 2021

Table 2.2.3 Justification for the Proposed Reclassification

Land Classification	Description of Changes (2)	Justification
Project Operations (PO)	<p>The net increase in PO lands from 338 acres to 422 acres was due to the following:</p> <p>✓61 acres HDR reclassified to PO.</p>	<p>HDR acres were reclassified to capture PO components that were previously not classified as PO near the dam. In addition, land adjacent to the El Dorado State Park Shooting Range were reclassified</p>

		as PO to aid in assuring public safety.
High Density Recreation (HDR)	<p>The net decrease in HDR lands from 3,927 to 3,722 was due to the following:</p> <ul style="list-style-type: none"> ✓43 acres HDR reclassified as ESA. ✓61 acres HDR reclassified as PO. ✓68 acres HDR reclassified to WM. 	<p>ESA areas were designated to protect areas where scientific, ecological, cultural, or aesthetic features have been identified. Additionally, lands associated with KDWPT wildlife management areas removed from HDR to identify their current WM use under the current out grant. HDR acres were reclassified to capture PO components that were previously not classified as PO near the dam</p>
Environmentally Sensitive Areas (ESA)	<p>The net increase in ESA of 138 acres was due to the following:</p> <ul style="list-style-type: none"> ✓43 acres HDR reclassified as ESA. ✓94 acres WM reclassified as ESA. 	<p>Created ESA areas to protect areas where scientific, ecological, cultural, or aesthetic features have been identified near Bemis Creek (ESA 3), Boulder Bluff Area (ESA 2), and the NW quadrant of El Dorado Lake.</p>
MRML – Low Density Recreation (LDR)	<p>The net decrease in LDR from 61 acres to 31 acres was due to the following:</p> <ul style="list-style-type: none"> ✓94 acres LDR were reclassified as WM. 	<p>Previous classifications failed to appropriately reflect current use of the area. Area was reclassified to capture the recreation uses created by KDWPT State Parks management in the area below the dam.</p>
MRML – Wildlife Management (WM)	<p>The net increase in WM from 3,718 acres to 4,098 acres was due to the following:</p> <ul style="list-style-type: none"> ✓68 acres HDR were reclassified as WM. 	<p>Created ESA areas to protect areas where scientific, ecological, cultural, or aesthetic features have been identified. Land</p>

	✓94 acres WM were reclassified to ESA. ✓21 acres WM were reclassified to LDR.	classification alignment with KDWP&T Wildlife Management Area was also necessary to reflect current uses.
MRML – Vegetation Management (VM)	There are no VM acres at El Dorado Lake.	N/A
Future/Inactive Recreation Areas	There are no Future/Inactive Recreation Areas at El Dorado Lake.	N/A

⁽¹⁾The land classification changes described in this table are the result of changes to individual parcels of land ranging from a few acres to several hundred acres. New acreages were measured using more accurate GIS technology, thus total changes will not equal individual changes. The acreage numbers provided are approximate.

⁽²⁾ Acreages are based on GIS measurements and may vary from Net Difference totals detailed in Figure 41

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER CONSIDERATION

Other alternatives to the Proposed Action were initially considered as part of the scoping process for this EA. However, none met the purpose of, and need for, the Proposed Action or the current USACE regulations and guidance. Furthermore, no other alternatives addressed public concerns. Therefore, no other alternatives are being carried forward for analysis in this EA.

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 these alternatives are described, per CEQ guidance (40 CFR § 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 El Dorado Lake watershed is designated as a Federal 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 CFR § 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 CFR § 1508.8 [b]). As discussed in this section, the alternatives may create temporary (less than one year), short-term (up to three years), long-term (three to ten10 years), or permanent effects, following implementation of the master plan revision.

Whether an impact is significant depends on the context in which the impact occurs and the intensity of the impact (40 CFR § 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

El Dorado Dam was constructed for the purpose flood risk management, water supply, water quality, fish and wildlife, and recreation. Congressional authority for the construction of the El Dorado Dam began when it was originally authorized by Resolution, Committee on Public Works, House of Representatives dated 16 October 1951. It was then authorized by the Flood Control Act of 27 October 1965, Section 204 (Public Law 89-298, 89th Congress 1st Session).

The USACE lands presently associated with El Dorado Lake are listed in the 1976 Master Plan as follows:

- 338 acres of Project Operations
- 3,927 acres of Recreation Intensive Use
- 61 acres of Recreation Low-Density Use
- 3,718 acres of Wildlife Management
- 284 acres of Transportation Right-of-Way

The USACE has leased lands to Kansas Department of Wildlife, Parks and Tourism (KDWPT) who operates and manages numerous areas designated as High Density Recreation (HDR) including Walnut River Park, Boulder Bluff, Shady Creek Park, and Bluestem Point.

Section 5.3 of the 2021 Master Plan further describes recreation areas at El Dorado Lake.

3.1.1 Alternative 1: No Action Alternative

The No Action Alternative for El Dorado Lake is defined as the USACE taking no action, which means the operation and maintenance of USACE lands at El Dorado Lake would continue as outlined in the existing 1976 Master Plan. No new resource analysis, resources management objectives, or land-use classifications would occur. Although this alternative does not result in a Master Plan that meets current regulations and guidance, there would be no significant negative long-term impacts on land uses on El Dorado Lake lands.

3.1.2 Alternative 2: Proposed Action

The objectives for revising the El Dorado Lake 2021 Master Plan were to describe current and foreseeable land uses, taking into account expressed public opinion and USACE policies that have evolved to meet day-to-day operational needs.

The USACE intends to continue leasing lands to KDWP for the continued operation of the campgrounds, day use areas, and access points, by maintaining and improving existing facilities with no plans for expansion. Emphasis will be placed on improvements such as upgrading aging water and electrical infrastructure, improving energy efficiency and sustainability of facilities, and repairing or replacing outdated restrooms.

The changes required for the Proposed Action were developed to help fulfill 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 negative long-term adverse impacts on land uses on project lands. For example, 138 acres would be reclassified as ESA compared to the No Action Alternative which contains 0 acres (see Table 2.2.1). The ESA reclassifications would afford protection to and potentially benefit wildlife, wildlife habitats, sensitive species habitat, and cultural resources. The protection and appropriate management of these areas aligns with Resource Goals B, C, D, and E as described in Section 3.2 of the revised Master Plan, as well as numerous natural resource objectives listed in Table 3-1 of the revised Master Plan. The reduction of HDR by 205 acres occur in areas of parks with little to no recreational development. No decrease in recreational opportunities are expected as low impact activities, such as hiking and wildlife viewing, can still occur on other land classes like ESA and WM. Maintaining the HDR and MRML-LDR areas allows for continued outdoor recreation opportunities at El Dorado Lake. New resource goals A, C, and E and several recreational objectives are supported by these reclassifications as described in Section 3.3 and Table 3-1 of the revised Master Plan. The new resources objectives will provide a level of consistency in beneficial management practices that would not occur with the No Action Alternative. ESA classification would allow for appropriate active management and protection for these sites.

No changes in land use are expected with 2021 Master Plan as recreation and project maintenance areas and operation areas will largely remain the same. As such, no short or long-term, adverse impacts are expected to occur as a result of the 2021 Master Plan.

3.2 WATER RESOURCES

Surface Water

El Dorado Lake is located in the Walnut River Basin. Its watershed drains approximately 234 square miles above the dam and is located in Butler County in southcentral Kansas. Fluctuation within the conservation pool depends upon the rate of withdrawals for water supply by the water district, as well as inflows and evaporation.

Hydrology and Groundwater

An additional benefit from El Dorado Lake is the utilization of water impounded to provide municipal and industrial water supplies to the city of El Dorado. The Kansas Water Office is the state agency created by the legislature to administer the water supply features of the project.

The dam has an uncontrolled concrete spillway excavated through the left abutment about two miles east of the river channel, and an outlet structure consisting of a reinforced concrete conduit.

Water Quality

The Kansas Department of Health and Environment sets and implements standards for surface water quality to improve and maintain the quality of water in the state based on various beneficial use categories. The 2020 Kansas Integrated Water Quality Assessment, published pursuant to the Clean Water Act Sections 305(b) and 303(d), evaluates the quality of surface waters in Kansas and identifies those that do not meet uses and criteria defined in the Kansas Surface Water Quality Standards. Impaired waters are then identified, along with impairment descriptions, on the 303(d) list.

The Integrated Water Quality Assessment has identified siltation and eutrophication at station LM33001 in El Dorado Lake, resulting in the lake listed as a high priority among the impaired Water Bodies in Kansas. The lake is shallow and due to this has high levels of inorganic turbidity and sediment in the water column. High levels of phosphorus and sediment entering the lake are a known issue. Due to impairment issues, El Dorado Lake is a high priority in the Water Restoration and Protection Strategy Program.

For more information regarding water quality at El Dorado Lake, please refer to Section 2.2.8 of the 2021 Master Plan.

Wetlands

Waters of the United States are defined within the Clean Water Act (CWA), and jurisdiction is addressed by the USACE and United States Environmental Protection Agency (USEPA). Wetlands are a subset of the waters of the United States that may be subject to regulation under Section 404 of the CWA (40 CFR 230.3). Wetlands are defined under Section 404 as those areas inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

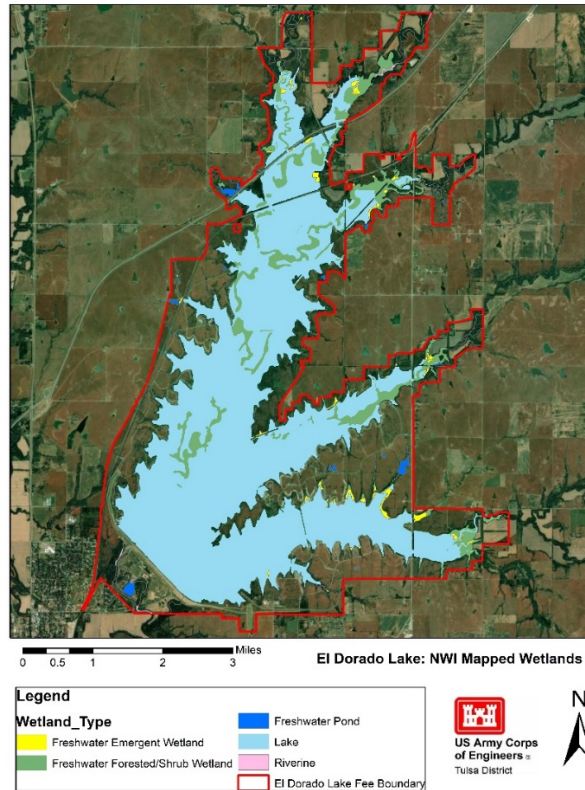
As a result of the topography of the region for El Dorado Lake, wetlands generally occur near the rivers and within areas with low topographic relief. Table 3.2.1 lists the acreages of various types of wetlands present at El Dorado Lake. Wetland classifications presented are derived from the USFWS Trust Resource List generated using the Information, Planning, and Conservation System decision support system (USFWS, 2020D).

Table 3.2.1 Wetland Resources

Wetland Types	Total Acres
Emergent Wetland	6.32
Pond	29.141
Forested Wetland	12.496
Lake	24.067
Riverine	35.139

Note: Acreages from the USFWS website do not match exactly with the USACE digitized acreages.

Figure 3.2.2. Map of Wetlands within USACE El Dorado Lake Federal Fee-Owned Property.



3.2.1 Alternative 1: No Action Alternative

There would be no negative significant permanent 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 included in the Proposed Action would allow land management and land uses to be compatible with the goals of good stewardship of water resources. Land reclassifications and new resource objectives proposed as part of the Proposed Action would have a potential for minor long-term beneficial impacts on water quality. For example, 138 acres would be reclassified as ESA compared to the No Action Alternative which allocates 0 acres to strictly ESA (see Table 2.2.1). This directly supports resource goals B, D, and E and several natural resource management objectives including minimizing activities that disturb the aesthetic value and protect natural habitat, all of which are further described in Chapter 3 of the revised Master Plan. The net reduction of HDR lands from 3,927 acres to 3,722 acres will limit future intensive development, thus reducing the potential for erosion and sedimentation. Natural vegetation communities act as buffers to trap runoff, thus potentially reducing sedimentation. New designation of no wake zones will also reduce the risk of sedimentation from wake wave action. The new resources objectives will provide a

level of consistency in beneficial management practices that would not occur with the No Action Alternative.

3.3 CLIMATE

El Dorado Lake lies in a moderately humid region of the southwest United States where the temperature is generally mild. Summer temperatures are generally hot during the day and cool at night, while winter temperatures are generally mild to cold, including frequent freezing temperatures. Sub-zero temperatures are in short duration and not uncommon during the winter. While the mean annual temperature is about 56.6 degrees Fahrenheit (°F), the maximum recorded temperature was 118 °F in August 1936, and the minimum recorded temperature was -28 °F in December 1989. The growing season between killing frosts is normally from April to late-October. For more detailed information see Section 2.1.2 of the 2021 Master Plan.

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 impacts on climate as a result of implementing the No Action Alternative.

3.3.2 Alternative 2: Proposed Action

Revision of the El Dorado Lake Master Plan would have no impact on the climate of the study area. There would be no impacts on climate as a result of implementing the Proposed Action Alternative.

3.4 CLIMATE CHANGE AND GREENHOUSE GASS (GHG)

CEQ drafted guidelines for determining meaningful GHG decision-making analyses. The CEQ guidance states that if a project would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of carbon dioxide (CO₂)-equivalent (CO_{2e}) GHG emissions per year, the project should be considered in a qualitative and quantitative manner in NEPA reporting (CEQ, 2015). 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, 2015).

EPA records show that there are two GHG contributors within Butler County, Kansas. The general operations and recreation facilities associated with El Dorado Lake does not approach the proposed reportable limits. Within the Operational Management Plan (OPM) for El Dorado Lake, USACE does prescribe land management actions that will protect natural resources and reduce GHG emissions. In addition, USACE will continue monitoring programs at El Dorado Lake as required to meet applicable laws and policies.

The USACE has prepared an Adaptation Plan in response to the EOs and the 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.

The USACE manages project lands and recreational programs to advance broad national climate change mitigation goals including, but not limited to, climate change resilience and carbon sequestration.

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 impacts on climate change or contributions to GHG emissions and climate change as a result of implementing the No Action Alternative.

3.4.2 Alternative 2: Proposed Action

Under the Proposed Action, current El Dorado Lake project management plans and monitoring programs would not be changed. There would be no impacts on climate change or contributions to GHG emissions as a result of implementing the 2021 Master Plan. In the event that GHG emission issues become significant enough to impact the current operations at El Dorado Lake, the 2021 Master Plan and all associated documents would be reviewed and revised as necessary.

3.5 AIR QUALITY

The overall air quality condition for El Dorado Lake is generally of good quality. The region is currently in attainment for all air quality standards. In conducting routine operations and maintenance activities at El Dorado Lake, the USACE will comply with all Federal, state, and local laws governing air quality and will implement best management practices to protect air quality.

3.5.1 Alternative 1: No Action Alternative

There would be no impacts on air quality as a result of implementing the No Action Alternative, since there would be no change to the existing 1976 Master Plan.

3.5.2 Alternative 2: Proposed Action

Existing operation and management of El Dorado Lake is compliant with the Clean Air Act and would not change with implementation of the 2021 Master Plan. Land reclassifications and new resource objectives proposed as part of the Proposed Action would have a potential for negligible long-term beneficial impacts on air quality. The new resources goals, primarily B and C, along with several recreational and natural resource management objectives regarding sustainability and the conservation of natural areas are supported by the proposed land classifications and are further described in Chapter 3 of the revised Master Plan. The new resources objectives will

provide a level of consistency in beneficial management practices that would not occur with the No Action Alternative. Because the proposed action does not entail greenhouse gas emissions and the project area does not fall within a State Implementation Plan area for air quality standards, a General Conformity analysis in accordance with the Clean Air Act is not required.

3.6 TOPOGRAPHY, GEOLOGY, AND SOILS

Topography and Geology

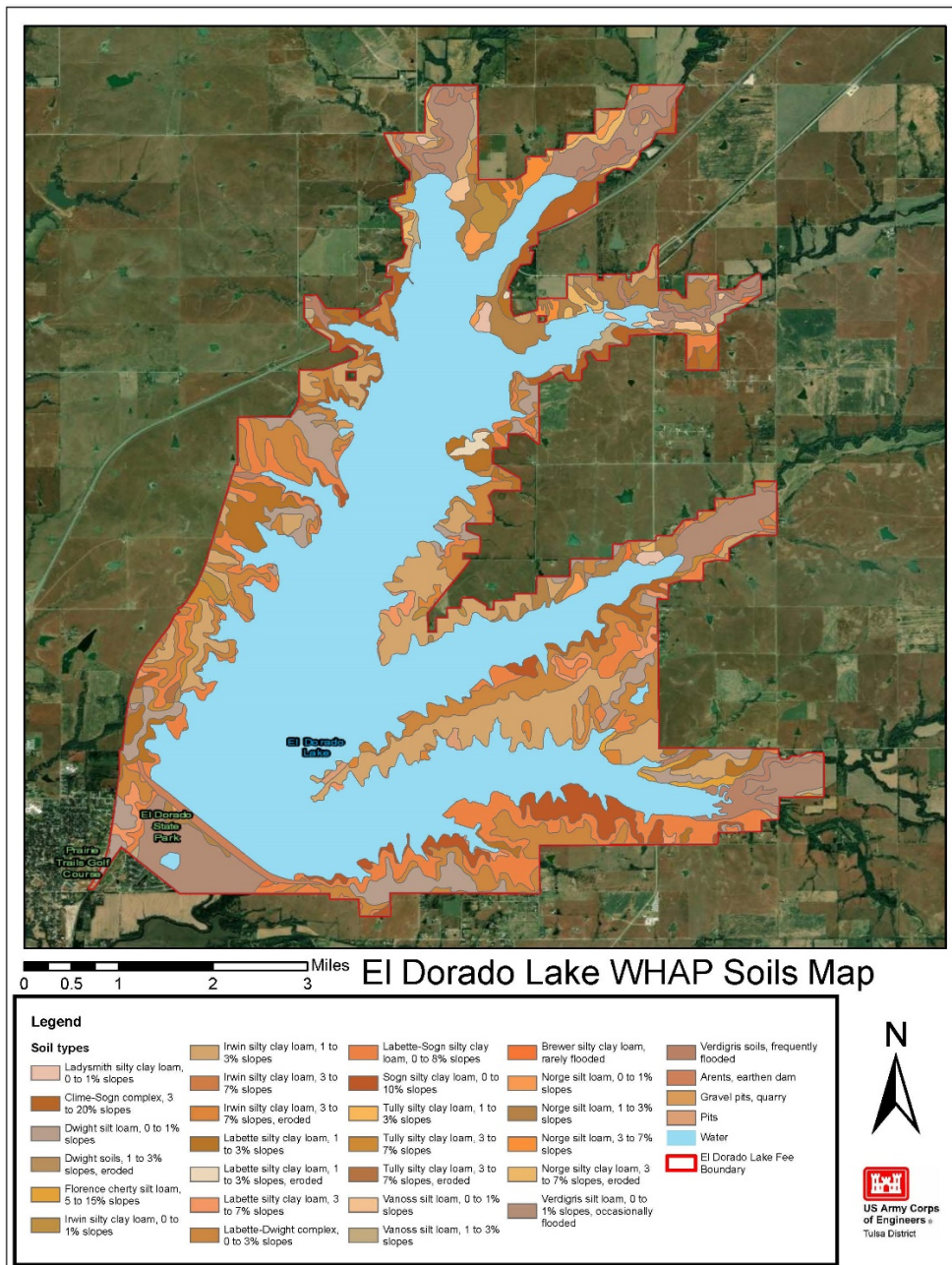
The El Dorado Lake area contains Barneston limestone formation and consists of the Fort Riley limestone and the Florence limestone members in descending order. The bedrock of the flood plain is Florence limestone and the Fort Riley limestone is the bedrock of the abutments. The Barneston formation dips to the northwest at 20 feet per mile, and the formation is thickest on the right side of the river. The right abutment is approximately 100' thick, and the left abutment is approximately 70' thick. Below the Barneston formation, core holes penetrated Blue Springs shale, Kinney limestone, and Wymore shale members of the Matfield formation. The overburden is predominantly moderately plastic clay. Most of these fountain soils, especially in abutment areas, have liquid limits ranging from 40' to 60'. Depth of clays in the flood plain is fairly uniform, averaging approximately 20', but clays in the abutments average only five feet in thickness. A layer of coarse-grained soil underlies the clays across the entire width of the flood plain. This layer averages three feet in thickness and is predominately clayey sand or clayey gravel, which are relatively impervious.

El Dorado Lake is in the Osage Plains section of the Central Lowlands physiologic province. The streams are generally well entrenched into the flood plains, and the valleys are wide and flat with steep sides. Limestone outcrops form scarps and benches along the valley walls.

Soils

The El Dorado Lake area has Labette silty clay loam and Irwin silty clay loam soils in the highest density. For a visual representation of where these soils can be found please see the below Figure 3.6 and for a more detailed discussion see Section 2.1.5 in the 2021 Master Plan.

Figure 3.6 Map of Soils within USACE El Dorado Lake Federal Fee-Owned Property.



3.6.1 Alternative 1: No Action Alternative

The No Action Alternative does not involve any activities that would contribute to changes in existing conditions, so there would be no impacts on topography, geology, soils, sedimentation, or shoreline erosion as a result of implementing the No Action Alternative.

3.6.2 Alternative 2: Proposed Action

Topography, geology, and soils were considered during the refining process of land reclassifications for the 2021 Master Plan. Total acreage for HDR was reduced from 3,927 acres to 3,722 acres. This net reduction is based on the realization that the

amount of acreage originally planned for intensive recreation use per the 1976 Master Plan significantly exceeded the amount necessary to meet public needs and therefore were not being fully utilized. Areas currently developed as park would continue to operate as parks and no change would occur. However, some of the lands designated as Recreation – Intensive Use would be reclassified to various other land use classifications to better reflect historic use patterns and current land management efforts. As such, no additional intensive use facilities would be constructed outside of existing intensive use areas, limiting future impacts to soils and Prime Farmlands.

Land reclassifications, such as increased acreages to ESA and WM, and new resource objectives proposed as part of the Proposed Action would have a potential long-term beneficial impact on soil conservation and Prime Farmlands at EL Dorado Lake. The reduction of Recreation Areas will limit future intensive development, thus reducing the potential impacts of soil erosion and development of Prime Farmland. The new resources objectives will provide a level of consistency in beneficial management practices that would not occur with the No Action Alternative. As described in Chapter 3 of the revised Master Plan, resource goals B, C, D, and E and several natural resource management objectives, particularly those that address unauthorized uses of public land, evaluation of the lands for active soil erosion, and taking action to prevent soil deposition in the lake, are supported by the proposed resource management objectives. The 117 acres of designated no-wake water surface will also help minimize wave-induced soil erosion near recreation features. Therefore, under the Proposed Action, there would be no long-term, major adverse impacts on topography, geology, soils or Prime Farmland as a result of implementing the 2021 Master Plan.

3.7 NATURAL RESOURCES

Operational civil works projects administered by USACE are required, with few exceptions, to prepare an inventory of natural resources. The basic inventory required is referred to within USACE regulations (ER and EP 1130-2-540) as a Level One Inventory. This inventory includes the following: vegetation in accordance with the National Vegetation Classification System through the sub-class level; assessment of the potential presence of special status species including but not limited to federal and state listed endangered and threatened species, migratory species, and birds of conservation concern listed by the USFWS; land (soils) capability classes in accordance with Natural Resources Conservation Service (NRCS) soil surveys; and wetlands in accordance with the USFWS Classification of Wetlands and Deepwater Habitats of the United States, which are previously discussed in Section 3.2.

In the fall of 2020, USACE biologist, rangers, and lake managers conducted a wildlife habitat assessment of USACE lands at El Dorado Lake to inform potential revision of land classifications. Methodology used, habitat quality, and vegetation species encountered at El Dorado Lake is described in Appendix B of this EA.

Habitat assessments were conducted using Texas Parks and Wildlife Department's (TPWD) Wildlife Habitat Appraisal Procedure ([WHAP] TPWD 1995). WHAP survey point locations were preselected based on aerial imagery from existing Geographical Information Systems (GIS) data. Following survey point selection teams

collected information on the habitat quality, species composition, and utilization by wildlife to help give managers and staff a better understanding of the property and to inform the Master Plan revision.

WHAP data collected was used to identify unique and/or high quality habitats for targeted conservation through the designation of appropriate land classes such as ESA, MRLM-WM, or MRLM-VM. These land classes allow for the continued conservation and management of natural, high quality habitat.

Fisheries and Wildlife Resources

El Dorado Lake provides habitat for an abundance of fish and wildlife species. The lake provides a quality fishery, as well as quality wildlife habitat on public land associated with the project. The following is a description of the fish and wildlife resources found at El Dorado Lake.

Terrestrial Wildlife Resources

In addition to hunting, El Dorado Lake also provides abundant fishing opportunities in many varying habitats including steep, rocky shorelines, shallow mudflats, and submerged timber. Several creeks that feed into the lake, each varying in depth, width, and structure add diversity to aquatic and terrestrial habitats. El Dorado Lake offers more than 90 miles of shoreline and almost 8,000 acres of open water.

Prominent populations of fish include walleye (*Sander vitreus*), largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomeieu*), crappie (*Pomoxis spp.*), white bass (*Morone chrysops*), Palmetto wiper (white bass x striped bass), bluegill (*Lepomis macrochirus*), channel catfish (*Ictalurus punctatus*), blue catfish (*Ictalurus furcatus*), and flathead catfish (*Pylodictis olivaris*). Trout are also regularly stocked each winter. A public fishing area is maintained below the dam at the reservoir outlet.

Specific information on fishing resources at El Dorado Lake can be found at the Kansas Department of Wildlife, Parks and Tourism's website.

3.7.1 Alternative 1: No Action Alternative

The No Action Alternative does not involve any activities that would contribute to changes in existing conditions; therefore, no major long-term adverse impacts on natural resources would be anticipated as a result of implementing the No Action Alternative.

3.7.2 Alternative 2: Proposed Action

The proposed net increase of ESA by 138 acres and MMRL-WM by 380 acres would cause major long-term beneficial impacts to natural resources within these areas. Through the WHAP survey and analysis some of these areas were identified as having high quality wildlife habitat leading to classification of the areas as ESA. The net increase in MRML-WM Lands, resulted primarily from reclassification of former

Recreation-Intensive Use lands that will not be needed for high density recreation uses or development for the foreseeable future. The ESA classification provides the highest form of protection for natural resources. These proposed changes would then protect natural resources from various types of adverse impacts such as habitat fragmentation.

The reclassifications, resource management objectives, and resource plan required for the Proposed Action would promote land management and land uses that are compatible with the goals of good stewardship of natural resources. The Proposed Action would allow project lands to continue supporting the USFWS and Kansas Department of Wildlife, Parks and Tourism missions associated with wildlife conservation and implementation of operational practices that would protect and enhance wildlife and fishery populations and habitat. In addition, the Proposed Action would be compatible with conservation principles and measures to protect migratory birds as mandated by EO 13186.

3.8 THREATENED AND ENDANGERED SPECIES

The Endangered Species Act was enacted to provide a program for the preservation of endangered and threatened species and to provide protection for the ecosystems upon which these species depend for their survival. USFWS is the primary agency responsible for implementing the Endangered Species Act and is responsible for migratory birds and other terrestrial and freshwater species. USFWS responsibilities under the Endangered Species Act include (1) the identification of threatened and endangered species; (2) the identification of critical habitats for listed species; (3) implementation of research and recovery efforts for these species; and (4) consultation with other Federal agencies concerning measures to avoid harm to listed species.

An endangered species is a species officially recognized by USFWS as being 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 formally submitted to Congress for official listing as threatened or endangered. Species may be considered eligible for listing as endangered or threatened when any of the five following criteria occur: (1) current/imminent destruction, modification, or curtailment of their habitat or range; (2) overuse of the species for commercial, recreational, scientific, or educational purposes; (3) disease or predation; (4) inadequacy of existing regulatory mechanisms; and (5) other natural or human-induced factors affecting their continued existence.

In addition, 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 USFWS has sufficient information to support proposals to list as endangered or threatened under the Endangered Species Act; however, proposed rules have not yet been issued because such actions are precluded at present by other listing activity. Although not afforded protection by the Endangered Species Act, candidate species may be protected under other federal or state laws.

The USFWS's Information for Planning and Consultation (IPaC) database (2020D) lists the threatened and endangered species and trust resources that may

occur within the El Dorado Lake Federal Fee Boundary (see USFWS Species List and the IPAC Report in Appendix C of the 2021 Master Plan). Based on the IPaC report, there are two federally listed species found on USACE fee-owned lands and waters at El Dorado Lake. A list of these species is presented in Table 3.8.1. No Critical Habitat has been designated within or near El Dorado Lake.

Table 3.8.1 Federally Listed Threatened & Endangered Species with Potential to Occur at El Dorado Lake

Common Name	Scientific Name	Federal Status	State Status
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	Not listed
Topeka Shiner	<i>Notropis topeka</i>	Endangered	Threatened

USFWS lists the northern long-eared bat threatened wherever it is found (USFWS, 2020B). It was federally listed in 2015 following studies that revealed a decline in populations from the spread of white nose syndrome. USFWS service lists Morris County (approximately 70 miles north of El Dorado Lakes) as a location where northern long-eared bats occur (USFWS, 2020B). Most northern long-eared bats seasonally migrate between winter hibernacula and summer maternity or bachelor colonies. Roosting may take place in tree bark, tree cavities, caves, mines, and barns. Northern long-eared bats forage along forested hillsides and ridges near roosting and hibernating caves. They emerge at dusk and feed on various insect species such as moths, flies, leafhoppers, caddisflies, and beetles from vegetation and water surfaces. Few large patches of forest occur in the study area and no known caves exist in the area. With limited habitat, they are not expected to occur in the study area.

USFWS lists Topeka Shiner as endangered whenever it is found (USFWS, 2020C). It was federally listed in 1998 following studies that revealed a decline in populations from habitat destruction. USFWS service lists Morris County as a location where Topeka Shiner occur. It is a fish that primarily feeds on aquatic invertebrates. The species can be found in waters of high quality near the head of streams with clean gravel or substrate (KDWPT, 2020C). Even though there are documented occurrences of the species within creeks in Morris County, it is not expected to occur within El Dorado fee owned boundary because there are not any headwaters to streams that occur within it with clear water.

Kansas Department of Wildlife, Parks and Tourism publishes the list of Kansas State Listed Threatened and Endangered Species. The species are listed by county and the table below lists those species found in Butler County Kansas.

Table 3.8.2 State Listed Threatened & Endangered Species with Potential to Occur at El Dorado Lake

Common Name	Scientific Name	State	Critical Habitat Designation
Topeka Shiner	<i>Notropis topeka</i>	Threatened	Yes
Sharp Hornsnail	<i>Pleurocera acuta</i>	Threatened	No
Least Tern	<i>Sterna antillarum</i>	Endangered	No

Piping Plover	<i>Charadrius melodus</i>	Threatened	No
Snowy Plover	<i>Charadrius alexandrines</i>	Threatened	No
Eastern Spotted Skunk	<i>Spilogale putoris</i>	Threatened	No
American Burying Beetle	<i>Nicrophorus americanus</i>	Endangered	No

Of the state listed species it is expected that only the sharp hornsnail and the American burying beetle are likely to be found on fee land surrounding El Dorado Lake.

Kansas also keeps a data base of Species in Need of Conservation. Those found in Butler County are listed below.

Table 3.8.3 Kansas Listed Species in Need of Conservation with Potential to Occur at El Dorado Lake

Common Name	Scientific Name
Southern Bog Lemming	<i>Synaptomys cooperi</i>
Spotted Sucker	<i>Minytrema melanops</i>
Black Tern	<i>Chlidonias niger</i>
Shot-eared Owl	<i>Asio flammeus</i>
Ferruginous Hawk	<i>Buteo regalis</i>
Golden Eagle	<i>Aquila chryseatos</i>
Cardinal Shiner	<i>Luxilus cardinalis</i>
Creeper Mussel	<i>Strophitus undulatus</i>
Bobolink	<i>Dolichonyx oyzivorus</i>
Henslow's Sparrow	<i>Ammodramus henslowii</i>
Mountain Plover	<i>Charadrius montanus</i>
Yellow-throated Warbler	<i>Setophaga dominica</i>
Eastern Whip-poor-will	<i>Antrostomas vociferus</i>

3.8.1 Alternative 1: No Action Alternative

The No Action Alternative does not involve any activities that would contribute to changes in existing conditions; therefore, no major, long-term 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 reclassifications proposed in the 2021 Master Plan include 138 acres as ESA, and 380 additional acres MRML-WM.

The ESA reclassification recognizes those areas having the highest ecological value and ensures they are given the highest order of protection among possible land classifications. The high degree of protection for ESA means that any threatened or endangered species will benefit from higher quality habitats and less disturbances.

MRML-WM areas are managed to maintain and improve habitat for fish and wildlife resources. Even though they are not afforded as much protection as areas classed as ESA, they still provide valuable habitats for threatened, endangered, or unique habitats.

The reclassification of these lands was supported by recommendations from the USFWS. The reclassification will have no effect on current or projected public use. While the occurrence of threatened and endangered species are limited at El Dorado Lake, minor to moderate, long-term beneficial impacts on endangered, threatened, and rare/unique communities would occur as a result of implementing the reclassifications outlined in the 2021 Master Plan. Habitat in ESA classified lands would provide valuable resting, stopover, and/or foraging grounds for special status species.

Based on the above information describing habitat benefits for state and federal listed species and no associated ground disturbing activities associated with the proposed plan, it is the USACE determination that implementation of the 2021 Master Plan will have No Effect on any federally threatened or endangered species. Any future activities that could potentially result in impacts on federally listed species will be coordinated with USFWS, consistent with requirements found in Section 7 of the Endangered Species Act.

3.9 INVASIVE SPECIES

Invasive species are any kind of living organism which, if uncontrolled, causes harm to the environment, economy, or human health. Invasive species generally grow and reproduce quickly and spread aggressively. Non-native, or exotic, species have been introduced, either intentionally or unintentionally, and can out-compete native species for resources or otherwise alter the ecosystem. Native invasive species are those species that spread aggressively due to an alteration in the ecosystem, such as lack of fire or the removal of a predator from the food chain.

Both USACE and KDWPT monitor and enforce aquatic nuisance species regulations in an effort to prevent the expansion/colonization of invasive species at El Dorado Lake such as zebra mussels. Section 2.2.5 of the 2021 Master Plan further describe invasive species at El Dorado Lake.

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 El Dorado Lake would continue to be managed according to the existing invasive species management practices. There would be no long-term major adverse impacts from invasive species as a result of implementing the No Action Alternative.

3.9.2 Alternative 2: Proposed Action

The land reclassifications, resource objectives, and resource plan required to revise the El Dorado Lake Master Plan are compatible with the lake's invasive species management practices. The addition of 138 acres classified as ESA may provide long-term benefits as these areas may receive additional invasive species management. The objectives developed under the proposed action as explained in detail in Chapter 3 of the revised Master Plan will result in minor, long-term beneficial impacts by reducing and preventing the spread of invasive species. In summary, these objectives are: monitoring for invasive species presence; addressing unauthorized uses of public lands which may spread invasive species; and evaluating erosion control as eroding lands provide colonization opportunities for invasive plant species. All of these would include a public outreach and education emphasis. The addition of no wake zones will also have minor, long-term benefits by reducing erosion along the shoreline. Areas with erosion are known to be high quality homes for non native species.

3.10 CULTURAL, HISTORICAL, AND ARCHAEOLOGICAL RESOURCES

Cultural History Sequence

Six broad cultural divisions are applicable to a discussion of the culture history of the Fall River region: Paleoindian, Archaic, Woodland, Plains Village, Protohistoric, and Historic. These general adaptation types are adopted in this EA and in the 2021 Master Plan to characterize prehistoric cultural traditions, within the following regional chronology. Due to differential rates of change through time in different regions, the State of Kansas has subsumed three of the cultural divisions into the broader Ceramic Period. Due to the use of both systems of cultural divisions in the site records and literature, both systems are incorporated below.

Paleoindian: 13,500 to 8000 BP

Archaic: 8000 to 2000 BP

Woodland (Early Ceramic): AD 1 to 1000

Plains Village (Middle Ceramic): AD 1000 to 1500

Protohistoric (Contact Period; Late Ceramic): AD 1500 to 1825

Historic: AD 1825 to present

For more detailed information about the archeological history in each of these time periods please see Section 2.3 of the Revised Master Plan.

Cultural Resources Management at El Dorado Lake

Cultural resources preservation and management is an equal and integral part of all resource management at USACE-administered operational projects. The term "cultural resources" is a broad term that includes, but is not limited to historic and prehistoric archaeological sites, deposits, and features; burials and cemeteries; historic and prehistoric districts comprised of groups of structures or sites; cultural landscapes; built environment resources such as buildings, structures (such as bridges), and objects; traditional cultural properties and sacred sites Completion of a full inventory of

cultural resources at El Dorado Lake is a long-term objective that is needed for compliance with Section 110 of the National Historic Preservation Act (NHPA). Currently, about 90% of fee owned lands above the conservation pool of the reservoir have been inventoried. Ultimately, all currently known sites, as well as those found in future inventories should be evaluated to determine their eligibility for the NRHP. Sites of currently unknown NRHP eligibility and those found in the future to be eligible for the NRHP must be protected from impacts caused by USACE or those having leases or easements on El Dorado Lake fee lands. In order to ensure compliance with the NHPA, Archaeological Resources Protection Act (ARPA), and Native American Graves Protection and Repatriation Act (NAGPRA) cultural resource activities will be coordinated with the State Historic Preservation Officer at the Kansas State Historical Society and federally recognized tribes within whose areas of interest, historical homelands, or ancestral territory the work will occur. ARPA permits are required and issued by the Tulsa District for all archaeological work conducted on USACE fee lands, to ensure qualified professional archaeologists perform the work according to established standards. The cultural, historical, and archaeological resources are described in detail in Section 2.3 of the 2021 Master Plan and are incorporated herein by reference (USACE 2021).

Numerous cultural resources laws establish the importance of cultural resources to our Nation's heritage. With the passage of these laws, the historical intent of Congress has been to ensure that the Federal government protects cultural resources. Stewardship of cultural resources on USACE Civil Works water resources projects is an important part of the overall Federal responsibility.

Under all Alternatives equally, it will be necessary to comply with federal environmental and cultural resources laws and regulations, as appropriate, when future actions are planned. These federal environmental laws and regulations include, but are not limited to, Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended); the National Environmental Policy Act (NEPA) of 1969; and the Endangered Species Act. Additionally, under all Alternatives equally, protection of cultural resources is authorized specifically by the Archaeological Resources Protection Act (ARPA) of 1979; Native American Graves Protection and Repatriation Act (NAGPRA); and Title 36 Code of Federal Regulations; among other laws and regulations.

3.10.1 Alternative 1: No Action Alternative

There would be no major adverse impacts on cultural resources as a result of implementing the No Action Alternative, as there would be no changes to the existing 1976 Master Plan.

3.10.2 Alternative 2: Proposed Action

Impacts on cultural, historical, and archaeological resources were considered during the refinement processes of land reclassifications. Based on previous surveys at El Dorado Lake, the required reclassifications, resource management objectives, and resource plan would not change current cultural resource management plans or alter areas where these resources exist. The Proposed Action would potentially result in

long-term and moderate beneficial impacts with the reclassification of additional 138 acres to ESA as those lands afford more protection against development and ground disturbing activities. Therefore, no significant adverse impacts on cultural, historical, and archaeological resources would occur as a result of implementing revisions to El Dorado Lake Master Plan. Any future ground-disturbing activities would take into account Section 106 of the NHPA and other applicable cultural resource statutes to insure that cultural resources are protected. Also, several cultural resources management objectives were developed to promote the protection of El Dorado Lake cultural resources and are described in Chapter 3 of the revised Master Plan.

3.11 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

The zone of interest for this socioeconomic analysis includes Butler County with additional economic influence coming from Greenwood, Harvey, Marion, and Sedgwick Counties in Kansas. This Central Kansas-county region, where the most impacts would be expected, has been utilized as the basis in summarizing the population characteristics of El Dorado Lake. The population, education level, employment rates, income, and household characteristics of the area are discussed in detail in Section 2.4 of the 2021 Master (USACE, 2021).

Environmental Justice

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued by President Clinton on February 11, 1994. It was intended to ensure that proposed federal actions do not have disproportionately high and adverse human health and environmental effects on minority and low-income populations and to ensure greater public participation by minority and low-income populations. It required each agency to develop an agency-wide environmental justice strategy. A Presidential Transmittal Memorandum issued with the EO states that “each federal agency shall analyze the environmental effects, including human health, economic and social effects, of federal actions, including effects on minority communities and low-income communities, when such analysis is required by the NEPA 42 U.S.C. Section 4321, et seq.”

EO 12898 does not provide guidelines as to how to determine concentrations of minority or low-income populations. However, analysis of demographic data on race and ethnicity and poverty provides information on minority and low-income populations that could be affected by the Proposed Actions. The U.S. Census American Community Survey provides the most recent estimates available for race, ethnicity, and poverty. Minority populations are those persons who identify themselves as Black, Hispanic, Asian American, American Indian/Alaskan Native, Pacific Islander, or Other (Section 2.4.2 of the 2021 Master Plan). Poverty status is used to define low-income. Poverty is defined as the number of people with income below poverty level, which was \$24,588 for a family of four in 2017 with two children under 18 (US Census Bureau, 2021). A potential disproportionate impact may occur when the minority in the study area exceeds 50 percent or when the percent minority and/or low-income in the study area are meaningfully greater than those in the region.

Protection of Children

EO 13045 requires each federal agency “to identify and assess environmental health risks and safety risks that may disproportionately affect children” and “ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.” This EO was prompted by the recognition that children, still undergoing physiological growth and development, are more sensitive to adverse environmental health and safety risks than adults. The potential for impacts on the health and safety of children is greater where projects are located near residential areas. Please refer to Figure 16 in Section 2.4.2 of the 2021 Master Plan for a graphical representation for the percentage of total population that are children in the study area.

3.11.1 Alternative 1: No Action Alternative

Under the No Action Alternative, there would be no changes to the existing Master Plan, with the USACE continuing to manage El Dorado Lake natural resources as set forth in the 1976 Master Plan. There would be no major adverse long-term impacts on socioeconomic resources. Beneficial socioeconomic impacts existing as a result of the implementation of the 1976 Master Plan would continue, as visitors would continue to come to the lake from surrounding areas. In addition to camping in USACE-operated campgrounds, many visitors purchase goods such as groceries, fuel, and camping supplies locally, eat in local restaurants, stay in local hotels and resorts, play golf at local golf courses, and shop in local retail establishments. These activities would continue to bring revenues to local companies, provide jobs for local residents, and generate local and state tax revenues. There would be no disproportionately high or adverse impacts on minority or low-income populations or children with the implementation of the No Action Alternative.

3.11.2 Alternative 2: Proposed Action

El Dorado Lake is beneficial to the local economy through indirect job creation and local spending by visitors, and also offers a variety of recreation opportunities and uses innovative maintenance and planning programs to minimize usage fees. The 3,722 acres of HDR and 31 acres of MRML-LDR will continue to provide recreation opportunities. The 138 acres of ESA land will also allow minimally invasive recreation activities such as wildlife viewing and hiking.

Since recreational opportunities remain abundant, and the revised Master Plan recognizes and reinforces projected recreational trends there would be negligible, long-term beneficial impacts on area economic stability and environmental justice populations resulting from the revision of the 1976 Master Plan.

3.12 RECREATION

Most visitors to El Dorado Lake come from within a 100-mile radius of the reservoir. These visitors are a diverse group of people with a wide variety of interests. Examples of visitors include campers who utilize the state operated campgrounds around the reservoir; adjacent residents; hunters and anglers who utilize public hunting areas and participate in recreational fishing as well as tournaments; and day users who picnic, hike, bird watch, bicycle, and ride horses. Recreational facilities, activities, and needs are discussed in detail in Section 2.5 of the 2021 Master Plan.

3.12.1 Alternative 1: No Action Alternative

Under the No Action Alternative, there would be no major adverse long-term impacts on recreational resources, as there would be no changes to the existing Master Plan.

3.12.2 Alternative 2: Proposed Action

The primary objective for revising the El Dorado Lake 1976 Master Plan is to capture current land use and management that has evolved to meet day-to-day operational needs. Under the Proposed Action, the required revisions to the El Dorado Lake Master Plan would be compatible with current recreation management plans and recognizes regional and national outdoor recreation trends. 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 recreational use and development of project lands. The 3,722 acres of HDR and 31 acres of MRML-LDR will continue to provide recreation opportunities. The 138 acres of ESA land will also allow minimally invasive recreation activities such as wildlife viewing and hiking. Since recreational opportunities remain abundant, and the revised Master Plan recognizes and reinforces projected recreational trends there would be negligible, long-term beneficial impacts on recreation resulting from the revision of the Master Plan from the Proposed Action.

3.13 AESTHETIC RESOURCES

El Dorado Lake sits along the western edge of the Flint Hills Region, one of the last vestiges of Tall Grass Prairie in North America. Lying in close proximity to several major metropolitan areas, El Dorado lake proper and surrounding federal lands offer public, open space value and scenic vistas without having to travel far from home. The relatively flat shoreline provides visitors with an unobstructed view of mixed native grasslands, riparian hardwood forests, and croplands managed for wildlife.

El Dorado Lake is well known for providing excellent fishing, but is also popular for the many hunting, hiking, camping, and wildlife viewing opportunities available.

3.13.1 Alternative 1: No Action Alternative

There would be no major adverse impacts on visual resources as a result of implementing the No Action Alternative, as there would be no changes to the existing 1976 Master Plan.

3.13.2 Alternative 2: Proposed Action

El Dorado Lake currently plays a pivotal role in availability of parks and open space in Butler County. Even though the amount of acreage available for HDR reduces from 3,927 acres to 3,722 acres with implementation of the 2021 Master Plan, this land reclassification reflects changes in land management and land uses that have occurred since 1976 at El Dorado Lake. The conversion of these lands would have no effect on current or projected public use or visual aesthetics.

Furthermore, the addition in the acreage of land classified as ESAs to 138 acres and the net increase of MRML-WM by 380 acres would protect lands that are aesthetically pleasing at El Dorado Lake and limit future development. Natural Resources Management Objectives for the lake will continue to minimize activities which will disturb the scenic beauty and aesthetics of the lake.

Therefore, the Proposed Action would result in minor, long-term beneficial impacts to the aesthetic resources of El Dorado Lake.

3.14 HAZARDOUS MATERIALS AND SOLID WASTE

This section describes existing condition with the Project area with regard to potential environmental contamination and the sources of releases to the environment. Contaminants could enter the lake 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.

3.14.1 Alternative 1: No Action Alternative

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

3.14.2 Alternative 2: Proposed Action

The land reclassifications required to revise the Master Plan would be compatible with El Dorado Lake hazardous and toxic waste and solid waste management practices. Therefore, no major, adverse, long-term impacts due to hazardous, toxic, radioactive, or solid wastes would occur as a result of implementing the 2021 Master Plan.

3.15 HEALTH AND SAFETY

As mentioned earlier in this document, El Dorado Lake authorized purposes include flood risk management, water storage, water quality, recreation and flood control. Compatible uses incorporated in project operation management plans include programs that establish recreation management practices to protect the public, such as water safety education, safe boating and swimming regulations, safe hunting regulations, and speed limit and pedestrian signs for park roads. The staff of El Dorado Lake are in place to enforce these policies, rules, and regulations during normal park hours.

3.15.1 Alternative 1: No Action Alternative

Under the No Action Alternative, the 2021 Master Plan would not be revised. No major, adverse, long-term impacts on human health or safety would be anticipated.

3.15.2 Alternative 2: Proposed Action

Under the Proposed Action, the required revisions to the El Dorado Lake 1976 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. Existing regulations and safety programs throughout the El Dorado Lake area would continue to be enforced to ensure public safety. Therefore, there would be no major, adverse, long-term impacts on public health and safety as a result of implementing the Proposed Action.

3.16 SUMMARY OF CONSEQUENCES AND BENEFITS

Table 3.16 provides a tabular summary of the consequences and benefits for the No Action and Proposed Action alternatives for each of the 15 assessed resource categories.

Table 3.16. Summary of Consequences and Benefits

Resource	Change Resulting from Revised Master Plan	Environmental Consequences		Benefits Summary
		No Action Alternative	Proposed Action	
Land Use	No effect on private lands. Minor to moderate benefit from placing emphasis on protection of wildlife and environmental values on USACE land and maintaining current level of developed recreation facilities.	Fails to recognize recreation trends and regional natural resource priorities.	Recognizes recreation trends and regional natural resource priorities identified by the state, and public comment.	Land classification changes and new resource objectives fully recognize passive use recreation trends and regional environmental values.
Water Resources Including Groundwater, Wetlands, and Water Quality	Minor change with benefits to recognize value of wetlands.	Fails to recognize the water quality benefits of good land stewardship and need to protect wetlands.	Promotes restoration and protection of wetlands and good land stewardship.	Specific resource objective promotes restoration and protection of wetlands.
Climate	Minor change to recognize need for sustainable, energy efficient design.	Fails to promote sustainable, energy efficient design.	Promotes land management practices and design standards that promote sustainability.	Specific resource objectives promote national climate change mitigation goal.
Climate Change and Greenhouse Gases	Same as for Climate.	Same as for Climate.	Same as for Climate.	Same as for Climate.
Air Quality	Negligible change to help reduce air emissions.	No effect.	Promotes activities and goals that will help to reduce emissions.	Reduces HDR acres, which in turn reduces the motor vehicle exhaust that is produced. New resource objectives also help to reduce emissions.
Topography, Geology and Soils	Beneficial change to place emphasis on good stewardship of land and water resources.	Fails to specifically recognize known and potential soil erosion problems.	Encourages good stewardship that would reduce existing and potential erosion.	Specific resource objectives call for stopping erosion from overuse and land disturbing activities.

Resource	Change Resulting from Revised Master Plan	Environmental Consequences		Benefits Summary
		No Action Alternative	Proposed Action	
Natural Resources	Major benefits through land reclassification and resource objectives.	Fails to recognize ESAs, and regional priorities calling for protection of wildlife habitat.	Gives full recognition of sensitive resources and regional trends and priorities related to natural resources.	Reclassification of lands included 138 acres of ESA and a net increase in lands emphasizing wildlife management.
Threatened & Endangered Species	Moderate benefits from land reclassifications for recognizing both federal and state-listed species.	Fails to recognize current federal and state-listed species.	Fully recognizes federal and state-listed species.	The master plan sets forth the most recent listing of federal and state-listed species and addresses on-going commitments associated with USFWS conservation goals.
Invasive Species	Minor change to recognize several recent and potentially aggressive invasive species.	Fails to recognize current invasive species and associated problems.	Fully recognizes current species and the need to be vigilant as new species may occur.	Specific resource objectives specify that invasive species shall be monitored and controlled as needed.
Cultural, Historical and Archaeological Resources	Minor change to recognize current status of cultural resource.	Included cursory information about cultural resources that is inadequate for future management and protection.	Recognizes the presence of cultural resources and places emphasis on protection and management.	Reclassification of lands and specific resource objectives were included for protection of cultural resources.
Socioeconomics and Environmental Justice	No change.	No effect.	No effect.	No added benefit.
Recreation	Negligible benefits to outdoor recreation programs.	Fails to recognize current outdoor recreation trends.	Fully recognizes current outdoor recreation trends and places special emphasis on trails.	Specific management objectives focused on outdoor recreation opportunities and trends are included.
Aesthetic Resources	Minor benefits through land reclassification and resource objectives.	Fails to minimize activities that disturb the scenic beauty and aesthetics of the lake.	Promotes activities that limit disturbance to the scenic beauty and aesthetics of the lake.	Specific management objectives to minimize activities that disturb the scenic beauty and aesthetics of the lake.

Resource	Change Resulting from Revised Master Plan	Environmental Consequences		Benefits Summary
		No Action Alternative	Proposed Action	
Hazardous Materials and Solid Waste	No change.	No effect.	No effect.	No added benefit.
Health and Safety	Minor change to promote public safety awareness.	Fails to emphasize public safety programs.	Recognizes the need for public safety programs.	Includes specific management objectives to increase water safety outreach efforts. Also, classifies 6 acres of water surface as restricted and 117 acres of designated no-wake for public safety purposes.

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SECTION 4: CUMULATIVE IMPACTS

The most severe environmental degradation may not result from the direct effects of any particular action, but from the combination of effects of multiple, independent actions over time. As defined in 40 CFR 1508.7, a cumulative effect is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.

By Memorandum dated June 24, 2005, from the Chairman of the CEQ to the Heads of Federal Agencies, entitled "Guidance on the Consideration of Past Actions in Cumulative Effects Analysis", CEQ made clear its interpretation that "...generally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions..." and that the "...CEQ regulations do not require agencies to catalogue or exhaustively list and analyze all individual past actions." 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.

Congressional authority for the construction of the El Dorado Dam and Lake is contained in Public Law 89-298, approved October 27, 1965. Construction of El Dorado Lake Dam was completed in June 1981.

4.2 Current and Reasonably Foreseeable Projects Within and Near the Zone Of Interest

Future management of the 948 acres of flowage easement lands at El Dorado Lake includes routine inspection of these areas to ensure that the Government's rights specified in the easement deeds are protected. In almost all cases, the Government acquired the right to prevent placement of fill material or habitable structures on the easement area. Placement of any structure that may interfere with the USACE flood risk management and water conservation missions may also be prohibited.

Regional and county mobility plans call for general roadway improvements of some existing roadways within the surrounding vicinity of USACE lands. No local road expansion or construction projects planned or anticipated to take place within the zone of interest during the planning horizon of the 2021 Master Plan.

The Resource Plan in Chapter 5 of the 2021 Master Plan does not list any specific actions that may occur in the future.

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. Moderate growth and development are expected to continue in the vicinity of El Dorado Lake 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. 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. Therefore, cumulative impacts on land use within the area surrounding El Dorado Lake, when combined with past and proposed actions in the region, are anticipated to be minimal.

4.3.2 Water Resources

El Dorado Lake was developed for flood control, water supply, water quality fish and wildlife and recreation. A major impact would occur if any action is inconsistent with adopted surface water classifications or water use plans, or if an action would substantially alter those resources required for, supporting, or benefiting the current use. 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.

Other activities surrounding El Dorado Lake, such as the addition of future utility lines, which would require boring beneath streams in most cases to avoid impacts, have been identified as having the potential to contribute directly to the cumulative impacts on water quality; however, water quality monitoring will continue to be used to assess any changes in these conditions. The cumulative impacts on water quality from the Proposed Action at El Dorado Lake are anticipated to be negligible when combined with past and proposed actions in the area.

4.3.3 Climate

The implementation of the revised land use classifications in the 2021 Master Plan, when combined with other existing and proposed projects in the region, would not result in major cumulative impacts on the climate.

4.3.4 Climate Change and GHG

Under the Proposed Action, current El Dorado Lake project management plans and monitoring programs would not be changed. In the event that GHG emission issues become significant enough to impact the current operations at El Dorado Lake, the 2021 Master Plan and all associated documents would be reviewed and revised as necessary. Therefore, implementation of the 2021 Master Plan, when combined with other existing and proposed projects in the region, would not result in major cumulative impacts on climate change and GHG emissions.

4.3.5 Air Quality

For the area surrounding El Dorado Lake, activities that could add to air emissions are likely few and minor in nature. Vehicle traffic along park and area roadways and routine daily activities in nearby communities contribute to current and future emission sources. Minor improvements to the communities in the El Dorado Lake area, such as construction of new business buildings, could also contribute to minor future emissions. Implementation of the 2021 Master Plan will not contribute to major cumulative impacts in the region.

4.3.6 Topography, Geology, and Soils

A major impact would occur if the action exacerbates or promotes long-term erosion, if the soils are inappropriate for the proposed construction and would create a risk to life or property, or if there would be a substantial reduction in agricultural production or loss of Prime Farmland soils. Cumulative adverse impacts on topography, geology, and soils within the area surrounding El Dorado Lake, when combined with past and proposed actions in the region, are anticipated to be negligible on the long-term basis.

Land use around El Dorado Lake has not changed in the past several years. The cumulative impacts on Prime Farmland from the Proposed Action at El Dorado Lake are anticipated to be negligible when combined with past and proposed actions in the area.

4.3.7 Natural Resources

The significance threshold for natural resources would include a substantial reduction in ecological processes, communities, or populations that would threaten the long-term viability of a species or result in the substantial loss of a sensitive community that could not be offset or otherwise compensated. Past, present, and future projects are not anticipated to impact the viability of any plant species or community, rare or sensitive habitats, or wildlife. The establishment of ESA and expansion of MRML-WM areas, as well as resource objectives that favor protection and restoration of valuable

natural resources, will have beneficial cumulative impacts. No identified projects would threaten the viability of natural resources. Therefore, there would be long-term beneficial impacts to natural resources resulting from the revision of the 2021 El Dorado Lake Master Plan, when combined with past and proposed actions in the area.

4.3.8 Threatened and Endangered Species

The Proposed Action and No Action Alternative would not adversely impact threatened, endangered and special status species within the area, as they will be coordinated with the appropriate resource agencies. Should federally listed species change in the future (e.g., delisting of a species or listing of new species), associated requirements will be reflected in revised land management practices in coordination with the USFWS. The USACE would continue cooperative management plans with the USFWS and the state to preserve, enhance, and protect critical wildlife habitat resources.

The land reclassifications explained in detail in Section 3.8.3 will allow for further protection of state listed threatened, endangered, and unique species. The reclassifications will also allow future land management practices that would maintain and enhance habitats for these species. Therefore, there would be major long-term beneficial impacts on threatened and endangered species resulting from the revision of the El Dorado Lake 1976 Master Plan when combined with past and proposed actions in the area.

4.3.9 Invasive Species

Invasive species control has and will continue to be conducted on various areas across the project lands. Implementing Best Management Practices (BMP) will help reduce the introduction and distribution of invasive species, ensuring that proposed actions in the region will not contribute to the overall cumulative impacts related to invasive species. The land reclassifications required to revise the 1976 Master Plan are compatible with El Dorado Lake invasive species management practices. Therefore, there would be minor long-term beneficial impacts on reducing and preventing invasive species within the area surrounding El Dorado Lake.

4.3.10 Cultural, Historical, and Archaeological Resources

The Proposed Action would not negatively affect cultural resources or historic properties. Therefore, this action, when combined with other existing and proposed projects in the region, would not result in major cumulative impacts on cultural resources or historic properties.

4.3.11 Socioeconomics and Environmental Justice

The Proposed Action would not result in the displacement of persons (minority, low-income, children, or otherwise) or decrease numbers of people recreating at El Dorado Lake as a result of implementing the revised land classifications. The creation of jobs, increase of visitor spending, and relative decrease of usage fees, results in a positive impact to the local economy. Therefore, the effects of the Proposed Action on

environmental justice and the protection of children, when combined with other ongoing and proposed projects in the El Dorado Lake area, are anticipated to have negligible long-term beneficial impacts.

4.3.12 Recreation

El Dorado Lake is beneficial to the local visitors and also offers a variety of free recreation opportunities. Some of the popular recreation activities at El Dorado Lake are, on a national basis, either static or declining in participation. For example, developed camping activity, power boating, hunting, and fishing have experienced small to moderate declines in recent years. In contrast to these declines, significant increases in hiking, walking, sightseeing, wildlife viewing and canoeing/kayaking have occurred in recent years. Even though the amount of acreage available for HDR would decrease with implementation of the 2021 Master Plan, these land reclassifications reflect changes in land management and land uses that have occurred since 1976 at El Dorado Lake. The lands that remain in the HDR classification include undeveloped acreage that could be used for future outdoor recreation development, and all MRML lands are available for passive recreation uses characteristic of MRML-LDR lands. The conversion of these lands would have no adverse effect on current or projected public use. Therefore, the effects of the Proposed Action, when combined with other existing and proposed projects in the region, would result in negligible long-term beneficial impacts on the area recreation.

4.3.13 Aesthetic Resources

El Dorado Lake proper and surrounding federal lands offer public, open space values and scenic vistas that are unique in the region. Natural Resources Management Objectives for the lake will continue to minimize activities which disturb the scenic beauty and aesthetics of the lake. Therefore, the Proposed Action would result in minor long-term beneficial impacts to the aesthetic resources of El Dorado Lake.

4.3.14 Hazardous Materials and Solid Waste

No hazardous material or solid waste concerns would be expected with implementation of the 2021 Master Plan; therefore, when combined with other ongoing and proposed projects in El Dorado Lake, there would be no major long-term adverse impacts on hazardous materials and solid waste.

4.3.15 Health and Safety

No health or safety risks would be created by the Proposed Action. The effects of implementing the 2021 Master Plan, when combined with other ongoing and proposed projects in the El Dorado Lake area, would result in no major long-term adverse impacts on health and safety for the area.

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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 CFR Parts 1500 – 1508, and the USACE ER 200-2-2, *Environmental Quality: Procedures for Implementing NEPA*. The revision of the 2021 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

The USACE initiated public involvement and agency scoping activities to solicit input on the 2021 Master Plan revision process, as well as identify reclassification proposals, and identify significant issues related to the Proposed Action. Information provided by USFWS and the state on fish and wildlife resources has been utilized in the development of the 2021 Master Plan.

Endangered Species Act of 1973, as amended

Current lists of threatened and endangered species were compiled for the revision of the 2021 Master Plan. There would be no adverse long-term impacts on threatened or endangered species resulting from the revision of the 2021 Master Plan. However, major long-term beneficial impacts, such as habitat protection, could occur as a result of the revision of the 2021 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 2021 Master Plan revision will not result in adverse impacts on migratory birds or their habitat as no ground disturbing activities are associated with the proposed action. Beneficial impacts could occur through protection of habitat as a result of the 2021 Master Plan revision.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act 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 Endangered Species Act. The timing of resource management activities would be coordinated to avoid impacts on migratory and nesting birds.

Clean Water Act (CWA) of 1977

The Proposed Action is in compliance with all state and federal CWA regulations and requirements and water quality is regularly monitored by the USACE and OEQ. A

state water quality certification pursuant to Section 401 of the CWA is not required for the 2021 Master Plan revision. However, any future utilities would be required to comply with all Clean Water Act requirements. There will be no change in 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 previous 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 surveys prior to any earthmoving or other potentially impacting activities.

Clean Air Act of 1977

The US EPA established nationwide air quality standards to protect public health and welfare. Existing operation and management of the reservoir is compliant with the Clean Air Act and will not change with the 2021 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 within and adjacent to El Dorado Lake. The 2021 Master Plan would not impact Prime Farmland present on El Dorado Lake.

Executive Order 11990, Protection of Wetlands

EO 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 2021 Master Plan complies with EO 11990.

Executive Order 11988, Floodplain Management

This EO 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 El Dorado Lake project lands.

Executive Order 12898, Environmental Justice

This EO 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 2021 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 of reclassification of land would not be considered an irreversible commitment because subsequent Master Plan revisions could result in some lands being reclassified to a prior, similar land classification. 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). No irreversible or irretrievable impacts on federally protected species or their habitat is anticipated from implementing revisions to the El Dorado Lake 2021 Master Plan.

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SECTION 7: PUBLIC AND AGENCY COORDINATION

In accordance with 40 CFR §§ 1501.7, 1503, and 1506.6, the USACE initiated public involvement and agency scoping activities to solicit input on the 2021 Master Plan revision process, as well as identify reclassification proposals, and identify significant issues related to the Proposed Action. The USACE began its public involvement process with a public information presentation posted to the Tulsa District website to provide an avenue for public and agency stakeholders to ask questions and provide comments. This was done in response to the COVID-19 Pandemic and social distancing guidelines. The public information presentation was available starting on May 11, 2020 and the comment period remained open until June 26, 2020. This presentation introduced the public to the 1976 Master Plan and began the public comment period. A second public information presentation will be posted to the website on 11 June 2021. This information presentation introduced the public to the Draft Master Plan and EA and to begin the 30-day public review period of the Draft Master Plan and EA. The USACE, Tulsa District, placed advertisements on the USACE webpage, social media, and print publications prior to these meetings. The EA was coordinated with agencies having legislative and administrative responsibilities for environmental protection. Please refer to Section 7 of the 2021 Master Plan for a summary of comments received during the public comment period.

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SECTION 9: ACRONYMS/ABBREVIATIONS

%	Percent
°	Degrees
ARPA	Archaeological Resources Protection Act
BMP	Best Management Practice
BLM	Bureau of Land Management
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CO ₂ e	CO ₂ -equivalent
CWA	Clean Water Act
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EP	Engineer Pamphlet
ER	Engineer Regulation
ESA	Environmentally Sensitive Area
F	Fahrenheit
FAA	Federal Aviation Administration
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
GHG	Greenhouse Gas
HDR	High Density Recreation
IFR	Inactive/Future Recreation
IPaC	Information, Planning, and Consultation System
KDWPT	Kansas Department of Wildlife Parks and Tourism
LEED	Leadership in Energy & Environmental Design
MRML-IFR	Future/Inactive Recreation
MRML	Multiple Resource Management Lands
MRML-LDR	Low Density Recreation
MRML-WM	Wildlife Management
MRML-VM	Vegetative Management
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO	Nitrogen Oxide
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O ₃	Ozone
OEQ	Office of Environmental Quality
PO	Project Operations
ROD	Record of Decision

RPEC	Regional Planning and Environmental Center
SINC	Site of Interest for Nature Conservation
SGCN	Species of Greatest Conservation Need
SO ₂	Sulfur Dioxide
TPWD	Texas Parks and Wildlife Department
U.S.	United States
U.S.C.	U.S. Code
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
WHAP	Wildlife Habitat Appraisal Protocol
WM	Wildlife Management
VM	Vegetative Management

SECTION 10: LIST OF PREPARERS

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**APPENDIX C - WILDLIFE HABITAT APPRAISAL PROCEDURE
(WHAP) REPORT**

WILDLIFE HABITAT APPRAISAL PROCEDURE (WHAP)
SUMMARY REPORT EL DORADO LAKE MASTER PLAN
BUTLER COUNTY, KANSAS

JANUARY 2021



**US Army Corps
of Engineers®**

Tulsa District

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Table of Contents

INTRODUCTION.....	1
STUDY AREA.....	1
METHODOLOGY.....	3
HABITAT.....	6
RESULTS AND DISCUSSION.....	7
RECOMMENDATIONS.....	16
REFERENCES.....	17
ATTACHMENT A: El Dorado Lake WHAP Results Summary.....	19
ATTACHMENT B: El Dorado Lake Whap Point Photographs.....	23

List of Tables

Table 1: Cover Types and Maximum Total Scores.....	5
Table 2: Survey Points per Habitat Type.....	6
Table 3: Average, Minimum, and Maximum Scores per Habitat Type.....	7
Table 4: Average Site Potential, Successional Stage, and Uniqueness and Relative Abundance Scores per Habitat Type.....	13

List of Figures

Figure 1: Distribution of WHAP Points – El Dorado Lake, Kansas.....	2
Figure 2: El Dorado Lake Vicinity Map.....	3
Figure 3: Total Score Range for All Points Surveyed on the Northern Boundary of El Dorado Lake.....	8
Figure 4: Total Score Range for All Points Surveyed within the Center of El Dorado Lake.....	9
Figure 5: Total Score Range for All Points Surveyed on the Southern Boundary of El Dorado Lake.....	10
Figure 6: All Sites with Total Scores over 0.80.....	12
Figure 7: All Sites with Maximum Site Potential Scores.....	14
Figure 8: All Sites with Maximum Uniqueness and Relative Abundance.....	15

INTRODUCTION

Habitat assessments were conducted at El Dorado Lake on August 31 - September 1, 2020 using Texas Parks and Wildlife Department's (TPWD) Wildlife Habitat Appraisal Procedure ([WHAP] TPWD 1995). WHAP survey point locations were based on points believed or known to have various habitat types and features based on aerial imagery from existing Geographical Information Systems (GIS) data as well as from local knowledge of the area. A total of 33 WHAP points were surveyed, all within U.S. Army Corps of Engineers (USACE) fee boundary (Figure 1).

The purpose of this report is to describe wildlife habitat quality within the USACE El Dorado Lake fee-owned property in Butler County, Kansas. This report is being prepared by the USACE Regional Planning and Environmental Center to provide habitat quality information and inform land classifications as part of the El Dorado Lake Master Plan revision process.

STUDY AREA

Located in the Walnut River Basin of the Upper Walnut River Watershed, El Dorado Lake is located on the Walnut River, at river mile 114.7 in Butler County, Kansas (Figure 2). The Walnut River flows southwest through the northern two-thirds of Butler County, then southward through Cowley County to its confluence with the Arkansas River at river mile 696. The Walnut River Basin drains 1,955 square miles in southeastern Kansas, of which 234 square miles are above the El Dorado damsite. The watershed above the damsite is approximately rectangular in shape. Its maximum length and width are 20 miles and 15 miles, respectively.

USACE fee-owned property at El Dorado encompasses approximately 12,276 acres, including 5,890 acres of land that sits above the conservation pool elevation of 1,350.5' mean sea level.

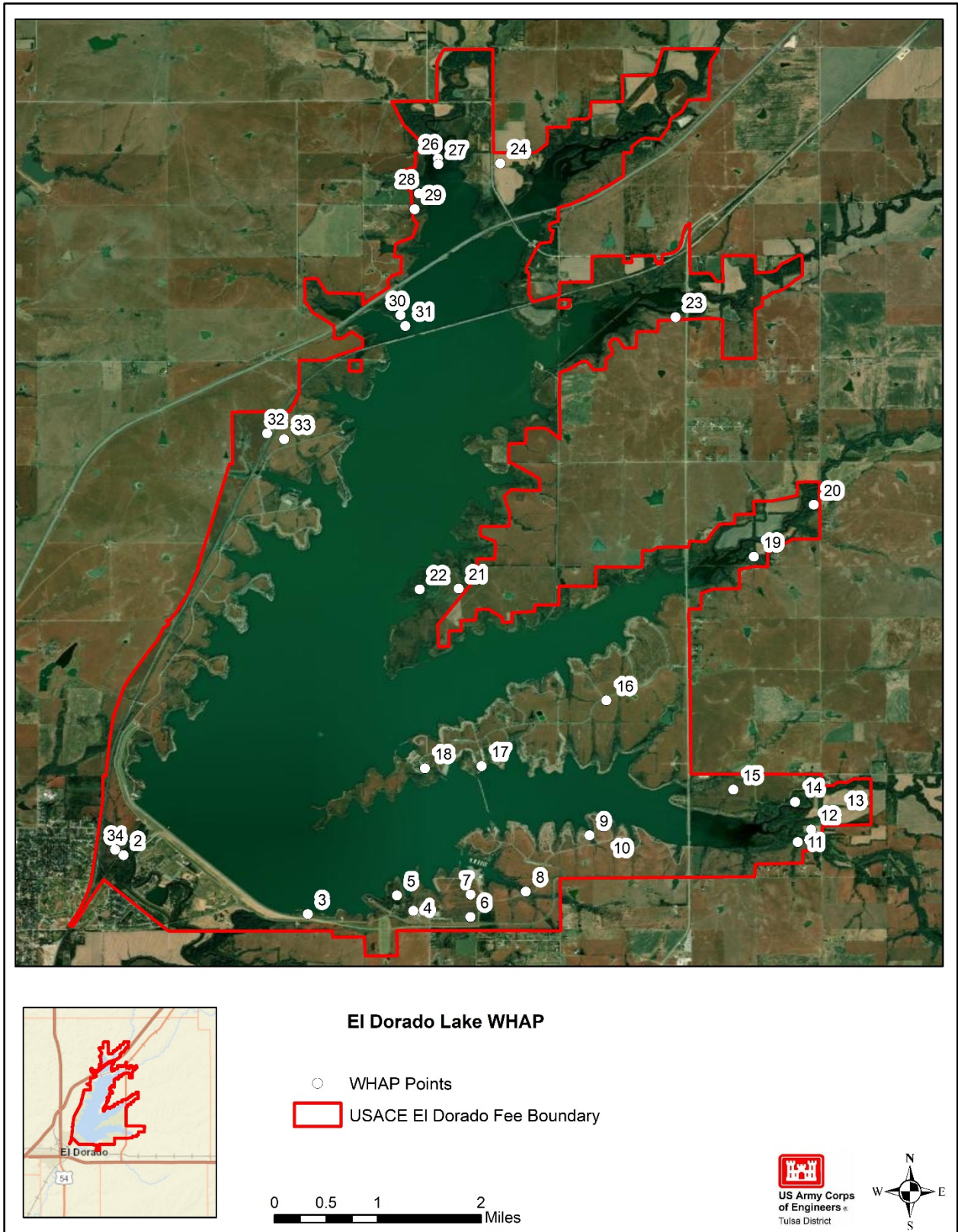


Figure 1: Distribution of WHAP Points – El Dorado Lake, Kansas

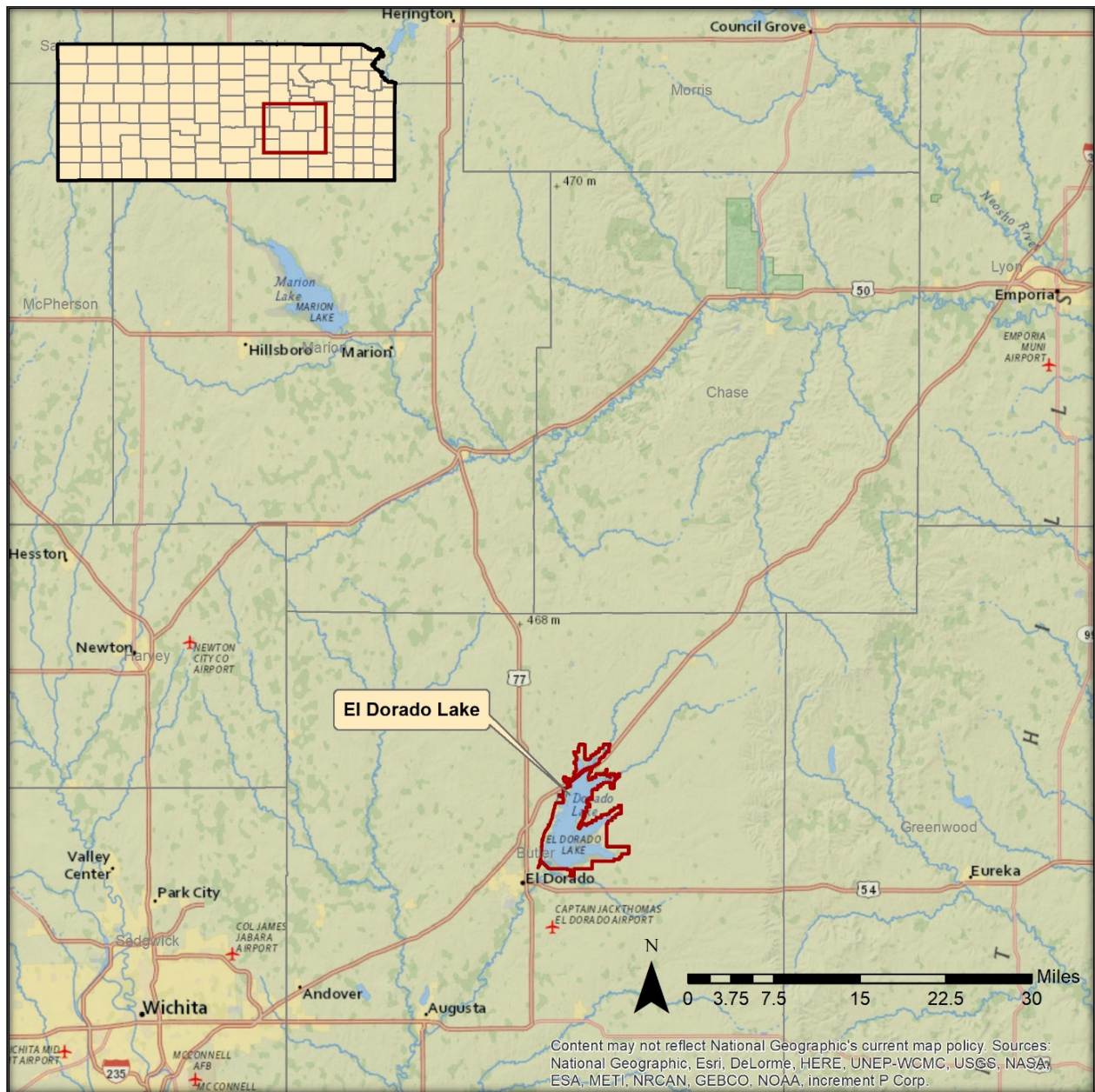


Figure 2: El Dorado Lake Vicinity Map

METHODOLOGY

An interagency team of biologists, foresters, and USACE park rangers conducted a habitat evaluation of selected areas at El Dorado Lake. TPWD’s WHAP protocol was used to analyze and describe existing habitats.

The WHAP requires evaluating representative sites of each cover type present within an area of interest. For this project, a search area of 0.1 acre (circle with radius of 37.2 feet) was used at each WHAP site to compile a list of plant species occurring at

each site and to complete the Biological Components Field Evaluation Form (TPWD 1995). Field data collected on the form at each WHAP site included the following components:

1. Site Potential
2. Temporal Development of Existing Successional Stage
3. Uniqueness and Relative Abundance
4. Vegetation Species Diversity
5. Vertical Vegetation Stratification
6. Additional Structural Diversity
7. Condition of Existing Vegetation

Points were assigned for all components present at each site. A habitat quality score, where values range from 0.0 (low quality) to 1.0 (high quality), was then calculated for each site by adding together all points and multiplying by 0.01. Habitat quality was then determined for all sites within the same habitat type. Photographs were taken at each site (cardinal directions) and are included as Attachment B.

The TPWD developed the WHAP to allow a qualitative, holistic evaluation of wildlife habitat for tracts of land statewide without imposing significant time requirements in regard to field work and compilation of data (TPWD 1995). The WHAP was not designed to evaluate habitat quality in relation to specific wildlife species.

The WHAP is based on the following assumptions:

1. Vegetation structure including species composition and physiognomy is sufficient to define the habitat suitability for wildlife.
2. A positive relationship exists between vegetation diversity and wildlife species diversity.
3. Vegetation composition and primary productivity directly influence population densities of wildlife species.

As designed, the WHAP is intended to be used for the following applications:

1. Evaluating impacts upon wildlife populations from specific development project alternatives.
2. Establishing baseline data prior to anticipated or proposed changes in habitat conditions for specific areas.
3. Comparing tracts of land that are candidates for land acquisition or mitigation.
4. Evaluating general habitat quality and wildlife management potential for tracts of land over large geographical areas, including wildlife planning units.

The WHAP protocol can be used to assess a wide range of habitats; however, it was originally developed to assess and develop mitigation requirements for loss of bottomland hardwoods and other aquatic habitats. Scores can skew higher for these habitats based on how the scoring is allotted to each WHAP habitat component. Upland forest and grassland habitat types cannot reach a score indicative of high-quality habitat although they may exhibit high quality features. Subsequently, high quality upland habitat may not be identified or can be overlooked.

Grasslands, in particular, fall into this category. Consider the Site Potential component with a maximum score of 0.25 points; it allocates more points based on higher hydrologic connectivity. In order to receive the highest score for this component, the area must exhibit at least one of the following: at least periodically support predominately hydrophytic vegetation, is predominately undrained hydric soil and supports or is capable of supporting hydrophytic vegetation, and/or is saturated with water or covered by shallow water during 1-2 months during the growing season of each year. In a grassland setting, when conditions become conducive to hydrophytic plant growth, a successional shift from a grassland to herbaceous wetlands, swamps, or riparian forest is likely to occur. Therefore, grasslands would almost always be limited to a maximum score of 0.12 points (uplands with thick surface layer).

Similarly, grasslands would be limited to a maximum of 0.12 points for the Temporal Development of Existing Successional Stage component, whereas other forested habitats could receive the full 0.25 points.

These two components alone regularly exclude grassland habitat from receiving 0.25 points on the WHAP scale. In order to identify the maximum score each habitat type can receive, USACE environmental staff scored each criterion given ideal conditions for riparian/bottomland hardwood forest (BHF), upland forest (includes all non-riparian/BHF forests), grassland, swamp, and marsh habitats. The maximum values scores, shown in Table 1, were then used to normalize scores for habitats that are prevented from reaching the maximum WHAP score primarily due to arbitrary low scores in the two WHAP components described above. Normalizing habitat scores will identify high quality habitat that would otherwise not be detected.

Table 1: Cover Types and Maximum Total Scores

Cover Type	Component Number								Maximum Total Score
	1	2	3	4	5	6	7	7B	
Riparian/BHF	25	20	20	15	5	5	5	5	1.00
Upland Forest	12	20	20	15	5	5	5	5	0.87
Grassland	12	12	20	0	4	1	5	5	0.59
Cropland	25	5	10	15	NA	NA	10	NA	0.65
Marsh	25	20	20	20	NA	5	10	NA	1.00

Riparian/BHF habitats can achieve the maximum score, therefore, no normalization of scores were made for that habitat type. Upland forests and grasslands, however, can only reach within 0.13 and 0.41 points of the maximum WHAP score, even in ideal conditions.

To evaluate all habitat types on an even scoring basis, upland forest and grassland scores were normalized by dividing their original scores by the maximum possible score for their respective habitat types. For example, if a grassland site received an initial score of 0.42, it would be divided by the maximum total points a grassland site can receive, 0.59. The normalized total score used for further analysis for the grassland site would be 0.75.

This adjustment allows habitat type scores to be analyzed and compared to their corresponding habitat type maximum total score. Rather than, for instance, a grassland being evaluated on a bottomland hardwood scoring scale.

All WHAP scores analyzed and discussed from here forward reflect the normalized total scores. As mentioned above riparian/BHF habitat was not normalized because it already can achieve the maximum score. Grassland scores were normalized by dividing initial scores by 0.59, while all upland forest scores were normalized by dividing the initial score by 0.87.

HABITAT

El Dorado Lake lies within the Flint Hills ecoregion (Level IV), which is characterized by tall grasslands and is the smallest grassland ecoregion in North America. It covers the Flint Hills of Kansas and the Osage Plains of northeastern Oklahoma. It can be distinguished from other grasslands to the north by its low diversity of flora and fauna and its thin soil layer spread over distinct beds of limestone. Abundant residual flint often erodes out of the bedrock in the rocky uplands.

Woodlands are concentrated around lakes, rivers, and streams, and dominated by oaks (*Quercus spp.*) and hickories [(*Carya spp.*) Rohweder et al. 2001]. The dominant grass species in this ecoregion are big bluestem (*Andropogon gerardi*), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), and Indian grass (*Sorghastrum nutans*). Wildflowers like violets (*Viola spp.*), coneflowers (*Echinacea spp.*), evening primroses (*Oenothera spp.*), lobelias (*Lobelia spp.*), beardtongues (*Penstemon spp.*), and sunflowers (*Heliantheae spp.*) can be found throughout the region.

Table 2 displays all habitats surveyed and the number of points surveyed within each respective habitat type.

Table 2: Survey Points per Habitat Type

Habitat Type	Points Surveyed
Croplands	3
Riparian/BHF	10
Upland Forest	2
Grassland	17
Marsh	1
Total Points Surveyed	33

RESULTS AND DISCUSSION

The total habitat score for each point surveyed is a representation of multiple habitat attributes including vegetative diversity and structure, site soil potential, successional stage, and uniqueness of that habitat across the landscape. Data analysis highlights are discussed below, while detailed data for each point surveyed can be found in Attachment A of this report.

Grassland (17 sites) and Riparian/Bottomland Hardwood Forests [BHF (10 sites)] were the most abundant habitat types surveyed. Grassland scores ranged from 0.24 to 0.97 while riparian/BHF scores ranged from 0.45 to 0.78. The lower scores, especially for drier upland habitats, may be partly due to long-term flooding that has occurred at El Dorado Lake in recent years, thus leading to reduced plant diversity. Flooding at lower elevations in the flood pool during the growing season (spring thru fall) would result in the mortality of the typically upland species of herbaceous plant growth. This likely affected survey metrics within these inundated areas. Frequent high-water levels are a routine occurrence at typical USACE lakes having a primary mission of flood risk reduction.

The average, maximum, and minimum total scores observed for each habitat type surveyed are shown in Table 3.

Table 3: Average, Minimum, and Maximum Scores per Habitat Type

Habitat Type	Average Total Score	Maximum Total Score	Minimum Total Score
Riparian/BHF	0.65	0.78	0.45
Upland Forest	0.61	0.69	0.53
Grassland	0.66	0.97	0.24
Cropland	0.27	0.37	0.06
Marsh	0.70	0.70	0.70

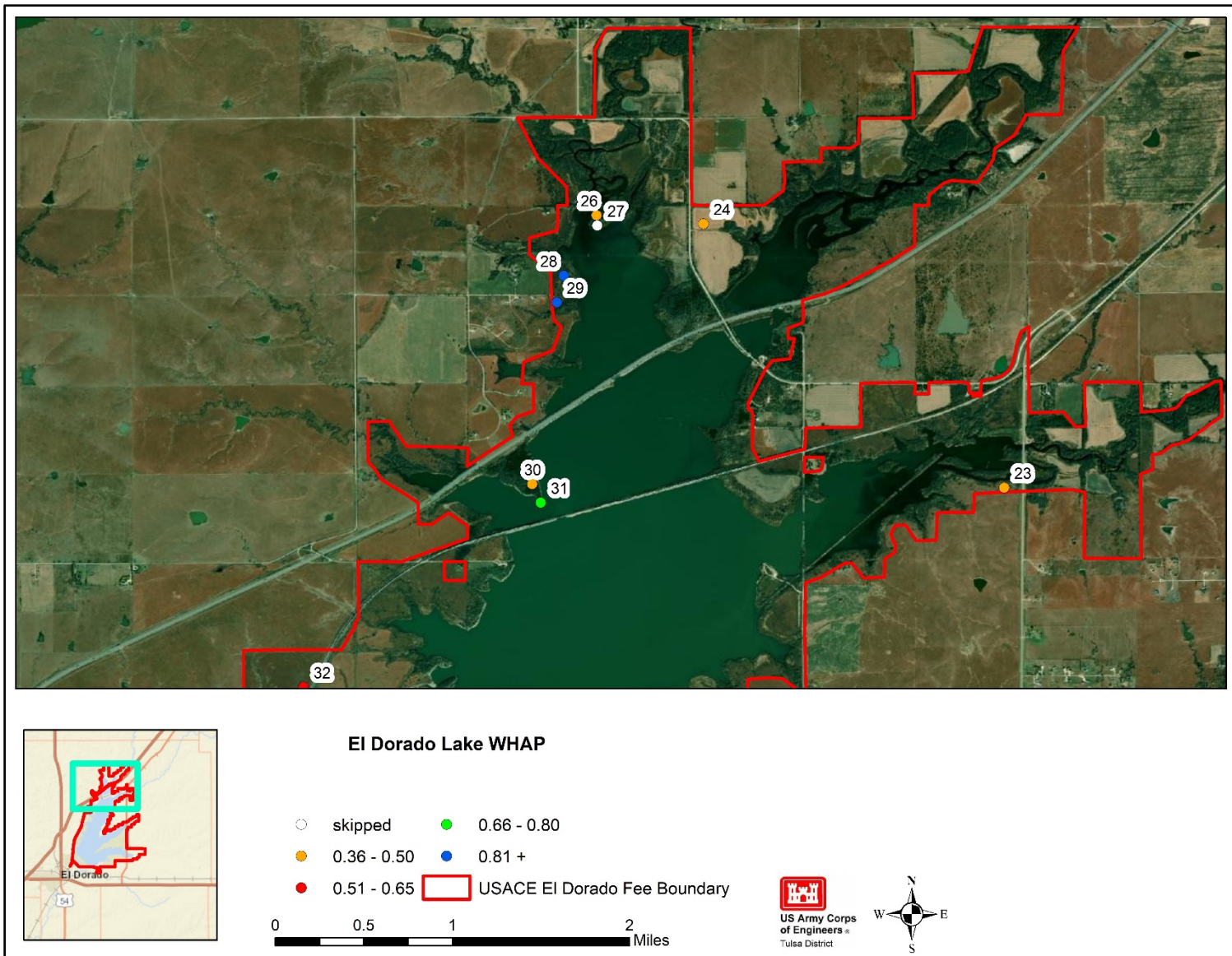


Figure 3: Total Score Range for All Points Surveyed on the Northern Boundary of El Dorado Lake

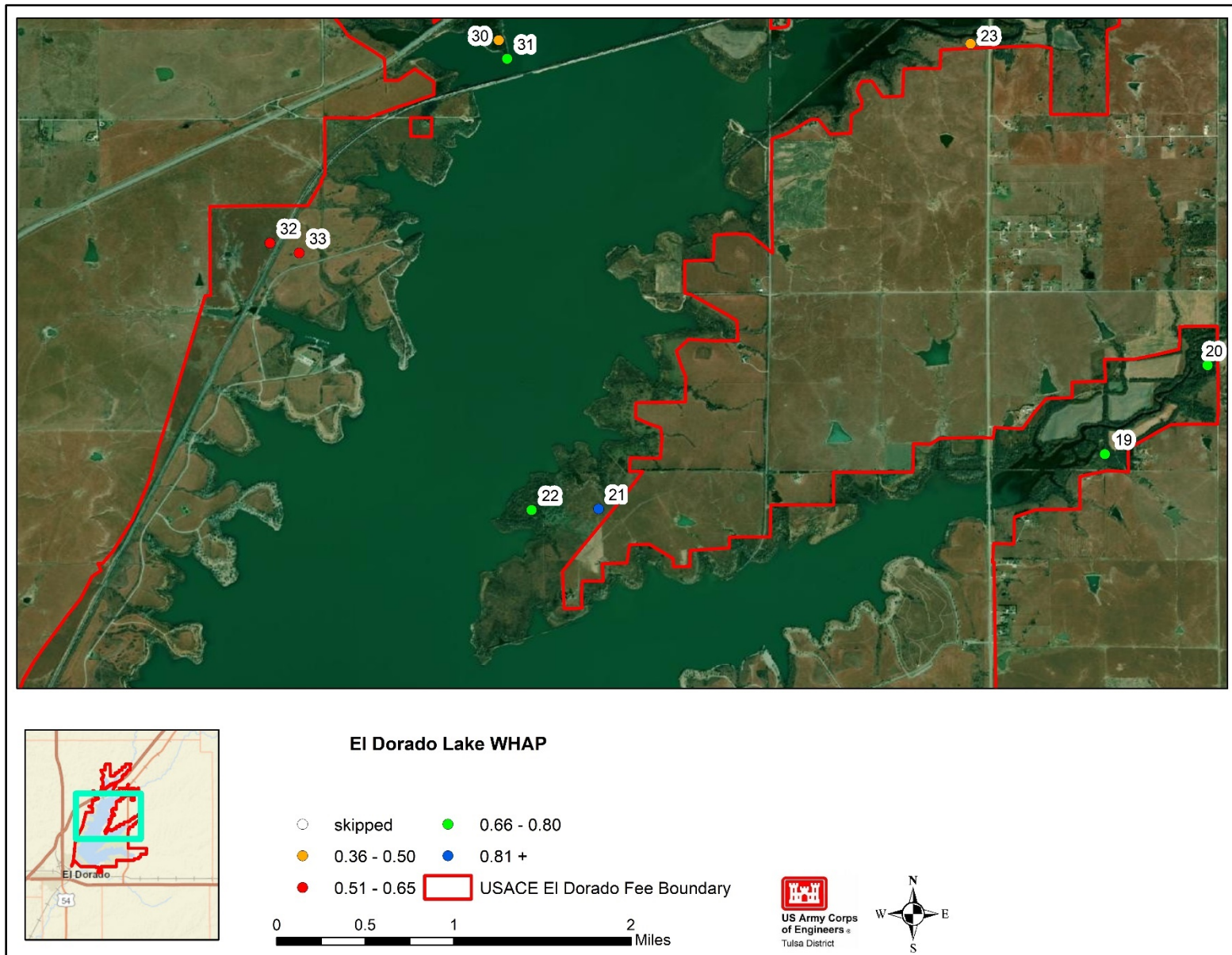


Figure 4: Total Score Range for All Points Surveyed within the Center of El Dorado Lake

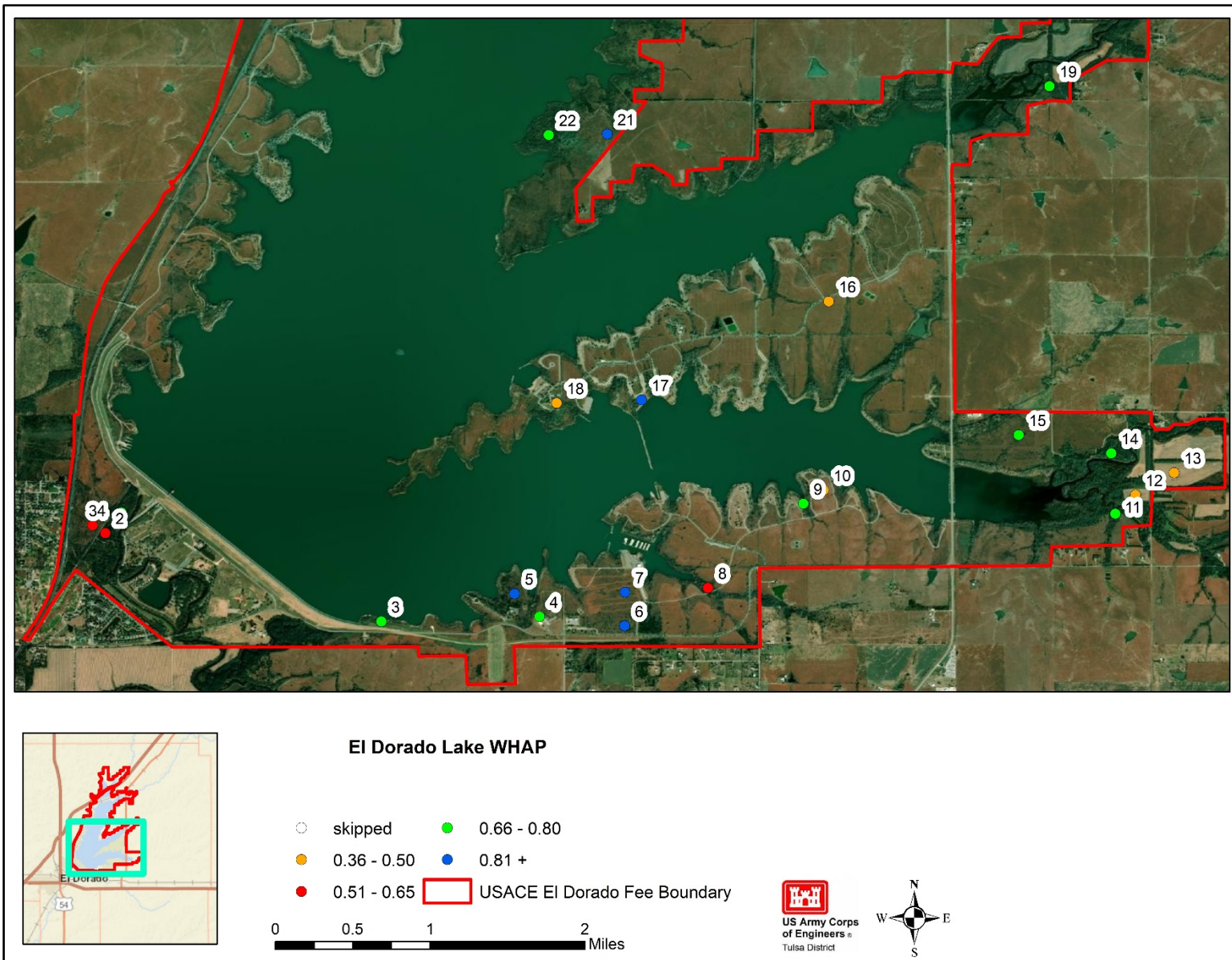


Figure 5: Total Score Range for All Points Surveyed on the Southern Boundary of El Dorado Lake

Figures 3 – 5 show the range of total scores for all points surveyed (N=33) as well as the one additional point (site 27) that was skipped due to inaccessibility. Overall, riparian/BLH forest, grassland, upland forest, and marsh habitats exhibited relatively similar scores (0.61 – 0.70). With such a close margin between the habitat types, they are essentially equal in value, which is evidence of how the normalizing of scores helps the sites to be evaluated on an equal basis.

Seven sites received a score of 0.80 or above, indicating higher quality habitat in comparison to other sites sampled. All seven are grassland sites and received maximum scores for site potential (Figure 6).

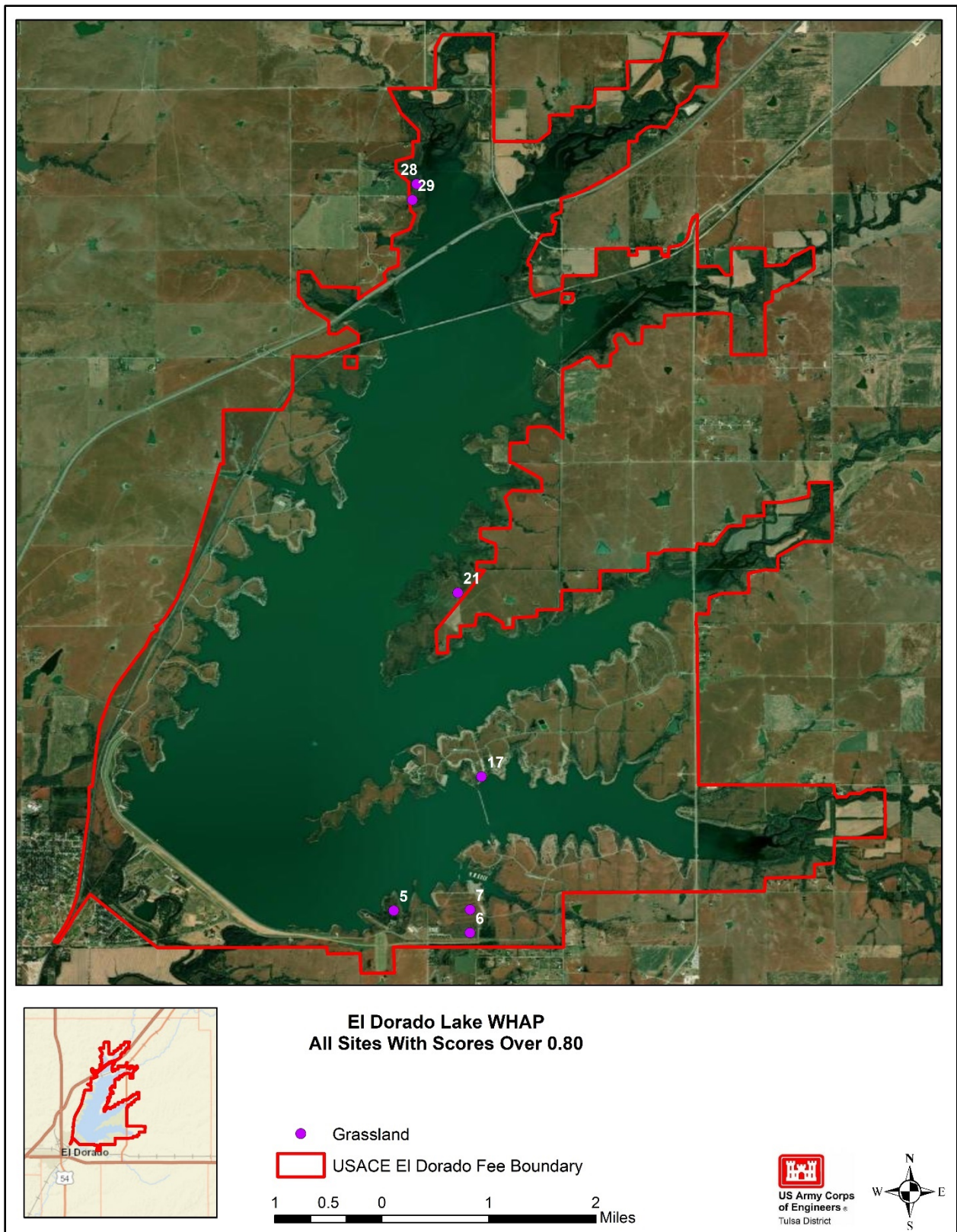


Figure 6: All Sites with Total Scores over 0.80

Beyond vegetative diversity, the three major metrics within the WHAP scoring criteria that allocate points are for site potential, successional stage, and uniqueness and relative abundance. Table 4 shows these metrics' average score per habitat type.

Table 4: Average Site Potential, Successional Stage, and Uniqueness and Relative Abundance Scores per Habitat Type

Habitat Type	Average Site Potential	Average Successional Stage	Average Uniqueness and Relative Abundance
Riparian/BHF	15.80	13.80	12.50
Upland Forest	12.00	9.00	10.00
Grassland	11.88	4.94	8.82
Cropland	8.33	1.00	6.67
Marsh	0.70	0.70	0.70

The site potential criterion allocates more points based on soil substrate characteristics and hydrologic connectivity that can support hydrophytic habitats, such as marshes, swamps, and bottomland hardwood forests. These sites are often considered to be higher quality and more diverse habitat. Since site potential focuses on soil characteristics, lowland sites with recent vegetation damage (e.g. fire, flood, insect damage, etc.) may receive higher scores than surrounding upland sites. Areas scoring high in site potential but low in other metrics can be targeted for management efforts, as vegetation community response should be favorable, thus increasing habitat value. WHAP sites with maximum site potential are shown in Figure 7.

Successional stage refers to the age of the vegetative community. Older, mature forests and climax prairies score higher than younger pole stands or disturbed grasslands because they provide more diverse forage, cover, and niche habitats. The successional stage of different habitat types is expected to increase as they age, except in areas that may not have the soil types to support hydrophytic vegetation or are flooded frequently enough to limit upland forest or grassland growth and development.

Uniqueness and relative abundance take into consideration the rarity of a habitat or vegetative community and its abundance in the region. Current and past agricultural practices have significantly influenced the region's remaining habitat composition. Few large, contiguous patches of habitat remain around El Dorado Lake, thus those remaining tracts representing historic vegetation are important to conserve and protect. Of the sites sampled, 4 sites received the maximum score for uniqueness and relative abundance as displayed in Figure 8. Three sites occurred in the area where Shady and Bemis Creeks flow into El Dorado Lake.

In addition to receiving a maximum score for successional stage, WHAP sites #1, 25, and 31 were the only sites that received maximum scores for successional stage.

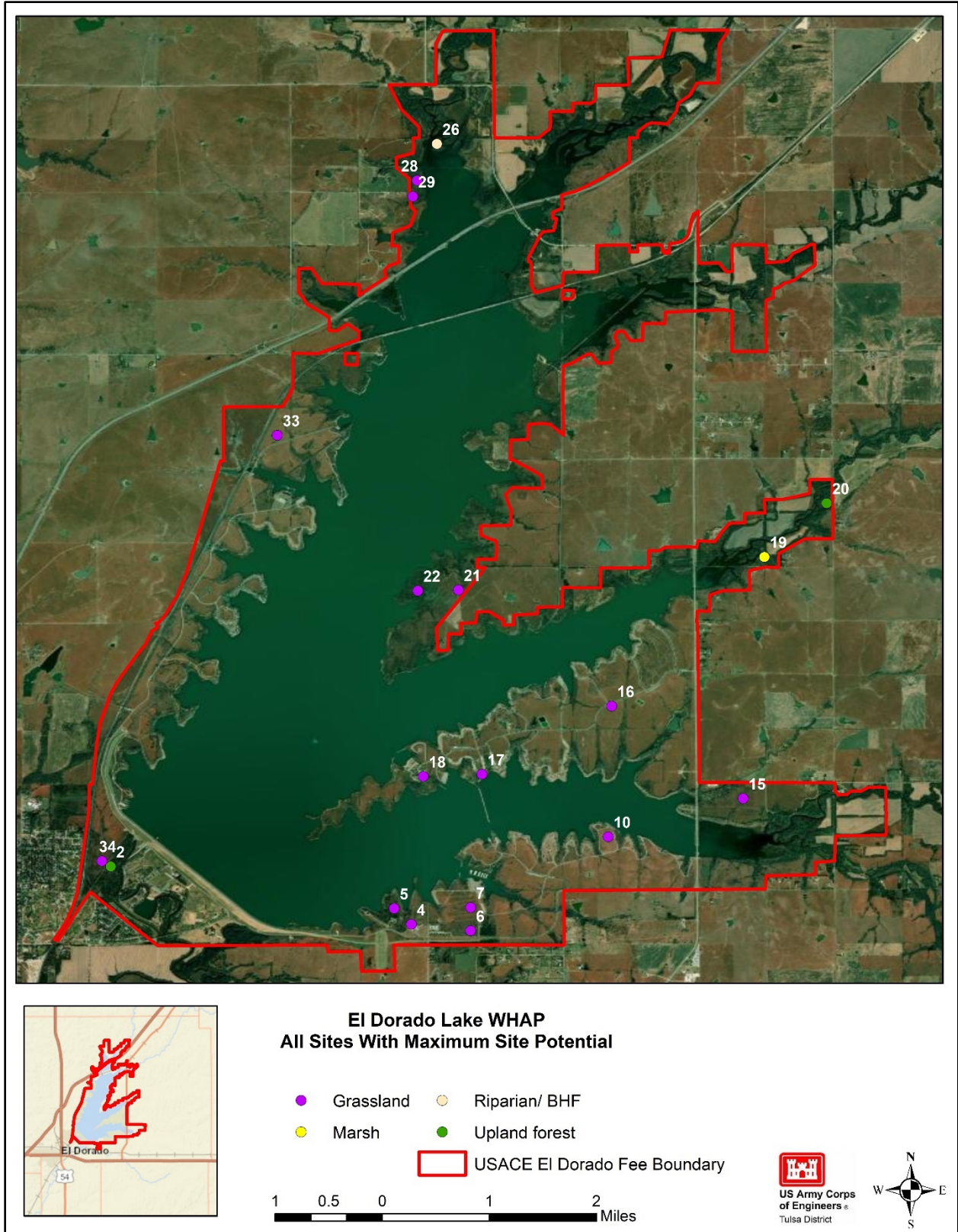


Figure 7: All Sites with Maximum Site Potential Scores

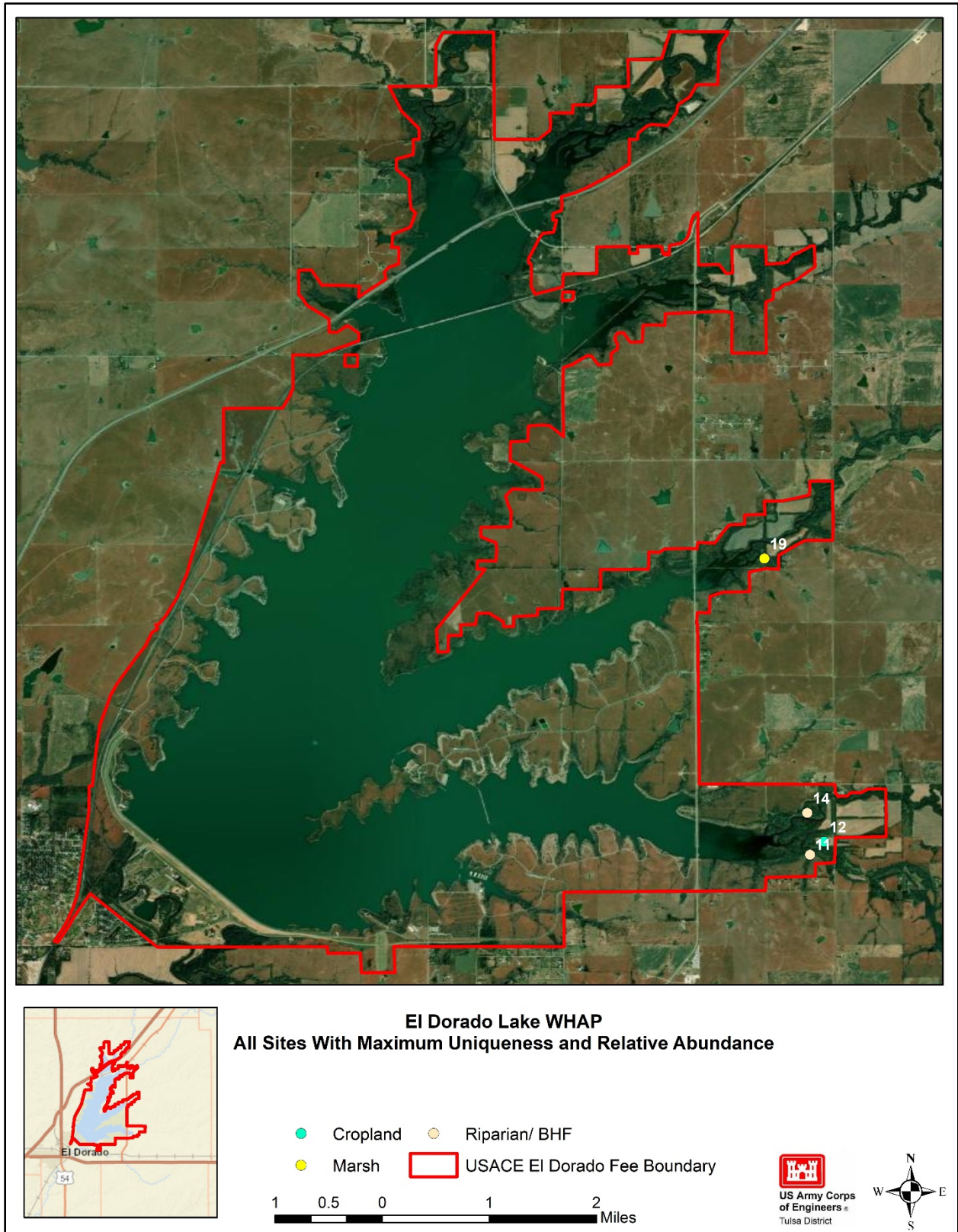


Figure 8: All Sites with Maximum Uniqueness and Relative Abundance

RECOMMENDATIONS

Even with unplanned disturbances, there are several areas with valuable wildlife habitat remaining on USACE fee-owned property at El Dorado Lake. Habitat management efforts by the USACE and the Kansas Department of Wildlife, Parks, and Tourism has proven effective in maintaining quality wildlife habitat around the lake.

When comparing overall high WHAP scores (Figures 3, 4, and 5) to Maximum Site Potential scores (Figure 7), two areas of the lake were identified, the area between 618 SE Bluestem RD and USACE Kansas City Regulatory Office and then another area east of 75th Street in El Dorado Kansas. These sites are close to or have reached their habitat potential. Most, if not all these areas likely require no management actions to reach their potential, but rather protection from disturbances.

Likewise, sites with low WHAP scores that also have low site potential have likely reached their habitat potential; however minimal it might be. Management actions to improve these sites will likely achieve minimal results.

Conversely, areas with relatively low total WHAP scores between 0.66 – 0.80, but high Site Potential scores have the greatest potential for improvement. Management actions targeting native species diversity through habitat manipulation (e.g. prescribed fire, invasive species control, etc.) will likely result in more diverse, higher quality wildlife habitat. WHAP sites 4, 15, 19, 20, and 22 meet this criterion.

Based on the results of the WHAP survey efforts, areas to consider for Wildlife Management or Environmentally Sensitive Areas land classifications include those areas with highest maximum scores. The planning team for the El Dorado Lake Master Plan revision will consider WHAP scores when making land classification decisions.

REFERENCES

- Rohweder, M.R. December 2015. Kansas Wildlife Action Plan. Ecological Services Section, Kansas Department of Wildlife, Parks and Tourism in cooperation with the Kansas Biological Survey. 176 pp.
- Texas Parks and Wildlife Department (TPWD). 1995. Wildlife Habitat Appraisal Procedure (WHAP). Last revised January 12, 1995. Retrieved from https://tpwd.texas.gov/publications/pwdpubs/media/pwd_rp_w7000_0145.pdf

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ATTACHMENT A: El Dorado Lake WHAP Results Summary

Point Number	Habitat Type	Final Score	Berry/Drupe	Legume/Pod	Acorn	Nut/Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
1	Riparian / BHF	0.69	paw paw, gooseberry, wild grape, Virginia creeper, poison ivy, smilax spec., bass wood	black locust	white oak	black walnut, pignut hickory	American elm, green ash	N/A	N/A	N/A	rattlesnake fern, jumpseed, wild rye, cord grass, whirlwood aster	N/A
2	Upland forest	0.53	hack berry, red bud, rough leafed dog wood, paw paw, Bradford pear, sumac, poison ivy, smilax spec., wild grape	black locust, honey locust	N/A	N/A	American elm,	eastern red cedar		osage orange	Johnson grass, white vervain, brome, hedge parsley, beggars lice, thistle, cordgrass, tall joe-pye weed, wingstem, ragweed, golden rod	N/A
3	Riparian / BHF	0.70	Virginia creeper. Poison ivy, rough leaf dog wood, hack berry, bittersweet, smilax	N/A	N/A	N/A	elm, sycamore	eastern red cedar	N/A	cottonwood	soft haired marbleseed, golden rod, annual ragweed, boneset	lots of cottonwood
4	Grassland	0.73	dewberry, sumac	N/A	N/A	N/A	American elm	N/A	N/A	N/A	lead plant, switch grass, wavy leaf thistle, Japanese brome, Canadian rye, bluestem, annual ragweed, horseweed, boneset	N/A
5	Grassland	0.97	poison ivy, rubus sp., sumac	honey mesquite	N/A	N/A	N/A	N/A	N/A	N/A	leadplant, ragweed, American germander, wavy leaf thistle, blue sage, golden rod, hemp dog bane, snow on the mountain, Canadian wild rye, flowering spurge, switchgrass, bluestem	N/A
6	Grassland	0.83	coral berry, poison ivy, roughleaf dog wood	honey locust	N/A	N/A	American elm	N/A	N/A	N/A	golden rod, bluestem, switchgrass, indian grass,	N/A
7	Grassland	0.83	roughleaf dogwood, poison ivy, coral berry, rubis sp., sumac	honey locust	N/A	N/A	American elm	N/A	N/A	N/A	golden rod, Johnson grass, prairie clover, switch grass, panicum sp. Hemp dog bane, maxout herb	N/A
8	Riparian / BHF	0.64	rubis sp. Poison ivy, muscadine grape, mulberry, smilax, roughleaf dogwood, pokeberry, Virginia creeper	honey locust, milkpea	N/A	N/A	American elm	N/A	N/A	N/A	ragweed, beggars tick, wavy leaf thistle, smart weed, western ragweed,	N/A
9	Riparian / BHF	0.71	poison ivy, muscadine grape, mulberry,	honey locust, milkpea	N/A	pecan	American elm, ash	N/A	N/A	cottonwood	ragweed, beggars tick, milkweed, Virginia rye, kidneywood, carex so.	N/A
10	Grassland	0.24	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ragweed, mimosa, indian grass, Johnson grass, sensitive briar, bunch grass	Mowed field
11	Riparian / BHF	0.66	poison ivy, smilax, muscadine grape, Virginia creeper, mulberry	milkpea	N/A	N/A	Ash, American elm	N/A	American sycamore	osage orange	knotweed, American germander, false nettle, annual ragweed, carex sp., beggars tick	N/A

Point Number	Habitat Type	Final Score	Berry Drupe	Legume/Pod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
12	Croplan d	0.37	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Sorghum, morning glory	Sorghum field
13	Croplan d	0.37	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	corn, guinea grass, morning glory	corn field
14	Riparian / BHF	0.78	Hack berry, Virginia creeper, muscadine grape, mustang grape, poison ivy, summer grape, smilax	milk pea	bur oak, post oak	N/A	ash	juniper sp.,	American elm	N/A	American jumpseed, annual ragweed, morning glory, cord grass, dotted knotweed	N/A
15	Grassla nd	0.69	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	golden rod, horse weed, blue sage, annual ragweed, silver bluestem, little bluestem, bone set, indian grass, white aster, hemp dog bane	N/A
16	Grassla nd	0.42	Virginia creeper	Pea Sp.	N/A	N/A	N/A	N/A	N/A	N/A	Bahea grass, purple prairie flower, annual ragweed, false bone set, indian grass, golden rod, rosette grass,	N/A
17	Grassla nd	0.86	Poison ivy, mustang grape, coral berry	Honey locust		N/A	cedar elm, ash	N/A	N/A	N/A	St. Augustine, trifolium sp. Crab grass	N/A
18	Grassla nd	0.24	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		mowed field
19	Marsh	0.70	N/A	N/A	N/A	N/A	Ash	N/A	N/A	duckweed, water tupelo	knotweed, hedge parsley, flatsedge, horse weed	Lots of frogs, low water level, connects to satchel creek
20	Upland forest	0.69	Russian olive, roughleaf dogwood, poison ivy, riverbank grape, prairie blackberry, coral berry	honey locust,	burr oak,	N/A	green ash, slippery elm	eastern red cedar	N/A	eastern cottonwood	deer tongue, ragweed, big bluestem, yellow bluestem, side oats gramma, upright sedge, spurred butterfly weed, white vervain, bull nettle, common milkweed, purple top tridens, horseweed, texas thistle, devils beggarticks, switchgrass, goldenrod	N/A
21	Grassla nd	0.85	coral berry,	N/A	N/A	N/A	N/A	N/A	N/A	N/A	little bluestem, goldenrod, annual ragweed, boneset, scribners panicum, witch grass,	N/A
22	Grassla nd	0.73	Dew berry, rough leaf dog wood,	honey locust, senna sp.	N/A	N/A	American elm	N/A	N/A	osage orange	bluestem, panicum sp. Annual ragweed, rosette grass, American germander	N/A
23	Grassla nd	0.47	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	False bone set, golden rod, purple prairie clover, evening primrose, indian grass, bitter sneeze weed, nose burn, Illinois bundle flower, white prairie clover, compass plant, fowlmanna grass, roosevelt weed, stiff sunflower, butterfly weed, green milkweed, fringleaf wild petunia	Site recently burned

Point Number	Habitat Type	Final Score	Berry/Drupe	Legume/Pod	Acorn	Nut/Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
24	Cropland	0.06	N/A	Soybean	N/A	N/A	N/A	N/A	N/A			soybean field
25	Riparian / BHF	0.68	N/A	N/A	N/A	N/A	Red maple, American elm	N/A	N/A	cotton wood, black willow, button bush	velvet leaf, devils begger tick, false nettle, western ragweed, velvet panic grass, yellow foxtail, smartweed, long hair sedge, barnyard grass, morning glory, annual marshelder, cutleaf ground cherry, white star	N/A
26	Riparian / BHF	0.45	sugar berry, poison ivy, Virginia creeper, smilax spec.,	black locust	N/A	N/A	American elm, siberian elm, green ash, box elder	N/A	N/A		Jumpseed, porcelain vine, white avens, white snakeroot, stinging nettle, climbing false buckwheat, western ragweed, wild rye grass, thistle, field pennycress, northern sea oats	N/A
27	Skipped	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
28	Grassland	0.88	Poison ivy, roughleaf dogwood, , prairie blackberry	partridge pea, honey locust	N/A	N/A	American elm,	N/A	N/A	cotton wood, osage orange	false indigo, gypsy wort, baldwins ironweed, bull nettle, common ragweed, rosemary, sedge sp., american germander, beggers lice, long flower butterfly weed, golden rod, common sunflower, indian hemp, indian grass	N/A
29	Grassland	0.86	roughleaf dogwood, white mulberry, sumac, prairie blackberry	N/A	N/A	N/A	american elm	N/A	N/A	N/A	rosemary, little bluestem, indian grass, common yarrow, yellow bluestem, goldenrod, indian hemp, maximillion sunflower, common ragweed, partridge pea, roundhead lespedeza, blue sage, long bluestem, Japanese clover	N/A
30	Riparian / BHF	0.47	Roughleaf dogwood, Kentucky coffee tree, coral berry, blackberry,	honey locust	N/A	N/A	N/A	eastern red cedar	N/A	N/A	Texas thistle, american germander, california fescue, rice cutgrass common ragweed, reed canary grass, poverty oat grass, common dandelion, panic velvet grass, blue sage, frost asters, common 3-seeded mercury	N/A
31	Riparian / BHF	0.70	poison ivy, muscadine, coral berry, smilax spec., riverbank grape	honey locust, redbud, Kentucky coffee tree	burr oak,	bitternut hickory	American elm, green ash	eastern red cedar	N/A	N/A	panic velvet grass, Texas thistle, Johnson grass, white avens, wild rye, northern sea oats	N/A
32	Grassland	0.56	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	buffalo grass, witch grass, snow on the mountain, golden rod, big bluestem, panic grass, common velvet grass, blue prairie sage, indian grass, common ragweed, lead plant, side oats gramma, blue wild indigo, yellow fox tail, long bract wild indigo, missouri ironweed	N/A
33	Grassland	0.53	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	illinois bundle flower, common ragweed, switch grass, big bluestem, groundplum milk vetch, rye grass, wood sage	Field
34	Grassland	0.54	poison ivy, coral berry, Bradford pear, roughleaf dogwood, prairie blackberry, sumac	honey locust	N/A	N/A	siberian elm, american elm	eastern red cedar	N/A	N/A	white sagebrush, iron weed, illinois bundle flower, white aster, long bract wild indigo, golden rod, big bluestem, switchgrass, wild rye, lead plant, common ragweed	N/A

APPENDIX D - FEDERAL AND STATE THREATENED AND ENDANGERED SPECIES LISTS

TRUST RESOURCES REPORT – USFWS

STATE OF KANSAS - BUTLER COUNTY THREATENED AND ENDANGERED
SPECIES LIST



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Kansas Ecological Services Field Office
2609 Anderson Avenue
Manhattan, KS 66502-2801
Phone: (785) 539-3474 Fax: (785) 539-8567

In Reply Refer To:
Consultation Code: 06E21000-2021-SLI-0129
Event Code: 06E21000-2021-E-00321
Project Name: El Dorado

November 09, 2020

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/endangered/esa-library/pdf/esa_section7_handbook.pdf

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*) (<https://www.fws.gov/birds/management/managed-species/eagle-management.php>), and wind projects affecting these species may require development of an eagle conservation plan (<https://www.fws.gov/migratorybirds/pdf/management/eagleconservationplanguidance.pdf>). Additionally, wind energy projects should follow the wind energy guidelines (<https://www.fws.gov/ecological-services/energy-development/wind.html>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <https://www.fws.gov/birds/management/project-assessment-tools-and-guidance.php>

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
 - USFWS National Wildlife Refuges and Fish Hatcheries
 - Migratory Birds
 - Wetlands
-

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Kansas Ecological Services Field Office

2609 Anderson Avenue

Manhattan, KS 66502-2801

(785) 539-3474

Project Summary

Consultation Code: 06E21000-2021-SLI-0129

Event Code: 06E21000-2021-E-00321

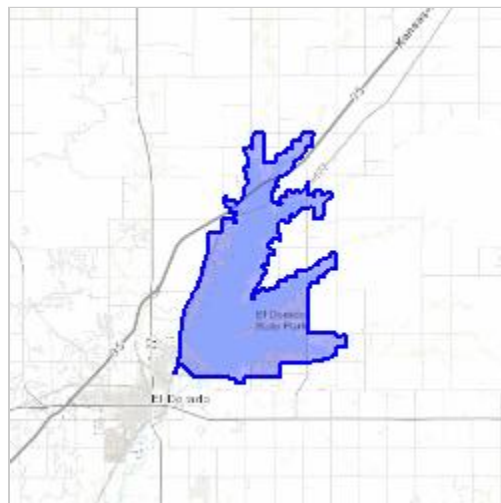
Project Name: El Dorado

Project Type: LAND - MANAGEMENT PLANS

Project Description: The El Dorado Master Plan (Butler County, Kansas) is the long-term strategic land use management document that guides the comprehensive management and development of all the project's recreational, natural, and cultural resources within the federal fee boundary. Under the guidance of ER-1130-2-550 Change 7, the Plan guides the efficient and cost-effective development, management, and use of project lands. It is a dynamic tool that provides for the responsible stewardship and sustainability of the project's resources for the benefit of present and future generations. The Plan works in tandem with the Operational Management Plan (OMP), which is the implementation tool for the resource objectives and development needs identified in the Master Plan. The Master Plan guides and articulates the USACE responsibilities pursuant to federal laws. Efforts are under way to revise the current Lake Master Plan. The Master Plan revision will update land classifications, plan for the modernization of existing parks, and inform the management of wildlife and other resource lands within USACE managed property at El Dorado Lake for the next 25 years.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/37.891962300987785N96.79515474068072W>



Counties: Butler, KS

Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Fishes

NAME	STATUS
Topeka Shiner <i>Notropis topeka</i> (=tristis) Population: Wherever found, except where listed as an experimental population There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4122	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

-
1. The [Migratory Birds Treaty Act](#) of 1918.
 2. The [Bald and Golden Eagle Protection Act](#) of 1940.
 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31
Lesser Yellowlegs <i>Tringa flavipes</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere

NAME	BREEDING SEASON
Prothonotary Warbler <i>Protonotaria citrea</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 1 to Jul 31
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Rusty Blackbird <i>Euphagus carolinus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ “Proper Interpretation and Use of Your Migratory Bird Report” before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

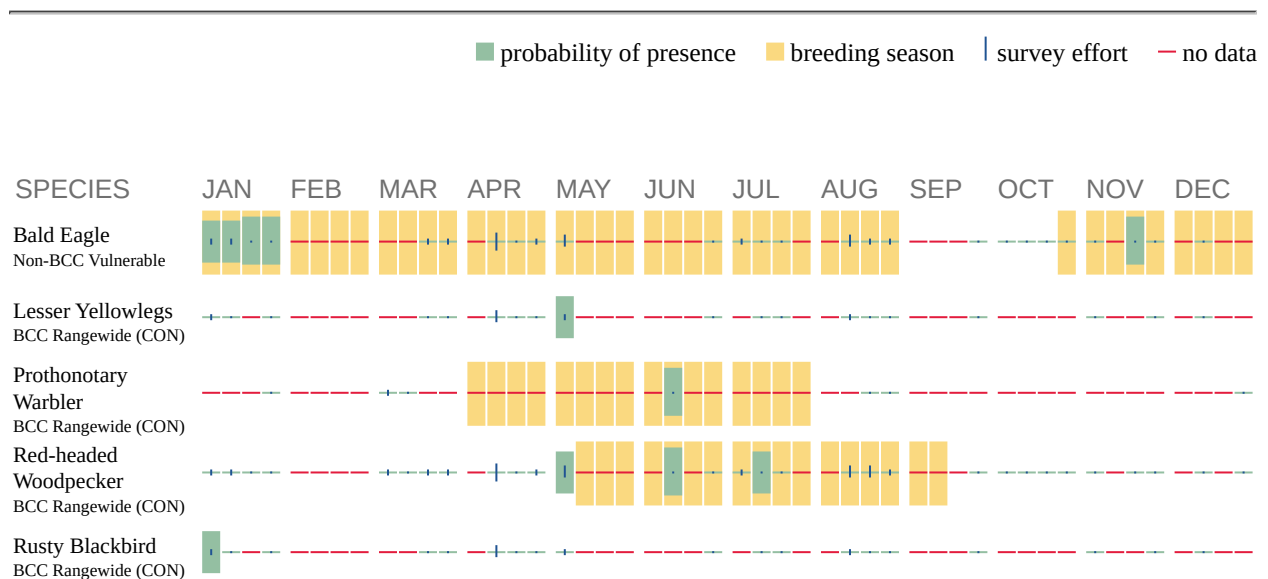
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (—)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) and/or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [AKN Phenology Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ “Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds” at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER EMERGENT WETLAND

- [PEM1A](#)
- [PEM1Ah](#)
- [PEM1Ax](#)
- [PEM1C](#)
- [PEM1Ch](#)
- [PEM1Cx](#)
- [PEM1Fh](#)

FRESHWATER FORESTED/SHRUB WETLAND

- [PFO5Fh](#)
- [PFO5Hh](#)
- [PFOA](#)
- [PFOAh](#)
- [PSS1Ah](#)
- [PSSA](#)
- [PSSAh](#)
- [PSSCh](#)

FRESHWATER POND

- [PABF](#)
- [PABFh](#)
- [PABFx](#)
- [PABGh](#)
- [PUBFx](#)

LAKE

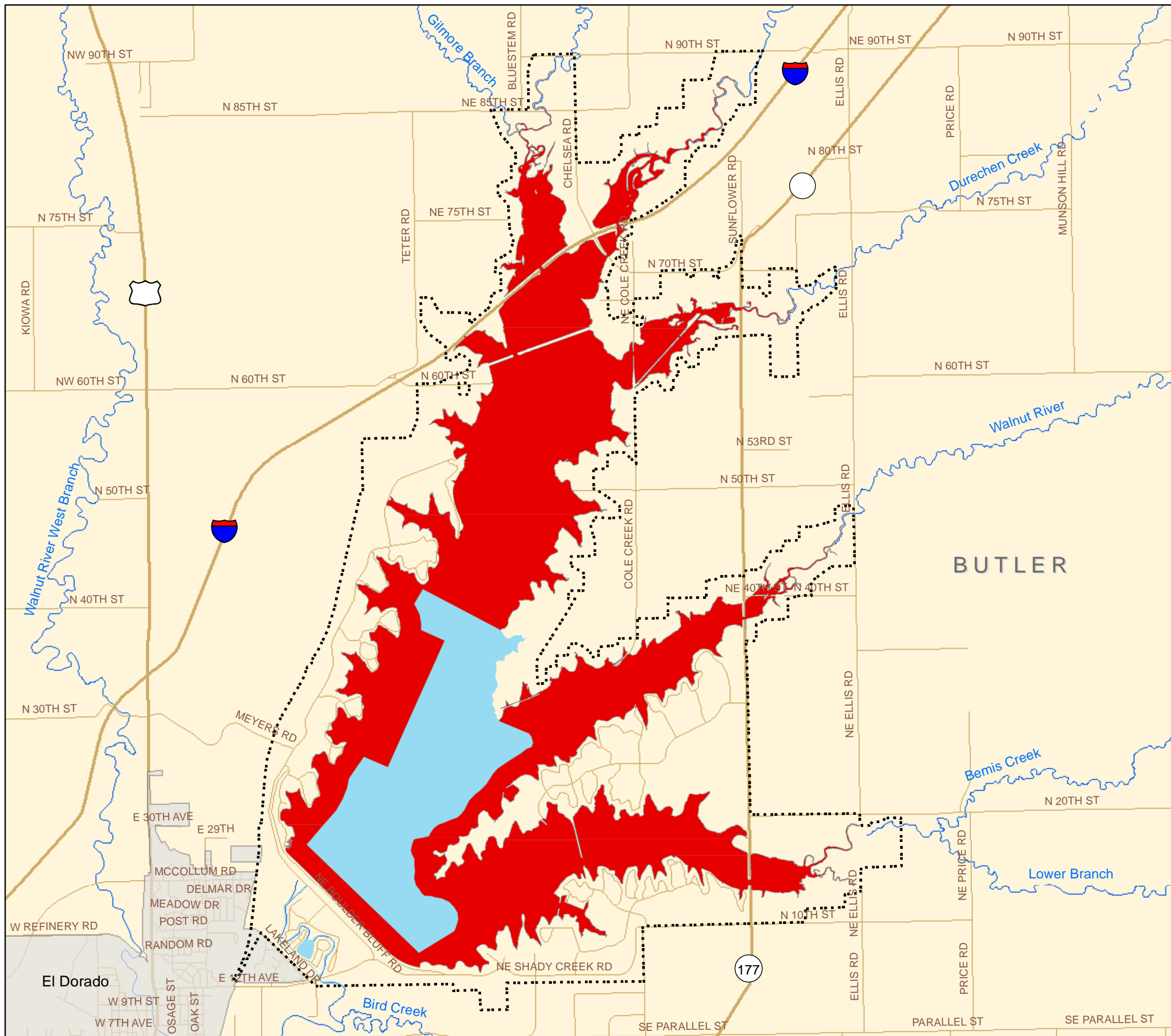
- [L1UBHh](#)
 - [L2USAh](#)
-

- [L2USCh](#)

RIVERINE

- [R2UBF](#)
 - [R2UBG](#)
 - [R2UBGx](#)
 - [R4SBC](#)
 - [R5UBH](#)
-

APPENDIX F - SEAPLANE MAP



- RESTRICTED
- FEE BOUNDARY
- RESERVOIR

**TAKE OFF AND LANDING PROHIBITED
WITHIN 1000' OF DAM STRUCTURE,
BRIDGES, AND RECREATION AREAS**

**OPERATIONS OF A SEA PLANE AT CORPS
PROJECTS IS AT THE RISK OF THE
PLANE'S OWNER, OPERATOR,
AND / OR PASSENGERS**



**U.S. ARMY CORPS
OF ENGINEERS
TULSA DISTRICT**

EL DORADO LAKE WALNUT RIVER, KANSAS

**EL DORADO LAKE MASTER PLAN
SEA PLANE GUIDE**



DATE:
JANUARY 2021

MAP NO.
EDL20MP-OP-01

APPENDIX G - ACRONYMS

ADA	Americans with Disabilities Act
ARPA	Archaeological Resources Protection Act of 1979
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
DC	District Commander
DM	Design Memorandum
DQC	District Quality Control
EA	Environmental Assessment
EC	Engineer Circular
EFA	Ecological Focus Area
EM	Engineering Manual
EO	Executive Order
EP	Engineering Pamphlet
EPA	United States Environmental Protection Agency
ER	Engineering Regulation
ESA	Environmentally Sensitive Area
FONSI	Finding of No Significant Impact
FT	Feet
GIS	Geographical Information Systems
HDR	High Density Recreation
HQ	USACE Headquarters
IPaC	USFWS Information for Planning and Conservation

KDHE	Kansas Department of Health and Environment
KDWPT	Kansas Department of Wildlife, Parks, and Tourism
KS	Kansas
KSHS	Kansas State Historical Society
LDR	Low Density Recreation
MGD	Million Gallons per Day
MP	Master Plan or Master Planning
MRML	Multiple Resource Management Lands
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act, 1970
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NOA	Notice of Availability
NRCS	Natural Resource Conservation Service
NVCS	National Vegetation Classification System
O&M	Operations and Maintenance
OMB	Office of Management and Budget
OMBIL	Operations and Maintenance Business Information Link
OMP	Operations Management Plan for a specific lake Project
OPM	Operations Project Manager
OWRB	Oklahoma Water Resources Board
PDT	Project Delivery Team
PM	Project Management or Project Manager
PMBP	Project Management Business Processes

PMP	Project Management Plan
PO	Project Operations
SCORP	State Comprehensive Outdoor Recreation Plan
SHPO	State Historical Preservation Office
SINC	Species in Need of Conservation
SMP	Shoreline Management Plan
WAP	Strategic Wildlife Action Plan
TP	Total Phosphorous
TSS	Total Suspended Solids
Ug/L	Micrograms per Liter
US	United States
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
USFWS	U. S. Fish and Wildlife Service
VMA	Vegetative Management Area
WHAP	Wildlife Habitat Appraisal Procedure
WMA	Wildlife Management Area
WRAPS	Water Restoration and Protection Strategy
WRDA	Water Resources Development Act