

01 September 2023

MEMORANDUM FOR Commander, Tulsa District

SUBJECT: Sardis Lake Revised Master Plan (September 2023)

1. Enclosed subject Master Plan is submitted for review and approval in accordance with ER 1130-2-550, Change 7 and EP 1130-2-550, Change 5.
2. Point-of-contact in Operations Division is Mrs. Amanda Palmer, 918-669-4903

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8
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Allen G. Ryan
Chief, Operations Division

Encl

Approved:  _____

Disapproved: _____



Timothy F. Hudson
Colonel, U.S. Army
District Commander

STAFF COORDINATION AND ROUTER

TO: CESWT-PE, CESWT-OC, CESWT-RE,
CESWT-OD, CESWF-PEM, CESWF-PEE

SUBJECT: DQC Review Final Sardis Lake Master Plan and EA

FROM: CESWF-PEM-E

DATE:

**SUMMARY OF ACTION REQUIRED, NOTES,
REMARKS, ETC:**

This router is for the 2023 Final Sardis Lake Master Plan and EA revision. The draft document received no public or agency comments.

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Thank you,
Tennille Hammonds

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EXECUTIVE COORDINATION

	APPROVE	DISAPPROVE	SEE ME
COMMANDER			
DEPUTY COMMANDER			
DEPUTY DISTRICT ENGINEER			
CHIEF OF STAFF			

EXECUTIVE REMARKS:

5

**FINDING OF NO SIGNIFICANT IMPACT
ENVIRONMENTAL ASSESSMENT FOR THE
SARDIS LAKE MASTER PLAN 2023
KIAMICHI RIVER BASIN
LATIMER, PITTSBURG, AND PUSHMATAHA COUNTIES, OKLAHOMA**

The U.S. Army Corps of Engineers (USACE) Engineering Regulation (ER) 1130-2-550 Change 07, dated 30 January 2013 and Engineering Pamphlet (EP) 1130-2-550 Change 05, dated 30 January 2013, require Master Plans for the USACE water resources development projects having a federally owned land base. The proposed revision of the 1978 Sardis Lake Master Plan is being conducted pursuant to this ER and EP and is necessary to bring it up to date to reflect current ecological, socio-demographic, and outdoor recreation trends that are affecting the lake, as well as those anticipated to occur within the planning period of 2023 to 2048.

In accordance with the National Environmental Policy Act of 1969, as amended, including guidelines in 33 Code of Federal Regulations (CFR), Part 230 and 40 CFR Parts 1500-1508, the U.S. Army Corps of Engineers, Tulsa District has conducted an environmental analysis on the Sardis Lake Master Plan 2023. The Sardis Lake Master Plan 2023 addresses the need for an updated comprehensive land management document for Sardis Lake in Latimer, Pittsburg, and Pushmataha Counties, Oklahoma. The final recommendation will be contained in the Sardis Lake Master Plan 2023.

The revision of the 1978 Sardis Lake Master Plan (hereafter Plan or Master Plan) is a framework built collaboratively to serve as a guide toward appropriate stewardship of USACE administered resources at Sardis Lake over the next 25 years.

The Environmental Assessment (EA) for the Sardis Lake Master Plan 2023 evaluated an alternative that would revise the 1978 Sardis Lake Master Plan to meet current policy, and its assessment of impacts are summarized in Table 1 and the EA is incorporated by reference.

In addition to a "no action" plan, one alternative that fully meets the project purpose was evaluated (proposed action/plan). Section 2.0 of the Sardis Lake Master Plan EA discusses the alternative formulation and selection as well the summary of the new goals and objectives. Section 8, Tables 8-1, and 8-2 of the Master Plan summarizes the changes to the land classifications. The proposed plan includes coordination with the public, updates to comply with the USACE regulations and guidance, and reflects changes in land management and land uses that have occurred since 1978. Land classifications were refined to meet authorized project purposes and current resource objectives that address a mix of natural resources and recreation management objectives that are compatible with regional goals, recognize outdoor recreation trends, and are responsive to public comments.

Table 1: Summary of Potential Effects of the Proposed Plan

Resource	Insignificant effects	Insignificant effects as a result of mitigation*	Resource unaffected by action
Aesthetics	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air quality	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aquatic resources/wetlands	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive species	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish and wildlife habitat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Threatened/Endangered species/critical habitat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Historic properties	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other cultural resources	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Floodplains	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hazardous, toxic & radioactive waste	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Hydrology	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Land use	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Socioeconomics	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Environmental justice	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Soils	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water quality	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Climate change	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

All practicable and appropriate means to avoid or minimize adverse environmental effects have been analyzed and incorporated into the proposed plan. The proposed plan will not entail any ground-disturbing activities. Future ground-disturbing activities on USACE property will be subject to all necessary environmental evaluations and compliance regulations.

No compensatory mitigation is required as part of the proposed plan.

Public review of the draft Master Plan, Environmental Assessment, and Finding of No Significant Impact (FONSI) was completed on April 29, 2023. All comments submitted during the public review period were responded to in the final Master Plan.

Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, the U.S. Army Corps of Engineers has determined that the proposed plan will have no effect on federally listed species or their designated critical habitat.

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, the U.S. Army Corps of Engineers has determined that the proposed plan will have no effect on historic properties.

All applicable environmental laws were considered and coordination with appropriate

agencies and officials has been completed.

All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives. Based on the report, the reviews by other Federal, State, and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the proposed plan would not cause significant adverse impacts on the quality of the human environment, therefore, preparation of an Environmental Impact Statement is not required.

11 September 2023

Date



Timothy P. Hudson
Colonel, EN
Commanding

Sardis Lake Master Plan

REPORT

Red River Basin

Latimer, Pittsburg, and Pushmataha Counties, Oklahoma

August 2023



**US Army Corps
of Engineers**

Tulsa District

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EXECUTIVE SUMMARY

Sardis Lake Master Plan
U.S. Army Corps of Engineers
Prepared by the Southwestern Division
Regional Planning and Environmental Center (RPEC)
August 2023

ES.1 PURPOSE

The Sardis Lake Master Plan (hereafter Plan or Master Plan) is a complete revision of the 1978 *Sardis Lake Master Plan* and its supplements. The revision is a framework built collaboratively to guide appropriate stewardship of U.S. Army Corps of Engineers (USACE) administered resources at Sardis Lake over the next 25 years. The 1978 Master Plan has served well past its intended 25-year planning horizon and does not reflect the growing population around the lake, current regulations, and regional recreation needs.

Sardis Lake as it is now known was authorized in 1962 as a multipurpose project for flood control, water supply, recreation, and fish and wildlife. Originally the project was called Clayton Lake, but the name was changed to Sardis in December of 1981. Sardis Lake, located on Jackfork Creek, is a tributary of the Kiamichi River (see general location map in Figure ES.1). It is an integral component of the larger Red River Basin that has additional congressionally authorized purposes including flood control, hydropower, navigation, and water quality. In addition to these primary missions, the USACE has an inherent mission for environmental stewardship of project lands as reflected in ER-1130-2-540 change 2 dated July 2005, while working closely with stakeholders and partners to provide regionally important outdoor recreation opportunities.

The Master Plan and supporting documentation provide an inventory and analysis, goals, objectives, and recommendations for USACE lands and waters at Sardis Lake, Oklahoma, with input from the public, stakeholders, and subject matter experts. The Master Plan is primarily a land use and outdoor recreation strategic plan that does not address the specific authorized purposes of flood risk management or water supply. Although the 2011 USACE Water Control Manual for Sardis Lake addresses the *specifics* of water management, the Master Plan acknowledges that fluctuating water level for flood risk management and water supply can have a dramatic effect on outdoor recreation, especially at boat ramps, swim beaches, and marinas.

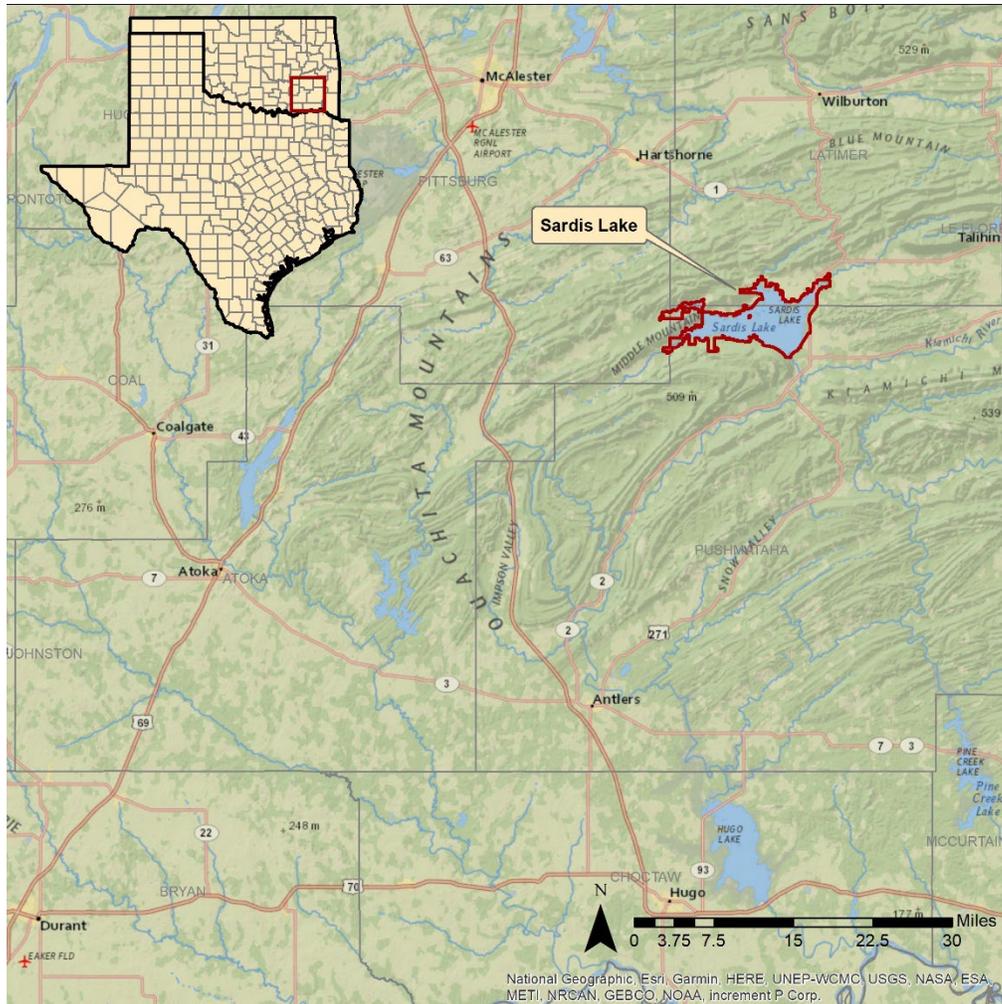


Figure ES.1 Vicinity Map of Sardis Lake

The mapping used for this Master Plan revision uses modern satellite imagery and Geographic Information System (GIS) mapping, resulting in different acreage calculations than that of the 1978 Master Plan. Using 2023 GIS measurements, Sardis Lake has a water surface of 13,869 acres at conservation pool of 599.0 feet NGVD29 and approximately 7,754 acres of federal land lie above the conservation pool with a shoreline of approximately 117 miles at the top of the conservation pool. In addition to the above acre counts, there is a current total of 1,148 easement acres which reflect all easements on the project and not solely flowage easements.

ES.2 PUBLIC INPUT

To ensure a balance between operational, environmental, and recreational outcomes, USACE obtained both public and agency input toward the Master Plan. An Environmental Assessment (EA) was completed in conjunction with the Master Plan to evaluate the impacts of alternatives and can be found in Appendix B.

On 24 March 2022 a public information workshop was held at Clayton Public School to inform the public of the intent to revise the master plan. The public input period remained open for 30 days from 24 March 2022 to 23 April 2022. At the public information workshop, a presentation was given that included the following topics:

- What is a Master Plan?
- What a Master Plan is Not
- Why Revise a Master Plan?
- Overview of the National Environmental Policy Act (NEPA) process
- Master Planning Process
- Instructions for submitting comments

For Sardis Lake, USACE received two (2) comments.

For the release of the Draft Sardis Lake Master Plan, a public information open house was held for the Sardis Lake Master Plan revision at the Clayton Public School Cafeteria in Clayton, Oklahoma, 74053 on 30 March 2023. The meeting was attended by five individuals. The purpose of this meeting was to provide attendees with information regarding the proposed Master Plan revision as well as to provide them the opportunity to provide comments on the proposed Draft Master Plan. The open house included the following topics:

- What is a Master Plan?
- What a Master Plan is Not;
- Why Revise a Master Plan?
- Overview of the National Environmental Policy Act (NEPA) process;
- Master Planning Process;
- Proposed Changes to the Master Plan; and
- Instructions for submitting comments.

The public input period remained open for 30 days from 30 March 2023 to 29 April 2023. During the 30-day comment period, the USACE did not receive any public, tribal, or agency comments.

ES.3 RECOMMENDATIONS

The following land and water classification revisions (detailed in Chapter 8) were a result of the inventory, analysis, synthesis of data, documents, and public and agency input. In general, all USACE land at Sardis Lake was reclassified either by a change in nomenclature required by regulation or changes needed to identify actual and projected use. Table ES.0-1 illustrates the prior and current land and water classifications, which includes small reductions in High Density Recreation and Wildlife Management, small increases in Project Operations and Low Density Recreation, and sets aside lands under the Environmentally Sensitive Area classification for environmental, cultural, and/or aesthetic preservation.

Table ES.0.1 Change from 1978 Land and Water Surface Classifications to 2023 Land and Water Surface Classification

Prior Land Classifications (1978)	Acres	Land Classifications (2023)	Acres	Net Difference
Project Operations	193	Project Operations (PO)	238	45
Recreation – Intensive Use	1,505	High Density Recreation (HDR)	866	(639)
		Environmentally Sensitive Areas (ESA)	576	576
Recreation – Low Density	937	Multiple Resource Management – Low Density Recreation (LDR)	1,269	332
Not Classified	27			
Wildlife Management	5,093	Multiple Resource Management – Wildlife Management (WMA)	4,805	(288)
TOTAL	7,755		7,754	(1)
Prior Water Surface Classifications (1978)	Acres	Water Surface Classifications (2022)	Acres	Net Difference
Conservation Pool	13,468	Open Recreation	13,857	389
		Designated No-Wake	2	2
		Restricted	10	10
TOTAL	13,468		13,869	401
TOTAL FEE	21,223		21,623	400

* Total Acreage differences from the 1978 total to the 2023 totals are due to improvements in measurement technology, deposition/siltation, and erosion. Totals also differ due to rounding while adding parcels.

The acreages of the conservation pool and USACE land lying above the conservation pool were measured using satellite imagery and Geographical Information System (GIS) technology. The GIS software allows for more finely tuned measurements and, thus, stated acres may vary from official land acquisition records and acreage figures published in the 1978 Public Use Plan. Some changes may also be due to erosion and siltation. A more detailed summary of changes and rationale can be found in Chapter 8.

ES.4 PLAN ORGANIZATION

Chapter 1 of the Master Plan presents an overall introduction to Sardis Lake. Chapter 2 consists of an inventory and analysis of Sardis Lake and associated land resources. Chapters 3 and 4 lay out management goals, resource objectives, and land classifications descriptions. Chapter 5 is the resource management plan that identifies

how project lands will be managed for each land use classification. This includes current and projected overall park facility needs, an analysis of existing and anticipated resource use, and anticipated influences on overall project operation and management. Chapter 6 details special topics that are unique to Sardis Lake. Chapter 7 identifies the public involvement 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 Environmental Assessment was developed in conjunction with the Master Plan, which analyzed alternative management scenarios for Sardis Lake, in accordance with federal regulations including 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, which would continue the use of the 1978 Public Use Plan, and 2) Proposed Action. The EA analyzed the potential impact these alternatives would have on the natural, cultural, and human environments. The Master Plan is conceptual and broad in nature, and 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.

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CHAPTER 1 – INTRODUCTION

1.1 GENERAL OVERVIEW

Sardis Lake is located at river mile (RM) 2.8 on Jackfork Creek, a tributary to the Kiamichi River, within the Red River Basin. The damsite is in Pushmataha County, 2.5 miles north of Clayton and 5 miles northwest of Tuskahoma, Oklahoma (Figure 1.1). Approximately 21,713 acres of fee simple land were purchased for the project in addition to 1,487 acres of easement lands to include flowage. The construction of Sardis Lake began in August 1975; the final storage began in January 1983; and the conservation pool was impounded in March 1984.

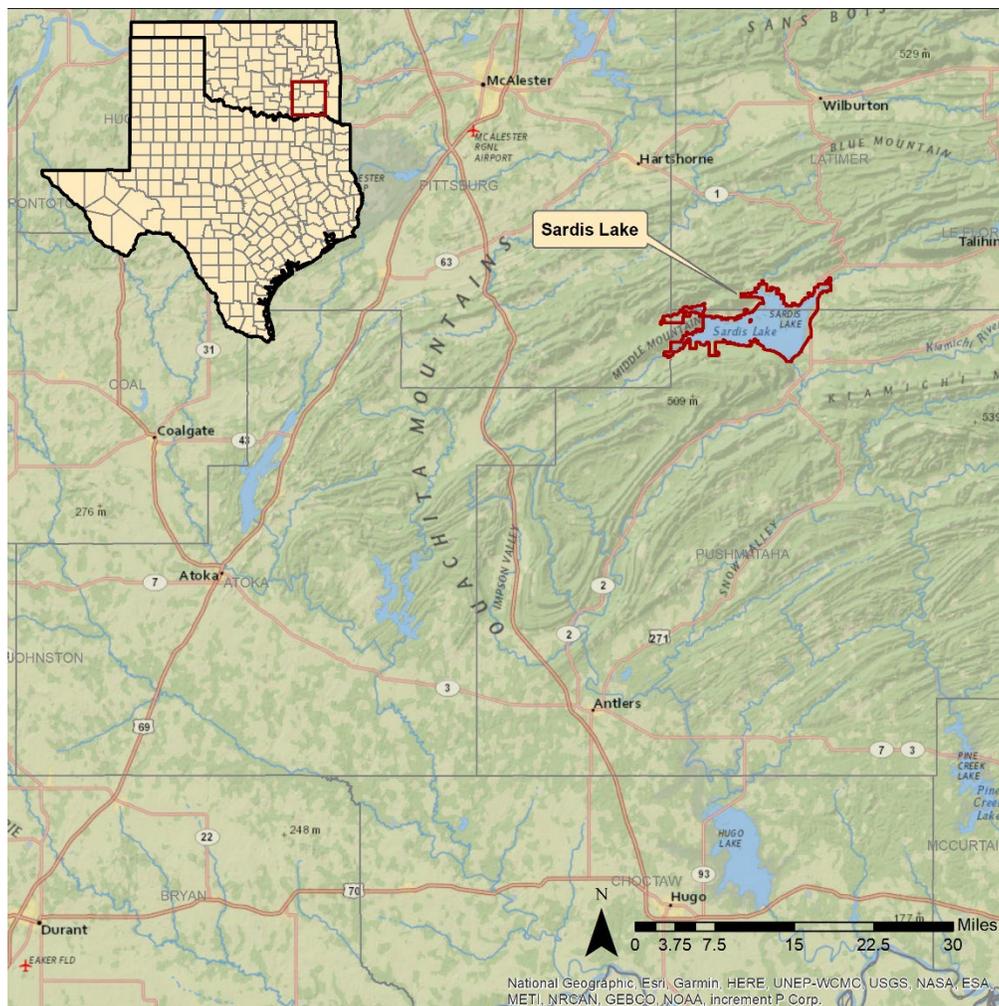


Figure 1-1 Vicinity Map of Sardis Lake and Dam

Sardis Lake is an integral part of the USACE regional plan for flood control and water conservation in the Red River Basin. The total river basin is 1,830 square miles, while the drainage area upstream of Sardis Dam is 275 square miles. The USACE operates and maintains the dam and associated facilities and administers the Federal

lands and flowage easements comprising the project through a combination of direct management and through consultation with local Tribal Nations.

The 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 associated with Sardis Lake as reflected in ER-1130-2-540 change 2 dated July 2005. The Master Plan identifies conceptual types and levels of activities, but does not include designs, project sites, or estimated costs. All actions carried out by the USACE, other agencies, and individuals granted leases to USACE lands must be consistent with the Master Plan. The Plan does not address the flood risk management or water supply purposes of Sardis Lake. The 1975 Sardis Lake Master Plan was written as Design Memorandum No. 20 and last supplemented in 1978, serving well past the intended planning horizon of 25 years. In 1999, USACE discontinued use of the Design Memorandum system as a means of organizing the many phases of civil works projects, therefore, the term "Design Memorandum" is not used in the title of this Master Plan revision.

National USACE missions associated with water resource development projects may include flood risk management, water supply, water quality, navigation, recreation, environmental stewardship 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 stewardship 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 moderate temperatures. To this end, the USACE has developed the following statements.

The USACE Sustainability Policy and Strategic Plan states:

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.

1.2 PROJECT AUTHORIZATION

Sardis Lake, originally named Clayton Lake, was authorized for construction by the Flood Control Act of 1962 (Project Document SD 45, 87th Congress, 2d Session). The project name was changed from Clayton Lake to Sardis Lake by Public Law 97-88 approved December 4, 1981. Public Law 99-88, approved August 15, 1985, authorized access road improvements, and Public Law 98-63, approved July 30, 1983, authorized an intake structure.

1.3 PROJECT PURPOSE

Sardis Lake is a multipurpose water resource project constructed and operated by the USACE. The project was designed to provide flood protection on Jackfork Creek when operated in conjunction with the larger Red River Basin System. Sardis Lake has the following primary authorized purposes:

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

Sardis Lake is an integral component of the larger Red River Basin. In addition to these primary missions, the USACE has an inherent mission for environmental stewardship of project lands while working closely with stakeholders and partners to provide regionally important outdoor recreation opportunities. 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 MASTER PLAN PURPOSE AND SCOPE

In accordance with Engineering Regulation (ER) 1130-2-550 Change 07, dated 30 January 2013 and Engineering 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. The master plan works in tandem with the Operational Management Plan (OMP), which is the task-oriented implementation tool for the resource objectives and development needs identified in the master plan. This revision of the 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 next 25 years.

The *Sardis Lake Master Plan* (hereafter Plan or 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 Sardis Lake project. It is a vital tool for responsible stewardship and sustainability of the project's natural and cultural resources 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 Sardis Lake resources and facilities, and that goals and objectives are accomplished 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 the following four primary components:

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

It is important to note what the Master Plan does not address. Details of design, management and administration, and implementation are not addressed here but are covered in the Sardis Lake OMP. In addition, the Master Plan does not address the specifics of regional water quality, shoreline management (a term used to describe primarily vegetation modification or permits by neighboring landowners), or water level management, nor does it address the operation and maintenance of prime project operations facilities such as the dam embankment, gate control outlet, and spillway. Additionally, the Plan does not address the flood risk management, water supply, or fish and wildlife purposes of Sardis Lake with respect to management of the water level in the lake.

The previous Plan was sufficient for prior land use planning and management, but changes in outdoor recreation trends, regional land use, population, current legislative requirements, and USACE management policy have occurred over the past decades. Additionally, the proximity to Broken Bow Lake, increasing fragmentation of wildlife habitat, national policies related to land management, climate change, and growing demand for recreational access and protection of natural and cultural resources are all factors affecting Sardis Lake and the region in general. In response to these escalating pressures and trends, a full revision of the 1978 Master Plan is required as set forth in this Master Plan. The Master Plan revision updates land classifications and includes new resource management goals and objectives.

1.5 BRIEF WATERSHED AND PROJECT DESCRIPTION

Sardis Lake is located on Jackfork Creek, a tributary of the Kiamichi River in the Red River Basin. The basin is crescent-shaped, 169 miles long, and varies in width from 5 to 30 miles. The total drainage area in the basin is 1,830 square miles, with 275 square miles above Sardis Lake. Elevations in the basin range from about 1,600 feet NGVD29 at the source to about 370 feet NGVD29 at the confluence with the Red River. Hugo Dam on the Kiamichi River is the only significant structure downstream of Sardis Dam. There are no significant structures upstream of Sardis Dam on Jackfork Creek. Sardis Dam consists of a rolled earthfill embankment, one controlled type outlet, an uncontrolled spillway, and supporting facilities. The embankment is approximately 14,138 feet long with a maximum height of 81 feet above the valley floor. The top of the dam, elevation 361.0 feet NGVD29, is 32 feet wide (see section 1.10 for further information). The outlets through the dam consist of a gate tower with two 4.25-by 12.25 foot hydraulically operated wheel gates with two emergency gates and stoplog slots. The uncontrolled spillway is located in the right abutment at the end of the embankment and is 215 feet wide. Sardis Lake is a component of the multiple-purpose Kiamichi River system. The projects of the Kiamichi River system are Hugo and Sardis Lakes (completed), and Tuskahoma Lake (de-authorized on 19 July 1998). This system, in conjunction with other units of the Red River and Little River system, is regulated for the control of floods and other beneficial uses on the Red River and its tributaries in Oklahoma, Arkansas, Texas and Louisiana.

1.6 DESCRIPTION OF RESERVOIR

Based on the Pertinent Data table maintained by the Tulsa District (see Section 1.10), Sardis Lake covers approximately 13,869 surface acres of water when at the top of conservation pool (599.0 NGVD29). The deepest part of the lake is located directly upstream of the dam and is approximately 55 feet deep, while depths gradually decrease further north of the dam. The top of the flood control pool is elevation 607.0 feet NGVD29. At the conservation pool, the lake was designed to accommodate 269,000 acre-feet for water supply.

1.7 PROJECT ACCESS

Sardis Lake is easily accessed by several primary, secondary, and tertiary roads. Oklahoma (OK)-43 runs east to west along the southern edge of the lake just below the dam. OK-43 intersects OK-2 about 0.2 miles north/northeast of the dam, which then runs northward. Sardis Cemetery Road also known as County Road 4190 crosses the west part of the lake before intersecting with OK-43.

1.8 PRIOR DESIGN MEMORANDA AND PLANNING REPORTS

Design Memoranda (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 prior to

1999, when the use of DMs was terminated. The *Master Plan, Sardis Lake, Jackfork Creek, Oklahoma*, dated June 1978, presents a program for development and management of the Sardis Lake area for recreation and other land and water uses. The following are DMs for Sardis Lake:

- Design Memorandum No. 1 Hydrology – Part I, July 1969
- Design Memorandum No. 2 Hydrology – Part II, February 1972
- Design Memorandum No. 3, General Design, October 1972
- Revisions of Design Memorandum No. 3, May 1973 and December 1973
- Design Memorandum No. 4 Land Requirements Plan, Public Use, August 1973
- Design Memorandum No. 5 Real Estate for Damsite, Public Use Areas, Part of Lake Area, and Access Roads, October 1973
- Design Memorandum No. 5A Real Estate for Remainder of Lake and Public Use Areas, December 1974
- Design Memorandum No. 5B Real Estate – State Highway 2, March 1976
- Design Memorandum No. 5C Real Estate – Pushmataha County Roads, August 1976
- Design Memorandum No. 5D Real Estate – Latimer County Roads, July 1976
- Design Memorandum No. 7 Embankment, January 1973
- Design Memorandum No. 8 Outlet Works, June 1975
- Design Memorandum No. 9 Construction Materials (Concrete Aggregates), June 1972
- Design Memorandum No. 10 Relocation – Public Service Co. Facilities, March 1974
- Design Memorandum No. 11 Relocation – Kiamichi Electric Coop. Facilities, August 1974
- Design Memorandum No. 12 Relocation – Western Telephone Co. Facilities, September 1974
- Design Memorandum No. 13 Relocation – Rural Water District No. 1 Facilities, March 1975
- Design Memorandum No. 14 Instrumentation and Inspection, April 1974
- Design Memorandum No. 15 Sedimentation and Degradation Ranges, May 1975
- Design Memorandum No. 16 Relocation – Oklahoma State Highway 2, March 1976
- Design Memorandum No. 17 Relocation – Pushmataha County Roads, June 1976
- Design Memorandum No. 18 Relocation of Latimer County Roads, June 1976
- Design Memorandum No. 19 Clearing (Revised), March 1979
- Design Memorandum No. 20 Master Plan, May 1975 (Revised May 1977, June 1978)
 - Supplement No. 1 (Recreation Changes), December 1978
 - Supplement No. 2 (Fencing Plan), June 1979
 - Supplement No. 3 (Land Classification Change), June 1982
 - Supplement No. 4 (Yanush Landing), June 1986
 - Supplement No. 5 (Public Use Plan Revision), July 1989

- Supplement No. 6 (Public Use Area Site Plan Update), August 1990
- Supplement No. 7 (Playground Equipment), July 1991
- Design Memorandum No. 21 Aggradation of Sardis Cemetery, September 1979
- Design Memorandum No. 22 Relocation of Private Cemetery No. 2 (Indian) and Private Cemetery No. 17 (Hotubbee) (No date of approval)
- Design Memorandum No. 23 Relocation of Remaining Private Cemeteries (No date of approval)
- Design Memorandum No. 24 Initial Filling Plan, June 1982

1.9 PUBLIC LAWS

The following Public Laws (PL) are applicable to Sardis Lake. Additional information on Federal Statutes applicable to Sardis can be found in the Environmental Assessment for the Sardis Lake Master Plan revision in Appendix B of this Plan.

- Flood Control Act of 1944, Section 4 PL 78-534 of this act as last amended in 1962 by Section 207 of Public Law 87-874 authorizes the 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.
- River and Harbor Act of 1946, PL 79-525. This act authorizes the construction, repair, and preservation of certain public works on rivers and harbors for navigation, flood control, and for other purposes.
- Flood Control Act of 1946, PL 79-526. 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 Sardis Lake. This law amends PL 78-534 to include authority to grant leases to non-profit organizations at recreational facilities in reservoir areas at reduced or nominal fees.
- Flood Control Act of 1954, PL 83-780. 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.
- Fish and Wildlife Coordination Act 1958, PL 85-624. 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.

- Rivers and Harbors Act of 1962, PL 87-874. This act authorizes the construction, repair, and preservation of certain public works on rivers and harbors for navigation, flood control, and for other purposes.
- Historic Preservation Act of 1966, PL 89-665. 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.
- River and Harbor and Flood Control Act of 1968, PL 90-483. 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.
- National Environmental Policy Act of 1969 (NEPA), PL 91-190. 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.
- River and Harbor and Flood Control Act of 1970, PL 91-611. 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.
- The Water Resources Development Act (WRDA) 1986, PL 99-662. This act provides for the conservation and development of water and related resources and the improvement and rehabilitation of the Nation's water resources infrastructure and establishes new requirements for cost sharing.
- WRDA 1996, PL 104-303. 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.

1.10 PERTINENT PROJECT INFORMATION

Table 1.1 provides pertinent information regarding key reservoir elevations and storage capacity a Sardis Lake.

Table 1.1 Sardis Lake Pertinent Data

Feature	Elevation (feet)	Area (acres)	Capacity (acre-feet)	Equivalent Runoff ⁽¹⁾ (inches)
Top of Dam	631.0	25,991	894,139	60.96
Maximum Pool	624.0	23,688	744,805	50.78
Surcharge	609.0	17,820	432,007	29.46
Top of Flood Control Pool	607.0	17,037	397,022	27.07
Flood Control Storage	599.0-607.0	-	128,022	8.73
Top of Conservation Pool	599.0	13,468 ⁽³⁾	269,000	18.34
Conservation Storage ⁽²⁾	542.0-599.0	-	268,960	18.34
Top of Inactive Pool	542.0	31	40	0.003

⁽¹⁾ Drainage area is 275 square miles.

⁽²⁾ 100% of the conservation pool is to be used for water supply (yield 140mgd after sedimentation with an associated storage of 297,200 acre-feet.)

⁽³⁾ 13,468 acres of water surface differs from the 2023 water surface acres of 13,869 due to the use of GIS measurement technology used for the revision.

CHAPTER 2 – PROJECT SETTING AND FACTORS INFLUENCING MANAGEMENT AND DEVELOPMENT PHYSIOGRAPHIC SETTING

2.1 ECOREGION OVERVIEW

Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and quantity 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. Sardis Lake and its watershed are located in the Level III Ouachita Mountains ecoregions as illustrated in Figure 2.1 (EPA 2021).

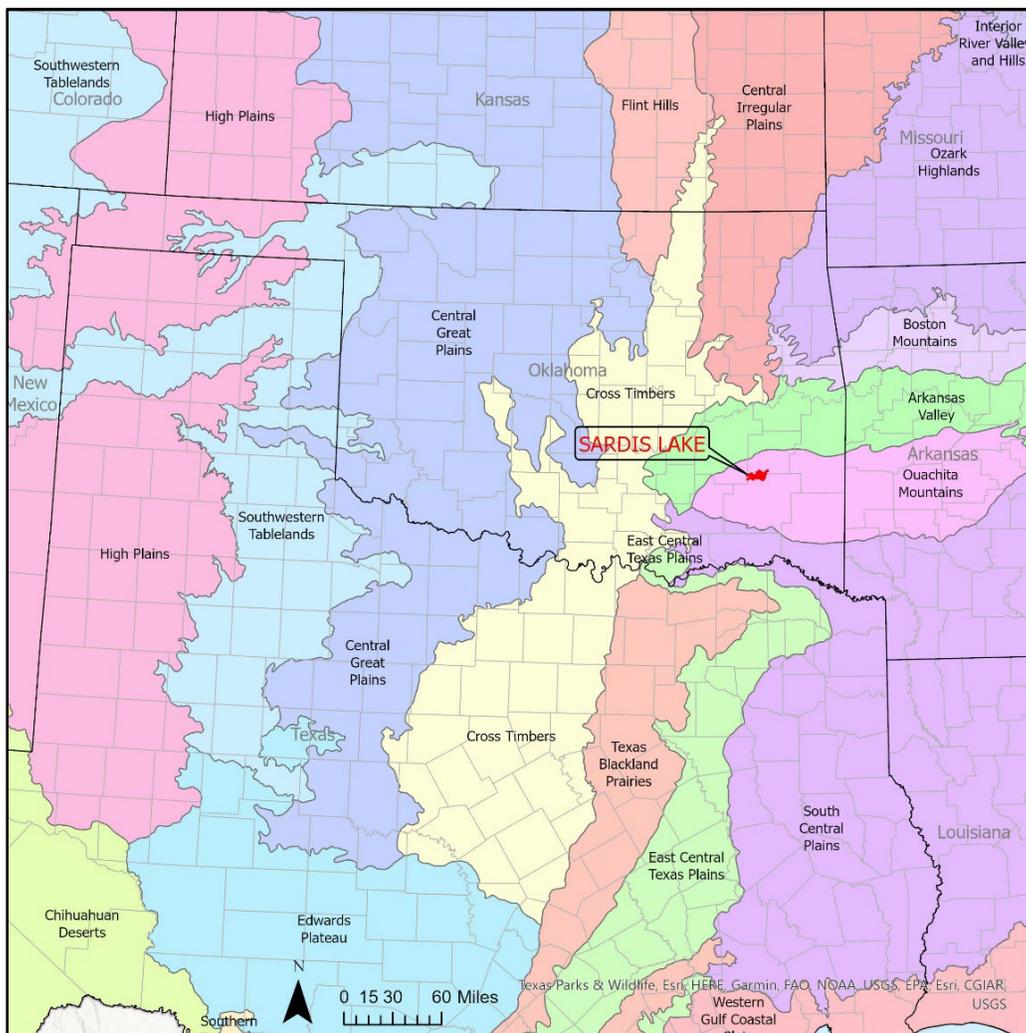


Figure 2-1 Sardis Lake within Oklahoma Ecoregions
Source: EPA (2021)

The Ouachita Mountains ecoregion vegetation is predominantly oak-hickory-pine forest. The common tree species are loblolly pine (*Pinus taeda*), shortleaf pine (*Pinus echinate*), southern red oak (*Quercus falcata*), scarlet oak (*Quercus coccinea*), black oak (*Quercus ellipsoidalis*), post oak (*Quercus stellata*), blackjack oak (*Quercus marilandica*), white oak (*Quercus alba*), pignut hickory (*Carya glabra*), and mockernut hickory (*Carya tomentosa*). What prairies exist are typically confined to managed lands like parks and wildlife management areas, as areas outside of those units had typically evolved into pastures and forests. Bottomland forests and wetlands typically occur in poorly drained areas.

2.2 CLIMATE

Sardis Lake lies in the southeast part of the state of Oklahoma. The region is characterized by moderate winters and long, humid summers with high temperatures. Rainfall usually occurs as high intensity, local thunderstorms occurring primarily in the late spring and early fall months. These storms are frequently accompanied by high winds, hail, and occasional tornadoes. The mean annual temperature in nearby Tuskahoma, Oklahoma (the nearest NOAA weather station) is about 61.1 degrees Fahrenheit (°F) (NOAA, 2021A). January, the coldest month, has an average temperature of 40.2°F and average minimum daily temperature of about 28.5°F. July has the highest average daily temperature of 79.2°F, and August has the highest average maximum daily temperature of 93.3°F (NOAA, 2020). The average length of the growing season is 220 days (NOAA, 2021B). Sardis Lake lies within the USDA Plant Hardiness Zone 7A, which is determined by the winter extreme low temperatures, with 7b having normal winter lows between 5°F and 10°F (USDA, 2021).

The normal annual precipitation is 51.8 inches with greater precipitation during spring and less precipitation during winter (NOAA, 2023A). The highest annual precipitation recorded since 1970 was in 1990 at 88.27 inches, whereas the lowest annual precipitation recorded in the area since 2000 was in 2005, at 26.47 inches (NOAA, 2023A). The average monthly climate data is presented in Figure 2.2, which includes the average precipitation each month and the average minimum, maximum, and daily average for each month.

Monthly Climate Normals (1991–2020) – TUSKAHOMA, OK

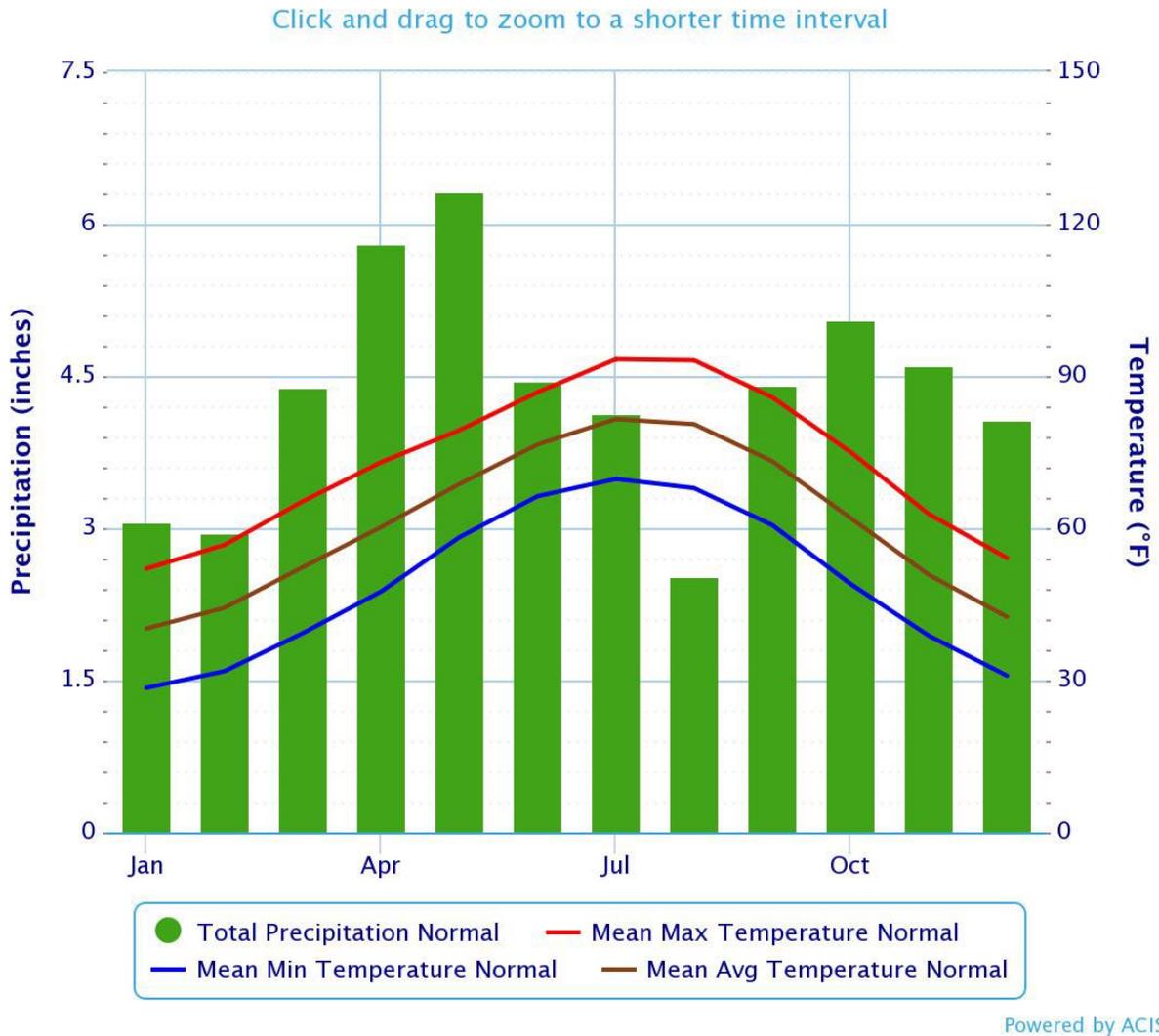


Figure 2-2 Average Monthly Climate Tuskahoma, Oklahoma, 1991 – 2020
Source: NOAA, 2023B.

2.3 CLIMATE CHANGE AND GREENHOUSE GASSES (GHG)

The U.S. Global Change Research Program (USGCRP) looks at potential impacts of climate change globally, nationally, regionally, and by resource (e.g., water resources, ecosystems, human health). Sardis Lake area lies within the Southern Great Plains region of analysis, which covers Texas, Oklahoma, and Kansas. The Southern Great Plains region has already seen evidence of climate change in the form of rising temperatures that are leading to increased demand for water and energy and impacts on agricultural practices. Over the last few decades, the Southern Great Plains has seen fewer cold days in winter and more hot days in summer, as well as changes to precipitation patterns. The decrease in the cold days has resulted in an overall increase of the frost-free season. Within this region, there has been an increase in average

temperatures 1° – 2° Fahrenheit (F) since 1901 (Kloesel et al., 2018). The changing precipitation patterns in the region has led to more frequent extreme droughts, storms, and flood events. If the current rate of greenhouse gas (GHG) emissions continues, the potential increase will be much higher by 2100. 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.” The effects of climate change and mitigation efforts are evolving, and Sardis Lake and all federally owned property will be managed to comply with laws and executive orders to respond to the growing threat of climate change.

2.4 AIR QUALITY

The U.S. Environmental Protection Agency (EPA) established nationwide air quality standards to protect public health and welfare in 1971. The Air Quality Division of the Oklahoma Department of Environmental Quality (DEQ) has adopted the National Ambient Air Quality Standards (NAAQS) as the state’s air quality criteria. NAAQS standards specify maximum permissible short- and long-term concentrations of various air contaminants including primary and secondary standards for six criteria pollutants: Ozone (O₃), Carbon Monoxide (CO), Sulfur Dioxide (SO₂), Nitrogen Oxides (NO_x), particulate matter (PM₁₀ and PM_{2.5}), and Lead (Pb). If the concentrations of one or more criteria pollutants in a geographic area is found to exceed the regulated “threshold” level for one or more of the NAAQS, the area may be classified as a non-attainment area. Areas with concentrations that are below the established NAAQS levels are considered either attainment or unclassifiable area. There are currently no non-attainment areas for any monitored pollutants in the State of Oklahoma including the counties around Sardis Lake (DEQ, 2021).

2.5 TOPOGRAPHY, GEOLOGY, AND SOILS

2.5.1 Geology

Lying within the Fourche-Kiamichi belt of the Ouachita Mountains, the federal land at Sardis Lake, is characterized by high, rugged mountains with very shallow soil cover. The rock is mostly shale and sandstone with some limestone. The bedrock of the area is formed of the Stanley shale and Jackfork formations of the Mississippian age, characterized by predominance of quartzitic sandstone with interbedded shale. Fossil remains in the area are negligible. The ridges are composed mainly of the hard Jackfork sandstone. The valleys have been eroded into the Stanley shale. The soil is generally lean clay and clayey, silty sand and gravel. Overburden depth varies from practically none in the upper parts of the mountains to 60 feet in the lower part of the basin.

2.5.2 Topography

Based on its location in the foothills of the Jackfork Creek Mountains, which are a part of the Rugged Ouachita Mountain system in southeastern Oklahoma, federally owned lands at Sardis Lake contains a variety of terrain. The areas to the east tend to

be flatter and have been widely cleared for pasture with a small amount of cultivation. The southern and western sections have steeper terrain, with the ridges rising sharply above the valley to the south in contrast to the gentler slopes to the north.

2.5.3 Soils

The National Resources Conservation Service NRCS Web Soil Survey (NRCS 2022) reports 58 soil types occurring within Sardis Lake project lands. Table 2.1 lists the acreage and farmland status associated with each soil and surface type in the detention area while Figure 2.3 shows the location of the soils.

The main soil series within Sardis Lake Project Lands is the Tuskahoma-Clebit-Sobol association, 8 to 12 percent slopes. Of the 58 soil types at Sardis Lake, this soil association makes up 12.99 percent of soils found and is not a prime farmland soil. This soil series is shallow to moderately deep, well drained, very slowly to moderately rapidly permeable soils over hard sandstone that is tilted about 40 degrees from horizontal.

Table 2.1 Acres of Surface Soil Types within Sardis Lake Project Lands

Soil Type	Number of Acres	Percent Total	Farmland Status
Alikchi loam, 1 to 3 percent slopes	88.80	1.12%	All Areas are Prime Farmland
Alikchi silt loam, 0 to 2 percent slopes, deep	88.40	1.12%	All Areas are Prime Farmland
Bengal-Clebit-Clearview complex, 5 to 30 percent slopes	100.90	1.28%	Not Prime Farmland
Bigfork-Yanush association, 20 to 45 percent slopes, rocky	2.30	0.03%	Not Prime Farmland
Carnasaw-Clebit association, 8 to 30 percent slopes	36.00	0.46%	Not Prime Farmland
Carnasaw-Pirum-Clebit association, 12 to 20 percent slopes, dry	405.10	5.13%	Not Prime Farmland
Ceda gravelly fine sandy loam, 0 to 2 percent slopes, frequently flooded	88.70	1.12%	Not Prime Farmland
Ceda gravelly loam, 0 to 2 percent slopes, occasionally flooded	3.90	0.05%	Not Prime Farmland
Ceda-Rubble land complex, 0 to 3 percent slopes, frequently flooded	9.80	0.12%	Not Prime Farmland
Clearview fine sandy loam, 1 to 3 percent slopes	23.40	0.30%	All Areas are Prime Farmland
Clearview fine sandy loam, 3 to 5 percent slopes	0.10	0.00%	All Areas are Prime Farmland
Clearview fine sandy loam, 3 to 5 percent slopes, eroded	8.10	0.10%	Not Prime Farmland
Clebit-Clearview complex, 3 to 5 percent slopes	7.40	0.09%	Not Prime Farmland
Clebit-Pirum-Carnasaw association, 20 to 45 percent slopes, dry	320.80	4.06%	Not Prime Farmland

Soil Type	Number of Acres	Percent Total	Farmland Status
Clodine variant-Wilburton variant complex, 0 to 3 percent slopes	4.80	0.06%	Not Prime Farmland
Counts loam, 0 to 1 percent slopes	24.10	0.30%	All Areas are Prime Farmland
Counts-Wing complex, 1 to 3 percent slopes	15.30	0.19%	All Areas are Prime Farmland
Cupco silt loam, 0 to 1 percent slopes, occasionally flooded	39.60	0.50%	All Areas are Prime Farmland
Dela fine sandy loam, 0 to 1 percent slopes, occasionally flooded	106.40	1.35%	All Areas are Prime Farmland
Dela fine sandy loam, 0 to 2 percent slopes, frequently flooded	201.20	2.55%	Not Prime Farmland
Dela fine sandy loam, 0 to 2 percent slopes, occasionally flooded	14.70	0.19%	All Areas are Prime Farmland
Denman-Carnasaw association, 8 to 30 percent slopes	5.60	0.07%	Not Prime Farmland
Guyton silt loam, 0 to 1 percent slopes, occasionally flooded	234.50	2.97%	Not Prime Farmland
Guyton-Elysian complex, 0 to 3 percent slopes	4.10	0.05%	Not Prime Farmland
Moyers-Burwell complex, 1 to 3 percent slopes	50.50	0.64%	All Areas are Prime Farmland
Moyers-Burwell complex, 3 to 5 percent slopes	30.60	0.39%	All Areas are Prime Farmland
Neff and Rexor soils, 0 to 1 percent slopes, frequently flooded	216.80	2.74%	Not Prime Farmland
Neff silt loam, 0 to 1 percent slopes, occasionally flooded	217.80	2.76%	Not Prime Farmland
Octavia-Carnasaw-Clebit association, 30 to 45 percent slopes, cool	140.20	1.77%	Not Prime Farmland
Pirum-Carnasaw-Panama association, 12 to 25 percent slopes	23.90	0.30%	Not Prime Farmland
Pushmataha loam, 0 to 1 percent slopes, occasionally flooded	119.70	1.51%	Not Prime Farmland
Pushmataha silt loam, 0 to 2 percent slopes, occasionally flooded	92.60	1.17%	Not Prime Farmland
Pushmataha, Elysian, and Guyton soils, 0 to 3 percent slopes	158.30	2.00%	Not Prime Farmland
Rexor and Verdigris soils, 0 to 1 percent slopes, frequently flooded	64.20	0.81%	Not Prime Farmland
Rexor loam, 0 to 1 percent slopes, occasionally flooded	6.70	0.08%	All Areas are Prime Farmland
Rexor silt loam, 0 to 1 percent slopes, occasionally flooded	106.70	1.35%	All Areas are Prime Farmland
Sallisaw loam, 1 to 3 percent slopes	18.20	0.23%	All Areas are Prime Farmland

Soil Type	Number of Acres	Percent Total	Farmland Status
Shermore fine sandy loam, 1 to 3 percent slopes	164.10	2.08%	Not Prime Farmland
Shermore fine sandy loam, 3 to 5 percent slopes	135.70	1.72%	Not Prime Farmland
Sherwood-Zafra association, 3 to 5 percent slopes	256.40	3.24%	All Areas are Prime Farmland
Sherwood-Zafra association, 5 to 12 percent slopes	193.30	2.45%	Not Prime Farmland
Sobol clay loam, 3 to 5 percent slopes	256.70	3.25%	All Areas are Prime Farmland
Sobol-Tuskahoma association, 8 to 12 percent slopes	443.20	5.61%	Not Prime Farmland
Speer loam, 1 to 3 percent slopes, rarely flooded	13.40	0.17%	All Areas are Prime Farmland
Stigler silt loam, 0 to 1 percent slopes	14.60	0.18%	All Areas are Prime Farmland
Tuskahoma-Clebit-Sobol association, 8 to 12 percent slopes	1,026.80	12.99%	Not Prime Farmland
Tuskahoma-Sobol complex, 3 to 8 percent slopes	298.00	3.77%	Not Prime Farmland
Tuskahoma-Sobol complex, 8 to 20 percent slopes	405.70	5.13%	Not Prime Farmland
Wetsaw-Bernow variant complex, 0 to 2 percent slopes	154.50	1.95%	Not Prime Farmland
Wilburton cobbly loam, 3 to 8 percent slopes	76.30	0.97%	Not Prime Farmland
Wilburton cobbly loam, 8 to 20 percent slopes	1.00	0.01%	Not Prime Farmland
Wister silt loam, 1 to 3 percent slopes	270.00	3.42%	Not Prime Farmland
Wister-Burwell complex, 0 to 1 percent slopes	116.40	1.47%	Not Prime Farmland
Wister-Burwell complex, 1 to 3 percent slopes	119.40	1.51%	Not Prime Farmland
Yanush gravelly silt loam, 1 to 3 percent slopes	124.40	1.57%	All Areas are Prime Farmland
Yanush gravelly silt loam, 3 to 8 percent slopes	365.10	4.62%	Not Prime Farmland
Yanush gravelly silt loam, 5 to 20 percent slopes	344.00	4.35%	Not Prime Farmland
Yanush-Sobol complex, 5 to 20 percent slopes	44.00	0.56%	Not Prime Farmland
Total Acres	7,903.20		

Source: Soil Classes (NCRS, 2022)

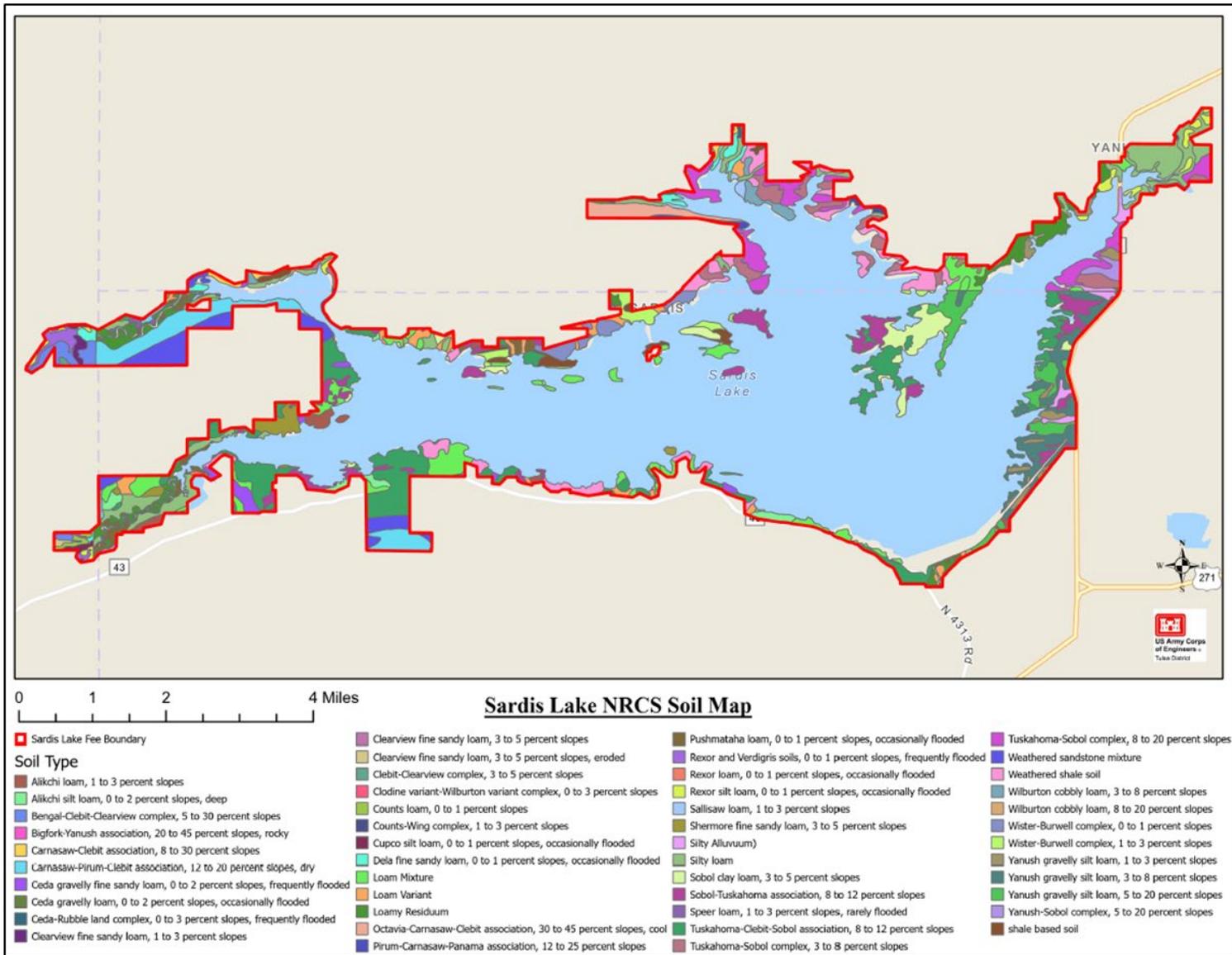


Figure 2-3 Sardis Lake NRCS Soil Map

2.5.4 Prime Farmland

As required by Section 1541(b) of the Farmland Protection Policy Act (FPPA) of 1980 and 1995, 7 U.S.C. 4202(b), federal and state agencies, as well as projects funded with federal funds, are required to (a) use the criteria to identify and take into account the adverse effects of their programs on the preservation of farmland, (b) consider alternative actions, as appropriate, that could lessen adverse effects, and (c) ensure that their programs, to the extent practicable, are compatible with state and units of local government and private programs and policies to protect farmland.

There are several soil types in the study area that are considered prime farmland soils or soils associated with farmlands of state importance. However, the lands represented by these soil types have not been used for farming since the lands were acquired prior to the initiation of construction of Sardis Lake in August 1975.

2.6 WATER RESOURCES

2.6.1 Surface Water

Jackfork Creek rises in the Kiamichi Mountains in northwestern Pushmataha County and flows in a northeasterly direction through the southeastern corner of Pittsburg County, then in an easterly direction back into Pushmataha County to its junction with North Jackfork Creek and on east to its junction with Anderson Creek. Jackfork Creek then flows in a southeasterly direction to its confluence with Buffalo Creek and then in a more southerly direction to its confluence with the Kiamichi River. Jackfork Creek is a right bank tributary of the Kiamichi River, entering the river about 104.4 miles above the mouth. The total drainage area of the Jackfork Creek basin is 280 square miles, with 275 square miles above Sardis Lake. The drainage area above the lake is roughly fan-shaped, with a length of about 28 miles in a northwesterly direction and about 11 miles in both a northerly and a northeasterly direction. The length of the stream above the dam site is about 34 miles and the weighted slope is about 6.3 feet per mile. The slope varies from about 4.2 feet per mile near the dam site to more than 100 feet per mile at the source of the creek. Elevations in the basin vary from about 2,100 feet in the mountains near the source of Buffalo Creek to about 530 feet near the dam site. The Jackfork Creek Basin is located in the rugged Kiamichi Mountain area, with cultivation generally confined to valley portions near the stream.

2.6.2 Wetlands

Wetlands are those areas inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions, and under normal circumstances these wetlands do support this vegetation type. 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), which are defined within the Clean Water Act (CWA). Jurisdiction for these waters is addressed with the USACE and EPA.

Typically, the National Wetlands Inventory (NWI) established by US Fish and Wildlife Service (USFWS) is used to identify wetland types in a USACE water resource project area. However, the available dataset for the Sardis project area was mapped prior to impoundment and does not reflect the current conditions. Therefore, the NWI was not used to identify and calculate wetland acreage with the fee boundary of the project. Instead, the Oklahoma Ecological System Mapping (ESM) developed by Oklahoma Department of Wildlife Conservation (ODWC) was used (ODWC, 2022). Using the ODWC ESM mapping, wetlands are delineated as swamps and the lake is shown as open water. Table 2.2 quantifies the number of acres per wetland type and Figure 2.4 displays the ecological habitat types at Sardis Lake based on ESM including wetland habitat types.

Table 2.2 Total Acres of Wetland and Open Water at Sardis Lake

Wetland Types	Acres
Bottomland Herbaceous Wetland	24.00
Herbaceous Wetland	25.00
*Open Water	13,787.00
Riparian Herbaceous Wetland	2.00
Total Acres of Wetlands	13,838.00

*These totals are based on EMS calculations and differ from the official or calculated acres reflected in other parts of this document.

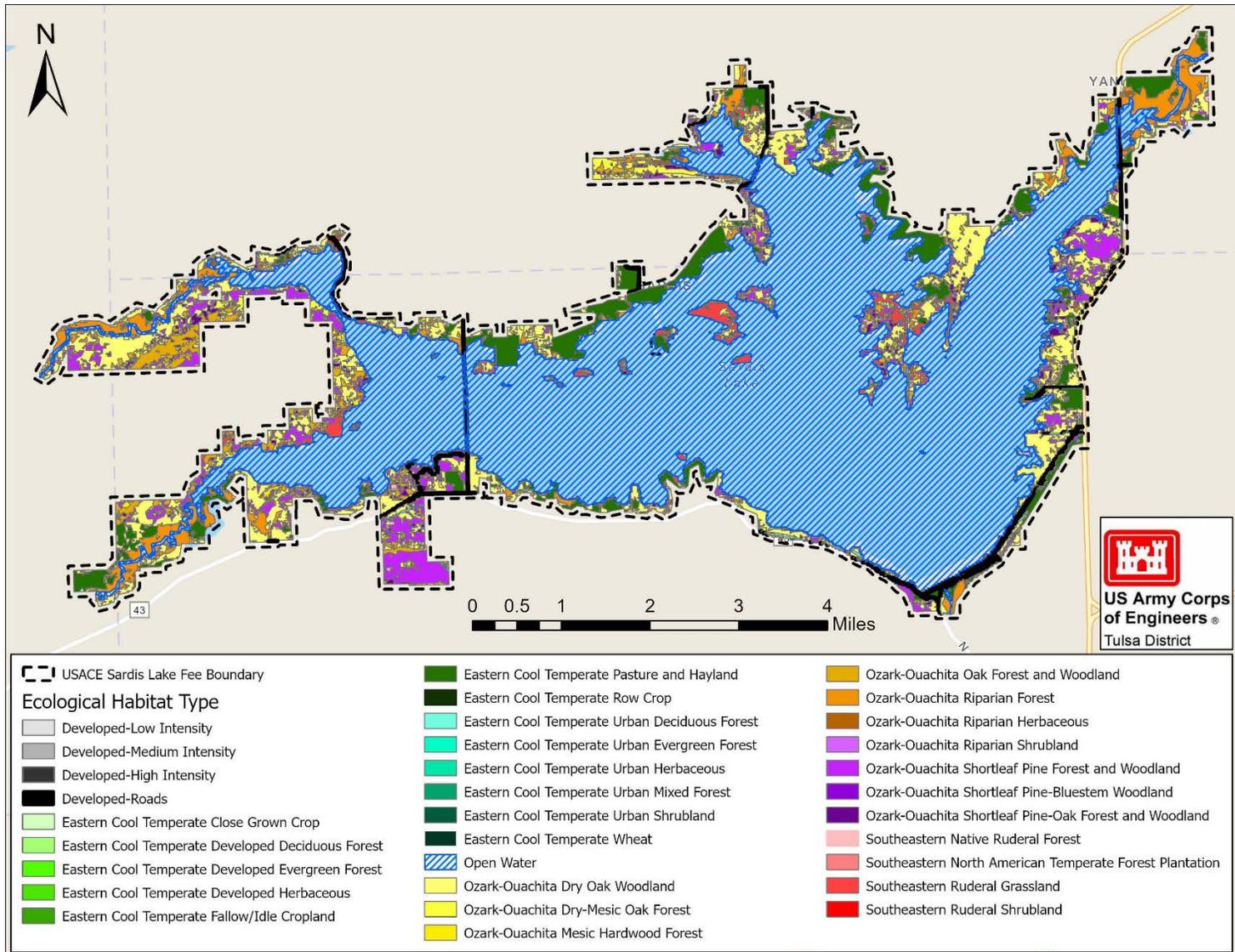


Figure 2-4 Ecological Habitat Types at Sardis Lake

2.6.3 Groundwater

While no major aquifers are found within Sardis Lake federal fee boundary, the Kiamichi Minor Bedrock Aquifer lies deep below the lake. The Kiamichi Minor Bedrock Aquifer stores roughly 3.4M acre-feet of water (OWRB, 2001) and covers an area of 3.02M acres. The overall water quality is suitable for municipal use.

2.6.4 Hydrology

Surface waters are categorized by hydrologic units. Hydrologic units are classified by the United States Geologic Survey (USGS) using a Hydrologic Units Code (HUC) system. The units are classified from largest HUC with a two-digit region (i.e., the Arkansas-White-Red Region), encompassing the largest area, to a twelve-digit sub-watershed HUC. Sardis Lake is classified by sub-watersheds as follows:

- 11 (HUC 2: Region) – Arkansas-White-Red Region
- 1114 (HUC 4: Sub-region) – Red-Sulphur
- 111401 (HUC 6: Basin) – Red-Little
- 11140105 (HUC 8: Sub Basin) – Kiamichi
- 1114010502 (HUC 10: Watershed) – Sardis
- 111401050203 (HUC 12: Sub-watershed) – North Jackfork Creek
- 111401050204 (HUC 12: Sub-watershed) – Jackfork Creek
- 111401050205 (HUC 12: Sub-watershed) – West Fort Anderson Creek
- 111401050208 (HUC 12: Sub-watershed) – Middle Buffalo Creek

The hydrology within the basin is greatly affected by major storms. Most major storms in the Sardis Lake drainage basin occur from April through June and September through November. Thunderstorms and the remnants of hurricanes are the type of storms that produce most high runoff events in the basin. Major factors that determine the amount of runoff from a given storm include time of year and soil moisture conditions. Thus, some lesser storm events can result in runoff as great as or greater than storms of higher precipitation. Generally, the storms common to the drainage basin are not of uniform intensity.

As previously stated, Sardis Lake is an integral part of the USACE plan for flood control and water conservation in the Red River Basin and currently consists of the following major flood control projects, Texoma, Altus, Fort Cobb, Foss, De Queen, Pine Creek, Broken Bow, Millwood, Arbuckle, Pat Mayse, Hugo, Lake Kemp, Mountain Park, Tom Steed, and Waurika. The total river basin is 92,600 square miles within the USACE Red River flood control and water conservation plan, while the drainage area upstream of Sardis Dam is 275 square miles. USACE operates and maintains the dam and associated facilities and administers the Federal lands and flowage easements comprising the project through direct management for park and recreation purposes.

2.6.5 Water Quality

Oklahoma Department of Environmental Quality (DEQ) 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 for the water body. The Water Quality in Oklahoma 2022 Integrated Report, which is a requirement of the Federal Clean Water Act Sections 305(b) and 303(d), evaluates the quality of surface waters in Oklahoma and identifies those that do not meet uses and criteria defined in the Oklahoma Water Quality Standards (WQS). The Oklahoma 2022 Integrated Report describes the status of Oklahoma natural waters based on historical data and assigns waterways to various categories depending on the extent to which they attain the WQS (DEQ, 2022).

Existing water quality within Sardis Lake is affected by rainfall and associated stormwater flows originating from residential, commercial, and industrial point and nonpoint sources from properties upstream of the dam and reservoir. These stormwater flows have increased over time as a result of increased urbanization, development, and climate change. The Oklahoma 2022 Integrated Report-303(d) List of Impaired Waters lists the entire Sardis Lake as exceeding WQS for pH, mercury, and turbidity (DEQ, 2022).

As of January 23, 2023, a fish consumption advisory exists for Sardis Lake, due to mercury found in fish tissue samples. Fish under this advisory include channel catfish, flathead catfish, largemouth bass, and spotted bass (DEQ, 2022). The advisory warnings range from consumption is not recommended for sensitive populations to two meals per month for certain lengths, depending on fish species. Sensitive populations are women of child-bearing age, pregnant or nursing mothers, and children up to age 15.

2.7 HAZARDOUS MATERIALS AND SOLID WASTE

There are no hazardous or solid waste advisories for Sardis Lake. However, DEQ has issued chemical contaminant advisories for Sardis Lake and recommends that persons should limit their consumption of certain species as explained in Section 2.6.5 of the Master Plan (DEQ, 2021B). The chemical contaminant of concern is mercury.

2.8 HEALTH AND SAFETY

Sardis Lake's authorized purposes include flood control, water supply, recreation, and fish and wildlife. Compatible uses incorporated in project operation management plans include conservation and fish and wildlife habitat management components. The USACE, with some assistance from the Oklahoma Highway Patrol, ODWC, and USFWS, has established public outreach programs to educate the public on water safety and conservation of natural resources. In addition to the water safety outreach programs, the project has established recreation management practices to protect the public. These include safe boating and swimming regulations, and speed limit and

pedestrian signs for park roads. Sardis Lake also has solid waste management plans in place for camping and day use areas that are maintained by the USACE.

2.9 ECOREGION AND NATURAL RESOURCE ANALYSIS

2.9.1 Natural Resources

The Texas Parks and Wildlife Division (TPWD) Wildlife Habitat Assessment Protocol (WHAP) was used to assist in the preparation of the Master Plan. This WHAP assessment was developed to allow a qualitative, holistic evaluation of wildlife habitat for particular tracts of land and measures key components that contribute to the ecological condition of the evaluated point and resulting overall suitability for wildlife.

The assessment was conducted May 23-27, 2022 at Sardis Lake by an interdisciplinary USACE team consisting of USACE biologists and park rangers. Twenty-six WHAP survey point locations were selected and surveyed based on areas believed or known to have representative habitat types and features based on aerial imagery from existing GIS data as well as from local knowledge of the area. The purpose of the survey was to quickly assess wildlife habitat quality within the USACE Sardis Lake fee-owned property. The highest score a site can receive is 1.00 while the lowest is 0.03, while a score of 0 represents a site skipped and not incorporated into the report calculations. The scores are not species dependent but rather diversity dependent. The data gathered from this survey helped to quantifiably describe the general habitat characteristics and identify unique/high quality areas found within USACE Sardis Lake Fee Boundary. This data helped with revising the land classification based on what areas needed the most protection. Three major habitat types were selected and assessed at Sardis Lake and include grassland, riparian/bottomland hardwood forests (BHF), and upland forests.

The two most abundant habitat types surveyed for the WHAP were upland forests and riparian/bottomland hardwood forest. 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. These habitat types had the highest average scores, with average total scores within 1 point of each other. This reflects how normalizing efforts on the data has helped to evaluate sites on an even scoring basis. It was further determined that the area southwest of Potato Hills South has high quality habitat based on the scores calculated from the WHAP habitat assessment, with some of the highest scoring habitats. The WHAP assessment report can be found in Appendix C of this Plan.

2.9.2 Vegetation Resources

Sardis Lake lies within the Ouachita Mountains ecoregion (Level IV). This ecoregion vegetation is predominantly of an oak-hickory-pine forest type. It is characterized by oak–hickory–shortleaf pine forest covered mountains and steep stream gradients. As stated previously, the common tree species are loblolly pine (*Pinus taeda*), shortleaf pine (*Pinus echinate*), southern red oak (*Quercus falcata*),

scarlet oak (*Quercus coccinea*), black oak (*Quercus ellipsoidalis*), post oak (*Quercus stellata*), blackjack oak (*Quercus marilandica*), white oak (*Quercus alba*), pignut hickory (*Carya glabra*), and mockernut hickory (*Carya tomentosa*). What prairies exist are typically confined to managed lands like parks and wildlife management areas, as areas outside of those units had typically evolved into pastures and forests. Bottomland forests and wetlands typically occur in poorly drained areas.

This region like so many other ecological regions in Oklahoma has undergone significant changes in the past 150 years. Although habitat for wildlife is present throughout the ecological regions as a whole, populations vary considerably within sub-regions. The diversity and configuration of the plant communities on the landscape influence wildlife populations. Other factors include fragmentation of once continuous habitat into smaller land holdings; competition for food and cover with livestock; conversion of woodland habitat to improved pastures, or urban and rural developments; and lack of proper wildlife and habitat management.

2.10 FISHERIES AND WILDLIFE RESOURCES

Sardis Lake provides habitat for an abundance of fish and wildlife species. Predominant fish species in the lake are largemouth bass (*Micropterus salmoides*), white bass (*Morone chrysops*), channel catfish (*Ictalurus punctatus*), blue catfish (*Ictalurus furcatus*), flathead catfish (*Pylodictis olivaris*), white crappie (*Pomoxis annularis*), black crappie (*Pomoxis nigromaculatus*), walleye (*Sander vitreus*), and bluegill (*Lepomis macrochirus*). Although not sport fish, smaller fish are the most abundant fish in Sardis Lake.

Many of the undeveloped open spaces provide habitat for wildlife including white tail deer (*Odocoileus virginianus*), black bear (*Ursus americanus*), coyotes (*Canis latrans*), bobcats (*Lynx rufus*), eastern cottontail rabbit (*Sylvilagus floridanus*), fox squirrel (*Sciurus niger*), grey squirrel (*Sciurus carolinensis*), possum (*Didelphis virginiana*), nine-banded armadillo (*Dasypus novemcinctus*), striped skunks (*Mephitis mephitis*), raccoons (*Procyon lotor*), beavers (*Castor canadensis*) and wild boar (*Sus scrofa*). The area also provides habitat for a diverse range of birds including eastern wild turkey (*Meleagris gallopavo*), great blue herons (*Ardea herodias*), turkey vultures (*Cathartes aura*), American crows (*Corvus brachyrhynchos*), and bald eagles (*Haliaeetus leucocephalus*) and acts as a stopover for migratory birds.

2.11 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 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 officially recognized by USFWS as being in danger of extinction throughout all or a significant portion of its range. A threatened species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Proposed species are any species of fish, wildlife, or plant that is proposed in the Federal Register to be listed under Section 4 of the Endangered Species Act. 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.

By protecting a specific species, the USFWS and National Marine Fisheries Service (NMFS) may list them as endangered, threatened, listed, migratory, and or protected. A species can have more than one protection measure with the exclusion of endangered, threatened, and listed. A species cannot be both endangered and threatened; however, a species can be endangered, migratory and protected.

- Endangered is officially recognized by USFWS as being in danger of extinction throughout all or a significant portion of its range. Under this protection measure, a species cannot be taken, essential habitat altered and destroyed, nor transported without a permit. Take means “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct” (USFWS, 2020B).
- Threatened means any species recognized by the USFWS as being likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Under this protection measure, a species cannot be taken, essential habitat altered and destroyed, nor transported without a permit.
- Candidate is a species for which the USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposal to list, but issuance of a proposed rule is currently precluded by higher priority listing actions.

- Protected means that there are other Federal laws and regulations protecting the species than the Endangered Species Act. Examples include Bald and Golden Eagle Protection Act, Lacey Act, and Migratory Bird Treaty Act. Just because a species is listed as migratory doesn't automatically qualify it as protected, it must be protected by more than one law.
- Migratory means it applies specifically to migratory birds. The law that governs these species is the Migratory Bird Treaty Act. Under this law "it is illegal to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts*, nests, or eggs of such a bird except under the terms of a valid Federal permit" (USFWS, 2020A).

The USFWS may list a species under "Similarity of Appearance (Threatened)" because of the species' similarity of appearance to another species that is currently listed as threatened. Under this classification these species will not have to go through Section 7 Consultation of the Endangered Species Act because they are not biologically endangered. However, under this listing category, the species may be protected by Section 9 of the Endangered Species Act, which primarily prohibits the "taking" of endangered species of fish and wildlife.

The USFWS's Information for Planning and Consultation (IPaC) database (USFWS, 2023) lists the threatened and endangered species, and trust resources that may occur within the Sardis Lake Federal Fee Boundary (see USFWS Species List and the IPaC Report in Appendix C). Based on the IPaC report, there are 12 federally listed, proposed, or candidate species that could be found within Sardis Lake (USFWS, 2022A). A list of these species is presented in Table 2.3. There is no Critical Habitat designated within or near Sardis Lake.

Table 2.3 Federally Listed Threatened & Endangered Species with Potential to Occur at Sardis Lake

Common Name	Scientific Name	Federal Status	State Status
Alligator Snapping Turtle	<i>Macrochelys temminckii</i>	Proposed Threatened	Not Listed
American Burying Beetle	<i>Nicrophorus americanus</i>	Threatened	Not Listed
Indiana Bat	<i>Myotis Sodalis</i>	Endangered	Not Listed
Monarch Butterfly	<i>Danaus plexippus</i>	Candidate	Not Listed
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	Not Listed
Ouachita Rock Pocketbook	<i>Arcidens wheeleri</i>	Endangered	Not Listed
Piping Plover	<i>Charadrius melodus</i>	Threatened	Not Listed

Red-cockaded Woodpecker	<i>Picoides borealis</i>	Endangered	Not Listed
Red Knot	<i>Calidris canutus rufa</i>	Threatened	Not Listed
Scaleshell Mussel	<i>Leptodea leptodon</i>	Endangered	Not Listed
Tricolored Bat	<i>Perimyotis subflavus</i>	Proposed Endangered	Not Listed
Winged Mapleleaf	<i>Quadrula fragosa</i>	Endangered	Not Listed

The alligator snapping turtle (*Macrochelys temminckii*) is a reptile that is currently being considered by the USFWS as a threatened species wherever it may be found (USFWS, 2022A). The turtle is a carnivorous species that primarily inhabits freshwater bodies of water like marshes, swamps, creeks, rivers, ponds, and lakes. It is characterized by the three rows of points that run along the topside of its shell, as well as the jagged edges of its shell. The turtle can grow up to 250 lbs, and be over 2ft in length (USFWS, 2022A). It is primarily an ambush predator that attracts its prey while submerged by waving its tongue and waiting until something comes close enough for it to attack. It can also be an opportunistic scavenger that will feed on carrion that it comes across. Even though there is an abundance of food and habitat within the fee boundary at Sardis Lake, there is a lack of recent official and informal sightings, in part due to the lake location being so far upstream of known areas of occurrence.

The American burying beetle (*Nicrophorus americanus*) is a member of the family *Silphidae* (carrion or burying beetles) that is listed as threatened (USFWS, 2022B). It is the largest species of *Nicrophorus* in North America. The American burying beetle is known to inhabit level areas in grasslands, grazed pastures, bottomland forest, open woodlands, and riparian areas. Wetlands with standing water or saturated soils and vegetation typical of hydric soils and wetland hydrology are listed as unfavorable habitats. American burying beetles are habitat generalists; however, it is thought that undisturbed habitat and the availability of carrion is the most likely influence on species distribution. The lake is well within the known habitat range for the species, and existing populations are found in eastern Oklahoma. However, the lack of recent formal and informal sightings as well as the overall rarity of the species makes encountering the species rare within the Sardis Lake Fee Boundary.

The Indiana bat (*Myotis Sodalis*) is listed as endangered wherever found (USFWS, 2022C). It is a medium-sized bat with a dull gray to chestnut colored fur dorsally, and pinkish white ventrally. The species primarily is found in the midwestern and eastern United States and has been reported in 23 states, with eastern Oklahoma within the western limit of its range. The Indiana bat's present range in Oklahoma includes Adair, Delaware, LeFlore, and Pushmataha counties, and have been reported to occur at only Keystone, Eufaula, and Tenkiller Lakes. This species is migratory with approximately 87% of the entire known population hibernating in just seven caves. The species prefers to hibernate in limestone caves, ideally ones with pools, with maternity sites in trees. During the summer months, the bats can be found under bridges, in old buildings, under tree bark, or in hollow trees generally associated with streams.

Although Sardis Lake contains preferred summer and maternity habitat, the lake is located at the western limit of their known range, and the lack of recent formal and informal sightings and overall rarity of the species makes for their occurrence within the fee boundary rare.

The Monarch butterfly (*Danaus plexippus*) is listed as a candidate species wherever it is found (USFWS, 2022D). It is an orange butterfly with black stripes and white dots on its wings, whose span can be up to 10 cm (NatureServe, 2022A). Its breeding habitat consists primarily of milkweed species (*Asclepias* spp.), which larvae feed exclusively. When it is in North America and is migrating, the species can be found pretty much wherever blooming flowers are. Sardis Lake and its federal fee boundary does contain an abundance of blooming flowers and milkweed; this along with numerous recent sightings confirms that this species is common within the area when the species is migrating and during breeding season.

USFWS lists the northern long-eared bat (*Myotis septentrionalis*) as threatened wherever it is found (USFWS, 2022E). The USFWS service lists lake project area as a location where northern long-eared bats may occur. 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 (NatureServe, 2022B). The lake is well within the known habitat range for the species, however the lack of recent formal and informal sightings as well as the overall rarity of the species makes for the encountering of the species rare within the Sardis Lake Fee Boundary.

The Ouachita rock pocketbook (*Arcidens wheeleri*) is a freshwater mussel listed by USFWS (2022F) as endangered wherever it is found. Preferred habitat consists of rivers and large creeks, substrate that is stable, large, diversified mussel beds, and areas that are next to sand/gravel/cobble bars, but these must be scoured clean or support emergent aquatic vegetation (NatureServe, 2022C). It is documented to occur within Sardis Lake and in the waters below Sardis Lake Dam, the information provided by the Oklahoma Natural Heritage Inventory (ONHI) confirms this information (ONHI, 2022). However, it is believed the populations in the lake are not repopulating on their own, so what individuals exist will only continue to decline in the years to come, which is why the occurrence of the species is considered to be rare with the lake and uncommon below the below Sardis Lake Dam.

The piping plover (*Charadrius melodus*) is a shorebird listed as endangered in the watershed of the Great Lakes of North America and threatened in the remainder of its range, which includes the Northern Great Plains, the Atlantic Coast, the Gulf Coast, the Bahama Islands, and the West Indies (USFWS, 1996). The USFWS identifies Sardis Lake as “situated within the probable migratory pathway between breeding and winter habitats [of the Northern Great Plains population] and contain[ing] sites that could provide stopover habitat during migration (USFWS, 2022G).”

The Northern Great Plains population of piping plover spends up to 10 months a year on its wintering ground along the Gulf Coast and arrives on prairie breeding grounds in early May. During migration periods, they use large rivers, reservoir beaches, mudflats, and alkali flats (NatureServe, 2020D). They feed on a variety of aquatic and terrestrial invertebrates. The sandy beaches within the study area could provide suitable habitat during the plovers' spring and fall migrations. Despite the availability of habitat and the location of the lake within the species known migratory route the occurrence of the species within the project area is considered to be rare due to the lack of recent sightings.

The red cockaded woodpecker (*Picoides borealis*) is a small black and white bird with black beak and legs that is listed by the USFWS as endangered wherever it is found (USFWS, 2022H). The preferred habitat of the Red-cockaded Woodpecker is that of a broad savanna that consists of mature to old growth pines that are frequently burned (NatureServe, 2022E). It is a non-migratory omnivore that primarily feeds on insects but will feed on wild berries and pine seeds. It feeds by sight instead of sound which is characteristic of other species of woodpeckers. The lake is well within the known habitat range for the species, however the lack of recent formal and informal sightings as well as the overall rarity of the species makes for the encountering of the species rare within the Sardis Lake Fee Boundary.

The red knot (*Calidris canutus rufa*) is a migratory shorebird listed as threatened wherever found (USFWS, 2022I). Although sightings are rare, the project area is listed as a location where the red knot is "known or believed to occur" and is located within the probable migratory path, between breeding in the Arctic tundra and winter habitats in the southern U.S. and Central and South America. Red knots forage along sandy beaches and mud flats, and this species may use the study area for temporary stopover and foraging (NatureServe, 2022F). The bare sandy shoreline along Sardis Lake could provide suitable habitat during the red knot's spring and fall migrations. Although there is available habitat and the project area is within its known range, the species is considered rare at Sardis Lake due to lack of recent sightings.

The scaleshell mussel (*Leptodea leptodon*) is freshwater mussel that can grow up to 11 centimeters in length and is listed by the USFWS as Endangered wherever it is found (USFWS, 2022J). It has a thin brown shell. The scaly like appearance which the species is known for is only found within females. Preferred habitat consists of rivers with good water quality with stable river channels (NatureServe 2022G). The occurrence of the species within the project area is considered to be rare due to lack of recent sightings as evidenced by the information provided by the Oklahoma Natural Heritage Inventory (ONHI, 2022) and by (ODWC, 2022C).

The USFWS lists the tricolored bat (*Perimyotis subflavus*) as proposed endangered (USFWS, 2022K), within the Sardis Lake fee boundary as a location where the species may occur. Tricolored bats seasonally migrate between winter hibernacula and summer nursery sites. Roosting may take place in tree cavities, caves, mines, rock crevices, piles of dead leaves, under dead & live leaves, and buildings. Tricolored bats forage along the edge of forests and across waterways near roosting and hibernating

sites. They emerge at dusk and feed on various insect species from over water and tops of trees (NatureServe, 2022H). The species occurrence is expected to be rare within the project areas because due to lack of recent sightings.

The winged mapleleaf (*Quadrula fragosa*) is a freshwater mussel that can grow up to 4 inches long and is listed by the USFWS as Endangered with non-essential experimental populations (USFWS, 2022L). It has a thick brown shell with rows of bumps, with smaller sizes being characterized by having rays in addition to the bumps. Preferred habitat consists of clear water with underlying substrate consisting of either rubble, sand, or clean gravel (NatureServe 2022I). These areas are in portions of small rivers and streams that are characterized by rough waters. The occurrence of the species within the project area is considered to be rare due to lack of recent formal and informal sightings as evidenced by the information provided by the ONHI (ONHI, 2022).

2.12 OKLAHOMA NATURAL HERITAGE INVENTORY

The Oklahoma Natural Heritage Inventory (ONHI), administered by the University of Oklahoma (OU) (2022), manages and disseminates occurrence of information on rare species, native plant communities, and animal aggregations in Oklahoma to help guide project planning efforts. An official request via email was made requesting this information for the Sardis project area. In the inventory given to USACE, ONHI indicates that there is one federally endangered, threatened, and protected species that is known to occur within the vicinity Sardis Lake Federal Fee Boundary and that is the Ouachita Rock Pocketbook (*Arkansia wheeleri*) (ONHI, 2022).

The species identified as Threatened, Endangered or Candidate Species by ODWC (2022D) that are not federally listed are included in Appendix C as well as a list of Species of Greatest Conservation Need (SGCN) for the Ouachita Mountains, Arkansas River Valley and West Gulf Coastal Plain Region (ODWC, 2016).

2.13 INVASIVE SPECIES

An invasive species is defined as a plant or animal that is non-native (or native nuisance) to an ecosystem and whose introduction causes, or is likely to cause, economic and/or environmental harm, or harm to human health. Invasive species can thrive in areas beyond their normal range of dispersal. These species are characteristically adaptable, aggressive, and have high reproductive capacity. Their vigor, along with a lack of natural enemies or controls, often leads to outbreak populations with some level of negative effects on native plants, animals, and ecosystem functions and are often associated with disturbed ecosystems and human activities.

Table 2-4 lists many of the invasive and noxious native species found at Sardis Lake (USACE, 2016A). Other species are currently being researched for their invasive characteristics.

Table 2.4 Invasive and Noxious Native Species Found at Sardis Lake

Common Name	Scientific Name	Native/Non-native
Birds		
Black Vulture	<i>Coragyps atratus</i>	Native
Cowbirds	<i>Molothrus ater</i>	Native
Mammals		
Wild Boar	<i>Sus scrofa</i>	Non-native
Insects		
Red Imported Fire Ant	<i>Solenopsis invicta</i>	Non-native
Plants		
Johnson Grass	<i>Sorghum halepense</i>	Non-native
Multiflora Rose	<i>Rosa multiflora</i>	Non-native
Musk Thistle	<i>Carduus nutans</i>	Non-native
Sericea Lespedeza	<i>Lespedeza cuneata</i>	Non-native
Amphibians		
None	None	None
Mollusks		
None	None	None
Fish		
None	None	None

Because of the lake's relative isolation from metropolitan areas, it does not have as many invasive species compared to those within or directly adjacent to major metropolitan areas. The remoteness protects the lake from the inadvertent release and spread of common landscape plants that could become aggressive colonizers from nearby residential developments.

While currently not present in Sardis Lake, invasive mollusks including zebra mussels (*Dreissena polymorpha*) are an ongoing threat to native aquatic species and infrastructure due to their ability to infest and expand rapidly, and the close proximity to other infested lakes increases the risk at Sardis Lake.

Emerald Ash Borers (*Agrilus planipennis*) are a growing threat across much of the United States. Emerald Ash Borers are not native to North America but to parts of eastern Asia. All native North American ash species are susceptible to Emerald Ash Borers, including Green Ash (*Fraxinus pennsylvanica*) which is fairly abundant around Sardis Lake. While there have not been any Emerald Ash Borers identified at Sardis Lake, they have been identified in northern Oklahoma as well as every neighboring state except New Mexico. The Oklahoma Department of Agriculture, Food, and

Forestry (ODAFF) stated that “[Emerald Ash Borers are] now considered the most destructive forest pest ever seen in North America.” (ODAFF, 2015). The USACE does have an active program in place that monitors and reports any possible signs of emerald ash borers.

Although native, cowbirds (*Molothrus ater*) have become problematic due to their expanding range associated with agriculture and human development and are considered a nuisance. They often outcompete many other native species while also acting as a brood parasite, introducing their own eggs into the nests of other birds, to the detriment of the other birds’ offspring.

2.14 AESTHETIC RESOURCES

Sardis Lake includes many acres of scenic shorelines, lake views, and wildlife viewing areas providing high visual and scenic qualities. Some areas are admired for their scenic attractiveness (intrinsic scenic beauty that evokes a positive response), scenic integrity (wholeness of landscape character), and landscape visibility (how many people view the landscape and for what reasons and how long). Because Sardis Lake is located a short drive away from the Tulsa metropolitan area and the Dallas-Fort Worth metropolitan area, people come from those urban and suburban communities to enjoy the scenic and naturalistic views offered at the lake. Some areas have been designated as Wildlife Management or Environmentally Sensitive Areas to preserve specific animal, plant, or environmental features that also add to the scenic qualities at the lake. Nearby parks have been designed to access the lake, allow access to hiking trails, and take advantage of scenic qualities at the lake and surrounding areas.

Adjacent landowners are informed that removing trees from USACE property to obtain a view of the lake not only destroys wildlife habitat but also lowers the scenic quality of the shoreline when viewed by the general public from the water surface. Furthermore, unauthorized removal of trees and other vegetation from USACE property could result in fines. Additionally, reasonable measures must be taken to ensure that damage to the natural landscape from invasive species and catastrophic wildfire are minimized. Vegetative management, debris removal, and other shoreline issues are managed by the USACE Sardis Lake Office.

2.15 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 (TCP) and sacred sites. These property types may be listed on the National Register of Historic Places (NRHP) if they meet the criteria specified by 36 CFR 60.4 as authorized by the NHPA, 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 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.

2.15.1 Cultural History Sequence

Six broad cultural divisions are applicable to a discussion of the culture history of the Sardis Lake region: Paleoindian, Archaic, Woodland, Mississippian/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.

Paleoindian: 30,000 to 7000 BC
Archaic: 7000 BC to 1 AD
Woodland: AD 1 to 1000
Mississippian/Plains Village: AD 1000 to 1500
Protohistoric (Contact Period): AD 1500 to 1830
Historic: AD 1830 to present

Paleoindian Period

While it is becoming increasingly evident that humans arrived in the Americas as early as 30,000 years ago, the Paleoindian Period is broadly accepted as spanning the end of the Pleistocene into the Early Holocene. The Clovis complex (9500-8900) 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. The Dalton Complex is well represented in Eastern Oklahoma and spans the period from the end of the Paleoindian Period and into the Early Archaic (Ballenger 2001; Meltzer 2009).

In Oklahoma, the earliest proven evidence of human occupation occurs at sites such as the Domebo site, a Clovis era mammoth kill site in Caddo County, and Jakes Bluff, a bison kill site in Harper County (Gilbert and Brooks 2000). Typically, in Oklahoma, isolated 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 very limited number of Paleoindian sites have been recorded in the project area. 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. In eastern Oklahoma sites such as the Packard site in Mayes County, the Quince Site in Atoka County, and the Billy Ross site in Haskell county include large quantities of local chert, which may indicate that later Paleoindian peoples were less nomadic than earlier Paleoindians (Brooks 2021).

Archaic Period

During the Archaic Period, an increase in seasonal variability of resources and increasing populations resulted in changing settlement and subsistence patterns (Gilbert and Brooks 2000). 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; Brooks 2021). 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 (Thies and Witty 1992). 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 7000 BC to 1 AD.

The Calf Creek Culture was prominent in Oklahoma during the Archaic Period between 7,000 and 4,000 years ago. This group adapted to a long drought period by living in highly mobile bands, hunting bison, and supplementing their diet with edible starchy plant seeds that were more readily available in the dry climate. Calf Creek is distinguished by finely made large spear points with deep notches on the base. Archaeologists believe there were four groups located in the east central, north central,

south central, and western areas of the state based on their reliance on local flint found in the four areas (Gilbert and Brooks 2000).

Prominent Calf Creek sites in Oklahoma include Primrose and Stillman Pit sites in Murray County, the Kubik site in Kay County, the Arrowhead Ditch site in Muskogee County, and the Anthony site in Caddo County. The Anthony site is unique in that it exhibits artifacts from all four Calf Creek groups and was likely a gathering place for the people as a whole (Gilbert and Brooks 2000). Archaic sites along this portion of the Kiamachi River and its tributaries, in the vicinity of the project area indicate people depended heavily on riverine resources, though sites closer to the Red River demonstrate less cultural diversity (Brooks 2021).

Woodland

The Woodland Period (AD 1 to 1000) in Oklahoma 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. As people began domesticating plants during this period, populations became more sedentary in order to cultivate and harvest crops. In North America sunflower, native squash, may grass, marsh elder, goosefoot, and pigweed were first domesticated while South American crops such as corn, beans, squash, and chiles were imported through trade later. Bone tools from bison were commonly used in agricultural practices. People lived in small, seasonal villages with houses made of pole frameworks with grass thatch or cane matting to form walls and circular hearths (Gilbert and Brooks 2000).

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 (Gilbert and Brooks 2000 and Brooks 2021).

Woodland Period sites in Oklahoma continued to follow a north-south, east-west distinction. In eastern Oklahoma north of the Arkansas River the Cooper Culture has been defined in Delaware and Mayes counties. These archaeological assemblages are similar to groups living near Kansas City including spearpoints, ceramics, clay figurines, and the use of rock shelters as seasonal camps. South of the Arkansas River but north of the Ouachita Mountains, the Fourche Maline Culture is prominent and exhibited by the McCutchan-McLaughlin site in Latimer County. In western Oklahoma people continued a nomadic bison hunting communities and were slow to adopt the bow and arrow. The Certain Bison Kill site in Beckham County represents this, though sites such as the Swift Horse site in Roger Mills County demonstrate more adaptation of plant subsistence and bow and arrow use (Brooks 2021).

Mississippian/Plains Village

From 1000 to 1500 AD, two main cultures were present in Oklahoma. The Mississippian to the east, and the Plains Village to the north and west. Although in other regions either the Mississippian or the Plains Village are considered unique cultures and time periods in prehistoric chronology, Oklahoma presents a crossroads where the cultures coexisted in the state around the same time. Both cultures became more reliant upon cultivating crops, and large villages soon became common. Both cultures also began creating more pottery forms and styles including bowls, jars, plates, bottles, and effigies with a wide variety of surface treatments. Ornamentation made from copper and a variety of minerals and textiles were widely used as well (Brooks 2021).

The Mississippian culture in Oklahoma, also known as the Caddoan culture, is the western-most representation of a mound building culture that dominated the southeast during this timeframe. Early Mississippians constructed houses and temples that had square or rectangular floor plans with center posts supporting the roofs. Later structures had only two center posts and some were circular. Large burial mounds surrounded by smaller mounds are defining features of Mississippian culture. Burials included grave goods that became more elaborate over time. The Harlan site in Cherokee County is the earliest known center of Mississippian culture in Oklahoma. Spiro Mounds in Le Flore County is the most famous Mississippian site in Oklahoma. Consisting of at least 12 mounds covering an area of 80 acres, the site contained many well preserved and elaborate objects that yielded a great deal of information about the Mississippian people (Gilbert and Brooks 2000).

Plains Village people grew crops and hunted and gathered wild resources. Artifact assemblages contain gardening tools along with triangular arrow points for hunting. Sites from this time are often identified in lowland terraces of waterways where gardening with bone tools was viable. These villages have been found along major rivers and their tributaries including the Arkansas, Canadian, North Canadian, Washita, and Red Rivers (Gilbert and Brooks 2000). Food was stored in underground cache pits that could be 3-5 feet deep and 3-5 feet wide. Ceramics were used for cooking directly over fire both inside and out and were usually smooth, though some were cord marked. Clay figurines have been found at Plains Village sites as well and may have been used in fertility ceremonies related to agriculture. Usually, Plains Village people still lived in villages of 75-150 people. Houses were square or rectangular and could be over 20 feet long. Rather than mounds, Plains Village people buried their dead in nearby cemeteries (Gilbert and Brooks 2000). Examples of Plains Village sites in Oklahoma include the Roy Smith Site in Beaver County, the Heerwald site in Custer County, the Arthur site in Garvin County, and the McLemore site in Washita County.

The Protohistoric (Contact) Period

The period from A.D. 1500-1830 is referred to as the Protohistoric (or Contact) Period. 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 (Everett 2021a). 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). The Tribes first encountered by Europeans in Oklahoma included the Caddo and Wichita in the southern and eastern part of the state, and the Plains Apache, Osage, Pawnee, and other more nomadic groups in the northern and western part of the state. The project area was primarily occupied by the Wichita and the Caddo though the Osage were known to hunt and raid in the area (Everett 2021a).

The first Europeans documented in Oklahoma were part of a Spanish expedition led by Francisco Vazquez de Coronado in 1541. In search of gold, they erroneously believed to be in the province of Quivira, the expedition began in New Mexico and ended at a Wichita village in southern Kansas, passing through the panhandles of Texas and Oklahoma (Everett 2021a). Additional Spanish explorations in search of gold were conducted in the region through the early 1600s, though the most valuable finding of these expeditions were the descriptions of the land, animals, and peoples they encountered. Spain eventually lost interest in exploring the area northeast of New Mexico and viewed it as a buffer zone between its territory and the French.

In 1682, Robert Cavelier, Sieur de la Salle, claimed the territory drained by the Mississippi as part of the French Empire in North America. By 1700, French traders were established in the region and had developed trading relationships with Wichita groups in the Arkansas Valley of northern Oklahoma and with the Osage to the east. In 1718 Jean Baptiste Benard Sieur de La Harpe lead a trading expedition with the eventual goal of establishing a trading post along the Red River in present day Texas (Everett 2021a).

The Caddoan language speaking Wichita and Affiliated Tribes were historically known as the Wichita Proper, Waco, Taovaya, Tawakoni, and Kichai. The Tribes can be traced back at least 800 years to the Washita River culture of central and western Oklahoma. The Washita River people resided in small villages of rectangular, mud-plastered houses with small gardens nearby. Between 1350 and 1450, some Washita River people began migrating north to the Great Bend of the Arkansas River in southern Kansas. 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 Wichita used horses from the Spanish colonies to more effectively hunt buffalo and used guns, metal hoes, and buckets from the French in their daily lives and to trade with the Comanche. In the late 1700s, due to increased pressure from the Osage, the Wichita abandoned their homes in northern Oklahoma and traveled south into southern Oklahoma and Texas along the Red River near the project area (Wichita and Affiliated Tribes 2021). The Wichita didn't remain in the area for long. Despite Wichita villages and claims in the area, the U.S. recognized

Osage and Quapaw authority to cede land south of the Arkansas River in Indian Territory to resettle displaced Tribes from the southeast (Pool 2021). The Wichita gradually relocated south into what today is northern Texas until 1859, when their reservation was established in Indian Territory west of the project area (Wichita and Affiliated Tribes 2021).

In present-day southeastern Oklahoma, southwestern Arkansas, and northeastern Texas the Caddo developed as a regional variant of the Mississippian tradition between AD 800-1100, and were encountered and described by Europeans during the 1500s and 1600s. The Caddo subsisted on agriculture supplemented with hunting and gathering wild plants. They used digging tools of bone, wood, or shell to cultivate crops such as corn, beans, squash, and other domestic plants including tobacco. The Caddo were also skilled potters and made salt. Agriculture coincided with a dispersal of people into residential, year-round settlements usually containing large circular dwellings with pitched roofs. Elaborate mound burials were common until later in the period (Early 2012). Each Caddo community had a principal leader called a caddi. Caddi was a hereditary position and required years of tutoring in order to keep order in the community and contribute to the peace of the Caddo Nation. Few spiritual leaders, called chenesi, held power superior of the caddi. The chenesi lived in houses built on top of the flat topped mounds and acted as guardians of sacred fire and communed with Ayo-Caddi-Amay or “Great Leader Above” in order to advise the Caddo people. By 1790, the Caddo had been weakened by European epidemics and raids by their northern enemies, the Osage (Carter 2018). The Caddo abandoned their homes in Arkansas and Oklahoma along the Red River and migrated farther south to the Sabine River into Texas, outside of the project area (Perttula 2020).

The Osage were one of five immigrant Tribes of Dhegiha Siouan speakers who originated in the Ohio River area. Over time the Dhegiha Sioux diffused into different Tribes as they migrated westward, and the Osage were one of the last to split and settle in the central and western portions of Missouri around 1300 (Hunter et al 2013). Osage villages were physically arranged to reflect the Osage cosmos with a central street running east-west representing the path of the sun. Dwellings were rectangular long houses with domed roofs constructed of poles and woven cattail mats, bark, hides, or some combination thereof. Osages planted crops near their permanent villages, though the entire village would move onto the plains during the summer and autumn buffalo hunts and return to the permanent village locations for the remainder of the year (Bailey and Swan 2004). As the French built trade alliances with the Osage in the late 1600s and early 1700s, the Osage benefited greatly from the influx of guns and other French trade goods, as well their villages’ proximity to accessible river trade routes. The Osage became the dominant Tribe in the region and began forcing the Wichita and Caddo further south into the project area. In the 1790s, French trader Rene Auguste Chouteau convinced roughly one third of the Tribe to relocate to the Three Forks region of northeastern Oklahoma where the Arkansas, Verdigris, and Grand Rivers converge near Chouteau’s new trading posts. Known as the Arkansas Osage, the group mainly settled at Claremore with other villages nearby. This allowed the Osage to more easily raid into the project area. As eastern Tribes such as the Cherokee were forced to move into Osage territory in Arkansas by the United States in the early 1800s, increased

conflict between the Osage and eastern Tribes became more commonplace as the groups competed for natural resources. In an effort to stop the violence the United States signed treaties in 1818 and 1825 with the Osage establishing their reservation in southern Kansas and forcing Osage removal. However, the last Arkansas Osage did not leave the region until 1839, when they became too overwhelmed by eastern Tribes forced into the area by the Indian Removal Act of 1830 (Bailey and Swan 2004).

By the time early American explorers entered the project area in the 1820s, Jackfork Valley (which Sardis Lake now occupies) was known as open hunting territory used by the Caddo and Osage. Constant warfare likely kept the area from being permanently occupied (Vehik and Galm 1979). The first printing press in Oklahoma was established at the Union Mission in 1835, technically ending the Protohistoric era in the state (Everett 2021b).

2.15.2 Historical Resources

What is now the state of Oklahoma was included in the Louisiana Purchase in 1803, becoming part of what was known as the Louisiana Territory. 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, Oklahoma was designated Indian Territory and closed to white settlement. From that time until 1890 when the Organic Act created the Oklahoma territory and incorporated it into the United States, more than three dozen Tribes had been forced to reside there (Bolton 2021). Fort Towson was first built south of the project area in 1824 as a fortification on the international border with Mexico (present day Texas), and Fort Smith was established in 1817 northeast of the project area to maintain the peace between the Osage and Cherokee. By the early 1830s, both forts served as terminals for the Trail of Tears (Tolman 2021, Boulden 2022). A military road linking the forts was constructed along the Kiamichi River in 1832 and was in use until at least 1840, and likely crossed through the project area (Vehik and Galm 1979, Goins and Goble 2006). The construction of this road provided easy access to supplies from both forts, and opened the area to Choctaw settlers (Vehik and Galm 1979).

The Choctaw have two creation myths that differ dramatically, but both are centered around Nanih Waiya mound located in modern-day Mississippi. When the Choctaw were first referenced in the written record in the late 1600s, the Choctaw were a matrilineal community that lived in three geographical districts, with two social divisions and multiple clans within each division that determined social roles and hierarchy (Mould 2018). During the 1700s, their government consisted of local headmen presiding over groups of villages. It was not until the early 1800s that the Choctaw began to coalesce into one nation as a gradual response to pressure from the U.S. Government (Krauthamer 2013). The Choctaw were the first major tribe in the southeast to be removed to modern day Oklahoma. Removal for the Choctaw lasted for over 70 years, with groups periodically being removed from Choctaw homeland until 1903. The biggest group, approximately 12,000 people, made the journey first between 1830-1834 after the Treaty of Dancing Rabbit Creek was signed in 1830. The Choctaw established their first capital in Oklahoma, Nunih Waya, in 1838 approximately two miles east of the

project area (Choctaw Nation, February 2021). A Baptist missionary named Reuben Anderson accompanied the Choctaw from Mississippi and founded the Sardis Mission west of Anderson Creek. The Anderson settlement grew around the mission and another community named Yanush developed north of Cupco Church. These areas became early hubs of social life in the Sardis reservoir area (Vehik and Galm 1979). “In addition to religious and school meeting places, the churches served as sites for political campaigns, social gatherings, annuity payments, funeral “cries”, and stick ball games” (Vehik and Galm 1979).

The Chickasaw homeland was located in portions of modern-day southwestern Kentucky, western Tennessee, northern Mississippi, and northwestern Alabama. (Chickasaw Nation 2021). Descendants of mound building societies, the Chickasaw were a matrilineal society that generally lived in towns containing around 200 households. Towns could move but kept the same names, spreading apart during peacetime but clustering during war. A typical town contained a log-palisaded fort, religious and council buildings, and grounds for councils, festivals, and sports. Individual households usually included a winter house that was circular, approximately twenty-five feet in diameter, and framed with pine logs and poles, with mud-plaster walls and a sunken earthen floor; one or two summer houses, which were rectangular and had two rooms, walls of loosely woven mats, and roofs of grass thatch and bark; and a storage house for crops (Newhall 2018). The Chickasaw were considered great warriors, and were instrumental in fighting the French during the French and Indian War (Chickasaw Nation 2021). The Chickasaw were the last major tribe in the southeast to be removed to modern day Oklahoma, and were able to negotiate favorable sales of their land in Mississippi. This allowed the Chickasaw to pay for their own removal and select favorable seasons to travel, which saved hundreds of lives.

In 1837 the Chickasaw, who had been traditional enemies of the Choctaw, signed a treaty with the Choctaw to create a Chickasaw district within Choctaw Nation. The Chickasaw would become a part of Choctaw Nation, and the two groups would negotiate with the United States together (Choctaw Nation, February 2021). At this time, Choctaw Nation was divided into three Choctaw districts to the east Moshulatubbee, Apukshunubbee (where the project is located), and Pushmataha and the Chickasaw District to the west. Chickasaw and Choctaw families were free to live in any of the four districts despite their tribal affiliation, though the bulk of Chickasaw families lived in the Chickasaw district. In 1850 the three districts were organized into 19 counties, and the capital was moved from Nunih Waya to Doaksville near Fort Towson (Vehik and Galm 1979). In 1855 the Choctaw, Chickasaw, and United States entered into a treaty that split the tribes into two nations once again; and sold Choctaw land holdings west of the Chickasaw district to the United States, reducing the reservation from over 23.7 million acres to 6.688 million acres. During this time the Choctaw prospered economically through small farms and large cotton plantations (Choctaw Nation March 2021 and April 2021). In the project area, self-sufficient Choctaw families lived on small farmsteads, and the economic improvements caused by the capitol’s nearby location from 1838-1850 included the establishment of roads and a burgeoning lumber industry with the first sawmill established in 1840 (Vehik and Galm 1979).

Both the Chickasaw and Choctaw had participated in the southern market economy built around chattel slavery. By the time both tribes were removed to Indian Territory, their slave-owning population reflected that of the rest of the deep south; the upper middle class owned anywhere from 1-15 slaves, a handful of extremely wealthy individuals owned hundreds of slaves, and the majority of Chickasaw and Choctaw citizens owned no slaves or would rent out their labor (Krauthamer 2013). Their slaveholdings meant that the majority of Choctaws and Chickasaws sympathized with the south during the Civil War, and that the tribes would ally with the confederacy.

Oklahoma went through a period of instability during the Civil War. Its low population, proximity to Confederate (Texas and Arkansas) and Union (Kansas) neighbors, relatively minor tactical importance to the western campaign focused on the Mississippi River, and the Tribes' smaller militaries ensured the territory became used for troop movements to other locales and a hotspot for small raids and guerilla warfare for both sides. The Five Tribes (Cherokee, Choctaw, Chickasaw, Muscogee Creek, and Seminole) signed treaties with the Confederacy in 1861 as the Confederacy promised to respect Tribal lands and sovereignty, and to not abolish slavery. At this time, approximately 14 percent of Oklahoma's residents were slaves. The Tribes formed regiments that fought in engagements throughout the western theater, most notably at Pea Ridge, Arkansas and Honey Springs, Oklahoma (Huston, 2021). The culminative battle at Honey Springs in 1863 ensured the Union maintained control of the territory for the remainder of the war, though small confederate raids continued. Due to constant marauding, retaliation, and split loyalties, refugee camps became common. Union loyalists were moved to Ft. Riley in Kansas and Ft. Smith in Arkansas, and Ft. Gibson was surrounded by as many as 7,000 refugees. Confederate camps along the Red River held close to 15,000 refugees (Huston 2021). The Sardis reservoir area hosted mainly Cherokee and Muscogee refugees during the Civil War (Vehik and Galm 1979). After the Confederacy surrendered, the Five Tribes signed a peace treaty with the United States in 1866. The treaty gave the western half of the territory to other Tribes in Kansas, slavery was abolished, freedmen obtained citizenship and property rights, and the territory was opened to railroads across Tribal lands (Huston 2021).

During Reconstruction, Oklahoma struggled with lawlessness as much as, if not more than during the Civil War. It was difficult to police the region given the turmoil of the Civil War, and Tribal police and courts had no jurisdiction over non-Tribal citizens (Huston 2021). In the 1890s, The Dawes Commission began the process of allotment that would transition communally held Tribal lands into individually owned private property. This led to a large loss of Tribal lands, Tribal citizens who accepted allotments now becoming United State Citizens, and allowed the area that had formerly been Indian Territory to become the territory of Oklahoma, which could then apply for statehood. Oklahoma achieved statehood in 1907 (Kidwell 2021a). Although Tribal governments were generally dissolved when Oklahoma became a state, the Choctaw Nation government continued to exist in order to manage subsurface coal and asphalt deposits located in the Choctaw reservation (Kidwell 2021b). The area remained important to the Choctaw, and the current Choctaw capital Tuskahoma (which was founded in 1885) is 2.5 miles east of the project area (Goins and Goble 2006).

Sardis Lake occupies parts of Latimer, Pittsburg, and Pushmataha Counties. Pushmataha County was named after the Choctaw district that occupied the area earlier, and formally organized in 1907 with the town of Antlers as its seat (Milligan 2021a). Latimer County was organized at statehood in 1907 with the town of Wilburton as its seat (Everett 2022). Because of the county's rich coal deposits, Pittsburg was named after the Pennsylvania city at statehood in 1907 with McAlester serving as its county seat (O'Dell 2022).

After the Choctaw moved their capitol to Tuskahoma near the project area in 1885, the town experienced a short-lived economic boom. Within months, two hotels, several general stores, a blacksmith shop, school, photographer, and post office were established (Vehik and Galm 1979). However, as the St. Louis-San Francisco railroad surveyed a route along the Kiamichi in 1887, they attempted to extort Tuskahoma by demanding a bonus to include the town on their route. When the town refused, the railroad was routed further south past the Clayton Sawmill (Vehik and Galm 1979). When the railroads bisecting the Choctaw reservation were completed, the lumber industry primarily supported the area's economy. Clayton, located approximately 2.5 miles to the south of the project area, became an economic hub for local lumber mills (Wilson 2022). The lumber industry attracted many Euro-Americans to the area, who mainly lived in lumber camps surrounding the sawmills. The mills established company stores, doctors, schools, and churches to accommodate employees, which meant employees were largely segregated from the local Choctaw population (Vehik and Galm 1979).

Pushmataha County relied heavily on cotton and other crops such as corn, potatoes, and sweet potatoes supplemented by the lumber industry. By the end of the twentieth century, soybeans, vegetables, and corn dominated agriculture production. The area was prospected for oil, but the oil industry never took off (Milligan 2021a and 2021b). North of the project area in Latimer and Pittsburg Counties, coal mining became the driving economic force of the region through World War II (Everett 2022 and O'Dell 2022). Near the Sardis area, a large deposit of natural asphalt was discovered south of the Anderson settlement in 1902. Mining operations began, and a small mining settlement was established. In 1905 the mining settlement merged with Anderson and became the town of Sardis. Asphalt production continued at Sardis until 1922 (Vehik and Galm 1979). The Great Depression led to a decline in population in the area. Currently, the area's economy relies on recreation and agriculture.

Sardis Lake dam was originally authorized as Clayton Lake dam by the 1962 Flood Control Act as a comprehensive plan for flood control, water supply, fish and wildlife management, and recreation. The project was renamed to Sardis Lake by Public Law 97-98 in December of 1981. Construction began in August 1975 and was completed in December 1982. The dam consists of a rolled earth-filled embankment about 14,138 feet long and its maximum height is 101 feet above the streambed.

Historic site types and related resources expected in the project area include homesteads and ranches, farmsteads, lumber mills and camps, trails, cemeteries, wells, cisterns, privies, rock walls, foundations or foundation piers, cellar depressions,

chimneys (stone or brick), stairs, railroad lines, roads, schools, dumps, and water diversion features.

2.15.3 Cultural Resources at Sardis Lake

There are more than 56 known archaeological sites located wholly or in part on USACE fee lands associated with Sardis Lake. There are 34 precontact sites, 8 known historic sites, and 14 multicomponent sites with both historic and precontact components, and 1 unknown site. Of these, two sites have been determined eligible for the NRHP, 8 are ineligible, and 46 sites have not been assessed for the NRHP. No sites are currently listed on the NRHP, though multiple NRHP properties are within 10 miles of USACE fee lands including the Cupco Church, the Isaac Billy Homestead and Family Cemetery, the New State School, the Wilburton Administration Building, Colony Park Pavilion, the Tuskahoma Choctaw Council House, Clayton High School Auditorium, the Clayton Depot, and the Depression Era Bridge Concentration #59 along County Road 6144C. Eighteen sites were discussed in earlier publications as being on USACE fee land but are not actually located on USACE fee land. Thirteen sites are precontact, one is historic, one is multicomponent, and two have unknown affiliations. None of the sites have been assessed for the NRHP. The dam itself was completed in 1982 and is not old enough to be considered for NRHP inclusion. Once the structure is 50 years old it will need to be evaluated for the NRHP. Multiple significant sites at Sardis Lake have been protected through various land classification designations.

Under the NHPA properties of traditional, religious, and cultural importance to a living community may be determined to be eligible for inclusion on the NRHP. Commonly known as Traditional Cultural Properties (TCP), these properties are associated with cultural practices or beliefs of a living community that are rooted in that community's history and are important in maintaining the continuing cultural identity of the community. Therefore, TCPs must be taken into account in order to comply with federal cultural resources regulations. Additionally, Executive Order 13007 states that each federal agency with responsibility for the management of Federal lands shall accommodate access to and ceremonial use of Native American sacred sites by religious practitioners and avoid adversely affecting the physical integrity of such sacred sites. There have been no TCPs or sacred sites identified at this time at Sardis Lake. If TCPs or sacred sites are identified at Sardis Lake in the future, they could be given additional protected status through various land classification designations.

Multiple formal archaeological surveys have been completed at Sardis Lake since the 1970s in response to ongoing activities such as lake construction, inadvertent discoveries, and NHPA Section 106 compliance. This section includes an overview of work conducted in the area. The first archaeological survey known to take place within USACE fee lands of Sardis Lake was conducted by Larry Neal in 1972 (Neal, 1972). Neal led a survey of the lake area prior to its inundation in May and June 1972, however the survey relied heavily on local informants, pedestrian survey, and analysis of informants' collections. Thirty-one prehistoric sites were recorded, 25 historic cemeteries were located, and "no sites of a historical nature worthy of preservation were noted" (Neal 1972). Neal recommended 20 sites be tested, and 10 be "subjected to

more extensive excavations...depending on the results and the judgement of the excavator” (Neal 1972). From 1976-1977, Shelia Bobalik led additional testing at these sites. This testing recorded 8 additional sites in areas that had been inaccessible from thick brush during Neal’s survey. She recommended additional testing at 16 of the previously recorded sites and at four of the newly recorded sites (Bobalik 1977). In 1976 Bobalik conducted emergency salvage excavations on one of the newly recorded sites as it was located within the spillway area and construction was imminent (Bobalik 1978). Rain Vehik and Jerry Galm led an examination of eight of the sites identified for additional testing by Bobalik from July-September 1978 as mitigation to interpret the chronology of the Sardis Lake area. They recommended four sites for additional testing to address research questions and two sites for additional testing to provide more information on smaller sites (Vehik and Galm 1979). Three of the sites recommended for additional work and three different sites were excavated in 1979 by Vehik to refine the chronology of the area and study subsistence patterns (Vehik 1982a).

In preparations for excavations at one of the sites, the fluvial history and soil geomorphology at the site were studied by Donald Johnson in the summer of 1981 (Johnson 1981a and 1981b). The site was excavated in 1979 prior to inundation and reported on separately due to the presence of significant deposits (Vehik 1982b). In 1981-1982, excavations continued at the site to study the cultural ecology of the site’s residents (Altschul 1983).

No additional work occurred at Sardis Lake until 1998 when Lone Mountain Archaeological Services conducted a survey of 38.3 acres prior to the Buffalo Mountain 3-D Seismic project. Five sites were recorded during the survey, two of which were recommended as eligible for the NRHP. The remaining three sites were not fully evaluated for eligibility for the NRHP (Hokanson and Teigrob 1998). James Briscoe of Briscoe Consulting Services conducted a survey for miscellaneous reservoir studies at Eufaula, Canton, and Sardis Lakes on USACE property. At Sardis Lake, South Potato Hills, Central Potato Hills, and Sardis Cove Recreation Areas were researched via an analysis of previously known archaeological sites and historic maps and aerial photographs. Briscoe identified areas of likely site locations in his archival research, and “spot checked” locations in August of 2004. Nine sites were recorded during this survey and their NRHP eligibility was not assessed (Briscoe 2004). In July 2005 USACE contracted Engineering-environmental Management Inc. to conduct surveys at multiple properties including Potato Hills South, Potato Hills North, and Potato Hills Central Recreation Areas at Sardis Lake. The survey identified 12 sites at Sardis Lake, and recommended five of those sites for additional testing (Hokanson and Fariello 2006). As part of a transmission line upgrade, American Electric Power surveyed approximately three linear miles in June and August of 2014 and did not record any new sites (Schubert and Rudolph 2014). Small surveys have been, and continue to be, conducted in and near Sardis Lake for compliance with Section 106 of the NHPA. When funds are available, surveys and other preservation activities are also conducted in accordance with Section 110 of the NHPA.

2.15.4 Long-term Objectives for Cultural Resources

As funding allows, the Tulsa District will plan and budget for a Historic Preservation Management Plan (HPMP) that shall be developed and incorporated into the Operational Management Plan (OMP) in accordance with EP 1130-2-540. The purpose of the HPMP is to provide a comprehensive program to direct the historic preservation activities and objectives at Sardis Lake and it will be accomplished if future funding is forthcoming. Completion of a HPMP is dependent on funding. Completion of a full inventory of cultural resources at Sardis Lake is a long-term objective that is needed for compliance with Section 110 of the National Historic Preservation Act (NHPA). All currently known sites with unknown eligibility and newly recorded sites must be evaluated to determine their eligibility for the NRHP. Identification and evaluation of sites is an ongoing process at Sardis Lake. As more significant sites are identified, they could be protected through land classification designation in the future.

In accordance with Section 106 of the NHPA, any proposed activities or projects at Sardis Lake will require review by District Archaeologists to assess their potential to impact historic properties. These activities may include those described in this master plan or those that may be proposed in the future by others for leases, licenses, right-of-way easements, recreational development, construction, wildlife management, or other activities that can be considered undertakings subject to Section 106 of the NHPA. The need for cultural resource surveys to locate and evaluate historic and prehistoric resources, consultation, or other compliance activities related to Section 106 of the NHPA shall be determined and coordinated by a qualified District Archaeologist. Resources determined eligible for the NRHP must be protected from proposed project impacts, or the impacts must be mitigated in consultation with appropriate parties.

The Archaeological Resources Protection Act (ARPA) secures the protection of archaeological resources and sites on lands owned and administered by the United States for the benefit of the American people. According to ARPA, it is illegal to excavate, remove, damage, or deface archaeological resources on public lands without a permit issued by the federal agency managing the land. It is also illegal to sell or transport archaeological resources removed from public lands. Tulsa District requires permits for archaeological investigations at Sardis Lake in accordance with ARPA, and is increasing surveillance and coordination with law enforcement agencies in the state to enforce ARPA civil and criminal penalties.

According to the Native American Graves Protection and Repatriation Act (NAGPRA), it is the responsibility of a federal agency to inventory human remains and associated funerary objects, as well as summarize any potential sacred objects, that existed within their archaeological collections prior to the passage of the law and, to the extent possible, identify their cultural affiliation in order to repatriate such objects to affiliated Tribes requesting their return. In addition, there are responsibilities related to the inadvertent discovery of human remains or funerary objects that occurred on federal land after the passage of the law that require a separate process of consultation, affiliation determinations, and notifications prior to repatriation. Although NAGPRA compliance has been an ongoing focus of the Tulsa District and many consultations and

repatriations have occurred over the past 25-30 years, there is still more work to be done.

In recognition of the significance of the responsibility the Tulsa District has to ensure the proper and respectful treatment of the individuals who have been - or may inadvertently be - disinterred from Tulsa District land, and acknowledging the fact that this work requires more than a part-time effort to be accomplished, a new full-time position has been established to focus on the proper execution of this responsibility. The intensive process to verify existing documentation and complete any missing part of the process for all collections of human remains, funerary objects, or sacred objects subject to NAGPRA in Tulsa District archaeological collections is in progress. As a necessity, this renewed effort is starting with research and reorganization of associated records and archaeological collections to ensure the proper identification and initial inventory of all NAGPRA materials that are under the control of Tulsa District. This effort will include NAGPRA collections that have been made – or may yet be discovered - at Sardis Lake, therefore, compliance with NAGPRA is ongoing.

2.16 CURRENT SOCIAL AND ECONOMIC CONDITIONS

2.16.1 Zone of Interest

Sardis Lake is in southeast Oklahoma, along Oklahoma Highway 2. The Sardis Lake project covers 21,623 acres, with 13,869 acres of surface water and 117 miles of shoreline offering many opportunities for every diversification of outdoor recreation. The zone of interest for the socio-economic analysis of Sardis Lake is identified as Atoka County, Haskell County, Latimer County, LeFlore County, McCurtain County, Pushmataha County, and Pittsburg County.

2.16.2 Population

The total population for the zone of interest in 2021 was 169,161, as shown in Table 2.5. Approximately 28% of the zone of interest’s population resides in LeFlore County, 25% in Pittsburg County, 18% in McCurtain County. The remaining counties in the zone of interest each account for less than 10% of the zone of interest’s population.

Table 2.5 2020 and 2021 Population Estimates and 2050 Projections

Geographical Area	2000	2010	2020 Population Estimate	2021 Population Estimate	2050 Population Projection
Oklahoma	3,450,654	3,751,351	3,959,353	3,986,639	4,860,554
Atoka County	13,879	14,182	14,174	14,324	17,428
Haskell	11,792	12,769	11,561	11,602	15,083
Latimer	10,692	11,154	9,461	9,427	13,469

LeFlore	48,109	50,384	48,131	48,476	68,174
McCurtain County	34,402	33,151	30,786	30,884	38,151
Pushmataha County	11,667	11,572	10,797	10,815	13,773
Pittsburg	43,953	45,837	43,727	43,633	53,698
Zone of Interest Total	174,494	179,049	168,625	169,161	219,776

Source: U.S. Census Bureau (USCB), Population Division (2000 Estimate) (USCB, 2000); USCB 2020 American Community Survey 5-Year (2009-2020) (USCB, 2022); Oklahoma Department of Commerce (ODC), (Oklahoma 2050 Projections) (ODC, 2012)

From 2020 to 2050, the population in the zone of interest is expected to increase from 169,161 to approximately 219,776, an average annual growth rate of 0.29%. By comparison, the populations of Oklahoma are expected to increase at an annual rate of 1.7%. During this timeframe, all counties within the zone of interest are expected to experience growth. Population for the years 2000 and 2010 are included for historical reference.

The distribution of the population among gender, as shown in Table 2.6 is approximately 49% male and 51% female in the zone of interest.

Table 2.6 2020 Percent of Population Estimate by Gender

Geographical Area	Male	Female
Oklahoma	2,001,293	1,985,346
Atoka County	6,804	7,520
Haskell	5,801	5,801
Latimer	4,582	4,845
LeFlore	23,996	24,480
McCurtain County	15,658	15,226
Pushmataha County	5,472	5,343
Pittsburg	21,249	22,384
Zone of Interest Total	83,562	85,599

Source: USCB, 2020 American Community Survey 5-Year (2009-2020) (USCB, 2022)

Figure 2.5 shows the population by age group for the state of Oklahoma and the entire zone of interest. The zone of interest has a slightly smaller population ages 25 to 34 and 35 to 44 a larger population starting with the age of 45 to over 85 when compared to the state of Oklahoma.

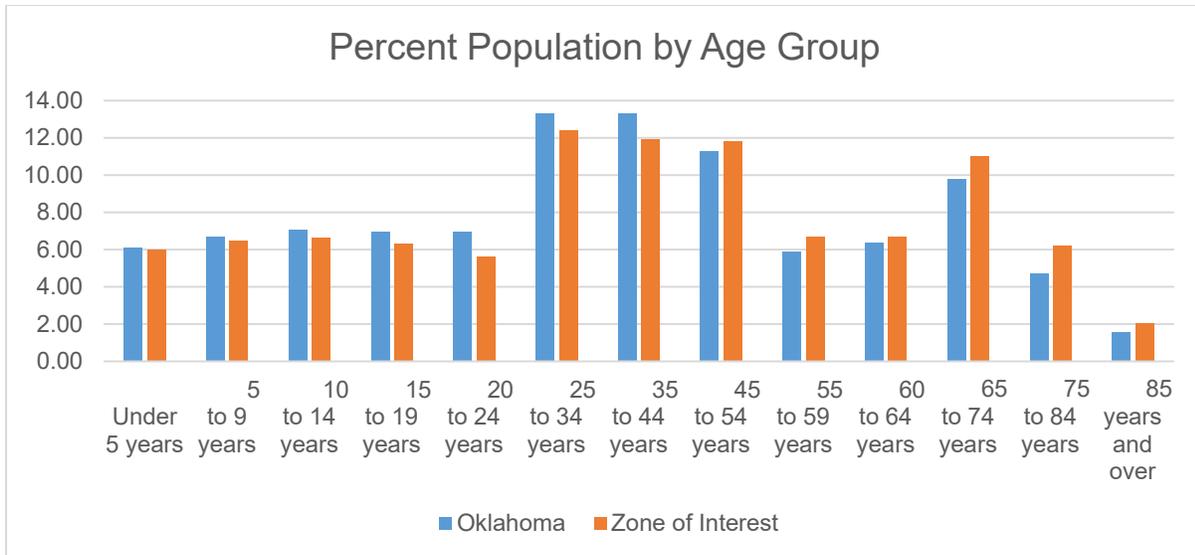


Figure 2-5 2019 Percent of Population by Age Group

Source: 2020 Percent of Population by Age Group Source: U.S. Census Bureau, 2020 American Community Survey 5-Year (2009-2020)

Population by race and Hispanic Origin is displayed in Table 2.7. The zone of interest is approximately 70% White, 11% American Indian or Alaskan Native, 6% Hispanic or Latino, 3% Black, and 8% two or more races. The other race categories each account for 1% or less of the zone of interest population. By comparison, the population in the state of Oklahoma is 61% White, 12% Hispanic or Latino, 7% Black, 8% American Indian or Alaskan Native, 9% two or more races, and 2% Asian.

Table 2.7 2020 Population Estimate by Race/Hispanic Origin

Area	White	Hispanic or Latino	Black	American Indian and Alaska Native alone	Asian alone	Native Hawaiian and Other Pacific Islander alone	Some other race alone	Two or more races
Oklahoma	2,407,188	471,931	283,242	311,890	89,653	8,168	13,602	373,679
Atoka	9,303	548	565	2,192	49	4	58	1,424
Haskell	7,697	529	64	2,153	21	7	26	1,064
Latimer	5,818	344	42	2,216	67	5	16	936
LeFlore	31,920	3,573	841	6,890	292	32	50	4,531
McCurtain	18,159	1,894	2,538	4,290	124	460	40	3,309
Pushmataha	7,382	376	66	1,830	52	0	23	1,083
Pittsburg	28,388	2,266	1,227	6,388	280	35	62	5,127
Zone of Interest	108,667	9,530	4,606	17,568	696	527	152	12,967

Source: USCB, 2020 American Community Survey 5-Year (2009-2020) (USCB, 2022)

2.16.3 Education and Employment

Table 2.8 displays the highest level of education attained by the population ages 25 and over. In the zone of interest, 4.5% of the population has less than a 9th grade education, and another 10.5% has between a 9th and 12th grade education; 39.5% has a high school diploma or equivalent, and another 20% has some college and no degree; 9% has an Associate degree; 11% has a bachelor's degree, and 5% has a graduate or professional degree. In Oklahoma, 4% of the population has less than a 9th grade education; another 8% has between a 9th and 12th grade education; 31% has at least a high school diploma or equivalent; 23% has some college; 8% has an Associate degree; 17% has a bachelor's degree; and 9% has a graduate or professional degree.

Table 2.8 2020 Population Estimate by Highest Level of Educational Attainment, Population 25 Years of Age and Older

Area	Population 25 years and over	Less than 9th grade	9th to 12th grade, no diploma	High school graduate (includes equivalency)	Some college, no degree	Associate degree	Bachelor s degree	Graduate or professional degree
Oklahoma	2,611,680	101,338	197,694	812,618	602,288	214,840	448,366	234,536
Atoka	9,675	397	1,208	3,825	2,037	625	1,116	467
Haskell	8,749	420	888	3,464	1,720	899	989	369
Latimer	6,995	251	634	2,568	1,464	1,002	713	363
LeFlore	33,685	1,725	3,512	13,519	6,216	3,423	3,687	1,603
McCurtain	21,760	1,233	2,504	9,214	4,223	1,447	2,215	924
Pushmataha	7,870	411	769	3,473	1,535	528	629	525
Pittsburg	30,893	991	3,089	11,252	6,997	2,908	3,735	1,921
Zone of Interest	119,627	5,428	12,604	47,315	24,192	10,832	13,084	6,172

Source: USCB, 2020 American Community Survey 5-Year (2009-2020) (USCB, 2022)

Employment by sector is presented in Figure 2.7 (by percentage) and Table 2.9 (by number employed by county). Figure 2.7 shows that the largest percentage of the zone of interest is employed in the Educational services, and health care and social assistance sector at 24%, followed by 14% in Manufacturing, 11% in Retail Trade, 10% in the Arts, entertainment, and recreation, and accommodation and food services, 8% in Construction, and 6% in the Professional, scientific, and management, and administrative and waste management services. The remainder of the employment sectors each comprise 5% or less of the zone of interest's labor force.

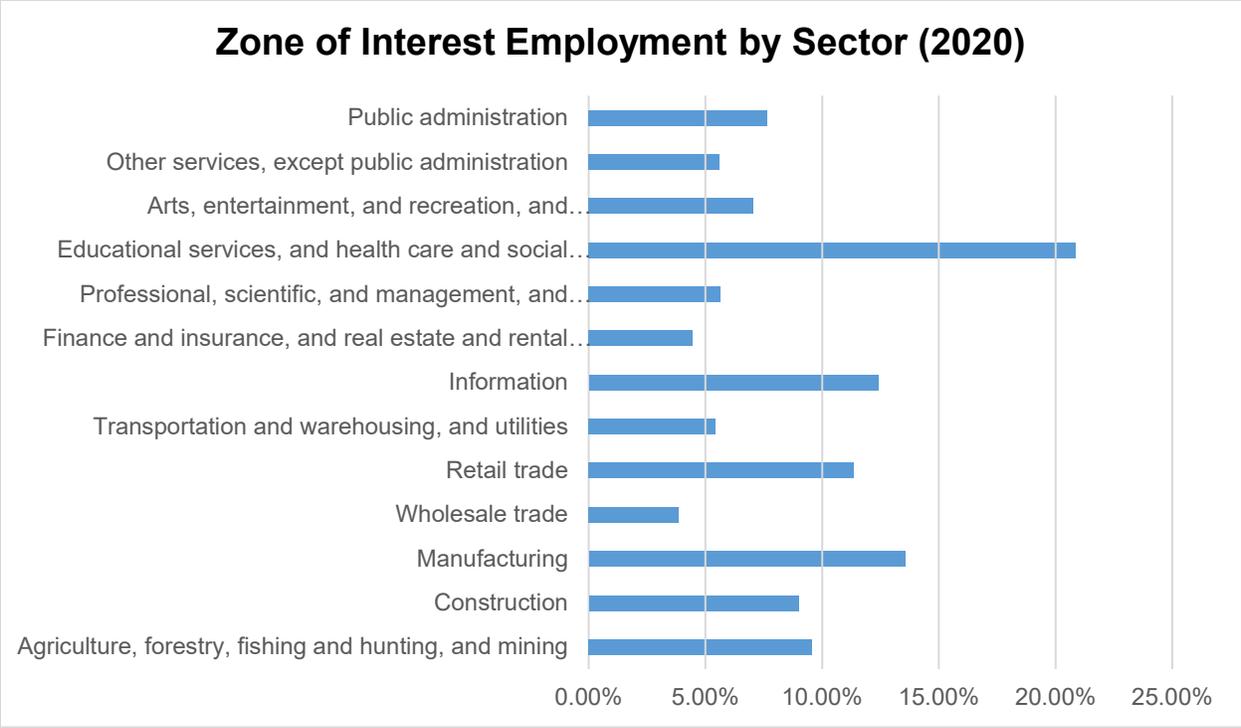


Figure 2-6 Zone of Interest Employment by Sector (2020)
 Source: USCB, 2020 American Community Survey 5-Year (2009-2020) (USCB, 2022)

Table 2.9 Annual Average Employment by Sector (2020)

Employment Sector	Geographic Area								
	Oklahoma	Atoka County	Haskell	Latimer	LeFlore	McCurtain	Pushmataha County	Pittsburg	Zone of Interest Total
Civilian employed population 16 years and over	1,779,157	4,794	4,891	3,764	19,156	12,895	3,961	17,633	67,094
Agriculture, forestry, fishing and hunting, and mining	77,366	392	784	1,173	1,448	649	1,023	947	6,416
Construction	126,998	529	454	685	1,319	1,120	768	1,160	6,035
Manufacturing	170,330	359	358	675	2,280	2,935	839	1,646	9,092
Wholesale trade	45,401	55	56	705	445	169	713	438	2,581
Retail trade	204,679	468	401	526	2,330	1,238	618	2,038	7,619
Transportation and warehousing, and utilities	97,283	310	313		1,419	775		823	3,640
Information	27,785	23	29	3,764	182	139	3,961	226	8,324
Finance and insurance, and real estate and rental and leasing	97,235	211	166	299	772	466	330	739	2,983
Professional, scientific, and management, and administrative and waste management services	154,280	216	189	278	1,105	537	441	1,031	3,797
Educational services, and health care and social assistance	401,780	1,136	1,184	178	4,610	2,662	184	4,046	14,000
Arts, entertainment, and recreation, and accommodation and food services	171,558	439	262	70	1,484	1,118	41	1,312	4,726
Other services, except public administration	94,216	228	344	320	776	547	535	1,014	3,764
Public administration	110,246	428	351	304	986	540	314	2,213	5,136

Source: USCB, 2020 American Community Survey 5-Year (2009-2020) (USCB, 2022)

A summary of the civilian labor force in the zone of interest is displayed in Table 2.10. In 2020, the zone of interest had an unemployment rate of 6.81%, slightly higher than the 5.10% unemployment rate in Oklahoma.

Table 2.10 Labor Force, Employment and Unemployment Rates, 2020 Annual Averages

Geographic Area	Civilian Labor Force	Number Employed	Number Unemployed	Unemployment Rate
Oklahoma	1,874,598	1,779,157	95,441	5.10%
Atoka County	5,009	4,794	215	4.30%
Haskell	5,314	4,891	423	8.00%
Latimer	4,180	3,764	416	10.00%
LeFlore	20,225	19,156	1,069	5.30%
McCurtain County	13,634	12,895	739	5.40%
Pushmataha County	4,309	3,961	348	8.10%
Pittsburg	18,886	17,633	1,253	6.60%
Zone of Interest	71,557	67,094	4,463	6.81%

Source: USCB, 2020 American Community Survey 5-Year (2009-2020) (2020 averages) (USCB, 2022)

2.16.4 Households, Income and Poverty

Table 2.11 displays the number of households and average household sizes in the state and zone of interest. There were approximately 67,000 households in the zone of interest with an average household size of 2.4.

Table 2.11 2020 Households and Household Size

Area	Total Households	Average Household Size
Oklahoma	1,493,569	2.57
Atoka County	5,200	2.41
Haskell	4,935	2.55
Latimer	4,083	2.42
LeFlore	18,309	2.66
McCurtain County	12,651	2.57
Pushmataha County	4,477	2.45
Pittsburg	17,846	2.34
Zone of Interest	67,501	2.4

Source: USCB, 2020 American Community Survey 5-Year (2009-2020) (USCB, 2022)

The median household income in the zone of interest ranged from \$39,091 in McCurtain County to \$47,511 in Pittsburg County in 2020, as displayed in Table 2.12. Per capita income in the zone of interest was \$22,818 in 2020, lower than the state of Oklahoma which had per capita income of \$29,873.

Table 2.12 2020 Median and Per Capita Income

Geographic Area	Median Household Income (All)	Per Capita Income
Oklahoma	\$53,840	\$29,873
Atoka County	\$42,392	\$22,575
Haskell	\$43,950	\$23,316
Latimer	\$40,044	\$25,534
LeFlore	\$41,900	\$21,234
McCurtain County	\$39,091	\$20,641
Pushmataha County	\$38,325	\$22,812
Pittsburg	\$47,511	\$25,685
Zone of Interest Median	\$41,900	\$22,818

Source: USCB, 2020 American Community Survey 5-Year (2009-2020) (USCB, 2022)

Table 2.13 displays the percentage of persons and families whose incomes fell below the poverty level in the past twelve months as of 2020. Within the zone of interest, McCurtain County had the greatest share of people with incomes below the poverty level at 23.8%, followed by Haskell County at 20.8%. In terms of families below the poverty level, all counties in the zone of interest have a greater share with incomes below the poverty level when compared to the state of Oklahoma.

Table 2.13 Percent of Families and People Whose Income in the Past 12 Months is Below the Poverty Level (2020)

Geographic Area	All Persons	All Families
Oklahoma	15.30%	9.10%
Atoka County	19.00%	13.80%
Haskell	20.80%	15.60%
Latimer	16.50%	14.10%
LeFlore	20.00%	16.20%
McCurtain County	23.80%	20.80%
Pushmataha County	18.70%	16.60%
Pittsburg	17.30%	12.90%
Zone of Interest Median	19.44%	15.90%

2.17 RECREATION FACILITIES, ACTIVITIES, NEEDS, AND TRENDS

Sardis Lake offers a variety of recreational opportunities along the Jackfork Creek Basin. The narrow valley characterized by dense forest provides a relaxing setting for camping, hunting, fishing, boating, hiking, or horseback riding.

Table 2.14 provides a listing of areas as well as a general summary of the primary recreation facilities provided.

Table 2.14 Recreational Facilities and Operating Agencies

FACILITIES	Managing Entity	Designated Campsites	Boat Launching Ramps	Restrooms	Courtesy Dock	Group Picnic Shelter	Fishing Facilities	Designated Picnic Area	Dump Stations	Swimming Area	Trails	Playground
LOCATION												
Overlook Park	U						P	A				
Mathis Park	U			*				A				
The Narrows	U		*	*	*							
Potato Hills North	U			*			P	A				
Potato Hills Central	U	E G Q		*			P		*		Q	*
Sardis Cove	U	E N	*	*	*				*			
Potato Hills South	U	N	*	*	*	GS	D	A		BE	H	*

* Exists at lake	Fishing C Fish Cleaning Stations D Fishing Docks P Fishing Piers	Trails B Bike Trails Q Equestrian Trails H Hiking Trails I Interpretive Hiking Trails M Multipurpose Trails
Managing Entity O Other U USACE	Picnic A Picnic Area G Group Picnic GS Group Picnic Shelter	
Camping E Electric Campsites N Non-electric Campsites T Pull-through Campsites G Group Camping Q Equestrian Campsites	Swimming BE Beach P Swimming Pool	

Source: USACE 2016B

2.17.1 Fishing and Hunting

Sardis Lake provides almost 8,000 acres of public hunting land for a multitude of wildlife species. Sardis Lake also offers thousands of acres of water for fishing, including large areas of timber and brush shelters. Both hunting and fishing are described in more detail in Chapter 5 under Multiple Resource Management Lands Wildlife Management Areas.

2.17.2 Camping and Picnicking

USACE manages seven parks at Sardis Lake. Park areas include a variety of group and individual camping options with general hookups, restrooms, showering facilities, swim beach and fishing docks. Campgrounds are quiet and spacious, ranging from primitive nonelectric sites to paved camping pads with water and electricity for fully equipped recreational vehicles. The lake also has facilities for equestrian groups with picnic shelters equipped with tables, electricity, and large outdoor cooking grills.

2.17.3 Water Sports

The lake offers a variety of recreational opportunities for boaters and non-boaters alike, including skiing, tubing, kayaking, swimming, or simply relaxing on or around Sardis Lake. Three individual boat launching ramps exist at The Narrows, Sardis Cove, and Potato Hills South along with one designated swim beach at Potato Hills South. Boating on the lake is in accordance with Oklahoma boating laws and USACE regulations. Just like traffic laws, boating laws exist to help prevent accidents.

2.17.4 Hiking

Sardis Lake provides a ¾ mile trail. This trail, the Lost Buffalo Trail, is located in the Potato Hills Recreation Area and connects Potato Hills Central camping area to Potato Hills South camping area, ending at Potato Hills South beach area. The trail is cleared and marked for easy hiking as it meanders through a diverse forest community.

2.17.5 Commercial Concession Leases

Concessionaires provide valuable services to the public at USACE lakes across the United States. USACE makes efforts to attract concessionaires that can establish suitable, well-maintained businesses offering desirable water-related services to the general public. Presently, there are no commercial concession leases on Sardis Lake.

2.17.6 Recreation Analysis – Trends and Needs

The 2017 Statewide Comprehensive Outdoor Recreation Plan (SCORP) was referred to in preparing the Plan. Preparation of the 2017 SCORP included numerous surveys including a statewide survey of cities and towns in Oklahoma, a survey of recreation professionals as Members of the Oklahoma Municipal League, a survey of Oklahoma residents, a survey of trail users and advocates, and hosted two Recreation Rallies, one in Tulsa and one in Oklahoma City, that were open to members of the public and representatives of public and private recreation service providers. The 2017 SCORP also summarized the results of a survey conducted by the USACE in 2010 to garner public input on public preferences for lake usage and development in Oklahoma. The USACE survey was required by Section 3134 of the Water Resources Development Act of 2007 which established what is referred to as the Oklahoma Lakes Demonstration Program. In addition, the SCORP assessed public preferences through cited research pertinent to the recreation needs and issues of the people of Oklahoma and those who visit the state for recreational experiences.

The 2017 SCORP references data from a survey of statewide residents with questions pertaining to reasons and barriers to participation in outdoor recreation, funding priorities, use of technology while recreating, opinions about outdoor recreation issues, and demographics. The following are a list of findings from survey of statewide residents in the SCORP:

- 485 individuals completed the survey, with 95% of the respondents being Oklahoma residents
- Nearly 70% of the respondents were female.
- 46% of the respondents indicated that they participate in outdoor recreation activities a few times per week.
- 51% of the respondents used one of the Oklahoma state parks for their most frequent outdoor recreation activity.
- The top 5 most important reasons for participation are outdoor recreation activities were: (1) for relaxation, (2) to enjoy the scenery, (3) for my mental well-being, (4) to be close to nature, and (5) to be with family and friends.
- The top 3 highest reasons identified as barriers to outdoor recreation participation were: (1) too busy with other activities, (2) lack of information, and (3) weather is not comfortable outside.
- The top 3 rated statements about issues and concerns for participation in outdoor recreation activities were: (1) recent budget cuts to parks and recreation providers have had a negative impact on outdoor recreation experiences in my area, (2) the parks and recreation in my community are

generally well-maintained, and (3) access to the public outdoor recreation lands in my area is adequate.

- The top funding priorities for respondents were: (1) improve/enhance existing parks and recreation areas and facilities, (2) acquire more land for parks and open space, and (3) build bike and pedestrian paths between places of work, school, shopping areas, and neighborhoods.
- 86% of respondents stated that they used technology such as smartphone, maps, and social media websites while participating in outdoor recreation.

A summary of the USACE study includes:

- People have favorite lakes and favorite locations on those lakes. Knowledgeable lake visitors also avoid specific areas on their favorite lakes and have good, personal reasons for avoiding those locations.
- Personal preference for specific lakes and locations is motivated by aesthetic appearance of the property, quiet experience, safety and security of the property, friendly staff, special events, and tradition. Respondents rarely mentioned commercial development or private support services as motivators for preference of a recreation location.
- People desire public access locations, campgrounds, and public day use recreation sites at USACE lakes. They do not desire or support private development to the same extent as they do public development.
- Respondents want more development and more day use at some USACE managed lakes.
- One-half of the respondents believe present facilities at USACE lakes are inadequate. The structured survey responses revealed desires for changes related to physical aspects of USACE lakes, while the open-ended responses revealed desires for changes related to policies.
- The changes related to facilities desired by respondents were by level of importance from most important: (1) hiking trails, (2) swim beaches, (3) bike trails, (4) playgrounds, (5) campgrounds, (6) equestrian trails and canoe trails, (7) marinas.
- Crowding at these lakes is neither perceived nor an issue as related to number and location of docks, number of people, number of boats, or presence of structures.
- Respondents desire more parking, improved access roads, increased law enforcement, and retention of fee revenue at the lakes of origin.

The SCORP and related studies document national and regional trends showing the highest demand for unpaved trails for walking and hiking with demand expected to increase in the near future. Given the outdoor recreation trends, it is evident that future recreation development at Sardis Lake should focus less on campgrounds and more on providing increased trail opportunities (of all kinds), more facilities for family and group gatherings, and more wildlife and nature-related viewing opportunities. With the popularity of hunting in Wildlife Management Areas, trails can be developed for hiking

and nature viewing during non-hunting seasons and provide parking and trailheads that can be used for both types of activities. The USACE should also place a high priority on the protection and retention of large, undeveloped parcels of public land. Doing so responds to outdoor recreation needs expressed in the SCORP and related studies. These large expanses of natural habitat on public land are held in high regard by the citizens throughout the zone of interest. This Plan responds to these needs through revised land classifications, new management objectives, and conceptual management plans for each land classification.

2.18 REAL ESTATE

A total of 21,713 acres of land were originally acquired in fee simple title for the Sardis Lake project by USACE. Later land disposals of fee title acres led to a current total of 21,703 acres of fee simple title. Originally, there were 1,487 easement acres, however, 338 acres were disposed leaving the current total of 1,148 easement acres. Easement acres reflect all easements on the project and not solely flowage easements. These are the official acres and may differ from those in other parts of this plan, which are for planning purposes only, due to improved measurement technology, erosion, and sedimentation.

2.18.1 Outgrants

The term “outgrant” is a broad term used by the USACE to describe a variety of real estate instruments wherein an interest in real property has been conveyed by the USACE to another party. Outgrants at Sardis Lake include leases, licenses, easements, consents, permits, and others which include the following (including consents):

- 10 Easements
- 8 Leases
- 2 License
- 3 Consents
- 0 Permits

The demand for real estate outgrants at Sardis Lake ranks fairly low among all USACE lake projects in terms of the total number and complexity. Management actions related to outgrants include routine inspections to ensure compliance with the terms of the outgrant, public safety requirements, and environmental compliance such as proper solid waste disposal and storage of pesticides. Additional actions include review of maintenance and construction proposals made by grantees. Leases are generally inspected annually for overall compliance, whereas minor outgrants are inspected approximately every five years or as needed. The management of outgrants is a major responsibility shared by the Operations and Real Estate Divisions of Tulsa District.

2.18.2 Guidelines for Property Adjacent to Public Land

It is the policy of the USACE to manage the natural, cultural, and developed resources of Sardis Lake to provide the public with safe and healthful recreational

opportunities, while protecting and enhancing those resources. While private exclusive use of public land is not permitted, property owners adjacent to public lands do have all the same rights and privileges as any other citizen on government owned property. Therefore, the information contained in these policies is designed to acquaint the adjoining landowner and other interested persons with the types of property involved in the management of government land at Sardis Lake.

2.18.3 Trespass and Encroachment

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 the 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, 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 the USACE Real Estate Division, with recommendations from Operations Division and Office of Counsel. The 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.

Incidents of unauthorized tree removal and mowing have occurred as well as the placement of personal property items such as outdoor furniture, firewood, boats, vehicles, and structures on USACE land. Trash dumping is an especially difficult and expensive problem at many USACE lakes. Efforts are continuously underway to resolve these unauthorized acts, but the sheer volume creates a workload that is difficult to accomplish.

CHAPTER 3 – RESOURCE GOALS AND OBJECTIVES

3.1 INTRODUCTION

The terms “goals” and “objectives” are often defined as synonymous, but in the context of this Master Plan resource goals express the overall desired end state of the Master Plan whereas resource objectives are specific task-oriented actions necessary to achieve the overall Master Plan goals.

3.2 RESOURCE GOALS

The following statements, paraphrased from EP 1130-2-550, Chapter 3, express the goals for the Sardis 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 the project’s 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 the project’s natural resources.

GOAL D. Recognize the project’s unique qualities, characteristics, and potentials.

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; bringing 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, Sardis Lake Project Office. The objectives stated in this Master Plan support the goals of the Master Plan, the USACE Environmental Operating Principles (EOPs), and applicable national performance measures. They 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 including:

- Oklahoma Comprehensive Wildlife Conservation Strategy – Ouachita Mountains, Arkansas River Valley, and West Gulf Coastal Plain Region
- Oklahoma Statewide Comprehensive Outdoor Recreation Plan

The objectives in this Master Plan are intended to provide project benefits, meet public needs, and foster environmental sustainability for Sardis Lake to the greatest extent possible. Tables 3.1 through 3.5 list the resource objectives for Sardis Lake. Objectives are subject to personnel and funding availability as well as recreational partners.

Table 3.1 Recreational Objectives

Recreational Objectives	Goals				
	A	B	C	D	E
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, and improved electrical service at campsites.	*		*		

Provide opportunities for day use activities, especially picnicking and trails. Provide additional campsites in popular areas.	*		*		
Manage recreation facilities in accordance with public demand. Examples include universally accessible fishing docks, fish cleaning stations near boat ramps, and playground equipment in day use and camping areas.	*		*		
Work with partners to expand existing trails and develop new ones.	*		*		*
Consider flood/conservation pool to address potential impact to recreational facilities (i.e., campsites, boat ramps, courtesy docks, etc.).	*	*	*	*	
Ensure consistency with USACE Natural Resource Management (NRM) Strategic Plan.					*
Monitor the Oklahoma SCORP to ensure that USACE is responsive to outdoor recreation trends, public needs, and resource protection within a regional framework. All plans by others will be evaluated considering USACE policy and operational aspects of Sardis 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
Prioritize 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 old growth forests characteristic of the Level III Ouachita Mountains and Level IV Western Ouachita's and Western Ouachita Valleys.	*	*		*	*
Work with Tribal Nations to provide access to any culturally significant sites and natural resources.		*		*	*
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 of Greatest Conservation Need, by implementing ecosystem management principles. Key among these principles is the use of	*	*		*	*

Natural Resource Management Objectives	Goals				
	A	B	C	D	E
native species adapted to the Level IV Western Ouachita's and Western Ouachita Valleys in restoration and mitigation plans.					
Manage high density and low-density recreations lands in ways that enhance benefits to wildlife while providing public recreation.					*
Optimize resources, labor, funds, and partnerships for protection and restoration of fish and wildlife habitats.		*			*
Minimize activities which disturb the scenic beauty and aesthetics of the lake.	*	*	*	*	
Implement prescribed fire, timber harvests, and removal of targeted species as a management tool to promote the vigor and health of forests, woodlands, and prairies.	*	*			*
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 species. Emphasize actions that promote butterfly and /or pollinator habitat, migratory bird habitat, habitat for birds listed by USFWS as Birds of Conservation Concern, and potential habitat for American Burying Beetle.	*	*		*	*
As funding permits, complete an inventory of timber resources and prepare a Forest Management Plan.	*	*		*	*

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

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, and USACE missions.	*	*	*	*	*
Promote USACE Water Safety message.	*		*	*	*
Educate adjacent landowners on policies and permit processes to reduce encroachment actions.	*	*	*	*	*
Work with Tribal Nations to provide educational and informational opportunities to the general public.	*	*	*	*	*

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

Table 3.4 General Management Objectives

General Management Objectives	Goals				
	A	B	C	D	E
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 and EP 1130-2-550 and applicable chapters in ER 405-1-12.	*				*
Manage project lands and recreational programs to advance broad national climate change mitigation goals, including but not limited to climate change resilience and carbon sequestration, as set forth in Executive Order 13990 and related USACE policy.					*

General Management Objectives	Goals				
	A	B	C	D	E
The USACE will continue to monitor both current and projected climate change impacts to operations and the authorized project purposes within USACE federal fee boundary and react through adaptation and resiliency projects, as funding becomes available.	*	*	*		*

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

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 histories.		*		*	*
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.

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

4.1 LAND ALLOCATION

All 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: Operations, Recreation, Fish and Wildlife, and Mitigation. Land allocations, unlike classifications, are assigned at the time of purchase and do not change unless authorized by congress. At Sardis Lake, the land allocation categories that apply are Operations and Recreation. Operations allocation is defined as those lands that are required to operate the project for the primary authorized purposes of flood risk management, water supply, recreation, water quality, and fish and wildlife. Recreation allocation is defined as lands acquired specifically for the authorized purpose of recreation, referred to as separable recreation lands. The remaining allocations of Fish and Wildlife or Mitigation would apply only if lands had been acquired specifically for these purposes. Of the total 10,640 acres, 879 acres are allocated to Recreation (per 1978 Master Plan) with the remaining 9,761 acres allocated to Project Operations.

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

The previous version of the Sardis Lake Master Plan included land classification criteria that were similar, but not identical to the current criteria. In the Plan, these prior land classifications were called Land-use allocations and zoning classifications. In the years since the previous Master Plan was published, wildlife habitat values, surrounding land use, and regional recreation trends have changed giving rise to the need for revised classifications. Table 4.1 identifies land and water surface classification changes from the 1978 Master Plan to the 2023 Master Plan Revision.

Table 4.1 Change from 1978 Land and Water Classifications to 2023 Land and Water Classifications

Prior Land Classifications (1978)	Acres	Land Classifications (2023)	Acres	Net Difference
Project Operations	193	Project Operations (PO)	238	45
Recreation – Intensive Use	1,505	High Density Recreation (HDR)	866	(639)
		Environmentally Sensitive Areas (ESA)	576	576
Recreation – Low Density	937	Multiple Resource Management – Low Density Recreation (LDR)	1,269	332
Not Classified	27			
Wildlife Management	5,093	Multiple Resource Management – Wildlife Management (WMA)	4,805	(288)
TOTAL	7,755		7,754	(1)
Prior Water Surface Classifications (1978)	Acres	Water Surface Classifications (2022)	Acres	Net Difference
Conservation Pool	13,468	Open Recreation	13,857	389
		Designated No-Wake	2	2
		Restricted	10	10
TOTAL	13,468		13,869	401
TOTAL FEE	21,223		21,623	400

* Total Acreage differences from the 1978 total to the 2023 totals are due to improvements in measurement technology, deposition/siltation, and erosion. Totals also differ due to rounding while adding parcels.

The previous land classifications were as follows:

- Project Operations:** Lands designated for project operations and classified for the safe and efficient operation of the project for those authorized purposes other than fish and wildlife. In all cases this included, but was not restricted to, land on which the operational structures are located. Agricultural uses of this land are permitted on an interim basis only when it is not in conflict with use for an authorized purpose.
- Operations: Recreation-Intensive Use:** Lands designated for operations and classified for use as developed public use areas for intensive recreational activities by the visiting public, including areas for concession and quasi-public developments. No agricultural uses are permitted on this land except on an interim basis.

- **Operations: Low-Density:** Lands designated for project operations and classified for low density recreational activities by the visiting public as required as open space between intensive recreational developments or between an intensive recreational development and land which, by virtue of use, is incompatible with the recreational development and would detract from the quality of the public use. Such incompatible land may be located either on the project or adjacent to the project. Land required for ecological workshops and forums, hiking trails, primitive camping, or similar low density recreational use available for a significant role in shaping public understanding of the environment will be under this allocation. No agricultural uses are permitted on this land except on an interim basis.
- **Recreation Lands:** Lands designated specifically for recreational purposes and classified for any recreational use. No agricultural uses are permitted on these lands except on an interim basis for terrain adaptable for maintenance or open space and/or scenic values.
- **Wildlife Management:** Lands designated for project operations and classified as habitat for fish and wildlife or for propagation of such species. Such lands should be continuously available for low density recreation activities.

4.2.3 Land and Water Surface Classifications

USACE regulations require project lands and waters to be classified in accordance with the primary use for which project lands are managed. There are six primary and four subcategories of land classifications identified in USACE regulations, as well as four water classifications which are as follows:

- Project Operations
- High Density Recreation
- Mitigation
- Environmentally Sensitive Areas
- Multiple Resource Management Lands
 - Low Density Recreation
 - Wildlife Management
 - Vegetative Management
 - Future/Inactive Recreation
- Water Surface
 - Restricted Areas
 - Designated No Wake Areas
 - Fish and Wildlife Sanctuary
 - Open Recreation

The land and water surface classifications for Sardis Lake were established after considering public comments, input from key stakeholders and lessees operating on USACE land, as well as USACE expert assessment. Additionally, wildlife habitat values identified in the WHAP and the trends analysis provided in the SCORP was used in land

and water classification decision making. Furthermore, the USACE consulted with Tribal Nations who have cultural and historical interests in the lands at Sardis Lake. 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 (PO)

This classification includes the lands managed for operation of the dam, stilling basin, project office, maintenance compound, and levee, all of which must be maintained to carry out the primary authorized purposes of flood risk management, water supply, recreation, and fish and wildlife. In addition to the operational activities taking place on these lands, limited recreational use may be allowed for activities such as public fishing access below the discharge outlet works. Regardless of any limited recreation use allowed on these lands, the primary classification of Project Operations will take precedent over other uses. There are 238 acres of Project Operations land specifically managed for this purpose.

4.2.5 High Density Recreation (HDR)

This classification includes lands developed, or available to be developed for intensive recreational activities 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. That 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 Sardis Lake, there are 866 acres classified as High Density Recreation land. Each of the High Density Recreation Public Use Areas is described briefly in Chapter 5 of this Plan.

4.2.6 Mitigation

This classification is used only for lands set aside for mitigation for the purpose of offsetting losses associated with the development of the project. This is not the same as allocated lands that are purchased for the purpose of mitigation. There are no lands at Sardis Lake with this classification.

4.2.7 Environmentally Sensitive Areas (ESA)

These are areas where scientific, ecological, cultural, and aesthetic features have been identified. Several areas are designated as ESAs at Sardis Lake primarily for the protection of a combination of sensitive habitats, aesthetics, and legally protected cultural resources. Each of these areas is discussed in Chapter 5 of this Plan and illustrated on the maps in Appendix A. Within those areas, hunting and other wildlife management activities are still permitted, but protection of sensitive resources takes priority over any other activity. The process of correspondence with Tribal Nations to designate ESAs is briefly described as a special topic in Chapter 6 of this Plan. There are 576 acres classified as ESA at Sardis Lake.

4.2.8 Multiple Resource Management Lands (MRML)

This classification is divided into four sub-classifications identified as: Low Density Recreation, Wildlife Management, Vegetative Management, and Future/Inactive Recreation Areas. A given tract of land may be classified using one or more of these sub-classifications, 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 6,074 acres of land under this classification at Sardis Lake. The following paragraphs list each of the sub-classifications, and the number of acres and primary uses of each.

Low Density Recreation (LDR)

These are lands that may support passive public recreational use (e.g., fishing, hunting, wildlife viewing, natural surface trails, hiking, etc.). There are 1,269 acres under this classification at Sardis Lake.

Wildlife Management (WM)

This land classification applies to 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 are 4,805 acres of land included in this classification at Sardis Lake.

Vegetative Management (VM)

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 no acres under this classification at Sardis Lake.

Future or Inactive Recreation (FOIR)

These are lands with site characteristics compatible with High Density Recreation development but have been undeveloped or planned for very long-range recreation needs. These areas are typically closed to vehicular traffic and will be managed as multiple resource management lands until development takes place. There are no acres classified as Future or Inactive Recreation.

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 the USACE or lessees with navigational or informational buoys or signs or are denoted on public maps and brochures. The Water Surface Classification map can be found in Appendix A of this Plan. The four sub-categories of water surface classification are as follows:

Restricted

Restricted water surface includes those areas where recreational boating is prohibited or restricted for project operations, safety, and security purposes. The areas include the water surface immediately surrounding the gate control tower upstream of the Sardis Lake Dam, around the water intake structures, just below the dam, and at designated swim beaches. There are 10 acres of restricted water surface at Sardis Lake.

Designated No-Wake

Designated No-Wake areas are intended to protect environmentally sensitive shorelines and improve boating safety near key recreational water access areas such as boat ramps. There are three boat ramps at Sardis Lake where no-wake restrictions

are in place for reasons of public safety and protection of property. There are 2 acres of designated no-wake water surface at Sardis Lake. No-wake areas are typically denoted by buoys in appropriate areas.

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. Sardis Lake has no acres of water surface designated as a Fish and Wildlife Sanctuary.

Open Recreation

Open Recreation includes all water surface areas available for year-round or seasonal water-based recreational use. This classification encompasses the majority of the lake water surface and is open to general recreational boating. Boaters are advised through maps and 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. There are 13,857 acres of water surface at Sardis Lake are designated as Open Recreation.

4.2.10 Project Easement Lands

Project Easement Lands are primarily 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 Sardis Lake there are easement lands where a flowage easement was acquired. 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 10 total easements at Sardis Lake totaling 1,148 acres which includes flowage easements as well as leases, licenses, and consents. A more detailed breakout of these easements is located in section 2.18.1.

CHAPTER 5 – RESOURCE PLAN

5.1 RESOURCE PLAN OVERVIEW

This chapter describes the management plans for each land use classification within the Master Plan. Management plans describe how the project lands and water surface will be managed in broad terms. A more descriptive plan for managing these lands resides in the Sardis Lake Operations Management Plan (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. 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. Acreages shown for the various land classifications were calculated using GIS technology and may not agree with lease documents, prior publications, or official land acquisition records.

5.2 PROJECT OPERATIONS

The Project Operations (PO) classification is land associated with the dam, spillway, levees, lake office, maintenance facilities, and other areas managed solely for the operation and fulfillment of the primary mission of the project. There are 238 acres of lands under this classification, all of which are managed by the USACE. The Project Operation land management plan consists of continuing to provide physical security necessary to ensure continued operation of the critical operational structures.

Public access to Project Operations lands is restricted although limited recreational access is permitted when lake operations allow. Regardless of any authorized public recreational use of lands that are classified as Project Operations, the operation, maintenance, and safety requirements of the dam and associated lands and infrastructure take priority over any recreational access.

5.3 HIGH DENSITY RECREATION

Sardis Lake has 866 acres classified as High Density Recreation. 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 Sardis Lake include 7 park areas that are managed by USACE. The USACE will continue to review requests and ensure compliance with applicable laws and regulations for proposed activities in all USACE-operated HDR areas. USACE will also continue to ensure that recreation areas are managed and operated in accordance with the objectives prescribed in Chapter 3. Additional best management practices to implement may include the following:

- Monitor the Oklahoma SCORP to ensure that USACE is responsive to outdoor recreation trends, public needs and resource protection within a regional framework. All plans by others will be evaluated considering USACE policy and operational aspects of Sardis Lake. Preserve and restore wildlife habitat in high density recreation areas.
- Continue coordination with Oklahoma Forest Service regarding the management of emerald ash borer and sustaining general tree health in high density recreation areas.
- Work with Tribal Nations to provide educational and informational opportunities to the general public.
- Manage project lands and recreational programs to advance broad national climate change mitigation goals, including but not limited to climate change resilience and carbon sequestration, as set forth in Executive Order 13990 and related USACE policy.

The following is a description of the parks operated by USACE on USACE lands at Sardis Lake, some of which are highly developed, while others have only basic facilities and limited development. Classifications for the various parks at Sardis Lake include Day Use, Class A (highly developed parks) and Class C (parks with basic facilities). Maps showing existing parks and facilities can be found in Appendix A.

5.3.1 USACE Managed High Density Recreation Areas

USACE is the largest federal provider of outdoor recreation, managing 12 million acres of lands and waters across the country. The recreation mission and overarching strategy of USACE is to manage and conserve natural resources while continuing to deliver a quality recreation program that is resilient considering today's fiscal realities and be responsive to the changing needs of the American people. The following parks are under USACE direct management.

Day Use Parks

- **Overlook Park**

Overlook Park (Photo 5.1) encompasses 4 acres. The overlook serves as a day use area offering views of the lake and the flood control structure. Fishing and picnicking are allowed at the site.



Photo 5.1 Overlook Park (Source: USACE)

- **Mathis Park**

Mathis Park (Photo 5.2) is located at the outlook channel and encompasses 35 acres. The park is located below the dam and offers access to the river for fishing as well as designated picnic areas. Vault toilets are available.



Photo 5.2 Mathis Park (Source: USACE)

- **The Narrows**

The Narrows (Photo 5.3) is located on the northwest end of the lake. It encompasses 2 acres and serves as a boat launch area for the lake. A courtesy dock is available for ease of boat launching. Vault toilets are available.



Photo 5.3 The Narrows (Source: USACE)

- **Potato Hills North**

Potato Hills North (Photo 5.4) encompasses 1.5 acres and serves as a fishing area for local visitors. There are two designated picnic areas on site. Vault toilets are available.



Photo 5.4 Potato Hills North (Source: USACE)

Class A Parks

- **Potato Hills Central**

Potato Hills Central (Photo 5.5) encompasses 85 acres, with 12 acres developed for recreation. The park is operated by USACE and offers 94 reservable campsites. There are two group camping areas that can accommodate up to 14 guests. Electric hookups, flush toilets and other modern amenities are available. The park has 5 campsites that can accommodate equestrian riders. These sites are adjacent to the lake's 15-mile equestrian trail. The campground has plenty of shade and open grassy areas for games and recreation. There is a fishing pier and playground within the park.



Photo 5.5 Potato Hills Central (Source: USACE)

Class C Parks

- **Sardis Cove**

Sardis Cove (Photo 5.6) encompasses 33 acres. The park is operated by the USACE and offers 45 reservable campsites. Electric hookups are available at 22 sites, and vault toilets and other modern amenities are provided. The campground has plenty of shade and open grassy areas for games and recreation. The park offers a boat ramp and courtesy dock.



Photo 5.6 Sardis Cove (Source: USACE)

- **Potato Hills South**

Potato Hills South (Photo 5.7) encompasses 18 acres. The park is operated by the USACE and offers 18 reservable non-electric campsites and is the starting point for the Eagle Trail. Vault toilets are provided here. The day use recreation area offers a beach, picnic area, fishing pier, two reservable shelters, courtesy dock and a boat ramp. Water borne and vault toilets are available.



Photo 5.7 Potato Hills South (Source: USACE)

Trails

There are two trails on Sardis Lake USACE lands, both of which are managed by USACE. All trails are open year-round and offer a variety of activities and experiences.

- **Eagle Trail**

Eagle Trail (Photo 5.8) is located in the Potato Hills South/Central Recreation Areas. The trail connects Potato Hills Central camping area to Potato Hills South camping area and can be entered from each point. The trail is 3/4 mile in length and has been cleared and marked for easy location as it meanders through a diverse forest community.



Photo 5.8 Eagle Trail (Source: USACE)

- **Sardis Lake Equestrian Trail**

The Sardis Lake Equestrian Trails originate out of Potato Hills Central Recreation Area. The trails are located to the north of Potato Hills Central Recreation Area and to the west of State Highway 2. Riders can enjoy over 15 miles of well-marked trails with varying terrain and good footing. The scenery along the trail is second to none with creek bottoms, ridges, and gorgeous views of Sardis Lake. Wildlife is abundant along the trail with deer, hogs and turkey commonly being seen. Designated equestrian campsites with corrals are available in D-Loop.

5.4 MITIGATION

The Mitigation classification is applied to lands that were acquired specifically for the purpose of offsetting losses associated with the development of the project. There are no acres at Sardis Lake under this classification. USACE lands at Sardis Lake

where environmental mitigation activities have taken place in association with real estate easements or other outgrants are not included in lands classified for Mitigation.

5.5 ENVIRONMENTALLY SENSITIVE AREAS

Ten (10) distinct areas totaling 576 acres are designated as Environmentally Sensitive Areas (ESA). These are areas where scientific, ecological, cultural, or aesthetic features have been identified. Designation of these lands is not limited to just lands that are otherwise protected by laws such as the Endangered Species Act, the National Historic Preservation Act (NHPA), or applicable state statutes. The primary management objective for ESAs is to allow existing compatible uses to continue but to protect sensitive resources from intensive development, use, or disturbance beyond that which currently exists. In general, these areas must be managed to ensure that they are not adversely impacted. With the exception of natural surface pedestrian trails and minimal visitor parking areas, limited or no development of public use facilities is allowed on these lands and no real estate outgrants for easements should be granted unless disturbance can be confined to the boundaries of existing easements. No agricultural or grazing uses are permitted on these lands unless necessary for a specific resource management benefit, such as prairie restoration or provision of supplemental browse and forage for wildlife. An ESA classification provides the highest level of ecological protection among the various land use classifications. Future management of ESAs includes monitoring and surveillance of cultural resource sites to ensure they are not damaged or destroyed. For a brief description of consultation with Tribal Nations for ESA and land classification changes, see Chapter 6.

The ESAs listed and described in Table 5.1 provide the map reference (found in Appendix A), number of acres for each ESA and a brief location description of the ESA. Many of the ESAs were designated to protect culturally and/or historically significant sites. Since the purpose of the ESA designation is to protect those sites, many of the ESAs have been expanded well beyond the known cultural site to avoid identifying the exact location of the site and to protect potential additional unidentified sites adjacent to those which are being protected.

Table 5.1 ESA Listing

ESA#	Acres	Location and Description
ESA 1	54	ESA 1 is located north of Potato Hills South.
ESA 2	18	ESA 2 is located across the cove from Potato Hills North in the Buffalo Creek Area.

ESA#	Acres	Location and Description
ESA 3	27	ESA 3 is located south of SW 240 th on the north shore of Sardis Lake. The area is surrounded by Wildlife Management lands.
ESA 4	79	ESA 4 is also located south of SW 240 th on the north shore of Sardis Lake. ESA 3 and 4 are intersected by Sardis Cemetery Road.
ESA 5	50	ESA 5 is an island located in the northern area of the main body of the lake.
ESA 6	22	ESA 6 surrounds the existing Sardis Cemetery.
ESA 7	24	ESA 7 is located near the south end of SW 1060 th Avenue on the north shore.
ESA 8	21	ESA 8 is also located on the north shore of Sardis lake. The area is on the northeast side of N 4260 Rd.
ESA 9	166	ESA 9 is on the far western side of the lake, south of Savage Rd.
ESA 10	115	ESA 10 is located in the Jackfork Creek Area on the west side of the lake. The majority of the area is surrounded by Wildlife Management lands.

5.6 MULTIPLE RESOURCE MANAGEMENT LANDS

Multiple Resource Management Lands (MRML) are, as the name implies, lands that serve multiple purposes, but that are sub-classified and managed for a predominant use. There are no lands sub-classified as Vegetation Management (VM) or Future or Inactive Recreation Areas at Sardis Lake. The following paragraph describes the sub-classification, how they are managed, and provides the number of acres in each sub-classification.

5.6.1 Wildlife Management

There are 4,805 acres of MRML – Wildlife Management, which is the dominant land classification at Sardis Lake. These are lands designated primarily for the stewardship of fish and wildlife resources but are available for passive recreation use such as natural surface trails, hiking, and nature study. The USACE goals and objectives for these lands is to continue to ensure wildlife management practices are ecologically sustainable and provide the intended public benefits. 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. Future management 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. Additional best management practices may include use of erosion control blankets that do not pose entrapment hazards to wildlife; elimination of open-top vertical pipes that pose an entrapment hazard to wildlife; minimize nighttime lighting and only use down-shielded lighting to prevent disorientation of night-migrating birds; follow USFWS guidelines for building glass to prevent bird collisions; preserve and restore wildlife habitat in high density recreation areas; ensure that mowing practices provide standing tallgrass over winter to provide essential cover for wintering birds; and report sightings of state-listed species and presence of rare vegetative communities to USFWS and ODWC. Priority will be given to the improvement or restoration of existing wetlands, or the construction of wetlands where topography, soil type, and hydrology are appropriate.

Use of available funds for wildlife management must be prioritized to meet legal mandates and regional priorities. While exceptions can occur, management actions will be guided by the following, in order of priority: 1) Protect federal and state-listed threatened and endangered species. 2) Meet the needs of species protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. 3) Meet the needs of rare species and Species of Greatest Conservation Concern. 4) Meet the needs of resident species not included in the above priorities.

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 the USACE and approved through state regulatory processes. Natural surface pedestrian trails are appropriate for most areas designated as Wildlife Management and can be implemented through partnerships with other agencies.

Fishing and Hunting Opportunities

Sardis Lake is known for quality wild turkey, squirrel and waterfowl hunting; however, hunters can explore nearly 8,000 acres of public hunting land for a multitude of wildlife species. Public hunting maps are available at the Sardis Lake Project Office and on the USACE Tulsa District website. Available game includes wild turkey, squirrel,

and waterfowl. State of Oklahoma hunting and fishing laws are enforced on project lands.

Fishing in Buffalo, Anderson, and North and South Jackfork Creeks offer plentiful bass, crappie, and catfish fishing opportunities. The ODWC manages a fish stocking program to include channel and blue catfish, smallmouth bass, native largemouth and Florida largemouth bass, and forage fish like threadfin shad and bluegill. Large areas of timber and brush were left standing to provide plenty of habitat. Brush shelters have been strategically placed throughout the lake.



Photo 5.9 Fishing Signage (Source: USACE)

5.6.2 Low Density Recreation

There are 1,269 acres of MRML – Low Density Recreation at Sardis Lake. 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.

5.7 WATER SURFACE

At conservation pool level of 599.0 NGVD29 there are 13,869 acres of water surface. The USACE is the primary agency responsible for managing the recreational use of the water surface at Sardis Lake. Enforcement of water surface rules and regulations is a shared responsibility between the USACE, ODWC, and the Marine Enforcement Division of the Oklahoma Highway Patrol (OHP). Zoning of 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 designated using the following classifications:

5.7.1 Restricted

Restricted water surface includes those areas where recreational boating is prohibited or restricted for project operations and safety and security purposes. Vessels are not allowed to enter Restricted water surface. The total acreage of Restricted water surface is approximately 10 acres. The Restricted water surface at Sardis Lake includes the area around the intake gate control tower near the dam, immediately below the dam which is restricted for safety and security concerns. Also, small areas at the municipal water intake structure (Photo 5.10), and around the designated swimming beach. Future management calls for one or more of the following management measures: placement of buoys; placement of signs at swimming beach; and describing the areas on maps available to the public.



Photo 5.10 Water Intake Structure (Source: USACE)

5.7.2 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, swim beaches, and marinas. Designated No-Wake areas at Sardis Lake include approximately 2 acres. Future plans include for No-wake Areas include continuing placement of buoys, placement of signs near boat ramps, and describing the areas on maps available to the public.

5.7.3 Open Recreation

Open Recreation includes all water surface areas available for year-round or seasonal water-based recreational use. Approximately 13,857 acres of Sardis 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 Oklahoma. The USACE encourages all boaters and swimmers to wear lifejackets at all times and to learn to swim well.

5.7.4 Recreational Seaplane Operations

Recreation seaplane landings and takeoffs may occur on water surface areas where this activity is not prohibited. A map depicting areas where seaplane landings and takeoffs are prohibited can be found in Appendix A. The USACE imposed restrictions that apply to seaplane operations are published by the Federal Aviation Administration in their Notice to Airmen and are also set forth in Title 36 of the Code of Federal Regulations, Chapter III, Section 327.4. Note that once a seaplane is on the water it is considered to be a water vessel and falls under the guidelines for watercraft.

CHAPTER 6 – SPECIAL TOPICS/ISSUES/CONSIDERATIONS

6.1 COMPETING INTERESTS ON THE NATURAL RESOURCES

Sardis Lake is a multi-purpose project with numerous authorized purposes. The authorized purposes accommodate the needs of federal, state, and municipal users which have developed over time and have contractual rights that must be honored. The benefits provided by virtue of authorized purposes are critical to the local and regional economies and are of great interest to the public. Aside from operating the reservoir to meet the needs of those entities with contractual rights, there are many competing interests for the utilization of federal lands including recreational users, adjacent landowners, those who own mineral rights, utility providers, and all entities that provide and maintain public roads. A growing population and increasing urbanization places additional stress on these competing interests through increased demand for water resources and recreation spaces as well as diminishing quality and space for natural habitat and open spaces. Balancing the interests of each of these groups to ensure that valid needs are met while at the same time protecting natural and cultural resources is a challenge. The purpose of this Plan is to guide management into the foreseeable future to ensure responsible stewardship and sustainability of the project's resources for the benefit of present and future generations.

6.2 UTILITY CORRIDORS

USACE policy allows for the establishment of designated corridors on project lands, where feasible, to serve as the preferred location for future outgrants such as easements for roads or utility lines. After obtaining public input and examining the location of existing roads and utility lines on project lands, and due to the relatively low demand for easements at Sardis Lake, the USACE decided that the creation of utility corridors would not be necessary. Any entity seeking a utility easement to cross USACE property must research alternate routes around USACE property and demonstrate that a feasible alternative does not exist. Additionally, a NEPA permitting process would be required.

6.3 PUBLIC HUNTING ACCESS

Oklahoma has less public land available for hunting than many states, so public access on USACE lands is often the best opportunity for many Oklahoma residents for hunting. Hunting at all USACE projects is in accordance with applicable Federal and State regulations. Generally, all USACE hunting areas are open for public hunting of all legal species with the use of any legal weapon for that open season except in areas designated for restricted hunting. Hunting is prohibited in developed recreational areas, lands around dams, and around other structures. Vehicles must remain on established roads, and camping is allowed in designated areas only. Individuals interested in hunting on USACE lands should visit the Tulsa District Hunting Information webpage or visit the Sardis Lake Office for more information. Hunting maps, guidelines, and restrictions are available at the USACE Tulsa District Website and Sardis Lake Office.

6.4 CULTURAL RESOURCES AND CONSULTATION WITH TRIBAL NATIONS

It is required for federal agencies to consult with affiliated Native American Tribes on activities that take place on federal land under federal guidance 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 1969 NEPA as amended. USACE summarizes the guidance provided in these laws in ER and EP 1130-2-540. Additionally, Executive Order 13007 states that each federal agency with responsibility for the management of Federal lands shall accommodate access to and ceremonial use of Native American sacred sites by religious practitioners and avoid adversely affecting the physical integrity of such sacred sites.

The Tulsa District takes its responsibilities for consultation on a government-to-government basis very seriously and consulted extensively with Native American Tribes on the Sardis Lake Master Plan. The Tulsa District consulted with Tribes primarily on developing ESA's and ensuring areas of Tribal concern were addressed. This process has allowed Tribes to become more familiar with USACE property at Sardis Lake, and has increased USACE staff awareness of Tribal histories, sites, and concerns in the area. This exchange of knowledge from developing the master plan will allow USACE staff to better engage with Tribes on future projects at Sardis Lake and will likely lead to more efficient reviews and better outcomes meeting objectives for both parties.

6.5 SETTLEMENT OF WATER-RELATED CLAIMS

In accordance with Section 3608 of the Water Infrastructure Improvements for the Nation (WIIN) Act, Public Law 114-322, including the Settlement Agreement between the State of Oklahoma, Choctaw Nation of Oklahoma, Chickasaw Nation, Oklahoma City, and the United States referenced therein, it is proposed that roughly 48% of the conservation pool at Sardis Lake be maintained for the benefit of recreation and fish and wildlife purposes. USACE was not a party to the Settlement Agreement but, as directed in Section 3608, has facilitated approval of the Amended Storage Contract Transfer Agreement (ASCTA) transferring responsibility of the 1974 water supply contract from the Oklahoma Water Resources Board to the City of Oklahoma City and the Oklahoma City Water Utilities Trust. As referenced in the ASCTA and as further identified in the Settlement Agreement, Sardis Lake Release Restrictions set aside water supply conservation storage for lake level maintenance for the benefit of recreation and fish and wildlife. The referenced Sardis Lake Release Restrictions do not constitute a reallocation.

Upon becoming effective as outlined in Section 3608, the City of Oklahoma City's agreement to maintain the lake levels as proposed will help serve the goals of the Sardis Lake Master Plan identified in Chapter 3.

CHAPTER 7 – PUBLIC AND AGENCY COORDINATION

7.1 PUBLIC AND AGENCY COORDINATION OVERVIEW

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 Sardis 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 NEPA process. Public involvement is especially important at Sardis Lake to ensure that future management actions are environmentally sustainable and responsive to public outdoor recreation needs. The following milestones provide a brief look at the overall process of revising the Sardis Lake Master Plan.

The USACE began planning to revise the Sardis Lake Master Plan in the fall of 2021. The objectives for the Master Plan revision are to (1) revise land classifications to reflect changes in USACE land management policies since the 1978 Master Plan, (2) prepare new resource goals and objectives, and (3) revise 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 AND PUBLIC MEETINGS

On 24 March 2022 a public information meeting was held at Clayton Public School to inform the public of the intent to revise the master plan. The public input period remained open for 30 days from 24 March 2022 to 23 April 2022. At the public information meeting a presentation was given that included the following topics:

- What is a Master Plan?
- What a Master Plan is Not
- Why Revise a Master Plan?
- Overview of the National Environmental Policy Act (NEPA) process
- Master Planning Process
- Instructions for submitting comments

For Sardis Lake, USACE received two (2) comments.

Table 7.1 Comments from Initial Comment Period

Comment	Response
Comments from the Choctaw Nation	
<p>Sardis Lake lies at the heart of the Choctaw Nation of Oklahoma’s Reservation. The Lake’s proximity to the Choctaw Nation’s Council Grounds at Tushkahoma stands as a testament to its importance to the Tribe and its people. We have fought for the protection of the lake for the people of southeastern Oklahoma. In doing so, we instituted lake level protections so that recreational and economic activities may not suffer because of extremely low lake levels. We believe that the lake should be enjoyed by the public and used as a resource for families to enjoy time outdoors together. We pray that the Army Corps’ consideration for the management of land around Sardis Lake strike a balance between the protection of the natural resource while providing for sufficient opportunities for public enjoyment and economic development of the area. Any further resources that the Army Corps may appropriate to Sardis Lake for the enhancement of public amenities would be greatly appreciated.</p> <p>We hope that the Army Corps of Engineer’s continue to allow the current designation of existing Recreation Intensive-Use areas identified in the Sardis Lake Master Plan and retain that classification for the following areas:</p> <ul style="list-style-type: none"> Potato Hills South Potato Hills Central Potato Hills North 	<p>Noted. USACE seeks to address this comment through the goals and objectives for Sardis Lake located in Chapter 3 of this MP. Resource goals and objectives were created to target the balance between public needs, environmental sustainability, and project benefits to the greatest extent possible. Additionally, the study team determined proposed land classification changes, see Chapter 8, Table 8.1 and 8.2. These changes are proposed in part based on comments received.</p>

Comment	Response
<p>Mathies Park</p> <p>Sardis Cove</p> <p>The Narrows</p> <p>The Recreation Intensive-Use classification for the area on the North side of the lake near the mouth of Anderson Creek known as Yanush Landing may be better re-zoned as a low-density recreation area.</p> <p>We support the remaining lands to be continued to be used and managed for all wildlife endemic to the area. The people of the Choctaw Nation enjoy an inherent right to hunt and fish within our Reservation. Yet lack extensive lands to hunt game for sustenance and/or cultural and traditional practices. The use of the land surrounding the lake is very valuable to the Choctaw People for this purpose.</p> <p>Previous to its impoundment, the area in and around Sardis Lake sits was occupied by Choctaw people and other communities. Sardis Lake Cemetery is located under the lake, and a variety of other cultural resources may be located along the shoreline. Low water levels, caused by drought or drawdown, have the potential to expose these cultural sites to wave action and potential looting. Choctaw Nation would like to consult with the appropriate USACE staff concerning a cultural resources management plan for the lake.</p> <p>Finally, the Choctaw Nation supports any special designation for the Sardis Lake Church and Cemetery. This is a sensitive site that must be monitored and protected</p>	

Comment	Response
<p>so that shoreline erosion doesn't impact the grounds of this special community site.</p> <p>The Army Corps of Engineers is a valuable partner the Choctaw Nation. It is our request that the Army Corps continue to manage and operate this lake to the high standard for which they are known and this community deserves.</p>	
Comments From Oklahoma City and the Oklahoma City Water Utilities Trust	
<p>As legal counsel to the City of Oklahoma City and the Oklahoma City Water Utilities Trust (collectively "Oklahoma City"), I am providing Oklahoma City's following comments for the Corps' Sardis Lake Master Plan Revision ("Sardis MP Revision"). Pursuant to the November 6, 2018 Amended Storage Contract Transfer Agreement ("ASCTA"), Oklahoma City has been recognized by the Secretary of the Army, through his representative, as the assignee and transferee of the 1974 Contract between the United States of America and the Water Conservation Storage Commission of the State of Oklahoma (now the Oklahoma Water Resources Board, or "OWRB") for Water Storage Space in Clayton Lake (now Sardis Lake) ("1974 Contract"). The final assignment and transfer of the 1974 Contract to the City is still contingent upon confirmation by the Oklahoma Supreme Court of Oklahoma City's OWRB streamwater permit for Sardis Lake. However, we are confident that finalization of the assignment and transfer will occur as contemplated by the settlement agreement between the State of Oklahoma, Choctaw Nation,</p>	<p>Noted. Reference to the Settlement Agreement and Settlement Act has been added under Chapter 6 – Special Topics/Issues/Considerations. Setting aside around 48% of the conservation storage capacity for recreation and fish and wildlife benefits will help serve the goals for the Sardis Lake Master Plan identified in Chapter 3.</p> <p>As set out in Sec. 3608(d)(6) of the Settlement Act, the amended storage contract and associated approval are deemed consistent with the authorized purposes of Sardis Lake, do not affect the authorized purposes for which the project was authorized, surveyed, planned, and constructed, and shall not constitute a major operational change. Additionally, water supply and lake level management are generally beyond the scope of project master plans and addressed in a separate water control plan. Therefore, no additional revisions to the Master Plan are proposed.</p>

Comment	Response
<p>Chickasaw Nation, Oklahoma City, and the United States ("Settlement Agreement"), which was authorized and memorialized into law by Congress under Section 3608 of Pub. L. 114-322, 130 Stat. 1796 (Dec. 16, 2016) ("Settlement Act"). These comments are provided under the assumption that such finalization of the assignment and transfer of the 1974 Contract to Oklahoma City will occur. Under the ASCTA and the 1974 Contract, Oklahoma City is the "User" of the 297,200 acre-feet of the conservation storage in Sardis Lake. Further, the ASCTA and the Settlement Agreement contain "Sardis Lake Release Restrictions" that limit Oklahoma City's ability to release water from its conservation storage in Sardis Lake and which thereby control Sardis Lake surface elevations. However, because "[a] MP does not address the specifics of regional water quality, shoreline management, or water level management," the operation and use by Oklahoma City of Sardis Lake conservation storage is not within the scope of the Sardis MP Revision. (Corps, Engineering Pamphlet (*EP) 1130-2-550, Project Operations: Recreation Operations and Maintenance Guidance and Procedures (Nov. 15, 1996, rev. Aug. 15, 2002) ("EP 1130-2-550"), §3-2..) Consequently, Oklahoma City's comments do not address the City's use of Sardis Lake conservation storage capacity and water as authorized by the 1974 Contract, the ASCTA, the Settlement Agreement, the Settlement Act, and the City's OWRB streamwater permit. Subject to the foregoing,</p>	

Comment	Response
<p>Oklahoma City provides the following comments regarding the Sardis MP Revision. These comments are organized based on the Master Plan Content organization provided under EP 1130-2-550. Applicable Federal Statutes. (Id. at §3-5.f.(1)) The Sardis MP's required checklist of applicable statutes for the appendix of references should include the Settlement Act, Section 3608 of Pub. L. 114-322, 130 Stat. 1796 (Dec. 16, 2016). The Settlement Agreement, as conformed on January 15, 2021, should also be included in the appendix of references.</p> <p>Project Authorization. (Id. at §3-6, Chapter 1.a.) The Sardis MP's description of Sardis Lake project authorization should include the Settlement Act.</p> <p>Project Purpose. (Id. at §3-6, Chapter 1.b.) Consistent with Section (d)(4) of the Settlement Act, the Sardis MP should recognize as Sardis Lake project purposes the Congressionally approved allocation of the use of conservation storage capacity in Sardis Lake for administrative set-aside subcontracts, Oklahoma City water supply, and fish and wildlife and recreation as provided by the ASCTA. Project Setting and Factors Influencing Management and Development. (Id. at §3-6, Chapter 2.) In addition to being limited in scope as appropriate for a MP, management and development of Sardis Lake must be consistent with the above-described Project Authorization and Project Purpose. Subject to and consistent with the foregoing, the interests of the Choctaw Nation in the management and development of Sardis Lake should be</p>	

Comment	Response
<p>acknowledged and facilitated by the Sardis MP.</p> <p>Resource Objectives. (Id. at §3-6, Chapter 3.) In addition to being limited in scope as appropriate for a MP, resource objectives for Sardis Lake must be consistent with the above-described Project Authorization and Project Purpose. Subject to and consistent with the foregoing, the interests of the Choctaw Nation in the resource objectives of Sardis Lake should be acknowledged and facilitated by the Sardis MP.</p> <p>Land Allocation, Land Classification, Water Surface, and Project Easement Lands. (Id. at §3-6, Chapter 4.) When delineating and identifying interests under this chapter, the Sardis MP should recognize Oklahoma City's interests in the project "operations." Under Article 1(b)(2) of the 1974 Contract, Oklahoma City [S]hall have the right to withdraw water from the lake, or to order releases to be made by the Government through the outlet works, in the Dam,, to the extent the aforesaid storage space (in conservation storage] will provide; and shall have the right to construct all such works, plants, pipelines, and appliances as may be necessary and convenient for the purpose of diversion or withdrawals, subject to the approval of the Contracting Officer as to design and location. The grant of an easement for right-of-way, across, in and upon the land of the Government at the Project shall be by a separate instrument in a form satisfactory to the Secretary of the Army, without</p>	

Comment	Response
<p>additional cost to the User.... Subject to the conditions of such casement, the User shall have the right to use so much of the Project land as may reasonably be required in the exercise of the rights and privileges herein granted. Consistent with the above, and consistent with the Settlement Act, the Settlement Agreement, and the ASCTA, Oklahoma City plans to take delivery of water stored in Sardis Lake conservation storage by release of the water through the Sardis Lake outlet works to Jackfork Creek for conveyance to Moyers Crossing on the Kiamichi River. Water delivered to Moyers Crossing either will be diverted for delivery to Oklahoma City's service arca or will remain in the Kiamichi River in the SO cfs Bypass.</p> <p>Resource Plan. (Id. at §3-6, Chapter S.) In addition to being limited in scope as appropriate for a MP, the resource plan for Sardis Lake must be consistent with the above-described Project Authorization and Project Purpose, and should also reflect Oklahoma City's interest in project operations discussed above. Subject to and consistent with the foregoing, the interests of the Choctaw Nation in the resource plan for Sardis Lake should be acknowledged and facilitated by the Sardis MP.</p> <p>Special Topics/Issues/Considerations (Id. at §3-6, Chapter 6.) It would be appropriate for the Sardis MP to discuss the unique role of Sardis Lake in the historic water settlement, as memorialized in the Settlement Agreement and approved by Congress in the Settlement</p>	

Comment	Response
<p>Act, between the Choctaw Nation, the Chickasaw Nation, the State of Oklahoma, and Oklahoma City.</p> <p>Bibliography. (Id. at §3-6, Chapter 9.) See earlier comment regarding "Applicable Federal Statutes."</p> <p>Oklahoma City thanks the Corps for the opportunity to provide the foregoing comments to the Sardis MP Revision, and requests to be included in future notifications and processes related to the Sardis MP Revision.</p>	

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

A public information open house was held for the Sardis Lake Master Plan revision at the Clayton Public School Cafeteria in Clayton, Oklahoma, 74053 on 30 March 2023. The meeting was attended by five individuals. The purpose of this meeting was to provide attendees with information regarding the proposed Master Plan revision as well as to provide them the opportunity to provide comments on the proposed Draft Master Plan. The open house included the following topics:

- What is a Master Plan?
- What a Master Plan is Not;
- Why Revise a Master Plan?
- Overview of the National Environmental Policy Act (NEPA) process;
- Master Planning Process;
- Proposed Changes to the Master Plan; and
- Instructions for submitting comments.

The public input period remained open for 30 days from 30 March 2023 to 29 April 2023. During the 30-day comment period, the USACE did not receive public, tribal, or agency comments.

CHAPTER 8 – SUMMARY OF RECOMMENDATIONS

8.1 SUMMARY OVERVIEW

The preparation of this Master Plan for Sardis Lake followed the 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 guidance include the preparation of contemporary Resource Objectives, Classification of project lands using the 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, consideration of regional recreation and natural resource management priorities identified by other federal, state, and municipal authorities, and consultation with local Tribal Nations.

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 Sardis Lake as also reflected in ER 1130-2-540 change 2 dated July 2005. Factors considered in the Plan development were identified through public involvement and review of regional and statewide planning documents including the 2012 Oklahoma SCORP, Mobility Plans by ODOT, EPA Ecoregion Handbook and descriptions, and the USFWS ICAP website. This Master Plan will guide the long-term sustainability of the outdoor recreation program and natural resources associated with Sardis Lake.

8.2 LAND CLASSIFICATION PROPOSALS

A key component in preparing this Master Plan was examining prior land classifications and addressing the needed transition to the updated land classification standards that reflect how lands are being managed now and will be managed in the foreseeable future. The updated land classification standards will also comply with current USACE standards. Public comment was solicited to assist in making these land reclassification decisions. Consultation was also conducted with Tribal Nations to provide input on cultural and natural resources to help inform the land classification decisions. Chapter 7 of this Plan describes the public involvement process and Appendix E 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 and waters associated with Sardis Lake as described in Table 8.1 and explained in Table 8.2.

Table 8.1 Change from 1978 Land and Water Surface Classifications to 2023 Land and Water Surface Classification

Prior Land Classifications (1978)	Acres	Land Classifications (2023)	Acres	Net Difference
Project Operations	193	Project Operations (PO)	238	45
Recreation – Intensive Use	1,505	High Density Recreation (HDR)	866	(639)
		Environmentally Sensitive Areas (ESA)	576	576
Recreation – Low Density	937	Multiple Resource Management – Low Density Recreation (LDR)	1,269	332
Not Classified	27			
Wildlife Management	5,093	Multiple Resource Management – Wildlife Management (WMA)	4,805	(288)
TOTAL	7,755		7,754	(1)
Prior Water Surface Classifications (1978)	Acres	Water Surface Classifications (2022)	Acres	Net Difference
Conservation Pool	13,468	Open Recreation	13,857	389
		Designated No-Wake	2	2
		Restricted	10	10
TOTAL	13,468		13,869	401
TOTAL FEE	21,223		21,623	400

* Total fee simple title acreage differences from the 1978 total to the 2023 totals are due to improvements in measurement technology, deposition/siltation, and erosion. Totals also differ due to rounding while adding parcels.

Table 8-2 lists the descriptions and justifications for the reclassification of USACE lands at Sardis Lake. The team examined numerous parcels that ranged from a few acres to hundreds of acres, and rather than describing how each individual parcel was reclassified, the changes are grouped by classification category. A few examples of changes made to individual parcels are provided to assist in understanding how and why changes were made. The prior land classification Recreation – Intensive Use is similar to the current HDR classification; the prior Recreation – Low Density and Recreation Lands are similar to the current MRML – LDR classification; and the prior Wildlife Management classification is similar to the current MRML – WMA classification. The following table describes changes from the prior classification to current classifications but combines the similar classifications for ease of explaining changed acres.

Table 8.2 Changes and Justifications for Land Classifications ⁽¹⁾

Land Classification	Description of Changes ⁽²⁾	Justification
Project Operations (PO)	<p>The net increase in Project Operations lands from 193 to 238 acres is due to the following:</p> <ul style="list-style-type: none"> • 45 acres HDR reclassified to PO. 	<p>All lands classified as PO are managed and used primarily in support of critical operational requirements related to the primary missions of flood risk management and water conservation, including lands that were previously classified as HDR near the auxiliary spillway and channel. Additional length of the dam which was not previously classified as PO was captured.</p>
High Density Recreation (HDR)	<p>The net decrease in High Density Recreation lands from 1,505 to 866 is due to the following:</p> <ul style="list-style-type: none"> • 9 acres of WM reclassified to HDR. • 27 acres HDR reclassified to ESA. • 307 acres HDR reclassified to LDR. • 45 acres HDR reclassified to PO. • 216 acres HDR reclassified to WM. <p><i>* Any remaining acres not accounted for in above totals are attributed to changes in measuring technology.</i></p>	<p>The net decrease in HDR was in part due to the reclassification of acres which were originally classified as HDR with the intent to develop recreation facilities which were never developed or minimally developed. The reclassification of these acres reflects the current and future use. The majority of these acres were reclassified as LDR or WM. A portion of the decrease is due to the need to capture additional PO. A small portion of water surface in the Mathies Park area, originally classified as HDR, was reclassified as Restricted Water Surface.</p>

Land Classification	Description of Changes ⁽²⁾	Justification
Environmentally Sensitive Areas (ESA)	<p>The classification of 576 acres as Environmentally Sensitive Areas resulted from the following:</p> <ul style="list-style-type: none"> • 5 acres not previously classified identified as ESA. • 27 acres of HDR reclassified to ESA. • 491 acres of WM reclassified to ESA. <p><i>* Any remaining acres not accounted for in above totals are attributed to changes in measuring technology.</i></p>	<p>Reclassification of 576 acres was determined by the study team to be necessary to provide a high level of protection for those areas supporting significant habitat, views, or cultural sites. Classifying these areas as ESA will afford these areas with the highest level of protection from disturbance. The reclassification of these acres will have no effect on current or projected public use.</p>
MRML – Low Density Recreation (LDR)	<p>The net increase in Low Density Recreation acres from 937 acres to 1,269 acres resulted from the following:</p> <ul style="list-style-type: none"> • 7 acres not previously classified identified as LDR. • 307 acres of HDR reclassified to LDR. • 18 acres of WM reclassified to LDR. 	<p>Many areas around the shoreline were originally classified as HDR, but never developed, therefore a classification shift to LDR is appropriate for the current and future use. Additionally, some acres initially identified as WM such as Yanush Landing, Buffalo Creek Landing, and Anderson Creek currently have primitive uses and therefore reclassifying as LDR is more appropriate for current and future use.</p>

Land Classification	Description of Changes ⁽²⁾	Justification
MRML – Wildlife Management (WM)	<p>The net decrease in Wildlife Management lands from 5,093 acres to 4,805 acres is due to the following:</p> <p>16 acres not previously classified identified as WM.</p> <p>216 acres of HDR reclassified to WM.</p> <p>491 acres WM reclassified to ESA.</p> <p>9 acres WM reclassified to HDR.</p> <p>18 acres WM reclassified to LDR.</p>	<p>Many islands not previously classified were classified as WM due to adjacent land classifications. Additionally, Potato Hills North area currently allows day use fishing and therefore was reclassified as HDR. The Narrows area was reclassified from WM to HDR due to the current uses which includes a boat launch, bathroom and courtesy dock. 491 WM acres were reclassified as ESA to allow for the highest level of protection from disturbance.</p>

(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 detailed in Table 8.1.

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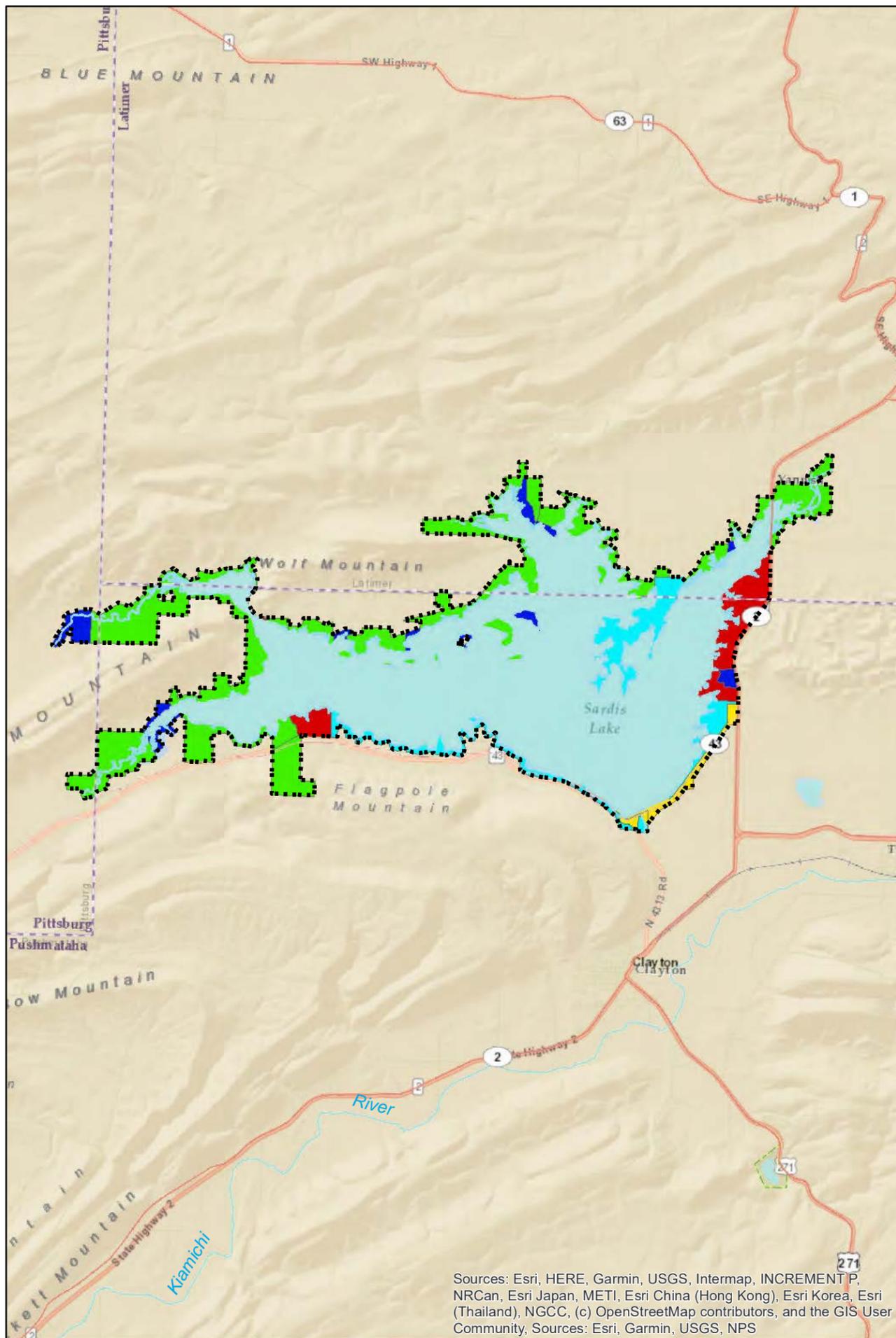
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APPENDIX A – LAND CLASSIFICATION, MANAGING AGENCIES, AND RECREATION MAPS



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community. Sources: Esri, Garmin, USGS, NPS

INDEX TO MASTER PLAN MAPS

GENERAL

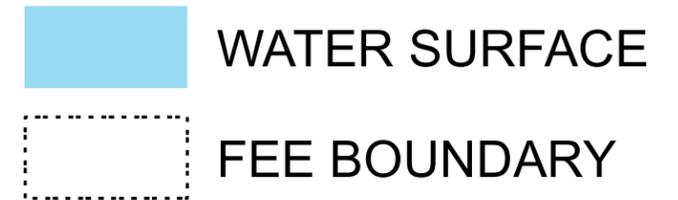
MAP NO.	TITLE
SL22MP-OI-00	PROJECT LOCATION & INDEX TO MAPS
SL22MP-OM-01	LAND MANAGING ENTITIES
SL22MP-OP-01	SEA PLANE GUIDE
SL22MP-OW-01	WATER SURFACE CLASSIFICATIONS

LAND CLASSIFICATION

MAP NO.	TITLE
SL22MP-LC-01	MASTER PLAN REVISION LAND CLASSIFICATION CHANGES
SL22MP-OC-00	LAND AND WATER CLASSIFICATIONS (00)
SL22MP-OC-01	LAND AND WATER CLASSIFICATIONS (01)
SL22MP-OC-02	LAND AND WATER CLASSIFICATIONS (02)

RECREATIONAL AREAS

MAP NO.	TITLE
SL22MP-OR-0A	MANAGED RECREATIONAL AREAS
SL22MP-OR-0B	PARK PLATE INDEX
SL22MP-OR-01	THE NARROWS
SL22MP-OR-02	SARDIS COVE
SL22MP-OR-03	MATHIES PARK
SL22MP-OR-04	POTATO HILLS SOUTH
SL22MP-OR-05	POTATO HILLS CENTRAL
SL22MP-OR-06	POTATO HILLS NORTH





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

SARDIS LAKE
JACKFORK CREEK, OKLAHOMA

SARDIS LAKE MASTER PLAN

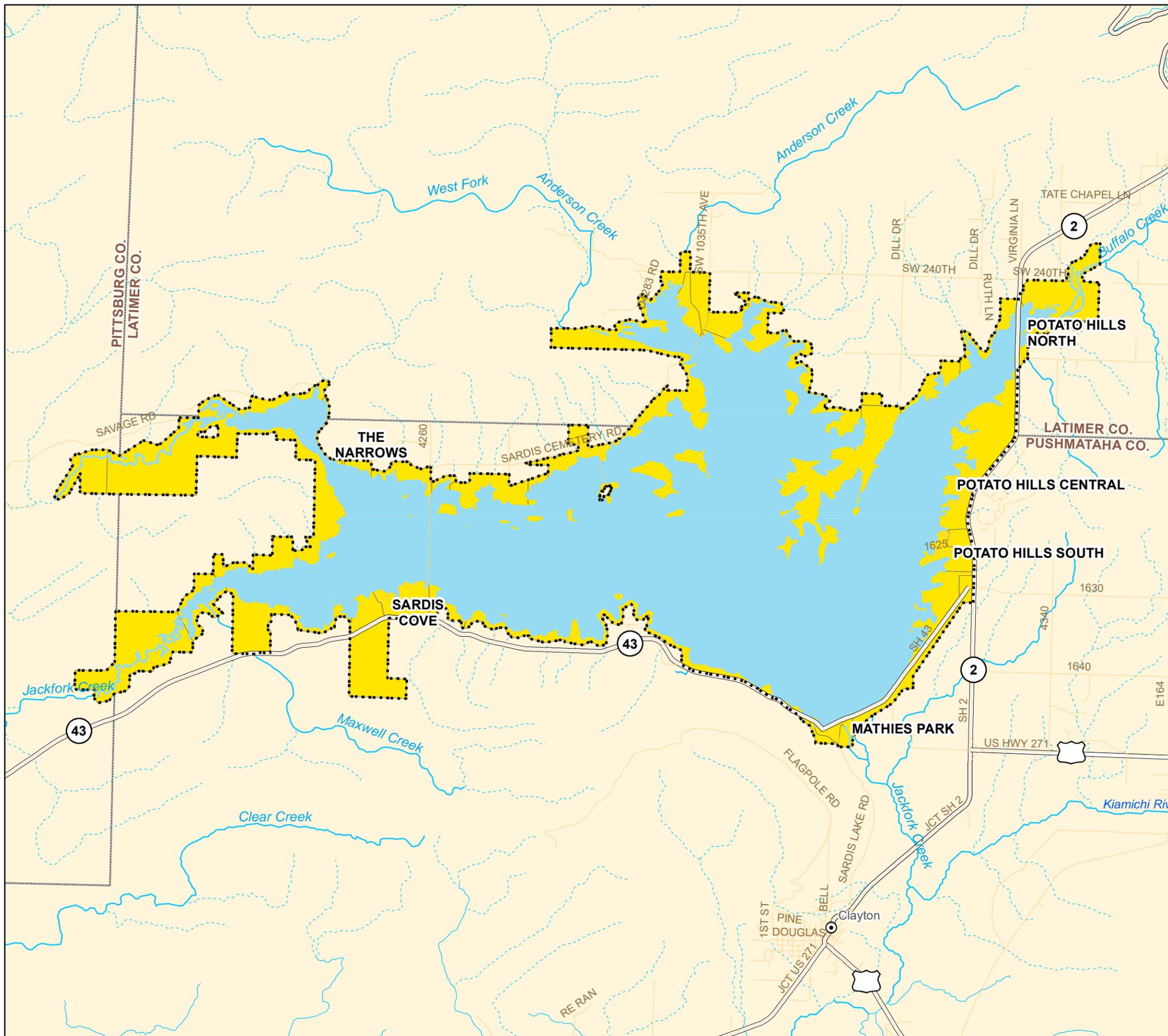
**PROJECT LOCATION AND
INDEX TO MAPS**





DATE: AUGUST 2023	MAP NO. SL22MP-OI-00
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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.



- U.S. ARMY CORPS OF ENGINEERS
- WATER SURFACE
- FEE BOUNDARY



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

SARDIS LAKE
JACKFORK CREEK, OKLAHOMA

SARDIS LAKE MASTER PLAN

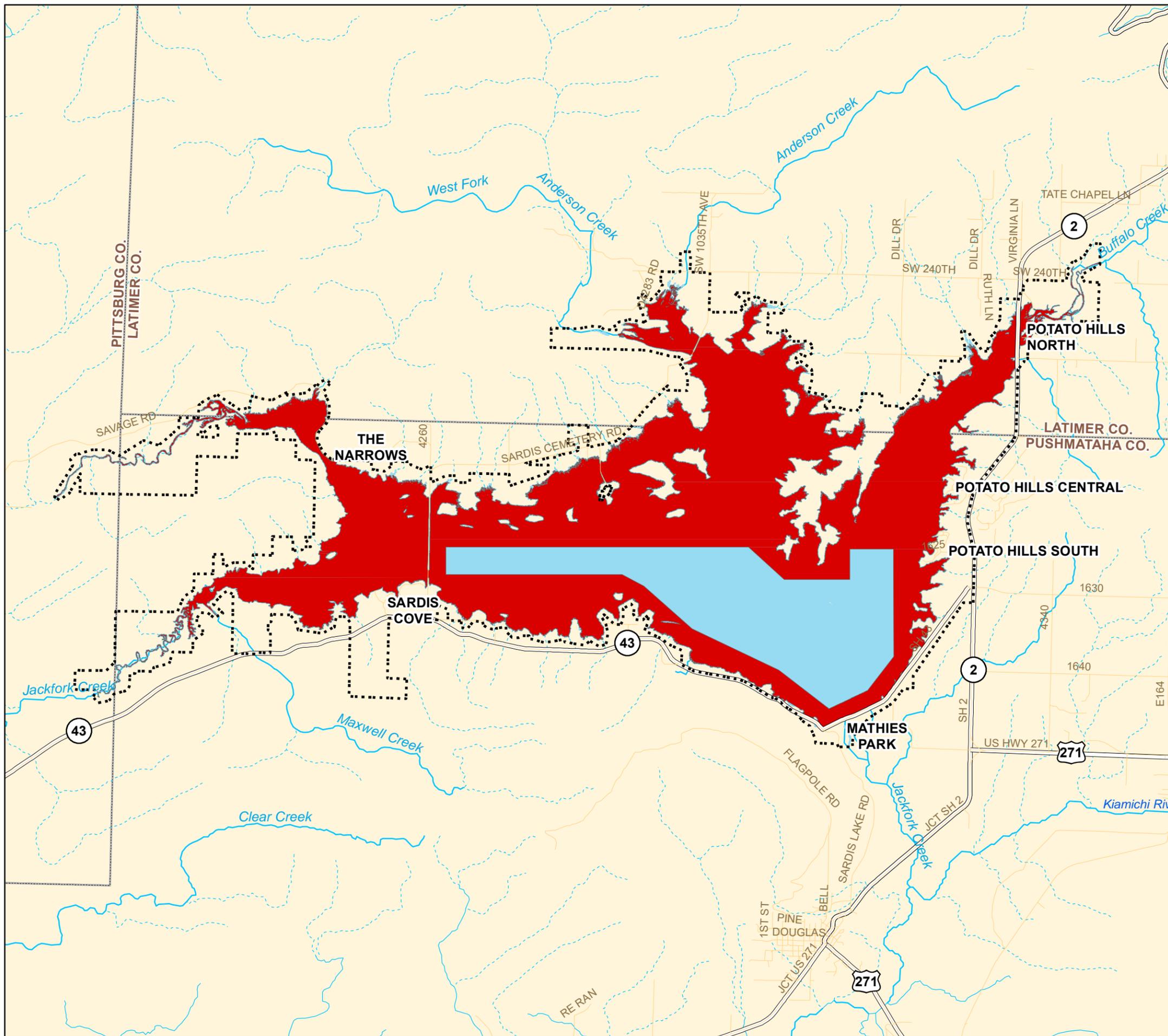
LAND MANAGING ENTITIES



0 0.75 1.5 3

Miles

DATE: AUGUST 2023	MAP NO. SL22MP-OM-01
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- RESTRICTED
- WATER SURFACE
- FEE BOUNDARY

**TAKE OFF AND LANDING PROHIBITED
WITHIN 1,000' OF DAM STRUCTURE,
BRIDGES, RECREATION AREAS AND
STANDING TIMBER**

**OPERATION OF A SEAPLANE AT CORPS
PROJECTS IS AT THE RISK OF THE
PLANE'S OWNER, OPERATOR,
AND / OR PASSENGERS**



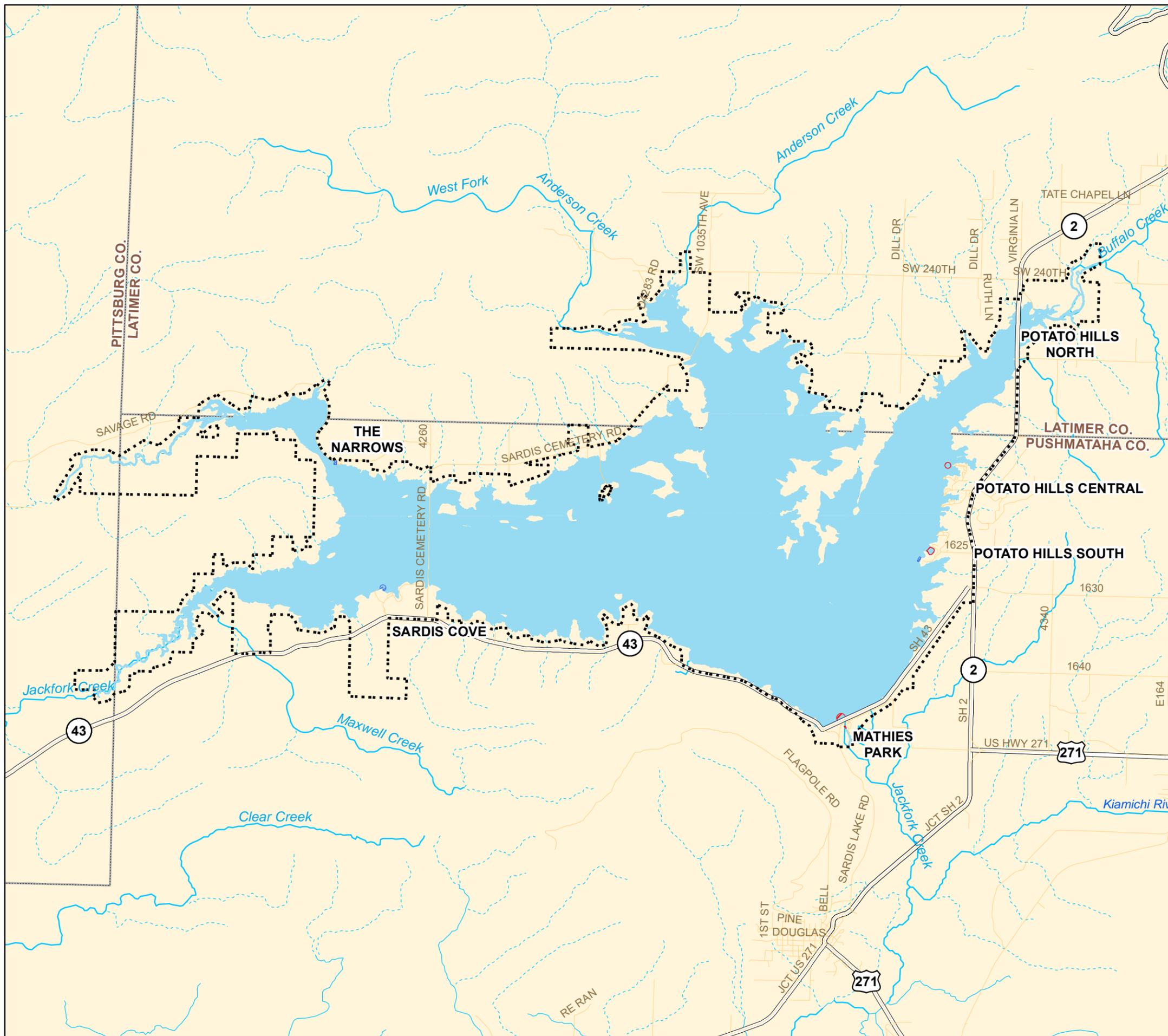
**U.S. ARMY CORPS
OF ENGINEERS
TULSA DISTRICT**

SARDIS LAKE JACKFORK CREEK, OKLAHOMA

**SARDIS LAKE MASTER PLAN
SEA PLANE GUIDE**



DATE: AUGUST 2023	MAP NO. SL22MP-OP-01
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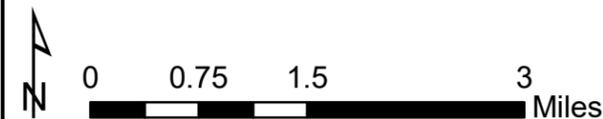
-  WATER SURFACE: DESIGNATED NO WAKE
-  WATER SURFACE: RESTRICTED
-  WATER SURFACE: OPEN RECREATION
-  FEE BOUNDARY



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

SARDIS LAKE JACKFORK CREEK, OKLAHOMA

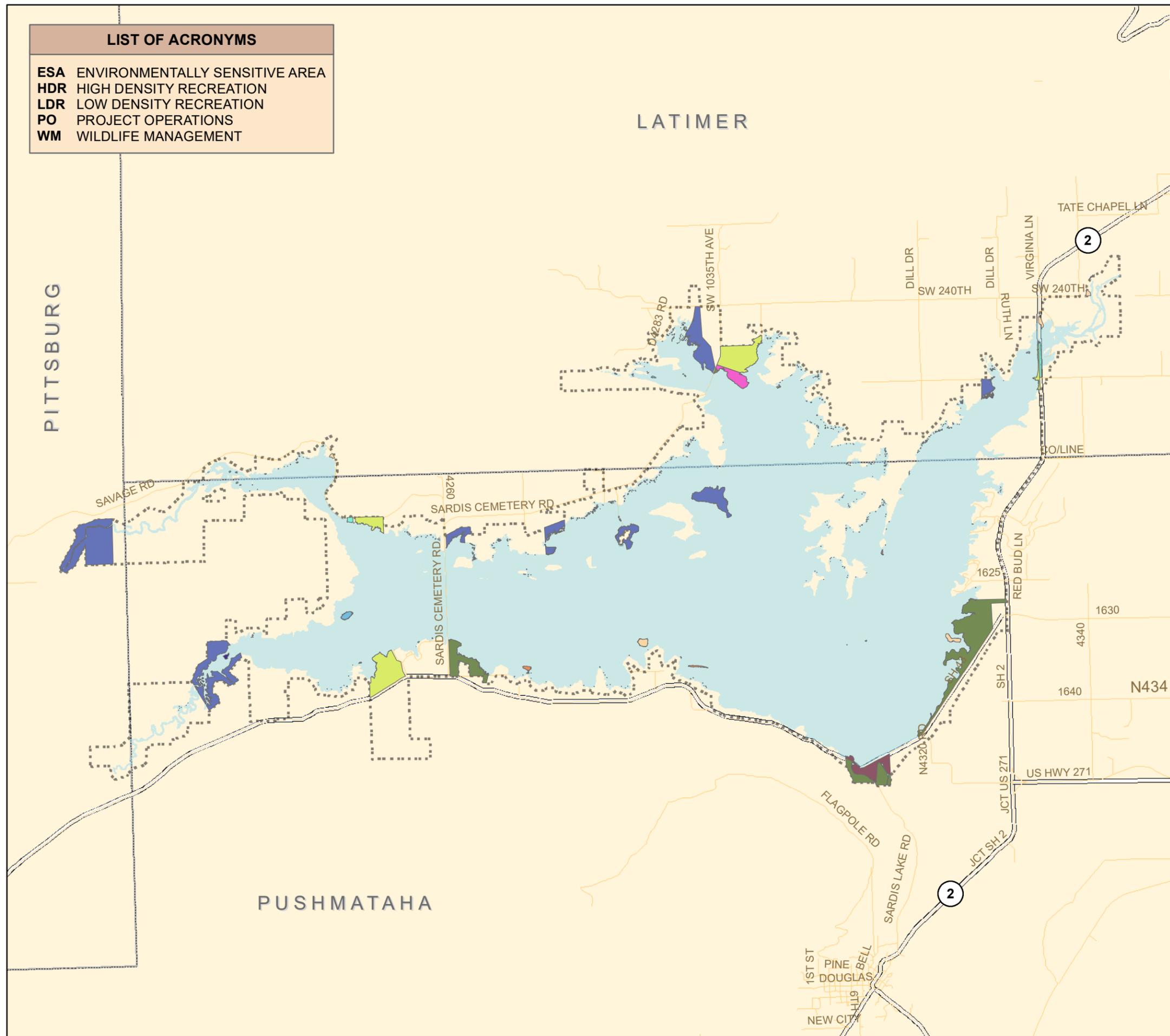
**SARDIS LAKE MASTER PLAN
WATER SURFACE CLASSIFICATIONS**



DATE: AUGUST 2023	MAP NO. SL22MP-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 1978 MASTER PLAN TO 2021

- FROM "NULL" TO ESA
- FROM "NULL" TO HDR
- FROM "NULL" TO LDR
- FROM "NULL" TO WM
- FROM HDR TO ESA
- FROM HDR TO LDR
- FROM HDR TO WM
- FROM WM TO ESA
- FROM WM TO HDR
- FROM WM TO LDR

BASE MAP LAYERS

- WATER SURFACE
- FEE BOUNDARY

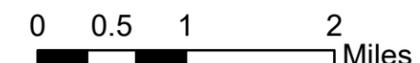


**U.S. ARMY CORPS
OF ENGINEERS
TULSA DISTRICT**

SARDIS LAKE JACKFORK CREEK, OKLAHOMA

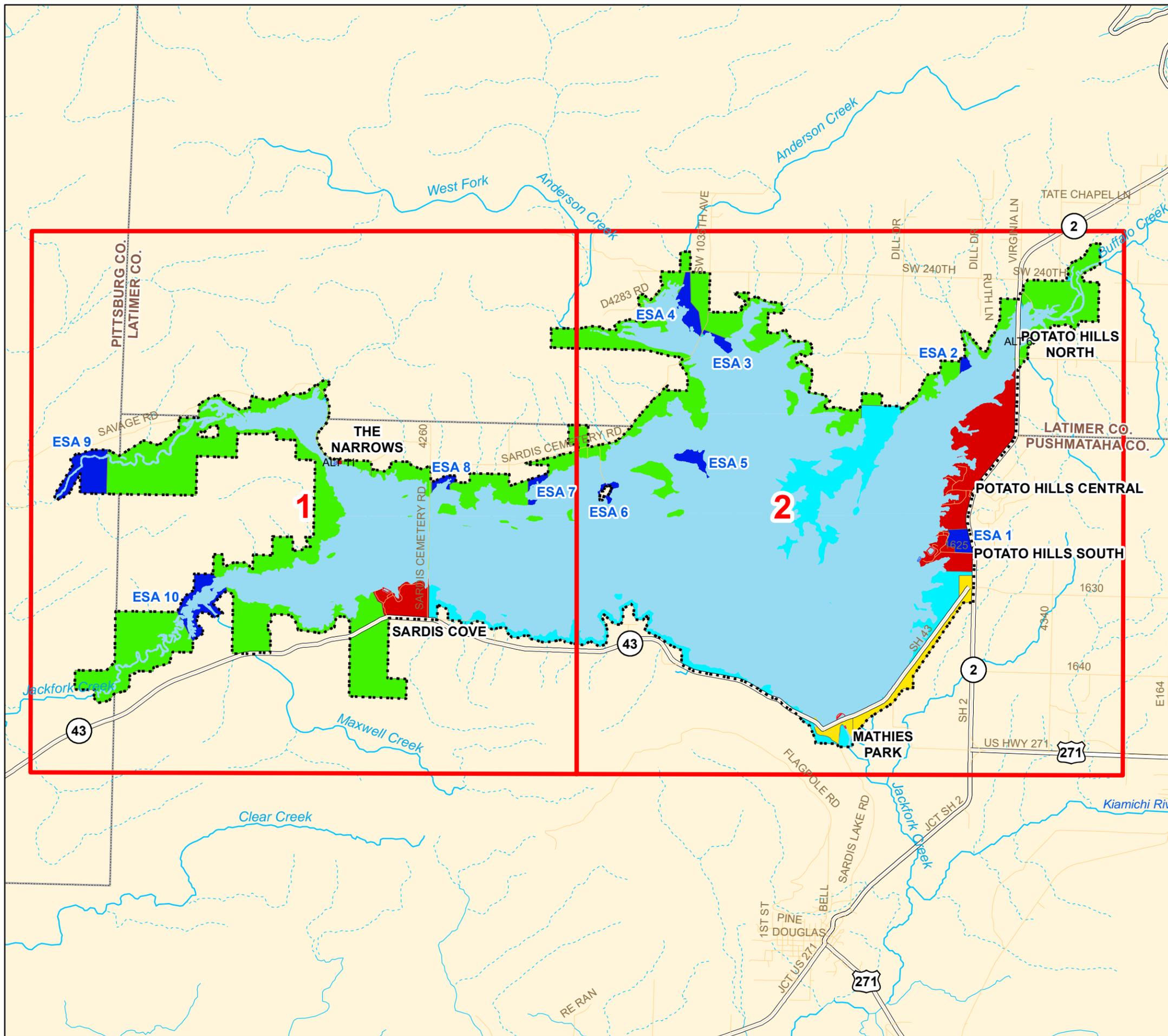
SARDIS LAKE MASTER PLAN

**MASTER PLAN REVISION LAND
CLASSIFICATION CHANGES**



DATE:
AUGUST 2023

MAP NO.
SL22MP-LC-01



-  INDEX GRID
-  ENVIRONMENTALLY SENSITIVE AREA
-  HIGH DENSITY RECREATION
-  LOW DENSITY RECREATION
-  PROJECT OPERATIONS
-  WILDLIFE MANAGEMENT
-  WATER SURFACE: DESIGNATED NO WAKE
-  WATER SURFACE: RESTRICTED
-  WATER SURFACE: OPEN RECREATION
-  FEE BOUNDARY

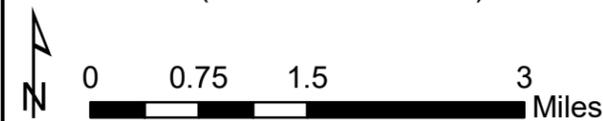


**U.S. ARMY CORPS
OF ENGINEERS
TULSA DISTRICT**

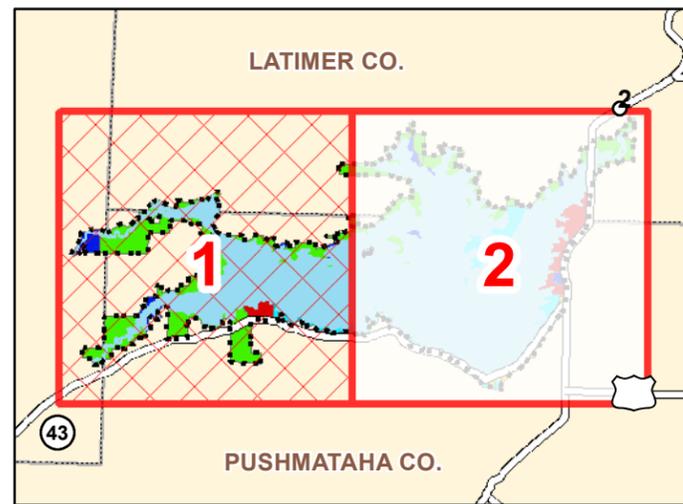
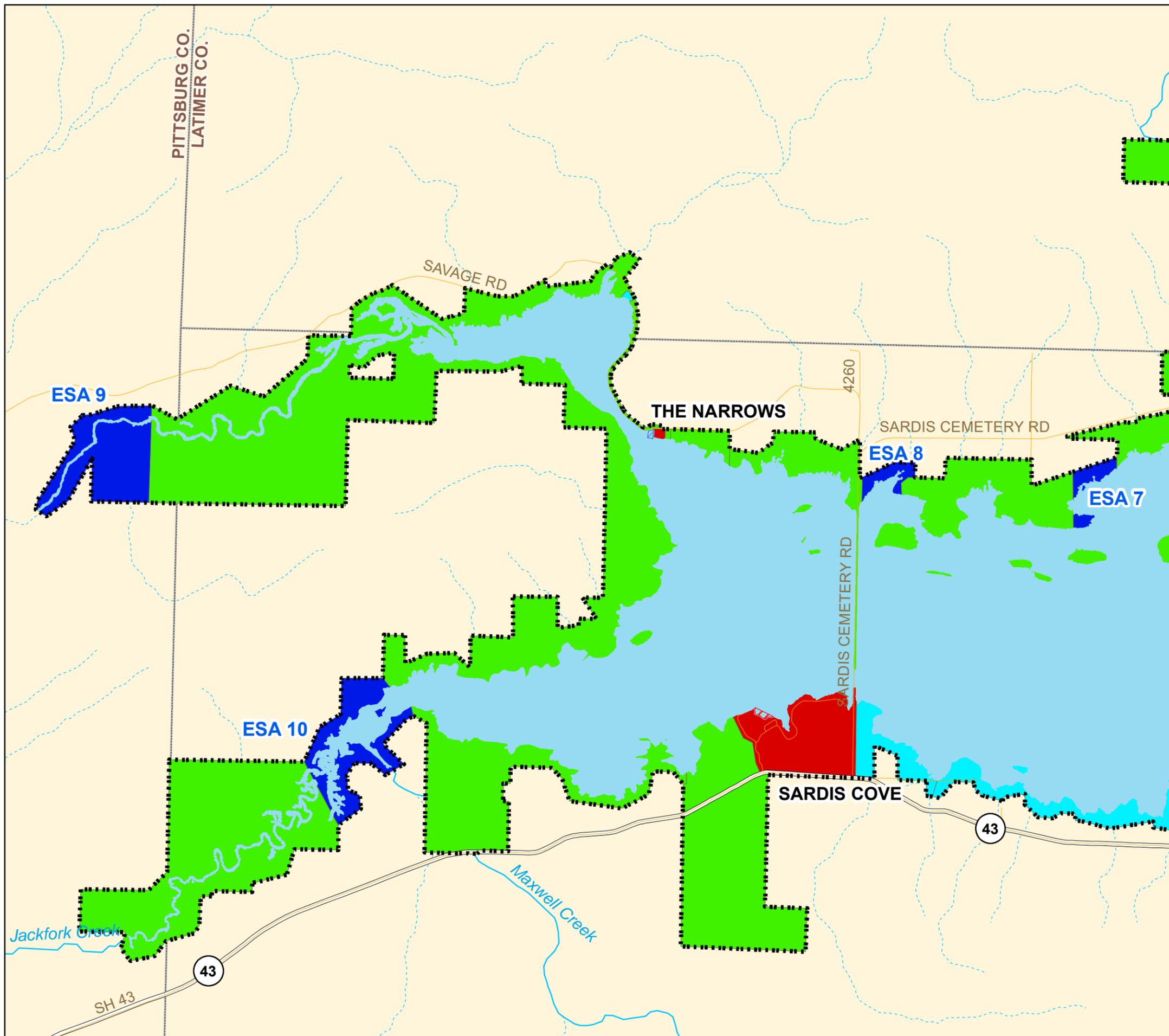
SARDIS LAKE JACKFORK CREEK, OKLAHOMA

SARDIS LAKE MASTER PLAN

**LAND AND WATER CLASSIFICATIONS
(INDEX SHEET 00)**



DATE: AUGUST 2023	MAP NO. SL22MP-OC-00
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- ENVIRONMENTALLY SENSITIVE AREA
- LOW DENSITY RECREATION
- HIGH DENSITY RECREATION
- WILDLIFE MANAGEMENT
- WATER SURFACE: DESIGNATED NO WAKE
- WATER SURFACE: RESTRICTED
- WATER SURFACE: OPEN RECREATION
- FEE BOUNDARY



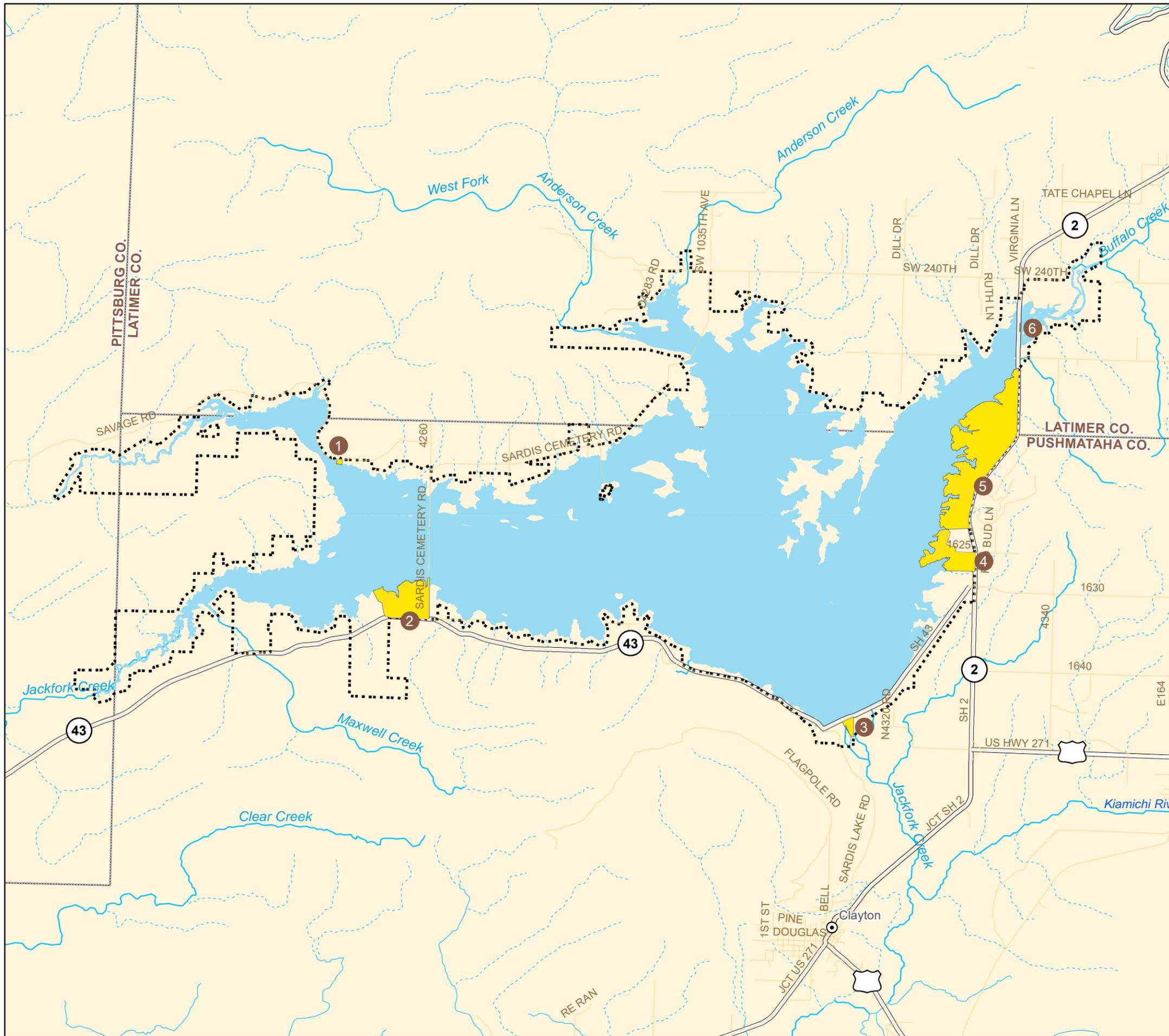
**U.S. ARMY CORPS
OF ENGINEERS
TULSA DISTRICT**

SARDIS LAKE JACKFORK CREEK, OKLAHOMA

**SARDIS LAKE MASTER PLAN
LAND AND WATER CLASSIFICATIONS
(INDEX SHEET 01)**



DATE: AUGUST 2023	MAP NO. SL22MP-OC-01
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 U.S. ARMY CORPS OF ENGINEERS

KEY TO PARKS

- 1** THE NARROWS
- 2** SARDIS COVE
- 3** MATHIES PARK
- 4** POTATO HILLS SOUTH
- 5** POTATO HILLS CENTRAL
- 6** POTATO HILLS NORTH



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

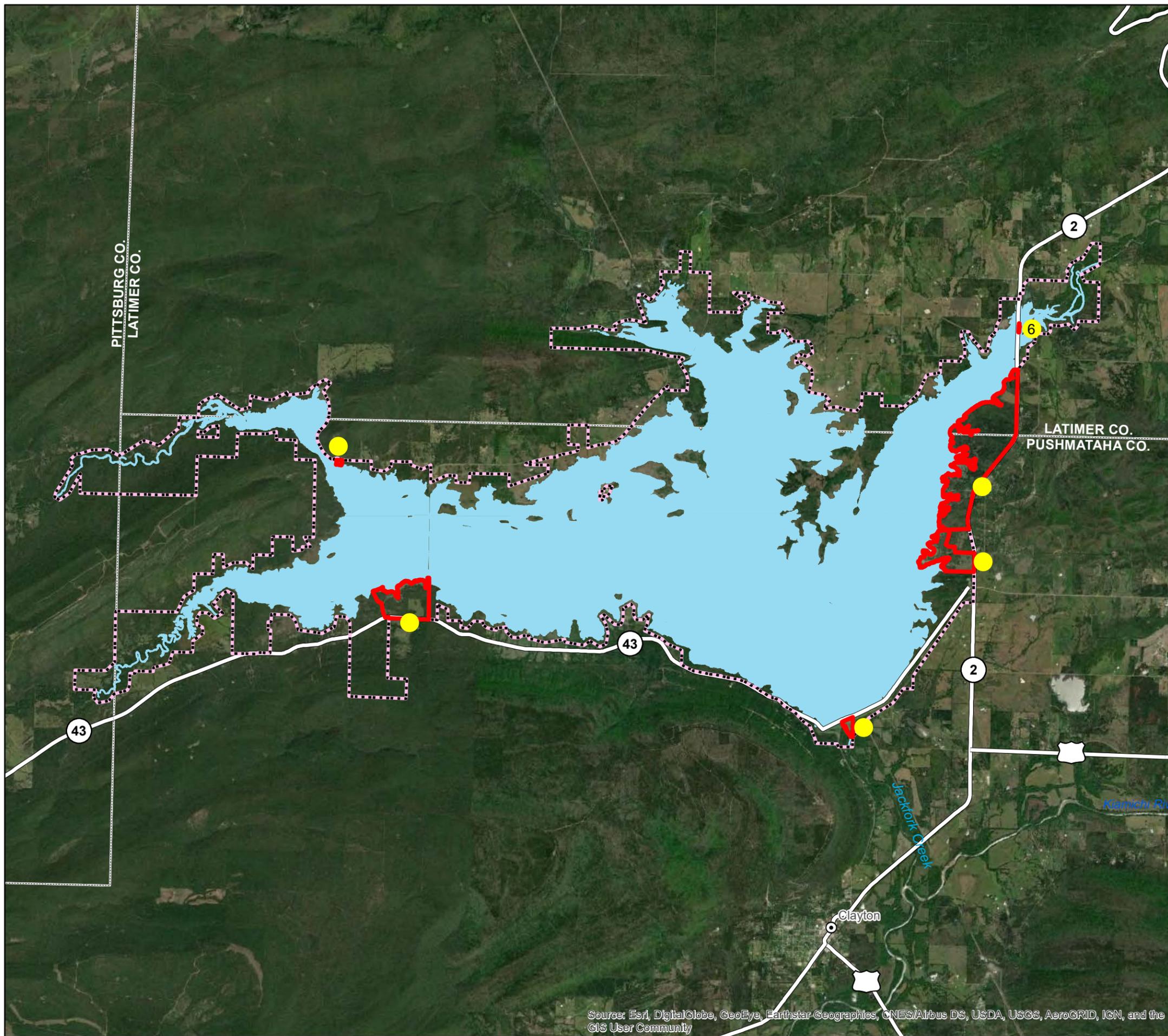
SARDIS LAKE MASTER PLAN
MANAGED RECREATIONAL AREAS





Miles

DATE: AUGUST 2023	MAP NO. SL22MP-OR-0A
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RECREATION AREAS		
ID #	NAME	SHEET #
●	THE NARROWS	SL22MP-OR-01
●	SARDIS COVE	SL22MP-OR-02
●	MATHIES PARK	SL22MP-OR-03
●	POTATO HILLS SOUTH	SL22MP-OR-04
●	POTATO HILLS CENTRAL	SL22MP-OR-05
●	POTATO HILLS NORTH	SL22MP-OR-06



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TULSA DISTRICT**

SARDIS LAKE
JACKFORK CREEK, OKLAHOMA

SARDIS LAKE MASTER PLAN

PARK PLATE INDEX



0 0.75 1.5 3

Miles

DATE: AUGUST 2023	MAP NO. SL22MP-OR-0B
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



ITEM	EXISTING
BOAT RAMP	1
COURTESY DOCK	1
GROUP CAMPSITES	
CAMPSITES	
ELECTRICAL HOOK-UP	
GROUP PICNIC SHELTER	
PICNIC SITES	
VAULT TOILET	1
RESTROOMS	
SHOWERS	
DUMP STATION	

-  BOAT RAMP
-  COURTESY DOCK
-  PARKING
-  VAULT TOILET
-  WATER SURFACE: DESIGNATED NO WAKE
-  FEE BOUNDARY



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

SARDIS LAKE
JACKFORK CREEK, OKLAHOMA

SARDIS LAKE MASTER PLAN

**RECREATIONAL AREAS
(THE NARROWS)**





0 75 150 300
Feet

DATE: AUGUST 2023	MAP NO. SL22MP-OR-01
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



ITEM	EXISTING
BOAT RAMP	1
COURTESY DOCK	1
GROUP CAMPSITES	
CAMPSITES	45
ELECTRICAL HOOK-UP	45
GROUP PICNIC SHELTER	
PICNIC SITES	
VAULT TOILET	
RESTROOMS	4
SHOWERS	
DUMP STATION	1

-  BOAT RAMP
-  CAMPSITE
-  COURTESY DOCK
-  GATE ATTENDANT FACILITIES
-  PARKING
-  RESTROOM
-  SANITARY DUMP STATION
-  WATER SURFACE: DESIGNATED NO WAKE
-  FEE BOUNDARY



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TULSA DISTRICT**

SARDIS LAKE
JACKFORK CREEK, OKLAHOMA

SARDIS LAKE MASTER PLAN

**RECREATIONAL AREAS
(SARDIS COVE)**



0 200 400 800

Feet

DATE: AUGUST 2023	MAP NO. SL22MP-OR-02
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



ITEM	EXISTING
BOAT RAMP	
COURTESY DOCK	
GROUP CAMPSITES	
CAMPSITES	
ELECTRICAL HOOK-UP	
GROUP PICNIC SHELTER	
PICNIC SITES	
VAULT TOILET	1
RESTROOMS	
SHOWERS	
DUMP STATION	

-  GATE TOWER
-  PARKING
-  SPILLWAY
-  VAULT TOILET
-  WATER SURFACE: RESTRICTED
-  FEE BOUNDARY



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TULSA DISTRICT**

SARDIS LAKE
JACKFORK CREEK, OKLAHOMA

SARDIS LAKE MASTER PLAN

**RECREATIONAL AREAS
(MATHIES PARK)**



0 75 150 300

Feet

DATE: AUGUST 2023	MAP NO. SL22MP-OR-03
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



ITEM	EXISTING
BOAT RAMP	1
COURTESY DOCK	1
GROUP CAMPSITES	
CAMPSITES	18
ELECTRICAL HOOK-UP	
GROUP PICNIC SHELTER	2
PICNIC SITES	8
VAULT TOILET	
RESTROOMS	4
SHOWERS	1
DUMP STATION	

-  BOAT RAMP
-  CAMPSITE
-  GATE ATTENDANT FACILITIES
-  GATE HOUSE
-  GROUP SHELTER
-  PARKING
-  PICNIC SITE
-  PLAYGROUND
-  RESTROOM
-  RESTROOM W/ SHOWERS
-  SWIM BEACH
-  WATER SURFACE: DESIGNATED NO WAKE
-  WATER SURFACE: RESTRICTED
-  COURTESY DOCK
-  FISHING PIER



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SARDIS LAKE
JACKFORK CREEK, OKLAHOMA

SARDIS LAKE MASTER PLAN

**RECREATIONAL AREAS
(POTATO HILLS SOUTH)**

N



0 150 300 600
Feet

DATE: AUGUST 2023	MAP NO. SL22MP-OR-04
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



ITEM	EXISTING
BOAT RAMP	
COURTESY DOCK	
GROUP CAMPSITES	
CAMPSITES	94
ELECTRICAL HOOK-UP	94
GROUP PICNIC SHELTER	2
PICNIC SITES	
VAULT TOILET	
RESTROOMS	5
SHOWERS	3
DUMP STATION	1

- BASEBALL FIELD
- CAMPSITE
- FISHING PIER
- GATE ATTENDANT FACILITIES
- GATE HOUSE
- GROUP SHELTER
- PARKING
- PLAYGROUND
- RESTROOM
- RESTROOM W/ SHOWERS
- SANITARY DUMP STATION
- WATER INTAKE STRUCTURE
- WATER SURFACE: RESTRICTED

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TULSA DISTRICT**

SARDIS LAKE JACKFORK CREEK, OKLAHOMA

SARDIS LAKE MASTER PLAN

**RECREATIONAL AREAS
(POTATO HILLS CENTRAL)**

DATE: AUGUST 2023	MAP NO. SL22MP-OR-05
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



ITEM	EXISTING
BOAT RAMP	
COURTESY DOCK	
GROUP CAMPSITES	
CAMPSITES	
ELECTRICAL HOOK-UP	
GROUP PICNIC SHELTER	
PICNIC SITES	
VAULT TOILET	1
RESTROOMS	
SHOWERS	
DUMP STATION	

-  FISHING PIER
-  PARKING
-  VAULT TOILET



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TULSA DISTRICT**

SARDIS LAKE JACKFORK CREEK, OKLAHOMA

SARDIS LAKE MASTER PLAN

**RECREATIONAL AREAS
(POTATO HILLS NORTH)**



DATE:
AUGUST 2023

MAP NO.
SL22MP-OR-06

APPENDIX B – NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) DOCUMENTATION

Environmental Assessment for the 2023 Sardis Lake Master Plan

Kiamichi River Basin
Latimer, Pittsburg, and Pushmataha Counties, Oklahoma

2023



**US Army Corps
of Engineers** ®
Tulsa District

ENVIRONMENTAL ASSESSMENT ORGANIZATION

This Environmental Assessment (EA) evaluates the potential environmental and socioeconomic impacts of the 2023 Sardis Lake Master Plan revision. This EA would 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
- 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.
- ATTACHEMENT A* National Environmental Policy Act (NEPA) Coordination and Scoping

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ENVIRONMENTAL ASSESSMENT

2023 Master Plan

Sardis Lake

Latimer, Pittsburg, and Pushmataha Counties, Oklahoma

SECTION 1: INTRODUCTION

This Environmental Assessment (EA) has been prepared by the United States Army Corps of Engineers (USACE) to evaluate the proposed 2023 Sardis Lake Master Plan (2023 MP). The 2023 MP is a programmatic document that is subject to evaluation under the National Environmental Policy Act (NEPA) of 1969, (Public Law [PL] 91-190). This document provides an assessment of potential impacts that could result with the implementation of either the No Action or Proposed Action and has been prepared in accordance with the National Environmental Policy Act (NEPA, Public Law 91-190) as amended in 2020, the Council on Environmental Quality (CEQ) regulations (40 CFR, 1500–1508), and USACE regulations, including Engineer Regulation (ER) 200-2-2: Procedures for Implementing NEPA (1988).

A MP is the strategic land use management plan that provides direction to the orderly development, administration, maintenance, preservation, enhancement, and management of all natural, cultural and recreational resources of a USACE water resource project, which includes all government-owned lands in and around a reservoir. 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 lands associated with Sardis Lake for the benefit of present and future generations. A MP identifies conceptual types and levels of activities, but does not include designs, project sites, or estimated costs. All actions carried out by USACE, other agencies, and individuals granted leases to USACE lands must be consistent with the MP. Therefore, the MP must be kept current in order to provide effective guidance in USACE decision-making. The original Sardis Lake Master Plan was last revised in 1975 and having a supplement completed in 1978.

1.1 PROJECT DESCRIPTION

Sardis Lake Dam is located at river mile (RM) 2.8 of the Jackfork Creek. The dam site is located in Pushmataha County, in southeastern Oklahoma. The lake is located in Latimer, Pittsburg, and Pushmataha Counties, Oklahoma, and lies within the Kiamichi Watershed. Jackfork Creek rises in the Kiamichi Mountains in northwestern Pushmataha County and flows northeast through the southeastern corner of Pittsburg County, then flows east back into Pushmataha County to its junction with North Jackfork Creek and eastward to its junction with Anderson Creek. Jackfork Creek then flows in a southeaster direction to its confluence with Buffalo Creek and then flows south to its confluence with the Kiamichi River. Jackfork Creek is a right bank tributary of the Kiamichi River, entering the river about 104.4 miles above the mouth. The total drainage area of the Jackfork Creek basin is 280 square miles, with 275 square miles above Sardis Lake. The drainage area above the lake is roughly fan-shaped, with a length of

about 28 miles to the northwest and about 11 miles to the north and northwest. The length of the stream above the dam site is about 34 miles and the weighted slope is about 6.3 feet per mile.

Originally known as Sardis Lake, it was approved in 1962 as a multipurpose project for flood control, water supply, recreation, and fish and wildlife. Originally the project was called Clayton Lake, the name was changed to Sardis in December of 1981. Sardis Lake, located on Jackfork Creek, is a tributary of the Kiamichi River. It is an integral component of the larger Red River Basin that has additional congressionally authorized purposes including flood control, hydropower, navigation, and water quality. The total river basin is 1,830 square miles, while the drainage area upstream of Sardis Dam is 275 square miles.

The construction of Sardis Lake began in August 1975; the final storage began in January 1983; and the conservation pool was filled for the first time in March 1984.

1.2 PURPOSE OF AND NEED FOR THE ACTION

The purpose of the Proposed Action is to ensure that the conservation and sustainability of the land, water, and recreational resources on Sardis Lake comply with applicable environmental laws and regulations and to maintain quality lands for future public use. The 2023 MP is intended to serve as a comprehensive land and recreation management plan with an effective life of approximately 25 years.

The Sardis Lake Master Plan must be kept current in order to provide effective guidance in decision-making that responds to changing regional and local needs, resource capabilities and suitabilities, and expressed public interests consistent with authorized project purposes and pertinent legislation and regulations. The current 1978 Sardis Lake Master Plan is over 40 years old and does not currently reflect ecological, socio-political, and socio-demographic changes that are currently affecting Sardis Lake, or those changes anticipated to occur through 2048. Changes in outdoor recreation trends, regional land use, population, current legislative requirements and USACE management policy have indicated the need to revise the plan. Additionally, increasing fragmentation of wildlife habitat, national policies related to climate change, a growing demand for recreational access, and protection of natural resources are all factors impacting public lands both nationwide and regionally, and have the potential to effect the Sardis Lake Project. In response to these continually evolving trends, the USACE determined that a full revision of the 1978 plan is needed.

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 Oklahoma Department of Wildlife Conservation [ODWC] and the U.S. Fish and Wildlife Service [USFWS]) to operate and maintain public lands; and
- Evolving public concerns.

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 2023 MP. The alternative considerations were formulated with special attention given to revised land reclassifications, new resource management objectives, and a conceptual resource plan for each land reclassification category. The 2023 MP is currently available and is incorporated into this EA by reference. This EA was prepared pursuant to the National Environmental Policy Act (NEPA), (Public Law 91-190) as amended in 2020. The application of NEPA to more strategic decisions not only meets the Council on Environmental Quality (CEQ) implementing regulations (CEQ 2005) and USACE regulations for implementing NEPA (USACE 1988), but also allows the USACE to consider the environmental consequences of its actions long before any physical activity is implemented. Multiple benefits can be derived from such early consideration. Effective and early NEPA integration with the master planning process can significantly increase the usefulness of the 2023 MP to the decision maker.

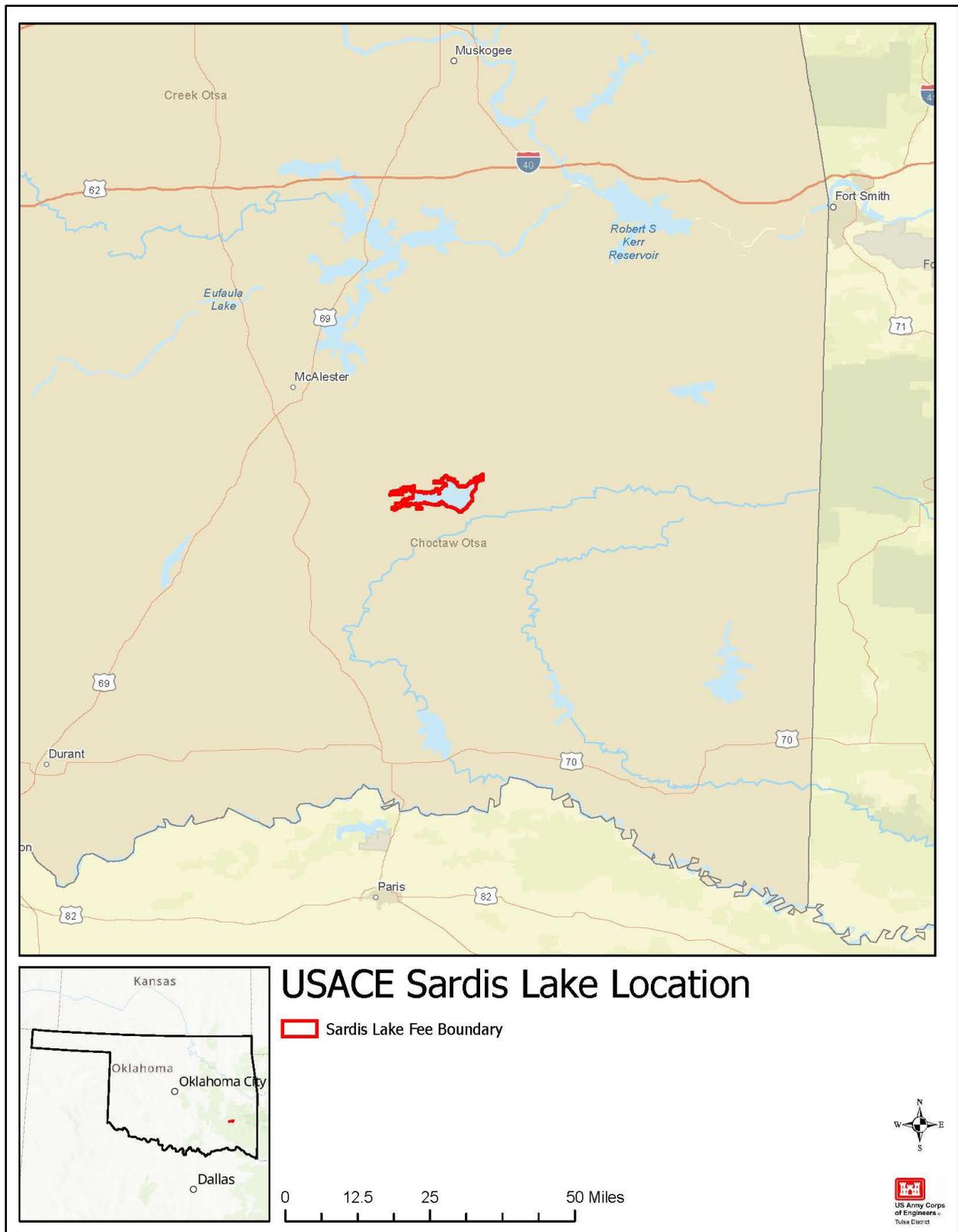


Figure 1-1. Location Map

SECTION 2: PROPOSED ACTION AND ALTERNATIVES

During the alternative development process, the Project Delivery Team (PDT) utilized an iterative process to evaluate different land classes for each parcel of USACE land. This evaluation included consideration of the multiple Congressionally authorized missions of the Project, public and agency comments, USACE staff knowledge, and potential impacts to the social, cultural, and environmental resources, to determine the primary use for each parcel (i.e. land classification). USACE regulations specify five possible categories of land reclassification: Project Operations (PO), High Density Recreation (HDR), Mitigation, Environmentally Sensitive Areas (ESA), and Multiple Resource Managed Lands (MRML). MRML are divided into four subcategories: Low Density Recreation (MRML-LDR), Wildlife Management (MRML-WM), Vegetation Management (MRML-VM), and Inactive/Future Recreation (MRML-IFR) Areas.

Two alternatives were developed in detail and brought forward for evaluation, including a No Action Alternative and a Proposed Action Alternative. The Proposed Action Alternative is the culmination of the iterative evaluation process described above and best meets the Purpose and Need identified in Section 1.2 of this document and Section 1.4 of the 2023 MP revision. The No Action Alternative, while it does not meet the purpose and need, serves as a benchmark of existing conditions against which Federal actions can be evaluated, and, therefore, is included in this EA pursuant to CEQ regulations 40 CFR § 1502.14(c)).

The goals for the MP include the following:

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 the project's 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 the project's natural resources.

GOAL D. Recognize the project's unique qualities, characteristics, and potentials.

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 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 of the 2023 MP.

USACE will not address dam operations or water management of Sardis Lake under either the No Action or Proposed Action alternatives. Water management, which includes flood risk management and dam operations, is established in the Red River Basin Master Reservoir Regulation Manual and the Sardis Lake Water Control Manual.

2.1 ALTERNATIVE 1: NO ACTION

Under the No Action Alternative, the USACE would not approve the adoption or implementation of the MP. Instead, the USACE would continue to manage Sardis Lake's natural resources as set forth in the 1978 MP. The 1978 Master Plan would continue to provide the only source of comprehensive management guidelines and philosophy. However, the 1978 MP is out of date and does not reflect the current ecological, socio-political, or socio-demographic conditions of Sardis Lake or those that are anticipated to occur through 2048.

The No Action Alternative, while it does not meet the purpose and need, serves as a benchmark of existing conditions against which Federal actions can be evaluated, and, therefore, is included in this EA pursuant to CEQ regulations 40 CFR § 1502.14(c).

2.2 ALTERNATIVE 2: PROPOSED ACTION

Under the Proposed Action, the USACE will adopt and implement the 2023 MP, which guides and articulates USACE responsibilities pursuant to Federal laws to preserve, conserve, restore, maintain, manage, and develop the land, water, and associated resources. The 2023 MP will replace the 1978 MP and provide an up-to-date management plan that follows current Federal laws and regulations while sustaining the project's natural resources and providing recreational opportunities for the next 25

years. The Proposed Action will meet regional goals associated with good stewardship of land, water, and recreational resources; address identified recreational trends; and allow for continued use and development of project lands without violating national policies or public laws.

The 2023 MP will classify all Federal land lying above elevation 599.0 NGVD29 into management reclassification categories. These management reclassification categories will allow uses of Federal property that meet the definition of the assigned category and ensure the protection of natural resources and environmental stewardship while allowing maximum public enjoyment of the lake's resources.

The land reclassification categories to be used are defined as follows:

- Project Operations: Lands required for the dam, spillway, switchyard, levees, dikes, offices, maintenance facilities, and other areas used solely for the operation of Sardis Lake.
- High Density Recreation: 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: 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: Lands with minimal development or infrastructure that support passive recreational use (primitive camping, fishing, hunting, trails, wildlife viewing, etc.).
 - MRML Wildlife Management: Lands designated for stewardship of fish and wildlife resources.
 - MRML Vegetation Management: Lands designated for stewardship of vegetative resources.
 - MRML Inactive/Future Recreation: Areas with site characteristics compatible with potential future recreational development or recreation areas that are closed. Until there is an opportunity to develop or reopen these areas, they will be managed for multiple resources.
- Surface Water: Allows for surface water zones.
 - Restricted: Water areas restricted for Sardis Lake operations, safety, and security.
 - Designated No-Wake: Water areas to protect environmentally sensitive shoreline areas and 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.

Table 2-1 shows the reclassifications and acres contained in each reclassification, Table 2-2 shows the water surface reclassifications, and Table 2-3 provides the justification for the 2023 reclassification.

Table 2-1 2023 Sardis Lake Land Reclassifications

Prior Land Classifications (1978 Plan)	Acres	2023 Reclassifications	Acres
Project Operations	193	Project Operations (PO)	238
Operations - Intensive Use	1,505	High Density Recreation (HDR)	866
		Environmentally Sensitive Areas (ESA)	576
Recreation-Low Density	937	Multiple Resource Management – Low Density Recreation	1,269
Not Classified	27		
Wildlife Management	5,093	Multiple Resource Management-Wildlife Management (WM)	4,805
Total	7,754		7,754

Table 2-2. Sardis Lake Surface Water Reclassifications

Prior Water Surface Classifications (1978 Plan)	Acres	Water Surface Classifications (2023)	Acres
Conservation Pool	13,468	Open Recreation	13,857
		Designated No-Wake	2
		Restricted	10
Total	13,468		13,869

Total Acreage differences from the 1978 total to the 2022 totals are due to improvements in measurement technology, deposition/siltation, and erosion. Totals also differ due to rounding while adding parcels.

Table 2-3. Justification for the Reclassifications ⁽¹⁾

Reclassification	Description of Changes ⁽²⁾	Justification
Project Operations (PO)	<p>The net increase in Project Operations lands from 193 to 238 acres is due to the following:</p> <ul style="list-style-type: none"> • 45 acres HDR reclassified to PO. 	<p>All lands classified as PO are managed and used primarily in support of critical operational requirements related to the primary missions of flood risk management and water conservation, including lands that were previously classified as HDR near the auxiliary spillway and channel. Additional length of the dam which was not previously classified as PO was captured.</p>
High Density Recreation (HDR)	<p>The net decrease in High Density Recreation lands from 1,505 to 866 is due to the following:</p> <ul style="list-style-type: none"> • .2 acres not previously classified identified as HDR. • 9 acres of WM reclassified to HDR. • 27 acres HDR reclassified to ESA. • 307 acres HDR reclassified to LDR. • 45 acres HDR reclassified to PO. • 216 acres HDR reclassified to WM. 	<p>The net decrease in HDR was in part due to the reclassification of acres which were originally classified as HDR with the intent to develop recreation facilities which were never developed or minimally developed. The reclassification of these acres reflects the current and future use. The majority of these acres were reclassified as LDR or WM. A portion of the decrease is due to the need to capture additional PO. A small portion of water surface in the Mathies Park area, originally classified as HDR, was reclassified as Restricted Water Surface.</p>

Reclassification	Description of Changes ⁽²⁾	Justification
Environmentally Sensitive Areas (ESA)	<p>The classification of 576 acres as Environmentally Sensitive Areas resulted from the following:</p> <ul style="list-style-type: none"> • 5 acres not previously classified identified as ESA. • 27 acres of HDR reclassified to ESA. • 491 acres of WM reclassified to ESA. 	<p>Reclassification of 576 acres was determined by the study team to be necessary to provide a high level of protection for those areas supporting significant habitat, views, or cultural sites. Classifying these areas as ESA will afford these areas with the highest level of protection from disturbance. The reclassification of 3 acres will have no effect on current or projected public use.</p>
MRML – Low Density Recreation (LDR)	<p>The net increase in Low Density Recreation acres from 937 acres to 1,269 acres resulted from the following:</p> <ul style="list-style-type: none"> • 7 acres not previously classified identified as LDR. • 307 acres of HDR reclassified to LDR. • 18 acres of WM reclassified to LDR. 	<p>Many areas around the shoreline were originally classified as HDR, but never developed therefore a classification shift to LDR is appropriate for the current and future use. Additionally, some acres initially identified as WM currently have primitive uses such as Yanush Landing, Buffalo Creek Landing, and Anderson Creek therefore reclassifying as LDR is more appropriate for current and future use.</p>
MRML – Wildlife Management (WM)	<p>The net decrease in Wildlife Management lands from 5,093 acres to 4,805 acres is due to the following:</p> <p>16 acres not previously classified identified as WM. 216 acres of HDR reclassified to WM. 491 acres WM reclassified to ESA. 9 acres WM reclassified to HDR. 18 acres WM reclassified to LDR.</p>	<p>Many islands not previously classified were classified as WM due to adjacent land classifications. Additionally, Potato Hills North area currently allows day use fishing therefore, it was reclassified as HDR. The Narrows area was reclassified from WM to HDR due to the current uses which include a boat launch, bathroom and courtesy dock. 491 WM acres were reclassified as ESA to allow for the highest level of protection from disturbance.</p>

(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 detailed in Table 2.1 and 2.2.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER CONSIDERATION

As previously discussed in this Section, other alternatives to the Proposed Action were initially considered as part of the alternative development process for the 2023 MP revision. However, none met the Purpose and Need for the Proposed Action, current USACE regulations and guidance, or addressed public and agency comments or 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 potential impacts of the No Action and Proposed Action alternatives on the natural, cultural, and social resources found within the USACE Sardis Lake Fee Boundary. A description of the existing condition of resources can be found in Chapter 2 of the 2023 MP. Only the resources that have the potential to be affected by implementation of either alternative will be analyzed in this EA. The following resources were excluded from further impact analysis because the No Action nor the Proposed Action will not have any impact on them: Hazardous, Toxic, and Radioactive Waste.

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 § 1508.1 [g]). Indirect effects are caused by the action and are later in time or further removed in distance but are still reasonably foreseeable (40 CFR § 1508.1 [g]). The alternatives may create temporary (less than 1 year), short-term (up to 3 years), long-term (3 to 10 years following the master plan revision), or permanent effects.

In considering whether the effects of the proposed action are significant, agencies shall analyze the potentially affected environment and degree of the effects of the action (40 CFR § 1501.3). In considering the potentially affected environment, agencies should consider, as appropriate to the specific action, the affected area (national, regional, or local) and its resources, such as listed species and designated critical habitat under the Endangered Species Act (40 CFR § 1501.3[b](1)). In considering the degree of the effects, agencies should consider the following, as appropriate to the specific action: both short- and long-term effects, both beneficial and adverse effects, effects on public health and safety, effects that will violate Federal, State, Tribal, or local law protecting the environment (40 CFR § 1501.3[b](2)). For the purpose of this analysis, the intensity of impacts will 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

Please refer to Chapters 1.5, 2.5 and 2.6 of the 2023 MP for existing land use information in and around Sardis Lake.

3.1.1 Alternative 1: No Action

Under the No Action Alternative, USACE will not implement the 2023 MP, and thus the land use management would not be updated to reflect current and projected future needs and demands. The operation and maintenance of USACE lands at Sardis Lake would continue as outlined in the 1978 MP to the extent that current and future laws and regulations would permit. Management would continue to lag behind the current and future recreational needs identified through scoping efforts and USACE Project staff experience and recommendations. If the 1978 MP is kept and implemented, this would not align with current and future operations and recreation trends or needs for the Lake. This divergence would create a patchwork of management requirements that would be inefficient for Sardis Lake staff to implement. The management would also increasingly lack transparency to the public, or alternately create more of a burden to staff to communicate how the lake management differs from that in the 1978 MP.

Implementation of the No Action Alternative would have moderate, adverse, short- and long-term impacts on land use within and on USACE Sardis Lake project lands due to conflicting guidance and management of USACE lands.

3.1.2 Alternative 2: Proposed Action

The objectives for revising the 1978 MP describe current and foreseeable land uses while considering expressed public opinion, regional trends, and USACE policies that have evolved to meet day-to-day operational needs. The reclassifications in the 2023 MP were developed to help fulfill regional goals associated with good stewardship of land and water resources that will allow for continued use and development of project lands.

While HDR is technically a new management classification, the bulk of the 866 acres of HDR land in the 2023 MP is from areas previously classified as Recreation Intensive Use. MRML-LDR is new in name but how they are managed is the exact way as the lands that they will be replacing are managed which is Operations Recreation Low Density Use. Even though the acres in the 2023 MP are decreasing for HDR from 1,505 to 866 acres, recreational opportunities will not decrease. The change in acreages reflects current and foreseeable recreational trends for the area.

MRML-LDR are lands that have minimal development or infrastructure that support passive public use such as hiking, nature photography, bank fishing, and hunting. Future uses may include designating additional natural surface hike/bike trails. Even though these areas are managed for recreational purposes, this designation provides more protection for wildlife and vegetation than HDR, but less than ESA.

HDR and MRML-LDR are not the only new management classifications introduced in the 2023 MP. The establishment and reclassification of 576 acres as ESA will allow for greater protection of sensitive habitats and/or cultural resources. Conservation

efforts within USACE Sardis Lake fee owned boundary will be further aided by the reclassification of 1,269 acres as MRML-LDR and 4,805 acres as MRML-WM. Even though MRML-WM will decrease by 288 acres in the 2023 MP, the majority of those acres being lost will be converted to ESA, which means conservation efforts will not be further reduced.

On the waters of Sardis Lake, the 2023 MP will add established surface water use categories in addition to the current ad hoc management of the lake. The establishment of 10 acres as Restricted, 2 acres as No Wake, and 13,857 acres as Open Recreation to the water surface, respectively, will allow for a delineated and safer management of the lake's waters when the lake is at conservation pool. These reclassifications will help to improve safety of those recreating on and around Sardis Lake by restricting boat access and speeds around certain parts of the lake, as well as establishing areas that boating can occur in. The Sardis Lake office will still maintain the authority to make ad hoc adjustments as needed by lake level, which will prevent the reclassifications from being overly rigid or even ineffectual in various lake level conditions.

The current and foreseeable land use demand and patterns for Sardis Lake does not entail the need of utility corridors, thus none will be implemented in the 2023 MP. However, if such a need would arise, current USACE policy dictates that all utilities must go around USACE property unless no other feasible alternative exists. If there is no feasible alternative that exists, then the utility must go through the NEPA permitting process prior to approval and implementation.

The majority of the land use reclassifications in the 2023 MP will maintain the functional management that is currently occurring. While the terminology updates appear substantial, they have been implemented after considerable public input, and seek to maintain the values the public holds highest at Sardis Lake. Additionally, the land reclassifications provide a balance between public use, both intensive and passive, and natural resources conservation. Therefore, the implementation of the Proposed Action will have moderate, long-term beneficial impacts to land use as the land reclassifications further refine areas for appropriate activities.

3.2 WATER RESOURCES

Please refer to section 2.6 of the 2023 MP for existing water resource information in and around Sardis Lake.

3.2.1 Alternative 1: No Action

There are no known water resource related problems occurring at Sardis Lake, therefore there would be no impacts on water resources as a result of implementing the No Action Alternative.

3.2.2 Alternative 2: Proposed Action

The reclassifications and resource management objectives required for implementing the Proposed Action will allow land management and land uses to be adjusted for current and reasonably foreseeable future changes in water resources. For

example, the establishment of 576 acres as ESA lands will help to stabilize soils through the promotion and restoration of native habitats. In turn, these habitats will help reduce erosion, and buffer and filter storm runoff before making its way into the lake, thereby reducing water turbidity. The establishment of 576 acres of ESA lands, 1,269 acres as MRML-LDR, and 4,805 acres as MRML-WM, will result in more upland areas and wetlands being protected from erosion and sedimentation. Even though MRML-WM will decrease by 288 acres, the majority of those acres being lost will be converted to ESA, which means wetlands being protected will not be further reduced. The resource objectives will require that all decision-making processes take into consideration their impacts to Sardis Lake flood/conservation pool levels. By doing this, the resource objectives will help to further protect water resources within Sardis Lake.

Implementation of the Proposed Action will have minor, short- and long-term beneficial impacts on water resources located within USACE project lands.

3.3 CLIMATE, CLIMATE CHANGE AND GHG

Please refer to section 2.2 and 2.3 of the 2023 MP for existing climate, climate change and greenhouse gas information in and around Sardis Lake.

3.3.1 Alternative 1: No Action

The No Action Alternative would not result in any change in management of Sardis Lake project land. Implementation of the 1978 MP would have no impact (beneficial or adverse) on existing or future climate conditions. Current policy (Executive Orders [EO] 3834 and 13783, and related USACE policy) requires project lands and recreational programs be managed in a way that advances broad national climate change mitigation goals including, but not limited to, climate change resilience and carbon sequestration. Climate Change and GHG policies were not evaluated in the 1978 MP, as such the 1978 MP does not align with current laws and regulations. The No Action Alternative has no impact on Climate Change and GHG because the 1978 MP does not have any action that impacts existing conditions.

3.3.2 Alternative 2: Proposed Action

The 2023 MP would have negligible positive impacts to climate, climate change and GHG emissions in the region. The impacts will come from the promotion of land management practices and design standards that promote sustainability. Management under the 2023 MP will follow current policy to meet climate change goals as described for the No Action Alternative. Any ground disturbing activities considered under the 2023 MP will go through the NEPA and design processes prior to implementation. During that time, impacts to the climate will be analyzed for those ground disturbing activities.

3.4 AIR QUALITY

Please refer to section 2.4 of the 2023 MP for existing air quality information in and around Sardis Lake.

3.4.1 Alternative 1: No Action

The continued implementation of the 1978 MP would not result in any changes to current and reasonably foreseeable future air quality in the region. No new increase in vehicular traffic, mass permanent vegetation removal, or the building of mass industrial facilities would occur as result of implementing this alternative. The No Action Alternative would remain compliant with the Clean Air Act because the 1978 MP includes only guidelines and does not incorporate actions which produce criteria pollutants which brings it further into compliance with the Clean Air Act.

3.4.2 Alternative 2: Proposed Action

As with the No Action Alternative, the 2023 MP will not result in any change to current and reasonably foreseeable air quality in the region. The Proposed Action does not implement any actions (i.e. ground disturbing activities) that directly or indirectly produce criteria pollutants (i.e. total emissions is 0); therefore, implementation of the Proposed Action will remain compliant with the Clean Air Act and State Implementation Plan and is not subject to a conformity determination. Negligible air quality benefits may be realized through the reclassification of 576 acres as ESA lands, 1,276 acres as MRML-LDR lands, and 4,805 acres as MRML-WM lands. Even though MRML-WM will decrease by 288 acres, the majority of those acres being lost will be converted to ESA, which means air quality will not be further reduced. The added protection these classifications provide will benefit native vegetation communities that filter and sequester air pollutants.

3.5 TOPOGRAPHY, GEOLOGY, AND SOILS

Please refer to section 2.5 of the 2023 MP for existing topography, geology, and soils information in and around Sardis Lake.

3.5.1 Alternative 1: No Action

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, or prime farmland as a result of implementing the No Action Alternative.

3.5.2 Alternative 2: Proposed Action

The Proposed Action takes into consideration the various topographical, geological, and soils aspects of USACE Sardis Lake Project lands. The reduction of HDR land (1,505 acres to 866 acres), classification of 4,805 acres as MRML-WM lands, 1,269 acres as MRML-LDR, and the establishment of 576 acres as ESA, will help to increase the long-term preservation and stabilization of the soils within USACE Sardis Lake project lands. Even though MRML-WM is decreasing by 288 acres, the majority of those acres being lost will be converted to ESA, which means topography, geology, and soil conditions will not be further reduced. Implementation of the Proposed Action will have minor, positive, long-term impacts on soil conservation and topography, and geology at Sardis Lake.

3.6 NATURAL RESOURCES

Please refer to section 2.9 of the 2023 MP for existing natural resources information in and around Sardis Lake.

3.6.1 Alternative 1: No Action

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

3.6.2 Alternative 2: Proposed Action

The reclassifications of land classes, improvement of resource management objectives, and the overall improvement of the 2023 MP will improve the ability for USACE Sardis Federal Project lands to be better managed in accordance with the Project's authorized purposes. Implementing the knowledge gained from the Wildlife Habitat Appraisal Procedure (WHAP) (Appendix C of the 2023 MP) completed for Sardis Lake will help to establish high quality and unique areas around the lake. The implementation of the land classifications will allow project lands to continue and further support the USFWS and the ODWC missions associated with wildlife conservation and implementation of operational practices that will protect and enhance wildlife and fishery populations and habitat. The resource objectives will allow for natural resources to be managed with consideration of how they will be impacted from the retention of flood waters, which will further help to protect the natural resources with Sardis Lake. The reduction of HDR land (1,505 acres to 866 acres), classification of 4,805 acres as MRML-WM lands, 1,269 acres as MRML-LDR, and the establishment of 576 acres as ESA, especially in prime ecological areas, will help protect natural resources from various types of adverse impacts such as habitat fragmentation. Even though MRML-WM is decreasing by 288 acres, the protection of natural resources will not be decreased. That is because the majority of those acres being lost will be converted to ESA. Therefore, under the Proposed Action, there will be moderate short- and long-term, beneficial impacts on natural resources as a result of implementing the 2023 MP.

3.7 THREATENED AND ENDANGERED SPECIES

The USFWS Information for Planning and Consultation (IPaC) database (USFWS 2023) lists the threatened and endangered species, and trust resources that may occur within the Sardis Lake Federal Fee Boundary (see USFWS Species List and the IPaC Report in Appendix C of 2023 MP). Based on the IPaC report, there are 12 federally listed or proposed endangered, threatened, or candidate species that could be found within Sardis Lake. A list of these species is presented in Table 3.1. There is no Critical Habitat designated within or near Sardis Lake. The species identified as Threatened, Endangered or Candidate Species by ODWC that are not federally listed are included in Appendix C of the 2023 MP as well as a list of Species of Greatest Conservation Need (SGCN) for the Ouachita Mountains, Arkansas River Valley and West Gulf Coastal Plain Region.

Table 3-1. Federally Listed Threatened & Endangered Species with Potential to Occur at Sardis Lake.

Common Name	Scientific Name	Federal Status	State Status
Alligator Snapping Turtle	<i>Macrochelys temminckii</i>	Proposed Threatened	Not Listed
American Burying Beetle	<i>Nicrophorus americanus</i>	Threatened	Not Listed
Indiana Bat	<i>Myotis Sodalis</i>	Endangered	Not Listed
Monarch Butterfly	<i>Danaus plexippus</i>	Candidate	Not Listed
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	Not Listed
Ouachita Rock Pocketbook	<i>Arcidens wheeleri</i>	Endangered	Not Listed
Piping Plover	<i>Charadrius melodus</i>	Threatened	Not Listed
Red-cockaded Woodpecker	<i>Picoides borealis</i>	Endangered	Not Listed
Red Knot	<i>Calidris canutus rufa</i>	Threatened	Not Listed
Scaleshell Mussel	<i>Leptodea leptodon</i>	Endangered	Not Listed
Tricolored Bat	<i>Perimyotis subflavus</i>	Proposed Endangered	Not Listed
Winged Mapleleaf	<i>Quadrula fragosa</i>	Endangered	Not Listed

3.7.1 Alternative 1: No Action

The No Action Alternative does not involve any activities that would contribute to changes in existing conditions. The USACE has determined that implementation of the No Action Alternative would have No Effect on any federally listed or proposed threatened, endangered, or candidate species that may occur within the Sardis Lake Project area.

3.7.2 Alternative 2: Proposed Action

The implementation of the 2023 MP will allow for better cooperative management plans with the USFWS and ODWC that will help to preserve, enhance, and protect vegetation and wildlife habitat resources that are essential to various endangered and threatened species that may be found within USACE Sardis Lake federal project lands. To further management opportunities and beneficially impact habitat diversity, the reclassifications in the 2023 MP includes 576 acres as ESAs, including several land parcels previously classified as unclassified, Operations-Recreation Intensive Use, Operations-Wildlife Management, and Operations-Recreation Low-Density Use. These parcels were converted to ESA in order to recognize those areas having the highest ecological value and to ensure they are given the highest order of protection among possible land classifications. The resource objectives will require that threatened and endangered species are managed by various ecosystem management principles. Any

future activities that could potentially result in impacts to Federally listed species will be coordinated with USFWS through Section 7 of the Endangered Species Act. USACE has determined that the implementation of the Proposed Action will have No Effect on any federally listed or proposed threatened, endangered, or candidate species that may occur within the Sardis Lake federal fee boundary.

3.8 INVASIVE SPECIES

Please refer to section 2.13 of the 2023 MP for existing information on invasive species within the USACE fee owned boundary.

3.8.1 Alternative 1: No Action

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

3.8.2 Alternative 2: Proposed Action

The reclassifications of land classes, improvement of resource management objectives, and the overall improvement of the 2023 MP will allow invasive species within USACE Sardis Lake federal project lands to be better managed. Implementation of the knowledge gained from the Wildlife Habitat Appraisal Procedure (WHAP) survey completed for Sardis Lake will help identify high value and unique areas that will benefit from further protection, thus reducing the opportunity for invasive species encroachment.

The reduction of HDR land (1,505 acres to 866 acres), classifying 4,805 acres as MRML-WM lands, and the establishment of 576 acres as ESA, especially in prime ecological areas, helps to protect natural resources from various types of adverse impacts such as habitat fragmentation which increases the opportunity for the spread of invasive species. Even though MRML-WM is decreasing by 288 acres, the majority of those acres being lost will be converted to ESA, which means the management for invasive species control will not be further reduced. These areas will also receive more invasive species management efforts. The resource goals and objectives will require monitoring and reporting of invasive species, as well as action items to prevent and/or reduce the spread of these species. Therefore, under the Proposed Action, there will be short-and long-term minor, beneficial impacts on invasive species management as a result of implementing the 2023 MP.

3.9 CULTURAL, HISTORICAL, AND ARCHAEOLOGICAL RESOURCES

Please refer to section 2.15 of the MP for existing information on cultural, historical, and archaeological resources within the USACE fee owned boundary.

3.9.1 Alternative 1: No Action

There would be no additional short- or long-term, minor, moderate, or major, beneficial, or adverse impacts on cultural, historical, or archaeological resources as a result of implementing the No Action Alternative, as there would be no changes to the 1978 MP.

3.9.2 Alternative 2: Proposed Action

The implementation of the reclassifications of land management classes, improvement of resource management objectives, and the overall improvement of the 2023 MP will allow cultural, historical, and archaeological resources within USACE Sardis Lake federal project lands to be better managed and accounted for. Based on previous surveys at Sardis Lake, the required reclassifications, resource objectives, and resource plan will not change current cultural resource management plans or alter areas where these resources exist. All future activities will be coordinated with the Oklahoma State Historic Preservation Officer (SHPO) and federally recognized Tribes to ensure compliance with Section 106 of the NHPA, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act. Therefore, no adverse impacts on cultural, historical, or archaeological resources will occur as a result of implementing the 2023 MP. Beneficial short-and long-term but moderate, impacts may occur as a result of the 2023 MP as lands classified as PO, ESA, MRML-LDR or MRML- WM will generally protect any historic properties within those lands against ground disturbing activities.

3.10 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

Please refer to section 2.16 of the 2023 MP for existing socioeconomic and environmental justice information in and around Sardis Lake.

3.10.1 Alternative 1: No Action

The continued implementation of the 1978 MP would result in the existing beneficial socioeconomic impacts to continue, as visitors would continue to come to the lake from surrounding areas. In addition to camping, many visitors purchase goods such as groceries, fuel, and camping supplies locally, eat in local restaurants, 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 disproportionate impacts on minority or low-income populations, or children, with the implementation of the No Action Alternative.

3.10.2 Alternative 2: Proposed Action

The implementation of the 2023 MP land reclassifications, resources objectives, and resource plan reflect changes in land management and land uses that have occurred since 1978. Sardis Lake offers a variety of recreational opportunities for visitors. The 2023 MP will be beneficial to the local economy through direct and indirect job creation and local spending by visitors as a result of the improved management from the goals, objectives, and land classifications that will help to improve visitors experience of Sardis Lake. Beneficial impacts will be similar to the No Action Alternative. After using the Environmental Protection Agency (EPA) Climate and Economic Screening Tool (CEST)

(2022A), the lake is determined to be surrounded by disadvantaged communities on all sides. These communities are defined by the EPA (2022B) as those that meet one or both screening criteria, meet the threshold of burden for the CEST, and or are on land within the boundaries of Federally Recognized Tribes. The CEST provides two burden criteria for disadvantaged communities as being characterized by “(1) at or above the threshold for one or more environmental, climate, or other burdens, and (2) at or above the threshold for an associated socioeconomic burden”. The communities surrounding Sardis Lake meet the burden criteria for being within Federally Recognized Tribes boundaries, climate change, health, legacy pollution, transportation, and energy. There will be no adverse impacts to these communities as a result of implementing the 2023 MP because no construction activities will occur as result of implementation that will otherwise impact these communities. There will be no adverse impacts on the economy in the area and no disproportionate impacts on minority or low-income populations, children, or on environmental justice as a result of the Proposed Action.

3.11 RECREATION

Please refer to section 2.17 of the 2023 MP for existing recreation information in and around Sardis Lake.

3.11.1 Alternative 1: No Action

Under the No Action Alternative, there would be no short- or long-term, minor, moderate, or major, beneficial, or adverse impacts on recreational resources, as there would be no changes to the 1978 MP.

3.11.2 Alternative 2: Proposed Action

Sardis Lake is beneficial to the local visitors and also offers a variety of free recreation opportunities. Even though the amount of acreage available for High Density Recreation will decrease (1,505 acres to 866 acres) with implementation of the 2023 MP, this land reclassification reflects changes in land management and land uses that have occurred since 1978 at Sardis Lake. Passive recreational activities will still be allowed as they are now within all lands, regardless of the land classification. The resource objectives will require that all decisions made in regard to the lake take into consideration their impacts to recreation and will be monitored should adjustments be needed. Therefore, under the Proposed Action, there will be no adverse, short- or long-term impacts on recreation as numerous recreation opportunities will remain in and around Sardis Lake to accommodate various outdoor based recreation activities. Moderate beneficial impacts may occur as a result of the 2023 MP meeting the current and future recreational needs and public preferences.

3.12 AESTHETIC RESOURCES

Please refer to section 2.14 of the MP for existing aesthetic resource conditions in and around Sardis Lake.

3.12.1 Alternative 1: No Action

There would be no short- or long-term, minor, moderate, or major, beneficial, or adverse impacts on visual resources as a result of implementing the No Action Alternative, as there would be no changes to the 1978 MP.

3.12.2 Alternative 2: Proposed Action

Sardis Lake currently plays a pivotal role in availability of parks and open space in Latimer, Pittsburg, and Pushmataha Counties and in the surrounding region. The amount of acreage classified for High Density Recreation will decrease (1,505 acres to 866 acres) with implementation of the 2023 MP. This land reclassification reflects changes in land management and land uses that have occurred since 1978 at Sardis Lake. The conversion of these lands will have no effect on current or projected public use or visual aesthetics as views from natural and recreation areas will remain in place. Furthermore, the classification of 4,805 acres as MRML-WM, and the establishment of 576 acres as ESA, will have positive impacts on aesthetic resources by protecting lands that are aesthetically pleasing and available for passive recreation activity at Sardis Lake and limit future development in these areas. Even though MRML-WM will decrease by 288 acres, the majority of those acres being lost will be converted to ESA, which means aesthetic resources will not be further reduced. Additionally, resource objectives place an emphasis on increasing public education on recreation, nature, cultural resources, and ecology resources at Sardis Lake. Therefore, under the Proposed Action, there will be no short- or long-term minor, adverse impacts to aesthetic resources as a result of implementing the 2023 MP.

3.13 HAZARDOUS MATERIALS AND SOLID WASTE

Please refer to section 2.7 of the 2023 MP for information concerning hazardous materials and solid waste in and around Sardis Lake fee owned boundary.

3.14 HEALTH AND SAFETY

Please refer to section 2.8 of the 2023 MP for information concerning health and safety in and around Sardis Lake fee owned boundary.

3.14.1 Alternative 1: No Action

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

3.14.2 Alternative 2: Proposed Action

The implementation of the 2023 MP will result in the classification of Restricted Surface Water (10 acres), Designated No-Wake areas (2 acres), and Open-Recreation (13,857). These reclassifications maintain and in some cases, improve boating, non-motorized recreation, and swimming safety near the Sardis Lake Dam, water intake structures, and key recreational water access areas such as boat ramps and designated swimming areas.

The project will continue to have reporting guidelines in place should water quality become a threat to public health. Existing regulations and safety programs throughout

the Sardis Lake project area will continue to be enforced to ensure public safety. The resource objectives will require that various factors that impacts human safety at the lake will be monitored and that actions are taken to address, eliminate or reduce those factors. Additionally, the objectives place an emphasis on educating the public on water safety and on flood risk management efforts at Sardis Lake. Therefore, under the Proposed Action, there will be short- and long-term minor, beneficial impacts on health and safety as a result of implementing the 2023 MP.

3.15 SUMMARY OF CONSEQUENCES AND BENEFITS

Table 3-2 provides a tabular summary of the consequences and benefits for the No Action and Proposed Action alternatives for each of the 13 assessed resource categories.

Table 3-2. Summary of Consequences and Benefits

Resource	Change Resulting from the proposed Master Plan	Environmental Consequences: No Action Alternative	Environmental Consequences: Proposed Action	Benefits Summary
Land Use	No effect on private lands. Emphasis is on protection of wildlife and environmental values on USACE land and maintaining current level of developed recreation facilities.	Lags behind the current and future recreational needs. Conflicting guidance and management is an existing problem.	Recognizes recreation trends and regional natural resource priorities identified by ODWC, and public comments.	Land reclassification changes and resource objectives fully recognize passive use recreation trends and regional environmental values such as protection of riparian zones.
Water Resources Including Groundwater, Wetlands, and Water Quality	Small change to recognize value of wetlands.	No effect.	Promotes restoration and protection of wetlands and good land stewardship.	Specific resource objective that will promote restoration and protection of wetlands.
Climate, Climate Change, and Greenhouse Gases	Minor change to recognize need for sustainable, energy efficient design.	No effect.	Promotes land management practices and design standards that promote sustainability.	Specific resource objectives promote national climate change mitigation goal. LEED standards for green design, construction, and operation activities will be employed to the extent practicable.
Air Quality	No change	No effect	No effect	No added benefit
Topography, Geology and Soils	Minor change to preserve and stabilize soils.	No effect.	Encourages good stewardship that would reduce existing and potential erosion.	The promotion of land classes that would preserve and stabilize soils.

Natural Resources	Major benefits through land reclassification and resource objectives.	No effect.	Gives full recognition of sensitive resources and regional trends and priorities related to natural resources.	Reclassification of lands included 576 acres of ESA and an increase in lands emphasizing wildlife management.
Threatened and Endangered Species, including SGCN species.	Minor change to recognize both federal and state-listed species.	No effect.	Fully recognizes federal and state-listed species as well as SGCN listed by ODWC and Rare species listed by ODWC.	The 2023 MP sets forth the most recent listing of federal and state-listed species and addresses ongoing commitments associated with USFWS.
Invasive Species	Minor change to recognize several recent and potentially aggressive invasive species.	No effect.	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 Resources	Minor change to recognize current status of cultural resources.	No effect.	Recognizes the presence of cultural resources and places emphasis on protection and management.	Reclassification of lands included 576 acres of ESA 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	Moderate benefits to outdoor recreation programs.	No effect.	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.	No effect.	Promotes activities that limit disturbance to the scenic beauty and aesthetics of the lake.	No added benefit Specific management objectives to minimize activities that disturb the scenic beauty and aesthetics of the lake.
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, will classify 10 acres of water surface as restricted and designated no-wake for public safety purposes.

SECTION 4: CUMULATIVE IMPACTS

NEPA regulations updated May 20, 2022 require that cumulative impacts of a proposed action be assessed and disclosed in an EA. Council on Environmental Quality (CEQ) regulations define a cumulative impact as *“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. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”* (40 CFR §1508.7). Impacts can be positive or negative.

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.” CEQ guidance also recommends narrowing the focus of cumulative impacts analysis to important issues of national, regional, or local significance.

The initial step of the cumulative impact analysis uses information from the evaluation of direct and indirect impacts in the selection of environmental resources that should be evaluated for cumulative impacts. A proposed action would not contribute to a cumulative impact if it would not have a direct or indirect effect on the resource.

Based on a review of the likely environmental impacts analyzed in Section 3 (Affected Environment and Consequences) the USACE determined that the analysis of cumulative impacts will be limited to: land use, water resources, climate, climate change, GHG, air quality, topography, geology, soils, natural resources, threatened and endangered species, invasive species, cultural resources, historical resources, archeological resources, recreation, aesthetic resources, and health & safety. With respect to the remaining resource topics such as socioeconomic & environmental justice and hazardous, toxic, & radioactive waste, both the No Action and Proposed Action alternatives will either:

1. Not result in any direct or indirect impacts and therefore will not contribute to a cumulative impact; or,
2. That the nature of the resource is such that impacts do not have the potential to cumulate. For example, impacts related to geology are site specific and do not cumulate; or,
3. That the future with or future without project condition analysis is a cumulative analysis and no further evaluation is required. For example, because climate change is global in nature, the future without project condition and future with project condition analysis is inherently a cumulative impact assessment.

For each resource topic carried forward for cumulative impact analysis, the timeframe for analysis is the time since the 1978 Master Plan was implemented (past)

and thru the life of the 2023 Master Plan (25 years – to 2047). The zone of interest for all resources except economy is Latimer, Pittsburg, and Pushmataha Counties, Oklahoma. The zone of interest for economics is the same used in Section 3.10.

4.1 PAST IMPACTS WITHIN THE ZONE OF INTEREST

Sardis Lake was originally authorized for construction in 1962 as a multi-purpose reservoir for flood control, water supply, recreation, and fish and wildlife. Construction of Sardis Dam began in 1975; the final storage began in January 1983; and the conservation pool was filled for the first time in March 1984. The total project area at Sardis Lake encompasses 21,623 acres, including the 13,869 acres of surface water at normal pool elevation of 599.0. The entire 21,623 acres were acquired in fee simple title by USACE with 1,148 acres as easement lands. Flowage easement lands are grouped under the same land classification as easement lands.

Originally the project was called Clayton Lake, the name was changed to Sardis in December of 1981. Sardis Lake, located on Jackfork Creek, a tributary of the Kiamichi River. It is an integral component of the larger Red River Basin that has additional congressionally authorized purposes including flood control, hydropower, navigation, and water quality. The total river basin is 1,830 square miles, while the drainage area upstream of Sardis Dam is 275 square miles.

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

Future management of the 1,148 acres of easement lands at Sardis 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. At the time of this publication, there are not any major projects like road expansion, new industrial centers, neighborhoods being built, and new hiking trails in and around Sardis Lake.

At the time of this publication there are not any major projects (e.g., new roads, residential developments), new utility lines planned for in and around Sardis Lake.

National USACE policy set forth in ER 1130-2-550, Appendix H, states that USACE lands will, in most cases, only be made available for roads that are regional arterials or freeways (as defined in ER 1130-2-550). All other types of proposed roads, including driveways and alleys, are generally not permitted on USACE lands. The proposed expansion or widening of existing roadways on USACE lands will be considered on a case-by-case basis.

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 Sardis Lake and cumulative adverse impacts on resources will 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 will occur if any action were inconsistent with adopted land use plans or if an action will substantially alter those resources required for, supporting, or benefiting the current use. Land use around Sardis Lake has experienced major change, it is rapidly being developed from uninhabited thick forest hillsides to thin forests, with cabins and vacation homes. Under the No Action Alternative, land use will not change. Although the Proposed Action will result in the reclassification of project lands, the reclassifications were developed to help fulfill regional goals associated with good stewardship of land resources that will allow for continued use of project lands.

The current and foreseeable land use demand and patterns for Sardis Lake does not entail the need of utility corridors, which the 2023 MP will not have any. However, if such a need would arise, current USACE policy dictates that all utilities must go around USACE property unless no other feasible alternative exists. If there is no feasible alternative that exists then the utility must go through the NEPA permitting process prior to approval and implementation.

Therefore, cumulative impacts on land use within the area surrounding Sardis Lake, when combined with past and proposed actions in the region, are anticipated to be negligible.

4.3.2 Water Resources

A major impact would occur if any action were 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. Sardis Lake was developed for flood control, water conservation, fish and wildlife, and recreation purposes. The reclassifications and resource objectives that will be required to revise the 1978 MP are compatible with water use plans and surface water classification; further, they were developed to help fulfill regional goals associated with good stewardship of water resources that will allow for continued use of water resources associated with Sardis Lake. Therefore, cumulative impacts on water resources within the area surrounding Sardis Lake, when combined with past and proposed actions in the region, are anticipated to be minor.

4.3.3 Climate Change and GHG

Under the Proposed Action, current Sardis Lake project management plans and monitoring programs will not be changed. In the event that GHG emission issues become significant enough to impact the current operations at Sardis Lake, the 2023 MP and all associated documents will be reviewed and revised as necessary. Therefore, implementation of the 2023 MP, when combined with other existing and

proposed projects in the region, will result in negligible reasonably foreseeable future impacts on climate, climate change or GHG.

4.3.4 Air Quality

There are not any major highway projects scheduled near the zone of interest for Sardis Lake nor any other projects that will limit the amount of new emissions that could potentially affect air quality within the region. The Proposed Action will not adversely impact air quality within the area. Vehicle traffic along park and area roadways and routine daily activities in nearby communities contribute to current and future emission sources; however, the impacts associated with the reclassification of lands at Sardis Lake under the Proposed Action will be negligible. Seasonal prescribed burning could occur on Sardis Lake to help maintain the various prairies found throughout the fee boundary, but will have minor, negative impacts on air quality through elevated ground-level O₃ and particulate matter concentrations; however, these seasonal burns will be scheduled so that impacts are minimized. Implementation of the 2023 MP, when combined with other existing and proposed projects in the region, could result in minor adverse and beneficial cumulative impacts on air quality.

4.3.5 Topography, Geology, and Soils

A major impact could occur if a proposed future 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 impacts on topography, geology, and soils within the area surrounding Sardis Lake, when combined with past and proposed actions in the region, are anticipated to be negligible.

4.3.6 Natural Resources

The significance threshold for natural resources will include a substantial reduction in ecological processes, communities, or populations that will 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 keeping 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 will threaten the viability of natural resources. Therefore, there will be major long-term beneficial impacts to natural resources resulting from the revision of the 2023 MP when combined with past and proposed actions in the area.

4.3.7 Threatened and Endangered Species

The Proposed Action and No Action Alternatives will not adversely impact threatened, endangered and Oklahoma Natural Heritage Inventory (ONHI) species within the area. Should federally listed species change in the future (e.g., delisting of the American burying beetle or other species or listing of new species), associated requirements will be reflected in revised land management practices in coordination with

the USFWS. The USACE will continue cooperative management plans with the USFWS and ODWC to preserve, enhance, and protect critical wildlife habitat resources.

No reasonably foreseeable future impacts on federal and state listed species are anticipated.

4.3.8 Invasive Species

The USACE will continue to monitor for zebra mussels and take all practicable measures to prevent them from becoming a nuisance to Sardis Lake.

The land reclassifications required to revise the 1978 MP are compatible with Sardis Lake invasive species management practices. Therefore, there will be minor long-term beneficial impacts on reducing and preventing invasive species within the area surrounding Sardis Lake.

4.3.9 Cultural, Historical, and Archaeological Resources

The Proposed Action will not affect cultural resources or historic properties, as the master plan revision does not involve any ground disturbing activities. However, ESA and Wildlife Management lands provide additional protection against ground disturbances. Therefore, this action, when combined with other existing and proposed projects in the region, will not result in major, or minor, or moderate cumulative impacts on cultural resources or historic properties.

4.3.10 Recreation

Sardis Lake provides regionally significant outdoor recreation benefits including a variety of recreation opportunities. Even though the amount of acreage available for High Density Recreation will decrease as a result of implementing the reclassifications, resources objectives, and resource plan in the proposed 2023 MP, these changes reflect changes in land management and historic recreation use patterns that have occurred since 1978 at Sardis Lake. The conversion of these lands will have no effect on current or projected public use. Therefore, the Proposed Action, when combined with other existing and proposed projects in the region, will result in negligible beneficial cumulative impacts on area recreational resources.

4.3.11 Aesthetic Resources

No impacts on visual resources will occur as a result of implementing the reclassifications, resources objectives, and resource plan in the 2023 MP. The Proposed Action, especially the classification of ESAs, in conjunction with other projects in the region, will result in minor beneficial cumulative impacts on the visual resources in the Sardis Lake area.

4.3.12 Health and Safety

No health or safety risks will be created by the Proposed Action. The effects of implementing the 2023 MP, when combined with other ongoing and proposed projects in the Sardis Lake area, will not be considered a major, or moderate, or minor cumulative effect.

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 2023 MP 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 2023 MP revision process, as well as identify reclassification proposals, and identify significant issues related to the Proposed Action. Information provided by USFWS and ODWC on fish and wildlife resources has been utilized in the development of the 2023 MP.

Endangered Species Act of 1973, as amended – Current lists of threatened or endangered species were compiled for the 2023 MP. USACE has determined that there will be No Effect on any federally-listed species with implementation of either alternative.

Executive Order 13186 (Migratory Bird Habitat Protection) – Sections 3a and 3e of EO 13186 direct 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 1978 MP revision will not result in adverse impacts on migratory birds or their habitat. Beneficial impacts could occur through protection of habitat as a result of the 2023 MP revision.

Migratory Bird Treaty Act, as amended – 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 will be coordinated to avoid impacts on migratory and nesting birds.

CWA of 1977, as amended – The Proposed Action will comply with all state and Federal CWA regulations and requirements and is regularly monitored by the USACE and Oklahoma Department Environmental Quality (DEQ) for water quality. A state water quality certification pursuant to Section 401 of the CWA is not required for the 2023 MP. There will be no change in the existing management of the reservoir that will 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 Oklahoma State Historic Preservation Officer. Known sites are mapped and avoided by maintenance activities. Areas that have not undergone cultural resources surveys or evaluations will need to do so prior to any earthmoving or other potentially impacting activities.

Clean Air Act of 1977, as amended – The USEPA 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 2023 MP 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. There are Prime Farmland and farmland of state importance on Sardis Lake project lands, but these will not be impacted.

Executive Order 11990, Protection of Wetlands, as amended – 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 Proposed Action complies with EO 11990.

Executive Order 11988, Floodplain Management, as amended – This EO directs Federal agencies to evaluate the potential impacts of proposed actions in floodplains. Both alternatives comply with EO 11988, as neither will have impacts to the existing floodplain at Sardis Lake.

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 will not impact Prime Farmland present on Sardis 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 revisions in the 2023 MP 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 regenerate. The impacts for this project from the reclassification of land will not be considered an irreversible commitment because subsequent 2023 MP 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 the revisions to the 1978 MP.

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 revision of the 1978 MP, as well as identifying reclassification proposals and significant issues related to the Proposed Action. The USACE began its public involvement process with a public scoping meeting to provide an avenue for public and agency stakeholders to ask questions and provide comments. The public scoping meeting was held on March 24, 2022, at the Clayton Public School Cafeteria, Clayton Oklahoma. The USACE Tulsa District, placed advertisements on the USACE webpage, social media, and print publications prior to the public scoping meeting.

A second public meeting was held on March 30, 2023 at the Clayton Public School Cafeteria, 329 North 1st Street, Clayton, Oklahoma 74053. This meeting introduced the public to the draft MP and EA and began the 30-day public review period of the draft MP, EA and draft Finding of No Significant Impact (FONSI). As with the first public meeting, USACE, Tulsa District, placed advertisements on the USACE webpage, and various social media sites sponsored by adjacent cities. In addition, news releases were sent to area newspapers.

Comments received during the initial scoping period were incorporated as appropriate in the 2023 draft MP. No comments were received during the draft MP and EA review period.

Attachment A to this EA includes the ads published in the local newspaper, the agency coordination letters, and the distribution list for the coordination letters published as of the time of this draft publication. The draft EA has been coordinated with agencies having legislative and administrative responsibilities for environmental protection.

SECTION 8: REFERENCES

Council on Environmental Quality (CEQ). 2005. Executive Office of the President. *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act.*

Environmental Protection Agency (EPA) (2022A) Climate and Economic Justice Screening Tool. Explore the Map. Retrieved from <https://screeningtool.geoplatform.gov/en/>

EPA (2022B) Climate and Economic Justice Screening Tool. Methodology. Retrieved from <https://screeningtool.geoplatform.gov/en/methodology>

United States Army Corps of Engineers (USACE). 2023. Sardis Lake Master Plan, Red River Basin, and McCurtain County, Oklahoma. USACE, Tulsa District.

USACE. 1988. *Engineering Regulation 200-2-2, Procedures for Implementing NEPA.* Washington, DC.

U.S Fish and Wildlife Service (USFWS). 2023. Information, Planning, and Consultation (IPAC) System, Environmental Conservation Online System. Official Species List. Project Code: 2023-0001807. Created on July 11, 2023. <https://ecos.fws.gov>.

SECTION 9: ACRONYMS/ABBREVIATIONS

%	Percent
°	Degrees
§	Section
ac-ft	acre-feet
AQCR	Air Quality Control Region
BMP	Best Management Practice
BP	Before Present
CAP	Climate Action Plan
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
CRMP	Cultural Resources Management Plan
CWA	Clean Water Act
DEQ	Oklahoma Department Environmental Quality
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EP	Engineer Pamphlet
ER	Engineer Regulation
ERS	Environmental Radiation Surveillance
ESA	Environmentally Sensitive Area
F	Fahrenheit
FAA	Federal Aviation Administration
FONSI	Finding of No Significant Impact
GHG	Greenhouse Gas
gpm	gallons per minute
HDR	High Density Recreation
HTRW	Hazardous, Toxic, Radioactive Wastes
IFR	Inactive/Future Recreation
IPAC	Information for Planning and Consultation (USFWS)
LDR	Low Density Recreation
MP	Master Plan
MRML	Multiple Resource Management Lands
msl	mean sea level
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NO	Nitrogen Oxide
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRRS	National Recreation Reservation Service
NWI	National Wetlands Inventory (USFWS)
ODWC	Oklahoma Department of Wildlife Conservation
ONHI	Oklahoma Natural Heritage Inventory
O ₃	Ozone
OAQPS	Office of Air Quality Planning and Standards

ODWC	Oklahoma Department of Wildlife Conservation
Pb	Lead
PCB	Polychlorinated Biphenyls
PCPI	Per Capita Personal Incomes
PL	Public Law
PM _{2.5}	Particulate Matter Less than 2.5 Microns
PM ₁₀	Particulate Matter Less than 10 Microns
PO	Project Operations
RM	River Mile
ROD	Record of Decision
RPEC	Regional Planning and Environmental Center
SGCN	Species of Greatest Conservation Need
SO ₂	Sulfur Dioxide
SUPER	USACE Suite of Computer Programs
SHPO	Oklahoma State Historic Preservation Office
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TPWD	Texas Parks and Wildlife Department
U.S.	United States
U.S.C.	U.S. Code
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGCRP	U.S. Global Change Research Group
VOC	Volatile Organic Compounds
WHAP	Wildlife Habitat Appraisal Procedures
WM	Wildlife Management
VM	Vegetation Management
ZOI	Zone of Interest

SECTION 10: LIST OF PREPARERS

Paul E. Roberts - Biologist, Regional Planning and Environmental Center, Fort Worth District- 8 years of USACE experience.

ATTACHMENT A: NEPA COORDINATION AND PUBLIC SCOPING



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, TULSA DISTRICT
2488 EAST 81ST STREET
TULSA, OKLAHOMA 74137-4290

February 24, 2022

Public Notice

Open House for Sardis Lake Master Plan Revision, Sardis Lake, Kiamichi River Basin Pushmataha and Latimer Counties, Oklahoma

The Tulsa District, U.S. Army Corps of Engineers (USACE) is revising the Sardis Lake Master Plan. An open house will be held from **6:00 pm to 8:00 pm on March 24, 2022 at the Clayton Public School Cafeteria, 329 North 1st Street, Clayton, OK 74053**. The open house will provide attendees with information regarding the revision content and process, and provide a general schedule. Attendees can view current land use classification maps and ask USACE staff questions. A 30-day comment period will follow the meeting from March 24, 2022 through April 23, 2022 in which the public can send comments, suggestions, and concerns.

A Master Plan is defined by USACE as the strategic land use management document that guides the comprehensive management and development of all recreational, natural, and cultural resources throughout the life of the water resource development project. In general, it defines "how" the resources will be managed for public use and resource conservation.

Revision of the Master Plan will not address in detail the technical operational aspects of the lake related to flood risk management, the water conservation missions of the project, or the shoreline management program which specifies what private uses are permitted along the shoreline. The Master Plan study area will include Sardis Lake proper and all adjacent recreational and natural resources properties under federal control.

The current Master Plan, last approved in 1978, is in need of revision to address changes in regional land use, population, outdoor recreation trends, and USACE management policy. Key topics to be addressed in the revised Master Plan include revised land use classifications, new natural and recreational resource management objectives, recreation facility needs, and special topics such as invasive species management and threatened and endangered species habitat. **Public participation is critical to the successful revision of the Master Plan.** Information provided at the open house, including the existing Master Plan, may be viewed on the Tulsa District website at the following link beginning March 24, 2022: <https://www.swt.usace.army.mil/>

Comments can be submitted in writing and can be given to USACE staff at the scheduled open house, or mailed to: Kirt E. Curell, Sardis Assistant Lake Manager; 42160 State Highway 43, Clayton, OK 74536, (918) 569-4131. Comments can also be submitted via email to: CESWT-OD-SARDIS@usace.army.mil

Sincerely,

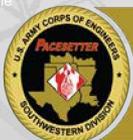
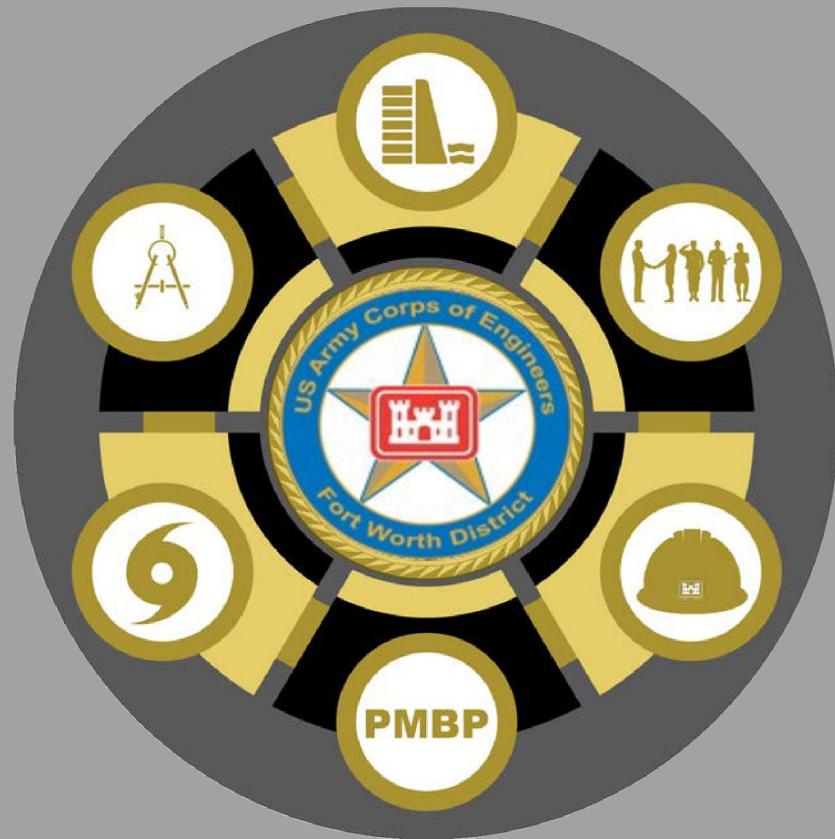
Robert Morrow

Robert Morrow
Interim Chief, Environmental Branch
Regional Planning and Environmental Center

REVISING THE 1977 SARDIS LAKE MASTER PLAN

Public Workshops
24 March 2022
Clayton, OK

U.S. Army Corps of Engineers, Tulsa District



MISSION / PEOPLE / TEAMWORK



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WHAT IS A MASTER PLAN?

- The purpose of a master plan is to establish guidelines for comprehensive management and development of all recreational, natural and cultural resources
- Main focus is stewardship of natural and cultural resources and provision of quality outdoor recreation facilities and opportunities
- Proposed effective life of a Master Plan is 25 years
- Recreational use of the water surface is addressed



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ADDITIONAL KEY POINTS

Key sections of the Master Plan Revision include

- Resource management objectives
- Revised land use classifications
- Conceptual management plan for each land classification

Potential outcomes could be

- Designation of lands for utility corridors, environmentally sensitive areas...

Protection of environmentally sensitive areas is given priority



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of Engineers®



WHAT MASTER PLANS ARE NOT

Master Plans **do not** address in detail the technical aspects of:

- Regional water quality
- Water management for flood risk management
- Water supply or water level management
- Shoreline management (Including boat docks, mowing, or other permits)



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WHAT ABOUT DROUGHT/FLOOD?

- Master Plans cannot change how water in the lake is managed, this is addressed in a separate Water Control Plan
- Natural resources and recreation management must be implemented within the constraints of the primary missions of flood risk management and water supply



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Why Revise MASTER PLAN?

- Revision is needed to incorporate any changes in Public Law
- Current Master Plan is dated March 1977 and has exceeded its useful life. The way the Lake is managed today is different from the vision set forth in the 1977 plan
- Need to re-examine Land Classifications
- The Master Plan must be revised to address current and projected future growth in the region



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What Revisions Can You Propose?

- Re-examine the classification of all project lands
- Re-examine the classification of all project water surface
- Resource Management Objectives
- Recreation Management Objectives



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NATIONAL ENVIRONMENTAL POLICY ACT

- The MP Revision process includes compliance with the National Environmental Policy Act (NEPA) of 1969.
- Purpose of NEPA is to:
 - Ensure federal agencies give proper consideration to the environment prior to undertaking a federal action.
 - Involve the Public (scoping) in the decision-making process.
 - Document the process by which agencies make informed decisions.
- NEPA Scoping Process:
 - Opportunity for Public comments and questions on the potential impacts of proposed federal actions.
 - Includes comments by other federal, State, and local governments, and American Indian Tribal Nations.



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NEPA Includes:

- Public exchange of information related to problems to be solved, issues to be addressed, and potential alternatives.
- Identification and evaluation of a broad range of alternatives.
- Identification and quantification of potential impacts.
- Screening of non-relevant issues from analysis.
- Documentation of analysis and coordination through preparation of NEPA documents, such as an Environmental Assessment (EA) or an Environmental Impact Statement (EIS).
- Federal, State, and Public review of NEPA documents.



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What Types of Comments Can You Submit under NEPA?

- NEPA requests your input on the proposed revision of the Oologah Lake Master Plan and the potential environmental impacts of that action.
- Broadly, covers any aspect of the natural and human environment.
- Some examples of comment categories might include:
 - Recreation availability and access;
 - Fish & wildlife habitat;
 - Public access to federal land;
 - Economic impacts;
 - Cultural resources; or
 - Water and air quality.



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NEPA RESOURCES

Available on NEPAnet: <http://www.NEPA.gov>

NEPAnet Includes:

- A Citizen's Guide to NEPA – Having Your Voice Heard
- Council on Environmental Quality Regulations for Implementing NEPA (40 CFR Parts 1500-1508)



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THE MASTER PLAN REVISION PROCESS



★ Where we are today



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U.S. ARMY

How can you participate?

Review the below documents at website:

<https://www.swt.usace.army.mil/Missions/Recreation/Master-Plans/>

- Public Meeting PowerPoint
- Existing Oologah Lake Master Plan
- Sardis Master Plan Update Comment Instructions
- Sardis Lake Master Plan Comment Form
- USACE Master Planning Policies and Procedures

Submit a comment with your input on the proposed MP revision.



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Sardis Lake Master Plan Revision Comments

SUBMIT YOUR COMMENTS:

(1) Using comment forms available at this Public Meeting

or

(2) by mail: Kirt E. Curell, Sardis Assistant Lake Manager; 42160 State Hwy 43, Clayton, OK 74536

or

(3) by email: CESWT-OD-SARDIS@usace.army.mil

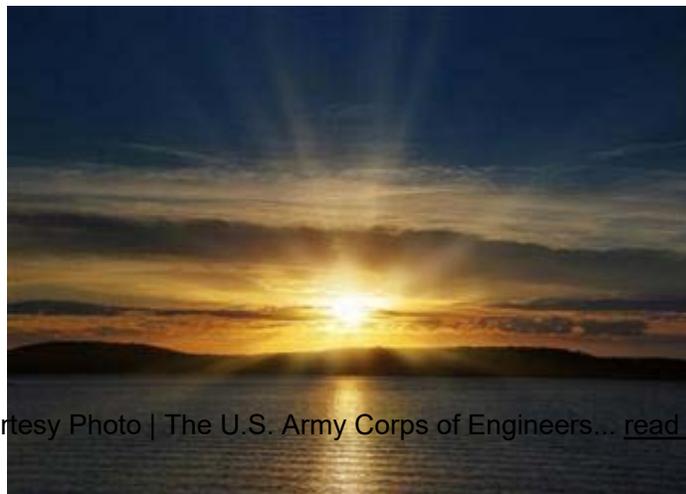


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Sardis Lake Master Plan Revision Open House set for March 24



Courtesy Photo | The U.S. Army Corps of Engineers... [read more](#)

OK, UNITED STATES

03.09.2022

Story by Sara Goodeyon 

U.S. Army Corps of Engineers, Tulsa District  

 **Subscribe**

9

TULSA, Okla. – The U.S. Army Corps of Engineers Tulsa District will host an Open House March 24 to provide information about the Sardis Lake Master Plan revision content and process and will provide a general schedule. The event will be at the Clayton Public School Cafeteria, 329 North 1st Street, Clayton, Okla., 74053 from 6:00 to 8 p.m.

Current land use classification maps will be available to view and USACE personnel will be available to answer questions. There will be a 30-day comment period for the Sardis Lake Master Plan Revision that will be open from March 24 through April 23, 2022, during which the public can submit comments, suggestions and concerns.

The USACE defines a Master Plan as the strategic land use management document that guides the comprehensive management and development of all recreational, natural, and cultural resources throughout the life of the water resource development project. In general, it defines how the resources will be managed for public use and resource conservation.

The revision of the Master Plan will not address in detail the technical operational aspects of the lake related to flood risk management, the water conservation missions of the project, or the shoreline management program which specifies what private uses are permitted along the shoreline. The Master Plan study area will include Sardis Lake proper and all adjacent recreational and natural resources properties under federal control.

The current Master Plan, approved in 1978, needs revision to address changes in regional land use, population, outdoor recreation trends, and USACE management policy. Key topics to be addressed in the revised Master Plan include revised land use classifications, new natural and recreational resource management objectives, recreation facility needs, and special topics such as invasive species management and threatened and endangered species habitat. Public participation is critical to the successful revision of the Master Plan. Information provided at the open house, including the existing Master Plan, may be viewed on the Tulsa District website beginning March 24, 2022.

Comments can be submitted in writing and given to USACE staff at the or mailed to Kirt E. Curell, Sardis Assistant Lake Manager; 42160 State Hwy 43, Clayton, OK 74536, (918) 569-4131. Comments can also be submitted via email to: CESWT-OD-SARDIS@usace.army.mil

CONNECTED MEDIA NEWS INFO

Sardis Lake

Master Plan Date Taken:	03.09.2022
Revision Open Date Posted:	03.09.2022 14:21
House set for House ID:	416105
March 24 Location:	OK, US

Web Views:	128
Downloads:	0

PUBLIC DOMAIN 

MORE LIKE THIS

This work, *Sardis Lake Master Plan Revision Open House set for March 24*, by Sara Goodeyon, identified by DVIDS, must comply with the restrictions shown on <https://www.dvidshub.net/about/copyright>.



CONTROLLED VOCABULARY KEYWORDS

No keywords found.

TAGS

USACE Tulsa District

Sardis Lake Oklahoma

https://www.poteaudailynews.com/theantlersamerican/news/open-house-for-sardis-lake-master-plan-revision-sardis-lake-kiamichi-river-basin-pushmataha-and/article_19042c0a-aad2-11ec-b170-bf3a220472cf.html

Open House for Sardis Lake Master Plan Revision, Sardis Lake, Kiamichi River Basin, Pushmataha and Latimer Counties

Mar 23, 2022



The Tulsa District, U.S. Army Corps of Engineers is revising the Sardis Lake Master Plan. An open house will be held from 6:00 p.m.-8:00 p.m. on Thursday, March 24, 2022, at the Clayton School Cafeteria, 329 North 1st Street in Clayton. The open house will provide attendees with information regarding the revision content and process and provide a general schedule. Attendees can view current land use classification maps and ask USACE staff questions. A 30-day comment period will follow the meeting from March 24, 2022 through April 23, 2022, in which the public can send comments, suggestions and concerns.

A Master Plan is defined by USACE as the strategic land use management document that guides the comprehensive management and development of all recreational, natural, and cultural resources throughout the life of the water resource development project. In general, it defines "how" the resources will be managed for public use and resource conservation.

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The Current Master Plan, last approved in 1978, is in need of revision to address changes in regional land use, population, outdoor recreation trends, and USACE management policy. Key topics to be addressed in the revised Master Plan include revised land use classifications, new natural and recreational resource management objectives, recreation facility needs, and special topics such as invasive species management and threatened and endangered species habitat. Public Participation is critical to the successful revision of the Master Plan. Information provided by the open house, including the existing Master Plan, may be viewed on the Tulsa District website at the following link beginning March 24, 2022:

<https://www.swt.usace.army.mil/>

Comments can be submitted in writing and can be given to USACE staff at the scheduled open house, or mailed to: Kirt E. Currell, Sardis Assistant Lake Manager, 42160 State Highway 43, Clayton, OK 74536, (918) 569-4131. Comments can also be submitted via email to: CESWT-OD-SARDIS@USACE.ARMY.MIL



**US Army Corps
of Engineers** ®

Comment Form Instructions

Sardis Lake Master Plan Revision

*30 Day Comment Period March
24 through April 23, 2022*

The U.S. Army Corps of Engineers is in the process of revising the Sardis Lake Master Plan. The master plan revision will guide the land and recreational management of the federally owned property that make up the its flood storage area for the next 25 years. Management activities include protecting natural and cultural resources, providing public land and water recreation, protecting the public, and ensuring reservoir and dam operations. Pertinent information and a copy of the current land use map can be found on the USACE website below.

To add your comments, ideas, or concerns about the future land and recreational management for Sardis Lake, please submit comments using any of the following methods:

- Fill out and return a comment form available below or at:
<https://www.swt.usace.army.mil/Missions/Recreation/Master-Plans/>
- Provide comments in an email message or use comment for and send to:
CESWT-OD-SARDIS@usace.army.mil
- Provide comments in a letter or use comment form and mail to:

U.S. Army Corps of Engineers
Kirt Curell, Sardis Assistant Lake Manager
42160 State Highway 43
Clayton, OK 74536; 918/569-4131,
CESWT-OD-SARDIS@usace.army.mil

Thank you for your participation in helping develop the Master Plan for Sardis Lake.





DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, TULSA DISTRICT
2488 EAST 81ST STREET
TULSA, OKLAHOMA 74137-4290

March 9, 2023

Public Notice
Draft Sardis Lake Master Plan 2023 and Environmental Assessment
Sardis Lake, Kiamichi River Basin
Latimer, Pittsburg, and Pushmataha Counties, Oklahoma

The U.S. Army Corps of Engineers (USACE), Tulsa District, hereby informs the public that the 2023 Draft Sardis Lake Master Plan (MP), Finding of No Significant Impact (FONSI), and Environmental Assessment (EA) are available for public review. An open house will be held from 4:00 PM to 6:00 PM on March 30, 2023, within the Clayton Public School Cafeteria, 329 North 1st Street, Clayton, Oklahoma, 74053. The public open house will give an overview of the proposed changes to the current Sardis Lake Master Plan, provide instructions on how to submit comments, and provide an opportunity for the public to ask questions and provide feedback. The 30-day public comment period will begin on March 30, 2023, and end on April 29, 2023. For those unable to attend the public open house, the draft MP, EA, comment form with instructions, and a presentation covering the same topics covered in the open house will be available for download starting on March 30, 2023, at the following Tulsa District website:

www.swt.usace.army.mil/Missions/Recreation/Master-Plans/

The master plan is a vital tool produced and used by the USACE to guide the responsible stewardship of the USACE-administered lands and resources for present and future generations. The master plan provides direction for appropriate management, use, development, enhancement, protection, and conservation of the natural, cultural, and manmade resources at Sardis Lake. The master plan presents an inventory and analysis of land resources, resource management objectives, land use classifications, a resource use plan for each land use classification, current and projected park facility needs, an analysis of existing and anticipated resource use, and anticipated influences on overall project operation and management. The most recent Master Plan for Sardis Lake was last approved in 1978.

Comments, suggestions, and questions can be submitted in writing and can be given to the USACE staff at the scheduled open house, or mailed to: Kirt E. Curell, Sardis Assistant Lake Manager; 42160 State Highway 43, Clayton, Oklahoma 74536. Comments can also be submitted via email to: CESWT-OD-SARDIS@usace.army.mil

Sincerely,

A handwritten signature in cursive script that reads "Jeffrey F. Pinsky".

Jeffrey F. Pinsky
Chief, Environmental Branch
Regional Planning and Environmental Center

The Master Plan does not entail facility designs, daily project administration details or any technical discussion regarding flood risk management, water quality, water supply, shoreline management, water level management, hydropower or navigation. Many of these topics are covered in the many other Operational Plans each lake develops separately from the master plan.

Why Revise a Master Plan?

Most Master Plans at Tulsa lakes are the original document when the lake was built. Over the span of 40+ years, many changes have taken place including major utility and highway construction, urbanization, and evolving recreational uses. The Plan and the land classifications are in need of revision to address changes in regional land use, population, outdoor recreation trends, and USACE management policy. Key topics to be addressed in the revised Master Plan include revised land classifications, new natural and recreational resource management objectives, recreation facility needs, and special topics such as invasive species management and protection of sensitive wildlife habitat. Public participation is critical to the successful revision of the Master Plan.

[The Master Planning Process](#)

Master Plans Policy & Procedures

This link will take you to the established guidance, procedures and policies for the management of recreation programs and activities, and for the operation and maintenance of U.S Army Corps of Engineers recreation facilities and related structures, at civil work water resource projects.

[Plans & OMP's](#)

Sardis Lake, Jackfork Creek, Oklahoma

March 10, 2022

[Sardis Lake DM No. 20](#) (10.3MB)

[Land Classification Map](#) with imagery

[Land Classification Map](#) street view

[News Release](#)

[Sardis Lake Master Plan Scoping Public Notice](#)

[Comment Form and Instructions](#) **Comment period ended April 23, 2022**

[Presentation](#)



Master Plans Policy & Procedures

This link will take you to the established guidance, procedures and policies for the management of recreation programs and activities, and for the operation and maintenance of U.S Army Corps of Engineers recreation facilities and related structures, at civil work water resource projects.

[Plans & OMP's](#)

Sardis Lake, Jackfork Creek, Oklahoma

March 10, 2022

[Sardis Lake DM No. 20](#) (10.3MB)

[Land Classification Map](#) with imagery

[Land Classification Map](#) street view

[News Release](#)

[Sardis Lake Master Plan Scoping Public Notice](#)

[Comment Form and Instructions](#) **Comment period ended April 23, 2022**

[Presentation](#)

March 23, 2023

[News Release](#)

[Sardis Lake Draft Master Plan](#)

[Comment Form and Instructions](#) **Comment period March 30, 2023 through April 29, 2023**

[Presentation](#)

[Sardis Lake Home Page](#)



US Army Corps
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Sardis Lake Master Plan Revision

Comment Form Instructions

30 Day Comment Period

March 30, 2023 through April 29, 2023

The U.S. Army Corps of Engineers is in the process of revising the Sardis Lake Master Plan. The master plan revision will guide the land and recreational management of the federally owned property that make up the flood storage area for the next 25 years. Management activities include protecting natural and cultural resources, providing public land and water recreation, protecting the public, and ensuring reservoir and dam operations. Pertinent information and a copy of the current land use map can be found on the USACE website below.

To add your comments, ideas, or concerns about the future land and recreational management for Sardis Lake, please submit comments using any of the following methods by April 29, 2023:

- ***Fill out and return the comment form available below or at:***
www.swt.usace.army.mil/Missions/Recreation/Master-Plans/
- ***Provide comments in an email message or use comment form and send to:***
CESWT-OD-SARDIS@usace.army.mil
- ***Provide comments in a letter or use the comment form and mail***
to: U.S. Army Corps of Engineers
Kirt E. Curell, Sardis Assistant Lake Manager
42160 State Highway 43, Clayton, OK 74536

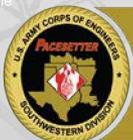
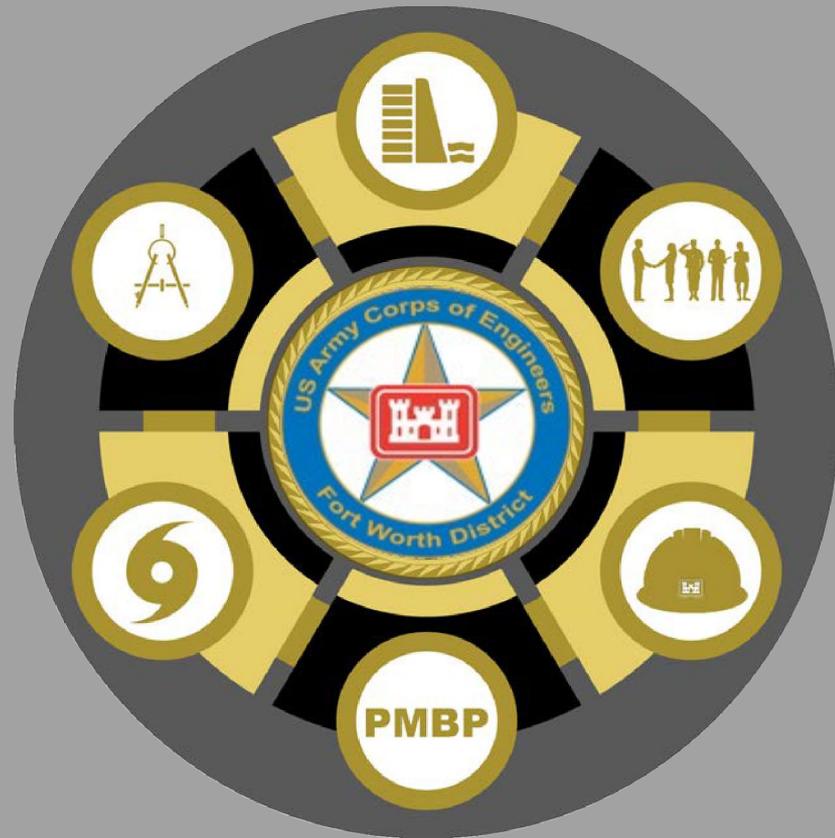
Thank you for your participation in helping to develop the Master Plan for Sardis Lake. A QR code is provided below for your convenience. Open the camera app on your phone and focus on the QR code. A link to the Sardis Lake Master Plan page will appear. Click on the link to be taken directly to the page for more information.



SARDIS LAKE DRAFT MASTER PLAN REPORT PUBLIC COMMENT PERIOD ANNOUNCEMENT

Public Workshop
30 March 2023
Clayton, OK

U.S. Army Corps of Engineers, Tulsa District



MISSION / PEOPLE / TEAMWORK



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Purpose

- Announce the availability of the draft revision of the Sardis Lake Master Plan and accompanying Environmental Assessment.
- Highlight changes proposed in the revised Master Plan compared to the previous 1978 version.
- The draft Master Plan with Environmental Assessment documents are available for 30-day public comment period beginning March 30, 2023 and closing on April 29, 2023.



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Process Followed to Date

- Initial public involvement presentation was announced and available for viewing on March 24, 2022.
- All comments were considered. See Chapter 7 of the draft Master Plan for comments and Government responses.
- Wildlife Habitat Appraisal Procedure (WHAP) completed for the entire lake area with report included in Master Plan Appendix.
- A draft Environmental Assessment (EA) was prepared and is available in the Master Plan Appendix.



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What is a Master Plan?

- The Master Plan is a 25-year comprehensive land use management guide for recreation, natural, and cultural resources.
- Adheres to Federal Laws to preserve, conserve, restore, maintain, and develop project lands, waters, and associated resources, including the National Environmental Policy Act (NEPA) for environmental stewardship and outdoor recreation.
- Provides land classifications and resource management objectives that are broad and adaptive over time.
- Requires and encourages public involvement.



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What Master Plans are Not

Master Plans **do not** address in detail the technical aspects of:

- Regional water quality
- Water management for flood risk management
- Water supply or water level management
- Shoreline management (Including boat docks, mowing, or other permits)

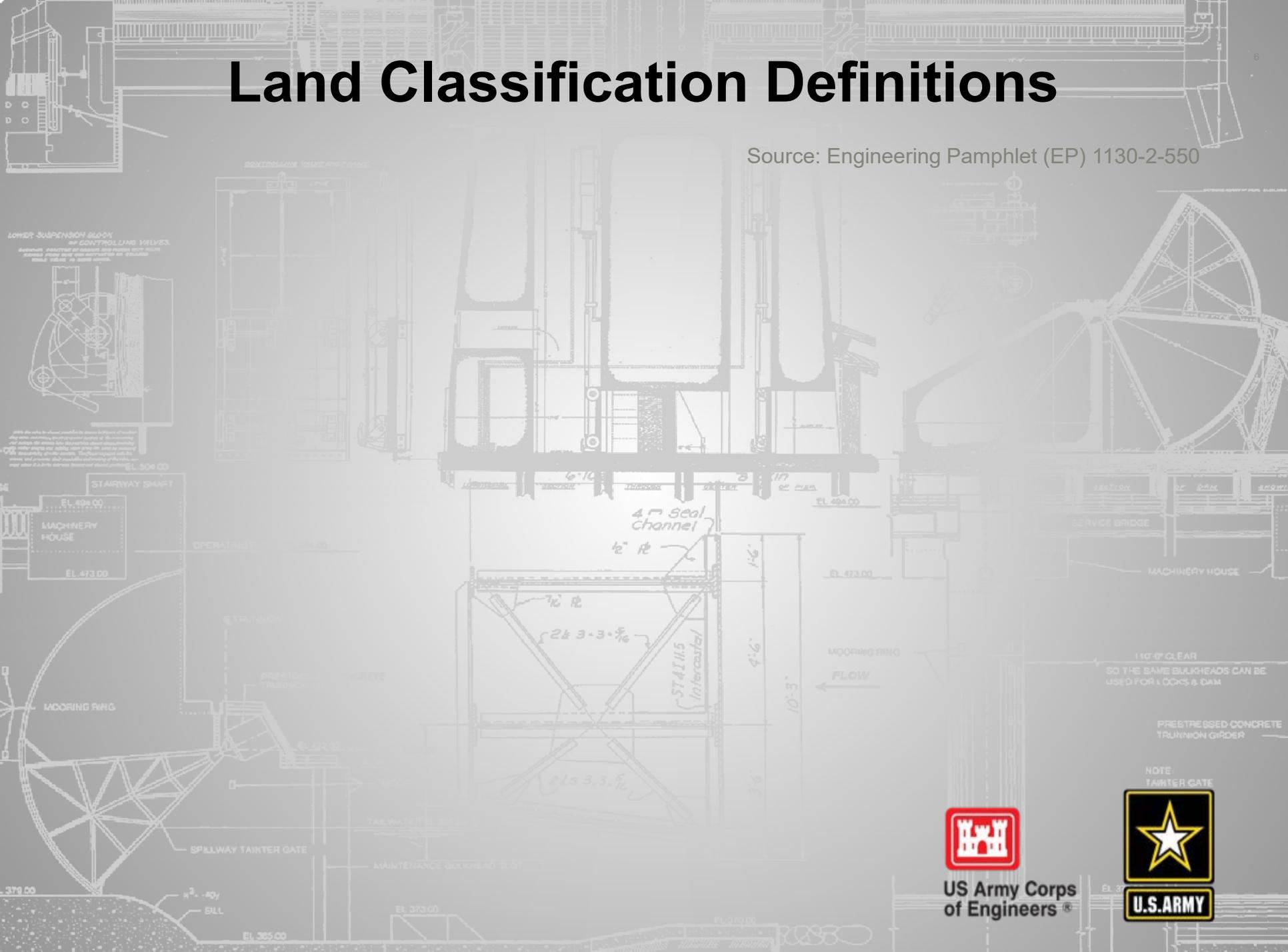


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Land Classification Definitions

Source: Engineering Pamphlet (EP) 1130-2-550



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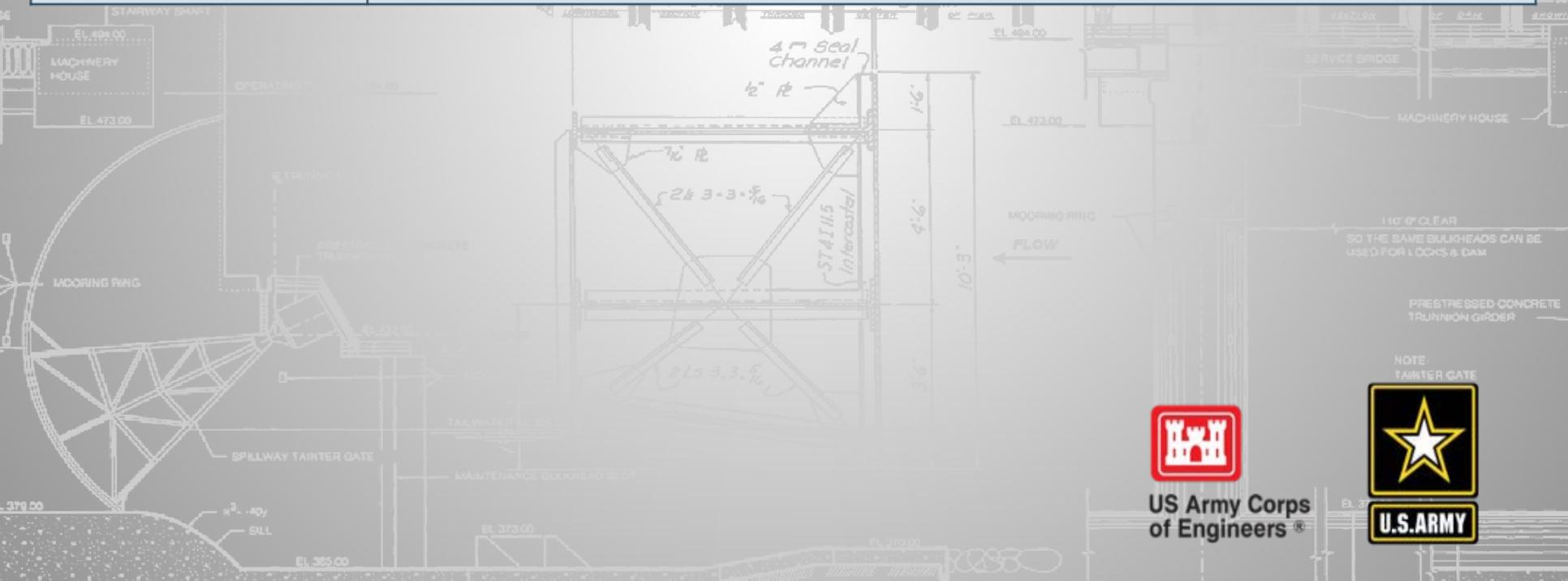


U.S. ARMY

Water Surface Classification Definitions

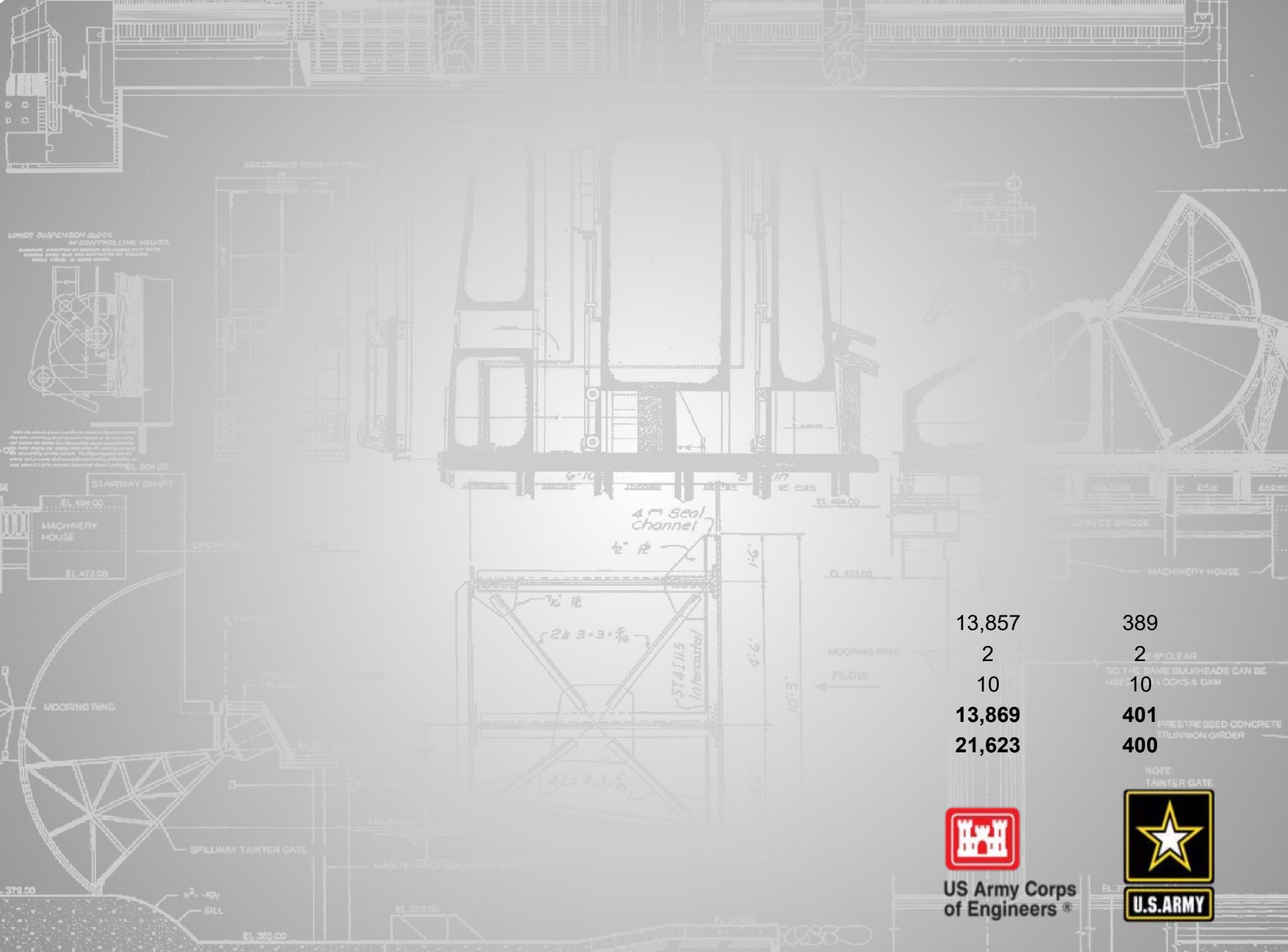
Source: Engineering Pamphlet (EP) 1130-2-550

Water Surface Classification	Definition
Open Recreation	Those waters available for year-round or seasonal water-based recreational use.
Restricted	Water areas restricted for project operations, safety, and security purposes.
Designated No-Wake	To protect environmentally sensitive shoreline areas, recreational water access areas from disturbance, and for public safety.
Fish and Wildlife Sanctuary	Annual or seasonal restrictions on areas to protect fish and wildlife species during periods of migration, resting, feeding, nesting, and/or spawning.



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13,857 389
 2 2'-6" CLEAR
 10 SO THE SAME BULKHEADS CAN BE
 USED AT LOCKS & DAM
 13,869 401
 21,623 400

PRESTRESSED CONCRETE TRUNNION GIRDER

NOTE
 TAINTER GATE



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Management Goals & Resource Objectives

- Goals and objectives were developed during the revision process specific to the following categories:
 - Recreation
 - Natural Resource Management
 - Visitor Information, Education, and Outreach
 - General Management
 - Cultural Resources Management
- A complete description of the revised goals and objectives can be found in Chapter 3 of the revised draft Master Plan.



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National Environmental Policy Act

- The MP Revision process includes compliance with the National Environmental Policy Act (NEPA) of 1969.
- Purpose of NEPA is to:
 - Ensure federal agencies give proper consideration to the environment prior to undertaking a federal action.
 - Involve the Public (scoping) in the decision-making process.
 - Document the process by which agencies make informed decisions.
- NEPA Scoping Process:
 - Opportunity for Public comments and questions on the potential impacts of proposed federal actions.
 - Includes comments by other federal, State, and local governments, and American Indian Tribal Nations.



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NEPA Includes:

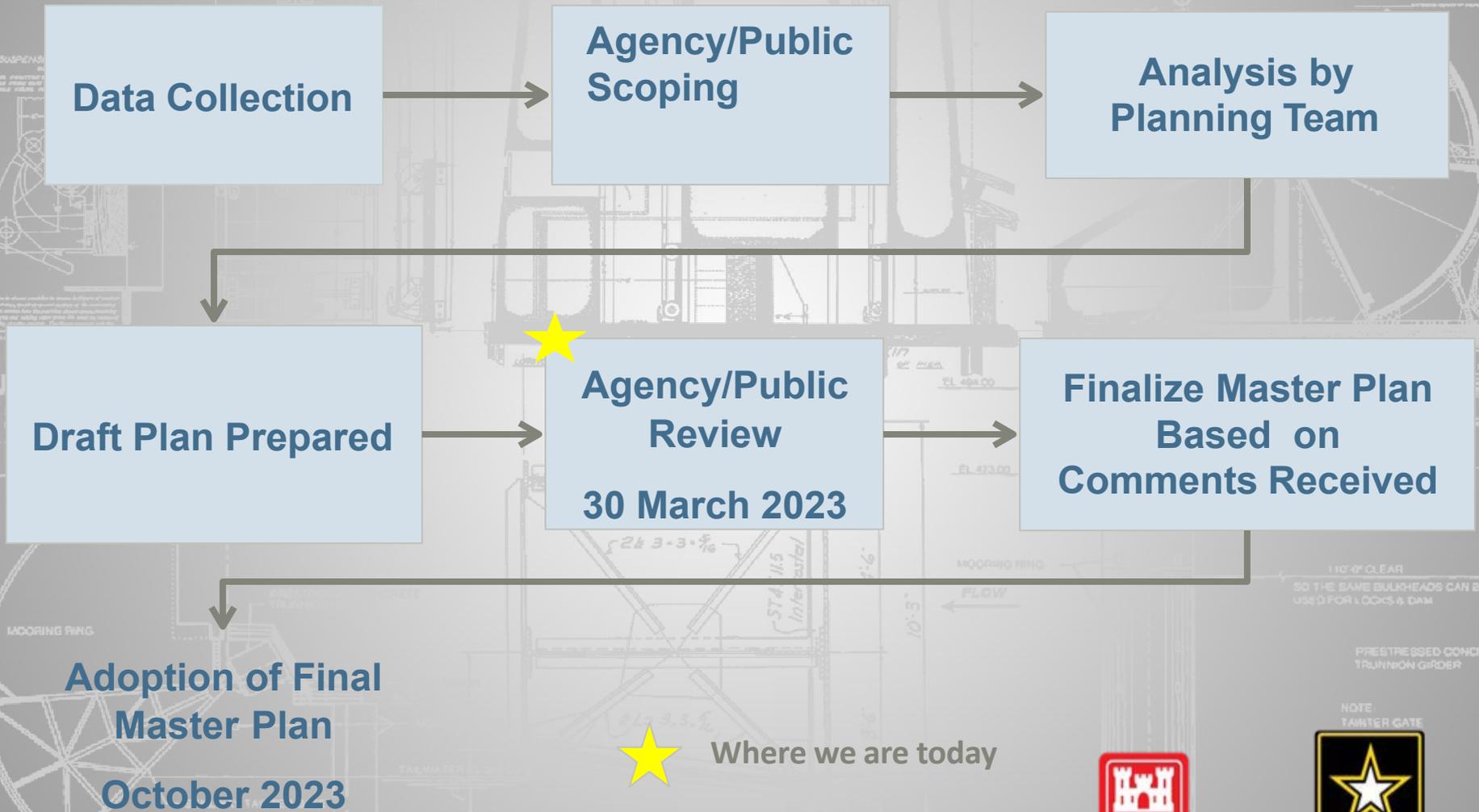
- Public exchange of information related to problems to be solved, issues to be addressed, and potential alternatives.
- Identification and evaluation of a broad range of alternatives.
- Identification and quantification of potential impacts.
- Screening of non-relevant issues from analysis.
- Documentation of analysis and coordination through preparation of NEPA documents, such as an Environmental Assessment (EA) or an Environmental Impact Statement (EIS).
- Federal, State, and Public review of NEPA documents.



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Where are we in the Process?



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How to Participate

Submit written comments!

- Review all documents available on the USACE website:

www.swt.usace.army.mil/Missions/Recreation/Master-Plans/

- Documents available for review on the website include:

- Master Plan documents
- Project maps
- Comment form
- Presentation

- Spread the word by telling your colleagues, friends, and neighbors to participate.



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How to Submit a Comment?

You can participate in the process by reviewing the documents available on the project website and submit written comments. **The USACE will only accept comments in written format.** The project website (www.swt.usace.army.mil/Missions/Recreation/Master-Plans/) is hosting all the documents relevant to the Regional Master Plan revision, including the draft Master Plan document, project maps, and comment forms with instructions on how to submit a comment.

- You may download the comment form provided on the website, fill it out electronically, and email it to USACE
- Or you may print the comment form provided on the website, fill it out by hand, and mail it to USACE at the address on the comment form
- Or you may write a comment or send an email without using the comment form, and mail or email it to the USACE address provided on the website
- Comments are due on April 29, 2023



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If You Have Questions

Questions about the Master Plan can be addressed by contacting:

Sardis Lake Office:

Kirt E. Curell, Sardis Assistant Lake Manager

42160 State Hwy 43

Clayton, OK 74536

Email: CESWT-OD-SARDIS@usace.army.mil

Phone: (918) 569-4131



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APPENDIX C – WILDLIFE DOCUMENTS

TRUST RESOURCES REPORT – USFWS

OFFICIAL SPECIES LIST – USFWS

LIST OF SGCN SPECIES

WHAP REPORT



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Oklahoma Ecological Services Field Office
9014 East 21st Street
Tulsa, OK 74129-1428
Phone: (918) 581-7458 Fax: (918) 581-7467

In Reply Refer To:
Project Code: 2023-0001807
Project Name: Sardis Lake Master Plan Revision

July 11, 2023

Subject: List of threatened and endangered species that may occur in your proposed project location 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:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see <https://www.fws.gov/birds/policies-and-regulations.php>.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see <https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php>.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.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 Code 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:

Oklahoma Ecological Services Field Office

9014 East 21st Street

Tulsa, OK 74129-1428

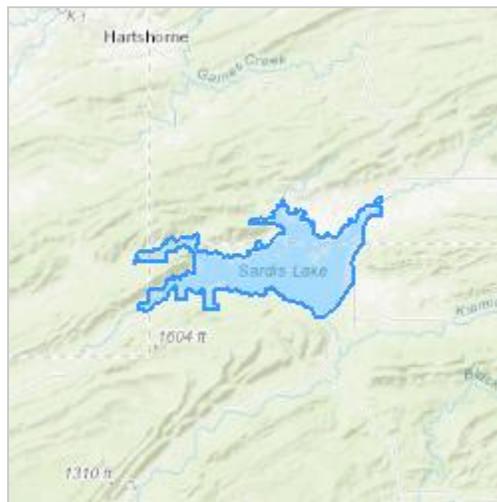
(918) 581-7458

PROJECT SUMMARY

Project Code: 2023-0001807
Project Name: Sardis Lake Master Plan Revision
Project Type: Land Management Plans - NWR
Project Description: The Sardis Lake Master Plan (Latimer , Pittsburg , and Pushmataha counties, Oklahoma) 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 Sardis Reservoir for the next 25 years.

Project Location:

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@34.669981,-95.37473631699872,14z>



Counties: Latimer , Pittsburg , and Pushmataha counties, Oklahoma

ENDANGERED SPECIES ACT SPECIES

There is a total of 12 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
Indiana Bat <i>Myotis sodalis</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
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	Endangered
Tricolored Bat <i>Perimyotis subflavus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

BIRDS

NAME	STATUS
Piping Plover <i>Charadrius melodus</i> Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red Knot <i>Calidris canutus rufa</i> There is proposed critical habitat for this species. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened
Red-cockaded Woodpecker <i>Picoides borealis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7614	Endangered

REPTILES

NAME	STATUS
Alligator Snapping Turtle <i>Macrochelys temminckii</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4658	Proposed Threatened

CLAMS

NAME	STATUS
Ouachita Rock Pocketbook <i>Arcidens wheeleri</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4509	Endangered
Scaleshell Mussel <i>Leptodea leptodon</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5881	Endangered
Winged Mapleleaf <i>Quadrula fragosa</i> Population: Wherever found, except where listed as an experimental population No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4127	Endangered

INSECTS

NAME	STATUS
American Burying Beetle <i>Nicrophorus americanus</i> Population: Wherever found, except where listed as an experimental population No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/66	Threatened
Monarch Butterfly <i>Danaus plexippus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

CRITICAL HABITATS

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

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

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
American Kestrel <i>Falco sparverius paulus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9587	Breeds Apr 1 to Aug 31
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.	Breeds Sep 1 to Jul 31

NAME	BREEDING SEASON
Chimney Swift <i>Chaetura pelagica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25
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

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 (|)

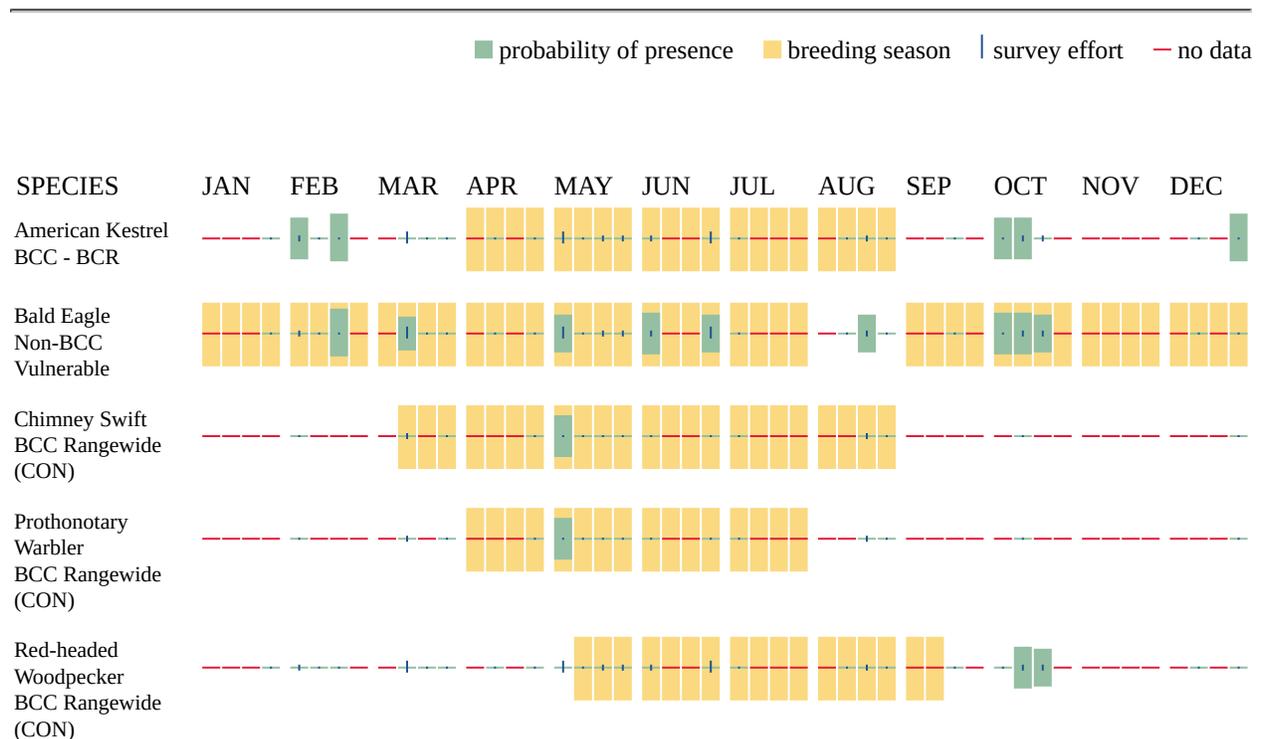
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

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 <https://www.fws.gov/program/migratory-birds/species>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide conservation measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.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](#) 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 list of migratory birds that potentially occur 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 [Rapid Avian Information Locator \(RAIL\) 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 or migrating in my 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 query your location using the [RAIL Tool](#) and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. 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

- [PEM1Fh](#)
- [PEM1Ax](#)
- [PEM1A](#)
- [PEM1F](#)
- [PEM1C](#)

RIVERINE

- [R2USC](#)
- [R4SBC](#)
- [R2UBH](#)
- [R5UBF](#)
- [R3UBH](#)
- [R3RBF](#)

LAKE

- [L1UBHx](#)

FRESHWATER POND

- [PUBFh](#)
 - [PAB3Fx](#)
 - [PUBF](#)
 - [PUBHx](#)
 - [PAB3Fh](#)
 - [PUBHh](#)
 - [PUBH](#)
 - [PAB3F](#)
 - [PUSC](#)
-

FRESHWATER FORESTED/SHRUB WETLAND

- [PFO1A](#)
- [PFO1C](#)

IPAC USER CONTACT INFORMATION

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Very High Priority Conservation Landscape: Small River



Figures OM2. and OM3. Upper Mountain Fork River (left), Lower Little River (right) both McCurtain Co.

Five small rivers are found in the region of the Ouachita Mountains, West Gulf Coastal Plain (WGCP) and Arkansas Valley. Each river originates in the Ouachita Mountains then flows either north into the Arkansas River (Poteau River) or south to eventually enter the Red River (Kiamichi, Little, Glover, and Mountain Fork rivers). The Glover and Mountain Fork rivers are tributaries of the Little River, and collectively these three small rivers are known as the Little River system. The three rivers that comprise the Little River system are similar in structure and share many of the same aquatic species including the federally threatened Leopard Darter (*Percina pantherina*) and the endemic Ouachita Mountain Shiner (*Lythrurus snelsoni*).

The upper reaches of all five small rivers are relatively shallow, clear, and fast moving with a substrate of cobble or bedrock. The lower reaches of these rivers are relatively turbid and slow moving and meander over a sandy substrate in broad, forested floodplains. Flow rates are typically greater during the winter and spring and lower during the summer and fall; however, the seasonal variation is less than that which is seen on the Oklahoma's larger rivers. The small rivers contain gravel bars and sloughs but not the dynamic mosaic of sandbars, mudflats, and sloughs found on the larger river systems. Most sloughs along the smaller rivers are dominated by woody vegetation including River Birch (*Betula nigra*), Sycamore (*Platanus occidentalis*), Water Oak (*Quercus nigra*), and Red Maple (*Acer rubrum*). Of special note is the presence of the federally endangered Harperella (*Ptilimnium nodosum*) in the lower reaches of the Mountain Fork River and the potential for it to occur elsewhere in the Little River watershed. Another rare plant found along streams and rivers in the region is the Cumberland Sandreed (*Calamovilfa arcuata*).

The species of greatest conservation need that occupy the small rivers in substantial or manageable numbers are listed in the following table. A narrative description is provided for each species' status within the region that is based upon the existing literature and the professional judgment of the technical experts that were consulted. Each species' population trend was based upon an evaluation of the existing statewide or national data over the past 50 years. The species are sorted alphabetically within larger taxonomic groups: amphibians, birds, fish, invertebrates, mammals, and reptiles for easy reference. Symbols for trends are: D = declining, S = stable, U = unknown, I = increasing and Ex = probably extirpated.

Group	Species of Greatest Conservation Need Common or Scientific Name	Status within the Region	Trend in Population Size
Amph	Lesser Siren	locally common but secretive; found in shallow, heavily vegetated sites within low-gradient reaches of the rivers in the WGCP	U
Amph	Three-toed Amphiuma	rare & secretive species; appears to be limited to the Little River in the West Gulf Coastal Plain	U

Group	Species of Greatest Conservation Need Common or Scientific Name	Status within the Region	Trend in Population Size
Bird	Bald Eagle	uncommon year-round resident along all of the small rivers in the region; common winter resident due to a seasonal influx of birds from northern populations	I
Bird	Canvasback	uncommon winter resident throughout the region	S
Bird	Little Blue Heron	common summer resident in the low-gradient reaches of each small river in the region	U
Bird	Louisiana Waterthrush	uncommon but widespread in the Ouachita Mts. and Arkansas Valley portions of the region	S
Bird	Northern Pintail	uncommon winter resident throughout the region	D
Bird	Prothonotary Warbler	locally common in riparian forests along all of the small rivers in the region	U
Bird	Snowy Egret	common summer resident in the low-gradient reaches of each small river in the region	U
Bird	Solitary Sandpiper	common spring and fall migrant across the region	S
Bird	Wood Stork	rare summer visitor; after the nesting season, birds wander north from their coastal colonies into the West Gulf Coastal Plain	S
Fish	Alabama Shad	probably extirpated from this region; occurred historically in the Little and Poteau rivers	Ex
Fish	Alligator Gar	rare but regularly occurring in the lower Poteau River	D
Fish	Black Buffalo	uncommon in the low-gradient reaches of the Kiamichi, Little and Poteau rivers; difficult to correctly identify	U
Fish	Blackside Darter	rare and known from the Poteau and Little rivers; Oklahoma represents the southwestern edge of its large range; state listed as threatened	U
Fish	Blackspot Shiner	rare and found in the lower reaches of the Kiamichi and Little rivers	U
Fish	Bluehead Shiner	uncommon and only documented in Oklahoma since the early 1980s; found in sluggish backwaters of the lower Little River	U
Fish	Blue Sucker	an uncommon species associated with deeper channels; found in the Poteau River below Wister Reservoir and the Kiamichi River below Hugo Reservoir	U
Fish	Brown Bullhead	rare and limited to the West Gulf Coastal Plain portion of Little River	D
Fish	Creole Darter	rare; likely to occur only in lower Little River and its tributary streams	U
Fish	Crystal Darter	very rare and documented at only a few sites in the Little and Kiamichi rivers	U
Fish	Cypress Minnow	uncommon species found in the backwaters of the lower Mt. Fork & Little rivers	U
Fish	Harlequin Darter	locally common in riffles in the lower Poteau and Little rivers	U
Fish	Ironcolor Shiner	very rare in Oklahoma and restricted to the lower Little River	U
Fish	Kiamichi Shiner	common in the headwaters of the Kiamichi, Little and Poteau rivers	U
Fish	Leopard Darter	uncommon and restricted to the rocky reaches of the Little, Glover and Mt. Fork rivers; endemic to the central Ouachita Mts.; federally listed as threatened	D
Fish	Longnose Darter	potentially extirpated from the region; occurred historically in the Poteau River and its tributaries; state listed as an endangered species	Ex
Fish	Mooneye	uncommon and limited to the Little River system	D

Group	Species of Greatest Conservation Need Common or Scientific Name	Status within the Region	Trend in Population Size
Fish	Mountain Madtom	uncommon in the higher gradient reaches in the Little River system (Glover, Mt. Fork and Little)	U
Fish	Orangebelly Darter	common and widespread in the Red River watershed portion of the region; endemic to Oklahoma and Arkansas	S
Fish	Paddlefish	rare in the lower parts of the Kiamichi, Little and Poteau rivers	S
Fish	Pallid Shiner	rare, occurs in low-gradient reaches of the lower Poteau, Kiamichi and Little rivers	D
Fish	Peppered (Colorless) Shiner	rare species that appears to be limited to the Little River; a small population may occur in the Kiamichi River	U
Fish	Plains Minnow	uncommon and found only in the low-gradient portions of each small river in the region	D
Fish	Rocky Shiner	common in the Kiamichi and Little rivers; endemic to the Red River tributaries in the Ouachita Mts.	S
Fish	Taillight Shiner	uncommon species restricted to backwaters and tributaries of the lower Little River	U
Fish	Western Sand Darter	locally common in river reaches with sandy substrate in the lower Kiamichi River	U
Invert	Black Sandshell	probably extirpated; weathered shells suggest that Black Sandshells may have occurred in the Poteau River prior to modern settlement	Ex
Invert	Butterfly mussel	uncommon; found in the lower reaches of the Kiamichi and Little rivers	D
Invert	<i>Faxonella blairi</i>	Uncommon species that is endemic to the WGCP; has been documented only in the lower Littler River in Oklahoma	U
Invert	Little Spectaclecase	common in the Red River tributaries – the Little, Glover, Mt. Fork and Kiamichi rivers	S
Invert	Louisiana Fatmucket	common in the small rivers that are tributaries of the Red River (e.g. Little and Kiamichi)	D
Invert	Ouachita Creekshell	taxonomic uncertainties surround this species and genetic work suggests that what we call the Ouachita Creekshell in the Little River in Oklahoma may be the Southern Hickorynut	U
Invert	Ouachita Kidneyshell	common in the Glover River, uncommon elsewhere in the Littler River system and the Kiamichi River	U
Invert	Ouachita Rock Pocketbook	very rare and restricted to the Kiamichi River and the lower Little River; federally listed as an endangered species	D
Invert	Ozark Emerald	Locally occurring in the upper reaches of small rivers in the Ouachita Mountains	U
Invert	Plain Pocketbook	common and widespread in all of the rivers in the region	U
Invert	Pyramid Pigtoe	not documented in Oklahoma, but suspected to be present in the Littler River in small numbers based upon mussels with similar shell characteristics	U
Invert	Purple Lilliput	occurrence not confirmed in Oklahoma; potentially occurs as a rare species in the upper Poteau River	U
Invert	Rabbitsfoot	uncommon species; found in the lower Little River; federally listed as a threatened species	U
Invert	Scaleshell	very rare and possibly extirpated; known only from the Kiamichi and Little rivers; federally listed as an endangered species	D
Invert	Southern Hickorynut	locally common in the Kiamichi, Little, Glover and Mt. Fork rivers	U
Invert	Texas Lilliput	not confirmed in Oklahoma but may be present in the Little River watershed	U

Group	Species of Greatest Conservation Need Common or Scientific Name	Status within the Region	Trend in Population Size
Invert	Washboard	common in the Poteau River, uncommon in the Kiamichi and Little rivers	S
Invert	Winged Mapleleaf	a small population is present in the lower Little River; federally listed as an endangered species	D
Mamm	Northern Long-eared Bat	uncommon but widespread in the Ouachita Mountains in LeFlore, Pushmataha and McCurtain counties; forages over rivers and streams; federally listed as a threatened species	U
Mamm	Southeastern Bat	rare and limited to the Little River watershed; often forages over rivers and streams	U
Rept	Alligator Snapping Turtle	rare and secretive; small numbers are found in the low-gradient reaches of the Kiamichi, Little and Poteau rivers	D
Rept	American Alligator	rare but seen with increasing frequency in the lower reaches of the Little and Kiamichi rivers	I
Rept	False (Mississippi) Map Turtle	uncommon but widespread in the low-gradient portions of the small rivers in this region	U
Rept	Ouachita Map Turtle	locally common and widespread throughout the region	D
Rept	Razor-backed Musk Turtle	uncommon and generally found in the higher-gradient reaches of each of the small rivers in the region	U
Rept	River Cooter	common in all of the small rivers throughout the region	D
Rept	Smooth Softshell	uncommon but widespread throughout the region	D
Rept	Spiny Softshell Turtle	locally common and found primarily in the low-gradient reaches of each small river	D

The following conservation issues and actions are listed in general priority order.

Conservation Issues Related to Geomorphic Alteration and Instability of River Channels, Altered Patterns of Flow and Decreasing Water Quantity:

1. River channels normally meander through their floodplains and maintain stable, vegetated banks, but some human activities alter the channel structure of rivers and contribute to bank instability. These actions include:
 - efforts to channelize rivers,
 - in-stream gravel or sand mining,
 - creating channel constrictions at bridges and low water dams, and
 - dredging river channels to make them deeper and narrower to convey water more quickly.

These actions can result in the river cutting a deeper channel and creating a disconnection between the river and its riparian vegetation. Channel cutting erodes gravel and sediment from the river bank and deposits it into the river.
2. In relatively low-gradient reaches of rivers, riparian and flood plain vegetation has been removed and habitat converted to pastureland, pine plantations, and riverside cabin developments. Reduction in riparian vegetation, sloughs and wetlands contribute to river bank instability and facilitates bank erosion.
3. The loss of wetlands and the constriction of floodplains reduce the ability of the land to hold and slowly release water, often resulting in “flashier” stream and river flows in which flow is accelerated during storm events, but then rapidly drops afterward.
4. Reservoir construction on river main stems (e.g. Pine Creek, Broken Bow and Wister reservoirs) and on major tributaries (Sardis Reservoir) alters the historic flooding frequencies and flow patterns of small rivers. Reservoirs have inundated long reaches of rivers and altered these from shallow, flowing habitats to deep, still habitats. Reservoirs hold back water and can alter the seasonal fluctuations in flow downstream by reducing the magnitude of high flow events following storms,

Threatened & Endangered Species

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THREATENED & ENDANGERED SPECIES

Below is a list of species in Oklahoma that are classified as federally endangered, federally threatened, state endangered, or state threatened.

 <p>ODWC Photo Federally Threatened</p> <p>American Burying Beetle</p>	 <p>ODWC Photo Federally Threatened</p> <p>Arkansas River Shiner</p>	 <p>ODWC Photo State Threatened</p> <p>Blackside Darter</p>	 <p>Photo by: Ann Frschauer/USFWS Federally Endangered</p> <p>Gray Bat</p>
 <p>Photo by: Ann Frschauer/USFWS Federally Endangered</p> <p>Indiana Bat</p>	 <p>Photo by: Richard Standage/USFS Federally Threatened</p> <p>Leopard Darter</p>	 <p>Photo by: Michael Gatlin State Endangered</p> <p>Longnose Darter</p>	 <p>Photo by: USFWS Federally Threatened</p> <p>Neosho Madtom</p>
 <p>Photo by: Chris Bamhart/MSU Federally Endangered</p> <p>Neosho Mucket</p>	 <p>Photo by: USFWS Federally Endangered</p> <p>Northern Long-eared Bat</p>		

1 2 3 Next Last »

THREATENED & ENDANGERED SPECIES

Below is a list of species in Oklahoma that are classified as federally endangered, federally threatened, state endangered, or state threatened.

- 

Photo by: Dante Fenallo
State Endangered

Oklahoma Cave Crayfish
- 

Photo by: Susan Rogers/USFWS
Federally Endangered

Quachita Rock Pocketbook
- 

Photo by: USFWS
Federally Endangered

Ozark Big-eared Bat
- 

Photo by: USFWS
Federally Threatened

Ozark Cavefish
- 

Photo by: Matt Poole/USFWS
Federally Endangered

Piping Plover
- 

Photo by: Matthew Patterson/USFWS
Federally Threatened

Rabbitsfoot
- 

Photo by: John Maxwell/USFWS
Federally Endangered

Red-cockaded Woodpecker
- 

Photo by: Gregory Breeze/USFWS
Federally Threatened

Rufa Red Knot
- 

Photo by: Andy Roberts/USFWS
Federally Endangered

Scaleshell
- 

Photo by: John Noll/USDA
Federally Endangered

Whooping Crane

Threatened & Endangered Spei X

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THREATENED & ENDANGERED SPECIES

Below is a list of species in Oklahoma that are classified as federally endangered, federally threatened, state endangered, or state threatened.



Photo by: Bernard Sietman/MDNR
Federally Endangered

Winged Mapleleaf

« First ‹ Previous 1 2 3

WILDLIFE HABITAT APPRAISAL PROCEDURE (WHAP)
SUMMARY REPORT SARDIS LAKE MASTER PLAN
LATIMER AND PUSHMATAHA COUNTIES, OKLAHOMA

JULY 2022



**US Army Corps
of Engineers®**

Tulsa District

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Introduction

Habitat assessments were conducted at Sardis Lake on June 13-17, 2022, 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 26 WHAP points were surveyed, all within U.S. Army Corps of Engineers (USACE) fee boundary (Figures 1, 2, 3, and 4).

The purpose of this report is to describe wildlife habitat quality within the USACE Sardis Lake fee-owned property in Latimer and Pushmataha Counties, Oklahoma. 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 Sardis Lake Master Plan revision process.

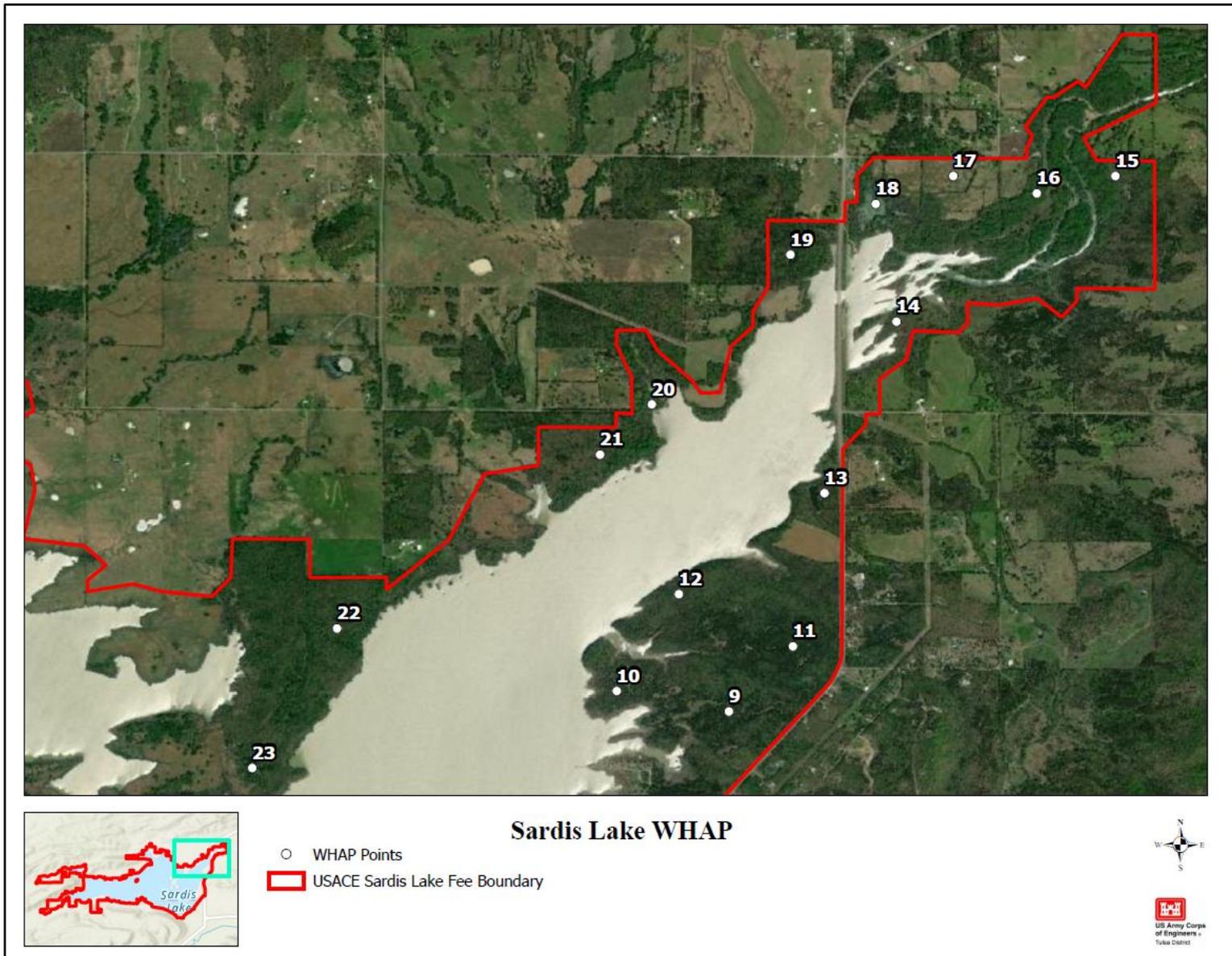


Figure 1. Distribution of WHAP Points within the North Eastern Boundary of Sardis Lake



Figure 2. Distribution of WHAP Points within the South Center of Sardis Lake

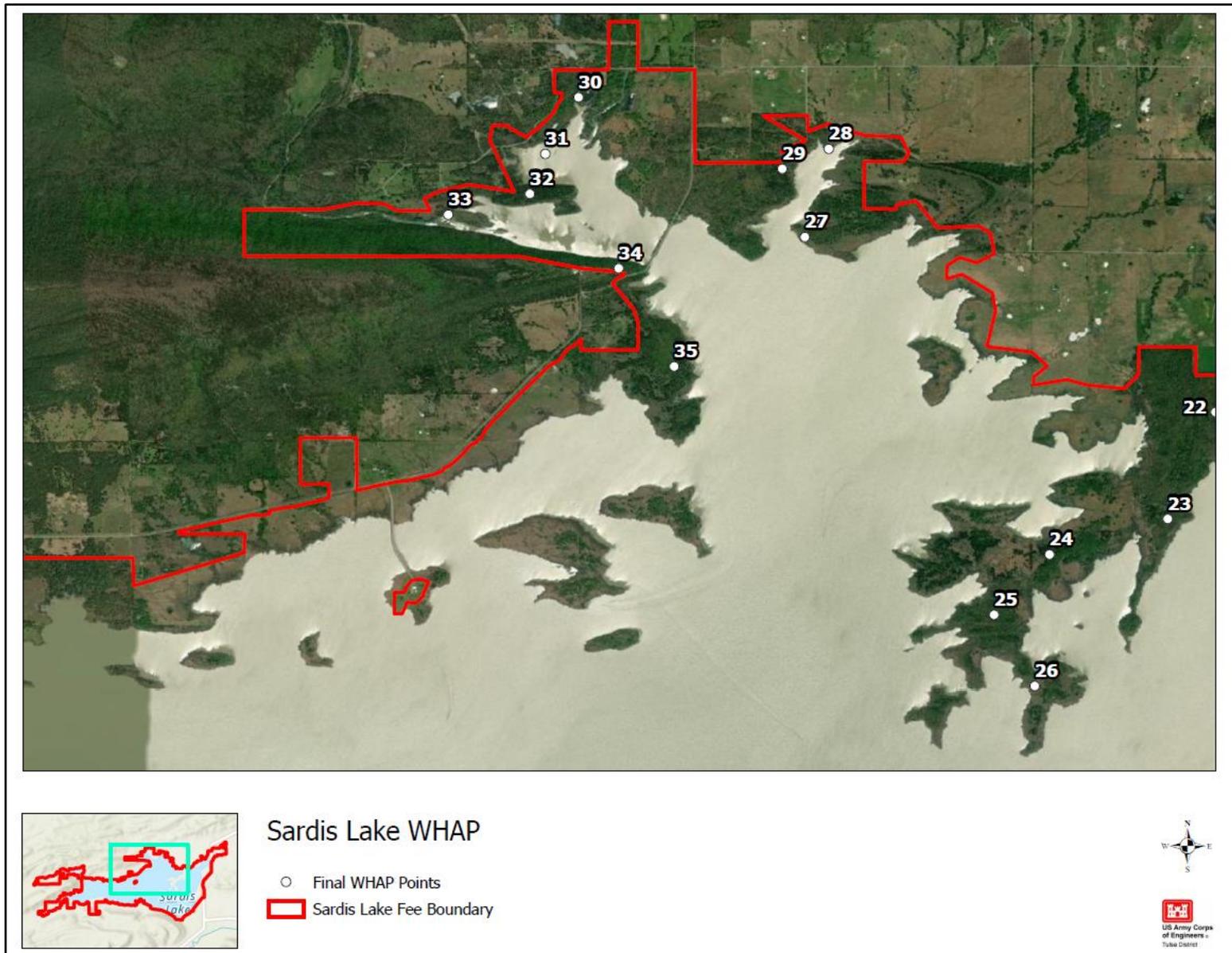


Figure 3. Distribution of WHAP Points within the North Center of Sardis Lake

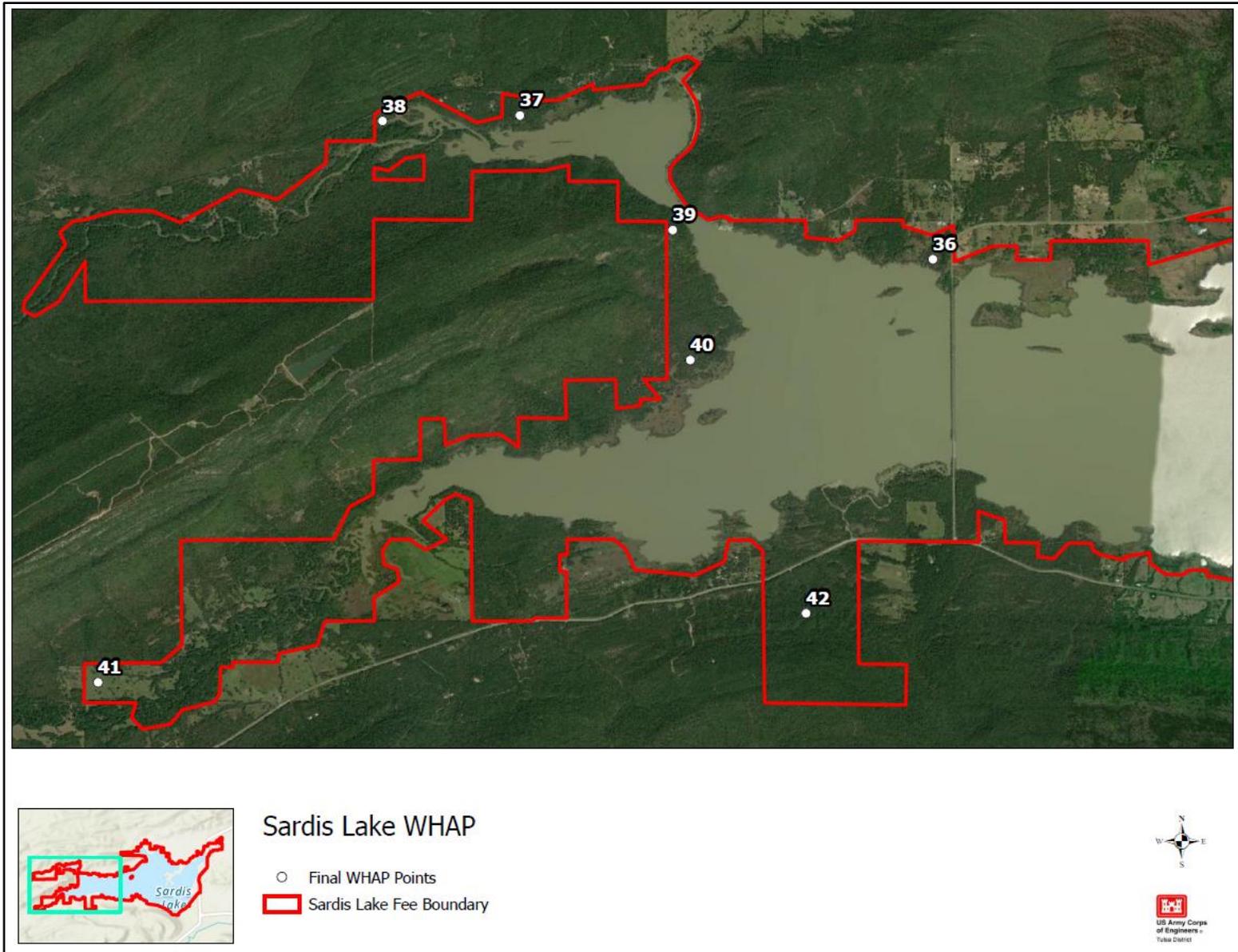


Figure 4. Distribution of WHAP Points within the Western Boundary at Sardis Lake

Study Area

USACE fee owned property at Sardis Lake, approximately 14,360 acres, is located five miles north of Clayton, Oklahoma, on Jackfork Creek of the Kiamichi River as displayed in Figure 5 below. More specifically, the lake lies within the Ouchita Mountains ecoregion. The major tributaries to the Jackfork Creek are North Jackfork, Anderson, and Buffalo Creeks. Downstream of the Sardis Lake dam, the Jackfork Creek meanders until it reaches the Kiamichi River.

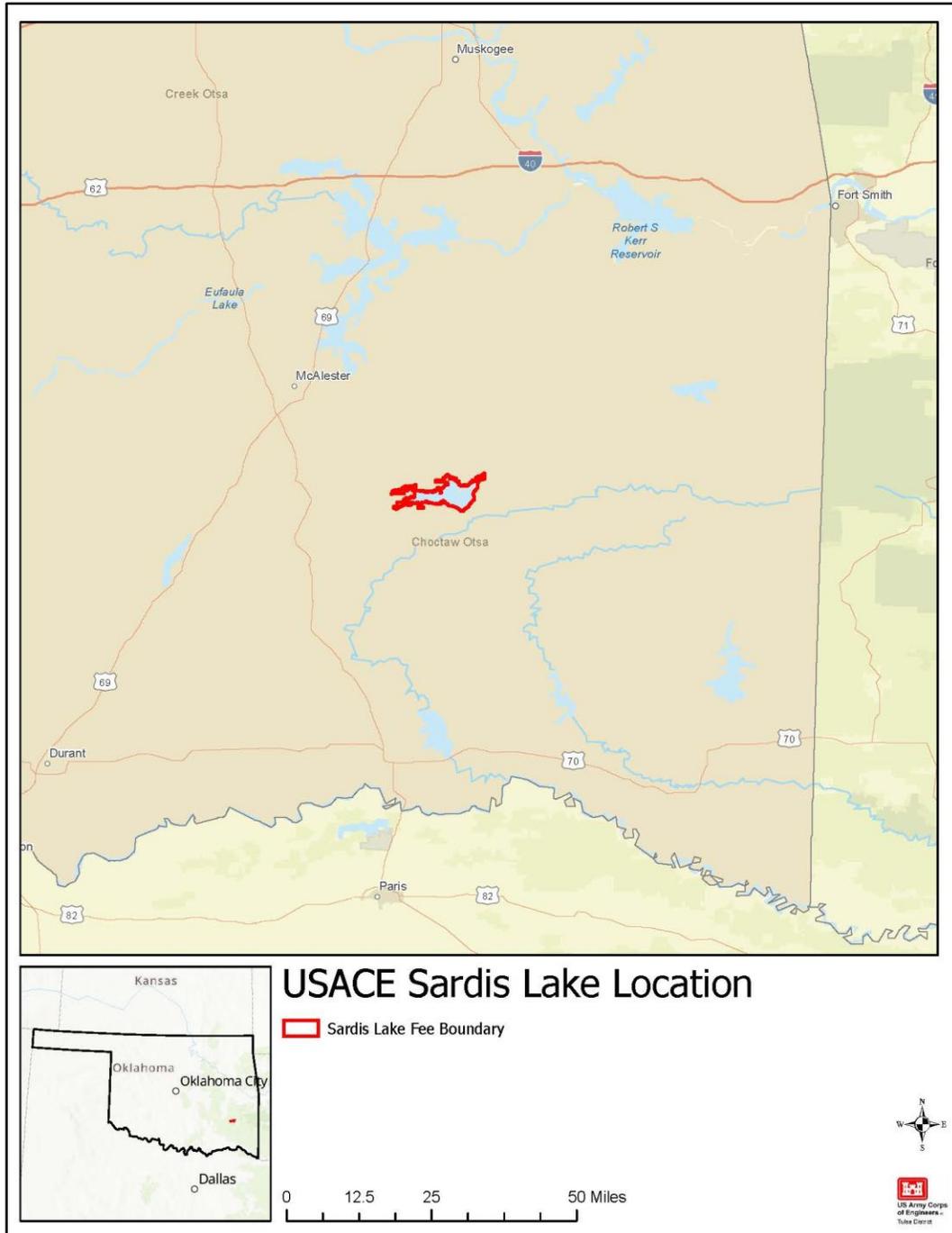


Figure 5. Sardis Lake Vicinity Map

Methodology

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

The TPWD developed the WHAP to allow a qualitative, holistic evaluation of wildlife habitat for particular 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 itself 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.

At each site, a 1/10th acre plot was evaluated and points were assigned to all applicable components based on field conditions. 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. The scores for each site can be found in Attachment A. Photographs were taken at each site and are included as Attachment B.

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 yield higher results 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. The Site Potential component has a maximum score of 0.25 points and 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: periodically support predominately hydrophytic vegetation, have 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 of the growing season 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 layers).

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.

High value grasslands may not have any woody vegetation, nor vegetation that is more than 12 feet tall, and very little additional structural components. To account for this, total scores for areas categorized as grasslands do not reflect the Vegetation Species Diversity component and makes the maximum score for Vertical Vegetation Stratification component as a value of 4 and Additional Structural Diversity component as 1.

These components regularly exclude grassland habitat from receiving the maximum score of 1.00 on the WHAP point scale. In order to identify the maximum score each habitat type can receive, USACE environmental staff scored each criteria given ideal conditions for riparian/bottomland hardwood forest (BHF), upland forest (includes all non-riparian/BHF forests), grassland, and marsh habitats. The maximum value scores, shown in Table 1, were then used to normalize scores for habitats that are prevented from reaching the maximum WHAP score. This is 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		
Marsh	0.25	0.20	0.20	0.20	NA	0.05	0.10	NA	1.00	
Riparian/B HF	0.25	0.20	0.20	0.15	0.05	0.05	0.05	0.05	1.00	

Upland Forest	0.12	0.20	0.20	0.15	0.05	0.05	0.05	0.05	
Grassland	0.12	0.12	0.20	0.0	0.04	0.01	0.05	0.05	0.59

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

Sardis Lake lies within the within the western extent of the Ouchita Mountains ecoregions (Level IV). The Ouchita Mountains ecoregion vegetation is predominantly of an oak-hickory-pine forest. Specifically, the common tree species are: loblolly pine (*Pinus taeda*), shortleaf pine (*Pinus echinate*), southern red oak (*Quercus falcata*), scarlet oak (*Quercus coccinea*), black oak (*Quercus ellipsoidalis*), post oak (*Quercus stellata*), blackjack oak (*Quercus marilandica*), white oak (*Quercus alba*), pignut hickory (*Carya glabra*), and mockernut hickory (*Carya tomentosa*). What prairies exist are typically confined to managed lands like parks and wildlife management areas, as areas outside of those units had typically evolved into pastures and forests. Bottomland forests and wetlands typically occur in poorly drained areas.

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
--------------	-----------------

Riparian/BHF	4
Upland Forest	20
Grassland	2
Total Points Surveyed	26

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: Sardis Lake WHAP Summary Results of this report.

Upland forest (20 sampled) and Riparian/BHF (4 sampled) were the most abundant habitat types surveyed. With the recent flooding making some points inaccessible this number would have changed with more riparian/BHF being sampled and the dense underbrush would have allowed for more Upland Forest site sites to be sampled. Upland forest scores ranged from 0.58 to 0.68 while Riparian/BHF scores ranged from 0.59 to 0.61. The lower minimum scores, especially for these normally drier upland habitats, may be partly due to long-term flooding that occurred at Sardis Lake in recent years, thus leading to reduced plant diversity. Flooding at lower elevations in the flood pool of Sardis Lake almost certainly led to mortality of the typically upland species of herbaceous plant growth. This certainly affected survey metrics within the inundated areas. Long-term flooding of federal lands is 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	0.59	0.61	0.53
Upland Forest	0.58	0.68	0.40
Grassland	0.44	0.51	0.37

Figures 6, 7, 8, and 9 show the range of total scores for all points surveyed (26 sampled) as well as the 16 additional points that were skipped due to inaccessibility. Skipped points show a total score of 0 these figures. Overall, upland and riparian/BHF habitats exhibited the highest average total score (0.58 and 0.59). With such a close margin, these two habitats are equal in value, which is proof of how the normalizing of scores helps the sites to be evaluated on an equal basis.

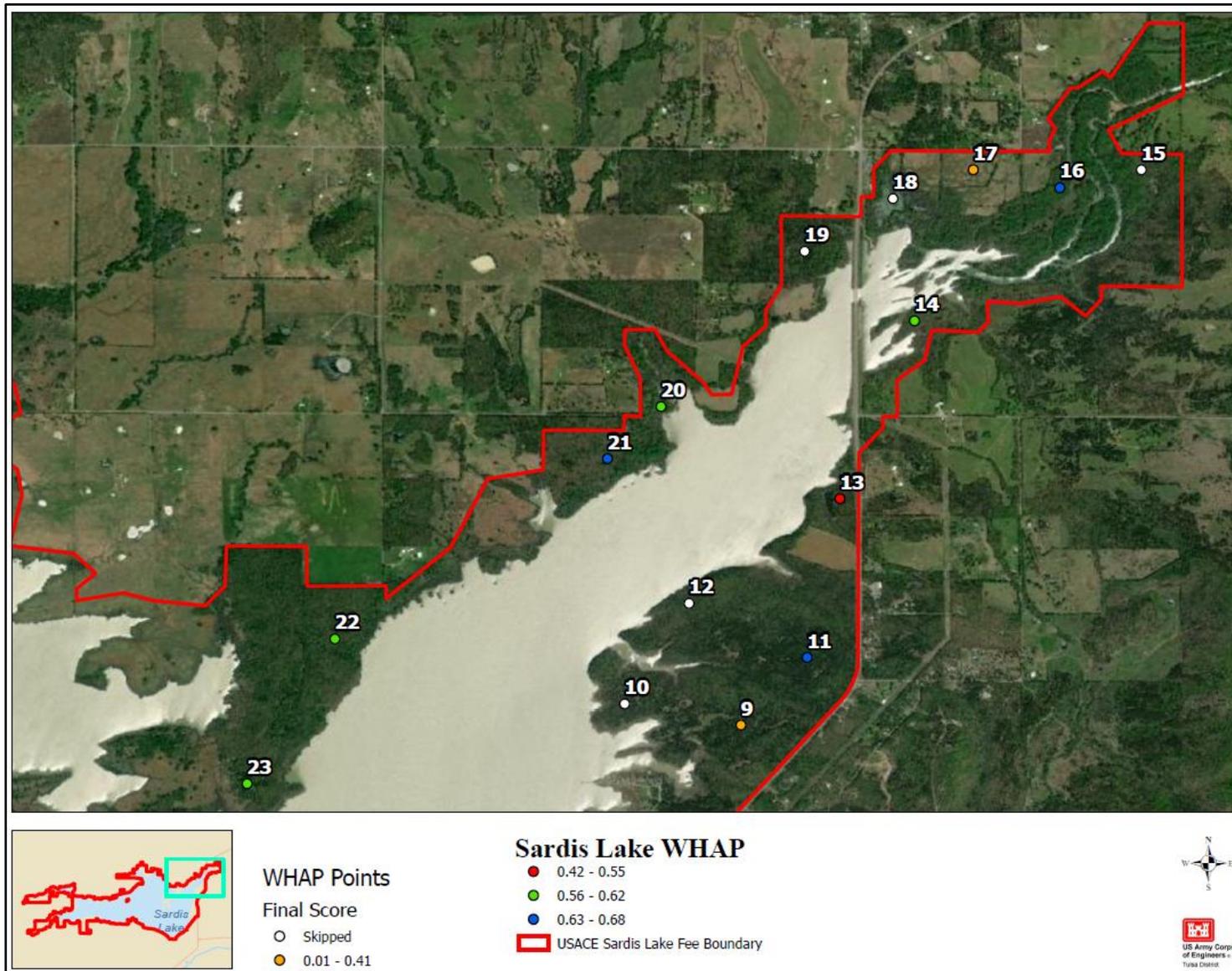


Figure 6. Total Score Range for All Points Surveyed on the Eastern Boundary of Sardis Lake



Figure 7. Total Score Range for All Points Surveyed within South Center of Sardis Lake

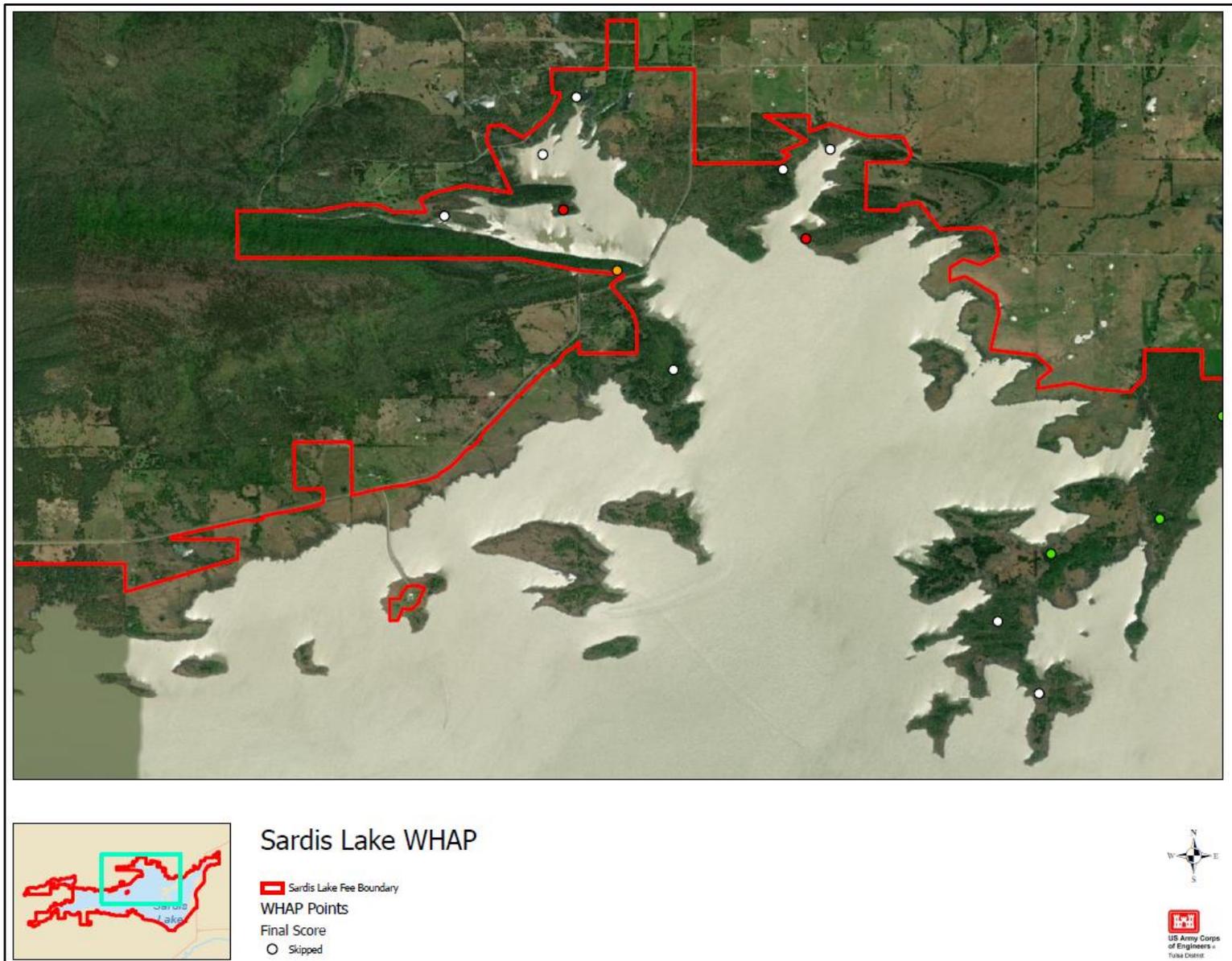


Figure 8. Total Score Range for All Points Surveyed within North Center of Sardis Lake

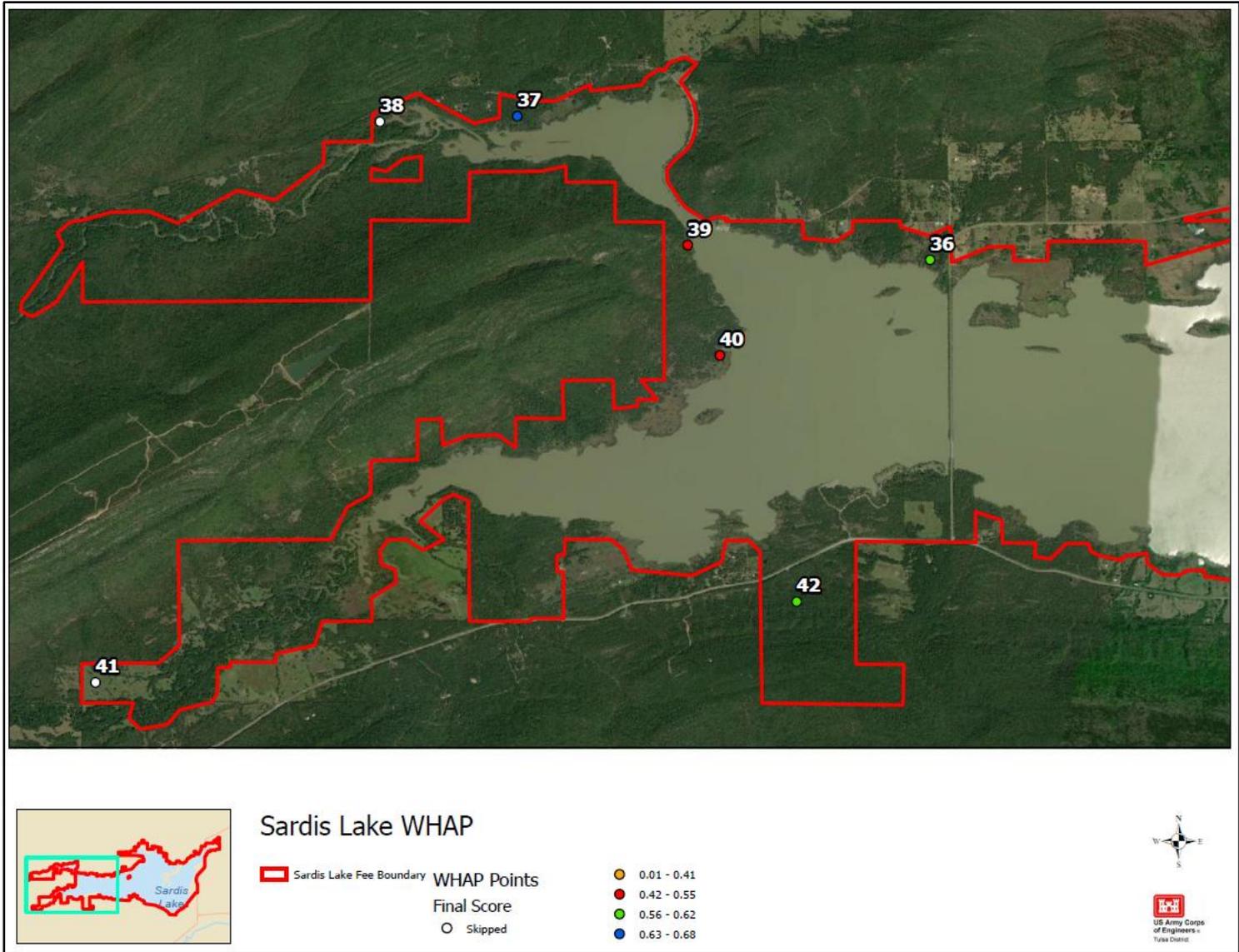


Figure 9. Total Score Range for All Points Surveyed on the Western Boundary of Sardis Lake

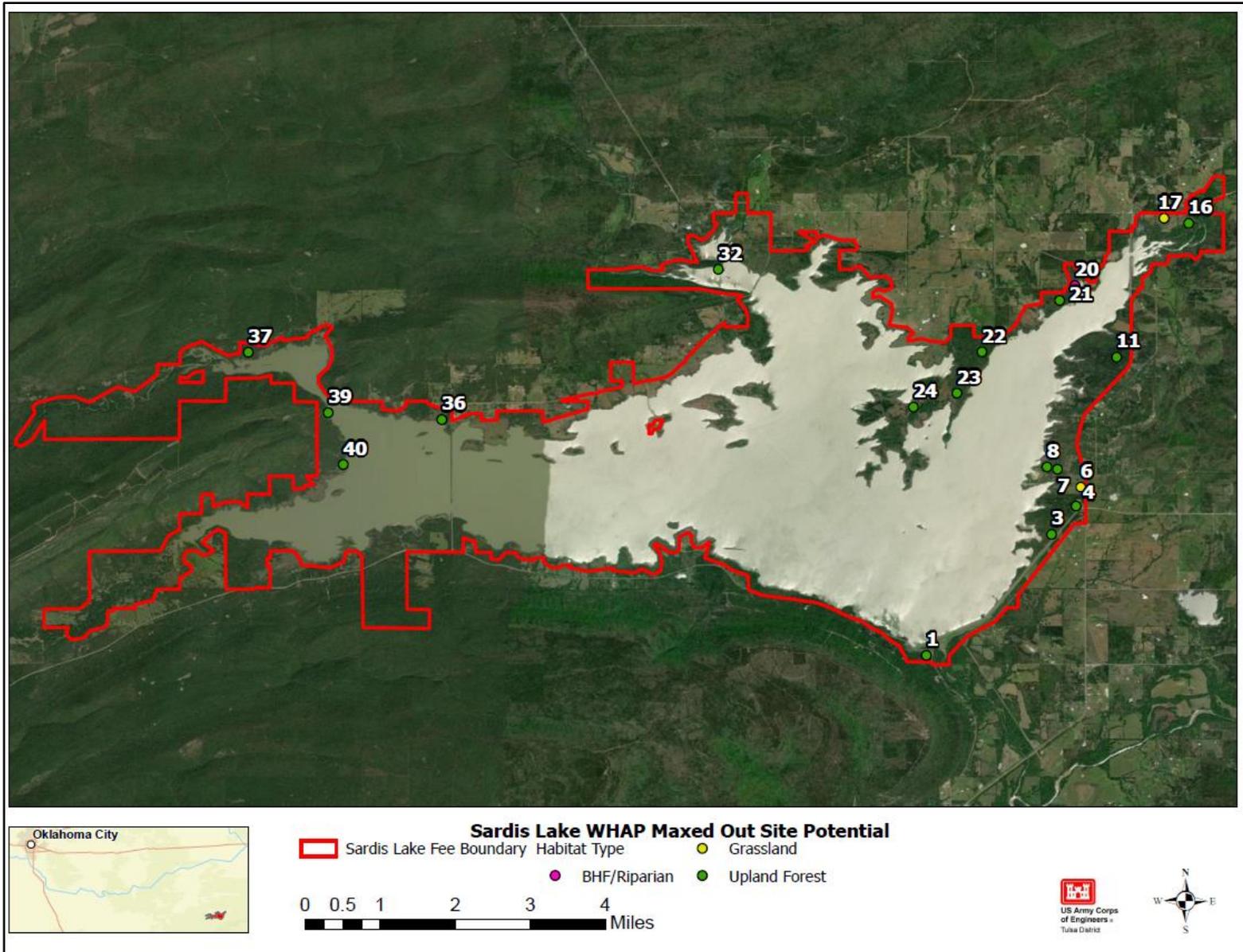


Figure 10. High Scoring Sites in Site Potential

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	0.21	0.09	0.09
Upland Forest	0.11	0.09	0.09
Grassland	0.12	0.05	0.08

Site potential allocates more points based on soil substrates characteristics and hydrologic connectivity that can support hydrophytic habitats, such as marshes, swamps, and bottomland hardwood forests that are often considered to be higher quality, more diverse habitat. This allows areas to score higher even though a recent disturbance, such as fire or flood, may have removed most of the vegetation. Areas scoring high in site potential but low in other metrics can be targeted for management efforts as these areas' vegetation community response should be favorable, thus increasing habitat value. The predominate thick soil surface layer that is common within Sardis Lake is the main factor that upland forest and grassland sites scored so high in average site potential. WHAP sites with maximum site potential are shown in Figure 10.

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. These scores are expected to increase across the habitats, 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 takes into consideration the rarity of a habitat or vegetative community and its abundance in the region. Current and past agricultural and forestry practices have significantly influenced the region's remaining habitat composition.

Recommendations

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

When comparing overall high total WHAP scores between (0.63-0.68) (Figures 6, 7, 8, and 9) to Maximum Site Potential scores (Figure 10), one area was identified, the area southwest of Potato Hills South, with the rest spread across various parts of the lake (points 3, 4, 7, 11, 16, 21, and 37). These sites are close to or have reached their maximum 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 0.37 – 0.55, 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 17, 32, 39, and 40 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 Sardis Lake Master Plan revision will consider WHAP scores when making land classification decisions.

References

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Attachment A: Sardis Lake WHAP Results Summary

Point Number	Specific Habitat Type	Grouped Habitat Type	1) Site Potential	2) Successional Stage	Marsh Successional Stage	3) Uniqueness and Relative Abundance	4A) Diversity of Woody Species	4B) Number of Woody Species	Swamp Diversity of Veg	Marsh Diversity of Veg	5) Vertical Stratification	6) Additional Structural Diversity	7A) Condition of Woody Vegetation	7B) Herbaceous Vegetation	Cropland Condition	Marsh Condition	Total Score before readjustment	Converted to Decimal	Total Score with Adjustment	Final Score	Berry Drupe	Legume Pod	Acorn	Nut Nutlike	Samara	Cones	Achenes	All Others	Herbaceous Species	Notes	
1	Dry Mixed Oak - Evergreen Woodland	Upland Forest	12	6	NA	10	6	5	NA	NA	4	3	3	1	NA	NA	50	0.5	0.57	0.57	roundleaf briar, cat briar, Virginia creeper, sensitive briar,	sericea lespedeza,	Shumard oak, white oak	hickory	American Elm,	eastern redcedar	NA	NA	witchgrass, carex,	NA	
2	Bottomland Hardwood Forest	BHF/Riparian	20	12	NA	5	4	3	NA	NA	5	5	3	3	NA	NA	60	0.6	0.60	0.60	roundleaf briar, cat briar	NA	NA	NA	winged elm, white ash	NA	sycamore	sweet gum	buckwheat, sedge, aster, commelina sp., wild parsley, witchgrass, St. John's wort, sedge, carex, woodland oats x2, beebalm, bonese t	NA	
3	Ruderal Deciduous Woodland	Upland Forest	12	6	NA	10	5	3	NA	NA	5	5	5	5	NA	NA	56	0.56	0.64	0.64	cat briar, farkleberry, unknown berry sp., Chinese privet, roundleaf briar, cat briar, poison ivy, farkleberry	NA	Shumard oak	hickory	winged elm	eastern redcedar	NA	NA	woodland oats x2, beebalm, bonese t	NA	
4	Shortleaf Pine - Oak Forest	Upland Forest	12	12	NA	10	4	3	NA	NA	5	5	5	3	NA	NA	59	0.59	0.68	0.68	err	NA	Shumard oak	NA	American elm	eastern redcedar	NA	NA	sedge, buckwheat, wild parsley, beebalm	NA	
5	Pasture/Prairie	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	0.0	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped
6	Pasture/Prairie	Grassland	12	5	NA	5	1	1	NA	NA	3	0	0	3	NA	NA	30	0.3	0.51	0.51	NA	ericea lespedeza	NA	NA	NA	NA	NA	NA	milkweed sp x2, bonese t, sedge, woodland oats, daisy, indian paintbrush	Hayfield	

Point Number	Specific Habitat Type	Grouped Habitat Type	1) Site Potential	2) Successional Stage	Marsh Successional Stage	3) Uniqueness and Relative Abundance	4A) Diversity of Woody Species	4B) Number of Woody Species	Swamp Diversity of Veg	Marsh Diversity of Veg	5) Vertical Stratification	6) Additional Structural Diversity	7A) Condition of Woody Vegetation	7B) Herbaceous Vegetation	Crop and Condition	Marsh Condition	Total Score before readjustment	Converted to Decimal	Total Score with Adjustment	Final Score	Berry Drupe	Legume Pod	Acorn	Nut Nutlike	Samaras	Cones	Achenes	All Others	Herbaceous Species	Notes	
16	Bottomland Hardwood Forest	Upland Forest	12	12	NA	10	4	3	NA	NA	5	3	5	3	NA	NA	57	0.57	0.66	0.66	cat briar, dewberry, roundleaf green briar,	sericea lespedeza,	NA	turkey oak, white oak	American elm,	NA	NA	fern,	goldenrod, woodland oats, ragweed, white snakeroot, meadow rose,	NA	
18	Bottomland Hardwood Forest	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	0.00	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	NA
20	Dry-Mesic Oak Forest	BHF/Riparian	25	6	NA	10	3	1	NA	NA	5	5	3	3	NA	NA	61	0.61	0.61	0.61	dewberry,	NA	post oak,	NA	NA	NA	NA	NA	button bush, black willow	swamp weed, soft rush, false nettle	NA
22	Dry-Mesic Oak Forest	Upland Forest	12	12	NA	10	6	3	NA	NA	4	1	5	1	NA	NA	54	0.54	0.62	0.62	poison ivy, Virginia creeper, snowberry	NA	white oak, post oak,	hickory	American elm,	eastern red cedar	NA	NA	carex,	NA	
24	Dry-Mesic Oak Forest	Upland Forest	12	12	NA	10	3	3	NA	NA	4	1	5	3	NA	NA	53	0.53	0.61	0.61	huckleberry, virginia creeper	NA	NA	NA	white ash	eastern red cedar	NA	NA	sedge, parsley, unknown herb x2	NA	

Point Number	Specific Habitat Type	Grouped Habitat Type	1) Site Potential	2) Successional Stage	Marsh Successional Stage	3) Uniqueness and Relative Abundance	4A) Diversity of Woody Species	4B) Number of Woody Species	Swamp Diversity of Veg	Marsh Diversity of Veg	5) Vertical Stratification	6) Additional Structural Diversity	7A) Condition of Woody Vegetation	7B) Herbaceous Vegetation	Crop and Condition	Marsh Condition	Total Score before readjustment	Converted to Decimal	Total Score with Adjustment	Final Score	Berry Drupe	Legume Pod	Acorn	Nut Nutlike	Samaras	Cones	Achenes	All Others	Herbaceous Species	Notes	
36	Dry-Mesic Oak Forest	Upland Forest	12	6	NA	10	2	3	NA	NA	5	3	5	3	NA	NA	49	0.49	0.56	0.56	roundleaf briar, persimmon, hackberry	NA	NA	NA	white ash, American elm	NA	NA	NA	bromex2, carex, wild parsley, false nettle, knotweed	NA	
																														Biggest pine trees for the lake	
38	Bottomland Hardwood Forest	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	0.00	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	
39																														beebalm	NA
40	Dry Oak Woodland	Upland Forest	12	6	NA	10	3	1	NA	NA	4	3	5	1	NA	NA	45	0.45	0.52	0.52	NA	NA	post oak, white oak	NA	American elm,	eastern red cedar,	NA	NA	NA	beebalm, carex sp., sedge sp., wild parsley	NA
41	Dry-Mesic Oak Forest	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	0.00	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	Skipped	
42	Dry-Mesic Mixed Oak - Evergreen Forest	Upland Forest	7	12	NA	10	6	3	NA	NA	3	5	5	1	NA	NA	52	0.52	0.60	0.60	NA	bush clover	post oak, red oak	hickory	white ash, American elm	short leaf pine, eastern red cedar	NA	NA	NA	paspalum, carex, unknown herb	NA

Attachment B: Sardis Lake WHAP Point Photographs

Sardis Lake #: 1

Facing North



Facing East



Facing West



Facing South



Sardis Lake #: 2

Facing North



Facing East



Facing West



Facing South



Sardis Lake #: 3

Facing North



Facing East



Facing West



Facing South



Sardis Lake #: 4

Facing North



Facing East



Facing West



Facing South



Sardis Lake #: 6

Facing North



Facing East



Facing West



Facing South



Sardis Lake #: 7

Facing North



Facing East



Facing West



Facing South



Sardis Lake #: 8

Facing North



Facing East



Facing West



Facing South



Sardis Lake #: 9

Facing North



Facing East



Facing West



Facing South



Sardis Lake #: 11

Facing North



Facing East



Facing West



Facing South



Sardis Lake #: 13

Facing North



Facing East



Facing West



Facing South



Sardis Lake #: 14



Sardis Lake #: 16

Facing North



Facing East



Facing West



Facing South



Sardis Lake #: 17

Facing North



Facing East



Facing West



Facing South



Sardis Lake #:20

Facing North



Facing East



Facing West



Facing South



Sardis Lake #: 21

Facing North



Facing East



Facing West



Facing South



Sardis Lake #: 22

Facing North



Facing East



Facing West



Facing South



Sardis Lake #:23

Facing North



Facing East



Facing West



Facing South



Sardis Lake #:24

Facing North



Facing East



Facing West



Facing South



Sardis Lake #:27

Facing North



Facing East



Facing West



Facing South



Sardis Lake #:32

Facing North



Facing East



Facing West



Facing South



Sardis Lake #:34

Facing North



Facing East



Facing West



Facing South



Sardis Lake #:36

Facing North



Facing East



Facing West



Facing South



Sardis Lake #:39

Facing North



Facing East



Facing West



Facing South



Sardis Lake #:40

Facing North



Facing East



Facing West



Facing South



Sardis Lake #:42

Facing North



Facing East



Facing West



Facing South



APPENDIX D - PERTINENT LAWS

- Antiquities Act of 1906, Public Law 59-209, 34 Stat. 225, 54 U.S.C. Sections 320301-320303: 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.
- Historic Sites Act of 1935, Public Law 74-292, 49 Stat. 666, 16 U.S.C. Sections 461-467: 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".
- Flood Control Act of 1938, Public Law 75-761: This act authorizes the construction, repair, and preservation of certain public works on rivers and harbors for navigation, flood control, and for other purposes.
- Bald and Golden Eagle Protection Act, as amended, 16 U.S.C. Sections 668-668d: 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.
- Flood Control Act of 1944, Public Law 78-534: 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.
- River and Harbor Act of 1946, Public Law 79-525: This act authorizes the construction, repair, and preservation of certain public works on rivers and harbors for navigation, flood control, and for other purposes.
- Flood Control Act of 1946, PL 79-526: 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 Sardis Lake. This law amends PL 78-534 to include authority to grant leases to non-profit organizations at recreational facilities in reservoir areas at reduced or nominal fees.
- Flood Control Act of 1954, Public Law 83-780: This act authorizes the construction, maintenance, and operation of public parks 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.

- Fish and Wildlife Coordination Act, Public Law 85-624: This act, as amended, 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 86-717: 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.
- River and Harbor Act of 1962, Public Law 87-874: This act authorizes the construction, repair, and preservation of certain public works on rivers and harbors for navigation, flood control, and for other purposes.
- Land and Water Conservation Fund Act of 1965, Public Law 88-578: This act established a fund from which U.S. Congress can make appropriations for outdoor recreation. This law 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 88-29: Authorized the Secretary of the Interior to inventory and classify outdoor recreation needs and resources and to prepare a comprehensive outdoor recreation plan taking into consideration the plans of the various Federal agencies, State, and other political subdivisions. It also states that the federal agencies undertaking recreational activities shall consult with the Secretary of the Interior concerning these activities and shall carry out such responsibilities in general conformance with the nationwide plan.
- Federal Water Project Recreation Act, Public Law 89-72: 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 HQUSACE/OMB implementation policy made these provisions applicable to projects completed prior to 1965.
- Water Resources Planning Act, Public Law 89-80: 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.
- Solid Waste Disposal Act, as amended, Public Law 89-272, 42 U.S.C. Sections 6901 et seq.: 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 natural 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.

- National Historic Preservation Act of 1966, Public Law 89-665, 54 U.S.C. Sections 300101 et seq.: 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.
- Flood Control Act of 1968, Section 210, Public Law 90-483: Restricted collection of entrance fee at USACE lakes and reservoirs to users of highly developed facilities requiring continuous presence of personnel.
- National Environmental Policy Act of 1969 (NEPA), Public Law 91-190, 42 U.S.C. Sections 4321 et seq.: 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. It is Section 102 that requires consideration of environmental impacts associated with Federal actions. Section 101 of NEPA requires the federal government to use all practicable means to create and maintain conditions under which man and nature can exist in productive harmony.

Specifically, Section 101 of NEPA declares:

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations
- Assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings
- Attain the widest range of beneficial uses of the environment without degradation risk to health or safety or other undesirable and unintended consequences
- Preserve important historic, cultural, and natural aspects of our national heritage and maintain wherever possible an environment which supports diversity and variety of individual choice
- Achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities
- Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources

- River and Harbor Act of 1970 and Flood Control Act of 1970, Public Law 91-611: Establishes the requirement for evaluating the economic, social, and environmental impacts of projects.
- Public Law 92-347: This act revises Public Law 88-578, the Land and Water Conservation Fund Act of 1965, to require Federal agencies to collect special recreation user fees for the use of specialized sites developed at Federal expense and to prohibit the USACE from collecting entrance fees to projects.
- Federal Water Pollution Control Act Amendments of 1972, Public Law 92-500: The Federal Water Pollution Control Act of 1948 (PL 845, 80th U.S. Congress), as amended in 1961, 1966, 1970, 1972, 1977, and 1987, 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."
- Federal Environmental Pesticide Control Act of 1972, Public Law 92-516, 86 Stat. 973, 7 U.S.C. Sections 136 et seq.: 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: This law amends Section 4 of the Land and Water Conservation Fund 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.
- Endangered Species Act of 1973, Public Law 93-205, 16 U.S.C. Sections 1531 et seq.: 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.
- Water Resources Development Act of 1974, Public Law 93-251: Section 107 of this law establishes a broad Federal policy which makes it possible to participate with local governmental entities in the costs of sewage treatment plan installations.
- Archeological and Historic Preservation Act of 1974, Public Law 93-291: 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. This amends the Reserve Salvage Act of 1960 (PL-86-523).
- Public Law 93-303: This law amends Section 4 of the Land and Water Conservation Fund 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.

- Safe Drinking Water Act, Public Law 93-523: 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: Expands the role of the Advisory Council on Historic Preservation. Section 201 amends Section 106 of the National 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.
- Clean Water Act of 1977, as amended, Public Law 95-217: This Act amends the Federal Water Pollution Control Act Amendments of 1972 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.
- American Indian Religious Freedom Act, Public Law 95-341: 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.
- Endangered Species Act Amendments of 1978, Public Law 95-632: This law amends the Endangered Species Act 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.
- Archeological Resources Protection Act of 1979, Public Law 96-95: This Act protects archeological resources and sites that are on public and tribal lands and that 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.
- Supplemental Appropriations Act, 1983, Public Law 98-63: 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 the USACE, except policymaking or law or regulatory enforcement.
- Water Resources Development Act of 1986, Public Law 99-662: Provides for the conservation and development of water and related resources and the improvement and rehabilitation of the Nation's water resources infrastructure.
- North American Wetland Conservation Act of 1989, Public Law 101-233: This act 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.

- Americans with Disabilities Act of 1990 (ADA), PL101-336, as amended by the ADA Amendments Act of 2008 (PL110-325): This law prohibits discrimination based on disabilities in, among others, the area of public accommodations and requires reasonable accommodations for persons with disabilities.
- Native American Graves Protection and Repatriation Act, Public Law 101-601: This act requires Federal agencies to return Native American human remains and cultural items, including funerary objects and sacred objects, to their respective peoples.
- Water Resources Development Act (WRDA) of 1992 PL 102-580: This act authorizes the 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.
- Omnibus Reconciliation Act of 1993, Public Law 103-66: Day use fees - authorizes the USACE to collect fees for the use of developed recreational sites and facilities, including campsites, swimming beaches and boat ramps.
- WRDA 1996, PL 104-303: 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.
- Omnibus Parks and Public Lands Management Act of 1996, Public Law 104-333: This act 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.
- Neo-tropical Migratory Bird Conservation Act of 2000, Public Law106-147: This act promotes the conservation of habitat for neo-tropical migratory birds.

APPENDIX E – ACRONYMS

ac-ft	Acre Feet
AQI	Air Quality Index
BMP	Best Management Practices
CAP	Climate Action Plan
CHSP	Cedar Hill State Park
CRMP	Cultural Resources Management Plan
CWA	Clean Water Act
DC	District Commander
DF	Deciduous Forest
DQC	District Quality Control
DQCB	District Quality Control Board
DM	Design Memorandum
EA	Environmental Assessment, NEPA Document
EMS	Ecological Mapping System
EOP	Environmental Operating Principles
EP	Engineering Pamphlet
EPA	United States Environmental Protection Agency
ER	Engineering Regulation
ESA	Environmentally Sensitive Area
°F	Degrees Fahrenheit
FONSI	Finding of No Significant Impact
FWCA	Fish and Wildlife Coordination act of 1958
GIS	Geographical Information Systems
HDR	High Density Recreation
HQ	USACE Headquarters (also HQUSACE)
IH	Interstate Highway
IPaC	Information for Planning and Consultation
KR	King Ranch (also King Ranch Bluestem)
LDR	Low Density Recreation
LEED	Leadership in Energy and Environmental Design
MP	Master Plan or Master Planning
MRML	Multiple Resource Management Lands
NAAQS	National Ambient Air Quality Standards
NCTCOG	North Central Texas Council of Governments
NEPA	National Environmental Policy Act, 1970
NGVD/NGVD29	National Geodetic Vertical Datum (1929)
NHPA	National Historic Prevention Act
NRHP	National Register of Historic Places
NOA	Notice of Availability
NRCS	Natural Resource Conservation Service
NRHP	National Registry of Historic Places
NVCS	National Vegetation Classification System
NWI	National Wetland Inventory
ODWC	Oklahoma Department of Wildlife Conservation
O&M	Operations and Maintenance
OK	Oklahoma

OMB	Office of Management and Budget
OMBIL	Operations and Maintenance Business Information
OMP	Operations Management Plan for a specific lake Project
OPM	Operations Project Manager
PDT	Project Development Team
PL	Public Law
PM	Project Management or Project Manager
PMP	Project Management Plan
PO	Project Operations
RBLH	Riparian Bottomland Hardwoods
RBS	Recreational Boating Survey
RIFA	Red Imported Fire Ant
RPEC	Regional Planning and Environmental Center
RTEST	Rare, Threatened, and Endangered Species of Texas
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SGCN	Species of Greatest Conservation Need
SH	State Highway
SHPO	State Historical Preservation Office
SMPS	Shoreline Management Policy Statement
SIP	State Implementation Plan
SMU	Southern Methodist University
SWA	State Wildlife Area
TPWD	Texas Parks and Wildlife Department
TORP	Texas Outdoor Recreation Plan
TRA	Trinity River Authority
U.S.	United States (also US)
USACE	United States Army Corps of Engineers
USFWS	U. S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VM	Vegetative Management Area
WDA	Workforce Development Area
WHAP	Wildlife Habitat Appraisal Procedure
WM	Wildlife Management Area