FINDING OF NO SIGNIFICANT IMPACT
ENVIRONMENTAL ASSESSMENT FOR THE
PROPOSED 2024 BARDWELL LAKE MASTER PLAN
TRINITY RIVER BASIN
ELLIS COUNTY, TEXAS

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 1974 Bardwell 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 2024 to 2049.

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, Fort Worth District has conducted an environmental analysis on the draft 2024 Bardwell Lake Master Plan (MP). The draft MP addresses the need for an updated comprehensive land management document for Bardwell Lake in Ellis County, Texas. The final recommendation will be contained in the 2024 Bardwell Lake Master Plan.

The proposed revision of the 1974 Bardwell 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 Bardwell Lake over the next 25 years.

The Environmental Assessment (EA) for the draft 2024 Bardwell Lake Master Plan evaluated an alternative that would revise the 1974 Bardwell Master Plan to meet current policy, and its assessment of impacts are summarized in Table 1 and the draft EA is included as reference.

In addition to a “no action” plan, one alternative that fully meets the project purpose was evaluated (proposed action/plan). Chapter 2.0 of the draft Bardwell Lake Master Plan EA discusses the alternative formulation and selection as well the summary of the new goals and objectives. Chapter 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 1974. 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	☒	☐	☐
Air quality	☒	☐	☐
Aquatic resources/wetlands	☒	☐	☐
Invasive species	☒	☐	☐
Fish and wildlife habitat	☒	☐	☐
Threatened/Endangered species/critical habitat	☒	☐	☐
Historic properties	☒	☐	☐
Other cultural resources	☒	☐	☐
Floodplains	☒	☐	☐
Hazardous, toxic & radioactive waste	☐	☐	☒
Hydrology	☒	☐	☐
Land use	☒	☐	☐
Socioeconomics	☒	☐	☐
Environmental justice	☐	☐	☒
Soils	☒	☐	☐
Water quality	☒	☐	☐
Climate change	☒	☐	☐

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) will be completed on May 11, 2024. All comments submitted during the public review period will be 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 potential to cause effects 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 draft 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.

Draft

Date

Draft

CALVIN A. KROEGER
COL, EN
Commanding

Bardwell Lake Master Plan

Draft

Trinity River Basin,
Ellis County, Texas

April 2024

US Army Corps of Engineers®

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EXECUTIVE SUMMARY

Bardwell Lake Master Plan
Draft
U.S. Army Corps of Engineers
Prepared by the Southwestern Division
Regional Planning and Environmental Center (RPEC)
April 2024

ES.1 PURPOSE

The revision of the 1974 Bardwell Lake Master Plan (hereafter Plan or Master Plan) is a framework built collaboratively to guide appropriate stewardship of U.S. Army Corps of Engineers (USACE) administered resources at Bardwell Lake over the next 25 years. The 1974 Plan has served well past the intended 25-year planning horizon and does not reflect the growing population around the lake and regional recreation needs. When originally built, the dam and lake's purposes were flood control and water conservation. In addition to these primary missions, USACE has an inherent mission for environmental stewardship of project lands, working closely with the Texas Parks and Wildlife Department and local cities to provide regionally important outdoor recreation opportunities. The Master Plan is primarily a land use and outdoor recreation strategic plan that does not address the specific authorized purposes of flood control or water conservation .

Bardwell Lake is located in the Dallas-Fort Worth Metroplex and spans across Ellis County, within the North Central Texas Council of Governments (NCTCOG) as shown in Figure ES.1. The 1974 Master Plan included a total of 7,488 acres of fee land with 3,570 acres of water area and 3,918 acres of land area above the conservation pool elevation. The acres figure was derived using land measurement technology dating from the 1970s to describe the size of the pool at the normal elevation. The mapping used for this Master Plan revision uses modern satellite imagery, Lidar (3-dimensional laser scanning) and Geographic Information System (GIS) mapping, resulting in different acreage calculations than that of the 1974 Master Plan. There are approximately 25 miles of shoreline at the top of the conservation pool. Bardwell Dam and Lake Project (Bardwell Lake hereafter) is part of an integral flood control and water conservation project in the Trinity River Basin consisting of eight major projects. This Plan and supporting documentation provide an inventory and analysis, goals, objectives, and recommendations for USACE lands and waters at Bardwell Lake, Texas, with input from the public, stakeholders, and subject matter experts.

Figure ES.0.1 Vicinity Map of Bardwell Lake within the larger Dallas-Fort Worth Metropolitan Area

ES.2 PUBLIC INPUT

To ensure a balance between operational, environmental, and recreational outcomes, the 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.

The first public input meeting was held on February 16, 2023, in Ennis Texas. The presentation and public input process remained open for 30 days. The public comment period began February 16, 2023, and ran through March 17, 2023.

During the public comment period, the USACE received 1 submitted comment. Issues addressed in the comment included wildlife and habitat concerns and hiking and boaters' safety. Comment received, and government responses are listed in Table 7.1 and were considered in development of the Draft Master Plan.

A public meeting will be held at in Ennis to release the Draft Master Plan. This will begin a 30-day comment period when members of the public, agencies, and other stakeholders can provide comments on the Draft Master Plan. After closing the comment period, this section will be completed with further details including public meeting or presentation details, comments received as well as significant edits to the draft based on those comments.

ES.3 RECOMMENDATIONS

The following land and water classification changes (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 Bardwell Lake was reclassified either by a change in nomenclature required by regulation or changes needed to identify actual and projected use.

Table ES.1 Change from Prior Land Classification to Proposed Land Classification

Prior Land Classifications (1974 Plan)	Acres*	Proposed Land Classifications (2024)	Acres
Project Operations	126	Project Operations	254
Environmentally Sensitive Areas*		Environmentally Sensitive Areas	1,046
Recreation – Intensive Use	1,436	High Density Recreation	879
Recreation – Low Density Use	900	MRML – Low Density Recreation	957
Wildlife Management	1,806	MRML – Wildlife Management	1,109
Total Land Acres	**4,268**	**Total Land Acres**	**4,245**
Prior Land Classifications (1974 Plan)	**Acres***	**Proposed Land Classifications (2024)**	**Acres**
Permanent Pool	3,240	Permanent Pool	
—	—	Restricted	1.6
—	—	Open Recreation	3,238
TOTAL Water Surface Acres	**3,240**	**TOTAL Water Surface Acres**	**3,240**

* Some acreage differences are due to improvements in mapping and measurement technology, deposition/siltation, and erosion.

The acreages of the conservation pool and USACE land lying above the conservation pool was 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 1974 Master 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 Bardwell Lake. Chapter 2 consists of an inventory and analysis of Bardwell Lake and associated land resources. Chapters 3 and 4 lay out management goals, resource objectives, and land classifications. 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 Bardwell 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 with the master plan, which analyzed alternative management scenarios for Bardwell Lake, in accordance 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 1974 Master 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

Bardwell Dam and Lake (hereafter Bardwell Lake) is located at river mile (RM) 5.0 on the Waxahachie Creek, a tributary of Chambers Creek and the Trinity River. The damsite is located in Ellis County, about 5 miles south of Ennis Texas (Figure 1.1). The lake spans entirely within Ellis County and borders the Cities of Ennis and Bardwell. The construction of Bardwell Dam began in August 1963, and the dam was completed in November 1965.

Figure 1.1 Vicinity Map of Bardwell Lake within the larger Dallas-Fort Worth Metropolitan Area

Bardwell Lake is an integral part of the U.S. Army Corps of Engineers (USACE) plan for flood control and water conservation in the Trinity River Basin. The plan presently consists of eight major flood control projects, known as Grapevine Dam, Bardwell Dam, Benbrook Dam, Joe Pool Dam, Lavon Dam, Lewisville Dam, Navarro Mills Dam, and Ray Roberts Dam. The eight flood mitigation projects in the Trinity River

system mitigate approximately 1,591,300 acre-feet (ac-ft) of flood mitigation area. Bardwell mitigates 187 square miles of drainage area within the Trinity River Basin. 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 leases for park and recreation purposes.

The state of Texas controls allocations of water from the conservation pool through the Trinity River Authority (TRA). The Secretary of the Army approved a contract on June 24, 1963, authorizing TRA to utilize 25% of the conservation storage space as water supply for the City of Ennis. A supplemental agreement to the contract approved in October 1969 reallocated 60% of the water in the conservation pool to the City of Ennis and 40% to the City of Waxahachie.

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 Bardwell Lake. 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 USACE, other agencies, and individuals granted leases to USACE lands must be consistent with the Master Plan. The Plan does not address the flood control or water conservation purposes of Bardwell Lake (see the 2019 USACE Water Control Manual for Bardwell Lake for a description of these project purposes). The Bardwell Lake Master Plan was last updated in 1974, which is well past the intended planning horizon of 25 years.

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

> *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

Bardwell Lake was authorized March 31, 1960, with the primary missions of flood control and water conservation for water supply as contained in the River and Harbor Act of 1945 (Public Law [PL] 14, 79th Congress, 1st Session), in accordance with the total plan of improvements for the Trinity River basin outlined in House Document Number 403 (77th Congress, 1st Session). The construction of Bardwell Dam began in August 1963, and deliberate impoundment began November 1965.

1.3. PROJECT PURPOSE

When built, Bardwell Dam and Lake's purposes were primarily flood control and water conservation. The USACE administers the surrounding federal lands and water surface to provide a variety of public, outdoor recreation opportunities. Refer to the maps in Appendix A for an overview of the recreational lands. Environmental stewardship of Federal lands is carried out to recognize and protect important fish and wildlife habitats and species.

1.4. MASTER PLAN PURPOSE AND SCOPE

The Bardwell Lake Master Plan is the living, flexible, long-term strategic land-use management document that guides the comprehensive management and development of all the project's recreational, natural, and cultural resources. Under the guidance published in Engineering Regulation (ER) 1130-2-550 Change 7, and the accompanying Engineer Pamphlet (EP) 1130-2-550 Change 5, the Master 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 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. The Master Plan guides and articulates the USACE responsibilities

pursuant to federal laws. The USACE vision for the future management of the natural resources and recreation program at Bardwell Lake is set forth as follows:

> *The land, water, and recreational resources of Bardwell Lake will be managed to protect, conserve, and sustain natural and cultural resources, especially environmentally sensitive resources, and provide outdoor recreation opportunities that complement overall project purposes for the benefit of present and future generations.*

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 Bardwell 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 or water conservation purposes of Bardwell Lake with respect to management of the water level in the lake (see the USACE Water Control Manual for Bardwell Lake for a description of these project purposes).

The master planning process encompasses the examination and analysis of past, present, and future environmental, recreational, and socioeconomic conditions and trends. Within 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 Bardwell Lake's authorized purposes
- Environmental sustainability elements

The original Bardwell Lake Master Plan was revised in 1974. Outdoor recreation trends, regional land use, rapidly growing population, current legislative requirements, and USACE management policy have evolved. Increased urbanization, fragmentation of wildlife habitat, impacts of climate change, and the growing demand for recreational access and natural resource management have affected the region and Bardwell Lake. In response to these escalating pressures, a full revision of the 1974 Master Plan is required. The Master Plan revision will update land classifications, include new resource management objectives, and describe future plans proposed by key partners and stakeholders. The Plan will also inform the management of vegetation, wildlife, and other natural resources for the next 25 years.

1.5. BRIEF WATERSHED AND PROJECT DESCRIPTION

Bardwell Lake is located in the Waxahachie Creek watershed in the Upper Trinity River Basin. The headwaters of Waxahachie Creek originate north of Midlothian in northwestern Ellis County. It then runs southeast for 23.5 miles. It empties into

Chambers Creek three miles south of the southern end of Bardwell Dam in northern Navarro County. The watershed has a total drainage area of 178 square miles, among which 95% drains to Bardwell Dam.

Bardwell Dam consists of a compacted earth-fill embankment, 15,400 feet long with a maximum height of 82 feet above the streambed and a crown width of 20 feet. The dam includes a separate outlet works and an uncontrolled spillway section. The spillway is a 350-foot uncontrolled broad-crested weir structure. Releases of water from the flood control pool are made through the outlet works structure which has a 10 foot diameter conduit controlled by two 5 foot by 10 foot sluice gates.

A total of 7,473 fee simple acres and 831 flood flowage easement acres were acquired for the construction of Bardwell Lake. Of this total acreage in fee simple, 3,570 is water area and 3,903 acres is land area above the conservation pool elevation.

1.6. DESCRIPTION OF RESERVOIR

Bardwell Lake is small by comparison to many USACE lakes, with a conservation (normal) pool of 6,040 surface acres at elevation 439.0 feet NGVD29. The maximum depth is approximately 60 feet deep within the original river channel upstream of the dam, but depths decrease further south of the dam. The top of the flood control pool and uncontrolled spillway crest is at elevation 439.0 feet NGVD29. The dam is a rolled earth-fill of impervious material, approximately 15,400 feet long. The dam has a maximum height of 82 feet.

Bardwell is a multi-purpose flood control and water conservation lake with a total storage capacity of 140,000 acre-feet. The lake has a sediment reserve of 17,600 acre-feet for storage of an estimated 100 years of sediment deposition and provides 79,600 acre-feet of flood control storage. It has a conservation storage of 42,800 acre-feet at the conservation pool level for municipal water supply and other beneficial uses.

1.7. PROJECT ACCESS

Bardwell Lake is easily accessed by several roads. The main east-west access roads include US Highway (US) 287 and State Highway (SH) 34, which connect to the main north-south access roads of Interstate (I) 45 and I 35E. SH 34 crosses over the middle of Bardwell Lake.

The North Central Texas Council of Governments (NCTCOG) coordinates with cities, counties, and transportation partners to plan road, transit, bicycle, and pedestrian transportation improvements for 16 counties comprising the NCTCOG and serves as the Metropolitan Planning Organization for the Dallas-Fort Worth Area. NCTCOG's Mobility 2045 plan was used as a reference document for this Master Plan. Items recommended for implementation in the Mobility 2045 plan that are of significance to the area surrounding Bardwell Lake include the following:

- Improvements to US 287 to the north of Bardwell Lake

- Improvements to SH 34 Lake Bardwell Drive which bisects Bardwell Lake

In addition, local cities including Ennis and Waxahachie have transportation and mobility plans which include roadway improvements, bike lanes, sidewalks, right-of-way improvements, hiking trails, and signage improvements to surface streets, parks, and neighborhoods around Bardwell 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.

1.8. PRIOR DESIGN MEMORANDA

Design Memorandums were prepared setting forth design criteria for all aspects of the project including the prime flood risk management facilities, real estate acquisition, road and utility relocations, reservoir clearing, and the master plan for recreation development and land management. Table 1.1 lists the Design Memoranda as well as other manuals and reports for Bardwell Lake.

Table 1.1 Relevant Design Memoranda (DM), Manuals, and Reports

DM	Title	Date
DM 1	Design Memorandum No. 1 - Hydrology	June 1961
	Supplement No. 1	June 1962
	Supplement No. 2	October 1962
DM 2	Design Memorandum No. 2 - Site Selection (Incorporated in No. 5)	
DM3	Design Memorandum No. 3 - Real Estate	
	Part I- Construction Area	July 1962
	Part II- Reservoir Area	November 1962
DM4	Design Memorandum No. 4 - Relocation	May 1964
	Part I- State Highway 34 and US Highway 287	December 1962
	Part II- Fort Worth and Denver Railway	October 1962
	Part III- Ellis County Roads – Dam Construction Area	December 1963
	Part VA- Brazos Electric Co-op	June 1963
	Part VB- Navarro County Co-op	November 1963
	Part VC- Texas Power and Light	November 1963
	Part VD- American Telephone and Telephone Company	November 1963
	Part VE- Southwestern Bell Telephone Company	November 1963
	Part VF- Texas Telephone and Telephone Company	November 1963
DM5	Design Memorandum No. 5 - General	October 1962
DM6	Design Memorandum No. 6 - Availability of Materials	May 1961
DM7	Design Memorandum No. 7	
	A- Preliminary Master Plan	July 1962

DM	Title	Date
	B- Master Plan	June 1963
DM7B	Design Memorandum No. 7B – Cost Estimate to Accompany Supplement No. 3	December 1966
DM8	Design Memorandum No. 8 Maintenance Facilities, Visitors; Overlook and Shelter for Fallout Protection	August 1962
DM9	Design Memorandum No. 9 – Clearing	August 1963
DM10	Design Memorandum No. 10 – Sedimentation and Degradation Ranges	October 1963
	Horizonal and Vertical Control for Dam Site Work Areas and Reservoir Area	January 1966
	Dam Safety Assurance Study, Hydrology and Hydraulics	January 1983
	Appraisal Report, Review of Completed Projects	December 1985
	Water Control Manual	March 1989
	Review of Completed Projects	May 1989
	Water Control Manual	January 2009
	Periodic Assessment No. 01	November 2016
	Periodic Inspection No. 11	November 2016

Source: USACE

1.9. PERTINENT PROJECT INFORMATION

The following table provides pertinent information regarding key reservoir elevations and storage capacity at Bardwell Lake.

Table 1.2 Elevations and Water Storage Capacity

Feature	Elevation (Feet NGVD)	Lake Area (Acres)	Storage (Acre-Feet)	Runoff (inches)
Top of Dam	460.0	–	–	–
Maximum Design Water Surface Elevation	455.9	9,480	268,400	28.27
Top of Flood Control Pool and Top of Gates	439.0	6,040	140,000	14.75
Top of Conservation Pool	421.0	3,570	54,900	5.78
Streambed	377.6	0	0	0

Source: USACE 2019 Bardwell Lake Water Control Manual

CHAPTER 2 – PROJECT SETTING AND FACTORS INFLUENCING MANAGEMENT AND DEVELOPMENT

2.1. PHYSIOGRAPHIC SETTING

2.1.1. 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. Bardwell Lake and its watershed is located in the Texas Blackland Prairie ecoregion as seen in Figure 2.1. Within the finer Level IV ecoregions, Bardwell Lake is located within the Northern Blackland Prairies ecoregion.

Before Anglo settlement, the region was habitat for bison (*Bison bison*), pronghorn antelope (*Antilocapra Americana*), mountain lion (*Puma concolor*), bobcat (*Lynx rufus*), ocelot (*Leopardus pardalis*), black bear (*Ursus americanus*), collared peccary (*Pecari tajacu*), white tailed deer (*Odocoileus virginianus*), red wolf (*Canis lupus rufus*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), badger (*Taxidea taxus*), river otter (*Lontra canadensis*), and many species of birds. Much of the original prairie has been converted to cropland and pasture or cleared for urbanization, leading to a loss of habitat for native species.

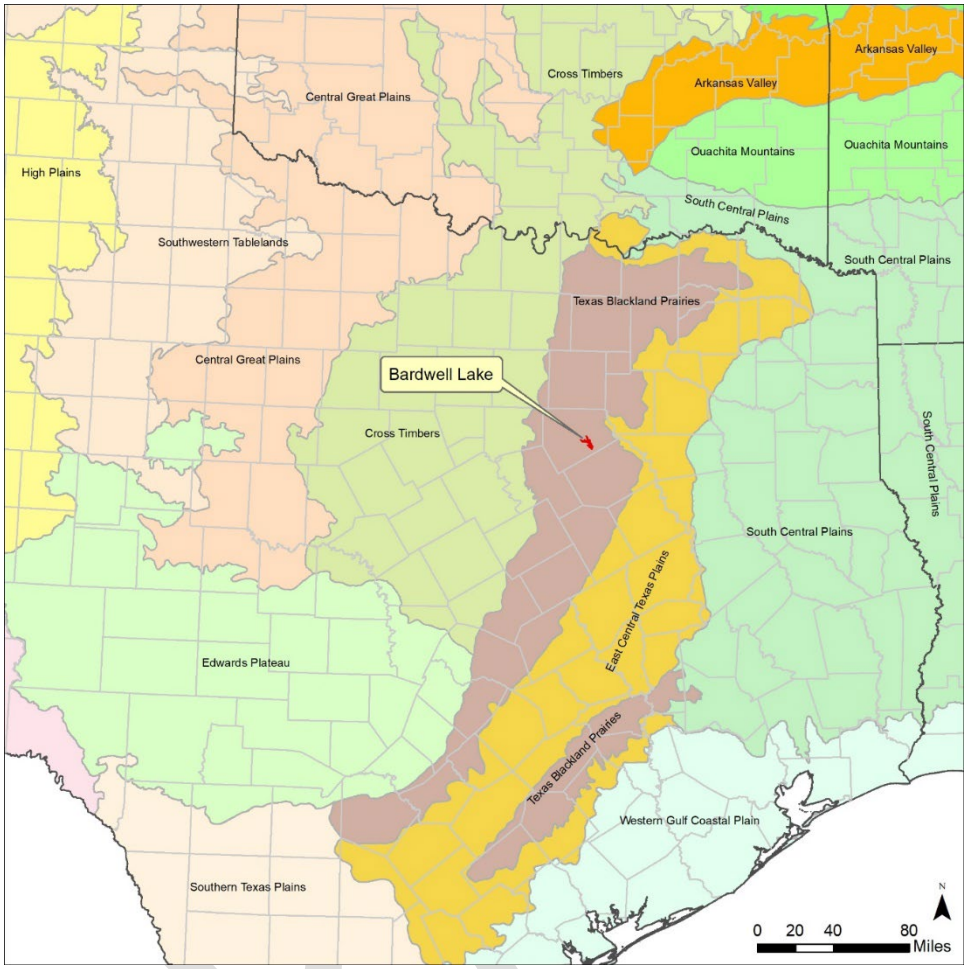


Figure 2.1 Bardwell Lake within Texas Level III Ecoregions

2.1.2. Climate

Bardwell Lake lies in the north central part of the state of Texas. The region has a warm, temperate, continental climate with cool winters and hot, humid summers. Tropical maritime air masses from the Gulf of Mexico play a dominant role in the climate from late spring through early fall, while polar air masses determine the winter climate. The mean annual temperature over the lake is about 65 degrees Fahrenheit (°F) (NOAA, 2023C). January, the coldest month, has an average temperature of 46°F and average minimum daily temperature of about 36°F. August, the warmest month, has an average daily temperature of 84°F and average maximum daily temperature of 95°F. The average length of the growing season is 237 days (NOAA, 2023B). Bardwell Lake lies within the USDA Plant Hardiness Zone 8A, which is determined by the winter extreme low temperatures, with 8A having normal winter lows between 10°F and 15°F (USDA, 2023). Figure 2.2 shows the monthly climate average precipitation and the mean maximum, mean minimum, and mean average temperatures between 1991 to 2020.

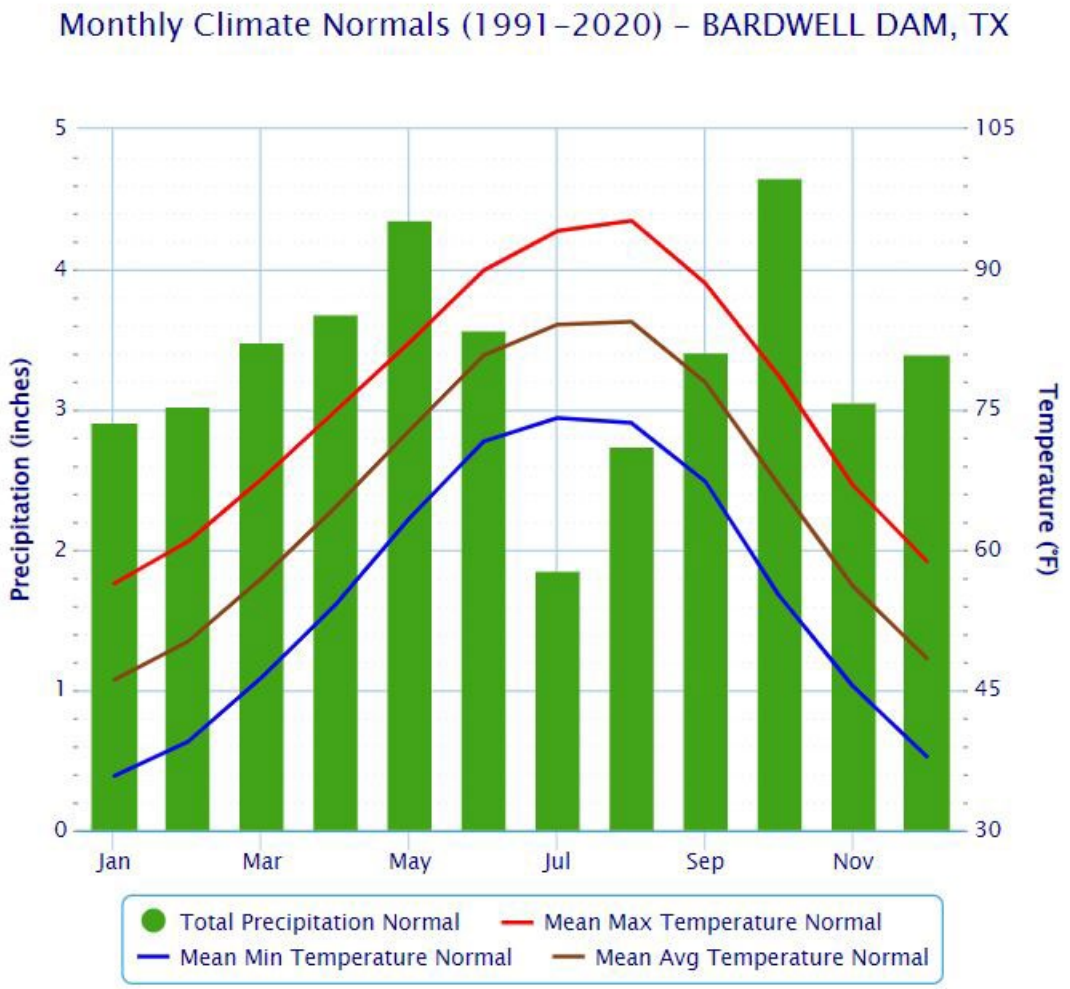


Figure 2.2 Average Monthly Climate Bardwell Lake, 1991 – 2020
Source: NOAA, 2023.

The normal annual precipitation is 40 inches with greater precipitation during spring and fall, and less precipitation during summer and winter. Because of the preponderance of tropical maritime air, heavy showers of short duration may occur at any time during the year (USACE, 2018). The relative humidity typically ranges from 20% to 80% over the course of a year. The air is driest around the end of November – February timeframe and is most humid between June – August (USACE, 2018).

2.1.3. Climate Change and Green House Gas Emissions

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). Bardwell Lake lies within the Great Plains region of analysis. The 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 Great Plains Region has seen fewer cold days and more hot days, as well as an overall

increase in total precipitation. The decrease in the cold days has resulted in an overall shortening of the frost-free season by one to two weeks.

Within this region, there has been an increase in average temperatures 1.5°F from a 1960-1970 baseline to the year 2000 (USGCRP 2014). In addition to more extreme rain events, the region is experiencing more frequent extreme heat events. The increased heat wave severity and frequency in the U.S. has been connected to human activity, with a detectable human influence in recent heat waves in the southern Great Plains Region (USGCRP, 2014). In 2011, the State of Texas experienced a heat wave and drought (that lasted through the winter of 2014). The growing season and summer of 2011 were both the hottest and driest on record. Frequent extreme heat events throughout Texas have increased substantially.

This trend of rising temperatures and more frequent extreme events such as heat waves, drought, and heavy rainfall is projected to continue into the future (USGCRP 2014). The USGCRP looks at two potential future conditions as part of its predictive modeling process. Under conditions of lower greenhouse gas (GHG) emissions, the average temperature in the Great Plains region may increase as much as 4°F by 2020, 6°F by 2050, and 8°F by 2090 from averages observed in 2000. Under conditions of higher continuous GHG emissions, the potential increase is greater in the long-term, and may be as much as 13.5°F by 2090.

Over the past 100 years (from 1921 – 2020), some of these climate trends have already been documented in the local area. Average annual precipitation has increased by approximately 10 inches in the past 100 years while having much more variability (Figure 2.3). The number of days with greater than 1 inch of precipitation has increased over that same time, demonstrating the increasing frequency of heavy storms and local flood events (Figure 2.4). Over that same period, the number of days below freezing has progressively declined (Figure 2.5), which is due to both the changing climate and growing urban heat island effect. The USDA projects further shifts in climate through the 21st century, with the number of growing degree days changing from approximately 5,000 in 1980 to over 5,500 by 2099 under low emissions or as much as 6,500 by 2099 under higher emissions. The plant hardiness zone has already seen a shift from 7B to 8A during the 20th century and is projected to shift from 8A to 8B by 2099 under low emissions or to 9A by 2099 under higher emissions (USDA 2020B). These changes will affect local agricultural practices, water supply, flood management, infrastructure, recreation access and opportunities, local habitats, and threatened or endangered species – placing an increased strain on those species already pressured from reduced populations and habitat loss.

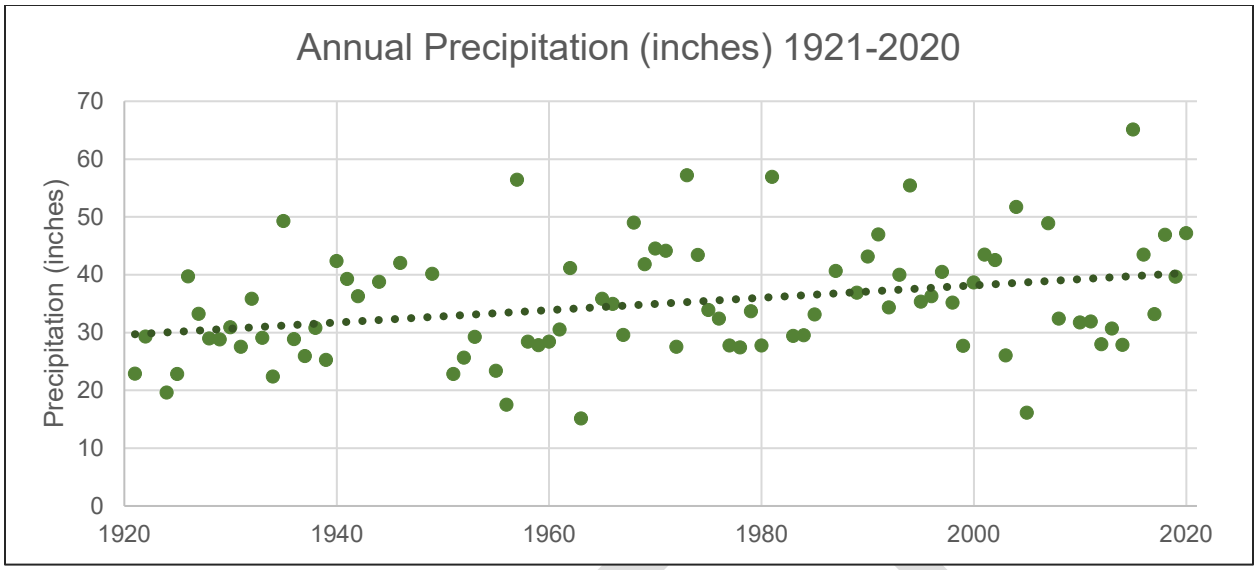


Figure 2.3 Annual Precipitation 1921 – 2020
Source: NOAA, 2022, DFW International Airport

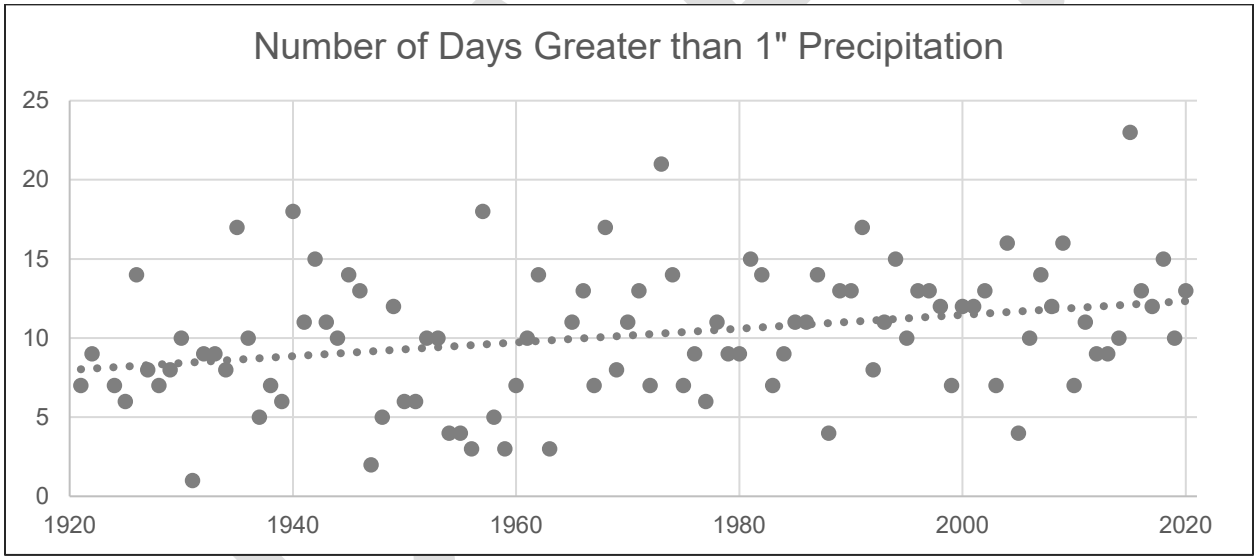


Figure 2.4 Number of Days with Greater than 1-inch Precipitation 1921 – 2020
Source: NOAA, 2022, DFW International Airport

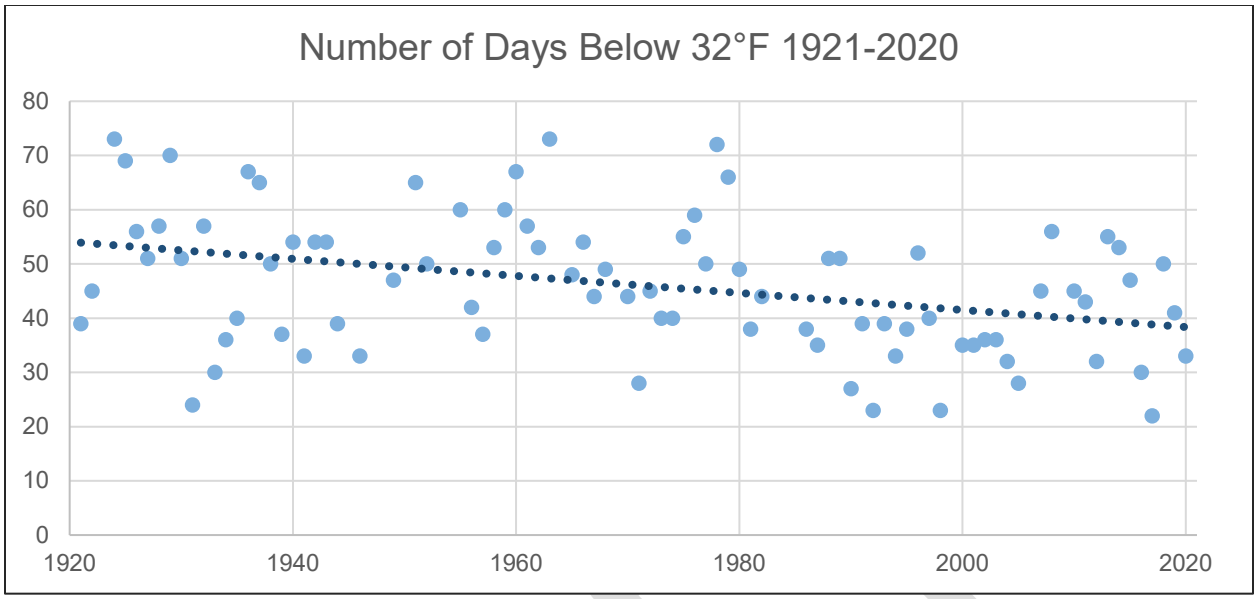


Figure 2.5 Number of Days Below 32 °F 1921 – 2020
Source: NOAA, 2022, DFW International Airport

Ellis County is listed by the EPA Level Information on GreenHouse gases Tool (FLIGHT) as to having 11 reporting facilities that as of 2022 emitted 6,612, 375 metric tons CO_2 (EPA, 2024). The top two emitters being Minerals and Power Plants being responsible for 92.8% of this emission amount.

2.1.4. Air Quality

The U.S. Environmental Protection Agency (EPA) established nationwide air quality standards to protect public health and welfare in 1971. The State of Texas 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 (O_3), Carbon Monoxide (CO), Sulfur Dioxide (SO_2), Nitrous Oxides (NO_x), particulate matter (PM_{10} 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 areas.

Bardwell Lake is located within the Metropolitan Dallas-Fort Worth (DFW) Air Quality Control Region (AQCR). The DFW AQCR is in attainment for all criteria air pollutants, except for ozone (TCEQ, 2020A). The DFW non-attainment area includes 9 counties (Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Tarrant, and Wise counties). Current attainment status is classified as marginal under the 2015 eight-hour ozone NAAQS. The attainment deadline for the DFW marginal non-attainment area was August 3, 2021. That deadline has since past and now the DFW AQCR is considered to be in a non-attainment standard.

Emissions in the DFW non-attainment area come from a variety of stationary and mobile sources. Approximately 70% of the region's air pollution comes from mobile sources such as cars, trucks, airplanes, construction equipment, and lawn equipment. The majority of pollutants emitted from motor vehicles include VOCs, NO_x, CO, PM_{10}, and $PM_{2.5}$. The largest regional sources of VOCs, NO_x emissions, and ozone levels are non-road vehicles (construction equipment, airplanes, and locomotive) and on-road vehicles (cars and trucks) (TCEQ 2011).

2.1.5. Topography, Geology, and Soils

Topography

The Waxahachie Creek basin consists of moderate to rolling, undulating plains. Terrain is characterized by mature stream and valleys with broad alluvial plains. The river flows through a relatively stable channel 60 to 100 feet wide with banks 15 to 20 feet high. The channel has extreme meandering with snags, boulders and drifts. Land use consists of ranching, crop production, limited timber production, and extraction of oil and gas.

Geology

Bardwell Dam is located in the Black Prairie subdivision of the West Gulf Coast Plains area of Texas. Subsurface materials at the dam are included in the Taylor group of the Gulf series of Upper Cretaceous age. The formations that comprise the group have a northeast southwest strike and southeasterly dip of approximately 60 feet per mile. The formations consist of massive shales, clay shales, marls, sands and sandstones which form a low, rolling relief.

The Taylor group is overlain by the Navarro group and underlain by the Austin group. In northern Texas, the Taylor group can be divided into four formations: the Lower Taylor, Pecan Gap. Wolfe City, and Upper Taylor. It is questionable that the Pecan Gap can be differentiated in Ellis County. In the extreme northwestern end, the watershed is included in the clays, shales, and marls of the Eagle Ford group: continuing southeastward the Austin Chalk is encountered.

Soils

At Bardwell Dam, the drainage is in chiefly the clays and sandy shales of the Lower Taylor formation. The Eagle Ford and Austin Chalk are quite resistant to erosion, but the Taylor is generally less indurate and subject to considerable erosion during fast runoff. The flood plain overburden in the area of the Lower Taylor exposures consist of Quaternary alluvium up to 60 feet thick and the upper drainage Eagle Ford area is residual in nature and somewhat thinner. In general, the alluvium within the subject area is relatively fine-grained and consists chiefly of calcareous sands and sandy calcareous clays.

The NRCS Web Soil Survey (2018) reports 24 soil types occurring within Bardwell Lake project lands. Table 2.1 shows the acreage associated with each soil & surface type in the detention area. The vast size and the overall different number of soils makes it impossible to make a coherent visible map for this report.

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

Soil Type	Number of Acres	Percent Total	Prime Farmland
Burleson clay, 0 to 1 percent slopes	26.3	0.4%	All areas
Dams	76.4	1.0%	n/a
Gravel pits	3.6	0.0%	Not
Houston Black clay, 0 to 1 percent slopes	15.9	0.2%	All areas
Houston Black clay, 1 to 3 percent slopes	188.8	2.5%	All areas
Branyon clay, 0 to 1 percent slopes	48.0	0.6%	All areas
Branyon clay, 1 to 3 percent slopes	294.4	3.9%	All areas
Heiden clay, 1 to 3 percent slopes	138.6	1.9%	All areas
Heiden clay, 3 to 5 percent slopes, eroded	338.5	4.5%	Not
Heiden clay, 5 to 8 percent slopes, eroded	324.1	4.3%	Not
Heiden-Ferris complex, 5 to 8 percent slopes, severely eroded	317.7	4.2%	Not
Lewisville silty clay, 1 to 3 percent slopes	4.4	0.1%	All areas
Lewisville silty clay, 3 to 5 percent slopes, eroded	112.4	1.5%	Not
Lewisville silty clay, 5 to 8 percent slopes, eroded	238.1	3.2%	Not
Leson clay, 1 to 3 percent slopes	27.6	0.4%	All areas
Altoga soils, 5 to 8 percent slopes, severely eroded	227.2	3.0%	Not
Lewisville association, 1 to 3 percent slopes	11.2	0.1%	All areas
Ferris clay, 5 to 12 percent slopes, eroded	28.2	0.4%	Not
Trinity clay, 0 to 1 percent slopes, frequently flooded	1,403.4	18.7%	Not
Trinity clay, 0 to 1 percent slopes, occasionally flooded	285.6	3.8%	Not
Water	3,251.8	43.4%	n/a
Wilson clay loam, 1 to 3 percent slopes	96.2	1.3%	Statewide importance
Wilson clay loam, 1 to 3 percent slopes, eroded	12.9	0.2%	Not
Wilson clay loam, terrace, 1 to 3 percent slopes	15.4	0.2%	Statewide importance
Burleson clay, 0 to 1 percent slopes	26.3	0.4%	All areas

Note: Total acres differ from total land acres in the Master Plan due to NRCS using different measuring technology

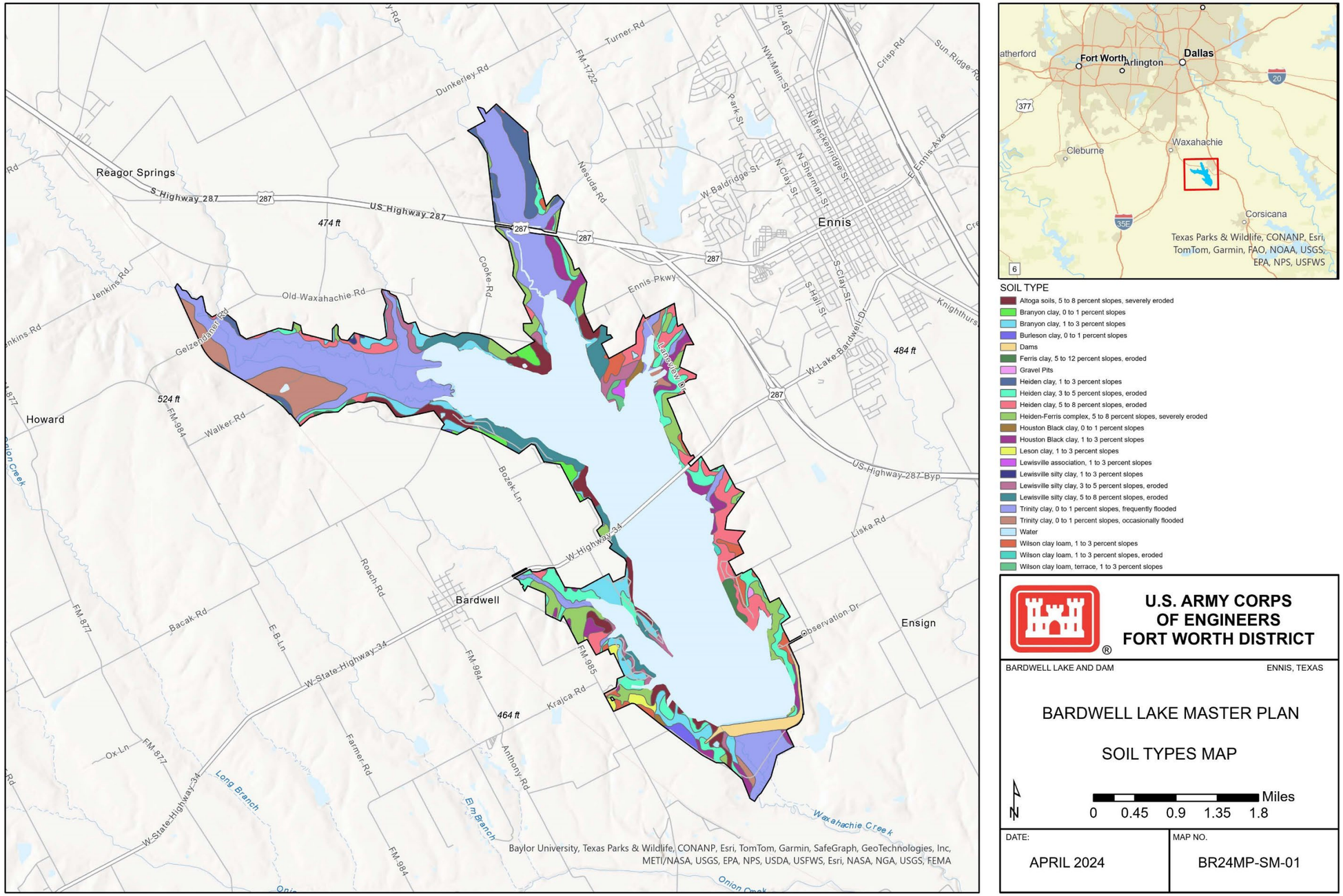


Figure 2.6 Bardwell Lake Soil Types (Source: NRCS Web Soil Survey)

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 Bardwell Lake in August 1963.

2.1.6. Water Resources

Surface Water

Bardwell Lake is located in the Waxahachie Creek watershed in the Upper Trinity River Basin. The headwaters of Waxahachie Creek originate north of Midlothian in northwestern Ellis County. It then runs southeast for 23.5 miles. It empties into the Chambers Creek three miles south of the southern end of Bardwell Dam in northern Navarro County. The watershed has a total drainage area of 187 square miles, among which 95% drains to Bardwell Dam.

Wetlands

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

Typically, the National Wetlands Inventory (NWI) established by US Fish and Wildlife Service (USFWS) is used to identify wetland types in a project area. However, the available dataset for the Bardwell project area was mapped prior to impoundment and does not reflect the current conditions. Therefore, NWI was not used to identify and calculate wetland acreage with the fee boundary of the project. Instead, the Ecological Mapping System (EMS) developed by Texas Parks and Wildlife (TPWD) was used. Using the TPWD's EMS mapping, wetlands are delineated as swamps, and the lake is shown as open water. Table 2.2 indicates the total acres of wetlands and open water at

Bardwell Lake, and Figure 2.6 displays the ecological habitat types at Bardwell Lake based on EMS including wetland habitat types.

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

Wetland Type	Acres
Swamp	5
Open Water	6,547
TOTAL ACRES of Water Resources	**6,552**

Source: TPWD EMS. Note: Total acres differ from total water surface acres in the Master Plan due to TPWD using different measuring technology and a snapshot of water surface that may not be at the conservation pool.

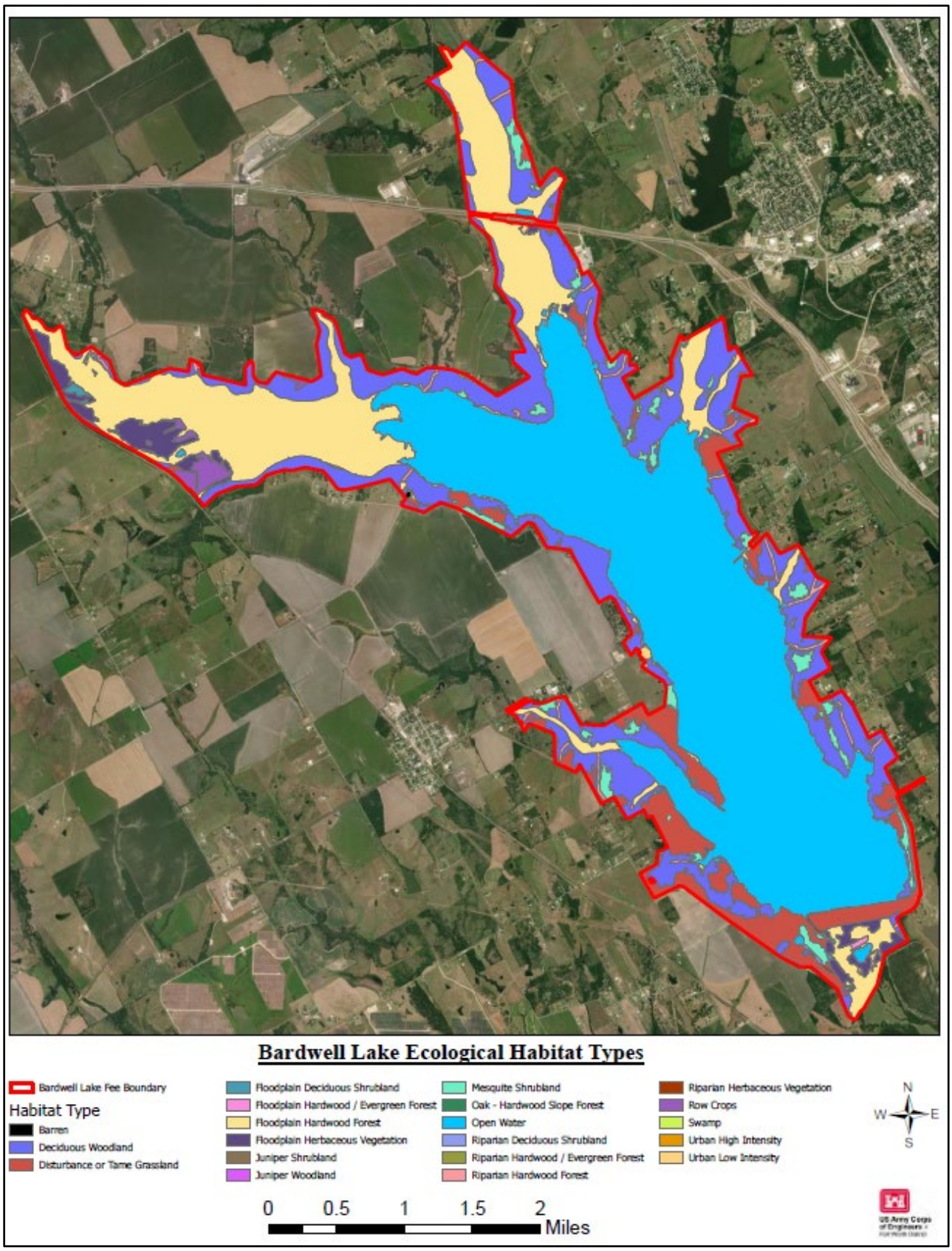

Bardwell Lake Ecological Habitat Types
Bardwell Lake Fee Boundary
Habitat Type
Barren
Deciduous Woodland
Disturbance or Tame Grassland
Floodplain Deciduous Shrubland
Floodplain Hardwood / Evergreen Forest
Floodplain Hardwood Forest
Floodplain Herbaceous Vegetation
Juniper Shrubland
Juniper Woodland
Mesquite Shrubland
Oak - Hardwood Slope Forest
Open Water
Riparian Deciduous Shrubland
Riparian Hardwood / Evergreen Forest
Riparian Hardwood Forest
Riparian Herbaceous Vegetation
Row Crops
Swamp
Urban High Intensity
Urban Low Intensity
N
W
E
S
0
0.5
1
1.5
2
Miles

Figure 2.7 Ecological Habitat Types Found at Bardwell Lake

Deep below Bardwell Lake lies the Trinity aquifers subcrop. The Trinity Aquifer extends across much of the central and northeastern portion of Texas. This major aquifer is composed of several smaller aquifers contained within the Trinity Group including: the Antlers, Glen Rose, Paluxy, Twin Mountains, Travis Peak, Hensell, and Hosston.

The Trinity Aquifer is one of the most extensive and highly used groundwater resources in Texas. Although its primary use is for municipalities, it is also used for irrigation, livestock, and other domestic purposes. Some of the state's largest water level declines, ranging from 350 to more than 1,000 feet, have occurred in counties along the Interstate 35 corridor from McLennan County to Grayson County. These declines are primarily attributed to municipal pumping, but they have slowed over the past decade as a result of increasing reliance on surface water.

In general, groundwater quality in the Trinity Aquifer is fresh but very hard in the outcrop. Total dissolved solids (TDS) increase from less than 1,000 milligrams per liter in the east and southeast to between 1,000 and 5,000 milligrams per liter, or slightly to moderately saline, as the depth of the aquifer increases. Sulfate and chloride concentrations also tend to increase with depth.

Hydrology

The Waxahachie Creek watershed is subject to three general types of flood-producing rainfall: thunderstorms, frontal rainfall, and tropical cyclones. The topography, soils, and typical rainfall patterns of the watershed lead to rapid runoff and sharp crested flood hydrographs. Floods occur frequently and at almost any time of year. Generally, the highest 24-hour and monthly precipitation periods have occurred during major thunderstorms. However, there are some instances of heavy precipitation resulting from local thunderstorms. Generally, the Waxachachie Creek's large floods are long-duration type having two or more peaks spaced as close as ten days apart.

Bardwell Lake is an integral part of the USACE plan for flood control and water conservation in the Trinity River Basin. The plan presently consists of eight major USACE flood control projects - Grapevine Dam, Bardwell Dam, Benbrook Dam, Joe Pool Dam, Lavon Dam, Lewisville Dam, Navarro Mills Dam, and Ray Roberts Dam. The eight USACE dam projects in the Trinity River system work in concert to control approximately 1,591,300 acre-feet (ac-ft) of flood control area.

Water Quality

Texas Commission on Environmental Quality (TCEQ) 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 Texas Integrated Report of Surface Water Quality, which is a requirement of the Federal Clean Water Act Sections 305(b) and 303(d), evaluates the quality of surface waters in Texas and identifies those that do not meet uses and criteria defined in the Texas Surface

Water Quality Standards (TSWQS). The Texas Integrated Report describes the status of Texas' natural waters based on historical data and assigns waterways to various categories depending on the extent to which they attain the TSWQS.

Existing water quality within Bardwell 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 and development.

The 2020 Texas Integrated Report - Texas 303(d) List (TCEQ, 2020B) does not identify any segment within Bardwell Lake as to exceeding TSWQS.

The Texas Department of State Health Services (DSHS) Seafood and Aquatic Life Group purpose is to address and prevent/reduce any disease-causing agent from occurring that can be transferred from aquatic life to humans within the State of Texas. As of December 2023, no fish consumption advisories have been issued for Bardwell Lake.

2.1.7. Hazardous Materials and Solid Waste

There are no hazardous or solid waste advisories or DSHS-issued fish consumption advisory warnings within the Bardwell federal fee boundary.

As a part of USACE SWF lake annual environmental compliance assessment, members of USACE inspect various areas (leases, easements, and parks) of Bardwell that are known to potentially emit or store hazardous materials on an annual basis as part of USACE efforts to be in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This assessment is completed through a USACE formal process known as the Environmental Review Guide for Operations (ERGO). Upon completion of the assessment if any compliance findings occur then formal remedial actions will take place.

2.1.8. Health and Safety

Bardwell Lake's authorized purposes include flood control and water conservation. Compatible uses incorporated in project operation management plans include conservation and fish and wildlife habitat management components. The USACE, with assistance from the TPWD 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. Bardwell Lake also has solid waste management plans in place for camping and day use areas that are maintained by the respective partners that hold the lease.

2.2. ECOREGION AND NATURAL RESOURCE ANALYSIS

2.2.1. Natural Resources

Operational civil works projects administered by USACE are required, with few exceptions, to prepare an inventory of natural resources. The basic inventory required is referred to within USACE regulations (ER and EP 1130-2-540) as a Level One Inventory. This inventory includes the following: vegetation in accordance with the National Vegetation Classification System through the sub-class level; assessment of the potential presence of special status species including but not limited to Federal and state listed endangered and threatened species, migratory species, and birds of conservation concern listed by the USFWS; land (soils) capability classes in accordance with NRCS soil surveys; and wetlands, which are discussed in Section 3.2. In addition to the data from the Level One Inventories, a Wildlife Habitat Appraisal Procedure was conducted.

TPWD's Wildlife Habitat Appraisal Procedure (WHAP) was used to assist in the preparation of the 2024 MP. The assessment was conducted May 16-17, 2023 at Bardwell Lake by USACE biologists, foresters, and park rangers. A total of 41 data collection sites were selected using aerial photography and knowledge of the Bardwell Lake staff. The four major habitat types that were selected and assessed were marsh, riparian/bottomland hardwood forests (BHF), upland forests, and grasslands. The WHAP assessment report can be found in Appendix C of this Plan.

The WHAP assessment revealed that the two most abundant habitat types surveyed were riparian/BHF and grassland. However, the two habitat types that scored the highest on average were grassland and marsh. Overall grassland points scored medium to high values. It was determined that much of the land northwest of the lake has high quality habitat based on the scores calculated from the WHAP habitat assessment, with some of the highest scoring habitats in the DFW area.

2.2.2. Vegetation

Bardwell Lake is located within Texas Blackland ecological region. The Texas Blackland Prairie is divided into distinct Northern and Southern regions. Bardwell Lake is located in the Northern Blackland Prairie, which stretches over 300 miles from Sherman in the north to San Antonio in the south. Prairie vegetation includes various grasses and forbs, while the bottomland hardwood forests is predominantly oak and other hardwood trees. Elevations range from approximately 95 to 850 NGVD.

The Texas Blackland Prairies Ecoregion originally contained a diverse range of prairie species including little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardi*), yellow Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), eastern gamagrass (*Tripsacum dactyloides*), tall dropseed (*Sporobolus compositus*), asters (*Symphyotrichum* spp.), prairie bluet (*Stenaria nigricans*), prairie clovers (*Dalea spp.*), and coneflowers (*Echinacea spp*.). Bottomland hardwood forests are not as prevalent, but where they occur contain bur oak (*Quercus macrocarpa*),

Shumard oak (*Quercus shumardii*), post oak (*Quercus stellata*), blackjack oak (*Quercus marilandica*), green ash (*Fraxinus pennsylvanica*), pecan (*Carya illinoinensis*), cedar elm (*Ulmus crassifolia*), American elm (*Ulmus americana*), winged elm (*Ulmus alata*), sugar hackberry (*Celtis laevigata*), and eastern cottonwood (*Populus deltoides*). Some slopes and upland forests support honey mesquite (*Prosopis glandulosa*) and several cedars and junipers (*Juniperus spp*.) that have become more prevalent due to the absence of regular fires.

This region like so many other ecological regions in Texas has undergone significant changes in the past 150 years. Although habitat for wildlife is present throughout the ecological region 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; completion 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.

Two of the most populous metropolitan areas of Texas are located in part of the Texas Blackland Prairie Ecoregion. The close proximity to urban and suburban landscapes has led to many plants escaping into wild plant communities, some of which have dramatically altered the ecosystems where they have spread. Common landscape plants which are aggressive colonizers and commonly escape cultivation include privet (*Ligustrum spp*.), Chinaberry (*Melia azedarach*), Heavenly bamboo (*Nandina domestica*), Pincushions (*Scabiosa atropurpurea*), Chinese Tallow (*Triadica sebifera*), and Tree of Heaven (*Ailanthus altissima*). Several grasses have also been identified as aggressive and/or invasive including Bermuda grass (*Cynodon dactylon*), Bahiagrass (*Paspalum notatum*), and Johnsongrass (*Sorghum halepense*). Giant Salvinia (*Salvinia molesta*) and water hyacinth (*Eichhornia crassipes*) are invasive aquatic plants and have been spreading aggressively in many USACE reservoirs. Several native plants have also become problematic due to human activities including mesquite (*Prosopis glandulosa*), whitebrush (*Aloysia grati*), yaupon (*Ilex vomitoria*), and several species of juniper (*Juniperus spp*.) (TPWD 2012).

2.2.3. Fisheries and Wildlife Resources

Bardwell Lake provides habitat for an abundance of fish and wildlife species. Predominant fish species in the lake are white and hybrid striped bass (*Morone chrysops*) and crappie (*Pomoxis*). Other less prominent species include black, yellow, and striped bass; carp; catfish; gar; and sunfish.

Many of the undeveloped open spaces provide habitat for wildlife including mountain lions (*Puma concolor*), coyotes (*Canis latrans*), bobcats (*Lynx rufus*), eastern cottontail rabbit (*Sylvilagus floridanus*.), fox squirrel (*Sciurus niger*), nine-banded armadillo (*Dasypus novemcinctus*), striped skunks (*Mephitis mephitis*), and raccoons (*Procyon lotor*). The area also provides habitat for a diverse range of birds and acts as a stopover for migratory birds.

2.2.4. 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 a species officially recognized by USFWS as being in danger of extinction throughout all or a significant portion of its range. A threatened species is a species likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Proposed species are those that have been formally submitted to Congress for official listing as threatened or endangered. Species may be considered eligible for listing as endangered or threatened when any of the five following criteria occur: (1) current/imminent destruction, modification, or curtailment of their habitat or range; (2) overuse of the species for commercial, recreational, scientific, or educational purposes; (3) disease or predation; (4) inadequacy of existing regulatory mechanisms; and (5) other natural or human-induced factors affecting their continued existence.

In addition, USFWS has identified species that are candidates for listing as a result of identified threats to their continued existence. The candidate designation includes those species for which USFWS has sufficient information to support proposals to list as endangered or threatened under the Endangered Species Act; however, proposed rules have not yet been issued because such actions are precluded at present by other listing activity. Although not afforded protection by the Endangered Species Act, candidate species may be protected under other federal or state laws.

The USFWS's Information for Planning and Consultation (IPaC) database (2024B) lists the threatened and endangered species, and trust resources that may occur within the Bardwell Lake Federal Fee Boundary (see USFWS Species List and the IPAC Report in Appendix C of the 2020 MP). Based on the IPaC report, there are 6 federally listed species that could be found within Bardwell Lake. A list of these species is presented in Table 2.3. No Critical Habitat has been designated within or near Bardwell Lake. The species identified as Threatened, Endangered or Candidate Species by TPWD that are not federally listed are included in Appendix C of the 2024 Master Plan as well as a list of Species of Greatest Conservation Need (SGCN) for the Texas Blackland Prairie Ecoregions.

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

Common Name	Scientific Name	Federal Status	State Status
Alligator Snapping Turtle	*Macrochelys temminckii*	Proposed Threatened	Threatened
Monarch Butterfly	*Danaus plexippus*	Candidate	Not Listed
Piping Plover	*Charadrius melodus*	Threatened	Threatened
Rufa Red Knot	*Calidris canuts rufa*	Threatened	Threatened
Tricolored Bat	*Perimyotis subflavus*	Proposed Endangered	Not Listed
Whooping Crane	*Grus americana*	Endangered	Endangered

The master plan revision does not entail wind energy aspects; therefore, the red knot (*Calidris canutus rufa*) and piping plover (*Charadrius melodus*) will not be addressed any further concerning possible impacts to the species.

The alligator snapping turtle (*Macrochelys temminckii*) is a reptile that is currently being considered (proposed) by the USFWS as a threatened species wherever it may be found (USFWS, 2024A). 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 249 pounds and be over two feet in length (Florida Fish and Wildlife Conservation Commission [FWC], 2023). It is primarily an ambush predator that attracts its prey while submerged. It can also be an opportunistic scavenger. The presence of the species within Bardwell Lake is rare because of the lack of recent official and informal sightings of the species at Bardwell Lake.

The monarch butterfly (*Danaus plexippus*) is listed as a candidate wherever it is found (USFWS, 2021). It is an orange butterfly with black stripes and white dots on its wings, whose span can be up to 10 cm (USFWS, 2022). Its breeding habitat consists primarily of milkweed species (*Asclepias sp.*), which its larvae feed exclusively on. During North American migration, the monarch butterfly can be found anywhere flowers are blooming. The Bardwell Lake fee boundary contains an abundance of blooming flowers, including milkweed, which is critical to egg laying. The combination of habitat and numerous recent sittings confirms that this species is common to the area during migrating.

The whooping crane habitat consists of marshes, shallow lakes, lagoons, salt flats, grain and stubble fields, and barrier islands (AOU 1983, Matthews and Moseley 1990) and (NatureServe 2016). Pockets of habitat for this species are present on Bardwell Lake project land but these areas are used as a stopover during their annual migrations. When the species is migrating, sighting for the species is uncommon at the lake and therefore they are considered a rare occurrence at Bardwell Lake.

The tricolored bat is one of the smallest bats native to North America. In the winter these bats nest in caves and mines or can be found roosting in road-associated culverts. During the spring, summer, and fall tricolored bats are found in forested habitats where they roost in trees. This bat has been greatly impacted by white-nose syndrome which has led to its proposed endangered species listing. These species would be considered a rare occurrence at Bardwell Lake.

Texas Parks and Wildlife Department's (TPWD 2023) Annotated County Lists of Rare Species database records the threatened and endangered species that may occur on Bardwell Lake project lands (see Appendix C of the 2024 MP for the full report).

Texas Natural Diversity Database

The Texas Natural Diversity Database (TXNDD) (2023), administered by TPWD, manages and disseminates information on occurrence of rare species, unique native plant communities, and animal aggregations in Texas to help guide project planning efforts. TXNDD provided information for the U.S. Geological Survey (USGS) Ennis quadrangle that encompass Bardwell Lake lands. Upon request from the USACE, TPWD provided this information for Bardwell Lake, which there is none found within the fee boundary.

2.2.5. 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 exotic species found at Bardwell Lake. Other species are currently being researched for their invasive characteristics.

Table 2.4 Invasive and Noxious Native Species Found at Bardwell Lake

Common Name	Scientific Name	Native/Non-Native
Birds		
Cattle Egret	*Bubulcus ibis*	Non-native
Cowbirds	*Molothrus ater*	Native
Eurasian Collared Dove	*Streptopelia decaocto*	Non-native
European Starling	*Sturnus vulgaris*	Non-native
House Sparrow	*Passer domesticus*	Non-native
Fish		

Common Name	Scientific Name	Native/Non-Native
European Carp	*Cyprinus carpio*	Non-native
Mammals		
Nutria	*Myocastor coypus*	Non-native
Wild Boar	*Sus scrofa*	Non-native
Insects		
Emerald Ash Borer	*Agrilus planipennis*	Non-native
Red Imported Ant	*Solenopsis invicta*	Non-native
Western Honeybee	*Apis mellifera*	Non-native
Plants		
Bastard Cabbage	*Rapistrum rugosum*	Non-native
Bermuda Grass	*Cynodon spp.*	Non-native
Bushclovers	*Lespideza spp.*	Non-native
Callery Pear	*Pyrus calleryana*	Non-native
Chinaberry	*Melia azedarach*	Non-native
Chinese Pistache	*Pistacia chinensis*	Non-native
Chinese Privet	*Ligustrum sinense*	Non-native
Chinese Tallow	*Triadica sebifera*	Non-native
Giant Reed	*Arundo donax*	Non-native
Glossy Privet	*Ligustrum lucidum*	Non-native
Heavenly Bamboo	*Nandina domestica*	Non-native
Hydrilla	*Hydrilla verticillata*	Non-native
Japanese Brome	*Bromus japonicus*	Introduced
Japanese Honeysuckle	*Lonicera japonica*	Non-native
Johnson Grass	*Sorghum halepense*	Non-native
King Ranch Bluestem	*Bothriochloa ischaemum var. songarica*	Non-native
Lilac Chaste Tree	*Vitex agnus-castus*	Non-native
Multiflora Rose	*Rosa multiflora*	Non-native
Quihoi Privet	*Ligustrum quihoi*	Non-native
Reptiles		
Mediterranean Gecko	*Hemidactylus turcicus*	Non-native
Mollusks		
Asian Clam	*Corbicula fluminea*	Non-native

Because of the large expanse of metropolitan areas located in the Texas Blackland Prairie ecoregions, it has led to a greater number of invasive species than most other regions of the state. Free-ranging pets (cats and dogs, in particular) have made a significant impact on populations of small mammals, reptiles, and birds.

Other invasive animals include several species of introduced fish (including released baitfish and “aquarium dumping”). 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. Asian clams (*Corbicula fluminea*) and decollate snails (*Rumina decollate*) are common in waterways throughout Texas and often out-compete native mollusks.

Although native, cowbirds (*Molothrus ater*) have become problematic due to their expanding range associated with agriculture and human development and are considered a nuisance. Honey mesquites (*Prosopis glandulosa*) and junipers/cedars are also native but are spreading aggressively in native prairies where their aggressive growth was historically kept in check by periodic wildfires and grazing. The close proximity to urban landscaping has led to many common landscape plants becoming aggressive colonizers and are now invasive at Bardwell Lake.

2.2.6. Aesthetic Resources

Bardwell 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 Bardwell Lake is located near several large cities, people come from local urban communities to enjoy the scenic and naturalistic views offered at the lake. Some areas have been designated as 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 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. Unauthorized removal of trees and other vegetation could result in a fine. Additionally, reasonable measures must be taken to ensure that damage to the natural landscape from invasive species and catastrophic wildfire are minimized. Vegetative management, mowing permits, debris removal, and other shoreline issues are addressed in the shoreline policy.

2.3. CULTURAL RESOURCES

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

2.3.1. Precontact Cultural Sequence of Chronology

The Precontact cultural context section and the Protohistoric subsection presented below is derived from the May 2022 report titled Intensive Cultural Resources Survey of the Proposed Navarro Mills Lake HDD Project, Navarro and Hill Counties, Texas by Jeffrey D. Owens and Jesse O. Dalton (Owens and Dalton 2022). Navarro Mills Lake is located approximately 20 miles to the southwest of Bardwell Lake and so this cultural sequence is pertinent to the project area. The 19th and 20th Centuries subsection and the Construction of Bardwell Lake and Dam sections were derived from the Texas State Historical Association's "Handbook of Texas" website and the U.S. Army Corps of Engineers' Bardwell Lake web page (Haasser 2023).

Paleoindian Period (10,000 to 6,000 BCE)

The initial human occupations in the New World can now be confidently extended back before 10,000 BCE (Dincauze 1984; Haynes et al. 1984; Kelly and Todd 1988; Lynch 1990; Meltzer 1989). Evidence from Meadowcroft Rockshelter in Pennsylvania suggests that humans were present in Eastern North America as early as 14,000 to 16,000 years ago (Adovasio et al. 1990), while more recent discoveries at Monte Verde in Chile provide unequivocal evidence for human occupation in South America by at

least 12,500 years ago (Dillehay 1989, 1997; Meltzer et al. 1997). Most archeologists have historically discounted claims of much earlier human occupation during the Pleistocene glacial period. However, researchers recently identified a pre-Clovis projectile point technology that was previously unknown and unrelated to Clovis at the Gault Site in central Texas, pushing the estimates of human occupation in the region to 16,000 years before present (Waters et al. 2018).

By approximately 11,000 years ago, PaleoIndian populations were present in north-central Texas. The PaleoIndian occupation of the Upper Trinity River basin is known primarily through diagnostic projectile points from surface collections or stratigraphically mixed contexts. The Field Ranch Site (Jensen 1968) along the upper Elm Fork is a primary example of typical site contexts. Clovis and Plainview points are commonly found along both Denton and Clear creeks in the Cross Timbers region. The Lewisville Lake Site (Crook and Harris 1957, 1958, 1961) is the best known PaleoIndian site in the region. While the original radiocarbon dates (ca. 37,000 B.P.) contributed to the significance of the site, more recent work (Stanford 1981) has resolved the controversy concerning the date of occupation. It appears that the presence of naturally occurring lignite as either a fuel in the hearths excavated at the site or an inadvertent inclusion contaminated the radiocarbon samples. Consequently, the usually accepted date of 10,000 to 8,000 B.P. for Clovis period occupations is probably a reasonable estimate for the first human occupation of north-central Texas. Our knowledge of the subsistence and settlement strategies used by these early occupants is extremely limited. However, recent excavations at the Aubrey Site (Ferring 1989), a well preserved Clovis period site in Denton County, indicate that subsistence efforts did not focus on big game animals alone; rather, the entire range of prairie and forest species was exploited. Whether this pattern of a more generalized foraging subsistence system is characteristic of Clovis adaptations in the Eastern Woodlands, and the focus on now-extinct big game species is more characteristic of a Plains adaptation, remains to be documented.

While some PaleoIndian sites are known within this region, few have been adequately examined (Preston 1972, 1974). The Lewisville Lake Site (Crook and Harris 1957; Stanford 1981, 1982), the Murphy Site (Texas Archeological Research Laboratory [TARL] archives), and the Quince Site are the only sites that have been examined in any detail. The examination by Story (1990:176-210) of the distribution of finds of PaleoIndian projectile points has revealed some interesting spatial and chronological trends. Clovis points cluster along the Red River, within the Upper Trinity River drainage, and in southeastern Texas. Folsom points, which are probably indicative of a Plains adaptation, are not well represented; rather, Dalton or Dalton-like points are well represented in the Ouachita Mountains of western Oklahoma and eastern Arkansas and on the adjacent Gulf Coastal Plain. Story (1990:196) postulates that this concentration may reflect ecological or territorial factors between 8500 and 7500 BCE San Patrice points, which occur within the same time span, are represented but are few in number.

Archaic Period (6000 BCE to 700 BCE)

With the end of the Ice Age, the prehistoric residents of north-central Texas began to develop into localized populations of efficient hunter-gatherers, exploiting localized resource bases. This period, and the subsistence pattern that characterizes it, has come to be known as the Archaic. The Archaic represents a long period of time that is characterized by only gradual and minor changes in subsistence patterns, lithic technology, and projectile point styles. It was apparently a period of strong cultural stability. Archaic populations are usually characterized as generalized hunter-gatherers with more limited geographic ranges than preceding PaleoIndian peoples. There is presently no evidence for the development of local cultigens during the Archaic period in Texas; this is, however, not the case for the Ozark Highlands and other parts of the eastern US.

Although Archaic period components have been observed on many sites in the region, our knowledge of the Archaic period in the Upper Trinity River basin has been severely hindered by the lack of data from single-component or stratified sites. Important exceptions to this situation include the Packard, Bell, Gregory E. Johnson, Beaver, Lamas Branch, Hill, McKensie, and Mahaffey sites in Oklahoma; the Tankersley Creek, Jake Martin, and Yarbrough sites in Texas; and the Stark and Old Martin Place sites in Arkansas. Recent investigations along the West Fork of the Trinity River (Peter and McGregor 1988; Yates and Ferring 1986) indicate that primary contexts for Early and Middle Archaic sites are found deeply buried within floodplain alluvium. Artifacts from these periods occur on terrace surfaces, but they are frequently mixed with later materials. In fact, the initial treatment of the Archaic period (Crook and Harris 1952, 1954), which defined the Carrollton and Elam foci, was based upon materials recovered from such terrace contexts. Consequently, these time-space constructs are no longer recognized as acceptable for north-central Texas (Peter and McGregor 1988; Prikryl 1987; Yates and Ferring 1986).

Recent investigations at Joe Pool Lake (Peter and McGregor 1988) and at Lake Ray Roberts (Baird et al. 1982; Bousman and Verrett 1973; Ferring and Yates 1997; Prikryl and Yates 1987; Yates and Ferring 1986) indicate that the Late Archaic period is characterized by assemblages left by small bands of foraging hunters and gatherers who occupied a locality for a limited period of time on a seasonal basis. Deer and numerous small mammals were the primary food resources. Large pits, known as Willey Focus pits, appear in the archeological record during the Late Archaic period. The function of these pits is not entirely clear, although excavation of one such feature at the Sister Grove Creek Site in the East Fork of the Trinity River basin (Lynott 1975) revealed the presence of 13 features within the pit fill, including two burials (one human and one dog), hearths, and small refuse pits. Based on these excavations, it was hypothesized that the Sister Grove Creek pit could be interpreted as the remains of a structure in which the entire community participated in ritual feasting. The documentation of large pits associated with Late Archaic period sites in the Richland/Chambers Creek drainage (Bruseth and Martin 1987) further suggests that important sociopolitical changes may have been occurring during this time period.

Unfortunately, the significance of these pits remains an enigma despite their excellent documentation.

Late Precontact Period (700 to 1600CE)

The beginning of the Late Prehistoric period in the Upper Trinity River basin is marked by the appearance of arrow points. The initial date of CE 700 for this period is based upon dated contexts to the west in the Brazos River drainage. Lynott (1977) suggests that the Late Prehistoric period may be divided into early and late phases. The early phase is characterized by sand- and grog-tempered ceramics, Scallorn and Alba arrow points, and a continuation of the foraging subsistence system of the Late Archaic period. The late phase reflects a Southern Plains influence with the appearance of Nocona Plain ceramics of the Henrietta Focus, various unstemmed triangular projectile points (e.g., Fresno, Harrell, Washita), and the Perdiz point. Evidence of horticulture and the procurement of bison also appears in sites of this period (Harris and Harris 1970; Morris and Morris 1970).

Recent investigations of the Cobb-Pool Site at Joe Pool Lake (Peter and McGregor 1988) have resulted in a reformulation of the Late Prehistoric period. The Cobb-Pool Site yielded house structures, roasting pits, Alba points, grog-tempered ceramics, and charred corn cupules. Radiocarbon dates from several features indicate that the site was occupied during the late 12th or early 13th centuries. Present evidence suggests that the site does not represent an intrusive Caddoan occupation; consequently, a significant adaptive change appears to have occurred during a middle phase of the Late Prehistoric period. It is also likely that ceramics were not introduced into the region before this time. Whether the Cobb-Pool Site merely represents a local anomaly or reflects a regional adaptive change remains to be documented.

2.3.2. Post Contact Sequence and Chronology

Protohistoric Period (1600 to 1800CE)

Historical documentation and archeological evidence are very sparse for the Protohistoric period in the Upper Trinity River basin. Tonkawa, Wichita, Caddo, and Comanche all are likely to have traversed the area; however, the locations of their sites and detailed ethnohistoric data are almost nonexistent. Although European trade items (Sollberger 1953) appear on a limited number of sites, no protohistoric site has been thoroughly investigated, and characterizations of Native American adaptations during this time period are conjectural at best. A lack of documentary evidence, together with a lack of interest among ethnologists and archeologists, has contributed to this situation.

By the 18th century, immigrant Plains Indian groups had moved into and beyond North-Central Texas, and their documentation by traders and explorers marks the start of the Protohistoric period. Documentary sources suggest that the Apache, Caddo, Comanche, Delaware, Kickapoo, Kitsai, Tonkawa, Wichita, and Yojaune traversed the region at various times during the period (Newcomb 1961; Newcomb and Campbell 1982); however, archeological sites that can be associated definitely with historic

groups are few. The Wichita are known to have moved into Texas from Oklahoma and Kansas in the early 1700s. Sites attributable to the Wichita have been identified at the edges of North-Central Texas. Among these is the Stansbury Site in Hill County, now inundated by Lake Whitney (Stephenson 1970). Excavations at the site produced burials, house structures, storage pits, and a variety of aboriginal artifacts, along with European ceramics, glass beads, metal arrow points, and flintlock musket parts. A cluster of Wichita sites also occurs to the north along the Red River in Montague County. These sites occur on both the Oklahoma and Texas sides of the river. Woodall (1967) excavated one of these sites, named the Upper Tucker Site, which produced artifacts and features similar to those discovered at the Stansbury Site.

19th and 20th Centuries

Euro-American population was generally sparse during this period, considering that only 17 percent of the land in the area had been surveyed by 1845, and no permanent habitations were established until Texas achieved statehood (Prikryl and Jackson 1985:28–29). A U.S. Army outpost at Fort Graham was established on the Brazos River in March 1849 that greatly aided in settlement efforts (Prikryl and Jackson 1985:29). However, settlers did not move into the Ellis County area in great numbers until the removal of indigenous populations, first to a reservation in Texas in 1854 and then on to present-day Oklahoma in 1859 (Smryl 1996a:431).

Ellis County was established on December 20, 1849. The county's earliest settlers were primarily from the southern part of the United States as well as enslaved African-Americans and some European settlers including Czechs, Hungarians, and Germans. Cattle was the most profitable industry given the climate and fertile prairies. Following the United States Civil War, Ellis County steadily grew and the economy shifted from predominately cattle to farming, more specifically cotton. This upward trend continued until the Great Depression that began in 1929. As reflective of most of the country, Ellis County's economy drastically faltered with farm values dropping approximately 42% and unemployment rising from 6.9% to 16% between 1930 and 1940. Although World War Two technically ended the Great Depression, the damage done to the county's economy and population did not begin to abate until the 1970s (Haaser 2023).

2.3.3. Construction of Bardwell Lake and Dam

Congress approved the Bardwell Lake and Dam project on March 31, 1960. Construction of the dam began in August 1963 with the deliberate impoundment of water beginning on 20 November 1965. Although operated principally for flood control and water conservation for 178 miles of drainage area, Bardwell Lake also boasts popular recreational facilities such as roads, parking areas, parks, boat ramps, sanitary facilities, potable water supply, and picnic and camping areas where local residents enjoy participating in outdoor recreation, water sports, hunting, fishing, and boating.

2.3.4. Cultural Resources at Bardwell Lake

There are more than 20 known archaeological sites located wholly or in part on USACE fee lands associated with Bardwell Lake. Of these, 1 site has been determined eligible for the NRHP, 2 are ineligible, and 17 sites have not been assessed for the NRHP. The dam itself was completed in 1965 and has not been assessed for NRHP eligibility. Multiple significant sites at Bardwell Lake have been protected through various land classifications.

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 Bardwell Lake. If TCPs or sacred sites are identified at Bardwell Lake in the future, they could be given additional protected status through land classifications.

Multiple formal archaeological surveys have been completed at Bardwell Lake since the 1960s 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 Bardwell Lake was conducted by Texas Archeological Salvage Project (TASP) on behalf of the National Park Service in 1963 (Shafer 1964). TASP was a result of the Reservoir Salvage Act of 1960 that facilitated numerous investigations on federal lands. Six sites were located and investigated. One was selected for further testing and was the subject of its own survey/investigation in 1965 performed by William M. Sorrow (Sorrow 1966). A survey was conducted in 1982 by D. Derven (Derven 1982). In 1992 the USACE conducted an archeological salvage operation at a previously identified site where human remains had subsequently become exposed on the ground surface. A survey was conducted in 1996 by Steven Hunt and Duane Peters as part of a larger investigation that also encompassed Lavon Lake in Collin County, Texas (Hunt and Peters 1996). Ecological Communications Corporation conducted a survey in 2011 (Butler 2012). The most recent survey occurred in 2022 as and was conducted jointly by Poznecki-Camarillo, LLC. and AmaTerra Environmental, Inc. (Carter 2022).

2.3.5. Long-Term Objectives for Cultural Resources

As funding allows, the Fort Worth 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 Bardwell Lake and it will be accomplished if future funding is forthcoming. Completion of a full inventory of cultural resources at Bardwell 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 Bardwell Lake. As more significant sites are identified, they could be protected through further land classifications.

In accordance with Section 106 of the NHPA, any proposed activities or projects at Bardwell 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. Fort Worth District requires permits for archaeological investigations at Bardwell 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 Fort Worth 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 Fort Worth District has to ensure the proper and respectful treatment of the individuals who have been - or may

inadvertently be - disinterred from Fort Worth 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 Fort Worth 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 Fort Worth District. This effort will include NAGPRA collections that have been made – or may yet be discovered - at Bardwell Lake, therefore, compliance with NAGPRA is ongoing.

2.4. DEMOGRAPHIC AND ECONOMIC ANLALYSIS

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

2.4.1. Zone of Influence

Bardwell Lake Dam is located in Ellis County, Texas 5 miles south of the town Ennis. It provides flood control to the Trinity River basin. It also supplies water to neighboring towns and farms, and is a popular recreation area for fishing, camping, and wildlife. Bardwell Lake covers 3,570 acres. The zone of interest for the socio-economic analysis of the lake encompasses one state and 8 counties.

Texas Counties: Collin, Dallas, Ellis, Hill, Johnson, Kaufman, Navarro, Tarrant.

2.4.2. Population

The total population for the zone of interest in 2021 was 6,329,232, as shown in Table 2.5. Approximately 41% of the zone of interest's population resides in Dallas County, TX, 33% in Tarrant County, TX, and 16% in Collin County, TX. The remaining counties in the zone of interest each account for less than 3% of the zone of interest's population.

Table 2.5 2020 and 2021 Population Estimates, and 2030 and 2050 Projections

Geographical Area	2000	2010	2020	2021 Population Estimate	2030 Population Projection	2050 Population Projection
Texas	20,851,820	25,145,561	29,145,505	28,862,581	33,913,233	42,294,281
Collin County, TX	491,272	788,407	1,050,506	1,039,812	1,239,303	1,807,279
Dallas County, TX	2,220,848	2,377,351	2,587,960	2,604,722	2,871,662	3,429,783
Ellis County, TX	112,330	150,462	191,638	187,984	241,778	360,584
Hill County, TX	32,539	35,136	37,828	35,686	40,277	43,643
Johnson County, TX	127,627	151,211	173,835	177,022	200,573	258,414
Kaufman County, TX	72,270	103,927	146,389	140,145	195,107	306,833
Navarro County, TX	45,202	47,812	52,505	51,908	59,556	74,213
Tarrant County, TX	1,456,919	1,817,658	2,004,609	2,091,953	2,279,113	2,799,127
Zone of Interest (Total)	4,559,007	5,471,964	6,245,270	6,329,232	7,127,369	9,079,876

Source: U.S. Census Bureau, Population Division (2000, 2010 Estimate); U.S. Census Bureau, 2021 American Community Survey 5-Year (2017-2021); Texas Water Development Board County Population Projections (2020-2050 estimates)

From 2020 to 2050, the population in the zone of interest is expected to increase from 6,245,270 to approximately 9,079,876, an average annual growth rate of 1.45%. By comparison, the population of Texas is expected to increase at an annual rate of 1.55%. During this timeframe, none of the counties in Texas within the zone of interest are projected to decrease in population. 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 2021 Population by Gender

Geographical Area	Male	Female
Texas	14,398,171	14,464,410
Collin County, TX	515,290	524,522
Dallas County, TX	1,290,636	1,314,086
Ellis County, TX	93,269	94,715
Hill County, TX	17,924	17,762
Johnson County, TX	88,880	88,142
Kaufman County, TX	69,372	70,773
Navarro County, TX	25,701	26,207
Tarrant County, TX	1,027,266	1,064,687
Zone of Interest Total	3,128,338	3,200,894

Source: U.S. Census Bureau, 2021 American Community Survey 5-Year (2017-2021)

Figure 2.7 shows the population by age group for the state of Texas and the ZOI. The zone of interest is consistent with the state as a whole with no notable difference plus or minus a percent in populations for the noted age groups.

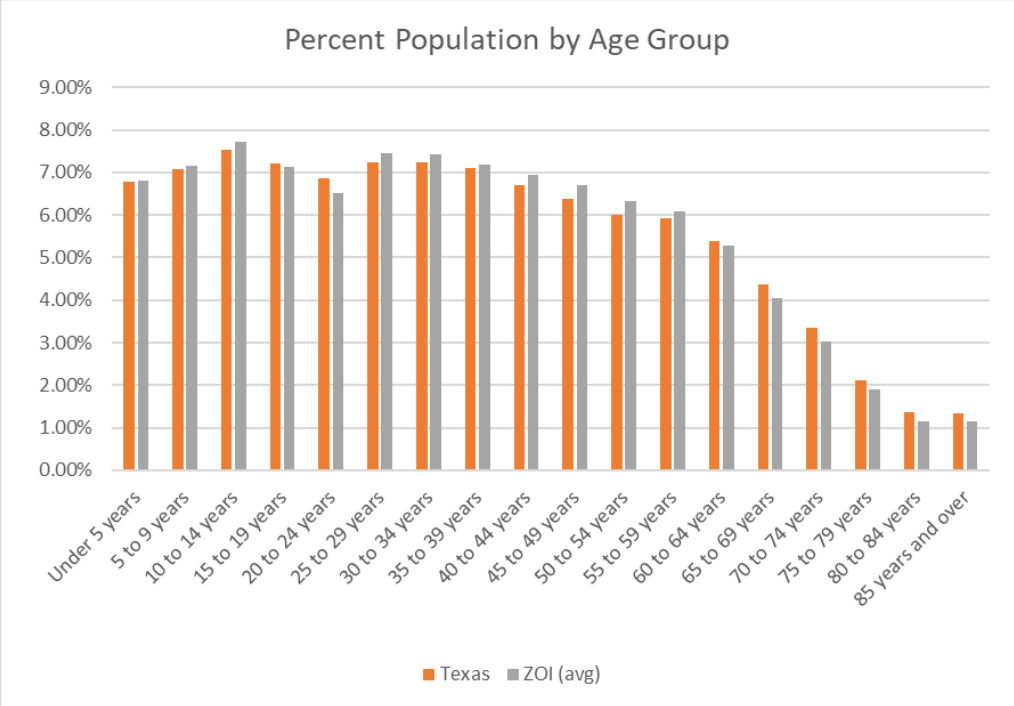


Figure 2.8 2021 Percent of Population by Age Group

Population by Race and Hispanic Origin is displayed in Table 2.7. The zone of interest is approximately 44% white, 24% Hispanic or Latino, 13% black, 0.38% American Indian and Alaska native, 6% Asian, 0.08% native Hawaiian-Pacific Islander, 5.6% some other race and 6.7% two or more races. Notable differences include Texas 28% Hispanic or Latino compared with 24% in the ZOI, and Texas with a population of 9% black compared with the ZOI population of 13% black.

Table 2.7 2021 Population by Race and Hispanic Origin

Area	White	Hispanic or Latino	Black	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some other race	Two or more races
Texas	18,566,027	11,479,932	3,499,862	147,892	1,452,713	24,608	2,019,394	3,152,085
Collin County, TX	653,729	161,908	105,044	4,649	169,344	849	31,110	75,087
Dallas County, TX	1,348,117	1,060,847	586,142	14,247	171,844	936	229,174	254,262
Ellis County, TX	138,798	51,109	21,196	1,110	1,371	55	10,036	15,418
Hill County, TX	29,351	7,695	2,228	250	289	47	1,836	1,685
Johnson County, TX	151,503	40,367	7,806	558	1,984	82	4,437	10,652
Kaufman County, TX	100,433	33,145	19,113	450	1,889	112	4,890	13,258
Navarro County, TX	36,050	14,944	5,815	122	341	825	5,428	3,327
Tarrant County, TX	1,245,396	617,233	354,778	10,290	118,506	4,084	179,266	179,633
Zone of Interest	3,703,377	1,987,248	1,102,122	31,676	465,568	6,990	466,177	553,322

Source: U.S. Census Bureau, 2021 American Community Survey 5-Year (2017-2021)

2.5. 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, 3.7% of the population has less than a 9th grade education, and another 3.6% has between a 9th and 12th grade education; 11% has a high school diploma or equivalent, and another 10.2% has some college and no degree; 3.6% has an Associate degree; 11.4% has a bachelor's degree, and 6.4% has a graduate or professional degree. The ZOI is similar in all educational attainments, but has the widest variation for the bachelor's degree group. The ZOI bachelor's degree group (11.4%) compares with Texas (10.2%).

Table 2.8 2021 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
Texas	18,619,469	1,422,360	1,403,821	4,563,619	3,956,030	1,402,444	3,791,665	2,079,530

Collin County, TX	685,704	21,671	20,174	100,786	125,803	50,862	230,564	135,844
Dallas County, TX	1,677,755	174,466	148,955	379,095	320,326	101,994	345,945	206,974
Ellis County, TX	121,350	6,490	8,766	33,040	30,790	10,402	21,736	10,126
Hill County, TX	24,393	1,459	2,092	8,388	5,825	2,398	2,952	1,279
Johnson County, TX	115,385	5,513	10,277	40,709	26,781	8,479	15,969	7,657
Kaufman County, TX	89,311	4,579	7,565	26,567	22,596	8,186	13,890	5,928
Navarro County, TX	33,635	3,185	3,482	10,106	8,474	2,788	3,795	1,805
Tarrant County, TX	1,346,743	84,425	95,345	318,869	293,057	105,322	299,714	150,011
Zone of Interest	4,094,276	301,788	296,656	917,560	833,652	290,431	934,565	519,624

Source: U.S. Census Bureau, 2021 American Community Survey 5-Year (2017-2021)

Employment by sector is presented in Figure 2.8 and shows that the largest percentage of the zone of interest is employed in the educational services, and health care and social assistance sector at 19.1%, followed by professional, scientific, and management 13.7%, retail 11.2%, and manufacturing 9.1%. The remainder of the employment sectors each comprise 9% or less of the zone of interest's labor force.

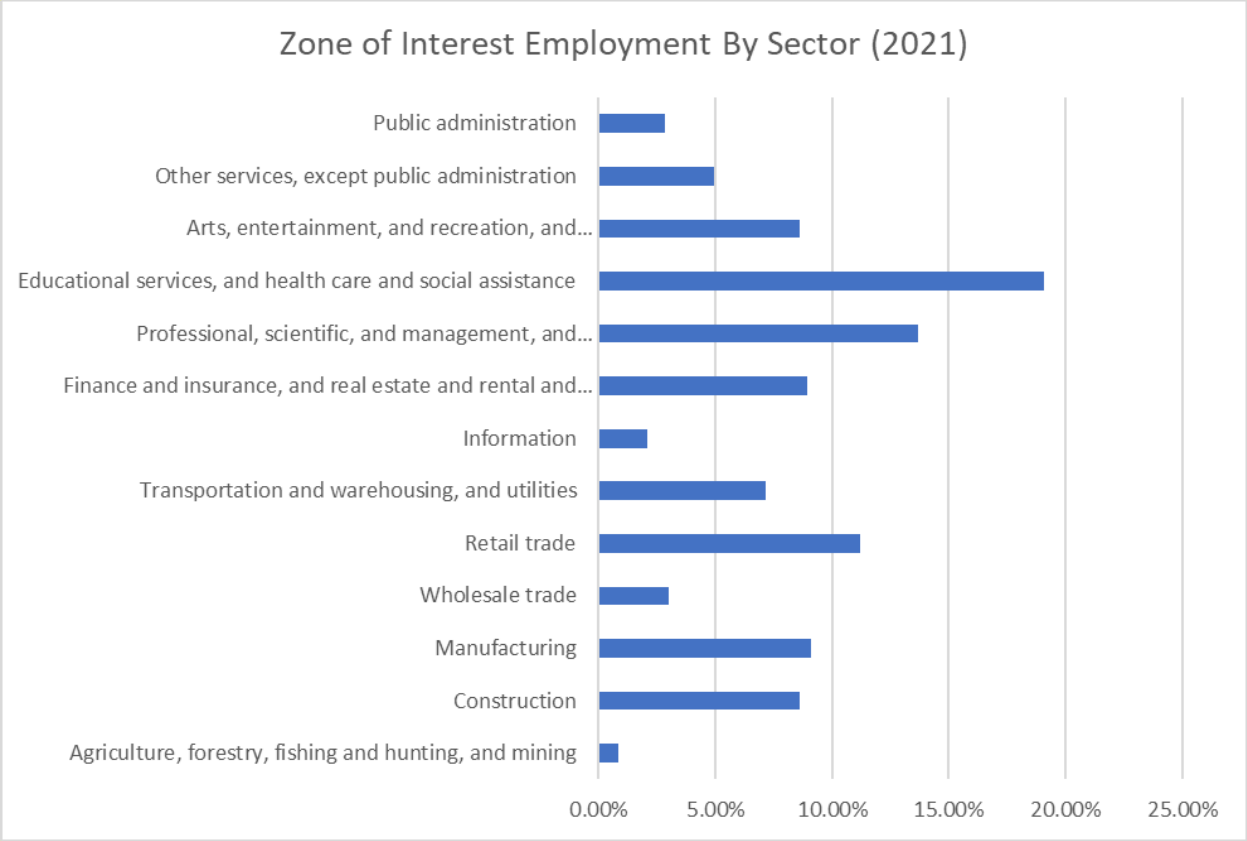


Figure 2.9 Zone of Interest Employment by Sector (2021)
Source: U.S. Census Bureau, 2021 American Community Survey 5-Year (2017-2021)

Table 2.9 Annual Average Employment by Sector (2021)

Employment	TX	Collin County, TX	Dallas County, TX	Ellis County, TX	Hill County, TX	Johnson County, TX	Kaufman County, TX	Navarro County, TX	Tarrant County, TX	Total ZOI
Civilian employed population 16 years and over	13,618,630	541,459	1,307,329	93,818	15,900	83,266	67,534	22,711	1,046,941	3,178,958
Agriculture, forestry, fishing and hunting, and mining	374,528	4,087	7,608	1,358	1,027	1,713	1,064	864	8,682	26,403
Construction	1,183,978	29,225	135,898	8,410	1,683	6,994	6,948	2,115	83,270	274,543
Manufacturing	1,160,355	43,970	106,787	12,264	2,083	9,139	5,298	3,954	105,953	289,448
Wholesale trade	368,376	15,143	39,800	3,288	275	2,120	1,783	298	32,815	95,522
Retail trade	1,512,535	57,349	138,874	11,220	1,960	15,291	8,027	2,957	120,047	355,725
Transportation and warehousing, and utilities	851,148	21,098	90,990	6,501	1,348	5,172	4,815	1,329	96,304	227,557
Information	223,506	19,543	26,195	1,874	122	624	1,488	324	16,180	66,350
Finance and insurance, and real estate and rental and leasing	930,348	67,573	116,944	6,167	700	4,131	3,861	637	83,571	283,584

Employment	TX	Collin County, TX	Dallas County, TX	Ellis County, TX	Hill County, TX	Johnson County, TX	Kaufman County, TX	Navarro County, TX	Tarrant County, TX	Total ZOI
Professional, scientific, and management, and administrative and waste management services	1,625,997	100,268	194,750	8,400	1,039	6,129	7,401	1,604	114,968	434,559
Educational services, and health care and social assistance	2,950,798	102,529	235,155	19,379	3,259	18,408	15,181	4,656	207,342	605,909
Arts, entertainment, and recreation, and accommodation and food services	1,194,692	42,839	116,953	6,938	1,121	5,803	4,342	1,673	93,519	273,188
Other services, except public administration	679,369	24,533	65,603	4,010	764	4,346	3,415	1,131	52,746	156,548
Public administration	563,000	13,302	31,772	4,009	519	3,396	3,911	1,169	31,544	89,622

Source: U.S. Census Bureau, 2021 American Community Survey 5-Year (2017-2021)

A summary of the civilian labor force in the zone of interest is displayed in Table 2.10. In 2021, the zone of interest had an unemployment rate of 4.5%, lower than the unemployment rate in Texas of 5.4%.

Table 2.10 Labor Force, Employment and Unemployment Rates, 2021 Annual Averages

Geographic Area	Civilian Labor Force	Number Employed	Number Unemployed	Unemployment Rate %
Texas	14,390,216	13,618,630	771,586	5.40
Collin County, TX	565,504	541,459	24,045	4.30
Dallas County, TX	1,378,324	1,307,329	70,995	5.20
Ellis County, TX	97,719	93,818	3,901	4.00
Hill County, TX	16,822	15,900	922	5.50
Johnson County, TX	86,095	83,266	2,829	3.30
Kaufman County, TX	70,989	67,534	3,455	4.90
Navarro County, TX	23,928	22,711	1,217	5.10
Tarrant County, TX	1,102,633	1,046,941	55,692	3.50
Zone of Interest	3,342,014	3,178,958	163,056	4.48

Source: U.S. Census Bureau, 2021 American Community Survey 5-Year (2017-2021) (2021 averages)

2.6. HOUSEHOLDS, INCOME, AND POVERTY

Table 2.11 displays the number of households and average household sizes in the states and zone of interest. There were approximately 2,256,475 households in the zone of interest with an average household size of 2.8.

Table 2.11 2021 Households and Household Size

Area	Total Households	Average Household Size
Texas	10,239,341	2.76
Collin County, TX	369,168	2.8
Dallas County, TX	947,046	2.72
Ellis County, TX	62,708	2.97
Hill County, TX	13,043	2.67
Johnson County, TX	60,915	2.86
Kaufman County, TX	46,189	3.01
Navarro County, TX	17,602	2.9
Tarrant County, TX	739,804	2.8
Zone of Interest	2,256,475	2.84

Source: U.S. Census Bureau, 2021 American Community Survey 5-Year (2017-2021)

The median household income in the zone of interest ranged from $50,466 in Navarro County, TX to $104,327 in Collin County, TX in 2021, as displayed in Table 2.12. Per capita income in the zone of interest was $33,826 in 2021, lower than the state of Texas with per capita income of $34,255.

Table 2.12 2021 Median and Per Capita Income

Geographic Area	Median Household Income (All)	Per Capita Income
Texas	67,321	34,255
Collin County, TX	104,327	48,438
Dallas County, TX	65,011	35,459
Ellis County, TX	85,272	35,743
Hill County, TX	57,800	28,774
Johnson County, TX	70,767	30,126
Kaufman County, TX	75,187	31,376
Navarro County, TX	50,466	24,524
Tarrant County, TX	73,545	36,170
Zone of Interest Median (Avg)	72,797	33,826

Source: U.S. Census Bureau, 2021 American Community Survey 5-Year (2017-2021)

Table 2.13 displays the percentage of persons and families whose incomes fell below the poverty level in the past twelve months as of 2021. Within the zone of interest, Dallas County, TX had the greatest share of people with incomes below the poverty level at 14.2%, followed by Navarro County, TX at 14.1%. In terms of families below the poverty level, Dallas County, TX is reporting the highest percent with 11.1% compared with Collin County, TX which is reporting the lowest rate at 4.7%. The ZOI median for both categories are shown in the table for reference.

Table 2.13 Percent of Families and People Whose Income in the Past 12 Months is Below the Poverty Level (2021)

Geographic Area	All Persons	All Families
Texas	14.00	10.70
Collin County, TX	6.50	4.70
Dallas County, TX	14.20	11.10
Ellis County, TX	8.20	6.30
Hill County, TX	12.30	9.40
Johnson County, TX	10.40	7.50
Kaufman County, TX	10.00	7.90
Navarro County, TX	14.10	10.60
Tarrant County, TX	11.30	8.40
Zone of Interest (Avg)	10.88	8.24

Source: U.S. Census Bureau, 2021 American Community Survey 5-Year (2017-2021)

2.7. ENVIRONMENTAL JUSTICE

Executive Order (EO) 12898, dated February 11, 1994, directs each federal agency to “make achieving environmental justice part of its mission by identifying and addressing, 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 Council on Environmental Quality (CEQ) has oversight of the federal government’s compliance with EO 12898 and NEPA. CEQ, in consultation with the USEPA and other affected agencies, developed NEPA guidance for addressing requirements of the EO. This guidance was developed to further assist federal agencies with their NEPA procedures so that environmental justice (EJ) concerns are effectively identified and addressed. The CEQ has also identified six general principles for consideration in identifying and addressing EJ in the NEPA process which include: (1) area composition (demographics); (2) data (concerning cumulative exposure to human health or environmental hazards); (3) interrelated factors (recognize the interrelated cultural, social, occupational, or economic factors); (4) public participation; (5) community representation; and (6) tribal representation.

The Bardwell Lake project is in Ellis County, Texas. Data collected from the US Census Bureau and the USEPA Environmental Justice website indicates that approximately 21 percent of the population of Ellis County is considered low income with approximately 42 percent of the county population being considered a minority population (EPA, 2024B). A refined 5.0-mile radius search around the Bardwell Lake fee boundary indicated that approximately 32 percent of the population is considered low income with approximately 55 percent of the population considered a minority population within the immediate project area (Appendix C of the EA).

The Council on Environmental Quality (CEQ) released the Climate and Economic Justice Screening Tool (CEJST) in November of 2022 as a result of President Biden’s Executive Order 14008 - Tackling the Climate Crisis at Home and Abroad. Census tracts that are overburdened and underserved are highlighted as being disadvantaged on the screening tool. Federally Recognized Tribes, including Alaska Native Villages, are also considered disadvantaged communities. The CEJST Mapper indicates that none of the census tracts intersecting Bardwell Lake’s federal fee boundary are considered disadvantaged communities (CEJST, 2024). Directly adjacent to the intersecting census tracts however, the city of Ennis, TX has census tracts that are considered disadvantaged communities (CEJST, 2024). These tracts are considered disadvantaged because they meet one or more burden threshold and the associated socioeconomic thresholds related to climate change impacts, education, and income.

2.8. RECREATION FACILITIES, ACTIVITIES, AND NEEDS

The initial development of outdoor recreation facilities at Bardwell Lake was addressed in the previous Master Plan. This document laid out a plan for the

comprehensive management of the lake's lands and water surface including plans for a significant investment in outdoor recreation facilities.

USACE's role in outdoor recreation at Bardwell Lake consists of managing parks and trails, fishing along waterways, management of the water surface as it relates to boating activity and managing general access to lands. See Chapter 6 for more details about Bardwell Lake's hunting program.

The following factors contribute to the importance of Bardwell Lake as a recreational area:

- Easily accessed by nearby highways.
- Provides full-service campgrounds and day-use areas.
- Access to water-based recreation at marina and boat ramps.
- Provides hiking and equestrian trails.
- Many natural areas provide opportunities for bird watching and other wildlife viewing.
- Provides rare opportunity for hunting on public land in the DFW metropolitan area.

2.8.1. Visitor Profile Zone of Influence

Bardwell Lake is located in Ellis County in North Central Texas. The zone of interest for the recreation analysis of Bardwell Lake is defined as Ellis, Navarro, Hill, Johnson, Collin, Dallas, Tarrant, and Kaufman Counties in Texas. Most visitors to Bardwell Lake come from the zone of influence and is one of many options for recreators within the larger DFW metropolitan area.

2.8.2. Recreation Areas and Facilities

Recreation areas at Bardwell Lake are managed by USACE. The lake provides camping, picnic sites and shelters, group shelters, boat ramps, playgrounds, many miles of trails, and more. Popular activities include boating, kayaking, and horseback riding. A full list of amenities, maps, rules and regulations, hours, fees, reservation instructions, and other important can be found on the USACE Lake Bardwell website.

2.8.3. Recreational Analysis - Trends

The 2018 Texas Outdoor Recreation Plan (TORP) published by TPWD is a comprehensive recreational demand study that evaluates recreation trends and needs across Texas and in subdivided regions. Some of the information in the TORP was extracted from the National Survey on Recreation and the Environment (NSRE) and reports generated by the USFWS. Much of the data in the TORP was from a survey conducted in 2017 titled "Texas Residents' Participation in and Attitudes Toward Outdoor Recreation by Responsive Management (Survey) on behalf of TPWD. Bardwell Lake provides many recreation opportunities that help to meet the recreation needs identified in the TORP.

The TORP indicated the rates of participation for various outdoor activities in Texas, Bardwell Lake located in TORP Region 6. Across the entire state and also in Region 6, walking for pleasure is the most popular outdoor activity, while the next most popular being picnicking, cookouts, and other gatherings. The top ten areas of participation for outdoor recreation are indicated in Figure 2.9. Bardwell Lake provides an array of opportunities for walking for pleasure; picnicking, cookouts, and gatherings; sightseeing; wildlife viewing and photography; fishing; and swimming in the lake – providing most of the top 10 areas of participation for outdoor recreation activities in the state and region.

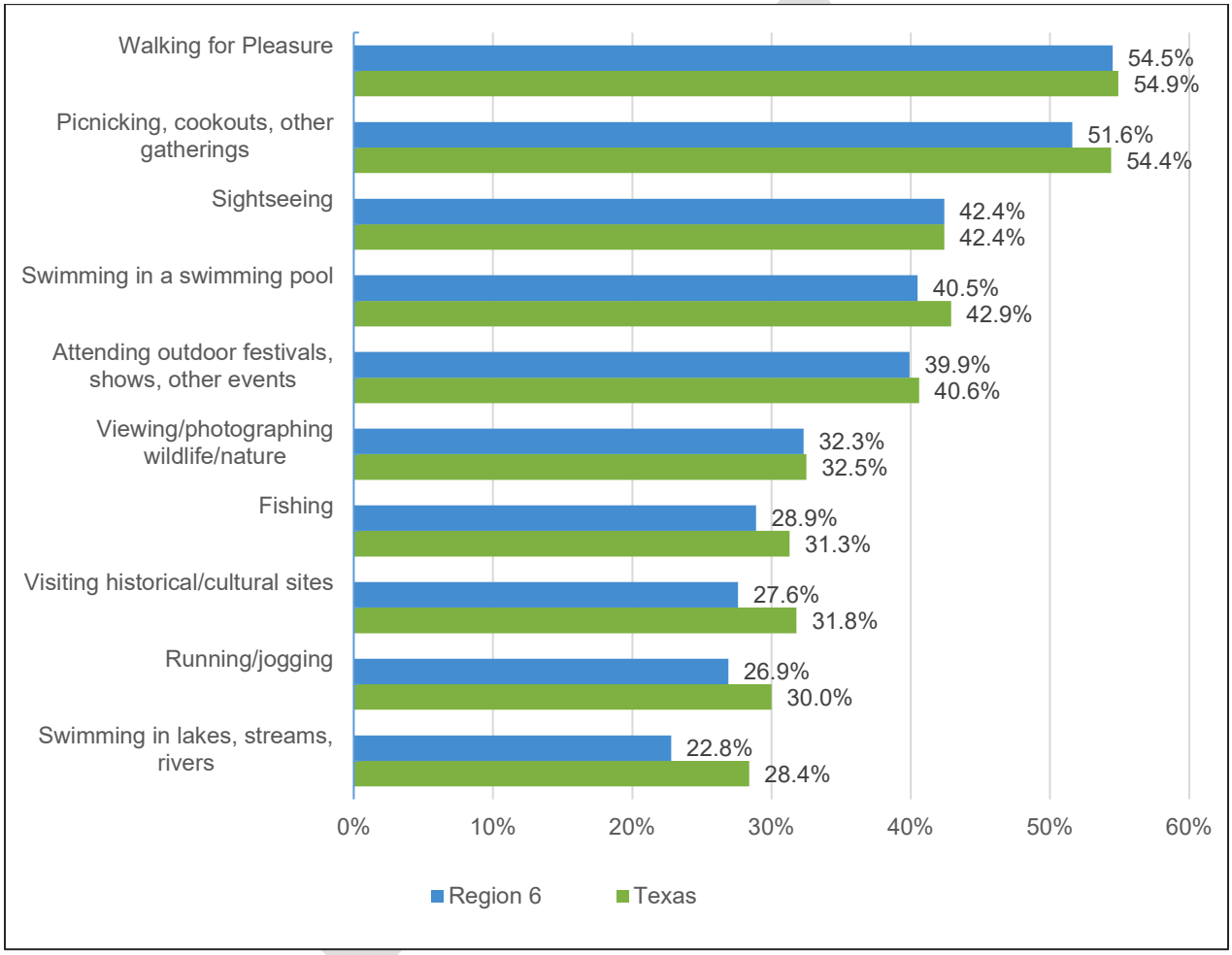


Figure 2.10 Top 10 Areas of Participation for Outdoor Recreation Activities
Source: TPWD TORP 2018

Asked "which outdoor recreation opportunities does your community currently lack or would like to see more of in your community," the top answer across the state and region was trails/places to hike/bike, and the next highest response was pools/swimming facilities (other than lakes). The top ten responses are indicated in Figure 2.10. Bardwell Lake provides an array of trails and paths for hiking, biking, and equestrian recreation. The USACE provides and promotes natural resource-based

recreation at lakes projects, and Bardwell Lake provides many of the top ten that community members would like to see more of in the community.

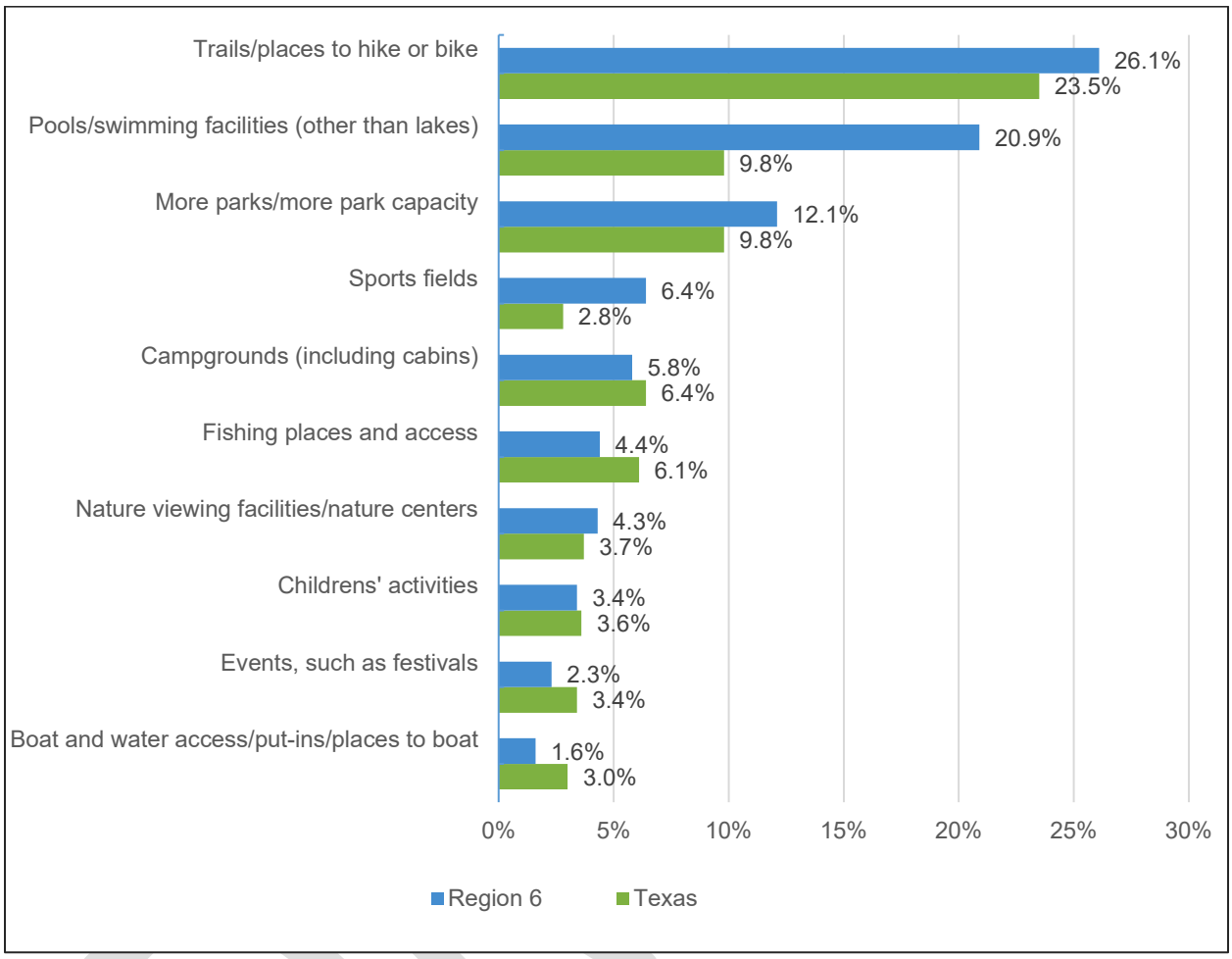


Figure 2.11 "Which outdoor recreation opportunities does your community currently lack or would like to see more of in your community?"
Source: TPWD TORP 2018

Additional findings from the Survey found that 34 percent of Texas residents and 27 percent of Region 6 residents have visited a state park during the past 12 months. Furthermore, 58 percent of Texas residents and 53 percent of Region 6 residents have visited a local park in the past 6 months (local park was defined as 30 minutes from respondents' home and not a state or national park). Within Region 6, 50 percent of survey respondents have visited a local park at least 5 times in the last 12 months, while 98 percent have visited a local park at least once in the past 12 months. Asked "which features or facilities do your local parks currently lack, or would you like to see more of at your local parks," the overwhelming response was more restroom facilities at 20.7 percent across Region 6 and 20.5 percent across Texas. The top ten responses to that survey question are indicated in Figure 2.11.

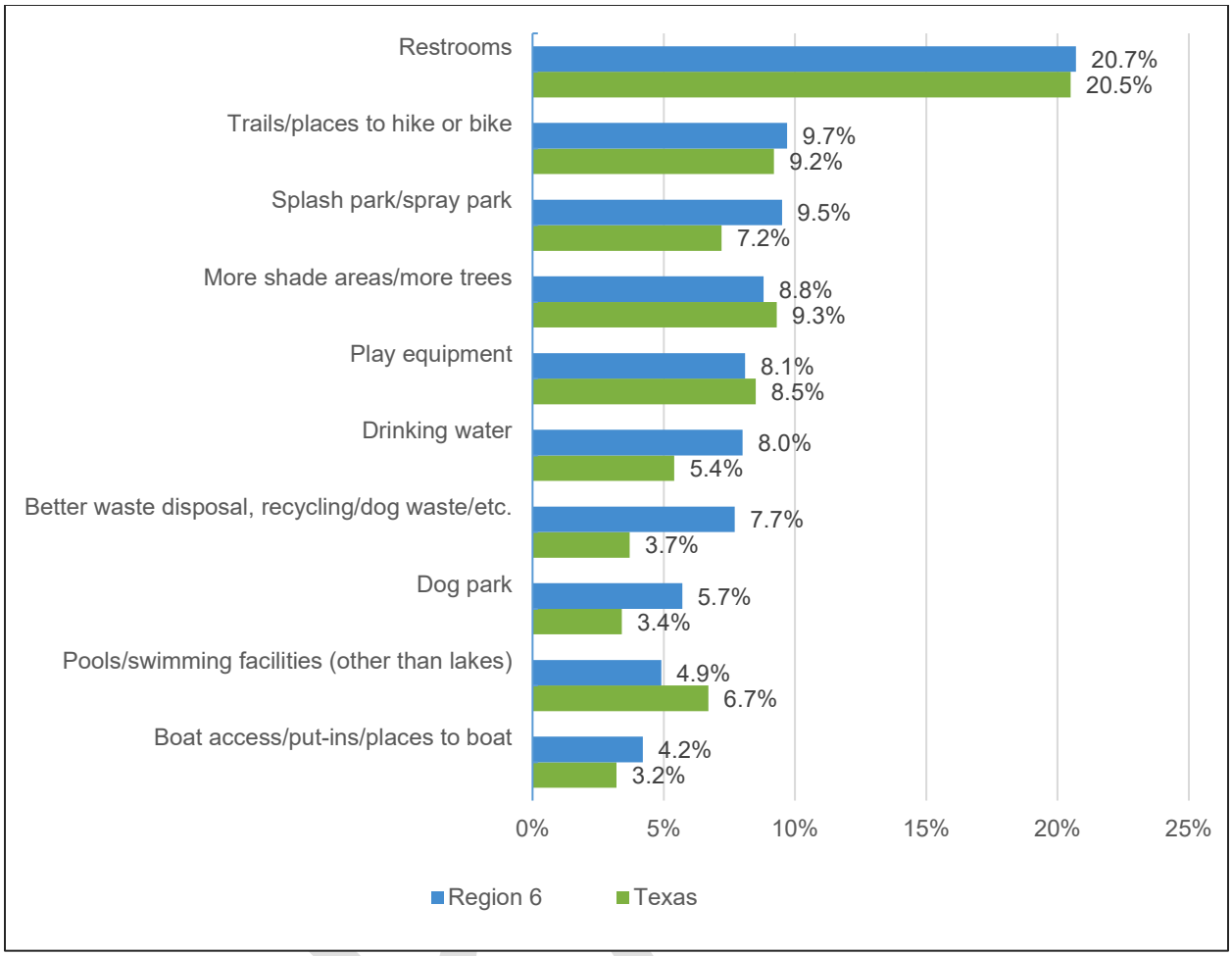


Figure 2.12 "Which features or facilities do your local parks currently lack, or would you like to see more of at your local parks?"
Source: TPWD TORP 2018

In accordance with historical visitation rates and recent outdoor recreation trends documented in the 2012 and 2018 TORP, camping in developed and primitive settings has declined significantly since 2000. In contrast, the TORP documented an increase in demand for day trip activities including hiking/walking for pleasure; picnicking, cookouts, or other gatherings; sightseeing; swimming in pools; attending outdoor festivals, shows, or events; and viewing/photographing wildlife/nature. The recreation activity most people say their community lacks is hiking/biking trails, swimming pool facilities, more park capacity, and more sports fields; with the demand for swimming pool facilities and more sports fields being much higher in the Region 6 than the entire state. In response to trends documented in the TORP, USACE will endeavor to develop trails in or adjacent to park areas as funding permits and work with local municipalities and other partners to further enhance and improve recreation opportunities. USACE encourages partnerships with agencies who lease and manage parks to respond to increasing demands and build on the current quality of USACE parks for present and future visitors.

The TORP documented a dramatic increase in the demand for motor homes and travel trailers, but it did not make the top-ten areas of participation or top-ten lacking recreation opportunities. Public comments also showed interest in new motor home and travel trailer facilities, as well as upgrades and improvements for larger vehicles and improvements to hookups including electrical, water, and internet/Wi-Fi connectivity. USACE intends to continue to operate campgrounds and day use areas by maintaining and improving existing facilities but has no long-range plans to add additional campsites or add new motor home or recreational vehicle facilities at Bardwell Lake. In response to comments and the increased trend documented in the TORP, USACE will continue to monitor demand for motor home and travel trailer facilities as well as other amenities. USACE will make needed upgrades based on changes in demand as funding permits.

2.9. REAL ESTATE

In August of 1963, under the authorization of the Flood Control Act approved on March 31, 1960 (PL 86-399), construction of Bardwell Lake began for the purposes of both flood control and water conservation. This generally required fee simple acquisition of the area that closely followed and encompassed the 444.0 feet, National Geodetic Vertical Datum of 1929 (NGVD29) contour. In lieu of fee simple acquisition, flowage easements were acquired in the upper reaches of tributaries where the configuration of required lands were relatively narrow.

After prior reconveyances of land, the current fee simple owned lands total 7,473 acres. In addition to the fee land acquisition, approximately 831 acres of flowage easement were acquired up to elevation 444.0 NGVD29. 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 on flowage lands.

Bardwell Lake is part of a series of lakes, along with an extensive floodway system of levees, which are operated in a coordinated manner to minimize flooding along the Trinity River floodplain corridor in the Fort Worth and Dallas metroplex.

Table 2.14 Real Estate Fee and Flowage Acreage

Land	Acres
Total Fee Acres	7,473
Flowage Easement Acres	831

The fee simple and easement acreage identified in this master plan was obtained from the Real Estate Management Information System and is subject to change as the acquisition documents are audited.

Table 2.15 Outgrants at Bardwell Lake

Outgrant Type	Number
Leases	
Marina Lease	0
Telecommunications Tower Lease	1
Easements, Licenses, Consents, and Other	
Sewer/water/storm drain	8
Oil/Gas pipeline	1
Roadway	6
Electric/Communication Lines	13
Other	4
Total Outgrants	**33**

2.9.1. Guidelines for Property Adjacent to Public Land

It is the policy of the USACE to manage the natural, cultural, and developed resources of Bardwell 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. Therefore, the information contained in these guidelines is designed to acquaint the adjoining landowner and other interested persons with the types of property involved in the management of Bardwell Lake. Adjoining landowners interested in more information should request additional information from the USACE project office at Bardwell Lake.

2.9.2. 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 USACE approval. Unauthorized trespasses may result in a Title 36 citation to appear in Federal Magistrate Court, which could subject the violator to fines or imprisonment (See Title 36 Code of Federal Regulations (CFR) 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 USACE Real Estate Division, with recommendations from Operations Division and Office of Counsel. USACE's general policy is to require removal of encroachments, restoration of the premises, and collection of appropriate administrative costs and fair market value for the term of the unauthorized use.

2.10. PERTINENT PUBLIC LAWS

Numerous public laws apply directly or indirectly to the management of Federal land at Bardwell Lake. Listed below are several key public laws that are most frequently referenced in planning and operational documents.

- PL 59-209, Antiquities Act of 1906. - This was 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.
- PL 74-292, Historic Sites Act of 1935. - This act 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".
- Title 16 U.S. Code §§ 668-668a-d, 54 Stat. 250, Bald Eagle Protection Act of 1940, as amended. - This act prohibits anyone, without a permit issued by the Secretary of the Interior, from taking bald eagles, including their parts, nests, or eggs. The act provides criminal penalties for persons who take, possess, sell, purchase, barter, offer to sell, transport, export or import, at any time or any manner, any bald eagle [or any golden eagle], alive or dead, or any part, nest, or egg thereof. The act defines "take" as pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.
- PL 78-534, Flood Control Act of 1944. - Section 4 of the act as last amended in 1962 by Section 207 of Public Law 87-874 authorizes USACE to construct, maintain, and operate public parks and recreational facilities in reservoir areas and to grant leases and licenses for lands, including facilities, preferably to Federal, State or local governmental agencies.
- PL 79-14, River and Harbor Act of 1945 (PL 14, 79th Congress, 1st Session), in accordance with the total plan of improvements for the Trinity River basin outlined in House Document Number 403. Section 603a

authorized improvements to rivers and harbors for removing accumulated snags, obstructions, and other debris located in or adjacent to a Federal channel, and for protecting, clearing, and straightening channels in navigable harbors and navigable streams and tributaries thereof, when in the opinion of the Chief of Engineers such work is advisable in the interest of navigation, flood control, or recreation.

- PL 79-526, Flood Control Act of 1946 (24 July 1946). - This law amends PL78-534 to include authority to grant leases to non-profit organizations at recreational facilities in reservoir areas at reduced or nominal fees.
- PL 83-780, Flood Control Act of 1954. - This act authorizes the construction, maintenance, and operation of public park and recreational facilities in reservoir areas under the control of the Department of the Army and authorizes the Secretary of the Army to grant leases of lands in reservoir areas deemed to be in the public interest.
- PL 85-624, Fish and Wildlife Coordination Act 1958. - This act as amended in 1965 sets down the general policy that fish and wildlife conservation shall receive equal consideration with other project purposes and be coordinated with other features of water resource development programs. Opportunities for improving fish and wildlife resources and adverse effects on these resources shall be examined along with other purposes which might be served by water resources development.
- PL 86-523, Reservoir Salvage Act of 1960, as amended. - This act provides for (1) the preservation of historical and archeological data that might otherwise be lost or destroyed as the result of flooding or any alteration of the terrain caused as a result of any Federal reservoir construction projects; (2) coordination with the Secretary of the Interior whenever activities may cause loss of scientific, prehistoric, or archeological data; and (3) expenditure of funds for recovery, protection, and data preservation. This Act was amended by Public Law 93-291.
- PL 86-717, Forest Conservation. - This act provides for the protection of forest and other vegetative cover for reservoir areas under the jurisdiction of the Secretary of the Army and the Chief of Engineers.
- PL 87-88, Federal Water Pollution Control Act Amendments of 1961, as amended. - Section 2(b)(1) of this act gives the USACE responsibility for water quality management of USACE reservoirs. This law was amended by the Federal Water Pollution Control Act Amendment of 1972, Public Law 92-500.
- PL 87-874, Rivers and Harbors Act of 1962. This act authorizes the construction, repair, and preservation of certain public works on rivers and harbors for navigation, flood control, and for other purposes.
- PL 88-29, Recreation Coordination and Development Act of 1963. - This act 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, States, and other political subdivisions. It also stated that 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.

- PL 88-578, Land and Water Conservation Fund Act of 1965. - This act established a fund from which Congress can make appropriations for outdoor recreation. Section 2(2) makes entrance and user fees at reservoirs possible by deleting the words "without charge" from Section 4 of the 1944 Flood Control Act as amended.
- PL 89-72, Federal Water Project Recreation Act of 1965. - This act requires that not less than one-half of 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 Head Quarters USACE (HQUSACE)/OMB implementation policy made these provisions applicable to projects completed prior to 1965.
- PL 89-90, Water Resources Planning Act (1965). - This act established the Water Resources Council and gives it the responsibility to encourage the development, conservation, and use of the Nation's water and related land resources on a coordinated and comprehensive basis.
- PL 89-272, Solid Waste Disposal Act, as amended by PL 94-580, dated October 21, 1976. - This act authorized a research and development program with respect to solid-waste disposal. It proposes (1) to initiate and accelerate a national research and development program for new and improved methods of proper and economic solid-waste disposal, including studies directed toward the conservation of national resources by reducing the amount of waste and unsalvageable materials and by recovery and utilization of potential resources in solid waste; and (2) to provide technical and financial assistance to State and local governments and interstate agencies in the planning, development, and conduct of solid-waste disposal programs.
- PL 89-665, Historic Preservation Act of 1966. - This act provides for: (1) an expanded National Register of significant sites and objects; (2) matching grants to states undertaking historic and archeological resource inventories; and (3) a program of grants-in aid to the National Trust for Historic Preservation; and (4) the establishment of an Advisory Council on Historic Preservation. Section 106 requires that the President’s Advisory Council on Historic Preservation have an opportunity to comment on any undertaking which adversely affects properties listed, nominated, or considered important enough to be included on the National Register of Historic Places.

- PL 90-483, River and Harbor and Flood Control Act of 1968, Mitigation of Shore Damages. - Section 210 restricted collection of entrance fee at USACE lakes and reservoirs to users of highly developed facilities requiring continuous presence of personnel.
- PL 91-190, National Environmental Policy Act of 1969 (NEPA). - NEPA declared it a national policy to encourage productive and enjoyable harmony between man and his environment, and for other purposes. Specifically, it declared a “continuing policy of the Federal Government... to use all practicable means and measures...to foster and promote the general welfare, to create conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.” Section 102 authorized and directed that, to the fullest extent possible, the policies, regulations, and public law of the United States shall be interpreted and administered in accordance with the policies of the Act. 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.
- PL 89-665, Historic Preservation Act of 1966. - This act provides for: (1) an expanded National Register of significant sites and objects; (2) matching grants to states undertaking historic and archeological resource inventories; and (3) a program of grants in aid to the National Trust for Historic Preservation; and (4) the establishment of an Advisory Council on Historic Preservation. Section 106 requires that the President’s Advisory Council on Historic Preservation have an opportunity to comment on any undertaking which adversely affects properties listed, nominated, or considered important enough to be included on the National Register of Historic Places.
- PL 91-611, The Flood Control Act of 1970. - This act authorizes the project and establishes the requirement (Section 122) for evaluating the economic, social, and environmental impact of projects.
- PL 92-347, Golden Eagle Passbook and Special Recreation User Fees. - This act revises Public Law 88-578, the Public Land and Water Conservation Act of 1965, to require Federal agencies to collect special recreation user fees for the use of specialized sites developed at Federal expense and to prohibit the USACE from collecting entrance fees to projects.
- PL 92-500, Federal Water Pollution Control Act Amendments of 1972. - The Federal Water Pollution Control Act of 1948 (PL 845, 80th Congress), as amended in 1956, 1961, 1965 and 1970 (PL 91- 224), established the basic tenet of uniform State standards for water quality. Public Law 92-500 strongly affirms the Federal interest in this area. "The objective of this act

is to restore and maintain the chemical, physical and biological integrity of the Nation's waters."

- PL 92-516, Federal Environmental Pesticide Control Act of 1972. - This act completely revises the Federal Insecticide, Fungicide and Rodenticide Act. It provides for complete regulation of pesticides to include regulation, restrictions on use, actions within a single State, and strengthened enforcement.
- PL 93-205, Conservation, Protection, and Propagation of Endangered Species Act of 1973, as amended. - This law repeals the Endangered Species Conservation Act of 1969. It also directs all Federal departments/agencies to carry out programs to conserve endangered and threatened species of fish, wildlife, and plants and to preserve the habitat of these species in consultation with the Secretary of the Interior. This act establishes a procedure for coordination, assessment, and consultation. This act was amended by Public Law 96-159.
- PL 93-251, Water Resources Development Act of 1974. - Section 107 of this law establishes a broad Federal policy which makes it possible to participate with local governmental entities in the costs of sewage treatment plant installations.
- PL 93-291, Archeological Conservation Act of 1974. - The Secretary of the Interior shall coordinate all Federal survey and recovery activities authorized under this expansion of the 1960 act. The Federal Construction agency may transfer up to one percent of project funds to the Secretary with such transferred funds considered non-reimbursable project costs.
- PL 93-303, Recreation Use Fees. - This act amends Section 4 of the Land and Water Conservation Act of 1965, as amended, to establish less restricted criteria under which Federal agencies may charge fees for the use of campgrounds developed and operated at Federal areas under their control.
- PL 93-523, Safe Drinking Water Act. - The act assures that water supply systems serving the public meet minimum national standards for protection of public health. The act (1) authorizes the Environmental Protection Agency to establish Federal standards for protection from all harmful contaminants, which standards would be applicable to all public water systems, and (2) establishes a joint Federal-State system for assuring compliance with these standards and for protecting underground sources of drinking water.
- PL 93-81, Collection of Fees for Use of Certain Outdoor Recreation Facilities. - This act amends Section 4 of the Land and Water Conservation Act of 1965, as amended to require each Federal agency to collect special recreation use fees for the use of sites, facilities, equipment, or services furnished at Federal expense.

- PL 94-422, Amendment of the Land and Water Conservation Fund Act of 1965. - This act expands the role of the Advisory Council. Title 2 - Section 102a amends Section 106 of the Historical Preservation Act of 1966 to say that the Council can comment on activities which will have an adverse effect on sites either included in or eligible for inclusion in the National Register of Historic Places.
- PL 95-217, Clean Water Act of 1977, as amended. - This act amends the Federal Water Pollution Control Act of 1970 and extends the appropriations authorization. The Clean Water Act is a comprehensive Federal water pollution control program that has as its primary goal the reduction and control of the discharge of pollutants into the nation's navigable waters. The Clean Water Act of 1977 has been amended by the Water Quality Act of 1987, Public Law 100-4.
- PL 95-341, American Indian Religious Freedom Act of 1978. - The act protects the rights of Native Americans to exercise their traditional religions by ensuring access to sites, use and possession of sacred objections, and the freedom to worship through ceremonials and traditional rites.
- PL 95-632, Endangered Species Act Amendments of 1978. - This law amends the Endangered Species Act Amendments of 1973. Section 7 directs agencies to conduct a biological assessment to identify threatened or endangered species that may be present in the area of any proposed project. This assessment is conducted as part of a Federal agency's compliance with the requirements of Section 102 of NEPA.
- PL 96-95, Archeological Resources Protection Act of 1979. - This act protects archeological resources and sites that are on public and tribal lands and fosters increased cooperation and exchange of information between governmental authorities, the professional archeological community, and private individuals. It also establishes requirements for issuance of permits by the Federal land managers to excavate or remove any archeological resource located on public or Indian lands.
- PL 98-63, Supplemental Appropriations Act of 1983. - This act authorized the USACE Volunteer Program. The United States Army Chief of Engineers may accept the services of volunteers and provide for their incidental expenses to carry out any activity of the USACE, except policymaking or law or regulatory enforcement.
- PL 99-662, The Water Resources Development Act (WRDA) 1986. - 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.
- PL101-233, North American Wetland Conservation Act (13 Dec 1989). - 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.

- PL101-336, Americans with Disabilities Act of 1990 (ADA), 26 July 1990, 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.
- PL 101-601, Native American Graves Protection and Repatriation Act (16 November 1990). - This Act requires Federal agencies to return Native American human remains and cultural items, including funerary objects and sacred objects, to their respective peoples.
- PL 102-580, Water Resources Development Act (WRDA) of 1992 (31 Oct 1992). - 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.
- PL 103-66 Omnibus Reconciliation Act-Day use fees (10 Aug 1993). - This authorizes the USACE to collect fees for the use of developed recreational sites and facilities, including campsites, swimming beaches and boat ramps.
- PL 104-303, WRDA 1996. - Authorizes recreation and fish and wildlife mitigation as purposes of a project, to the extent that the additional purposes do not adversely affect flood control, power generation, or other authorized purposes of a project.
- PL 104-333, Omnibus Parks and Public Lands Management Act of 1996, (12 Nov 1996). - 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.
- PL106-147, Neo-tropical Migratory Bird Conservation Act (20 July 2000). - This act promotes the conservation of habitat for neo-tropical migratory birds.

CHAPTER 3 – RESOURCE GOALS AND OBJECTIVES

3.1. INTRODUCTION

This chapter sets forth goals and objectives necessary to achieve the USACE vision for the future of Bardwell Lake. The terms “goal” and “objective” are often defined as synonymous, but in the context of this Master Plan 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 goals are the priorities for consideration when determining management objectives and development activities. Implementation of these goals is based upon time, manpower, and budget. The objectives provided in this chapter are established to provide high levels of stewardship to USACE managed lands and resources while still providing a high level of public service. These goals will be pursued through the use of a variety of mechanisms such as: assistance from volunteer efforts, hired labor, contract labor, permit conditions, remediation, and special lease conditions. It is the intention of Bardwell Lake staff to provide a realistic approach to the management of all resources. The following statements, based on EP 1130-2-550, Chapter 3, express the goals for the Bardwell 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 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 Fort Worth District, Bardwell Lake Project Office. The objectives stated in this Master Plan support the goals of the Master Plan, USACE Environmental Operating Principles (EOPs), and applicable national performance measures. They are consistent with authorized project purposes, Federal laws and directives, regional needs, resource capabilities, and they consider public input. Recreational and natural resources carrying capacities are also accounted for during development of the objectives found in this Master Plan. Regional and State planning documents including TPWD’s 2012 Texas Conservation Action Plan (TCAP) and the 2012 Texas Outdoor Recreation Plan (TORP) are monitored for applicability to Bardwell Lake.

The objectives in this Master Plan provide project benefits, meet public needs, and foster environmental sustainability for Bardwell Lake to the greatest extent possible. Implementation of the objectives are dependent upon available funds.

Table 3.5 lists the objectives for the following objective categories: recreational objectives; natural resource management objectives; visitor information, education, and outreach objectives; general management objectives; and cultural resource management objectives.

Table 3.1 Recreational Objectives

Recreational Objectives	Goals				
	A	B	C	D	E
In cooperation with TPWD and local stakeholders, evaluate the demand for improved recreation facilities and increased public access on USACE-administered public lands and water for recreational activities (i.e., camping, walking, hiking, biking, boating, fishing, wildlife viewing, etc.) and facilities (i.e., campsites, picnic facilities, overlooks, all types of trails, boat ramps, courtesy docks, interpretive signs/exhibits, and parking lots).	*		*		*
Monitor the condition and quality of day use and campground facilities within the USACE as well as leased areas including, but not limited to roads, sewer hook ups, potable water systems, electrical service, concrete or asphalt recreational vehicle pads, tent pads, restrooms, trails, pavilions, and park entrances.	*		*		
Monitor public use levels (with a special focus on boating congestion and marina capacity) and evaluate potential impacts from overuse and crowding. Take action to prevent/remediate overuse, conflict, and public safety concerns.	*		*		
Evaluate water surface classification and regulations with emphasis on designated quiet water or no-wake areas, natural resource protection, quality recreational opportunities, and public safety concerns.	*		*		
Follow the Environmental Operating Principles associated with recreational use of waterways for all water-based management activities and plans.		*	*		*
Encourage lessees to increase universally accessible facilities on Bardwell Lake.	*		*		*
Consider flood/conservation pool elevations to address potential impact to recreational facilities (i.e., campsites, boat ramps, courtesy docks, etc.).	*	*	*	*	
Ensure consistency with USACE NRM Strategic Plan.	*	*	*		*
Monitor the TCAP, the TORP, and adjacent municipality plans 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 in light of USACE policy and operational aspects of Bardwell 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
Consider flood/conservation pool levels to ensure that natural resources are managed in ways that are compatible with primary project purposes of flood risk management and water supply.	*	*		*	*
Coordinate with stakeholders to ensure project lands are managed with preservation and conservation of natural habitat and open space as a primary objective in order to maintain availability of public open space.	*		*	*	*
Actively manage and conserve fish and wildlife resources, especially migratory, Partners in Flight species, native prairies, Cross Timbers, and other special status species, by implementing ecosystem management principles. Key among these principles is the use of native species adapted to the ecological region in restoration and mitigation plans.	*	*		*	*
Consider watershed approach during decision-making process.	*				*
Optimize resources, labor, funds, and partnerships for protection and restoration of fish and wildlife habitats.		*			*
Minimize activities that disturb the scenic beauty and aesthetics of the lake.	*	*	*	*	
Continually evaluate erosion control and sedimentation issues at Bardwell Lake and develop alternatives to resolve the issues.	*	*			*
Address unauthorized uses of public lands such as off-highway vehicle (OHV) use, trash dumping, unauthorized fires, fireworks, poaching, clearing of vegetation, 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. Implement prescribed fire as a management tool to control the spread of noxious and invasive plants and to promote the vigor of native prairie grasses and forbs.	*	*		*	*
Protect and/or restore important native habitats such as riparian zones, wetlands, Blackland Prairie upland habitats, and native prairie where they occur, or historically occurred on project lands. Special emphasis should be taken to protect and/or restore special or rare plant communities like Blackland Prairie forested areas, to include actions that promote butterfly and/or pollinator habitat, migratory bird habitat, and habitat for birds listed by USFWS as Birds of Conservation Concerns and Partners in Flight species.	*	*	*	*	*
Administer the Shoreline Management Policy Statement to balance private shoreline uses (such as mowing or vegetation removal requests along the Federal property	*		*		

Natural Resource Management Objectives	Goals:				
boundary, or paths to the shoreline) with wildlife habitat protection and impacts to public use.					
Actively manage natural resources to promote diverse pollinator habitat. As funding allows and in partnership with stakeholders and other agencies and organizations, improve the quality and quantity of pollinator habitat at Bardwell Lake.	*	*	*	*	*

*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 more opportunities for communication with lessees, agencies, special interest groups, and the general public (i.e., comment cards, updates to City Managers, web page).	*		*	*	*
Implement more educational, interpretive, and outreach programs at the lake office and around the lake. Topics to include are history, lake operations (flood risk management and water supply), water safety, recreation, nature, cultural resources, ecology, and USACE missions.	*	*	*	*	*
Enhance network among local, state, and federal agencies in order to exchange lake-related information for public education and management purposes.	*			*	*
Increase public awareness of special use permits or other authorizations required for special activities, organized special events, and commercial activities on public lands and waters of the lake.	*	*	*		
Capture trends concerning boating accidents and other incidents on public lands and waters and coordinate data collection with other public safety officials.	*		*	*	*
In cooperation with local stakeholders, promote TPWD and USACE Water Safety message and provide water safety patrols.	*		*	*	*
Educate adjacent landowners on shoreline management policies and permit processes in order to reduce encroachment actions.	*	*	*	*	*

*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 USACE boundary line to ensure it is clearly marked and recognizable in all areas to reduce habitat degradation and encroachment actions.	*	*		*	
Secure sustainable funding for the shoreline management policy statement.	*	*	*	*	*
In cooperation with all stakeholders; 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.					*
Carefully manage non-recreation outgrants such as utility and road easements in accordance with national guidance set forth in ER-1130-2-550 and applicable chapters in ER 405-1-12.	*	*			*
Manage project lands and recreational programs to advance broad national climate change mitigation goals, including but not limited to climate change resilience and carbon sequestration, as set forth in USACE policy.					*
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
Monitor and coordinate lake development and the protection of cultural with lessees and appropriate entities.	*	*		*	*
Increase public awareness and education of regional history.		*		*	*
The project office will ensure any future historical preservation is fully integrated into the Bardwell Lake Master Plan and the planning decision making process (Section 106 and 110 of the National Historic Preservation Act) on public lands surrounding the lake.		*		*	*
Develop partnerships that promote and protect cultural resources at Bardwell Lake.		*	*	*	*
Stop unauthorized use of public lands as it pertains to the illegal excavation and removal of cultural resources.		*		*	*
Complete an inventory of cultural and historic resources and request funding for a Cultural Resources Management Plan (CRMP).	*	*		*	*

*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. At Bardwell Lake, the only land allocation category that applies is Operations, which is defined as those lands that are required to operate the project for the primary authorized purposes of flood risk management, hydroelectric power, and water conservation. The remaining allocations of Recreation, Fish and Wildlife, and Mitigation would apply only if lands had been acquired specifically for these purposes.

4.2. LAND CLASSIFICATION

The previous version of the Bardwell Lake Master Plan included some land classification criteria that were similar to the current criteria. These prior land classifications were based on predicted projected need rather than actual experience, which resulted in some areas being classified for a type of use that has not or is not likely to occur. Additionally, in the 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. Refer to Table 8.1 in Chapter 8 for a summary of land classification changes from the prior classifications to the current classifications. The following are the previous land classifications as designated and defined in the 1974 Master Plan:

- **Operations and Maintenance:** Areas required for normal operating procedures and emergency flood control
- **Recreational Areas:** Areas under constant intense use with a variety of activities and development.
- **Wildlife Areas:** Wildlife and waterfowl in this area are free from human threat since hunting is permitted. This area is accessible only by trails and boats.
- **Flowage Easement:** These areas provide for periodic inundation by lake waters and are not owned or managed by USACE. Buildings for human habitation will not be constructed on these lands.

4.2.1. Current 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 land classifications and four subclassifications identified in USACE regulations, as well as four water surface designations including:

- 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 revised land and water surface classifications for Bardwell Lake were established after considering public comments, key stakeholder's input including elected officials, city and county governments, lessees operating on USACE land, and USACE expert assessments. Additionally, wildlife habitat values and the trends analysis provided in TPWD's TORP and 2012 TCAP were used in decision making. 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.

4.2.2. Project Operations

This classification includes the lands managed for operation of the dam, project office, and maintenance yards, all of which must be maintained to carry out the authorized purpose of flood risk management. In addition to the operational activities taking place on these lands, limited recreational use may be allowed. Regardless of any limited recreation use allowed on these lands, the primary classification of Project Operations will take precedent over other uses. There are 254 acres of Project Operations land specifically managed for this purpose.

4.2.3. High Density Recreation (HDR)

These are lands developed for intensive recreational activities for the visiting public including day use areas, campgrounds, and related 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 Bardwell Lake, prior land classifications included a number of areas under the recreation classification. Several of these areas, including Mott Park, High View Park, Waxahachie Creek Park, and Love Park. Using public, agency, and lessee input, the planning team revised the classification of some of these lands to reflect current and projected outdoor recreation needs and trends. At Bardwell Lake there are 879 acres classified as High Density Recreation land. Each of the High Density Recreation areas is described briefly in Chapter 5 of this Plan.

Prior land classifications at Bardwell Lake identified several tracts for future high density recreation development but included them all as recreation. However, much of that land is not suitable for recreation or would be better classified to protect natural resources such as Environmentally Sensitive Areas, Wildlife Management, or Low Density Recreation. Several areas of existing parks are less developed but will remain HDR, which will allow for stakeholders to further develop them as needed.

4.2.4. 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 Bardwell Lake with this classification.

4.2.5. Environmentally Sensitive Areas (ESA)

These are areas where scientific, ecological, cultural, and aesthetic features have been identified. At Bardwell Lake several distinct areas have been classified as Environmentally Sensitive Areas (ESA), primarily for the protection of sensitive habitats or cultural resources. Each of these areas is discussed in Chapter 5 of this Plan and illustrated on the maps in Appendix A. There are 1,046 acres classified as ESA at Bardwell Lake.

4.2.6. 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. 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 2,061 acres of land under this classification at Bardwell 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.). Under prior land classifications, numerous areas were classified to support “low use” recreation and wildlife management. The planning process resulted in most of these areas being reclassified as either LDR or Wildlife Management. There are 957 acres under this classification at Bardwell 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 1,109 acres of land included in this classification at Bardwell 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 of land included in this classification at Bardwell Lake.

Future or Inactive Recreation

These are lands with site characteristics compatible with High Density Recreation development but have been undeveloped or planned for very long-range recreation needs. There are no acres classified as Future or Inactive Recreation.

4.2.7. Water Surface

USACE regulations specify four possible sub-categories of water surface classification. These classifications are intended to promote public safety, protect resources, or protect project operational features such as the dam and spillway. These areas are typically marked by USACE or lessees with navigational or informational buoys or signs or are denoted on public maps and brochures. The Water Surface Classification map can be found in Appendix A of this Plan. The four sub-categories of water surface classification are Restricted, Designated No Wake, Fish and Wildlife Sanctuary, and Open Recreation.

Restricted

Restricted water surface includes those areas where recreational boating is prohibited or restricted for project operations, safety, and security purposes. There are 1.6 acres of restricted water surface at Bardwell 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 no water surface areas designated as No-Wake areas on Bardwell Lake.

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. Bardwell Lake has no water surface areas 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 3,238 acres of open recreation water surface at Bardwell Lake.

4.3. 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. Flowage easement lands are the only easements that exist at Bardwell Lake. 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 831 acres of flowage easements lands at Bardwell Lake.

CHAPTER 5 – RESOURCE PLAN

5.1. RESOURCE PLAN OVERVIEW

This chapter describes in broad terms how each land classification within the Master Plan will be managed. The classifications that exist at Bardwell Lake are Project Operations (PO), High Density Recreation (HDR), Environmentally Sensitive Area (ESA), and Multiple Resource Management Lands (MRML) on which a predominant use is specified including Low Density Recreation (LDR) and Wildlife Management (WM). The water surface is also classified into sub-classifications of Restricted, Designated No Wake, and Open Recreation. The management plans describe how the project lands and water surface will be managed in broad terms. A more descriptive plan for managing these lands can be found in the Bardwell Lake Operations Management Plan (OMP). Acreages shown for the various land classifications were calculated using satellite imagery and 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, project office, maintenance facilities, and other areas managed solely for the operation and fulfillment of the primary mission of the project. There are 254 acres of lands under this classification, which are managed by the USACE. The management plan for this area is to continue providing physical security necessary to ensure sustained operations of the dam and related facilities including restricting public access in hazardous locations near the dam and spillway.

5.3. HIGH DENSITY RECREATION

Bardwell Lake has 879 acres classified as High Density Recreation. These lands are developed for intensive recreational activities for the visiting public including day use areas and campgrounds. National USACE policy set forth in ER 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 following sections describe areas designated as High Density Recreation at Bardwell Lake.

The USACE and stakeholders operate and manage numerous areas designated as High Density Recreation. The following is a description of each park along with a conceptual management plan for the parks managed by the USACE. Maps showing existing parks and facilities managed by USACE can be found in Appendix A.

5.3.1. Parks Operated by USACE

Mott Park – Located at 957 FM 985, Mott Park offers camping and day use/ picnicking with 33 total RV sites (27 are reservable) that are all 30 amp, all campsites have water and electric hookups, and there are 7 covered picnic tables in the day use area, there is a four-lane boat ramp with a courtesy dock and 1 dump station located near the group shelter, the group shelter is rented overnight and has a capacity of 100 people, there are two bathrooms one with running water one is a vault toilet, the park is typically open 01 April – 30 September.

Photo 5.1 Photo of Mott Creek Park and Tonkawa Trail entrance (Source: USACE)

Photo 5.2 Photo of Mott Creek Park (Source: USACE)

High View Park – Located at 260 High View Road, High View Park offers camping and day use/ picnicking with 39 total campsites of which 32 are reservable (16 are 50 amp and 16 are 30 amp), all campsites have water and electric hookups, and there are 10 covered picnic tables in the day use area, there is a four-lane boat ramp with a courtesy dock and a dump station located near the park entrance, the park has four functioning restrooms three of which have running water (showers and toilets) and one is a vault toilet, the park has a group shelter that is day use only and can house 50 people, the park is typically open year round.

Photo 5.3 Photo of High View Park picnic shelter (Source: USACE)

Photo 5.4 Photo of High View Park campsite (Source: USACE)

Waxahachie Creek Park – Located at 930 Bozek Road, Waxahachie Creek Park offers camping, day use/ picnicking, and multiuse trails, 3 bath houses and 1 vault toilet, 1 dump station, 13 day use picnic sites, 5 tent camping site that offer 30 amp electric without water, 36 camping sites available to RVs (32 are available for reservations) that have water and electrical pedestals (all but three sites are 30 amp – sites 7, 9, and 12 are 50 amp), 4 equestrian camping sites with stalls and one stall for day use, group shelter can be rented overnight and it has 8 water and electric hookups and can house 200 people, the park is typically open 01 April until 30 September.

Photo 5.5 Photo of Waxahachie Creek Park campsite (Source: USACE)

Love Park – Located at 4420 Beach Road, Love Park offers boat ramp with courtesy dock and shoreline fishing, four-lane boat ramp, walking trail through the woods, group shelter can hold 200 people and is day use only. There is a closed portion of the park that has 20 day use picnic sites with coverings and tables but has been closed for several years due to budget restraints and needed rehab of the sites.

Little Mustang Park – Located at 200 Lane View Drive, Little Mustang Park offers four-lane boat ramp and 2 hunting access points.

Big Mustang Creek Park – Located at 2598 Old Waxahachie road, access point to hunting areas.

Buffalo Creek Wetland Area - Located on Bardwell Dam Road, Buffalo Creek Wetland Area offers multiuse trails, open year around.

Meadowview Nature Area - Located at 2001 Laneview Drive-Bluebonnet Viewing Drive thru, Meadowview Nature Ares is open seasonally based upon blue bonnet blooms, typically 1-30 April.

5.3.2. Boat Ramps

There are five (4) lane boat ramp operated by USACE at Bardwell Lake. These have varying hours of operation and have a fee associated with their use. Ramps may be closed from time to time due to flooding or other damage. The maps in Appendix A of this Plan indicate the location of these ramps. Currently, there are no plans to expand or add additional boat ramps at Bardwell Lake. Management of USACE operated facilities will include maintaining and improving facilities as time and funding permits. Future management of leased facilities will be by the grantee with coordination and approved by the USACE.

5.3.3. Trails

Bardwell Lake Equestrian and Multiuse Trail – The trail is on a two thousand acre tract of land at the north end of Waxahachie Creek Park at Bardwell Lake. Waxahachie Creek Park is 7/10 of a mile west of the Bardwell Lake Bridge on Highway 34 east of Bardwell and west of Ennis. Currently, there are over 13 miles of trails for horseback riding, bicycling, or hiking providing a possible round trip ride of 26 Miles. The trailhead is located near the northernmost boat ramp at Waxahachie Creek Park. The system features one broad flat main trail traversing the area with numerous loops into the surrounding upland wooded thickets, meadows, croplands, and bottomland hardwood forest along Waxahachie Creek. Trail head features include informational bulletin board, a secure trailer length parking lot with hitching posts, equestrian campsites with 30 amp electrical service, water hook ups, and horse barn with 2 designated stalls per site, and trail maps available at the gate house.

Photo 5.6 Photo of Bardwell Lake Multiuse Trail (Source: USACE)

Tonkawa Trial – Almost a mile in length, Tonkawa Trail provides easy access to the various components of Buffalo Creek Wetland. It is named for a tribe of native Americans that inhabited this part of Texas many years ago. A four to six inch layer of

crushed granite provides a firm, all-weather, universally accessible surface for persons to see many of the plants and animals that were so essential to the native Americans, pioneers and early settlers that previously occupied the region. Plenty of parking space is provided near the trail entrance on the north side of Bardwell Dam Road very near the east bank of Waxahachie Creek. Four observation shelters, strategically placed along the trail, provide an excellent opportunity to observe or photograph some of the plants and/or animals that live at Buffalo Creek Wetland or they may simply serve as a nice shady place to sit, relax and rest before finishing the hike.

Photo 5.7 Photo of Tonkawa Trail (Source: USACE)

Photo 5.8 Photo of Tonkawa Trail access (Source: USACE)

Waxahachie Trail – A dense upper canopy of bottomland hardwood trees covers most of the journey along the short nature trail in Waxahachie Creek Park, with a small segment skirting the edge of an adjacent open range site. The three tiers or layers of forest vegetation are easily observed in this relatively undisturbed bottomland hardwood forest and local schools have used the trail extensively to illustrate the function and benefits of this type of ecosystem. Many species of native plants and animals may be viewed while walking quietly along the trail. The trail entrance is conveniently located near the picnic area for persons wanting to go for a relaxing walk after enjoying a meal at Waxahachie Creek Park.

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 Bardwell Lake under this classification. USACE lands at Bardwell 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

One area totaling approximately 1,046 acres at Bardwell Lake were selected by the planning team for classification as ESA. The results of the Wildlife Habitat Appraisal Procedure conducted May 2023 were used, in part, to assist in determining which areas should be classified as ESA. Other factors, including stakeholder comment, the presence of cultural resources, presence of species of conservation concern, and visual esthetics were also included in the selection of ESA areas. By definition, these areas are to be protected from intense development or disturbance from future land use actions such as utility or road easements. Passive public use such as natural surface trails, bank fishing, and nature study are appropriate for these areas.

5.6. MULTIPLE RESOURCE MANAGEMENT LANDS

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

5.6.1. Low Density Recreation (LDR)

These lands include narrow parcels of land that are adjacent to private residential developments as well as lands where current or potential public use is limited to passive, pedestrian-oriented recreation such as hiking, bank fishing, nature study, and photography. Future management of these lands calls for maintaining a healthy, ecologically adapted vegetative cover to reduce erosion and improve aesthetics. Prevention of unauthorized use such as trespass or encroachments is an important management objective for all USACE lands but is especially important for those lands in

close proximity to private development. 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. The general public may use these lands for bank fishing, hiking, and for access to the shoreline. Future uses may include additional designated natural surface trails, interpretive and directional signage, and other less intensive recreation activities. There are 957 acres classified for the primary use of Low Density Recreation at Bardwell Lake.

5.6.2. Wildlife Management (WM)

These are lands designated primarily for the stewardship of fish and wildlife resources but are open to passive recreation use such as natural surface trails, hiking, and nature study. There are currently 1,109 acres under this classification. The management priority will be to restore these lands to support native vegetation adapted to soil type and elevation with respect to the flood control pool. Where topography, soil type, and hydrology are suitable; areas within the riparian floodplains may be selected for wetland development.

5.6.3. Vegetative Management (VM)

These are lands that have native vegetative types considered to be sensitive and needing special classification to ensure protection or management practices specifically to benefit or improve vegetative cover or habitats. Such areas sometimes include prairie or wetland restoration or areas with controlled burns, aggressive invasive plant removal, or other vegetative management practices. Practices compatible with VM lands are also conducted in other land classification, and currently there are no acres classified for the primary use of Vegetative Management at Bardwell Lake.

5.6.4. Future/Inactive Recreation Areas

These are 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. There are no acres classified under this sub-classification at Bardwell Lake.

5.7. WATER SURFACE

Using measurements based on GIS data available, at conservation pool level of 421.0 NGVD29 there are 3,240 acres of surface water. Buoys are managed by USACE. These buoys help mark hazards, boats keep-out, and no-wake areas. Future management of the water surface includes the maintenance of warning, information, and regulatory buoys as well as routine water safety patrols during peak use periods.

5.7.1. Restricted

Restricted areas are around public water supply intakes and near the USACE gate control tower on the dam. Vessels are not allowed to enter Restricted water

surface. Water surface zoned as Restricted totals approximately 1.6 acres at Bardwell Lake.

5.7.2. 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 no water surface areas designated as No-Wake areas on Bardwell Lake.

5.7.3. Fish and Wildlife Sanctuary

Fish and Wildlife Sanctuary areas are managed with annual or seasonal restrictions to protect fish and wildlife species during periods of migration, resting, feeding, nesting, and/or spawning. There are no water surface acres under this classification at Bardwell Lake.

5.7.4. Open Recreation.

The remaining water surface area is open to recreational use. No specific zoning exists for these areas. It is incumbent on boaters to be aware of lake conditions and to operate vessels responsibly. Approximately 3,238 acres of Bardwell Lake is classified for Open Recreation.

5.7.5. Future Management of the Water Surface

Future management of the water surface includes the maintenance of warning, information, and regulatory buoys as well as routine water safety patrols during peak use periods. Currently, water safety patrols are conducted by USACE Park Rangers.

5.7.6. Recreational Seaplane Operations

Seaplane restrictions are part of Title 36 Code of Federal Regulations. At Bardwell Lake and other USACE lakes across the nation, areas where recreational seaplane operations are prohibited were established through public meetings and environmental assessments circa 1980. The seaplane policy for USACE Fort Worth District is found in the Notice to Seaplane Pilots (see Appendix E), which lays out the general restrictions as well as lake-specific restrictions for seaplane operation. At Bardwell Lake Landings and takeoffs are prohibited north of Highway 34 and in all coves off the main body of the lake.

CHAPTER 6 – SPECIAL TOPICS/ISSUES/CONSIDERATIONS

6.1. UTILITY CORRIDORS

USACE policy encourages 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, USACE determined that utility corridors would be designated at Bardwell Lake.

The following 3 utility corridors have been designated across USACE land with each corridor incorporating and/or running parallel to an existing easement. These corridors are shown on the maps in Appendix A. Future use of these corridors, where the corridor is limited to, or incorporates an existing easement, would in most cases require prior approval of those entities that have legal rights to the easement. Some existing easements at Bardwell Lake have not been designated as utility corridors. These non-corridor easements may be used for placement of additional utilities only by the grantee holding the easement, but only for purposes which directly serve the grantee or are of direct benefit to the Government. Expansion or widening of existing non-corridor easements will generally not be permitted.

Table 6.1 Utility Corridors (see map in Appendix A)

UC#	Description
Corridor 1 (Getzendaner Road)	This corridor will extend to the northwest 25 feet beyond the existing overhead transmission line easement and 25 feet southeast from the right-of-way for Getzendaner Road. Total width is approximately 260 feet wide and 2,200 feet long. All utilities will be restricted to subsurface boring within 100 feet of Waxahachie Creek and any other wetlands with no surface rights granted within this buffer.
Corridor 2 (Highway 287 Crossing)	This corridor will extend south from the northernmost boundary of tract 221-1 a distance of 250 feet. This corridor is restricted to subsurface boring within 100’ east and west of Mustang Creek and any other wetlands with no surface rights granted within this buffer. This corridor is approximately 3,520 feet in length. A parallel portion of this corridor extends 50’ from the northern highway right of way but is restricted to subsurface boring for the entire 3,500 foot length.
Corridor 3 (Highway 34 Bridge)	This corridor is confined to the Highway 34 bridge and any utility crossings will be attached to the bridge structure.

6.2. PUBLIC HUNTING PROGRAM

The Bardwell Lake Project offers over 2,500 acres for public hunting. Rising costs of private land hunting opportunities, coupled with a general scarcity of public land

available for hunting within the zone of influence, has resulted in significant public interest in hunting opportunities at Bardwell Lake. Other public lands available for hunting within the region include USACE land at Benbrook Lake, Lavon Lake, Lewisville Lake, Grapevine Lake, and Ray Roberts Lake. Hunting is not the exclusive use of these hunting areas; hunters must exercise caution, because areas may be used by hikers, equestrian riders, bird watchers, and others. While much of the boundary is fenced and marked, some areas are not. It is the hunter's responsibility to become familiar with the hunting area and the limits of public lands. Hunting on public land does not give any person the right to cross or enter private property.

CHAPTER 7 – PUBLIC AND AGENCY COORDINATION

7.1. PUBLIC AND AGENCY COORDINATION OVERVIEW

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 Bardwell 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 Bardwell Lake to ensure that future management actions are both environmentally sustainable and responsive to public outdoor recreation needs in a region which is experiencing rapid population growth. The following milestones provide a brief look at the overall process of revising the Bardwell Lake Master Plan.

The USACE began planning to revise the Bardwell Lake Master Plan in November of 2023. The objectives for the Master Plan revision are to (1) revise land classifications to reflect changes in USACE land management policies since 1974, (2) prepare new resource 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.

- 16 February- 17 March 2023: Online Review open to the public for initial scoping. Requested public input and received 1 comment.
- 15-16 May 2023: USACE conducted wildlife habitat evaluation field work on Bardwell Lake project lands.

7.2. INITIAL STAKEHOLDER AND PUBLIC MEETINGS

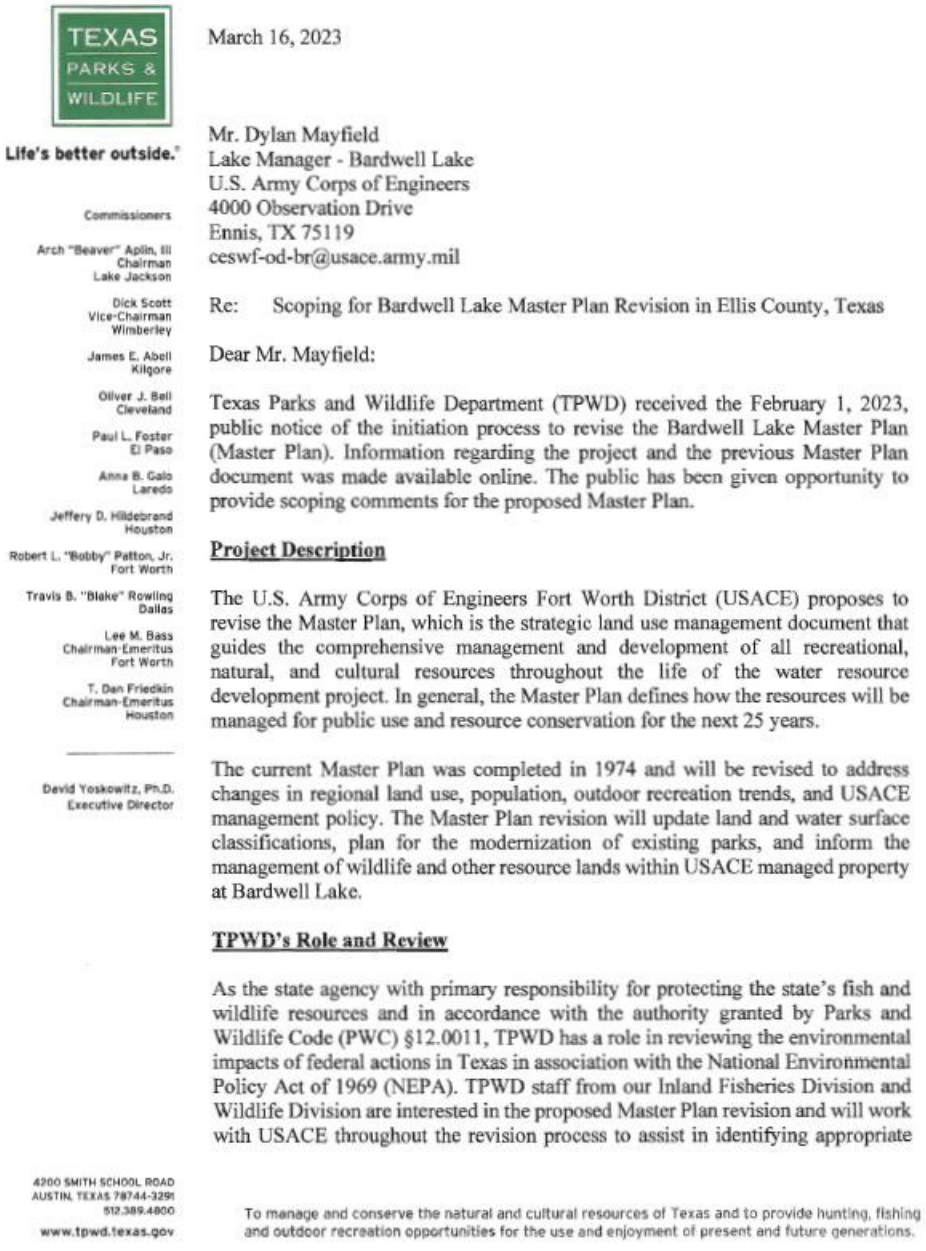
A public scoping meeting was held on February 16th 2023 at Ennis Welcome Center to provide information and receive public input on the Bardwell Lake Master Plan and Environmental Assessment. Stakeholders were presented with the existing master plan documents and maps, as well as a presentation of the master plan update process. The information was made available to the public on 16th February 2023, and comments were accepted through 17 March 2023.

The presentation included the following topics to help the public better understand what a Master Plan Update is:

- Public Involvement Process
- Project Overview
- Overview of the NEPA process
- Master Plan and current land classifications
- Instruction for Submitting Comments

Much like national forests or parks, Bardwell Lake is a federally owned and managed public property. It is USACE's goal to be a good neighbor as well as steward of the public interest as it concerns Bardwell Lake. As such, USACE is bound to the equal enforcement of policies and rules for this publicly held national asset. Below gives a copy of the comment and USACE response.

7.2.1. Comments from Texas Parks and Wildlife Department



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March 16, 2023

Mr. Dylan Mayfield
Lake Manager - Bardwell Lake
U.S. Army Corps of Engineers
4000 Observation Drive
Ennis, TX 75119
ceswf-od-br@usace.army.mil

Re: Scoping for Bardwell Lake Master Plan Revision in Ellis County, Texas

Dear Mr. Mayfield:

Texas Parks and Wildlife Department (TPWD) received the February 1, 2023, public notice of the initiation process to revise the Bardwell Lake Master Plan (Master Plan). Information regarding the project and the previous Master Plan document was made available online. The public has been given opportunity to provide scoping comments for the proposed Master Plan.

Project Description

The U.S. Army Corps of Engineers Fort Worth District (USACE) proposes to revise the Master Plan, which is the strategic land use management document that guides the comprehensive management and development of all recreational, natural, and cultural resources throughout the life of the water resource development project. In general, the Master Plan defines how the resources will be managed for public use and resource conservation for the next 25 years.

The current Master Plan was completed in 1974 and will be revised to address changes in regional land use, population, outdoor recreation trends, and USACE management policy. The Master Plan revision will update land and water surface classifications, plan for the modernization of existing parks, and inform the management of wildlife and other resource lands within USACE managed property at Bardwell Lake.

TPWD's Role and Review

As the state agency with primary responsibility for protecting the state's fish and wildlife resources and in accordance with the authority granted by Parks and Wildlife Code (PWC) §12.0011, TPWD has a role in reviewing the environmental impacts of federal actions in Texas in association with the National Environmental Policy Act of 1969 (NEPA). TPWD staff from our Inland Fisheries Division and Wildlife Division are interested in the proposed Master Plan revision and will work with USACE throughout the revision process to assist in identifying appropriate

To manage and conserve the natural and cultural resources of Texas and to provide hunting, fishing and outdoor recreation opportunities for the use and enjoyment of present and future generations.

Figure 7.1 Comment from Texas Parks and Wildlife Department (Page 1 of 5)

land classifications with respect to wildlife resources, sensitive resources, and habitat management goals, potential surface water use restriction areas, land and water recreation needs and access, and terrestrial and aquatic invasive species management goals.

TPWD offers the following for consideration in the Master Plan to minimize potential impacts to natural resources within the Project area and to guide conservation-minded recreational development.

Sensitive Resource Datasets

TCAP: The project area is within the Texas Blackland Prairies ecoregion. The Texas Conservation Action Plan (TCAP) provides guidance toward addressing Species of Greatest Conservation Need (SGCN) and important habitats and includes a statewide handbook as well as handbooks for each ecoregion of the state. To help guide your planning efforts, information on the TCAP, handbooks, and lists of SGCN can be found on TPWD's website. The TCAP identifies priority habitats as well as priority issues related to farm, ranch, and municipal land and water management issues, conservation and recreation land and water management issues, and non-native invasive species and problematic native invasive species that can impact priority species and habitats. Within the Texas Blackland Prairies ecoregion, the TCAP generally identifies priority habitats as barrens, tallgrass prairie communities, slope forest and woodlands, savannahs and woodlands, riparian and bottomland woodlands, freshwater wetlands, seeps, and springs.

TPWD RTEST: In addition to the TCAP lists of SGCN by ecoregion, the TPWD *Rare, Threatened, and Endangered Species of Texas by County* (RTEST) online application provides information regarding state listed species and other SGCN with potential to occur within each county in Texas.

TXNDD: TPWD maintains the Texas Natural Diversity Database (TXNDD) which monitors known occurrences of SGCN and rare habitats, and the data are available by request. Given the small proportion of public versus private land in Texas, the TXNDD does not include a representative inventory of rare resources in the state, and absence of information in the database does not imply that a species is absent from that area. A TPWD review of the TXNDD shows no records of SGCN, species features, or sensitive vegetation communities have been documented or reported to the TXNDD at the USACE Bardwell Lake Project.

TPWD TEAM: The Ecological Mapping Systems of Texas is a land classification project which provides systems, mapping subsystems, and vegetative types for Texas and may assist in the USACE efforts toward examining project lands. EMST data are available by download or through the Texas Ecosystem Analytical Mapper (TEAM), an online interactive mapping tool.

Figure 7.2 Comment from Texas Parks and Wildlife Department (Page 2 of 5)

iNaturalist: The iNaturalist community application may provide data on plants and wildlife observed at Bardwell Lake to help guide appropriate land use classifications.

Mussel Stream Groupings: The 2021 Texas Freshwater Mussel Survey Protocol was designed by TPWD and USFWS to determine the presence or probable absence of freshwater mussels in waters of Texas and to initiate standardized procedures for projects affecting streams and impoundments that may be occupied by native freshwater mussels in Texas. The Texas Freshwater Mussel Sampling Protocol Stream Grouping dataset, found at https://www.fws.gov/library/collections/texas-freshwater-mussel-sampling-protocol, indicates that Bardwell Lake and Waxahachie Creek upstream of the lake are categorized as Group 5 waters. Group 5 is defined as: streams where no federal or state listed freshwater mussels occur, but mussels are known to occur; or perennial streams where it is anticipated that live freshwater mussels may occur, but presence or diversity have not been confirmed. Although the Master Plan does not identify specific construction actions, the stream grouping dataset indicates that the USACE Bardwell Lake project area likely supports freshwater mussel resources within its perennial waters.

WHCR Grids: Safe access to stopover sites is critical for the migration of the federal- and state-endangered whooping crane (WHCR) (*Grus americana*). During migratory stopovers, whooping cranes utilize grain fields and wetland habitats such as marshes, small ponds, and lake edges. The Bardwell Lake Project area occurs within the core migration corridor that represents 95% of the sightings during whooping crane migration (Pearse et al., 2018). The *Characterization of whooping crane migrations and stopover sites used in the Central Flyway, 2010-2016* and the associated companion publication indicate that a known peripheral stopover grid overlaps a portion of the Bardwell Lake Project area (Pearse et al., 2019 and 2020). A peripheral grid has one to two identified stopover sites. Habitats at Bardwell Lake may provide suitable stopover habitat for the WHCR.

Recommendation: TPWD recommends referring to the TCAP, RTEST, TXNDD, EMST, iNaturalist, Mussel Stream Groupings, and WHCR Grids datasets for information regarding sensitive resources or priority habitats potentially occurring in the project area.

Recommendation: TPWD recommends considering land classifications of Environmentally Sensitive Areas or Multiple Resource Management Lands to protect or manage priority habitat types of the Texas Blackland Prairies ecoregion including barrens, tallgrass prairie communities, slope forest and woodlands, savannahs and woodlands, riparian and bottomland woodlands, freshwater wetlands, seeps, and springs. TPWD recommends Environmentally Sensitive Areas to protect federal or state listed species. TPWD also supports addressing invasive species, restoring degraded prairies, addressing encroachments or trespass, and improving recreational infrastructure and opportunity as appropriate to the meet public demand without exceeding

Figure 7.3 Comment from Texas Parks and Wildlife Department (Page 3 of 5)

carrying capacity of the property and its resources while balancing the stewardship of the natural resources.

Floral Resources

Significant declines in the population of migrating monarch butterflies (*Danaus plexippus*) have led to widespread concern about this species and other native insect pollinator species due to reductions in native floral resources. Currently, the monarch butterfly is a candidate for listing, and the USFWS will review the species status annually until a proposal for listing is developed. To support pollinators and migrating monarchs, TPWD encourages the establishment of native wildflower habitats on private and public lands across the state.

Recommendation: TPWD recommends incorporating pollinator conservation into the Master Plan to promote and sustain the availability of floral resources throughout the growing season. TPWD encourages conservation of quality native grasslands and restoration of degraded grasslands to provide diverse floral resources for pollinators and habitat for grassland SGCN plants and wildlife.

Fisheries Management Survey Report

The 2018 Fisheries Management Survey Report for Bardwell Lake is available for download online at the TPWD Lake Survey Reports webpage. TPWD recommends reviewing the 2018 Fisheries Management Survey Report to aid in the Master Plan's assessment of recreational needs, identification of resource objectives, and designation of land and surface water classifications. The survey reports are typically updated on a four-year cycle.

Invasive Species

Because Bardwell Lake is within the Trinity River Basin and is at risk for the invasive zebra mussel, TPWD recommends the continued support of TPWD initiatives to educate the public regarding zebra mussels, as well as other invasive species.

Public Hunting

USACE currently has a public hunting program at Bardwell Lake. It is important to TPWD and the hunting community for continued access to public lands for hunting.

Recommendation: TPWD recommends USACE identify which land classifications allow for hunting as a recreational use and encourages USACE to select land classifications that retain hunting opportunities at Bardwell Lake.

Figure 7.4 Comment from Texas Parks and Wildlife Department (Page 4 of 5)

Future Coordination and Contacts

Because multiple TPWD staff may contribute to this project, I will serve as the primary contact and ensure that the necessary TPWD staff are kept involved and informed. Please include me in all correspondence with other TPWD staff regarding this project.

TPWD is available to assist in field assessments and available to review and provide input regarding USACE's preliminary land use and water surface classifications as they are being developed. Once the Master Plan and Environmental Assessment are drafted for public review, please coordinate with the TPWD Wildlife Division WHAB program through my email as well as our project review repository at WHAB@tpwd.texas.gov.

If you have any questions, please contact me at (903) 322-5001 or Karen.Hardin@tpwd.texas.gov.

Sincerely,

Karen B. Hardin
Wildlife Habitat Assessment Program
Wildlife Division

kbh/49975

References

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Figure 7.5 Comment from Texas Parks and Wildlife Department (Page 5 of 5)

Response to Texas Parks and Wildlife Department

The USACE concurs with the description of the Bardwell Lake Master Plan and TPWD's role as described.

The Master Plan considered the Sensitive Resources discussed and referenced the TCAP, TPWD RTEST, TXNDD, TPWD TEAM, iNaturalist, Mussel Stream Groupings, and WHCR Grids when developing the new land classification maps in Appendix A as well as the Goals and Objectives in Chapter 3.

Recommendation 1: Concur.

Recommendation 2: Concur.

Recommendation 3: Concur.

Comment 4: Noted

The USACE welcomes review by TPWD of the proposed Master Plan and providing additional comments within the comment period.

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

A public meeting will be held at the Ennis Welcome Center on 10 April, 2024 to release the Draft Master Plan. This will begin a 30-day comment period when members of the public, agencies, and other stakeholders can provide comments on the Draft Master Plan. After closing the comment period, this section will be completed with further details including public meeting or presentation details, comments received as well as significant edits to the draft based on those comments.

CHAPTER 8 – SUMMARY OF RECOMMENDATIONS

8.1. SUMMARY OVERVIEW

The preparation of the Bardwell Lake Master Plan followed the USACE master planning guidance in ER 1130-2-550 and EP 1130-2-550, both dated 13 January 2013. Three major requirements set forth in the guidance include (1) the preparation of contemporary resource objectives, (2) classification of project lands using the newly approved classification standards, and (3) 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 public involvement throughout the process, and consideration of regional recreation and natural resource management priorities identified by other federal, state, and municipal authorities. The study team endeavored to follow this guidance to prepare a master plan that will provide for enhanced recreational opportunities for the public, improve environmental quality, and foster a management philosophy that promotes partnerships and the success of each stakeholder involved in the management of the lands and surface waters of Bardwell Lake. Factors considered in the Plan were identified through public involvement and review of local and statewide planning documents including the following:

- NCTCOG Planning Documents
- TCAP – Cross Timbers and Texas Blackland Prairie Ecoregions Reports
- TPWD's 2018 and 2012 TORP and Survey
- TRWD Integrated Water Supply Plan

This Master Plan will ensure the long-term sustainability of the outdoor recreation program and natural resources associated with Bardwell 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 new land classification standards. During the public involvement process USACE sought public input into whether, besides the simple change in nomenclature, a shift in land classification was desired (for example, should lands with a recreation classification be reclassified to a wildlife classification or vice versa.). Chapter 7 of the Plan describes the public input process.

Based on an evaluation of documents such as the TORP and the TCAP, development of goals and objectives, public and stakeholder comments, as well as subject matter experts, the planning team prepared the land reclassification proposal for Bardwell Lake. All changes reflect historic and projected public use and new guidance from ER 1130-2-550 and EP 1130-2-550. A summary of acreage changes from prior land and water classifications to the proposed classifications is provided in Table 8.1,

and key decision points in the reclassification of project lands are presented in Table 8.2.

Table 8.1 Changes from Prior Classification to Proposed Classification

Prior Land Classifications (1974	Acres*	Proposed Land Classifications (2024)	Acres
Project Operations	126	Project Operations	254
Environmentally Sensitive Areas		Environmentally Sensitive Areas	1,046
Recreation- Intensive Use	1,436	High Density Recreation	879
Recreation – Low Density Use	900	MRML – Low Density Recreation	957
Wildlife Management	1,806	MRML – Wildlife Management	1,109
Total Land Acres	**4,268**	**Total Land Acres**	**4,245**
Prior Land Classifications (1974	**Acres***	**Proposed Land Classifications (2024)**	**Acres**
Permanent Pool	3,240	Permanent Pool	
—	—	– Restricted	1.6
—	—	– Open Recreation	3,238
TOTAL Water Surface Acres	**3,240**	**TOTAL Water Surface Acres**	**3,240**

* Some acreage differences are due to improvements in mapping and measurement technology, deposition/siltation, and erosion.

There are several major differences in the acres between the 1974 Master Plan and the proposed 2024 Master Plan which are not accounted for in Table 8.1, or the maps in Appendix A. These differences are due to the following:

- The previous maps were digitized and converted to the current GIS files in order to make a direct comparison between water and surface acres. The conversion led to starting acre totals that are not identical to the acres listed in the 1974 Master Plan.
- Current mapping and measuring technology have improved since the 1974 Master Plan, providing more precise measurements. The current Plan uses GIS computer software, LiDAR spatial mapping, and updated boundary surveys.
- Since the 1974 Master Plan, erosion and deposition/siltation have led to changes in the water surface acres and land acres, with some areas increasing and other areas decreasing the total acres.

Table 8.2 Reclassification Proposals

Proposal	Acres	Justification
Recreation Intensive Use	370	370 acres of land that was previously classified as Intensive Recreation has been reclassified to Low Density Recreation. Most of these areas are not developed for high

Proposal	Acres	Justification
to Recreation Low Density		density recreation and will be managed for passive, less-intensive recreation.
Recreation Intensive Use to Project Operations	10	10 acres of Recreation Intensive Use have been reclassified as Project Operations. These areas include access roads and acres needed for safe operation of the dam.
Recreation Intensive Use to Wildlife Management	168	168 acres of Recreation Intensive Use have been reclassified as Wildlife Management. These acres are found on the North side of the lake in areas with limited access and high-quality habitat. Activities such as hiking and bird watching will still be available in these areas.
Recreation Low Density to Project Operations	117	117 acres of Recreation Low Density have been reclassified as Project Operations. These areas include access roads and acres needed for safe operation of the dam and other facilities.
Recreation Low Density to Wildlife Management	186	186 acres of Recreation Low Density have been reclassified to Wildlife Management. These are located on the North side of the lake with limited access and high quality habitat better suited for management of wildlife resources than low density recreation. Activities will remain that same but management will focus on habitat.
Wildlife Management to Environmental Sensitive Areas	1,039	1,039 acres of Wildlife Management have been reclassified as Environmental Sensitive Areas. These areas include quality habitat to be protected and preserved. Although the area will be managed to preserve specific sensitive resources, wildlife management activities including hunting or passive recreation such as unpaved hiking trails will still be permitted in many areas, as long as these activities do not interfere with the sensitive resources. Hunters should reference the most recent TPWD public hunting maps for public hunting areas as well as rules and regulations.

Note: The land classification changes described in this table are the result of changes to individual parcels of land ranging from a few acres to more than 100 hundred acres. Acreages were measured using GIS technology. The acreage numbers provided are approximate.

CHAPTER 9 – BIBLIOGRAPHY

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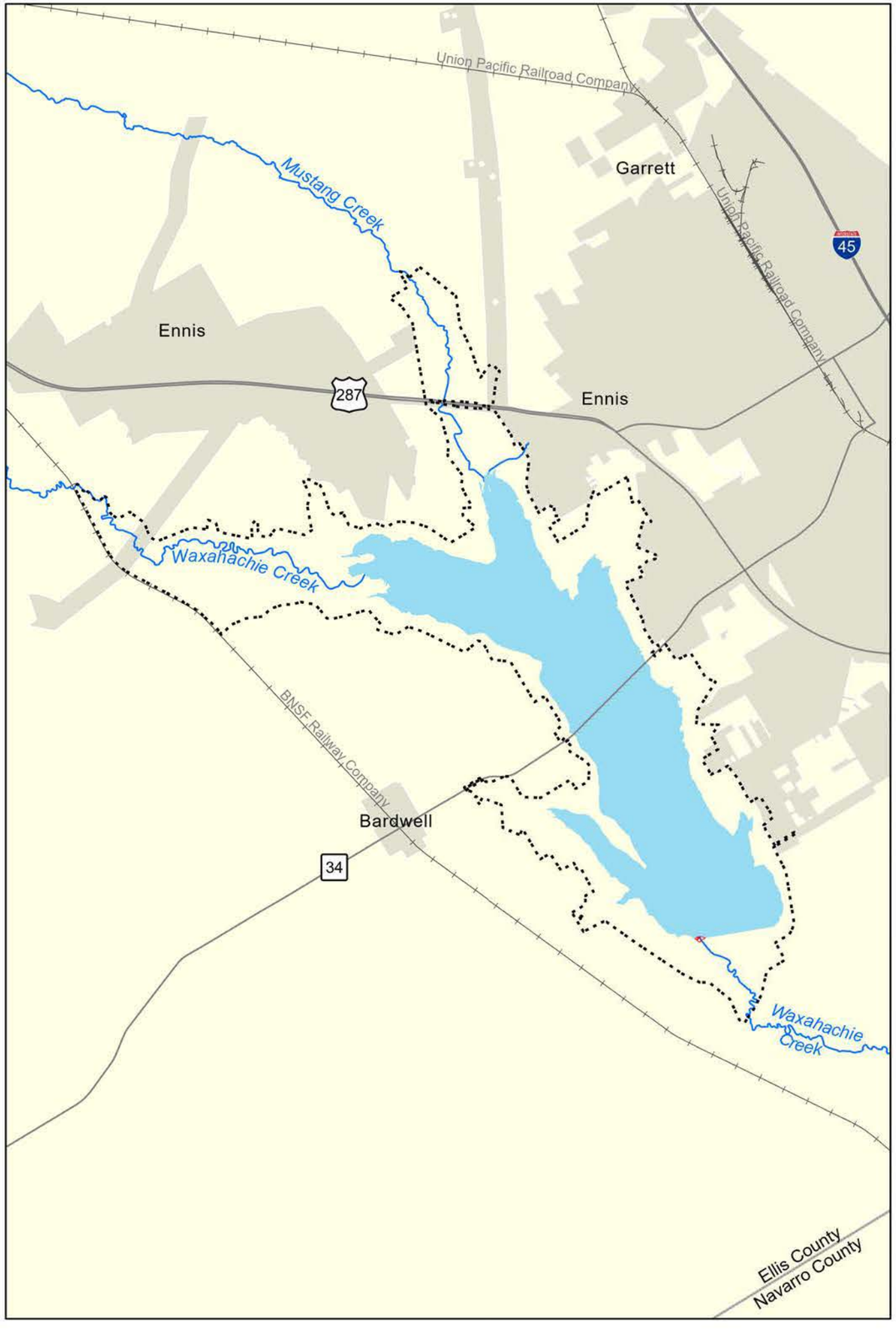
APPENDIX A – LAND CLASSIFICATION, MANAGING AGENCIES, AND RECREATION MAPS



INDEX TO MASTER PLAN MAPS

GENERAL

MAP NO.	TITLE
BR24MP-OI-00	PROJECT LOCATION & INDEX TO MAPS
BR24MP-OM-01	LAND MANAGING ENTITIES
BR24MP-OW-01	WATER SURFACE CLASSIFICATIONS

LAND CLASSIFICATION

MAP NO.	TITLE
BR24MP-OC-00	LAND AND WATER CLASSIFICATIONS (00)
BR24MP-OC-01	LAND AND WATER CLASSIFICATIONS (01)
BR24MP-OC-02	LAND AND WATER CLASSIFICATIONS (02)
BR24MP-OC-03	LAND AND WATER CLASSIFICATIONS (03)

RECREATIONAL AREAS

MAP NO.	TITLE
BR24MP-OR-0A	MANAGED RECREATIONAL AREAS
BR24MP-OR-0B	PARK PLATE INDEX
BR24MP-OR-01	MOTT PARK
BR24MP-OR-02	HIGH VIEW PARK
BR24MP-OR-03	WAXAHACHIE CREEK PARK
BR24MP-OR-04	LITTLE MUSTANG PARK
BR24MP-OR-05	LOVE PARK

FEE BOUNDARY

WATER SURFACE: OPEN RECREATION

WATER SURFACE: RESTRICTED

U.S. ARMY CORPS OF ENGINEERS
FORT WORTH DISTRICT

TRINITY RIVER BASIN — ENNIS, TEXAS

BARDWELL LAKE MASTER PLAN

PROJECT LOCATION AND MAP INDEX

N

0 0.75 1.5 3 Miles

DATE:	MAP NO.
APRIL 2024	BR24MP-OI-00

U.S. ARMY CORPS OF ENGINEERS

WATER SURFACE: OPEN RECREATION

WATER SURFACE: RESTRICTED

FEE BOUNDARY

U.S. ARMY CORPS OF ENGINEERS
FORT WORTH DISTRICT

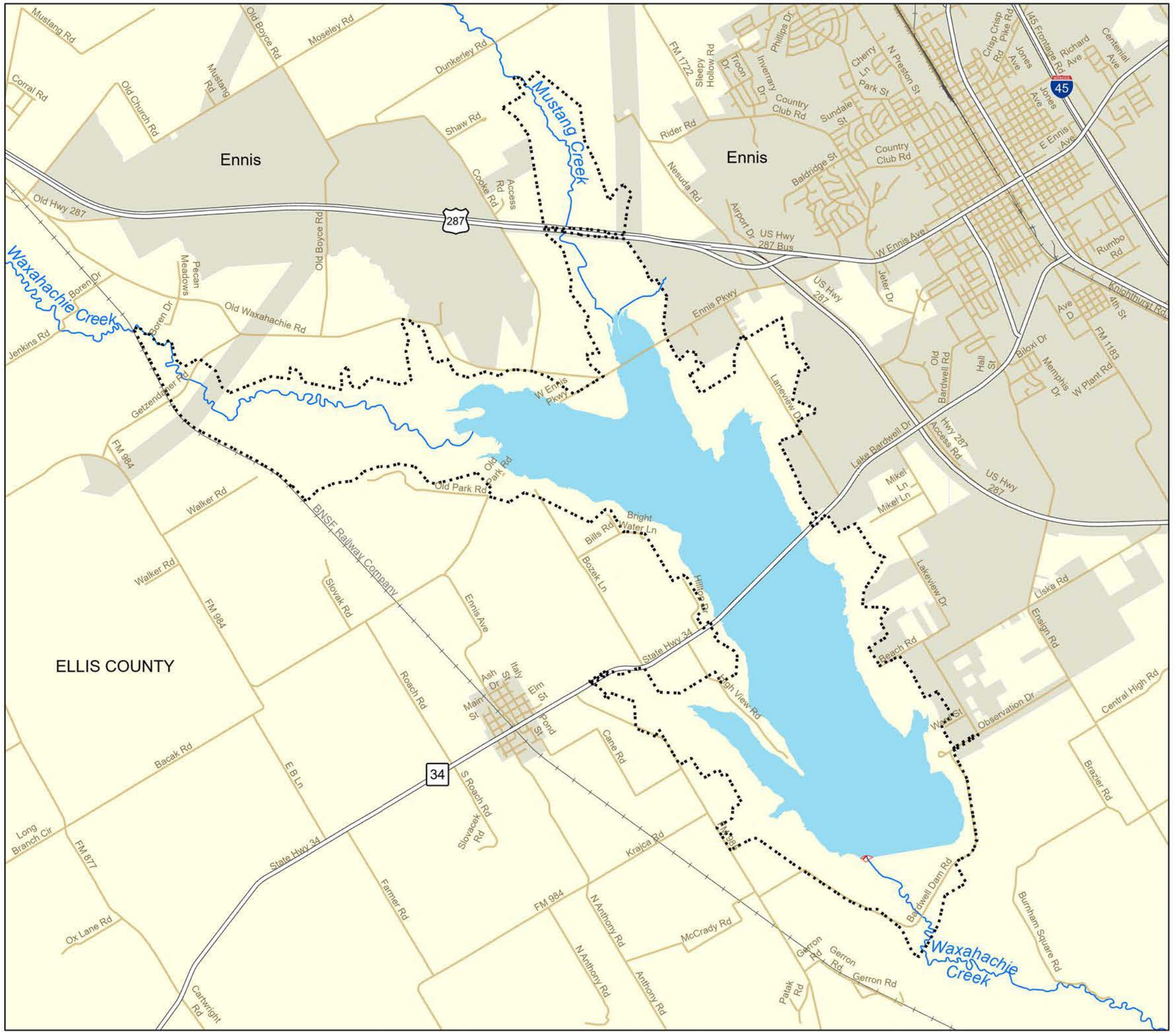
TRINITY RIVER BASIN — ENNIS, TEXAS

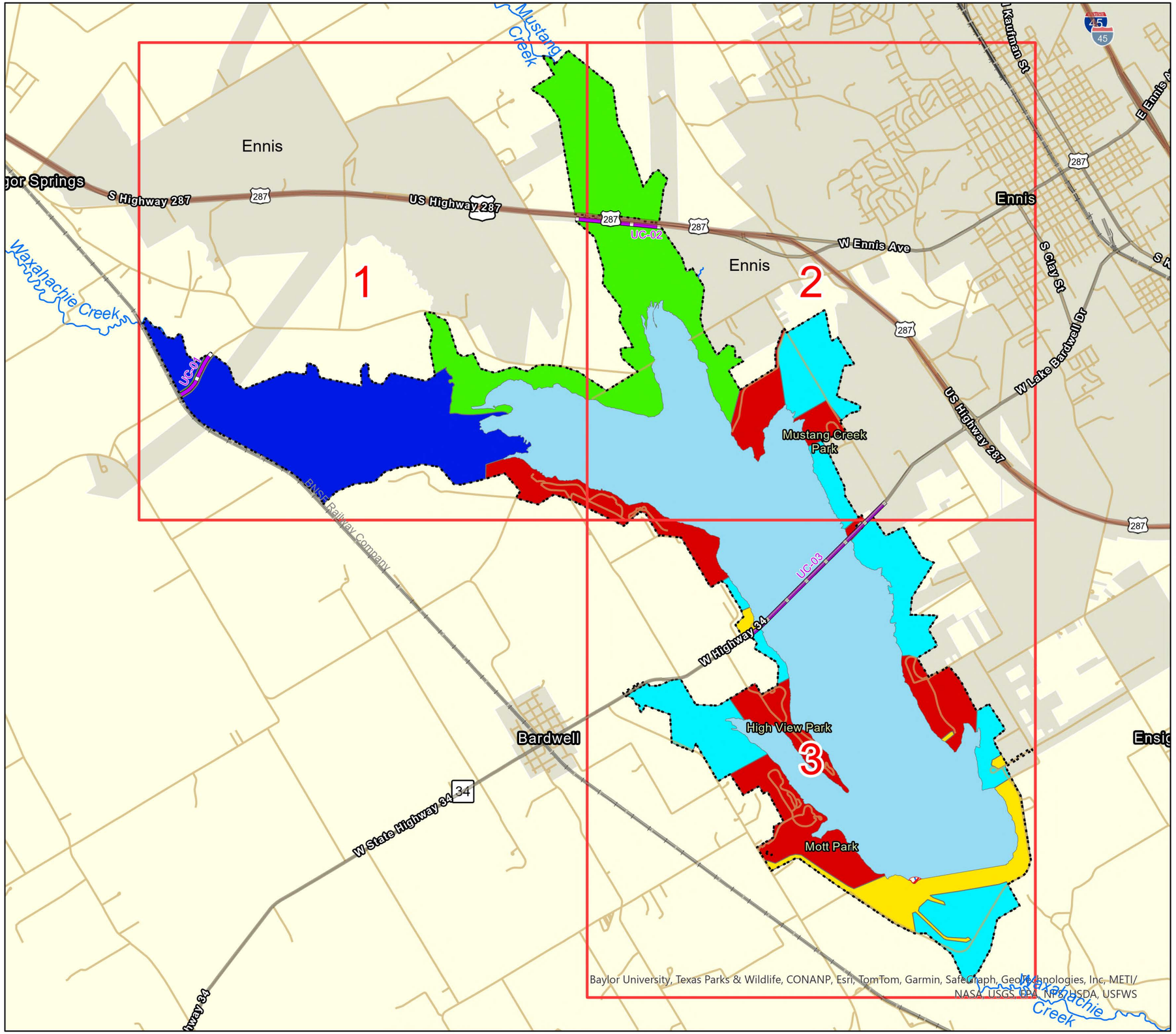
BARDWELL LAKE MASTER PLAN

LAND MANAGING ENTITIES

0 0.5 1 2 Miles

DATE:	MAP NO.
APRIL 2024	BR24MP-OM-01


Ennis
Ennis
ELLIS COUNTY
Mustang Creek
Waxahachie Creek
Waxahachie Creek
Old Hwy 287
287
US Hwy 287 Bus
W Ennis Ave
Ennis Pkwy
US Hwy 287
Old Waxahachie Rd
Old Park Rd
Lake Bardwell Dr
Hwy 287 Access Rd
US Hwy 287
State Hwy 34
34
State Hwy 34
Bardwell Dam Rd
Gerron Rd
Gerron Rd
Gerron Rd
Mustang Rd
Corral Rd
Old Church Rd
Old Boyce Rd
Moseley Rd
Dunkerley Rd
Shaw Rd
Cooke Rd Access
Rider Rd
Nesuda Rd
Old Boyce Rd
Pecan Meadows
Boren Dr
Boren Dr
Jenkins Rd
Getzendaner Rd
FM 984
Walker Rd
BNSF Railway Company
Slovak Rd
FM 984
Ennis Ave
Roach Rd
Ash St
Main St
Italy St
Elm St
Pond St
Bacak Rd
E B Ln
S Roach Rd
Slovacek Rd
Long Branch Cir
FM 877
Ox Lane Rd
Cartwright Rd
Farmer Rd
Krajca Rd
FM 984
N Anthony Rd
McCrady Rd
N Anthony Rd
Anthony Rd
Patak Rd
Bills Rd
Bozek Ln
Bright Water Ln
Hilltop Dr
High View Rd
Cane Rd
Beach Rd
Water St
Observation Dr
Lakeview Dr
Liska Rd
Ensign Rd
Central High Rd
Brazier Rd
Burnham Square Rd
Waxahachie Creek
FM 1722
Sleepy Hollow Rd
Troon Dr
Inverrary Dr
Phillips Dr
Country Club Rd
Cherry Ln
Park St
N Preston St
Sundale St
Baldridge St
Country Club Rd
Airport Dr
Jeter Dr
Laneview Dr
Old Bardwell Rd
Hall St
Biloxi Dr
Memphis Dr
W Plant Rd
FM 1183
Ave D
4th St
Knightburst Rd
Rumbo Rd
Crisp Crisp Rd
I45 Frontage Rd
Jones Ave
Jones Ave
Richard Ave
Centennial Ave
45
E Ennis Ave
Mikel Ln
Mikel Ln
Tulsa
Oklahoma City
Amarillo
OKLAHOMA
Lubbock
Ft. Worth
Dallas
TEXAS
Waco
Austin
WATER SURFACE: OPEN RECREATION
WATER SURFACE: RESTRICTED
FEE BOUNDARY
U.S. ARMY CORPS OF ENGINEERS
FORT WORTH DISTRICT
TRINITY RIVER BASIN
ENNIS, TEXAS
BARDWELL LAKE MASTER PLAN
WATER SURFACE CLASSIFICATIONS
N
0
0.5
1
2
Miles
DATE:
APRIL 2024
MAP NO.
BR24MP-OW-01



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

U.S. ARMY CORPS OF ENGINEERS
FORT WORTH DISTRICT

TRINITY RIVER BASIN — ENNIS, TEXAS

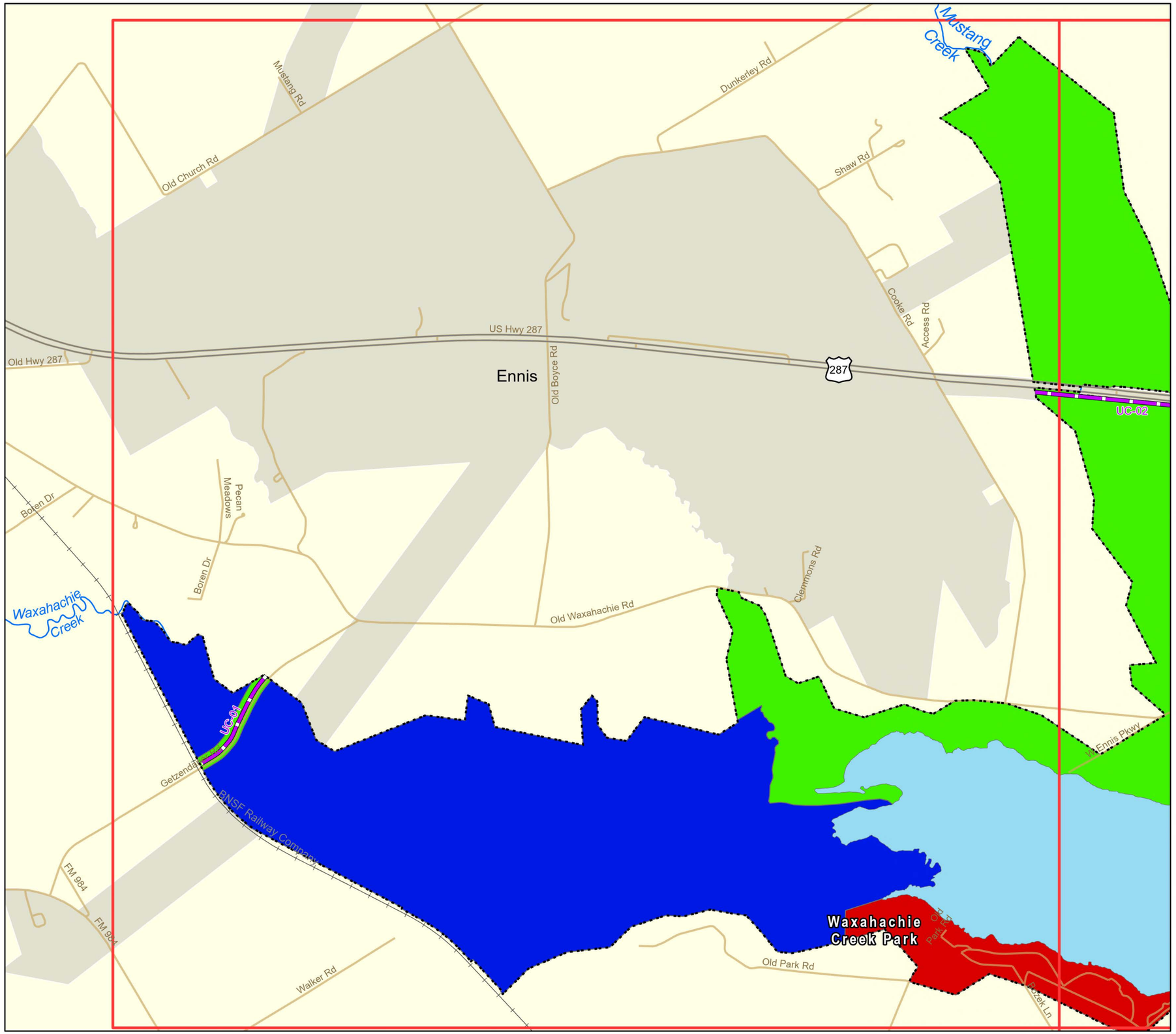
BARDWELL LAKE MASTER PLAN

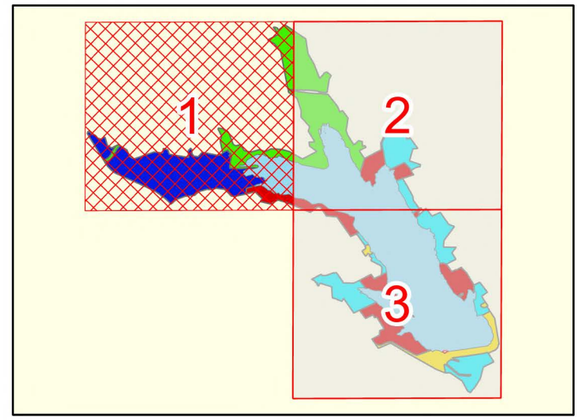
LAND AND WATER CLASSIFICATION (INDEX SHEET 00)

N

0 0.5 1 2 Miles

DATE:	MAP NO.
APRIL 2024	BR24MP-OC-00





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

U.S. ARMY CORPS OF ENGINEERS
FORT WORTH DISTRICT

TRINITY RIVER BASIN — ENNIS, TEXAS

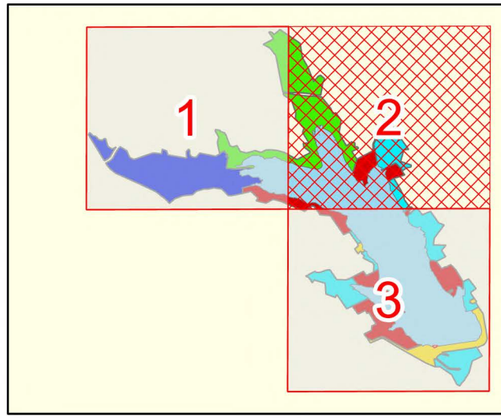
BARDWELL LAKE MASTER PLAN

LAND AND WATER CLASSIFICATION (INDEX SHEET 01)

N

0 1,000 2,000 4,000 Feet

DATE:	MAP NO.
APRIL 2024	BR24MP-OC-01



UTILITY CORRIDORS

INDEX GRID

ENVIRONMENTALLY SENSITIVE AREA

PROJECT OPERATIONS

HIGH DENSITY RECREATION

LOW DENSITY RECREATION

WILDLIFE MANAGEMENT

WATER SURFACE: OPEN RECREATION

WATER SURFACE: RESTRICTED

FEE BOUNDARY

U.S. ARMY CORPS OF ENGINEERS
FORT WORTH DISTRICT

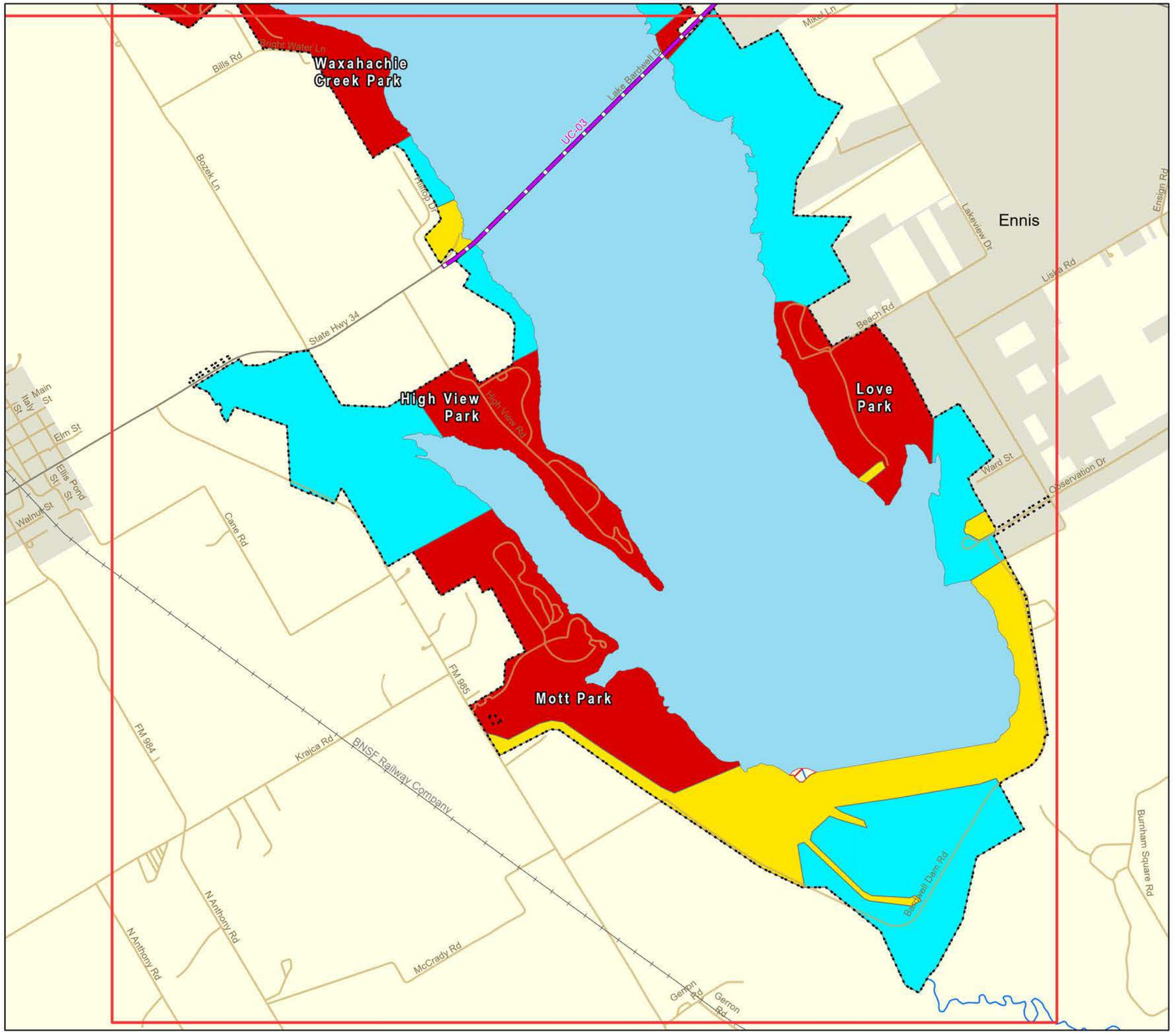
TRINITY RIVER BASIN — ENNIS, TEXAS

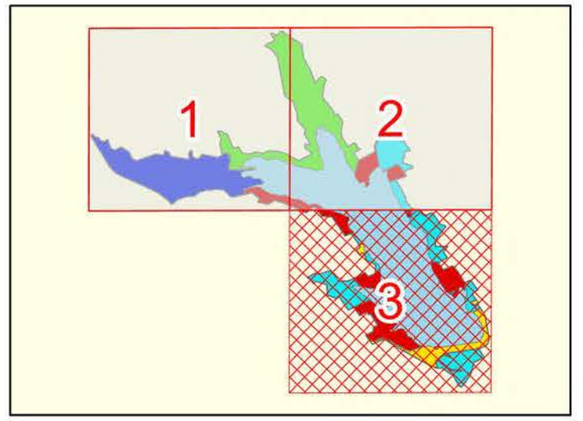
BARDWELL LAKE MASTER PLAN

LAND AND WATER CLASSIFICATION (INDEX SHEET 02)

0 1,000 2,000 4,000 Feet

DATE:	MAP NO.
APRIL 2024	BR24MP-OC-02





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

U.S. ARMY CORPS OF ENGINEERS
FORT WORTH DISTRICT

TRINITY RIVER BASIN — ENNIS, TEXAS

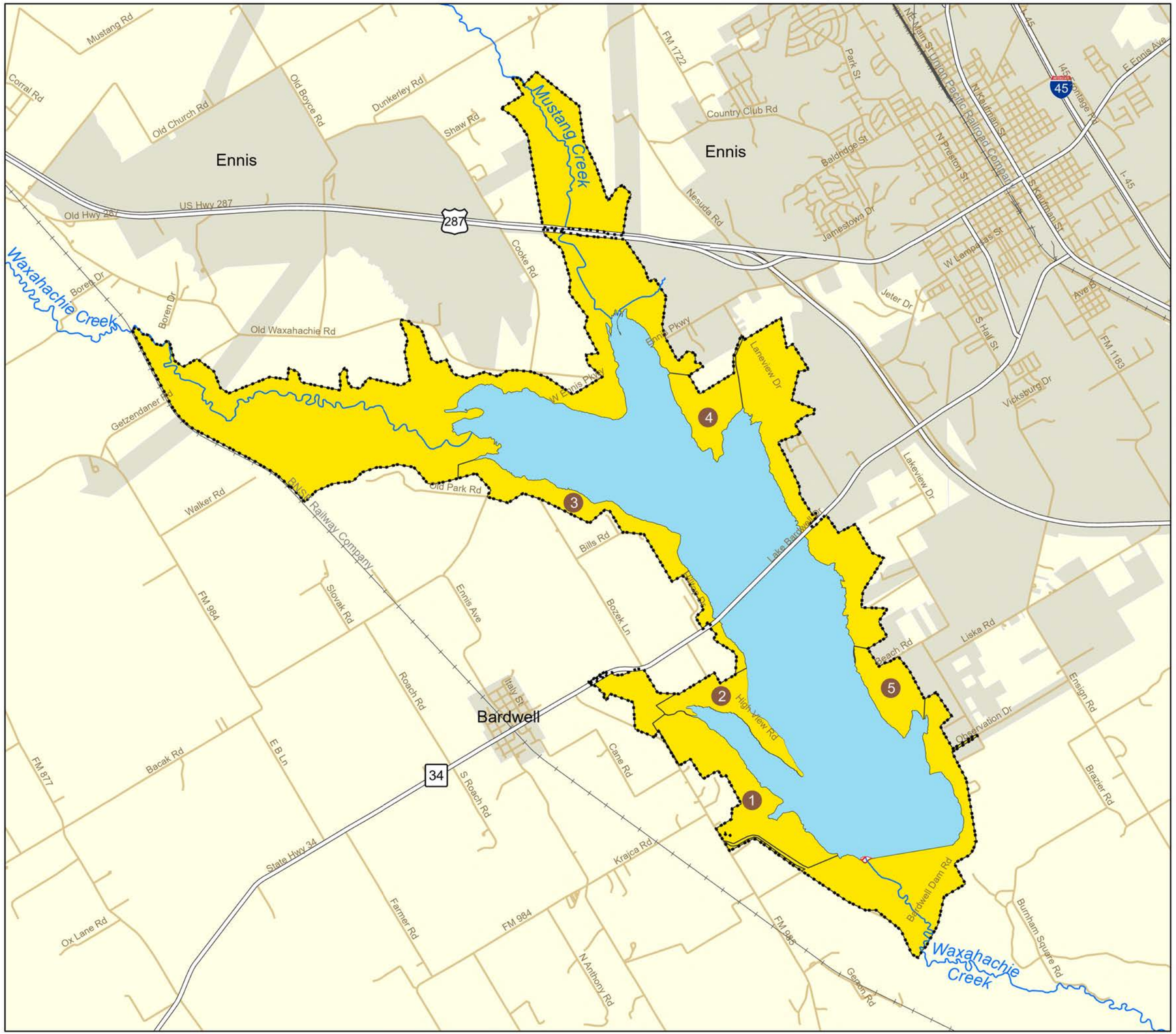
BARDWELL LAKE MASTER PLAN

LAND AND WATER CLASSIFICATION (INDEX SHEET 03)

N

0 1,000 2,000 4,000 Feet

DATE:	MAP NO.
APRIL 2024	BR24MP-OC-03



U.S. ARMY CORPS OF ENGINEERS

WATER SURFACE: OPEN RECREATION

WATER SURFACE: RESTRICTED

FEE BOUNDARY

KEY TO PARKS

1. MOTT PARK
2. HIGH VIEW PARK
3. WAXAHACHIE CREEK PARK
4. LITTLE MUSTANG PARK
5. LOVE PARK

U.S. ARMY CORPS OF ENGINEERS
FORT WORTH DISTRICT

TRINITY RIVER BASIN — ENNIS, TEXAS

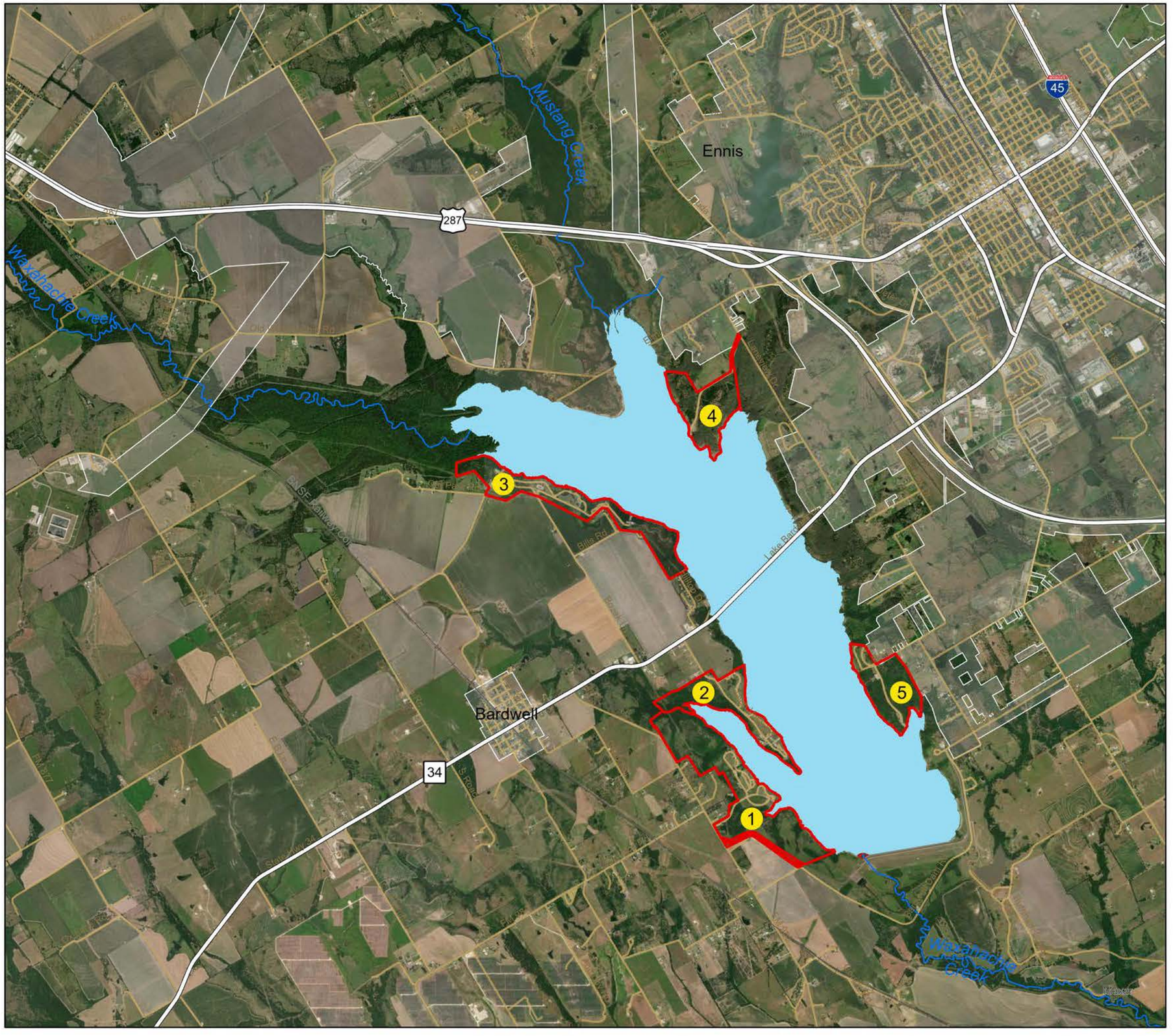
BARDWELL LAKE MASTER PLAN

MANAGED RECREATIONAL AREAS

N

0 0.5 1 2 Miles

DATE:	MAP NO.
APRIL 2024	BR24MP-OR-0A



RECREATION AREAS		
ID#	NAME	SHEET#
1	MOTT PARK	BR24MP-OR-01
2	HIGH VIEW PARK	BR24MP-OR-02
3	WAXAHACHIE CREEK PARK	BR24MP-OR-03
4	LITTLE MUSTANG PARK	BR24MP-OR-04
5	LOVE PARK	BR24MP-OR-05

U.S. ARMY CORPS OF ENGINEERS
FORT WORTH DISTRICT

TRINITY RIVER BASIN — ENNIS, TEXAS

BARDWELL LAKE MASTER PLAN

PARK PLATE INDEX

N

0 0.5 1 2 Miles

DATE:	MAP NO.
APRIL 2024	BR24MP-OR-0B

ITEM	EXISTING
BOAT RAMP	1
CAMPSITES	33
COURTESY DOCK	1
ENTRANCE GATE	1
GROUP PICNIC SHELTERS	1
HORSE STABLE/BARN	0
HORSE TRAIL ENTRANCE	0
PARKING	12
PICNIC SITES	11
RESTROOMS	1
SANITARY DUMP STATION	1
VAULT TOLIET	1

- BOAT RAMP
- CAMPSITE
- COURTESY DOCK
- ENTRANCE GATE
- GROUP PICNIC SHELTER
- PARKING
- PICNIC SITE
- RESTROOM
- SANITARY DUMP STATION
- VAULT TOILET
- WATER SURFACE: OPEN RECREATION
- PARK LIMITS
- FEE BOUNDARY

U.S. ARMY CORPS OF ENGINEERS
FORT WORTH DISTRICT

TRINITY RIVER BASIN — ENNIS, TEXAS

BARDWELL LAKE MASTER PLAN

RECREATIONAL AREAS (MOTT PARK)

N

0 130 260 520 780 Feet

DATE:	MAP NO.
APRIL 2024	BR24MP-OR-01

ITEM	EXISTING
BOAT RAMP	1
CAMPSITES	39
COURTESY DOCK	1
ENTRANCE GATE	1
GROUP PICNIC SHELTERS	1
HORSE STABLE/BARN	0
HORSE TRAIL ENTRANCE	0
PARKING	13
PICNIC SITES	14
RESTROOMS	3
SANITARY DUMP STATION	1
VAULT TOLIET	1

- BOAT RAMP
- CAMPSITE
- COURTESY DOCK
- ENTRANCE GATE
- GROUP PICNIC SHELTER
- PARKING
- PICNIC SITE
- RESTROOM
- SANITARY DUMP STATION
- VAULT TOILET
- WATER SURFACE: OPEN RECREATION
- PARK LIMITS
- FEE BOUNDARY

U.S. ARMY CORPS OF ENGINEERS
FORT WORTH DISTRICT

TRINITY RIVER BASIN — ENNIS, TEXAS

BARDWELL LAKE MASTER PLAN

RECREATIONAL AREAS (HIGH VIEW PARK)

N

0 155 310 620 930 Feet

DATE:	MAP NO.
APRIL 2024	BR24MP-OR-02

ITEM	EXISTING
BOAT RAMP	1
CAMPSITES	39
COURTESY DOCK	1
ENTRANCE GATE	1
GROUP PICNIC SHELTERS	1
HORSE STABLE/BARN	0
HORSE TRAIL ENTRANCE	0
PARKING	13
PICNIC SITES	14
RESTROOMS	3
SANITARY DUMP STATION	1
VAULT TOLIET	1

- BOAT RAMP
- CAMPSITE
- COURTESY DOCK
- ENTRANCE GATE
- GROUP PICNIC SHELTER
- HORSE STABLE/BARNS
- HORSE TRAIL ENTRANCE
- PARKING
- RESTROOM
- SANITARY DUMP STATION
- VAULT TOILET
- WATER SURFACE: OPEN RECREATION
- PARK LIMITS
- FEE BOUNDARY

U.S. ARMY CORPS OF ENGINEERS
FORT WORTH DISTRICT

TRINITY RIVER BASIN — ENNIS, TEXAS

BARDWELL LAKE MASTER PLAN

RECREATIONAL AREAS (WAXAHACHIE CREEK PARK)

N

0 220 440 880 1,320 Feet

DATE:	MAP NO.
APRIL 2024	BR24MP-OR-03

ITEM	EXISTING
BOAT RAMP	1
CAMPSITES	0
COURTESY DOCK	0
ENTRANCE GATE	0
GROUP PICNIC SHELTERS	0
HORSE STABLE/BARN	0
HORSE TRAIL ENTRANCE	0
PARKING	1
PICNIC SITES	0
RESTROOMS	0
SANITARY DUMP STATION	0
VAULT TOLIET	0

BOAT RAMP

PARKING

WATER SURFACE: OPEN RECREATION

PARK LIMITS

FEE BOUNDARY

U.S. ARMY CORPS OF ENGINEERS
FORT WORTH DISTRICT

TRINITY RIVER BASIN — ENNIS, TEXAS

BARDWELL LAKE MASTER PLAN

RECREATIONAL AREAS (LITTLE MUSTANG PARK)

N

0 235 470 940 1,410 Feet

DATE:	MAP NO.
APRIL 2024	BR24MP-OR-04

ITEM	EXISTING
BOAT RAMP	1
CAMPSITES	0
COURTESY DOCK	1
ENTRANCE GATE	1
GROUP PICNIC SHELTERS	1
HORSE STABLE/BARN	0
HORSE TRAIL ENTRANCE	0
PARKING	2
PICNIC SITES	0
RESTROOMS	0
SANITARY DUMP STATION	0
VAULT TOLIET	2

- BOAT RAMP
- COURTESY DOCK
- ENTRANCE GATE
- GROUP PICNIC SHELTER
- PARKING
- VAULT TOILET
- WATER SURFACE: OPEN RECREATION
- FEE BOUNDARY
- PARK LIMITS

U.S. ARMY CORPS OF ENGINEERS
FORT WORTH DISTRICT

TRINITY RIVER BASIN — ENNIS, TEXAS

BARDWELL LAKE MASTER PLAN

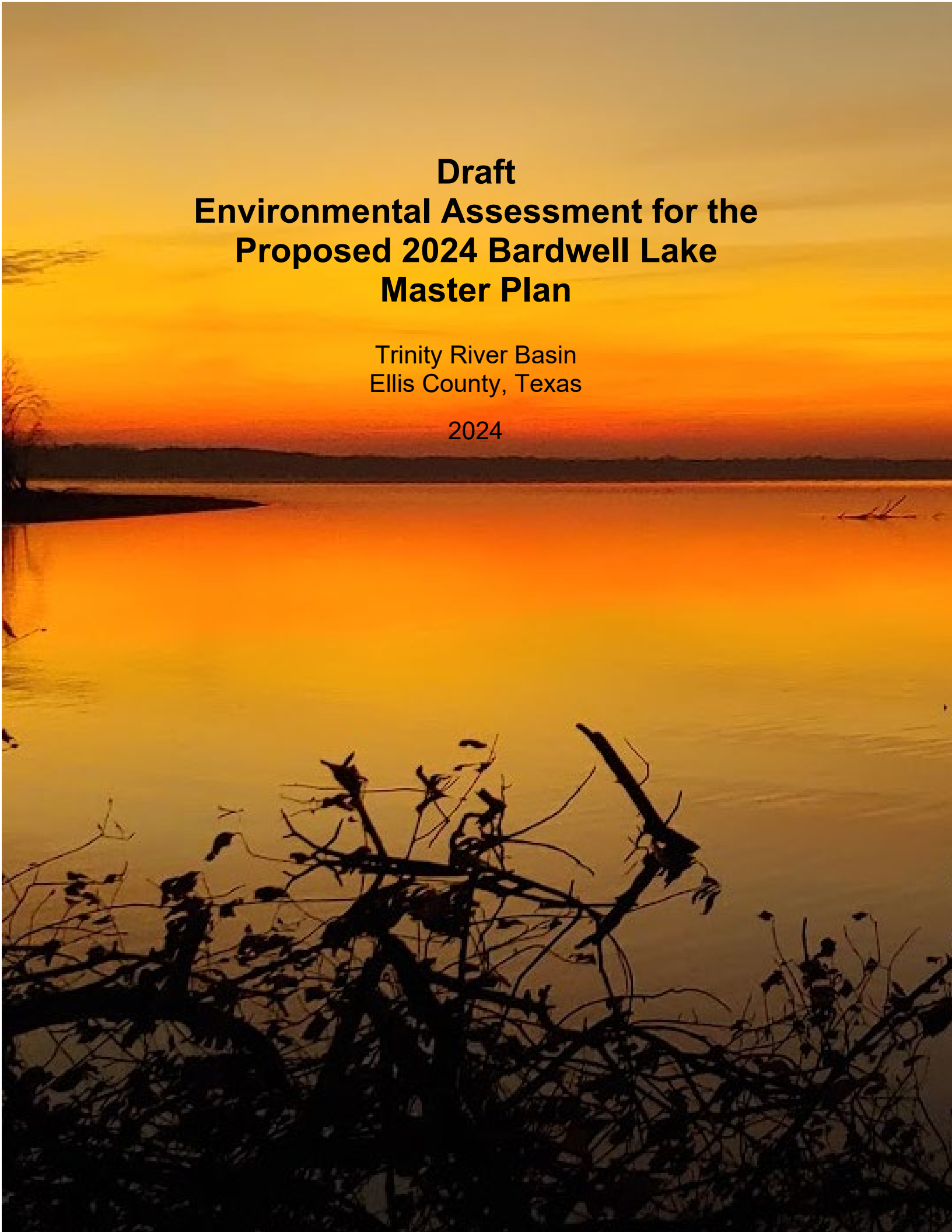
RECREATIONAL AREAS (LOVE PARK)

N

0 170 340 680 1,020 Feet

DATE:	MAP NO.
APRIL 2024	BR24MP-OR-05

APPENDIX B – NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) DOCUMENTATION



Draft
Environmental Assessment for the Proposed 2024 Bardwell Lake Master Plan

Trinity River Basin
Ellis County, Texas

2024

ENVIRONMENTAL ASSESSMENT ORGANIZATION

This Environmental Assessment (EA) evaluates the potential environmental and socioeconomic impacts of the proposed 2024 Bardwell 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.

ATTACHMENT A National Environmental Policy Act (NEPA) Coordination and Scoping

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ATTACHMENTS

Draft
ENVIRONMENTAL ASSESSMENT

Proposed 2024 Master Plan

Bardwell Lake
Ellis County, Texas

SECTION 1: INTRODUCTION

This Environmental Assessment (EA) has been prepared by the United States Army Corps of Engineers (USACE) to evaluate the proposed draft 2024 Bardwell Lake Master Plan (MP). The proposed 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 EA is 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).

The proposed MP is a 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 Bardwell Lake for the benefit of present and future generations. The proposed 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 proposed MP. Therefore, the MP must be kept current in order to provide effective guidance in USACE decision-making. The original Bardwell Lake Master Plan was approved in 1964 with subsequent revisions and supplements made since then with last master plan being revised in 1974.

1.1 PROJECT DESCRIPTION

Bardwell Dam is located at river mile (RM) 5.0 on the Waxahachie Creek, a tributary of Chambers Creek and the Trinity River. The damsite is located in Ellis County, about 5 miles south of Ennis, Texas in central Texas (Figure 1-1). The lake's span is entirely within Ellis County and borders the Cities of Ennis and Bardwell. Bardwell Lake is located in the Waxahachie Creek watershed in the Upper Trinity River Basin. The headwaters of Waxahachie Creek originate north of Midlothian in northwestern Ellis County. It then runs southeast for 23.5 miles. It empties into the Chambers Creek three miles south of the southern end of Bardwell Dam in northern Navarro County. Waxahachie Creek has two main tributaries above Bardwell Dam; Mustang Creek, a left bank tributary, enters Waxahachie Creek at river mile 10.0; and South Prong Creek, a

right bank tributary, enters Waxahachie Creek at river mile 24.6. The Waxahachie Creek watershed is rectangular in shape being about 31 miles long and averaging about 6 miles in width. Waxahachie Creek has a drainage area of 178 square miles. In the upper portions of the watershed, the slopes are steep. The streambed elevation ranges from approximately 450 feet at the headwaters to about 380 feet at Bardwell Dam, and to about 350 feet at the mouth. The fall to the dam is 70 feet, with an average slope of 4.38 feet per mile (USACE, 2019).

The congressional authorization for the construction of the Bardwell Dam was published in the Flood Control Act approved 31 March 1960 (Public Law 86-399, 86th Congress, 2nd Session) in accordance with the recommendations of the Chief of Engineers as contained in House Document No. 424 (85th Congress, 2nd Session). Authority to initiate advance planning was contained in the Public Works Appropriation Act of 1961, approved 2 September 1960 (Public Law 86 700, 86th Congress, 2nd Session and in Advice of Allotment C 85, dated October 6, 1960). The project plan for Bardwell Reservoir recommended in House Document No. 424 proposed that the dam be constructed on Waxahachie Creek, 6.0 river miles upstream from its confluence with Chambers Creek. The construction of Bardwell Dam began in August of 1963. Deliberate impoundment began on November 20, 1965, and the conservation pool was filled in May of 1966.

The Bardwell Dam and Lake Project is an integral part of the USACE plan for flood control and water conservation in the Trinity River Basin. In particular, Bardwell Lake is operated in conjunction with Navarro Mills Lake to provide flood control and water supply in Richland Creek and Chambers Creek Watersheds.

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 Bardwell Lake comply with applicable environmental laws and regulations and to maintain quality lands for future public use. The proposed MP is intended to serve as a comprehensive land and recreation management plan with an effective life of approximately 25 years.

The Bardwell 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 suitability, and expressed public interests consistent with authorized project purposes and pertinent legislation and regulations. The current 1974 Bardwell Lake Master Plan is over 40 years old and does not currently reflect ecological, socio-political, and socio-demographic changes that are currently affecting Bardwell Lake, or those changes anticipated to occur through 2049. 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 and growing demand for recreational access and protection of natural resources are all factors affecting Bardwell Lake and project's region in general. In response to these continually evolving trends, the USACE determined that a full revision of the 1974 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 Texas Parks & Wildlife Department [TPWD] 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 proposed 2024 Master Plan (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 proposed 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 proposed MP to the decision maker.

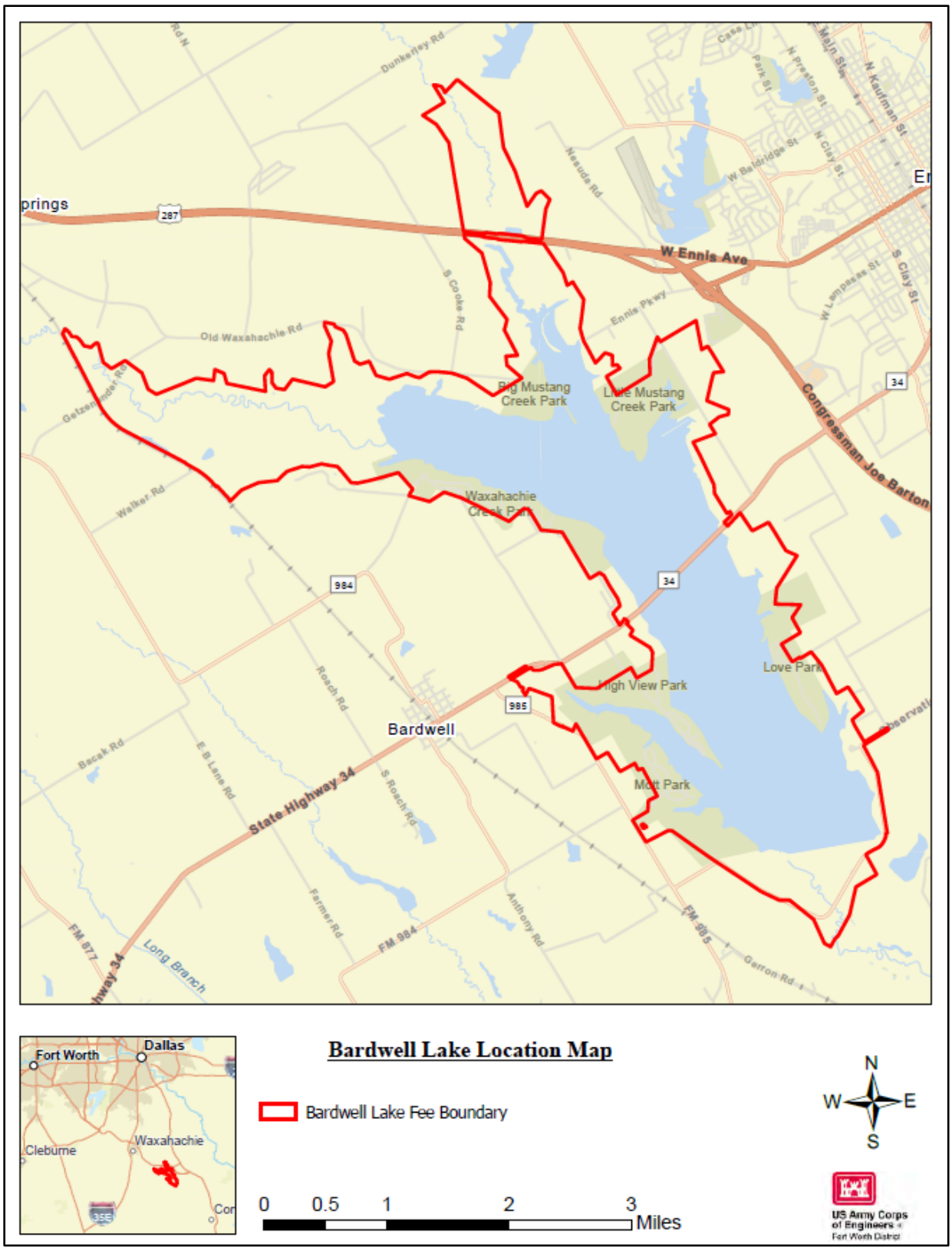


Figure 1-1. Location Map

SECTION 2: PROPOSED ACTION AND ALTERNATIVES

Two alternatives were developed for evaluation, including a No Action Alternative and a Proposed Action Alternative. The alternatives were developed using land reclassifications that indicate the primary use for which project lands would be managed. 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.

USACE guidance recommends the establishment of resource goals and objectives for purposes of development, conservation, and management of natural, cultural, and man-made resources at a project. Goals describe the desired end state of overall management efforts, whereas resource objectives are specific task-oriented actions necessary to achieve the overall proposed MP goals. Goals and objectives are guidelines for obtaining maximum public benefits while minimizing adverse impacts on the environment and are developed in accordance with 1) authorized project purposes, 2) applicable laws and regulations; 3) resource capabilities and suitability; 4) regional needs; 5) other governmental plans and programs; and 6) expressed public desires. The five project-wide management goals established for Bardwell Lake that were used in determining the Proposed Action, as well as the nationwide USACE Environmental Operating Principles, are discussed in detail Chapter 3: Resource Goals and Objectives of the proposed MP and are incorporated herein by reference (USACE, 2024).

The goals for the proposed 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.

Specific resource objectives to accomplish these goals can be found in Chapter 3 of the proposed MP.

USACE will not address dam operations or water management of Bardwell Lake under either the No Action or Proposed Action alternatives. Water management, which

includes flood risk management and dam operations, is established in the Neches River Basin Master Reservoir Regulation Manual and the Bardwell 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 proposed MP. Instead, the USACE would continue to manage Bardwell Lake's natural resources as established in the 1974 MP. The 1974 Master Plan would continue to provide the only source of comprehensive management guidelines. However, the 1974 MP is out of date and does not reflect the current ecological, socio-political, or socio-demographic conditions of Bardwell Lake or those that are anticipated to occur through 2049.

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(d)).

2.2 ALTERNATIVE 2: PROPOSED ACTION

Under the Proposed Action, the USACE would adopt and implement the proposed 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 proposed MP would replace the 1974 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 would 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 proposed MP would classify all Federal land lying above elevation 439.0 National Geodetic Vertical Datum (NGVD)29 into management reclassification categories. These management reclassification categories would 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 Bardwell 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 Bardwell 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 2024 reclassification.

Table 2-1 2024 Bardwell Lake Land Reclassifications

Prior Land Classifications (1974 Plan)	**Acres**	**Proposed Reclassifications (2024)**	**Acres**
Project Operations	126	Project Operations	254
Environmentally Sensitive Areas		Environmentally Sensitive Areas	1,046
Recreation-Intensive Use	1,436	High Density Recreation	879
Recreation-Low Density Use	900	MRML – Low Density Recreation	957
Wildlife Management	1,806	MRML – Wildlife Management	1,109
Total Land Acres	**4,268**	**Total Land Acres**	**4,245**

* Some acreage differences are due to improvements in mapping and measurement technology, deposition/siltation, and erosion.

Table 2-2. Proposed Bardwell Lake Surface Water Reclassifications

Prior Water Surface Classifications (1974 Plan)	Acres		Proposed Water Surface Classifications (2024)	Acres
Permanent Pool	3,240		Permanent Pool	N/A
---	---		– Restricted	1.6
---	---		– Open Recreation	3,238
Total Water Acres	**3,240**		**Total Water Acres**	**3,240**

* Some acreage differences are due to improvements in mapping and measurement technology, deposition/siltation, and erosion.

Table 2-3. Justification for the Proposed Land Reclassifications

Proposal	Acres	Justification
Recreation Intensive Use to Recreation Low Density	370	370 acres of land that was previously classified as Intensive Recreation has been reclassified to Low Density Recreation. Most of these areas are not developed for high density recreation and will be managed for passive, less-intensive recreation.
Recreation Intensive Use to Project Operations	10	10 acres of Recreation Intensive Use have been reclassified as Project Operations. These areas include access roads and acres needed for safe operation of the dam.
Recreation Intensive Use to Wildlife Management	168	168 acres of Recreation Intensive Use have been reclassified as Wildlife Management. These acres are found on the North side of the lake in areas with limited access and high-quality habitat. Activities such as hiking and bird watching will still be available in these areas.
Recreation Low Density to Project Operations	117	117 acres of Recreation Low Density have been reclassified as Project Operations. These areas include access roads and acres needed for safe operation of the dam and other facilities.
Recreation Low Density to Wildlife Management	186	186 acres of Recreation Low Density have been reclassified to Wildlife Management. These are located on the North side of the lake with limited access and high quality habitat better suited for management of wildlife resources than low density recreation. Activities will remain that same but management will focus on habitat.
Wildlife Management to Environmental Sensitive Areas	1,039	1,039 acres of Wildlife Management have been reclassified as Environmental Sensitive Areas. These areas include quality habitat to be protected and preserved. Although the area will be managed to preserve specific sensitive

Proposal	Acres	Justification
		resources, wildlife management activities including hunting or passive recreation such as unpaved hiking trails will still be permitted in many areas, as long as these activities do not interfere with the sensitive resources. Hunters should reference the most recent TPWD public hunting maps for public hunting areas as well as rules and regulations.

Note: The land classification changes described in this table are the result of changes to individual parcels of land ranging from a few acres to more than 100 hundred acres. Acreages were measured using GIS technology. The acreage numbers provided are approximate.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER CONSIDERATION

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

SECTION 3: AFFECTED ENVIRONMENT AND CONSEQUENCES

This section of the EA describes the potential impacts of the No Action and Proposed Action alternatives on the natural, cultural, and social resources found within the USACE Bardwell Lake Fee Boundary. A description of the existing condition of resources can be found in Chapter 2 of the proposed MP. Only those 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 would 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 § 1508.8 [a]). Indirect effects are caused by the action and are later in time or further removed in distance but are still reasonably foreseeable (40 CFR § 1508.8 [b]). As discussed in this section, the alternatives may create temporary (less than 1 year), short-term (up to 3 years), long-term (3 to 10 years following the master plan revision), or permanent effects.

Whether an impact is significant depends on the context in which the impact occurs and the intensity of the impact (40 CFR § 1508.27). The context refers to the setting in which the impact occurs and may include society as a whole, the affected region, the affected interests, and the locality. Impacts on each resource can vary in degree or magnitude from a slightly noticeable change to a total change in the environment. For the purpose of this analysis, the intensity of impacts 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, 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 proposed MP for existing land use information in and around Bardwell Lake.

3.1.1 Alternative 1: No Action

Under the No Action Alternative, USACE would not implement the proposed MP, and thus the land use management would not be updated to current needs and demands. The operation and maintenance of USACE lands at Bardwell Lake would continue as outlined in the 1974 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 and public preferences. As the regulatory environment continues to change, management at Bardwell Lake would diverge from the plan as it is no longer applicable to existing policies and lake conditions. This divergence would create a patchwork of management requirements that would be inefficient for Bardwell Lake staff to implement. The management would also increasingly lack transparency to the public, or possibly create more of a burden to staff to communicate how the lake management differs from that in the 1974 MP. Implementation of the No Action Alternative would have moderate, adverse, short- and long-term impacts on land use within and on USACE Bardwell Lake project lands due to conflicting guidance and management of USACE lands.

3.1.2 Alternative 2: Proposed Action

The objectives for revising the 1974 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 proposed MP were developed to help fulfill regional goals associated with good stewardship of land and water resources that would allow for continued use and development of project lands.

While HDR is technically a new management classification, the bulk of the 879 acres of HDR land is from areas previously classified as Recreation Intensive Use. The management of these areas would be no different than areas previously managed as Recreation-Intensive Use. MRML-LDR is also a new land classification with the bulk coming from areas previously classified as Recreation Low Density Use. Even though the acres are decreasing for HDR, recreational opportunities would 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, which these areas would support should future management ever want to change them. The management of these areas would be no different than areas previously managed as Recreation-Low Density Use. 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 proposed MP. The establishment and reclassification of 1,046 acres as ESA would allow for greater protection of sensitive habitats and/or cultural resources. Conservation efforts within USACE Bardwell Lake fee owned boundary would be further aided by the additional reclassification of 57 acres as MRML-LDR and the keeping of 1,109 acres as MRML-WM.

On the waters of Bardwell Lake, the proposed MP would add established surface water use categories in addition to the current ad hoc management of the lake. The establishment of 1.6 acres as Restricted, and 3,238 acres as Open Recreation to the water surface, respectively, would allow for a delineated, and safer management of the lake's waters when the lake is at conservation pool. These reclassifications would help to improve safety of those recreating on and around Bardwell Lake by restricting boat access and speeds around certain parts of the lake, as well as establishing areas that boating can occur in. The Bardwell Lake office would still maintain the authority to make ad hoc adjustments as needed by lake level, which would prevent the reclassifications from being overly rigid or even ineffectual in various lake level conditions.

The proposed MP defines Designated No-Wake Areas as areas intended to protect sensitive shorelines and improve boating safety near key water-based recreation access areas such as boat ramps. Bardwell Lake lacks any formal Designated No-Wake Areas, instead relying on its Buoy Plan to facilitate public safety around its seven developed boat ramps. The Buoy Plan may change its no-wake restrictions based upon water level, public safety, and project needs. The areas surrounding the boat ramps are designated in the MP as Open Recreation.

The three utility corridors as explained in Section 6.1 and in Table 6.1 of the proposed MP would restrict future utilities to these areas and eliminate the potential for future habitat destruction through the development of additional corridor areas.

The majority of the land use reclassifications in the proposed MP would 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 Bardwell 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 would have moderate, long-term beneficial impacts to land use as the land reclassifications and utility corridors further refine areas for appropriate activities.

3.2 WATER RESOURCES

Please refer to section 2.1.6 of the proposed MP for existing water resource information in and around Bardwell Lake.

3.2.1 Alternative 1: No Action

There are no known water resource related problems occurring at Bardwell Lake, therefore 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 would allow land management and land uses to be adjusted for current and reasonably foreseeable future changes in water resources. For example, the establishment of 1,046 acres as ESA lands would help to stabilize soils through the promotion and potential restoration of native habitats should future management ever decide to implement. In turn, these habitats will help reduce erosion, and buffer and filter storm runoff before making its way into the lake, therefore reducing water turbidity. The establishment of 57 additional acres as MRML-LDR, and preservation of 1,109 acres as MRML-WM would result in more upland areas and wetlands being protected from erosion and sedimentation. Resource objectives makes it mandatory that all decision-making processes take into consideration their impacts to Bardwell Lake watershed, lake water supply, and water quality.

Implementation of the Proposed Action would 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 2.1.2 and 2.1.3 of the proposed MP for existing climate, climate change and greenhouse gas information in and around Bardwell Lake.

3.3.1 Alternative 1: No Action

The No Action Alternative would not result in any change in management of Bardwell Lake project land. Implementation of the 1974 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.

3.3.2 Alternative 2: Proposed Action

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

3.4 AIR QUALITY

Please refer to section 2.1.4 of the proposed MP for existing air quality information in and around Bardwell Lake.

3.4.1 Alternative 1: No Action

The continued implementation of the 1974 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 1974 MP includes only guidelines and does not incorporate actions which produce criteria pollutants.

3.4.2 Alternative 2: Proposed Action

As with the No Action Alternative, the proposed MP would not result in any change to current and reasonably foreseeable air quality in the region. The Proposed Action does not propose 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 would 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 1,046 acres as ESA lands, increasing MRML-LDR lands by 57 acres, and keeping 1,109 acres as MRML-WM lands. The added protection these classifications provide would benefit native vegetation communities that filter and sequester air pollutants.

3.5 TOPOGRAPHY, GEOLOGY, AND SOILS

Please refer to section 2.1.5 of the proposed MP for existing topography, geology, and soils information in and around Bardwell 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 Bardwell Lake Project lands. The reduction of HDR land (1,436 acres to 879 acres), reclassification of 1,046 acres as ESA lands, increasing MRML-LDR lands by 57 acres, and keeping 1,109 acres as MRML-WM lands, would help to increase the long-term preservation and stabilization of the soils within USACE Bardwell Lake project lands. In addition, resource objectives would make it mandatory that erosion control and sedimentation issues be monitored and alternatives developed and implemented to resolve those issues. The three utility corridors would condense disturbances associated with utility operations to limited areas instead of future construction of new corridors, which would reduce soil exposure to erosive wind and water forces. Implementation of the Proposed Action would have minor, positive, long-term impacts on soil conservation and topography, and geology at Bardwell Lake.

3.6 NATURAL RESOURCES

Please refer to section 2.2.1 of the proposed MP for existing natural resources information in and around Bardwell 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 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 proposed MP would allow natural resources within USACE Bardwell Federal Project lands to be better managed for the area's natural resources. Implementing the knowledge gained from the Wildlife Habitat Appraisal Procedure (WHAP) (Appendix C of the proposed MP) completed for Bardwell Lake, would help preserve and protect high quality and unique areas around the lake per the current and future management decisions. The purpose of the survey was to describe wildlife habitat quality within the USACE Bardwell Lake fee property. The implementation of the proposed land classifications would allow project lands to continue and further support the USFWS and the TPWD missions associated with wildlife conservation and implementation of operational practices that would protect and enhance wildlife and fishery populations and habitat. The new resource objectives also allow for natural resources to be managed with consideration of how they would be impacted from the retention of flood waters. The reduction of HDR land (1,436 acres to 879 acres), reclassification of 1,046 acres as ESA lands, increasing MRML-LDR lands

by 57 acres, and keeping 1,109 acres as MRML-WM lands, especially in prime ecological areas, would help protect natural resources from various types of adverse impacts such as habitat fragmentation. The three utility corridors described in section 6.2 and Table 6.1 of the proposed MP would increase the acreage of future undisturbed habitat by consolidating utility-related disturbances to specific areas. Therefore, under the Proposed Action, there would be moderate short- and long- term, beneficial impacts on natural resources as a result of implementing the proposed 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 Bardwell Lake fee boundary (see USFWS Species List and the IPAC Report in Appendix C of the proposed MP). Based on the IPaC report, there are 6 federally listed species that are designated as endangered, threatened, proposed, or candidate species that could be found within Bardwell Lake. A list of these species is presented in Table 3.1. No Critical Habitat is present within Bardwell Lake. The species identified as Threatened, Endangered or Candidate Species by TPWD that are not federally listed are included in Appendix C of the proposed MP as well as a list of Species of Greatest Conservation Need (SGCN). In addition, Appendix C also provides the list of rare plant communities for the Texas Blackland Prairie Ecoregion.

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

Common Name	Scientific Name	Federal Status	State Status
Alligator Snapping Turtle	*Macrochelys temminckii*	Proposed Threatened	Threatened
Monarch Butterfly	*Danaus plexippus*	Candidate	Not Listed
Piping Plover	*Charadrius melodus*	Threatened	Threatened
Rufa Red Knot	*Calidris canuts rufa*	Threatened	Threatened
Tricolored Bat	*Perimyotis subflavus*	Proposed Endangered	Not Listed
Whooping Crane	*Grus americana*	Endangered	Endangered

Please refer to chapter 2.2.5 of the proposed MP for further information on threatened and endangered species within the USACE fee-owned boundary.

3.7.1 Alternative 1: No Action

The No Action Alternative does not involve any activities that would contribute to changes in existing conditions, which have had no effect on federally listed species. USACE has determined that implementation of the No Action Alternative would have No Effect on any federally threatened or endangered species that may occur within the study area.

3.7.2 Alternative 2: Proposed Action

The implementation of the proposed MP would allow for better cooperative management plans with the USFWS and TPWD that would 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 Bardwell Lake federal project lands. To increase management opportunities and beneficially impact habitat diversity, the reclassifications in the proposed MP include 1,046 acres as ESAs. Under this reclassification almost all the area previously classified as Wildlife Management were converted to ESA in order to preserve areas with the highest ecological value and to ensure they are given the highest order of protection among possible land classifications. Resource objectives would require that threatened and endangered species are managed by various ecosystem management principles. In addition, all new utilities would be built within three proposed utility corridors. This would help reduce future loss of natural resources that could potentially occur from placement of utility lines on project lands. Any future ground-disturbing activities would be coordinated with USFWS through Section 7 of the Endangered Species Act. The USACE has determined that the implementation of the Proposed Action would have No Effect on any federally-listed threatened or endangered species that may occur within the Bardwell Lake federal fee boundary.

3.8 INVASIVE SPECIES

Please refer to section 2.2.5 of the proposed 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 Bardwell Lake would continue to be managed according to the existing invasive species management practices. There would be no 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 proposed MP would allow invasive species within USACE Bardwell federal project lands to be better managed. Implementation of the knowledge gained from the Wildlife Habitat Appraisal Procedure (WHAP) survey done for Bardwell Lake would help identify high value and unique areas that would benefit from further protection, thus reducing the opportunity for invasive species encroachment. The reduction of HDR land (1,436 acres to 879 acres), reclassification of 1,046 acres as ESA lands, increasing MRML-LDR lands by 57 acres, and keeping 1,109 acres as MRML-WM lands, 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. Updated resource objectives also require monitoring and reporting of invasive species, as well as action items to prevent and/or reduce the spread of these species. The three proposed utility corridors would help reduce the spread of invasive species by

preventing the construction of additional corridors that can contribute to the introduction and spread of invasive species. Therefore, under the Proposed Action, there would be short- and long-term minor, beneficial impacts on invasive species management as a result of implementing the proposed MP.

3.9 CULTURAL, HISTORICAL, AND ARCHAEOLOGICAL RESOURCES

Please refer to section 2.3 of the proposed 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 1974 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 proposed MP would allow cultural, historical, and archaeological resources within USACE Bardwell federal project lands to be better managed and accounted for. Based on previous surveys at Bardwell Lake, the required reclassifications, utility corridors, resource objectives, and resource plan would not change current cultural resource management plans or alter areas where these resources exist. All future activities would be coordinated with the State Historic Preservation Officer 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 potential to cause effects on cultural, historical, or archaeological resources would occur as a result of implementing the proposed MP. Beneficial impacts may occur as a result of the proposed MP as lands classified as PO, ESA, MRML-LDR or MRML- WM would generally protect any historic properties within those lands against ground disturbing activities.

3.10 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

Please refer to section 2.4 of the proposed MP for existing socioeconomic information in and around Bardwell Lake. For information on environmental justice information which includes various federal laws please refer the below section 3.10.2.

3.10.1 Alternative 1: No Action

The continued implementation of the 1974 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, stay in local hotels and resorts, play golf at local golf courses, and shop in local retail establishments. These activities would continue to bring revenues to local companies, provide jobs for local residents, and generate local and state tax revenues. There would be no

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 proposed MP land reclassifications, resources objectives, and resource plan reflect changes in land management and land uses that have occurred since 1974. Bardwell Lake offers a variety of recreational opportunities for visitors. Beneficial impacts would be similar to the No Action Alternative. There would be no adverse impacts on economy in the area and no disproportionate impacts on minority or low-income populations, or children, as a result of the Proposed Action.

After using the Environmental Protection Agency (EPA) Climate and Economic Screening Tool (CEST) (2023A), the lake is determined to be surrounded by a disadvantaged community on the northeast side of the lake, with none occurring anywhere else around the lake. This one community is defined by the EPA (2023B) as meeting one or both screening criteria, 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". This disadvantaged community meets the burden criteria for being within socioeconomic threshold, climate change, health, legacy pollution, and workforce development. There would be no adverse impacts to these communities as a result of implementing the proposed MP because no construction activities would occur as result of implementation that would otherwise impact these communities. There would 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 2.5 of the proposed MP for existing recreation information in and around Bardwell Lake.

3.11.1 Alternative 1: No Action

Under the No Action Alternative, there would be no impacts on recreational resources, as there would be no changes to the 1974 MP.

3.11.2 Alternative 2: Proposed Action

Bardwell 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 would decrease (1,436 acres to 879 acres) with implementation of the proposed MP, this land reclassification reflects changes in land management and land uses that have occurred since 1974 at Bardwell Lake. Passive recreational activities would still be allowed as they are now within all lands, regardless of the land classification. The resource objectives would make it mandatory that all decisions made in regard to the lake take into consideration their impacts to recreation and would be monitored should adjustments be needed. Therefore, under the Proposed Action, there

would be no adverse, short- or long-term impacts on recreation as numerous recreation opportunities would remain in and around Bardwell Lake to accommodate various outdoor based recreation activities.

3.12 AESTHETIC RESOURCES

Please refer to section 2.2.6 of the proposed MP for existing aesthetic resource conditions in and around Bardwell Lake.

3.12.1 Alternative 1: No Action

There would be no impacts on aesthetic resources as a result of implementing the No Action Alternative, as there would be no changes to the 1974 MP.

3.12.2 Alternative 2: Proposed Action

Bardwell Lake currently plays a pivotal role in availability of parks and open space in Ellis County and in the surrounding region. The amount of acreage classified for High Density Recreation would decrease (1,436 acres to 879 acres) with implementation of the proposed MP. This land reclassification reflects changes in land management and land uses that have occurred since 1974 at Bardwell Lake. The conversion of these lands would have no effect on current or projected public use or visual aesthetics as views from natural and recreation areas would remain in place. Furthermore, the reclassification of 1,046 acres as ESA lands, increasing MRML-LDR lands by 57 acres, and keeping 1,109 acres as MRML-WM lands, would have positive impacts on aesthetic resources by protecting lands that are aesthetically pleasing and available for passive recreation activity at Bardwell Lake and limit future development in these areas. All new utilities would be built within the three proposed utility corridors to limit aesthetics impacts to natural landscapes. Additionally, resource objectives place an emphases on increasing public education on recreation, nature, cultural resources, and ecology resources at Bardwell Lake. Therefore, under the Proposed Action, there would be no short- or long-term minor, adverse impacts to aesthetic resources as a result of implementing the proposed MP.

3.13 HAZARDOUS MATERIALS AND SOLID WASTE

Please refer to section 2.1.7 of the proposed MP for information concerning hazardous materials and solid waste in and around Bardwell Lake fee owned boundary.

3.14 HEALTH AND SAFETY

Please refer to section 2.1.8 of the proposed MP for information concerning health and safety in and around Bardwell Lake fee owned boundary.

3.14.1 Alternative 1: No Action

Under the No Action Alternative, the 1974 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 proposed MP would result in the classification of Restricted Surface Water (1.6 acres), and Open-Recreation (3,238 acres). These reclassifications would maintain and in some cases, improve boating, non-motorized recreation, and swimming safety near the Bardwell Lake Dam, water intake structures, and key recreational water access areas such as boat ramps and designated swimming areas.

There will not be any impact on health and safety on those who recreate at Bardwell Lake as a result of there not being any area managed as designated No Wake Zone in the proposed MP, in these areas are managed by the Buoy Plan, which in turn helps to maintain the health and safety of all those who recreate at Proctor Lake.

The project would continue to have reporting guidelines should water quality become a threat to public health. Existing regulations and safety programs throughout the Bardwell Lake project area would continue to be enforced to ensure public safety. The resource objectives would make it mandatory that various factors that impacts human safety at the lake are 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 Bardwell Lake. Therefore, under the Proposed Action, there would be short- and long-term minor, beneficial impacts on health and safety as a result of implementing the proposed MP.

3.15 SUMMARY OF CONSEQUENCES AND BENEFITS

Table 3-8 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.	Would have moderate, adverse, short- and long-term impacts on land use within and on USACE Bardwell Lake project lands.	Would have moderate, long-term beneficial impacts to land use	Land classification changes and new resource objectives fully recognize passive use recreation trends and regional environmental values such as protection of prairies.
Water Resources Including Groundwater, Wetlands, and Water Quality	Small change to recognize value of wetlands.	No impacts on water resources as a result of implementing the No Action Alternative.	Would have minor, short- and long- term beneficial impacts on water resources located within USACE project lands.	Specific resource objective promotes restoration and protection of wetlands.
Climate, Climate Change, and Greenhouse Gases	Minor change to recognize need for sustainable, energy efficient design.	Would have no impact (beneficial or adverse) on existing or future climate conditions.	Would have negligible positive impacts to climate, climate change and GHG emissions in the region.	Specific resource objectives promote national climate change mitigation goal. LEED standards for green design, construction, and operation activities would be employed to the extent practicable.
Air Quality	No change	No effect	No effect	No added benefit
Topography, Geology and Soils	Minor change to place emphasis on good stewardship of land and water resources.	There would be no impacts on topography, geology, soils, or prime farmland	Would have minor, positive, long-term impacts on soil conservation and topography, and geology at Bardwell Lake.	Specific resource objectives call for stopping erosion from overuse and land disturbing activities.

Resource	Change Resulting from the Proposed Master Plan	Environmental Consequences: No Action Alternative	Environmental Consequences: Proposed Action	Benefits Summary
Natural Resources	Moderate benefits through land reclassification and resource objectives.	There would be no impacts on natural resources	There would be moderate short- and long- term, beneficial impacts on natural resources	Reclassification of lands included 1,046 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.	Would have No Effect on any federally threatened or endangered species that may occur within the Bardwell Lake federal fee boundary.	Would have No Effect on any federally-listed threatened or endangered species that may occur within the Bardwell Lake federal fee boundary.	The proposed MP sets forth the most recent listing of federal and state-listed species and addresses on-going commitments associated with USFWS Biological Opinions.
Invasive Species	Minor change to recognize several recent and potentially aggressive invasive species.	There would be no impacts from invasive species.	There would be short- and long-term minor, beneficial impacts on invasive species	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.	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	No potential to cause effects on cultural, historical, or archaeological resources	Reclassification of lands included 1,046 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.	There would be no impacts on recreational resources	There would be no adverse, short- or long-term impacts on recreation	Specific management objectives focused on outdoor recreation opportunities and trends are included.

Resource	Change Resulting from the Proposed Master Plan	Environmental Consequences: No Action Alternative	Environmental Consequences: Proposed Action	Benefits Summary
Aesthetic Resources	Minor benefits through land reclassification and resource objectives.	There would be no impacts on visual resource.	There would be no short- or long-term minor, adverse impacts to aesthetic resources	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.	No adverse impacts on human health or safety would be anticipated.	There would be short- and long-term minor, beneficial impacts on health and safety.	Includes specific management objectives to increase water safety outreach efforts.

SECTION 4: CUMULATIVE IMPACTS

NEPA regulations updated May 20, 2023 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 would 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 would either:

1. Not result in any direct or indirect impacts and therefore would 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 1974 Master Plan was implemented (past) and thru the proposed life of the 2024 Master Plan (25 years – to 2049). The zone of interest for all resources except economy is Ellis County, Texas. The zone of interest for economics is the same used in Section 3.10.

4.1 PAST IMPACTS WITHIN THE ZONE OF INTEREST

Bardwell was originally authorized for construction in 1954 as a multi-purpose reservoir for flood control, and water conservation. Construction of Bardwell Dam began in August of 1963. Deliberate impoundment began on November 20, 1965 and the conservation pool was filled in May of 1966.

A total of 7,473 fee simple acres and 831 flood flowage easement acres were acquired for the construction of Bardwell Lake. Of this total acreage in fee simple, 3,570 is water area and 3,918 acres is land area above the conservation pool elevation.

Within Bardwell Lake, there has not been any projects that have modified the structures and operations of Bardwell Lake for the purpose of improving the environment in the public interest. Such projects are governed by Section 1135 of the 1986 Water Resources Development Act, as amended.

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

Future management of the 831 acres of Flowage Easement Lands at Bardwell Lake include 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, or new hiking trails in and around Bardwell Lake.

The North Central Texas Council of Governments (NCTCOG) coordinates with cities, counties, and transportation partners to plan road, transit, bicycle, and pedestrian transportation improvements for 16 counties comprising the NCTCOG and serves as the Metropolitan Planning Organization for the Dallas-Fort Worth Area. NCTCOG's Mobility 2045 plan was used as a reference document for this Master Plan. Items recommended for implementation in the Mobility 2045 plan that are of significance to the area surrounding Bardwell Lake include the following:

- Improvements to US 287 to the north of Bardwell Lake
- Improvements to SH 34 Lake Bardwell Drive which bisections Bardwell Lake

National USACE policy set forth in ER 1130-2-550, Appendix H, states that USACE lands would, 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 would 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 would 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 Bardwell Lake and cumulative adverse impacts on resources would not be expected when added to the impacts of activities associated with the Proposed Action or No Action Alternative. A summary of the anticipated cumulative impacts on each resource is presented below.

4.3.1 Land Use

A major impact would occur if any action were inconsistent with adopted land use plans or if an action would substantially alter those resources required for, supporting, or benefiting the current use. Land use around Bardwell Lake has experienced major change, it is rapidly being developed from agricultural fields into urbanized communities. Under the No Action Alternative, land use would not change. Although the Proposed Action would result in the reclassification of project lands, the reclassifications were developed to help fulfill regional goals associated with good stewardship of land resources that would allow for continued use of project lands.

Section 6.1 of the proposed MP also identifies the need and location for utility corridors. The purpose of utility corridors is to condense the footprint and associate impacts of any future roads and utilities crossings on USACE lands. Therefore, cumulative impacts on land use within the area surrounding Bardwell 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. Bardwell Lake was developed for flood control, and water conservation purposes. The reclassifications and resource objectives required to revise the 1974 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 would allow for continued use of water resources associated with Bardwell Lake. Therefore, cumulative impacts on water resources within the area surrounding Bardwell 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 Bardwell 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 Bardwell Lake, the proposed MP and all associated documents would be reviewed and revised as necessary. Therefore, implementation of the proposed MP, when combined with other existing and proposed projects in the region, would result in negligible cumulative impacts on climate, climate change or GHG.

4.3.4 Air Quality

There are a few major highway projects that are scheduled near the zone of interest for Bardwell Lake; therefore, increasing the amount of new emissions that could potentially affect air quality within the region. The Proposed Action would 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 Bardwell Lake under the Proposed Action would be negligible. Seasonal prescribed burning could occur on Bardwell Lake to help maintain the various prairies found throughout the fee boundary, but would have minor, negative impacts on air quality through elevated ground-level O_3 and particulate matter concentrations; however, these seasonal burns would be scheduled so that impacts are minimized. Implementation of the proposed 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 Bardwell 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 would include a substantial reduction in ecological processes, communities, or populations that would threaten the long-term viability of a species or result in the substantial loss of a sensitive community that could not be offset or otherwise compensated. Past, present, and future projects are not anticipated to impact the viability of any plant species or community, rare or sensitive habitats, or wildlife. The establishment of ESA, and keeping MRML-WM areas, as well as resource objectives that favor protection and restoration of valuable natural resources would have beneficial cumulative impacts. No identified actions would threaten the viability of natural resources. Therefore, there would be major long-term beneficial impacts to natural resources resulting from the revision of the proposed MP when combined with past and proposed actions in the area.

4.3.7 Invasive Species

The land reclassifications required to revise the 1974 MP are compatible with Bardwell Lake invasive species management practices. Therefore, there would be minor long-term beneficial impacts on reducing and preventing invasive species within the area surrounding Bardwell Lake.

4.3.8 Threatened and Endangered Species

The Proposed Action and No Action Alternatives would not adversely impact threatened, endangered and Texas Natural Diversity Database (TXNDD) species within the area. Should federally listed species change in the future (e.g., delisting of the piping plover 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 TPWD to preserve, enhance, and protect critical wildlife habitat resources.

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

4.3.9 Cultural, Historical, and Archaeological Resources

The Proposed Action would 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. Additionally, the Utility Corridors would restrict any future pipelines, roads, or other infrastructure to already disturbed areas, further limiting impacts on cultural resources. Therefore, this action, when combined with other existing and proposed projects in the region, would not result in major cumulative impacts on cultural resources or historic properties.

4.3.10 Recreation

Bardwell Lake provides regionally significant outdoor recreation benefits including a variety of recreation opportunities. Even though the amount of acreage available for High Density Recreation would decrease as a result of implementing the proposed reclassifications, resources objectives, and resource plan in the proposed MP, these changes reflect changes in land management and historic recreation use patterns that have occurred since 1974 at Bardwell Lake. The conversion of these lands would have no effect on current or projected public use. Therefore, the Proposed Action, when combined with other existing and proposed projects in the region, would result in negligible beneficial cumulative impacts on area recreational resources.

4.3.11 Aesthetic Resources

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

4.3.12 Health and Safety

No health or safety risks would be created by the Proposed Action. The effects of implementing the proposed MP, when combined with other ongoing and proposed projects in the Bardwell Lake area, would not be considered a major 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 proposed 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 proposed MP revision process, as well as identify reclassification proposals, and identify significant issues related to the Proposed Action. Information provided by USFWS and TPWD on fish and wildlife resources has been utilized in the development of the proposed MP.

Endangered Species Act of 1973, as amended – Current lists of threatened or endangered species were compiled for the proposed MP. USACE has determined that there would 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 1974 MP revision would not result in adverse impacts on migratory birds or their habitat. Beneficial impacts could occur through protection of habitat as a result of the proposed MP revision.

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. The species is known to occur within the Bardwell Lake Fee Boundary. Nothing within the 2024 master plan would constitute as "take" on the species.

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 would be coordinated to avoid impacts on migratory and nesting birds.

Clean Water Act (CWA) of 1977, as amended – The Proposed Action would comply with all state and Federal CWA regulations and requirements and is regularly monitored

by the USACE and TCEQ for water quality. A state water quality certification pursuant to Section 401 of the CWA is not required for the proposed MP. There would be no change in the existing management of the reservoir that would impact water quality.

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

Clean Air Act of 1977, as amended – The U.S. Environmental Protection Agency (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 would not change with the proposed 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 Bardwell Lake project lands, but these would 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 would have impacts to the existing floodplain at Bardwell 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 would not impact Prime Farmland present on Bardwell Lake project lands.

Executive Order 12898, Environmental Justice, as amended – 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 proposed MP would 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 will 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 would not be considered an irreversible commitment because subsequent 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 proposed revisions to the 1974 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 1974 Master Plan, 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. This public scoping meeting was held on February 16, 2023 in the Ennis Welcome Center – 201 North West Main, Ennis, Texas 75119.

A second public meeting will be held on April 10, 2024, in the Ennis Welcome Center – 201 North West Main, Ennis, Texas 75119. from 4-6pm. This meeting will introduce the public to the draft MP and EA and will begin the 30-day public review period of the MP, EA and draft Finding of No Significant Impact (FONSI). As with the first public meeting, USACE, Fort Worth District, will place advertisements on the USACE webpage, and various social media sites sponsored by adjacent cities. In addition, news releases will be sent to area newspapers.

Comments received during the initial scoping period and on the draft MP and EA will be incorporated in the documents, and as appropriate in the proposed MP.

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

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United States Army Corps of Engineers (USACE). 2024. Proposed 2024 Bardwell Lake Master Plan, Trinity River Basin, and Ellis County, Texas. USACE, Fort Worth District.

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

USACE. 2019. Bardwell Dam and Lake. Waxahachie Creek. Trinity River Basin, Texas. Water Control Manual. Appendix F. Master Reservoir Regulation Manual.

USFWS. 2024. IPAC: Information, Planning, and Consultation System, Environmental Conservation Online System. Official Species List. Project Code: 2023-0016214. Created on March 21, 2024. https:ecos.fws.gov.

SECTION 9: ACRONYMS/ABBREVIATIONS

%	Percent
°	Degrees
ac-ft	acre-feet
AQCR	Air Quality Control Region
CEQ	Council on Environmental Quality
CEST	Climate and Economic Screening Tool
CFR	Code of Federal Regulations
cfs	cubic feet per second
CHSP	Cedar Hill State Park
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO2e	CO2-equivalent
CRMP	Cultural Resources Management Plan
CWA	Clean Water Act
DSHS	Department of State Health Services (Texas)
EA	Environmental Assessment
EO	Executive Order
EP	Engineer Pamphlet
ER	Engineer Regulation
ESA	Environmentally Sensitive Area
F	Fahrenheit
FAA	Federal Aviation Administration
FONSI	Finding of No Significant Impact
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
NCTCOG	North Central Texas Council of Governments
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
NWI	National Wetlands Inventory (USFWS)
O_3	Ozone
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
TCAP	Texas Conservation Action Plan
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department
TXNDD	Texas Natural Diversity Database
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
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- 9 years of USACE experience.

ATTACHMENT A: NEPA COORDINATION AND PUBLIC SCOPING

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, FORT WORTH DISTRICT
P.O. BOX 17300
FORT WORTH, TX 76102-0300

February 1, 2023

Public Notice

BARDWELL LAKE MASTER PLAN REVISION OPEN HOUSE

The Fort Worth District, U.S. Army Corps of Engineers (USACE) is revising the 1974 Bardwell Lake Master Plan (MP). The USACE defines the MP 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. It defines "how" the resources for public use and conservation will be managed. The current MP, last approved in 1974, needs revision to address changes in regional land use, population, outdoor recreation trends, and the USACE management policy.

An open house will be held from 4:00 pm to 6:00 pm on February 16, 2023, in the Ennis Welcome Center – 201 North West Main, Ennis, Texas 75119**.** The open house will provide attendees with information regarding the revision content and process and a general schedule. Attendees will be able to view current land use classification maps and ask the USACE staff questions.

The 30-day public comment period will begin February 16, 2023, and end March 17, 2023. The public can send comments, suggestions, and concerns during this time. Public participation is critical to successfully revising the 1974 MP. Information provided at the open house, including the current MP, may be viewed on the USACE website at the following link beginning February 16, 2023.

https://www.swf.usace.army.mil/About/Lakes-and-Recreation-Information/Master-Plan-Updates

Comments can be submitted in writing at the scheduled open house, mailed to the USACE, Lake Manager, the U.S. Army Corps of Engineers, 4000 Observation Drive, Ennis, Texas 75119, or emailed to: ceswf-od-br@usace.army.mil.

Sincerely,

Kenneth Shingleton

Kenneth Shingleton
Chief, Cultural and Environmental Program Support Section
Regional Planning and Environmental Center

Bardwell Lake Master Plan Revision

General Information

The Army Corps of Engineers (USACE), Fort Worth District, is revising the Master Plan for Bardwell Lake. The Master Plan is intended to serve as a comprehensive land and recreational management plan with a life span of 25 years. It guides the stewardship of natural and cultural resources and the provision of outdoor recreation facilities and opportunities to ensure sustainability of federal land associated with Bardwell Lake.

About Bardwell Lake

Bardwell Lake is located at river mile 5.0 on Waxahachie Creek about 5 miles south of Ennis, Texas. The lake is located entirely in Ellis County. Bardwell is a multi-purpose flood control and water conservation lake with a total storage capacity of 140,000 acre feet. In addition to these primary missions, USACE has an inherent mission of environmental stewardship of project lands and works closely with neighboring cities to provide regionally important outdoor recreation opportunities. Construction on the dam was started in 1963 and was completed in 1965. Bardwell Lake is home to the following parks and recreation areas: Mott Park, High View Park, Waxahachie Creek Park, Love Park, Little Mustang Creek Park, Big Mustang Creek Park, Buffalo Creek Wetland Area and Meadowview Nature Area.

What is a Master Plan?

The Master Plan is the strategic land use management document that guides the comprehensive management and development of all project recreational, natural, and cultural resources throughout the life of the water resources project. Revision of the Master Plan will not address in detail the technical operational aspects of the reservoir related to the water supply or flood risk management missions of the project.

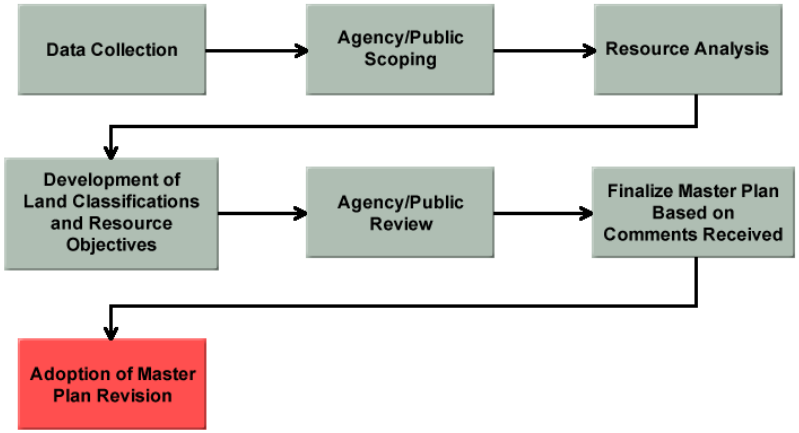
Why Revise the Bardwell Lake Master Plan?

The current Master Plan for Belton Lake was prepared in 1970. The Plan and the land classifications are in need of revision to address changes in regional land use, population, outdoor recreation trends and

Why Revise the Bardwell Lake Master Plan?

The current Master Plan for Belton Lake was prepared in 1970. 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 threatened and endangered species habitat. Public participation is critical to the successful revision of the Master Plan.

The Master Planning Process

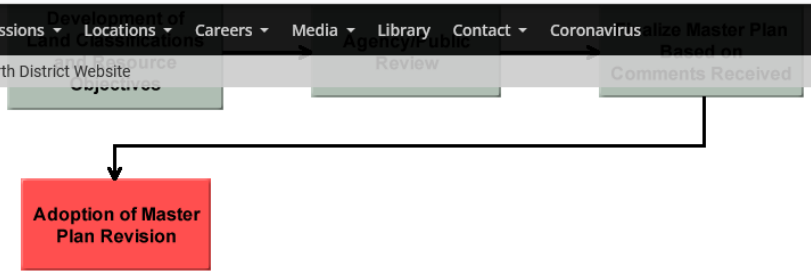


Comments may be submitted in person at the meeting, delivered to the project office, online by filling out the Comment Form below and clicking the link provided on the comment form, by mailing the comments to the address below, or via email at the email address provided. Only written comments will be accepted. **The comment period begins February 17, 2023 and ends March 18, 2023**. Comments and questions pertaining to the Master Plan revision can be addressed to:

U.S. Army Corps of Engineers

Attn: Lake Manager
Bardwell Lake Office
4000 Observation Dr
Ennis, Texas 75119

Email: ceswf-od-br@usace.army.mil



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4000 Observation Dr
Ennis, Texas 75119

Email: ceswf-od-br@usace.army.mil

Related Files

Initial Public Meeting Notice and other information:

PUBLIC NOTICE AND OPEN HOUSE

- Comment Form with Instructions
- Presentation from February 16 Public Meeting
- Lake Project Overview Map
- 1974 Bardwell Lake Master Plan

BARDWELL LAKE MASTER PLAN REVISION:

PUBLIC INVOLVEMENT PRESENTATION

U.S. Army Corps of Engineers
Fort Worth District

MISSION / PEOPLE / TEAMWORK

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Purpose of Presentation

- Inform the public and stakeholders that a master plan revision has started
- **Define** a master plan
- **Describe** the master plan **revision process**
- **Provide instructions** on how to participate in the revision process
- **Encourage** participation
- **Provide links** to documents

The Corps defines a Master Plan as…

> "The strategic land use management document that guides the comprehensive management and development of all project recreational, natural and cultural resources throughout the life of the water resource development project."

Source: Chapter 3 of EP 1130-2-550 available at www.usace.army.mil/library/publications

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Presentation Topics

What is a master plan?

Why do a revision?

What is the revision process?

What is not part of a master plan?

What is changing in the plan?

How can I participate?

Who can I talk to about the plan?

When will the master plan be done?

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What is a master plan?

- The master plan is a **25 year comprehensive land use management guide** for recreational, natural, and cultural resources

- **Adheres to Federal laws** to preserve, conserve, restore, maintain, manage, 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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Why do a revision?

- The current master plan is **out of date** and is **no longer compliant** with new regulations
- **Substantial changes in** environmental, cultural, social, and recreational **conditions have occurred** since the current master plan was approved
- **Re-examine land classification** due to these substantial changes
- The master plan **provides long-term goals** and **consistent management objectives** to guide balanced management of resources and public recreation

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What is the revision process?

The process is a cover-to-cover **review and revision of the entire plan** and is accomplished by:

- **A team of Corps employees** including Operations, Real Estate, Master Planning, and Environmental Compliance subject matter experts
- **Receive input from** and **collaboration with** partners, neighbors, stakeholders, elected officials, resource agencies, and the public
- A thorough review and update of **land and water surface classifications**
- Developing appropriate **NEPA compliance** documents

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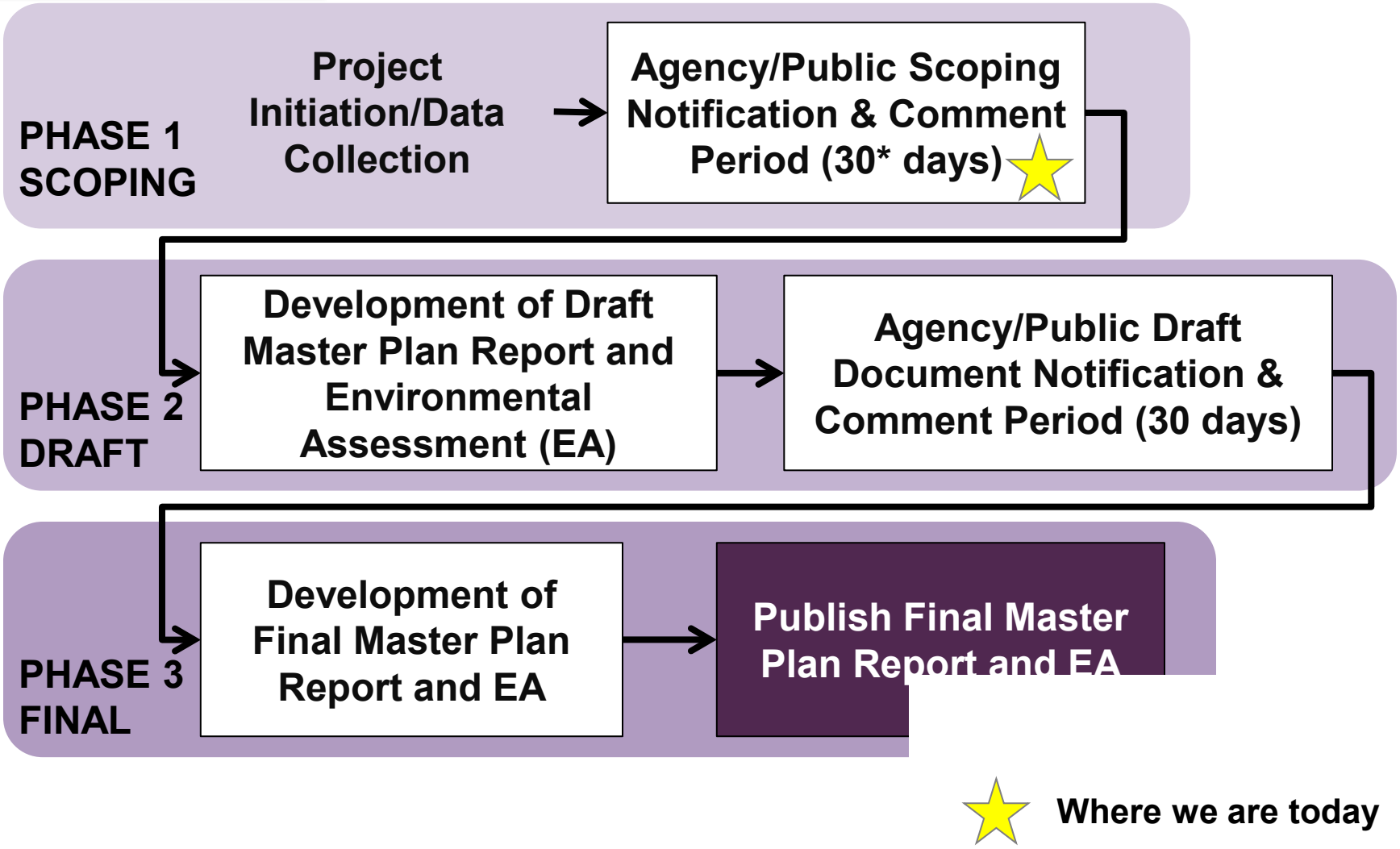
What is the revision process?



What is the revision process?

Land Classifications

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

Land Classification	Definition
Project Operations	Lands required for the dam, spillway, levees, office, maintenance facilities and other areas that are used solely for project operations.
High Density Recreation	Land developed for intensive recreational activities for the visiting public, including day use areas and campground areas for commercial concessions, and quasi-public development.
Multiple Resource Management Lands	**Low Density Recreation**: Lands with minimal development or infrastructure that support passive public recreational use (e.g., trails, primitive camping, wildlife observation, fishing and hunting).
	Wildlife Management: Lands designated for the stewardship of fish and wildlife resources.
	Vegetative Management: Lands designated for the stewardship of forest, prairie, and other native vegetative cover.
	Inactive and/or Future Recreation Areas: Recreation areas planned for the future or that have been temporarily closed.
Environmentally Sensitive Areas	Areas where scientific, ecological, cultural or aesthetic features have been identified. These areas must be considered by management to ensure they are not adversely impacted.
Mitigation	Lands acquired or designated specifically for offsetting losses associated with development of the project. Lands allocated as separable mitigation lands can only be given this classification.

What is the revision process?

Water Surface Classifications

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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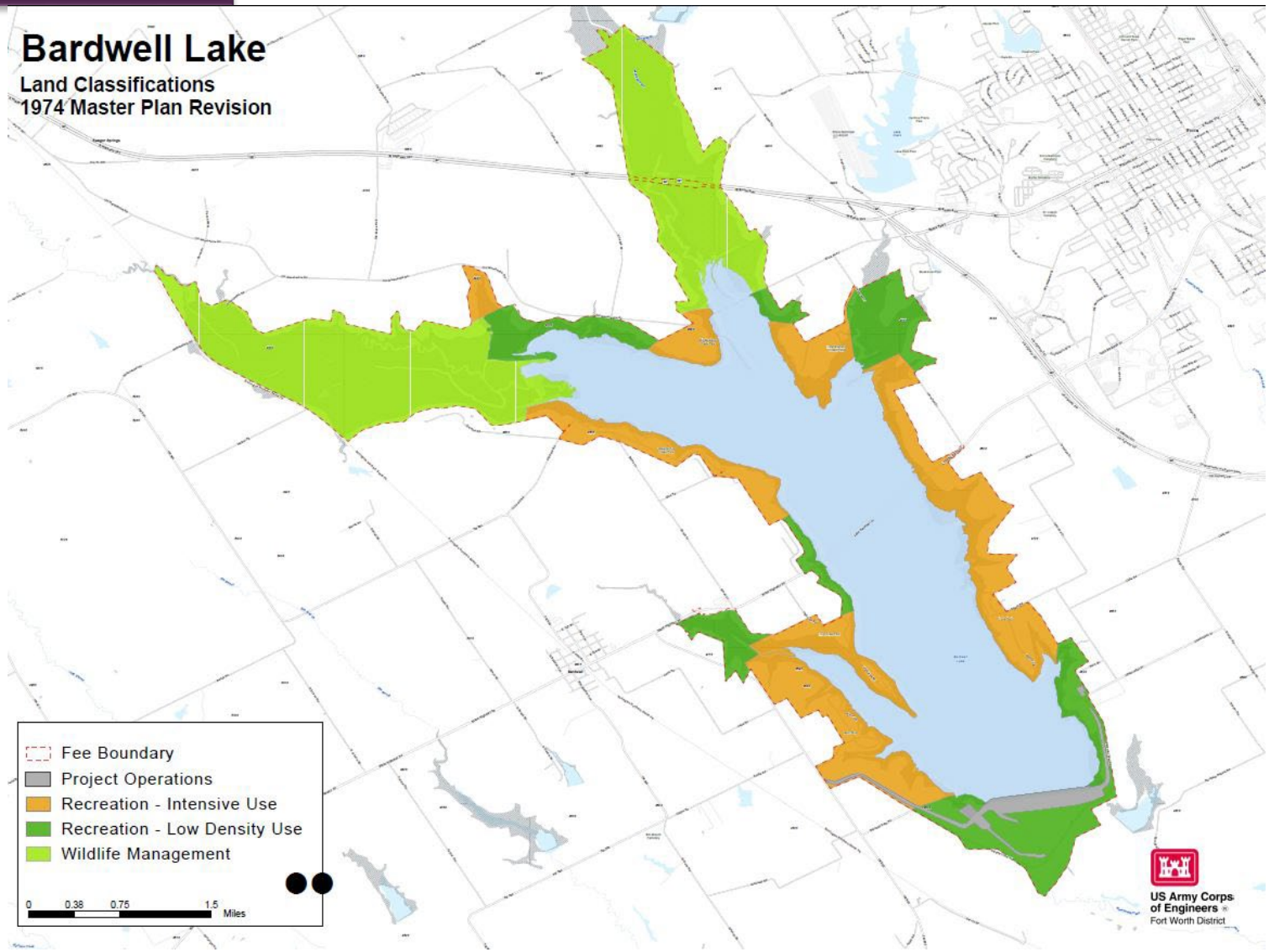
What is the revision process?

Land Use Map from 1974 Master Plan



What is the revision process?

NEPA Compliance

National Environmental Policy Act (NEPA)

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 from other federal, state, and local governments, and Tribal Nations

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What is not part of a master plan?

- Facility **design details**
- Details of **daily project administration**
- Technical aspects of:
  - Water management for **flood risk management**
  - Regional **water quality**
  - **Water supply**
  - **Shoreline management**
  - **Water level management**
  - **Hydropower**
  - **Navigation**

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What is changing in the plan?

At this point in the revision process **there are no proposed changes**

The Corps is **requesting written comments for RECOMMENDED changes** to the existing master plan

Possible Changes to the Revised Mater Plan Could Include:

- Change Land and Water Classification
- Change Resource Goals and Objectives
- Create Utility Corridors

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How can I participate?

Submit written comments!

Review all documents available on the USACE website:

https://www.swf.usace.army.mil/About/Lakes-and-Recreation-Information/Master-Plan-Updates/Bardwell/

Documents available 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 can I participate?

Comments will be accepted only **in writing**, some of the methods for submitting a comment include:

- You may **download the comment form** provided on the website, fill it out electronically, and email it to the Corps using the submit button on the comment form
- Or you may **print the comment form** provided on the website, fill it out by hand, and mail it to the Corps 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 Corps at the address provided on the website
- Comments are due by close of business on **March 17, 2023**

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Who can I talk to about the plan?

US Army Corps of Engineers

Talk to anyone from the USACE at the meeting to answer your questions.

- Call the Lake Office at: (972) 875-5711
- Visit the Lake Office at: 4000 Observation Drive Ennis, Texas 75119
- Email us your questions at: ceswf-od-br@usace.army.mil

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When will the master plan be done?

- The master plan will take **18-24 months** to complete
- Projected milestones/schedule

Milestones	Schedule
Public Notification for Scoping	**16 February 2023**
Public Comment Period (30 days)	**16 February – 17 March 2023**
Draft Master Plan/EA Public Notification	**April 2024***
Public Comment Period (30 days)	**May 2024***
Final Master Plan/EA Approved	**November 2024***

* Projected

Thank you for viewing this presentation and participating in the master plan revision process at Bardwell Lake.

Website address:

https://www.swf.usace.army.mil/About/Lakes-and-Recreation-Information/Master-Plan-Updates/Bardwell/

Email:

ceswf-od-br@usace.army.mil

Mail:

U.S. Army Corps of Engineers
Bardwell Project Office,
Attn: Lake Manager
4000 Observation Drive
Ennis, Texas 75119

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Comment Form Instructions

Bardwell Lake, Texas

Master Plan Revision

30 Day Comment Period

Comments Due By: 17 March 2023

The U.S. Army Corps of Engineers is in the process of revising the Bardwell Lake Master Plan. The master plan revision will guide the land and recreational management of the federally owned property that make up 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 the master plan, please submit comments using any of the following methods:

• Fill out and return a comment form available below or at: https://www.swf.usace.army.mil/About/Lakes-and-Recreation-Information/Master-Plan-Updates

• Provide comments in an email message or use comment form and send to:

ceswf-od-br@usace.army.mil

• Provide comments in a letter or use comment form and mail to:

Lake Manager
US Army Corps of Engineers
4000 Observation Drive, Ennis Texas 75119

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

US Army Corps of Engineers®

Comment Form

Bardwell Lake, Texas

Master Plan Revision

Comments Due By: 17 March 2023

Questions, comments, or suggestions?

Your input on the proposed Master Plan revision and any related environmental comments under the National Environmental Policy Act (NEPA) is valuable. Your participation is key to our success! Please write your questions, comments, or suggestions in the space provided below. Feel free to use additional pages if needed. Forms may be submitted at the public workshop or within 30 days, to the address below no later than the date listed on this form. Thank you for your participation!

_____

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_____

Optional Information (used for mailing list to keep you informed and will not be used for any other purpose):

Name:_____ Affiliation:_____

Address:_____ City:_____ State:_____

Zip code:_____ Phone: ____/_____ Email:_____

Mail or email comment sheet to the following Point of Contact:

Lake Manager
US Army Corps of Engineers
4000 Observation Drive, Ennis Texas 75119

ceswf-od-br@usace.army.mil

Additional information and comment sheets can be found at the following:
https://www.swf.usace.army.mil/About/Lakes-and-Recreation-Information/Master-Plan-Updates

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APPENDIX C – WILDLIFE DOCUMENTS

Items included in Appendix C:

IPAC Report - USFWS

SGCN List - TPWD

Rare Species Listing - TPWD

WHAP Report - USACE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arlington Ecological Services Field Office
501 West Felix Street
Suite 1105
Fort Worth, TX 76115-3410
Phone: (817) 277-1100 Fax: (817) 277-1129
Email Address: arles@fws.gov

In Reply Refer To: 03/21/2024 18:18:48 UTC
Project Code: 2023-0016214
Project Name: Bardwell Lake MP Revision

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, which may occur within the boundary of 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.).

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 section 7(a)(1) of the Act, Federal agencies are directed to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Under and 7(a)(2) and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether their actions may affect threatened and endangered species and/or designated critical habitat. A Federal action is an activity or program authorized, funded, or carried out, in whole or in part, by a Federal agency (50 CFR 402.02).

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 Federal actions 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.

After evaluating the potential effects of a proposed action on federally listed species, one of the following determinations should be made by the Federal agency:

1. *No effect* - the appropriate determination when a project, as proposed, is anticipated to have no effects to listed species or critical habitat. A "no effect" determination does not require section 7 consultation and no coordination or contact with the Service is necessary. However, the action agency should maintain a complete record of their evaluation, including the steps leading to the determination of affect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related information.
2. *May affect, but is not likely to adversely affect* - the appropriate determination when a proposed action's anticipated effects to listed species or critical habitat are insignificant, discountable, or completely beneficial. Insignificant effects relate to the size of the impact and should never reach the scale where "take" of a listed species occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not be able to meaningfully measure, detect, or evaluate insignificant effects, or expect discountable effects to occur. This determination requires written concurrence from the Service. A biological evaluation or other supporting information justifying this determination should be submitted with a request for written concurrence.
3. *May affect, is likely to adversely affect* - the appropriate determination if any adverse effect to listed species or critical habitat may occur as a consequence of the proposed action, and the effect is not discountable or insignificant. This determination requires formal section 7 consultation.

The Service has performed up-front analysis for certain project types and species in your project area. These analyses have been compiled into *determination keys*, which allows an action agency, or its designated non-federal representative, to initiate a streamlined process for determining a proposed project's potential effects on federally listed species. The determination keys can be accessed through IPaC.

The Service recommends that candidate species, proposed species, and proposed critical habitat be addressed should consultation be necessary. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found at: https://www.fws.gov/service/section-7-consultations

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 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 IPaC system by completing the same process used to receive the enclosed list.

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan (https://www.fws.gov/library/collections/bald-and-golden-eagle-management). Additionally, wind energy projects should follow the wind energy guidelines (https://www.fws.gov/media/land-based-wind-energy-guidelines) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: https://www.fws.gov/media/recommended-best-practices-communication-tower-design-siting-construction-operation. The Federal Aviation Administration (FAA) released specifications for and made mandatory flashing L-810 lights on new towers 150-350 feet AGL, and the elimination of L-810 steady-burning side lights on towers above 350 feet AGL. While the FAA made these changes to reduce the number of migratory bird collisions (by as much as 70%), extinguishing steady-burning side lights also reduces maintenance costs to tower owners. For additional information concerning migratory birds and eagle conservation plans, please contact the Service's Migratory Bird Office at 505-248-7882.

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

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- 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:

Arlington Ecological Services Field Office
501 West Felix Street
Suite 1105
Fort Worth, TX 76115-3410
(817) 277-1100

PROJECT SUMMARY

Project Code: 2023-0016214
Project Name: Bardwell Lake MP Revision
Project Type: Land Management Plans - NWR
Project Description: The Bardwell Lake Master Plan (Ellis County, Texas) 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 Bardwell 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/@32.29987935,-96.67969829665228,14z

Counties: Ellis County, Texas

ENDANGERED SPECIES ACT SPECIES

There is a total of 6 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. Note that 2 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], 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
Tricolored Bat *Perimyotis subflavus* 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 *Charadrius melodus* 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. This species only needs to be considered under the following conditions: ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Rufa Red Knot *Calidris canutus rufa* There is **proposed** critical habitat for this species. This species only needs to be considered under the following conditions: ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened
Whooping Crane *Grus americana* Population: Wherever found, except where listed as an experimental population There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/758	Endangered

REPTILES

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

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* 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.

BALD & GOLDEN EAGLES

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

---

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

There are likely bald eagles present in your project area. For additional information on bald eagles, refer to Bald Eagle Nesting and Sensitivity to Human Activity

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

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31

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 "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper

Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

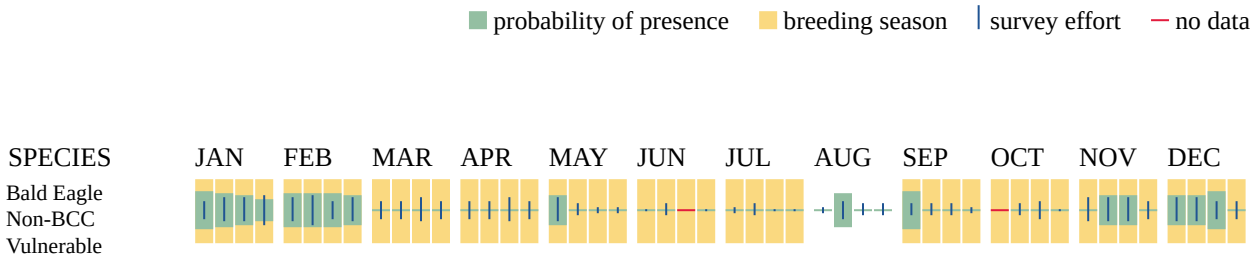
Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

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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)

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

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25
Lesser Yellowlegs *Tringa flavipes* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Little Blue Heron *Egretta caerulea* 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/9477	Breeds Mar 10 to Oct 15
Long-billed Curlew *Numenius americanus* 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/5511	Breeds elsewhere
Pectoral Sandpiper *Calidris melanotos* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9561	Breeds elsewhere

NAME	BREEDING SEASON
Prothonotary Warbler *Protonotaria citrea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9439	Breeds Apr 1 to Jul 31
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	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 "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

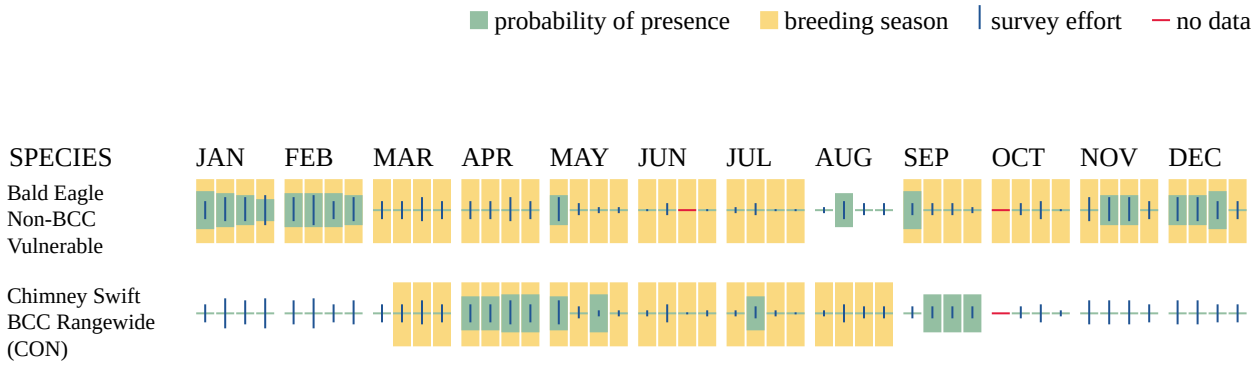
Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

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 FORESTED/SHRUB WETLAND

- PFO1A
- PFO1Ah

- PSS1Ch
- PSS1C
- PFO1/SS1C
- PFO1Ch
- PFO1C
- PFO1/EM1Ch

FRESHWATER POND

- PABFx
- PUBHx
- PUBHh
- PUBH
- PABFh

FRESHWATER EMERGENT WETLAND

- PEM1Fh
- PEM1C
- PEM1Ah
- PEM1A
- PEM1Cx
- PEM1Ch

RIVERINE

- R4SBC
- R2UBH
- R5UBH

LAKE

- L1UBHh
- L2USCh

IPAC USER CONTACT INFORMATION

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Last Update: 9/1/2023

ELLIS COUNTY

AMPHIBIANS

southern crawfish frog *Lithobates areolatus areolatus*

Terrestrial and aquatic: The terrestial habitat is primarily grassland and can vary from pasture to intact prairie; it can also include small prairies in the middle of large forested areas. Aquatic habitat is any body of water but preferred habitat is ephemeral wetlands.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4T4	State Rank: S3

Strecker's chorus frog *Pseudacris streckeri*

Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

Woodhouse's toad *Anaxyrus woodhousii*

Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: SU

BIRDS

bald eagle *Haliaeetus leucocephalus*

Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3B,S3N

black rail *Laterallus jamaicensis*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous years dead grasses; nest usually hidden in marsh grass or at base of Salicornia

Federal Status: T	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2

chestnut-collared longspur *Calcarius ornatus*

Occurs in open shortgrass settings especially in patches with some bare ground. Also occurs in grain sorghum fields and Conservation Reserve Program lands

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

ELLIS COUNTY

BIRDS

Franklin's gull *Leucophaeus pipixcan*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2N

piping plover *Charadrius melodus*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance.

Federal Status: LT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2N

rufa red knot *Calidris canutus rufa*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore. Bolivar Flats in Galveston County, sandy beaches Mustang Island, few on outer coastal and barrier beaches, tidal mudflats and salt marshes.

Federal Status: LT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4T2	State Rank: S2N

Sprague's pipit *Anthus spragueii*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat during migration and in winter consists of pastures and weedy fields (AOU 1983), including grasslands with dense herbaceous vegetation or grassy agricultural fields.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S3N

western burrowing owl *Athene cunicularia hypugaea*

Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4T4	State Rank: S2

ELLIS COUNTY

BIRDS

white-faced ibis *Plegadis chihi*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4B

whooping crane *Grus americana*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties.

Federal Status: LE	State Status: E	SGCN: Y
Endemic: N	Global Rank: G1	State Rank: S1S2N

wood stork *Mycteria americana*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers to nest in large tracts of baldcypress (Taxodium distichum) or red mangrove (Rhizophora mangle); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: SHB,S2N

INSECTS

American bumblebee *Bombus pensylvanicus*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G3G4	State Rank: SNR

No accepted common name *Amblycorypha uhleri*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G2G3	State Rank: SNA

No accepted common name *Arethaea ambulator*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: GNR	State Rank: SNR

ELLIS COUNTY

MAMMALS

big brown bat *Eptesicus fuscus*

Any wooded areas or woodlands except south Texas. Riparian areas in west Texas.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

cave myotis bat *Myotis velifer*

Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4G5	State Rank: S2S3

eastern red bat *Lasiurus borealis*

Red bats are migratory bats that are common across Texas. They are most common in the eastern and central parts of the state, due to their requirement of forests for foliage roosting. West Texas specimens are associated with forested areas (cottonwoods). Also common along the coastline. These bats are highly mobile, seasonally migratory, and practice a type of "wandering migration". Associations with specific habitat is difficult unless specific migratory stopover sites or wintering grounds are found. Likely associated with any forested area in East, Central, and North Texas but can occur statewide.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S4

eastern spotted skunk *Spilogale putorius*

Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges & woodlands. Prefer wooded, brushy areas & tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S1S3

hoary bat *Lasiurus cinereus*

Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S3

long-tailed weasel *Mustela frenata*

Includes brushlands, fence rows, upland woods and bottomland hardwoods, forest edges & rocky desert scrub. Usually live close to water.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

ELLIS COUNTY

MAMMALS

mountain lion *Puma concolor*

Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains & riparian zones.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2S3

muskrat *Ondatra zibethicus*

Found in fresh or brackish marshes, lakes, ponds, swamps, and other bodies of slow-moving water. Most abundant in areas with cattail. Dens in bank burrow or conical house of vegetation in shallow vegetated water. It is primarily found in the Rio Grande near El Paso and in SE Texas in the Houston area.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

southeastern myotis bat *Myotis austroriparius*

Caves are rare in Texas portion of range; buildings, hollow trees are probably important. Historically, lowland pine and hardwood forests with large hollow trees; associated with ecological communities near water. Roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S3?

swamp rabbit *Sylvilagus aquaticus*

Primarily found in lowland areas near water including: cypress bogs and marshes, floodplains, creeks and rivers.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

tricolored bat *Perimyotis subflavus*

Forest, woodland and riparian areas are important. Caves are very important to this species.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S2

western hog-nosed skunk *Conepatus leuconotus*

Habitats include woodlands, grasslands & deserts, to 7200 feet, most common in rugged, rocky canyon country; little is known about the habitat of the ssp. telmalestes

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S4

ELLIS COUNTY

MOLLUSKS

Louisiana pigtoe *Pleurobema riddellii*

Occurs in small streams to large rivers in slow to moderate currents in substrates of clay, mud, sand, and gravel. Not known from impoundments (Howells 2010f; Randklev et al. 2013b; Troia et al. 2015). [Mussels of Texas 2019]

Federal Status: PT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G1G2	State Rank: S1

sandbank pocketbook *Lampsilis satura*

Occurs in small streams to large rivers in slow to moderate current in sandy mud to sand and gravel substrate. Can occur in a variety of habitats but most common in littoral habitats such as banks or backwaters or in protected areas along point bars (Randklev et al. 2013b; Randklev et al. 2014a; Troia et al. 2015). [Mussels of Texas 2019]

Federal Status:	State Status: T	SGCN: Y
Endemic:	Global Rank: G2?	State Rank: S1

Texas heelsplitter *Potamilus amphichaenus*

Occurs in small streams to large rivers in standing to slow-flowing water; most common in banks, backwaters and quiet pools; adapts to some reservoirs. Often found in soft substrates such as mud, silt or sand (Howells et al. 1996; Randklev et al. 2017a). [Mussels of Texas 2019]

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G1G3	State Rank: S1

Trinity pigtoe *Fusconaia chunii*

Found in a variety of habitats but most common in riffles. Inhabits various substrates though most often sand, gravel, and cobble (species was recently split from Texas Pigtoe and occurs in similar habitats; Howells 2010a; Randklev et al. 2013b; Randklev et al. 2014a; Troia et al 2015). [Mussels of Texas 2020]

Federal Status:	State Status: T	SGCN: Y
Endemic: Y	Global Rank: GNR	State Rank: S1

REPTILES

alligator snapping turtle *Macrochelys temminckii*

Aquatic: Perennial water bodies; rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near running water; sometimes enters brackish coastal waters. Females emerge to lay eggs close to the waters edge.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2

eastern box turtle *Terrapene carolina*

Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

ELLIS COUNTY

REPTILES

prairie skink *Plestiodon septentrionalis*

The prairie skink can occur in any native grassland habitat across the Rolling Plains, Blackland Prairie, Post Oak Savanna and Pineywoods ecoregions.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2

slender glass lizard *Ophisaurus attenuatus*

Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

Texas garter snake *Thamnophis sirtalis annectens*

Terrestrial and aquatic: Habitats used include the grasslands and modified open areas in the vicinity of aquatic features, such as ponds, streams or marshes. Damp soils and debris for cover are thought to be critical.

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G5T4	State Rank: S1

Texas horned lizard *Phrynosoma cornutum*

Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4G5	State Rank: S3

timber (canebrake) rattlesnake *Crotalus horridus*

Terrestrial: Swamps, floodplains, upland pine and deciduous woodland, riparian zones, abandoned farmland. Limestone bluffs, sandy soil or black clay. Prefers dense ground cover, i.e. grapevines, palmetto.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S4

western box turtle *Terrapene ornata*

Terrestrial: Ornate or western box trutles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

ELLIS COUNTY

REPTILES

western chicken turtle *Deirochelys reticularia miaria*

Aquatic and terrestrial: This species uses aquatic habitats in the late winter, spring and early summer and then terrestrial habitats the remainder of the year. Preferred aquatic habitats seem to be highly vegetated shallow wetlands with gentle slopes. Specific terrestrial habitats are not well known.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5T5	State Rank: S2S3

PLANTS

Hall's prairie clover *Dalea hallii*

In grasslands on eroded limestone or chalk and in oak scrub on rocky hillsides; Perennial; Flowering May-Sept; Fruiting June-Sept

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G3	State Rank: S2

Sutherland hawthorn *Crataegus viridis var. glabriuscula*

In mesic soils of woods or on edge of woods, treeline/fenceline, or thicket. Above\near creeks and draws, in river bottoms. Flowering Mar-Apr; fruiting May-Oct.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5T3T4	State Rank: S3

TBPR RARE COMMUNITIES

Common Name	Scientific Name	G RANK	S RANK (Provisional)	ECOLOGICAL SYSTEM *added where relationship can be made at this scale*	ECOREGIONS (Note: other ecoregions are included for cross reference and conservation action coordination if needed)												Known COUNTIES	Endemic	Known PROTECTED AREAS	TERR	WETL	AQU	Comments
					TBPR	*ECPL*	*CRTB*	*EDPT*	*WGCP*	*CGPL*	*GCPM*	*STPL*	*AZNM*	*CHIH*	*HIPL*	*SWTB*							
Bur Oak - Shumard Oak Mixed Bottomland Forest	Quercus macrocarpa - Quercus shumardii - Chasmanthium latifolium Forest	G3?	S3?	South-Central Interior Large Floodplain CES202.705	TBPR	ECPL	CRTB										Anderson, Navarro, Red River and Tarrant	N		X			Newly described association (not in NatureServe). Probably in other North Texas counties.
Eastern Gammagrass - (Switchgrass) Floodplain Herbaceous Vegetation	Tripsacum dactyloides - (Panicum virgatum) Herbaceous Vegetation	G1	S1	Texas Blackland Tallgrass Prairie CES205.684	TBPR	ECPL			WGCP								Austin, Delta, Franklin, Hopkins, Hunt, Smith, Titus and Tyler	Y?	Cowleech Prairie (TNC)		X		Newly defined association including prairies dominated by lowland gammagrass in frequently flooded bottomlands of E Tx. In examples in the upper Sabine watershed, P. virgatum is unimportant or absent. Though widely distributed, examples are rare and small in spatial extent. This community is unrelated to the Tripsacum dactyloides - Panicum virgatum - Sorghastrum nutans - Helianthus maximiliani Herbaceous Assn. and the gammagrass may be genetically distinct.
Eastern Gammagrass - Switchgrass - Yellow Indiangrass - Michaelmas-daisy Herbaceous Vegetation	Tripsacum dactyloides - Panicum virgatum - Sorghastrum nutans - Helianthus maximiliani Herbaceous Vegetation	G1	S1	Texas Blackland Tallgrass Prairie CES205.684	TBPR												Collin, Dallas, Delta, Fannin, Hunt, and Lamar	N	Clymer Meadow Preserve and Mathews Prairie (TNC), Parkhill Prairie (Collin County)	X			Needs better definition. Both T. dactyloides and P. virgatum have upland and lowland variants; this community includes sites which occur in an upland context. NatureServe description lists forbs such as H. maximiliani, Aster ericoides, Acacia angustissima var. hirta etc. which are broadly indicative of Tx blackland prairies; but high quality examples are better characterized by occurrence of "conservative" spps. such as Eryngium yuccifolium, Silphium spp. and other Helianthus spps. Existing remnants are diverse and variable.
Silveus' Dropseed - Longspike Tridens Herbaceous Vegetation	Sporobolus silveanus - Tridens strictus Herbaceous Vegetation	G1G2	S1S2	Texas Blackland Tallgrass Prairie CES205.684	TBPR												Bowie, Fannin, Franklin, Hopkins, Lamar, Rains and Titus	Y?	Tridens Prairie (TNC), Gambill Goose Refuge (City of Paris)	X			May not be distinct from the Sporobolus silveanus - Carex meadii Herbaceous Vegetation. G1G2 is probably appropriate combined rank.
Silveus' Dropseed - Mead's Sedge Herbaceous Vegetation	Sporobolus silveanus - Carex meadii Herbaceous Vegetation	G1	S1	Texas Blackland Tallgrass Prairie CES205.684	TBPR												Bowie, Fannin, Franklin, Hopkins, Lamar, Rains and Titus	Y?	Tridens Prairie (TNC), Gambill Goose Refuge (City of Paris)	X			
Southern Elm - Chinquapin Oak Forest	Ulmus (americana, rubra) - Quercus muehlenbergii Forest	GNR	S1S2?	Western Great Plains Floodplain CES303.678	TBPR		CRTB										Collin, Cooke, Dallas, Denton, Fannin, Grayson and Lamar	N	Caddo National Grasslands (USFS), Spring Creek Forest (City of Garland)	X			Needs better definition. Shumard oak may be a codominant sp. Probably another mesic woodland/"rich woods" association is needed in North Texas with elms, Shumard oak, redcedar in which chinquapin oak may not be present (e.g. Hunt County)
Upper West Gulf Coastal Plain Dry Calcareous (Blackland) Prairie	Schizachyrium scoparium - Sporobolus compositus - Fimbristylis puberula var. puberula Wooded Herbaceous Vegetation	G1G2	S1S2	West Gulf Coastal Plain Northern Calcareous Prairie CES203.377	TBPR												Fannin and Hunt	N	Caddo National Grasslands (USFS)	X			
Vertisol Blackland Prairie	Schizachyrium scoparium - Sorghastrum nutans - Andropogon gerardii - Bifora americana Vertisol Herbaceous Vegetation	G1G2	S1S2	Texas Blackland Tallgrass Prairie CES205.684	TBPR												Austin, Bastrop, Bell, Brazos, Burleson, Collin, Colorado, Dallas, Delta, Ellis, Fannin, Falls, Fayette, Franklin, Freestone, Grayson, Grimes, Hill, Hunt, Kaufman, Lavaca, Lee, Limestone, McLennan, Milam, Navarro, Robertson, Rockwall, Titus, Travis, Washington and Williamson	Y	Leonhardt Prairie (TNC), Kachina Prairie (Tx Land Conservancy easement), Peters Prairie and Riesel Prairie (NPAT)	X			Broadly defined; further definition might be warranted. Remnants are typically small and isolated. Examples in the Fayette Prairie subregion may include Paspalum plicatulum as a codominant and have other affinities with coastal prairies.

Wildlife Habitat Appraisal Procedure (WHAP) Summary Report Bardwell Lake Master Plan
Ellis County, Texas
May 2023

US Army Corps
of Engineers®
Fort Worth District

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Introduction

Wildlife habitat assessments were conducted at Bardwell Lake from May 15-16, 2023 using Texas Parks and Wildlife Department's (TPWD) Wildlife Habitat Appraisal Procedure ([WHAP] TPWD 1995). WHAP survey point locations were based on specific areas to inventory and classify various habitat types and features based on aerial imagery using Geographical Information Systems (GIS) data and local expertise of the area. A total of 41 WHAP points were surveyed, all located on U.S. Army Corps of Engineers (USACE) fee property (Figures 1-4).

The purpose of this report is to describe wildlife habitat quality within the USACE Bardwell Lake fee property. This report has been prepared by the USACE Regional Planning and Environmental Center to assist land classification designations for the 2024 Bardwell Lake Master Plan Revision process.

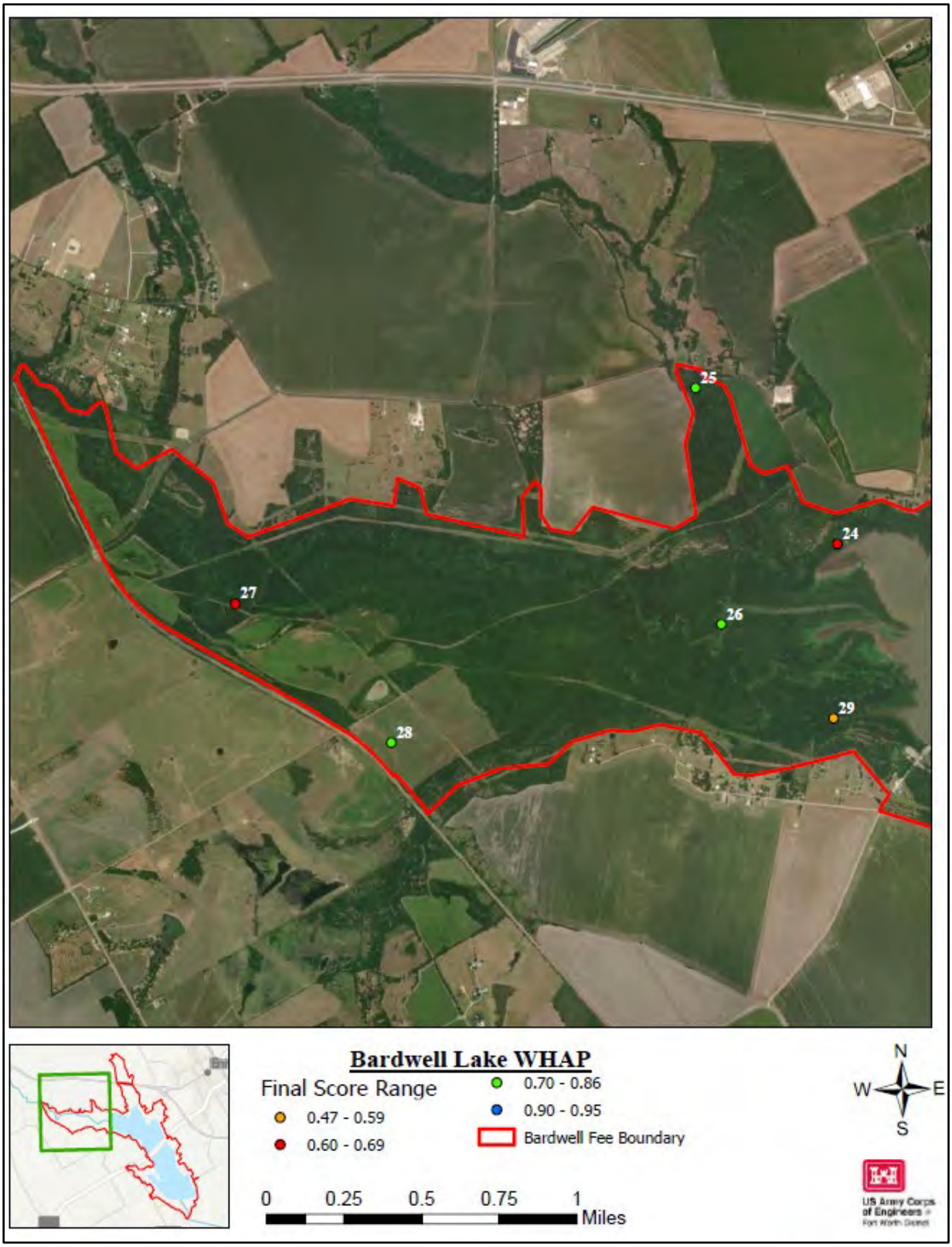

Figure 1. Total Score Range for Points Surveyed Within Bardwell Lake Federal Fee Owned Boundary.

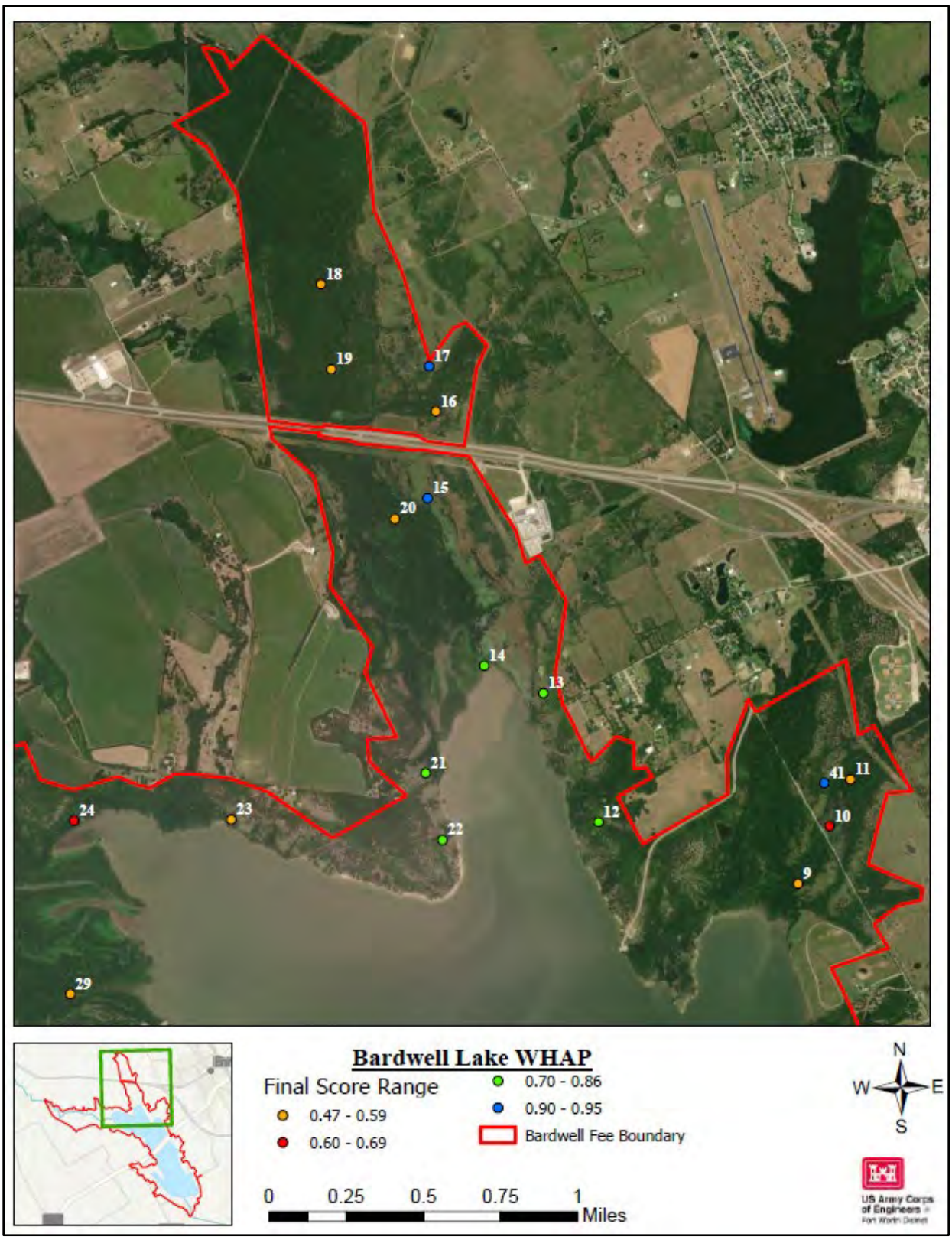

Figure 2. Total Score Range for Points Surveyed Within Bardwell Lake Federal Fee Owned Boundary.

Figure 3. Total Score Range for Points Surveyed Within Bardwell Lake Federal Fee Owned Boundary.

Figure 4. Total Score Range for Points Surveyed Within Bardwell Lake Federal Fee Owned Boundary.

Study Area

USACE fee owned property at Bardwell Lake, approximately 7,488 acres, is located just in rural central Texas as displayed in Figure 5 below. More specifically, the lake sits on the western outskirts of Ennis, Texas within the Texas Blackland Prairie Ecoregion. Bardwell Lake lies on the Waxahachie Creek, which is also the only major of body of water that flows into the lake. Downstream of the Bardwell Lake dam, the Waxahachie meanders until its confluence with Chambers Creek which then eventually flows into Richland-Chambers Reservoir.

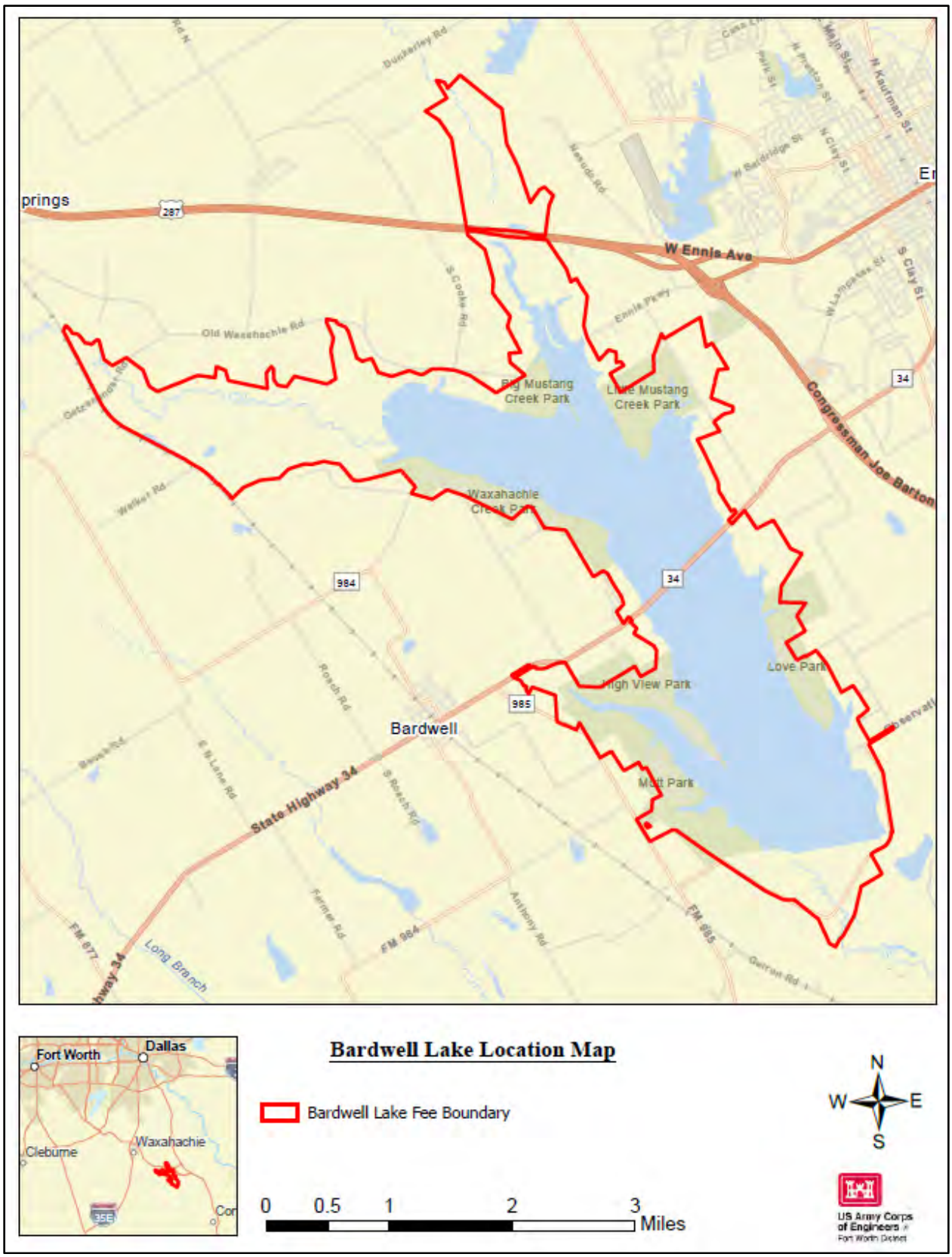

Figure 5. Bardwell Lake Vicinity Map

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 (CN) 1	CN 2	CN 3	CN 4	CN 5	CN 6	CN 7	CN 7B	Maximum Total Score
Riparian/BHF	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	0.87

Marsh	0.25	0.20	0.20	0.20	NA	0.05	0.10	NA	1.00
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

Using TPWD's Texas Ecological Mapping Systems (TPWD 2020), Bardwell Lake lies within the Texas Blackland Prairie ecoregion. The most common habitat types include riparian/BHF, upland forest, and grassland (Elliot, 2014). 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
Grassland	13
Marsh	2
Riparian/BHF	15
Upland Forest	11
Total Points Surveyed	41

Elliot (2014) provided general habitat type descriptions and associated vegetation communities for the Ecological Systems Classification and Mapping Project in support of the Comprehensive Wildlife Conservation Strategy for the Texas Parks and Wildlife

Department. These descriptions were meant to be broad and depict typical vegetative assemblages across vast areas as the observable vegetation communities can vary based on local conditions.

Historically, tallgrass prairies consisting of little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardi*), yellow Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), eastern gamagrass (*Tripsacum dactyloides*) and many forbs, such as asters (*Aster spp*.), clovers (*Trifolium spp*.), and black-eyed susan (*Rudbeckia hirta*) dominated the region. Before nearly all of the prairie was developed, bison (Bison bison) and pronghorn (*Antilocapra americana*), greater prairie chickens (*Tympanuchus cupido*), and even ocelot (*Leopardus pardalis*) utilized this area. Only an estimated 5,000 widely scattered acres in small tracts remain of the original 12 million acres of the region, or less than one-tenth of one percent of remaining prairie. Riparian hardwoods, primarily bur oak (*Quercus macrocarpa*), Shumard oak (*Quercus shumardii*), sugar hackberry (*Celtis laevigata*), elm (*Ulmus spec*.), ash (*Fraxinus* spec.), eastern cottonwood (*Populus deltoides*), and pecan (*Carya illinoinensis*), meander this prairie. The headwaters of several east Texas rivers begin in the Blackland Prairie region. In addition, the Trinity, Brazos and Colorado Rivers, and many tributaries of nearly every major system feeding the Gulf of Mexico, originate in or cross the Blackland Prairies (TPWD, 2012).

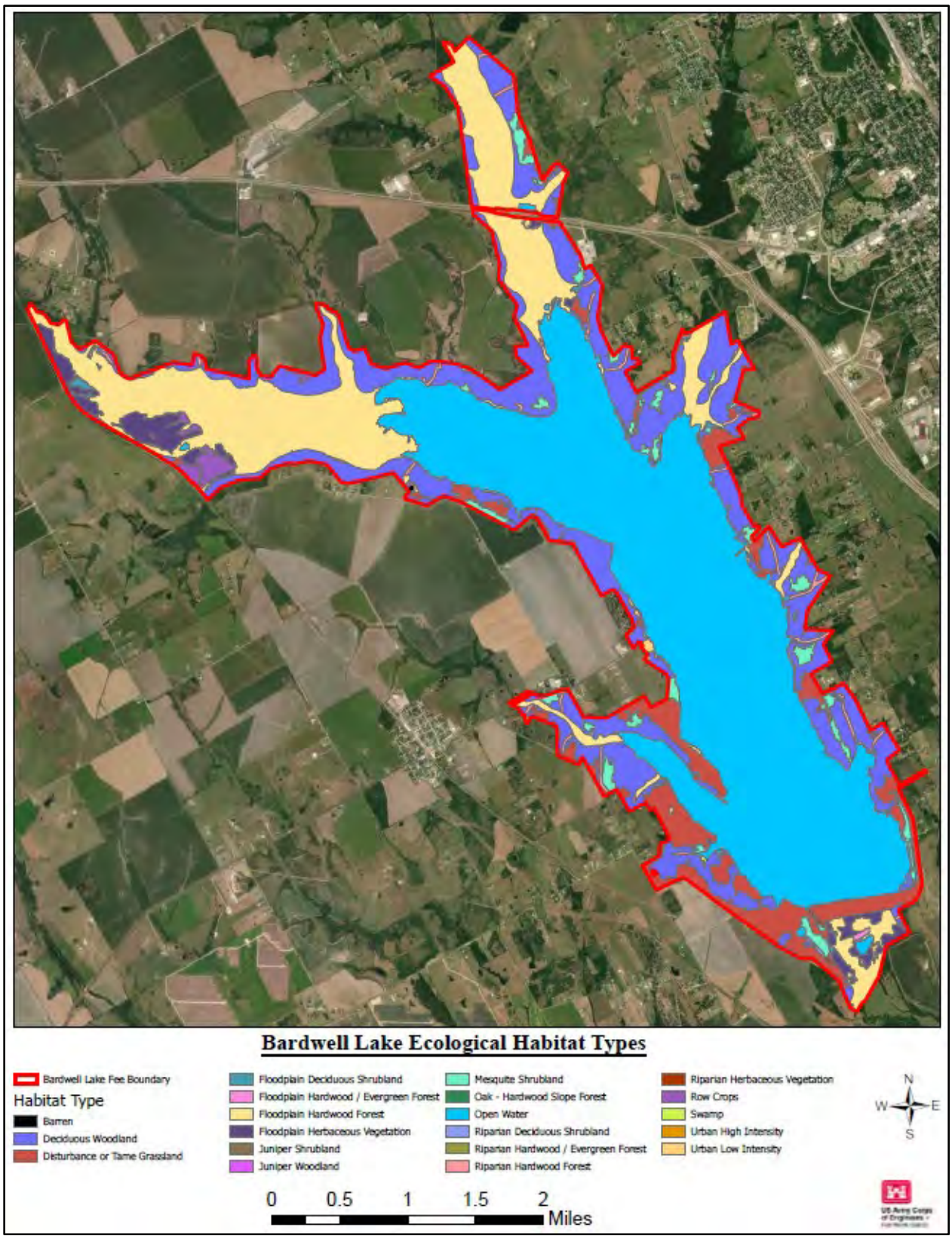

Figure 6. Distribution of Habitat Types within the Fee Owned Boundary at Bardwell Lake.

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: Bardwell Lake WHAP Summary Results of this report.

Riparia/BHF (15 sampled) and grassland (13 sampled) were the most abundant habitat types surveyed. Riparian/BHF scores ranged from 0.54 to 0.85 while grassland scores ranged from 0.47 to 0.95. The lower minimum scores, especially for these normally drier upland habitats, may be partly due to long-term flooding that occurred at Bardwell Lake in recent years, thus leading to reduced plant diversity. Flooding at lower elevations in the flood pool of Bardwell 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
Grassland	0.75	0.95	0.47
Marsh	0.76	0.86	0.65
Riparian/BHF	0.62	0.85	0.54
Upland Forest	0.62	0.75	0.51

Figures 1-4 show the range of total scores for all points surveyed (41 sampled). Overall, marsh and grassland habitats exhibited the highest average total score (0.76 and 0.75). The difference between marsh and grassland in Average Total Score is 0.01. 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.

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 Marsh Successional Stage	Average Uniqueness and Relative Abundance
Grassland	13	4	NA	10
Marsh	25	NA	10	18
Riparian/BHF	20	8	NA	13
Upland Forest	12	7	NA	10

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.

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. Point 26 is the only site with maxed out successional stage. This can be attributed to relative isolation of the site which leads to the area being hard to get to for timber cutting (prior to USACE purchasing the land). This leads to the majority trees in the area being older. And that the area is prone to frequent but not prolonged flooding which further helps to maintain the growing conditions that the established vegetation needs to grow and thrive.

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. Few large, contiguous patches of habitat remain around Bardwell Lake, thus those remaining tracts representing historic vegetation are important to conserve and protect.

In total, 3 points (15, 17, and 41) surveyed received a score of 0.90 and above indicating high quality habitat (Figure 7) in comparison to all the other points. They are all grasslands and have maxed out site potential as displayed in Figures 8 and 9.

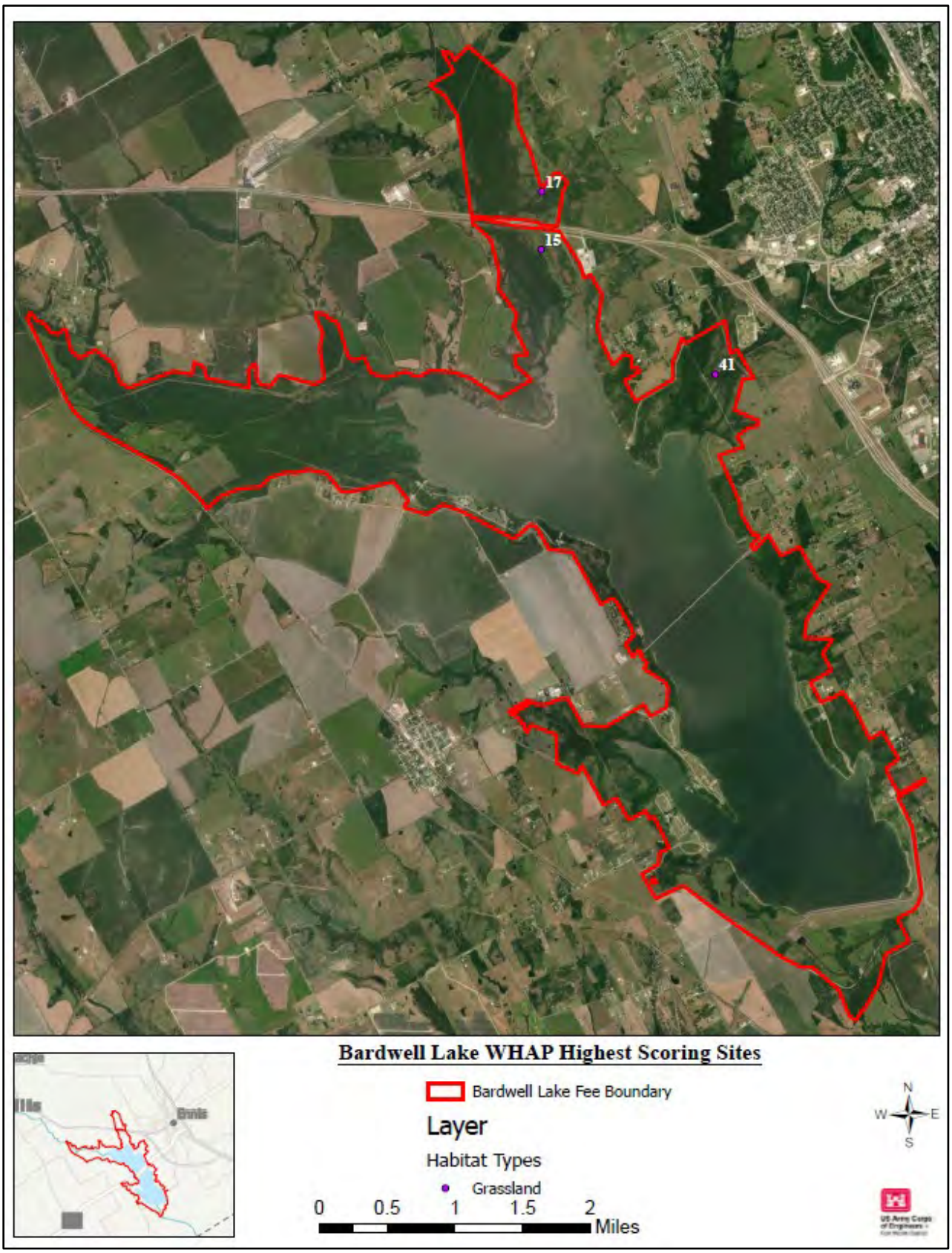

Figure 7. All Sites with Total Scores of 0.90 and Above.

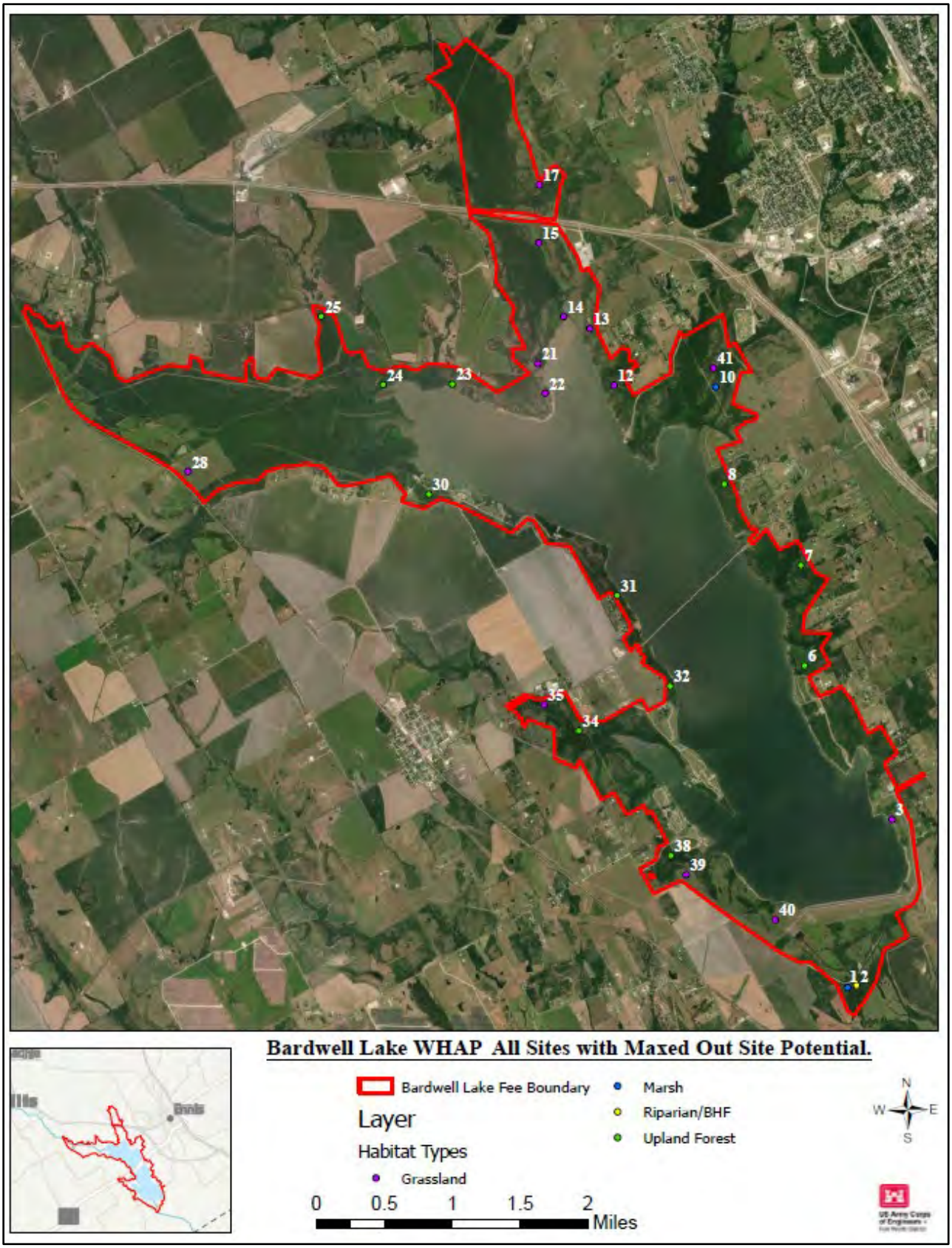

Figure 8. All Sites with Maxed Out Site Potential

Figure 9. All Sites with Maxed Out Uniqueness and Relative Abundance

Recommendations

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

When comparing overall high total WHAP scores(habitat quality) between 0.70-0.95 (Figures 1-4) to Maximum Site Potential scores (Figure 8), two areas of the lake were identified as to having these, the areas within and around Little and Big Mustang Creek Parks. 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 full habitat quality, but rather protection from disturbances.

Likewise, sites with low WHAP scores that also have low site potential have likely reached their full habitat quality; 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 0.47 – 0.69), 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 2, 6, 7, 8, 10, 23, 24, 30, 32, 35, 38, 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 Bardwell Lake Master Plan revision will take into account the WHAP scores when making land classification decision.

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Attachment A: Bardwell Lake WHAP Results Summary

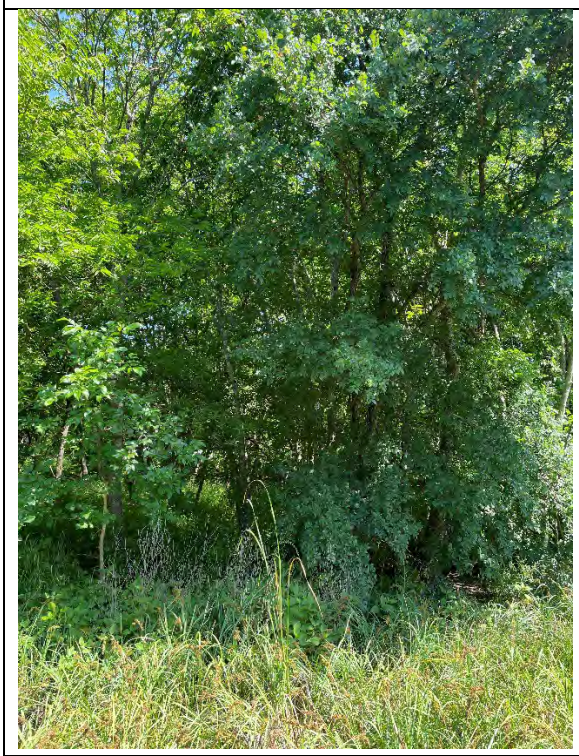
Point Number	Specific Habitat Type	Grouped Habitat Type	1) Site Potential	2) Successional Stage	Marsh Successional Stage	3)Uniqueness and Relative Abundance	4A)Diversity of Woody Species	4B)Number of Woody Species	Marsh Diversity of Veg	5) Vertical Stratific	6) Additional Structural Diversity	7A) Condition of Woody	7B) Herbaceous Vegetation	Final Score	Berry Drupe	Legume/Pod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
1	Floodplain Herbaceous Vegetation	Marsh	25	10	NA	20	NA	NA	15	5	1	NA	NA	0.86	Sugarberry, Poison Ivy	Honey Locust	NA	NA	Green Ash, Cedar elm	NA	NA	NA	Duckweed, Cat tail, Sedge Spp., Pepperweed, VA Wild rye, Prairie Bishop	NA
2	Floodplain Hardwood Forest	Riparian/BHF	25	12	NA	15	3	3	NA	5	3	3	1	0.70	Virginia Creeper, Eastern Coralberry, Greenbrier, Hackberry	NA	Bur Oak	NA	Cedar elm, green ash	NA	NA	NA	VA Wild rye, Upright hedge Parsley, Wild petunia spp.	NA
3	Disturbance or Tame Grassland	Grassland	12	5	NA	5	2	3	NA	4	3	5	5	0.75	Peppervine, gum bumelia, dewberry, hackberry	Illinois Bundleflower, partridge pea, bluebonnet	NA	NA	NA	NA	NA	NA	Evening primrose, KR Bluestem, Indian Paintbrush, Beebalm, Yarrow, Canary grass, Venus looking glass spp., quaking grass, TX vervain, Red seed plantain, Little Bulley	NA
4	Deciduous Woodland	Riparian/BHF	20	6	NA	15	4	3	NA	5	1	3	5	0.62	Poison Ivy, Hackberry, Leather flower	Honey Locust	Water oak	NA	Cedar Elm	NA	NA	NA	Wild Rye, Canary grass, hedge parsley, Venus looking glass, bee balm, Pennsylvania Pellitory, False dandelion, smallseed, Scandix, Giant ragweed, sump weed, Panic grass	Leather flower - Unique!
5	Riparian Hardwood Forest	Riparian/BHF	20	6	NA	5	7	7	NA	5	3	5	1	0.59	Greenbrier, white avens, Roughleaf dogwood, P.I. Privet, Chokeberry (ampelopsis), VA Creeper, Supplejack, Cowitch Vine, Gum Bumelia	Honey Mesquite	Red Oak	Pecan	American Elm, Cedar Elm	Eastern redcedar	NA	Black willow	Cat tail, Hedge parsley, sedge spp.	NA
6	Mesquite Shrubland	Upland Forest	12	6	NA	5	5	5	NA	4	1	5	5	0.55	Coralberry, Hackberry, Greenbrier, Poison Ivy, Privet Spp., Cowitch Vine, Woodland Shaded Plant, Roughleaf Dogwood, Dewberry	Honey Mesquite	Live oak	NA	Cedar Elm	Eastern redcedar	NA	NA	Indiangrass, Yellow Neptunia, KR Bluestem, Veens' Looking Glass, Bedstraw, One seed Croatan, Panic Grass, TX Wintergrass, Snow on the Prairie, Paspalum Sedge Spp., Lantana, Brown Eyed Susan	NA
7	Deciduous Woodland	Upland Forest	12	3	NA	10	5	5	NA	5	3	3	5	0.59	Greenbrier, Gum Bumelia, Dewberry, Privet	Bluebonnet, Vetch, Honey Mesquite, Prairie Bundleflower	NA	NA	Cedar Elm	Eastern redcedar	NA	Osage Orange	Bee balm, one seed croton, Milkweed, Texas thistle, Roemer spurge spp., snow on the prairie, Sedge Spp. Veens looking glass, False dandelion, Meadow dropseed, KR Bluestem, American Basket flower, Panic grass, TX Yellow star, ironweed, paspalum sedge, Johnson grass, little Bluestem, Common ragweed, switchgrass	NA
8	Deciduous Woodland	Upland Forest	12	6	NA	10	3	3	NA	5	5	3	5	0.60	Coralberry, hackberry, poison ivy, Greenbrier	Mesquite, Bluebonnet	NA	NA	NA	Eastern redcedar, cedar elm	NA	NA	quihoui privet, Texas Wintergrass, Texas Yellow star, Spurge, Tall thistle, bunchgrass, needlegrass, horseshoe, pony foot, wood sorrel, plantain	NA
9	Floodplain Hardwood Forest	Riparian/BHF	20	6	NA	10	3	1	NA	5	3	3	3	0.54	Deciduous holly	Locust	NA	NA	Green ash	NA	NA	NA	Giant ragweed, Canada wild rye, hedge parsley, ravenfoot sedge, Pennsylvania Pellitory, Thistle	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	Marsh Diversity of Veg	5) Vertical Stratification	6) Additional Structural Diversity	7A) Condition of Woody Vegetation	7B) Herbaceous Vegetation	Final Score	Berry Drupe	LegumePod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
10	Floodplain Hardwood Forest	Marsh	25	NA	10	15	NA	NA	5	NA	5	NA	NA	0.65	NA	NA	NA	NA	Box elder, green ash	NA	NA	NA	Pink Evening Primrose, Smartweed, Tall dock, Western Ragweed, American Gemander, Canary Grass, Ravenfoot sedge, Canada Wild rye, Hedge Parsley, Prickly saw thistle, Giant Ragweed, Sumpweed	Incredible prairie north of the point, rookery
11	Floodplain Hardwood Forest	Riparian/BHF	20	6	NA	10	4	3	NA	4	3	3	5	0.58	Hackberry, poison Ivy, Coralberry	NA	NA	NA	Cedar elm, green ash	NA	Pitcher leatherflower	Bois d'arc	Giant ragweed, Pennsylvania Pellitory, Ravenfoot sedge, Canada Wild rye, hedge parsley, field thistle, other Sedge, Canada Garlic	NA
12	Deciduous Woodland	Grassland	12	5	NA	10	3	1	NA	4	5	3	5	0.81	Swamp privet	Honey Locust, Partridge Pea	NA	NA	Green Ash, Cedar elm	NA	NA	NA	Horse mint, Canary grass, Black eyed Susan, Primrose, Clasping Coneflower, Pricley lettuce, Indian Paintbrush, foxtail, White trident, Mollck, Little bursely, Animal Rye, Little quacking grass, Veins looking glass, Western Ragweed, Frog fruit, Meadow pink, Rumex spp., Mugwort, Texas Dandelion, Prairie Variety(?)	NA
13	Disturbed Pasture	Grassland	12	5	NA	10	3	1	NA	4	1	3	5	0.75	Dewberry	Mequite, Honey Locust, Bluebonnet	NA	NA	Box Elder	Eastern redcedar	Powderpuff (?)	NA	Texas wintergrass, Primrose, Texas thistle, Prairie Parsley, horse mint, Indian Paintbrush, onion, spurge, Milkweed, Snow on the prairie, Virginia Wild rye, Mugwort,Wild carrot, Japanese brome, Black eyed Susan, horsweed, Texas ragwort,	NA
14	Disclimaxed Prairie	Grassland	12	5	NA	10	4	1	NA	4	3	3	5	0.80	Dewberry, blackberry	Honey Locust, Bluebonnet, Partridge Pea, Morty Pea(?)	NA	NA	Green Ash, Cedar Elm	NA	NA	NA	Primrose, American Germander, Bee balm, Indian paintbrush, Little bursely, Indian blanket, Vervain, Vervina, Clasping Coneflower, Dodder	NA
15	Floodplain Hardwood Forest	Grassland	20	5	NA	15	1	1	NA	3	3	5	3	0.95	NA	NA	NA	NA	Green Ash	NA	NA	NA	Canary grass, Illinois Bundleflour, Clasping Coneflower, Giant Ragweed, Pink Evening Primrose, Thistle Sow,Chicory	NA
16	Floodplain Hardwood Forest	Riparian/BHF	20	6	NA	10	3	1	NA	4	3	3	5	0.55	Hackberry	Honey Locust, Mesquite	NA	NA	Cedar Elm	NA	NA	NA	Wild Lettuce, Canary Grass, Finger Doghaids, Inland Sea oats, Veins looking glass, Beggarticks, Plantain, Hedge parsley, Pennsylvania Pellitory, Giant Ragweed, Pokeweed	NA
17	Floodplain Hardwood Forest	Grassland	12	5	NA	15	3	3	NA	4	3	5	5	0.93	Hackberry, Coralberry, Greenbriar, Gum Bumelia	Mesquite	NA	NA	Cedar Elm, Eastern Red Cedar	NA	NA	NA	Bristle Grass, Johnson Grass, Pink Evening Primrose, Western Ragweed, Diamond Flower, Bluebonnet, Fleabane, Great Plains Ragwort, Texas Paintbrush, Bundle Flower, Veins Looking Glass, King Ranch Bluestem, Little Bluestem, Texas Prairie Parsley, Rattlesnake Master, Texas Yellowstar	NA
18	Floodplain Hardwood Forest	Riparian/BHF	20	6	NA	10	2	3	NA	4	3	5	5	0.58	Hackberry, Mustang Grape, Vitas Grape	NA	NA	NA	Cedar Elm, Green Ash	NA	NA	NA	Carolina Desert Chicory, Canadian Garlic, Three Seeded Mercury, Passion Vine, Plantain, Hedge Parsley, Wild Rye, Ragweed, Penn Pellitory, Large Seeded Forget Me Not, Sedge, Common Chickweed	NA
19	Floodplain Hardwood Forest	Riparian/BHF	20	6	NA	10	2	3	NA	3	3	3	5	0.57	Poison Ivy, Hackberry, Greenbriar,	NA	NA	NA	Cedar Elm, Green Ash	NA	NA	NA	Tickweed, Common Hedge Parsley, Wood Sorrel, Plantain, Penn Pellitory, Veins Looking Glass, Wild Rice, Rye, Ragweed, Wild Lettuce, Large Seeded Forget Me Not	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	Marsh Diversity of Veg	5) Vertical Stratification	6) Additional Structural Diversity	7A) Condition of Woody Vegetation	7B) Herbaceous Vegetation	Final Score	Berry Drupe	LegumePod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
20	Floodplain Hardwood Forest	Riparian/BHF	20	6	NA	10	2	1	NA	5	5	3	3	0.55	Swamp Privet, Greenbriar	NA	NA	NA	Green Ash	NA	NA	NA	Hedge Parsley, Sow Thistle, Raven Foot Sedge, Tall Dock, Finger Dogwhede	NA
21	Disclimax Prairie	Grassland	12	5	NA	10	4	3	NA	3	1	3	5	0.78	Dewberry	NA	NA	NA	Cedar Elm, Green Ash	Eastern Red Cedar	NA	NA	Slow on the Prairie, Mugwart, Primrose, Clasping Coneflower, Hedge Parsley, Indian Paintbrush, Black Eyed Susan, Horse Mint, Venus Looking Glass, Little Bane, Texas Thistle, Sumpweed, Carex, Partridge Pea, Buffalo Grass, Illinois Bundleflower, Aster, Prairie Verbena, Chirvil, Carolina Creeper.	NA
22	Disclimax Prairie	Grassland	12	5	NA	10	3	3	NA	3	1	3	5	0.76	Poison Ivy	NA	NA	NA	Cedar Elm, Green Ash	Eastern Red Cedar	NA	NA	Horse Mint, Prairie verbena, Primrose, Wild Onion, Sumpweed, Indian Paintbrush, Japanese Brome, Mugwart, Foxtail, American Gemander, Illinois Bundleflower, Carolina Canarygrass, Venus Looking Glass, Aster, Carex, Chervil, Texas Dandelion, Clasping Coneflower, Western Ragweed, Partridge Pea, Plantain, Spurge, KR Bluestar, Broom Sedge, Slim Tridens	NA
23	Upland Hardwood	Upland Forest	12	6	NA	5	4	3	NA	5	3	3	5	0.53	Swamp Privet, Elbow Bush	Honey Locust	NA	NA	Green Ash, Japanese Zelkova	NA	NA	Black Willow	Western Ragweed, Clasping Coneflower, Aster#1, Yellow Sweet Clover, Mugwort, Cocklebur, Giant Ragweed, Prairie Wedgegrass, Buffalo Grass, Aster#2, Canary Grass	NA
24	Upland Hardwood	Upland Forest	12	12	NA	10	4	5	NA	4	5	3	5	0.69	Carolina Snailseed, Coral Berry, poison Ivy, Greenbriar, Hackberry, Swamp Privet, Muscadine, Mulberry, Unknown	NA	NA	NA	Cedar Elm, Green Ash	Eastern Red Cedar	NA	NA	Virginia Wild Rye, Queen Anne's Lace, Hedge Parsley, Mugwort, Carex#1, Aster, Texas Ragwort, Texas Ragweed, Carex#2	NA
25	Floodplain Hardwood Forest	Upland Forest	12	12	NA	15	3	5	NA	5	5	3	5	0.75	Poison Ivy, Greenbriar, Hackberry, Chinese Privet, Trumpet Vine, Virginia Creeper, Gum Bumelia, Mulberry, Elderberry	NA		Pecan	American Elm,Cedar Elm, Green Ash, Box Elder	NA	NA	NA	Carex, Virginia Wild Rye, False Nettle, Cocklebur, Hedge Parsley, Aster, Alium, unknown	NA
26	Floodplain Hardwood Forest	Riparian/BHF	20	20	NA	15	7	5	NA	5	5	3	5	0.85	Poison Ivy, Muscadine(grape), Carolina Snailseed, Dewberry	Honey Locust	Burr Oak	Pecan	Green Ash, American Elm, Box Elder	NA	NA	NA	Giant Ragweed, Foxtail, Boneset, Aster, Virginia Wild Rye, Nettle, Queen Anne's Lace, Smartweed, Canary Grass	NA
27	Floodplain Hardwood Forest	Riparian/BHF	12	12	NA	15	5	5	NA	5	5	1	5	0.63	Hackberry, Coralberry, Poison Ivy, Greenbriar, Gum Bumelia	Eve's Necklace	Burr Oak	NA	Cedar Elm, American Elm	NA	NA	Black Willow	Virginia Wild Rye, Carex, Petunia, Aster, Wild Lettuce, Bir Seed Forget Me Not, Plantain, Hedge Parsley, Giant Ragweed, Annual Rye, Wood Sorrel	NA
28	Row Crops	Grassland	12	5	NA	10	1	1	NA	3	0	5	5	0.71	NA	NA	NA	NA	Cedar Elm	NA	NA	NA	Primrose, Prairie Parsley, Clasping Cone, Vervain, Illinois Bundleflower, Texas Star, Horse Mint, Milkweed, Texas Dandelion, Goldenrod, Johnson Grass, Slim Tridens, Japanese Brome, Indian Paintbrush, Blanket Flower, Dock, Guara, Annual Rye, Bluebonnet, Little Barley, Muhly Grass	NA
29	Floodplain Hardwood Forest	Riparian/BHF	20	6	NA	10	4	3	NA	3	1	3	5	0.55	Greenbriar, Elbow Bush	Honey Locust	Black Willow	NA	Cedar Elm, Green Ash	NA	NA	NA	Queen Anne's Lace, Texas Ragwort, Carex, Virginia Wild Rye, Japanese Brome, Cocklebur, Giant Ragweed.	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	Marsh Diversity of Veg	5) Vertical Stratific	6) Additional Structural Diversity	7A) Condition of Woody	7B) Herbaceous Vegetation	Final Score	Berry Drupe	LegumePod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
30	Deciduous Woodland	Upland Forest	12	6	NA	10	5	7	NA	5	3	3	5	0.64	Chinese Privet, Glossy Privet, Virginia Creeper, Poison Ivy, Grape, Japanese Honeysuckle, Greenbriar, Mulberry, Coralberry	Redbud	Shumard Oak	Pecan	Green Ash, American Elm, Cedar Elm	NA	NA	NA	Petunia, Hedge Parsley, Nettle, Wild Lettuce, Large Seed Forget Me Not, Red Seed Plantain, Heavenly Bamboo, Piggyback Plant	NA
31	Deciduous Woodland	Upland Forest	12	12	NA	10	2	3	NA	5	1	3	5	0.61	Coralberry, Greenbrier, Poison Ivy, Roughleaf Dogwood, Hackberry, Dewberry	NA	NA	NA	Cedar Elm, Green Ash	NA	NA	NA	Wild Rye, Scandix, Wild Lettuce, Giant Ragweed, Hedge Parsely, Carolina Snailseen, Fleabane, Horsewood	NA
32	Mesquite Shrubland	Upland Forest	12	6	NA	10	5	5	NA	5	3	5	5	0.64	Poison Ivy, Muscadine Grape, Hackberry, Gum Bumelia, Greenbrier, Dewberry, Roughleaf Dogwood	Mesquite, Singlestmy Pea (Vetch-mg)	NA	NA	Cedar Elm, Green Ash	Eastern Redcedar	NA	Osage Orange	Johnson Grass, Japanese Brome, Scandix, Prairie Parsley, Lemon Bee Barn, Indian Paintbrush, Evening Primrose, Paspalum, Texas Yellowtops, Ironweed, LA Vetch, TX Thistle	NA
33	Floodplain Hardwood Forest	Riparian/BHF	20	6	NA	15	3	3	NA	5	3	3	5	0.63	Roughleaf dogwood, Yaupon holly, Dewberry, Red mulberry	partridge pea	NA	NA	Green Ash, Cedar elm	NA	NA	NA	Sumpweed, Yellow sweet clover, peppervine, White trident grass, Pennywort, Pyrrolopappus spp., Philadelphia fleabane, Marsh parsley, Aster Spp., Common vetch, sweet clover	NA
34	Deciduous Woodland	Upland Forest	12	6	NA	20	4	5	NA	5	3	3	3	0.70	Greenbrier (Green), Anglrod, Poison Ivy, Gum Bumelia, Sugarberry, Evergreen Sumac	Honey Locust	NA	NA	Cedar Elm, Green Ash	NA	NA	Osage Orange	VA Wild Rye, Vems' Looking grass, Cherville spp., Catching Bedstraw, Red Seed Plantain, Sedge Spp. (Ravenfoot), Clasping Coneflower	2a) Big Cedal Elms
35	Disturbances/Tame Grassland	Grassland	12	1	NA	5	1	1	NA	3	1	0	5	0.49	NA	Bluebonnet	NA	NA	NA	NA	NA	NA	Indian paintbrush, clasping coneflower, green milkweed, Western Ragweed, Canary grass, Illinois bundleflower, Beebalm, Marsh parsley, Canada wild rye, sedge spp., snow on the prairie, Medicago spp.	NA
36	Floodplain Hardwood Forest	Riparian/BHF	20	6	NA	20	2	1	NA	5	5	3	5	0.67	Greenbrier, Poison Ivy, Honey Locust	NA	NA	NA	Green Ash	NA	NA	NA	Wild Rye, Scandix Spp., Giant Ragweeds, Wild Garlic, Sedge Spp. (Ravenfoot), Vems' looking Glass, Cherville Spp., Canary Grass Rush Spp.	
37	Floodplain Hardwood Forest	Riparian/BHF	20	12	NA	20	2	3	NA	5	3	3	1	0.69	Poison Ivy, Greenbrier, Alabama supplejack, Sugarberry, soapberry	NA	NA	NA	Ash spp.	NA	NA	NA	Virginia Wild rye, March Parsley	Unique Backwoods thoughout, Tight Canopy Forest
38	Deciduous Woodland	Upland Forest	12	6	NA	5	2	3	NA	5	3	5	3	0.51	Poison Ivy, Hackberry, Greenbrier, Soapberry (western), Eastern Coralberry, Honey Vine	NA	NA	NA	Cedar Elm	NA	NA	NA	Marsh parsleys, Clasping Coneflower, Giant ragweed, VA Wild rye, Vems Looking Glass	NA
39	Disturbance or Tame Grassland	Grassland	12	5	NA	5	2	1	NA	3	3	5	5	0.69	NA	Common Vetch	NA	NA	Cedar Elm	NA	NA	NA	Evening Primrose, Clasping coneflower, Indian Paintbrush, Johnson Grass, Golden rod, Western Ragweed, Prairie Bundleweed, heath aster, TX Thistle, Japanese brome, TX Vervain, Broom sedge bluestem	NA
40	Disturbance or Tame Grassland	Grassland	12	1	NA	5	1	1	NA	3	0	0	5	0.47	NA	Vetch Spp., Yellow sweet clover, Bluebonnet	NA	NA	NA	NA	NA	NA	Yarrow, Evening primrose, Pyrrolopappus spp., Golden rod, TX Thistle, Johnson grass, Prairie Parsley, Bermuda grass, KR Bluestem, Vems looking glass, Indian bundleflower, Indian Paintbrush, Japanese Brome, Blue eyed grass	NA
41	Prairie Grassland Meadow	Grassland	12	5	NA	15	3	3	NA	4	3	3	5	0.90	Hackberry, Coralberry, Ground Mimosa, Mesquite	NA	NA	NA	Eastern Red Cedar	NA	NA	NA	Milkweed, Daughter, Horsemint, American Germander, Hedge Parsley, Rescue Grass, Indian Blanket, Indian Grass, Bluebonnet, Pink Evening Primrose, Texas Paintbrush, Bushy Bluestem, Texas Thistle, Maximillion Sunflower, Texas Yellowstar, Texas Prairie Parsley, Vems Looking Glass, Grass	Also known as pr 11a

Attachment B: Bardwell Lake WHAP Point Photographs

Bardwell Lake Site #: 1	
Facing North	Facing East
	
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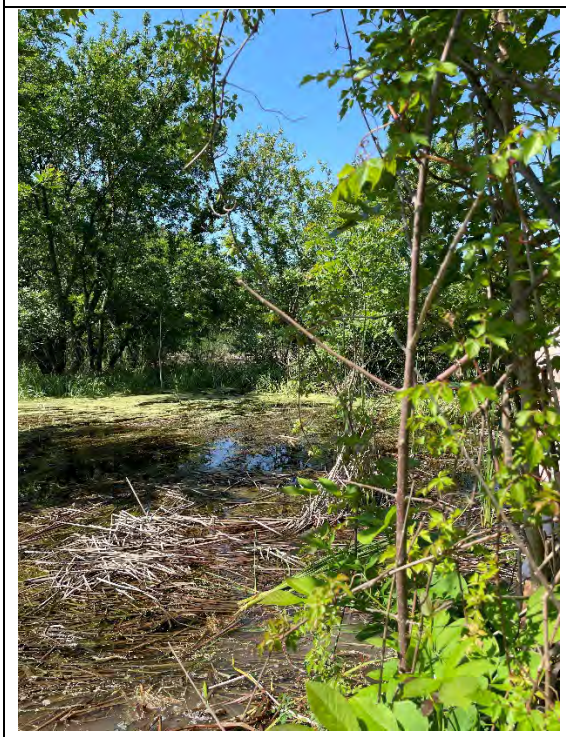	

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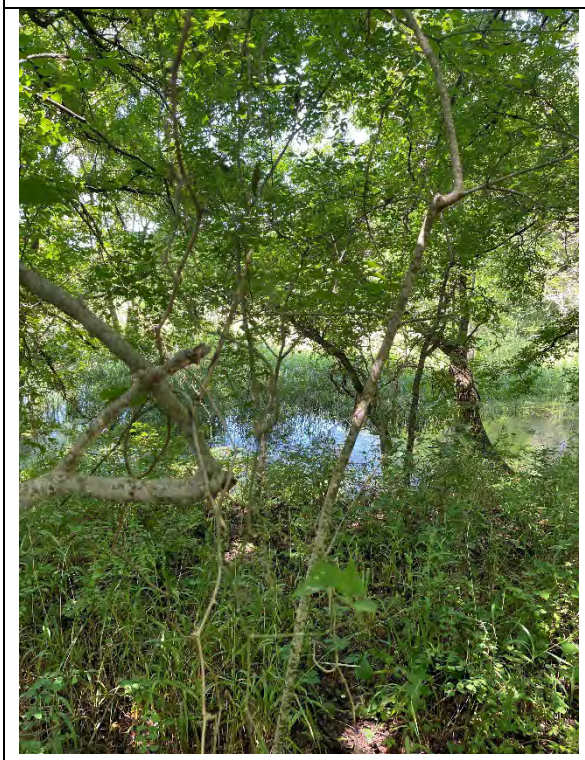	

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	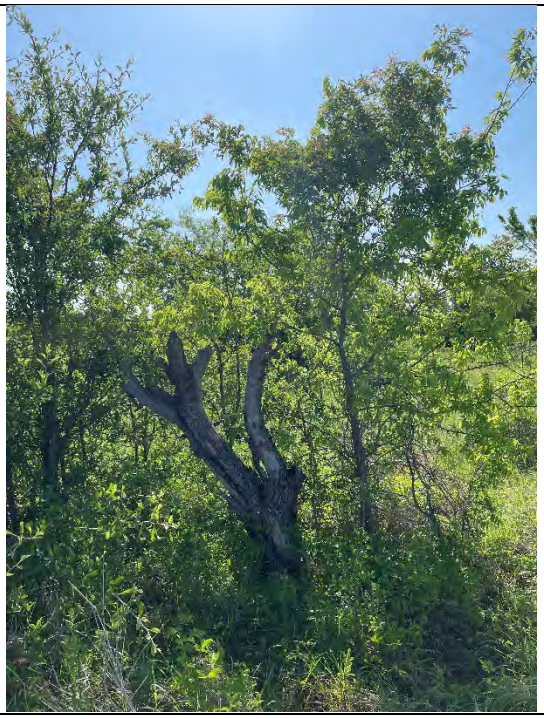
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Facing West	Facing South
	

Bardwell Lake Site #: 5	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 6	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 7	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 8	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 9	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 10	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 11	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 12	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 13	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 14	
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Facing West	Facing South
	

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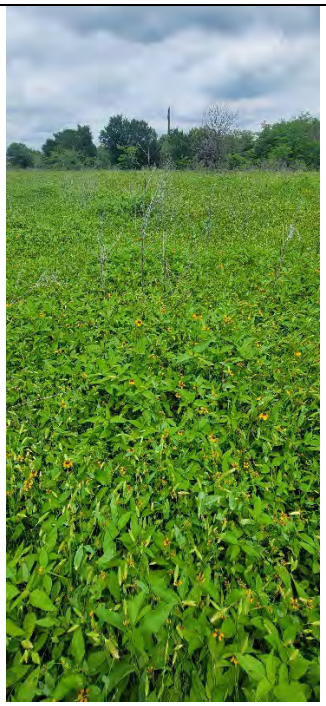	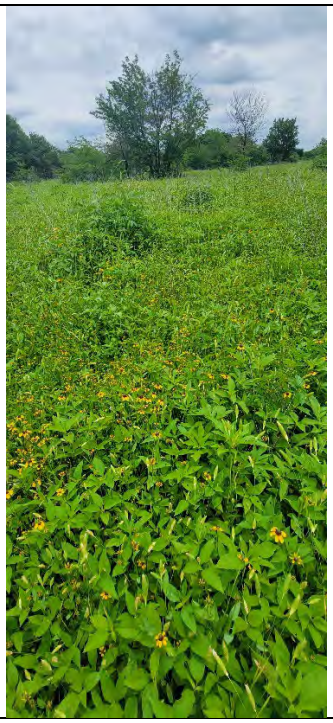
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Facing West	Facing South
	

Bardwell Lake Site #: 17	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 18	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 19	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 20	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 21	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 22	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 23	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 24	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 25	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 26	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 27	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 28	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 29	
Facing North	Facing East
	
Facing West	Facing South
	

Bardwell Lake Site #: 30	
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Facing West	Facing South
	

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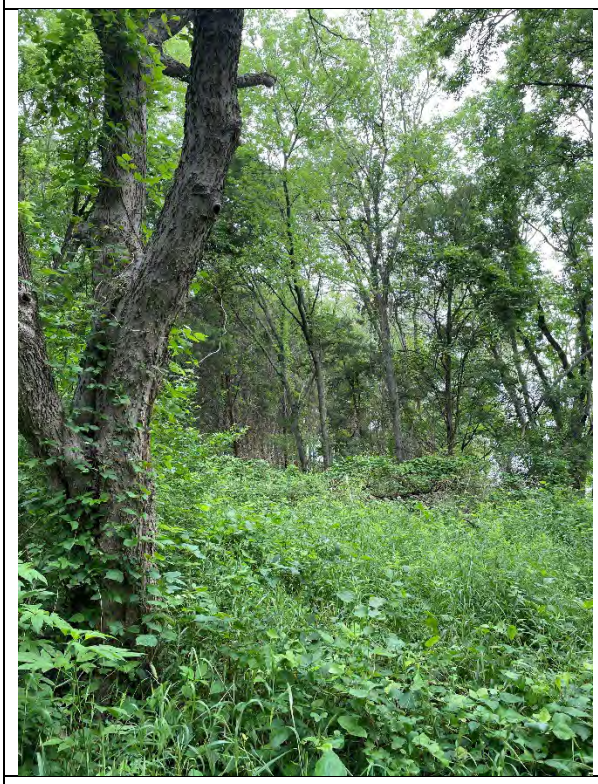	
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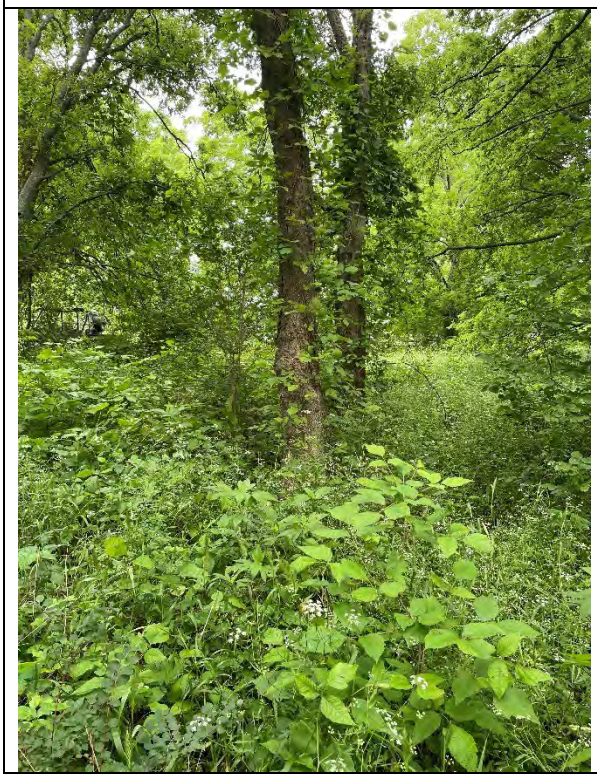	

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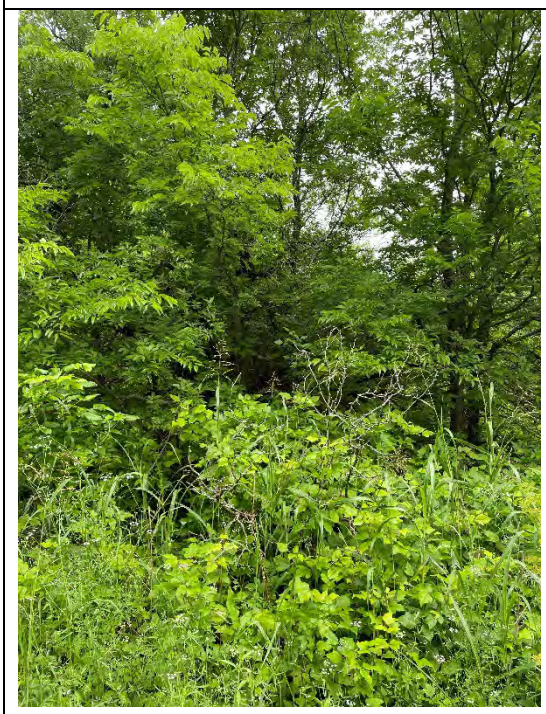	
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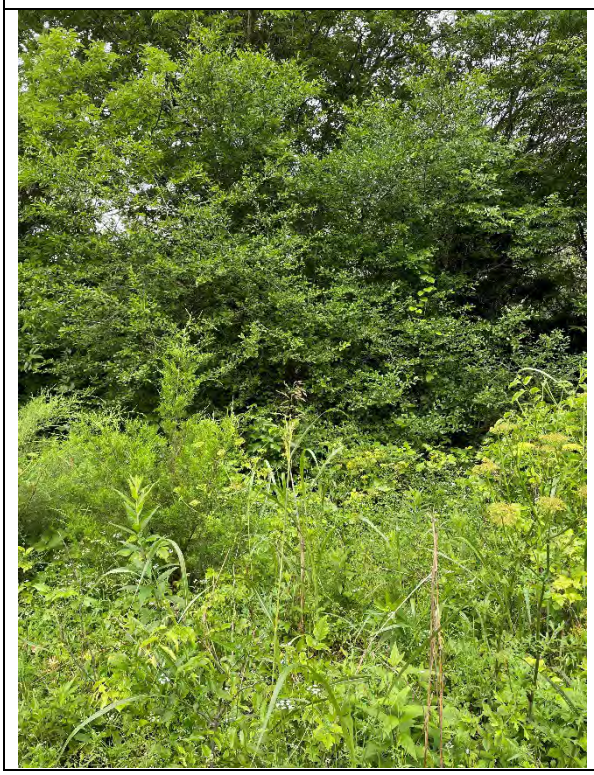	

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	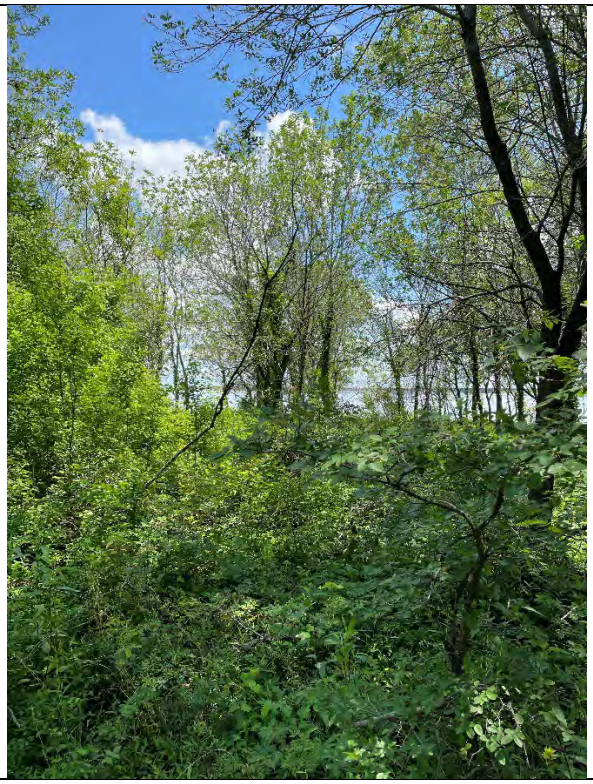
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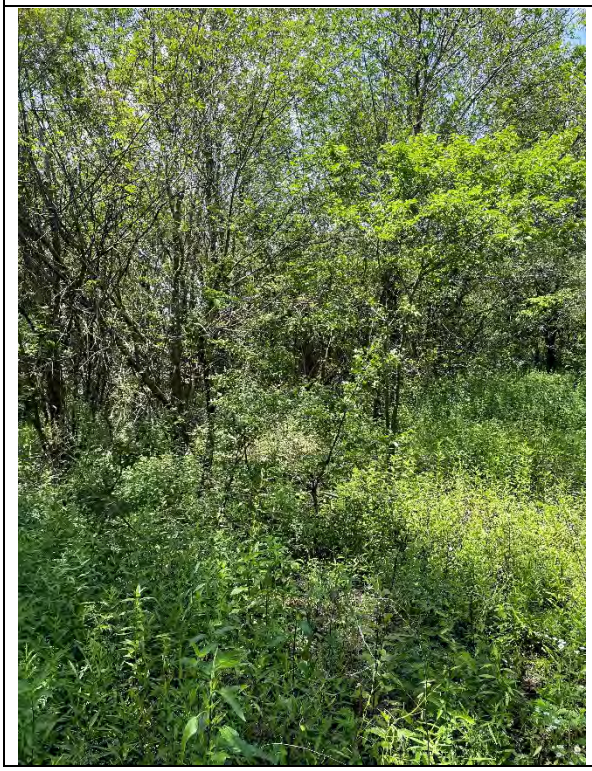	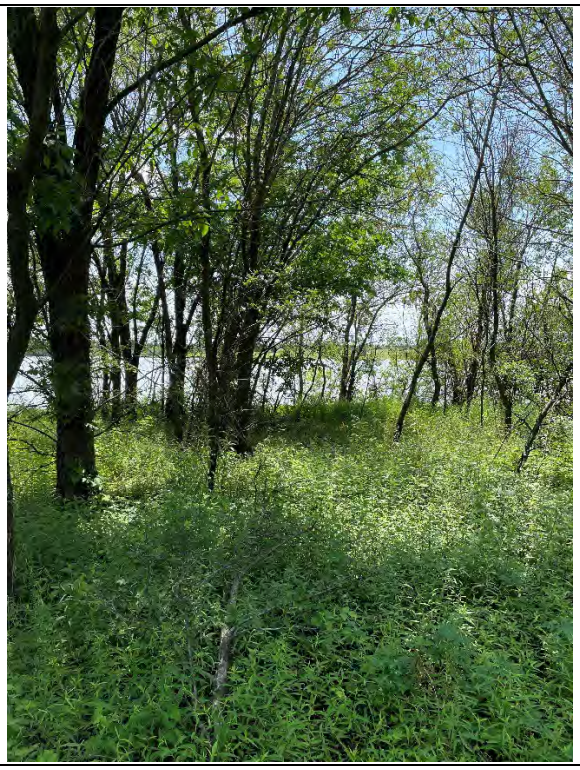

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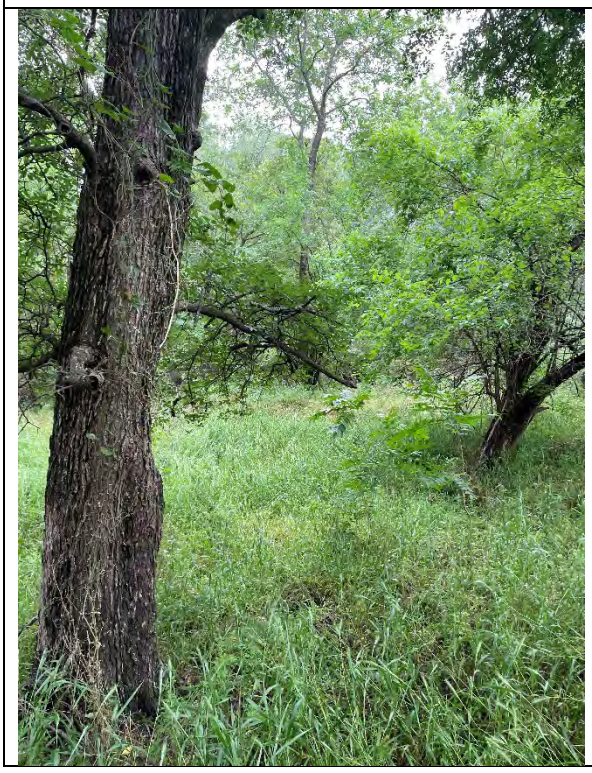	

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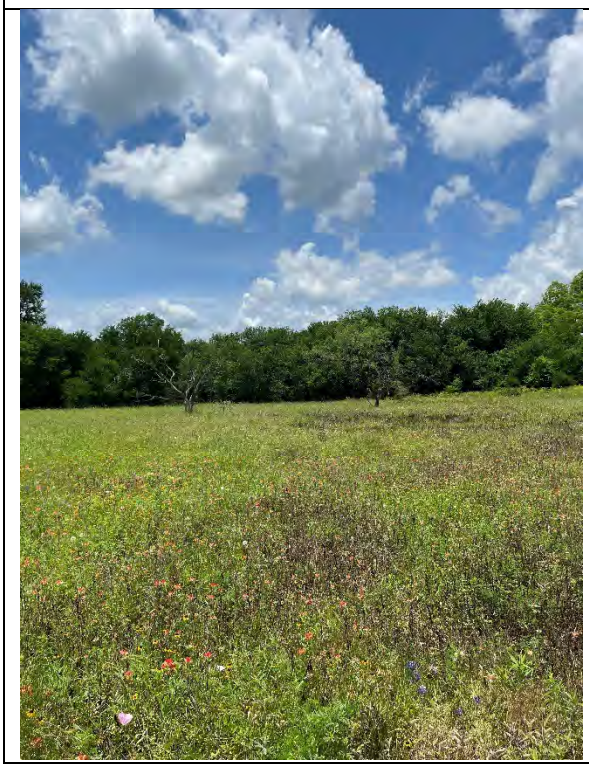	

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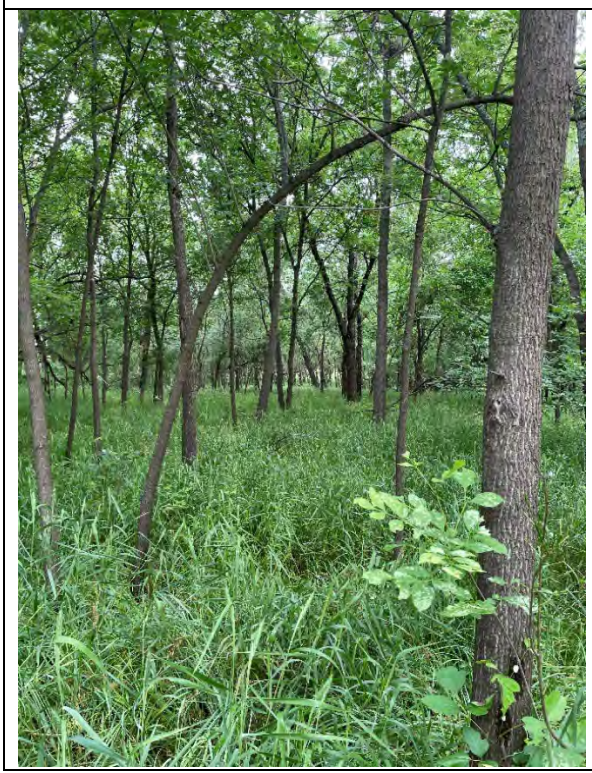	

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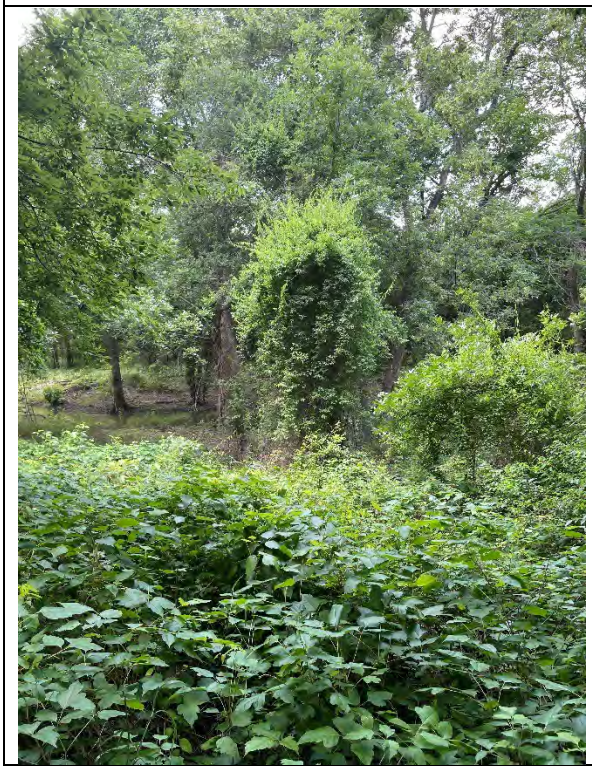	

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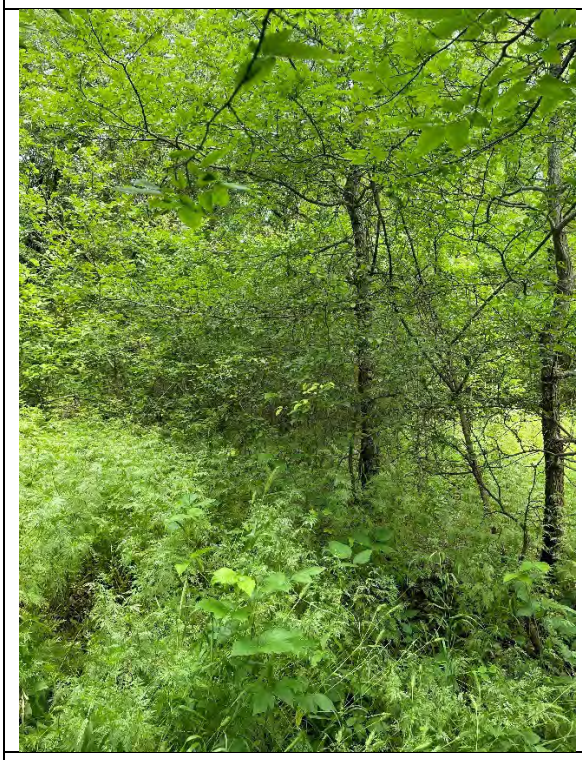	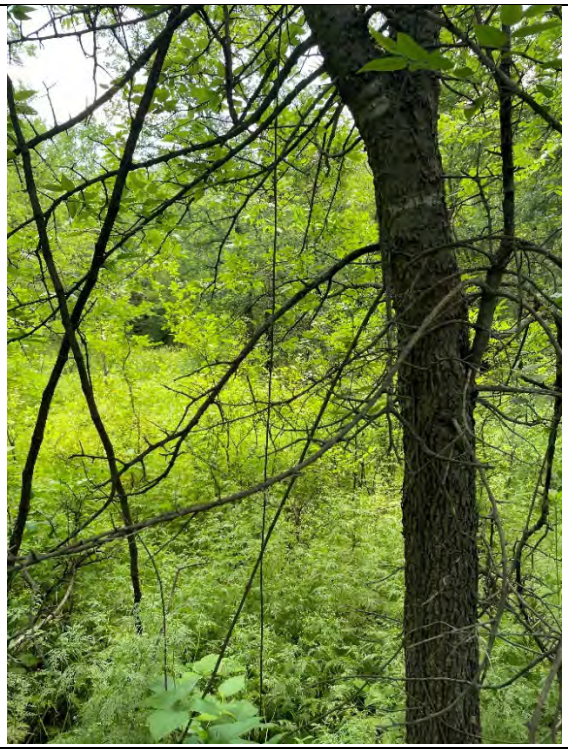
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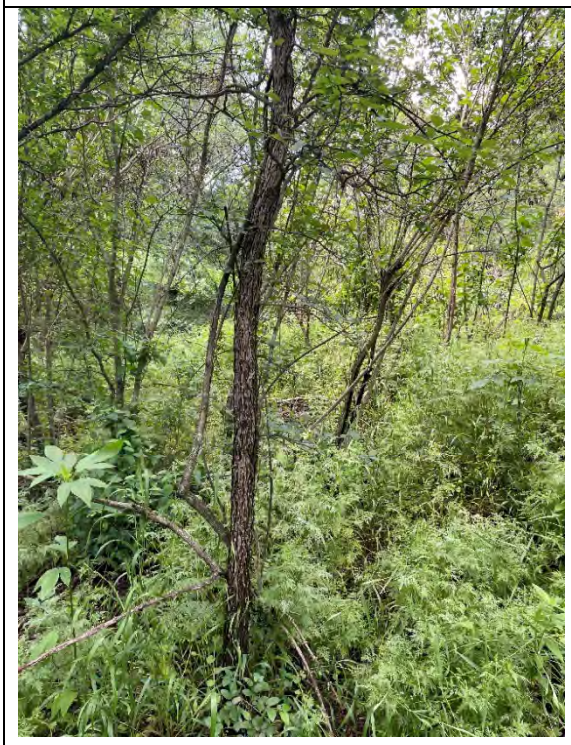	

Bardwell Lake Site #: 39	
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Facing West	Facing South
	

Bardwell Lake Site #: 40	
Facing North	Facing East
	
Facing West	Facing South
	

APPENDIX D – FORT WORTH DISTRICT NOTICE TO SEAPLANE PILOTS

NOTICE TO SEAPLANE PILOTS
U.S. Army Corps of Engineers, Fort Worth District
Prohibitions and Restrictions Governing the Use of Seaplanes

POLICY

In accordance with Title 36, Chapter III, Part 328 of the Code of Federal Regulations, it is the objective of the Corps of Engineers natural resources management mission to maximize public enjoyment and use of Corps lakes, consistent with their aesthetic and biological values. Within that context, the following restrictions governing the use of seaplanes have been developed.

DISTRICT-WIDE PROHIBITIONS AND RESTRICTIONS

1. Pilots are responsible for knowing the rules and regulations pertaining to aircraft as set forth in Title 36, Chapter III, Part 327.4 of the Code of Federal Regulations. Copies are available from any Corps of Engineers Lake Office.

2. Seaplanes may not be operated between sunset and sunrise. Where not specifically restricted or prohibited, recreational seaplane operations are allowed seven days a week.

3. Aircraft larger than 5,000 pounds gross weight are prohibited from landing without special permission from the District Engineer.

4. Commercial seaplane operations are prohibited unless authorized by the District Engineer. Commercial operations, if authorized, will be limited to the hours of 10 a.m. to 5 p.m., Monday through Friday, from November 1 to April 1.

5. Individual letter permits may be issued for seaplanes to operate in prohibited areas on a one-time-only basis.

6. The operation of a seaplane at Corps of Engineers lakes is at the risk of the plane's owner, operator, and passenger(s). All lakes in the Fort Worth District are operated as flood control reservoirs with widely fluctuating pool elevations. Pilots are encouraged to contact each lake project office for current pool elevation information. Addresses and phone numbers of each lake are listed in the attached Visitor's Guide. Information may also be obtained from the Corps of Engineers web site at www.swf.usace.army.mil

7. Where landings and takeoffs are not totally prohibited at a given lake, a minimum distance of 500 feet from shore or structures must be maintained during landing and takeoffs.

8. The attached information lists specific restrictions and prohibitions for each lake in the Fort Worth District.

SEAPLANE OPERATIONS ARE PROHIBITED ON THE FOLLOWING LAKES
Lake Georgetown Grapevine Lake Hords Creek Lake O.C. Fisher Lake B.A. Steinhagen Lake Waco Lake

SPECIFIC RESTRICTIONS ON SEAPLANE OPERATION	
AQUILLA LAKE Seaplane operations are prohibited in all areas except on 'open water' areas of the lake from the dam northeast to the mouth of Hackberry Creek Branch and from the dam northwest to an East-West line extending from the north bank of the Old School branch.	**JIM CHAPMAN LAKE - COOPER DAM** Landings and takeoffs are prohibited in the uncleared portion of the lake west of a line running from the west end of South Sulphur State Park to the peninsula at the mouth of Doctors Creek and in the cove formed Doctors Creek.
BARDWELL LAKE Landings and takeoffs are prohibited north of Highway 34 and in all coves off the main body of the lake.	**GRANGER LAKE** Landings and takeoffs are prohibited in both major arms of the lake formed by Willis Creek and the San Gabriel River and in the large, shallow lake area north of a line from the outlet structure to the east tip of the San Gabriel Wildlife Area.
BELTON LAKE Landings and takeoffs are prohibited north of Highway 36, in the coves formed by Owl Creek and Cedar Creek, and in the arm of the lake formed by Cowhouse Creek upstream from the northwest end of the Fort Hood Recreation Area.	**JOE POOL LAKE** Landings and takeoffs are prohibited in all lake areas west of the Lakeridge Parkway bridges.
BENBROOK LAKE Landings and takeoffs are prohibited in the lake area south of the abandoned pump station on the east shore and in the coves formed by East and West Dutch Branch Creeks.	**LAKE O THE PINES** Landings and takeoffs are prohibited in all coves and bays off the main body of the lake and in uncleared and shallow areas of the lake.
CANYON LAKE Landings and takeoffs are prohibited upstream from Cranes Mill Park and in all coves and major bay areas off of the main body of the lake. (Including the large lake area east and west of Canyon Park.)	**LAVON LAKE** Landings and takeoffs are prohibited in lake areas north of Collin Park, north of Tickey Creek Park, and in all coves and bays off the main body of the lake.

SPECIFIC RESTRICTIONS ON SEAPLANE OPERATION	
LEWISVILLE LAKE Landings and takeoffs are prohibited in uncleared areas north of Crescent Oaks Park, the entire area west of IH 35 and north of Highway 720, and in large uncleared portions of the entire eastern half of the lake.	**SOMERVILLE LAKE** Landings and takeoffs are prohibited west of the west end of Birch Creek Unit of Somerville Lake State Park and in all coves and bays off the main body of the lake.
NAVARRO MILLS LAKE Landings and takeoffs are prohibited west of Wolf Creek Park 1.	**STILLHOUSE HOLLOW LAKE** Landings and takeoffs are prohibited west and south of Cedar Knob Road and in large shallow areas surrounding unnamed islands in the main body of the lake.
PROCTOR LAKE Landings and takeoffs are prohibited in all areas north and west of the eastern tip of Promontory Park and all areas west of the southwest tip of Promontory Park.	**WHITNEY LAKE** Seaplane operations are prohibited in areas downstream from a line drawn from the northern tip of Walling Bend park to the mouth of Frazier Creek and upstream from a line drawn from the mouth of Cedar Creek southwest to the opposite undeveloped shoreline. The coves formed by King Creek and Cedron Creek are also prohibited
RAY ROBERTS LAKE Landings and takeoffs are prohibited north of Highway 3002 and in areas north and east of a line from the northeast tip of Johnson Park to the southwest tip of Jordan Park.	**WRIGHT PATMAN LAKE** Landings and takeoffs are prohibited in all coves and bays off main body of lake and in uncleared and shallow areas of the lake.
SAM RAYBURN RESERVOIR Landings and takeoffs are prohibited west of Highway 147, north of Highway 83, and in scattered uncleared areas of the reservoir.	

NOTE: The latest revision to this Notice to Seaplane Pilots was completed in March of 2000.

APPENDIX E – ACRONYMS

ac-ft	Acre Feet
B.P.	Before Present
CAP	Climate Action Plan
CRMP	Cultural Resources Management Plan
CWA	Clean Water Act
DC	District Commander
DM	Design Memorandum
EA	Environmental Assessment, NEPA Document
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
GIS	Geographical Information Systems
HDR	High Density Recreation
HQ	USACE Headquarters (also HQUSACE)
IH	Interstate Highway
IPaC	Information for Planning and Consultation
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
NOA	Notice of Availability
NRCS	Natural Resource Conservation Service
NRHP	National Registry of Historic Places
O&M	Operations and Maintenance
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
RPEC	Regional Planning and Environmental Center
RTEST	Rare, Threatened, and Endangered Species of Texas
SGCN	Species of Greatest Conservation Need

SH	State Highway
SMP	Shoreline Management Plan
TCAP	Texas Conservation Action Plan
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department
TORP	Texas Outdoor Recreation Plan
TRA	Trinity River Authority
TX	Texas
TXDOT	Texas Department of Transportation
TXNDD	Texas Natural Diversity Database
US	United States (U.S.)
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