Granger Lake Master Plan

Brazos River Basin: San Gabriel River
Williamson County, Texas
April 2022

US Army Corps of Engineers®

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EXECUTIVE SUMMARY

Granger Lake Master Plan
U.S. Army Corps of Engineers
Prepared by the Southwestern Division
Regional Planning and Environmental Center (RPEC)
April 2022

ES.1 PURPOSE

The revision of the 1974 *Granger 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 Granger Lake over the next 25 years. The 1974 Plan has served well past its intended 25-year planning horizon and does not reflect the growing population around the lake and regional recreation needs. When originally constructed, the dam and lake's purposes were primarily flood risk management and watershed conservation. Today, the lake and dam provide a multi-purpose reservoir for the original purposes of flood mitigation, water supply, fish and wildlife management, and recreation. In addition to these primary missions, USACE has an inherent mission for environmental stewardship of project lands. Granger Lake exists within the 10-county Capital Area Council of Governments (CAPCOG). Refer to Figure ES.1 for a regional overview showing Granger Lake on the periphery of the core regional boundaries as defined by the CAPCOG.

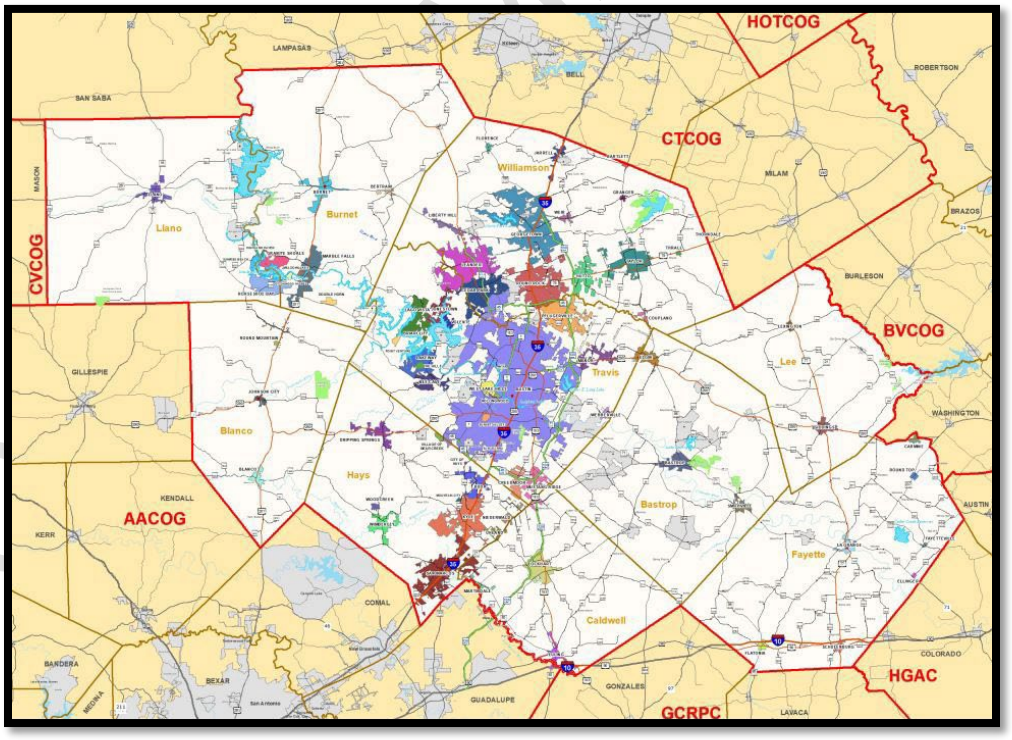

Figure ES 1 CAPCOG Regional Boundaries

The Master Plan is primarily a land use and outdoor recreation strategic plan that does not address the specific authorized purposes of flood risk management or water supply. Although water management is addressed in the 2017 USACE Water Control Manual for Granger Lake, the Master Plan acknowledges that fluctuating water level for flood risk management and water supply can have a dramatic effect on outdoor recreation, especially at boat ramps and swim beaches.

The 1974 Master Plan included a total of 13,200 acres of USACE land and 4,400 acres of surface water at the normal or conservation pool elevation of 549.3 feet National Geodetic Vertical Datum of 1929 (NGVD29). Erosion, sedimentation, and siltation over the years have impacted lake contour and level. The acres figure has been used since 1974 to describe the size of the pool at the normal elevation. The mapping used for this Master Plan revision uses modern satellite imagery and Geographic Information System (GIS) mapping, resulting in different acreage calculations than that of the 1974 Master Plan. Granger Lake has a water surface of 4,159 acres at the conservation pool of 504.0 feet NGVD29. Approximately 13,589 acres of federal land lie above the conservation pool with a shoreline of approximately 50.50 miles at the top of the conservation pool. Granger Dam and Lake Project (hereafter Granger Lake or Project) is part of an integral flood mitigation and water conservation project in the Brazos River Basin consisting of nine major projects. This plan and supporting documentation provide an inventory and analysis, goals, objectives, and recommendations for USACE lands and waters at Granger Lake, Texas, with input from the public, stakeholders, and subject matter experts.

ES.2 PUBLIC INPUT

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

Due to the Covid-19 pandemic, the public input process was changed from a face-to-face meeting to a virtual presentation detailing the specifics of the Master Plan revision. The presentation and public input process remained open for 30 days, providing descriptions of changes to new land classifications and the process of the master plan revision.

ES.3 RECOMMENDATIONS

The following land and water classification changes (detailed in Chapter 8) were a result of the inventory, analysis, and synthesis of data, documents, and public and agency input. In general, all USACE land at Granger Lake was reclassified either by a change in nomenclature required by regulation or changes needed to identify actual and projected use. The land classifications present at Granger Lake are described as follows: Project Operations (PO) are lands managed for operation of the dam, project office, and maintenance yards. High Density Recreation (HDR) refers to lands developed for intensive recreational activities for use by the public such as day use

areas, campgrounds, and related concession areas. Environmentally Sensitive Areas (ESA) are areas where scientific, ecological, cultural, and aesthetic features have been identified. Multiple Resource Management Lands (MRML) are divided into four different sub-classifications, two of which are located at Granger Lake. Low Density Recreation (LDR) are lands which may support passive public recreational use. Wildlife Management (WM) are for lands managed primarily for the conservation of fish and wildlife habitat.

The Water Surface category has three sub-classifications present at Granger Lake. Restricted refers to areas where recreational boating is prohibited and restricted for project operations, safety, and security purposes. Designated No-Wake are areas intended to protect environmentally sensitive shorelines and recreational sites. Open Recreation refers to open water which is available year-round for recreational use.

With the exception of Project Operations and Wildlife Management acreage, it is not possible to make a direct comparison of the new land classification with the prior 1974 classifications. The 1974 Plan classified a majority of the acres within designated parks as Operations: Wildlife Management. The changes to the land classification are due to delineating acres previously identified as Operations: Recreation Intensive Use to Wildlife Management Area to account for changing trends in recreational use by site visitors. In addition to the acreage changes, USACE has designated 3 utility corridors at Granger Lake which are described in detail in Section 6.2 and included in the maps in Appendix A.

Table ES 0-1 Change from Prior 1974 Land Classifications to New Proposed Land Classifications

Prior Land Classifications (1974 Plan)	Acres	Proposed Classifications (2022)	Acres
Project Operations	426	Project Operations	627
Operations: Recreation Intensive Use	1,518	High Density Recreation	936
Unclassified	779	Environmentally Sensitive Area	746
Operations: Wildlife Management	6,277	Wildlife Management Area	6,833
Operations: Recreation Low-Density Use	281	Low Density Recreation	139
Total Land Acres	8,800	Total Land Acres	9,281

Total Acreage differences from the 1974 total to the 2022 totals are due to improvements in measurement technology, deposition/sedimentation/siltation, and erosion. As real estate boundaries are researched, acreages may change slightly to reflect more precise boundary mapping. 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 ES 0-2 Change from Prior Water Surface Classification to Proposed Water Surface Classification

Prior Water Surface Classifications (1974 Plan)	Acres	Proposed Water Surface Classifications (2022)	Acres
Open Recreation	N/A	Open Recreation	4,289
Designated No-Wake	N/A	Designated No-Wake	21
Restricted Operation	N/A	Restricted Operation	25
Total Water Acres	3,985	Total Water Acres	4,335

Total Acreage differences from the 1974 total to the 2022 totals are due to improvements in measurement technology, deposition/sedimentation/siltation, and erosion.

The 1974 Master Plan described water surface areas including open water, shallow areas, uncleared areas, swimming areas, restricted areas, low speed boating areas, and low pool hazards which were intended to be flexible and managed by the lake staff. Detailed maps for these areas were not created, and acreages were not calculated for those areas, so there cannot be a direct comparison to the new water surface designations.

The acreages of the conservation pool and USACE land lying above the conservation pool was measured using satellite imagery and GIS software which 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, sedimentation, 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 Granger Lake. Chapter 2 consists of an inventory and analysis of Granger 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 Granger 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 Granger Lake, in accordance to 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

Granger Dam and Lake (hereafter Granger Lake) is located at river mile (RM) 31.9 on the San Gabriel River. The damsite is located within Williamson County, about 10 miles northeast of Taylor, Texas (Figure 1-1). The construction of Granger Dam began in October of 1972 and was completed in February of 1980. Deliberate impoundment began 3 March 1980, and the conservation pool was filled in May of 1981.

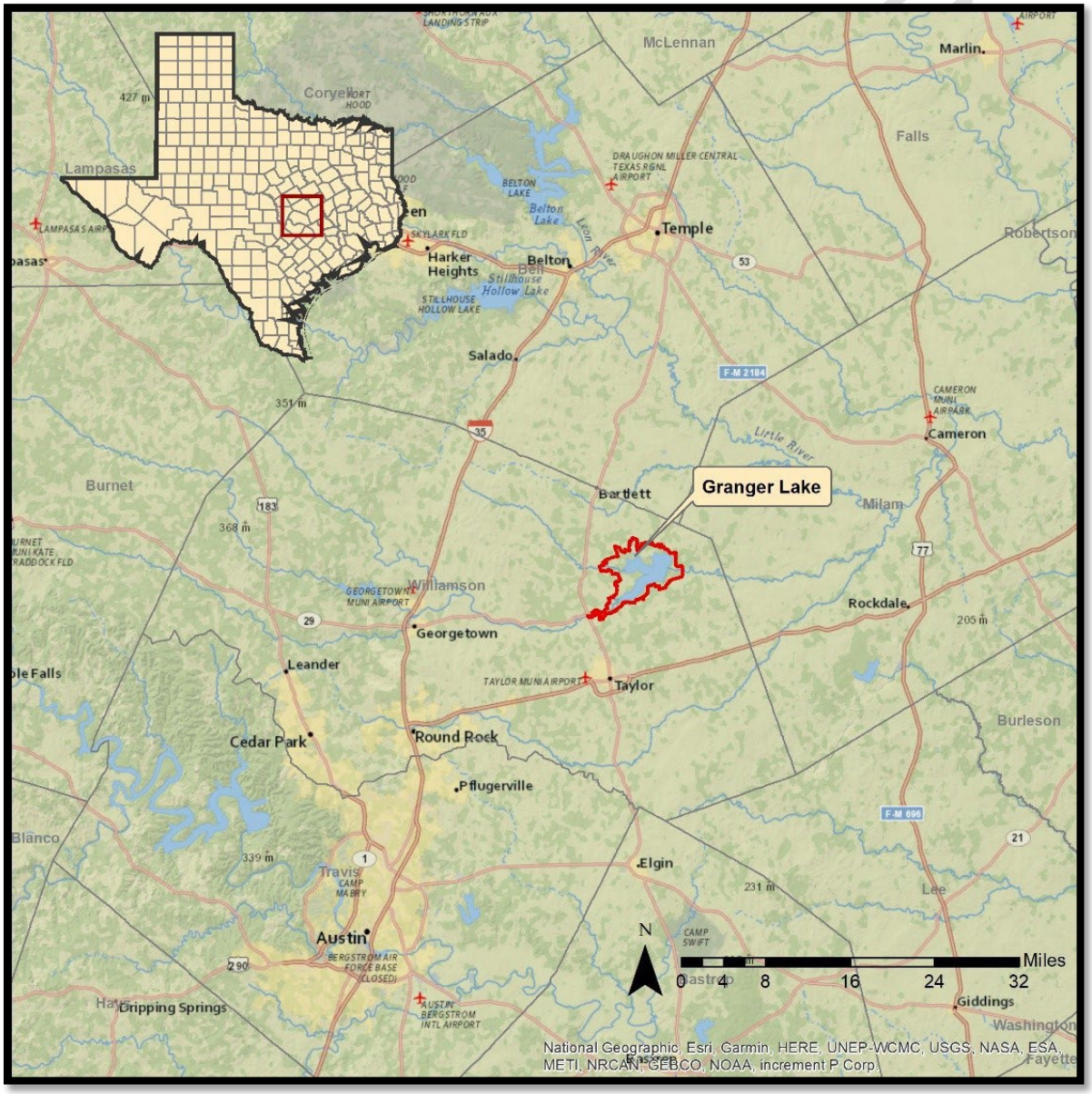


Figure 1-1 Vicinity Map of Granger Lake and Dam

Granger Lake is an integral part of the U.S. Army Corps of Engineers (USACE) plan for flood risk management and water conservation in the Brazos River Basin. The plan presently consists of nine major flood risk management projects, known as Whitney Dam, Aquilla Dam, Waco Dam, Proctor Dam, Belton Dam, Stillhouse Hollow Dam, North San Gabriel Dam, Granger Dam, and Somerville Dam. The nine flood mitigation projects in the Brazos River system control approximately 36,830 square miles of flood control area. Granger Lake mitigates 709 square miles of drainage area within the Brazos 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 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 Granger 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 risk management or water supply purposes of Granger Lake. The Granger Lake Master Plan was last revised 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 on federal lands and including where ecologically appropriate, a native prairie or tree cover within the constraints imposed by primary project purposes helps reduce stormwater runoff and soil erosion, mitigates air pollution, and moderates temperatures. To this end, USACE has developed the following statements.

The USACE Sustainability Policy and Strategic Plan states:

> *"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

Congressional authority for the construction of Granger Dam and Lake (previously Laneport Reservoir) on the San Gabriel River was contained in the Flood Control Act approved 3 September 1954 (Public Law [PL] 780, 83rd Congress, 2nd Session) in accordance with the plan of improvement as outlined in House Document No. 535 (81st Congress, 2nd Session). However, it was adopted on 29 July 1955 that the reports on the Brazos River and Tributaries, Texas, be printed in House Document No. 535, with a view to giving further study to the location of Granger Lake on the San Gabriel River and to determine if a change in the site of the reservoir was advisable. The Flood Control Act approved 23 October 1962 (Public Law 874, 87th Congress, 2nd Session) authorized the construction and operation of North Fork (Lake Georgetown) and South Fork Reservoirs in conjunction with the authorized Granger Lake, in accordance with the plan outlined in House Document No. 591 (87th Congress, 2nd Session). Authority to initiate advance planning on the San Gabriel River is contained in the Public Works Appropriation Act of 1965, approved 30 August 1964 (Public Law 88-511) and in advice of Allotment C-124 dated 9 September 1964.

In January 1975, Laneport Reservoir was officially renamed Granger Dam and Lake (Public Law [PL] 93-631). In 1980, North Fork Reservoir was officially changed to Lake Georgetown. South Fork Reservoir was not built and was deauthorized in June 2003. The construction of Granger Dam began in October of 1972 and was completed in February of 1980. Deliberate impoundment began 3 March 1980, and the conservation pool was filled in May of 1981.

1.3 PROJECT PURPOSE

Granger Dam and Lake is a multi-purpose water resource. The dam and resulting reservoir were originally constructed for the purpose of flood control and watershed conservation, with authorized purposes for the reservoir and lands later given for the development of recreation areas, water conservation in the form of a permanent conservation pool, and fish and wildlife conservation. The project seeks to

balance the needs of the surrounding population and visitors with the protection of the project's cultural resources and ecological systems.

Environmental stewardship, though not listed as a primary project purpose, is a major responsibility and inherent mission in the administration of federally owned lands. Other laws, including but not limited to Public Law 91-190, NEPA, and Public Law 86-717, Forest Cover Act, place emphasis on the environmental stewardship of federal lands and USACE-administered federal lands, respectively. This stewardship includes, among other laws, adherence to the Endangered Species Act of 1973, (Public Law 93-205), which protects imperiled species and the ecosystems upon which they depend.

1.4 MASTER PLAN PURPOSE AND SCOPE

The Granger 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 Granger Lake is set forth as follows:

> *"The land, water, and recreational resources of Granger 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, administration, and implementation are not addressed here but are covered in the Granger 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 Granger Lake with respect to management of the water level in the lake. The USACE Water Control Manual for Granger Lake is recommended for a description on 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 suitabilities
- Expressed public interests that are compatible with Granger Lake's authorized purposes
- Environmental sustainability elements

The latest version of the Granger Lake Master Plan was released in 1974. The original Plan was given limited approval for building some public use facilities, and the later updates authorized comprehensive land use and resource management. Although the previous revision was sufficient for prior land use planning and management, many changes are affecting the region. Outdoor recreation trends, regional land use, current legislative requirements, and USACE management policy have evolved. The impacts of climate change and the growing demand for recreational access and natural resource management have affected the region and Granger 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

Granger Lake is located in the Granger Lake watershed in the San Gabriel Sub-basin. The San Gabriel River originates in Burnet County approximately 12 miles north of Burnet, Texas, and flows in an easterly direction for approximately 120 miles to join the Little River at river mile 44.3, which then flows northeasterly to join the Brazos River at River Mile 315.8. The watershed lies in the central portion of Texas. The watershed of the San Gabriel River has a total drainage area of 1,355 square miles of which 709 square miles are controlled by Granger Dam.

The San Gabriel River has five principal tributaries that flow into its river system. North Fork and South Fork, the principal tributaries of the San Gabriel River, flow in an easterly to southeasterly direction for distances of approximately 46 and 39 miles, respectively, to their confluence with the San Gabriel River at Georgetown, Texas. The drainage areas of North Fork and South Fork are 270 and 133 square miles, respectively. Berry Creek and Willis Creek enter the San Gabriel River above Granger Dam. Berry Creek enters the San Gabriel River at river mile 57.8 and has a drainage area of 83 square miles. Willis Creek enters the San Gabriel River at river mile 29.7 and has a drainage area of 57.8 square miles. Brushy Creek, the last major tributary of the San Gabriel River, has a drainage area of 510 square miles and enters the San Gabriel River at river mile 5.2.

The San Gabriel River Sub-basin is crossed by a network of highways and railroads and includes the urban area of Georgetown. The majority of the San Gabriel River watershed lies within the Cross Timbers and Edwards Plateau ecoregions to the west, and the Texas Blackland Prairie ecoregion to the east. About two-thirds of the watershed is either in pasture or rangeland, with a considerable number of concentrated animal feeding operations. Agricultural cropland comprises about 20% of the watershed and developed land comprises about 5%. Manufacturing, trade, healthcare, and education are the major industries in the area. The population of the basin was approximately 90,000 in 2010.

Granger Dam operates with four other dams, Proctor Dam, Belton Dam, Stillhouse Hollow Dam, and North San Gabriel Dam on the Little River System and San Gabriel River to control floods at the Little River Gage at Cameron, Texas. Discharges from Granger Lake pass through control points at Laneport on the San Gabriel River and Cameron on the Little River. The stream capacity at Cameron gage is shared with four other projects in the Little River basin. All five of these dams provide for flood damage reduction in the Little River System. The nine USACE dam projects in the Brazos River system control 36,830 square miles of drainage area of which 8,950 square miles are non-contributing.

Granger Dam consists of a rolled earthfill embankment, an uncontrolled ogee weir spillway, and a gated outlet works. The total length of the dam is 16,375.5 feet. The outlet works consist of an approach channel, reinforced concrete intake and control structure, concrete conduit, service bridge, stilling basin, and a discharge channel. The intake tower is located in the lake upstream from the dam embankment station.

A total of 13,589 fee simple acres and approximately 1,731 flood flowage easement acres were acquired for the construction of Granger Lake. The real estate acquisition was based on a normal conservation pool elevation of 504.0 feet National Geodetic Vertical Datum 29 (NGVD29) and a flood pool elevation of 528.0 feet NGVD29. Flowage easements were obtained in the upper reaches of the lake up to a contour elevation of 533.0 feet NGVD29, 5 feet above the top of the flood pool. Lands not needed for project purposes or recreational development were offered for reconveyance to former owners. There is now a total of 13,589 acres of fee-owned land above 533.0 NGVD29 and approximately 1,731 acres of flowage easements.

1.6 DESCRIPTION OF RESERVOIR

Granger Lake is average size by comparison to many USACE lakes, with a conservation (normal) pool of 4,159 surface acres at elevation 504.0 feet NGVD29. The top of the flood pool is elevation 506.0 feet NGVD29 and the uncontrolled spillway crest is at elevation 528.0 feet NGVD29. The lake was originally designed to allow the accumulation of 44,100 acre-feet of sediment, but it was later revised to 27,600 acre-feet, based on 50-year duration. Sedimentation surveys would typically be conducted every twenty years. However, sedimentation surveys are currently done periodically depending on need and funding availability. Five sedimentation surveys have been

completed at Granger Lake, the last of which was in 2013 by the Texas Water Development Board (TWDB) Hydrographic Survey Program.

1.7 PROJECT ACCESS

Granger Lake is easily accessed by several secondary and tertiary roads. The two main east-west access roads include Farm to Market (FM) 971, located north of the lake. The two main north-south access roads are State Highway 95, located to the west of the lake and Granger Dam Road, located east of the lake. Both highways connect to all three major east-west access roads. Refer to Figure 1.2 for a map of the major access roads around Granger Lake.

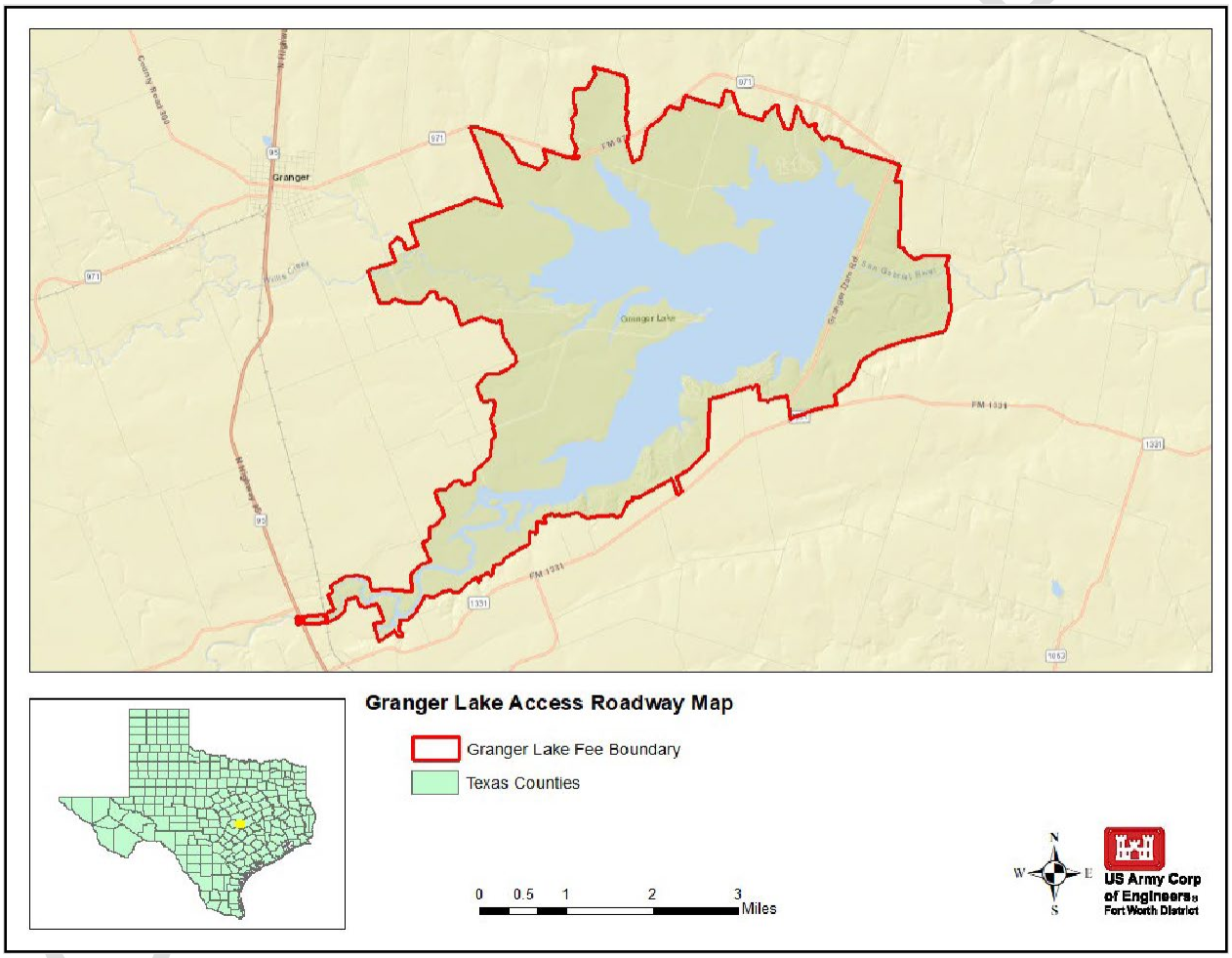


Figure 1-2 Granger Lake Access by Roadway

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 from 1965 thru 1980 setting forth design criteria for all aspects of the project including the prime flood risk management facilities, real estate acquisition, road and utility relocations, reservoir clearing, and the Master Plan for recreation development and land management. A few supplements and project related reports and manuals were added after 1980. Table 1-1 lists the Design Memoranda as well as other manuals and reports for Granger Lake.

Table 1-1 Granger Lake Design Memoranda, Manuals, and Reports
Source: USACE

	Title	Date
1.	Interim Report on Brazos River	December 1945
2.	Report on Survey of Brazos River and Tributaries, Texas	August 1947
3.	Design Memorandum No. 1	July 1965
4.	Design Memorandum No. 2	December 1966
5.	Design Memorandum No. 3	January 1968
6.	Design Memorandum No. 4	January 1967
7.	Design Memorandum No. 5	March 1967
8.	Design Memorandum No. 6	February 1967
9.	Design Memorandum No. 7	March 1967
10.	Design Memorandum No. 8	April 1967
11.	Design Memorandum No. 9	November 1967
12.	Design Memorandum No. 10	January 1972
13.	Design Memorandum No. 11	August 1967
14.	Design Memorandum No. 12	December 1967
15.	Design Memorandum No. 13	October 1967
16.	Design Memorandum No. 14	February 1972
17.	Design Memorandum No. 15	March 1973
18.	Design Memorandum No. 16	N/A
19.	Design Memorandum No. 17	December 1968
20.	Design Memorandum No. 18	October 1973
21.	Design Memorandum No. 19	April 1972
22.	Design Memorandum No. 20	November 1971
23.	Design Memorandum No. 21	1976
24.	Design Memorandum No. 22	December 1972
25.	Design Memorandum No. 23	July 1972
26.	Design Memorandum No. 24	1973
27.	Design Memorandum No. 25	June 1973
28.	Design Memorandum No. 26	March 1973
29.	Design Memorandum No. 27	1977
30.	Design Memorandum No. 28	1980
31.	Design Memorandum No. 29	1980
32.	Spillway Design Flood Study, Granger Lake	July 1981
33.	Granger Lake – Water Quality Report	November 1990
34.	Granger Lake Water Control Manual, Brazos River Basin, Texas	February 1991
35.	Periodic Inspection Report No. 10	July 2012

1.9 PERTINENT PROJECT INFORMATION

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

Table 1-2 Elevations and Water Storage Capacity

Feature	Elevation (Feet NGVD29)	Lake Area (Acres)	Storage (Acre-Feet)	Runoff (Inches)
Top of Dam	555.0	–	–	–
Maximum Design Water Surface Elevation (1973 Study)	550.3	19,220	579,900	22.89
Spillway Crest and Top of Flood Pool (1983 Study)	528.0	11,040	244,200	9.64
PMF Design Water Surface Elevation (1983 Study)	555.19	21,060	679,200	26.81
Top of the Conservation Pool (2013 Survey)	504.0	4,159	51,822	2.09
Sediment Reserve	–	–	27,600	–
Maximum Tailwater	481.2	4,312	–	–
Streambed (1998 Survey)	444.0	23,714	–	–

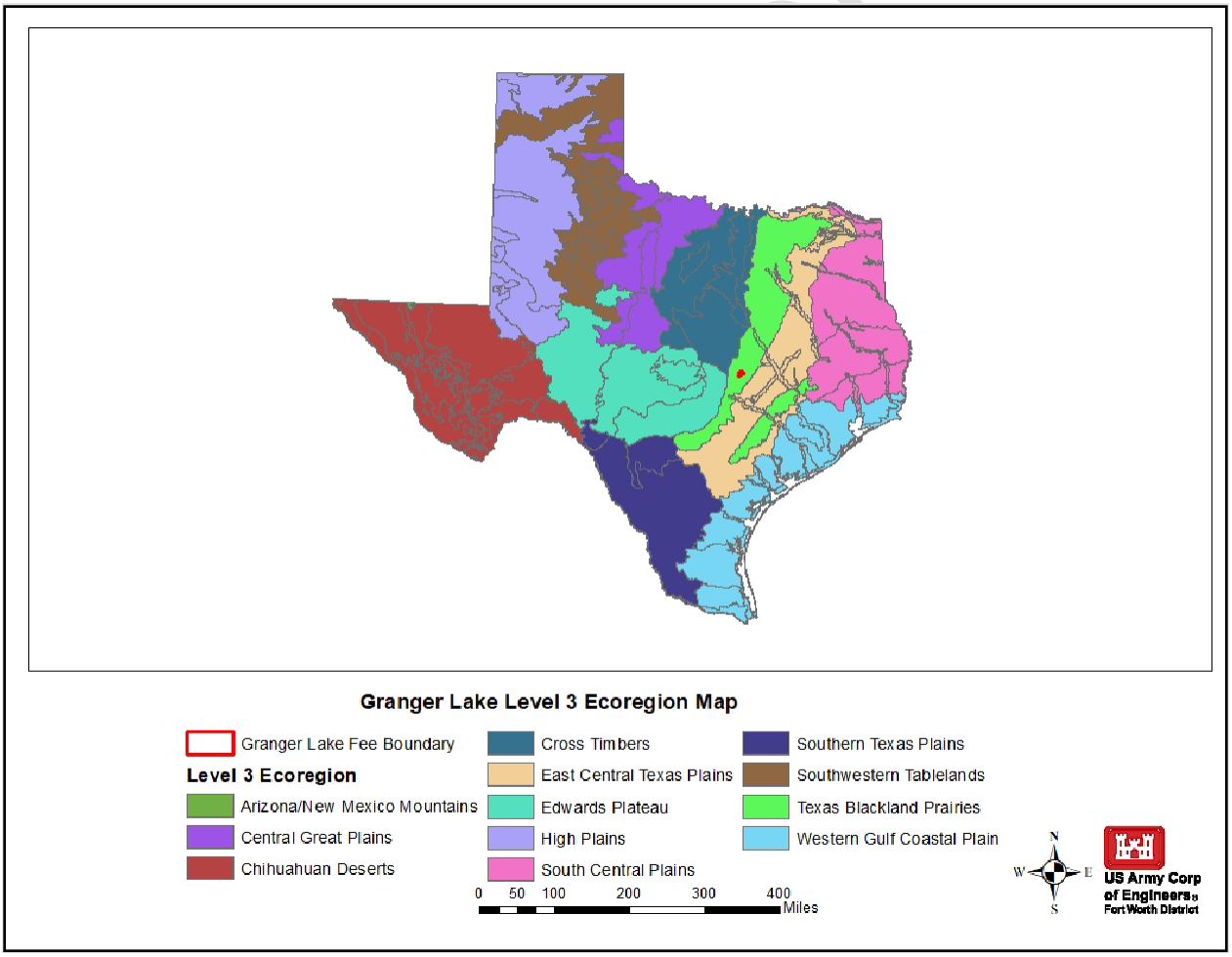
Source: USACE

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. Level III ecoregions represent a subdivision of those into 104 unique regions and Level IV is a finer sub-classification of those. Granger Lake and its watershed is located in the Level III Texas Blackland Prairie ecoregion, as seen in Figure 2-1, specifically in the Northern Blackland Prairie Level IV subdivision of the Texas Blackland Prairie ecoregion.



Source: EPA (2021)

The Texas Blackland Prairie is divided into distinct Northern and Southern regions. Granger 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 consist predominantly oak and other hardwood trees. Elevations range from approximately 300 to 1050 feet.

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 and forest has been converted to cropland and pasture or cleared for urbanization, leading to a loss of habitat for native species.

2.1.2 Climate

Granger Lake is located within central 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 67.5 degrees Fahrenheit (°F) (NOAA, 2020B). January, the coldest month, has an average temperature of 49.0°F and average minimum daily temperature of about 36.8°F. August, the warmest month, has an average daily temperature of 84.6°F and average maximum daily temperature of 96.9°F. The average length of the growing season is 266 days (NOAA,2020A). Granger Lake lies within the United States Department of Agriculture (USDA) Plant Hardiness Zone 8b, which is determined by the winter extreme low temperatures, with 8b having normal winter lows between 15°F and 20°F. Average monthly temperature and precipitation is provided in Figure 2.2.

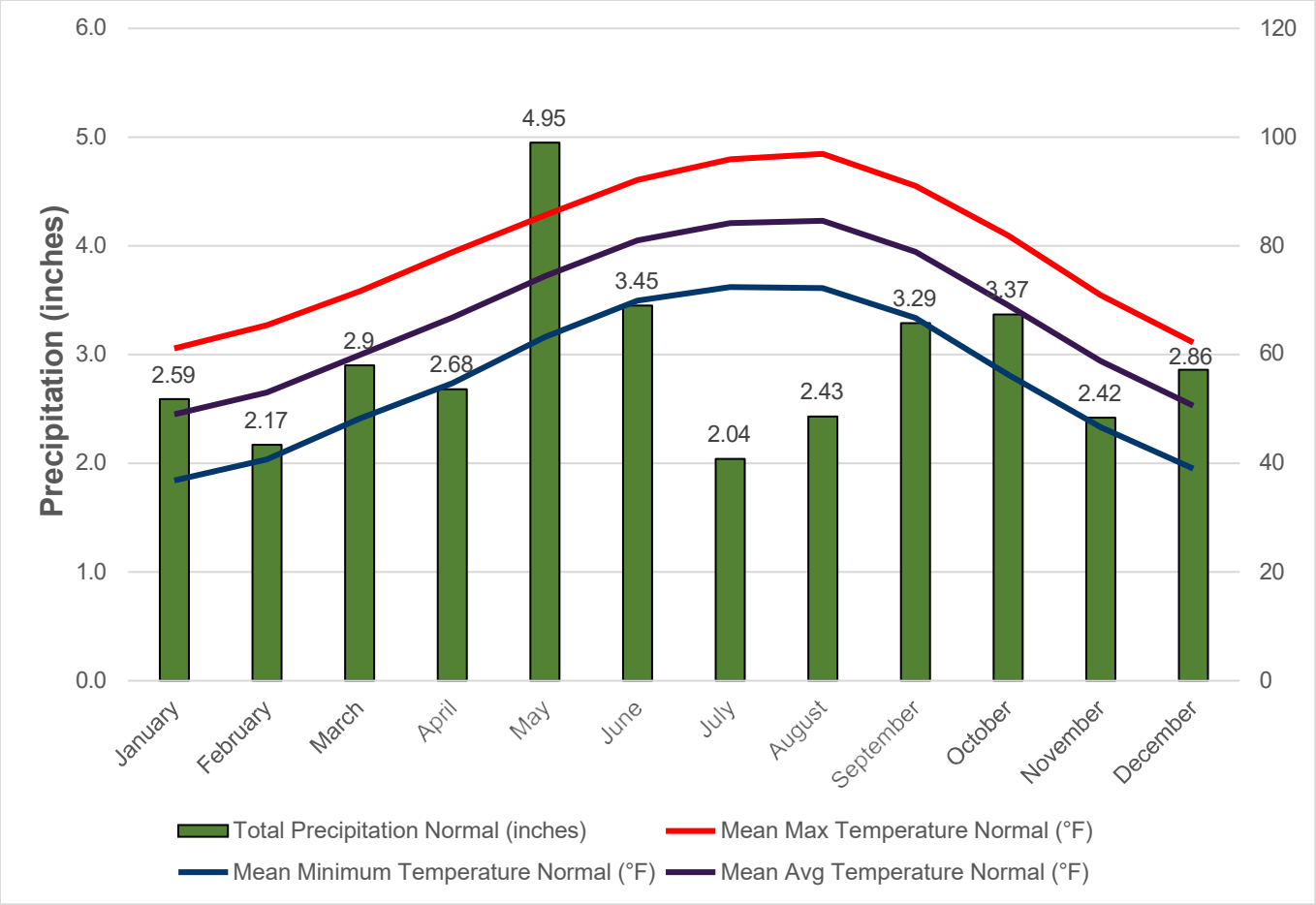


Figure 2-2 Average Monthly Climate Granger Lake, 1991 - 2020
Source: NOAA, 2020B.

The normal annual precipitation is 35.15 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 (NOAA/Weather.gov).

The average humidity for the area around Granger Lake is 74.75% over the course of a year. The air is driest around the end of November-February timeframe and is most humid between June-July (USACE, 2018). The average annual evaporation rate at Granger Lake, as calculated using the measured pan evaporation multiplied by the monthly pan coefficient, is about 52.33 inches with the lowest evaporations rates occurring during the winter and greatest evaporation occurring during the summer (USACE, 2017).

2.1.3 Climate Change and Greenhouse Gasses (GHG)

The U.S. Global Change Research Program (USGCRP) researched potential impacts of climate change globally, nationally, regionally, and by resource (e.g., water resources, ecosystems, human health). Granger Lake lies within the Southern Great Plains region of analysis. Growing population in the region has already increased the demand for water and energy, while evidence of climate change in the form of rising temperatures has led to increasing demand for water and energy and has impacted local agricultural practices.

Within the entire Southern Great Plains Region, there has been an increase in average temperatures by 1.5°F from a 1960–1970 baseline to the year 2000 (USGCRP, 2014). 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 (USGCRP, 2014). In 2011, the State of Texas experienced a heat wave and drought that lasted through the winter of 2014 and ended with record breaking floods in 2015. The growing season and summer of 2011 was the hottest and among the driest on record. Frequent extreme heat events throughout Texas have increased substantially over the past 20 years.

This trend of rising temperatures and more frequent extreme events such as heat waves, drought, and heavy rainfall is predicted to continue (USGCRP, 2014). The USGCRP projected two potential future conditions as part of its predictive modeling process. Under conditions of lower greenhouse gas (GHG) emissions, the average temperature in the Southern Great Plains region may increase as much as 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.

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 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), Nitrogen Oxide (NO_x), Particulate Matter (PM10 and PM2.5), 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.

Granger Lake is located within the Metropolitan Austin-Waco Air Quality Control Region (AQCR). The AQCR provides guidance on addressing air pollution at a regional level for counties in close proximity to Granger Lake, including Williamson County. Regional air pollution is addressed by maximizing compliance with National Ambient Air

Quality Standards (NAAQS) and minimizing the health and environmental impacts of regional air pollution.

2.1.5 Topography, Geology, and Soils

2.1.5.1 Topography

Granger Lake is located within the Gulf Coastal physiographic province along the San Gabriel River in the Blackland Prairie ecoregion. The San Gabriel River rises west of the Balcones Fault, a plateau and timber area of generally rugged topography containing steeply eroded hills, spurs, knobs, and escarpments. The watershed east of the Balcones Fault (Escarpment) is a rolling hilly terrain with little or no timber. The general land elevations in this area vary from about 750 feet NGVD29 near the escarpment line to an elevation of about 300 feet NGVD29 near the confluence of the San Gabriel River and Little River. The topography of the reservoir area is characterized by a dissected plateau, in late youth or early maturity. Just east of the dam site, the plateau gives way to the moderate or rolling relief of the Gulf Coastal Plain.

2.1.5.2 Geology

The Granger Lake site is underlain by upper cretaceous formations of the Navarro and Taylor Groups of the Gulfian Series. Lithologically, these almost horizontally stratified beds consist of argillaceous shales and marls which crop out across Texas in a narrow northeast-southeast trending belt that parallels the Balcones fault system. Regionally, the Taylor Group is comprised of several basic mappable members who are reported to have a combined thickness in excess of 1,300 feet. However, only the basal member (Lower Taylor Marl) is present at the dam site. The regional structure of the Taylor Group is controlled by a monocline that dips to the southeast at approximately 90 feet per mile. At the dam site, the dip is slightly reduced because of local faulting. Overburden at the site consists of Pliocene clays, caliche, and gravels. Maximum thickness of these sediments is found in the valley terraces where the deposits range from 10 to 30 feet.

2.1.5.3 Soils

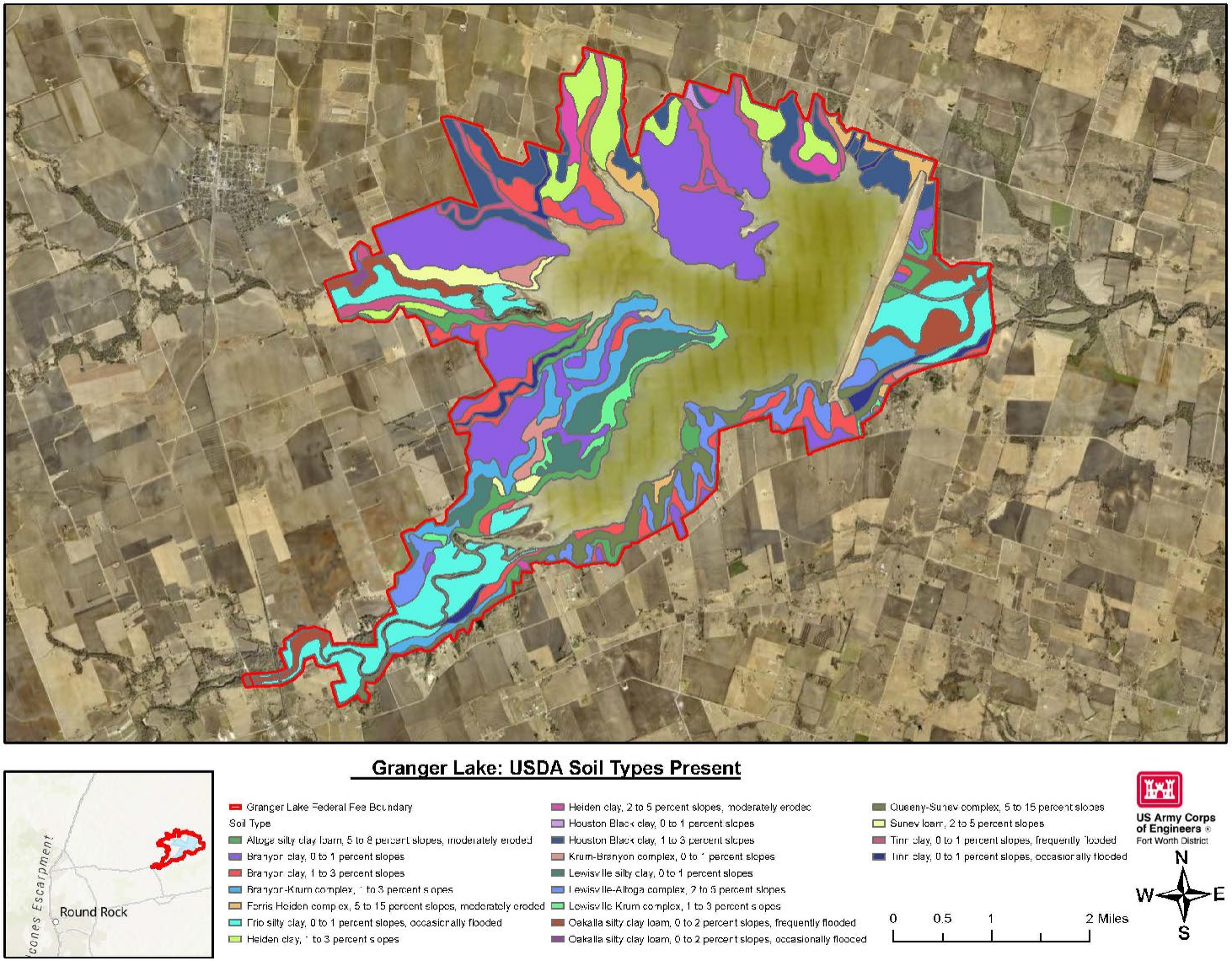
The main soil series within Granger Lake Project Lands is the Branyon clay, 0 to 1 percent slopes. It makes up 24.4 percent of soils found within Granger Lake project lands and is a prime farmland soil. The soil is moderately well-drained, occurs in 0 to 80-inch-thick surface layers, normally found on stream terraces, and contains calcareous clayey alluvium derived from mudstone of Pleistocene age.

The Natural Resources Conservation Service (NRCS) Web Soil Survey (2021) reports 20 soil types occurring within Granger Lake Project Lands. Table 2.1 shows the acreage and farmland status associated with each soil and surface type in the detention area.

Table 2-1 Estimated Acres of Soil Types within Granger Lake Project Lands

Map Unit Symbol	Soil Type	Number of Acres	Farmland Status
AlD2	Altoga silty clay loam, 5 to 8 percent slopes, moderately eroded	460.0	None
BrA	Branyon clay, 0 to 1 percent slopes	2,237.8	Prime Farmland
BrB	Branyon clay, 1 to 3 percent slopes	712.5	Prime Farmland
BrkB	Branyon-Krum complex, 1 to 3 percent slopes	573.5	Prime Farmland
FhF2	Ferris-Heiden complex, 5 to 15 percent slopes, moderately eroded	175.0	None
FrA	Frio silty clay, 0 to 1 percent slopes, occasionally flooded	1,090.1	Prime Farmland
HeB	Heiden clay, 1 to 3 percent slopes	537.8	Prime Farmland
HedC2	Heiden clay, 2 to 5 percent slopes, moderately eroded	159.7	None
HoA	Houston Black clay, 0 to 1 percent slopes	12.7	Prime Farmland
HoB	Houston Black clay, 1 to 3 percent slopes	676.6	Prime Farmland
KrbA	Krum-Branyon complex, 0 to 1 percent slopes	146.4	Prime Farmland
LeA	Lewisville silty clay, 0 to 1 percent slopes	338.9	Prime Farmland
LegC	Lewisville-Altoga complex, 2 to 5 percent slopes	390.3	None
LekB	Lewisville-Krum complex, 1 to 3 percent slopes	154.1	Prime Farmland
OaA	Oakalla silty clay loam, 0 to 2 percent slopes, occasionally flooded	13.9	None
OkA	Oakalla silty clay loam, 0 to 2 percent slopes, frequently flooded	389.8	None
QuF	Queeny-Sunev complex, 5 to 15 percent slopes	375.9	None
SvC	Sunev loam, 2 to 5 percent slopes	163.5	Prime Farmland
TcA	Tinn clay, 0 to 1 percent slopes, occasionally flooded	202.2	None
TnA	Tinn clay, 0 to 1 percent slopes, frequently flooded	347.1	None
Total		**9,157.8**	

Source: USGS.gov


Granger Lake: USDA Soil Types Present
Granger Lake Federal Fee Boundary
Soil Type
Altoga silty clay loam, 5 to 8 percent slopes, moderately eroded
Branyon clay, 0 to 1 percent slopes
Branyon clay, 1 to 3 percent slopes
Branyon-Krum complex, 1 to 3 percent slopes
Ferris Heiden complex, 5 to 15 percent slopes, moderately eroded
Frio silty clay, 0 to 1 percent slopes, occasionally flooded
Heiden clay, 1 to 3 percent slopes
Heiden clay, 2 to 5 percent slopes, moderately eroded
Houston Black clay, 0 to 1 percent slopes
Houston Black clay, 1 to 3 percent slopes
Krum-Branyon complex, 0 to 1 percent slopes
Lewisville silty clay, 0 to 1 percent slopes
Lewisville-Altoga complex, 2 to 5 percent slopes
Lewisville-Krum complex, 1 to 3 percent slopes
Oakalla silty clay loam, 0 to 2 percent slopes, frequently flooded
Oakalla silty clay loam, 0 to 2 percent slopes, occasionally flooded
Queeny-Sunev complex, 5 to 15 percent slopes
Sunev loam, 2 to 5 percent slopes
Tinn clay, 0 to 1 percent slopes, frequently flooded
Tinn clay, 0 to 1 percent slopes, occasionally flooded
0 0.5 1 2 Miles
US Army Corps of Engineers
Fort Worth District
N
W E
S
Round Rock
Cones Escarpment

Soil Classifications

A soil survey by the Natural Resource Conservation Service (NRCS) shows there are eight possible general classifications (Classes I through Class VIII) occurring in the reservoir area. The erosion hazards and limitations for use increase as the class number increases. Class I has few limitations, whereas Class VIII has many. The soil class data for project lands is provided in Table 2.2. This data is compiled by the NRCS and is a standard component of natural resources inventories on USACE lands. This, and other inventory data, is recorded in the USACE Operations and Maintenance Business Information Link (OMBIL).

Table 2-2 Granger Lake Soil Classifications

Soil Class	Acreage	Soil Class	Acreage
Class I	1,571	Class V	1,140
Class II	1,480	Class VI	820
Class III	1,450	Class VII	668
Class IV	1,300	Class VIII	773

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

- *Class I* soils have slight limitations that restrict their use.
- *Class II* soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.
- *Class III* soils have severe limitations that reduce the choice of plants or require special conservation practices, or both.
- *Class IV* soils have very severe limitations that restrict the choice of plants or require very careful management, or both.
- *Class V* soils have little or no hazard of erosion but have other limitations, impractical to remove, that limit their use mainly to pasture, range, forestland, or wildlife food and cover.
- *Class VI* soils have severe limitations that make them generally unsuited to cultivation and that limit their use mainly to pasture, range, forestland, or wildlife food and cover.

- *Class VII* soils have very severe limitations that make them unsuited to cultivation and that restrict their use mainly to grazing, forestland, or wildlife.

- *Class VIII* soils and miscellaneous areas have limitations that preclude their use for commercial plant production and limit their use to recreation, wildlife, or water supply or for aesthetic purposes.

The predominant soils at Granger Lake in order of prevalence are Class I, II, and III. In general, the soils in the watershed have moderate to severe limitations reducing vegetation variety and which may require special conservation practices.

2.1.5.4 Prime Farmland

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

There are several soil types in the study area that are considered prime farmland soils or soils associated with farmlands of state importance. However, the lands represented by these soil types have not been used for farming since the lands were acquired prior to the initiation of construction of Granger Lake in October1972.

2.1.6 Water Resources

2.1.6.1 Surface Water

The San Gabriel River originates in Burnet County approximately 12 miles north of Burnet, Texas, and flows in an easterly direction for approximately 120 miles to join the Little River at river mile 44.3. The watershed lies in the central portion of Texas, between north latitudes 30°20’ and 30°00’ and west longitudes 97°00’ and 98°20’. The watershed of the San Gabriel River has a total drainage area of 1,355 square miles of which 709 are controlled by Granger Dam.

Granger Dam is located on the San Gabriel River at river mile 31.9. Granger Lake is formed by flows from the North Fork and South Fork of the San Gabriel River, and left bank tributaries of Berry Creek and Willis Creek. The slope of the San Gabriel River in the vicinity of Granger Dam is approximately six feet per mile.

The San Gabriel River has five principal tributaries that flow into its river system. North Fork and South Fork, the principal tributaries of the San Gabriel River, flow in an easterly to southeasterly direction for distances of approximately 46 and 39 miles, respectively, to their confluence with the San Gabriel River at Georgetown, Texas. The drainage areas of North Fork and South Fork are 270 and 133 square miles, respectively. Berry Creek and Willis Creek enter the San Gabriel River above Granger

Dam. Berry Creek enters the San Gabriel River at river mile 57.8 and has a drainage area of 83 square miles. Willis Creek enters the San Gabriel River at river mile 29.7, and has a drainage area of 57.8 square miles. Brushy Creek, the last major tributary of the San Gabriel River, has a drainage area of 510 square miles and enters the San Gabriel River at river mile 5.2.

Table 2-3 Granger Lake Tributaries

Principal Tributary	Entrance of Tributary by River Mile	Length of Drainage Area (Square Miles)
North Fork	–	270.0
South Fork	–	133.0
Berry Creek	57.8	83.0
Willis Creek	29.7	57.8
Brushy Creek	5.2	510.0

Source: USACE

2.1.6.2 Wetlands

Waters of the United States are defined within the Clean Water Act (CWA), and jurisdiction is addressed by the USACE and EPA. 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 a prevalence of vegetation typically adapted for life in saturated soil conditions, and under normal circumstances these wetlands do support this vegetation type. Wetland classifications presented are derived from the National Wetlands Inventory, which was established by U.S. Fish and Wildlife Service (USFWS) to aid in conservation efforts by collecting nationwide wetland distribution and type information (USFWS, 2021). Within the Granger Lake project lands, wetlands generally occur near the rivers and flatter areas in the southern end of the lake. Table 2.4 lists the acreages of various types of wetlands present at Granger Lake from the USFWS and is mapped in Figure 2.6.

Table 2-4 Total Wetland and Open Water Acres at Granger Lake

Wetland Type	Acres
Freshwater Emergent Wetland	92.13
Freshwater Forested/Shrub Wetland	805.88
Freshwater Pond	29.56
Lake	3,853.03
Riverine	142.24
TOTAL ACRES of Water Resources	**4,922.85**

Source: USFWS 2021.

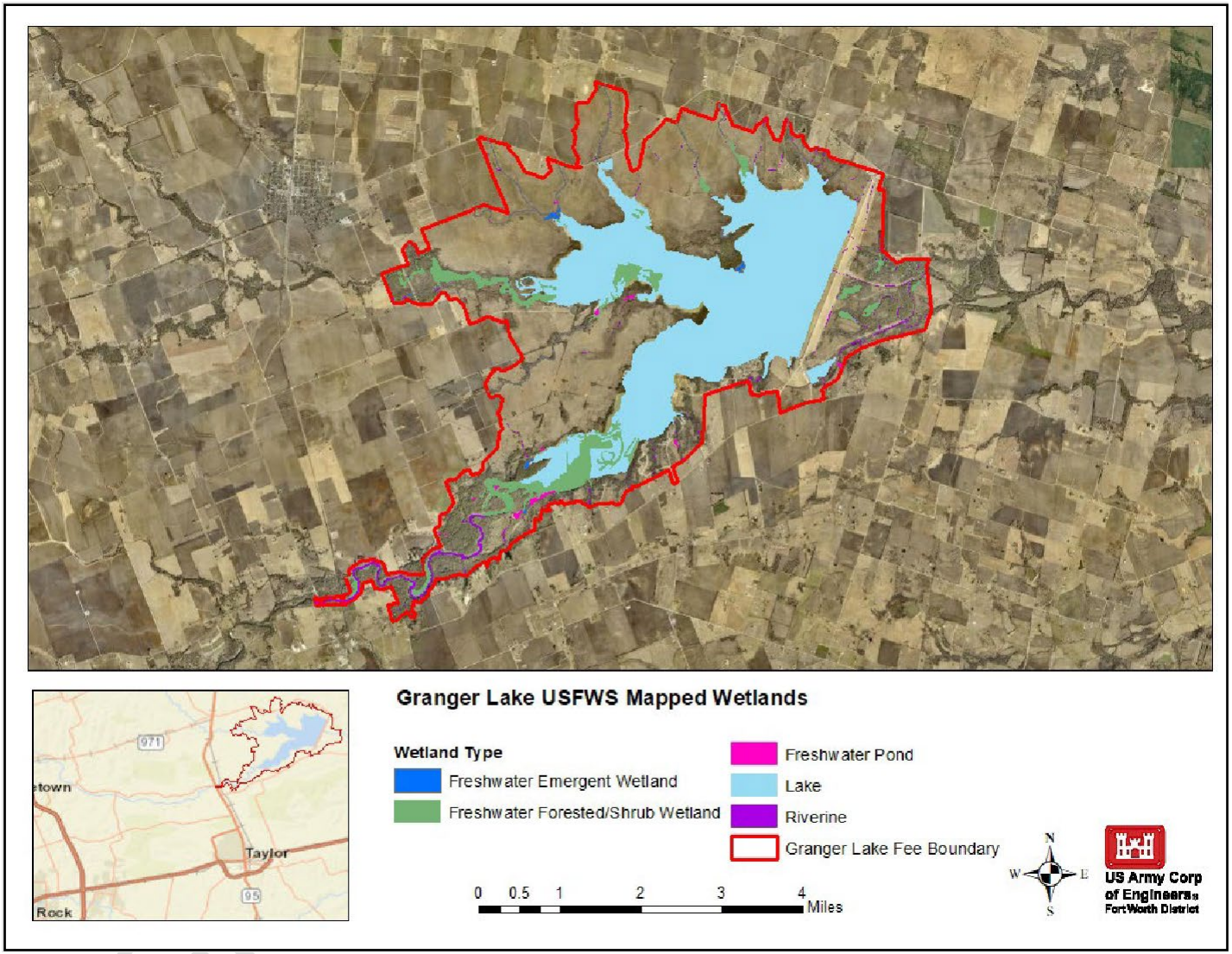


Figure 2-4 Granger Lake Wetland Types

2.1.6.3 Groundwater

Deep below Granger Lake lies the Trinity aquifers. 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: 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.

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.

2.1.6.4 Hydrology

The San Gabriel River watershed is subject to three general types of flood-producing rainfall: thunderstorms, frontal rainfall, and tropical cyclones. 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. The maximum 24-hour rainfall reported in or adjacent to the basin was 38.21 inches, which occurred at Thrall, Texas on 9-10 September 1921. The maximum monthly rainfall reported was 39.7 inches, which occurred at Thrall, Texas in September 1921.

Granger Dam and Lake are an integral part of the USACE plan for flood risk management and water conservation in the Brazos River Basin. The plan presently consists of nine major USACE flood mitigation projects – Whitney Dam, Aquilla Dam, Waco Dam, Proctor Dam, Belton Dam, Stillhouse Hollow Dam, North San Gabriel Dam, Granger Dam, and Somerville Dam. The nine USACE dam projects in the Brazos River system work in concert to control approximately 36,830 square miles of drainage area. Specifically, Granger Lake has a conservation pool capable of storing 4,159 surface acres at elevation 504.0 feet NGVD29. Once the water elevation reaches 528.0 feet NGVD29 and fills an additional 11,040 surface acres of storage space, water overtops the spillway and is uncontrollably released downstream. The pool of record occurred on March 05, 1992 with an elevation of 530.11 feet NGVD29.

Surface waters are categorized to hydrologic units. Hydrologic units are classified by the United States Geologic Survey (USGS) using a Hydrologic Units Code system, also referred to as HUC's. The units are classified from largest HUC with is a two-digit region (i.e., the Texas-Gulf Region), encompassing the largest area, to a twelve-digit sub-watershed HUC. Granger Lake is classified to sub-watershed as follows:

- 12 (HUC 2: Region) – Texas Gulf Region
- 1207 (HUC 4: Sub-region) – Lower Brazos
- 120702 (HUC 6: Basin) – Little
- 12070205 (HUC 8: Sub Basin) – San Gabriel
- 1207020505 (HUC 10: Watershed) – Granger Lake-San Gabriel River
- 120702050507 (HUC 12: Sub-watershed) – Granger Lake

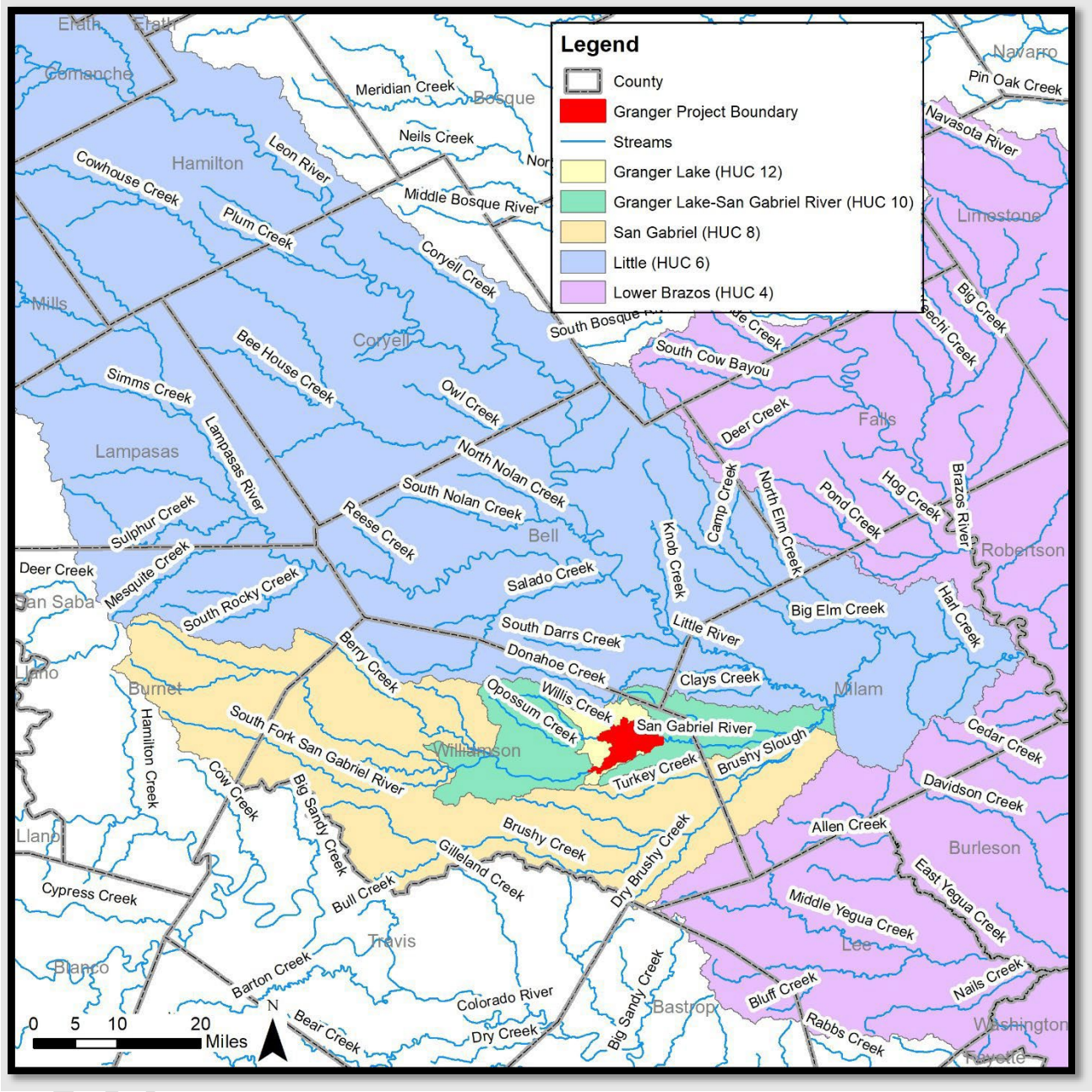


Figure 2-5 Map of Hydrologic Units at Granger Lake (Source: USGS, Watershed Boundary Dataset)

2.1.6.5 Water Quality

The 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 waters 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 Granger 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, 2020) identifies Willis Creek within the Granger Lake Fee Boundary as to exceeding TSWQS for recreation purposes due to bacteria (TCEQ, 2020).

Concerning exposure to harmful agents in the water, the Texas Department of State Health Services (DSHS) Seafood and Aquatic Life Group addresses and prevents/reduces any disease-causing agent from occurring that can be transferred from aquatic life to humans within the State of Texas. As of September 2021, no fish consumption advisories have been issued for Granger Lake.

2.1.7 Hazardous Materials and Solid Waste

There are no hazardous or solid waste advisories within Granger Lake federal fee boundary. Nor has DSHS issued any DSHS fish consumption advisory warnings within the same area.

As a part of USACE SWF lake annual environmental compliance assessment, members of USACE inspect various areas (leases, easements, and parks) of Granger Lake 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

Granger Lake's authorized purposes include flood risk management, water conservation, fish and wildlife, and recreation. Compatible uses incorporated in project operation management plans include conservation and fish and wildlife habitat management components. The USACE, with some 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. Granger 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 previously discussed in Section 2.1.5.3. In addition to the data from the Level One Inventories, a Wildlife Habitat Appraisal Procedure (WHAP) assessment was conducted to determine the quality of vegetation.

The WHAP for Granger Lake was conducted on April 26-29, 2021 by an interdisciplinary team of USACE biologists, foresters, and park rangers. The WHAP, developed by TPWD to systematically assess the habitat quality in a pre-chosen area, was used to assist in the preparation of the 2021 MP. The highest score a site can receive is 1.00 while the lowest is 0.03, while a score of 0 represents a site skipped and not incorporated in the report calculations. The scores are not species dependent but rather diversity dependent. The data gather from this survey helped to quantifiably describe the general habitat characteristics and identify unique/high quality areas found within the USACE Granger Lake Fee Boundary. This information was then used to revise Granger Lake land classifications, contributing to the revision of land classifications based on what areas needed the most protection. The WHAP assessment report can be found in Appendix C of this Plan.

A total of 82 data collection sites were selected using aerial photography and knowledge of the Granger Lake staff, choosing points both at random across multiple habitat types and based on areas known to have unique qualities, habitats, or species. The four major habitat types that were selected and assessed were marsh, riparian/bottomland hardwood forests (BHF), upland forests, and grasslands.

The WHAP assessment revealed that the two most abundant habitat types surveyed were upland forest and riparian/bottomland hardwood forest. However, the two habitat types that scored the highest on average were marsh and riparian/bottomland hardwood forest. Overall, the average score for grassland was 0.66. No specific area of Granger Lake was identified as having a concentration of high scoring habitats but instead several individual points scattered throughout the lake area. There is also no specific area of the lake that was targeted as having the greatest potential for improvement.

2.2.2 Vegetation

Granger Lake is located within the Texas Blackland Prairie ecological region. The Texas Blackland Prairie is divided into distinct Northern and Southern regions. Granger Lake is located in the Northern Blackland Prairie, which stretches over 300 miles north from Sherman 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 300 to 800 NGVD29.

The region, like many other ecological regions in Texas, has undergone significant changes in the past 150 years. Although habitat for wildlife is present throughout the entire ecological region, 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, isolated land holdings; competition for food and cover with livestock; conversion of woodland habitat to improved pastures or urban and rural developments; and lack of proper wildlife and habitat management.

The Texas Blackland Prairies Ecoregion originally contained a diverse range of prairie species including little bluestem (*Schizachyrium scoparium*), big bluestem (A*ndropogon gerardi*), yellow Indiangrass (*Sorghastrum nutans*), switchgrass (P*anicum virgatum*), eastern gamagrass (*Tripsacum dactyloides*), tall dropseed (*Sporobolus compositus*), asters (*Aster* 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*), sweetgum (*Liquidambar styraciflua*), 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*.), becoming more prevalent due to the absence of regular fires.

Table 2-5 Granger Lake Species by Habitat

Habitat Type	Species
Prairie	Little bluestem, Big bluestem, Yellow Indiangrass, Switchgrass, Eastern gamagrass, Tall dropseed, Asters, Prairie bluet, Prairie clovers, Coneflowers
Bottomland Hardwood Forest (BHF)	Bur oak, Shumard oak, Post oak, Blackjack oak, Green ash, Pecan, Cedar elm, American elm, Winged elm, Sweetgum, Sugar hackberry, Eastern cottonwood
Upland Forests	Honey Mesquite, Cedars (variety), Junipers (variety)

Three of the most populous metropolitan areas of Texas are within the Texas Blackland Prairie ecoregion, Dallas, Austin, and San Antonio. The proximity to urban and suburban landscapes has led to many plants escaping into natural areas, some of which have dramatically altered the ecosystems where they have spread. These non-native plants are considered invasive if they cause harm within the ecosystem (TPWD 2012). Invasive species are covered in more detail in Section 2.2.5.

2.2.3 Fisheries and Wildlife Resources

Granger Lake provides habitat for an abundance of fish and wildlife species. Predominant fish species in the lake includes, channel catfish (*Ictalurus punctatus*), blue (*Ictalurus furcatus*) and hybrid catfish, white crappie (*Pomoxis annularis*), and white bass (*Morone chrysops*). Other less prominent species include largemouth bass (*Micropterus salmoides*), white bass (*Morone chrysops*), carp (*Cyprinus carpio*), gar (*Atratosteus spatula*), flathead catfish (*Pylodictis olivaris*), bigmouth buffalo (*Ictiobus cyprinellus*) common carp (*Cyprinus carpio*), longnose gar (*Lepisosteus osseus*), and gizzard shad (*Dorosoma cepedianum*).

Many of the undeveloped open spaces provide habitat for wildlife including white-tailed deer (*Odocoileus virginianus*), 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*), opossums (*Didelphis virginiana*) and raccoons (*Procyon lotor*). The area also provides habitat for a diverse range of birds and acts as a stopover for migratory birds including sandhill cranes (*Antigone canadensis*) and on rare occasions whooping cranes (*Grus americana*). Bird observations of over 335 different species have been recorded at Granger Lake according to the eBird website (ebird.org).

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 with jurisdiction 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. If a species makes it past the candidate species listing then it will go through another review under either proposed threatened or proposed endangered species designation. Although not afforded protection by the Endangered Species Act, candidate, proposed threatened, and proposed endangered species may be protected under other federal or state laws.

The USFWS's Information for Planning and Consultation (IPaC) database (2021) lists the threatened and endangered species and trust resources that may occur within the Granger Lake federal fee boundary (see USFWS Species List and the IPaC Report in Appendix C of the 2022 MP). Based on the IPaC report, there are 12 federally listed species found within Granger Lake: bone cave harvestman, bracted twistflower, coffin cave mold beetle, false spike, Georgetown salamander, golden-cheeked warbler, Jollyville plateau salamander, monarch butterfly, Salado salamander, tooth cave ground beetle, tooth cave spider, and whooping crane (USFWS 2021). These species are presented in Table 2.5 Although the red knot and piping plover are on the threatened and endangered species list, they were intentionally left out when addressing impacts of the Master Plan since the Master Plan does not entail any wind energy projects. There is one candidate species, monarch butterfly (*Danaus plexppus*), one species proposed as threatened, bracted twistflower (*Streptanthus bracteatus*) and one species proposed as endangered, false spike (*Fusconaia mitchelli*), known to exist at Granger Lake. The species identified as Threatened, Endangered or Rare Species by TPWD that are not federally listed are included in Appendix C of the 2022 Master Plan as well as a list of TPWD rare plant communities for the Texas Blackland Prairie Ecoregion. No Critical Habitat has been designated within or near Granger Lake

Table 2-6 Threatened and Endangered Species with Potential to Occur at Granger Lake

Common Name	Scientific Name	Federal Status	State Status
Bone Cave Harvestman	*Texella reyesi*	Endangered	Endangered
Bracted Twistflower	*Streptanthus bracteatus*	Proposed Threatened	Not Listed
Coffin Cave Mold Beetle	*Batrisodes texanus*	Endangered	Not Listed
False Spike	*Fusconaia mitchelli*	Proposed Endangered	Threatened
Georgetown Salamander	*Eurycea naufragia*	Threatened	Threatened
Golden-cheeked Warbler	*Dendroica Chrysoparia*	Endangered	Endangered
Jollyville Plateau Salamander	*Eurycea tonkawae*	Threatened	Threatened
Monarch Butterfly	*Danaus plexippus*	Candidate	Not Listed
Salado Salamander	*Eurycea chisholmensis*	Threatened	Threatened
Tooth Cave Ground Beetle	*Rhadine Persephone*	Endangered	Not Listed
Tooth Cave Spider	*Neoleptoneta myopica*	Endangered	Not Listed
Whooping Crane	*Grus americana*	Endangered	Endangered
Red Knot	*Calidris canutus*	Threatened	Threatened
Piping Plover	*Charadrius melodus*	Endangered	Threatened

Although the red knot and piping plover are federally listed species, they only require consideration for projects entailing wind energy projects.

Bone cave harvestman (*Texella reyesi*) is listed by the USFWS (2021) as endangered wherever it is found. It is a blind spider whose coloration ranges from an opaque white to a clear golden color. The species ranges in length from 1.2-2.7 centimeters. It is further characterized by its long thin legs, which it uses in catching prey, which consists of small invertebrates (USFWS, 2018). Habitat for the species consists of humid, dark, limestone caves in the Edwards Plateau of Texas. Because Granger Lake lies outside of the Edwards Plateau, it is not expected to find the species within the federal fee boundary of Granger Lake.

Bracted twistflower (*Streptanthus bracteatus*) is listed by the USFWS (2021) as a proposed threatened species wherever it is found. It is an annual herb that produces flowers that range from blue to purple. These flowers have four petals, the flowers lineup alternately to one another and are placed in circular manner on the mainstem of

the plant. The plant ranges three to six feet in height, with wide green leaves clumping around the base of the plant. Preferred habitat consists of forests on slopes and in canyons that are characterized by having limestone bedrock with well-drained gravely clays and clay loams. These forests are refined by being dominated by oaks and junipers. Because predation by overgrazing is major threat, the species can be found among shrubs (NatureServe, 2021). Even though the habitat does exist within the federal fee boundary of Granger Lake, the species is not expected to be found because the lake is outside of known areas of occurrence for the species.

Coffin cave mold beetle (*Batrisodes texanus*) is listed by USFWS (2021) as endangered wherever it is found. It is a blind beetle that is golden in golden color, with length that ranges from 2.66 to 2.88 millimeters. The species can only be found within Williamson County, specifically within Godwin Ranch Preserve, Cobbs Cavern, Sunless City Cave, Waterfall Canyon Cave, On Campus Cave, Off Campus Cave, and Inner Space Cavern. Because Granger Lake does not contain any of these caves, it is not expected to be found within the federal fee boundary for Granger Lake.

False spike (*Fusconaia mitchelli*) is listed as proposed endangered wherever found (USFWS, 2021). It is a freshwater mussel, brown in color. The false spike can only be found within the Guadalupe River drainage area (NatureServe, 2021). Because Granger Lake lies within the Brazos River drainage area, it is not anticipated to be found within the federal fee boundary.

Georgetown salamander (*Eurycea naufragia*) is listed as threatened wherever it is found. It is a brown salamander with preferred habitat consisting of springs and possibly caves within Williamson County, specifically around the outskirts of Georgetown Lake. However, within the fee boundary there are no known springs, the species is not expected to occur within Granger Lake federal fee boundary.

The golden-cheeked warbler (GCWA) is a small, neo-tropical songbird that lives and breeds in Texas during the spring and early summer, leaving in July to spend the winter in Mexico and Central America. GCWA breeding habitat consists of woodlands with old-growth and mature regrowth Ashe juniper in a natural mix with oaks (*Quercus spp.*), elms (*Ulmus spp.*), and other hardwoods, in relatively moist areas such as steep canyons, slopes, and adjacent uplands. Of the nearly 360 bird species that breed in Texas, the GCWA is the only one that nests exclusively in Texas. Habitat destruction is the primary threat to GCWAs (NatureServe 2020B). Pockets of suitable habitat for GCWAs is present within and adjacent to Granger Lake fee boundary, but the lake lies just outside of its range. No recent sightings have occurred and therefore they are considered a rare occurrence within the federal fee boundary at Granger Lake.

Jollyville Plateau salamander (*Eurycea tonkawae*) also known as Tonkawa Springs salamander, is listed as threatened wherever it is found (USFWS, 2021). It is an aquatic brown salamander, that is known for its external gills and for not having lungs. The species breathes through the use of its gills and skin. Preferred habitat consists of springs, spring runs, and wet caves within Travis and Williamson Counties, Texas. The

species is not expected to occur within the federal fee boundary of Granger Lake because there are not any known springs, spring runs, and wet caves.

The monarch butterfly (*Danaus plexippus*) is listed as a candidate species 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 5 centimeters (NatureServe, 2021). Its breeding habitat consists primarily of milkweed species (*Asclepias sp.*), which its larvae feeds exclusively on. During North American migration, the monarch butterfly can be found anywhere flowers are blooming. The Granger Lake fee boundary contains an abundance of blooming flowers, including milkweed, which is critical to egg laying. The combination of habitat and numerous recent sightings confirms that this species is common to the area during migration.

The Salado salamander (*Eurycea chishomensis*) is entirely aquatic and reaches lengths up to six centimeters, with a grayish-brown dorsal color and slight cinnamon tinge. Of the 19 known populations, most appear to consistently produce low numbers of offspring when surveyed, providing weak evidence of stable populations in the short term. A few populations are located in heavily developed areas and probably lack long term viability. As with most spring salamanders in this genus in Texas, a small geographic distribution, rapidly expanding urban development, and long-term ground water depletion are the principal threats to this species (NatureServe 2020C). Salado salamander are a spring obligate, and therefore are not expected to be present within the Granger Lake fee-boundary area.

The tooth cave ground beetle (*Rhadine persephone*), a tiny, reddish brown beetle with rudimentary eyes attaining length of only eight millimteres that inhabits caves within Travis and Williamson Counties, Texas, is listed as endangered wherever it is found (USFWS, 2021). The beetle can be found along the cave floor searching for organic matter for which it eats. The species is not expected to be found within the Granger Lake fee boundary due to the lack of known caves in the area.

The tooth cave spider (*Neoleptoneta myopica*) is listed as endangered wherever it is found (USFWS, 2021). It is a golden translucent spider that can get up to one centimeter in length and can be found within the dry limestone caves of Travis County. Since Granger Lake doesn't have any caves, nor is it located within Travis County, this species is not likely to be found within the Granger Lake fee boundary.

The whooping crane (*Grus americana*) habitat consists of marshes, shallow lakes, lagoons, salt flats, grain and stubble fields, and barrier islands (AOU 1983, Matthews and Moseley 1990; NatureServe 2016). Pockets of habitat for this species are present on Granger Lake project lands, which are used as a stopover during the species annual migrations. Whooping crane sightings are uncommon during migration, therefore they are considered a rare occurrence at Granger Lake.

Photo 2-1 Whooping Crane (Courtesy, TPWD)

TPWD's 2021 Annotated County Lists of Rare Species database records the threatened and endangered species that may occur on Granger project lands. The full report can be found in Appendix C of this Plan.

Texas Natural Diversity Database

The Texas Natural Diversity Database (TXNDD 2021), administered by TPWD, manages and disseminates information on occurrence of rare species, native plant communities, and animal aggregations in Texas to help guide project planning efforts. TXNDD provided information for the U.S. Geological Survey (USGS) quadrangles encompassing Granger Lake project lands. The TXNDD reports and the data collected from the survey confirms that pockets of Vertisol Blackland Prairie. Vertisol Blackland Prairie primarily consist of little bluestem (*Schizachyrium scoparium*), indian grass (*Sorghastrum nutans*), and big bluestem (*Andropogon gerardii*), and prairie bishop (*Bifora americana*). Blackland prairies can occur on three different soil types, Vertisols, Mollisols, and Alfisols with Alfisols being the most common (Natureserve, 2022). Vertisol soils are characterized by clayey nature that can lead to deep and wide cracks forming within them. Since the prairie can be found on the project lands at Granger Lake the occurrence of this community on project lands is considered common. These grasslands are threatened and becoming increasingly rare across the region, becoming critically imperiled on the global level.

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. Invasive species are often associated with disturbed ecosystems and human activities. Table 2.7 lists many of the invasive and noxious native species found at Granger Lake. Other species are currently being researched for their invasive characteristics.

Table 2-7 Granger Lake Invasive and Noxious Plant Species

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
Mammals		
Feral Hog	*Sus scrofa*	Non-native
Nutria	*Mycocastor coypus*	Non-native
Fish		
European carp	*Cyprinus carpio*	Non-native
Insects		
Red imported fire ant	*Solenopsis invicta*	Non-native
Plants		
Annual bastard cabbage	*Rapistrum rugosum*	Non-native
Ashe juniper	*Juniperus ashei*	Native aggressive
Bermudagrass	*Cynodon dactylon*	Non-native
Chinaberry	*Melia azedarach*	Non-native
Chinese tallow	*Tridica sebirefa*	Non-native
Eastern red cedar	*Juniperus virginiana*	Native aggressive
Honey mesquite	*Prosopis glandulosa*	Native aggressive
Hydrilla	*Hydrilla verticillate*	Non-Native
Japanese honeysuckle	*Lonicera japonica*	Non-native
Johnson grass	*Sorghum halepense*	Non-native

Common Name	Scientific Name	Native/Non-native
King Ranch (yellow) bluestem	*Bothriochloa ischaemum var. songarica*	Non-native
Mollusks		
Asian clam	*Corbicula fluminea*	Non-native
Decollate snail	*Rumina decollate*	Non-native
Zebra mussel	*Dreissena Polymorpha*	Non-native

The large expanse of metropolitan areas located in the Texas Blackland Prairie ecoregion has led to a greater number of invasive species in this region compared to most other regions in 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 and are considered a nuisance due to their expanding range associated with agriculture and human development. Honey mesquites (*Prosopis glandulosa*) and junipers/cedars are also native but are spreading aggressively in native prairies. Their aggressive growth was historically kept in check by periodic wildfires and grazing, which are no longer in practice. Granger is currently not an urban lake, however over time and as development occurs in the region landscaping practices can lead to many common landscape plants aggressively colonizing at Granger Lake.

2.2.6 Aesthetic Resources

Granger Lake includes areas 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). Some areas have been classified as Wildlife and Vegetative Management, or Environmentally Sensitive Areas in this Master Plan 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, allowing access to hiking trails and scenic qualities at the lake and surrounding areas.

Adjacent landowners are informed that removing trees located on USACE property to obtain a view of the lake not only destroys wildlife habitat, but also lowers the scenic quality of the shoreline when viewed by the public from the water surface. Unauthorized removal of trees and other vegetation from USACE property without a permit is prohibited and could result in a fine. Additionally, reasonable measures to

protect property by adjacent landowners 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 for Granger Lake.

2.2.7 Mineral and Timber Resources

2.2.7.1 Minerals

The principal mineral resource known to exist near Granger Lake is oil. However, Granger Lake is not located within any major oil and gas formation and there are no well surface locations on USACE property though there are numerous abandoned wells. USACE has implemented a “no hydraulic fracturing” exclusion zone around each dam operated and maintained by USACE. This zone is 3,000 horizontal feet from the toe of the dam at Granger Lake. No existing pipelines of any kind are located within the Granger Lake federal fee boundary.

2.2.7.2 Timber

No commercial timber resources exist on Granger Lake project lands. The woodlands that exist on USACE lands have value primarily as wildlife habitat and as an aesthetic resource but have no commercial timber value.

2.3 CULTURAL RESOURCES

2.3.1 Prehistoric

The earliest well-documented evidence of human occupation in the San Gabriel River Valley dates to about 12,000 years before present (B.P.). Prehistory is divided generally into three broad time periods: Paleo-Indian (12,000-8,500 B.P.), Archaic (8,500-1.250 B.P.), and Late Prehistoric (1,250-300 B.P.).

Evidence for Paleo-Indian period occupation is relatively rare in the Granger Lake area and is known primarily from distinctive projectile point styles dating to this time period found in surface collections or in mixed multi-component sites. It is likely that intact Paleo-Indian campsites may be buried deeply beneath Holocene floodplain alluvium. Evidence suggests that the region was occupied by small groups of highly mobile hunter-gatherers that traveled over very large territories. Traditionally thought of as big-game hunters of mammoth and bison, more recent evidence indicates Paleo-Indians exploited a much broader range of animal and plant resources.

The Archaic period is divided into Early (8,500-6,000 B.P.), Middle (6,000-3,500 B.P.), and Late (3,500-1,250 B.P.) sub periods. During this long time period, a generalized hunting and gathering subsistence strategy is indicated. Trends through time suggest increasing population density and decreasing group mobility within smaller territories. Sites with Late Archaic components are well represented in the Granger

Lake area and in Central Texas generally. Archaic period sites at Granger Lake include open campsites and burned rock midden features.

The Late Prehistoric Period (1,250-300 B.P.) is marked by the presence of the bow and arrow and pottery. During the early portion of this time span, subsistence strategies remained similar to those of the preceding Late Archaic. The Late Prehistoric period is divided into early Austin phase (1,250-650 B.P.) and late Toyah phase (650-300 B.P.) sub periods. The Toyah phase differs from the preceding Austin phase in terms of technology and subsistence strategies. Bison became an important economic resource. Limited evidence of horticulture also appears but was of only minor importance to overall Toyah phase subsistence.

2.3.2 Historic

The arrival of Europeans in Central Texas began during the Spanish Colonial Period. The San Xavier missions were established by the Spanish further downstream from Granger Lake on the San Gabriel River in present-day Milam County. San Xavier was established in 1746 for local Native American groups of the Bidais, Deados, Cocos, Yojunes, Mayeye and Ervipiame Tribes. This mission effort was relatively unsuccessful, and drought, epidemics, and attacks by the Lipan Apache led to the abandonment of the San Xavier missions in 1755.

Intensive occupation of the area for farming and ranching began in the middle 1800s, after the annexation of Texas by the United States in 1845. Population growth in the area accelerated following the arrival of the railroads in the late 1870s. This improved access to major markets and led to a dramatic increase in the numbers of local farms and ranches. Most of the known historic period resources at Granger Lake contain the archeological remains of house sites and outbuildings associated with farms and ranches dating from the late 19th century through the mid-20th century.

2.3.3 Previous Investigations at Granger Lake

The initial archeological investigations at Granger Lake were conducted in the 1960s by the Texas Archeological Salvage Project (TASP). In 1963, a reconnaissance survey by TASP recorded 24 archeological sites, followed by test excavations at three of those sites in 1968. In 1972 and 1973, archeologists from UT-Austin conducted extensive test excavations at the Loeve-Fox Site (41WM230) at Granger Lake.

In 1976, additional survey work by Texas A&M University (TAMU) recorded more sites, and they conducted test excavations at three sites that year. The following year, 1977, test excavations were carried out at three additional sites by TAMU.

Beginning in 1978, a renewed period of investigations at Granger Lake was conducted by North Texas State University (NTSU) and the Texas Archeological Survey (TAS). NTSU performed additional survey work and conducted test excavations at several sites. NTSU also conducted a preliminary inventory of historic period archeological resources, which had been largely ignored by earlier investigations at

Granger Lake. Finally, large-scale data recovery excavations were conducted at seven prehistoric sites, four by NTSU (41WM124, 41WM163, 41WM258, 41WM267) and three by TAS (41WM133, 41WM165, 41WM230). Limited survey work since then has added to the number of known archeological sites.

2.3.4 Recorded Cultural Resources

Currently, 92 archeological sites have been recorded on Corps fee property at Granger Lake. The surveys of the 1960s and 1970s are no longer considered adequate by current survey standards, so the actual number of cultural resources at Granger is likely much larger. The 92 recorded sites will have to be formally evaluated to determine their eligibility for the National Register of Historic Places.

2.3.5 Long-term Objectives for Cultural Resources

As funding allows, a Cultural Resources Management Plan (CRMP) shall be developed and incorporated into the Operational Management Plan in accordance with EP 1130-2-540. The purpose of the CRMP is to provide a comprehensive program to direct the historic preservation activities and objectives at Granger Lake. Completion of a full inventory of cultural resources at Granger Lake is a long-term objective that is needed for compliance with Section 110 of the National Historic Preservation Act (NHPA). All currently known and newly recorded sites must be evaluated to determine their eligibility for the NRHP. In accordance with Section 106 of the NHPA, any proposed ground-disturbing activities or projects, such as those described in this Master Plan or as may be proposed in the future by others for right-of-way easements, will require cultural resource surveys to locate and evaluate historic and prehistoric resources. Resources determined eligible for the NRHP must be protected from proposed project impacts, or the impacts must be mitigated. All future cultural resource investigations at Granger Lake must be coordinated with the State Historic Preservation Officer and federally-recognized Tribes to ensure compliance with the National Historic Preservation Act, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act.

2.4 DEMOGRAPHIC AND ECONOMIC ANLALYSIS

2.4.1 Demographic and Economic Analysis Zone of Influence

Granger Lake is located within Williamson County in Central Texas. The zone of influence for the socio-economic analysis of Granger Lake is defined as the county in which the lake lies, Williamson County, as well as the surrounding counties, which are Bastrop, Bell, Burnet, Lee, Milam, and Travis.

2.4.2 Population

The total population for the zone of influence in 2019 was 2,295,863, as shown in Table 2-7. Approximately 53% of the zone of influence's population resides in Travis County, 24% in Williamson County,15% in Bell County, and 4% in Bastrop County. The

remaining counties in the zone of influence each account for 2% or less of the zone of influence's population.

The zone of influence's population makes up approximately 8% of the total population of Texas. From 2019 to 2050, the population in the zone of influence is expected to increase from 2.3 million to 4.3 million, an annual growth rate of 2.5%. By comparison, the population of Texas is projected to increase at a rate of 2% per year, and the national growth rate is expected to be 0.6% per year between 2019 and 2050. During this timeframe, all counties within the zone of influence, except for Milam County, are projected to have growth with Williamson County growing the fastest, at a rate of 3.6% annually. The distribution of the population among gender, as shown in Figure 2-9, is essentially equal in the zone of influence and the state of Texas.

Table 2-8 2000 and 2019 Population Estimates and 2050 Projections

Geographical Area	2010	2019	2050
Texas	20,851,820	28,260,856	**47,342,105**
Bastrop County	57,733	84,522	**125,002**
Bell County	237,974	348,574	**483,613**
Burnet County	34,147	46,530	**61,467**
Lee County	15,657	17,058	**18,309**
Milam County	24,238	24,770	**22,222**
Travis County	812,280	1,226,805	**1,980,918**
Williamson County	249,967	547,604	**1,645,982**
Zone of Influence	**1,431,996**	**2,295,863**	**4,337,513**

Source: U.S. Census Bureau, Population Division (2000 Estimate); U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates (2019 Estimate); Texas State Data Center, The University of Texas at San Antonio (2050 Projections)

Table 2-9 2019 Percent of Population Estimate by Gender

Geographical Area	Male	Female
Texas	14,034,009	14,226,847
Bastrop County	42,810	41,712
Bell County	173,837	174,737
Burnet County	22,992	23,538
Lee County	8,530	8,528
Milam County	12,270	12,500
Travis County	619,629	607,176
Williamson County	269,549	278,055
Zone of Influence	1,149,617	1,146,246

Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates (2019 Estimate)

Figure 2.6 shows the population by age group for the state of Texas, Williamson County, and the zone of influence. The zone of influence has a slightly larger population ages 25 to 44 when compared to the state of Texas. Table 2.10 shows the zone of influence's population by age group in 2019 compared to the projections for 2050. The forecast shows that the population ages 0 to 44 will decrease during this timeframe while ages 45 and over will increase.

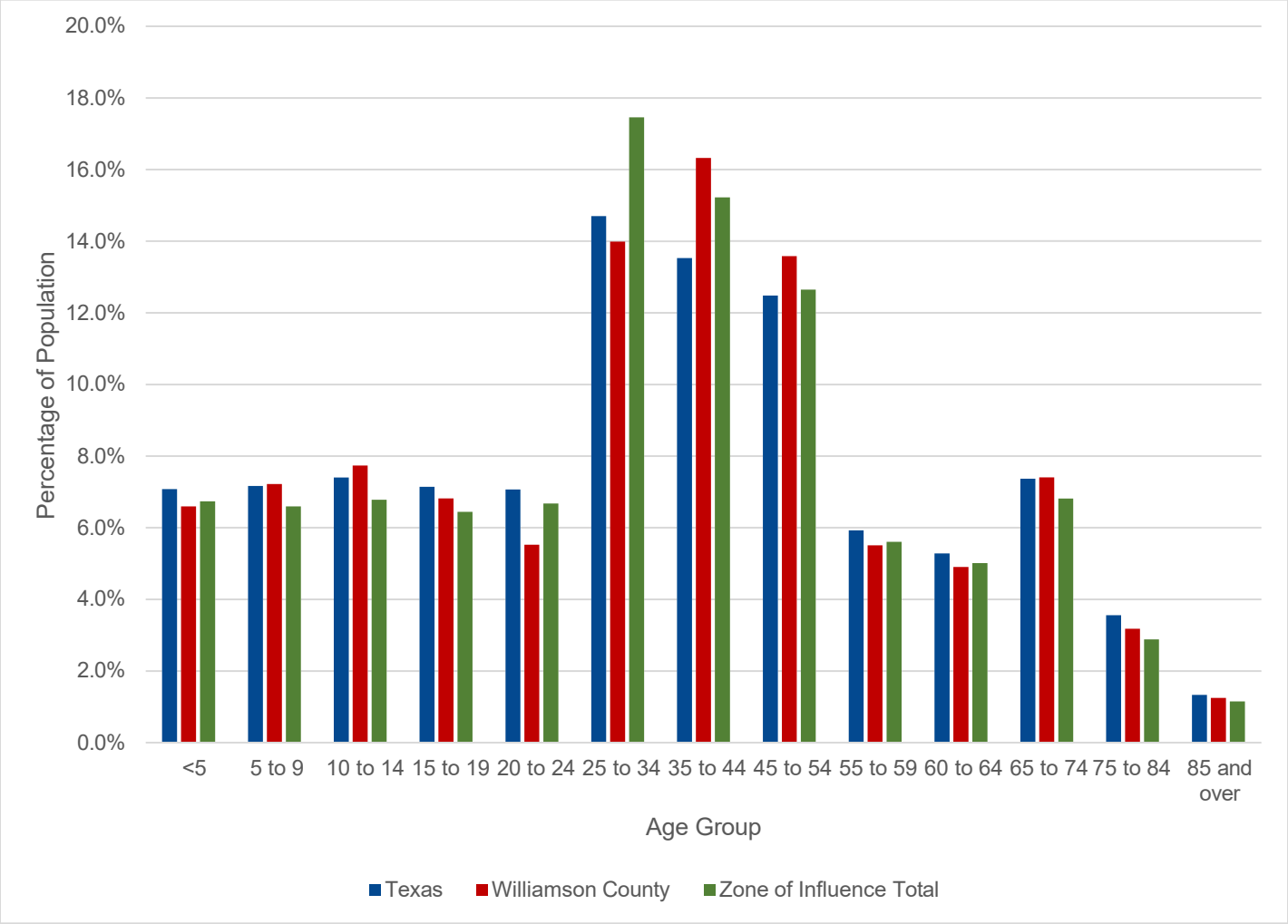


Figure 2-6 2019 Percent of Population by Age Group
Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates (2019 Estimate)

Table 2-10 2019 Population Estimate by Age Group

Age Group	Texas	Bastrop	Bell	Burnet	Lee	Milam	Travis	Williamson	Zone of Influence
< 5	1,998,803	5,519	29,720	2,417	1,060	1,519	78,278	36,092	154,605
5 to 9	2,024,009	5,485	26,804	2,419	915	1,392	74,809	39,524	151,348
10 to 14	2,090,590	6,629	25,737	3,168	1,094	1,856	74,831	42,345	155,660
15 to 19	2,017,644	6,001	24,278	3,058	1,258	1,979	74,035	37,318	147,927
20 to 24	1,997,256	5,342	30,516	2,831	1,139	1,343	81,822	30,247	155,240
25 to 34	4,154,182	9,595	58,728	4,453	1,758	2,756	246,918	76,589	400,797
35 to 44	3,823,085	10,339	45,076	5,143	2,125	2,357	195,045	89,374	349,459
45 to 54	3,526,243	11,305	37,366	5,620	1,970	3,086	156,630	74,362	290,339
55 to 59	1,673,637	6,063	18,162	3,608	1,111	1,636	67,950	30,164	128,694
60 to 64	1,491,880	5,941	15,394	3,610	1,414	1,808	60,004	26,849	115,020
65 to 74	2,081,849	8,140	22,042	6,076	1,844	2,839	74,938	40,534	156,413
75 to 84	1,004,810	3,072	10,750	3,076	1,004	1,571	29,168	17,398	66,039
85 and over	375,868	1,091	4,001	1,051	366	628	12,377	6,808	26,322

Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates (2019 Estimate)

Population by race and Hispanic Origin is displayed in Table 2.11. The zone of influence is approximately 52% White, 30% Hispanic or Latino, 9% Black, 6% Asian, and 3% two or more races. The other race categories account for less than 1% each of the population. By comparison, the state's population is approximately 42% White, 39% Hispanic or Latino, 12% Black, 5% Asian, and 2% two or more races. Figure 3 shows the 2019 population estimate and the 2050 projections by race/ethnicity in the zone of interest. The two graphs show that the Hispanic or Latino and Asian populations are projected to increase by 5% and 8% respectively, while the White population decreases by 14%.

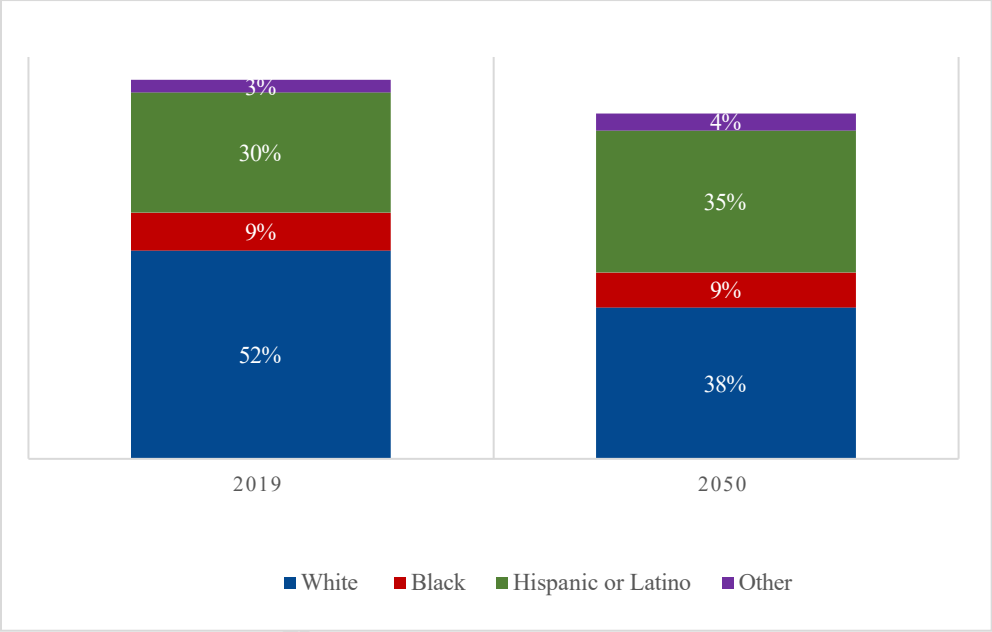


Figure 2-7 2019 Zone of Influence Population by Race/Hispanic Origin
Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates (2019 Estimate); Texas State Data Center, The University of Texas at San Antonio (2050 Projections)

Table 2-11 2019 Population by Race/Hispanic Origin

Geographical Area	White alone	Black alone	Asian alone	American Indian, Alaska Native, alone	Native Hawaiian and Other Pacific Islander alone	Some Other race alone	Two or More races	Hispanic or Latino
Texas	11,856,336	3,328,707	1,340,554	71,081	21,739	44,465	481,093	11,116,881
Bastrop County	44,228	5,977	710	228	0	371	1,156	31,852
Bell County	159,545	74,996	9,905	835	2,210	287	14,263	86,533
Burnet County	34,246	815	400	149	21	0	557	10,342
Lee County	10,804	1,899	169	0	0	25	121	4,040
Milam County	15,447	2,279	129	66	0	8	295	6,546
Travis County	600,694	96,367	81,212	2,042	338	2,006	29,401	414,745
Williamson County	325,160	33,561	37,170	935	377	1,068	15,461	133,872
Zone of Influence	1,190,124	215,894	129,695	4,255	2,946	3,765	61,254	687,930

Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates (2019 Estimate)

2.4.3 Education and Employment

Table 2.12 displays the highest level of education attained by the population ages 25 and over. In the zone of interest, 5% of the population has less than a 9th grade education, and another 5% has between a 9th and 12th grade education; 20% has a high school diploma or equivalent, and another 21% has some college and no degree; 7% has an Associate degree; 27% has a bachelor's degree, and 15% has a graduate or professional degree. In Texas, 8% of the population has less than a 9th grade education; another 8% has between a 9th and 12th grade education; 25% has at least a high school diploma or equivalent; 22% has some college; 7% has an Associate degree; 19% has a bachelor's degree; and 10% has a graduate or professional degree.

Table 2-12 2019 Population Estimate by Highest Level of Educational Attainment, Population 25 Years of Age and Older

Geographical Area	Total Population 25 Years and Older	Less than 9th Grade	9th to 12th Grade, no diploma	High school graduate (includes equivalency)	Some College, no degree	Associates Degree	Bachelor's Degree	Graduate or Professional Degree
Texas	18,131,554	1,482,952	1,475,007	4,525,099	3,918,815	1,309,005	3,534,714	1,885,962
Bastrop County	55,546	5,235	4,805	16,876	13,878	3,267	7,856	3,629
Bell County	211,519	7,614	11,355	55,003	60,260	24,087	34,751	18,449
Burnet County	32,637	1,660	2,146	10,048	8,292	2,204	5,724	2,563
Lee County	11,592	813	968	4,191	3,018	906	1,198	498
Milam County	16,681	1,404	1,699	6,352	3,452	1,424	1,630	720
Travis County	843,030	49,307	40,624	139,014	144,980	47,745	267,297	154,063
Williamson County	362,078	11,363	13,137	74,262	82,385	31,337	99,134	50,460
Zone of Influence	**1,533,083**	**77,396**	**74,734**	**305,746**	**316,265**	**110,970**	**417,590**	**230,382**

Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates (2019 Estimate)

Employment by sector is presented in Figure 2.8 and Table 2.15. Figure 4 shows that the largest percentage of the zone of interest is employed in the Educational services, and health care and social assistance sector at 21%, followed by 16% in the Professional, scientific, and management, and administrative and waste management services, 10% in Retail trade, 9% in the Arts, entertainment, and recreation, and accommodation and food services, 8% each in the Construction and the Manufacturing sectors, 7% in the Finance and insurance, and real estate and rental and leasing sector, and 6% in the Public administration sector. The remainder of the employment sectors each comprise 5% or less of the zone of influence's labor force.

Figure 2-8 Zone of Influence Employment by Sector (2019)
Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates (2019 Estimate)

Table 2-13 2019 Employment by Sector of Population 16 Years of Age and Over (2019)

Sector	Texas	Bastrop County	Bell County	Burnet County	Lee County	Milam County	Travis County	Williamson County	Zone of Interest
Total	13,253,631	36,296	141,131	21,041	8,153	9,788	688,232	279,178	**1,183,819**
Agriculture, forestry, fishing and hunting, and mining	397,032	989	1,194	654	577	1,026	5,156	1,965	**11,561**
Construction	1,137,958	5,348	10,456	3,142	1,140	970	52,003	19,397	**92,456**
Manufacturing	1,125,176	3,412	7,806	1,174	409	807	51,459	27,584	**92,651**
Wholesale trade	378,542	608	3,182	473	292	105	14,753	6,962	**26,375**
Retail trade	1,507,002	3,916	16,481	3,043	670	1,250	63,377	31,836	**120,573**
Transportation and warehousing, and utilities	77,044	3,041	7,007	842	691	638	23,846	9,984	**46,049**
Information	227,928	488	1,600	325	86	160	22,668	7,285	**32,612**
Finance and insurance, real estate, and rental and leasing	884,408	1,403	7,192	1,312	418	428	49,731	21,381	**81,865**
Professional, scientific, management, administrative, and waste management services	1,524,750	3,130	13,853	1,950	519	461	127,936	43,418	**191,267**
Educational services, health care and social assistance	2,863,828	7,001	37,424	3,690	1,373	1,926	136,406	59,522	**247,342**

Sector	Texas	Bastrop County	Bell County	Burnet County	Lee County	Milam County	Travis County	Williamson County	Zone of Interest
Arts, entertainment, recreation, accommodation and food services	1,216,771	2,435	13,505	2,579	688	858	68,545	22,361	**110,971**
Other services, except public administration	684,780	1,802	7,209	943	607	606	34,601	12,797	**58,565**
Public administration	528,412	2,723	14,222	914	683	553	37,751	14,686	**71,532**

Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates (2018 Estimate)

The civilian labor force in the zone of influence accounts for approximately 9% of the civilian labor force of the state of Texas. As shown in Table 2.14, the zone of influence had an unemployment rate of 2.8% in 2019, slightly lower than that of the state of Texas, which had an unemployment rate of 3.5% that same year. Within the zone of influence, Bell and Milam were the only two counties with higher unemployment rates than the state of Texas.

Table 2-14 Labor Force, Employment and Unemployment Rates, 2019 Annual Averages

Geographic Area	Total Civilian Labor Force	Employed	Unemployed	Unemployment Rate
Texas	14,037,537	13,541,936	495,601	3.5%
Bastrop County	42,689	41,385	1,304	3.1%
Bell County	143,787	138,259	5,528	3.8%
Burnet County	23,586	22,943	643	2.7%
Lee County	10,126	9,858	268	2.6%
Milam County	9,754	9,270	484	5.0%
Travis County	737,411	718,128	19,283	2.6%
Williamson County	318,841	309,869	8,972	2.8%
Zone of Influece	**1,286,194**	**1,249,712**	**36,482**	**2.8%**

Source: Bureau of Labor Statistics, 2019 Annual Averages

2.4.4 Households, Income and Poverty

Table 2.15 displays the number of households and average household sizes in the state and zone of influence. There were approximately 9.7 million households in the state of Texas with an average household size of 2.85 in 2019. The zone of influence contained approximately 832,800 of those homes with an average household size of 2.76.

Table 2-15 2019 Households and Household Size

Geographic Area	Total Households	Average Household Size
Texas	9,691,647	2.85
Bastrop County	25,571	3.22
Bell County	122,689	2.75
Burnet County	16,743	2.74
Lee County	6,036	2.74
Milam County	9,228	2.63
Travis County	472,361	2.54
Williamson County	180,160	3.02
Zone of Influence	**832,788**	**2.76**

Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates (2019 Estimate)

Table 2.16 showcases the median household income in the zone of interest ranged from $47,902 in Milam County to $87,337 in Williamson County in 2019, as displayed in Table 8. Per capita income in the zone of interest was $38,392 in 2019, higher than the state of Texas, which had a per capita income of $31,277.

Table 2-16 2019 Median and Per Capita Income

Geographic Area	Median Household Income ($)	Per Capita Income ($)
Texas	$61,874	$31,277
Bastrop County	$64,597	$27,773
Bell County	$54,884	$26,677
Burnet County	$59,492	$30,980
Lee County	$54,744	$27,227
Milam County	$47,902	$25,714
Travis County	$75,887	$43,658
Williamson County	$87,337	$37,242
Zone of Interest	**N/A**	**$38,392**

Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates (2019 Estimate)

Table 2.17 displays the percentage of persons and families whose incomes fell below the poverty level in the past twelve months as of 2019. There were less people in the zone of interest with incomes below the poverty level in 2019 (10.9%) as compared to the state of Texas (14.7%). Within the zone of interest, Milam County had the most people with incomes below the poverty level at 15.4%, followed by Bell County at 13.9%. Bastrop, Burnet, Lee, Travis, and Williamson Counties each had between 6% and 12% of individuals below the poverty level. Williamson experienced the least amount of poverty within the zone of interest, with 6.4% of the population below the poverty level. In terms of families below the poverty level, the only county with a greater percentage of poverty than the state of Texas was Milam County, which had approximately 12% of families below the poverty level. The remainder of the counties in the zone of interest had between 4.4% and 10.8% of families below the poverty level in 2019.

Table 2-17 Percent of Families and People Whose Income in the Past 12 Months is Below the Poverty Level (2019)

Geographic Area	Total Number of Families	Percent of Families
Texas	4,154,345	11.3%
Bastrop County	9,466	9.1%
Bell County	48,451	10.8%
Burnet County	4,746	7.8%
Lee County	2,098	10.1%
Milam County	3,814	11.8%
Travis County	147,216	7.9%
Williamson County	35,046	4.4%
Zone of Interest	**250,840**	**N/A**

Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates (2019 Estimate)

2.5 RECREATION FACILITIES, ACTIVITIES, AND NEEDS

The initial development of outdoor recreation facilities at Granger Lake was addressed in the 1974 Master Plan, Design Memorandum (DM) No. 1C. This document laid out a robust 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 Granger Lake consists of managing roads and trails, fishing along waterways and adjacent to the stilling basin area below the dam, management of the water surface as it relates to boating activity and managing general access to lands.

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

- Easily accessed by nearby highways, State Highway 95 and State Highway 29. Granger Lake Dam is located 23 miles from downtown Georgetown and just 12 miles from downtown Taylor along major highways.
- Full-service campgrounds and day-use areas.
- 5 boat ramps and 1 primitive boat ramp.

2.5.1 Recreation Zone of Influence

The recreation zone of influence for Granger Lake as it relates to this Master Plan mirrors the demographic and economic analysis zone of influence and includes Williamson County, Texas as well as the adjacent counties of Milam, Lee, Bastrop, Travis, Bell and Burnet Counties.

2.5.2 Visitation Profile

Most visitors to Granger Lake come from within the zone of influence. The most recent visitor data from Recreation.gov includes zip codes for visitors who made reservations at Friendship, Taylor, Willis Creek, and Wilson H. Fox Parks. The most recent data available includes zip codes from visitors during 2020-2021. An examination of approximately 300,000 visits revealed that Wilson H. Fox Park experienced the highest number of visitors at 30.6%, followed by 19.1% of visitors travelling to the Scenic Overlook. Table 2.15 provides the number of visitors and percentage of total visitors to each park located at Granger Lake.

Table 2-18 Granger Lake Park Use Statistics

PARK	NUMBER OF VISITORS	PERCENT OF VISITORS
Wilson H. Fox Park	91,438	30.6%
Scenic Overlook	57,162	19.1%
Friendship Park	53,014	17.7%
Taylor Park	36,481	12.4%
Willis Creek Park	36,401	12.2%
Stilling Basin	19,379	6.4%
Dispersed Use	4,800	1.6%

Source: NRM Assessment Tool 2020

2.5.3 Recreation Areas and Facilities

The primary outdoor recreation facilities at Granger are operated by USACE, City of Taylor, and various private parties. USACE provides recreational opportunities by managing pedestrian traffic on the road across the top of Granger Dam, fishing access to the stilling basin area, as well as all the campgrounds and day use areas around the lake. Table 2.17 provides a brief summary of the primary recreation facilities operated by these various entities.

Table 2-19 Facilities Provided by USACE, City of Taylor, and various Private Parties.

Facilities	USACE	Private Party Leases
Campsites: electric and water	120	0
Campsites: electric, water and sewer	4	0
Enclosed screen shelters, with 20/30/50 amp electric and water hookups	1	0
Campsites with no hookups	0	0
Picnic Sites	Yes – Varies with lake level	yes
Group shelters	1	1
Picnic Shelter	128	0
Hiking Trails	4 miles	0
Equestrian Trails	18 miles	0
Boat Ramp	5	1
Swimming Beach	2	0
Interpretive Site	Yes	0

Source: USACE

2.5.4 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. Granger 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, with Williamson County and Granger Lake located in TORP Region 3. Across the entire state and in Region 3, 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.

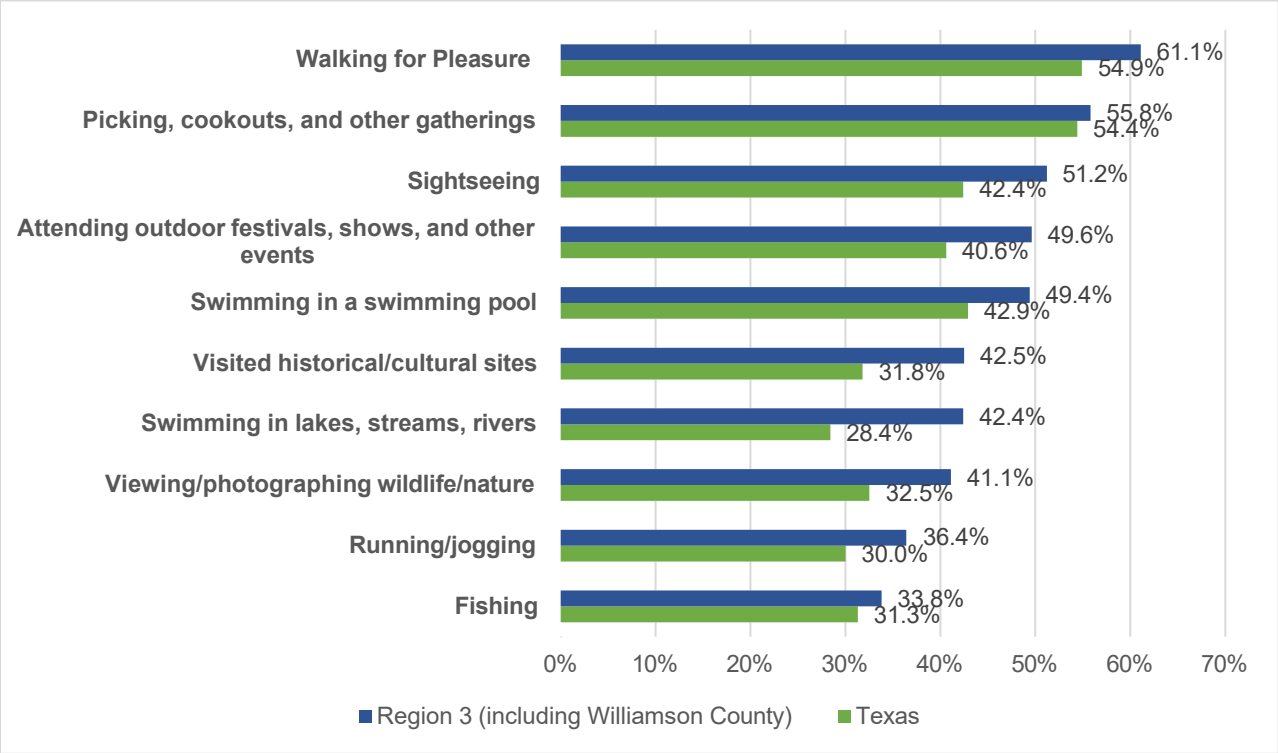


Figure 2-9 Top 10 Areas of Participation for Outdoor Recreation Activities
Source: TPWD TORP 2018

Asked "which outdoor recreation opportunities does your community currently lack or would like to see more of in your community," the top three answers across the state are trails/places to hike/bike, pools/swimming facilities (other than lakes), more parks/more park capacity, and fishing places and access. Granger Lake provides the top three recreational opportunities for Region 3 communities. The top ten responses for the State of Texas and Region 3 are indicated in Figure 2.12.

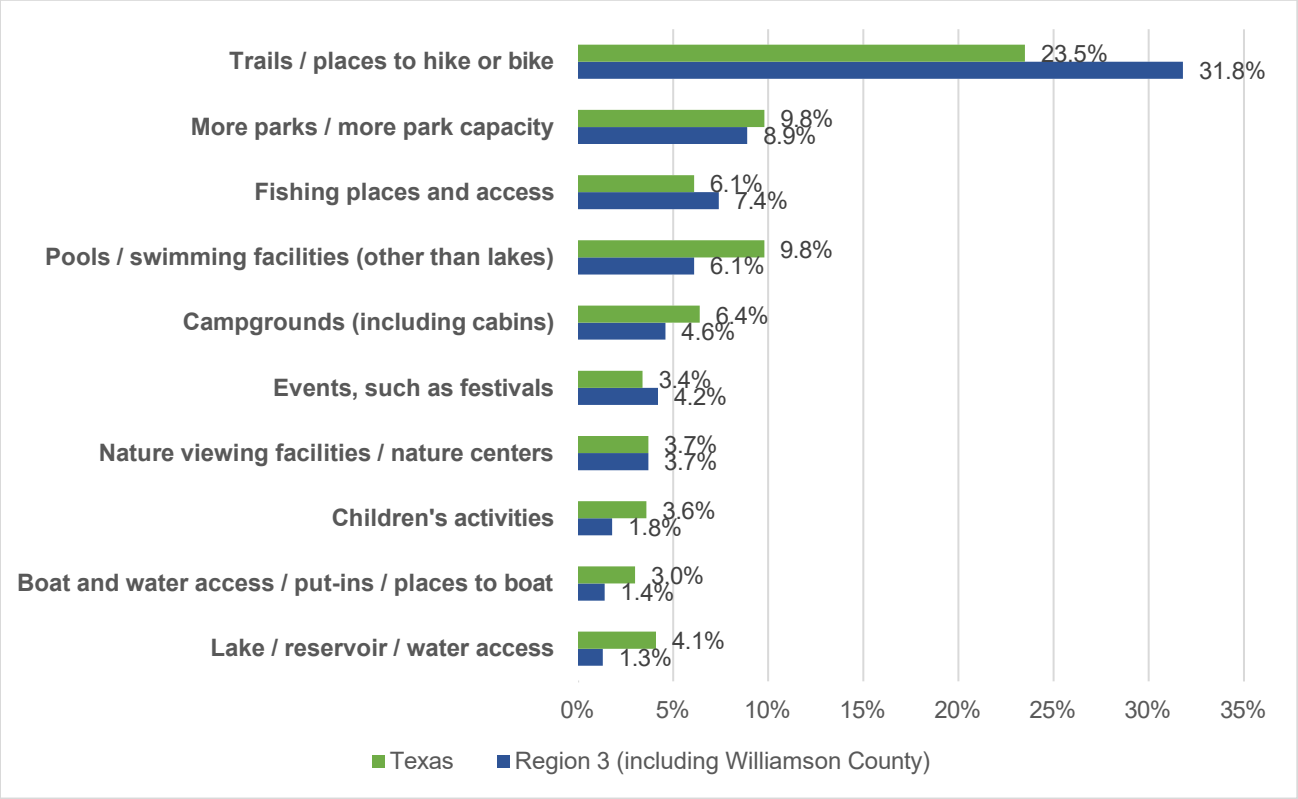


Figure 2-10 Top 10 Outdoor Recreational Opportunities Currently Lacking for the Community
Source: TPWD TORP 2018

Additional findings from the Survey found that 34 percent of Texas residents and 43 percent of Region 3 residents have visited a state park during the past 12 months. Furthermore, 58 percent of Texas residents and 66 percent of Region 3 residents have visited a local park in the past 12 months (local park was defined as 30 minutes from respondents' home and not a state or national park). Within Region 3, 59 percent of survey respondents have visited a local park at least 5 times in the last 12 months, while 97 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 most common response in Region 3 was more shaded areas and trees at 19 percent and across the state the most common response was restrooms at 20.7 percent. The top ten responses to that survey question are indicated in Figure 2.13.

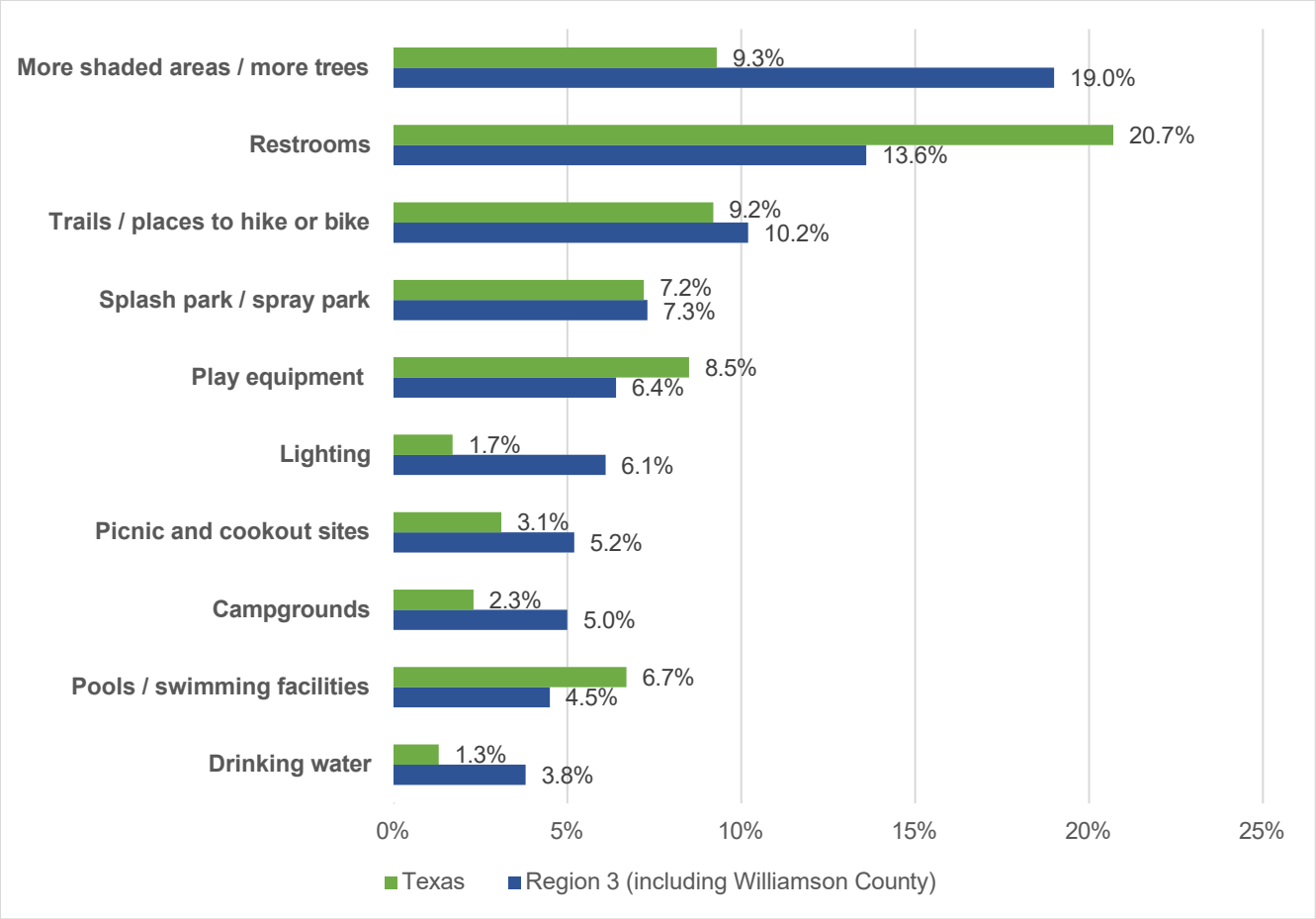


Figure 2-11 Top 10 Features and Facilities Currently Lacking in Community
Source: TPWD TORP 2018

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 campgrounds; with the demand for sightseeing and attending outdoor festivals, shows, and other events being much higher in the Region 3 than the entire state. In response to trends documented in the TORP, USACE will endeavor to improve access to some swim beaches and to develop trails in or adjacent to park areas as funding permits.

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. USACE intends to continue to operate campgrounds and day use areas by maintaining and improving existing facilities and has long-range plans for consolidating the use of existing facilities. 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.

2.6 REAL ESTATE

In October 1972, under the authorization of the Flood Control Act of 1954, construction of Granger Lake began for the purposes of both flood risk management and watershed conservation. In lieu of fee simple acquisition, flowage easements were acquired in the upper reaches of most tributaries where the configuration of required lands was relatively narrow. The boundary at Granger Lake is typically fenced.

Considering the reconveyance of approximately 3,683 acres of land, the current fee simple owned lands total approximately 9,938 acres. In addition to the fee land acquisition, approximately 1,763 acres of flowage easement were acquired up to elevation 741.0 feet 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 structures on flowage lands.

Table 2-20 Real Estate Fee and Flowage Acreage

Land	Acres
Fee Acres	13,601
Reconveyance Lands	-3,683
Total Acres	**9,938**
Approximate Flowage Easement Acres	1,717

Source: Real Estate Management Information System

The fee simple and easement acreage identified in this Master Plan was obtained from the Real Estate Management Information System (REMIS) and is subject to change as the acquisition documents are audited. These are the official acres and may differ slightly from the planning acres reflected in other parts of this document.

Table 2-21 Granger Lake Outgrant Types

Outgrant Type	Number
Leases	**2**
Grazing	2
Easements	**7**
Sewer/water/storm drain	2
Gas pipeline	1
Road	2
Electric	1
Communication	1
Licenses	**2**
Consents/Other	**5**
Earthworks/Pond/Pool/Drainage	5
Permit	**9**
Weather	1
Sewer/water/storm drain	6
Livestock	1
Oil/Gas Pipeline/Well	1
Total Outgrants	**25**

2.6.1 Guidelines for Property Adjacent to Public Land

It is the policy of the USACE to manage the natural, cultural, and developed resources of Granger 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 have the same rights and privileges as any other citizen. Therefore, the information contained herein is designed to acquaint the adjoining landowner and other interested persons with the types of property involved in the management of Granger Lake. Adjacent landowners interested in more information should request additional information from the USACE office at Granger Lake.

2.6.2 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.

2.7 PERTINENT PUBLIC LAWS

Numerous public laws apply directly or indirectly to the management of federal land at Granger Lake. Listed below are several key public laws that are most frequently referenced in planning and operational documents. Refer to Appendix D for a more comprehensive listing.

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

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

- Public Law 86-717, 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.

- Public Law 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 Headquarters USACE (HQUSACE)/OMB implementation policy made these provisions applicable to projects completed prior to 1965.

- Public Law 91-190, National Environmental Policy Act of 1969 (NEPA). – NEPA declared it a national policy to encourage productive and enjoyable harmony between man and his environment, and for other purposes. Specifically, it declared a “continuing policy of the Federal Government... to use all practicable means and measures...to foster and promote the general welfare, to create conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.” Section 102 authorized and directed that, to the fullest extent possible, the policies, regulations, and public law of the United States shall be interpreted and administered in accordance with the policies of the Act. It is Section 102 that requires consideration of environmental impacts associated with Federal actions. Section 101 of NEPA requires the federal government to use all practicable means to create and maintain conditions under which man and nature can exist in productive harmony.

  Specifically, Section 101 of the National Environmental Policy Act declares:

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

- 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 101-601, Native American Graves Protection and Repatriation Act (16 November 1990), requires federal agencies to return Native American human remains and cultural items, including funerary objects and sacred objects, to their respective peoples.

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 Granger Lake. The terms “goals” and “objectives” 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 objectives are specific task-oriented resource actions necessary to achieve the overall Master Plan goals.

3.2 RESOURCE GOALS

The following statements based on *EP 1130-2-550*, Chapter 3, express the goals for the Granger Lake Master Plan (see section 3.3 for Resource Goals applicability to Resource Objectives):

GOAL A. Provide the best management practices to respond to regional needs, resource capabilities and capacities, and expressed public interests consistent with authorized project purposes.

GOAL B. Protect and manage the Project’s natural and cultural resources through sustainable environmental stewardship programs.

GOAL C. Provide public outdoor recreation opportunities that support project purposes and public interests while sustaining the Project’s natural resources.

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

GOAL E. Provide consistency and compatibility with national objectives and other State and regional goals and programs.

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

- Strive to achieve environmental sustainability. An environment maintained in a healthy, diverse, and sustainable condition is necessary to support life.
- Recognize the interdependence of life and the physical environment. Proactively consider environmental consequences of USACE programs and act accordingly in all appropriate circumstances.
- Seek balance and synergy among human development activities and natural systems by designing economic and environmental solutions that support and reinforce one another.

- Continue to accept corporate responsibility and accountability under the law for activities and decisions under our control that impact human health and welfare and the continued viability of natural systems.

- Seek ways and means to assess and mitigate cumulative impacts to the environment; bringing systems approaches to the full life cycle of our processes and work.

- Build and share an integrated scientific, economic, and social knowledge base that supports a greater understanding of the environment and impacts of our work.

- Respect the views of individuals and groups interested in USACE activities; listen to them actively and learn from their perspective in the search to find innovative win-win solutions to the nation's problems that also protect and enhance the environment.

3.3 RESOURCE OBJECTIVES

Resource objectives are defined as clearly written statements that respond to identified issues and that specify measurable and attainable activities for resource development and/or management of the lands and waters under the jurisdiction of the Fort Worth District, Granger 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 take public input into consideration. Recreational and natural resources carrying capacities are also accounted for during development of the objectives found in this Master Plan, as well as regional and state planning documents including:

- Texas Comprehensive Action Plan
- Texas Parks & Wildlife – Texas Outdoor Recreation Plan
- Native Prairie Association of Texas – Blackland Chapter

The objectives in this Master Plan are intended to provide project benefits, meet public needs, and foster environmental sustainability for Granger Lake to the greatest extent possible. The following tables list the objectives for Granger Lake.

Table 3-1 Recreational Objectives

Recreational Objectives	Goals				
	A	B	C	D	E
Renovate existing facilities to provide a quality recreation experience for visitors while protecting natural resources for use by others. Examples include development of high impact zones at campsites, provision for universally accessible facilities, separation of day use and camping facilities, and improved electrical service at campsites.	*		*		
Provide opportunities for day use activities, especially picnicking. Provide enough campsites in popular areas.	*		*		
Monitor boating traffic and evaluate the need to conduct a comprehensive recreation boating use study to ensure visitor safety and enjoyment.	*		*		
Monitor public use levels and evaluate potential impacts from overuse and crowding. Take action to prevent/remediate overuse, conflict, and public safety concerns.	*				
Manage recreation facilities in accordance with public demand. Examples include universally accessible fishing docks, fish cleaning stations near boat ramps, and playground equipment in day use and camping areas.	*		*		
Work with partners to expand existing trails and develop new ones.	*		*		*
Consider flood/conservation pool to address potential impact to recreational facilities (i.e., campsites, boat ramps, courtesy docks, etc.).	*	*	*	*	
Ensure consistency with USACE Natural Resource Management (NRM) Strategic Plan.					*
Follow the Environmental Operating Principles associated with recreational use of waterways for all water-based management activities and plans.		*	*		*
Increase universally accessible facilities on Granger Lake lands.	*		*		*
Consider long-term sustainable operational and maintenance costs when planning new recreational facilities or upgrading and expanding existing facilities.	*	*		*	
Evaluate established permits/outgrants to determine impacts on public lands and waters. Sustain the Shoreline Statement of Policy to balance private shoreline uses (such as mowing or vegetation removal requests along the federal property boundary, or paths to the shoreline) with habitat management and impacts to the general public.	*	*	*		
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 considering USACE policy and operational aspects of Granger Lake.					*

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

Table 3-2 Natural Resource Management Objectives

Natural Resource Management Objectives	Goals				
	A	B	C	D	E
Give priority to the preservation and improvement of wild land values in public use planning, design, development, and management activities. Give high priority to examining project lands in consideration of the Texas Blackland Prairie ecoregion.	*	*		*	*
Ensure project lands are managed with preservation and conservation of natural habitat and open space as a primary objective for maintaining the availability of public open space.		*		*	*
Consider flood/conservation pool levels to ensure that natural resources are managed in ways that are compatible with project purposes.	*	*		*	
Consider a watershed approach during the decision-making process.					*
Actively manage and conserve fish and wildlife resources, especially habitat for the Golden-cheeked warbler and Bone Cave Harvestman and other special status species, by implementing ecosystem management principles. Key among these principles is the use of native plant species adapted to the ecological region in restoration and mitigation plans.	*	*			*
Manage high density and low-density recreations lands in ways that enhance benefits to wildlife.					*
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 Granger Lake and develop alternatives to resolve the issues.	*	*			*
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. Potential invasive species of great concern are bermudagrass and hydrilla. Implement prescribed fire as a management tool to control the spread of noxious plants including johnsongrass, King Ranch bluestem, and Ashe juniper, and to promote the vigor of native prairie grasses and forbs.	*	*		*	*
Conservation concern such as the golden-cheeked warbler and whopping crane.	*	*		*	*

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

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

Visitor Information, Education and Outreach Objectives	Goals				
	A	B	C	D	E
Provide opportunities (i.e., comment cards, updates to local municipalities, web page) for communication with agencies, special interest groups, and the general public. Utilize social media to keep visitors informed.	*			*	*
Provide educational, interpretive, and outreach programs at the lake office and around the lake. Topics to include: history, lake operations (flood risk management, water supply, and recreation), water safety, cultural resources, ecology, and USACE missions.	*	*	*	*	*
Promote USACE Water Safety message.	*		*	*	*
Educate adjacent landowners on policies and permit processes to reduce encroachment actions.	*	*	*	*	*
Enhance network among local, state, and federal agencies for exchanging 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.	*	*	*		*

*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
Resurvey and maintain the public lands boundary line to ensure it is clearly marked and recognizable in all areas to reduce habitat degradation and encroachment actions.	*	*		*	
Ensure consistency with USACE Campaign Plan (national level), IPlan (regional level), OPlan (District level).					*
Identify safety hazards or unsafe conditions; correct infractions and implement safety standards in accordance with Engineering Manual (EM) 385-1-1.					*
Ensure green design, construction, and operation practices, such as the Leadership in Energy and Environmental Design (LEED) criteria for government facilities, are considered as well as applicable Executive Orders.					*
Manage non-recreation outgrants such as utility and road easements in accordance with national guidance set forth in Engineering Regulation (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 Executive Order 13653, Executive Order 13693 and related USACE policy.					*

*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
Ensure full integration of historical preservation by keeping an inventory of cultural sites in accordance with Section 106 and 110 of the NHPA, the Archeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act.	*	*		*	*
Increase public awareness and education of regional history.		*		*	*
Monitor and enforce Title 36 and Advanced Research Projects Agency (ARPA) to prevent unauthorized excavation and removal of cultural resources.		*		*	*
Preserve and protect cultural resources sites in compliance with existing federal statutes and regulations.	*	*	*	*	*
Develop partnerships that promote and protect cultural resources at Granger Lake.		*	*	*	*
Stop unauthorized use of public lands as it pertains to the illegal excavation and removal of cultural resources.		*		*	*

*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 Granger Lake, the land allocation categories that apply are Operations and Recreation. Operations allocation is defined as those lands that are required to operate the project for the primary authorized purposes of flood risk management and water conservation. Recreation allocation is defined as lands acquired specifically for the authorized purpose of recreation, referred to as separable recreation lands. The remaining allocations of Fish and Wildlife, and Mitigation would apply only if lands had been acquired specifically for these purposes. The entire fee simple federal estate at Granger Lake is 13,601 acres of which 4,159 acres is inundated at conservation pool. Of the 13,601 acres, 390 acres are allocated to Recreation with the remaining 13,211 acres are allocated to Project Operations.

4.2 LAND CLASSIFICATION

The previous version of the Granger Lake Master Plan included some land classification criteria that were similar to the current criteria. These prior land classifications were based on 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 48 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.

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. At Granger Lake, there are five land classifications and four subclassifications identified in USACE regulations, as well as three 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
  - Open Recreation

The revised land and water surface classifications for Granger 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 assessment. 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 (PO)

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 for activities such as public access to the road on top of the dam. Regardless of any limited recreation use allowed on these lands, the primary classification of PO will take precedent over other uses. There are 627 acres of PO 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 concession areas. Recreation development by lessees operating on USACE lands must follow policy guidance contained in USACE regulations at ER 1130-2-550, Chapter 16. That policy includes the following statement:

> *"The primary rationale for any future recreation development must be dependent on the project's natural or other resources. This dependency is typically reflected in facilities that accommodate or support water-based activities, overnight use, and day use such as marinas, campgrounds, picnic areas, trails, swimming beaches, boat launching ramps, and comprehensive resort facilities. Examples that do not rely on the project's natural or other resources include theme parks or ride-type attractions, sports or concert stadiums, and standalone facilities such as restaurants, bars, motels, hotels, non-transient trailers, and golf courses. Normally, the recreation facilities that are dependent on the project's natural or other resources, and accommodate or support water-based activities, overnight use, and day use, are approved first as primary facilities followed by those facilities that support them. Any support facilities (e.g., playgrounds, multipurpose sports fields, overnight facilities, restaurants, camp*

stores, bait shops, comfort stations, and boat repair facilities) must also enhance the recreation experience, be dependent on the resource-based facilities, and be secondary to the original intent of the recreation development…"

Lands classified as HDR 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 Granger Lake, prior land classifications included a number of areas under the recreation classification. Several of these areas, including Friendship Park, Wilson H. Fox Park, Taylor Park, and Willis Creek Park were developed during the construction phase of the overall project, while additional areas were selected for recreation, hunting, and interim recreation as areas would be developed in the future. 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 Granger Lake there are 936 acres classified as HDR land. Each of the HDR areas is described briefly in Chapter 5 of this Plan.

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 Granger 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 Granger 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 757 acres classified as ESA at Granger 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. A given tract of land may be classified using one or more of these sub-classifications, but the primary sub classification should reflect the dominant use of the land. Typically, Multiple Resource Management Lands support only passive, non-intrusive uses with very limited facilities or infrastructure. Where needed, some areas may require basic facilities that include, but are not limited to minimal parking space, a small boat ramp, and/or primitive sanitary facilities. There are 6,961 acres of land under

this classification at Granger Lake. The following paragraphs list each of the sub-classifications, and the number of acres and primary uses of each.

4.2.6.1 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, areas were classified to support "low intensity" recreation, however during the planning process, most of these areas were reclassified as either ESA or Wildlife Management. LDR lands are designated at Granger Lake in areas that were previously designated as "intensive recreation" areas but are no longer used for that level of use. There are 138 acres classified as LDR at Granger 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. 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 6,823 acres of land included in this classification at Granger 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 Granger Lake.

Future or Inactive Recreation

These are lands with site characteristics compatible with HDR development but have been undeveloped or planned for very long-range recreation needs. There are no areas 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, 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. The areas include the water surface immediately surrounding the gate control tower upstream of the Granger Lake Dam as well as around the water intake tower and two designated swim beaches at Granger Lake parks. There are 25 acres of restricted water surface at Granger 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 five boat ramps where no-wake restrictions are in place for reasons of public safety and protection of property. There are 21 acres of designated no-wake water surface at Granger 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. Granger 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, 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 4,289 acres of open recreation water surface at Granger Lake.

4.2.8 Recreational Seaplane Operations

Seaplane restrictions are part of Title 36 Code of Federal Regulations. At Granger 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. Due to potential hazards from sub-surface tree stumps and fluctuating water levels; seaplane operations at Granger Lake are generally prohibited in all areas.

Table 4.1 provides a summary of the revised land and water surface classifications and acreage at Granger Lake. Acreages were calculated by historical and GIS data. A map representing these areas can be found in Appendix A.

Table 4-1 Land and Water Surface Classification and Acreage

Land Classifications	Acres	Water Surface Classifications	Acres
Project Operations	627	Restricted	25
High Density Recreation	936	Designated No Wake	21
Environmentally Sensitive Areas	757	Open Recreation	4,289
Multiple Resource Management - Low Density Recreation	138		
Multiple Resource Management – Wildlife Management	6,823		
Total Land Classification	**9,281**	**Total Water Surface Classification**	**4,335**

*Total Acreage differences from the 1974 total to the 2022 totals are due to improvements in measurement technology, deposition/siltation, and erosion.

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 conveyed 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 Granger 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 approximately 1,731 acres of flowage easements lands at Granger Lake.

CHAPTER 5 – RESOURCE PLAN

5.1 MANAGEMENT BY CLASSIFICATION

This chapter describes the management plans for each land use classification within the Master Plan. The classifications that exist at Granger Lake are Project Operations, High Density Recreation, Low Density Recreation, Environmentally Sensitive Area, and Wildlife Management Area. The water surface is also classified into sub-classifications of Restricted, 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 Granger Lake Operations Management Plan (OMP). Acreages shown for the various land classifications were calculated using GIS technology and may not agree with lease documents, prior publications, or official land acquisition records.

5.2 PROJECT OPERATIONS

The Project Operations (PO) classification is land associated with the dam, spillway, levees, lake office, maintenance facilities, and other areas managed solely for the operation and fulfillment of the primary mission of the project. There are 627 acres of land under this classification, all of which are managed by the USACE. The management plan for the PO 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.

Recommended future actions for these areas include facility upgrades to meet USACE sustainability objectives as funding and personnel allow. Opportunities to incorporate environmental stewardship objectives for land management such as invasive species control and wildlife management through use of food or pollinator plots will be implemented as appropriate.

5.3 HIGH DENSITY RECREATION

Granger Lake has 936 acres classified as High Density Recreation (HDR). 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.

USACE operates and manages all the areas designated as HDR at Granger Lake. The following is a description of each park operated by USACE along with a conceptual management plan for parks by classification groups, which include Class A

(highly developed listed in section 5.3.1) and Class C (basic facilities listed in section 5.3.2). Maps showing existing parks and facilities managed by USACE can be found in Appendix A.

Class A Parks Operated by USACE

The management plan for all the parks listed below is to continue to operate them as campgrounds by maintaining and improving existing facilities. Emphasis will be placed on improvements such as continuing to upgrade aging electrical infrastructure, repairing or replacing outdated restrooms, paving new roads in some parks, and installing new fence lines, as funds and personnel allow.

Wilson H. Fox Park– Located on the southeast portion of the lake, Wilson H. Fox Park camping area contains 49 Class A campsites including five screened shelters. The park also provides access to swimming and picnicking facilities, a boat ramp with courtesy dock, playgrounds, restrooms with showers, a dump station, and a fishing dock.

Photo 5-1 Wilson H. Fox Park campground

Willis Creek Park – Located on the west portion of the lake, Willis Creek Park is home to a campground with 27 Class A campsites and 10 primitive equestrian group campsites. Willis Creek Park also includes the following amenities: restrooms with showers, a boat ramp with courtesy dock, picnic sites, a dump station, and direct access to equestrian trails.

Photo 5-2 Fishing at Willis Creek Park

Taylor Park – Located on the southwest portion of the lake, Taylor Park campground contains 48 Class A campsites including access to primitive camping at Fox Bottom. The park provides restrooms with showers, a playground, and a dump station for campers. Amenities for day use activities include 49 picnic sites, a boat ramp, and access to the Comanche Bluff hiking trail.

Photo 5-3 Taylor Park picnic sites

5.3.1 Class C Parks Operated by USACE

The management plan for all the parks listed below is to continue to operate them as day use areas and access points by maintaining and improving existing facilities. Emphasis will be placed on improvements such as construction of additional space for boat trailers, repairing or replacing outdated restrooms, paving new roads in some parks, installing new fence lines, and adding primitive camp sites, as funds and personnel allow.

Friendship Park – Located on the northeast portion of the lake near the lake office, this public use area is open year-round. Amenities that the park provides are a group camping shelter, a restroom with showers, picnic areas, a swimming area, a boat ramp, and a volleyball court.

Photo 5-4 Friendship Park picnic sites

5.3.2 Boat Ramps

There are five boat ramps and one primitive boat ramp for small hand launched boats operated by USACE at Granger Lake. The boat ramps are located in Willis Creek Park, Friendship Park, Taylor Park, and Wilson H. Fox Park (2). The primitive boat ramp is located on the north side of the San Gabriel River upstream of the lake. Boat Ramps have varying hours of operation and have a fee associated with their use with the exception of the primitive boat ramp. Ramps may be closed from time to time due to flooding or other damage (see USACE website for updates on closures). 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 Granger Lake. Management will continue to maintain and improve facilities as time and funding permits.

Photo 5-5 Willis Creek Park boat ramp

5.3.3 Trails

As stated in the TORP, there is a growing demand for trails of all kinds. Trails of various construction and purposes are permitted to be in most land classifications (see Chapter 4). The management plan for trails at Granger Lake include partnering with other agencies and organization to keep pace with demand for trails of all kinds by improving existing trails and developing new trails.

Comanche Bluff Trail – Located on the south side of the lake, the Comanche Bluff trail connects the trailhead at Taylor Park to the primitive campground at Fox Bottom, a total of 4.8 miles in length (see Figure 5.1). The trail is designated as a hike and bike trail only. No motorized equipment or equestrian use is allowed. The trail crosses two bridges along its route including the Hoxie and Friendship Bridges. Within Taylor Park a 1.5-mile loop is available for hikers who desire a shorter option. A day use fee is required to use the hiking trail.

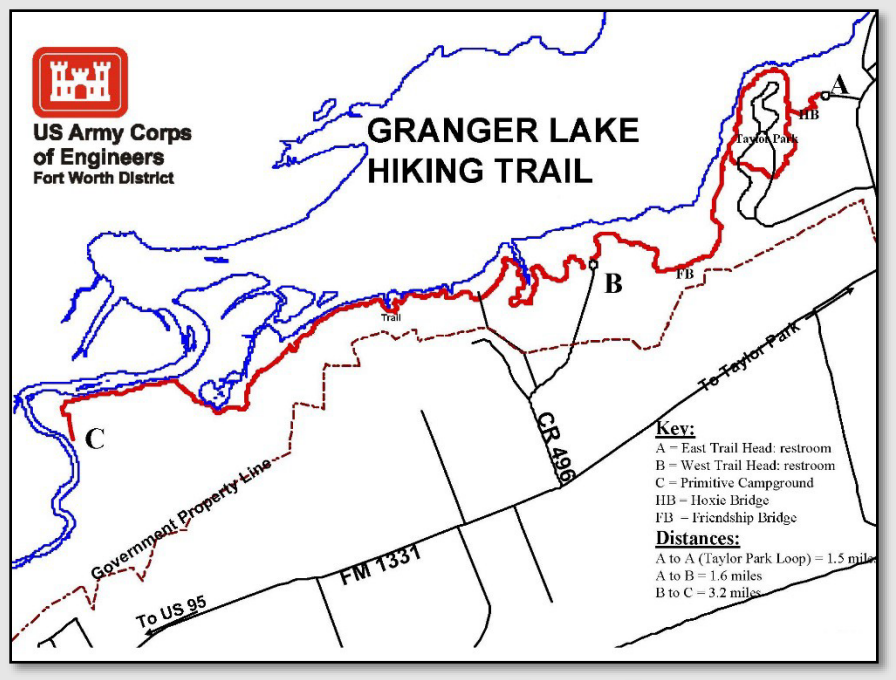


Figure 5-1 Comanche Bluff Trail map

Willis Creek Park Equestrian Trail – Located on the north side of the lake, the Willis Creek Park Equestrian Trail is comprised on six different trail segments or loops, each of different length. In total, there is approximately 18 miles of trails (see Figure 5.2). A day use fee is required to use the horse trail.

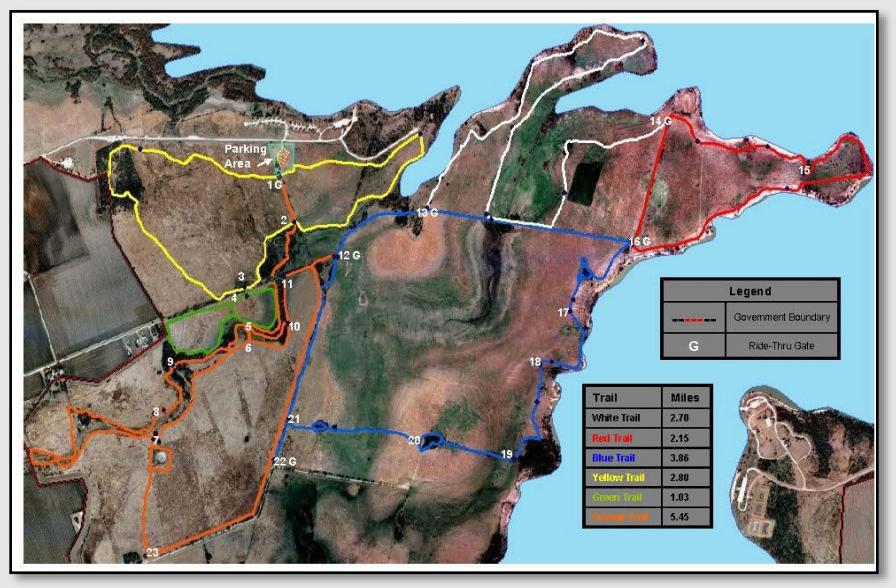


Figure 5-2 Willis Creek Equestrian Trail map

5.4 ENVIRONMENTALLY SENSITIVE AREAS

Environmentally Sensitive Areas are areas where scientific, ecological, cultural or aesthetic features have been identified. Designation of these lands is not limited to just lands that are otherwise protected by laws such as the Endangered Species Act, the National Historic Preservation Act or applicable state statutes. These areas must be managed to ensure they are not adversely impacted by activities on fee lands except where necessary for flood mitigation operations. No agricultural or grazing uses are permitted on these lands unless necessary for a specific resource management benefit, such as prairie restoration and management. These areas are 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. These areas are typically distinct parcels located within another, and perhaps larger, land classification area.

The Wildlife Habitat Appraisal Procedure (WHAP) is a tool developed by TPWD to evaluate the quality of habitat for wildlife, giving each selected land point a rating based on a set criterion (see Appendix C). The results of the WHAP completed 26-29 April 2021 were used, in part, to assist in determining which areas should be classified as ESA. Other factors, including the presence of cultural resource, species of conservation concern, and visual aesthetics were also included in the selection of ESA areas. At Granger Lake, 13 areas totaling approximately 757 acres are classified as ESA. Each of these areas are numbered on the land classification maps in Appendix A.

WHAP scores range from 1.00 (best) to .03 (worst), with .00 meaning not measured. In general, scores above 0.60 are considered good habitat, and scores above 0.80 are considered excellent habitat. Table 5.1 provides a listing of the ESA areas, including habitat type and WHAP scores. As can be seen, ESA8 and ESA9 had the highest WHAP point scores in a marsh (ESA8) and a hardwood slope forest and floodplain hardwood forest (ESA9). Typically, riparian, marsh, and floodplains have the largest diversity of vegetation and thus provide exceptional habitat for wildlife.

Table 5-1 WHAP Points Within ESA's

ESA#	WHAP Point #	WHAP Score(s)	Habitat Type
ESA1	1	.69	Blackland Prairie
ESA2	6	.59	Elm Woodland
ESA3	7	.70	Floodplain Hardwood Forest
ESA4	8	.77	Floodplain Hardwood Forest
ESA5	n/a	n/a	n/a
ESA6	n/a	n/a	n/a
ESA7	19	.75	Mesquite Shrubland
	20	.68	Deciduous Woodland
	21	.46	Deciduous Woodland
ESA8	25	.62	Floodplain Hardwood Forest
	26	.82	Marsh
ESA9	28	.55	Riparian Hardwood Forest
	29	.68	Riparian Hardwood Forest
	30	.82	Hardwood Slope Forest
	31	.66	Deciduous Forest
	32	.51	Ashe Juniper Slope Forest
	33	.56	Ashe Juniper Slope Forest
	34	.70	Floodplain Hardwood Forest
	35	.71	Riparian Hardwood Forest
	36	.60	Floodplain Hardwood Forest
	37	.84	Floodplain Hardwood Forest
ESA10	42	.60	Deciduous Woodland
ESA11	n/a	n/a	n/a
ESA12	n/a	n/a	n/a
ESA13	49	.65	Floodplain Hardwood Forest
	50	.65	Floodplain Hardwood Forest
	52	.59	Hardwood Slope Forest

5.5 MULTIPLE RESOURCE MANAGEMENT LANDS

Multiple Resource Management Lands (MRML) at Granger Lake are organized into two sub-classifications. These sub-classifications are Wildlife Management and Low Density Recreation. The following is a description of each sub-classification's resource objectives, acreages, and description of use. Management of MRML lands are dependent upon funding and resource availability.

5.5.1 Wildlife Management

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 6,823 acres under this classification, which are managed by USACE. Management efforts focus on producing native wildlife food and habitat.

The broad objective of fish and wildlife management is to conserve, maintain and improve the fish and wildlife habitat to produce the greatest dividend for the benefit of the public. Implementation of a fish and wildlife management plan is the first step toward achieving the goals of the Fish and Wildlife Conservation Act (Public Law 85-624).

The TPWD and USFWS share responsibility with USACE for managing fish and wildlife, primarily through enforcement of laws and regulations and establishing seasons and bag limits for game species. Future management plans for wildlife areas include continued cooperation with partners for the management and improvement of wildlife areas designated under this land classification. Techniques such as prescribed burning, and native grass and forbs species planting will be utilized. Wildlife management lands are available to the public for sightseeing, nature study, hiking, hunting and other activities that enhance environmental awareness and promote environmental stewardship.

5.5.2 Low Density Recreation

These lands have minimal development or infrastructure that support passive public use such as hiking, nature photography, bank fishing, and hunting. Since these lands are typically adjacent to private residential developments, hunting, which is regulated by TPWD, is only allowed in select areas that are a safe and reasonable distance from adjacent residential properties. LDR lands are typically open to the public, including adjacent landowners for access to the shoreline near their homes. Prevention of unauthorized use of this land, such as trespassing or encroachment, is an important management and stewardship objective for all USACE land but is especially important for land near private development. Future management of these lands calls for maintaining a healthy, ecologically-adapted vegetative cover to reduce erosion and improve aesthetics. Future uses may include designating additional natural surface hike/bike trails. There are 138 acres of LDR at Granger Lake.

5.6 WATER SURFACE

The Granger Lake conservation pool consists of 4,335 surface water acres at 504.0 feet NGVD29 per GIS measurement. Buoys, which mark hazards, swim beaches, boats keep-out, and no-wake areas, are managed by USACE.

5.6.1 Restricted

Restricted areas are around swim beaches, 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 total approximately 25 acres at Granger Lake.

5.6.2 Designated No-wake

No-wake areas are located near boat launch areas for the safety of launching and loading boats or personal watercraft. At Granger Lake, no-wake buoy information is available at the lake office. Growing interest in kayaks and paddle boats indicates a possible future need for designated no-wake areas where kayaks or paddle boats can be operated without competing with motorized vessels. USACE is open to the concept of paddle trails and will work with interested parties to fulfill this need. Currently, approximately 21 total acres of Granger Lake is designated for No-wake.

5.6.3 Open Recreation.

The remaining water surface area is open to recreational use. No specific zoning exists for these areas, but the buoy system mentioned above is in place to aid in public safety. It is incumbent on boaters to be aware of lake conditions and to operate vessels responsibly. Approximately 4,289 acres of Granger Lake is classified for Open Recreation.

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 Granger Lake.

The following 3 utility corridors have been designated across USACE land at Granger Lake 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. These non-corridor easements may be used for placement of additional utilities 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
UC1	This corridor is located in the Williamson County right of way for CR 348 starting approximately .47 miles from the intersection of CR 348 and CR 346 traveling north-northwest and ending along CR 348 1.33 miles from the CR 348 and FM 971 intersection. The length of the corridor is approximately 3090 feet with a width of 80 feet.
UC2	This corridor is located in The State of Texas right for way of FM 971 located from the FM 971 and CR 352 intersection traveling .66 miles in an easterly direction ending at the intersection of FM971 and CR 356 where the property boundary is located. The length of the corridor is approximately 3572 feet with a width of 120 feet.
UC3	This corridor is Y-shaped with the main leg beginning at it northern most point located from the intersection of FM 971 and Granger Dam Road S6°41'27"E, 1.3 miles with a bearing of 173 degrees and traveling in a southeasterly curve to the right with an end point located S19°24'01"E, 2.2 miles from the FM 971 and Granger Dam Road intersection bearing 161 degrees. This segment is approximately 6107 feet in length. The second segment follows a southernly direction beginning at a point 963 feet along the main leg of this corridor from the eastern most point ending at a point 1376 feet to the south and located N60°23'04"E, 2.3 miles and bearing 60 degrees from the FM 1331 and Granger Dam Road intersection. The corridor currently holds an easement for an overhead electric transmission line with Texas Power and Light. This segment is approximately 1376 feet in length and 20 feet in width.

6.2 SHORELINE MANAGEMENT POLICY

On 13 December 1974 the USACE published a regulation, ER 1130-2-406, in the Federal Register entitled “Civil Works Projects: Lakeshore Management.” This regulation was published as Part 327.30 of Chapter III, Title 36 of the Code of Federal Regulations. A subsequent change to the regulation was published in the Federal Register on 31 October 1990, incorporating the results of recent legislation and changing the name to “Shoreline Management at Civil Works Projects.” The focus of this regulation is to establish national policy, guidelines, and administrative procedures for management of certain private uses of federal lands administered by USACE. A key requirement in the regulation is that private shoreline uses, as defined in the regulation, are not allowed at lakes where no such private uses existed as of 13 December 1974. No private shoreline uses such as private docks have been permitted since the changes to the Federal Register, and as such, private docks are not allowed on Granger Lake.

The private uses described in the regulation primarily include privately-owned floating facilities such as floating boat docks, fixed or movable piers, and vegetation modification activities such as plantings, mowing, and selective removal of shrubs and trees to the extent that exclusive benefits accrue to an individual or group and the general public is denied use of public lands or waters. Not included in the above definition are certain limited private activities that do not provide exclusive benefits to an individual or group, nor preclude general public use. These limited private activities may be allowed at Granger Lake by written shoreline use permit for reasons of public safety, erosion control, benefits to wildlife, or to provide reasonable pedestrian access to the shoreline. USACE regulations at ER 1130-2-406 requires the preparation of a Shoreline Management Policy Statement (SMPS). In response to this requirement a SMPS was prepared for Granger Lake in 1975.

In 2012, an administrative update to the Shoreline Management Policy for all USACE Fort Worth District lakes, including Granger Lake, was prepared to incorporate current terminology and to ensure compliance and compatibility with the most current versions of ER 1130-2-406 and ER 1130-2-540, as well as Fort Worth District policy decisions related to shoreline management. One of the primary reasons for the administrative update was to incorporate language that supports the USACE natural resources mission statement to “manage and conserve natural resources consistent with ecosystem management principles” as set forth in ER 1130-2-540.

The purpose of the SMPS is to set forth the policy and procedures by which USACE manages certain private uses of public lands at Granger Lake. Private uses that accrue exclusive benefits to an individual are not allowed at Granger Lake. The non-exclusive private uses that may be authorized by written permit from USACE include mowing and removal of underbrush to the extent needed for protection from wildfire, as well as limited clearing to provide a pedestrian access path from private property to the shoreline. These non-exclusive uses may not be authorized in all areas and are subject to restrictions set forth in the SMPS. Inquiries regarding the SMPS at Granger Lake should be directed to the USACE office at Granger Lake.

6.3 PUBLIC HUNTING PROGRAM

The Granger Lake Project offers approximately 6,823 acres for public hunting. Other public lands available for hunting within the zone of influence include USACE land at nearby Stillhouse Hollow Lake, Belton Lake, and Georgetown 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.

The Granger Lake Hunting Program requires hunters to register for a lottery to acquire a no-cost, seasonal permit from the Lake Office. Primary game species at Granger Lake for shotgun hunting include dove, quail, waterfowl, rabbit, and squirrel in their applicable seasons. Archery and crossbow hunting for feral hogs is allowed year-

round. Hunting for deer is allowed through Public Hunting Areas (PHA) by the e-post card system which becomes available annually every July. The Granger Lake Youth Hunt for waterfowl is an annual hunt for youth education and natural resource conservation. The USACE staff at Granger Lake partners with the Texas Youth Hunting Program and Texas Parks and Wildlife Department to ensure safe and ethical hunting. Through the partnership, youth hunters are selected to come to the lake and attempt to hunt waterfowl ranging from teal, duck, and goose. The youth are taught hunting safety, ethics, laws, conservation, wildlife management, water safety, and land stewardship. All hunting is safely guided by experienced hunting guides in predetermined hunting locations.

Although USACE does not charge for hunting permits, USACE has authority to charge an administrative fee for issuing permits and may charge a fee in the future. Lottery and permit rules and requirements as well as the area hunting map are subject to change and are available on the Granger Lake hunting webpage and the lake office. Permit periods will be concurrent with the Texas Parks and Wildlife Department hunting license renewal dates. All hunters must have a Texas state hunting license and are expected to follow all Texas Parks and Wildlife Department hunting regulations.

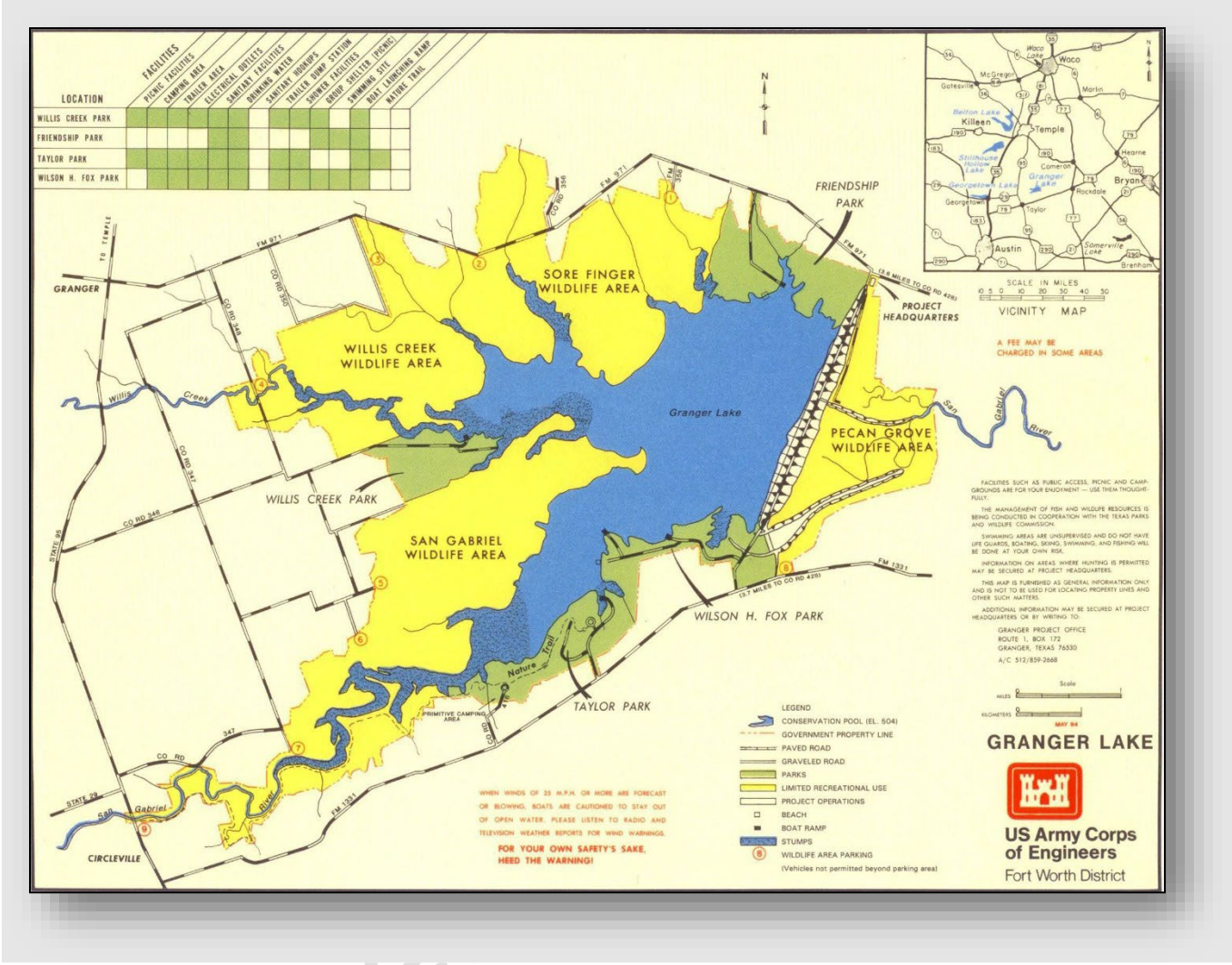


Figure 6-1 Granger Lake Hunting Map

CHAPTER 7 – PUBLIC AND AGENCY COORDINATION

7.1 PUBLIC AND AGENCY COORDINATION OVERVIEW

The USACE is dedicated to serving the public interests in support of the overall development of land uses related to land management for cultural, natural, and recreational resources of Granger 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 Granger 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 Granger Lake Master Plan.

The USACE began planning to revise the Granger Lake Master Plan in November 2020. 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.

7.2 INITIAL STAKEHOLDER AND PUBLIC INPUT PROCESS

In the interest of public health and well-being due to the Covid-19 pandemic, the public input process was changed from a face-to-face public meeting to a virtual presentation detailing the specifics of the Master Plan revision. The presentation and public input process remained open for 30 days. The public comment period began February 24, 2020 and continued through March 26, 2021.

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

- Public involvement process
- Project overview
- Overview of the NEPA process
- Master Plan and current land classifications
- Instructions for submitting comments

No comments were received from the initial stakeholder and public input process. Granger Lake is a federally owned and managed public property, and it is USACE's goal to be a good neighbor, as well as steward for public interest as it concerns Granger Lake. As such, USACE is bound to the equal enforcement of policies and fees for the publicly held national asset.

CHAPTER 8 – SUMMARY OF RECOMMENDATIONS

8.1 SUMMARY OVERVIEW

The preparation of the Granger 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 Granger Lake. Factors considered in the Plan were identified through public involvement and review of statewide planning documents including the following:

- TPWD's 2018 and 2012 TORP
- TCAP – Blackland Prairie Ecoregion

This Master Plan will ensure the long-term sustainability of the outdoor recreation program and natural resources associated with Granger 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 2012 TCAP, development of goals and objectives, public and stakeholder comments, interviews with adjacent cities and concerned agencies, as well as subject matter experts, the planning team prepared the land reclassification proposal for Granger 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 classifications to the current classifications is provided in Table 8.1, water surface classifications in Table 8.2, and

key decision points in the reclassification of project lands are presented in Table 8.3. The conversion of these lands will have no effect on current or projected public use.

Table 8-1 Change from Prior Land Classification to New Land Classification

Prior Land Classifications (1974 Plan)	Acres	Proposed Classifications (2022)	Acres
Project Operations	431	Project Operations	627
Operations: Recreation Intensive Use	1,385	High Density Recreation	936
Unclassified	779	Environmentally Sensitive Area	757
Operations: Wildlife Management	6,716	Wildlife Management Area	6,823
Operations: Recreation Low-Density Use	268	Low Density Recreation	138
Total Land Acres	8,800	Total Land Acres	9,281

Total Acreage differences from the 1974 total to the 2022 totals are due to improvements in measurement technology, deposition/siltation, and erosion. As real estate boundaries are researched, acreages may change slightly to reflect more precise boundary mapping. 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 8-2 Change from Prior Water Surface Classification to New Water Surface Classification

Prior Water Surface Classifications (1974 Plan)	Acres	Proposed Water Surface Classifications (2022)	Acres
Open Recreation	N/A	Open Recreation	4,289
Designated No-Wake	N/A	Designated No-Wake	21
Restricted Operation	N/A	Restricted Operation	25
Total Water Acres	3,985	Total Water Acres	4,335

Total Acreage differences from the 1974 total to the 2021 totals are due to improvements in measurement technology, deposition/siltation, and erosion.

Table 8-3 Reclassification Proposals

Land Classification	Description	Justification
Project Operations (PO)	The Project Operations classification was increased from 431 acres to 627 acres. • Approximately 5 acres of Operations: High Density Recreation at Fox Park and 8 acres at Friendship Park to account for project land boundaries and new lake office, totaling approximately 11 acres. • Approximately 38 acres of Operations: Low Density Recreation alongside Granger Dam Road were reclassified to PO to better represent actual PO area boundary. • Approximately 1555 acres of Wildlife Management Area at Pecan Grove WMA to PO to better capture actual PO land area. • Adjust PO around dam so that it more precisely matches Granger Dam Road atop Granger Dam, totaling 421 acres	The increase in acreage for Project Operations is to account for areas used for operations that are not currently classified as PO. The new area expands to include the entire dam, uncontrolled spillway, and discharge channel. The area also classified operations by others which includes municipal water operations near the dam and along Granger Dam Road.
High Density Recreation (HDR)	Approximately 936 acres have been classified as HDR. The previous classification Operations Recreation Intensive Use contained 1,518 acres and is similar to the current HDR classification. The decrease in Recreation Intensive Use is to account for	Decreases from the previous Recreation Intensive Use land classification is to more appropriately reflect current recreational needs and uses. The new HDR classification includes areas with existing intense recreational development and many undeveloped acres that

	• Approximately 4 acres of Wildlife Management Area at Friendship Park and 4 acres at Willis Creek Park to better represent actual park boundaries. • Approximately 22 acres of Unclassified to HDR to account for area within fee boundary within Friendship Park which includes road to park entrance. • Approximately 222 acres of HDR were classified for Friendship Park. • Approximately 549 acres were classified for Taylor Park and Fox Park. • Approximately 135 acres of HDR were classified for Willis Creek Park.	have the potential to meet future recreation needs. The conversion also accounts for more accurate measures of existing park boundaries.
Multiple Resource Management Lands (MRML) - Low Density Recreation (LDR)	Approximately 139 acres have been classified as LDR. This is a decrease from the previous land use classification of 281 acres of Recreation Low Density Use. • Approximately 122 acres of Operations: Recreation Intensive Use was allocated to account for the trailhead and trail of Taylor Park. • Approximately 9 acres of Operations: Wildlife Management alongside the San Gabriel River was transferred to account for Box 7	Decreases from the previous land classification of Operations: Recreation Low Density Use is to more appropriately reflect current recreational facilities, needs, and uses. The new LDR classification includes areas previously classified as both high density recreation and wildlife management that have the potential to meet future recreation needs.

	primitive boat ramp and access area. • Approximately 8 acres of Operations: Wildlife Management to account for access area to Box 6.	
Environmentally Sensitive Areas (ESA)	Approximately 746 acres have been classified as ESA areas – 351 acres were changed from Unclassified to ESA, 75 acres from Recreation Intensive Use to ESA, 89 acres of LDR to ESA, 226 acres from WMA to ESA, and 5 acres of PO to ESA. Each previous land classification from the 1974 Master Plan was reclassified to the new Environmentally Sensitive Areas classification. Of the Recreation Areas changed to ESA, approximately 3 acres were from Willis Creek Park, 22 acres were from Taylor Park, 14 acres were from Taylor Park and Fox Park. • See Section 5.4 for a detailed breakdown of all ESA areas.	The Environmentally Sensitive Area classification did not exist when the 1974 master plan designated land classifications. The new areas classified as ESA include unique or sensitive prairies, woodlands, wetlands, and aesthetic areas. Land areas surrounding Willis Creek, San Gabriel River, Taylor Park, Fox Park, and Pecan Grove were reclassified as ESAs to protect and preserve unique plant species and habitat types as well as riparian corridors. See Table 5.1 for a complete description of each ESA.
MRML – Wildlife Management (WM)	Approximately 6,833 acres have been classified as MRML – Wildlife Management. This is similar to the previous Operations: Wildlife Management classification, which included 6,277 acres. • On the northwestern side of the lake, approximately 189 acres of Unclassified area at Willis Creek WMA were classified for WM. • On the northeastern side of the lake,	Lands were converted from Operations: Recreation Intensive Use and Operations: Recreation Low-Density Use to more appropriately align lands outlying recreational areas for wildlife management. Land that was marked as unclassified in the 1974 master plan was aligned to Wildlife Management to account for areas lying within Wildlife Management land fee boundaries.

	approximately 194 acres of Unclassified area at Sore Finger WMA were classified for WM. • On the southwestern portion of the lake, approximately 12 acres of Unclassified area at San Gabriel WMA were classified for WM. • On the northeastern portion of the lake, approximately 7 acres of Operations: Low Density Recreation were transferred because the land was never developed for recreational use. • On the northeastern portion of the lake, approximately 1 acre of Operations: Recreation Intensive Use was transferred to account for Friendship Park land boundary. • Approximately 188 acres of HDR on the boundaries of Willis Creek Park, 34 acres on the boundaries of Fox Park, and 182 acres on the boundaries of Friendship Park were classified as WM due to falling outside of developed park area. • Approximately 154 acres of LDR area never used for LDR and instead used for wildlife management was classified as WM. • Approximately 448 acres of WM were classified for Pecan	

	Grove WMA. • Approximately 2,226 acres of WM were classified for San Gabriel WMA • Approximately 210 acres of WM were classified for Willis Creek WMA. • Approximately 2,986 acres of WM were classified for Sore Finger and Willis Creek WMAs.	
Water Surface Restricted	Approximately 25 acres of water surface have been classified as Restricted water surface where boats are not allowed.	These are comparatively small parcels that surround water intake structures, the USACE gate control tower, the approach to the uncontrolled spillway, and designated swimming beaches near Fox Park.
Water Surface No Wake Designation	Approximately 21 acres of water surface have been classified as Designated No Wake area where vessels are not allowed to create a wake when underway.	These parcels include areas surrounding boat ramps, including Taylor Park Boat Ramp, Wilson H. Fox Park Boat Ramp, Willis Creek Boat Ramp, and Friendship Park Boat Ramp.
Water Surface Open Recreation	Approximately 4,289 acres of water surface have been classified as Open Recreation that are available for water-based recreation.	Water surface that has not been classified as Restricted or No Wake are available for water-based recreation. 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.

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

8.3 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. The primary alternative will be for the utility to find a route off USACE property, and when no external feasible alternative exists, can cross within a designated utility corridor. After obtaining public input and examining the location of existing roads and utility lines on project lands, USACE designated a total of 3 utility corridors which are described in Section 6.2 and included in the maps in Appendix A.

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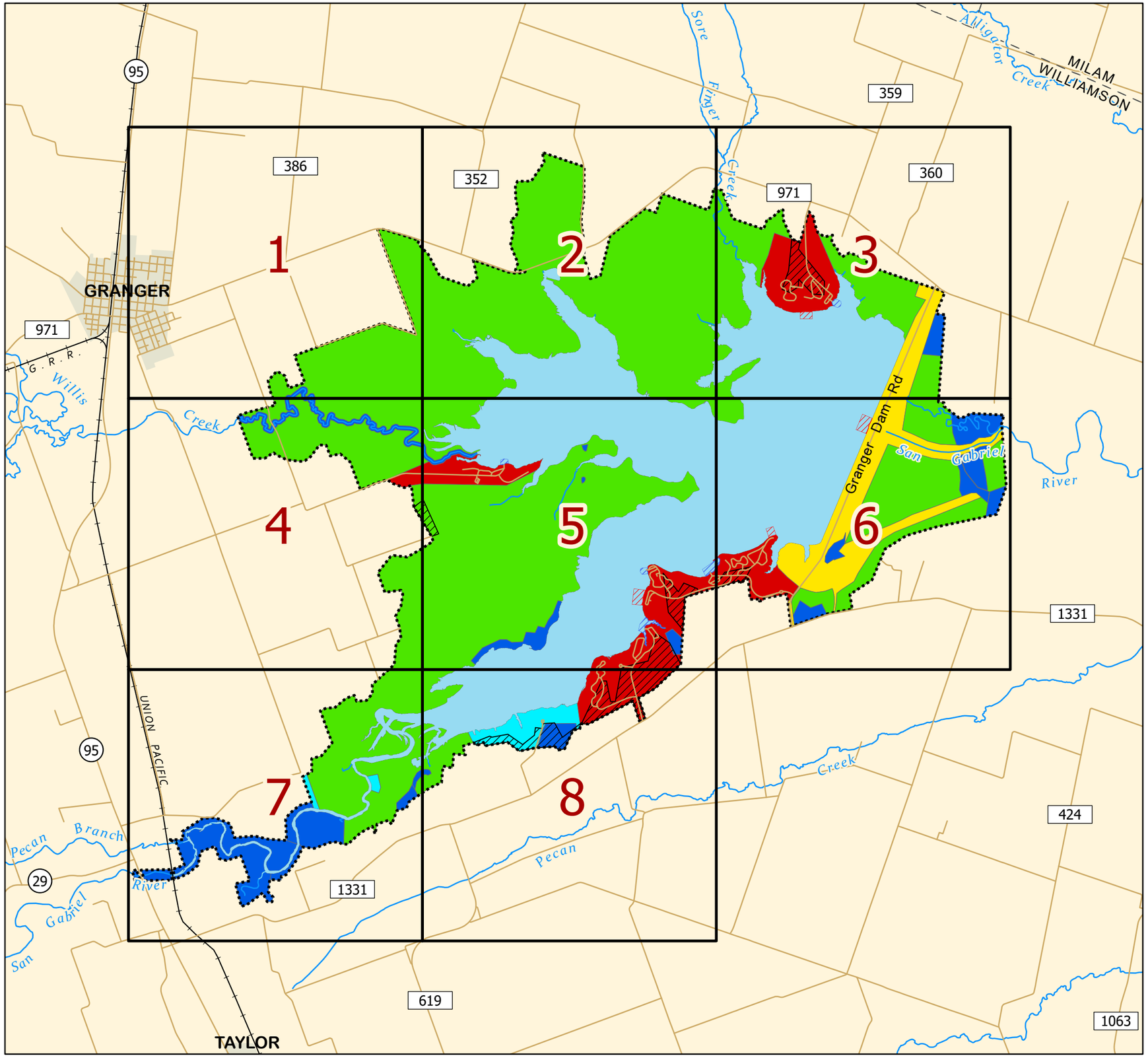
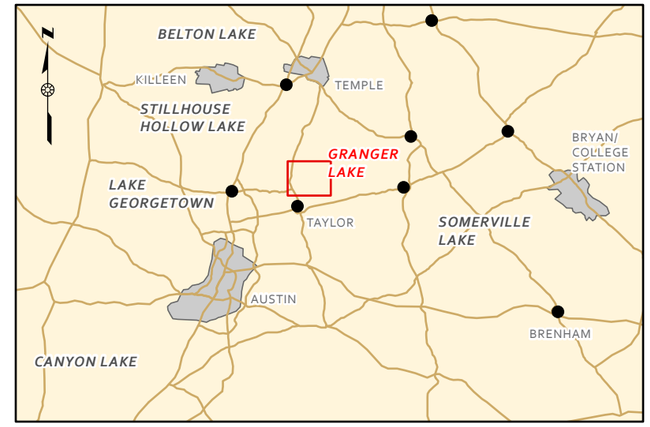
APPENDIX A – LAND CLASSIFICATION, MANAGING AGENCIES, AND RECREATION MAPS





FEE PROPERTY

WATER CLASSIFICATION

- OPEN RECREATION
- DESIGNATED NO-WAKE
- RESTRICTED

LAND ALLOCATION

- SEPARABLE_LANDS

LAND CLASSIFICATION

- PROJECT ORERATIONS
- HIGH DENSITY RECREATION
- LOW DENSITY RECREATION
- WILDLIFE MANAGEMENT AREA
- ENVIRONMENTALLY SENSITIVE AREA

US Army Corps of Engineers
Fort Worth District

GRANGER LAKE — GRANGER, TEXAS

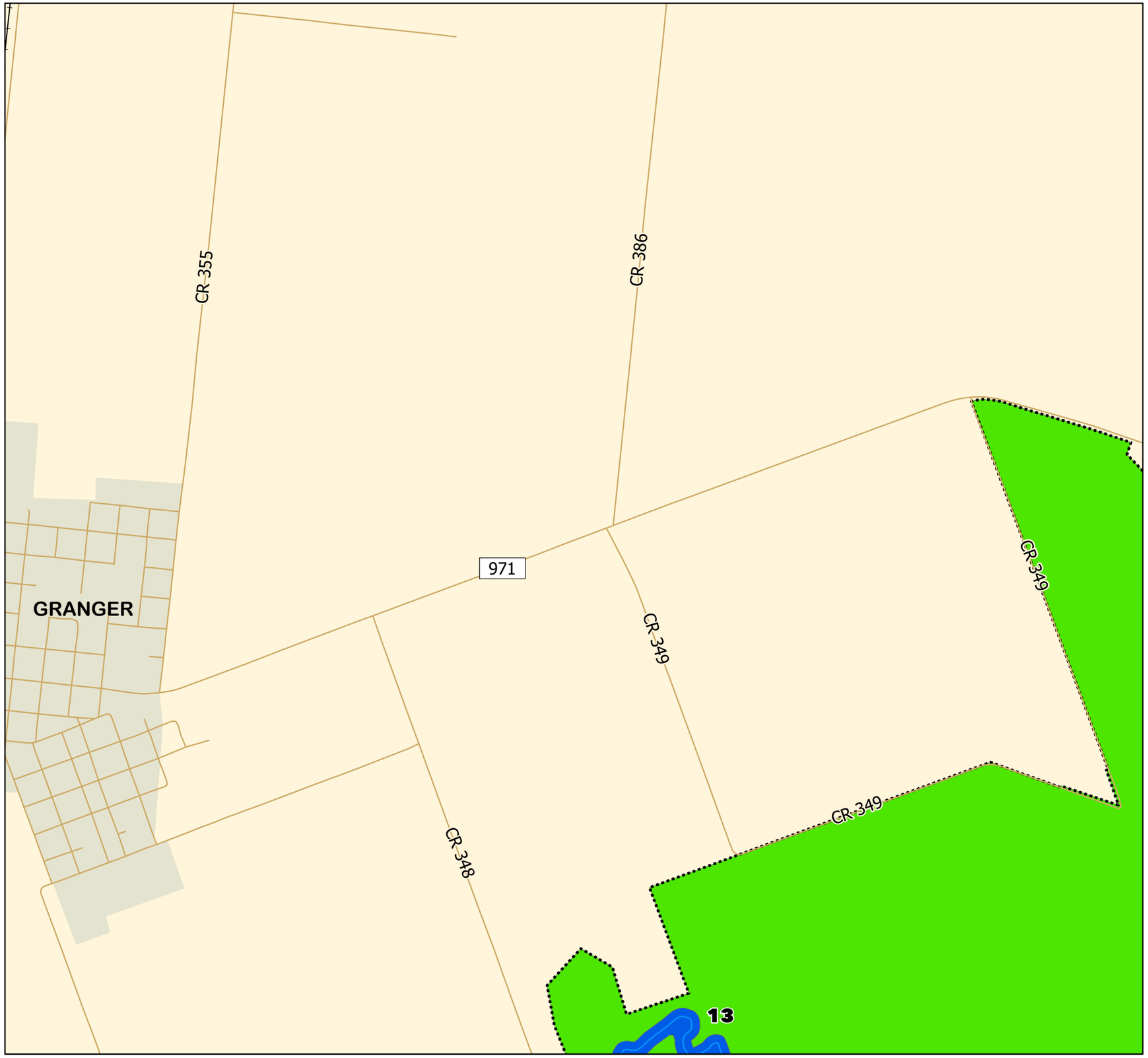
GRANGER LAKE

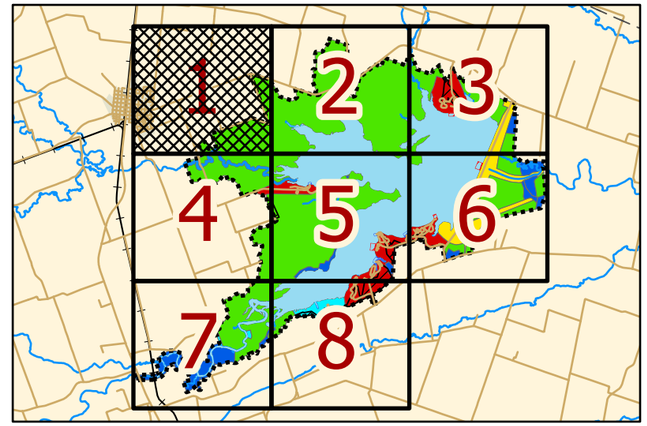
GRANGER LAKE MASTER PLAN

LAND AND WATER CLASSIFICATION INDEX

1 0 1 2
Miles

DATE:	MAP NO.
APRIL 2022	GA22MP-0C-00





- FEE PROPERTY
- BOAT RAMP
- SWIMBEACH
- FISHING POINT
- FLOOD CONTROL STRUCTURE
- WATER INTAKE

LAND ALLOCATION

- SEPARABLE LANDS

LAND CLASSIFICATION

- PROJECT ORERATIONS
- HIGH DENSITY RECREATION
- LOW DENSITY RECREATION
- WILDLIFE MANAGEMENT AREA
- ENVIRONMENTALLY SENSITIVE AREA

WATER CLASSIFICATION

- OPEN RECREATION
- DESIGNATED NO-WAKE
- RESTRICTED
- UTILITY CORRIDOR

US Army Corps of Engineers
Fort Worth District

GRANGER LAKE — GRANGER, TEXAS

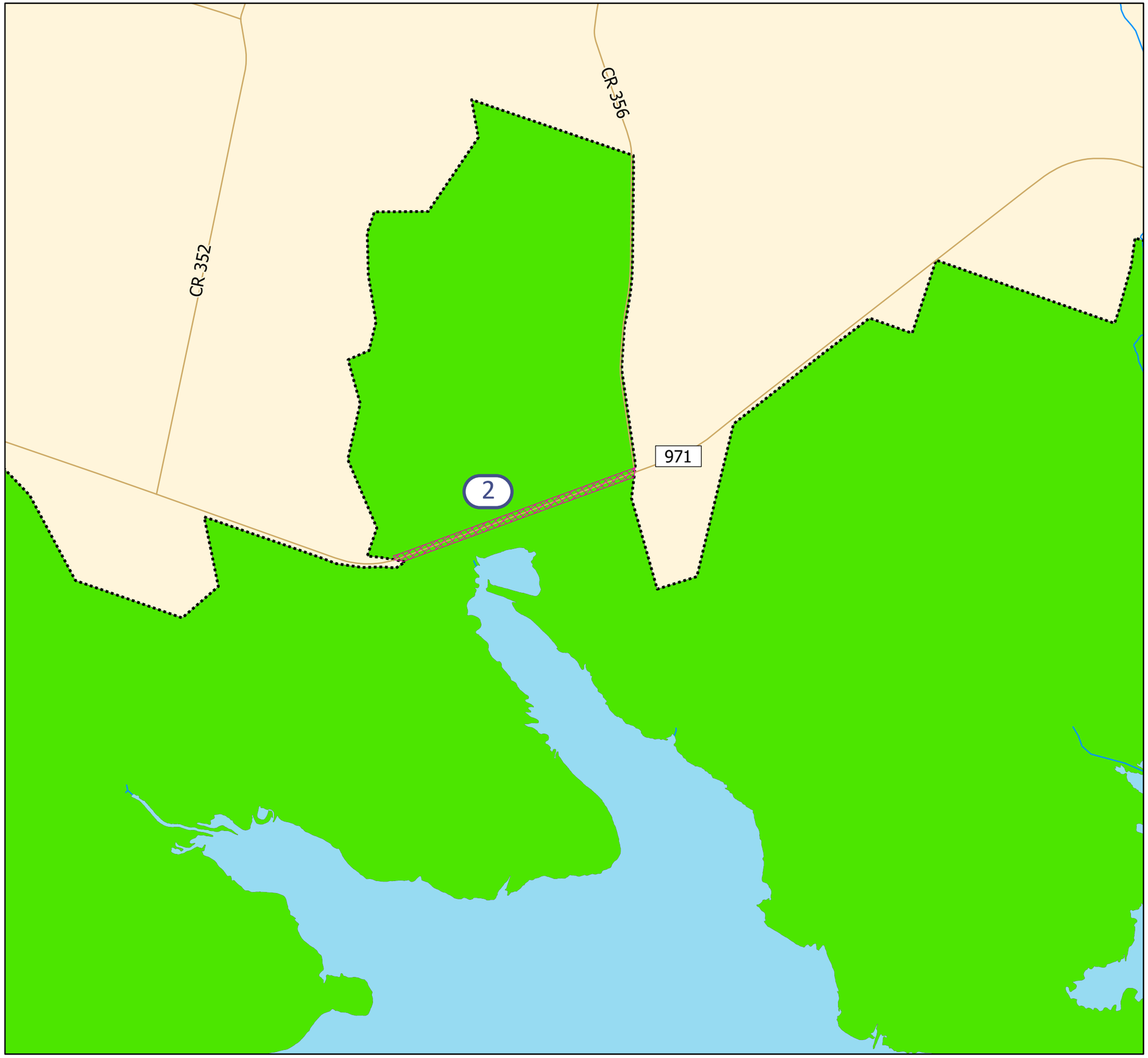
GRANGER LAKE

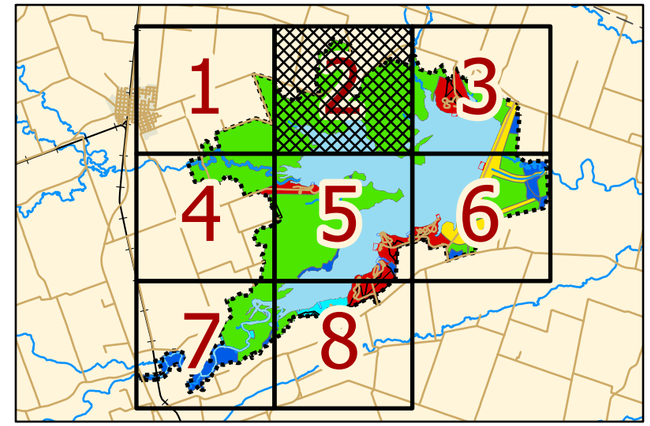
GRANGER LAKE MASTER PLAN

LAND AND WATER CLASSIFICATION (SHEET 1)

0.25 0 0.25 0.5
Miles

DATE:	MAP NO.
APRIL 2022	GA22MP-0C-01





- FEE PROPERTY
- BOAT RAMP
- SWIMBEACH
- FISHING POINT
- FLOOD CONTROL STRUCTURE
- WATER INTAKE

LAND ALLOCATION

- SEPARABLE LANDS

LAND CLASSIFICATION

- PROJECT ORERATIONS
- HIGH DENSITY RECREATION
- LOW DENSITY RECREATION
- WILDLIFE MANAGEMENT AREA
- ENVIRONMENTALLY SENSITIVE AREA

WATER CLASSIFICATION

- OPEN RECREATION
- DESIGNATED NO-WAKE
- RESTRICTED
- UTILITY CORRIDOR

US Army Corps of Engineers
Fort Worth District

GRANGER LAKE — GRANGER, TEXAS

GRANGER LAKE

GRANGER LAKE MASTER PLAN

LAND AND WATER CLASSIFICATION (SHEET 2)

0.25 0 0.25 0.5
Miles

DATE:	MAP NO.
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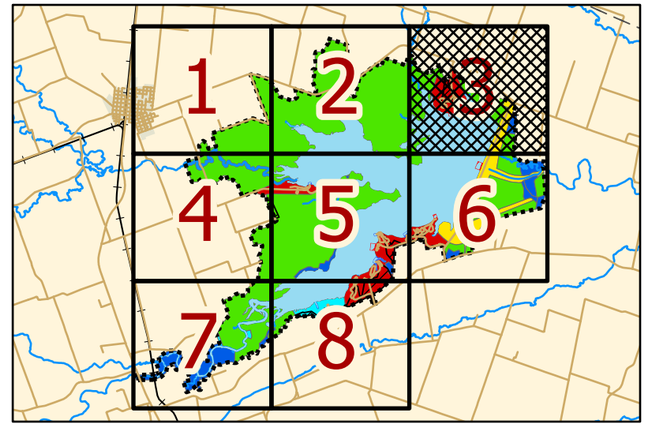

- FEE PROPERTY
- BOAT RAMP
- SWIMBEACH
- FISHING POINT
- FLOOD CONTROL STRUCTURE
- WATER INTAKE

LAND ALLOCATION

- SEPARABLE LANDS

LAND CLASSIFICATION

- PROJECT OPERATIONS
- HIGH DENSITY RECREATION
- LOW DENSITY RECREATION
- WILDLIFE MANAGEMENT AREA
- ENVIRONMENTALLY SENSITIVE AREA

WATER CLASSIFICATION

- OPEN RECREATION
- DESIGNATED NO-WAKE
- RESTRICTED
- UTILITY CORRIDOR

Sore Finger Creek

CR 359

CR 360

971

FRIENDSHIP PARK

1

GRANGER DAM RD

CR 393

US Army Corps of Engineers
Fort Worth District

GRANGER LAKE — GRANGER, TEXAS

GRANGER LAKE

GRANGER LAKE MASTER PLAN

LAND AND WATER CLASSIFICATION (SHEET 3)

0.25 0 0.25 0.5
Miles

DATE:	MAP NO.
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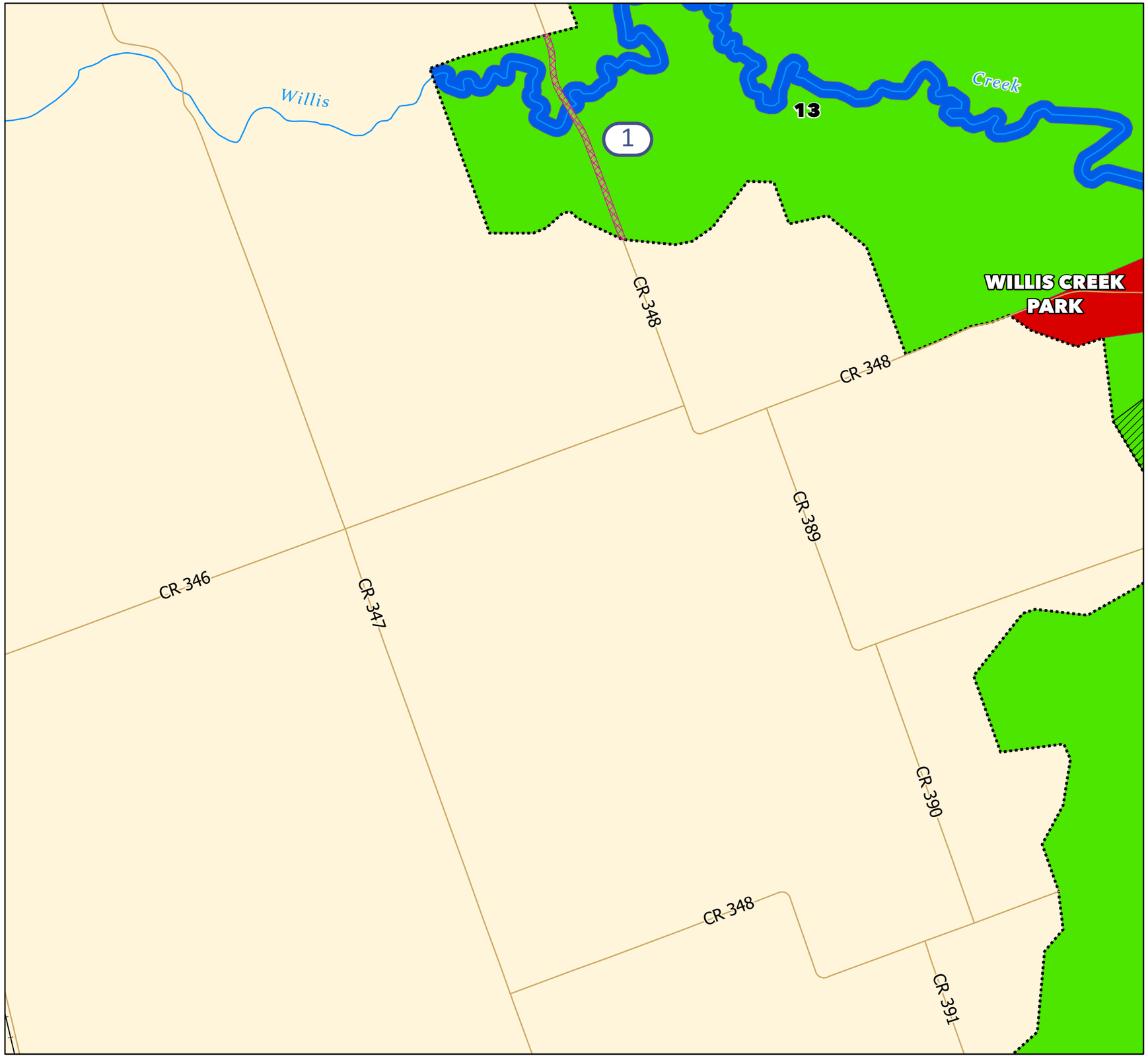

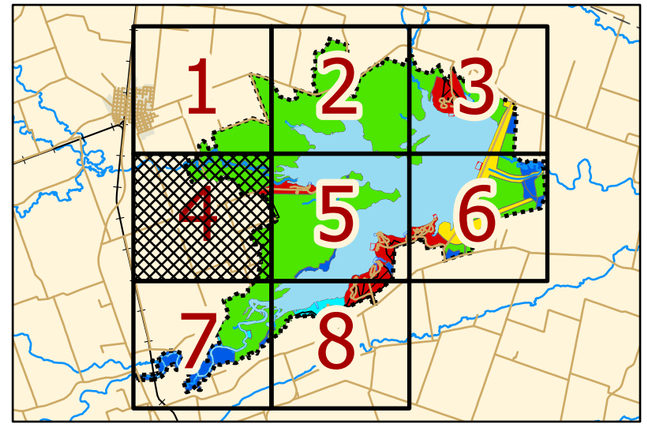

- FEE PROPERTY
- BOAT RAMP
- SWIMBEACH
- FISHING POINT
- FLOOD CONTROL STRUCTURE
- WATER INTAKE
- UTILITY CORRIDOR

LAND ALLOCATION

- SEPARABLE LANDS

LAND CLASSIFICATION

- PROJECT OPERATIONS
- HIGH DENSITY RECREATION
- LOW DENSITY RECREATION
- WILDLIFE MANAGEMENT AREA
- ENVIRONMENTALLY SENSITIVE AREA

WATER CLASSIFICATION

- OPEN RECREATION
- DESIGNATED NO-WAKE
- RESTRICTED

US Army Corps of Engineers
Fort Worth District

GRANGER LAKE — GRANGER, TEXAS

GRANGER LAKE

GRANGER LAKE MASTER PLAN

LAND AND WATER CLASSIFICATION (SHEET 4)

0.25 0 0.25 0.5
Miles

DATE:	MAP NO.
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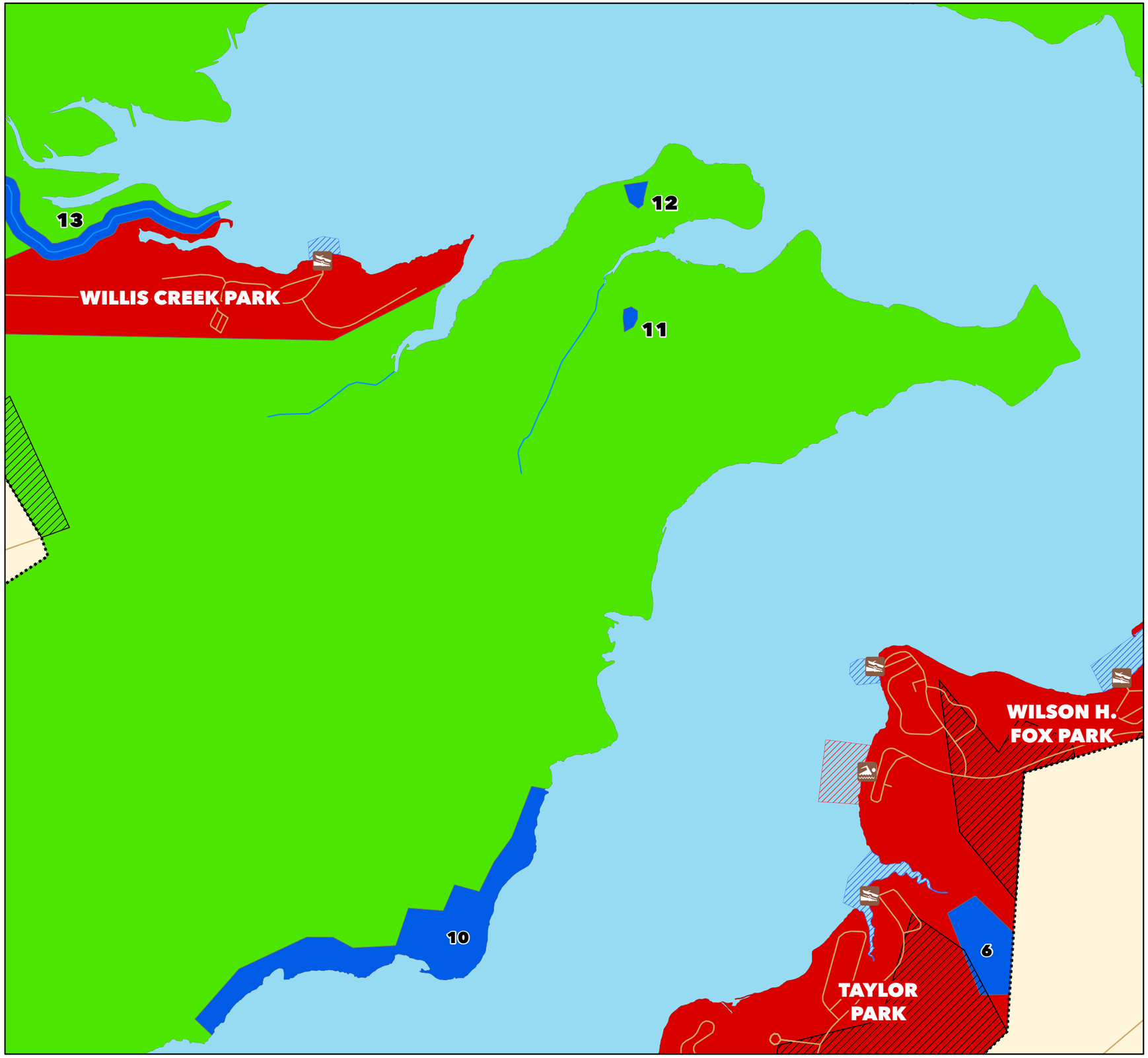
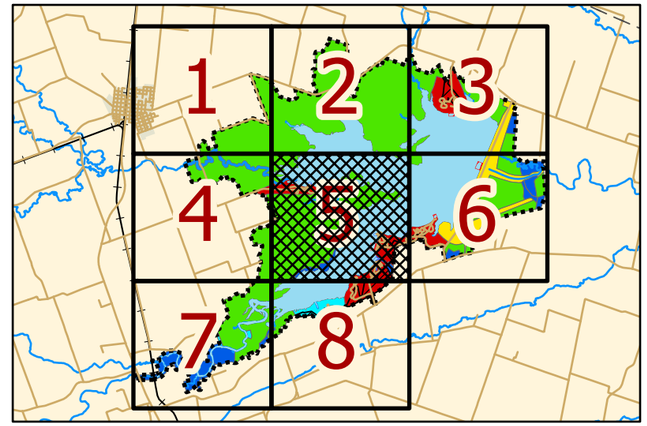




- FEE PROPERTY
- BOAT RAMP
- SWIMBEACH
- FISHING POINT
- FLOOD CONTROL STRUCTURE
- WATER INTAKE

LAND ALLOCATION

- SEPARABLE LANDS

LAND CLASSIFICATION

- PROJECT ORERATIONS
- HIGH DENSITY RECREATION
- LOW DENSITY RECREATION
- WILDLIFE MANAGEMENT AREA
- ENVIRONMENTALLY SENSITIVE AREA

WATER CLASSIFICATION

- OPEN RECREATION
- DESIGNATED NO-WAKE
- RESTRICTED
- UTILITY CORRIDOR

US Army Corps of Engineers
Fort Worth District

GRANGER LAKE — GRANGER, TEXAS

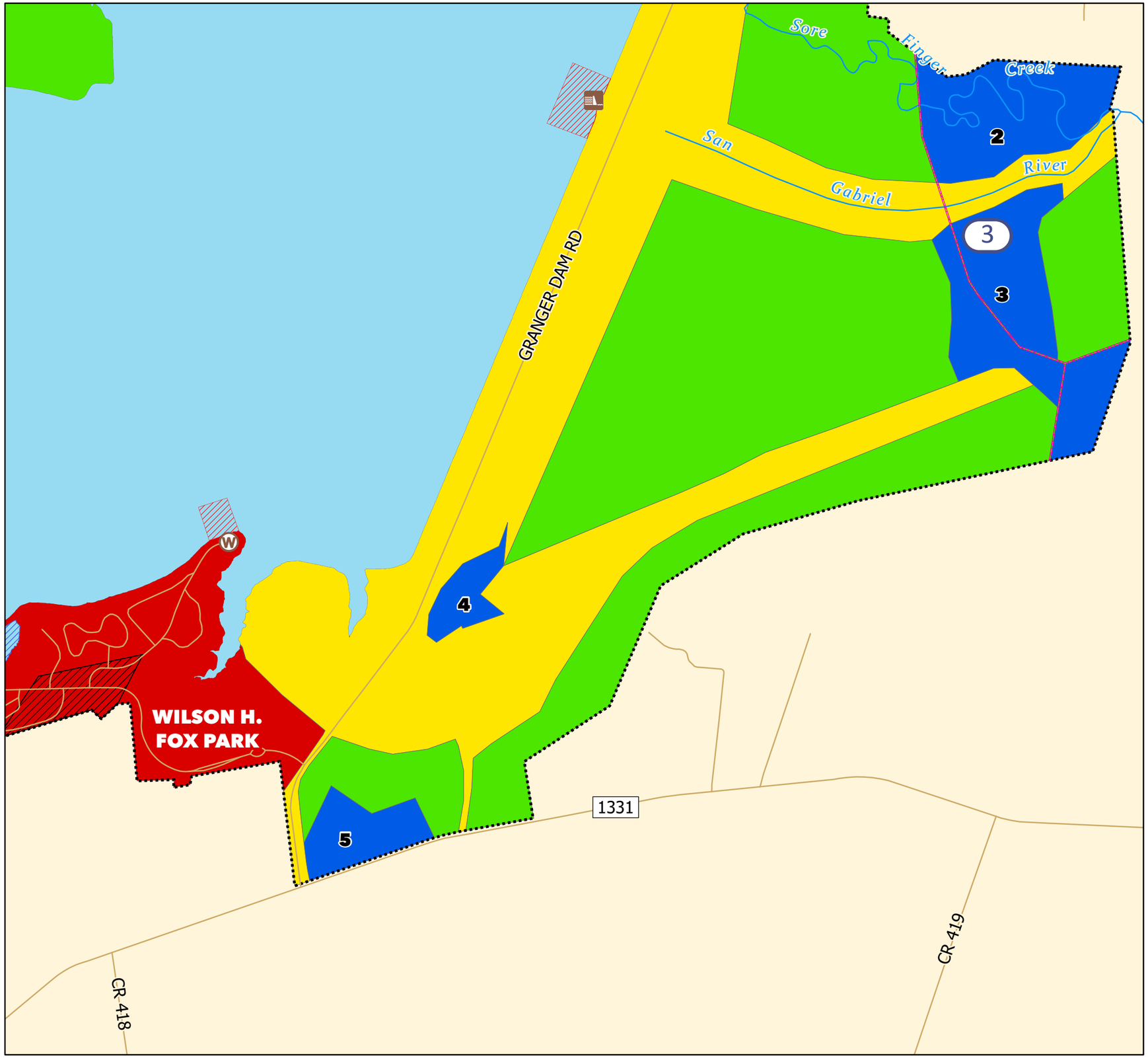
GRANGER LAKE

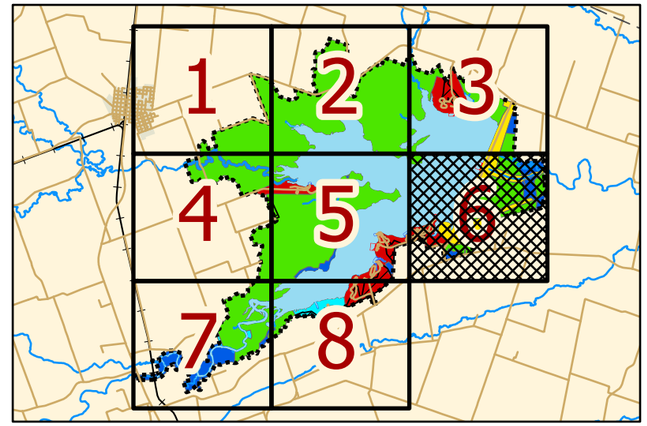
GRANGER LAKE MASTER PLAN

LAND AND WATER CLASSIFICATION (SHEET 5)

0.25 0 0.25 0.5
Miles

DATE:	MAP NO.
APRIL 2022	GA22MP-0C-05





- FEE PROPERTY
- BOAT RAMP
- SWIMBEACH
- FISHING POINT
- FLOOD CONTROL STRUCTURE
- WATER INTAKE
- UTILITY CORRIDOR

LAND ALLOCATION

- SEPARABLE LANDS

LAND CLASSIFICATION

- PROJECT OPERATIONS
- HIGH DENSITY RECREATION
- LOW DENSITY RECREATION
- WILDLIFE MANAGEMENT AREA
- ENVIRONMENTALLY SENSITIVE AREA

WATER CLASSIFICATION

- OPEN RECREATION
- DESIGNATED NO-WAKE
- RESTRICTED

US Army Corps of Engineers
Fort Worth District

GRANGER LAKE — GRANGER, TEXAS

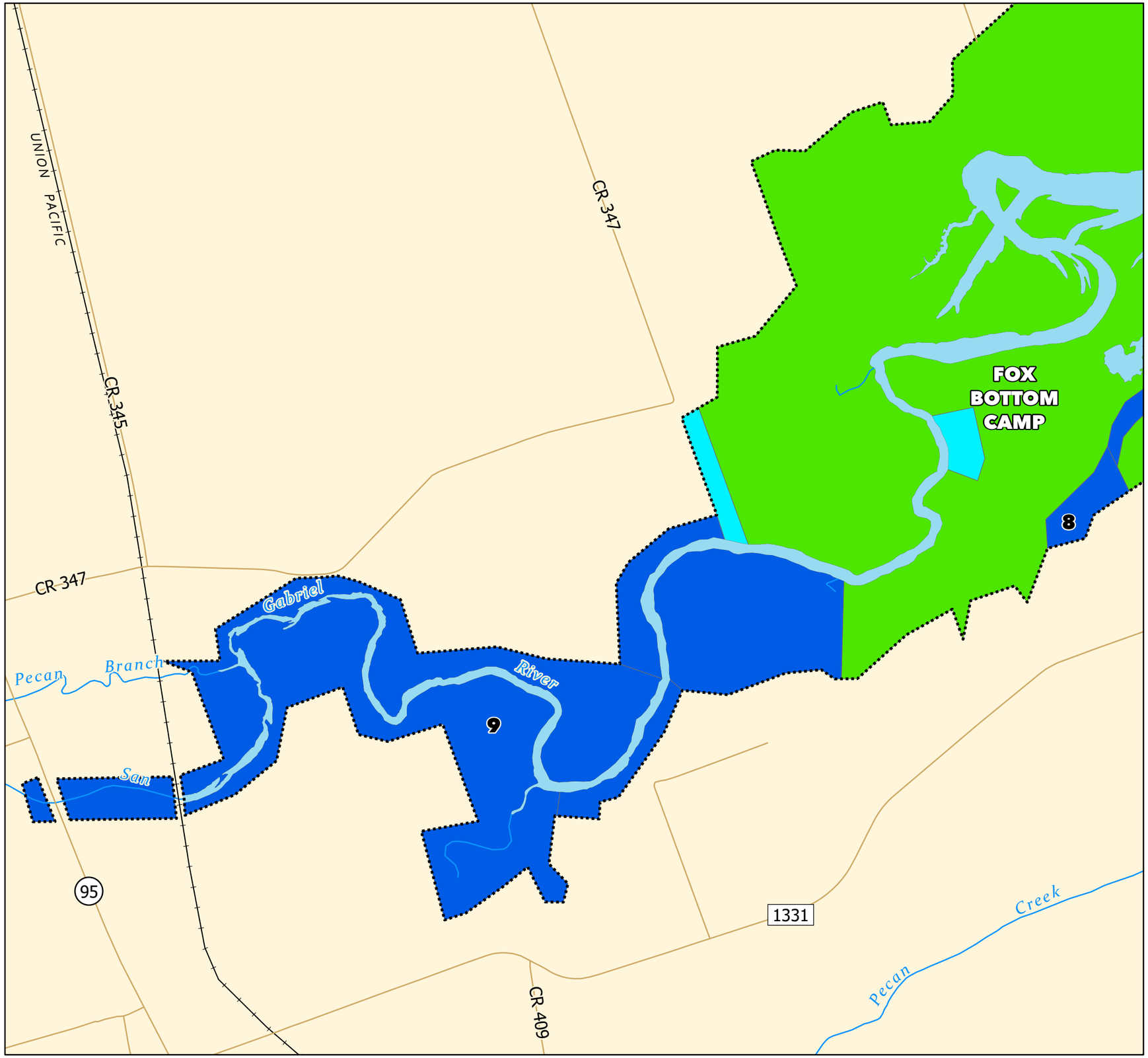
GRANGER LAKE

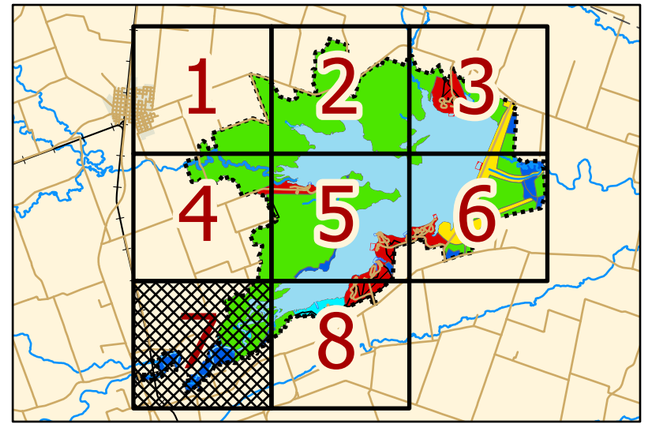
GRANGER LAKE MASTER PLAN

LAND AND WATER CLASSIFICATION (SHEET 6)

0.25 0 0.25 0.5
Miles

DATE:	MAP NO.
APRIL 2022	GA22MP-0C-06





- FEE PROPERTY
- BOAT RAMP
- SWIMBEACH
- FISHING POINT
- FLOOD CONTROL STRUCTURE
- WATER INTAKE

LAND ALLOCATION

- SEPARABLE LANDS

LAND CLASSIFICATION

- PROJECT OPERATIONS
- HIGH DENSITY RECREATION
- LOW DENSITY RECREATION
- WILDLIFE MANAGEMENT AREA
- ENVIRONMENTALLY SENSITIVE AREA

WATER CLASSIFICATION

- OPEN RECREATION
- DESIGNATED NO-WAKE
- RESTRICTED
- UTILITY CORRIDOR

US Army Corps of Engineers
Fort Worth District

GRANGER LAKE — GRANGER, TEXAS

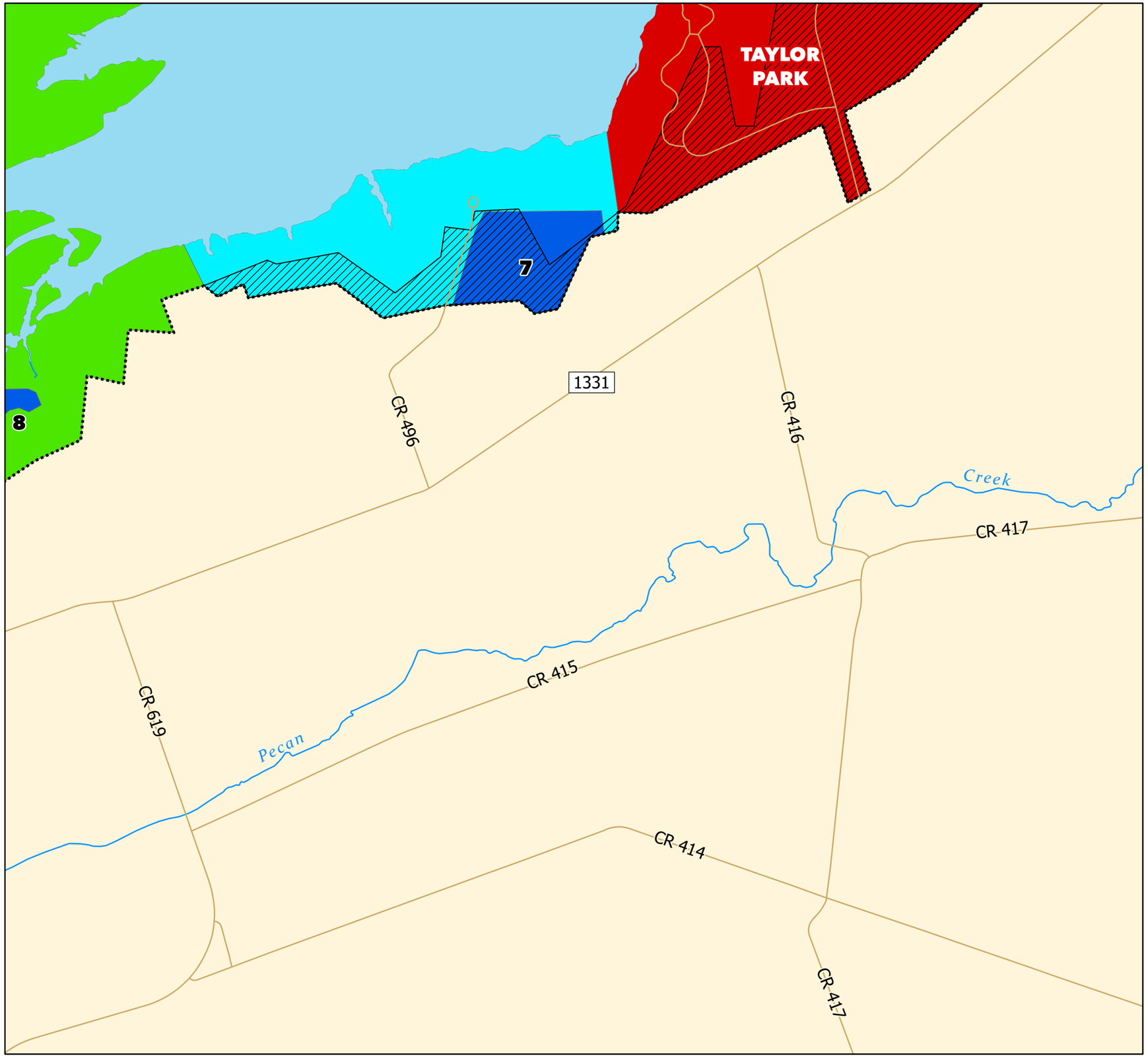
GRANGER LAKE

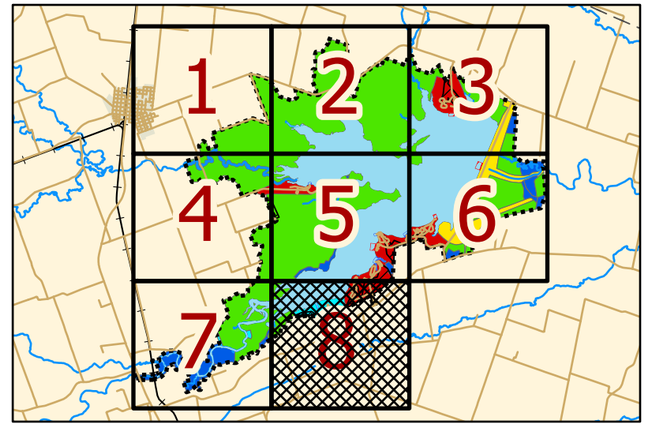
GRANGER LAKE MASTER PLAN

LAND AND WATER CLASSIFICATION (SHEET 7)

0.25 0 0.25 0.5
Miles

DATE:	MAP NO.
APRIL 2022	GA22MP-0C-07





- FEE PROPERTY
- BOAT RAMP
- SWIMBEACH
- FISHING POINT
- FLOOD CONTROL STRUCTURE
- WATER INTAKE

LAND ALLOCATION

- SEPARABLE LANDS

LAND CLASSIFICATION

- PROJECT OPERATIONS
- HIGH DENSITY RECREATION
- LOW DENSITY RECREATION
- WILDLIFE MANAGEMENT AREA
- ENVIRONMENTALLY SENSITIVE AREA

WATER CLASSIFICATION

- OPEN RECREATION
- DESIGNATED NO-WAKE
- RESTRICTED
- UTILITY CORRIDOR

US Army Corps of Engineers
Fort Worth District

GRANGER LAKE — GRANGER, TEXAS

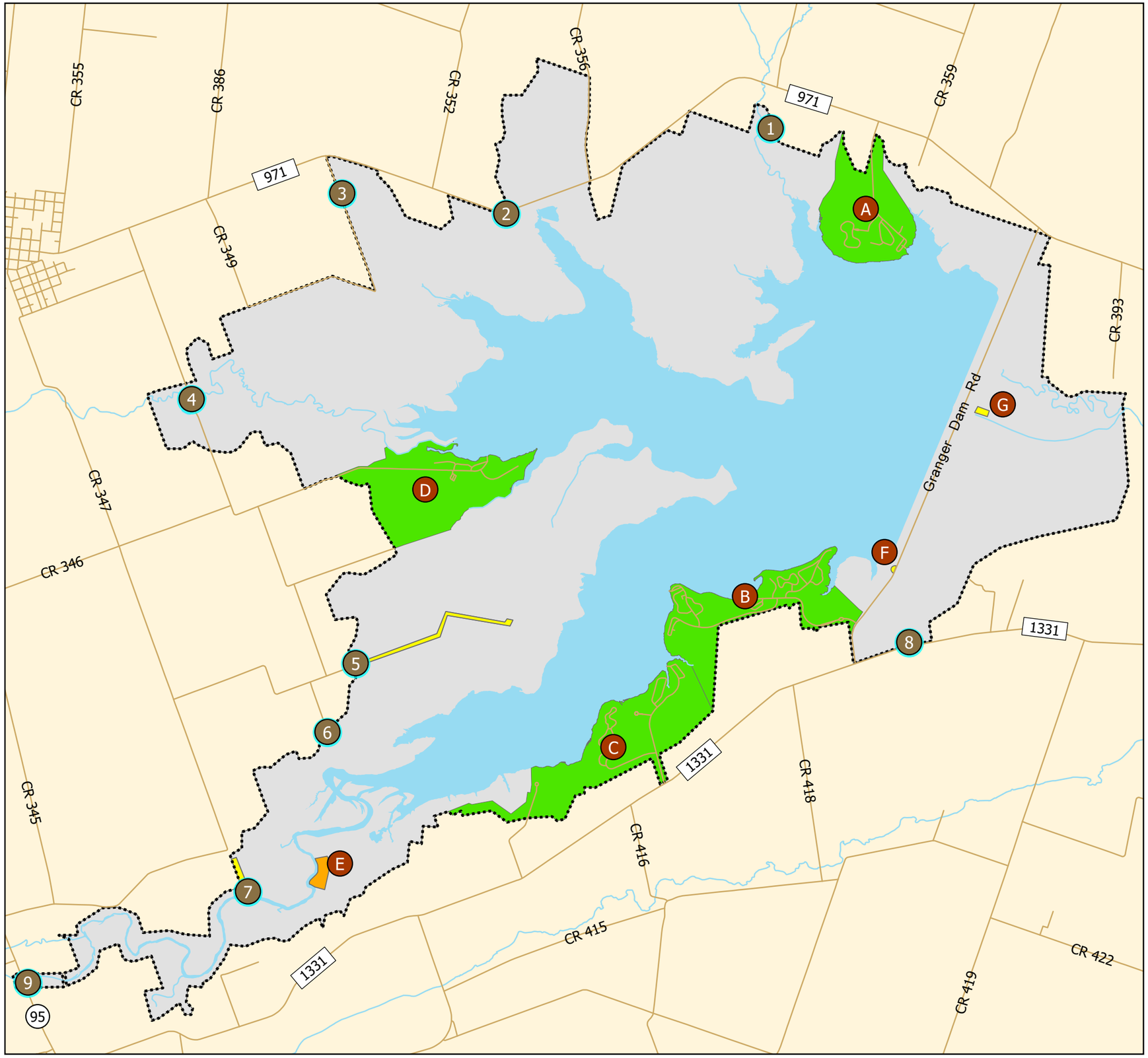
GRANGER LAKE

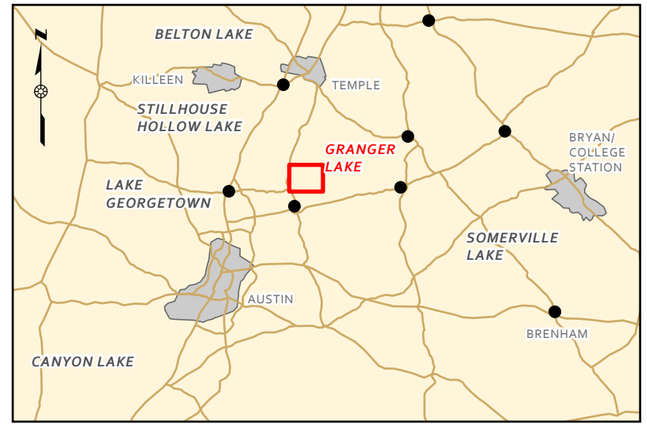
GRANGER LAKE MASTER PLAN

LAND AND WATER CLASSIFICATION (SHEET 8)

0.25 0 0.25 0.5
Miles

DATE:	MAP NO.
APRIL 2022	GA22MP-0C-08





RECREATIONAL AREAS

- DEVELOPED
- UNDEVELOPED
- ACCESS POINT

- A FRIENDSHIP PARK
- B WILSON H. FOX PARK
- C TAYLOR PARK
- D WILLIS CREEK PARK
- E FOX BOTTOM CAMP
- F OVERLOOK
- G STILLING BASIN
- # WILDLIFE AREA ACCESS POINT

US Army Corps of Engineers
Fort Worth District

GRANGER LAKE — GRANGER, TEXAS

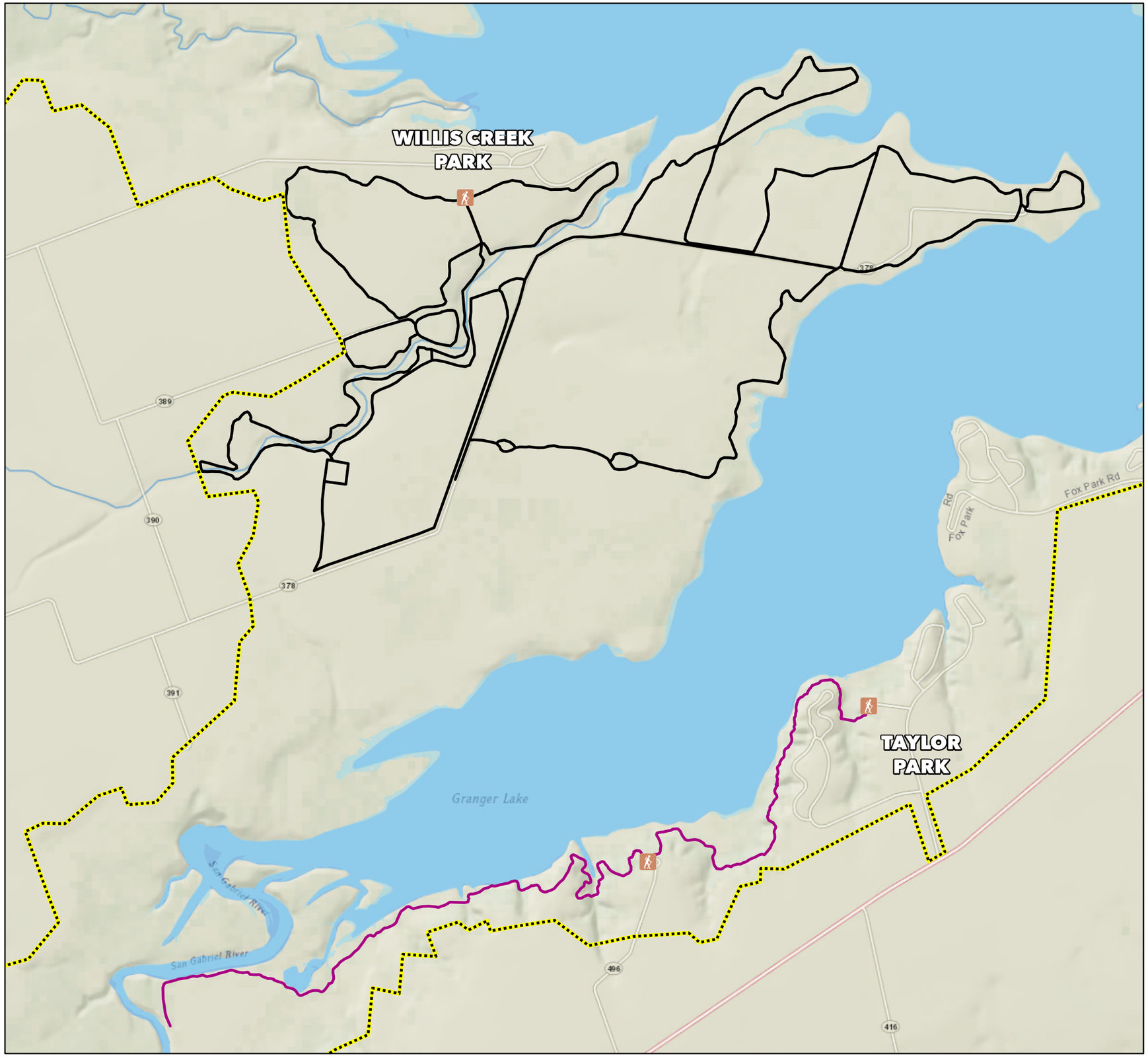
GRANGER LAKE

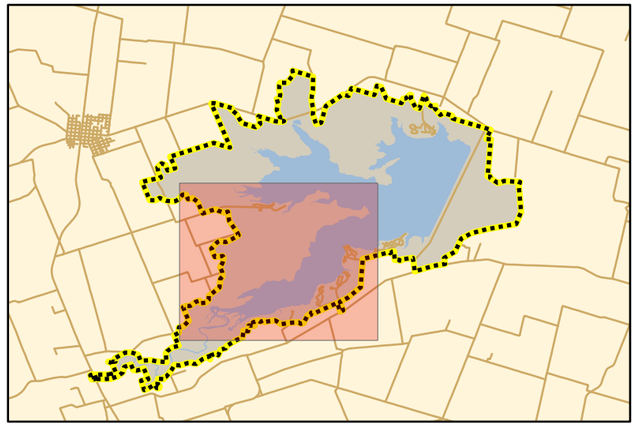
GRANGER LAKE MASTER PLAN

RECREATIONAL DEVELOPMENT MAP

1 0 1 2
Miles

DATE:	MAP NO.
APRIL 2022	GA22MP-0R-0A





WILLIS CREEK EQUESTRIAN AREA

COMANCHE BLUFF TRAIL

TRAILHEAD

traverse_line

WATER SURFACE AREA

US Army Corps of Engineers
Fort Worth District

GRANGER LAKE — GRANGER, TEXAS

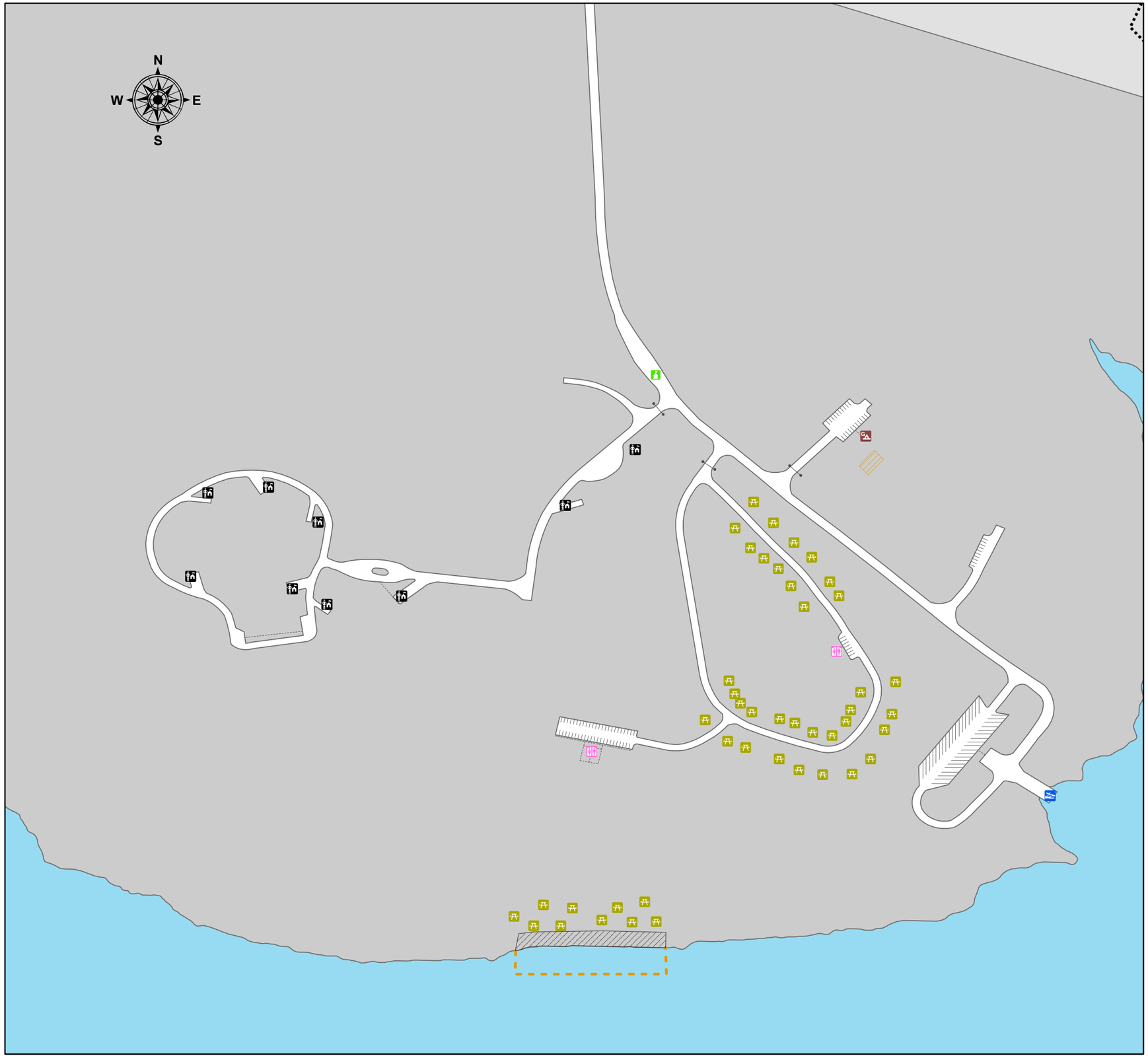
GRANGER LAKE

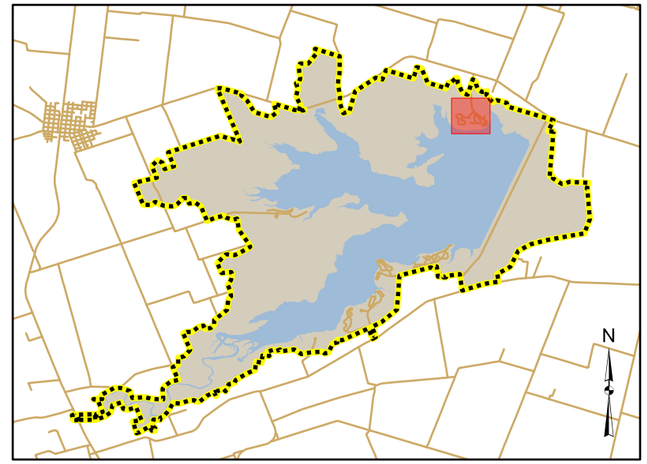
GRANGER LAKE MASTER PLAN

TRAILS MAP

0 — 0.5 — 1
Miles

DATE:	MAP NO.
APRIL 2022	GA22MP-0R-0B





- FEE PROPERTY
- WATER SURFACE AREA
- PAVED ROAD
- SIDEWALK
- PICNIC SITE
- GROUP SITE
- PARK HOST
- BOAT RAMP
- RESTROOM
- GATEHOUSE
- SWIMBEACH
- SWIMMING AREA
- GATE
- VOLLEYBALL COURT
- PRIMITIVE CAMPING ONLY

US Army Corps of Engineers
Fort Worth District

GRANGER LAKE — GRANGER, TEXAS

GRANGER LAKE

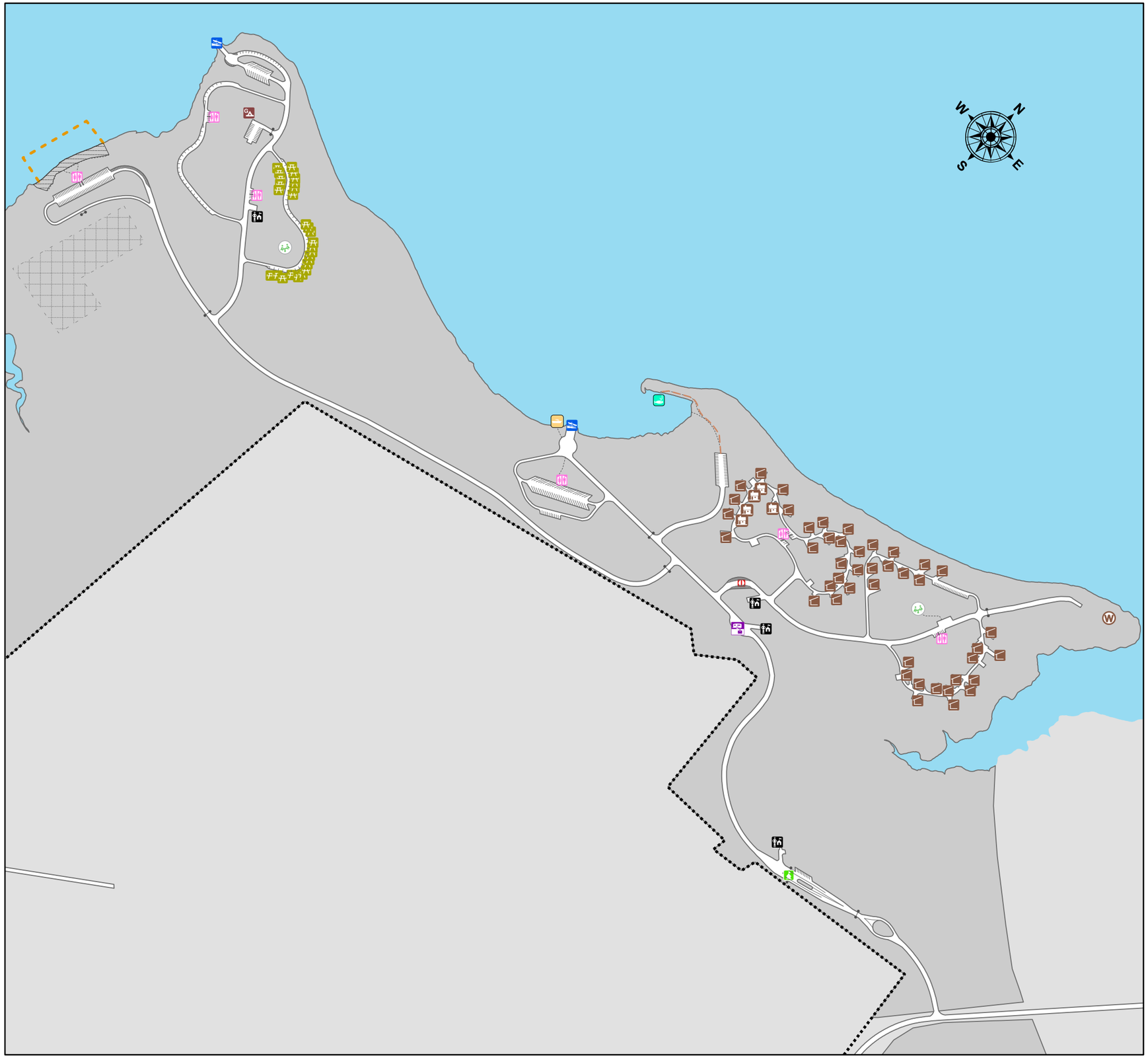
GRANGER LAKE MASTER PLAN

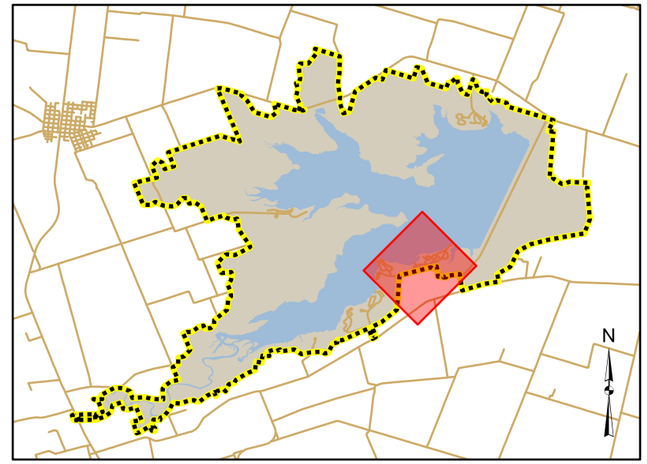
FRIENDSHIP PARK PLATE

Feet

250 0 250 500

DATE:	MAP NO.
APRIL 2022	GA22MP-0R-01





- FEE PROPERTY
- WATER SURFACE AREA
- PAVED ROAD
- SIDEWALK
- CAMPSITE
- SCREENED SHELTER
- PICNIC SITE
- GROUP SITE
- PARK HOST
- BOAT RAMP
- COURTESY DOCK
- FISHING DOCK
- RESTROOM
- DUMPSTATION
- GATEHOUSE
- SWIMBEACH
- SWIMMING AREA
- PLAYGROUND
- GATE
- AUTOMATIC GATE
- EVAPORATION POND
- WATER INTAKE
- PRIMITIVE CAMPING ONLY

US Army Corps of Engineers
Fort Worth District

GRANGER LAKE — GRANGER, TEXAS

GRANGER LAKE

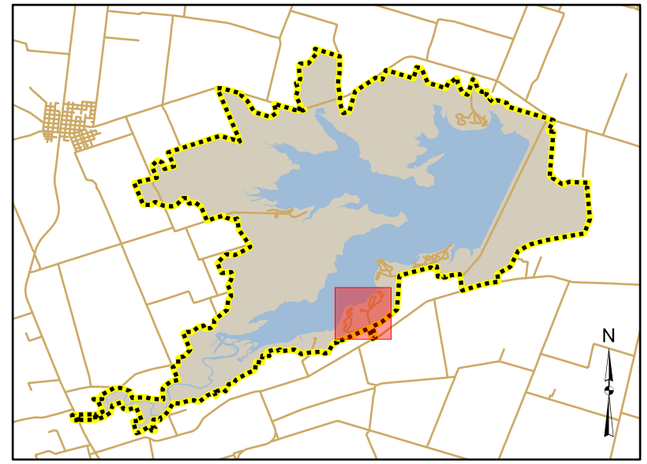
GRANGER LAKE MASTER PLAN

WILSON H. FOX PARK PLATE

Feet

500 0 500 1,000

DATE:	MAP NO.
APRIL 2022	GA22MP-0R-05



- FEE PROPERTY
- WATER SURFACE AREA
- PAVED ROAD
- SIDEWALK
- CAMPSITE
- PICNIC SITE
- PARK HOST
- BOAT RAMP
- COURTESY DOCK
- RESTROOM
- DUMPSTATION
- GATEHOUSE
- PLAYGROUND
- GATE
- TRAILHEAD
- TRAIL

US Army Corps of Engineers
Fort Worth District

GRANGER LAKE — GRANGER, TEXAS

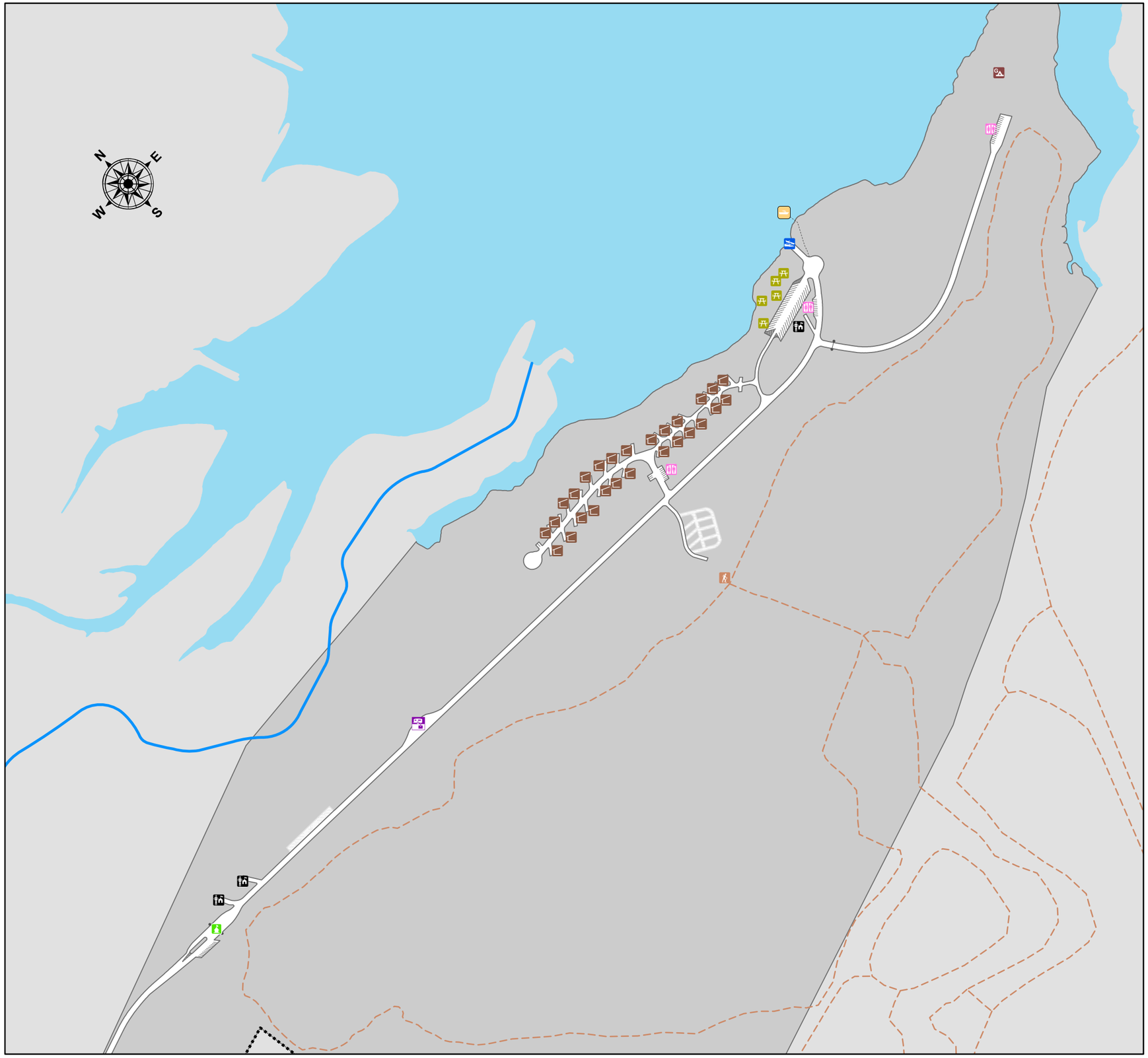
GRANGER LAKE

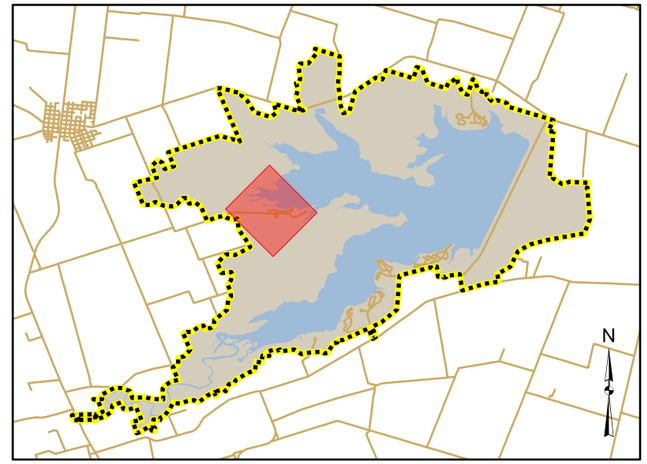
GRANGER LAKE MASTER PLAN

TAYLOR PARK PLATE

Feet
250 0 250 500

DATE:	MAP NO.
APRIL 2022	GA22MP-0R-03





- FEE PROPERTY
- WATER SURFACE AREA
- PAVED ROAD
- UNPAVED ROAD
- SIDEWALK
- CAMPSITE
- SCREENED SHELTER
- PICNIC SITE
- GROUP SITE
- PARK HOST
- BOAT RAMP
- COURTESY DOCK
- RESTROOM
- DUMPSTATION
- GATEHOUSE
- GATE
- TRAILHEAD
- TRAIL
- PRIMITIVE CAMPING ONLY

US Army Corps of Engineers
Fort Worth District

GRANGER LAKE — GRANGER, TEXAS

GRANGER LAKE

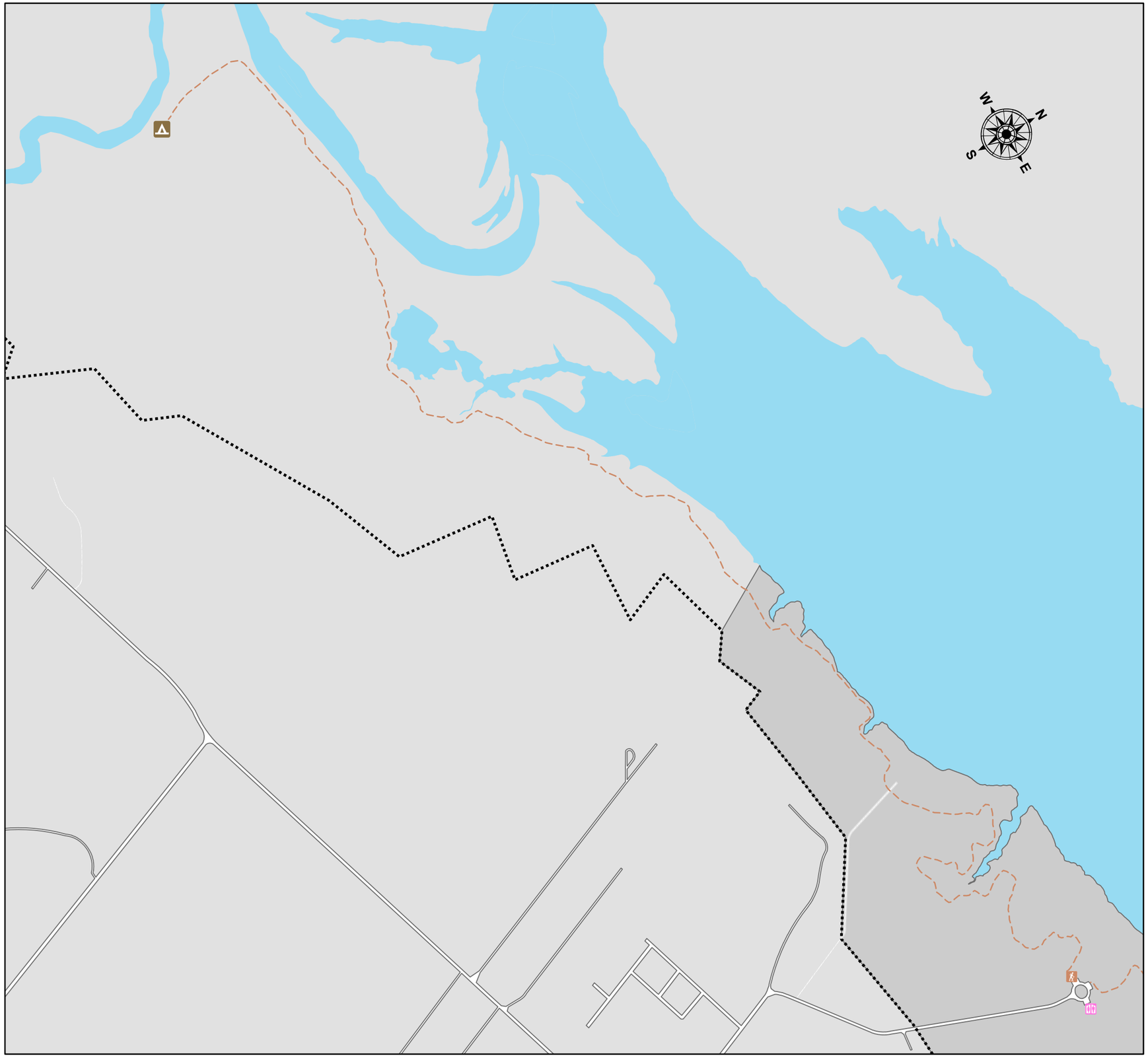
GRANGER LAKE MASTER PLAN

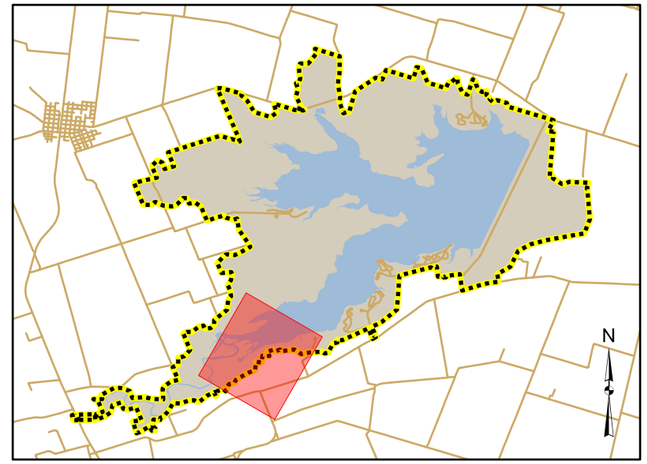
WILLIS CREEK PARK PLATE

Feet

500 0 500 1,000

DATE:	MAP NO.
APRIL 2022	GA22MP-0R-04





FEE PROPERTY
WATER SURFACE AREA
PAVED ROAD
PRIMITIVE CAMPING ONLY
RESTROOM
TRAILHEAD
TRAIL

US Army Corps of Engineers
Fort Worth District

GRANGER LAKE — GRANGER, TEXAS

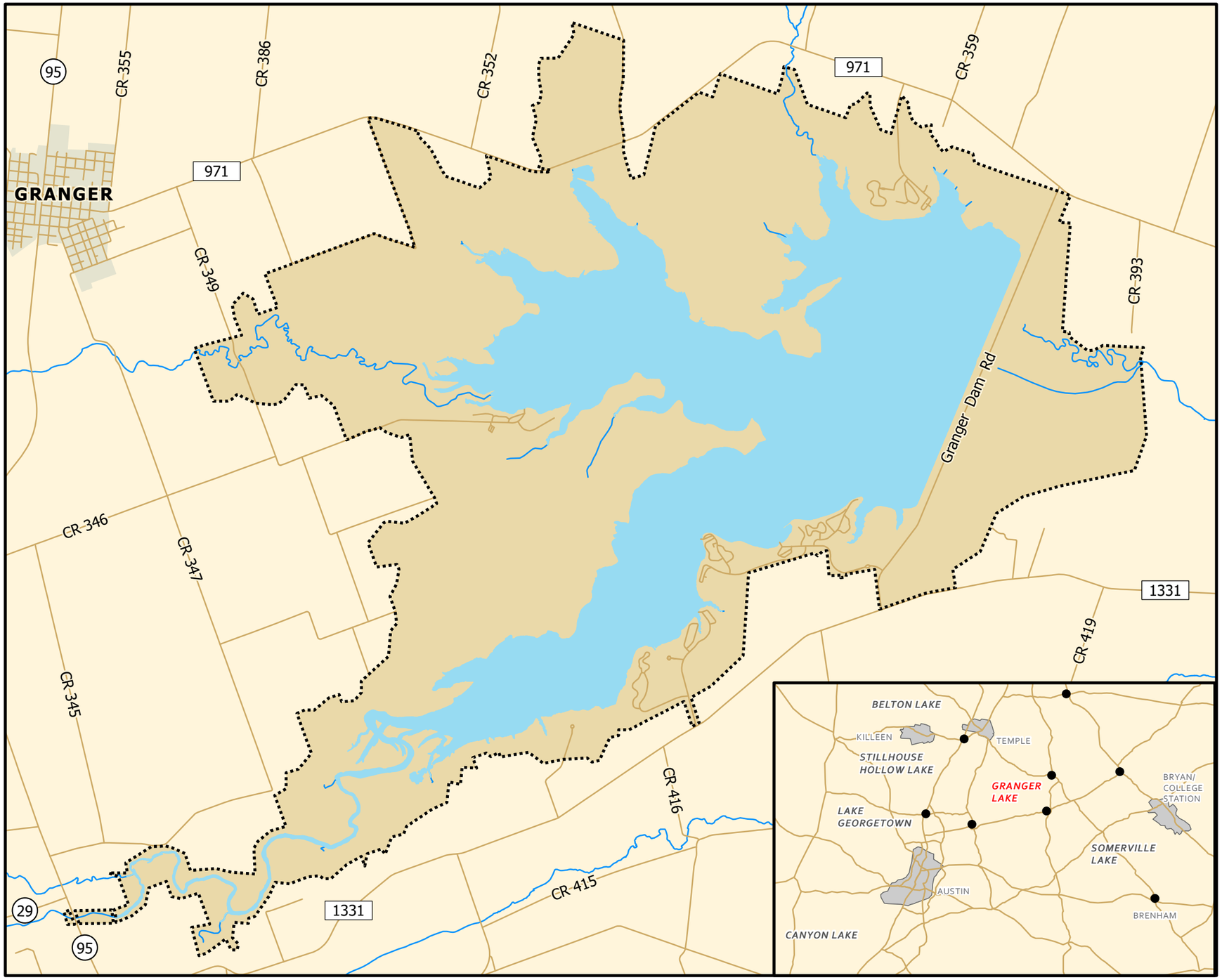
GRANGER LAKE

GRANGER LAKE MASTER PLAN

FOX BOTTOM CAMP PLATE

Feet
500 0 500 1,000

DATE:	MAP NO.
APRIL 2022	GA22MP-0R-05



INDEX TO MASTER PLAN MAPS

GENERAL

MAP NO.	TITLE
GA22MP-01-00	PROJECT LOCATION & INDEX
GA22MP-01-01	AGENCY LAND MANAGEMENT
GA22MP-01-02	UTILITY CORRIDOR

LAND CLASSIFICATION

MAP NO.	TITLE
GA22MP-0C-00	LAND AND WATER CLASSIFICATION (INDEX)
GA22MP-0C-01	LAND AND WATER CLASSIFICATION (SHEET 1)
GA22MP-0C-02	LAND AND WATER CLASSIFICATION (SHEET 2)
GA22MP-0C-03	LAND AND WATER CLASSIFICATION (SHEET 3)
GA22MP-0C-04	LAND AND WATER CLASSIFICATION (SHEET 4)
GA22MP-0C-05	LAND AND WATER CLASSIFICATION (SHEET 5)
GA22MP-0C-06	LAND AND WATER CLASSIFICATION (SHEET 6)
GA22MP-0C-07	LAND AND WATER CLASSIFICATION (SHEET 7)
GA22MP-0C-08	LAND AND WATER CLASSIFICATION (SHEET 8)

RECREATIONAL AREAS

MAP NO.	TITLE
GA22MP-0R-0A	RECREATIONAL DEVELOPMENT MAP
GA22MP-0R-0B	TRAILS MAP
GA22MP-0R-01	FRIENDSHIP PARK PLATE
GA22MP-0R-02	WILSON H. FOX PARK PLATE
GA22MP-0R-03	TAYLOR PARK PLATE
GA22MP-0R-04	WILLIS CREEK PARK PLATE
GA22MP-0R-05	FOX BOTTOM CAMP PLATE

LEGEND

- FEE PROPERTY LINE
- FEE PROPERTY AREA
- WATER SURFACE AREA
- TRIBUTARIES

N

US Army Corps of Engineers
Fort Worth District

GRANGER LAKE — GRANGER, TEXAS

GRANGER LAKE

GRANGER LAKE MASTER PLAN

PROJECT LOCATION AND INDEX

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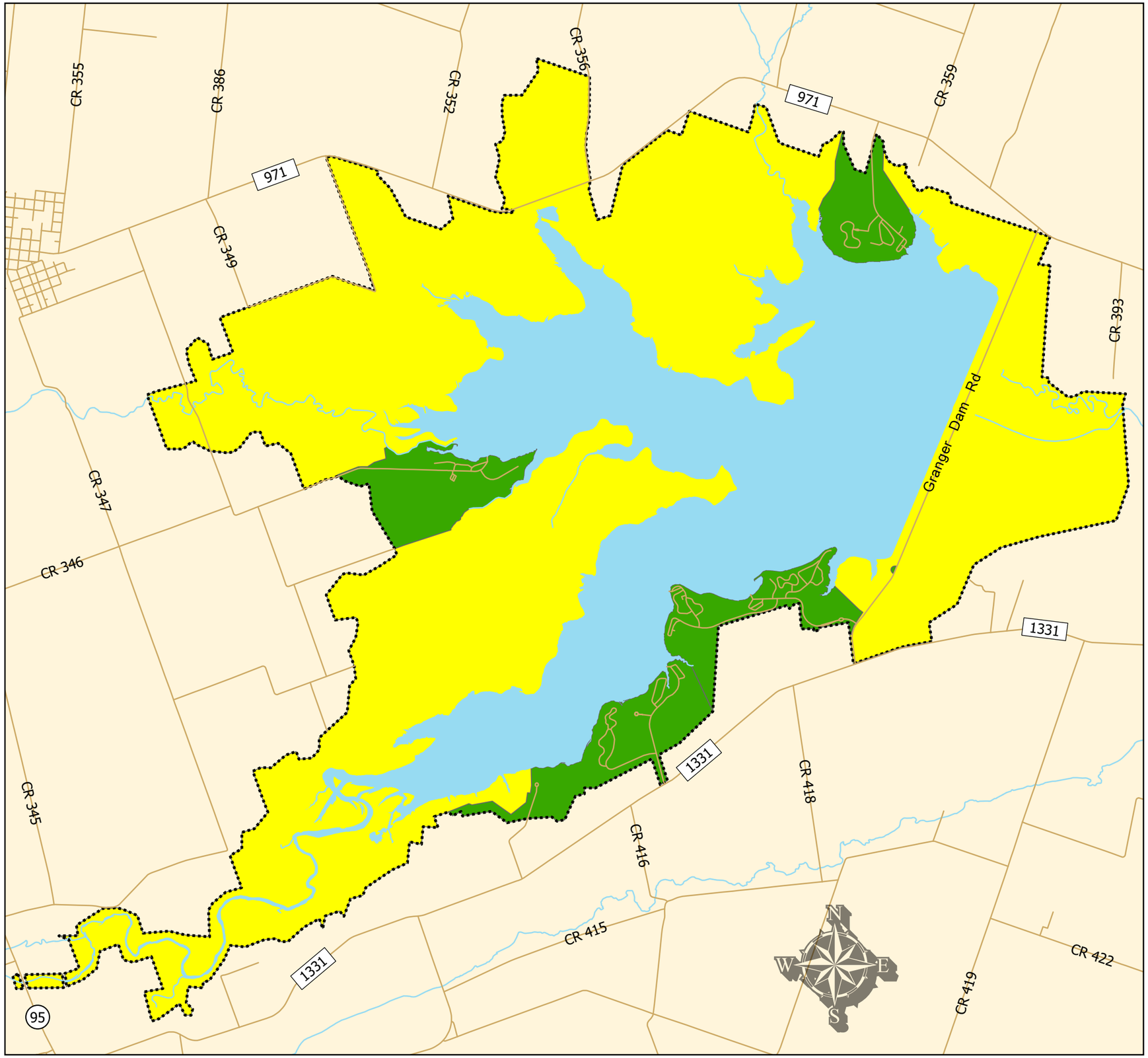
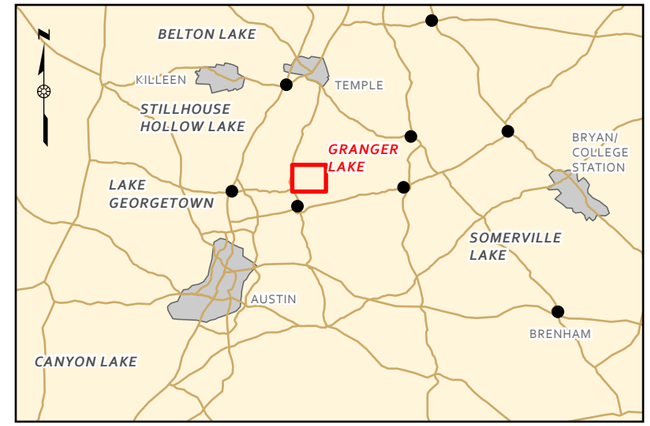
DATE:	MAP NO.
APRIL 2022	GA22MP-01-00





FEE PROPERTY

WATER SURFACE AREA

TRIBUTARIES

USACE RECREATIONAL AREAS

USACE MANAGED LANDS

US Army Corps of Engineers
Fort Worth District

GRANGER LAKE — GRANGER, TEXAS

GRANGER LAKE

GRANGER LAKE MASTER PLAN

AGENCY LAND MANAGEMENT MAP

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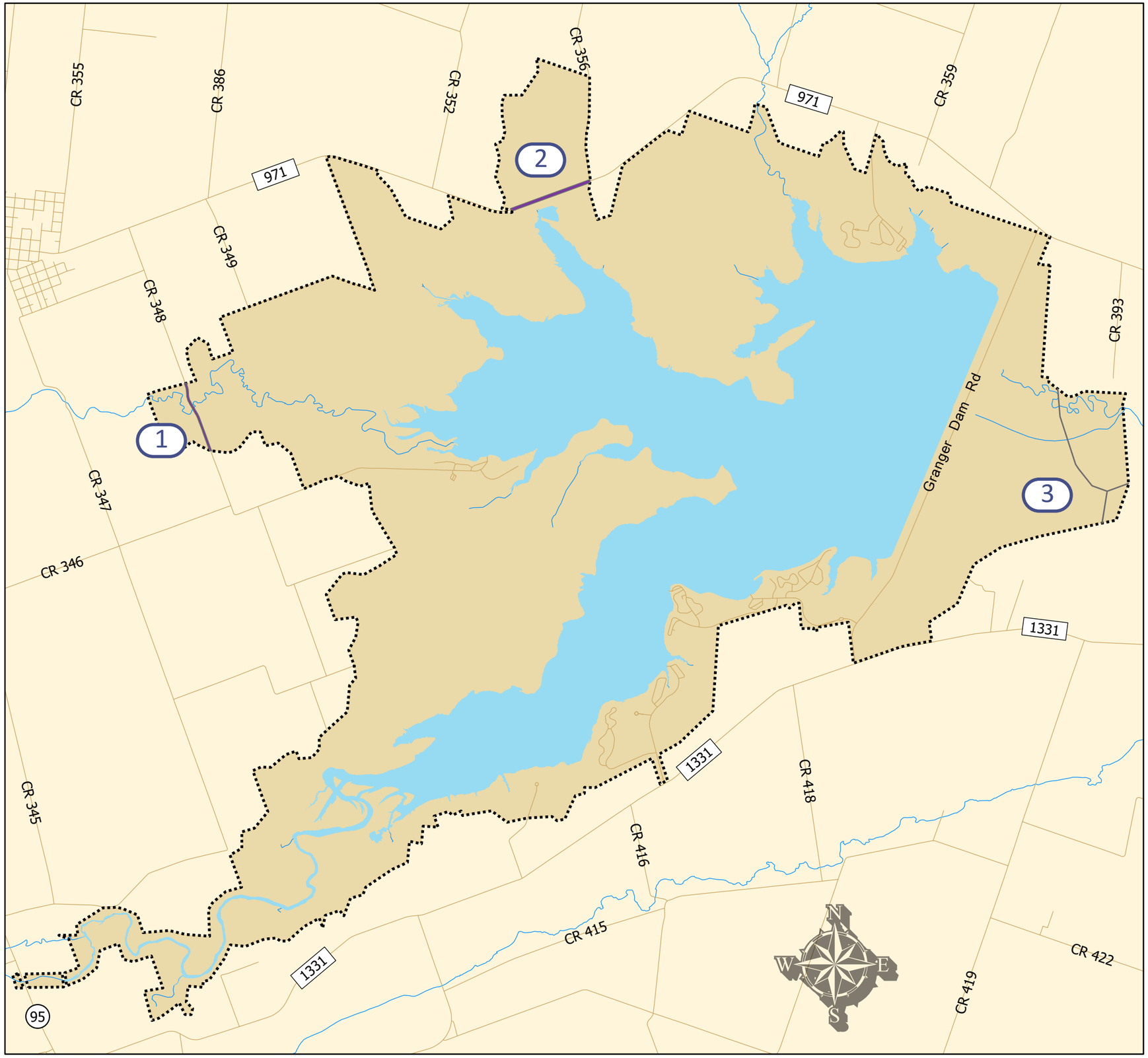
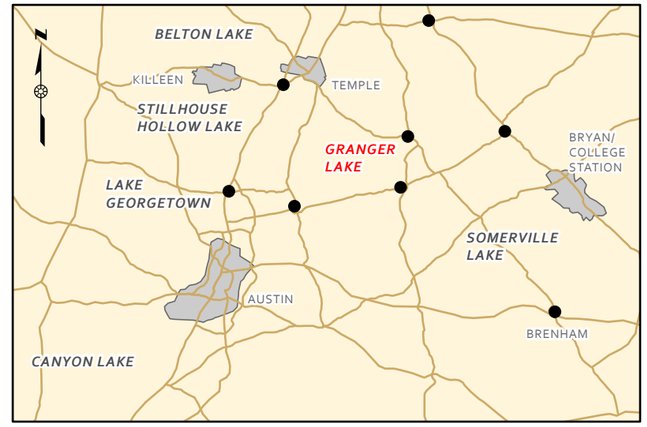
DATE:	MAP NO.
APRIL 2022	GA22MP-01-01





UTILITY COORIDOR

FEE PROPERTY LINE

ROADWAY

FEE PROPERTY AREA

WATER SURFACE AREA

US Army Corps of Engineers
Fort Worth District

GRANGER LAKE — GRANGER, TEXAS

GRANGER LAKE

GRANGER LAKE MASTER PLAN

UTILITY CORRIDOR MAP

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DATE:	MAP NO.
APRIL 2022	GA22MP-01-02

APPENDIX B – NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) DOCUMENTATION

FINDING OF NO SIGNIFICANT IMPACT
ENVIRONMENTAL ASSESSMENT FOR THE
GRANGER LAKE MASTER PLAN 2022
BRAZOS RIVER BASIN
WILLIAMSON COUNTY, TX

Engineering Regulation (ER) 1130-2-550 Change 07, dated January 2013 and Engineering Pamphlet (EP) 1130-2-550 Change 05, dated 30 January 2013, require Master Plans for U.S. Army Corps of Engineers water resources development projects having a federally owned land base. The revision of the 1974 Granger Lake Master Plan was 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 2022 to 2048.

In accordance with the National Environmental Policy Act of 1969, as amended, including guidelines in 33 Code of Federal Regulations (CFR), Part 230, the U.S. Army Corps of Engineers, Fort Worth District (USACE) has conducted an environmental analysis on the draft Granger Lake Master Plan 2022. The draft Granger Lake Master Plan 2022 addresses the need for an updated comprehensive land management document for Granger Lake in Williamson County, Texas. The final recommendation will be contained in the Granger Lake Master Plan 2022.

The Environmental Assessment (EA) for the draft Granger Lake Master Plan 2022 evaluated an alternative that would revise the 1974 Granger Lake Master Plan to meet current policy, and its assessment of impacts are summarized in Table 1 and are included as reference.

The revision of the *1974 Granger 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 Granger Lake over the next 25 years.

In addition to a “no action” plan, one alternative that fully meets the project purpose was evaluated (proposed action/plan). Section 2.0 of the draft Granger Lake Master Plan EA discusses the alternative formulation and selection as well the summary of the new goals and objectives. Section 8, Tables 8-1, and 8-2 of the Master Plan summarizes the changes to the land classifications. The proposed plan includes coordination with the public, updates to comply with the USACE regulations and guidance, and reflects changes in land management and land uses that have occurred since 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	☐	☐	☒
Socio-economics	☐	☐	☒
Environmental justice	☐	☐	☒
Soils	☐	☐	☒
Water quality	☒	☐	☐
Climate change	☐	☐	☒

All practicable and appropriate means to avoid or minimize adverse environmentaleffects have been analyzed and incorporated into the proposed plan. The proposed plan will not entail any ground-disturbing activities. Future ground-disturbing activitieson 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 --. 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 willhave no effect on historic properties.

All applicable environmental laws were considered and coordination with appropriateagencies 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 otherFederal, State, and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the proposed plan will not cause significant adverse impacts on the quality of the human environment, therefore, preparation of an Environmental Impact Statement is not required.

Date

Jonathan S. Stover, P.E., PMP
Colonel, EN
Commanding

Draft

Environmental Assessment for the Granger Lake Master Plan

Brazos River Basin: San Gabriel River
Williamson County, Texas

February 2022

US Army Corps of Engineers ®
Fort Worth District

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ENVIRONMENTAL ASSESSMENT ORGANIZATION

This Environmental Assessment (EA) evaluates the potential environmental and socioeconomic impacts of the 2022 Granger Lake Master Plan revision. This EA will facilitate the decision process regarding the Proposed Action and alternatives.

SECTION 1	*INTRODUCTION* of the Proposed Action summarizes the purpose of and need for the Proposed Action, provides relevant background information, and describes the scope of the EA.
SECTION 2	*PROPOSED ACTION AND ALTERNATIVES* examines alternatives for implementing the Proposed Action and describes the recommended alternative.
SECTION 3	*AFFECTED ENVIRONMENT* describes the existing environmental and socioeconomic setting. *ENVIRONMENTAL CONSEQUENCES* identifies the potential environmental and socioeconomic effects of implementing the Proposed Action and alternatives. *MITIGATION* summarizes mitigation actions required to enable a Finding of No Significant Impact for the Proposed Action.
SECTION 4	*Reasonably Foreseeable Future describes the impact on the environment that may result from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions.*
SECTION 5	*COMPLIANCE WITH ENVIRONMENTAL LAWS* provides a listing of environmental protection statutes and other environmental requirements.
SECTION 6	*IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES* identifies any irreversible and irretrievable commitments of resources that would be involved in the Proposed Action should it be implemented.
SECTION 7	*PUBLIC AND AGENCY COORDINATION* provides a listing of individuals and agencies consulted during preparation of the EA.
SECTION 8	*REFERENCES* provides bibliographical information for cited sources.
SECTION 9	*ACRONYMS/ABBREVIATIONS*
SECTION 10	*LIST OF PREPARERS* identifies persons who prepared the document and their areas of expertise.
ATTACHEMENT A	National Environmental Policy Act (NEPA) Coordination and Scoping

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Draft ENVIRONMENTAL ASSESSMENT

Master Plan

Granger Lake
Williamson 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 2022 Granger Lake Master Plan (MP). A Master Plan 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 33 Code of Federal Regulations (CFR) Part 230 and the Council on Environmental Quality (CEQ) Regulations (40 CFR 1500-1508), as reflected in the USACE Engineering Regulation, ER 200-2-2.

The Master Plan 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 Granger Lake for the benefit of present and future generations. 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. Therefore, the Master Plan must be kept current in order to provide effective guidance in USACE decision-making. The original Granger Lake Master Plan was approved in 1966 and being last revised in 1974.

1.1 PROJECT DESCRIPTION

Granger Lake Dam is located at river mile (RM) 31.9 of the San Gabriel River. The dam site is located in Williamson County, in south central Texas. The lake is located in Williamson County, Texas (Figure 1-1) and is located in the Granger Lake watershed in the San Gabriel Sub Basin. The San Gabriel River originates in Burnet County approximately 12 miles north of Burnet, Texas, and flows in an easterly direction for approximately 120 miles to join the Little River at river mile 44.3, which then flows northeasterly to join the Brazos River at river mile 315.8. The watershed lies in the central portion of Texas. The watershed of the San Gabriel River has a total drainage area of 1,355 square miles of which 709 are controlled by Granger Dam.

The San Gabriel River has five principal tributaries that flow into its river system. North Fork and South Fork, the principal tributaries of the San Gabriel River, flow in an

easterly to southeasterly direction for distances of approximately 46 and 39 miles, respectively, to their confluence with the San Gabriel River at Georgetown, Texas. The drainage areas of North Fork and South Fork are 270 and 133 square miles, respectively. Berry Creek and Willis Creek enter the San Gabriel River above Granger Dam. Berry Creek enters the San Gabriel River at river mile 57.8 and has a drainage area of 83 square miles. Willis Creek enters the San Gabriel River at river mile 29.7, and has a drainage area of 57.8 square miles. Brushy Creek, the last major tributary of the San Gabriel River, has a drainage area of 510 square miles and enters the San Gabriel River at river mile 5.2.

Congressional authority for the construction of Granger Dam and Lake (previously Laneport Reservoir) on the San Gabriel River was contained in the Flood Control Act approved 3 September 1954 (Public Law 780, 83rd Congress, 2nd Session) in accordance with the plan of improvement as outlined in House Document No. 535 (81st Congress, 2nd Session). However, it was adopted on 29 July 1955 that the reports on the Brazos River and Tributaries, Texas, be printed in House Document No. 535, with a view to giving further study to the location of the Granger Lake on the San Gabriel River and to determine if a change in the site of the reservoir was advisable. The Flood Control Act approved 23 October 1962 (Public Law 874, 87th Congress, 2nd Session) authorized the construction and operation of North Fork (Lake Georgetown) and South Fork Reservoirs in conjunction with the authorized Granger Lake, in accordance with the plan outlined in House Document No. 591 (87th Congress, 2nd Session). Authority to initiate advance planning on the San Gabriel River is contained in the Public Works Appropriation Act of 1965, approved 30 August 1964 (Public Law 88-511) and in advice of Allotment C-124 dated 9 September 1964.

In January 1975, Laneport Reservoir was officially renamed Granger Dam and Lake (Public Law 93-631). In 1980, North Fork Reservoir was officially changed to Lake Georgetown. South Fork Reservoir was not built and was deauthorized in June 2003.

The construction of Granger Dam began in October of 1972 and was completed in February of 1980. Deliberate impoundment began March 3, 1980, and the conservation pool was filled in May of 1981.

Granger Dam and Lake Project is an integral part of the USACE plan for flood control and water conservation in the Brazos River Basin. The plan presently consists of nine major USACE flood mitigation projects – Whitney Dam, Aquilla Dam, Waco Dam, Proctor Dam, Belton Dam, Stillhouse Hollow Dam, North San Gabriel Dam, Granger Dam, and Somerville Dam. The nine flood control projects in the Brazos River system control approximately 36,830 square miles of drainage area. Granger Lake controls 709 square miles of drainage area.

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 Granger Lake are in compliance with applicable environmental laws and regulations and to maintain quality lands for future public use. The 2022 MP is intended to serve as a comprehensive land and recreation management plan with an effective life of approximately 25 years.

The Master Plan must be kept current in order to provide effective guidance in decision-making that responds to changing regional and local needs, resource capabilities and suitabilities, and expressed public interests consistent with authorized project purposes and pertinent legislation and regulations. The current Granger Lake Master Plan is over 45 years old and does not currently reflect ecological, socio-political, and socio-demographic changes that are currently affecting Granger Lake, or those changes anticipated to occur through 2048. Changes in outdoor recreation trends, regional land use, population, current legislative requirements and USACE management policy have indicated the need to revise the plan. Additionally, increasing fragmentation of wildlife habitat, national policies related to climate change and growing demand for recreational access and protection of natural resources are all factors affecting Granger 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.

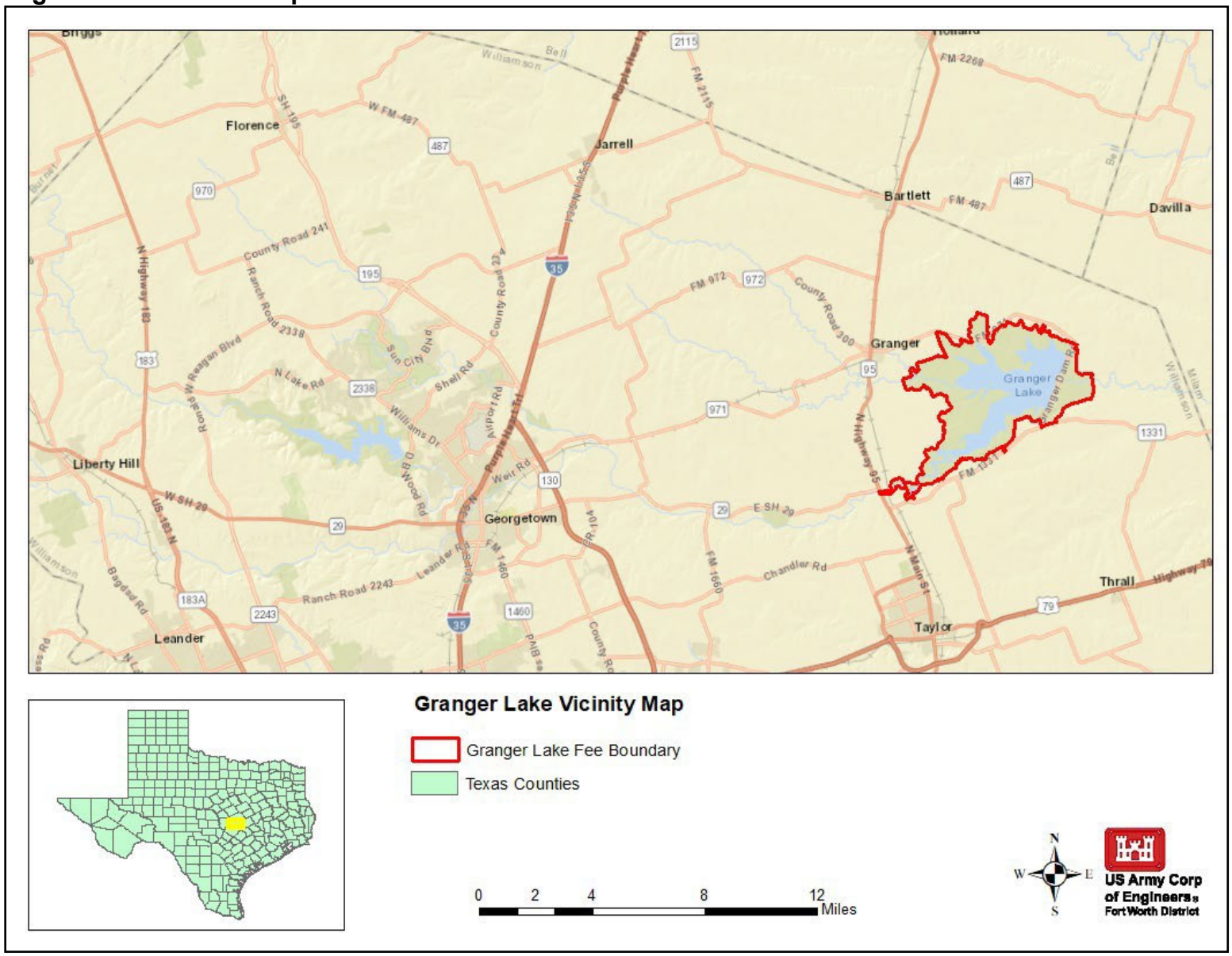
The following factors may influence reevaluation of management practices and land uses:

- 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 and 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 2022 Master Plan (MP). The alternative considerations were formulated with special attention given to revised land classifications, new resource management objectives, and a conceptual resource plan for each land classification category. The Draft 2022 MP is currently available and is incorporated into this EA by reference. This EA was prepared pursuant to the National Environmental Policy Act (NEPA).

Figure 1-1. Location Map



The application of NEPA to more strategic decisions not only meets the Council on Environmental Quality (CEQ) implementing regulations (CEQ 2020) 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 2022 MP to the decision maker.

SECTION 2:PROPOSED ACTION AND ALTERNATIVES

The purpose and need of the proposed action is to revise the 1974 Master Plan so that it is compliant with current USACE regulations and guidance, incorporates public needs, and recognizes surrounding land use and recreational trends. As part of this process, which includes public outreach and comment, two alternatives were developed for evaluation, including a No Action Alternative and a Proposed Action Alternative. The alternatives were developed using land classifications that indicate the primary use for which project lands would be managed. USACE regulations specify five possible categories of land classification: Project Operations (PO), High Density Recreation (HDR), Mitigation, Environmentally Sensitive Areas (ESA), and Multiple Resource Managed Lands (MRML). 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 2022 Master Plan goals. Goals and objectives are guidelines for obtaining maximum public benefits while minimizing adverse impacts on the environment and are developed in accordance with 1) authorized project purposes, 2) applicable laws and regulations; 3) resource capabilities and suitabilities; 4) regional needs; 5) other governmental plans and programs; and 6) expressed public desires. The five project-wide management goals established for Granger 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 2022 Master Plan and are incorporated herein by reference (USACE, 2022).

The goals for Granger Lake Master Plan include the following:

GOAL A. Provide the best management practices to respond to regional needs, resource capabilities and capacities, and expressed public interests consistent with authorized project purposes.

GOAL B. Protect and manage the project's natural and cultural resources through sustainable environmental stewardship programs.

GOAL C. Provide public outdoor recreation opportunities that support project purposes and public interests while sustaining the project's natural resources.

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

GOAL E. Provide consistency and compatibility with national objectives and other State and regional goals and programs.

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

- Foster sustainability as a way of life throughout the organization.
- Proactively consider environmental consequences of all USACE activities and act accordingly.
- Create mutually supporting economic and environmentally sustainable solutions.
- Continue to meet our corporate responsibility and accountability under the law for activities undertaken by USACE, which may impact human and natural environments.
- Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.
- Leverage scientific, economic and social knowledge to understand the environmental context and effects of USACE actions in a collaborative manner.
- Employ an open, transparent process that respects views of individuals and groups interested in USACE activities.

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 Granger Lake under either the No Action or Proposed Action alternatives. Water management, which includes flood risk management and dam operations, is established in the Brazos River Basin Master Reservoir Regulation Manual and the Granger 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 2022 MP. Instead the USACE would continue to manage Granger Lake's natural resources as set forth in the 1974 MP. The 1974 Master Plan would continue to provide the only source of comprehensive management guidelines and philosophy. However, the 1974 Master Plan is out of date and does not reflect the

current ecological, socio-political, or socio-demographic conditions of Granger Lake or those that are anticipated to occur through 2048.

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

2.2 ALTERNATIVE 2: PROPOSED ACTION

Under the Proposed Action, the USACE would adopt and implement the 2022 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 2022 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 pubic laws.

The proposed 2022 MP would classify all Federal land lying above elevation 694.0 NGVD29 into management classification categories. These management classification 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 proposed land classification categories 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 Granger 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:

- Surface Water: Allows for surface water zones.
    - Restricted: Water areas restricted for Granger 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 proposed classifications and acres contained in each classification, Table 2-2 shows the water surface classifications, and Table 2-3 provides the justification for the proposed reclassification.

Table 2-1 Proposed Granger Lake Land Classifications

Prior Land Classifications (1974 Plan)	Acres	Proposed Classifications (2022)	Acres
Project Operations	431	Project Operations	627
Operations: Recreation Intensive Use	1,385	High Density Recreation	936
Unclassified	779	Environmentally Sensitive Area	757
Operations: Wildlife Management	6,716	Wildlife Management Area	6,823
Operations: Recreation Low-Density Use	268	Low Density Recreation	138
Total Land Acres	8,800	Total Land Acres	9,281

Total Acreage differences from the 1974 total to the 2022 totals are due to improvements in measurement technology, deposition/siltation, and erosion. As real estate boundaries are researched, acreages may change slightly to reflect more precise boundary mapping. 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 2-2. Proposed Granger Lake Surface Water Classifications

Prior Water Surface Classifications (1974 Plan)	Acres		New Water Surface Classifications (2021)	Acres
Flowage Easement	1,650		Flowage Easement*	1,731
Permanent Pool	3,985		Permanent Pool	4,159
--	--		– Restricted	25
--	--		– Designated No Wake	21
--	--		– Open Recreation	4,289

Total Acreage differences from the 1974 total to the 2021 totals are due to improvements in measurement technology, deposition/siltation, and erosion. * Flowage easement acres are approximate, and buildings for habitation will not be constructed on flowage easement land.

Table 2-3. Justification for the Proposed Land Reclassifications

Land Classification	Description	Justification
Project Operations (PO)	The Project Operations classification was increased from 426 acres to 627 acres. • Approximately 5 acres of Operations: High Density Recreation at Fox Park and 8 acres at Friendship Park to account for project land boundaries and new lake office, totaling 13 acres. • Approximately 387.7 acres of Operations: Low Density Recreation alongside Granger Dam Road were reclassified to PO to better represent actual PO area boundary. • Approximately 1554.8 acres of Wildlife Management Area at Pecan Grove WMA to PO to better capture actual PO land area. • Adjust PO around dam so that it more precisely matches Granger Dam Road atop Granger Dam, totaling 4210.9 acres	The increase in acreage for Project Operations is to account for areas used for operations that are not currently classified as PO. The new area expands to include the entire dam, uncontrolled spillway, and discharge channel. The area also classified operations by others which includes municipal water operations near the dam and along Granger Dam Road.
High Density Recreation (HDR)	Approximately 936 acres have been classified as HDR. The previous classification Recreation Intensive Use contained 1,518 acres and is similar to the current HDR classification. The decrease in	Decreases from the previous Recreation Intensive Use land classification is to more appropriately reflect current recreational needs and uses. The new HDR classification includes areas with existing intense

	Recreation Intensive Use is to account for • Approximately 4.1 acres of Wildlife Management Area at Friendship Park and 4.1 acres at Willis Creek Park to more accurately represent park boundaries. • Approximately 22.4 acres of Unclassified to HDR to account for area within fee boundary within Friendship Park which includes road to park entrance. • Approximately 222.1 acres of HDR were classified for Friendship Park. • Approximately 5498.5 acres were classified for Taylor Park and Fox Park. • Approximately 1354.6 acres of HDR were classified for Willis Creek Park.	recreational development and many undeveloped acres that have the potential to meet future recreation needs. The conversion also accounts for more accurate measures of existing park boundaries.
Multiple Resource Management Lands (MRML) - Low Density Recreation (LDR)	Approximately 139 acres have been classified as LDR. This is a decrease from the previous land use classification of 281 acres of Recreation Low Density Use. • Approximately 121 acres of Operations: Recreation Intensive Use was allocated to Low Density Recreation to account for the trailhead and trail of Taylor Park. • Approximately 17 acres of Operations: Wildlife Management alongside	Decreases from the previous land classification of Operations: Recreation Low Density Use is to more appropriately reflect current recreational facilities, needs and uses. The new LDR classification includes areas previously classified as both high density recreation and wildlife management that have the potential to meet future recreation needs.

	the San Gabriel River was transferred to Low Density Recreation to account for Box 7 primitive boat ramp and access area.	
Environmentally Sensitive Areas (ESA)	Approximately 746 acres have been classified as ESA areas – 351 acres were changed from Unclassified to ESA, 75 acres from Recreation Intensive Use to ESA, 89 acres of LDR to ESA, 226 acres from WMA to ESA, and 5 acres of PO to ESA. Each previous land classification from the 1974 Master Plan was reclassified to the new Environmentally Sensitive Areas classification. Of the Recreation Areas changed to ESA, approximately 2.5 acres were from Willis Creek Park, 35.9 acres were from Taylor Park, 13.6 acres were from Taylor Park and Fox Park. • See Section 5.4 for a detailed breakdown of all ESA areas.	The Environmentally Sensitive Area classification did not exist when the 1974 master plan designated land classifications. The new areas classified as ESA include unique or sensitive prairies, woodlands, wetlands, and aesthetic areas. Land areas surrounding Willis Creek, San Gabriel River, Taylor Park, Fox Park, and Pecan Grove were reclassified as ESAs to protect and preserve unique plant species and habitat types as well as riparian corridors. See Table 5.1 for a complete description of each ESA.
MRML – Wildlife Management (WM)	Approximately 6,833 acres have been classified as MRML – Wildlife Management. This is similar to the previous Operations: Wildlife Management classification, which included 6,277 acres. • On the northwestern side of the lake, approximately 189 acres of Unclassified area at Willis Creek WMA were classified for WM. • On the northeastern side of the lake,	Lands were converted from Operations: Recreation Intensive Use and Operations: Recreation Low-Density Use to more appropriately align lands outlying recreational areas for wildlife management. Land that was marked as unclassified in the 1974 master plan was aligned to Wildlife Management to account for areas lying within Wildlife Management land fee boundaries.

	approximately 194 acres of Unclassified area at Sore Finger WMA were classified for WM. • On the southwestern portion of the lake, approximately 12 acres of Unclassified area at San Gabriel WMA were classified for WM. • On the northeastern portion of the lake, approximately 7 acres of Operations: Low Density Recreation were transferred because the land was never developed for recreational use. • On the northeastern portion of the lake, approximately 1 acre of Operations: Recreation Intensive Use was transferred to account for Friendship Park land boundary. • Approximately 188 acres of HDR on the boundaries of Willis Creek Park, 34 acres on the boundaries of Fox Park, and 182 acres on the boundaries of Friendship Park were classified as WM due to falling outside of developed park area. • Approximately 154 acres of LDR area never used for LDR and instead used for wildlife management was classified as WM. • Approximately 448 acres of WM were	

	classified for Pecan Grove WMA. • Approximately 2,226 acres of WM were classified for San Gabriel WMA. • Approximately 210 acres of WM were classified for Willis Creek WMA. • Approximately 2,986 acres of WM were classified for Sore Finger and Willis Creek WMAs.	
Water Surface Restricted	Approximately 25 acres of water surface have been classified as Restricted water surface where boats are not allowed.	These are comparatively small parcels that surround water intake structures, the USACE gate control tower, the approach to the uncontrolled spillway, and designated swimming beaches near Fox Park.
Water Surface No Wake Designation	Approximately 21 acres of water surface have been classified as Designated No Wake area where vessels are not allowed to create a wake when underway.	These parcels include areas surrounding boat ramps, including Taylor Park Boat Ramp, Wilson H. Fox Park Boat Ramp, Willis Creek Boat Ramp, and Friendship Park Boat Ramp.
Water Surface Open Recreation	Approximately 4,289 acres of water surface have been classified as Open Recreation that are available for water-based recreation.	Water surface that has not been classified as Restricted or No Wake are available for water-based recreation. 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.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER CONSIDERATION

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

carried forward for analysis in this EA. 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.

SECTION 3: AFFECTED ENVIRONMENT AND CONSEQUENCES

This section of the EA describes the potential impacts of the No Action and Proposed Action alternatives, outlined in Section 2 of this document. For descriptions of existing conditions of various resources within the USACE Granger Fee Boundary please refer to Chapter 2 of the 2022 MP. Based on resources described in the 2022 MP Ch. 2, each resource with potential to be impacted as a result of the No Action alternative, or by the Proposed Alternative is evaluated below.

Impacts (consequence or effect) can be either beneficial or adverse and can be either short- or long-term caused by the action(40 CFR § 1501.3). 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.

In considering whether the effects of the Proposed Action are significant, agencies shall analyze the potentially affected environment and degree of the effects of the action (40 CFR 1501.3). Impacts on each resource can vary in degree or magnitude from a slightly noticeable change to a total change in the environment. For this analysis, the intensity of impacts would be classified as negligible, minor, moderate, or major. The intensity thresholds are defined as follows:

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

3.1 Land Use

Please refer to sections 2.5 and 2.6 of the proposed MP for existing land use information in and around Granger 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 Granger Lake would continue as outlined in the existing MP to the existent 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 Granger Lake would diverge from the plan. This divergence would create a patchwork of management requirements that would be inefficient for Granger Lake staff to implement. The management would also increasingly lack transparency to the public, or alternately create more of a burden to staff to communicate how the lake management differs from that in the management plan. Implementation of the No Action Alternative would have moderate, adverse, short- and long-term impacts on land use within and on USACE Granger Lake project lands due to conflicting guidance and management of USACE lands.

3.1.2 Alternative 2: Proposed Action

The objectives for revising the Granger Lake MP describe current and foreseeable land uses, all the while taking into account expressed public opinion, regional trends, and USACE policies that have evolved to meet day-to-day operational needs. The proposed reclassifications in the 2022 MP were developed to help fulfill regional goals associated with good stewardship of land and water resources that will allow for continued use and development of project lands.

While HDR is technically a new management classification, the bulk of the proposed 936 acres of HDR land is from areas previously classified 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 and MRML-LDR from 1,385 to 936 acres and 268 and 138 acres, 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. Even though these areas are managed for recreational purposes, this designation still provides more protection for wildlife and vegetation than HDR but less than ESA, but the same amount as MRML-WM.

HDR and MRML-LDR are not the only new management classifications introduced in the proposed MP. The establishment and reclassification of 757 acres as ESA would allow for greater protection of sensitive habitats or cultural resources. Conservation

efforts within USACE Granger Lake fee owned boundary would be further aided by keeping 138 acres as MRML-LDR and the keeping of 5,422 acres as MRML-WM lands as well as it being increased by an additional 855 acres.

On the waters of Granger Lake, the proposed MP would add established surface water use categories in addition to the current ad hoc management of the lake. The proposed establishment of 25 acres as Restricted, 21 acres as No Wake, and 4,289 acres as Open Recreation to the water surface, respectively, will allow for delineated, and safer management of the lake's waters when the lake is at conservation pool. These classifications would help to improve safety of those recreating on and around Granger Lake. This would be done by restricting boat access and speeds around certain parts of the lake, as well as establishing areas that boating can occur in. The Granger Lake office would still maintain the authority to make ad hoc adjustments as needed by lake level, which will prevent the proposed classifications from being overly rigid or even ineffectual in various lake level conditions.

The 3 proposed utility corridors as explained in section 6.2 and in Table 6.1 of the proposed MP would have major positive short-and long-term impacts on land use within Granger Lake. The positive impacts would come from the condensing of disturbances associated with utility operations to limited areas which then frees up more land for other land uses. Their establishment would not increase the usage of nearby corridors.

The majority of the land use classifications proposed in the 2022 MP would maintain the functional management that is currently occurring. While the terminology updates appear substantial, they have been proposed after considerable public input, and seek to maintain the values the public holds highest at Granger 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 major, long term beneficial impacts to land use as the proposed land classes and utility corridors further refine areas for appropriate activities.

3.2 WATER RESOURCES

Please refer to section 2.1.6 of the proposed 2022 Granger Lake MP for existing water resource information in and around Granger Lake.

3.2.1 Alternative 1: No Action

There would be no impacts on water resources as a result of implementing the No Action Alternative, since there would be no change to the existing Master Plan. There are no known water resource related problems that the 1974 MP are helping to increase nor maintain.

3.2.2 Alternative 2: Proposed Action

The reclassifications and resource management objectives required for implementing the proposed MP 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 757 acres as ESA lands would help stabilize soils through the promotion of and restoration native habitat. In turn, the habitat

would help buffer and filter storm runoff before making its way into the lake. Minor, beneficial impacts to water quality may be realized during storm events as the natural areas may help to reduce erosion and subsequent water turbidity. The establishment of 757 acres of ESA lands, keeping 138 acres as MRML-LDR and the keeping of 5,422 acres as MRML-WM lands as well as it being increased by an additional 855 acres 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 Granger Lake watershed, lake water supply, and water quality.

Additionally, 21 acres of surface waters are proposed to be classified as designated No Wake. These areas are near shorelines where wave action can increase erosion. This proposed Designated No Wake classification would be expected to help prevent further erosion and further reduce water turbidity.

Therefore, implementation of the proposed MP would have negligible positive short- and long-term impacts on water resources within and on 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 Granger Lake.

3.3.1 No Action

The No Action Alternative would not result in any change in management of Granger 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] 13783 and 13990, 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. These policies would continue to be implemented under this Alternative which are not addressed in the 1974 MP goals and objectives, which is further proof of the 1974 MP inability to meet current laws and regulations.

3.3.2 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 MP promotion of land management practices and design standards that promote sustainability. Management under the proposed MP would also follow current policy to meet climate change goals as described for the No Action Alternative. Ground disturbing activities that arise from guidance from this document would go through the NEPA and design process prior to implementation. It is during that time, that impacts to the climate would be analyzed for those ground disturbing activities. The proposed MP would then promote land management practices and design standards that promote sustainability which would have negligible impacts.

3.4 AIR QUALITY

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

3.4.1 Alternative 1: No Action

The continual 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 occur. The No Action Alternative would remain compliant with the Clean Air Act because the MP includes only guidelines and does not incorporate actions which produce criteria pollutants as explained in the previous sentence.

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, this action is 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 proposed classification of 757 acres as ESA lands, keeping 138 acres as MRML-LDR lands, and the keeping of 5,422 acres as MRML-WM lands as well as it being increased by an additional 855 acres. These areas contain natural 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 Granger 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 short- or long-term, minor, moderate, or major, beneficial, or adverse 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 MP takes into consideration of the various topographical, geological, and soils aspects of USACE Granger Lake project lands. The reduction of HDR land (1,385 acres to 936 acres), keeping of 5,422 acres as MRML-WM lands as well as it being increased by an additional 855 acres, keeping 138 acres as MRML-LDR, and the establishment of 757 acres as ESA would help to increase the long term preservation and stabilization of the soils within USACE Granger Lake project lands. In addition, resource objectives makes it mandatory that erosion control and sedimentation issues are being monitored and alternatives be developed and implemented to resolve those issues. The proposed 3 utility corridors would condense disturbances associated with utility operations to limited areas, further helping to reduce soil exposure to erosive wind and water forces. The establishment of ESA, and keeping of MRML-LDR & WM land

classes as well as the implementation of resource objectives and goals discussed in Chapter 3 of the proposed MP and the rest of the proposed action would have minor, positive, long-term impacts on soil conservation and topography, and geology at Granger Lake.

3.6 NATURAL RESOURCES

Please refer to section 2.2.1 of the proposed MP for existing natural resources information in and around Granger Lake.

3.6.1 Alternative 1: No Action

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

3.6.2 Alternative 2: Proposed Action

The implementation of the reclassifications of land management classes, improvement of resource management objectives, and the overall improvement of the proposed MP would allow natural resources within USACE Granger federal project lands to be better managed and accounted for. The better management would be from implementing the knowledge gained from the Wildlife Habitat Appraisal Procedure (WHAP) (Appendix C of the 2022 Granger Lake MP) done for Granger Lake, which helps to establish the high quality and unique areas. The implementation of proposed land reclassifications 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 allows 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 (1,385 acres to 936 acres), keeping of 5,422 acres as MRML-WM lands as well as it being increased by an additional 855 acres, keeping 138 acres as MRML-LDR, and the establishment of 757 acres as ESA, especially in prime ecological areas would help to protect natural resources from various types of adverse impacts such as habitat fragmentation. Which is what the 3 proposed utility corridors described in section 6.2 and Table 6.1 of the proposed MP would help to do and as well as increase the acreage of habitat that would not be disturbed in the future. This would be achieved from the restriction of all new utilities being built along existing right-of-ways and proposed corridors. Therefore, under the Proposed Action, there would be major short- and long term major, beneficial impacts on natural resources as a result of implementing the proposed MP.

3.7 THREATENED AND ENDANGERED SPECIES

Please refer to section 2.2.4 of the proposed MP for existing 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; therefore, no short- or long-term, major, moderate, or minor, beneficial, or adverse impacts on threatened and endangered species would be anticipated as a result of implementing the No Action Alternative.

3.7.2 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 Granger Lake federal project lands. To further management opportunities and beneficially impact habitat diversity, the reclassifications proposed in the 2022 MP include 757 acres as ESAs. Under this reclassification, several land parcels previously classified as unclassified, Operations-Recreation Intensive Use, Operations-Wildlife Management, and Operations-Recreation Low-Density Use were converted to ESA in order to recognize those areas having the highest ecological value and to ensure they are given the highest order of protection among possible land classifications. Resource objectives makes it mandatory that threatened and endangered species are managed by various ecosystem management principles. In addition, all new utilities would be built along existing right-of-ways and the 3 proposed utility corridors. This would help to reduce future loss of natural resources that could potentially occur from placement of utility lines on project lands. Any future activities that could potentially result in impacts on federally listed species would be coordinated with USFWS through Section 7 of the Endangered Species Act. There are negligible impacts on federally threatened and endangered species anticipated as a result of implementing the Proposed Action Alternative. Any future activities that could potentially result in impacts on federally listed species will be coordinated with USFWS through Section 7 of the Endangered Species Act. Therefore, USACE has determined that the proposed Granger Lake Master Plan will have No Effect on all federally threatened and endangered species within the study area

3.8 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 Granger Lake would continue to be managed according to the existing invasive species management practices. There would be no short- or long-term, minor, moderate, or major, beneficial, or adverse impacts from invasive species as a result of implementing the No Action Alternative.

3.8.2 Alternative 2: Proposed Action

The implementation of the reclassifications of land management classes, improvement of resource management objectives, and the overall improvement of the proposed MP would allow invasive species within USACE Granger federal project lands to be better managed and accounted for. The better management would be from implementing the knowledge gained from the Wildlife Habitat Appraisal Procedure (WHAP) survey done for Granger Lake, which helps to identify high value and unique areas that needs further protection from invasive species so as to protect their value and uniqueness that invasive species may destroy or degrade. The reduction of HDR land (1,385 acres to 936 acres), keeping of 5,422 acres as MRML-WM lands as well as it being increased by an additional 855 acres, and the establishment of 757 acres as ESA, especially in prime ecological areas helps to protect natural resources from various types of adverse impacts such as habitat fragmentation which increases the spread of invasive species and these areas also receive more invasive species management efforts. The resource objectives also makes for the monitoring and reporting of invasive species as well as the ability to take action to prevent and/or reduce the spread of these species. The 3 proposed utility corridors would help to further reduce the spread of invasive species by removing avenues of entry that they can be introduced and spread by keeping all new utilities being built along those areas. Therefore, under the Proposed Action, there would be short- and long-term minor, beneficial impacts on invasive species 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 existing Master Plan.

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 Granger federal project lands to be better managed and accounted for. Based on previous surveys at Granger Lake, the required reclassifications, proposed 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 significant adverse impacts 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 and environmental justice information in and around Granger Lake.

3.10.1 Alternative 1: No Action

The continual 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 disproportionately high or adverse 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. Granger Lake offers a variety of recreational opportunities for visitors. It is beneficial to the local economy through direct and indirect job creation and local spending by visitors. Beneficial impacts would be similar to the No Action Alternative. There would be no adverse impacts on economy in the area and no disproportionately high or adverse impacts on minority or low-income populations or children as a result of the Proposed Action.

3.10 RECREATION

Please refer to section 2.5 of the proposed MP for existing recreation information in and around Granger Lake.

3.10.1 Alternative 1: No Action

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

3.10.2 Alternative 2: Proposed Action

The USACE proposes to continue to lease recreation lands at Granger Lake to non-federal partners, who are anticipated to maintain and improve existing facilities with potential plans for future expansion.

Granger 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 (1,385 acres to 936 acres) and as well as for Low Density Recreation (268 acres to 138 acres) with implementation of the proposed MP, this land

reclassification reflects changes in land management and land uses that have occurred since 1974 at Granger Lake. Passive recreational activities would still be allowed as they are now within all lands regardless of the land classification. The resource objectives makes it mandatory that all decisions made in regards to the lake take into consideration their impacts to recreation and monitored should adjustments be needed. Therefore, under the Proposed Action, there would no adverse, short- or long-term impacts on recreation as numerous recreation opportunities would remain in and around Granger Lake to accommodate various outdoor based recreation activities.

3.11 AESTHETIC RESOURCES

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

3.12.1 Alternative 1: No Action

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

3.12.2 Alternative 2: Proposed Action

Granger Lake currently plays a pivotal role in availability of parks and open space in Williamson County and in the surrounding region. The amount of acreage classified for High Density Recreation would decrease (1,385 acres to 936 acres) and as well as for Low Density Recreation (268 acres to 138 acres) with implementation of the proposed MP. This land reclassification reflects changes in land management and land uses that have occurred since 1974 at Granger 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 keeping of 5,422 acres as MRML-WM lands as well as it being increased by an additional 855 acres, and the establishment of 757 acres as ESA, would protect lands that are aesthetically pleasing and available for passive recreation activity Granger Lake and limit future development. All new utilities would be built along existing right of ways and the 3 proposed utility corridors to limit aesthetics impacts to natural landscapes. Additionally, proposed resource objectives places an emphases on increasing public education on recreation, nature, cultural resources, and ecology resources at Granger Lake. Therefore, under the Proposed Action, there would be no short- and long-term minor, adverse impacts to aesthetic resources as a result of implementing the proposed MP.

3.12 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 Granger Lake fee owned boundary.

3.13 HEALTH AND SAFETY

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

3.13.1 Alternative 1: No Action

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

3.13.2 Alternative 2: Proposed Action

The implementation of the proposed MP would result in the classification of Restricted Surface Water (25 acres), Designated No-Wake areas (21 acres), and Open-Recreation (4,289). These classifications maintain and in some cases, improve boating, non-motorized recreation, and swimming safety near the Granger Lake Dam, water intake structures, and key recreational water access areas such as boat ramps and designated swimming areas.

The project would continue to have reporting guidelines in place should water quality become a threat to public health. Existing regulations and safety programs throughout the Granger Lake project area would continue to be enforced to ensure public safety. The resource objectives makes 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 places an emphases on educating the public on water safety and on flood risk management efforts at Granger 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.

3.14 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 3-1. Summary of Consequences and Benefits

Resource	Change Resulting from Revised Master Plan	Environmental Consequences		Benefits Summary
		No Action Alternative	Proposed Action	
Land Use	No effect on private lands. Emphasis is on protection of wildlife and environmental values on USACE land and maintaining current level of developed recreation facilities.	Fails to recognize recreation trends and regional natural resource priorities.	Recognizes recreation trends and regional natural resource priorities identified by TPWD, and public comments.	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.	Fails to recognize the water quality benefits of good land stewardship and need to protect wetlands.	Promotes restoration and protection of wetlands and good land stewardship.	Specific resource objective promotes restoration and protection of wetlands.
Climate, Climate Change, and Greenhouse Gases	Minor change to recognize need for sustainable, energy efficient design.	Fails to promote sustainable, energy efficient design.	Promotes land management practices and design standards that promote sustainability.	Specific resource objectives promote national climate change mitigation goal. 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.	Fails to specifically recognize known and potential soil erosion problems.	Encourages good stewardship that would reduce existing and potential erosion.	Specific resource objectives call for stopping erosion from overuse and land disturbing activities.
Natural Resources	Moderate benefits through land reclassification and resource objectives.	Fails to recognize ESAs, and regional priorities calling for protection of wildlife habitat.	Gives full recognition of sensitive resources and regional trends and priorities related to natural resources.	Reclassification of lands included 757 acres of ESA and an increase in lands emphasizing wildlife management.

Resource	Change Resulting from Revised Master Plan	Environmental Consequences		Benefits Summary
		No Action Alternative	Proposed Action	
Threatened and Endangered Species, including TXNDD species.	Minor change to recognize both federal and state-listed species.	Fails to recognize current federal and state-listed species.	Fully recognizes federal and state-listed species as well as SGCN listed by TPWD and Rare species listed by TPWD.	The master plan 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.	Fails to recognize current invasive species and associated problems.	Fully recognizes current species and the need to be vigilant as new species may occur.	Specific resource objectives specify that invasive species shall be monitored and controlled as needed.
Cultural Resources	Minor change to recognize current status of cultural resources.	Included cursory information about cultural resources that is inadequate for future management and protection.	Recognizes the presence of cultural resources and places emphasis on protection and management.	Reclassification of lands included 757 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.	Fails to recognize current outdoor recreation trends.	Fully recognizes current outdoor recreation trends and places special emphasis on trails.	Specific management objectives focused on outdoor recreation opportunities and trends are included.
Aesthetic Resources	Minor benefits through land reclassification and resource objectives.	Fails to minimize activities that disturb the scenic beauty and aesthetics of the lake.	Promotes activities that limit disturbance to the scenic beauty and aesthetics of the lake.	No added benefit Specific management objectives to minimize activities that disturb the scenic beauty and aesthetics of the lake.

Resource	Change Resulting from Revised Master Plan	Environmental Consequences		Benefits Summary
		No Action Alternative	Proposed Action	
Health and Safety	Minor change to promote public safety awareness.	Fails to emphasize public safety programs.	Recognizes the need for public safety programs.	Includes specific management objectives to increase water safety outreach efforts. Also, classifies 25 acres of water surface as restricted and designated no-wake for public safety purposes.

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SECTION 4: REASONABLY FORESEEABLE FUTURE

The most severe environmental degradation may not result from the direct effects of any particular action, but from the reasonably foreseeable future. As defined in 40 CFR 1508.1 (aa) (CEQ Regulations) as amended in 2020, “reasonably foreseeable means sufficiently likely to occur such that a person of ordinary prudence would take it into account in reaching a decision.” Which is further clarified in 1508.1(g) under effects or impacts as to applying to “changes to the human environment from the proposed action or alternatives that are reasonably foreseeable and have a reasonably close causal relationship to the proposed action or alternatives, including those effects that occur at the same time and place as the proposed action or alternatives and may include effects that are later in time or farther removed in distance from the proposed action or alternatives.”

4.1 PAST IMPACTS WITHIN THE ZONE OF INTEREST

Granger Lake was originally authorized for construction in 1945 as a multi-purpose reservoir for flood control, water conservation, fish and wildlife, and recreation. Construction of Granger Lake Dam began in January of 194, and was completed in July of 1952. Deliberate impoundment began in July of 1952. The total project area at Granger Lake encompasses 18,196 acres, including the 6,707 acres of surface water at normal pool elevation of 535.0. The entire 15,551 acres were acquired in fee simple title by USACE with perpetual Flowage Easements on 2,645 acres.

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

Future management of the 1,717 acres of Flowage Easement Lands at Granger Lake includes routine inspection of these areas to ensure that the Government’s rights specified in the easement deeds are protected. In almost all cases, the Government acquired the right to prevent placement of fill material or habitable structures on the easement area. Placement of any structure that may interfere with the USACE flood risk management and water conservation missions may also be prohibited. At the time of this publication, there are not any major projects like road expansion, new industrial centers, neighborhoods being built, and new hiking trails in and around Granger 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 would be considered on a case-by-case basis.

4.3 ANALYSIS OF IMPACTS WITHIN THE REASONABLY FORESEEABLE FUTURE

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 Granger Lake within the reasonably foreseeable future and 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 impacts into the reasonably on each resource is presented below.

4.3.1 Land Use

A major impact would occur if any action is inconsistent with adopted land use plans or if an action would substantially alter those resources required for, supporting, or benefiting the current use. Land use around Granger 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 2022 Master Plan also identifies the need and location for proposed 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, no adverse impacts on land use within the area surrounding Granger Lake is expected within the reasonably foreseeable future, 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 is inconsistent with adopted surface water classifications or water use plans, or if an action would substantially alter those resources required for, supporting, or benefiting the current use. Granger Lake was developed for flood control, water conservation, fish and wildlife, and recreation purposes. The reclassifications and resource objectives required to revise the Granger Lake 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 Granger Lake. Therefore, impacts from the reasonably future on water resources within the area surrounding Granger Lake, when combined with past and proposed actions in the region, are anticipated to be minor.

4.3.3 Climate

The Proposed Action would neither affect nor be affected by the climate. Therefore,

implementation of the revised land use classifications in the 2022 MP, when combined with other existing and proposed projects in the region, would not result in major reasonably foreseeable impacts on the climate.

4.3.4 Climate Change and GHG

Under the Proposed Action, current Granger Lake project management plans and monitoring programs would not be changed. In the event that GHG emission issues become significant enough to impact the current operations at Granger Lake, the 2022 MP and all associated documents would be reviewed and revised as necessary. Therefore, implementation of the 2022 MP, when combined with other existing and proposed projects in the region, would result in negligible reasonably foreseeable future impacts on climate change or GHG.

4.3.5 Air Quality

A major highway project is scheduled near the zone of interest for Granger Lake; therefore, limiting 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 Granger Lake under the Proposed Action would be negligible. Seasonal prescribed burning could occur on Granger 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 2022 MP, when combined with other existing and proposed projects in the region, could result in minor adverse and beneficial reasonably foreseeable future impacts on air quality.

4.3.6 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. Reasonably foreseeable future impacts on topography, geology, and soils within the area surrounding Granger Lake, when combined with past and proposed actions in the region, are anticipated to be negligible.

4.3.7 Natural Resources

The significance threshold for natural resources would include a substantial reduction in ecological processes, communities, or populations that would threaten the long-term viability of a species or result in the substantial loss of a sensitive community that could not be offset or otherwise compensated. Past, present, and future projects are not anticipated to impact the viability of any plant species or community, rare or sensitive habitats, or wildlife. The establishment of ESA, MRML-VM, and keeping MRML-WM areas, as well as resource objectives that favor protection and restoration of valuable natural resources would have beneficial reasonably foreseeable future e impacts. No identified projects would threaten the viability of natural resources. Therefore, there would be major long-term beneficial impacts to natural resources resulting from the revision of the2022 Granger MP when combined with past and proposed actions in the

area.

4.3.8 Threatened and Endangered Species

The Proposed Action and No Action Alternative would not adversely impact threatened, endangered and TXNDD species within the area. Should federally listed species change in the future (e.g., delisting of the Least Tern or other species or listing of new species), associated requirements would be reflected in revised land management practices in coordination with the USFWS. The USACE would continue cooperative management plans with the USFWS and TPWD to preserve, enhance, and protect critical wildlife habitat resources.

No new projects are proposed for USACE lands within the Granger Lake project area, and past, present, and future projects are not anticipated to impact threatened and endangered species as they would coordinated with the appropriate resource agencies. Therefore, there would be major long-term beneficial impacts on threatened and endangered species resulting from the revision of the Granger Lake 1974 MP when combined with past and proposed actions in the area.

4.3.9 Invasive Species

To the extent that funding would allow, USACE would continue its proactive herbicide treatments to control invasive species that affect not only the natural biological resources, but also recreational opportunities. Pesticide treatment for invasive ants would also continue. The USACE would also continue to monitor for zebra mussels and take all practicable measures to prevent them from becoming a nuisance to Granger Lake.

Invasive species control has and would continue to be conducted on various areas across the project lands. Implementing Best Management Practices (BMP) would help reduce the introduction and distribution of invasive species, ensuring that proposed actions in the region would not contribute to the overall reasonably foreseeable future impacts related to invasive species.

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

4.3.10 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 proposed 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 reasonably foreseeable future impacts on cultural resources or historic properties.

4.3.11 Socioeconomics and Environmental Justice

The Proposed Action would not result in the displacement of persons (minority, low-income, children, or otherwise) as a result of implementing the reclassifications,

resources objectives, and resource plan proposed in the 2022 MP. Therefore, the effects of the Proposed Action on environmental justice and the protection of children, when combined with other ongoing and proposed projects in the Granger Lake area, would not be considered a major cumulative effect.

4.3.12 Recreation

Granger Lake provides regionally significant outdoor recreation benefits including a variety of recreation opportunities. Even though the amount of acreage available for High Density Recreation and Low Density Recreation would decrease as a result of implementing the reclassifications, resources objectives, and resource plan proposed in the 2022 MP, these changes reflect changes in land management and historic recreation use patterns that have occurred since 1974 at Granger 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 reasonably foreseeable future impacts on area recreational resources.

4.3.13 Aesthetic Resources

No impacts on visual resources would occur as a result of implementing the reclassifications, resources objectives, and resource plan proposed in the 2022 MP. The Proposed Action, especially the classification of ESAs, in conjunction with other projects in the region, would result in minor beneficial reasonably foreseeable future impacts on the visual resources in the Granger Lake area.

4.3.14 Hazardous Materials and Solid Waste

No hazardous material or solid waste concerns would be expected with implementation of the 2022 MP; therefore, when combined with other ongoing and proposed projects in the Granger Lake area, there would be no major reasonably foreseeable future effects on hazardous materials and solid waste.

4.3.15 Health and Safety

No health or safety risks would be created by the Proposed Action. The effects of implementing the 2022 MP, when combined with other ongoing and proposed projects in the Granger Lake area, would not be considered a major reasonably foreseeable future 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 2022 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 2022 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 2022 MP.

Endangered Species Act of 1973, as amended – Current lists of threatened or endangered species were compiled for the 2022 MP. There would be no adverse impacts on threatened or endangered species resulting from the revision of the 1974 MP. However, beneficial impacts, such as habitat protection, could occur as a result of the revision of the proposed MP by classification of ESA and Vegetation Management lands.

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 2022 MP revision.

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

CWA of 1977, as amended – The Proposed Action is in compliance 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 2022 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 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 2022 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 Granger Lake project lands, but these would not be significantly 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. The operation and management of the existing project complies with EO 11988.

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

Executive Order 12898, Environmental Justice – This EO directs Federal agencies to achieve environmental justice to the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review. Agencies are required to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. The revisions in the 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 would be involved in the Proposed Action should it be implemented" (42 U.S.C. § 4332). An irreversible commitment of resources occurs when the primary or secondary impacts of an action result in the loss of future options for a resource. Usually, this is when the action affects the use of a nonrenewable resource or it affects a renewable resource that takes a long time to regenerate. The impacts for this project from the reclassification of land 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 revisions to the Granger Lake MP.

SECTION 7: PUBLIC AND AGENCY COORDINATION

In accordance with 40 CFR §§ 1501.9, and 1506.6, the USACE initiated public involvement and agency scoping activities to solicit input on the revision of the 1974 MP, as well as identifying reclassification proposals and significant issues related to the Proposed Action. The USACE began its public involvement process with a public scoping meeting to provide an avenue for public and agency stakeholders to ask questions and provide comments. Out of concern for public safety regarding the ongoing COVID-19 virus pandemic, this public scoping meeting was cancelled and replaced with an online presentation that was held on February 24, 2021. The USACE, Fort Worth District, placed advertisements on the USACE webpage, social media, and print publications prior to the public scoping meeting.

In addition to public scoping meeting being cancelled because of concerns over COVID-19, so to will the meeting introduce the draft proposed MP and EA to the public. However, it will be replaced by a similar online style of presentation as the public scoping meeting, and addition to this there will be other information resources that will summarize the MP. Public review and comment period on the draft proposed MP and EA will begin on DATE and end on DATE.

At the close of the 30-day public review period, public comments received will be incorporated and formally addressed in Appendix F of the MP. Attachment A includes the ads published in the local newspaper, the agency coordination letters, and the distribution list for the coordination letters. The EA is being coordinated with agencies having legislative and administrative responsibilities for environmental protection.

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SECTION 8: REFERENCES

Council on Environmental Quality (CEQ). 2020. Update to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act

United States Army Corps of Engineers (USACE). 2022. Granger Lake Master Plan, Brazos River Basin, and Williamson Counties, Texas. USACE, Fort Worth District.

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

USACE. 2017. Granger Dam Water Control Manual.

SECTION 9: ACRONYMS/ABBREVIATIONS

%	Percent
°	Degrees
ac-ft	acre-feet
AQCR	Air Quality Control Region
BMP	Best Management Practice
BP	Before Present
CAP	Climate Action Plan
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
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
EIS	Environmental Impact Statement
EMS	Ecological Mapping System (TPWD)
EO	Executive Order
EP	Engineer Pamphlet
ER	Engineer Regulation
ERS	Environmental Radiation Surveillance
ESA	Environmentally Sensitive Area
F	Fahrenheit
FAA	Federal Aviation Administration
FONSI	Finding of No Significant Impact
GHG	Greenhouse Gas
GCWA	Golden-cheeked Warbler
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
NRRS	National Recreation Reservation Service
NWI	National Wetlands Inventory (USFWS)
O_3	Ozone
OAQPS	Office of Air Quality Planning and Standards

Pb	Lead
PCB	Polychlorinated Biphenyls
PCPI	Per Capita Personal Incomes
PL	Public Law
$PM_{2.5}$	Particulate Matter Less than 2.5 Microns
PM_{10}	Particulate Matter Less than 10 Microns
PO	Project Operations
RM	River Mile
ROD	Record of Decision
RPEC	Regional Planning and Environmental Center
SGCN	Species of Greatest Conservation Need
SMU	Southern Methodist University
SO_2	Sulfur Dioxide
SUPER	USACE Suite of Computer Programs
TCAP	Texas Conservation Action Plan
TCEQ	Texas Commission on Environmental Quality
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TPWD	Texas Parks and Wildlife Department
TSWQS	Texas Surface Water Quality Standards
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
VOC	Volatile Organic Compounds
WHAP	Wildlife Habitat Appraisal Procedures
WM	Wildlife Management
VM	Vegetation Management
ZOI	Zone of Interest

SECTION 10: LIST OF PREPARERS

Paul E. Roberts - Biologist, Regional Planning and Environmental Center, Fort Worth District- 7 years of USACE experience.

ATTACHMENT A: NEPA COORDINATION AND PUBLIC SCOPING

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

February 12, 2021

Public Notice

Public Input for Granger Lake Master Plan Revision,
Williamson County, Texas

The Fort Worth District, U.S. Army Corps of Engineers (USACE) is revising the Granger Lake Master Plan. The public is invited to view a brief presentation describing the revision process, a map of current land classifications, and instructions on how to submit public comments at the following website:

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

The public involvement process will be conducted online in lieu of face-to-face workshops due to the COVID-19 pandemic. All members of the public are encouraged to submit online comments and suggestions from **24 February** through **26 March 2021**. The presentation and online review materials will be available during the 30-day comment period.

A Master Plan is defined by USACE as the strategic land use management document that guides the comprehensive management and development of all recreational, natural, and cultural resources throughout the life of the water resource development project. In general, it defines "how" the resources will be managed for public use and resource conservation, and is a vital tool used by USACE to guide the responsible stewardship of USACE administered lands and resources for the benefit of present and future generations.

The current master plan was last updated in 1974 and is in need of a full 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, natural, cultural, and recreational resource management objectives, recreation facility needs, and special topics such as threatened and endangered species habitat. **Public participation is critical to the successful revision of the Master Plan.**

Questions pertaining to the proposed revision can be addressed to: **Scott Blank**, Lake Manager, U.S. Army Corps of Engineers, 500 Overlook Rd, Georgetown, TX 78633, m2swfodga@usace.army.mil, (512) 930-5253.

Sincerely,

Amanda McGuire

Amanda M. McGuire
Chief, Environmental Branch
Regional Planning and Environmental Center

NEWS RELEASE

U.S. ARMY CORPS OF ENGINEERS **BUILDING STRONG®**

For Immediate Release: NR 21-002
February 12, 2021

Contact: Clay Church, 817-886-1314
clayton.a.church@usace.army.mil

U.S. Army Corps of Engineers officials to host virtual public involvement presentation for the Granger Lake Master Plan revision

FORT WORTH, Texas – U.S. Army Corps of Engineers, Fort Worth District officials announce initiation of the process to revise the Granger Lake Master Plan.

The public is invited to view the online public involvement video presentation along with pertinent information at the following website:

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

Beginning February 24, the USACE website above will contain a brief video presentation describing the revision process, a copy of the current (1974) master plan, a map of the current land use classifications, and instructions for submitting comments to USACE. The public involvement process will be conducted online in lieu of face-to-face workshops due to the COVID-19 pandemic. All members of the public are encouraged to submit written comments and suggestions during the 30-day public comment period from February 24 through March 26.

USACE defines a master plan as the strategic land use management document that guides the comprehensive management and development of all recreational, natural, and cultural resources throughout the life of the water resource development project. The master plan is a vital tool produced and used by USACE to guide the responsible stewardship of USACE administered lands and resources for the benefit of present and future generations. Public participation is critical to the successful revision of the master plan.

The current 1974 master plan is in need of revision to address changes in regional land use, population, outdoor recreation trends, and USACE management policy. Key topics to be addressed in the revised master plan include revised land classifications, natural, cultural, and recreational resource management objectives, recreation facility needs, and special topics such as threatened and endangered species habitat.

Questions pertaining to the proposed revision can be addressed to: Lake Manager Scott Blank, U.S. Army Corps of Engineers, 500 Overlook Rd, Georgetown, TX 78633, m2swfodga@usace.army.mil, (512) 930-5253.

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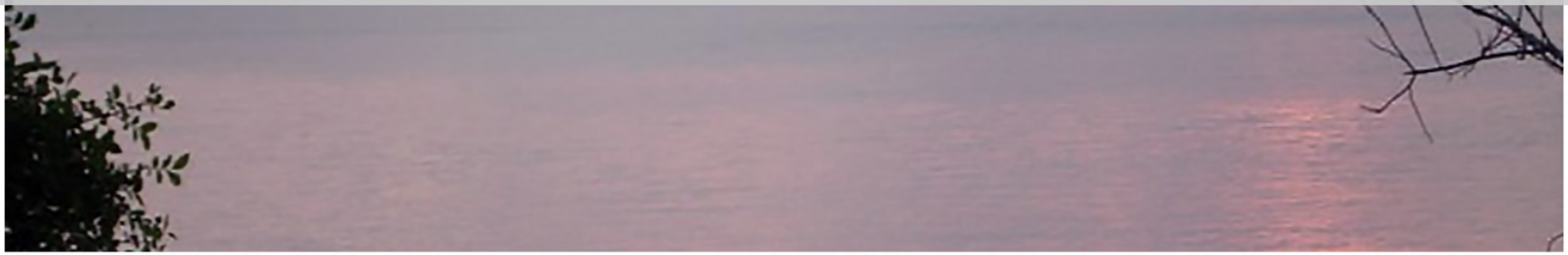
Visit the Fort Worth District Web site at: www.swf.usace.army.mil and social media at: https://about.me/usacefortworth



Presentation for Public and Agency Input

The Fort Worth District, U.S. Army Corps of Engineers (USACE) is hosting an online review to provide information and receive public input to begin the process of revising the Master Plan for Granger Lake. Normally, USACE would conduct a face-to-face public workshop to announce the start of the revision and to request comments from the public. However, precautions associated with the COVID-19 virus have made it necessary to conduct the public involvement process online instead of hosting a face-to-face workshop. Please watch the following video presentation or download the PDF copy to read the presentation. **The existing Master Plan documents and map are available to download at the bottom of the page as well as a comment form with instructions on how to send comments.**

Watch video on YouTube
Download a PDF copy to read the presentation.

General Information

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

About Granger Lake

Granger Lake, (formally Laneport Lake) was authorized by the Flood Control Act approved 03 September 1954 (Public Law (PL) 83-780) for the purpose of flood control, water conservation storage, recreation, and fish and wildlife enhancement. Granger Lake is currently a multipurpose water resources project operated by USACE that includes balancing the needs of the surrounding population, visitors, and the ecological system. The lake, located on the San Gabriel River in the Brazos River Basin, is also managed for public recreation and environmental stewardship, including fish and wildlife conservation.

What is a Master Plan?

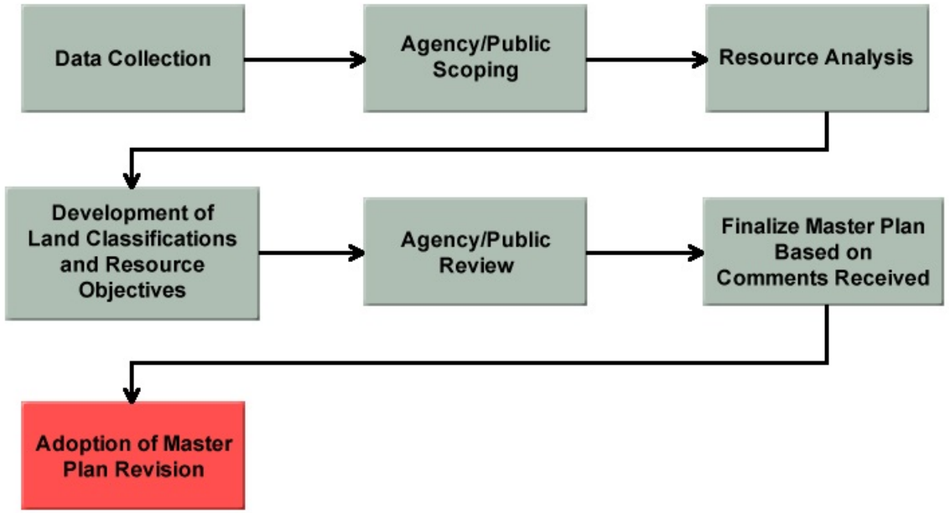
The Master Plan is the strategic land use management document that guides the comprehensive management and development of all recreational, natural, and cultural resources of the lake throughout the life of the water resources project.

Why Revise the Granger Master Plan?

Why Revise the Granger Master Plan?

The current Master Plan for Granger Lake was last updated in 1974. 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.

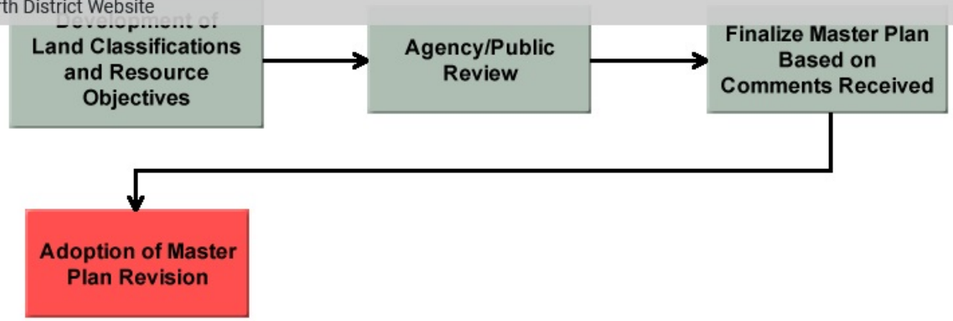
The Master Planning Process



Comments may be submitted online by filling out the Comment Form below and clicking the link provided on the comment form, or by mailing the comments to the address below. Only written comments will be accepted. The comment period begins February 24, 2021 and ends March 26, 2021. Comments and questions pertaining to the master plan revision can be addressed to:

U.S. Army Corps of Engineers
Attn: Scott Blank, Lake Manager
500 Overlook Rd
Georgetown, TX 78633

Phone: (512) 930-5253
OR
Email: m2swfodga@usace.army.mil



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Georgetown, TX 78633

Phone: (512) 930-5253
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Email: m2swfodga@usace.army.mil

Related Files

February 24, 2021

- Public Involvement Presentation (594 KB)
- Comment Form with Instructions (264 KB)
- Master Plan - March 1974 (18.2 MB)
- Land Classification Map - March 1974 (2.3 MB)

February 12, 2021

- News Release NR 21-002
- Public Notice: Public Input for Granger Lake Master Plan Revision, Williamson County, Texas

US Army Corps of Engineers®

Public Workshop

Comment Form

Granger Lake, Texas

Master Plan Revision

Granger, Texas

24 February through 26 March 2021

Questions, comments, or suggestions?

Your input on the Master Plan revision and any related environmental comments under the National Environmental Policy Act (NEPA) is valuable. Your participation is key to development of a successful Master Plan. Please write your questions, comments, or suggestions in the space provided below. Feel free to use additional pages if needed. Instructions for commenting are given below, and all written comments must be received within the 30 day window above. 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:

Scott Blank, USACE – Granger Lake Manager
500 Lake Overlook Drive,
Georgetown, TX 78633
Email: m2swfodga@usace.army.mil

Additional information and comment sheets can be found at the following:
http://www.swf.usace.army.mil/About/LakesandRecreationInformation/MasterPlanUpdates.aspx

US Army Corps of Engineers®

Comment Form Instructions

Granger Lake, Texas *Master Plan Revision*

Comment Period

24 February - 26 March 2021

The U.S. Army Corps of Engineers is in the process of revising the Granger Lake Master Plan. The master plan revision will guide the land and recreational management of the federally owned property that make up the lake and its shoreline 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 dam and reservoir information and a copy of the current land use map can be found on the web address below.

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

- View the presentation, current master plan, and map and fill out a comment form available at: http://www.swf.usace.army.mil/About/LakesandRecreationInformation/MasterPlanUpdates/Granger-Lake
- provide comments in an email message or use comment form and send to: m2swfodga@usace.army.mil
- provide comments in a letter or use comment form and mail to:

Scott Blank, USACE
Granger Lake Manager
500 Lake Overlook Drive
Georgetown, Texas 78633

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

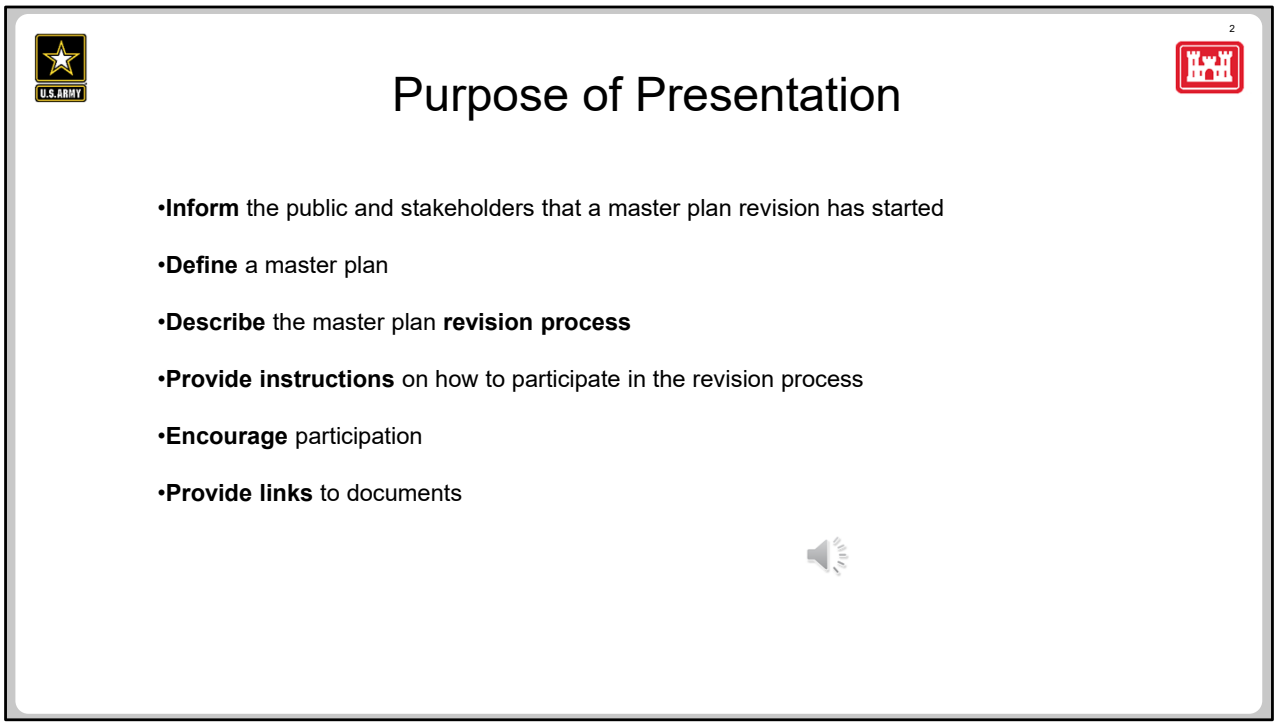
GRANGER LAKE
MASTER PLAN REVISION:
PUBLIC INVOLVEMENT PRESENTATION

U.S. Army Corps of Engineers
Fort Worth District
Granger Lake

24 February 2021

US Army Corps of Engineers

Welcome to the Public Involvement Presentation for the master plan revision at **Granger Lake.** ***Public and stakeholder involvement is critical to the success of the master plan revision***. As the country is responding to the COVID-19 outbreak, public meetings and workshops which accompany a master plan revision are all cancelled. The presentation you are viewing is the alternative to the Corps hosting face-to-face public meetings or workshops. Thank you for taking the time to participate.

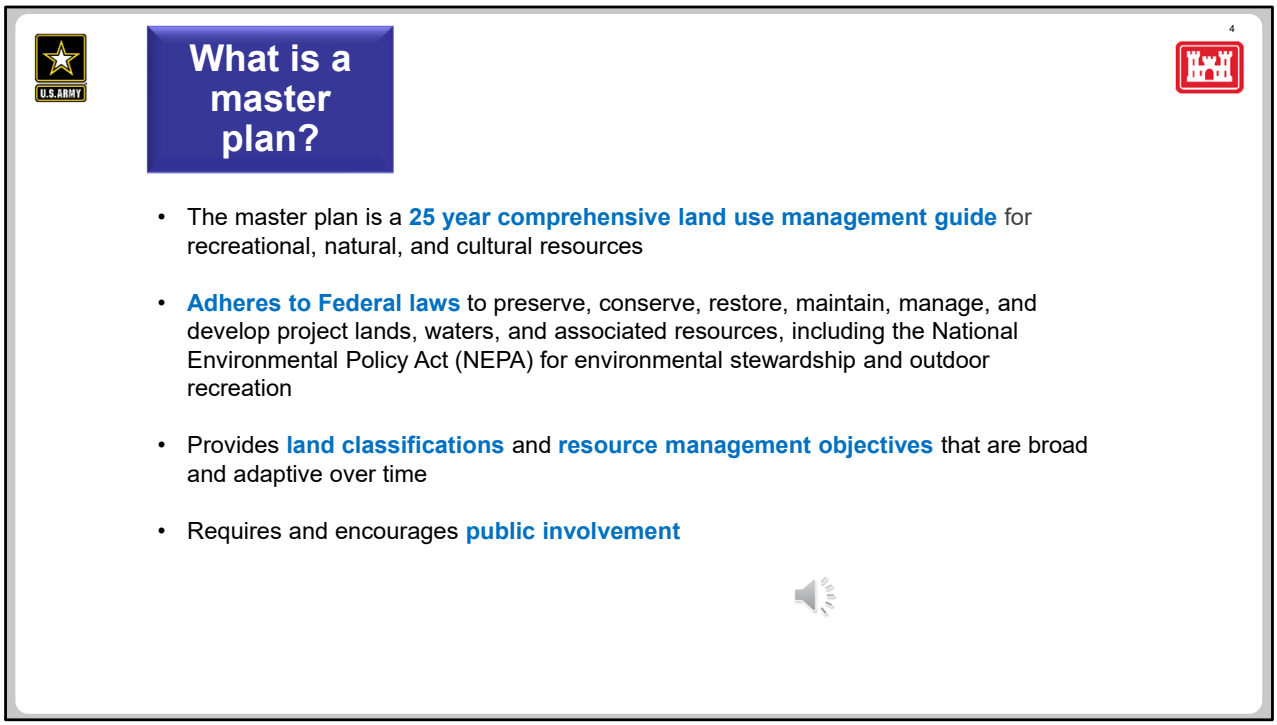


The purpose of this presentation is to inform the public and stakeholders that a master plan revision has started at Granger Lake. This presentation will define a master plan, describe the master plan revision process, provide instructions on how to participate in the process, and encourage participation. It will also provide links to documents and details about how to contact the Corps to ask questions.

The information provided through public and stakeholder comments is essential to the decision making process of how project lands will be classified and managed. The Corps wants your ideas and comments. After watching this presentation, review the other material on the project website and send in comments and participate in planning the future of Granger Lake.

Topics to be covered in this presentation are summed up under these 8 questions that are often asked in a public meeting or workshop:
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?

Under each of these 8 topics, this presentation will provide details to help you better understand the master plan project and your role in the process.

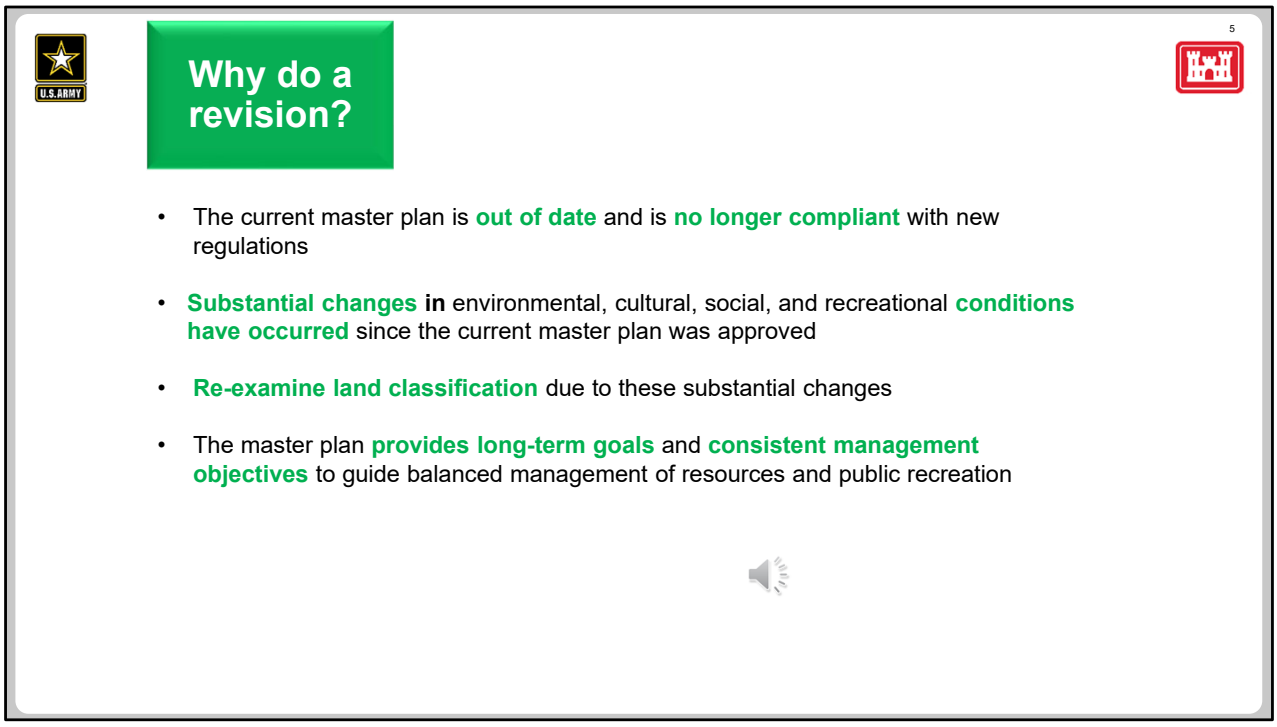


You might be wondering, what is a master plan?

The master plan is the document that will guide the land use and management of the project for the next 25 years, while adhering to all applicable Federal laws including the National Environmental Policy Act, or NEPA. The focus of the plan is the designation of land classifications with corresponding management plans, as well as establishing resource management objectives.

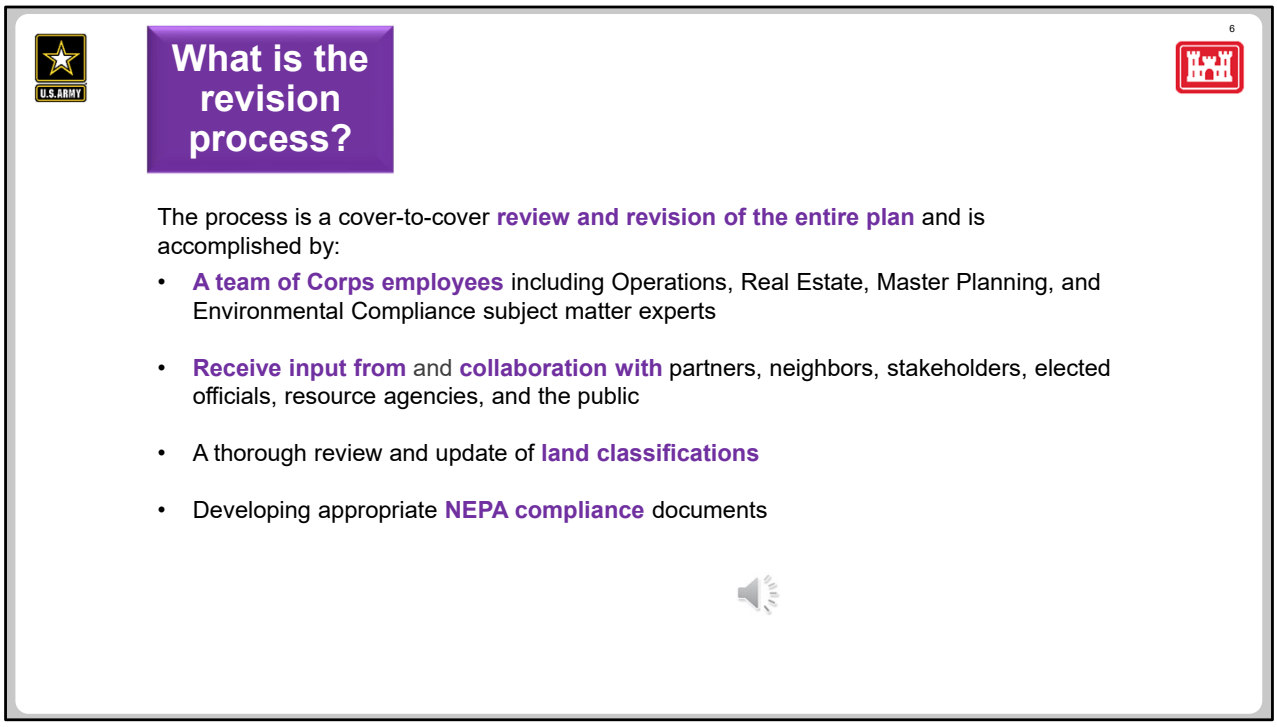
The key to a successful master plan is public involvement.

Participation, in the form of providing written comments, is how you can help.

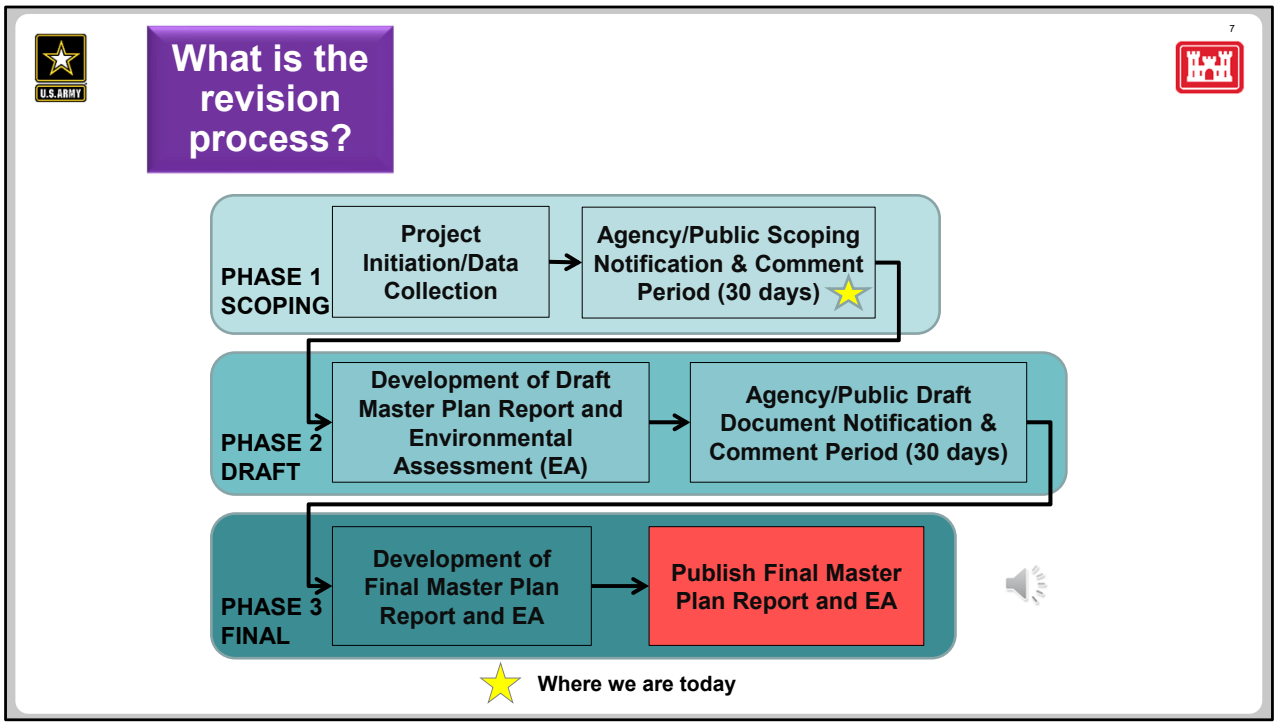


Why is the Corps doing a revision to the master plan at this time?

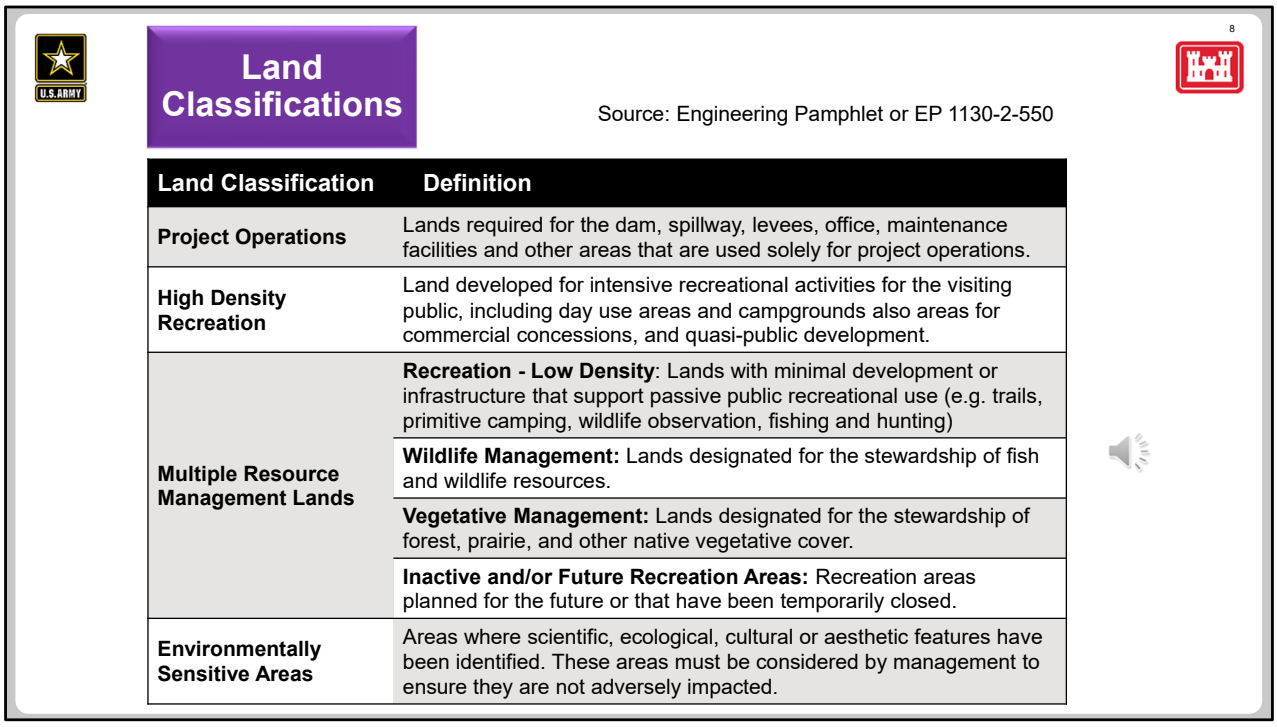
The Corps is undergoing master plan revisions at many of their projects nationwide as existing plans are no longer compliant with current regulations. Many projects have also been influenced by changes in the surrounding environment, either by increased urbanization and growth, or changes in rural patterns of land use. As change is ever constant, an update to the plan is needed to capture how the project land classifications meet the current and future projected uses. Not only does land use change, but also management resources in terms of personnel over time. The master plan provides stability, with long-term goals, and a consistent management strategy, for project resources.



The revision process includes a cover-to-cover review and update of the entire plan. The revision involves input from the public and stakeholders, but is compiled and completed by a team of Corps employees from a wide array of disciplines. Operations, Real Estate, Master Planning and Environmental Compliance are a few of the subjects where expertise is needed. The revision process will review all of the land classifications and recommend changes as appropriate. The revision process is a federal action that requires compliance with NEPA, and the appropriate documentation will be a part of the plan.



The revision process includes 3 phases: (scoping, draft and final)
The scoping phase is when the federal agency asks for initial input from other agencies, citizens and organizations regarding project area, resources and uses. This is the phase we are currently in, as noted by the yellow star on the chart.
The draft phase is when the Corps asks for public comments on the proposed recommendations in the draft master plan document.
The final phase is when the Corps incorporates public comments from the draft review into a final master plan document.
The plan is published after formal approval by the District Commander.



The Corps defines land classification as the primary use for which project lands are managed. All Federally owned lands are zoned for development and resource management consistent with project purposes.

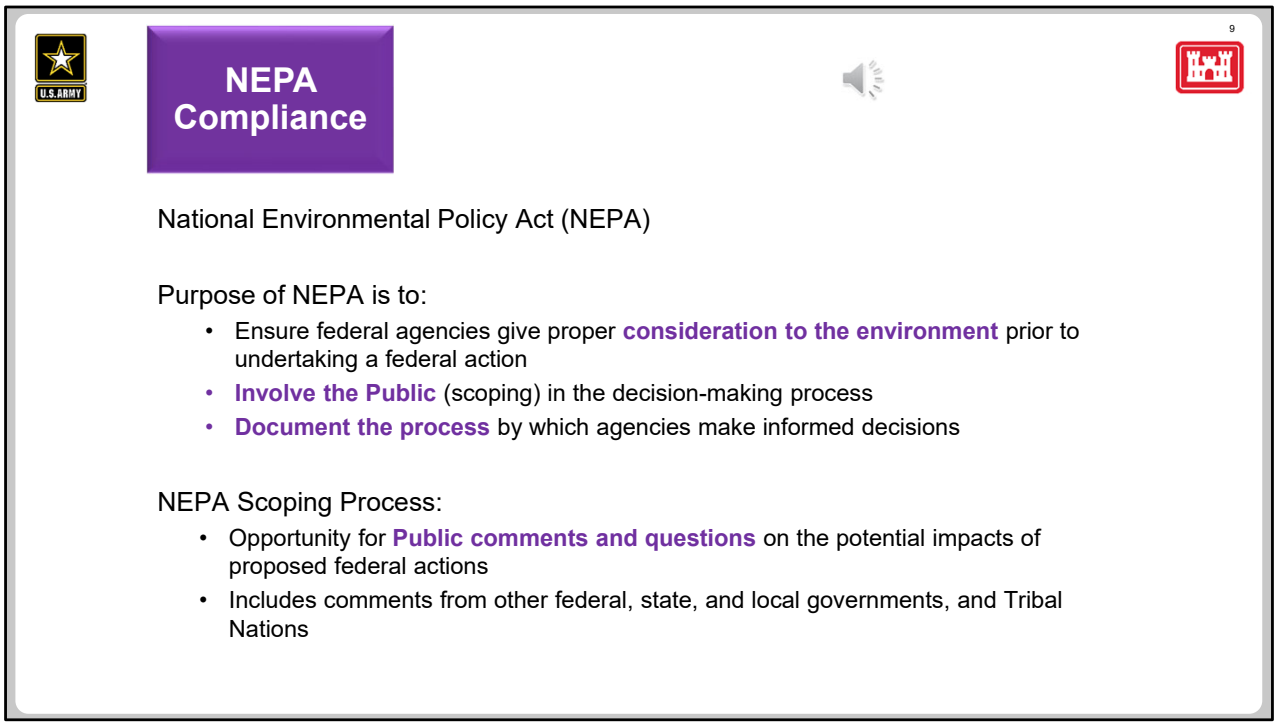
Utilizing the current Federal guidance, the land classifications are defined as shown in this table.

The Project Operations classification is used solely for lands dedicated for the operation of the project, including the dam, spillway, levees, project office, and other operational features.

The classification High Density Recreation is assigned to lands that are being used for intensive recreational activities, including day use and campground areas.

The Multiple Resource Management Lands allows for the designation of a predominate use and are subdivided into 4 classifications. All 4 classifications essentially allow for similar activities to occur, but are managed with a particular emphasis, including low density recreation, wildlife management, vegetative management, and inactive or future recreation areas.

The protection of Environmentally Sensitive Areas is given priority, and are for lands with unique scientific, ecological, cultural, or aesthetic features. Examples include endangered species habitat, scenic shorelines, and rare and unique plant communities to mention a few.

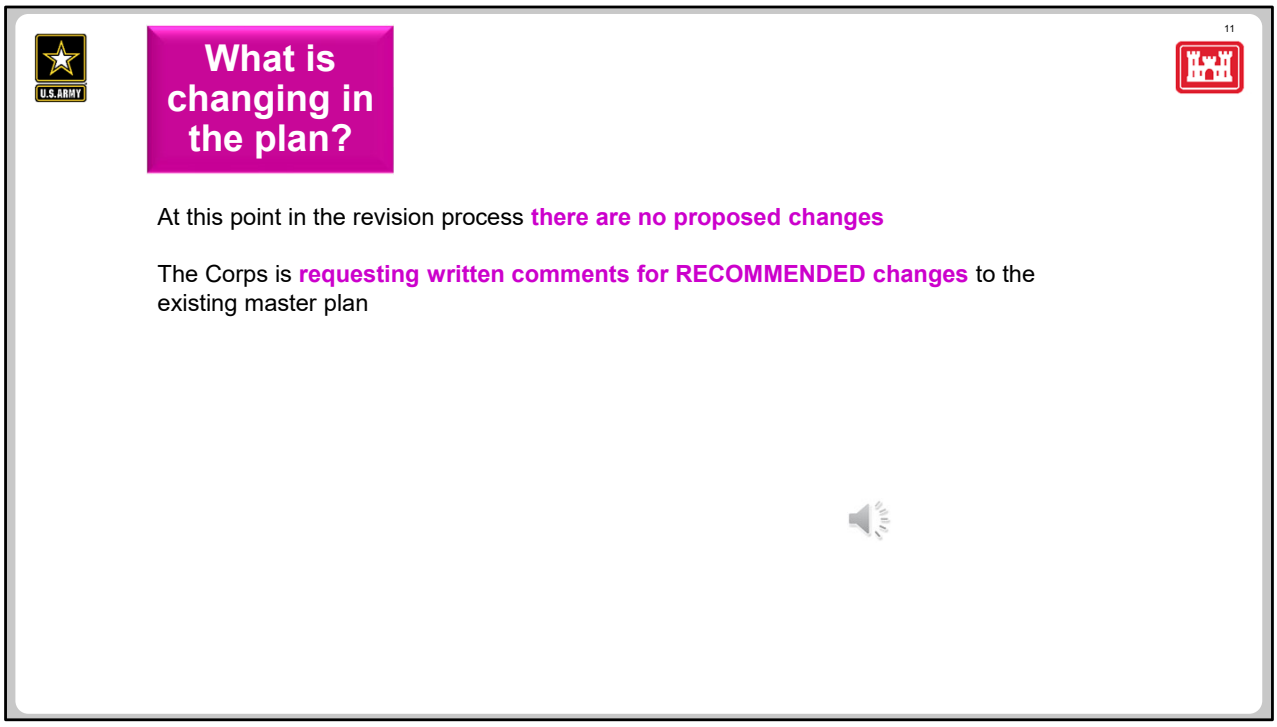


NEPA is the National Environmental Policy Act.

Compliance with NEPA is required during the master plan revision process. NEPA is required so that federal agencies give proper consideration to the environment prior to undertaking a federal action. Scoping during NEPA involves the public in the decision-making process, while documenting the process by which federal agencies make informed decisions.

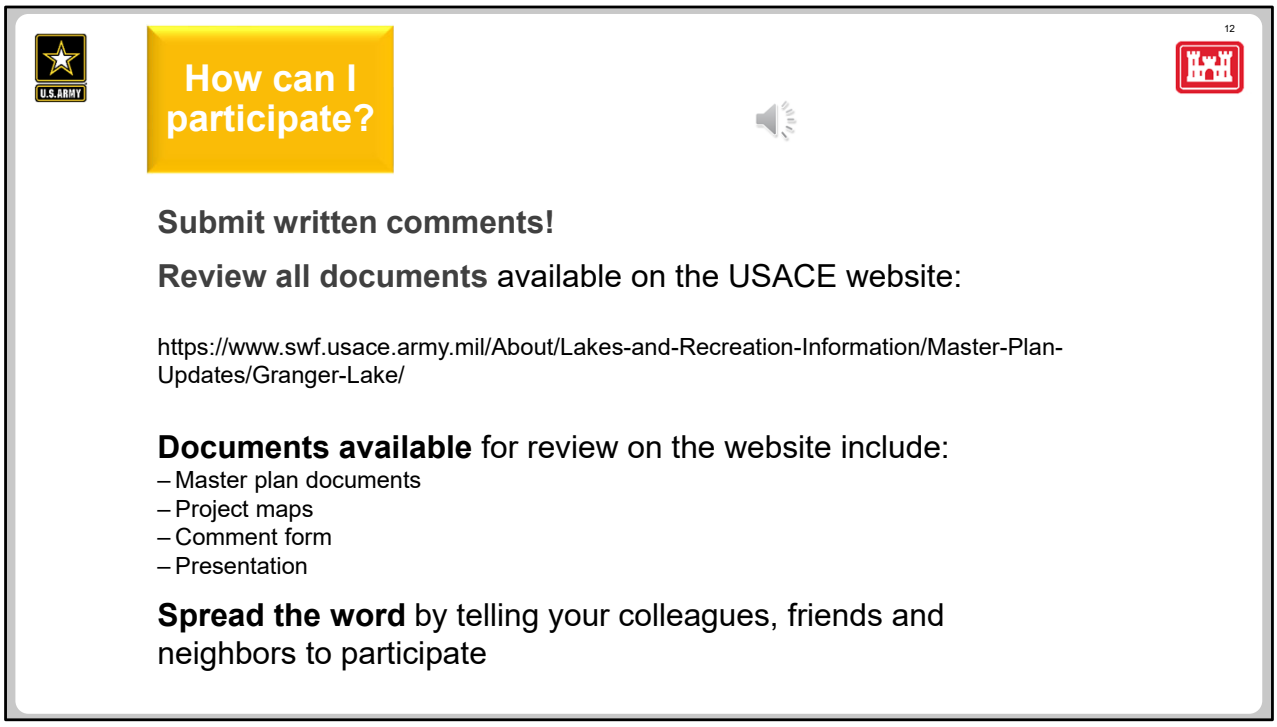
The NEPA process provides the public with the opportunity to ask questions and comment on the potential impacts of proposed federal actions. It also includes comments from other federal, state and local governments, and Tribal Nations.

There are topics of public interest that will not be part of the master plan. The master plan does not include facility designs, daily project administration details, or any technical discussion regarding flood risk management, water quality, water supply, shoreline management, water level management, hydropower, or navigation.



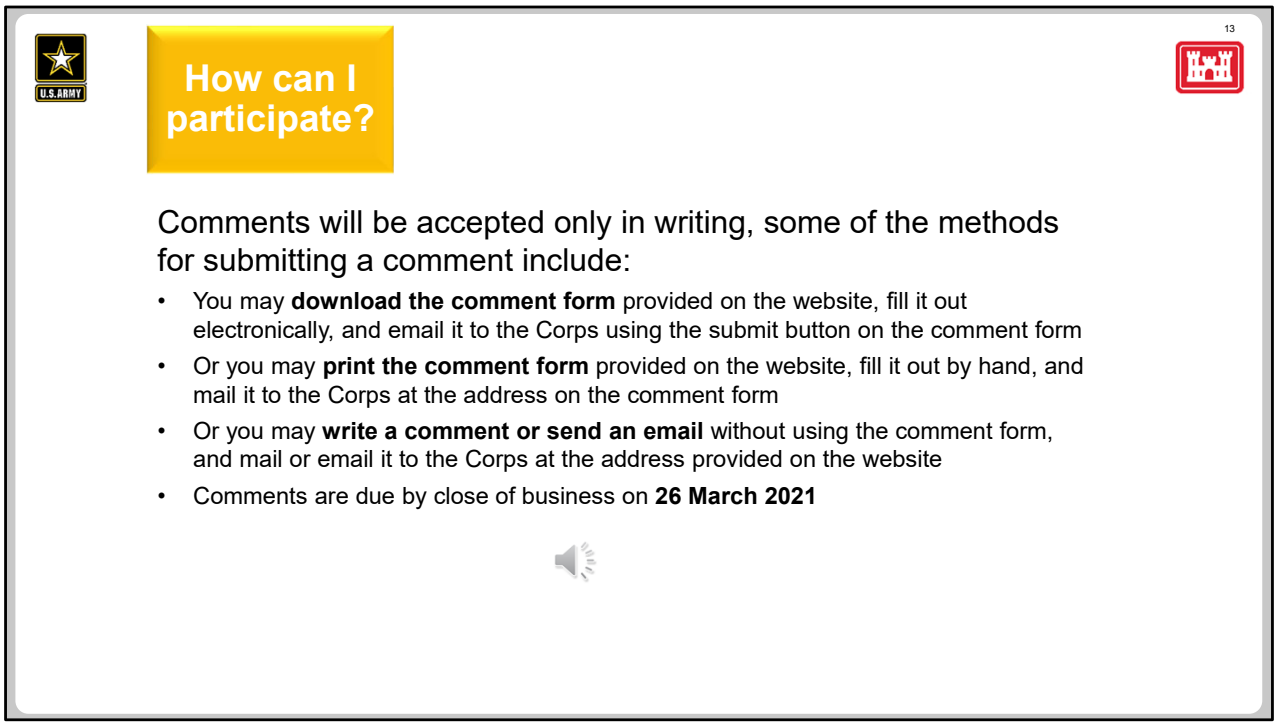
The master plan will be changing from the current master plan.

However, at this point in the Scoping Phase of the process, nothing has been proposed to change. Scoping is where the federal agency asks for initial input from other agencies, citizens, and organizations regarding project area, resources and uses. The purpose of this public involvement presentation is to inform the Public that the master plan revision has started, and to collect suggestions and written comment for possible changes to the master plan.



You can participate in the process by reviewing the documents available on the website and submit written comments. The Corps will only accept comments in written format. The project website is hosting all the documents relevant to the master plan revision, including the current master plan documents, project maps, comment forms with instructions on how to submit a comment, and copies of this presentation for your review. As the project progresses, and new information is developed, it will be posted to this project website, so you may want to bookmark the site for future reference.

We are asking for your help to spread the word to others, letting them know the master plan revision has been initiated, and this is the opportunity to participate in the process.



The Corps can accept any form of written comments and we have provided a few methods that may make it easier to submit.

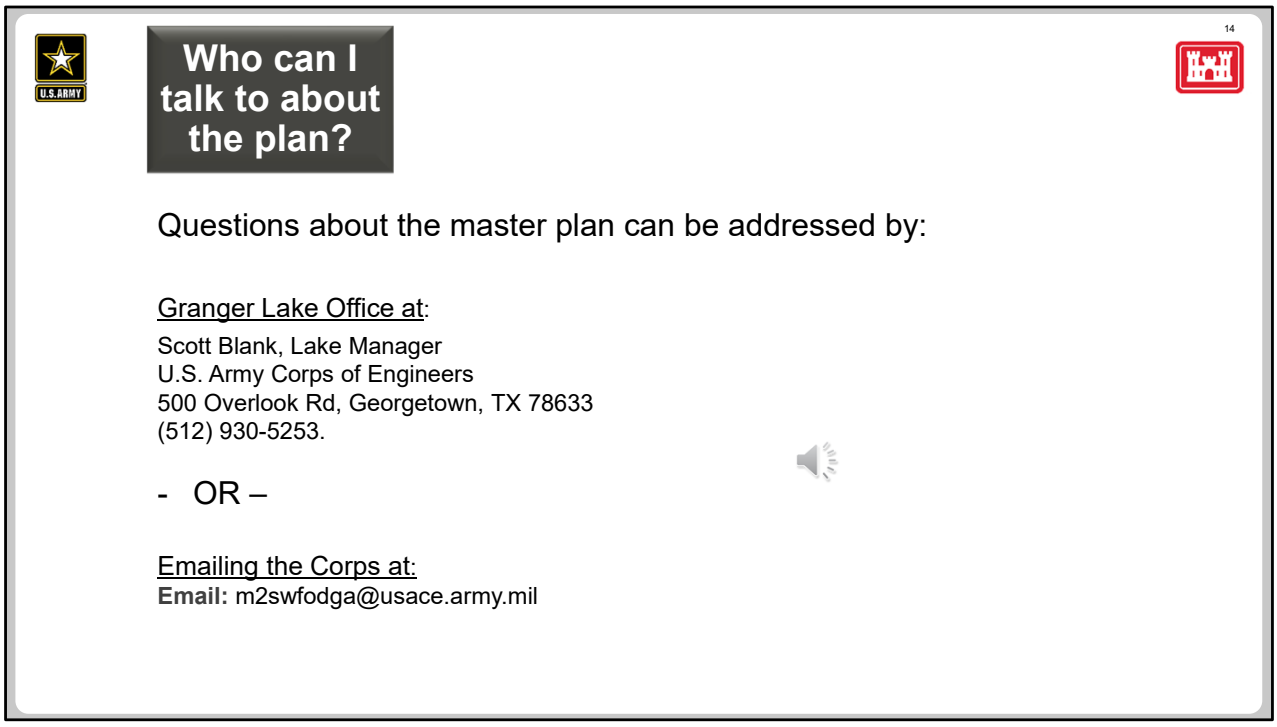
A comment form has been prepared and is available on the website which you can download and fill out electronically. Hit the submit button on the form, and it will autofill the email address, and you can send it in.

Another method is to print the comment form provided on the website and fill it out by hand, or electronically, and mail it in to the Corps.

Or you can write a comment in a letter, or email, and send it in. You don't have to use the comment form.

We will except all of these methods, and any other, as long as it's a written comment.

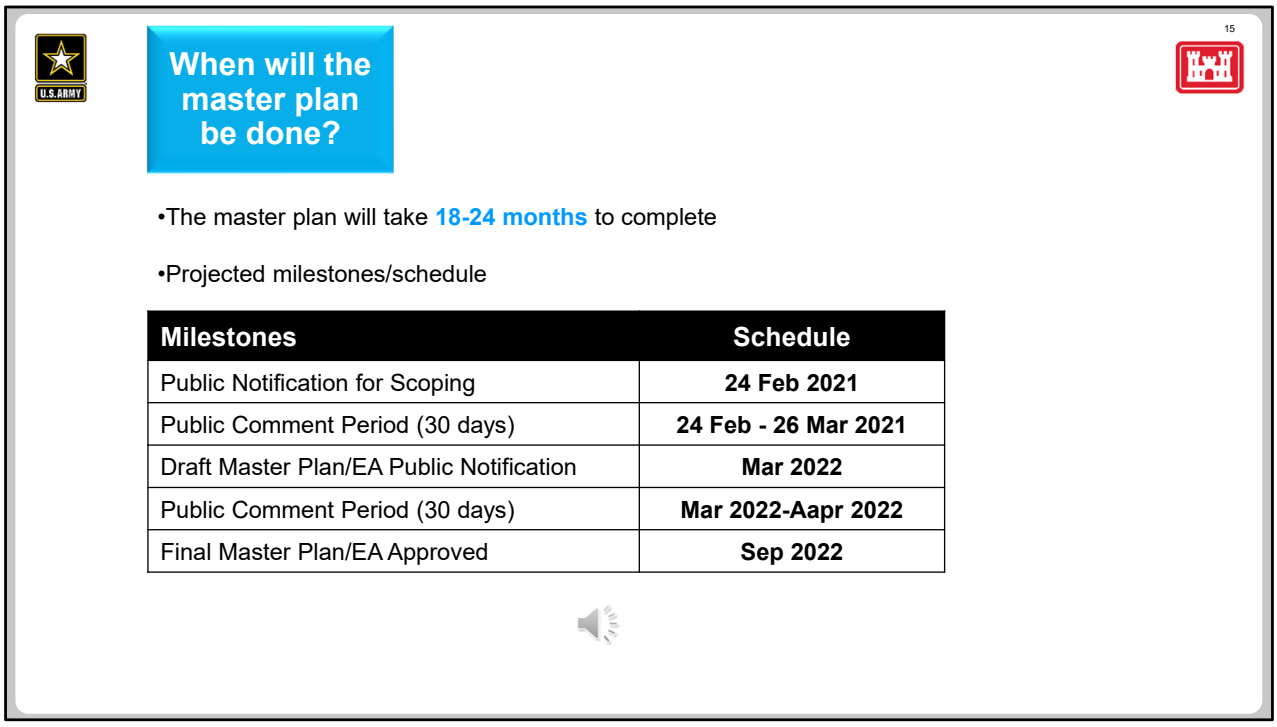
The comment period is open for 30 calendar days from the initial announcement.



If you have questions regarding the master plan, please call or email the following Corps project office or district staff.

You can also send questions to the Email address setup for this project as listed on this slide.

If you need to review a printed copy of the information please contact the lake office to make your request.

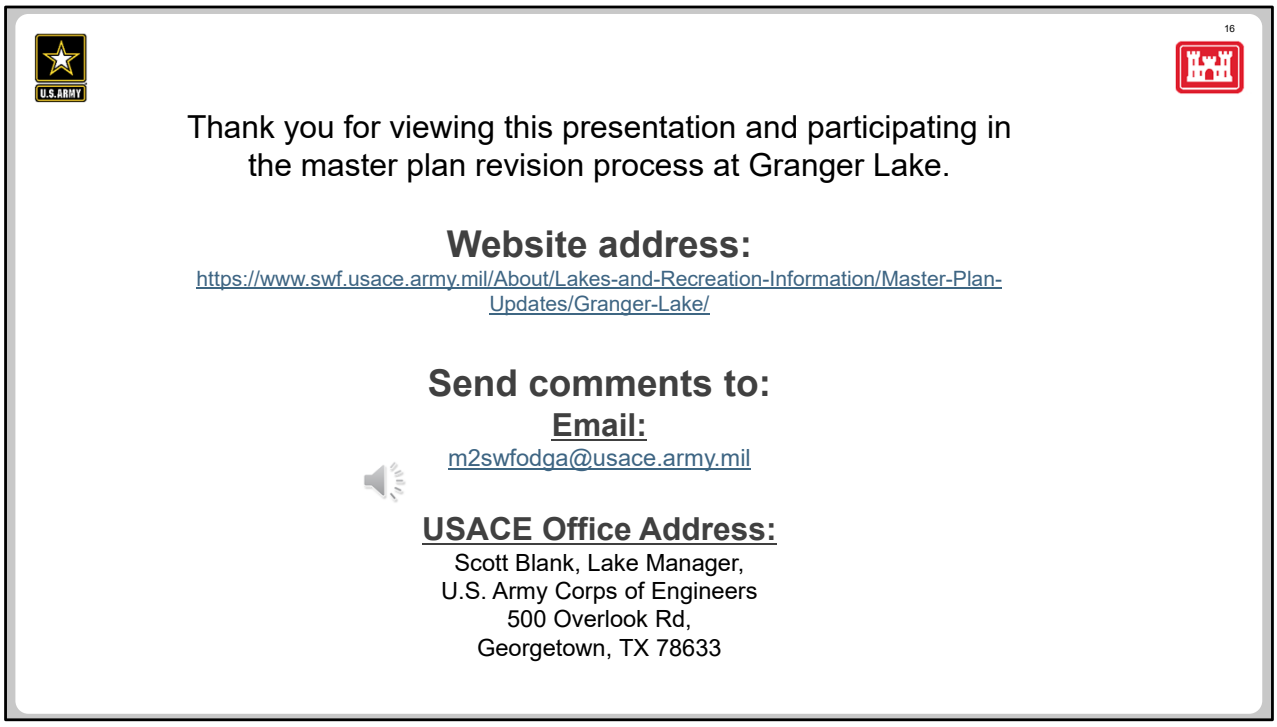


The master plan will take 18-24 months to complete.

Public notification for scoping was initiated on February 24. The 30-day comment period when written comments are accepted will remain open until March 26th.

The draft document is scheduled to be available for public review by March 2022, followed by a public comment period.

The final approved master plan and EA is scheduled for **September 2022**.



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

Project documents are available at this website.

Please send your comments to the Email address, or USACE Office Address listed here.

Thank you.

APPENDIX C – WILDLIFE DOCUMENTS

Items included in Appendix C:

IPaC Report – USFWS

SGCN List – TPWD

Rare Species Listing – TPWD

WHAP Report – USACE

Prairie Assessment Report – USACE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Austin Ecological Services Field Office
10711 Burnet Road, Suite 200
Austin, TX 78758-4460
Phone: (512) 490-0057 Fax: (512) 490-0974
http://www.fws.gov/southwest/es/AustinTexas/
http://www.fws.gov/southwest/es/EndangeredSpecies/lists/

In Reply Refer To: April 25, 2022
Project Code: 2022-0035479
Project Name: Granger Lake Master Plan 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, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

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

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

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

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

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

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

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

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

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of

this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

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:

Austin Ecological Services Field Office
10711 Burnet Road, Suite 200
Austin, TX 78758-4460
(512) 490-0057

Project Summary

Project Code: 2022-0035479
Event Code: None
Project Name: Granger Lake Master Plan Revision
Project Type: Land Management Plans - NWR
Project Description: The Granger Lake Master Plan (Williamson 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 Granger Lake for the next 25 years.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@30.68833265,-97.3595187394037,14z

Counties: Williamson County, Texas

Endangered Species Act Species

There is a total of 14 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.

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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.

Birds

NAME	STATUS
Golden-cheeked Warbler *Setophaga chrysoparia*	Endangered
No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/33	
Piping Plover *Charadrius melodus*	Threatened
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. The location of the critical habitat is not available. This species only needs to be considered under the following conditions: ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/6039	
Red Knot *Calidris canutus rufa*	Threatened
There is **proposed** critical habitat for this species. The location of the critical habitat is not available. This species only needs to be considered under the following conditions: ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/1864	
Whooping Crane *Grus americana*	Endangered
Population: Wherever found, except where listed as an experimental population There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/758	

Amphibians

NAME	STATUS
Georgetown Salamander *Eurycea naufragia* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/7278	Threatened
Jollyville Plateau Salamander *Eurycea tonkawae* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3116	Threatened
Salado Salamander *Eurycea chisholmensis* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3411	Threatened

Clams

NAME	STATUS
False Spike *Fusconaia mitchelli* There is **proposed** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3963	Proposed Endangered

Insects

NAME	STATUS
Coffin Cave Mold Beetle *Batrisodes texanus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6234	Endangered
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate
Tooth Cave Ground Beetle *Rhadine persephone* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5625	Endangered

Arachnids

NAME	STATUS
Bone Cave Harvestman *Texella reyesi* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5306	Endangered
Tooth Cave Spider *Tayshaneta myopica* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2360	Endangered

Flowering Plants

NAME	STATUS
Bracted Twistflower *Streptanthus bracteatus* There is **proposed** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/2856	Proposed Threatened

Critical habitats

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

IPaC User Contact Information

Agency: Department of Defense
Name: Paul Roberts
Address: 819 Taylor st RM 3A12
City: Fort Worth
State: TX
Zip: 76102-0300
Email paul.e.roberts@usace.army.mil
Phone: 8178861880

TEXAS BLACKLAND PRAIRIES SPECIES OF GREATEST CONSERVATION NEED

Scientific Name	Common Name	Status		Abundance Ranking		General Habitat Type(s) in Texas These are VERY broad habitat types as a starting place State of the practice resources are listed in each taxa line for more detailed information	Other Notes	Endemic in Texas
		Federal	State	Global	State			
MAMMALS						W.B. Davis and D.J. Schmidly. 1997 and 1994. Mammals of Texas (online and in print). Texas Tech University (1997) and Texas Parks and Wildlife Department (1994). http://www.nsrl.ttu.edu/tmot1/Default.htm (accessed 2011)		
Blarina hylophaga plumblea	Elliot's short-tailed shrew			G5T1Q	S1	Savanna/Open Woodland		N
Geomys attwateri	Attwater's pocket gopher			G4	S4	Shrubland		Y
Lutra canadensis	River otter			G5	S4	Riparian	Appendix II, CITES	N
Mustela frenata	Long-tailed weasel			G5	S5	Forest, Woodland, Desert Scrub, Shrubland, Savanna/Open Woodland	Statewide	N
Myotis austroriparius	Southeastern myotis			G3G4	S3	Caves/Karst, Forest, Riparian		N
Myotis velifer	Cave myotis			G5	S4	Caves/Karst,		N
Puma concolor	Mountain lion			G5	S2	Forest, Woodland, Desert Scrub, Shrubland, Savanna/Open Woodland, Riparian	Statewide	N
Spilogale putorius	Eastern spotted skunk			G4T	S4	Savanna/Open Woodland, Grassland		N
Sylvilagus aquaticus	Swamp rabbit			G5	S5	Riparian, Freshwater Wetland		N
Tadarida brasiliensis	Brazilian free-tailed bat			G5	S5	Cave/Karst, Artificial Refugia	Statewide	N
Taxidea taxus	American badger			G5	S5	Grassland, Desert scrub, Woodland, Savanna/Open Woodland, Forest		N
Ursus americanus	Black bear	SAT	T	G5	S3	Forest, Woodland, Savanna/Open Woodland, Desert Scrub, Shrubland	see also Louisiana black bear; may overlap with Louisiana black bear in TBPR, ECPL	N
BIRDS						The Birds of North America Online (A. Poole, Ed.). 2005 (with current updates by species). Retrieved from The Birds of North America Online database: http://bna.birds.cornell.edu/BNA/ (accessed 2011). Supported by information from the Cornell Lab of Ornithology and the American Ornithologists' Union (http://www.aou.org/).		BIRDS ONLY: instead of endemism these numbers are for taxonomic sorting
Anas acuta	Northern Pintail			G5	S3B,S5N	Lacustrine, freshwater wetland, saltwater wetland, coastal, marine	Winter	2
Colinus virginianus	Northern Bobwhite			G5	S4B	Grassland, Shrubland, Savanna/Open Woodland	deleted for CHIH	4
Tympanuchus cupido	Greater Prairie-Chicken (Interior)			G4	S1B	Grassland	Year-round	6
Meleagris gallopavo	Wild Turkey			G5	S5B	Shrubland, Savanna/Open Woodland, Forest, Riparian, Agricultural	Year-round, added *merriami* for CHIH	8
Ixobrychus exilis	Least Bittern			G5	S4B	Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary	Breeding	11
Egretta thula	Snowy Egret			G5	S5B	Riparian, Riverine, Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary, Coastal, Cultural Aquatic	Breeding	12
Egretta caerulea	Little Blue Heron			G5	S5B	Riparian, Riverine, Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary, Coastal, Cultural Aquatic	Breeding	13
Butorides virescens	Green Heron			G5	S5B	Riparian, Riverine, Lacustrine, Freshwater Wetland, Cultural Aquatic	Breeding	16
Mycteria americana	Wood Stork		T	G4	SHB,S2N	Riverine, Freshwater wetland	Migrant	18
Ictinia mississippiensis	Mississippi Kite			G5	S4B	Woodland, Forest, Riparian, Developed:Urban/Suburban/Rural	Breeding	20
Haliaeetus leucocephalus	Bald Eagle			G5	S3B,S3N	Riparian, Lacustrine, Freshwater Wetland, Saltwater Wetland	Year-round, added CRTB	22
Circus cyaneus	Northern Harrier			G5	S2B,S3N	Grassland, Shrubland	Year-round	23
Buteo lineatus	Red-shouldered Hawk			G5	S4B	Woodland, Forest, Riparian, Freshwater Wetland	Year-round	26
Pluvialis dominica	American Golden-Plover			G5	S3	Grassland, Freshwater Wetland, Agricultural	Migrant	39
Charadrius montanus	Mountain Plover	PT		G3	S2	Agricultural, Grassland	Winter	43
Scolopax minor	American Woodcock			G5	S2B,S3N	Woodland, Forest, Riparian	Winter (some breeding during that time)	51
Sternula antillarum	Least Tern	LE*	E*	G4	S3B	Riverine, Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary, Coastal, Marine, Developed: Industrial	Year-round; subspecies *athalassos*	54
Asio flammeus	Short-eared Owl			G5	S4N	Grassland, Shrubland, Agricultural	Winter	65
Caprimulgus carolinensis	Chuck-will's-widow			G5	S3S4B	Woodland, Forest, Riparian	Breeding	66
Melanerpes erythrocephalus	Red-headed Woodpecker			G5	S3B	Savanna/Open Woodland, Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Year-round	67
Dryocopus pileatus	Pileated Woodpecker			G5	S4B	Savanna/Open Woodland, Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Year-round	69
Tyrannus forficatus	Scissor-tailed Flycatcher			G5	S3B	Desert Scrub, Grassland, Shrubland, Agricultural, Developed	Breeding	71
Lanius ludovicianus	Loggerhead Shrike			G4	S4B	Desert Scrub, Grassland, Shrubland, Savanna/Open Woodland, Agricultural, Developed	Year-round	73
Vireo bellii	Bell's Vireo			G5	S3B	Desert scrub, Shrubland, Riparian	Breeding	74
Poecile carolinensis	Carolina Chickadee			G5	S5B	Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Year-round	76
Thryomanes bewickii (bewickii)	Bewick's Wren			G5	S5B	Shrubland, Savanna/Open Woodland, Woodland, Developed: Urban/Suburban/Rural	Year-round, red-backed form only	77
Cistothorus platensis	Sedge Wren			G5	S4	Grassland, Freshwater Wetland	Winter	78
Hylocichla mustelina	Wood Thrush			G5	S4B	Woodland, Forest, Riparian	Breeding	79
Anthus spragueii	Sprague's Pipit	C		G4	S3N	Barren/Sparse Vegetation, Grassland, Shrubland, Agricultural	Winter	80
Dendroica dominica	Yellow-throated Warbler			G5	S4B	Woodland, Forest, Riparian	Breeding	84
Protonotaria citrea	Prothonotary Warbler			G5	S3B	Woodland, Forest, Riparian, Lacustrine, Freshwater Wetland	Breeding	86
Limnothlypis swainsonii	Swainson's Warbler			G4	S3B	Woodland, Forest, Riparian	Breeding	88
Seiurus motacilla	Louisiana Waterthrush			G5	S3B	Woodland, Forest, Riparian	Breeding	89
Oporornis formosus	Kentucky Warbler			G5	S3B	Woodland, Forest	Breeding	90
Spizella pusilla	Field Sparrow			G5	S5B	Grassland, Shrubland, Savanna/Open Woodland	Year-round	96
Ammodramus savannarum	Grasshopper Sparrow			G5	S3B	Grassland, Agricultural	Year-round	97
Chondestes grammacus	Lark Sparrow			G5	S4B	Grassland, Shrubland, Savanna/Open Woodland	Year-round	98
Ammodramus henslowii	Henslow's Sparrow			G4	S2S3N,SXB	Grassland, Savanna/Open Woodland	Winter	100
Ammodramus leconteii	Le Conte's Sparrow					Grassland	Winter	101
Zonotrichia querula	Harris's Sparrow			G5	S4	Shrubland, Agricultural	Winter	103
Calcarius mccownii	McCown's Longspur			G4	S4	Grassland, Agricultural	Winter, TBPR (northern), ECPL (northern)	104

Scientific Name	Common Name	Status		Abundance Ranking		General Habitat Type(s) in Texas These are VERY broad habitat types as a starting place State of the practice resources are listed in each taxa line for more detailed information	Other Notes	Endemic in Texas
		Federal	State	Global	State			
Calcarius pictus	Smith's Longspur					Grassland, Agricultural	Winter	105
Piranga rubra	Summer Tanager			G5	S5B	Savanna/Open Woodland, Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Breeding	106
Passerina ciris	Painted Bunting			G5	S4B	Shrubland, Agricultural	Breeding	107
Spiza americana	Dickcissel			G5	S4B	Grassland, Agricultural	Breeding	108
Sturnella magna	Eastern Meadowlark			G5	S5B	Grassland, Shrubland, Savanna/Open Woodland	Year-round; subspecies *lilliana* added for CHIH	109
Euphagus carolinus	Rusty Blackbird			G4	S3	Woodland, Forest, Riparian, Lacustrine, Freshwater Wetland	Winter	110
Icterus spurius	Orchard Oriole			G5	S4B	Shrubland, Savanna/Open Woodland, Woodland, Riparian	Breeding	111
REPTILES AND AMPHIBIANS						J.E. Werler and J.R. Dixon. 2000. Texas Snakes: Identification, Distribution, and Natural History. University of Texas Press, Austin. 519 pgs. J.R. Dixon. 1987. Amphibians and Reptiles of Texas. Texas A&M University Press, College Station. 434 pp.		
Anaxyrus (Bufo) woodhousii	Woodhouse's toad			G5	SU	woodland, forest, freshwater wetland		N
Apalone mutica	smooth softshell turtle					riparian, riverine, lacustrine, freshwater wetland	added	N
Apalone spinifera	spiny softshell turtle					riparian, riverine, lacustrine, freshwater wetland	added, not AZNM	N
Cheylydra serpentina	Common snapping turtle					riparina, riverine	added	N
Crotalus atrox	Western diamondback rattlesnake				S4	barren/sparse vegetation, desert scrub, grassland, shrubland, savanna, woodland, caves/karst		N
Crotalus horridus	Timber (Canebrake) Rattlesnake		T	G4	S4	woodland, forest, riparian		N
Graptemys caglei	Cagle's map turtle		T	G3	S1	riparian, riverine		Y
Graptemys versa	Texas map turtle			G4	SU	riparian, riverine		Y
Heterodon nasicus	Western hognosed snake					desert scrub, grassland, shrubland	added	N
Macrochelys temminckii	alligator snapping turtle		T	G3G4	S3	riparian, riverine, cultural aquatic	added	N
Ophisaurus attenuatus	western slender glass lizard					grassland, savanna	added	N
Phrynosoma cornutum	Texas horned lizard		T	G4G5	S4	desert scrub, grassland, savanna		N
Pseudacris streckeri	Strecker's Chorus Frog			G5	S3	grassland, savanna, woodland, riparian, cultural aquatic, freshwater wetland		N
Sistrurus catenatus	massasauga					grassland, barren/sparse vegetation, shrubland, coastal,	added	N
Terrapene carolina	Eastern box turtle			G5	S3	grasslands, savanna, woodland		N
Terrapene ornata	Ornate box turtle			G5	S3	grassland, barren/sparse vegetation, deset scrub, savanna, woodland		N
Thamnophis sirtalis annectans	Texas Garter Snake (Eastern/Texas/ New Mexico)			G5	S2	riparian, around lacustrine and cultural aquatic sites		Y
Trachemys scripta	Red-eared slider					riparian, riverine, lacustrine, freshwater wetland, cultural aquatic	added	N
FRESHWATER FISHES						C. Thomas, T.H. Bonner and B.G. Whiteside. 2007. Freshwater Fishes of Texas: A Field Guide. Sponsored by The River Systems Institute at Texas State University, published by Texas A&M University Press. *Editor's Note: All freshwater fishes life history information in this table was sourced directly from the online version; citations are embedded in the online version at http://www.bio.txstate.edu/~tbonner/txfishes/*	Range in Texas, as known	
Anguilla rostrata	American eel			G4	S5	streams and reservoirs in drainages connected to marine environments	mouth upstream to and including the Kiamichi River), Sabine Lake (including minor	N
Atractosteus spatula	alligator gar					channel snag, pool-snag complex, pool-edge, and pool-vegetation habitat	(including minor coastal drainages west to Galveston Bay), Galveston Bay (including	N
Cycleptus elongatus	Blue sucker		T	G3G4	S3	large, deep rivers, and deeper zones of lakes	(including minor coastal drainages west to Galveston Bay), Galveston Bay (including	N
Etheostoma fonticola	Fountain darter	LE	E	G1	S1	usually in dense beds of *Vallisneria, Elodia, Ludwigia* and other aquatic plants; substrate normally mucky	Note: original population in the Comal River extirpated in mid-1950's when Comal Springs	Y
Macryhbopsis storeriana	Silver chub					common over silt or mud, turbid water with very soft sand/silt substrate	other populations of this species, which range through the Mississippi River Basin to	N
Micropterus treculii	Guadalupe bass			G3	S3	small lentic environments; commonly taken in flowing water	of the Brazos, Colorado, Guadalupe, and San Antonio basins; species also found outside of	Y
Notropis atrocaudalis	Blackspot shiner					backwater and swiftest currents	(including minor coastal drainages west to Galveston Bay), Galveston Bay (including	N
Notropis bairdi	Red River shiner					streambeds with widely fluctuating flows subject to high summer temperatures, high rates of evaporation,	Red River, from the mouth upstream to and including the Kiamichi River	N
Notropis buccula	Small eye shiner	C		G2Q	S2	broad condition tolerances (turbidity, salinity, oxygen).	Brazos River; historically as far south as Hempstead (Waller County)	Y
Notropis chalybaeus	Ironcolor shiner					Plain streams and rivers of low to moderate gradient; often at the upstream ends of pools, with a moderate to	(including minor coastal drainages west to Galveston Bay), San Antonio Bay (including	N
Notropis oxyrhynchus	Sharpnose shiner	C		G3	S3	Moderate current velocities and depths, sand bottom	captured into the Red River drainage; introduced in Colorado River drainage	Y
Notropis potteri	Chub shiner		T	G4	S3	turbid, flowing water with silt or sand substrate; tolerant of high salinities	Brazos River, Colorado River, San Jacinto River, Trinity Rivers, and Galveston Bay	N
Notropis shumardi	Silverband shiner					channel with moderate to swift current velocities and moderate to deep depths; associated with turbid water	(including minor coastal drainages west to Galveston Bay), Galveston Bay (including	N
Percina apristis	Guadalupe darter					collections from the clearest waters tributary to the Guadalupe, namely spring heads and the main river west	from the headwaters of the Blanco and the entirety of the San Antonio River	Y
Polyodon spathula	Paddlefish		T	G4	S3	sized rivers, sluggish pools, backwaters, bayous, and oxbows with abundant zooplankton; large reservoirs if	eastward; currently only Red River, from the mouth upstream to and including the	N
Satan eurystomus	Widemouth blindcat		T	G1	S1	Karst: Subterranean waters	(Edwards Limestone, Lower Cretaceous) in the vicinity of San Antonio (Bexar County)	Y
Trogloglanis pattersoni	Toothless blindcat		T	G1	S1	Karst: Subterranean waters	(Edwards Limestone, Lower Cretaceous) in the vicinity of San Antonio (Bexar County)	Y
INVERTEBRATES						www.bugguide.net – good tool for identification and taxonomic information. www.texasento.net – compilation of information on insects in Texas www.odonatacentral.org – resource for identification and distribution of damselflies and dragonflies www.butterfliesandmoths.org – resource for identification and distribution of Lepidoptera www.texasmussels.wordpress.com – resource for information on freshwater mussels in Texas Howells, R. G., R. W. Neck and H. D. Murray. 1996. Freshwater Mussels of Texas. Texas Parks and Wildlife Press, Austin		
Bombus pensylvanicus	American bumblebee			GU	SU*	Grassland, Savanna/Open Woodland	Terrestrial - Insect - Bee/Wasp/Ant	
Chimarra holzenthali	Holzenthal's Philopotamid caddisfly			G1G2	S1	Riparian, Riverine	Aquatic - Insects - Caddisflies; added TBPR, ECPL	
Cotinis boylei	A scarab beetle			G2*	S2*	Grassland, Shrubland, Woodland	Terrestrial - Insect - Beetles	
Nicrophorus americanus	American Burying Beetle	LE		G1	S1	Grassland, Savanna/Open Woodland	Terrestrial - Insect - Beetles	
Potamilus amphichaenus	Texas heelsplitter		T	G1G2	S1	Riverine	Aquatic - Freshwater - Mollusks; new state rank and threatened state status	
Procambarus regalis	Regal burrowing crayfish			G2G3	S2?*	Freshwater Wetland, Grassland	Aquatic - Crustaceans - Crayfish	

Scientific Name	Common Name	Status		Abundance Ranking		General Habitat Type(s) in Texas These are VERY broad habitat types as a starting place State of the practice resources are listed in each taxa line for more detailed information	Other Notes	Endemic in Texas
		Federal	State	Global	State			
Procambarus steigmani	Parkhill prairie crayfish			G1G2	S1S2*	Freshwater Wetland, Grassland	Aquatic - Crustaceans - Crayfish	
Pseudocentroptiloides morihari	A mayfly			G2G3	S2?*	Riverine, Riparian	Aquatic - Insects - Mayflies	
Sphinx eremitoides	Sage sphinx			G1G2	S1?*	Grassland	Terrestrial - Insect - Butterflies/Moths	
Susperatus tonkawa	A mayfly			G1	S1*	Riparian, Riverine	Aquatic - Insects - Mayflies	
PLANTS						J.M. Poole, W.R. Carr, D.M. Price and J.R. Singhurst. 2007. Rare Plants of Texas. Texas A&M University Press, College Station. D.S. Correll and M.C Johnston. 1979. Manual of the Vascular Plants of Texas. The University of Texas at Dallas, Richardson. M.C. Johnston. 1990. The Vascular Plants of Texas: A List Up-dating the Manual of the Vascular Plants of Texas, 2nd Edition. Marshall C. Johnston, Austin. F.W. Gould. 1975. The Grasses of Texas. Texas A & M University Press, College Station. S.D. Jones, J.K. Wipff, and P.M. Montgomery. 1997. Vascular Plants of Texas: A Comprehensive Checklist including Synonymy; Bibliography, and Index. University of Texas Press, Austin. R.A. Vines. 2004. Trees, Shrubs and Woody Vines of the Southwest. Blackburn Press.		
Agalinis densiflora	Osage Plains false foxglove			G3	S2	Savanna/Open Woodland - Outcrops	Terrestrial	N
Astragalus reflexus	Texas milk vetch			G3	S3	Savanna/Open Woodland	Terrestrial	Y
Calopogon oklahomensis	Oklahoma grass pink			G3	S1S2	Savanna/Open Woodland; Grassland; Freshwater Wetland	Terrestrial	N
Carex edwardsiana	canyon sedge			G3G4S3S4	S3S4	Woodland (slopes above Riparian)	Wetland	Y
Carex shinnersii	Shinner's sedge			G3?	S2	Grassland	Wetland	N
Crataegus dallasiana	Dallas hawthorn			G3Q	S3	Riparian (creeks in the Blackland Prairie)	Terrestrial	Y
Cuscuta exaltata	tree dodder			G3	S3	Woodland	Terrestrial	N
Dalea hallii	Hall's prairie-clover			G3	S3	Savanna/Open Woodland; Grassland	Terrestrial	Y
Echinacea atrorubens	Topeka purple-coneflower			G3	S3	Savanna/Open Woodland	Terrestrial	N
Hexalectris nitida	Glass Mountains coral-root			G3	S3	Woodland	Terrestrial	N
Hexalectris warnockii	Warnock's coral-root			G2G3	S2	Woodland	Terrestrial	N
Hymenoxys pygmea	Pygmy prairie dawn			G1	S1	Barren/Sparse Vegetation with Grassland matrix (saline prairie)	currently being described	Y
Liatris glandulosa	glandular gay-feather			G3	S3	Savanna/Open Woodland	Terrestrial	Y
Paronychia setacea	bristle nailwort			G3	S3	Savanna/Open Woodland	Terrestrial	Y
Phlox oklahomensis	Oklahoma phlox			G3	SH	Savanna/Open Woodland	Terrestrial	N
Physaria engelmannii	Engelmann's bladderpod			G3	S3	Savanna/Open Woodland	Terrestrial	Y
Polygonella parksii	Parks' jointweed			G2	S2	Savanna/Open Woodland (sandhills); Grassland	Terrestrial	Y
Prunus texana	Texas peachbush			G3G4	S3S4	Savanna/Open Woodland; Grassland	Terrestrial	Y
Thalictrum texanum	Texas meadow-rue			G2	S2	Savanna/Open Woodland; Riparian (bottomland forest)	Terrestrial	Y
Zizania texana	Texas wild rice	LE	E	G1	S1	Riverine (spring-fed, clear, thermally constant, moderate current, sand to gravel substrate)	Aquatic	Y

Last Update: 8/25/2020

WILLIAMSON COUNTY

AMPHIBIANS

Barton Springs salamander *Eurycea sosorum*

Aquatic; springs, streams and caves with rocky or cobble beds.

Federal Status: LE	State Status: E	SGCN: Y
Endemic: Y	Global Rank: G1	State Rank: S1

Georgetown salamander *Eurycea naufragia*

Aquatic; springs, streams and caves with rocky or cobble beds.

Federal Status: LT	State Status: T	SGCN: Y
Endemic: Y	Global Rank: G1	State Rank: S1

Jollyville Plateau salamander *Eurycea tonkawae*

Aquatic; springs, streams and caves with rocky or cobble beds.

Federal Status: LT	State Status: T	SGCN: Y
Endemic: Y	Global Rank: G2	State Rank: S2

Salado Springs salamander *Eurycea chisholmensis*

Aquatic; springs, streams and caves with rocky or cobble beds.

Federal Status: LT	State Status: T	SGCN: Y
Endemic: Y	Global Rank: G1	State Rank: S1

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

WILLIAMSON COUNTY

ARACHNIDS

Bone Cave harvestman *Texella reyesi*

Small, blind, cave-adapted harvestman endemic to several caves in Travis and Williamson counties; weakly differentiated from Texella reddelli

Federal Status: LE	State Status:	SGCN: Y
Endemic: Y	Global Rank: G2G3	State Rank: S2

No accepted common name *Tartarocreagris infernalis*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G2G3	State Rank: S2?

No accepted common name *Cicurina browni*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G1G2	State Rank: S1

No accepted common name *Cicurina travisae*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G1G2Q	State Rank: S1

No accepted common name *Cicurina vibora*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G1G2	State Rank: S1

No accepted common name *Eidmannella reclusa*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G1G2	State Rank: S1

Reddell harvestman *Texella reddelli*

Small, blind, cave-adapted harvestman endemic to a few caves in Travis and Williamson counties

Federal Status: LE	State Status:	SGCN: Y
Endemic: Y	Global Rank: G2G3	State Rank: S2

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

WILLIAMSON COUNTY

BIRDS

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

Black Rail *Laterallus jamaicensis*

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: PT | State Status: T | SGCN: Y
Endemic: N | Global Rank: G3G4 | State Rank: S2

black-capped vireo *Vireo atricapilla*

Oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer

Federal Status: | State Status: | SGCN: Y
Endemic: N | Global Rank: G3 | State Rank: S3B

Franklin's gull *Leucophaeus pipixcan*

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

golden-cheeked warbler *Setophaga chrysoparia*

Ashe juniper in mixed stands with various oaks (Quercus spp.). Edges of cedar brakes. Dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer.

Federal Status: LE | State Status: E | SGCN: Y
Endemic: N | Global Rank: G2 | State Rank: S2S3B

interior least tern *Sternula antillarum athalassos*

Sand beaches, flats, bays, inlets, lagoons, islands. Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony

Federal Status: LE | State Status: E | SGCN: Y
Endemic: N | Global Rank: G4T3Q | State Rank: S1B

mountain plover *Charadrius montanus*

Breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous

WILLIAMSON COUNTY

BIRDS

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

piping plover *Charadrius melodus*

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*

Red knots migrate long distances in flocks northward through the contiguous United States mainly April-June, southward July-October. A small plump-bodied, short-necked shorebird that in breeding plumage, typically held from May through August, is a distinctive and unique pottery orange color. Its bill is dark, straight and, relative to other shorebirds, short-to-medium in length. After molting in late summer, this species is in a drab gray-and-white non-breeding plumage, typically held from September through April. In the non-breeding plumage, the knot might be confused with the omnipresent Sanderling. During this plumage, look for the knot's prominent pale eyebrow and whitish flanks with dark barring. The Red Knot prefers the shoreline of coast and bays and also uses mudflats during rare inland encounters. Primary prey items include coquina clam (Donax spp.) on beaches and dwarf surf clam (Mulinia lateralis) in bays, at least in the Laguna Madre. Wintering Range includes- Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kennedy, Kleberg, Matagorda, Nueces, San Patricio, and Willacy. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore.

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

swallow-tailed kite *Elanoides forficatus*

Lowland forested regions, especially swampy areas, ranging into open woodland; marshes, along rivers, lakes, and ponds; nests high in tall tree in clearing or on forest woodland edge, usually in pine, cypress, or various deciduous trees

Federal Status: | State Status: T | SGCN: Y
Endemic: N | Global Rank: G5 | State Rank: S2B

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

WILLIAMSON COUNTY

BIRDS

white-faced ibis *Plegadis chihi*

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*

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: S1N

wood stork *Mycteria americana*

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

zone-tailed hawk *Buteo albonotatus*

Arid open country, including open deciduous or pine-oak woodland, mesa or mountain county, often near watercourses, and wooded canyons and tree-lined rivers along middle-slopes of desert mountains; nests in various habitats and sites, ranging from small trees in lower desert, giant cottonwoods in riparian areas, to mature conifers in high mountain regions

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S3B

FISH

Guadalupe bass *Micropterus treculii*

Endemic to the streams of the northern and eastern Edwards Plateau including portions of the Brazos, Colorado, Guadalupe, and San Antonio basins; species also found outside of the Edwards Plateau streams in decreased abundance, primarily in the lower Colorado River; two introduced populations have been established in the Nueces River system. A pure population was re-established in a portion of the Blanco River in 2014. Species prefers lentic environments but commonly taken in flowing water; numerous smaller fish occur in rapids, many times near eddies; large individuals found mainly in riffle tail races; usually found in spring-fed streams having clear water and relatively consistent temperatures.

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G3	State Rank: S3

WILLIAMSON COUNTY

FISH

Texas shiner *Notropis amabilis*

In Texas, it is found primarily in Edwards Plateau streams from the San Gabriel River in the east to the Pecos River in the west. Typical habitat includes rocky or sandy runs, as well as pools.

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

INSECTS

a mayfly *Procloeon distinctum*

Mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation

Federal Status: | State Status: | SGCN: Y
Endemic: Y | Global Rank: G1G3Q | State Rank: S2?

a mayfly *Pseudocentroptiloides morihari*

Mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation

Federal Status: | State Status: | SGCN: Y
Endemic: Y | Global Rank: G2G3 | State Rank: S2?

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

cave obligate springtail *Oncopodura fenestra*

Habitat description is not available at this time.

Federal Status: | State Status: | SGCN: Y
Endemic: Y | Global Rank: G2G3 | State Rank: S2?

Coffin Cave mold beetle *Batrisodes cryptotexanus*

Resident, small, cave-adapted beetle found in small Edwards Limestone caves in Travis and Williamson counties.

Federal Status: | State Status: | SGCN: Y
Endemic: | Global Rank: G2 | State Rank: SNR

Coffin Cave mold beetle *Batrisodes texanus*

Resident, small, cave-adapted beetle found in small Edwards Limestone caves in Travis and Williamson counties

Federal Status: LE | State Status: | SGCN: Y
Endemic: Y | Global Rank: G1G2 | State Rank: S1

WILLIAMSON COUNTY

INSECTS

Kretschmarr Cave mold beetle *Texamaurops reddelli*

Small, cave-adapted beetle found under rocks buried in silt; small, Edwards Limestone caves in of the Jollyville Plateau, a division of the Edwards Plateau

Federal Status: LE	State Status:	SGCN: Y
Endemic: Y	Global Rank: G1G2	State Rank: S1

No accepted common name *Bombus variabilis*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G1G2	State Rank: SNR

No accepted common name *Lymantes nadineae*

Habitat description is not available at this time.

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

No accepted common name *Rhadine noctivaga*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G1G2	State Rank: S1

No accepted common name *Rhadine russelli*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G1G2	State Rank: S1

No accepted common name *Rhadine subterranea*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G2	State Rank: S2

Tooth Cave ground beetle *Rhadine persephone*

Resident, small, cave-adapted beetle found in small Edwards Limestone caves in Travis and Williamson counties

Federal Status: LE	State Status:	SGCN: Y
Endemic: Y	Global Rank: G1G2	State Rank: S1

MAMMALS

American badger *Taxidea taxus*

WILLIAMSON COUNTY

MAMMALS

Generalist. Prefers areas with soft soils that sustain ground squirrels for food. When inactive, occupies underground burrow. Young are born in underground burrows.

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

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

big free-tailed bat *Nyctinomops macrotis*

Habitat data sparse but records indicate that species prefers to roost in crevices and cracks in high canyon walls, but will use buildings, as well; reproduction data sparse, gives birth to single offspring late June-early July; females gather in nursery colonies; winter habits undetermined, but may hibernate in the Trans-Pecos; opportunistic insectivore

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

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: S4

eastern red bat *Lasiurus borealis*

Found in a variety of habitats in Texas. Usually associated with wooded areas. Found in towns especially during migration.

Federal Status: State Status: SGCN: N
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*

Known from montane and riparian woodland in Trans-Pecos, forests and woods in east and central Texas.

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

long-tailed weasel *Mustela frenata*

WILLIAMSON COUNTY

MAMMALS

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

Mexican free-tailed bat *Tadarida brasiliensis*

Roosts in buildings in east Texas. Largest maternity roosts are in limestone caves on the Edwards Plateau. Found in all habitats, forest to desert.

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

mink *Neovison vison*

Intimately associated with water; coastal swamps & marshes, wooded riparian zones, edges of lakes. Prefer floodplains.

Federal Status: State Status: SGCN: Y
Endemic: N Global Rank: G5 State Rank: S4

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

plains spotted skunk *Spilogale putorius interrupta*

Generalist; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie

Federal Status: State Status: SGCN: N
Endemic: N Global Rank: G4T4 State Rank: S1S3

southern short-tailed shrew *Blarina carolinensis*

Found in East Texas pine forests and agricultural land. May favor areas with abundant leaf litter and fallen logs (Baumgardner et al. 1992). Nest sites are probably under logs, stumps and other debris.

Federal Status: State Status: SGCN: Y
Endemic: N Global Rank: G5 State Rank: S4

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

WILLIAMSON COUNTY

MAMMALS

thirteen-lined ground squirrel *Ictidomys tridecemlineatus*

Prefers short grass prairies with deep soils for burrowing. Frequently found in grazed ranchland, mowed pastures, and golf courses.

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: G2G3	State Rank: S3S4

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

woodland vole *Microtus pinetorum*

Include grassy marshes, swamp edges, old-field/pine woodland ecotones, tallgrass fields; generally sandy soils.

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

MOLLUSKS

Brazos Heelsplitter *Potamilus streckersoni*

Habitat description is not available at this time.

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

False Spike Mussel *Fusconaia mitchelli*

Occurs in small streams to medium-size rivers in habitats such as riffles and runs with flowing water. Is often found in stable substrates of sand, gravel, and cobble (Howells 2010; Randklev et al. 2012; Sowards et al. 2013; Tsakiris and Randklev 2016). [Mussels of Texas 2019]

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G1	State Rank: S1

WILLIAMSON COUNTY

MOLLUSKS

Texas Fawnsfoot *Truncilla macrodon*

Occurs in large rivers but may also be found in medium-sized streams. Is found in protected near shore areas such as banks and backwaters but also riffles and point bar habitats with low to moderate water velocities. Typically occurs in substrates of mud, sandy mud, gravel and cobble. Considered intolerant of reservoirs (Randklev et al. 2010; Howells 2010o; Randklev et al. 2014b,c; Randklev et al. 2017a,b). [Mussels of Texas 2019]

Federal Status: C | State Status: T | SGCN: Y
Endemic: Y | Global Rank: G1 | State Rank: S2

REPTILES

common garter snake *Thamnophis sirtalis*

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: N
Endemic: | Global Rank: G5 | 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

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

WILLIAMSON COUNTY

REPTILES

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

PLANTS

bigflower cornsalad *Valerianella stenocarpa*

Usually along creekbeds or in vernally moist grassy open areas (Carr 2015).

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G3	State Rank: S3

Elmendorf's onion *Allium elmendorfii*

Grassland openings in oak woodlands on deep, loose, well-drained sands; in Coastal Bend, on Pleistocene barrier island ridges and Holocene Sand Sheet that support live oak woodlands; to the north it occurs in post oak-black hickory-live oak woodlands over Queen City and similar Eocene formations; one anomalous specimen found on Llano Uplift in wet pockets of granitic loam; Perennial; Flowering March-April, May

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G2	State Rank: S2

gravelbar brickellbush *Brickellia dentata*

Essentially restricted to frequently-scoured gravelly alluvial beds in creek and river bottoms; Perennial; Flowering June-Nov; Fruiting June-Oct

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G3G4	State Rank: S3S4

Heller's marbleseed *Onosmodium helleri*

Occurs in loamy calcareous soils in oak-juniper woodlands on rocky limestone slopes, often in more mesic portions of canyons; Perennial; Flowering March-May

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G3	State Rank: S3

WILLIAMSON COUNTY

PLANTS

Plateau loosestrife *Lythrum ovalifolium*

Banks and gravelly beds of perennial (or strong intermittent) streams on the Edwards Plateau, Llano Uplift and Lampasas Cutplain; Perennial; Flowering/Fruiting April-Nov

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S3S4

plateau milkvine *Matelea edwardsensis*

Occurs in various types of juniper-oak and oak-juniper woodlands; Perennial; Flowering March-Oct; Fruiting May-June

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G3	State Rank: S3

Texas almond *Prunus minutiflora*

Wide-ranging but scarce, in a variety of grassland and shrubland situations, mostly on calcareous soils underlain by limestone but occasionally in sandier neutral soils underlain by granite; Perennial; Flowering Feb-May and Oct; Fruiting Feb-Sept

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G3G4	State Rank: S3S4

Texas claret-cup cactus *Echinocereus coccineus var. paucispinus*

Mountains, hills, and mesas, igneous and limestone, oak-juniper-pinyon woodland or juniper woodland on limestone mesas, mostly rocky habitats but also in alluvial basins, grasslands, or among mesquite or other shrubs. Flowering March - April (Powell and Weedin 2004).

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5T3	State Rank: S3

Wright's milkvetch *Astragalus wrightii*

On sandy or gravelly soils; April (Diggs et al. 1999).

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G3	State Rank: S3

Common Name	Scientific Name	G RANK	S RANK (Provisional)	ECOLOGICAL SYSTEM *added where relationship can be made at this scale*	Known COUNTIES	Endemic	Known PROTECTED AREAS	TERR	WETL	AQU	Comments
Bur Oak - Shumard Oak Mixed Bottomland Forest	Quercus macrocarpa - Quercus shumardii - Chasmanthium latifolium Forest	G3?	S3?	South-Central Interior Large Floodplain CES202.705	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	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	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	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	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	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	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	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 GRANGER LAKE MASTER PLAN

WILLIAMSON COUNTY, TEXAS

October 2021

US Army Corps of Engineers®
Fort Worth District

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Introduction

Habitat assessments were conducted at Granger Lake on April 26-29, 2021 using Texas Parks and Wildlife Department's (TPWD) Wildlife Habitat Appraisal Procedure ([WHAP] TPWD 1995). WHAP survey point locations were based on points believed or known to have various habitat types and features based on aerial imagery from existing Geographical Information Systems (GIS) data as well as from local knowledge of the area. A total of 81 WHAP points were surveyed, all within U.S. Army Corps of Engineers (USACE) fee boundary (Figures 1, 2, and 3).

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

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

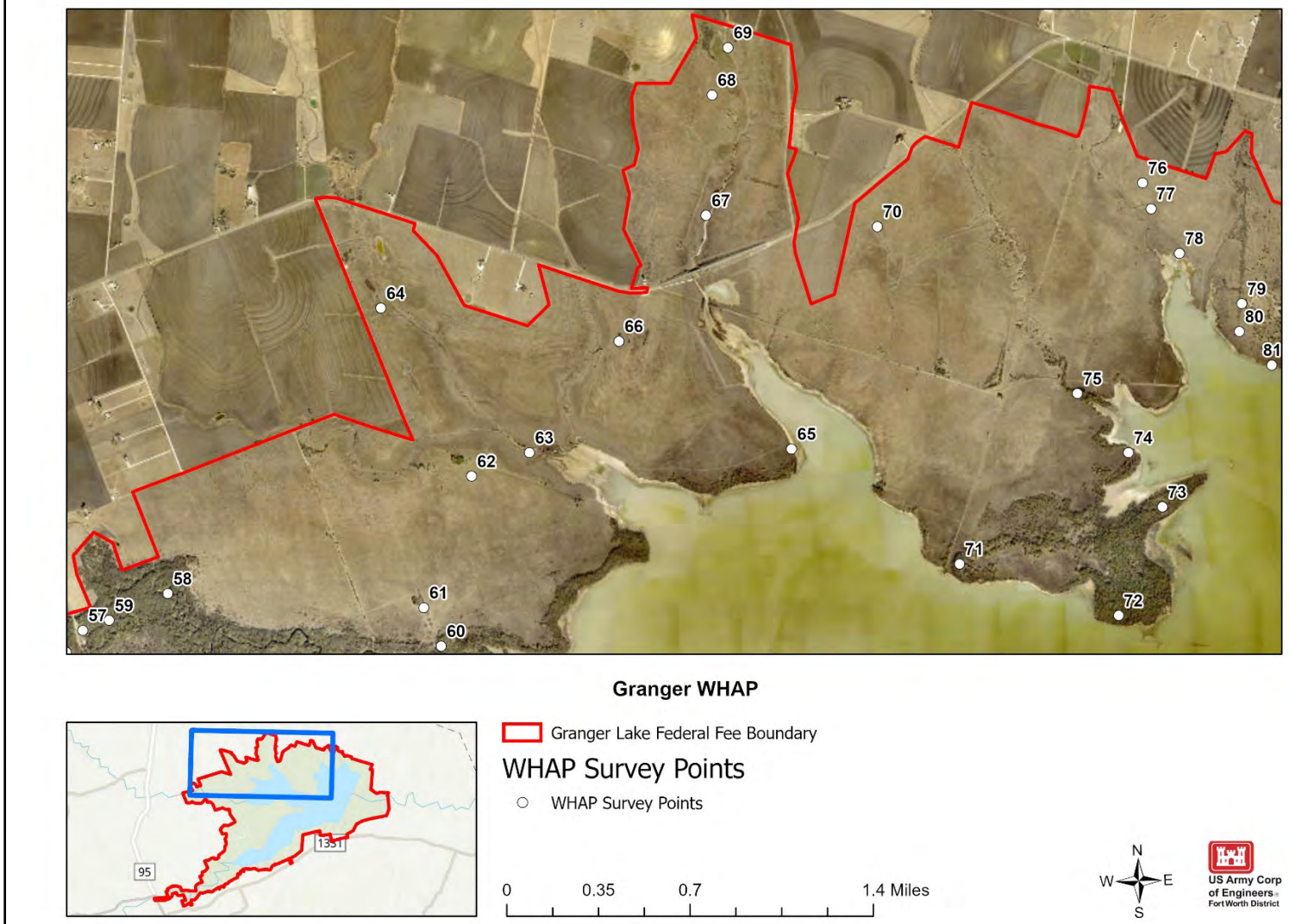

Figure 2. Distribution of WHAP Points within the Northern Boundary of Granger Lake

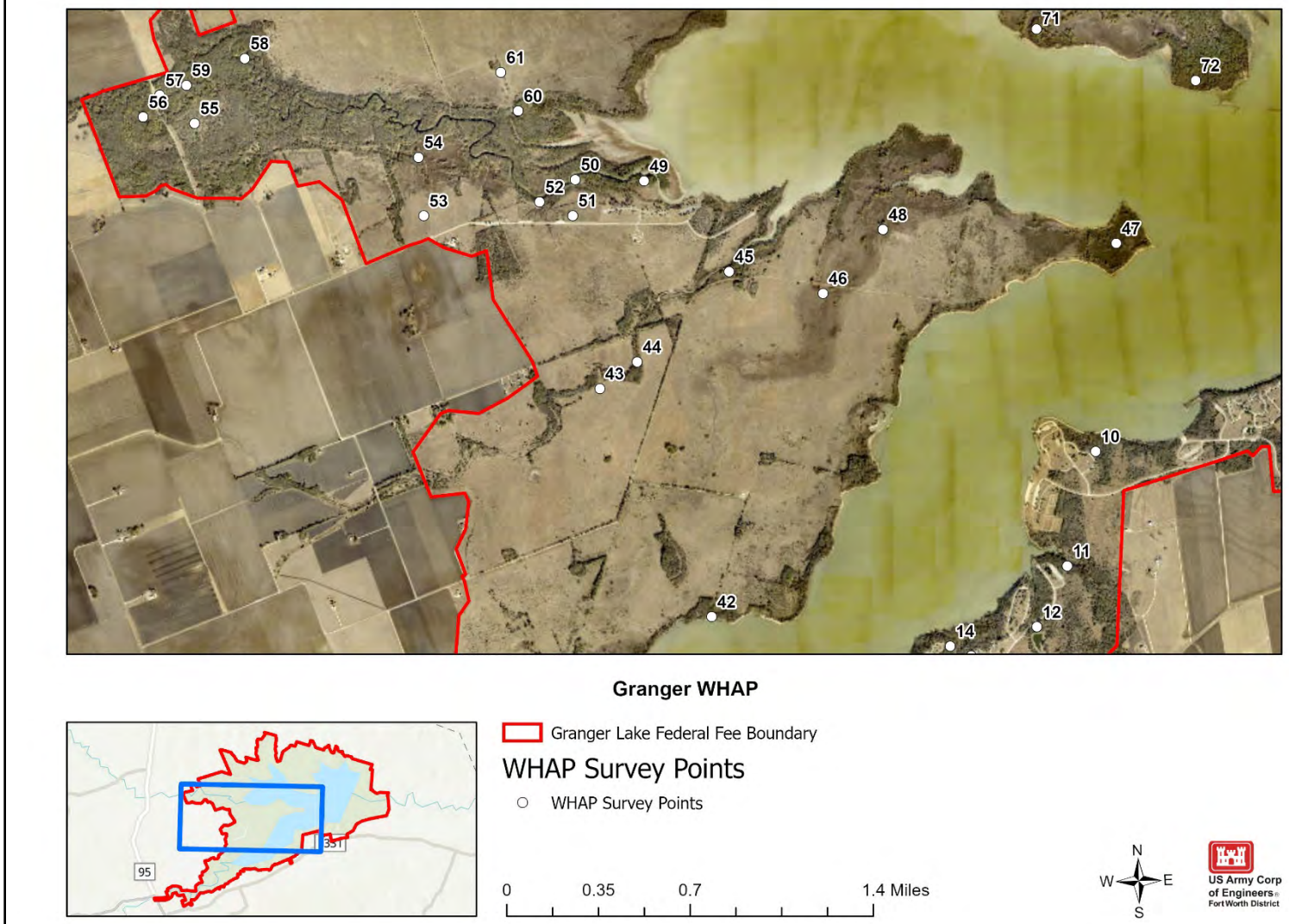

Figure 3. Distribution of WHAP Points within the Western Boundary of Granger Lake

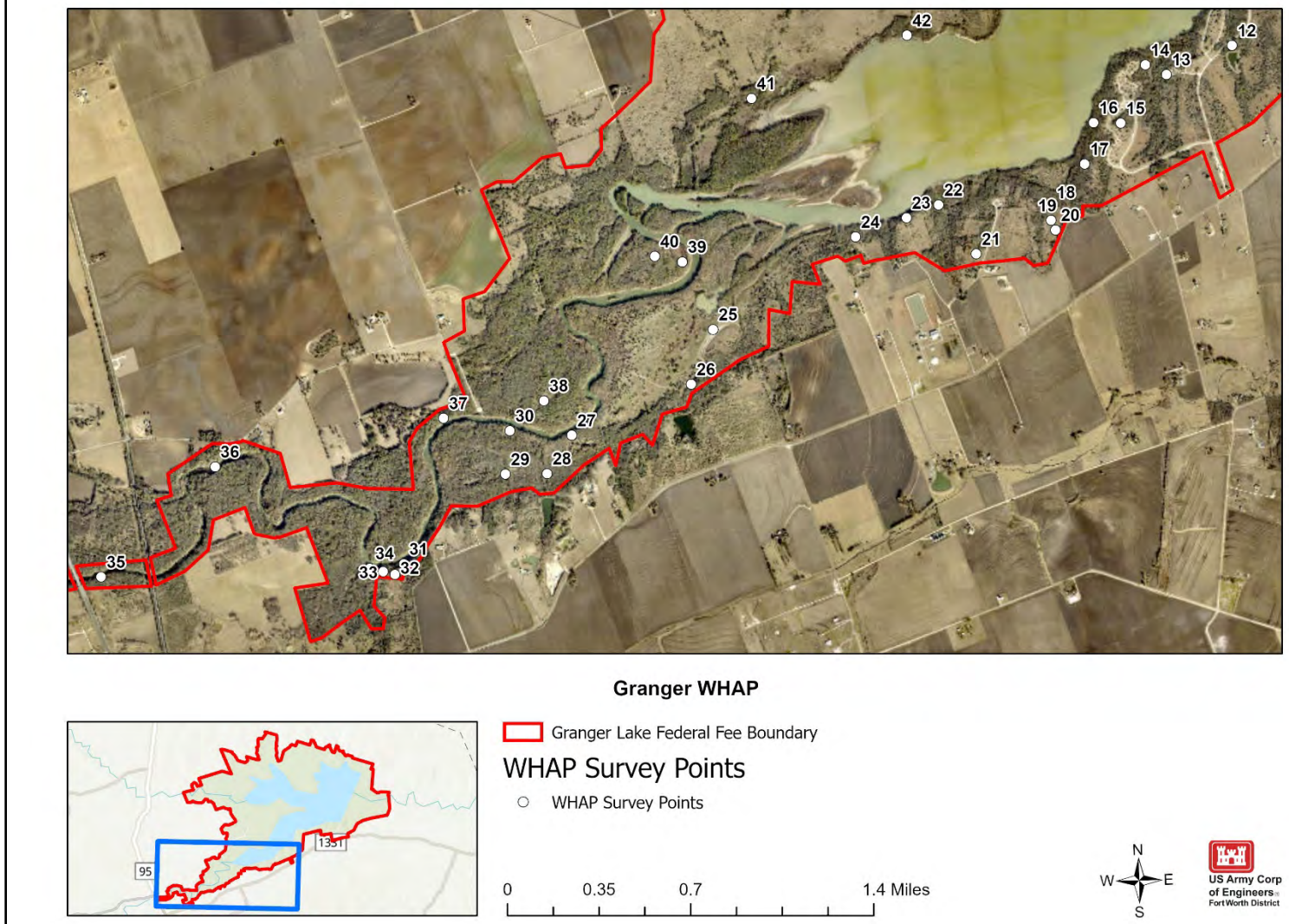

Figure 4. Distribution of WHAP Points within the Southern Boundary of Granger Lake

Study Area

USACE fee owned property at Granger Lake, approximately 13,616 acres, is located just east of Georgetown and north of Taylor in central Texas as displayed in Figure 5 below. More specifically, the lake sits within the Texas Blackland Ecoregion. Granger Lake lies on the San Gabriel River. The major tributaries to the San Gabriel River are North Fork and South Forks of the River. Downstream of the Granger Lake dam, the San Gabriel River meanders until its confluence with the Little River.

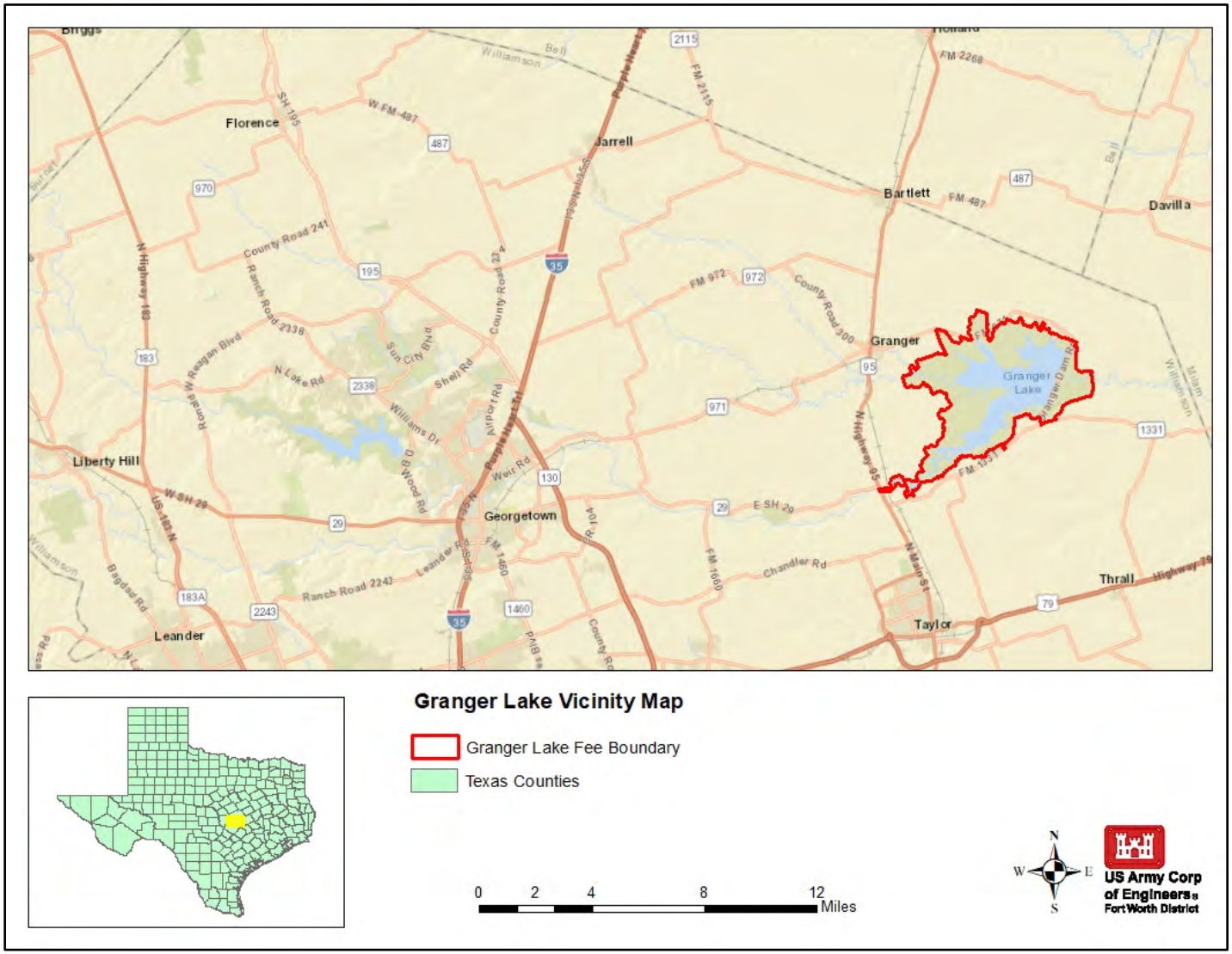

Figure 5. Granger Lake Vicinity Map

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 $1/10^{th}$ acre plot was evaluated and points were assigned to all applicable components based on field conditions. A habitat quality score, where values range from 0.0 (low quality) to 1.0 (high quality), was then calculated for each site by adding together all points and multiplying by 0.01. Habitat quality was then determined for all sites within the same habitat type. The scores for each site can be found in Attachment A. Photographs were taken at each site and are included as Attachment B.

The WHAP protocol can be used to assess a wide range of habitats; however, it was originally developed to assess and develop mitigation requirements for loss of bottomland hardwoods and other aquatic habitats. Scores can yield higher results for

these habitats based on how the scoring is allotted to each WHAP habitat component. Upland forest and grassland habitat types cannot reach a score indicative of high quality habitat, although they may exhibit high quality features. Subsequently, high quality upland habitat may not be identified or can be overlooked.

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

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

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

These components regularly exclude grassland habitat from receiving the maximum score of 1.00 on the WHAP point scale. In order to identify the maximum score each habitat type can receive, USACE environmental staff scored each criteria given ideal conditions for riparian/bottomland hardwood forest (BHF), upland forest (includes all non-riparian/BHF forests), grassland, and marsh habitats. The maximum value scores, shown in Table 1, were then used to normalize scores for habitats that are prevented from reaching the maximum WHAP score. This is primarily due to arbitrary low scores in the two WHAP components described above. Normalizing habitat scores will identify high quality habitat that would otherwise not be detected.

Table 1. Cover Types and Maximum Total Scores

Cover Type	Component Number								Maximum Total Score
	1	2	3	4	5	6	7	7B	
Marsh	25	20	20	20	NA	5	10	NA	1.00
Riparian/BHF	25	20	20	15	5	5	5	5	1.00

Upland Forest	12	20	20	15	5	5	5	5	0.87
Grassland	12	12	20	0	4	1	5	5	0.59

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), Granger Lake lies within the Blackland Prairie ecoregions. The most common habitat types include marsh, 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
Riparian/BHF	25
Upland Forest	33
Grassland	21
Marsh	2
Total Points Surveyed	81

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, 2012B).

Figure 6 displays the distribution of habitat types within the USACE boundary at Granger Lake. For analysis purposes, habitat types were pooled into one of four categories: marsh, riparian/BHF, upland forest, and grasslands.

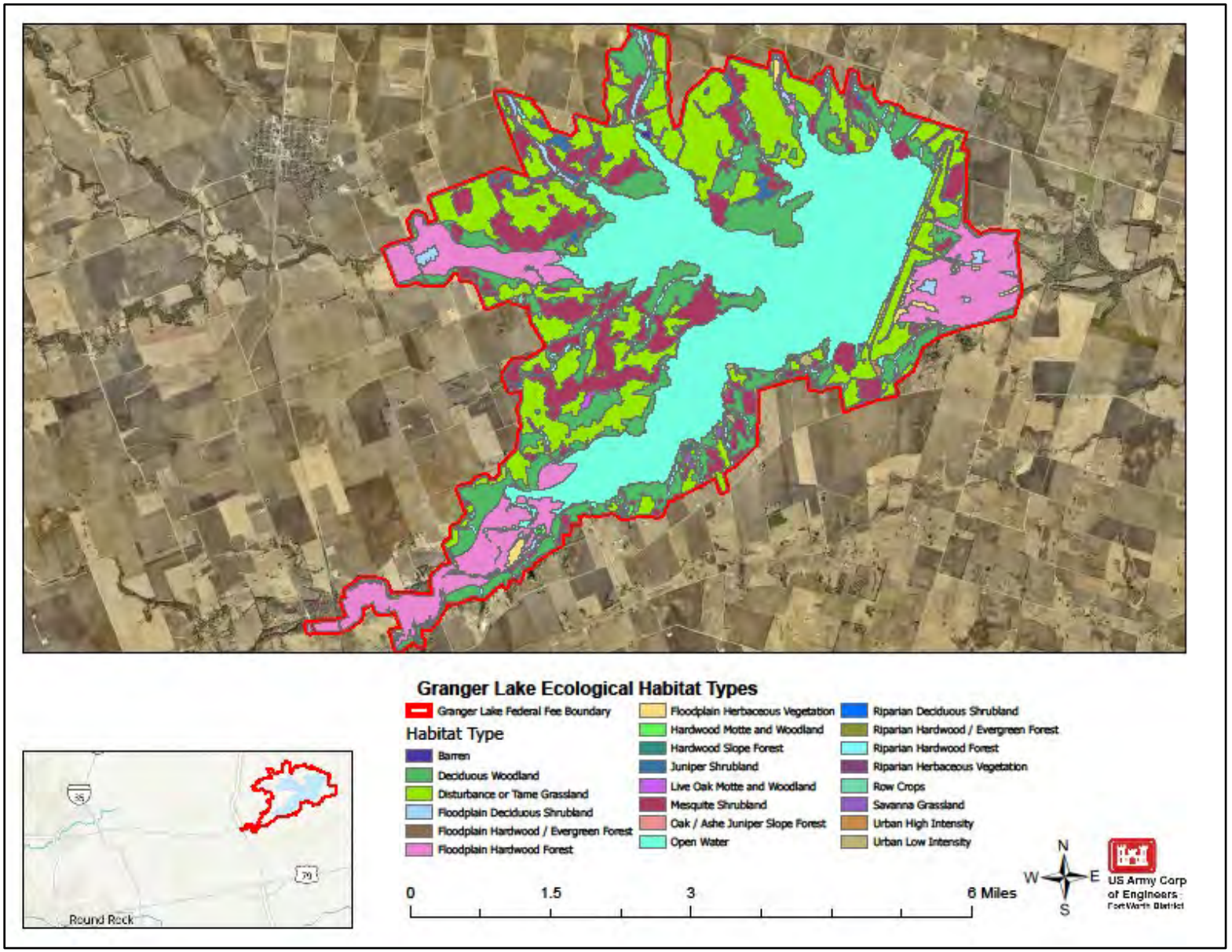

Figure 6. Distribution of Habitat Types within the Fee Owned Boundary at Granger Lake.

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: Ray Roberts Lake WHAP Summary Results of this report.

Upland forest (33 sampled) and riparian/BHF (25 sampled) were the most abundant habitat types surveyed. Upland forest scores ranged from 0.41 to 0.84 while riparian/BHF scores ranged from 0.36 to 0.84. The lower minimum scores, especially for these normally drier upland habitats, may be partly due to long-term flooding that occurred at Granger Lake in recent years, thus leading to reduced plant diversity. Flooding at lower elevations in the flood pool of Granger 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 lower scores of riparian/BHF can be attributed to the sites receiving a low site potential, which is a result of them not being flooded as often as they should be but they are still considered riparian/BHF because of their plant community and that they are still within a well-established flood zone.

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
Marsh	0.82	0.86	0.77
Riparian/BHF	0.59	0.82	0.36
Upland Forest	0.57	0.84	0.41
Grassland	0.66	0.80	0.42

Figure 7, Figure 8, and Figure 9 show the range of total scores for all points surveyed (81 sampled) as well as the 1 additional point that was skipped due to multiple points occurring in the same area. Skipped points show a total score of 0 in the above-mentioned figures. Overall, marsh and grassland habitats exhibited the highest average total score (0.82 and 0.66). The difference between upland forest and Riparian/BHF is that the Average Total Score is 0.02. With such a close margin, these two habitats are equal in value, which is proof of how the normalizing of scores helps the sites to be evaluated on an equal basis.

Figure 7. Total Score Range for All Points Surveyed on the Eastern Boundary of Granger Lake

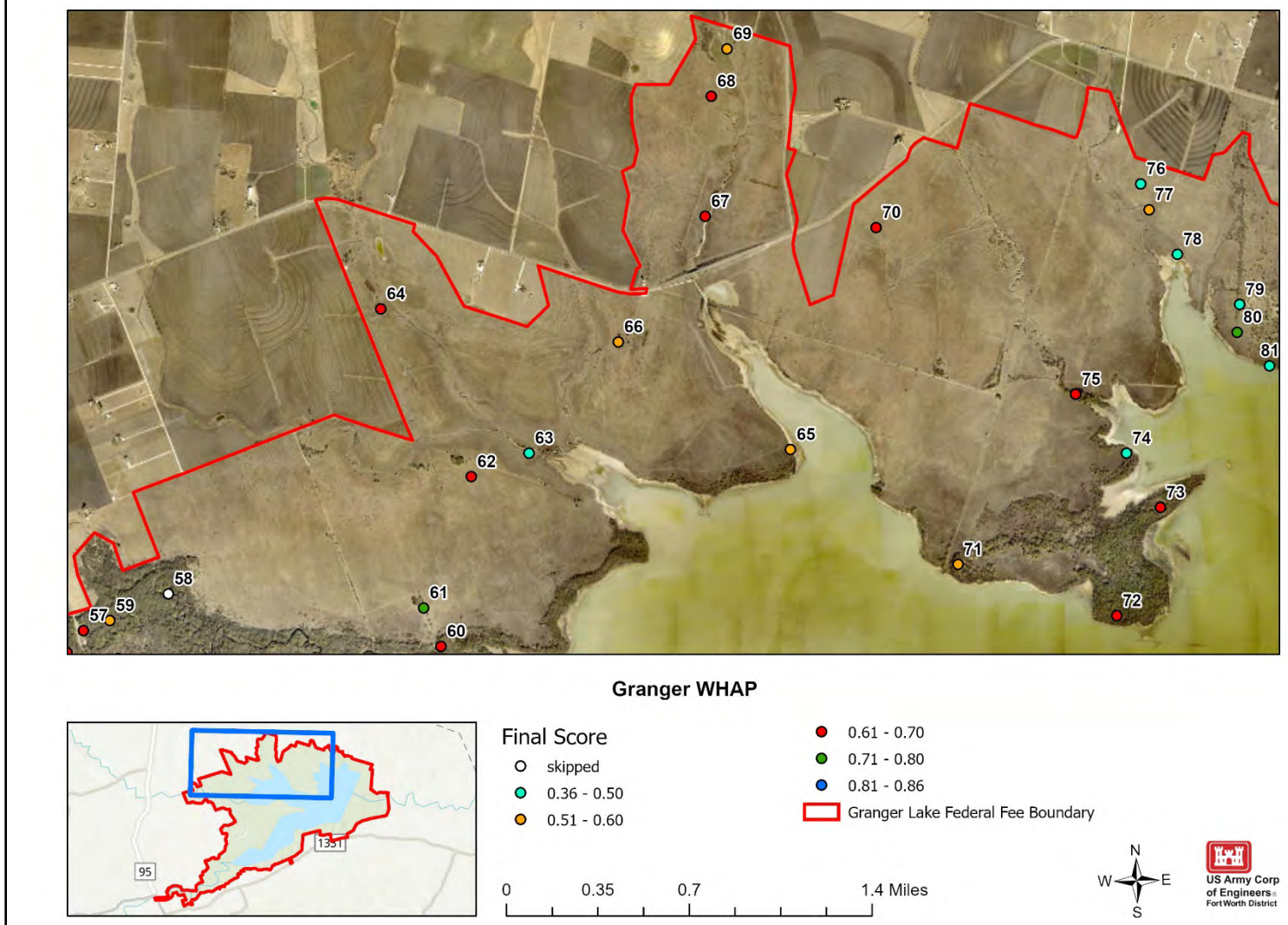

Figure 8. Total Score Range for All Points Surveyed Within the Northern Boundary of Granger Lake

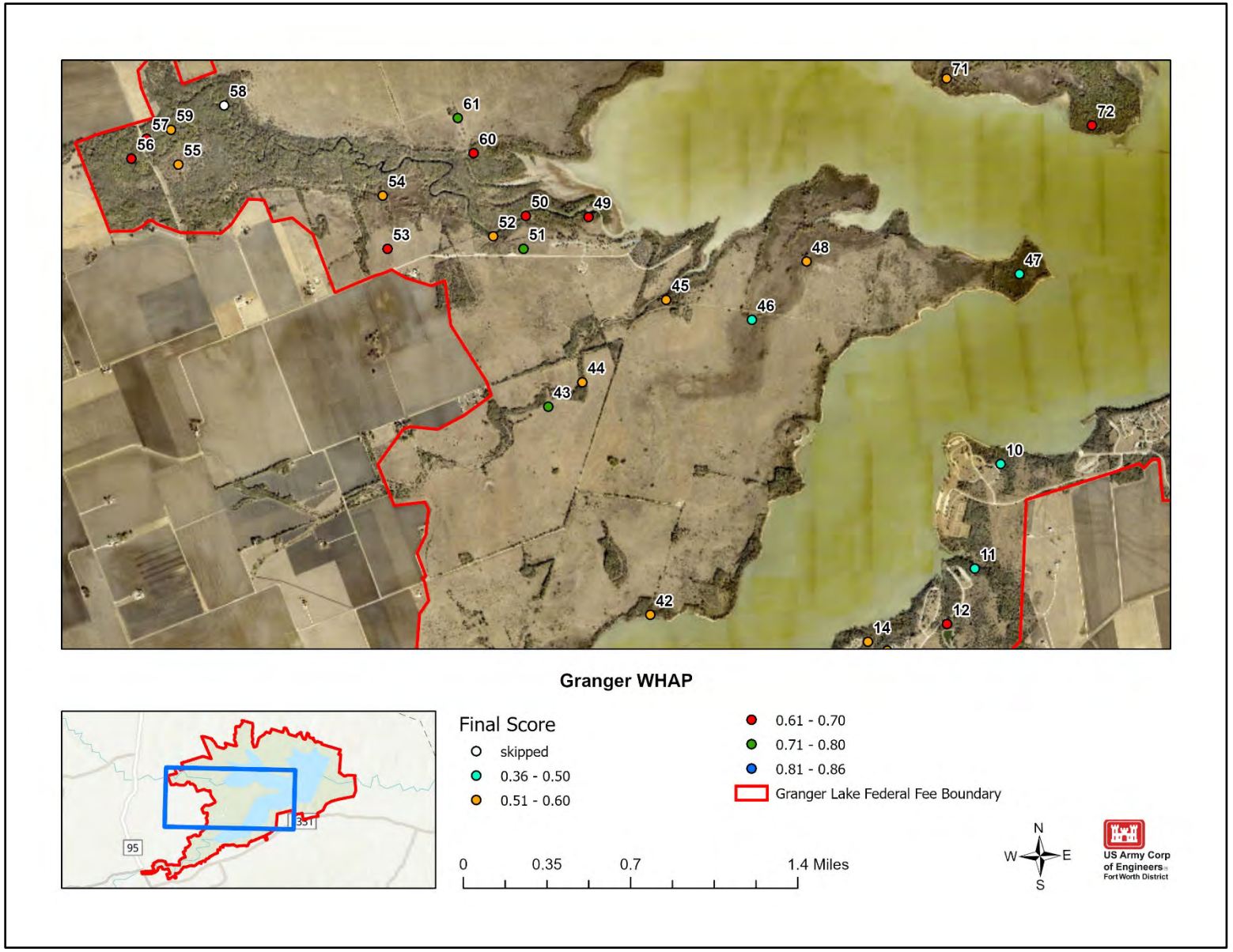

Figure 9. Total Score Range for All Points Surveyed Within the Western Boundary of Granger Lake

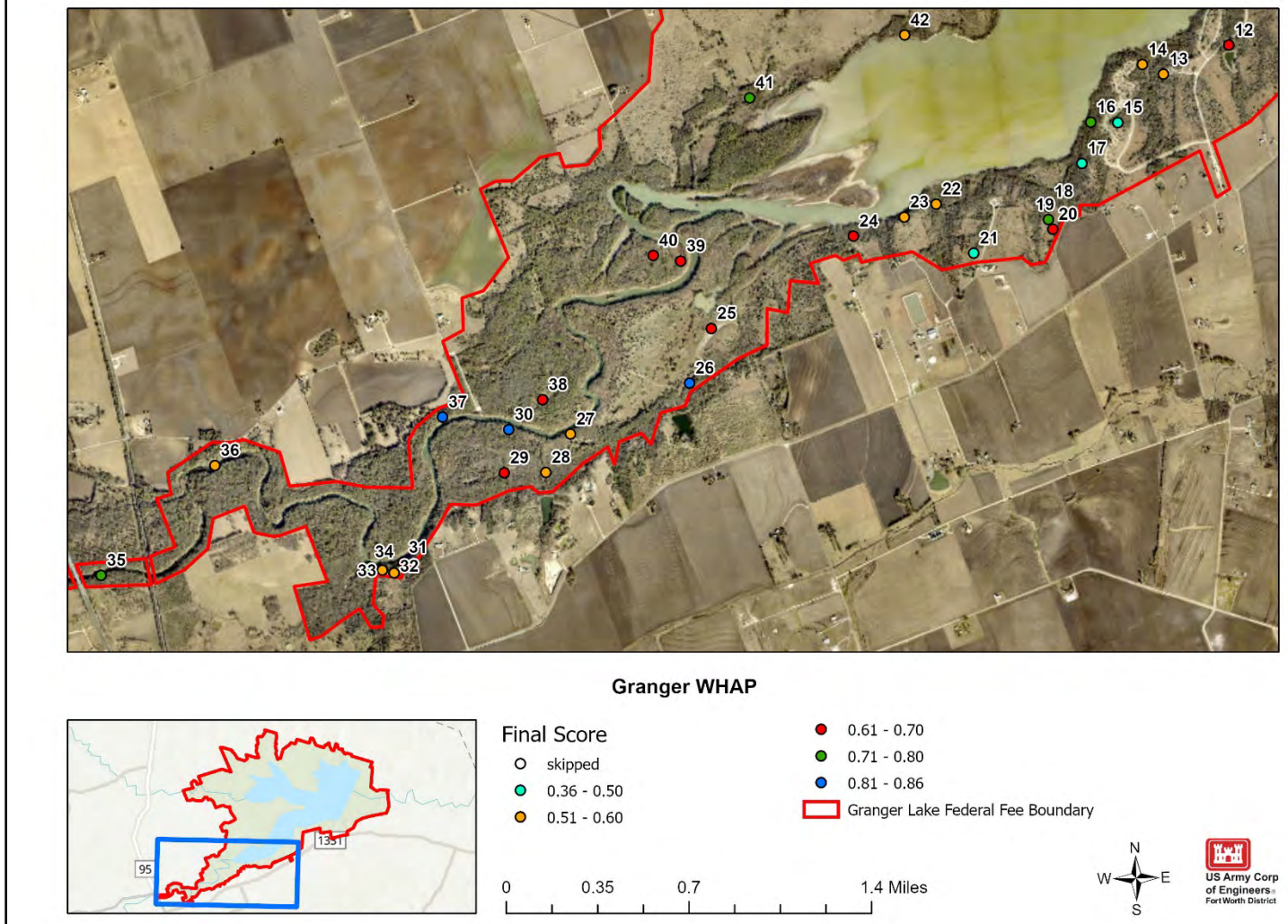

Figure 10. Total Score Range for All Points Surveyed Within the Southern Boundary of Granger Lake

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

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

Habitat Type	Average Site Potential	Average Successional Stage	Average Uniqueness and Relative Abundance
Marsh	25	5	12.5
Riparian/BHF	16.68	9.84	11.2
Upland Forest	10.94	7.61	9.39
Grassland	11.05	5.14	6.19

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.

Uniqueness and Relative Abundance takes into consideration the rarity of a habitat or vegetative community and its abundance in the region. Ongoing urban expansion has significantly influenced the region's remaining habitat composition. Few large, contiguous patches of habitat remain within the nearby Austin/Round Rock metroplex.

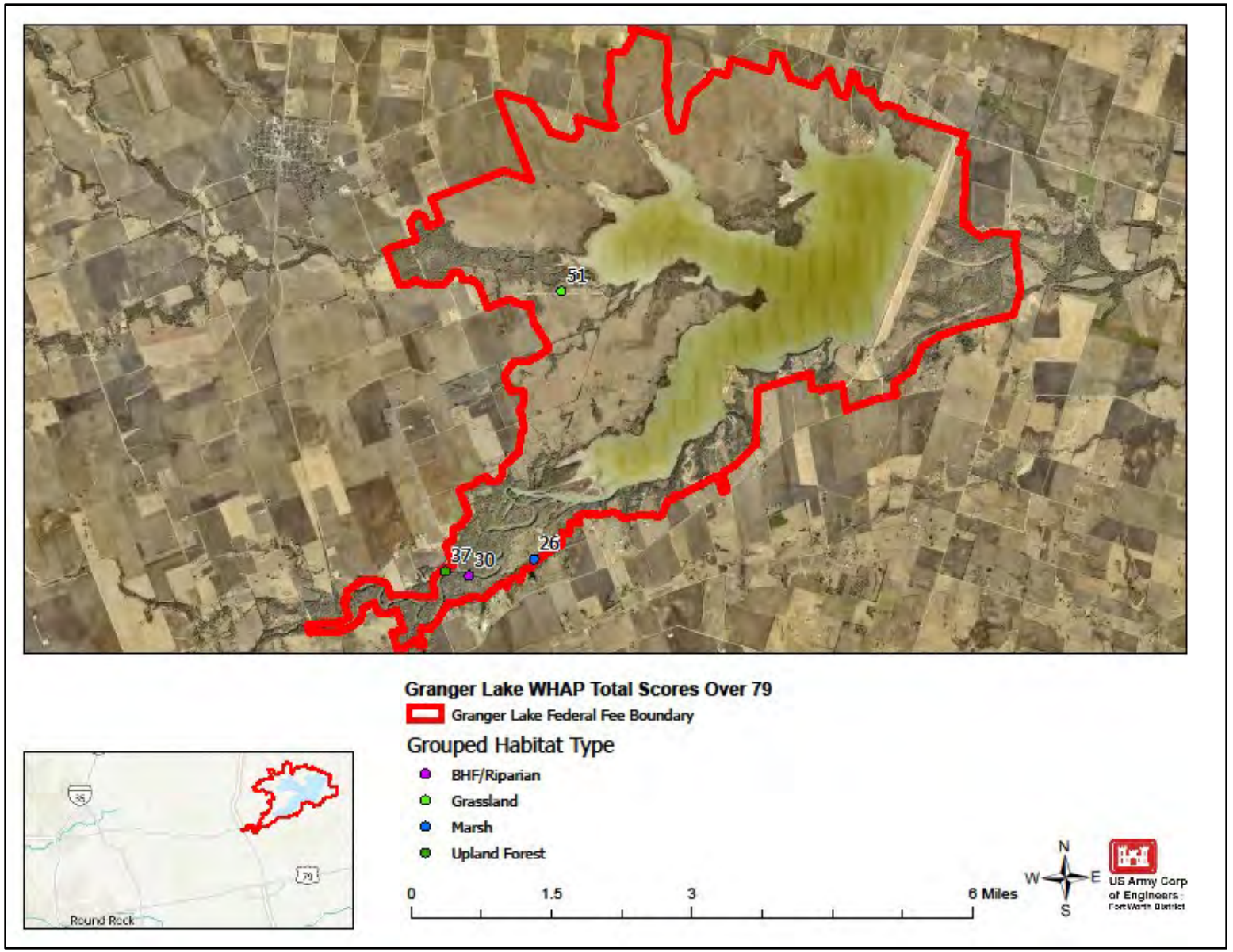

Figure 11. All Sites with Total Scores over 0.79

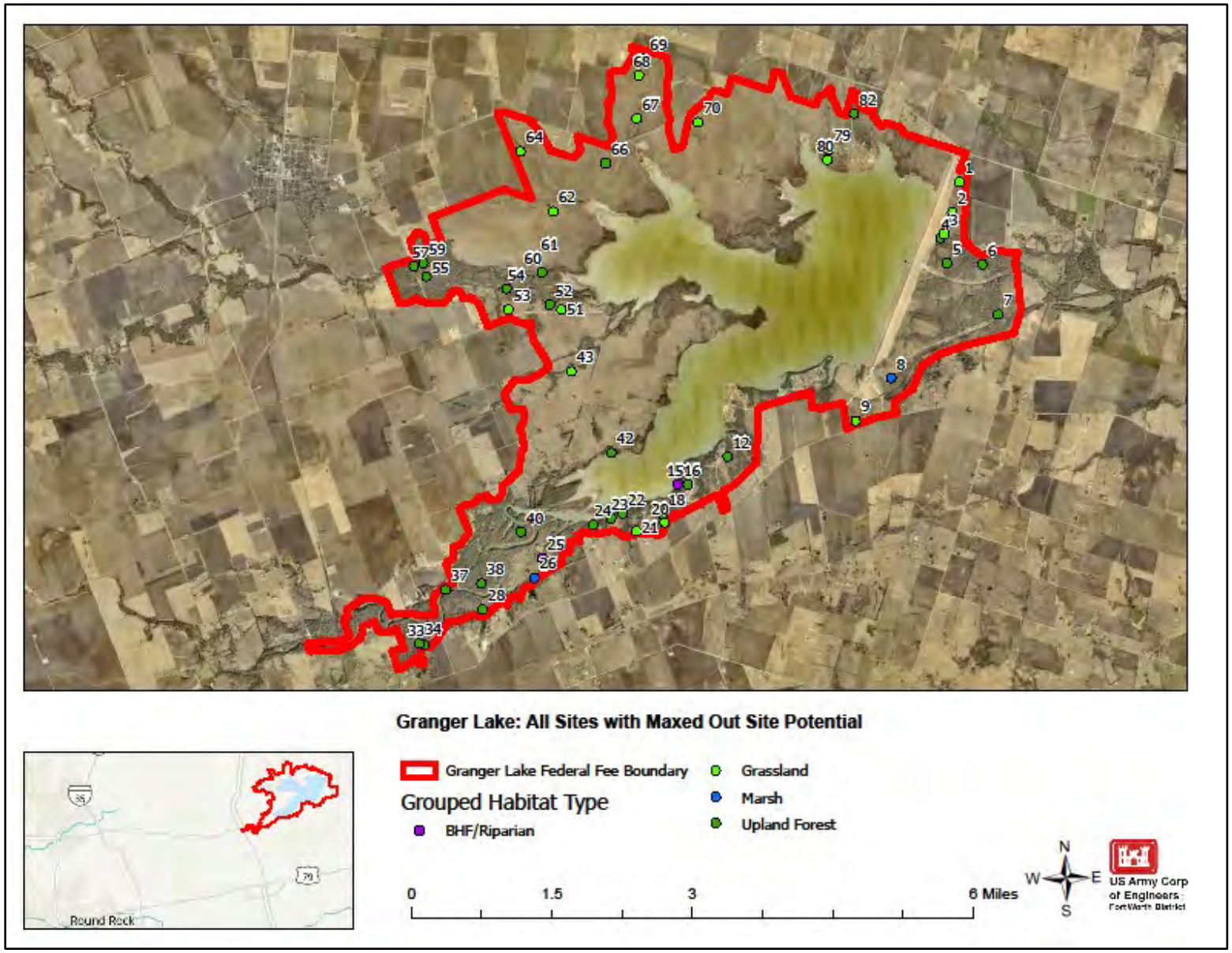

Figure 12. All Sites with Maxed Out Site Potential

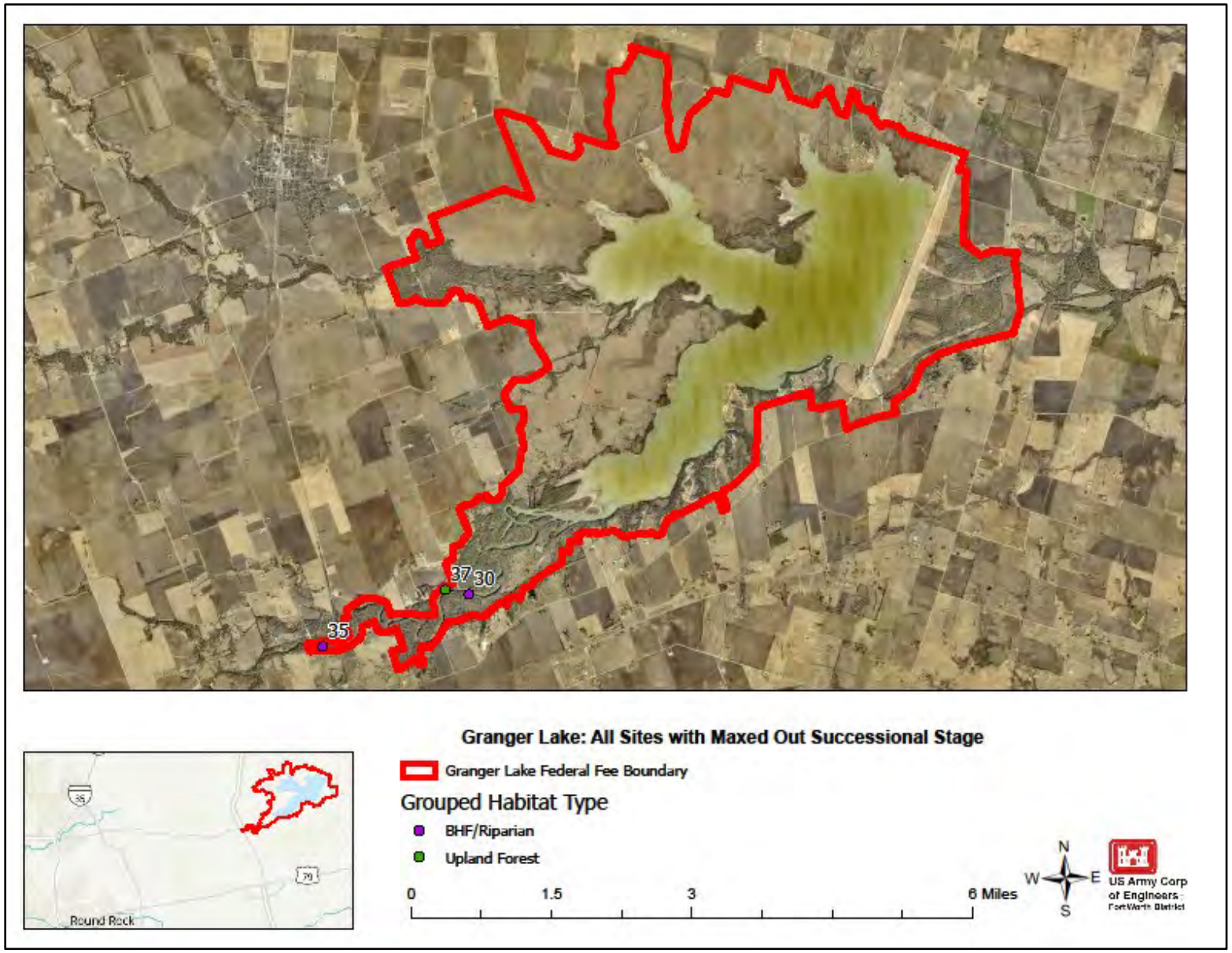

Figure 13. All Sites with Maxed Out Successional Stage

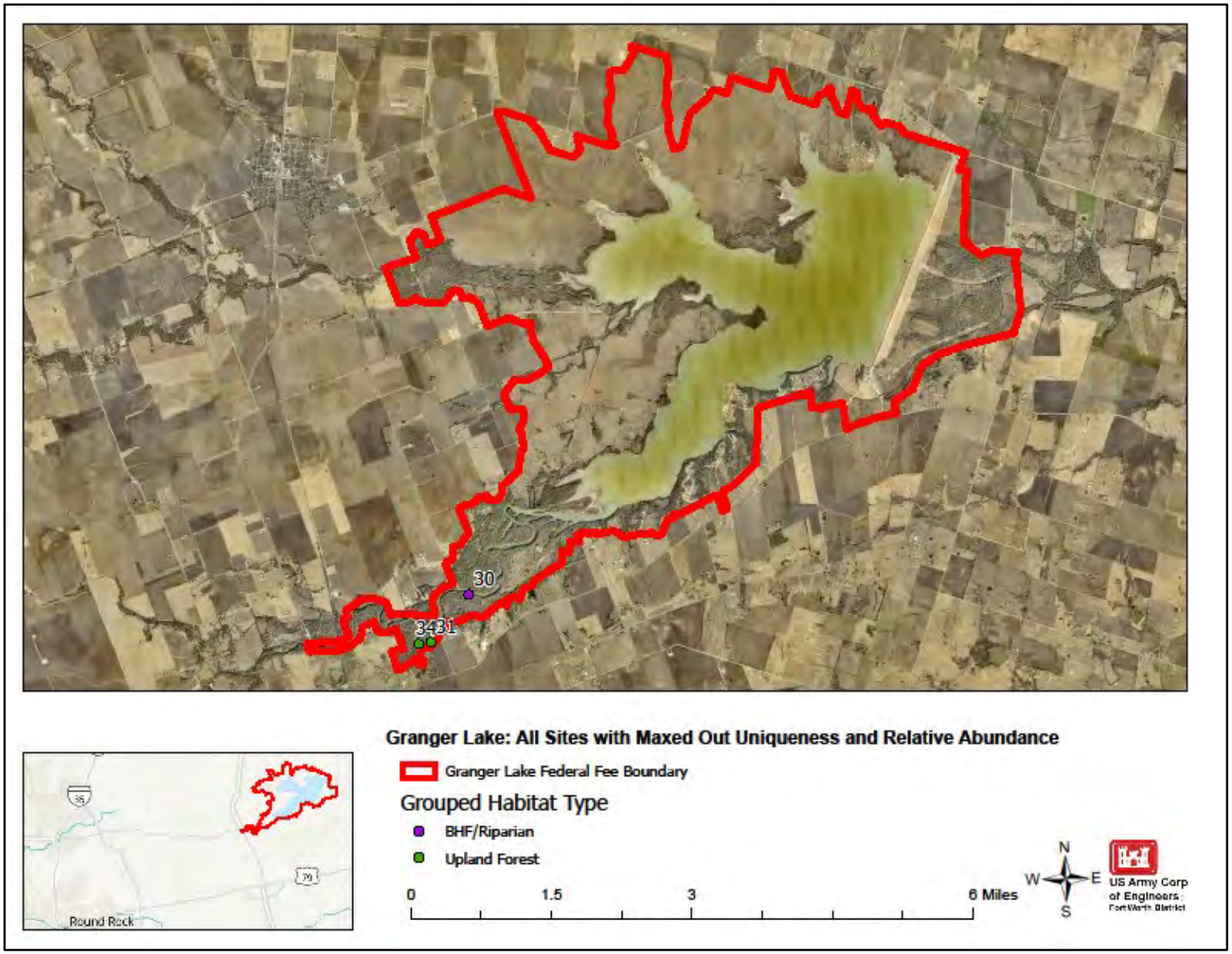

Figure 14. All Site with Maxed Out Uniqueness and Relative Abundance

Recommendations

Even with planned and unplanned disturbances, there are numerous areas of valuable wildlife habitat remaining on USACE fee owned property at Granger Lake.

When comparing overall high WHAP scores (Figures 6,7, and 8) to Maximum Site Potential scores (Figure 12), no one area of the lake was identified for habitat protection, but rather several individual points in various habitat types scattered around the lake (points 26, 37 and 51) were identified. These sites are close to or have reached their maximum habitat potential and have highest whap scores (over 0.79). Most, if not all these areas likely require no management actions to reach their potential, but rather protection from future disturbances.

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

Conversely, areas with relatively low total WHAP scores between 0.36 – 0.600, 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. There is not any part of the lake nor WHAP sites that meet this criterion but rather the points (18, 21, 22, 23, 28, 33, 52, 54, 55, 59, 66, and 82) are spread throughout various portions of the federal fee boundary.

Overall, habitat management has proven effective in maintaining medium- to high-quality wildlife habitat on USACE lands at Granger Lake.

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 Granger Lake Master Plan revision will take into account the WHAP scores when making land classification decision.

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Attachment A: Granger Lake WHAP Results Summary

Point Number	Habitat Type	Site Potential	Successional Stage	Marsh Successional Stage	Uniqueness and Relative Abundance	Diversity of Woody Species	Number of Woody Species	Swamp Diversity of Veg	Marsh Diversity of Veg	Vertical Stratification	Additional Structural Diversity	Condition of Woody Vegetation	Herbaceous Vegetation	Cropland Condition	Marsh Condition	Final Score	Berry Drupe	LegumePod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species
1	Grassland	12	5	N/A	5	3	3	N/A	N/A	4	1	3	5	N/A	N/A	0.69	dewberry, Gum bumelia	Blue bonnet, sensitive briar, honey mesquite	NA	NA	cedar elm	NA	NA	NA	switch grass, Johnson grass, fleabane, green antelope horn, ragweed sp., Maximilian sunflower, early golden rod, three seed croton, bee balm
2	Grassland	12	5	N/A	5	3	3	N/A	N/A	4	1	3	5	N/A	N/A	0.69	hackberry, smilax sp., dewberry, gum bumelia, poison ivy	honey mesquite, sensitive briar, mimosa sp.,	NA	NA	cedar elm	NA	NA	NA	Johnson grass, switch grass, annual ragweed, early ragweed, Maximilian sunflower, silver bluestem, baggars ticks, prairie dawn flower
3	Grassland	12	5	N/A	5	1	3	N/A	N/A	4	0	3	5	N/A	N/A	0.64	NA	Mesquite, Blue bonnet, sensitive briar, partridge pea	NA	NA	NA	NA	NA	NA	Indian paintbrush, little bluestem, blazing star, drummonds skull cap, coreopsis, meely blue sage, verbinum sp. Prairie blue star
4	Upland Forest	12	6	N/A	10	2	3	N/A	N/A	5	3	3	3	N/A	N/A	0.54	dewberry, poison ivy, Virginia creeper, green briar, passion vine, hackberry	NA	NA	NA	cedar elm, american elm	NA	NA	NA	carex sp., scribners panicum
5	Upland Forest	12	6	N/A	10	3	5	N/A	N/A	5	0	3	5	N/A	N/A	0.56	hackberry, dewberry, possumhaw, farkle berry, peppervine, poison ivy, gum bumelia, green briar, carolina snailseed, muscadine grape	mesquite, partridge pea	NA	NA	cedar elm	NA	NA	NA	scribners panicum, oxalis sp., halls panicum, false nettle, prickley lettuce, plantain, Texas thistle, green milkweed, witch grass, canadian rye, celery
6	Upland Forest	12	6	N/A	10	4	5	N/A	N/A	5	3	3	3	N/A	N/A	0.59	china berry, carolina snail seed, possum haw, hackberry, dewberry, muscadine grape, mexican plum, greenbriar	NA	NA	pecan	cedar elm	NA	NA	bois de arc	jointed goat grass, cheat grass, carex sp.,
7	Upland Forest	12	12	N/A	10	3	5	N/A	N/A	4	5	5	5	N/A	N/A	0.70	chinaberry, Virginia creeper, pokeberry, hackberry, dewberry, green briar, poison ivy, gum bumelia,	NA	NA	pecan	green ash, cedar elm	NA	NA	NA	Virginia wild rye, inland sea oats, large flower baby blue, bedstraw, rescue grass, woodsorrel, cheroke sedge, carex sp., jointed goat grass

Point Number	Habitat Type	Site Potential	Successional Stage	Marsh Successional Stage	Uniqueness and Relative Abundance	Diversity of Woody Species	Number of Woody Species	Swamp Diversity of Veg	Marsh Diversity of Veg	Vertical Stratification	Additional Structural Diversity	Condition of Woody Vegetation	Herbaceous Vegetation	Cropland Condition	Marsh Condition	Final Score	Berry Drupe	LegumePod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species
																	flowering dogwood								
8	Marsh	25	5	5	15	1	1	2	5	3	0	5	5	N/A	5	0.77	NA	NA	NA	NA	NA	NA	NA	button bush	bushy bluestem, switchgrass, Eleocharis elliota, bastard cabbage, cattail, frostweed, hydrocottle, maximillion sunflower, fleabane, carrot sp.,
9	Grass land	12	5	N/A	10	3	3	N/A	N/A	3	1	3	5	N/A	N/A	0.76	dewberry, hercules club, gum bumelia	mesquite, sensitive briar, legume sp.,	NA	NA	cedar elm	NA	NA	NA	switchgrass, early goldenrod, prairie verbinum, prairie primrose, western ragweed, gay feather, maximillion sunflower, wood sorrel, catching bedstraw, Texas thistle
10	Upland Forest	7	6	N/A	10	2	1	N/A	N/A	3	5	1	1	N/A	N/A	0.41	hawthorn, greenbriar	NA	NA	NA	winged elm	NA	NA	NA	carex sp.,
11	Upland Forest	7	6	N/A	10	3	3	N/A	N/A	3	3	1	1	N/A	N/A	0.43	green briar, hawthorn, hackberry, sugarberry, poison ivy	NA	NA	NA	european field elm, basket elm	NA	NA	agave	carex sp., carrot fern
12	Upland Forest	12	6	N/A	15	2	3	N/A	N/A	5	5	5	1	N/A	N/A	0.62	poison ivy, mustang grape, balloon vine, green briar, summac	NA	NA	NA	american elm, cedar elm, ash	NA	NA	NA	carex sp., frost weed
13	Upland Forest	7	6	N/A	5	5	3	N/A	N/A	5	3	5	5	N/A	N/A	0.51	greenbriar, dewberry, hackberry	mesquite	water oak	NA	cedar elm	NA	NA	prickly pear	drummond onion, carex sp., winter grass, mealy sedge, stinging grass, bull nettle, inland sea oats, thistle, Johnson grass
14	Upland Forest	7	12	N/A	10	3	3	N/A	N/A	5	5	3	3	N/A	N/A	0.59	poison ivy, green briar, sumac, sugar berry, hackberry	NA	water oak	NA	american elm	NA	NA	NA	carex sp., rescue grass, fern, lactuca sp., stinging grass
15	Upland Forest	12	6	N/A	5	2	3	N/A	N/A	3	0	3	5	N/A	N/A	0.45	hackberry, sugarberry, greenbriar,	mesquite	NA	NA	NA	NA	NA	NA	clover, rye, annual rye, bermuda thistle, false brome, carex sp., Virginia wild rye.

Point Number	Habitat Type	Site Potential	Successional Stage	Marsh Successional Stage	Uniqueness and Relative Abundance	Diversity of Woody Species	Number of Woody Species	Swamp Diversity of Veg	Marsh Diversity of Veg	Vertical Stratification	Additional Structural Diversity	Condition of Woody Vegetation	Herbaceous Vegetation	Cropland Condition	Marsh Condition	Final Score	Berry Drupe	LegumePod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species
16	BHF/ Riparian	25	12	N/A	0	3	3	15	N/A	4	3	5	1	N/A	N/A	0.71	green briar, flowering dogwood, mustang grape, poison ivy	NA	NA	NA	box elder, american elm, american ash	NA	NA	willow	carex sp.,
17	Upland Forest	7	6	N/A	5	2	3	N/A	N/A	5	5	3	1	N/A	N/A	0.43	greenbriar, poison iv, coral berry	NA	NA	NA	american elm, cedar elm, birch	NA	NA	NA	false brome, carex sp., pensylvania pellitory
18	Upland Forest	12	6	N/A	5	3	5	N/A	N/A	4	3	1	1	N/A	N/A	0.46	hackberry, greenbriar, possum haw, dewberry, poison ivy, carolina snail seed, flowering dogwood, peppervine	NA	NA	NA	cedar elm, slippery elm	NA	NA	bois de arc	frost weed, Carex sp.,
19	Grassland	7	6	N/A	15	2	1	N/A	N/A	3	0	5	5	N/A	N/A	0.75	NA	legume sp.,	NA	NA	NA	NA	NA	prickly pear, wright's nipple cactus	Nolima texana, Marshellion caespitosa, greenthread, antelope herb, skull cap, indian paintbrush, hairy grama, blazing star, trailing ratna, narrow leaf milkweed, Texas yellow star, plaintain, indian blanket, bindweed,
20	Grassland	12	6	N/A	5	2	3	N/A	N/A	3	1	3	5	N/A	N/A	0.68	mexican persimmon	sensitive briar, black medic, mesquite	NA	NA	NA	NA	NA	NA	three awn, rescue grass, blazing star, prairie vervain, gay feather, Texas thistle, berlandier flax, cheat grass, whirled tickseed, silver nightshade, compass plant, little blue stem, bindweed, carolina horse nettle, Salvia texana, indian blanket, green milkweed
21	Grassland	12	3	N/A	5	1	1	N/A	N/A	3	1	0	1	N/A	N/A	0.46	NA	NA	NA	NA	NA	NA	NA	NA	phragmites
22	Upland Forest	12	6	N/A	10	3	5	N/A	N/A	4	5	3	1	N/A	N/A	0.56	possum haw, Smilax glauca, Smilax bona-nox, peppervine, chinaberry, Virginia creeper, dewberry, poison	NA	NA	NA	cedar elm	NA	NA	bois de arc	catching bedstraw, carex sp., jointed goat grass

Point Number	Habitat Type	Site Potential	Successional Stage	Marsh Successional Stage	Uniqueness and Relative Abundance	Diversity of Woody Species	Number of Woody Species	Swamp Diversity of Veg	Marsh Diversity of Veg	Vertical Stratification	Additional Structural Diversity	Condition of Woody Vegetation	Herbaceous Vegetation	Cropland Condition	Marsh Condition	Final Score	Berry Drupe	LegumePod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species
																	ivy, parsley hawthorne								
23	Upland Forest	12	6	N/A	10	2	5	N/A	N/A	4	3	3	3	N/A	N/A	0.55	hackberry, poison ivy, possum haw, peppervine, Smilax bona-nox, Lactuca cereota, Virginia creeper, carolina snailseed	NA	NA	NA	cedar elm, green ash	NA	NA	NA	Texas thistle, Virginia rye, yellow wood sorrel, frostweed, carex sp., carolina milkweed
24	Upland Forest	12	6	N/A	10	8	3	N/A	N/A	5	5	3	3	N/A	N/A	0.63	holly, peppervine, gum bumelia	mesquite	NA	NA	cedar elm, ash, white ash	ash juniper	NA	NA	Texas vervain, narrowleaf ilkweed, beggarslice, black medic, rescue grass, speargrass, wild garlic, plaintain, Texas thistle, antelope horn, witch grass
25	BHF/ Riparian	25	5	N/A	15	2	1	N/A	N/A	4	0	5	5	N/A	N/A	0.62	NA	honey locust, mesquite	NA	NA	american ash	NA	NA	NA	carex sp., pink lady, mexican hat, foxtail grass, vervain, winter grass, Texas thistle, Johnson grass, dilver leaf sage, yellow mallow, horse nettle, little bluestem, silver leaf nightshade, japanese annual rye, sorgum
26	Marsh	25	N/A	10	10	3	3	N/A	15	4	3	3	5	N/A	5	0.86	green briar, chinaberry, hackberry, hawthorn	mesquite	NA	NA	cedar elm	NA	NA	NA	shirley poppy, cocklbur, winecup, winter grass, meadow barley, Texas thistle, perinial rye grass, pink lady, vervaine, field brome, white twinheads, little barley, ball turnip
27	BHF/ Riparian	20	6	N/A	10	2	3	N/A	N/A	4	1	3	3	N/A	N/A	0.52	hackberry, sugarberry, greenbriar, poison ivy	NA	NA	NA	cedar elm	NA	NA	NA	white clover, plantain, annual blue grass, carex sp.,
28	Upland Forest	12	6	N/A	10	3	3	N/A	N/A	5	3	5	1	N/A	N/A	0.55	greenbriar, hackberry, sugarberry, poison ivy, mustang grape	NA	NA	NA	cedar elm	NA	NA	prickly pear	winter grass, japanese brome, annual bluegrass

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29	BHF/ Riparian	20	12	N/A	15	2	3	N/A	N/A	5	3	3	5	N/A	N/A	0.68	hackberry, greenbriar, sugar berry, sumac, poison ivy, china berry, flameleaf sumac	NA	NA	NA	cedar elm	NA	NA	NA	annual bluegrass, wild onion, fescue grass, carex sp., ragweed, japanese brome, inland sea oats
30	BHF/ Riparian	20	20	N/A	20	2	3	N/A	N/A	4	5	5	3	N/A	N/A	0.82	greenbriar, sumac, poison ivy, china berry	NA	NA	pecan, walnut	NA	NA	NA	NA	annual bluegrass, rye grass, carex sp., american germander, wild onion, woodsitchwood, livid amartha
31	Upland Forest	7	3	N/A	20	6	5	N/A	N/A	5	5	3	3	N/A	N/A	0.66	poison ivy, Virginia creeper, mustang grape, sumac	mesquite	red oak	NA	slipery elm, cedar elm	ashe juniper	NA	cottonwood	carex sp., japanese brome, tickseed, hedge parsley, little bluestem, sedge sp.,
32	Upland Forest	7	6	N/A	10	3	3	N/A	N/A	4	5	3	3	N/A	N/A	0.51	greenbriar, chinaberry, hackberry, mustang grape	NA	bur oak, pin oak	NA	slipery elm, cedar elm	NA	NA	NA	carex sp., perenial rye grass, japanese brome
33	Upland Forest	12	6	N/A	10	2	3	N/A	N/A	5	5	3	3	N/A	N/A	0.56	green briar, china berry, hackberry	NA	NA	NA	cedar elm, ash	NA	NA	NA	false braom, japanese brome, carex sp., dog mercury
34	Upland Forest	12	12	N/A	20	2	1	N/A	N/A	5	5	3	1	N/A	N/A	0.70	Virginia creeper, hackberry, flowering dogwood	NA	bur oak, pin oak		american elm	NA	NA	NA	carex sp., japanese brome,
35	BHF/ Riparian	12	20	N/A	15	3	5	N/A	N/A	5	3	5	3	N/A	N/A	0.71	white mullberry, poison ivy, hackberry, sawtooth blackberry, red elderberry, smilax tamnoides, summergrape, china berry, Virginia creeper	NA	NA	pecan	box elder, winged elm, american elm	NA	NA	NA	jointed goat grass, hairy fruit chervil, wild onion, pale sedge, great ragweed, bastard cabbage, white grass, limestone wild petunia, perenial rye grass, ravensfoot sedge, japanese brome, giant ragweed, woodland lettuce, large flower baby blue eyes, yellow oxalis, Virginia spider wort

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36	BHF/ Riparian	12	12	N/A	15	4	3	N/A	N/A	5	3	3	3	N/A	N/A	0.60	hackberry, poison ivy, chinaberry	NA	NA	pecan	box elder, american elm, american ash	NA	NA	cottonwood, american water willow	common poppy, Johnson grass, hedge parsley, brazilian vervain, bastard cabbage, giant ragweed, woodland brome, perenial rye grass, water speedwell, white grass, catching bedstraw, curly dock, inland sea oats, cursed buttercup, scarlet pimpernell, carolina horse weed, timothy, rough bluegrass, upright prairie coneflower
37	Upland Forest	12	20	N/A	15	5	5	N/A	N/A	5	3	5	3	N/A	N/A	0.84	Virginia creeper, hackberry, mullberry, dewberry, roundleaf greenbriar, poison ivy, saw greenbriar	NA	Bur oak,	Pecan	cedar elm	NA	NA	cottonwood	goat grass, woodland lettuce, wild onion, rye grass, strager daisy, sedge parsley, plantain
38	Upland Forest	12	12	N/A	10	3	3	N/A	N/A	4	1	5	3	N/A	N/A	0.61	chinaberry, hackberry, poison ivy,	NA	NA	pecan	box elder, cedar elm, american elm	NA	NA		wild onion, japanese brome, goat grass, Virginia rye, woodland oats, spreading hedge parsley, lambs quarters, stragler daisy
39	BHF/ Riparian	20	6	N/A	15	3	3	N/A	N/A	5	3	3	3	N/A	N/A	0.61	poison ivy, hackberry, greenbriar, riverbank grape,	NA	NA	NA	box elder	NA	NA	willow	goat grass, cord grass, spiny plumeless thistle, perennial rye grass, dollar weed, water speedwell, seaside brookweed, ravensfoot sedge, curly doc
40	Upland Forest	12	12	N/A	10	4	3	N/A	N/A	5	1	5	3	N/A	N/A	0.63	poison ivy, muscadine grape	NA	NA	pecan	box elder, cedar elm, american elm	NA	NA	osage orange	catching bedstraw, japanese brome, sedge sp., wild onion, pony's foot, geranium, pensylvania pellitory, hoary belisio, blue violets

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41	BHF/ Riparian	20	12	N/A	15	2	5	N/A	N/A	5	5	3	5	N/A	N/A	0.72	poison ivy, greenbriar, dewberry, hackberry, china berry, mustang grape, Chinese tallow, mullberry, persimmon	NA	NA	NA	water ash	NA	NA		common mullein, little barley, fescue brome, pink lady, western ragweed, winter grass, taxas vervain, inland sea oats, curly dock, winecups, Texas thistle, silverleaf nightshade
42	Upland Forest	12	6	N/A	10	3	3	N/A	N/A	5	3	5	5	N/A	N/A	0.60	hackberry, poison ivy, dewberry, saw greenbriar, roundleaf greenbriar, mustange grape	NA	NA	NA	cedar elm	NA	NA	black willow	woodland lettuce, goat grass, hedge parsley, blue violets
43	Grassland	12	5	N/A	10	2	1	N/A	N/A	3	1	5	5	N/A	N/A	0.75	NA	bluebonnets, mesquite, trailing vetch, sensitive plant	NA	NA	cedar elm	NA	NA	NA	indian paint brush, pink lady, geranium, cornsalad, stiff stem flax, Texas yellowstar, plantain, prairie fleabane, japanese brome, carolina desert chickory, silverleaf nightshade, goldenrod, field clover, beebalm, speargrass, small meliot, green antelope horn
44	BHF/ Riparian	12	12	N/A	10	5	3	N/A	N/A	4	3	5	5	N/A	N/A	0.59	hackberry, poison ivy, mustang grape, china berry, autumn olive	mesquite	NA	pecan	cedar elm	NA	NA	black willow	giant ragweed, perenial ryegrass, hedge parsley, japanese brome, Virginia wild rye, ravensfoot sedge, canadian germander, wild onion, catching bedstraw, Texas vervain
45	BHF/ Riparian	12	12	N/A	10	4	5	N/A	N/A	5	3	3	5	N/A	N/A	0.59	dewberry, poison ivy, hackberry, mustang grape, sawtooth greenbriar, trumpet creeper	slender vetch,	NA	NA	cedar elm, box elder	NA	NA	black willow	giant ragweed, perenial ryegrass, hedge parsley, japanese brome, Virginia wild rye, ravensfoot sedge, canadian germander, wild onion, catching bedstraw, Texas vervain, sunflower, woodsorrel

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46	BHF/ Riparian	12	6	N/A	5	2	1	N/A	N/A	3	1	5	3	N/A	N/A	0.38	NA	slender vetch,	NA	NA	NA	NA	NA	black willow	small meliot, Texas vervain, turkey tangle frog fruit, cockelburr, pink lady, hairy crabgrass, bee balm, marsh elder, curly dock, Virginia pepperweed, great plains ragwort, bastard cabbage, field clover, giant goldenrod
47	BHF/ Riparian	12	6	N/A	10	6	3	N/A	N/A	4	3	3	3	N/A	N/A	0.50	dewberry, holly, carolina snailseed	NA	NA	NA	cedar elm, green ash, white ash	NA	NA	NA	annual yellow sweet clover, giatn ragweed, pink lady, curly dock, carolina geranium, carex sp., sow thistle,
48	BHF/ Riparian	12	12	N/A	10	3	3	N/A	N/A	4	1	5	5	N/A	N/A	0.55	hackberry, carolina snailseed, poison ivy, muscadine grape, smilax, Virginia creeper, passion vine	NA	NA	pecan	cedar elm	NA	NA	NA	perenial rye, carolina geranium, cheat grass, yellow foxtail, carex sp., cockleburr, silverleaf nightshade, giant ragweed, common ragweed, pink lady
49	BHF/ Riparian	20	12	N/A	15	3	3	N/A	N/A	5	5	1	1	N/A	N/A	0.65	poison ivy, mustang grape	NA	NA	NA	box elder, green ash	NA	NA	black willow	Virginia rye, catching bedstraw, false nettle, american germander, carex sp., jointed goat grass, frost weed, curly dock,
50	BHF/ Riparian	20	6	N/A	15	8	3	N/A	N/A	4	3	3	3	N/A	N/A	0.65	pepper vine, smilax, dewberry, red mullberry, carolina snailseed, carolina moonseed	NA	NA	NA	green ash, box elder	NA	NA	black willow	plantain, Virginia rye, false nettle, hedge parsley, catching bedstraw, goat grass, carex sp., frostweed
51	Grass land	12	6	N/A	5	3	3	N/A	N/A	5	3	5	5	N/A	N/A	0.80	green hawthorn	mesquite, slender vetch	NA	NA	winged elm, cedar elm	NA	NA	NA	pink evening primrose, indian paintbrush, illinois bundleflower, small meliot, Johnson grass, little bluestem, cheat grass, spear grass, turkey tangle frog fruit, yellow flax, wood sorrel
52	Upland Forest	12	12	N/A	5	3	3	N/A	N/A	5	5	5	1	N/A	N/A	0.59	poison ivy, greenbriar, mustang grape,	black locust	NA	NA	cedar elm, smerican	NA	NA	NA	longleaf wood oats, woodland lettuce,

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																	carolina snailseed, green hawthorn				elm, box elder				eastern woodland sedge
53	Grass land	12	5	N/A	5	2	1	N/A	N/A	3	3	5	5	N/A	N/A	0.69	gum bumelia	mesquite, slender vetch	NA	NA	NA	NA	NA	NA	pink evening primrose, maximillion sunflower, western ironweed, bee balm, yellow flax, Johnson grass, illinois bundleflower, small meliot
54	Upland Forest	12	6	N/A	5	2	1	N/A	N/A	5	5	5	5	N/A	N/A	0.53	dewberry,	NA	NA	NA	box elder	NA	NA	NA	small meliot, bastard cabbage, giant ragweed, japanese brome, rescue grass, cranes bill, Virginia wild rye, pink evening primrose
55	Upland Forest	12	6	N/A	5	4	3	N/A	N/A	5	5	5	5	N/A	N/A	0.57	poison ivy, hackberry, green hawthorn	slender vetch,	NA	NA	box elder, cedar elm, winged elm	NA	NA	desert olive	small meliot, pink evening primrose, germander, japanese brome, Johnson grass, cheat grass, goldenrod, woodsorrel, stinging nettle, beggars lice, annual ragweed,
56	BHF/ Riparian	12	12	N/A	10	4	5	N/A	N/A	5	5	5	5	N/A	N/A	0.63	greenbriar, Virginia creeper, elder berry, poison ivy, hackberry, carolina snailseed, gumbumelia, mustang grape	NA	bur oak	NA	box elder, cedar elm, Texas ash	NA	NA	cottonwood	allium, beggars lice, catching bedstraw, Virginia rye, Texas baby blue eyes, eastern woodland sedge, longleaf woodoats, germander
57	Upland Forest	12	12	N/A	5	4	3	N/A	N/A	5	5	5	5	N/A	N/A	0.64	Peach, poison ivy, Virginia creeper	NA	NA	pecan	box elder	NA	NA	honeysuckle	beggars lice, giant ragweed, western ragweed, bastard cabbage, clover, japanese brome, yellow woodsorrel, frostweed
58	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	0.00	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped
59	Upland Forest	12	6	N/A	5	2	3	N/A	N/A	4	5	5	5	N/A	N/A	0.54	greenbriar, Virginia creeper, poison ivy, mustang grape	NA	NA	NA	cedar elm, Texas ash, american elm	NA	NA	NA	beggars lice, catching bedstraw, Virginia wild rye, prairie plantain, small meliot, longleaf woodoats, eastern

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																									woodland sedge, scarlet pimpernell
60	Upland Forest	12	6	N/A	10	2	3	N/A	N/A	5	5	5	5	N/A	N/A	0.61	red mullbery, hackberry, dewberry, greenbriar	NA	NA	NA	box elder, Texas ash	NA	NA	NA	false dandelion, japanese brome, bastard cabbage, mexican hat, prairie plantain, shepherds purse, foxtail, carolina canary grass, clover, rescuegrass
61	Grassland	12	5	N/A	5	2	3	N/A	N/A	4	3	5	5	N/A	N/A	0.75	western soapberry, hackberry, poison ivy	mesquite, slender vetch	NA	NA	NA	NA	NA	NA	small meliot, pink envening primrose, western horsenettle, sliverleaf nightshade, giant ragweed, cherokee sedge, wood sorrel, foxtail, japanese brome, false dandelion, bastard cabage.
62	Grassland	12	5	N/A	5	1	1	N/A	N/A	3	3	5	5	N/A	N/A	0.68	NA	slender vetch	NA	NA	NA	NA	NA	NA	pink evening primrose, illinois bundleflower, small meliot, yellow flax, daisy fleabane, little barley, speargrass, false dandelion, japanese brome, annual ragweed, cranes bill
63	BHF/ Riparian	20	5	N/A	10	0	0	N/A	N/A	3	3	0	5	N/A	N/A	0.46	NA	NA	NA	NA	NA	NA	NA	NA	pink evening primrose, carolina canarygrass, velvet weed, cranes bill, false dandelion, american basketflower, giant ragweed, Texas thistle, foxtail
64	Grassland	12	6	N/A	5	1	1	N/A	N/A	3	3	5	5	N/A	N/A	0.69	NA	NA	NA	NA	NA	NA	NA	black willow	Texas thistle, pink evening primrose, bastard cabbage, giant ragweed, horseweed, silver nightshade, indian blanket, false dandelion, tall goldenrod, cherokee

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																									sedge, japanese brome, small meliot
65	BHF/ Riparian	20	6	N/A	10	3	1	N/A	N/A	5	5	5	5	N/A	N/A	0.60	NA	slender vetch	NA	NA	Texas ash	NA	NA	black willow, button bush	small meliot, pink evening primrose, giant ragweed, rabbitsfoot grass, carolina canary grass, boneset, marsh fleabane, great plains ragwort, false dandelion
66	Upland Forest	12	6	N/A	5	3	1	N/A	N/A	4	5	5	5	N/A	N/A	0.53	NA	mesquite, bluebonnet	NA	NA	NA	juniper	NA	osage orange	illinois bundleflower, yellow flax, antelopehorn milkweed, prairie plantain, false dandelion, japanese brome, small meliot, venus lookingglass, king ranch bluestem
67	Grassland	12	5	N/A	5	2	1	N/A	N/A	3	3	3	5	N/A	N/A	0.66	NA	slender vetch	NA	NA	NA	NA	NA	whitebrush	pink evening primrose, giat ragweed, talldock, green bristlegrass, venus-looking glass, small meliot, clasping coneflower, cranes bill, false dandelion
68	Grassland	12	5	N/A	5	1	1	N/A	N/A	3	3	5	5	N/A	N/A	0.68	NA	mesquite, slender vetch	NA	NA	NA	NA	NA	NA	antelopehorn milkweed, plains fleabane, venus looking glass, giant ragweed, goldenrod, yellow flax, illinois bundleflower, cranes bill.
69	Grassland	12	5	N/A	5	0	0	N/A	N/A	3	3	0	5	N/A	N/A	0.56	NA	NA	NA	NA	NA	NA	NA	NA	Texas thistle, soft brome, giant ragweed, foxtail, beggars lice, small meliot, cherokee sedge, cranes bill, bastard cabbage, false dandelion.

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70	Grassland	12	5	N/A	5	1	1	N/A	N/A	4	3	5	5	N/A	N/A	0.69	NA	bluebonnet, mesquite, slender vetch	NA	NA	NA	NA	NA	NA	pink evening primrose, indian paintbrush, antelopehorn milkweed, small meliot, indian blanket, Texas prairie parsley, annual ragweed, prairie verbena, yellow flax, japanese brome.
71	BHF/ Riparian	12	12	N/A	10	4	3	N/A	N/A	5	5	3	3	N/A	N/A	0.57	balloon vine, Chinese tallow	NA	NA	NA	Texas ash	NA	NA	black willow, buttonbush	germander, pink evening primrose, green bristlegrass, prickly sow thistle, scarlet pimpernell, boneset, canary grass, great prairie ragwort
72	BHF/ Riparian	20	12	N/A	10	4	3	N/A	N/A	5	5	3	5	N/A	N/A	0.67	balloon vine, Chinese tallow	NA	NA	NA	Texas ash	NA	NA	black willow, buttonbush	germander, boneset, carolina canary grass, ravens foot sedge, turkey tangle frog fruit, prickly sow thistle, ragweed, tall dock, white morning glory
73	BHF/ Riparian	20	6	N/A	10	3	3	N/A	N/A	5	5	5	5	N/A	N/A	0.62	balloon vine, Chinese tallow	NA	NA	NA	NA	NA	NA	black willow, buttonbush	germander, rat-tail fescue, cranes bill, boneset, canary grass, Virginia rye, mouse ear, sumpweed, switch grass
74	BHF/ Riparian	12	5	N/A	5	2	1	N/A	N/A	3	3	5	5	N/A	N/A	0.41	NA	slender vetch	NA	NA	NA	NA	NA	buttonbush,	pink evening primrose, great plains ragwort, illinoise bundleflower, green bristle grass, turkey tangle frog fruit, carolina canary grass, small meliot, arrowleaf violet, mouse ear, rat-tail fescue.
75	BHF/ Riparian	20	12	N/A	10	2	1	N/A	N/A	5	5	5	5	N/A	N/A	0.65	NA	NA	NA	NA	NA	NA	NA	buttonbush, black willow	rabbits foot grass, cockelburr, giant ragweed, pink evening primrose, Texas thistle, tall dock, Johnson grass, green bristle grass, cranes bill, venus looking glass, small meliot.

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76	Grassland	7	5	N/A	5	1	1	N/A	N/A	3	1	1	1	N/A	N/A	0.42	NA	blue bonnet, mesquite, sensitive plant, slender vetch	NA	NA	NA	NA	NA	NA	ragweed, turly tangle frog fruit, geranium, bee balm, pink lady, flowering flax, field brome, spear grass, Texas vervains, velvet grass, sedge sp., bastard cabbage, small meliot, prairie fleabane, bristle grass, hairy fruit chervile
77	Grassland	7	5	N/A	5	2	1	N/A	N/A	3	1	1	5	N/A	N/A	0.51	hackberry	slender vetch, mesquite	NA	NA	NA	NA	NA	NA	perenial ryegrass, geranium, small meliot, hairy fruit chervil, spiny sow thistle, Texas vervain, pink ladies, bristle grass, narrow leaf plantain, velvet weed, curly dock, bee balm, pennsylvania pellitory.
78	Grassland	7	5	N/A	5	1	1	N/A	N/A	3	1	1	5	N/A	N/A	0.49	NA	bluebonnet, sensitive plant	NA	NA	NA	NA	NA	NA	narrowleaf plantain, bee balm, wild clary, pink ladies, mock vervain, Texas vervain, geranium, perenial rye grass, timothy, ragweed, field brome, speargrass, curly dock, spiny sow thistle, bastard cabbage, small meliot.
79	Upland Forest	12	6	N/A	10	2	1	N/A	N/A	4	1	3	3	N/A	N/A	0.48	hackberry	slender vetch, mesquite	NA	NA	NA	NA	NA	NA	perrenial ryegrass, japanese brome, spreading hedge parsley, green antelope horn, Texas ragwort, catching bedstraw, speargrass, yellow oxallis
80	Grassland	12	6	N/A	10	2	3	N/A	N/A	4	1	3	1	N/A	N/A	0.71	roundleaf greenbriar, sawtooth greenbriar, dewberry, hackberry	slender vetch, sensitive pant	NA	NA	NA	NA	NA	NA	ragweed, small geranium, corn salad, perenial ryegrass, japanese brome, smooth hawksbeard, pink ladies, marsh hedge nettle, bristle grass, plantain, goldenrod.

Point Number	Habitat Type	Site Potential	Successional Stage	Marsh Successional Stage	Uniqueness and Relative Abundance	Diversity of Woody Species	Number of Woody Species	Swamp Diversity of Veg	Marsh Diversity of Veg	Vertical Stratification	Additional Structural Diversity	Condition of Woody Vegetation	Herbaceous Vegetation	Cropland Condition	Marsh Condition	Final Score	Berry Drupe	LegumePod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species
81	BHF/ Riparian	7	5	N/A	10	2	1	N/A	N/A	4	1	3	3	N/A	N/A	0.36	NA	sensitive briar	NA	NA	NA	NA	NA	buttonbush	clasping venus looking glass, switchgrass, staggerweed, bermuda grass, turkey tangle frog fruit, small meliot, timothy, bristle grass, geranium, ragweed,
82	Upland Forest	12	6	N/A	10	1	1	N/A	N/A	4	3	3	5	N/A	N/A	0.52	hackberry, black mullberry, saw tooth green briar	NA	NA	NA	NA	NA	NA	NA	hedge parsley, pensylvania pellitory, japanese brome, catching bedstraw, Virginia wild rye, yellow oxallis, dandylion, perrenial rye grass,

Attachment B: Granger WHAP Point Photographs

Granger Lake #: 1

Facing North

Facing East

Facing West

Facing South

Granger Lake #: 3

Facing North

Facing East

Facing West

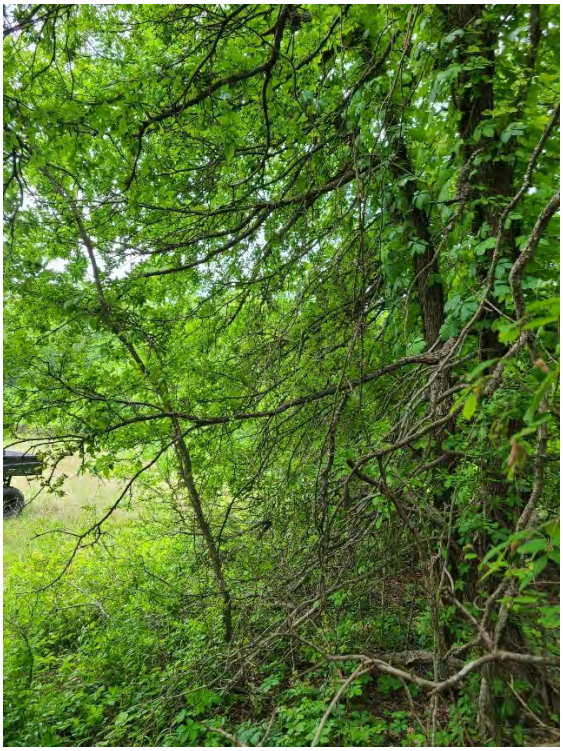
Facing South

Granger Lake #: 4

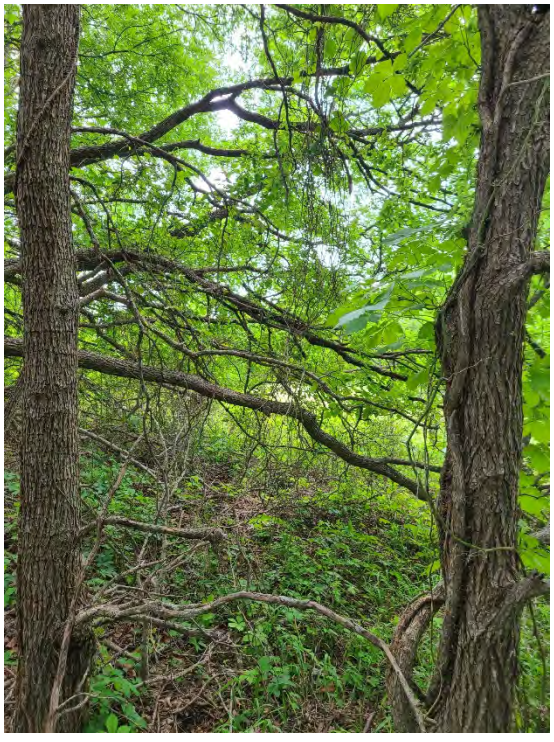
Facing North

Facing East

Facing West



Facing South



Granger Lake #: 5

Facing North

Facing East

Facing West

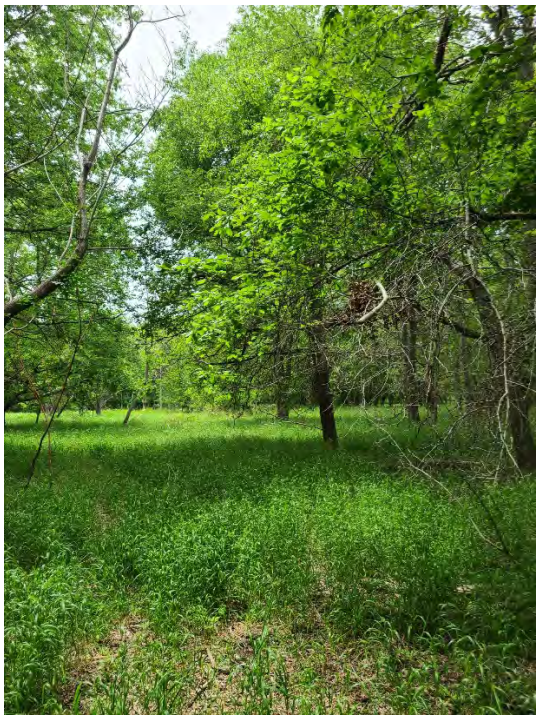
Facing South

Granger Lake #:6

Facing North

Facing East

Facing West



Facing South

Granger Lake #: 7

Facing North

Facing East

Facing West

Facing South

Granger Lake #: 8

Facing North

Facing East

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Facing South

Granger Lake #: 9

Facing North

Facing East

Facing West

Facing South

Granger Lake #: 10

Facing North

Facing East

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Granger Lake #: 11

Facing North

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Granger Lake #: 12

Facing North

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Granger Lake #: 13

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Granger Lake #: 14

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Granger Lake #: 15

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Granger Lake #: 16

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Granger Lake #: 17

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Granger Lake #: 18

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Granger Lake #: 47

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Granger Lake #: 49

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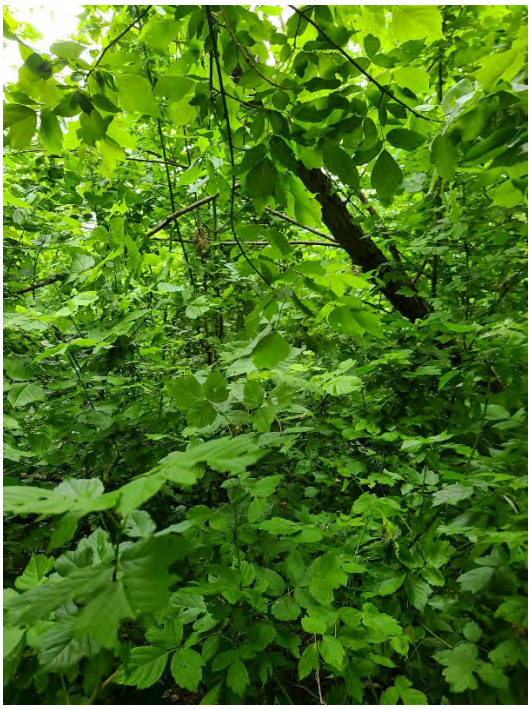
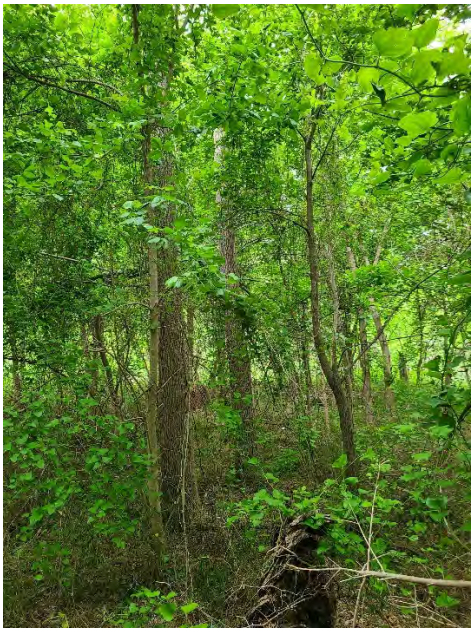


Facing South

Granger Lake #: 50

Facing North

Facing East



Facing West

Facing South

Granger Lake #: 51

Facing North

Facing East

Facing West

Facing South

Granger Lake #: 52	
Facing North	Facing East
	
Facing West	Facing South
	

Granger Lake #: 53

Facing North

Facing East

Facing West

Facing South

Granger Lake #: 54

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Granger Lake #: 55

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Granger Lake #: 56

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Granger Lake #: 57

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Granger Lake #: 67

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Granger Lake #: 68

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Granger Lake #: 69	
Facing North	Facing East
	
Facing West	Facing South
	

Granger Lake #: 70

Facing North

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Facing South

Granger Lake #: 71	
Facing North	Facing East
	
Facing West	Facing South
	

Granger Lake #: 72

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Granger Lake #: 73

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Granger Lake #: 74

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Granger Lake #: 75

Facing North

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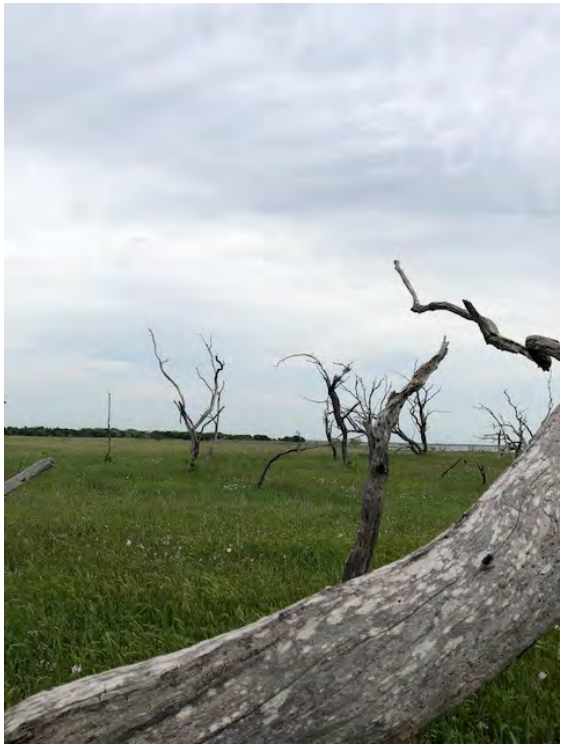
Granger Lake #: 77

Facing North

Facing East

Facing West



Facing South

Granger Lake #: 78

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Granger Lake #: 79

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Granger Lake #: 80

Facing North

Facing East

Facing West

Facing South

Granger Lake #: 81

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Granger Lake #: 82

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Facing South

APPENDIX D – PERTINENT PUBLIC LAWS

- House Document 74-308. Proposed the construction of the Caddoa Dam and Reservoir for flood control and irrigation purposes

- Public Law 74-738, Flood Control Act of 1936 as amended by the Public Law 75-761, Flood Control Act of 1938 – Authorized the construction of the Caddoa Dam and Reservoir for flood control and irrigation purposes.

- Public Law 76-667. Chapter 430, 3rd Session. Changed to name of the project to John Martin Reservoir Project in honor of John A Martin, the lake Congressman from Colorado.

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

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

- Public Law 86-717, Forest Conservation Act. This Act provides for the protection of forest and other vegetative cover for reservoir areas under the jurisdiction of USACE.

- Public Law 89-298, Flood Control Act of 1965. Authorizes the Chief of Engineers to use and not to exceed 10,000 acre-feet of flood control storage space in the reservoir for the purpose of establishing and maintaining a permanent pool for fish and wildlife and recreations purposes at such times as storage space may be available for such permanent pool within the conservation pool as defined in Article III F, Arkansas River Compact I63 Stat. 145).

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

- Public Law 91-190, National Environmental Policy Act of 1969. NEPA declared it a national policy to encourage productive and enjoyable harmony between man

and his environment, and for other purposes. Specifically, it declared a "continuing policy of the Federal Government...to use all practicable means and measures...to foster and promote the general welfare, to create conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans." Section 102 authorized and directed that, to the fullest extent possible, the policies, regulations, and public law of the United States shall be interpreted and administered in accordance with the policies of the Act. It is Section 102 that requires consideration of environmental impacts associated with Federal actions. Section 101 of NEPA requires the federal government to use all practicable means to create and maintain conditions under which man and nature can exist in productive harmony.

Specifically, Section 101 of the National Environmental Policy Act declares:

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

- Public Law 89-665, National Historic Preservation Act of 1966 (NHPA). Establishes a national policy of preserving, restoring, and maintaining cultural resources. It requires Federal agencies to take into account the effect an action may have on sites that may be eligible for inclusion on the National Register of Historic Places.

- Public Law 101-601, Native American Graves Protection and Repatriation Act. Requires Federal agencies to return Native American human remains and cultural items, including funerary objects and sacred objects, to their respective peoples.

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

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

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

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

- Public Law 89-272, 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 program.

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

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

- Public Law 92-463, Federal Advisory Committee Act. The Federal Advisory Committee Act became law in 1972 and is the legal foundation defining how federal advisory committees operate. The law has special emphasis on open meetings, chartering, public involvement, and reporting.

- Public Law 92-500, Federal Water Pollution Control Act Amendments of 1972. The Federal Water Pollution Control Act of 1948 (PL 845, 80th Congress), as amended in 1956, 1961, 1965 and 1970 (PL 91- 224), established the basic tenet of uniform State standards for water quality. Public Law 92-500 strongly affirms the Federal interest in this area. "The objective of this act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."

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

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

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

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

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

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

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

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

APPENDIX F – Public and Stakeholder Comments

APPENDIX G – ACRONYMS

ac-ft ..... Acre-Feet
AQI ..... Air Quality Index
B.P. ..... Before Present
BMP ..... Best Management Practices
CRMP ..... Cultural Resources Management Plan
CWA ..... Clean Water Act
DC ..... District Commander
DF ..... Deciduous Forest
DQC ..... District Quality Control
DQCB ..... District Quality Control Board
DM ..... Design Memorandum
EA ..... Environmental Assessment, NEPA Document
EMS ..... Ecological Mapping System
EOP ..... Environmental Operating Principles
EP ..... Engineering Pamphlet
EPA ..... United States Environmental Protection Agency
ER ..... Engineering Regulation
ESA ..... Environmentally Sensitive Area
°F ..... Degrees Fahrenheit
FONSI ..... Finding of No Significant Impact
FWCA ..... Fish and Wildlife Coordination Act of 1958
GIS ..... Geographical Information Systems
HDR ..... High Density Recreation
HQ ..... USACE Headquarters (also HQUSACE)
IH ..... Interstate Highway
IPaC ..... Information for Planning and Consultation
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
NGVD29 ..... National Geodetic Vertical Datum (1929)
NHPA ..... National Historic Prevention Act
NRHP ..... National Register of Historic Places
NOA ..... Notice of Availability
NRCS ..... Natural Resource Conservation Service
NRHP ..... National Registry of Historic Places
NVCS ..... National Vegetation Classification System
NWI ..... National Wetland Inventory
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
PII..... Personally Identifiable Information
PL..... Public Law
PM..... Project Management or Project Manager
PMP ..... Project Management Plan
PO..... Project Operations
RBLH ..... Riparian Bottomland Hardwoods
RBS..... Recreational Boating Survey
RIFA..... Red Imported Fire Ant
RPEC ..... Regional Planning and Environmental Center
RTEST ..... Rare, Threatened, and Endangered Species of Texas
SCORP ..... Statewide Comprehensive Outdoor Recreation Plan (synonymous with TORP in Texas)
SGCN..... Species of Greatest Conservation Need
SH..... State Highway
SHPO..... State Historical Preservation Office
SMPS..... Shoreline Management Policy Statement
SIP ..... State Implementation Plan
SWA..... State Wildlife Area
TCAP ..... Texas Conservation Action Plan
TCEQ..... Texas Commission on Environmental Quality
TPWD ..... Texas Parks and Wildlife Department
TORP ..... Texas Outdoor Recreation Plan
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 (VMA)
WDA..... Workforce Development Area
WHAP ..... Wildlife Habitat Appraisal Procedure
WM..... Wildlife Management Area (WMA)