Whitney Lake Master Plan

Brazos River Basin

Bosque, Hill, and Johnson Counties, Texas

June 2016

US Army Corps of Engineers

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PREFACE

The Whitney Lake Master Plan (Plan or Master Plan) is a collaborative effort designed to guide present and future land use planning for the responsible stewardship of US Army Corps of Engineers (USACE)-administered resources. This vital tool provides guidance and includes direction for the appropriate management, use, development, enhancement, protection, and conservation of the natural, cultural, and man-made resources at Whitney Lake. Input toward the Master Plan was obtained from local community stakeholders, regional stakeholders, lake management personnel, federal, state, and local government agencies; and non-government organizations, as well as information from best practices in lake master planning. Listening sessions and scoping comments from government officials and the general public were important for identifying issues that need to be addressed in the Plan.

Chapter 1 of the Master Plan presents an overall introduction of Whitney Lake from project authorization and purpose to a description of watershed. Chapter 2 consists of an inventory and analysis of project resources. Chapters 3 and 4 lay out management goals, resource objectives, and land allocation and classification. Chapter 5 is the resource plan that identifies how project lands will be managed through a resource use plan for each land use classification, current and projected park facility needs, an analysis of existing and anticipated resource use, and anticipated influences on overall project operation and management. Chapter 6 discusses any special topics unique to Whitney Lake. Chapter 7 identifies the coordination efforts and input from the stakeholders who gave valuable input into the development of the Master Plan, and Chapter 8 gives a summary of recommendations.

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

The EA evaluated and analyzed two alternatives; the implementation of the proposed Master Plan and a No Action Alternative (continued use of the 1972 Master Plan. The EA analyzed the potential impact these two alternatives would have on the natural, cultural, and human environments. Because the Master Plan is conceptual, any action proposed in the Plan that would result in significant disturbance to natural resources or result in significant public interest would require additional NEPA documentation at the time the action takes place.

This Master Plan is designed to be a living, breathing entity used in the day-to-day planning and operations of the environmental, cultural, and man-made resources of Whitney Lake. It was developed and organized to serve the current and future generations affected by Whitney Lake by guiding toward more sustainable and resilient resources. Looking forward, this Master Plan will be an essential tool in engaging the community, coordinating efforts, and protecting lake resources for everyone.

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CHAPTER 1 - INTRODUCTION

1.1 GENERAL OVERVIEW

Whitney Lake is a multipurpose water resources project constructed and operated by the U.S. Army Corps of Engineers, Fort Worth District (USACE). The lake and associated federal lands are located in Bosque, Hill and Johnson Counties, Texas at river mile 442 on the Brazos River. The Whitney Lake dam extends in a southwest-northeast direction for a distance of approximately 1.3 miles and is situated in Hill and Bosque Counties approximately 38 miles upstream from Waco, Texas. The dam and associated infrastructure, as well as all lands acquired for the Whitney Lake project, are federally owned and are administered by the USACE.

The *Whitney Lake Master Plan*, hereafter referred to as Plan or Master Plan, is intended to serve as a comprehensive land and recreation management plan with an effective life of approximately 25 years. The focus of this Plan is to guide the stewardship of natural and cultural resources, and the provision of outdoor recreation facilities and opportunities on federal land associated with Whitney Lake. This Plan does not address the flood risk management, hydroelectric power, or water conservation purposes of Whitney Lake (see the USACE Water Control Manual for Whitney Lake for a description of these project purposes). The original Plan for Whitney Lake was approved in April 1952 and updated in 1966 and again in 1972. The 1972 revision (Design Memorandum No 1C) is the most recent revision, and was intended to serve as a guide for the orderly and coordinated development and management of all land and water resources of the project. These earlier documents presented data on existing conditions, anticipated recreational use, types of facilities needed to service the anticipated use, and an estimate of future requirements. In 1999, USACE discontinued use of the Design Memorandum system as a means of organizing the many phases of civil works projects. Therefore, the term “Design Memorandum” is not used in this Master Plan revision.

1.2 PROJECT AUTHORIZATION

The following paragraphs provide a summary of key legislation authorizing the construction of Whitney Dam and Lake, as well as stewardship of project lands and the provision of outdoor recreation facilities and programs.

The Whitney Lake Project was authorized under provisions of the Flood Control Acts approved 18 August 1941 (Public Law 228, 77th Congress, First Session) and 22 December 1944 (Public Law 534, 78th Congress, Second Session) for the control of floods, the development of hydroelectric power, and for other beneficial uses.

Section 4 of the Flood Control Act approved 22 December 1944, (Public Law 534, 78th Congress, Second Session), as amended, authorized the development of reservoir areas under the Department of the Army for recreational purposes.

1.3 PROJECT PURPOSE

Whitney Lake is a multipurpose water resources project constructed and operated by the USACE. The Whitney Lake water resources project has the following primary and secondary purposes:

- Flood Risk Management : a primary mission
- Water Conservation: a primary mission
- Hydroelectric Power Generation: a primary mission
- Public Outdoor Recreation: a secondary mission
- Environmental Stewardship including Fish and Wildlife Management: an inherent mission associated with federal land ownership.

1.4 PURPOSE AND SCOPE OF MASTER PLAN

In accordance with Engineering Regulation (*ER) 1130-2-550 Change 07, dated 30 January 2013 and Engineering Pamphlet (EP) 1130-2-550 Change 05, dated 30 January 2013*, Lake Project master plans are required for most USACE water resources development projects having a federally-owned land base. This revision of the Whitney Lake Master Plan is intended to bring the master plan up to date to reflect ecological, socio-demographic, and outdoor recreation trends that are currently impacting the lake, as well as those anticipated to occur within the planning period of 2016 to 2041, a 25-year period.

The Master Plan is the strategic land use management document that guides the efficient, cost-effective, comprehensive management, development, and use of recreation, natural resources, and cultural resources throughout the life of the Whitney Lake project. It is a vital tool for the responsible stewardship and sustainability of the project's natural and cultural resources, and the provision of outdoor recreation facilities and opportunities on federal land associated with Whitney Lake for the benefit of present and future generations. The USACE vision for the future management of the natural resources and recreation program at Whitney Lake is set forth as follows:

> *"The land, water, and recreational resources of Whitney 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."*

The Plan guides and articulates USACE responsibilities pursuant to federal laws to preserve, conserve, restore, maintain, manage, and develop the land, water, and associated resources. It is a dynamic and flexible tool designed to address changing conditions. The Plan focuses on carefully crafted, resource-specific goals and objectives. It ensures that equal attention is given to the economy, quality, and

need in the management of Whitney Lake resources and facilities, and that goals and objectives are accomplished at an appropriate scale.

It is important to note what the Master Plan does not address. Details of design; management and administration; and implementation are not addressed here, but are addressed in the *Whitney Lake Operational Management Plan*. The Master Plan also does not address the specifics of regional water quality, shoreline management, or water level management. The operation and maintenance of primary project operations facilities, including but not limited to the dam, spillway, and gate-controlled outlet is not included in this Plan.

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

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

The 1972 Master Plan for Whitney Lake was sufficient for prior land use planning and management until recently as 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 Whitney Lake and the Central Texas region in general. In response to these continually evolving trends, USACE determined that a full revision of the 1972 plan is required as set forth in this Plan.

1.5 BRIEF WATERSHED AND PROJECT DESCRIPTION

The Brazos River watershed extends from eastern New Mexico in a southeasterly direction diagonally across the state of Texas to the Gulf of Mexico, with a watershed encompassing approximately 44,670 square miles. Approximately 8,950 square miles of the area, located in the northwest portion of the watershed, is classified as non-contributing drainage area. The total contributing drainage area is 35,720 square miles of which 17,656 square miles is controlled by Whitney Dam. The lake area is a scenic region characterized by a gently sloping valley bordered by steep, stony bluffs. The valley varies in width from approximately 0.5 miles at the dam to a maximum of two miles, with an average width of one mile. At the top of the conservation pool elevation of 533.0 Mean Sea Level (msl), the lake is approximately 42 miles long with a shoreline of 225 miles.

1.6 DESCRIPTON OF RESERVOIR

Whitney Dam and Reservoir is a unit of river improvement works in the Brazos River Basin. The project was initially authorized by the Flood Control Acts of 1941 and later in 1944. Authorized project purposes include hydroelectric power, flood control, water conservation and recreation. In the design of the project, it was recognized that less flood control storage might be required at a later date when additional flood control reservoirs were constructed in the watershed and experience was gained in the operation of the lake. Accordingly, provision was made in the design of the powerhouse and all electrical equipment for operation of the project at elevation 533.0 feet msl. The raising of the power pool from elevation 520.0 msl to elevation 533.0 msl was begun on 15 June 1972.

Construction of the Dam was started in 1947 and completed in 1950. Construction of the powerhouse started in 1950 and was completed in 1953. The two units constructed were 15,000 KW generators. Currently, there are six class A campgrounds, four class C campgrounds, and three day use parks operated by the USACE with other facilities operated by state, private entities, and local governments that have approximately one to 1.5 million visitors annually.

Whitney Lake has 2,100,400 acre-feet of storage that is utilized for flood control, water supply, and generation of hydroelectric power. The conservation pool, with top of elevation 533.00 msl, is fully allocated. Allocation of storage in Whitney Lake includes 248,100 acre-feet for water supply, 387,000 acre-feet for power drawdown storage, and 255,300 acre-feet of dead storage. An acre-foot of water is equivalent to one foot of water spread over one acre of land. The pool of record was reached on 29 May 1957 at an elevation of 570.25 msl and the record low was 509.26 msl on 1 November 1956.

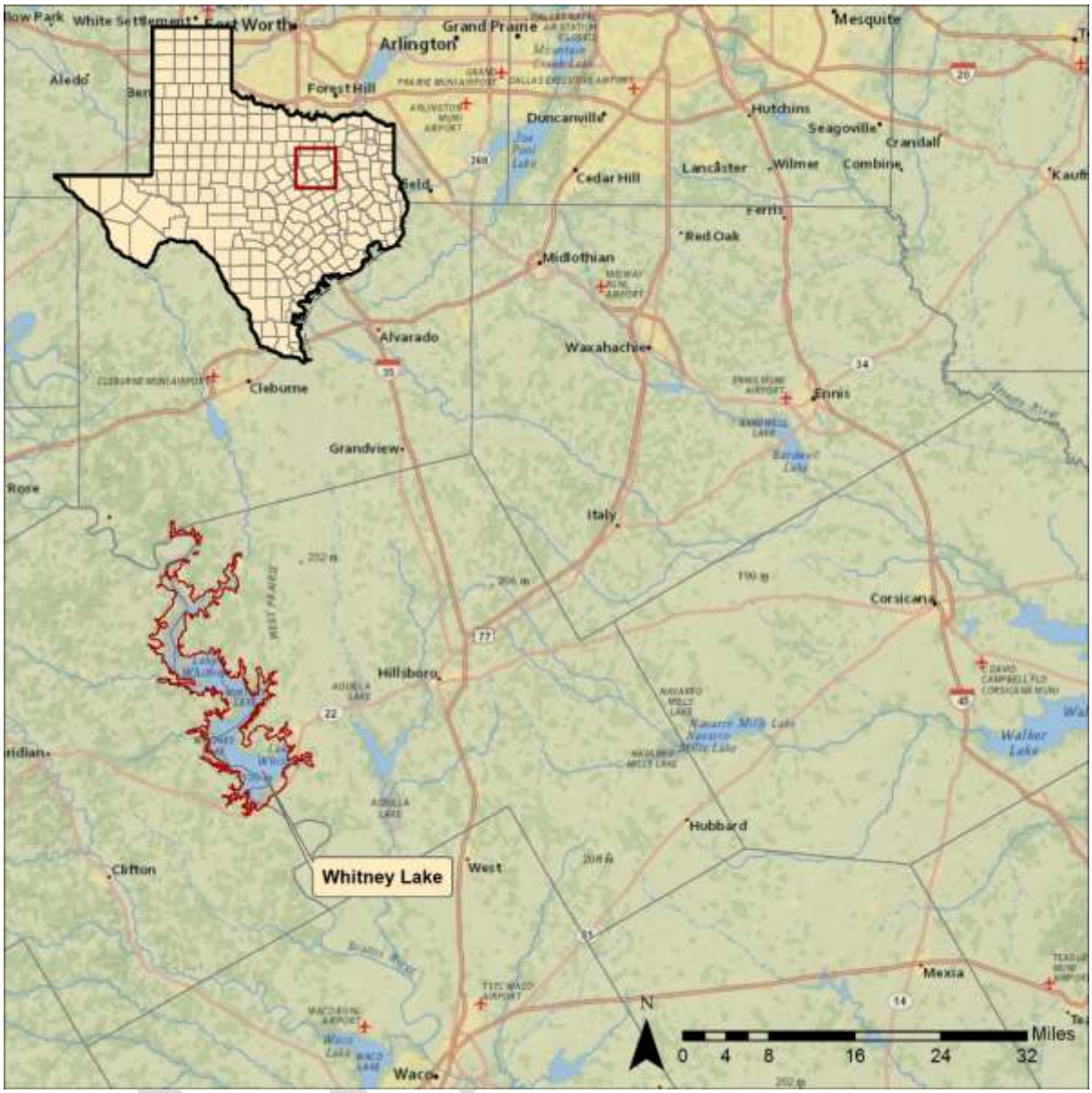


Figure 1.1 Vicinity Map of Whitney Lake

1.7 PROJECT ACCESS

Roads: State Highway 22 crosses the dam and State Highway 174 crosses the upper reaches of the lake. FMs (FM) 933 and 56 parallel the east and west shores of the lake, respectively. In the latter part of 1971, FM 1713 was extended across the old Katy railroad bridge and thus links FM 933 to FM 56 approximately five and one-half miles north of the dam.

Within Bosque, Hill, Johnson, and McLennan counties there is no Regional Mobility Authority. However, Johnson County is included in the North Central Texas Council of Governments (NCTCOG), which is a metropolitan planning organization

with regional transportation planning responsibilities. The Heart of Texas Council of Governments (HOTCOG) includes Hill and Bosque counties but does not perform mobility or transportation planning. In general, the primary planning responsibilities for the road network serving the four counties surrounding Whitney Lake is a function of the Texas Department of Transportation (TXDOT). The Waco Region TXDOT office performs most of the highway planning for the four counties of immediate concern. There are currently no significant highway projects planned for the four county region that would have a major effect on the actions set forth in this Plan. Relatively minor highway projects that are in the pre-construction or planning stages include: the rehabilitation of the Highway 174 bridge and bridge approaches where it crosses the upper end of Whitney Lake; the widening of FM 933 from two lanes to four lanes from the City of Whitney to FM 1713; repainting the FM 1713 bridge across Whitney Lake. A light rail line to be completed by 2035 is planned within Johnson County running from the city of Cleburne to downtown Fort Worth. The presence of this light rail line could encourage people to live further out from downtown Fort Worth, possibly living as far out as the north end of Whitney Lake.

Railroads: The mainline of the Burlington Northern Santa Fe Railroad crosses the lake between Kimball Bend Park and the mouth of the Nolan River.

1.8 PREVIOUS DESIGN MEMORANDUMS AND PERTINENT DOCUMENTS

Listed below are the primary design documents and reports associated with the initial construction and land acquisition, as well as successive development for Whitney Dam and Reservoir:

- Whitney Dam and Power Plant – Definite Project Report (April 1942) – Comprehensive report of all studies to date regarding the need and feasibility of the Whitney Lake project. Includes preliminary design and layout of project features, and results of initial cost estimates.

- Definite Project Report (DPR) on Whitney Reservoir (Revised September 1945) – Superseded the DPR of April 1942.

- Analysis of Design for Construction of Spillway and Completion of Embankment (September 1948) – Contains the basic design criteria and studies in the development of the construction plans and specifications for Whitney Dam Spillway and Earth Embankment. This report facilitated review of the plans and specifications by higher authority. This report is essentially a design memorandum, although not specifically titled as such.

- Whitney Dam and Reservoir – Bill of Materials for Construction of Spillway – Volume 4 of 4 (November 1947)

- Whitney Reservoir – Design Memorandum for Blum Access Road and Bridge (October 1952)

- Whitney Powerhouse – Efficiency Test by Gibson Method – Unit No. 1 (23 March 1954)

- Design Memorandum No. 1 on Whitney Reservoir – Recreational Facilities (February 1956)

- Design Memorandum No. 2 on Whitney Reservoir – Real Estate, Part I, Erosion below Dam (August 1958)

- Allocation of Water Supply Storage – Whitney Dam and Reservoir (Revised November 1960)

- Design Memorandum No. 4 on Whitney Reservoir – Shelter for Fallout Protection (May 1962)

- Design Memorandum No. 4 on Whitney Reservoir – Shelter for Fallout Protection (Revised September 1962)

- Design Memorandum No. 5 on Whitney Reservoir – Hill County Roads Nos. 3 and 5 (May 1968)

- Whitney Dam and Reservoir – Raising Power Pool to Elevation 533 (Revised July 1968) - Presents an analysis of the hydropower potentialities, the flood control storage requirements, and the water supply storage requirements of the Whitney Lake project in order to determine and establish the storage allocations which would assure the best overall use of the water resources provided by the project.

- Design Memorandum No. 5 on Whitney Reservoir – Hill County Roads Nos. 3 and 5 (Revised January 1969)

- Whitney Dam and Reservoir – Raising Power Pool to Elevation 533 – Supplemental Report (November 1970) – Included updated economic and cost allocation report for hydropower and water supply, respectively, for bottom of power pool at 520 msl and top of power pool at 533 msl.

1.9 PERTINENT PROJECT INFORMATION

The Whitney Dam consists of a concrete section 1,674 feet long at the top, including an 824-foot spillway; two earthen embankment sections totaling 8,201 feet; and saddle dikes 7,820 feet long. The top of the concrete section is 159 feet above the river bed. The spillway section is controlled by 17 individually operated tainter gates, each 40 feet wide by 38 feet high. Sixteen gate-controlled sluices, each five feet wide by nine feet high, are provided in the spillway structure. A powerhouse is located on the right bank immediately downstream from the non-overflow section of the dam. The original installed capacity of the hydroelectric generating facilities is 30,000 kilowatts (KW). Table 1.1 provides pertinent information regarding existing reservoir storage capacity.

Table 1.1 Pertinent Features of Project

Feature	Elevation (msl)	Area (acres)*	Capacity (acre-feet)
Top of Concrete Dam	584.0		
Top of Earth Embankment	580.0	56,360	2,476,800
Maximum Design Water Surface	573.0	51,190	2,100,400
Top of Flood Control Pool	571.0	49,820	1,999,500
Top of Conservation Pool and Spillway Crest	533.0	23,560	627,100
Five-Year Frequency Reservoir Drawdown	526.0	18,250	478,750
Ten-Year Frequency Reservoir Drawdown	522.0	16,200	411,070
Streambed	425.0		
Distance of shoreline at conservation level –	225 Miles		

The Texas Water Development Board (TWDB) conducted a Volumetric Survey of Whitney Lake in June 2005 to determine to amount of sedimentation that is occurring in the lake since 1959. The findings from that TWDB survey indicate that Whitney Lake had a volume of 554,203 acre-feet and encompasses 23,220 acres at conservation pool of 533.0 feet above mean sea level. The study indicates that Whitney Lake has lost 72,297 acre-feet of storage or 11.6% capacity and a 1.4% decrease in surface area.

CHAPTER 2 - PROJECT SETTING AND FACTORS INFLUENCING MANAGEMENT AND DEVELOPMENT

2.1 PHYSIOGRAPHIC SETTING

2.1.1 Ecoregion Overview

Ecoregions are areas with generally similar ecosystems and with similar types, qualities, and quantities of environmental resources. Ecoregion boundaries are determined by examining patterns of vegetation, animal life, geology, soils, water quality, climate, and human land use, as well as other living and non-living ecosystem components. Whitney Lake lies within the Level III Cross Timbers ecoregion and the Level IV Grand Prairie and Eastern Cross Timbers ecoregions of Texas. Refer to Figure 2.1 for a map of Ecoregions in the state of Texas.

The Cross Timbers ecoregion is a transitional area between the once prairie, now winter wheat growing regions to the west, and the forested low mountains or hills of eastern Oklahoma and Texas. The region stretches from southern Kansas into central Texas, and contains irregular plains with some low hills and tablelands. It is a mosaic of forest, woodland, savanna, and prairie. The transitional natural vegetation of little bluestem grassland with scattered blackjack oak and post oak trees is used mostly for rangeland and pastureland, with some areas of woody plant invasion and closed forest.

The Level IV Grand Prairie ecoregion is an undulating plain underlain by Lower Cretaceous limestones with interbedded marl and clay. Although the vegetation of the Grand Prairie is similar to the Northern Blackland Prairie, the limestone of the Grand Prairie is more resistant to weathering, which gives the topography a rougher appearance. Meandering streams deeply incise the limestone surface. The original vegetation was tallgrass prairie in the upland areas and elm, pecan, and hackberry in riparian areas where deeper soils have developed in floodplain deposits or where the underlying clays have been exposed by limestone erosion. The invasive species Ashe juniper and, to a lesser extent, honey mesquite have increased since settlement. Grand Prairie grasses include big bluestem *(Andropogon gerardi)*, yellow Indiangrass *(Sorghastrum nutans)*, little bluestem *(Schizachyrium scoparium)*, hairy grama *(Bouteloua hirsute)*, Texas wintergrass (Nassella leucotricha), sideoats grama *(Bouteloua curtipendula)*, and Texas cupgrass *(Eriochloa sericea)*. Some common Great Plains animals, such as black-tailed jackrabbit *(Lepus californicus)* and the scissortail flycatcher *(Tyrannus forficatus)*, range farther east through the Grand Prairie, creating an overlap in Great Plains and eastern forest species. Present land uses include grazing on ridges with shallow soils and farming of corn, grain sorghum, and wheat on the deeper soils on the flats.

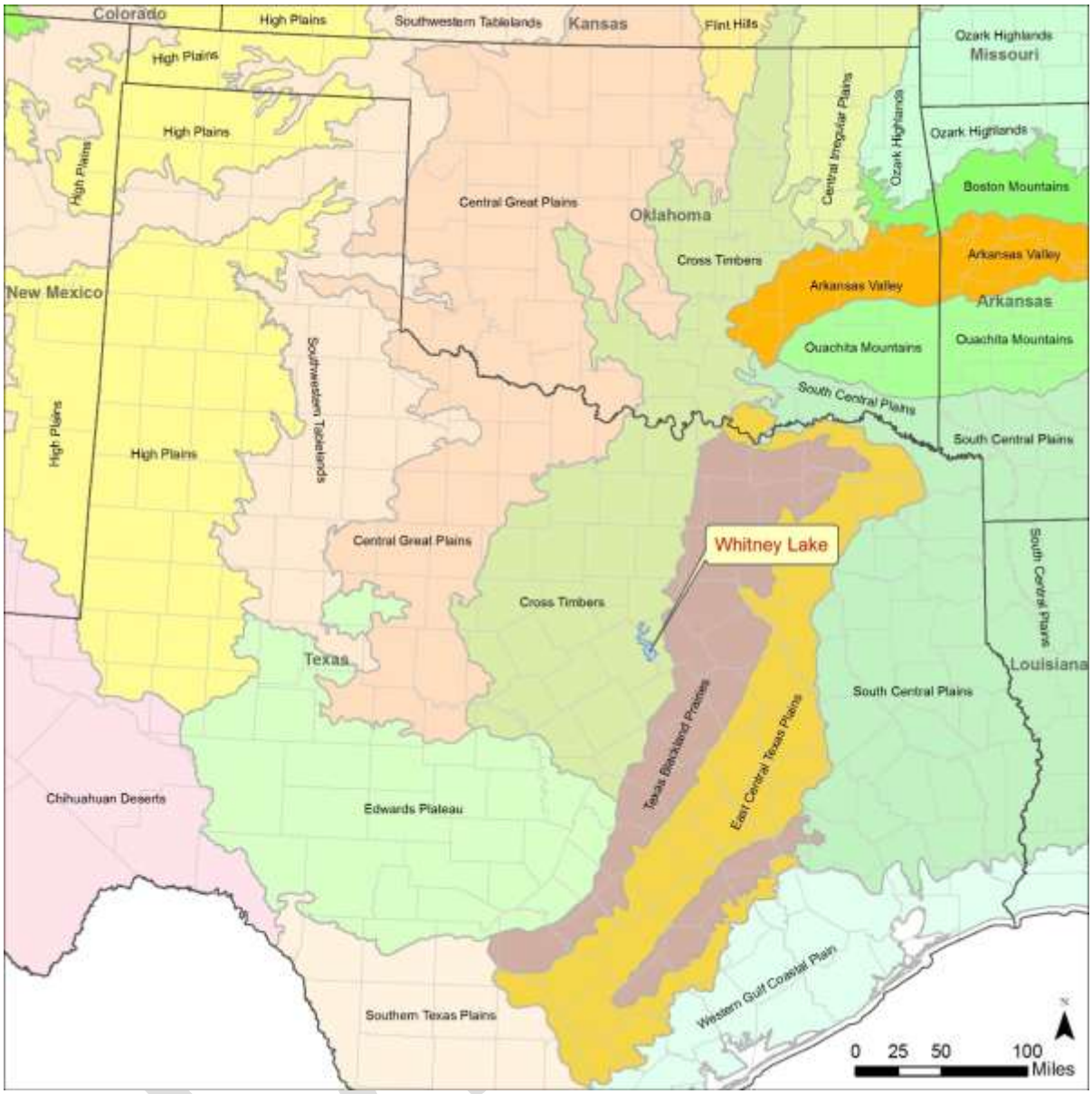


Figure 2.1 Ecoregions of Texas **(**Source: EPA, Level III Classifications)

2.1.2 Climate

Whitney Lake lies in a region characterized by moderate winters and comparatively long summers. In spring, summer, and fall, prevailing winds are from the south and southwest. The mean annual temperature in the vicinity of the dam site is 67 degrees (°) Fahrenheit (F). The maximum recorded temperature at Hillsboro, Texas was 113° F. The recorded low was 1° below zero. The growing season, between killing frosts, is normally from the latter part of March to the middle of November. The mean annual precipitation over the contributing portion of the Brazos River Basin above the Whitney Dam site is approximately 24.8 inches.

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

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

2.1.3 Geology

The dominate foundation of Whitney Lake's geology is Cretaceous Period limestone of the Fredericksburg Group which provides dramatic cliffs along the lakeshore and along the banks of the Nolan River. Interspersed between these outcroppings are terraced floodplains with deep alluvial soils.

2.1.4 Topography

Relief within project boundaries ranges from gently sloping to near vertical bluffs. The majority of the area is hilly with numerous limestone bluffs, with bottoms limited to areas dissected by streams or tributaries. Tributary flood plains have flat to less than five percent slopes, and terrace lands slope from five to 20 percent. Uplands are rolling to steep.

2.1.5 Hydrology and Groundwater

Whitney Dam is located on the Brazos River at 442.4 river miles approximately 38 miles upstream from Waco, Texas. The dam is located in Hill and Bosque Counties. There are approximately 17,656 square miles of drainage controlled by the Whitney Dam. The Brazos proper begins at the confluence of the Salt Fork and Double Mountain Fork, two tributaries of the Upper Brazos that rise on the high plains of the Llano Estacado flowing 840 miles through the center of Texas. Another major tributary of the Upper Brazos is the Clear Fork Brazos River. Important tributaries of the Lower Brazos include the Nolan River above Whitney Dam, and the Bosque River, Little River, Yegua Creek, Leon River, San Gabriel River, Lampasas River and the Navasota River below the Whitney Dam.

2.1.6 Soils

Whitney Lake is situated at the juncture of two major soil complexes. The eastern side in Hill County falls in the East Cross Timbers Land Resource Area. This

resource area contains sandy soils and Brazos River terrace soils of two major associations. The Bastrop-Travis Association is made up of deep, sandy soils located on level to gently sloping, old and high terraces. The Purves-Brackett-Bolar Association is comprised of moderately deep clayey soils on limestone slopes that range from gentle to steep in grade.

The western, or Bosque County side, is located in the Grand Prairie Land Resource Area. The three major soil associations are: Bastrop-Travis fine sandy loams; Tarrant-Brackett clays; and Denton-Tarrant clays. Physically, Bosque County soils are arranged much like those in Hill County except for frequent barren limestone outcroppings that are characteristic of the Grand Prairie and Blackland Prairie.

Factors imposing the most serious limitations on the use of project lands are the following: severe rocky texture, limited permeability, depth of bedrock, and high shrink/swell potential. In general, the soils of Whitney Lake are in good condition, with the possible exception of some eroded areas in the upper regions of the project watershed. Complete information regarding the 34 specific soil types making up the Whitney Lake Project are found within the Soil Survey of Bosque and Hill Counties, published by the United States Department of Agriculture, Natural Resources Conservation Service (NRCS). Copies of these surveys are available for viewing at the Whitney Lake Office.

The lake inflow carries a minimum amount of sediment because of the stony soils upstream of the project. Much of the shoreline of Whitney Lake is limestone cliffs with minimal erosion.

2.2 ECOREGION AND NATURAL RESOURCE ANALYSIS

2.2.1 Introduction

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 U.S. Fish and Wildlife Service (USFWS); land (soils) capability classes in accordance with NRCS soil surveys; and wetlands in accordance with the USFWS Classification of Wetlands and Deepwater Habitats of the United States. This basic inventory information is used in preparing project Master Plans and Operational Management Plans (OMP). The OMP is a five-year management plan setting forth detailed information required to implement the concepts set forth in the Master Plan.

In addition to the data from the Level One Inventories, a Habitat Assessment was conducted on 9 to 11 September 2015 at Whitney Lake using the TPWD's Wildlife Habitat Appraisal Procedures (WHAP) to assist in the preparation of this Plan. Sites were preselected based on aerial imagery from existing geospatial data. A total of 95 sites around the lake were selected. The four major habitat types that were selected and assessed were Grassland, Savannah, Woodland and Bottomland Hardwood. A summary of the WHAP analysis is presented in Appendix E.

The Texas Conservation Action Plan (TCAP) 2012 and the accompanying Texas Cross Timbers Ecoregion Handbook (Handbook), published by TPWD in August 2012, were used in the preparation of this Plan. The TCAP and Handbook were invaluable in identifying Species of Greatest Conservation Need (SGCN), rare plant communities, regional conservation issues and a suite of conservation actions needed to reduce negative effects on SGCN and rare plant communities. The TCAP and Handbook were especially valuable in preparing the Land Classifications and Resource Objectives in this Plan.

2.2.2 Vegetative Resources

The Whitney Lake Project is located within the Cross Timbers ecological region in north-central Texas. This region is a transitional area between tall grass prairies and oak savannas and is characterized by areas with high densities of trees and irregular plains and prairies.

The dominate trees include live oak (*Quercus virginiana*), post oak *(Quercus stellata)*, American elm *(Ulmus americana)*, cedar elm *(Ulmus crassifolia)*, eastern cottonwood *(Populus deltoides)*, black willow *(Salix nigra)*, pecan *(Carya illinoinensis)*, Ashe juniper *(Juniperus ashei)*, hackberry *(Celtis occidentialis)*, and honey mesquite *(Prosopis glandulosa)*. Ashe juniper and honey mesquite have become more prevalent over time due to the absence of fire from the system. While not desirable in the plains and prairie areas of the project, Ashe juniper is a valuable species on the limestone slopes of the surrounding hills and canyons providing nesting material for the endangered (Federally-listed) golden-cheeked warbler (Dendroica chrysoparia [GCWA]). Other common woody species include shrubs; such as flame leaf sumac *(Rhus copallina)*, sand plum *(Prunus angustifolia)*, rough-leaf dogwood *(Cornus drummondii)*, deciduous yaupon *(Ilex decidua)*, elbowbush *(Forestiera pubescens)*, and coralberry *(Symphoricarpos orbiculatus)*; as well as vines including mustang grapes *(Vitis mustangensis)*, Virginia creeper *(Parthenocissus quinquefolia)* and poison ivy *(Toxicodendron radicans)*.

Predominate herbaceous species include various grasses and forbs. The dominate forbs found on project lands include greenbriar *(Smilax sp.)*, Illinois bundleflower *(Desmanthus illinoensis)*, Engelmann daisy *(Engelmannia pinnatifida)*, Indian paintbrush *(Castilleja indivisa)*, bluebonnet *(Lupinus texensis)*, and Indian blanket *(Gaillardia pulchella)*. Common native grasses include little bluestem *(Schizachyrium scoparium)*, silver bluestem *(Bothriochloa saccharoides)*, bushy bluestem *(Andropogon glomeratus)*, switchgrass *(Panicum virgatum)*, Texas

wintergrass *(Nassella leucotricha)*, and Virginia wildrye *(Elymus virginicus)*. Common non-native grasses include Johnsongrass *(Sorghum halepense)* and bermudagrass *(Cynodon dactylon)*.

2.2.3 Wetlands

Due to steep topography around Whitney Lake wetlands generally occur near the rivers and flatter areas on the eastern side of the lake. Table 2.1 lists the acreages of various types of wetlands present at Whitney Lake. Wetland classifications presented are derived from the USFWS Trust Resource List generated using the Information, Planning, and Conservation System decision support system available at http://ecos.fws.gov/ipac/.

Table 2.1 Wetland Resources

Wetland Types	NWI Classification Code	Total Acres
Freshwater Emergent Wetland	PEM1Cx (Palustrine, Emergent, Persistent, Seasonally Flooded, Excavated)	0.3
Freshwater Emergent Wetland	PEM1Ah (Palustrine, Emergent, Persistent, Temporary Flooded, Impounded)	2281.9
Freshwater Emergent Wetland	PEM1Fh (Palustrine, Emergent, Persistent, Semi-permanently Flooded, Impounded)	2.2
Freshwater Emergent Wetland	PEM1Ax (Palustrine, Emergent, Persistent, Temporary Flooded, Excavated)	2.3
Freshwater Emergent Wetland	PEM1C (Palustrine, Emergent, Persistent, Seasonally Flooded)	1.6
Freshwater Emergent Wetland	PEM1A (Palustrine, Emergent, Persistent, Temporary Flooded)	48.2
Freshwater Emergent Wetland	PEM1Ch (Palustrine, Emergent, Persistent, Seasonally Flooded, Impounded)	3.1
Freshwater Forested/ Shrub Wetland	PSS1Ch (Palustrine, Scrub-shrub, Broad-leaved Deciduous, Seasonally Flooded, Impounded)	766.4
Freshwater Forested/ Shrub Wetland	PFO1Ah (Palustrine, Forested, Broad-leaved Deciduous, Temporary Flooded, Impounded)	884.8
Freshwater Forested/ Shrub Wetland	PFO5Fh (Palustrine, Forested, Dead, Semi-permanently Flooded, Impounded)	10.6
Freshwater Forested/ Shrub Wetland	PSS1Cd (Palustrine, Scrub-shrub, Broad-leaved Deciduous, Seasonally Flooded, Ditched)	5.2
Freshwater Forested/ Shrub Wetland	PSS1Ah (Palustrine, Scrub-shrub, Broad-leaved Deciduous, Temporary Flooded, Impounded)	18.9

Wetland Types	NWI Classification Code	Total Acres
Freshwater Forested/ Shrub Wetland	PFO1Ch (Palustrine, Forested, Broad-leaved Deciduous, Seasonally Flooded, Impounded)	280.2
Freshwater Forested/ Shrub Wetland	PFO1/SS1Ch (Palustrine, Forested and Scrub-shrub, Broad-leaved Deciduous, Seasonally Flooded, Impounded)	14.1
Freshwater Forested/ Shrub Wetland	PFO1/SS1Ah (Palustrine, Forested and Scrub-shrub, Broad-leaved Deciduous, Temporary Flooded, Impounded)	57.2
Freshwater Forested/ Shrub Wetland	PSS1/EM1Ah Palustrine, Scrub-shrub and Emergent, Broad-leaved Deciduous, Temporary Flooded, Impounded)	221.1
Freshwater Forested/ Shrub Wetland	PFO1C (Palustrine, Forested, Broad-leaved Deciduous, Seasonally Flooded)	14.6
Freshwater Forested/ Shrub Wetland	PFO1A (Palustrine, Forested, Broad-leaved Deciduous, Temporary Flooded)	46.6
Freshwater Forested/ Shrub Wetland	PFO1/SS1A (Palustrine, Forested and Scrub-shrub, Broad-leaved Deciduous, Temporary Flooded)	4.1
Freshwater Forested/ Shrub Wetland	PSS1F (Palustrine, Scrub-shrub, Broad-leaved Deciduous, Semi-permanently Flooded)	0.9
Freshwater Forested/ Shrub Wetland	PSS1/EM1Ch (Palustrine, Scrub-shrub and Emergent, Broad-leaved Deciduous and Persistent, Seasonally Flooded, Impounded)	172.1
Freshwater Forested/ Shrub Wetland	PFO1/EM1Ah (Palustrine, Forested and Emergent, Broad-leaved Deciduous and Persistent, Temporary Flooded, Impounded)	16.6
Freshwater Pond	PUBFx (Palustrine, Unconsolidated Bottom, Semi-permanently Flooded, Excavated)	2.2
Freshwater Pond	PUBHx (Palustrine, Unconsolidated Bottom, Permanently Flooded, Excavated)	9.5
Freshwater Pond	PUSCh (Palustrine, Unconsolidated Shore, Seasonally Flooded, Impounded)	5.1
Freshwater Pond	PUSCx (Palustrine, Unconsolidated Shore, Seasonally Flooded, Excavated)	1.0
Freshwater Pond	PUBF (Palustrine, Unconsolidated Bottom, Semi-permanently Flooded)	3.4
Freshwater Pond	PUSAx (Palustrine, Unconsolidated Shore, Temporary Flooded, Excavated)	0.3
Freshwater Pond	PUBHh (Palustrine, Unconsolidated Bottom, Permanently Flooded, Impounded)	18.1

Wetland Types	NWI Classification Code	Total Acres
Freshwater Pond	PUBFh (Palustrine, Unconsolidated Bottom, Semi-permanently Flooded, Impounded)	2.3
Lake	L1UBHx (Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, Excavated)	0.7
Lake	L2EMCh (Lacustrine, Littoral, Emergent, Seasonally Flooded, Impounded)	401.8
Lake	L2USAh (Lacustrine, Littoral, Unconsolidated Shore, Temporary Flooded, Impounded)	6,862.4
Lake	L1UBHh (Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, Impounded)	15,929.2
Lake	L2USCh (Lacustrine, Littoral, Unconsolidated Shore, Seasonally Flooded, Impounded)	849.9
Riverine	R2UBH (Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded)	955.8
Riverine	R2USA (Riverine, Lower Perennial, Unconsolidated Shore, Temporary Flooded)	15.4

2.2.4 Fish and Wildlife Resources

Whitney Lake provides habitat for an abundance of fish and wildlife species. The lake provides a quality fishery as well as quality wildlife habitat on public land associated with the project.

Whitney Lake provides fishing opportunities for the boater and for the bank angler. Common sport fish species present in Whitney Lake include striped bass *(Morone saxatilis)*, white bass *(Morone chrysops)*, largemouth bass *(Micropterus salmoides)*, smallmouth bass *(Micropterus dolomieu)*, spotted bass *(Micropterus punctulatus)*, white crappie *(Pomoxis annularis)*, black crappie *(Pomoxis nigromaculatus)*, channel catfish *(Ictalurus punctatus)*, blue catfish *(Ictalurus furcatus)*, and flathead catfish *(Pylodictis olivaris)*. Other species include a variety of sunfish *(Lepomis sp.)*, common carp (*Cyprinus carpio)*, gar (*Lepisosteus sp.)*, freshwater drum (*Aplodinotus grunniens)*, buffalo (*Ictiobus sp.)*, and shad (*Dorosoma sp.)*. Stocking of Whitney Lake is conducted by Texas Parks and Wildlife Department (TPWD) and varies annually but has included striped bass, largemouth bass, smallmouth bass, and bluegill. Golden algae blooms can occur in the reservoir. These blooms are at times toxic to fish and may affect the quality of fishing. Since impoundment in 1951, the native forests that were submerged by the reservoir have provided structure and forage habitat for fish.

There are 23,783 acres of federal land managed by USACE at Whitney Lake. There are 22 designated wildlife management areas with approximately 16,278 acres designated as multiple resource management lands. These management areas are popular with hunters and individuals wishing to observe wildlife in their natural habitat. Species that are located in these areas include: white-tailed deer *(Odocoileus virginianus)*, wild turkey (*Meleagris gallopavo*), feral hogs *(Sus scrofa)*, waterfowl (ducks and geese), Northern bobwhite *(Colinus virginianus)*, mourning dove *(Zenaida macroura)*, fox squirrel (*Sciurus niger*), cottontail rabbit *(Sylvilagus floridanus)*, bobcat (*Lynx rufus*), coyote *(Canis latrans)*, gray fox *(Urocyon cinereoargenteus)*, raccoon *(Procyon lotor)*, Virginia opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), various raptors, shore birds and song birds. These wildlife management areas provide a great benefit to the public, in a region with a limited amount of public land.

2.2.5 Threatened and Endangered Species

Threatened species are those which are likely to become endangered within the foreseeable future. Endangered species are in danger of extinction throughout all or a significant portion of their range. Table 2.2 indicates the various species of birds and mollusks listed by the USFWS as Threatened, Endangered or Candidate species that could potentially be found at Whitney Lake. The species identified as Threatened, Endangered or Candidate Species by TPWD are listed in Appendix C.

Table 2.2 Threatened and Endangered Species

Common Name	Scientific Name	Federal Status	Occurrence
Birds			
Piping Plover	*Charadrius melodus*	T	Rare
Whooping Crane	*Grus americana*	LE	Rare
Interior Least Tern	*Sterna antillarum athalassos*	LE	Rare
Black-capped Vireo	*Vireo atricapilla*	LE	Rare
Golden-cheeked Warbler	*Setophaga chrysoparia*	LE	Occasional
Red Knot	*Calidris canutus rufa*	T	Rare
Mollusks			
Smooth Pimpleback	*Quadrula houstonensis*	C	Rare
Texas Fawnsfoot	*Truncilla macrodon*	C	Rare

Federal Listings: *LE - Listed Endangered, T - Threatened, C - Candidate*
Occasional: Species is present on project site, but seen only a few times or during seasonal events.
Rare: Species is present on project site and seen at intervals of 2 to 5 years, or is present in limited numbers.

The GCWA is of unique interest and importance for the Whitney Lake Project. Surveys for GCWA at Whitney Lake were performed in 1996, 1997, and 1998 by private consulting firms revealing presence at several locations. The USACE

Engineering Research and Development Center (ERDC) conducted a study in 2005 which indicated continued presence at two previously surveyed locations. USFWS conducted an investigation in 2008 and observed 61 positive GCWA detections. The subsequent survey in 2009 recorded 29 positive GCWA detections. USFWS also conducted investigations in 2011 (15 positive GCWA detections) and 2015 (22 positive GCWA detections).

The property at Whitney Lake, which functions as habitat for the GCWA, is of unique importance regarding the recovery efforts for the species. The habitat at Whitney Lake occurs within GCWA Recovery Region 2 where less than 50 birds have been documented in years prior to 2008. Due to the limited amount of public land and GCWA breeding habitat in Recovery Region 2, Whitney Lake may represent the most realistic opportunity to pursue substantial GCWA recovery efforts within the region.

Figure 2.2 Typical GCWA habitat showing mature Ashe juniper with interspersed oaks

2.2.6 Invasive Species

Invasive species are any kind of living organism which, if uncontrolled, causes harm to the environment, economy, or human health. Invasive species generally grow and reproduce quickly, and spread aggressively. Non-native, or exotic, species

have been introduced, either intentionally or unintentionally, and can out-compete native species for resources or otherwise alter the ecosystem. Native invasive species are those species that spread aggressively due to an alteration in the ecosystem, such as lack of fire or the removal of a predator from the food chain. Table 2.3 lists invasive species that occur on the Whitney Lake Project.

Table 2.3 Invasive Species Found at Whitney Lake

Common Name	Scientific Name	Native/Non-native	Prevalence
Birds			
Brown-headed Cowbird	*Molothrus ater*	Native	Moderate
European Starling	*Sturnus vulgaris*	Non-native	Moderate
Eurasian collared-dove	*Streptopelia decaocto*	Non-native	Minor
Mammals			
Feral Hog	*Sus scrofa*	Non-native	Major
Nutria	*Myocastor coypus*	Non-native	Minor
Reptiles			
Mediterranean House Gecko	*Hemidactylus turcicus*	Non-native	Minor
Mollusks			
Asian Clam	*Corbicula fluminea*	Non-native	Moderate
Insects			
Red Imported Fire Ant	*Solenopsis invicta*	Non-native	Major
Plants			
Ashe Juniper	*Juniperus ashei*	Native	Major
Bermudagrass	*Cynodon dactylon*	Non-native	Moderate
Blueweed	*Echium vulgare*	Non-native	unknown
Bull Thistle	*Cirsium vulgare*	Non-native	Minor
Cheatgrass	*Bromus tectorum*	Non-native	Major
Chinaberry Tree	*Melia azedarach*	Non-native	Minor
Chinese Privet	*Ligustrum sinense*	Non-native	Minor
Chinese Tallow Tree	*Triadica sebifera*	Non-native	Major
Common Chickweed	*Stellaria media*	Non-native	Moderate
Common Dandelion	*Taraxacum officinale*	Non-native	Minor
Common Periwinkle	*Vinca minor*	Non-native	Minor
Dallisgrass	*Paspalum dilatatum*	Non-native	Minor
Deep-rooted sedge	*Cyperus entrerianus*	Non-native	Minor
Dotted Duckmeat	*Landoltia punctata*	Native	Moderate
Field Bindweed	*Convolvulus arvensis*	Non-native	Minor

Common Name	Scientific Name	Native/Non-native	Prevalence
Field Brome	*Bromus arvensis*	Non-native	Moderate
Giant Reed	*Arundo donax*	Non-native	Moderate
Glossy Privet	*Ligustrum lucidum*	Non-native	Moderate
Heavenly Bamboo	*Nandina domestica*	Non-native	Minor
Honey Mesquite	*Prosopis glandulosa*	Native	Moderate
Horehound	*Marrubium vulgare*	Non-native	Minor
Japanese Honeysuckle	*Lonicera japonica*	Non-native	Minor
Johnsongrass	*Sorghum halepense*	Non-native	Major
King Ranch Bluestem	*Bothriochloa ishaemum var. songarcia*	Non-native	Major
Lehman's Love Grass	*Eragrostis lehmanniana*	Non-native	Moderate
Mimosa	*Albizia julibrissin*	Non-native	Minor
Nodding Plumeless Thistle	*Carduus Nutans*	Non-native	Minor
Purple Nutsedge	*Cyperus rotundus*	Non-native	Minor
Popinac	*Leucaena leucocephala*	Non-native	Moderate
Purple Crown-vetch	*Coronilla varia*	Non-native	Minor
Rescuegrass	*Bromus catharticus*	Non-native	Moderate
Scotch Thistle	*Onopordum acanthium*	Non-native	Minor
Spiny Cocklebur	*Xanthium spinosum*	Non-native	Moderate
Spreading Hedgeparsley	*Torilis arvensis*	Non-native	Minor
Tall Fescue	*Lolium arundinaceum*	Non-native	Minor
Willow Baccharis	*Baccharis salicina*	Native	Moderate
Yellow Toadflax	*Linaria vulgaris*	Non-native	Minor

2.3.7 Interpretation and Visual Qualities

Whitney Lake is known for its beautiful limestone cliffs and abundant wildlife viewing opportunities; this makes it a popular destination for boating and camping. While Whitney Lake does not have a Visitor Center, the Lofers Bend Park Walking Trail can be used for interpretation, including nature walks and plant identification. Programs promoting natural resources are also conducted at local schools and libraries.

Figure 2.3 Limestone bluff on the west side of Whitney Lake

2.3.8 Water Quality

Whitney Lake is identified as segment 1203 within the Brazos River Basin. According to the Texas Commission on Environmental Quality's (TCEQ) 2014 Texas Integrated Report for Clean Water Act Section 305(b) and 303(d), no water quality parameters measured were considered impaired at Whitney Lake. Depressed dissolved oxygen was identified as a concern for aquatic life use (CN) for the portion of the lake near the dam. Steele Creek, Nolan River, and Brazos River arms measurements were high enough for chlorophyll to cause concern for the screening levels (CS) but not high enough to be considered impaired. All other parameters measured show Whitney Lake is fully supported for aquatic life, contact recreation, public water supply and general uses.

Physically, Whitney Lake is approximately 42 river miles in length and averages approximately 40 feet in depth. This depth value can be deceiving however, since the lake is constructed in a meandering river valley of the Brazos River, giving it a long-slender profile with a narrow (one mile) average width. The result of this valley construction is a very steep bathymetry that reaches a depth of just over 100 feet at the dam.

Deep reservoirs such as Whitney Lake can exhibit a slow response to climatic factors that induce in-reservoir circulation. Such variables as temperature and temperature-induced circulation ("turnovers") impact water quality including salinity,

algal productivity and overall reservoir ecology. One unique physical feature of Whitney Lake is that the linear nature of the reservoir lines up with the dominant wind direction for the region, both in the summer, from the southeast, and in the winter, from the northwest. Thus, wind driven circulation mechanics likely play a significant role in the circulation of the reservoir.

The main issue regarding utilization of Whitney Lake as a water supply resource is its salinity. Past work by the USGS, USACE, and the State of Texas have pointed to the elevated salinity levels in the reservoir, which have been traced to specific geologic units within the watershed itself. Specifically, the geology of the Salt Fork of the Brazos River is partially made up of high salinity sandstone, which results in increased salinity of return flow into main tributaries. These higher salinity waters eventually find their way into the reservoir. Even though the drainage area of the watershed is nearly 35,000 square miles, the proximity of Whitney Lake to the high salinity inflow waters does not allow sufficient stream dilution distance to affect the elevated levels. Within the reservoir itself, initial data gathered by the Brazos River Authority shows concentrations of salinity during much of the year exceeds the Environmental Protection Agency's (EPA) 300 ppm standard for drinking water by 20% to 30%.

One additional issue that has been identified as a critical component of water quality in Whitney Lake is the presence of the toxin-producing golden algae *(Prymnesium parvum).* Whitney Lake has been subject to fish kills caused by large blooms of the alga. The Texas Parks and Wildlife Department (TPWD), along with the Texas Commission on Environmental Quality (TCEQ) and the Baylor University Center for Reservoir and Aquatic Systems Research (CRASR), monitors levels of golden algae and other microbial organisms in Whitney Lake. The last fish kill at Whitney Lake occurred in early 2007 when numerous fish from a variety of species were affected, including threadfin *(Dorosoma petenense)* and gizzard shad *(D. cepedianum),* freshwater drum *(Aplodinotus grunniens),* crappie *(Pomoxis* spp.) and gar *(Lepisosteus* spp.). While it is not believed that golden algae is harmful to humans or other wildlife, the cost associated with managing such fish kills can be extensive. Monitoring of Whitney Lake, along with several other aquatic systems in Texas, is ongoing.

2.3 SOCIAL AND CULTURAL RESOURCES AND ANALYSIS

2.3.1 Prehistoric Resources

The earliest well-documented evidence of human occupation in the middle Brazos 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 to 8,500 B.P.), Archaic (8,500 to 1.250 B.P.), and Late Prehistoric (1,250 to 300 B.P.).

Evidence for Paleo-Indian period occupation is relatively rare in the Whitney 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 camp sites may be buried deeply beneath Holocene floodplain alluvium. On private land downstream from the Whitney Lake dam, Paleo-Indian materials have been documented in deeply stratified rockshelter deposits at Horn Shelter No. 2 (41BQ46). 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 to 6,000 B.P.), Middle (6,000 to 3,500 B.P.), and Late (3,500 to 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 Whitney Lake area and in North Central Texas generally. Archaic period sites at Whitney Lake include open campsites, burned rock midden features, and rockshelter occupations.

The Late Prehistoric Period (1,250 to 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. Division of the Late Prehistoric period into early Austin phase (1,250 to 650 B.P.) and late Toyah phase (650 to 300 B.P.) sub periods was based primarily on the results of excavations at two Whitney Lake sites (the Kyle and Blum Rockshelter Sites). The Toyah phase differs from the preceding Austin phase in terms of technology and subsistence strategies. Bison became an important economic resource. Evidence of horticulture also appears, but was of only minor importance to overall Toyah phase subsistence.

2.3.2 Historic Resources

In the late 1700s, tribes of the southern Wichita Indians had established villages along the middle Brazos River, including a Towakoni village in the Whitney Lake area. In the early 1840s, Caddo Indians (displaced from East Texas) occupied at least two villages in the Whitney Lake area. Also in the 1840s, limited numbers of Anglo settlers were beginning to occupy the area.

Following the annexation of Texas by the United States in 1845, the U.S. Army established a series of forts along the western frontier. Fort Graham (1849 to 1853) was established in the present location of Whitney Lake, and the Native Americans were forced to relocate farther upstream along the Brazos River. The presence of Fort Graham attracted settlers to the area as the frontier advanced westward. In the 1850s, the town sites of Kimball, Towash, and Fort Graham were established in the Whitney Lake area. During the 1870s, the Chisolm Trail and its cattle drives passed through the Whitney Lake area. A major trail crossing of the Brazos River was located at the town of Kimball.

Population growth in the area accelerated following the arrival of the railroads in 1881. This improved access to major markets and led to a dramatic increase in the numbers of local farms and ranches. Most of the historic period resources at Whitney Lake are expected to be the archeological remains of house sites and outbuildings associated with farms and ranches dating from the late 19th century through the middle of the 20th century.

2.3.3 Previous Investigations at Whitney Lake

The initial archeological investigations at Whitney Lake were conducted between 1947 and 1951 by the River Basin Surveys. During that period, 61 sites were recorded, five of which were excavated. Plans to enlarge the lake in the 1970s led to additional investigations by Southern Methodist University (SMU), during which 29 new sites were recorded. This was followed by excavations at the Bear Creek Shelter by SMU and the Fort Graham site by Wake Forest University. Limited survey work since then has added to the number of known archeological sites.

2.3.4 Recorded Cultural Resources

Currently, 121 archeological sites have been recorded at Whitney Lake. Only 26 of these sites have been evaluated to determine their eligibility for the National Register of Historic Places (NRHP) (6 listed, 7 eligible, 13 ineligible). Also, the Whitney Dam and Powerhouse were determined eligible for the NRHP in 2003. The remaining 95 archeological sites have not yet been evaluated for NRHP eligibility. Only about 1,100 acres of Whitney Lake property have been inventoried to current survey standards. The surveys of the 1970s and earlier were not systematic and are not considered adequate by current standards.

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 OMP 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 Whitney Lake. Completion of a full inventory of cultural resources at Whitney 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 Whitney Lake must be coordinated with the State Historic Preservation Officer (SHPO) and federally-recognized Tribes to insure compliance with the NHPA, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act.

2.3.6 Current Demographics, Economics, Trends and Analysis

The primary area of economic influence encompasses portions western Hill, eastern Bosque, northern McLennan and southern Johnson Counties with additional

economic influence extending up to a 100 mile radius of the lake. This four-county region has been utilized as the basis in summarizing the population characteristics of Whitney Lake.

2.3.6.1 Population

The total estimated 2014 population for the zone of influence is 453,525 as shown in Table 2.4. About 52% of the population is in McLennan County, 35% in Johnson County, 9% in Hill County and 4% in Bosque County. The distribution of the population among gender is approximately 50% male and 50% female in all geographical areas, as shown in Table 2.5

Table 2.4 2000 Population, 2014 Population Estimate and 2020 Projections

Geographical Area	2000 Population	2014 Population Estimate	2020 Projection
Bosque County	17,204	17,780	20,520
Hill County	32,321	34,848	39,349
Johnson County	126,811	157,456	186,847
McLennan County	213,517	243,441	255,521
Zone of Influence Total	389,853	453,525	502,237

Source: U.S. Bureau of the Census, American Fact Finder (2000 and 2014)
Texas Department of State Health Services (2020 Projections)

Table 2.5 2013 Population Estimate by Gender

Geographical Area	Male	Female
Bosque County	50%	50%
Hill County	49%	51%
Johnson County	50%	50%
McLennan County	49%	51%
Zone of Influence Total	50%	50%

Source: U.S. Bureau of the Census, American Fact Finder

Table 2.6 shows the population by age group. The distribution by age group is similar among the counties. The largest age group is the 45 to 54, with 13% of the total population for each geographic area. 38% of the total population for each area is between 25 and 54 years of age.

Table 2.6 2013 Population Estimate by Age Group

Area	Age Group												
	<5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 34	35 to 44	45 to 54	55 to 59	60 to 64	65 to 74	75 to 84	85 and over
Bosque County	959	1,151	1,188	1,110	856	1,606	1,982	2,572	1,333	1,360	2,230	1,282	465
Hill County	2,241	2,349	2,439	2,342	1,956	3,726	3,898	4,763	2,466	2,282	3,727	2,120	742
Johnson County	10,514	11,448	11,923	11,019	9,720	19,241	20,648	22,288	10,457	7,279	11,171	5,428	1,698
McLennan County	16,949	16,760	15,940	20,570	24,028	30,600	26,751	29,807	14,361	11,451	15,693	9,764	4,731
Zone of Influence Total	30,663	31,708	31,490	35,041	36,560	55,173	53,279	59,430	28,617	22,372	32,821	18,594	7,636

Source: U.S. Bureau of the Census, American Fact Finder

Population by race and Hispanic Origin is displayed in Table 2.7. For the Zone of Influence, 71% of the population is White, 18 % Hispanic, 8% Black, 2% Bi-racial and less than 1% each American Indian or Asian.

Table 2.7 2013 Population Estimate by Race/Hispanic Origin

Area	Race / Hispanic Origin							
	White	Black	American Indian or Native Alaskan	Asian	Native Hawaiian or Other Pacific Islander	Other Race	Two or more	Hispanic
Bosque County	17,006	276	92	82	0	340	298	2,956
Hill County	31,144	2,420	402	144	0	538	403	6,553
Johnson County	140,726	3,926	862	1,054	586	2,356	2,656	28,228
McLennan County	183,576	34,756	1,025	3,430	47	9,969	4,513	56,996
Zone of Influence Total	372,452	41,378	2,381	4,710	633	13,203	7,870	94,733

Source: U.S. Bureau of the Census, American Fact Finder

2.3.6.2 Education and Employment

In the zone of influence, for 32% of the population 25 years old and older, the highest level of education attained is a high school diploma or equivalent. Twenty-five percent have some college, but no degree, 12% have a Bachelor's degree, 11% have 9-12 years education but with no diploma, 8% have an Associate degree, 5% have a graduate or professional degree and 8% have less than nine years of education. The distribution is very similar to the state overall. Table 2.8 shows the population over 25 years of age by highest level of educational attainment for each of the geographical areas.

Table 2.8 2013 Population Estimate by Highest Level of Educational Attainment, Population 25 Years of Age and Older.

Area	Population 25 Over	Highest Educational Attainment <9 Years	9 to 12 Years, No Diploma	High School	Some College No Degree	Associate Degree	Bachelor Degree	Graduate or Professional Degree
Bosque County	12,830	7.9%	10.1%	34.2%	26.5%	5.9%	10.7%	4.8%
Hill County	23,724	8.7%	12.6%	30.7%	25.3%	7.9%	10.4%	4.4%
Johnson County	98,210	6.3%	10.6%	33.1%	26.5%	6.9%	11.9%	4.8%
McLennan County	143,069	7.4%	10.3%	28.3%	23%	9.3%	14.3%	7.5%
Zone of Influence Total	277,833	7.6%	10.9%	31.6%	25.3%	7.5%	11.8%	5.4%

Source: U.S. Bureau of the Census, American Fact Finder

2.3.6.3 Household and Income

As Table 2.9 below illustrates, there are approximately 160,000 households in the zone of influence with an average household size of 2.6 persons.

Table 2.9 2013 Households and Household Size

Area	Number of Households	Average Household Size
Bosque County	7,254	2.5
Hill County	13,328	2.6
Johnson County	52,193	2.8
McLennan County	86,892	2.6
Zone of Influence Total	159,667	2.6

Source: U.S. Bureau of the Census, American Fact Finder

As shown in Table 2.10 the zone of influence is slightly poorer than the state overall. In the zone of influence, the median household income is almost $47,000, compared to the state median household income of $51,000. Within the zone of influence, the median household incomes are similar, with Johnson County having the highest ($58,000) and Hill County the lowest ($41,000). Similarly, the zone of influence has a lower percentage of the population living below poverty level (16.7%) compared to the state (17.6%). Within the zone of influence, McLennan County has the highest (22%) and Johnson County has the lowest (12%).

Table 2.10 2013 Median Income and Percent below Poverty Level

Area	Median Household Income	Below Poverty Level
TEXAS	$51,900	17.6%
Bosque County	$44,742	14.7%
Hill County	$40,769	17%
Johnson County	$57,535	12%
McLennan County	$41,922	22%
Zone of Influence	$47,374	16.7%

Source: U.S. Bureau of the Census, American Fact Finder

2.4 RECREATION FACILITIES, ACTIVITIES, AND NEEDS

2.4.1 Zone of Influence

The zone of influence is the area the lake has the most economic impact on as well as from which the majority of the visitors to the lake originate. For Whitney Lake, this zone comprises Hill, Bosque, McLennan and Johnson Counties located in North Central Texas.

2.4.2 Visitation Profile

The majority of visitors to Whitney Lake come from within a 100 mile radius of the lake. Whitney Lake visitors are a diverse group ranging from campers who utilize the campgrounds around the lake, full time and part time residents of the private housing developments that border the lake, hunters who utilize the Wildlife Management Areas around the lake, day users who picnic in the state and federally operated parks, marina customers and many other user groups. The peak visitation months on Whitney Lake are April through September when 82% of the visits occur. June is the highest visitation month and accounts for 17 to 21% of the annual total. Approximately 95% of visits to recreation areas occur in USACE managed recreation areas.

There were 6,490 camping permits issued for USACE campgrounds through the National Recreation Reservation Service (NRRS) in Fiscal Year (FY) 2014. The majority of the reservations (52%) were made by individuals from within the zone of influence. Of that majority, 55% were from Johnson County, 25% from McLennan County, 21% from Hill County and 13% from Bosque County. The county within the zone of influence that these individuals live in is also an indicator on where they are most likely to recreate on the lake. An individual from Johnson County is more likely to recreate at McCown Valley Park (32% of reservations) while a person from McLennan County is more like to visit East Lofers Bend Park (38% of reservations).

The study of the camping permits issued in FY 2014 also indicates that the local small towns have a significant impact on the visitation of the lake and cannot be over looked. The small McLennan County town of West, Texas (population 2,834) generated the most reservations (20% of 975 reservations) for East Lofers Bend Park. The town of Whitney, Texas (population 2,083) in Hill County generated the most reservations (11% of 1,750 reservations) for McCown Valley Park.

2.4.3 Recreation Facilities

The USACE operates the following parks on Whitney Lake where user fees are charged: East Lofers Bend Park, West Lofers Bend Park, Lofers Bend Day Use Park, McCown Valley Park, Cedron Creek Park, Plowman Creek Park, and Kimball Bend Park. These parks, three of which are seasonal, have controlled access with twenty-four hour presence provided by contract gate attendants. All fee parks combined provide 376 campsites, eight boat ramps, three group camping areas with pavilions, nine playgrounds, a hiking trail, 29 day use picnic sites, three swim beaches and 18 restrooms.

The USACE operates the following no-fee or “free” parks on Whitney Lake: Riverside Park, Cedar Creek Park, Steele Creek Park, Nolan River Park, Walling Bend Park, and Soldiers Bluff Park. These parks provide limited multi-use facilities (can be used for either camping or picnicking) and very basic amenities. All free parks combined provide 73 multiple use sites, eight restrooms, six boat ramps and three group use shelters.

Four parks, Hamm Creek in Johnson County, Chisholm Trail Park in Hill County, Lake Whitney State Park in Hill County and the Whitney City Park in Hill County are not operated by USACE. Each of these parks is described in the following paragraphs.

Hamm Creek is leased to Johnson County and is situated in the extreme southwest corner of Johnson County, at the confluence of Hamm Creek and the Brazos River. The park is eight miles southwest of Rio Vista on FM 916 and encompasses 191 acres. It is approximately 45 road miles from the Whitney Project Office. The park contains 51 day use and camping sites, boat ramp, four group picnic shelters, five restrooms, two playgrounds, four horse stalls, dump station and entrance complex. The boat ramp is popular, when usable, because of trees lining the bank that serve as effective windbreaks, providing the smooth water surface preferred by skiers. Fishing pressure is heavy during the white bass "run" in the spring. During winter, the area is popular with hunters, fishermen, and on warmer weekends, a few skiers.

Chisholm Trail Park is leased to Hill County and is located on the banks of the Brazos River, approximately 21 miles south of Cleburne and encompasses 142 acres. Access is via a paved county road off State Highway 174. The park contains 14 day use and camping sites, a boat ramp, group picnic shelter, volleyball pit, horseshoe pits and restroom. The park is used mainly by families, with camping,

skiing, swimming and fishing being the most common uses. The park receives heavy usage during summer weekends, and relatively little usage at other times. There is no potable water in the park during winter months.

Whitney Lake State Park and Recreation Area is located on the east side of the lake in Hill County, approximately two miles west of the City of Whitney and encompasses 775 acres. Access is from FM 1244. The recreation area is leased to the State of Texas and is operated by the TPWD. All development and construction in the lease area was performed by the State. The park contains 152 day use and camping sites, 21 screened shelters, a group campsite area, a group picnic area, recreation hall, boat ramp, five restrooms and three playgrounds. The visitors at the recreation area are typical of those at the other fee parks on the project. Visitation is primarily from campers, but the day use area is heavily occupied on weekends during the peak visitation months. Limited deer hunting, using black powder rifles began several years ago. An annual drawing is held for prospective hunters.

The Whitney City Park is located immediately west of the city limits of Whitney. This 34 acre park is leased to and operated by the City of Whitney. Individuals in the immediate area of the City of Whitney primarily use the area. The park's main use comes from activities associated with baseball games and practice. The park contains five baseball fields, batting cages, playground equipment, concession stand and restroom.

There are four marinas located at Whitney Lake including Juniper Cove, Uncle Gus, Harbor Master and White Bluff. Harbor Master Marina is located between East and West Lofers Park in Hill County and provides 75 wet slips, dry storage slips, campsites, a restroom, boat ramp, boat rental, gas and store. Juniper Cove Marina is located in Hill County off of FM 1713 and provides 125 wet slips, dry storage slips, cabins, campsites, restrooms, boat ramps, boat rental, gas, store and a fish cleaning station. Uncle Gus Marina is located in Bosque County off of State Highway 22 near Laguna Park and provides 181 wet slips, boat ramp, boat rental, gas, store, courtesy dock and fish cleaning station. The White Bluff Marina is located in the White Bluff Subdivision off of FM 933 in Hill County and provides 104 wet slips, a boat ramp and gas. A map showing the location of these marinas is included in Appendix A.

2.4.4 Recreation Analysis

Recreational use at Whitney Lake continues to evolve. While visitation in USACE managed recreational areas remains strong, there is demand for recreational opportunities not offered in these parks. The 2012 Texas Outdoor Recreation Plan (TORP) published by TPWD pointed out the top five needs within all park systems in the State as identified by professional recreation providers and by Texas citizens. Refer to Table 2.11 and Table 2.12 for a listing the top five needs expressed by the respective groups.

Table 2.11 Top 5 Facilities Needed Now Per Survey of Professional Recreation Providers

Top 5 Facilities Needed Now by Recreation Providers	
Paved trails for walking, hiking, skating or biking	54.2%
Natural park area/open space	30.4%
Nature/interpretive trails	29.2%
Unpaved trails for walking and hiking	27.4%
Dog parks	25.0%

Source: 2012 TORP. Percentages are percent of total respondents.

Outdoor recreation trends in Texas are similar to national trends identified through the most recent and extensive National Survey on Recreation and the Environment (NSRE) conducted by the U.S. Forest Service in 2009. The results of the NSRE were used extensively by TPWD in developing the TORP.

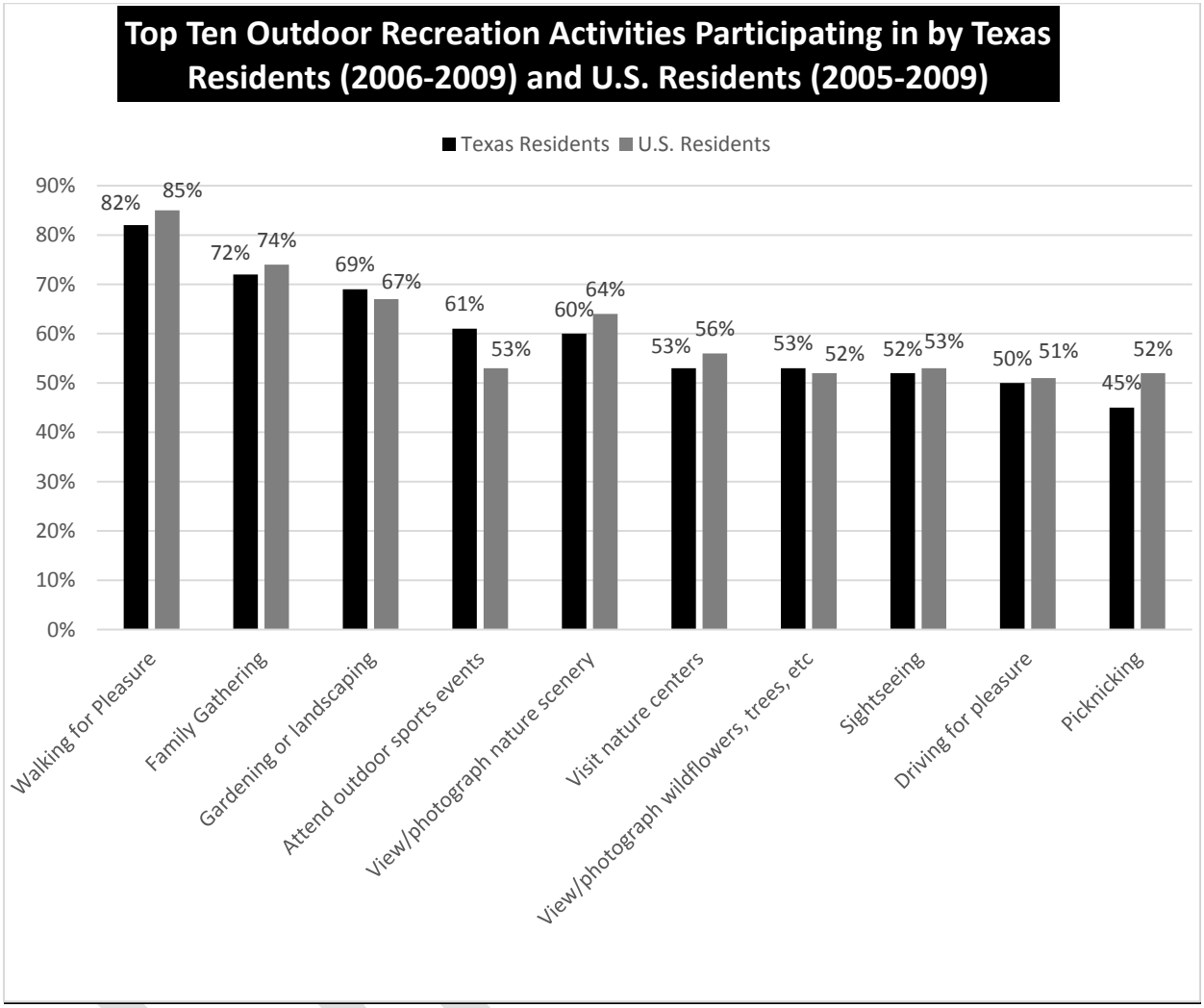
Refer to Table 2.13 for a listing of the top ten recreation activities participated in by Texas residents compared to U.S. Residents in recent years.

Table 2.12 Top 5 Facilities Needed Now in Local Parks Per Survey of Texas Citizens

Top 5 Facilities Needed Now In Local Parks by Texas Citizens	
Unpaved trails for walking and hiking	43.6%
Natural park area/open space	31.8%
Mountain bike trails	31.4%
Paved trails for walking, hiking, biking, skating	30.1%
Wildlife/nature observation sites	27.8%

Source: 2012 TORP. Percentages are percent of total respondents.

Table 2.13 Participation rates of Texas Residents compared to U.S. residents in the top ten outdoor recreation activities



Source: National Survey on Recreation and the Environment, USFS, 2009. & 2012 TORP

Although the TORP is not specific to Whitney Lake recreation areas, the facilities and opportunities offered by USACE and other providers at Whitney Lake fall short in some of the recreation categories where need is indicated or participation rates are high. While developed camping opportunities and facilities, as well as access to the lake for boating and fishing, are significant at Whitney Lake, there is a need for more trails, swimming beaches, paddle trails, picnic facilities and nature-based outdoor recreation.

Annual visitation trends recorded the USACE Operation and Maintenance Business Information Link (OMBIL) is presented in Table 2.14. Due to an on-going revision of the USACE visitation estimation system, the most recent available data from OMBIL for monthly visitation is FY 2012. In FY 2012, there were 986,714

visitors. The majority of visitation occurs within the traditional recreation season of April to September.

Table 2.14 Annual Visitation
FY 2004 through FY 2012

Year	Visitation
2004	438,590
2005	463,816
2006	458,509
2007	367,860
2008	482,220
2009	470,246
2010	673,438
2011	684,613
2012	986,714

During periods of drought, recreation is significantly impacted at Whitney Lake by low water levels. Being an on-demand hydropower dam, there are constant releases of water even when there is little to no inflow. This causes the lake to drop to elevations that make most of the boat ramps inoperable. It also causes large areas of the lake surface to become unusable due to shallow lake elevations, which reduces the lake's useable surface area by a significant amount. The lake level has been below the conservation level of 533 msl 80% of the time between 1972 and 2014. Of this time the lake has been between 533 msl and 523 msl 70% of the time.

2.4.5 Recreation Carrying Capacity

The recreation carrying capacity of a lake is the amount of development, use, and activity any lake and associated recreational lands can sustain without being permanently adversely impacted. No recreation carrying capacity studies have been conducted at Whitney Lake. Presently, USACE manages recreation areas at Whitney Lake using historic visitation data combined with best professional judgment to address recreation areas considered to be overcrowded, overused, underused, or well balanced. USACE will continue to identify possible causes and effects of overcrowding and overuse and apply appropriate best management practices and site management using NRRS utilization data.

Whitney's six Class A parks (parks offering modern restrooms, potable water, and electrical and water hookups at campsites), although full on major summer holiday weekends, are not being over utilized by the public. Occupancy rates for these parks averaged 22% from 2010 to 2014 with the highest yearly average being 34% in Lofers Bend West in 2012 and the lowest being 16% in Kimball Bend in 2011.

In June of FY 2014, average occupancy rates ranged from 19% on weekdays to 43% on weekends with and overall occupancy of 29%. This is Whitney's peak month for visitation. This indicates that while on some summer weekends these parks are completely full, there is additional capacity in these areas and no need for additional campsites.

There have been no water-related recreation development studies on Whitney Lake to determine the carrying capacity of the lake with regard to the number of boats that could safely operate on the lake surface. However, using data and findings from a 1999 comprehensive Water-Related Recreation Use Study (WRRUS) at Lewisville Lake, the Fort Worth District established a target carrying capacity of no less than 22 acres of water per boat on its lakes during peak use times as the District's standard for resource protection and user enjoyment. The current Potential Lake Surface Boat Load for Whitney Lake is 38.2 acres of water per boat on peak use days. This is a potential level of use that assumes the lake level is at the conservation pool elevation of 533.0 msl and that every wet slip is occupied and every boat in a wet slip is on the water. It also assumes all boat ramp parking spaces are occupied. This potential level of use is well above the Fort Worth District target of 22 acres of boatable water per boat, but actual use levels could only be determined through careful on-the-water boat counts coupled with counts of empty wet slips at marinas and occupied boat ramp parking spaces on peak use days. Furthermore, since the physiography of Whitney Lake creates distinct open-water segments, the lake has very definable use zones. This would have to be taken into account when considering any future water-related recreation development on the lake.

2.5 REAL ESTATE

The total project area at Whitney Lake encompasses 52,693 acres. Of this total area, 43,571 acres were acquired in fee simple title by USACE. Above the area acquired in fee simple title 9,122 acres were encumbered with a perpetual flowage easement up to the contour line of 573 msl.

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

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

2.6 PERTINENT PUBLIC LAWS

The following public laws are applicable to Whitney Lake:

- 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 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 the Corps 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 this jurisdiction of the Secretary of the Army and the Chief of Engineers.

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

- Public Law 89-272, Solid Waste Disposal Act, as amended by PL 94-580, dated October 21, 1976. - This act authorized a research and development program with respect to solid waste disposal. It proposes (1) to initiate and accelerate a national research and development program for new and improved methods of proper and economic solid-waste disposal, including studies directed toward the conservation of national resources by reducing the amount of waste and unsalvageable materials and by recovery and utilization of potential resources in solid waste; and (2) to provide technical and financial assistance to State and local governments and interstate agencies in the planning, development, and conduct of solid-waste disposal program.

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

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

- Public Law 91-190, National Environmental Policy Act of 1969 (NEPA). - NEPA declared it a national policy to encourage productive and enjoyable harmony between man and his environment, and for other purposes. Specifically, it declared a “continuing policy of the Federal Government... to use all practicable means and measures...to foster and promote the general welfare, to create

conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans." Section 102 authorized and directed that, to the fullest extent possible, the policies, regulations and public law of the United States shall be interpreted and administered in accordance with the policies of the Act.

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

- Public Law 92-463, 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.

CHAPTER 3 - RESOURCE GOALS AND OBJECTIVES

3.1 RESOURCE GOALS

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

The following statements paraphrased from EP 1130-2-550, Chapter 3, expresses the goals for the Whitney Lake Master Plan.

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

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

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

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

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

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

- Strive to achieve environmental sustainability. An environment maintained in a healthy, diverse and sustainable condition is necessary to support life.
- Recognize the interdependence of life and the physical environment. Proactively consider environmental consequences of Corps programs and act accordingly in all appropriate circumstances.
- Seek balance and synergy among human development activities and natural systems by designing economic and environmental solutions that support and reinforce one another.
- Continue to accept corporate responsibility and accountability under the law for activities and decisions under our control that impact human health and welfare and the continued viability of natural systems.
- Seek ways and means to assess and mitigate cumulative impacts to the environment; bring systems approaches to the full life cycle of our processes and work.

- Build and share an integrated scientific, economic and social knowledge base that supports a greater understanding of the environment and impacts of our work.
- Respect the views of individuals and groups interested in USACE activities; listen to them actively, and learn from their perspective in the search to find innovative win-win solutions to the nation's problems that also protect and enhance the environment.

3.2 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, Whitney 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 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 TPWD's TCAP and TORP. The objectives in this master plan are intended to provide project benefits, meet public needs, and foster environmental sustainability for Whitney Lake to the greatest extent possible. The following tables list the objectives for Lake Whitney.

Table 3.1 Recreational Objectives

Recreational Objectives	Goals				
	A	B	C	D	E
Evaluate the demand for improved recreation facilities and increased public access on USACE-managed public lands and water for recreational activities (i.e. camping, walking, hiking, biking, boating, hunting, fishing, wildlife viewing, etc.) and facilities (i.e. campsites, picnic facilities, overlooks, all types of trails, boat ramps, courtesy docks, interpretive signs/exhibits, and parking lots).	*		*		
Improve and modernize day use and campground facilities through addition and repair of amenities, including, but not limited to: road improvements, sewer hook ups, increased electrical service, concrete or asphalt recreational vehicle pads, wireless internet access, amphitheaters, restrooms, trails, pavilions, and improved park entrances.	*		*		

Recreational Objectives	Goals				
	A	B	C	D	E
Evaluate recreational use zoning and regulations for designated quiet water or no-wake areas with emphasis on natural resource protection, quality recreational opportunities, and public safety concerns.	*				
Follow the Environmental Operating Principles associated with recreational use of waterways for all water-based management activities and plans.		*	*		*
Increase universally accessible facilities on Whitney Lake.	*		*		*
Evaluate established private exclusive use of public lands through permits/outgrants to determine impacts on public lands and waters.	*		*		
Consider flood/conservation pool to address potential impact to recreational facilities (i.e. campsites, boat ramps, courtesy docks, etc.).	*	*	*	*	
Ensure consistency with USACE Recreation Strategic Plan.					*
Monitor the TCAP, the TORP to insure that USACE is responsive to outdoor recreation trends, public needs and resource protection within a regional framework. All plans by others will be evaluated in light of USACE policy and operational aspects of Whitney Lake.					*

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

Table 3.2 Natural Resource Management Objectives

Natural Resource Management Objectives	Goals				
	A	B	C	D	E
Consider flood/conservation pool levels to ensure that natural resources are managed in ways that are compatible with primary project purposes of flood risk management and water supply.	*	*		*	
Actively manage and conserve fish and wildlife resources, especially special status species, by implementing ecosystem management principles. Key among these principles is the use of native species adapted to the Texas Cross Timbers Ecological Region in restoration and mitigation plans.	*	*		*	*
Consider watershed approach during decision-making process.					*
Optimize resources, labor, funds, and partnerships for protection and restoration of fish and wildlife habitats.		*			*

Natural Resource Management Objectives	Goals A	B	C	D	E
Minimize activities which disturb the scenic beauty and aesthetics of the lake.	*	*	*	*	
Continually evaluate erosion control and sedimentation issues at Whitney Lake and develop alternatives to resolve the issues.	*	*			*
Stop unauthorized uses of public lands such as off-road vehicle (ORV) use, trash dumping, unauthorized fires, fireworks, poaching, clearing of vegetation, agricultural trespass, timber theft, unauthorized trails and paths, and placement of advertising signs that create negative environmental impacts.	*	*	*	*	*
Monitor lands and waters for invasive, non-native and aggressively spreading native species and take action to prevent and/or reduce the spread of these species. The most prevalent aggressively spreading native species at Whitney Lake are the Ashe Juniper, and honey mesquite. The most prevalent invasive species are salt cedar, Johnsongrass and Bermudagrass. Potential invasive species of great concern are the Zebra Mussel and Emerald Ash Borer. Implement prescribed fire as a management tool to control the spread of Ashe Juniper and other noxious plants and to promote the vigor of native prairie grasses and forbs.	*	*		*	*
Protect and/or restore important native habitats such as prairies, bottomland hardwoods, riparian zones, and wetlands, where they occur, or historically occurred on project lands. Special emphasis should be taken to protect and/or restore special or rare plant communities, to include actions that promote butterfly and /or pollinator habitat, migratory bird habitat, and habitat for birds listed by USFWS as Birds of Conservation Concern.	*	*	*	*	*

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

Table 3.3 Visitor Information, Education, and Outreach Objectives

Visitor Information, Education and Outreach Objectives	Goals A	B	C	D	E
Provide more opportunities (i.e. comment cards, updates to local municipalities, web page) for communication with agencies, special interest groups, and the general public.	*			*	*

Visitor Information, Education and Outreach Objectives	Goals				
	A	B	C	D	E
Implement more educational, interpretive, and outreach programs at the lake office and around the lake. Topics to include: history, lake operations (flood risk management and water supply), water safety, recreation, nature, cultural resources, ecology, and USACE missions.	*	*	*	*	*
Establish a network among local, state, and federal agencies in order to exchange lake-related information for public education and management purposes.	*			*	*
Increase public awareness of special use permits or other authorizations required for special activities, organized special events, and commercial activities on public lands and waters of the lake.	*	*	*		
Capture trends concerning boating accidents and other incidents on public lands and waters and coordinate data collection with other public safety officials.	*		*	*	*
Promote USACE Water Safety message.	*		*	*	*
Educate adjacent landowners on shoreline management policies and permit processes in order to reduce encroachment actions.	*	*	*	*	*

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

Table 3.4 General Management Objectives

General Management Objectives	Goals				
	A	B	C	D	E
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.	*	*		*	
Secure sustainable funding for the shoreline management program.	*	*	*	*	*
Ensure consistency with USACE Campaign Plan (national level), IPlan (regional level), OPlan (District level).					*

General Management Objectives	Goals				
	A	B	C	D	E
Reference Recreation Infrastructure Investment Strategy (RIIS) if funding levels change in future years.					*
Ensure green design, construction, and operation practices, such as the Leadership in Energy and Environmental Design (LEED) criteria for government facilities, are considered as well as applicable Executive Orders.					*
Carefully manage non-recreation outgrants such as utility and road easements in accordance with national guidance set forth in ER 1130-2-550 and applicable chapters in ER 405-1-12.	*				*
Manage project lands and recreational programs to advance broad national climate change mitigation goals, including but not limited to climate change resilience and carbon sequestration, as set forth in 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
Monitor and better coordinate lake development and the protection of cultural resources with SHPO and federally recognized Tribes.	*	*		*	*
Complete an inventory of cultural resources.	*	*		*	*
Increase public awareness and education of regional history.		*		*	*
Ensure historical preservation is fully integrated into the Whitney Lake Master Plan and future planning decision making process (Section 106 and 110 of the National Historic Preservation Act; the Archeological Resources Protection Act; and the Native American Graves Protection and Repatriation Act on public lands surrounding the 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 project lands at USACE water resource development projects are allocated by USACE into one of four categories in accordance with the congressionally authorized purpose for which the project lands were acquired. There are four possible categories of allocation identified in USACE regulations including Operations, Recreation, Fish and Wildlife, and Mitigation. At Whitney Lake, the only land allocation category that applies is Operations which is defined as those lands that are required to operate the project for the primary authorized purposes of flood control, hydroelectric power, and water conservation. The remaining allocations of Recreation, Fish and Wildlife, and Mitigation would apply only if lands had been acquired specifically for these purposes. The entire fee simple federal estate at Whitney Lake is 45,486 acres, all of which is allocated to Operations.

4.2 LAND CLASSIFICATION

4.2.1 General

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

4.2.2 Prior Land Classifications

Previous versions of the Whitney Lake Master Plan included land classification criteria that were similar to the current criteria. These prior land classifications were based more on projected need than on actual experience which resulted in some areas being classified for a type of use that has not, or is not likely to occur. Additionally, in the 40 plus 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 and Table 8.2 in Chapter 8 for a summary of land classification changes from the prior classifications to the current classifications.

4.2.3 Current Land Classifications

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

- Project Operations
- High Density Recreation
- Mitigation
- Environmentally Sensitive Areas
- Multiple Resource Management Lands
- Water Surface

The land and water surface classifications for Whitney Lake were established after taking into account public comments, input from key stakeholders including elected officials, city and county governments, and lessees operating on USACE land. Additionally, public comment, wildlife habitat values, and the trends analysis provided in TPWD's TORP and TCAP were also 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.

4.2.4 Project Operations

This classification includes the lands managed for operation of the dam, project office, and maintenance yards, all of which must be maintained to carry out the authorized purpose of flood control. In addition to the operational activities taking place on these lands, limited recreational use may be allowed for activities such as public access to the fishing pier in the tailrace area of the powerhouse. Regardless of any limited recreation use allowed on these lands, the primary classification of Project Operations will take precedent over other uses. There are 460 acres of Project Operations land specifically managed for this purpose.

4.2.5 High Density Recreation

These are lands developed for intensive recreational activities for the visiting public including day use areas, campgrounds, marinas and related concession areas.

At Whitney Lake, prior land classifications included an excessive number of areas under the High Density Recreation classification. Several of these areas were never developed and/or were determined by the study team to be unsuitable for development resulting in a change to another, more suitable land classification. At Whitney Lake there are 3,608 acres classified as High Density Recreation land. Each of the High Density Recreation areas is described briefly in Chapter 5 of this Plan.

4.2.6 Mitigation

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

4.2.7 Environmentally Sensitive Areas.

These are areas where scientific, ecological, cultural, and aesthetic features have been identified. 16 distinct parcels have been classified as Environmentally Sensitive Areas (ESA) at Whitney Lake primarily for the protection of sensitive habitats or cultural resources. The habitats were evaluated in the 2015 habitat study conducted jointly by USACE and TPWD. Mapping data was also used from USFWS GCWA Habitat Surveys conducted between 2008 and 2015. There are 2,268 acres classified as ESA at Whitney Lake.

4.2.8 Multiple Resource Management Lands.

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. As shown in Table 4.1, there are 17,448 acres of land under this classification at Whitney Lake. The following paragraphs list each of the sub-classifications, and the number of acres and primary uses of each.

- Low Density Recreation. These are lands that may support passive public recreational use (e.g., fishing, hunting, wildlife viewing, natural surface trails, hiking, etc). Under prior land classifications, several relatively large tracts were classified for low density recreation, but during the study process to develop this Plan, these larger tracts were reclassified under the sub-classification of Wildlife Management. Low Density Recreation lands are typically narrow strips of land lying between the shoreline at the conservation pool elevation and the USACE property boundary line, and are often located adjacent to private residential areas. The narrow configuration and location next to residential areas make these areas unsuitable for other uses such as High Density Recreation, Vegetation or Wildlife Management. These areas are often used by adjacent landowners for the passive recreation activities listed above. There are 1,170 acres under this classification at Whitney Lake.

- Wildlife Management. This land classification applies to those lands managed primarily for the conservation of fish and wildlife habitat. These lands generally include comparatively large contiguous parcels, most of which are located within the flood pool of the lake. Passive recreation uses such as natural surface trails, fishing, hunting, and wildlife observation are compatible with this classification unless restrictions are necessary to protect sensitive species or to promote public safety. There are 16,278 acres of land included in this classification at Whitney Lake.

- Vegetative Management. These are lands designated for stewardship of forest, prairie, and other native vegetative cover. Passive recreation activities previously described may be allowed in these areas. There are no lands under this classification at Whitney Lake.

- Future or Inactive Recreation. These are lands with site characteristics compatible with High Density Recreation development. These are areas where High Density Recreation development was anticipated in prior land classifications, but the development either never took place or was minimal. These areas are typically closed to vehicular traffic and will be managed as multiple resource management lands until development takes place. There are no lands under this classification at Whitney Lake.

Table 4.1 Land Classification Acres at Whitney Lake

CLASSIFICATION	ACRES
Project Operations	460
High Density Recreation	3,608
Environmental Sensitive Areas	2,268
Multiple Resource Managed Lands Low Density Recreation	1,170
Multiple Resource Managed Lands Wildlife Management	16,278
Multiple Resource Managed Lands Vegetative Management	0
Multiple Resource Managed Lands Future/Inactive Recreation Areas	0
Water Surface: Restricted	23
Water Surface: Designated No-Wake	143
Water Surface: Fish and Wildlife Sanctuary	0
Water Surface: Open Recreation	21,536

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

4.2.9 Water Surface.

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

Water Surface Classification map can be found in Appendix A of this Plan. The four sub-categories of water surface classification include:

- Restricted. These areas are restricted to the extent that public access is not allowed for reasons of public safety, and for project operations and security purposes. The areas include the water surface upstream and downstream of the Whitney Dam and designated swimming areas in the parks around Whitney Lake. Buoys mark the line in front of the dam while a line of signs in the Brazos River marks the downstream side around the dam. Keep out buoys and yellow poly buoy lines mark the designated swimming areas in each park. There are 23 acres of restricted water surface at Whitney Lake.

- Designated No-Wake. There are 14 boat ramps and four marina areas at Whitney Lake where no-wake restrictions are in place for reasons of public safety and protection of property. There are 143 acres of designated no-wake water surface at Whitney Lake.

- Fish and Wildlife Sanctuary. Annual or seasonal restrictions on areas to protect fish and wildlife species during periods of migration, resting, feeding, nesting, and/or spawning. There are currently no water surface areas designated as a Fish and Wildlife Sanctuary at Whitney Lake.

- Open Recreation. This classification encompasses the majority of the lake water surface and is open to general recreational boating. Boaters are advised through maps and brochures, or signs at boat ramps and marinas, that navigational hazards may be present at any time and at any location in these areas. Operation of a boat in these areas is at the owner's risk. Specific navigational hazards may or may not be marked with a buoy. There are 21,536 acres of open recreation water surface at Whitney Lake.

4.3 PROJECT EASEMENT LANDS

These are lands on which easement interests were acquired. Fee title was not acquired on these lands but the easement interests convey to the Federal government certain rights to use and/or restrict the use of the land for specific purposes. Easement lands are typically classified as Operations Easement, Flowage Easement, and/or Conservation Easement. At Whitney Lake the only easement lands are those lands where a flowage easement was acquired. A flowage easement, in general, grants to the government the perpetual right to temporarily flood/inundate private land during flood risk management operations and to prohibit activities on the flowage easement that would interfere with flood risk management operations such as placement of fill material or construction of habitable structures. There are 9,122 acres of Flowage Easement lands at Whitney Lake.

CHAPTER 5 - RESOURCE PLAN

5.1 MANAGEMENT BY CLASSIFICATION

This chapter describes the management plans for each area of classification within the Master Plan. The land classifications that exist at Whitney Lake are Project Operations, High Density Recreation, Environmentally Sensitive Areas, and Multiple Resource Management Lands which consist of Low Density Recreation, and Wildlife Management. The Water Surface classifications that exist at Whitney Lake are Restricted, Designated No-Wake, and Open Recreation. The management plans describe in broad terms how project lands and water surface will be managed. All management plans take into consideration the goals and objectives set forth in Chapter 3. A more descriptive plan for managing these lands can be found in the Whitney Lake Operational Management Plan (OMP).

5.2 PROJECT OPERATIONS

Project Operations is land associated with the dam, spillway, powerhouse, levees, lake office, maintenance facilities, and other areas used primarily for the primary purposes of flood risk management, hydroelectric power generation and water conservation. There are 460 acres of lands under this classification which are managed by USACE. The management plan for this area is to continue providing physical security necessary to ensure sustained operations of the dam and related facilities including restricting public access in hazardous locations near the dam and spillway.

5.3 HIGH DENSITY RECREATION

Whitney Lake has 3,608 acres classified as High Density Recreation. These are lands developed for intensive recreational activities for the visiting public including day use and campgrounds. National USACE policy set forth in ER and EP 1130-2-550, Chapter 16, limits recreation development on USACE lands to those activities that are dependent on a project's natural resources and typically include water-based activities, overnight use, and day use such as marinas, campgrounds, picnic areas, trails, swimming beaches, boat launching ramps and comprehensive resorts. Examples of activities that are not dependent on a project's natural resources include, theme parks or ride-type attractions, sports or concert stadiums, and stand-alone facilities such as restaurants, bars, motels, hotels, and golf courses.

USACE operates and manages numerous areas designated as high density recreation. The following is a description of each park operated by USACE with the facilities they contain along with a conceptual management plan for parks by classification groups. Groups include Class A (highly developed) and Class C (basic facilities). Maps showing existing parks and facilities managed by USACE can be found in Appendix A. In addition to the USACE managed and operated high density

recreation areas, USACE leases four high density recreation areas that are managed as parks by recreation partners. Section 5.3.3 below includes a brief description of these parks and notes the recreational partners who manage them.

5.3.1 Class A Parks

In accordance with past visitation rates and recent outdoor recreation trends documented in the 2012 TORP, camping in both highly developed settings and primitive settings has declined significantly in Texas since 2000. NSRE surveys documented that in the period 2006-2009 only 21.9% of Texans participated in developed camping and only 9.7% participated in primitive camping. These percentages are down significantly from surveys conducted in 2000-2001. As noted in Chapter 2, visitation rates in Class A parks at Whitney Lake is steady but not growing, and facilities provided are sufficient to meet foreseeable demand. Accordingly, USACE intends to continue to operate the Class A Campgrounds and Day Use Areas by maintaining and improving existing facilities with no plans for expansion. Emphasis will be placed on improvements such as upgrading aging water and electrical infrastructure, improving energy efficiency and sustainability of facilities, repairing or replacing outdated restrooms, and paving gravel roads in several parks. In response to trends documented in the TORP, USACE will endeavor to improve access to some swim beaches and to develop hiking and biking trails in or adjacent to some park areas.

Lofers Bend Park: Lofers Bend is divided into four distinct areas, East Lofers Bend Park, West Lofers Bend Park, Lofers Bend Day Use Area and Harbor Master Marina. It is located off of State Highway 22 on the east side of the Whitney Lake Dam. There are approximately 445 acres in the park. The day use area is located adjacent to the dam and is physically separated from the camping areas and the marina. Harbor Master Marina is located between the two camping areas. The park facilities include 24 non-electric campsites, five screened shelters, 105 electrical campsites, 29 picnic sites, eight restrooms, two group camp areas, one group shelter, two dump stations, three boat ramps with 107 parking spots, three entrance gate complexes, three playgrounds, three swim beaches and a hike and bike trail.

McCown Valley Park: Encompassing 357 acres, McCown Valley Park is located on the eastern shore of Whitney Lake, four miles west of FM 933 and adjacent to the FM 1713 bridge. It is broken up into three separate areas: the campground, Day Use and the Equestrian area. The park facilities include 48 electrical campsites, five screen shelters, 17 picnic sites, 39 equestrian campsites, five restrooms, three-lane boat ramp with parking for 64 vehicles, two entrance gate complexes, two playgrounds, swimming beach, dump station, group shelter and 18 covered horse pens.

Cedron Creek Park: Cedron Creek Park is located on the west side of Whitney Lake in Bosque County at the midpoint of the lake on FM 1713 (just west of Katy Bridge). The park contains 299 acres of land within its

boundaries. The park facilities include 57 campsites, two restrooms, two-lane boat ramp with parking for 20 vehicles, dump station, entrance gate complex, two playgrounds and a group camp area.

Plowman Creek Park: Plowman Creek Park is located off FM 56, adjacent to the community of Kopperl, in Bosque County. It is a multi-use area consisting of approximately 231 acres. The park facilities include 44 campsites, two restrooms, entrance gate complex, playground, two-lane boat ramp, dump station and four covered horse pens.

Kimball Bend Park: The park is situated on the south side of the Brazos River in the northeast corner of Bosque County. It is located approximately 30 miles south of Cleburne, and 20 miles north of Meridian on State Highway 174. The park contains 185 acres of land within its boundaries. Located within the park are remains of buildings from the Old Kimball Bend Town Site, at one time a cattle crossing on the Chisholm Trail. The park facilities include 36 campsites, restroom, two-lane boat ramp with parking for 44 vehicles, gate complex and dump station.

5.3.2 Class C Parks

The management plan for all the below parks is to continue to operate them as Class C Campgrounds, Day Use Areas and Access Points by maintaining and improving existing facilities. Similar to Class A parks, emphasis will be placed on improvements such as upgrading aging water and electrical infrastructure, repairing or replacing outdated restrooms, paving gravel roads in some parks and installing site amenities such as fire rings, lantern posts and cookers. Trails within and between parks will be considered.

Riverside Park: The park is comprised of two areas, located on either side of the Brazos River, below the dam and embankment. West Riverside contains 24 acres, while East Riverside encompasses two acres. The park is open 24 hours, year-round, and provides free camping and river access for fishing and boating. The park is adjacent to the dam and may be temporarily closed during periods of elevated security risk. The east area provides canoe and small boat access to the Brazos River. The park facilities include two restrooms, fishing platform and five multiple use sites.

Cedar Creek Park: The park is located halfway up the lake on the north bank of Cedar Creek in Hill County. The park contains 43 acres of land within its boundaries. The park facilities include a restroom, two-lane boat ramp, group shelter and 21 multiple use sites.

Steele Creek Park: Steele Creek is a multi-use park located approximately two miles northeast of FM 56, adjacent to the community of Lakeside Village. The park contains 277 acres of land within its boundaries.

The park facilities include 21 multiple use sites, a group shelter, restroom and two-lane boat ramp with parking for 20 vehicles.

Walling Bend Park: Walling Bend Park is located on the west side of Whitney Lake approximately two and one-half miles upstream from the dam on FM 2841. The park contains 262 acres of land within its boundaries. Texas Parks and Wildlife Department has leased 16 acres of the park on the north end for a boat ramp, parking lot and access road. The park facilities include two restrooms, 10 picnic sites, two-lane boat ramp with parking for 30 vehicles and a group shelter.

Soldiers Bluff Park: Soldiers Bluff Park is a 50 acre park located on the southwest end of Whitney Dam, adjacent to State Highway 22. The park facilities include a restroom, 16 multiple use sites, entrance complex and group shelter.

Nolan River Park: Nolan River Park is a 10 acre access area located on the Nolan River near the City of Blum, off of FM 933. The park facilities include an access point, small parking lot, and boat ramp that provides access to the Nolan River area of Whitney Lake.

5.3.3 Leased Parks

Four areas are leased to non-federal partners referred to as grantees; the USACE operates and manages all park areas that are not leased to others. Each grantee is responsible for the operation and maintenance of their leased area; USACE does not provide direct maintenance within any of the leased locations, but may occasionally lend support where appropriate. The USACE reviews requests and ensures compliance with applicable laws and regulations for proposed activities in all leased and USACE-operated HDR areas. USACE works with partners to ensure that recreation areas are managed and operated in accordance with the objectives prescribed in Chapter 3. The following are areas leased to grantees at Whitney Lake:

- Hamm Creek is leased to Johnson County and is situated in the extreme southwest corner of Johnson County, at the confluence of Hamm Creek and the Brazos River. The park is eight miles southwest of Rio Vista on FM 916 and encompasses 191 acres.
- Chisholm Trail Park is leased to Hill County and is located on the banks of the Brazos River, approximately 21 miles south of Cleburne and encompasses 142 acres.
- Whitney Lake State Park and Recreation Area is located on the east side of the lake in Hill County, approximately two miles west of the City of Whitney and encompasses 775 acres.
- The Whitney City Park is located immediately west of the city limits of Whitney. This 34 acre park is leased to and operated by the City of Whitney.

5.4 MITIGATION

This classification is used for lands that were acquired specifically for the purpose of offsetting losses associated with development of the project. There are no lands at Whitney Lake under this classification.

5.5 ENVIRONMENTALLY SENSITIVE AREAS (ESA)

These are areas where scientific, ecological, cultural or aesthetic features have been identified. Designation of these lands is not limited to just lands that are otherwise protected by laws such as the Endangered Species Act, the National Historic Preservation Act or applicable state statues. These areas must be managed to ensure they are not adversely impacted. Typically, limited or no development of public use is allowed on these lands. No agricultural or grazing uses are permitted on these lands unless necessary for a specific resource management benefit, such as prairie restoration and management. These areas are typically distinct parcels located within another, and perhaps larger, land classification area. There are 2,268 acres at Whitney Lake under this classification. The majority of acreage in these areas is excellent habitat for the Federally endangered Golden-cheeked warbler. In addition to the endangered species habitat a few areas are designated as ESA's due to the unique view sheds and scenic qualities of the area, such as the limestone bluffs located along the western edge of Whitney Lake. Additional consideration was given to unique or scarce habitat types such as bottomland hardwood forests located along river and creek bottoms when determining which areas should be designated as ESA's.

5.6 MULTIPLE RESOURCE MANAGEMENT LANDS

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

5.6.1 Low Density Recreation

These are lands with minimal development or infrastructure that support passive public use including, but not limited to hiking, nature photography, bank fishing, and hunting. Future management of these lands calls for maintaining a healthy, ecologically adapted vegetative cover to reduce erosion and improve aesthetics. Prevention of unauthorized use such as trespass or encroachments is an important management objective for all USACE lands, but is especially important for those lands in close proximity to private development. These lands are typically open to the public, including adjacent landowners, for pedestrian traffic and are frequently used by adjacent landowners for access to the shoreline near their homes. Adjacent landowners may apply for a permit to mow a meandering path to the shoreline, and if conditions warrant, may apply for a permit to mow a narrow strip

along the USACE boundary line as a precaution against wildfire. Mowing activity by adjacent landowners is addressed in the Whitney Lake Shoreline Management Plan available at the project office. The general public may use these lands for bank fishing, hiking, and for access to the shoreline. Hunting may be allowed in select areas that are a reasonable and safe distance from adjacent residential properties. Future uses may include additional designated natural surface hike/bike/equestrian trails. The placement of public trails in areas near residential properties will require public involvement prior to trail design. There are 1,170 acres of Low Density Recreation lands under this classification.

5.6.2 Wildlife Management

These are lands designated for the stewardship of fish and wildlife resources and are managed by USACE. There are currently 16,278 acres of land under this classification at Whitney Lake. Future management of these lands calls for managing the habitat to support native, ecologically adapted vegetation which in turn supports native wildlife species. Specific management techniques including, but not limited to placement of nesting structures, construction of water features or brush piles, prescription burning, fencing, and planting of specific food producing plants may be necessary to support the needs of wildlife Species of Greatest Conservation Need (see Appendix C for the TPWD listing of Species of Conservation Need). Migratory species, both game and non-game, will generally be given priority over non-migratory species when implementing wildlife management measures. Priority will also be given to the improvement or restoration of existing wetlands, or where topography, soil type, and hydrology are appropriate, the construction of wetlands. Where beneficial to long term ecological management goals, agricultural leases for grazing or hay production may be employed. Hunting and fishing activities are regulated by federal and state laws. Priority will be given to accomplishing the Natural Resources Management objectives identified in Chapter 3 for the Wildlife Management areas at Whitney Lake. These objectives cover a broad range of species both game and non-game.

There are several federally-listed endangered species that could utilize habitat within the Whitney Lake area. Any work or action that affects habitat will be in accordance to the Endangered Species Act and will be appropriately coordinated with the USFWS. The species of focus within this area of consideration are animals listed as a threatened or endangered species under the Endangered Species Act. These species (Table 2.1) will continue to receive attention to ensure they are managed in accordance with their habitat needs.

Current public use of these lands includes hiking and horseback riding on existing trails, bank fishing, canoeing and kayaking, and hunting. Future public use includes all existing uses and expansion of trail opportunities where feasible. Some MRML – Wildlife Management may support the establishment of nature centers or environmental learning areas.

5.6.3 Vegetative Management

These are lands that have vegetative types considered to be sensitive and needing special classification to ensure success. A good example of these types of vegetation would be forested wetlands and Cross Timbers forests. In general, the naturally occurring habitat types at Whitney Lake are in a sustainable condition with only limited effort needed to maintain this condition. Therefore, no lands are currently identified at Whitney Lake for vegetative management purposes.

5.6.4 Future/Inactive Recreation Areas

These are areas with site characteristics compatible with potential future recreational development or recreation areas that are closed. Until there is an opportunity to develop or reopen these areas, they will be managed for multiple resources. There are no lands classified under this sub-classification at Whitney Lake.

5.7 WATER SURFACE

At conservation pool level of 533.0 msl there are 21,702 acres of surface water. Buoys are managed by USACE in close coordination with the TPWD. These buoys help mark hazards, swim beaches, restricted areas and no-wake areas. Classification of the water surface at Whitney Lake is described as follows:

5.7.1 Restricted

Restricted areas are around swim beaches for public safety as well as the dam for project operations, safety, and security purposes. Water surface classified as restricted totals approximately 23 acres.

5.7.2 Designated No-wake

No-wake areas are located near boat launch areas for the safety of launching and loading boat or personal watercraft, as well as the entrance area at marinas. Approximately 143 total acres of Whitney Lake is classified as Designated No-Wake.

5.7.3 Fish and Wildlife Sanctuary

These areas are managed with annual or seasonal restrictions to protect fish and wildlife species during periods of migration, resting, feeding, nesting, and/or spawning. Whitney Lake does not have water surface under this classification.

5.7.4 Open Recreation

The remaining lake area not in the above classifications is open to recreational use. A buoy system is in place to help aid in public safety. Approximately 21,536 total acres of Whitney Lake is classified as Open Recreation. .

CHAPTER 6 - SPECIAL TOPICS/ISSUES/CONSIDERATIONS

6.1 CULTURAL RESOURCES

As mentioned in section 2.9, there are multiple cultural resources located around and within Whitney Lake. Special consideration will be given to any activity that may have a negative impact on cultural resources. Therefore, a thorough review of all actions that have soil disturbance must be conducted and reviewed by USACE archeologists. Any action found to have negative impact must be coordinated with the appropriate state or tribal entity before authorization of work is granted. In addition, a Cultural Resource Management Plan should be developed for the continuance of managing cultural resources in accordance with relevant laws and regulations.

6.2 SHORELINE MANAGEMENT PLAN

The Shoreline Management Plan (SMP) for Whitney Lake, dated August 1976 sets forth policy and procedures by which USACE manages certain private development and uses of public lands and waters such as placement of private floating facilities and vegetation modification. The objectives of all management actions described in the SMP are to achieve a balance between permitted private uses and protection of natural resources and environmental quality for general public use. The Shoreline Management Plan was prepared in accordance with ER 1130-2-406.

The overall management of lands, water surface, and related public recreational use is guided by the Whitney Lake Master Plan which is a strategic plan setting forth broad management goals, objectives, and land use classifications. In general, the Shoreline Management Plan must not contradict the Master Plan. The Shoreline Management Plan, in accordance with EP 1130-2-550, is a part of the Operational Management Plan and must, to the extent possible within constraints imposed by public law and agency policy, support the goals and objectives of the Master Plan. It is anticipated that after the completion of this Master Plan update that a full review and revision of the Whitney Lake Shoreline Management Plan with full public input and involvement will be undertaken as funding allows. For more detailed information regarding shoreline descriptions, shoreline designation, implementation, construction and maintenance requirements, permit applications, and other land and water uses contact the Whitney Lake Office.

6.3 ENDANGERED SPECIES

Several Federally endangered species occur on project lands at Whitney Lake. The complete list of species is presented in Table 2.2. The Golden-cheeked warbler (GCWA) is of unique interest and importance for the Whitney Lake Project. Surveys for GCWA at Whitney Lake were performed in 1996, 1997, and 1998 by

private consulting firms revealing the presence at several locations. The USACE Engineers Research and Development Center (ERDC) conducted a study in 2005 which indicated continued presence at two previously surveyed locations. USFWS conducted an investigation in 2008 and observed 61 positive GCWA detections. The subsequent survey in 2009 recorded 29 positive GCWA detections. USFWS also conducted investigations in 2011 (15 positive GCWA detections) and 2015 (22 positive GCWA detections).

Photo 6.1 Golden-cheeked Warbler. Courtesy, USFWS

USACE property at Whitney Lake which functions as habitat for the GCWA is of unique importance to the USFWS (Service) regarding recovery efforts for this species. The Service's Recovery Plan (Service 1992) for the GCWA dictates that recovery efforts must include "…protection of sufficient breeding habitat to ensure the continued existence of at least one viable, self-sustaining population in each of the eight recovery regions, and all existing GCWA populations on public lands are protected and managed to ensure their continued existence." The habitat at Whitney Lake occurs within GCWA Recovery Region 2 where less than 50 birds have been documented in years prior to 2008. Due to the limited amount of public land and GCWA breeding habitat in Recovery Region 2, Whitney Lake may represent the most realistic opportunity to pursue substantial GCWA recovery efforts within this region.

There are numerous management actions and techniques that can improve habitat for the GCWA. Refer to the report entitled " Investigations of U.S. Army Corps of Engineers Lands at Whitney Lake for the endangered Golden-cheeked Warbler and Black-capped Vireo 2015" prepared by the USFWS, Arlington Ecological Field Services Office for more information. This report is attached as Appendix D.

Due to the above information all lands designated by USFWS as high quality habitat for the GCWA were designated as Environmentally Sensitive Areas in this Master Plan update.

6.4 INVASIVE SPECIES

The extent of invasive species currently documented as present at the Whitney Lake Project is presented in Table 2.3. Unlike other lakes, Zebra mussels have not been documented in Whitney Lake. Population levels at several Fort Worth District lakes have quickly risen to levels that are impacting raw water intakes for water supply and internal piping. At present these impacts are mainly in the form of increased maintenance costs due to having to remove the mussels. Two lakes within the Brazos River Basin, Waco and Belton have confirmed the presence of zebra mussels. While zebra mussels have yet to spread to Whitney Lake, their spread may be inevitable.

Several invasive terrestrial species are known to occur on Whitney Lake Project lands as presented in Table 2.3. Those plant and animal species of greatest concern are the red imported fire ant, feral hog, Johnsongrass, King Ranch bluestem, Bermudagrass and salt cedar. The native species of Ashe juniper and honey mesquite have become more prevalent over time due to the absence of fire. While not desirable in the plains and prairie areas of the project, Ashe juniper is a valuable species on the limestone slopes of the surrounding hills and canyons, providing nesting material for the endangered GCWA.

According to the Natural Resource Management objectives in Chapter 3 of the Master Plan, USACE will monitor lands and waters for invasive, non-native and aggressively spreading native species. USACE will take action to (1) prevent and/or reduce the spread of those species along with implementing prescribed fire as a management tool to control the spread of Ashe Juniper and other noxious plants and (2) to promote the vigor of native prairie grasses and forbs.

6.5 PUBLIC HUNTING PROGRAM

The Whitney Lake Project offers approximately 14,914 acres for public hunting. Rising costs of private land hunting opportunities, coupled with a general scarcity of public land available for hunting within the zone of influence, has resulted in significant public interest in hunting opportunities at Whitney Lake. Other public lands available within the zone of influence include USACE land at nearby Aquilla Lake, which is administered by the Whitney Lake Office, Waco Lake, and Navarro Mills Lake.

The Whitney Lake Hunting Program requires hunters to acquire a no-cost annual permit from the Lake Office. Returning hunters have the option of registering

online via a website, https://whitneylakehunting.tamu.edu/, which is currently maintained by Texas A&M University. To obtain a permit, applicants must have a valid hunting license, meet the state's hunter education requirements, and sign a disclaimer/waiver of liability form. Permits are not issued to children under the age of 12 years. Individuals from 12 to 16 years may acquire a youth hunter permit, but are required to be accompanied by a permitted adult. Returning hunters must complete an on-line hunter survey from the previous year in order to obtain a new permit. The Lake Office issues one permit for all approved game, which includes dove, squirrel, rabbit, waterfowl, turkey, feral hogs, and white-tailed deer. White-tailed deer are the most sought after game.

The Lake Office issued 2,801 permits in 2013 and 3,195 permits in 2014. Administration of a hunting program of this size requires a significant investment of resources, including labor and materials. USACE has authority to charge an administrative fee for issuing permits and may charge a fee in the future. Hunting at Whitney Lake is a valued service to the public and brings in customers to local businesses during the fall and winter months, during the off-peak recreation season.

CHAPTER 7 - PUBLIC AND AGENCY COORDINATION

7.1 PUBLIC AND AGENCY COORDINATION OVERVIEW

The USACE began planning to revise the Whitney Lake Master Plan in the fall of 2014. The objectives for a master plan revision were to (1) update land classifications to reflect changes in USACE land management policies since 1972 and (2) update the Master Plan to reflect new agency requirements for Master Plan documents in accordance with ER 1130-2-550, Change 7, January 30, 2013 and EP 1130-2-550, Change 5, January 30, 2013.

7.2 INITIAL STAKEHOLDER AND PUBLIC MEETINGS

The first action was a scheduled public scoping meeting providing an avenue for public and agency stakeholders to ask questions and provide comments. The public scoping meeting was held on July 14, 2015 at the Whitney Independent School District Auditorium in Whitney, Texas. The Fort Worth District placed advertisements on the USACE webpage, social media and print publications two weeks prior to the public scoping meeting.

USACE employees hosted the workshop, which was conducted in an open format. Participants were asked to sign in at a table where staff provided the participants with information regarding the structure of the scoping meeting and comment forms. After signing in, participants were directed to be seated in the auditorium and a power point presentation was presented by the Project Manager for the Master Plan Revision to convey information about the following topics:

- Public Involvement Process
- Project Overview
- Overview of the National Environmental Policy Act process
- Master Plan and current land classifications
- How to Submit Comments

At the conclusion of the presentation USACE representatives were available to answer questions and receive written comments at information tables. Interested persons had the opportunity to comment about the project using a variety of methods, including the following:

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

In total, approximately 50 individuals, not including USACE personnel, attended the July 14, 2015 public scoping meeting for interest groups, partner agencies, other government agencies, and businesses. A total of five comments were received following this public scoping meeting. None of those comments requested a specific change to the land classification designations at Whitney Lake. Table 7.1 below lists the comments received and the USACE Response.

Table 7.1 Public Comments from July 14, 2015 Public Scoping Meeting

COMMENT	USACE RESPONSE
Comment 1: Supports a peaceful, tranquil lake living. Would like master plan to address upgraded boat ramps to accommodate easier and faster boat access. Concerned about Corps Property breaking off and falling into lake. Concerned about All terrain vehicles (ATV) use on Corp Property which has increased and concerned that riders are not mindful of whose property they ride on.	The current amount of boaters utilizing Whitney Lake does not support expanding the number of launching lanes at the boat ramps. ATV use is covered in Chapter 3-Resource Objectives. Although use of ATV's is not allowed on Federal Property at Whitney Lake, there are some unauthorized uses of these vehicles that do occur. Park Rangers patrol the land around Whitney and address unauthorized ATV use when discovered. A major portion of the boundary line at Whitney is fenced to separate public from private property to discourage people using public lands from inadvertently trespassing on private property. If an adjacent landowner has specific areas of concern, they should contact the Whitney Lake Project office to discuss.
Comment 2: Supports increasing trail and hiking areas. Supports seeing designated mountain biking areas as well as designated trails for jeeps, four-wheelers, and motorcycles. Does not support increased marinas, but supports increase to existing marinas should demand support it. Supports morning and evening fishing areas be designated where personal watercraft are prohibited during fishing hours. Supports all public boat ramps to be extended for use during low lake levels. Support adjacent property owners to be allowed to maintain a non-intrusive pathway to the waterfront from personal property.	There are several multi-purpose trails located on public lands at Whitney Lake. Although they are mostly maintained by equestrian trail riding groups, they are designated as multi-use trails and can accommodate the use of mountain bikes. Off-road vehicle use by jeeps, ATV's and motorcycles is not authorized anywhere on public land at Whitney Lake. Designated fishing areas – the State restricts the use of personal watercraft after dark and before sunrise. Whitney Lake is a multi-use reservoir used by all types of water craft. There are currently no plans to further restrict the use of personal watercraft at Whitney Lake. Through the years the boat ramps at

COMMENT	USACE RESPONSE
	Whitney have been extended during periods of low lake levels. Most boat ramps at the lake cannot be extended any farther due to shallow shelves and mud flats at the end of the current concrete ramps. Shoreline use permits can be issued for pathways in certain locations, this is covered in the Whitney Lake Shoreline Management Plan.
Comment 3: Supports primitive camp sites on Steele Creek at the end of the peninsula.	This area was closed due to the fact that it is prone to flooding and erosion. No plans exist to reopen this area.
Comment 4: Concerned that USACE land surrounding the lake has no defined purpose. Supports undesignated land sold back for private ownership.	All property at Whitney Lake currently has a defined purpose (ex. operation of the project for flood risk and wildlife management purposes) and is essential. Some excess property at Whitney Lake originally acquired during the 1940's and deemed not essential for the operation of the reservoir has been sold back over the years. However, all federal lands at Whitney are currently deemed essential and has a land classification identified in this Master Plan. There are no future plans for disposing of public property at the lake.
Comment 5: Supports continuing with the realization of a disc course at Lofers Bend Park.	Current location at Lofers Bend is high density recreation. A Disc Golf course is compatible with that designation and can be considered in future plans.

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

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

CHAPTER 8 - SUMMARY OF RECOMMENDATIONS

8.1 SUMMARY OVERVIEW

The preparation of this Master Plan for Whitney Lake followed current 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 the preparation of contemporary Resource Objectives, Classification of project lands approved classification standards, and the preparation of a Resource Plan describing in broad terms how the land in each of the land classifications will be managed into the foreseeable future. Additional important requirements include rigorous public involvement throughout the process, and consideration of regional recreation and natural resource management priorities identified by other federal, state, and municipal authorities. The study team endeavored to follow this guidance to prepare a Master Plan that will provide for enhanced recreational opportunities for the public, improve environmental quality, and foster a management philosophy conducive to existing and projected staff levels at the Whitney Lake Project. Factors considered in the Plan development were identified through public involvement and review of statewide planning documents including TPWD's 2012 TORP (synonymous with SCORP) and the TCAP – Cross Timbers Ecoregion. This Master Plan will ensure the long term sustainability of the recreation program and natural resources associated with Whitney Lake.

8.2 LAND RECLASSIFICATION PROPOSALS

A key component in preparing this Master Plan was examining prior land classifications and addressing the needed transition to the current 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 this Plan describes the public input process.

Although five public comments were received as a result of the first public scoping meeting, none of those comments contained a specific request or proposal to demonstrably change prior land classifications. In the absence of public or other agency suggestions/proposals to reclassify project lands, the land classifications presented in this Plan were formulated by Whitney Lake Project staff, SWF Operations Division Staff and the Regional Planning and Environmental Center (RPEC) staff assigned to the Master Plan Project Delivery Team. A summary of the acreage changes from prior land classifications to the current classifications is provided in Table 8.1 below. A summary of individual land classification changes and related justifications for the new land classifications is provided in Table 8.2

Table 8.1 Change from Prior Land Classification to New Land Classification

Prior (1972) Land Classifications	Acres	New Land Classifications	Acres
Operation and Maintenance	419	Project Operations	460
Recreational Areas	5,049	High Density Recreation	3,608
Special Use Areas – Natural Areas	565	Environmentally Sensitive Areas	2,268
Special Use Areas – Group Use Areas	858	Multiple Resource Management – Low Density Recreation	1,170
Wildlife Areas	3,880	Multiple Resource Management – Wildlife Management	16,278
Aesthetic and Multiple Use Recreation	9,776		

*** Note**: The new land classification acreage figures were measured using GIS technology and may vary slightly from official land acquisition records. The total land classification acres listed in the 1972 Whitney Lake Master Plan were 20,547. The current land classification acres in this revised Master Plan are 23,783.

Table 8.2 Reclassification Proposals

Land Classification	Description of Changes	Justification
Project Operations	The increase in Project Operations from 419 acres to 460 acres resulted from the following actions: • Conversion of former Recreational Areas below the dam on the east side of the Brazos River.	All lands converted to Project Operations have historically been used in support of critical operational requirements related to the primary missions of flood risk management and water conservation. The conversion of this additional 41 acres to Project Operations will have no effect on current or projected public use.
High Density Recreation	Lands under the prior classification of Recreational Areas were converted to the new and similar classification of High Density Recreation but were reduced from 5,049 to 3,608	These six park areas that were converted to another, more appropriate classification had never been developed or had been closed to the public for intensive recreation use for

Land Classification	Description of Changes	Justification
	acres through the following changes: • Lofers Bend, McCown Valley, Cedar Creek and Kimball Bend Parks had areas originally designated as high density recreation that were much larger than the land area actually used to develop these parks. This "excess" area was designated as Wildlife Management. • Old Fort Park and Morgan Lakeside Park were converted to Low Density Recreation.	many years. There is no public demand or plans to develop these acres or re-open the closed parks. Historically, these lands have been managed for the benefit of wildlife and are more appropriately classified as Wildlife Management lands. The conversion of these lands will have no effect on current or projected public use.
Environmentally Sensitive Areas	The classification of 2,268 acres as Environmentally Sensitive Areas resulted from the following land classification changes: • Areas designated by USFWS as important habitat for the endangered Golden-cheeked Warbler (GCWA), as well as unique aesthetics and Bottomland Hardwood Forest identified by the WHAP habitat assessment were converted to Environmentally Sensitive Areas. • The original classification of these lands included Aesthetics/Multiple Use Recreation, Recreation Intensive Use and Wildlife Areas.	These classification changes were necessary for the following reasons: • The need to recognize those areas at the project having the highest ecological value including areas of high value bottomland hardwood and riparian forest and for protection of important habitat for the endangered GCWA as designated by the USFWS. • The conversion of lands will have little to no effect on current or projected public use. • Lands classified as ESA are given the highest order of protection among possible land classifications.

Land Classification	Description of Changes	Justification
MRML - Low Density Recreation	The 1,170 acres designated as Low Density Recreation were acres of the former classification of Aesthetic and Multiple Use Recreation that were not suitable to convert to Wildlife Management. This current acreage consists of the areas of the project currently being used as access areas for private floating facilities, a small portion of Hamm Creek Park and the Nolan River Access Area.	The land areas in the former classification of Aesthetic and Multiple Use Recreation were retained as Low Density Recreation in areas where the historic land use patterns supported that retention. Other areas within that former classification were changed to other more appropriate new classifications such as Wildlife Management. The conversion of these lands will have no effect on current or projected public use.
MRML - Wildlife Management	The classification of 16,278 acres to Wildlife Management resulted from the following changes: • Lands under the prior classification of Wildlife Areas were converted to Wildlife Management or ESA. • A majority of the lands under the prior classification of Aesthetic and Multiple Use Recreation were converted to Wildlife Management. • A majority of the lands under the previous classification of Special Use Areas were also converted to Wildlife Management or ESA.	The change from Wildlife Areas to Wildlife Management was a simple name change to current nomenclature. The change to ESA was needed to reflect the high ecological value of some of those lands. The change from the prior classifications of Aesthetic and Multiple Use Recreation and Special Use Areas was needed to better reflect historic use and management patterns in those areas. The conversion of these lands will have no effect on current or projected public use.
Water Surface	The classification of 21,702 acres of water surface of the lake at the conservation pool elevation may result from the following four changes:	Restricted water surface includes areas where recreational boating is prohibited or restricted for

Land Classification	Description of Changes	Justification
	• 23 acres of Restricted water surface at Whitney Lake include the water surface upstream and downstream of the Whitney Dam and designated swimming areas in the parks around Whitney Lake. Buoys mark the line in front of the dam, while a line of signs in the Brazos River marks the downstream side around the dam. Keep-out buoys and yellow poly buoy lines mark the designated swimming areas in each park. • 143 acres of Designated No-Wake areas are in place near the 14 boat ramps and four marina areas at Whitney Lake. • There are 21,536 acres of Open Recreation water surface at Whitney Lake.	project operations, safety, and security purposes. Designated No-Wake areas intended to protect environmentally sensitive shorelines and improve boating safety near key recreational water access areas such as boat ramps Open Recreation areas encompass the majority of the lake water surface and are open to general recreational boating. Boaters are advised through maps and brochures, or signs at boat ramps and marinas, that navigational hazards may be present at any time and at any location in these areas. Operation of a boat in these areas is at the owner's risk. Specific navigational hazards may or may not be marked with a buoy.

CHAPTER 9 - BILIOGRAPHY

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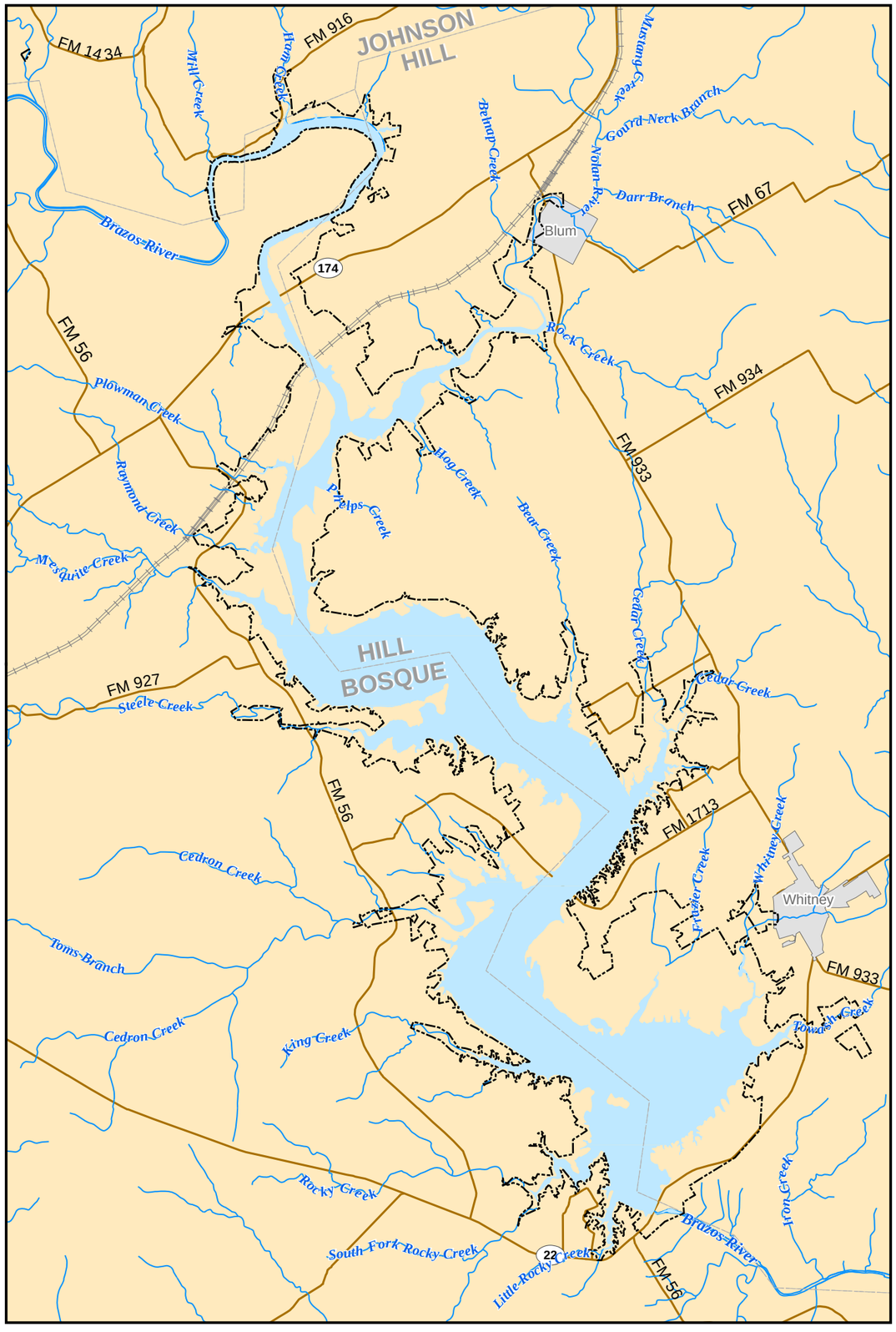
APPENDIX A – LAND CLASSIFICATION MAPS



INDEX TO MASTER PLAN MAPS

GENERAL

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WH15MP-OI-00	PROJECT LOCATION & INDEX TO MAPS
WH15MP-OM-01	AGENCY LAND MANAGEMENT

LAND CLASSIFICATION

MAP NO.	TITLE
WH15MP-OC-00	LAND CLASSIFICATION SHEET (00)
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WH15MP-OC-02	LAND CLASSIFICATION SHEET (02)
WH15MP-OC-03	LAND CLASSIFICATION SHEET (03)
WH15MP-OC-04	LAND CLASSIFICATION SHEET (04)
WH15MP-OC-05	LAND CLASSIFICATION SHEET (05)
WH15MP-OC-06	LAND CLASSIFICATION SHEET (06)
WH15MP-OC-07	LAND CLASSIFICATION SHEET (07)
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RECREATIONAL AREAS

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WH15MP-OR-02A	LOFERS DAY USE
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WH15MP-OR-02C	LOFERS EAST
WH15MP-OR-03	LAKE WHITNEY STATE PARK
WH15MP-OR-04	MCCOWN VALLEY
WH15MP-OR-05	CEDAR CREEK
WH15MP-OR-06	CHISHOLM TRAIL
WH15MP-OR-07	HAMM CREEK
WH15MP-OR-08	KIMBALL BEND
WH15MP-OR-09	PLOWMAN CREEK
WH15MP-OR-10	STEELE CREEK
WH15MP-OR-11	CEDRON CREEK
WH15MP-OR-12	WALLING BEND
WH15MP-OR-13	SOLDIERS BLUFF
WH15MP-OR-14	WHITNEY CITY PARK

FEE BOUNDARY

WATER SURFACE

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WHITNEY LAKE DAM

WHITNEY LAKE MASTER PLAN

PROJECT LOCATION AND INDEX

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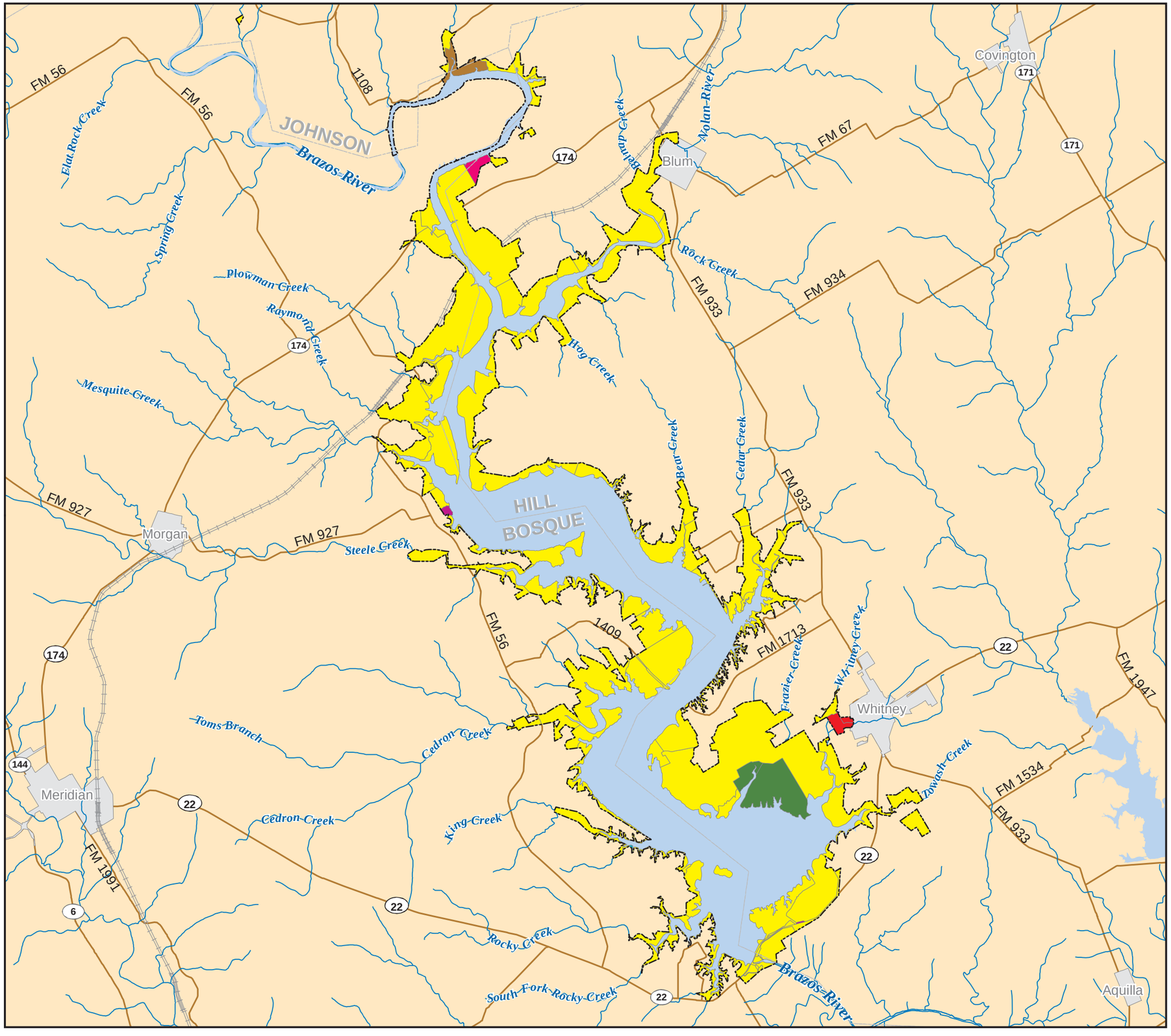
JUNE 2016	WH15MP-OI-00



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- TEXAS PARKS AND WILDLIFE DEPT.
- TEXAS DEPT. OF TRANSPORTATION
- BOSQUE COUNTY
- HILL COUNTY
- JOHNSON COUNTY
- CITY OF WHITNEY

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FORT WORTH DISTRICT

WHITNEY LAKE DAM — BRAZOS RIVER

WHITNEY LAKE DAM

WHITNEY LAKE MASTER PLAN

AGENCY LAND MANAGEMENT

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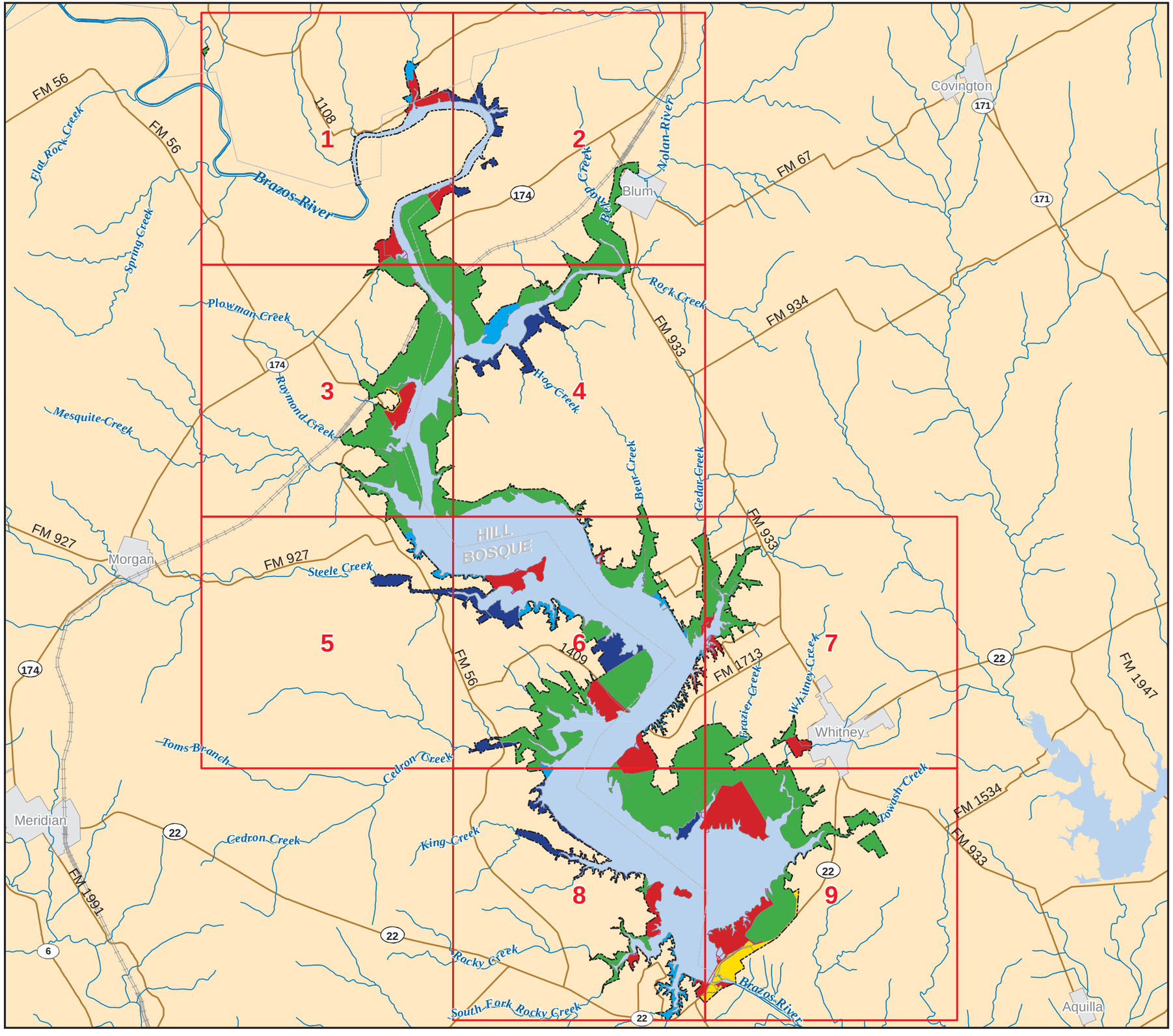

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LAND CLASSIFICATION (INDEX SHEET 00)

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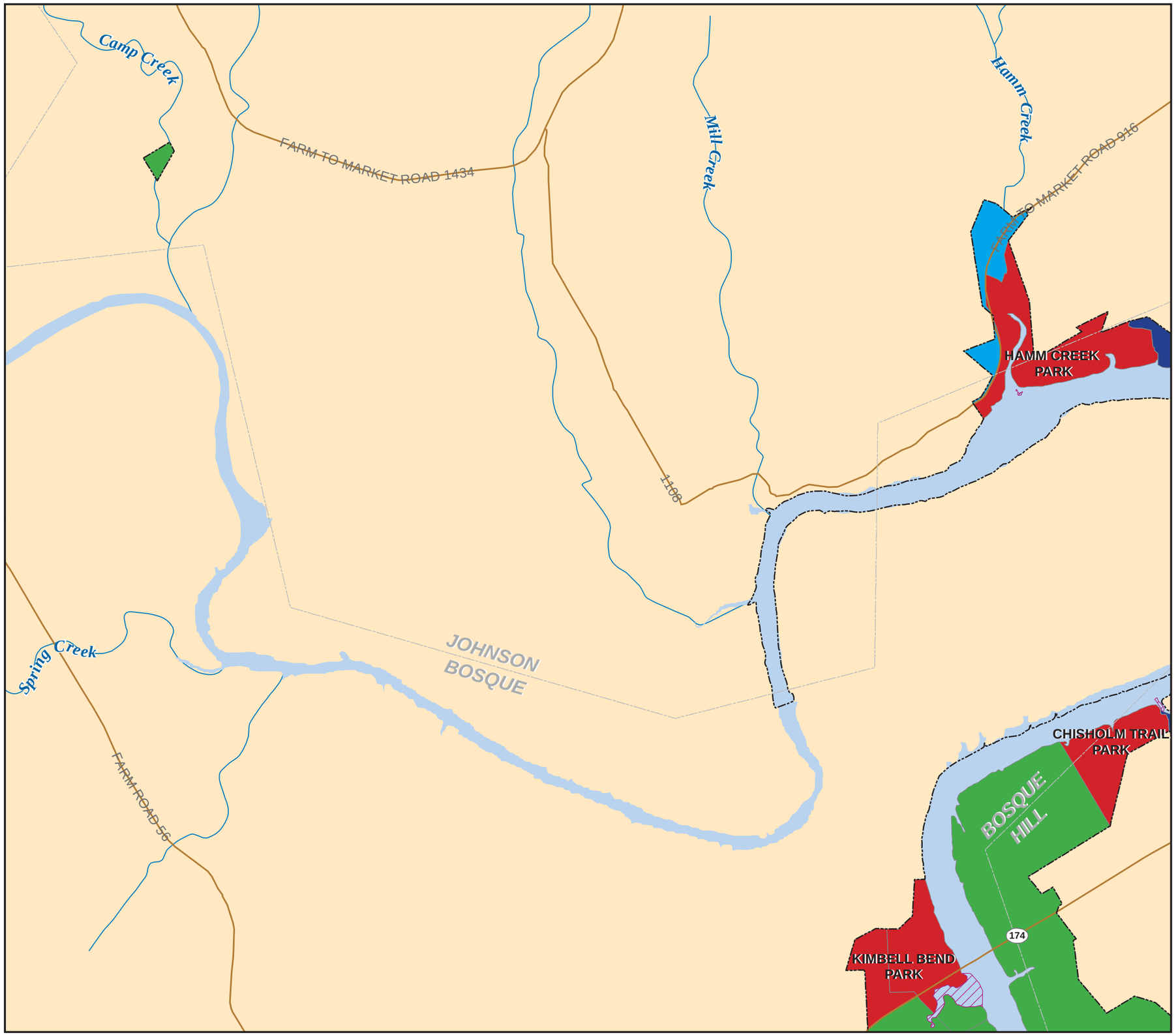

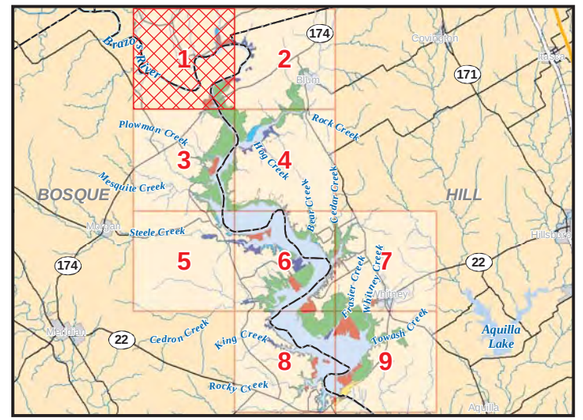

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LAND CLASSIFICATION (SHEET 01)

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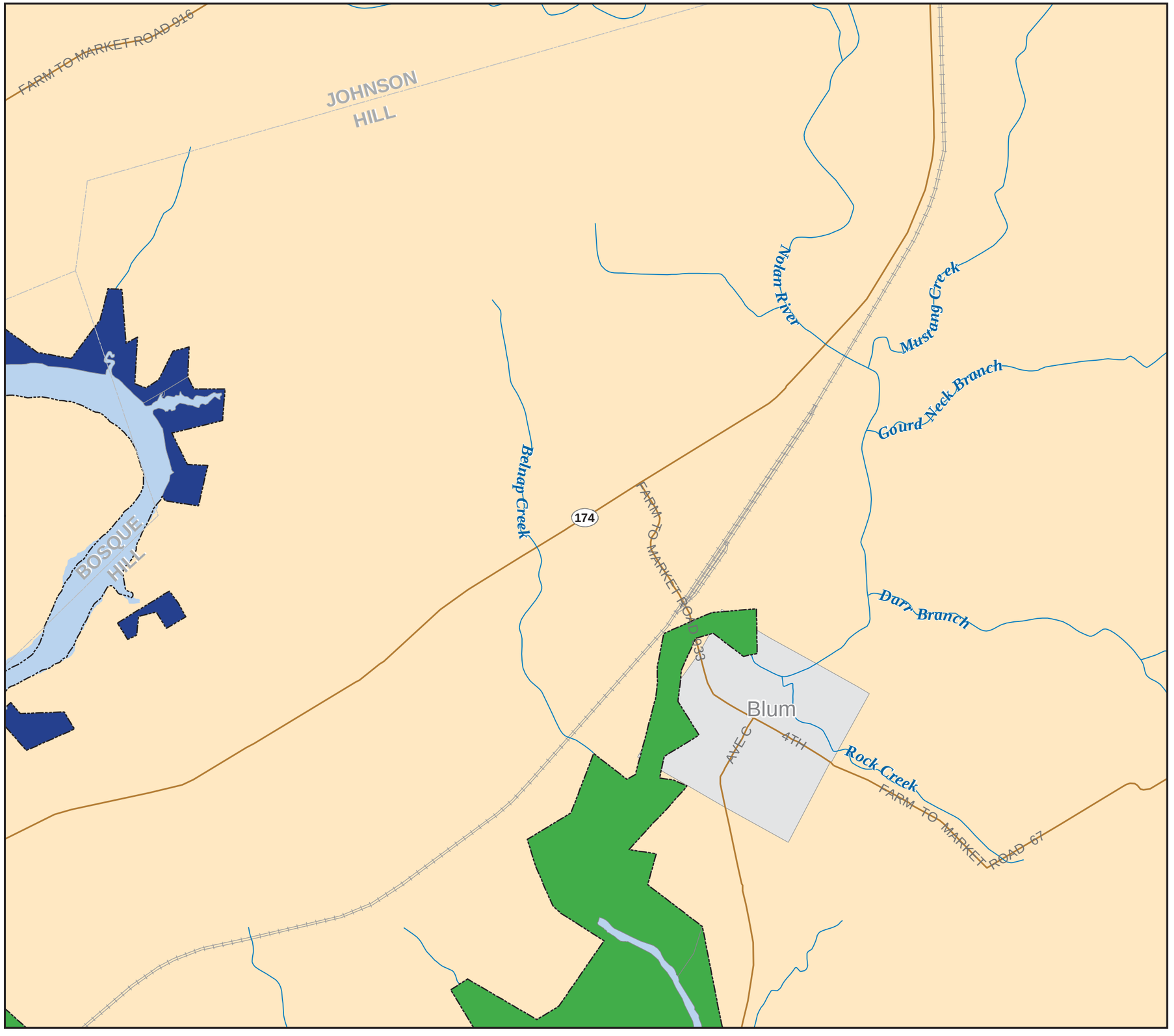

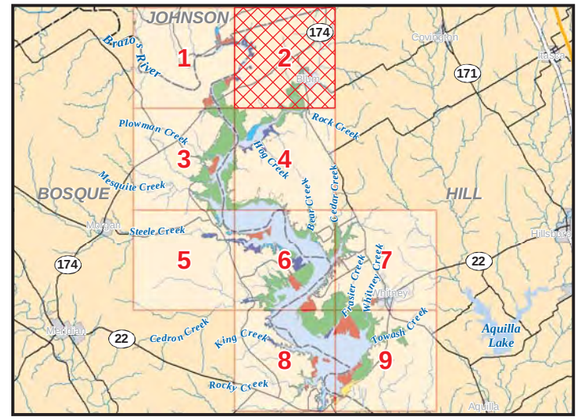

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LAND CLASSIFICATION (SHEET 02)

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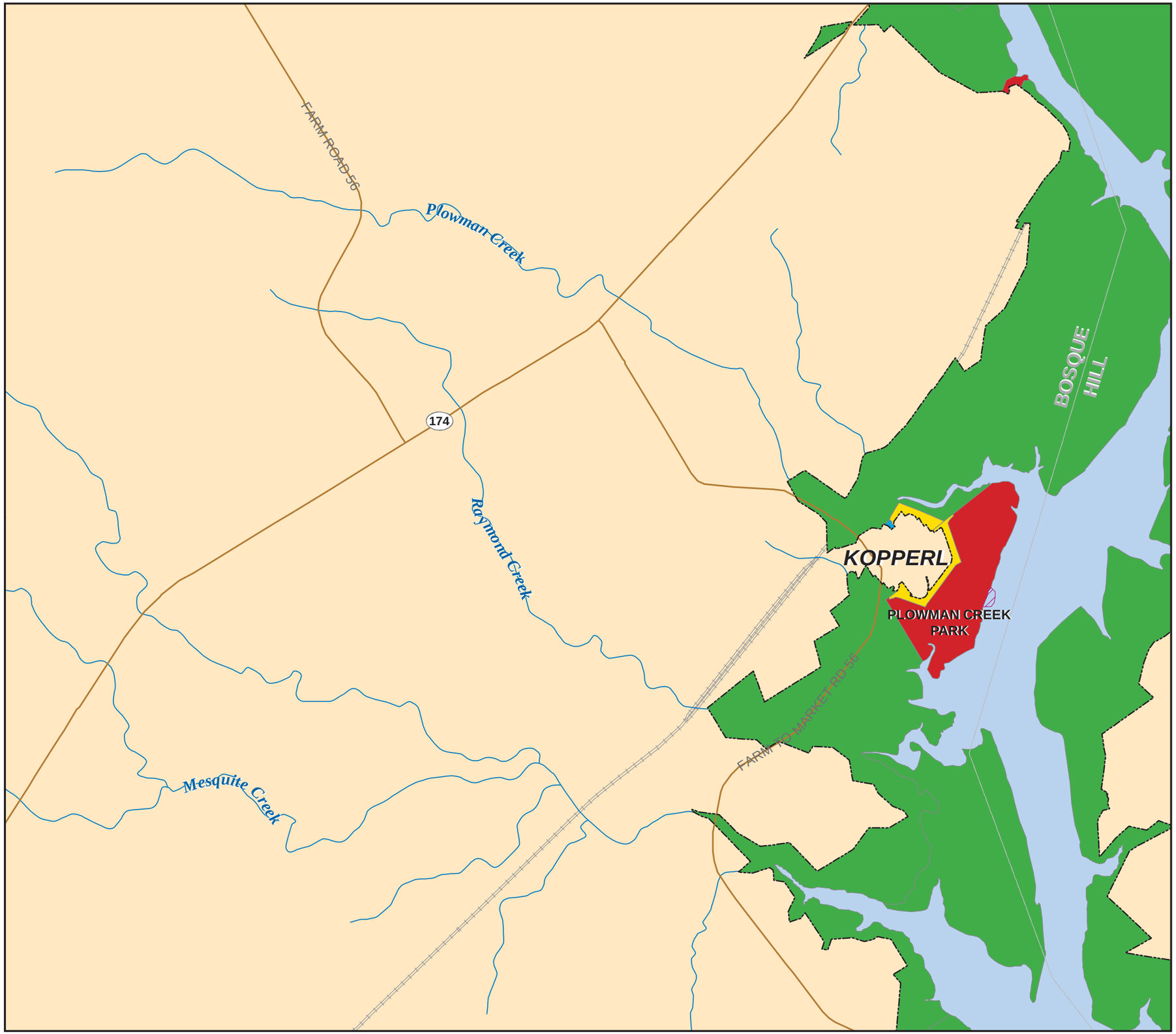

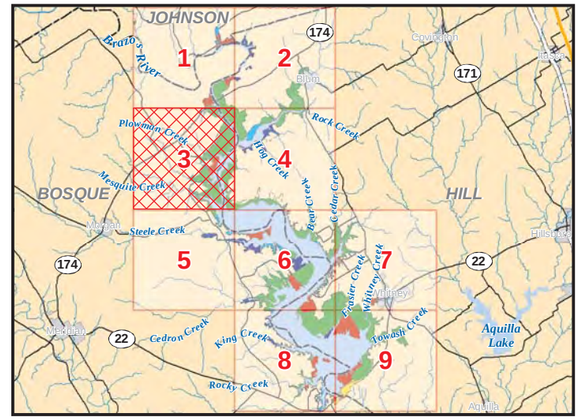

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LAND CLASSIFICATION (SHEET 03)

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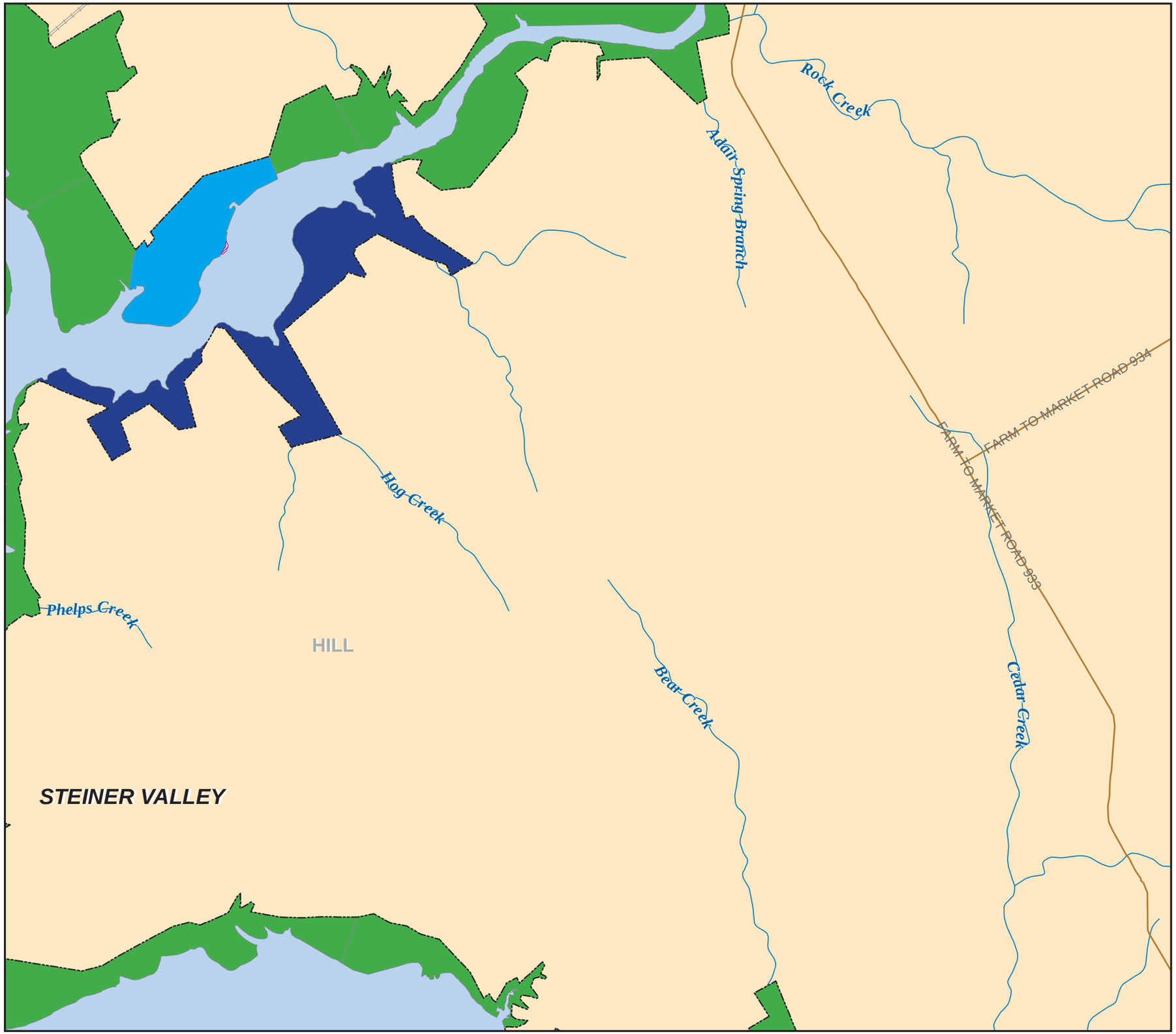

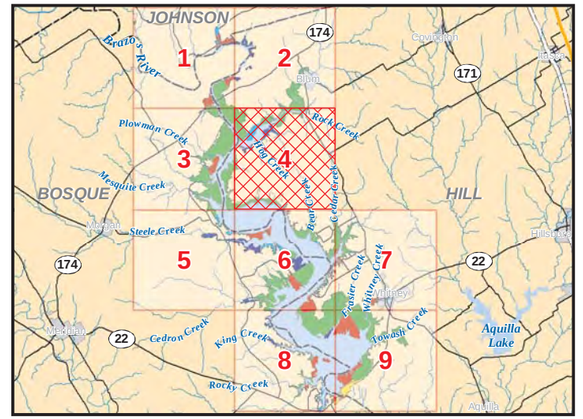

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LAND CLASSIFICATION (SHEET 04)

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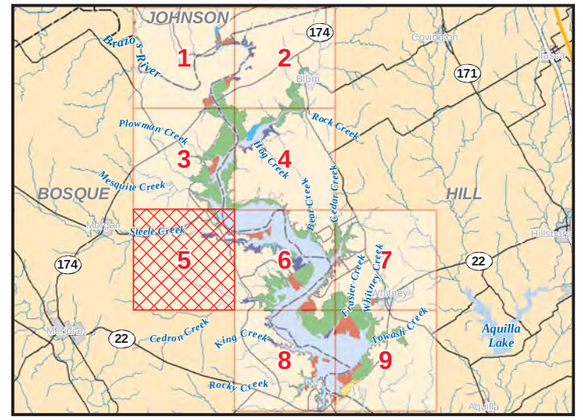

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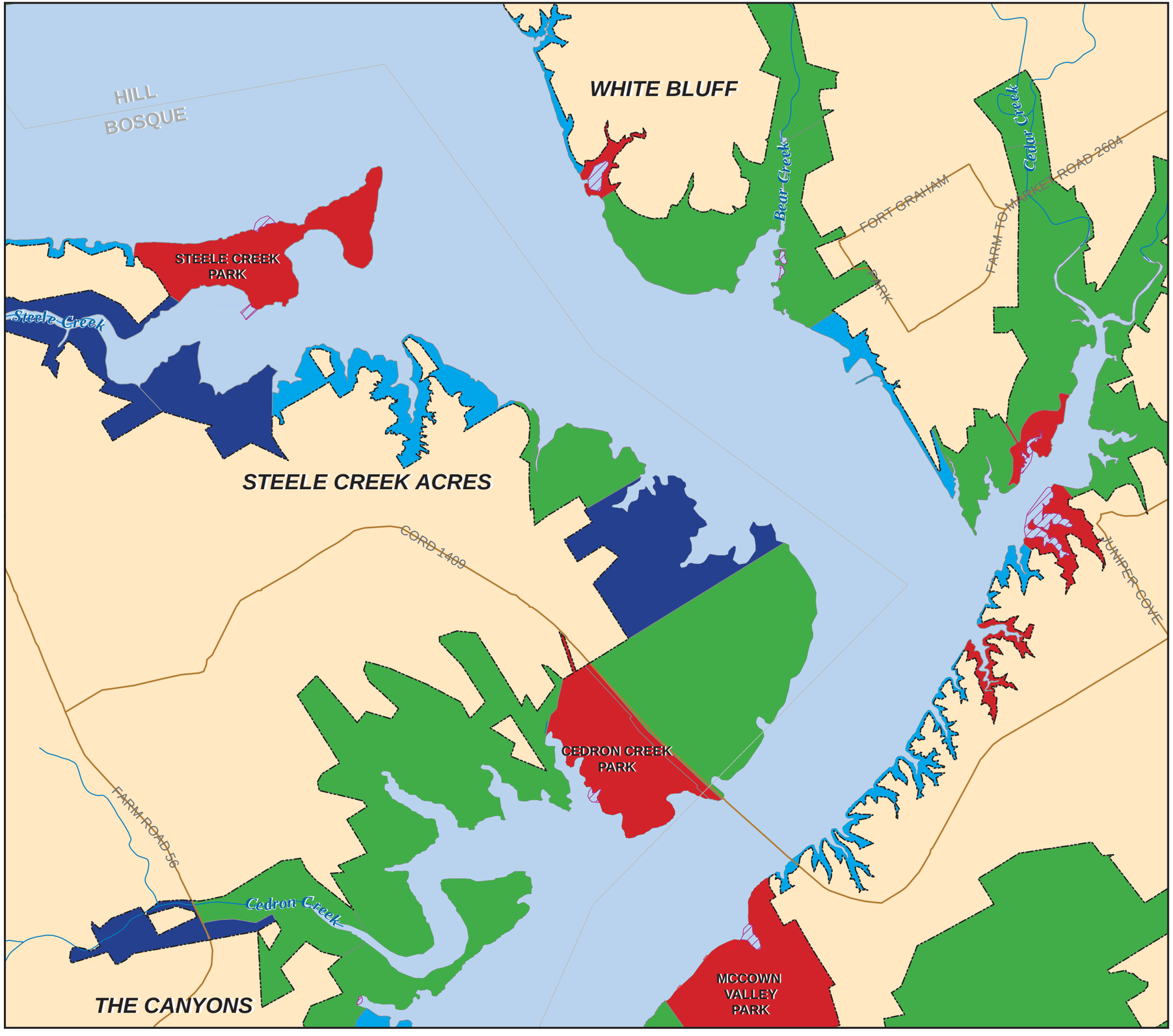

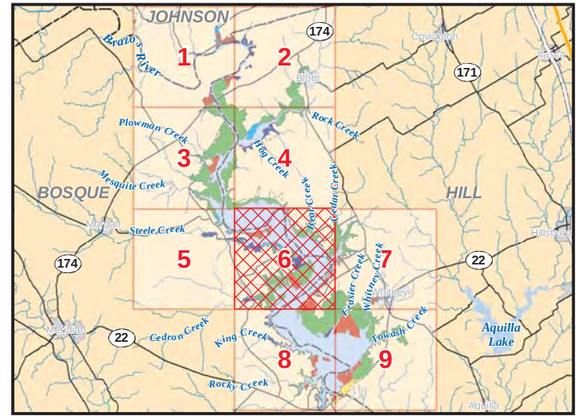

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FORT WORTH DISTRICT

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WHITNEY LAKE DAM

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LAND CLASSIFICATION (SHEET 06)

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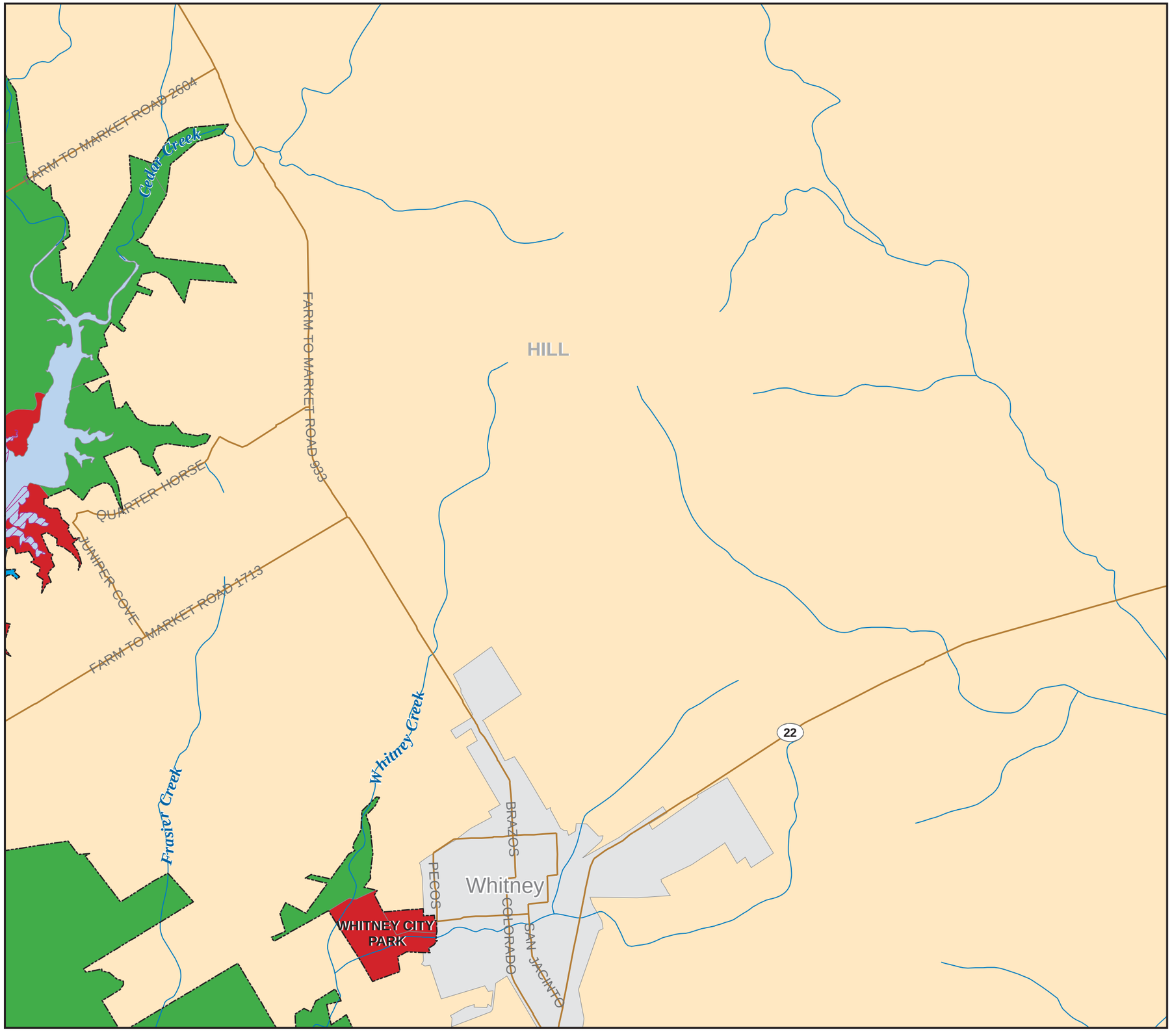
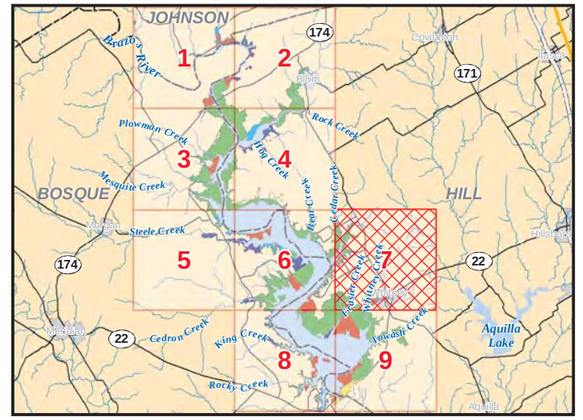




- INDEX GRID
- FEE BOUNDARY
- PROJECT OPERATIONS
- HIGH DENSITY RECREATION
- ENVIRONMENTALLY SENSITIVE AREAS
- LOW DENSITY RECREATION
- WILDLIFE MANAGEMENT
- WATER SURFACE: OPEN RECREATION
- WATER SURFACE: RESTRICTED
- WATER SURFACE: DESIGNATED NO-WAKE AREAS

U.S. ARMY CORPS OF ENGINEERS

FORT WORTH DISTRICT

WHITNEY LAKE DAM — BRAZOS RIVER

WHITNEY LAKE DAM

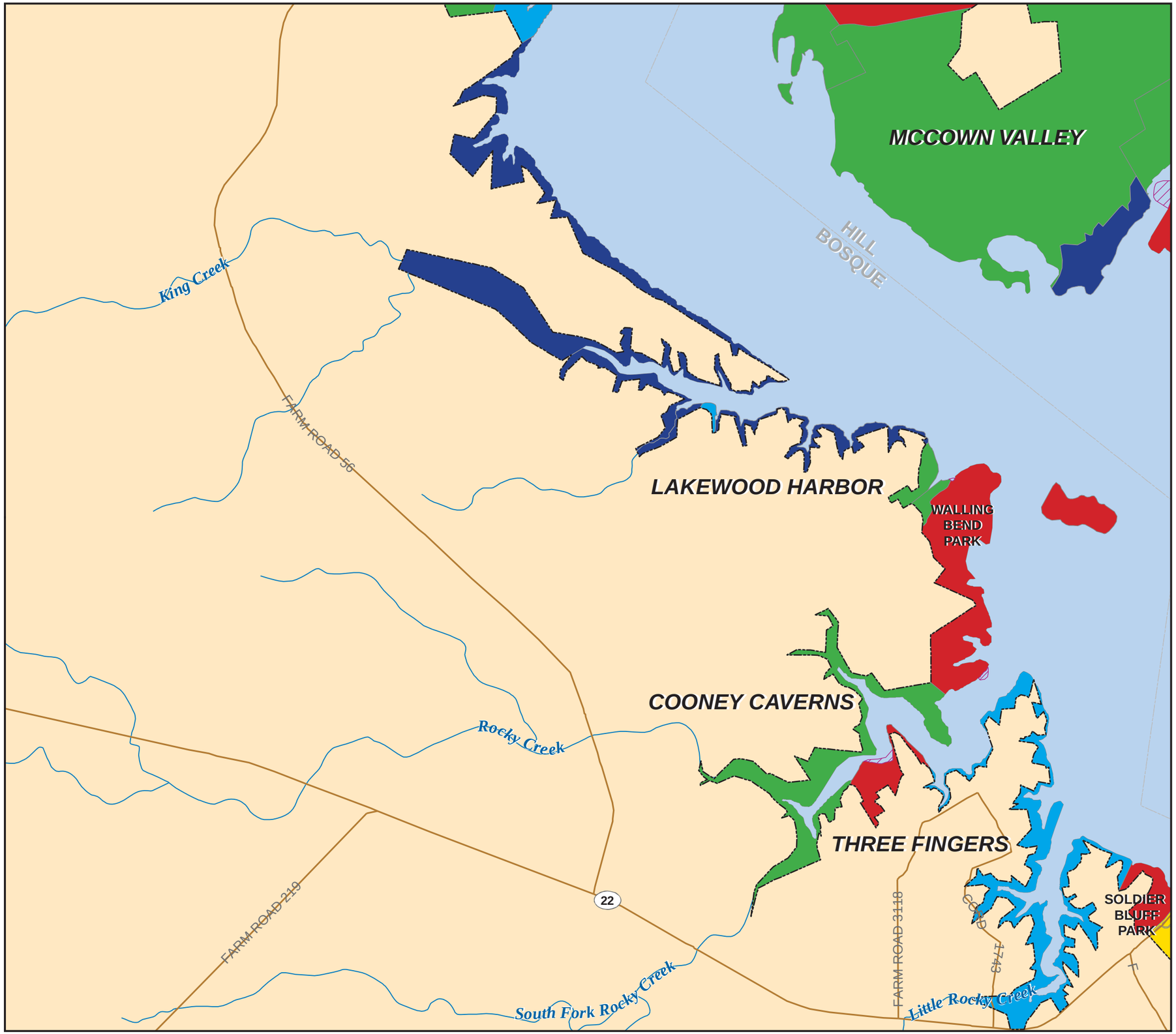
WHITNEY LAKE MASTER PLAN

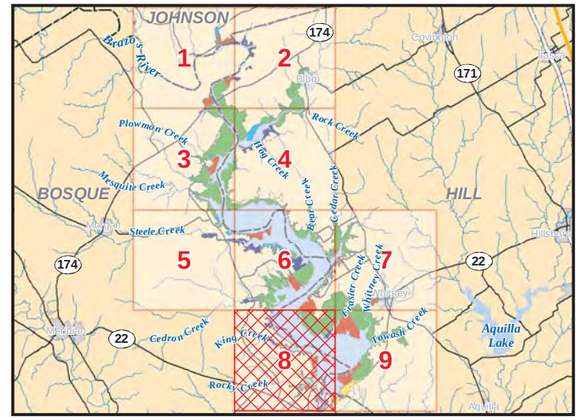
LAND CLASSIFICATION (SHEET 07)

N

0 2,000 4,000 6,000 8,000 FEET

DATE:	MAP NO.
JUNE 2016	WH15MP-OC-07





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

U.S. ARMY CORPS OF ENGINEERS

FORT WORTH DISTRICT

WHITNEY LAKE DAM — BRAZOS RIVER

WHITNEY LAKE DAM

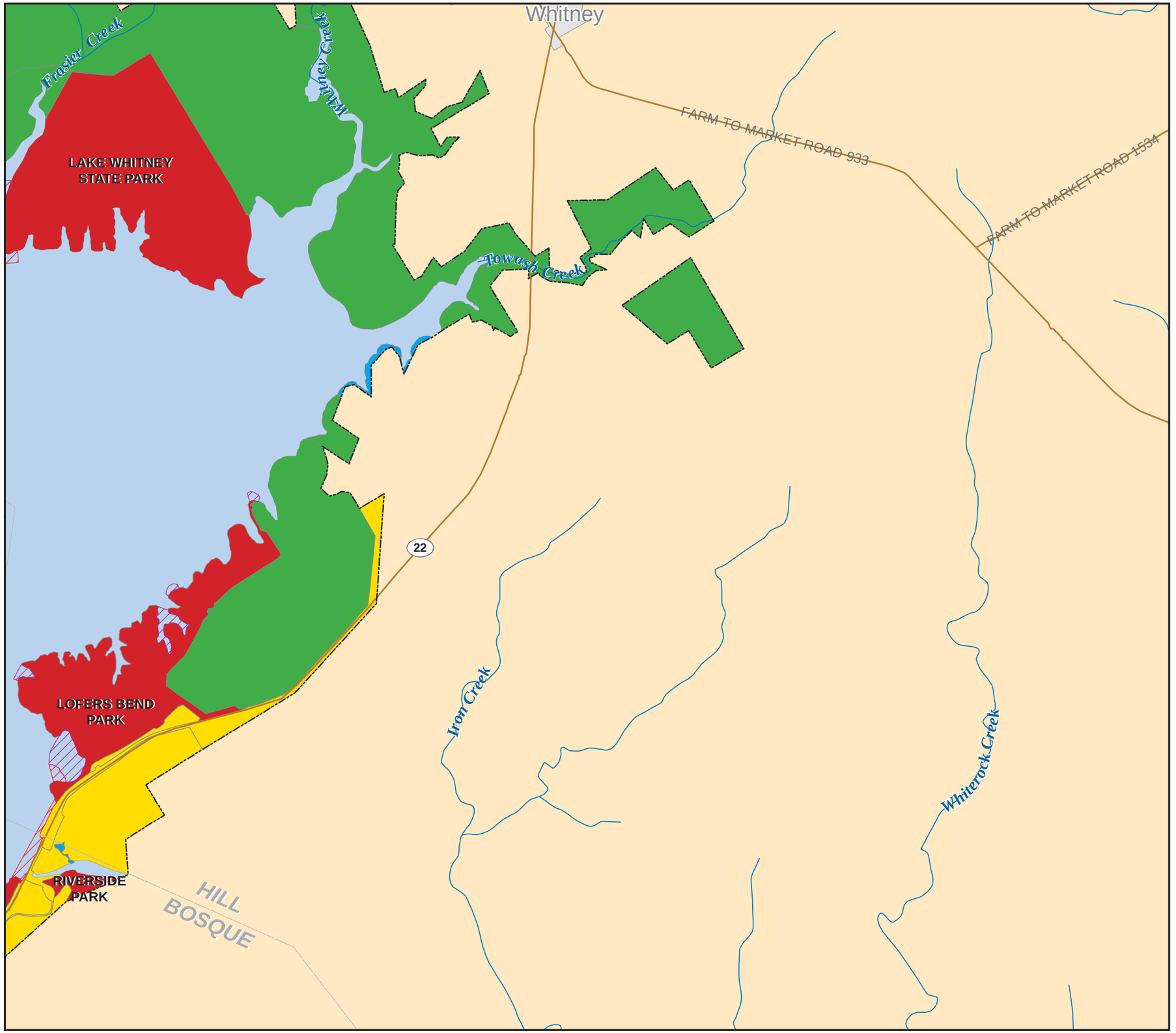
WHITNEY LAKE MASTER PLAN

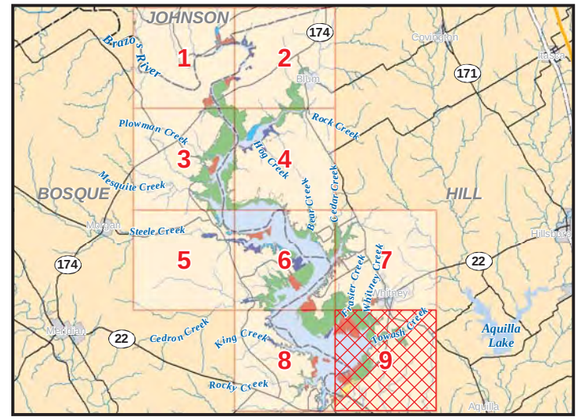
LAND CLASSIFICATION (SHEET 08)

N

0 2,000 4,000 6,000 8,000 FEET

DATE:	MAP NO.
JUNE 2016	WH15MP-OC-08





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

U.S. ARMY CORPS OF ENGINEERS

FORT WORTH DISTRICT

WHITNEY LAKE DAM — BRAZOS RIVER

WHITNEY LAKE DAM

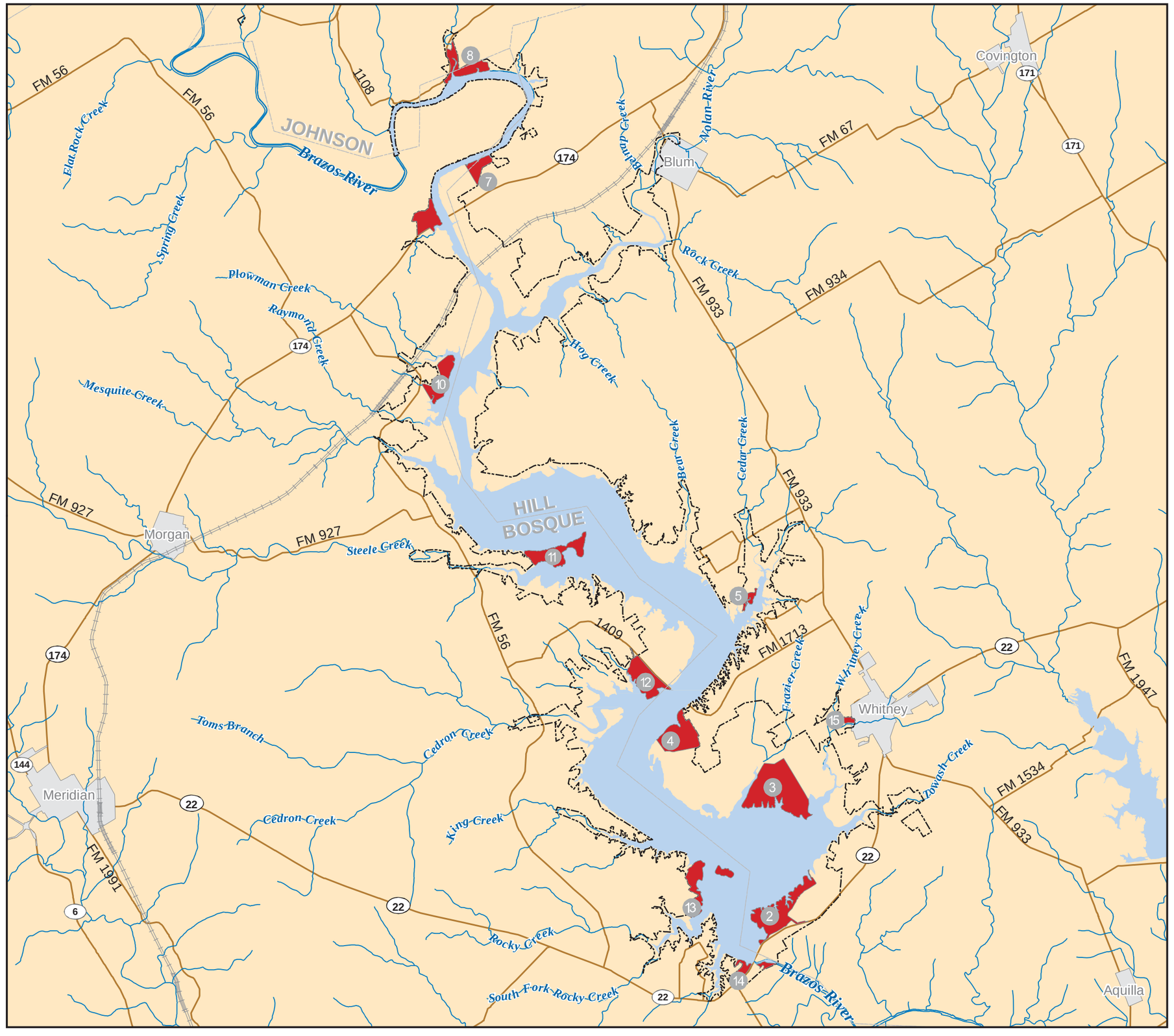
WHITNEY LAKE MASTER PLAN

LAND CLASSIFICATION (SHEET 09)

N

0 2,000 4,000 6,000 8,000 FEET

DATE:	MAP NO.
JUNE 2016	WH15MP-OC-09



RECREATIONAL AREAS

1. RIVERSIDE PARK
2. LOFERS BEND PARK
3. LAKE WHITNEY STATE PARK
4. MCCOWN VALLEY PARK
5. CEDAR CREEK PARK
6. NOLAN RIVER PARK
7. CHISHOLM TRAIL PARK
8. HAMM CREEK PARK
9. KIMBALL BEND PARK
10. PLOWMAN CREEK PARK
11. STEELE CREEK PARK
12. CEDRON CREEK PARK
13. WALLING BEND PARK
14. SOLDIERS BLUFF PARK
15. WHITNEY CITY PARK

U.S. ARMY CORPS OF ENGINEERS

FORT WORTH DISTRICT

WHITNEY LAKE DAM — BRAZOS RIVER

WHITNEY LAKE DAM

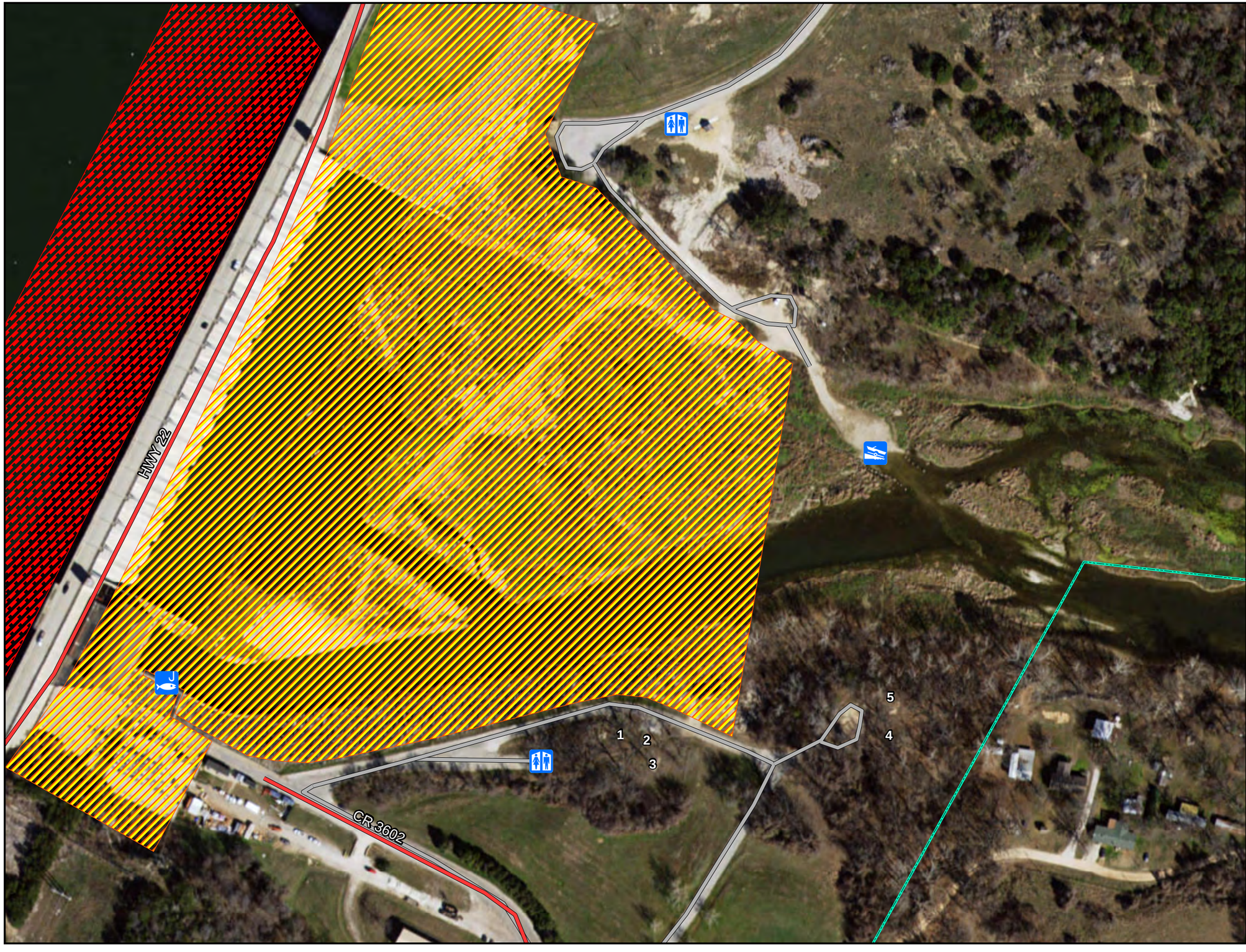
WHITNEY LAKE MASTER PLAN

RECREATIONAL AREAS

N

0 1.5 3 4.5 6 MILES

DATE:	MAP NO.
JUNE 2016	WH15MP-OR-00



ITEM	EXISTING
RIVER ACCESS RAMP	1
CAMPSITES	5
NON-ELECTRIC	5
RESTROOMS	2

Boats Keep Out

Restricted Area

Fee Boundary

Restrooms

River Access

Fishing Platform

N

W E

S

100 50 0 100 Feet

WHITNEY DAM & RESERVOIR BRAZOS RIVER

WHITNEY LAKE MASTER PLAN

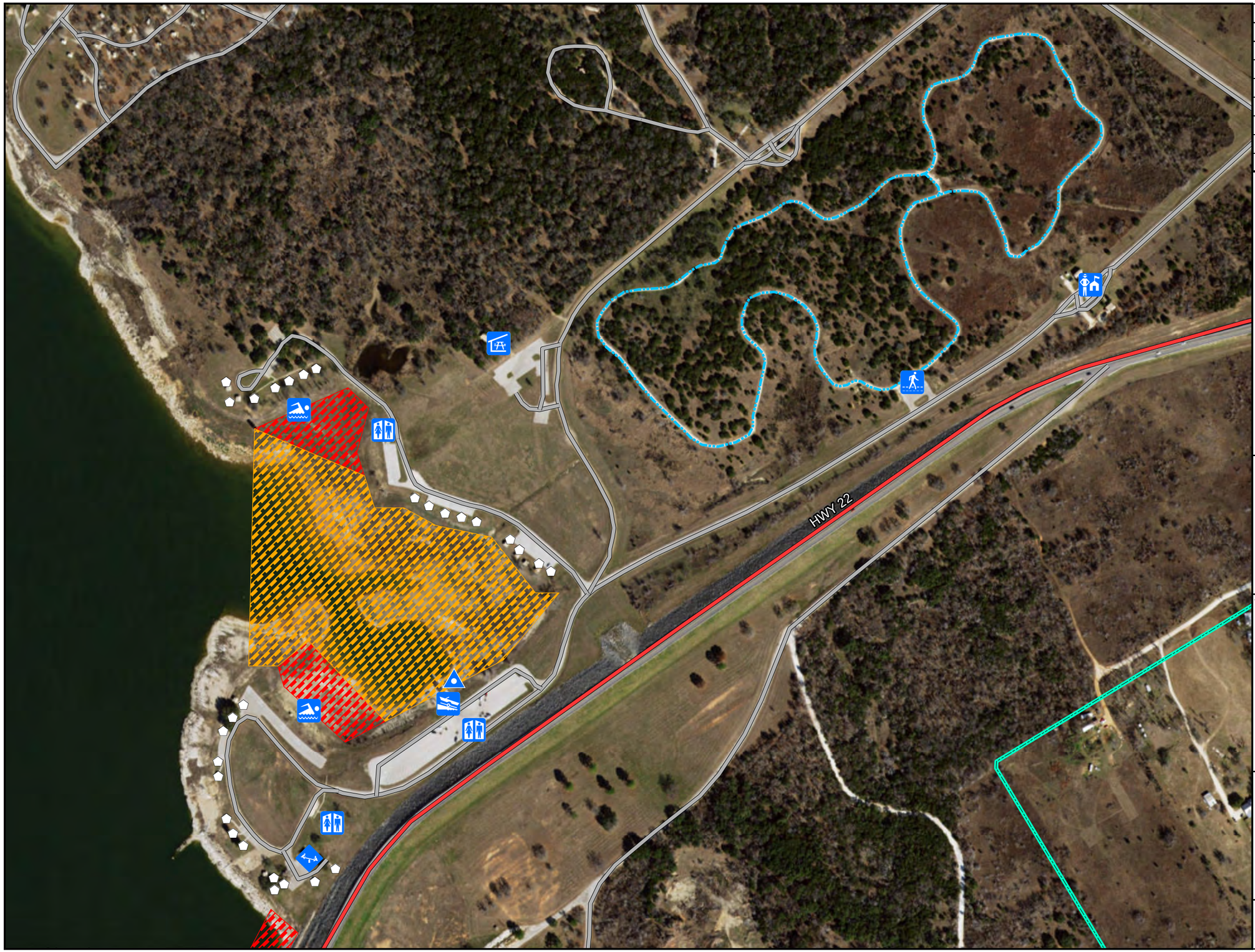
RECREATIONAL USE AREAS

RIVERSIDE PARK

US Army Corps of Engineers
Fort Worth District

Date: June 2016

Map No. WH15MP-OR-01



ITEM	EXISTING
BOAT RAMP LANES	2
COURTESY DOCK	1
GROUP PICNIC SHELTER	1
PICNIC SITES	29
PLAYGROUND	1
SWIM BEACHES	2
FITNESS TRAIL	1
RESTROOMS	3

- No Wake
- Boats Keep Out
- Picnic Sites
- Fitness Trail
- Fee Boundary
- Park Entrance
- Restroom
- Boat Launch
- Trail Head
- Swim Beach
- Playground
- Group Picnic Shelter
- Courtesy Dock

N
W E
S

300 150 0 300 Feet

WHITNEY DAM & RESERVOIR — BRAZOS RIVER

WHITNEY LAKE MASTER PLAN

RECREATIONAL USE AREAS

EAST LOFERS BEND PARK

US Army Corps of Engineers
Fort Worth District

Date:	Map No.
June 2016	WH15MP-OR-02a

ITEM	EXISTING
BOAT RAMP LANES	2
COURTESY DOCK	1
GROUP CAMP AREAS	1
HOOKUPS	6
CAMPSITES	68
ELECTRIC	45
NON-ELECTRIC	18
SCREEN SHELTER	5
PLAYGROUND	1
RESTROOMS	2
DUMP STATION	1

- Park Entrance
- Restrooms/Showers
- Trailer Dump Station
- Boat Launch
- Playground
- Group Shelter
- Courtesy Dock
- No Wake

N
W E
S

200 100 0 200 Feet

WHITNEY DAM & RESERVOIR — BRAZOS RIVER

WHITNEY LAKE MASTER PLAN

RECREATIONAL USE AREAS

WEST LOFERS BEND PARK

US Army Corps of Engineers
Fort Worth District

Date:	Map No.
June 2016	WH15MP-OR-02b

ITEM	EXISTING
BOAT RAMP LANES	3
COURTESY DOCK	1
GROUP CAMP AREAS	1
HOOKUPS	8
CAMPSITES	66
ELECTRIC	60
NON-ELECTRIC	6
PLAYGROUND	1
RESTROOMS	3
DUMP STATION	1

- Park Entrance
- Restrooms/Showers
- Trailer Dump Station
- Boat Launch
- Playground
- Group Shelter
- Courtesy Dock
- No Wake

N
W E
S

300 150 0 300 Feet

WHITNEY DAM & RESERVOIR BRAZOS RIVER

WHITNEY LAKE MASTER PLAN

RECREATIONAL USE AREAS

EAST LOFERS BEND PARK

US Army Corps of Engineers
Fort Worth District

Date:	Map No.
June 2016	WH15MP-OR-02c

ITEM	EXISTING
BOAT RAMP LANES	2
COURTESY DOCK	1
GROUP PICNIC AREA	1
RECREATION HALL	1
PICNIC SITES	15
GROUP CAMP AREA	1
SCREEN SHELTERS	8
DINNING HALL	1
CAMPSITES	158
ELECTRIC	74
SCREEN SHELTERS	21
NON-ELECTRIC	63
PLAYGROUNDS	3
RESTROOM	5

- Hike & Bike Trails
- No Wake
- Picnic Sites
- Air Strip
- Park Entrance
- Restrooms
- Dump Station
- Boat Launch
- Playground
- Group Shelter
- Courtesy Dock
- Trail Head
- Fishing Platform
- Maintenance
- Park Residence
- Recreation Hall
- Group Picnic Area
- Fish Cleaning Station
- Primitive Group Camp

N W E S

500 250 0 500 Feet

WHITNEY DAM & RESERVOIR BRAZOS RIVER

WHITNEY LAKE MASTER PLAN

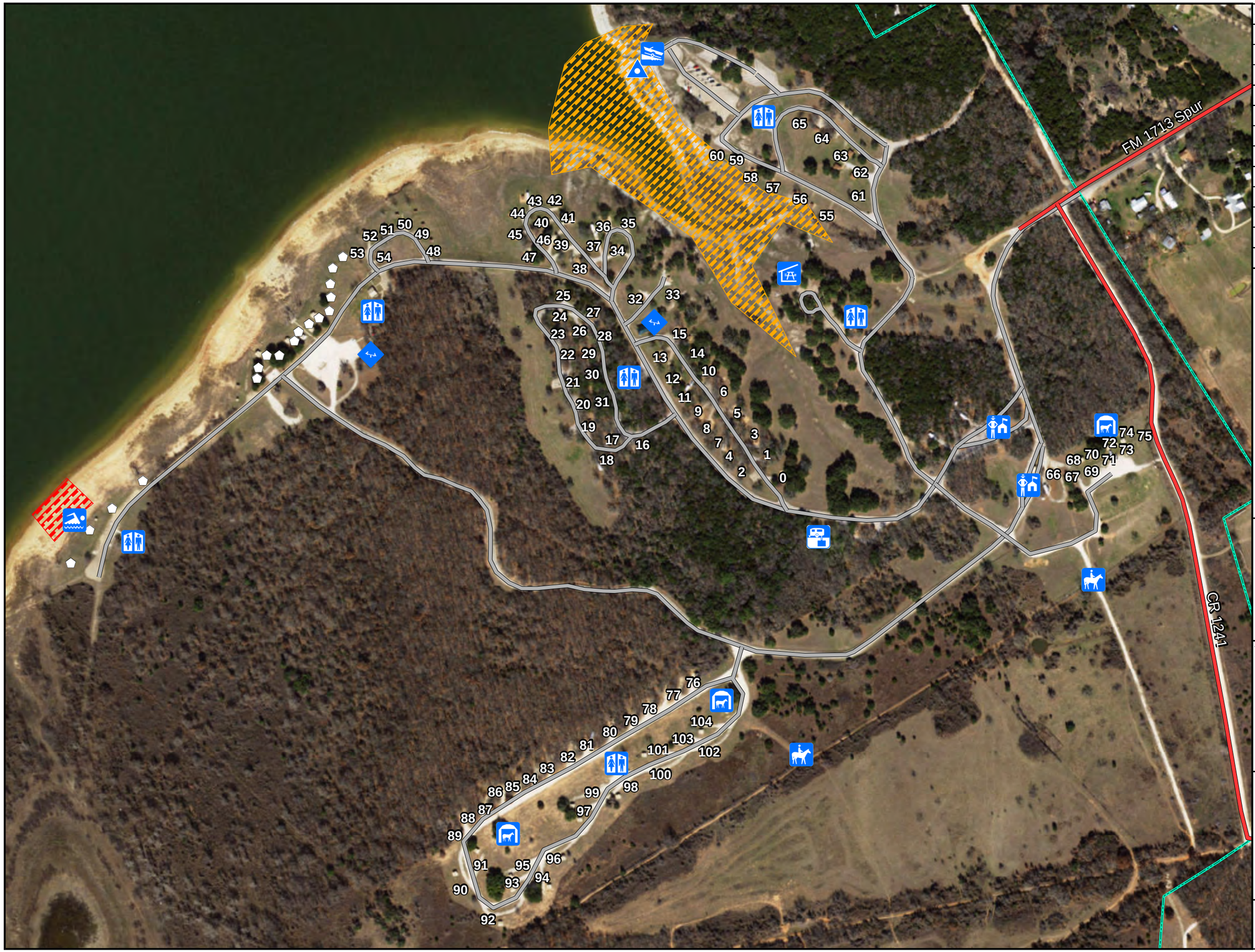
RECREATIONAL USE AREAS

LAKE WHITNEY STATE PARK

US Army Corps of Engineers
Fort Worth District

Date: June 2016

Map No. WH15MP-OR-03



ITEM	EXISTING
BOAT RAMP LANES	3
COURTESY DOCK	1
GROUP PICNIC SITE	1
CAMPSITES	105
ELECTRIC	48
EQUESTRIAN	39
NON-ELECTRIC	13
SCREEN SHELTERS	5
HORSE STALLS	18
PLAYGROUNDS	2
RESTROOMS	5
DUMP STATION	1

- Boats Keep Out
- No Wake
- Picnic Sites
- Fee Boundary
- Park Entrance
- Restrooms
- Dump Station
- Boat Launch
- Playground
- Swim Beach
- Horse Stalls
- Group Picnic Shelter
- Courtesy Dock
- Trail Head

N
W E
S

300 150 0 300 Feet

WHITNEY DAM & RESERVOIR — BRAZOS RIVER

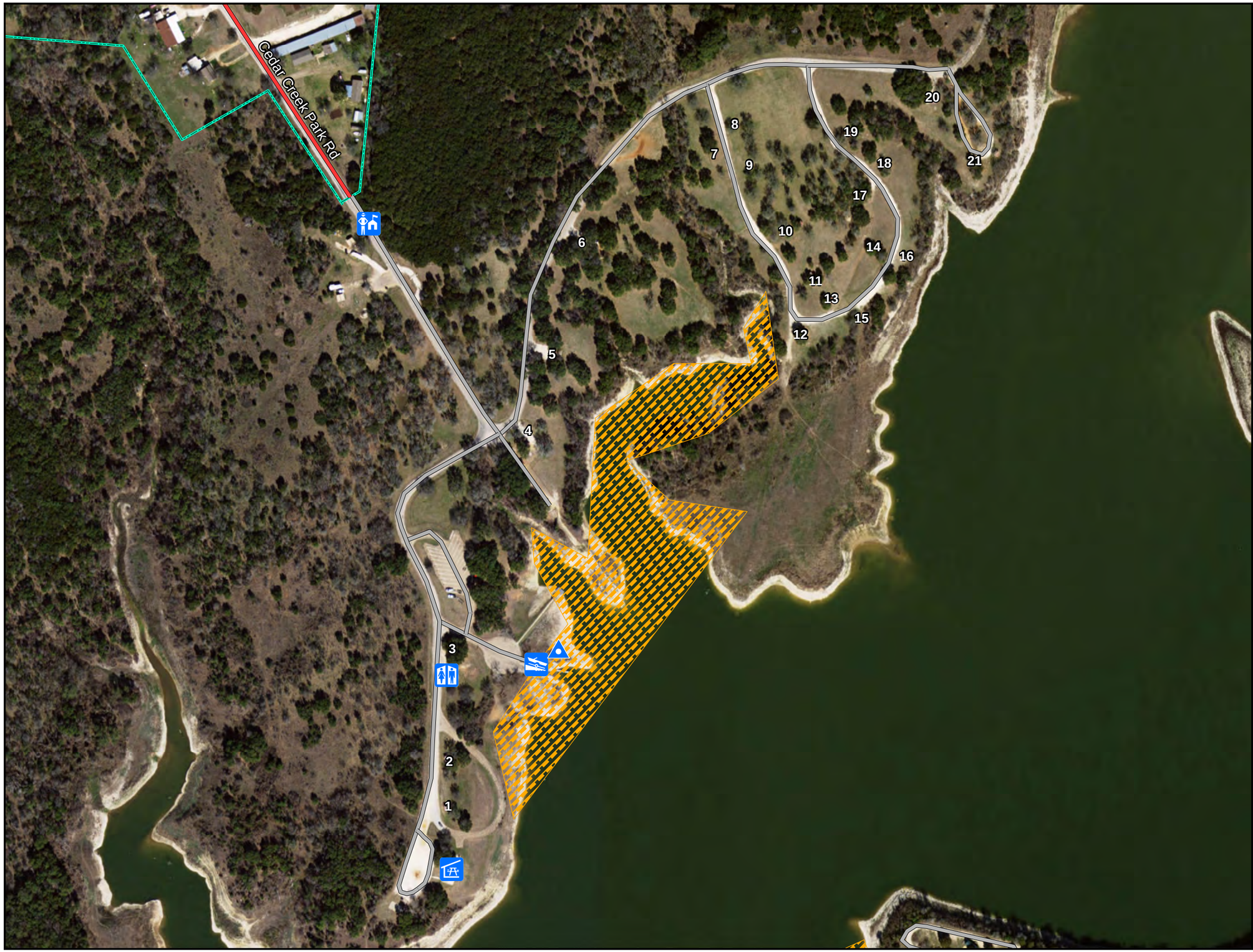
WHITNEY LAKE MASTER PLAN

RECREATIONAL USE AREAS

MCCOWN VALLEY PARK

US Army Corps of Engineers
Fort Worth District

Date:	Map No.
June 2016	WH15MP-OR-04



ITEM	EXISTING
BOAT RAMP LANES	2
COURTESY DOCK	1
GROUP PICNIC SITE	1
CAMPSITES	21
NON-ELECTRIC	21
RESTROOMS	1

No Wake

Fee Boundary

Park Entrance

Restrooms

Boat Launch

Group Picnic Shelter

Courtesy Dock

N

W E

S

200 100 0 200 Feet

WHITNEY DAM & RESERVOIR BRAZOS RIVER

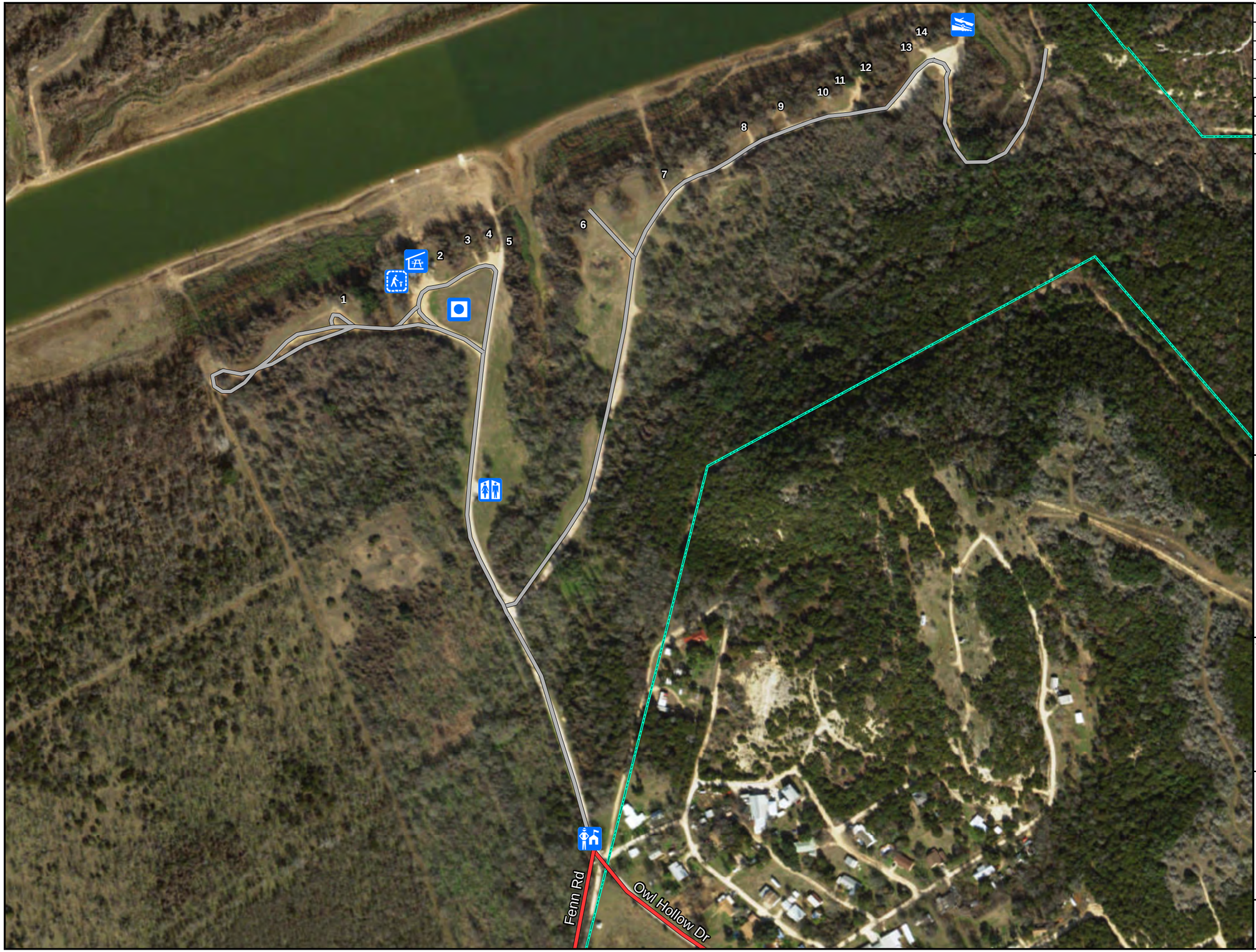
WHITNEY LAKE MASTER PLAN

RECREATIONAL USE AREAS

CEDAR CREEK PARK

US Army Corps of Engineers
Fort Worth District

Date:	Map No.
June 2016	WH15MP-OR-05



ITEM	EXISTING
BOAT RAMP LANES	2
GROUP PICNIC SHELTER	1
CAMPSITES	14
NON-ELECTRIC	14
VOLLEYBALL COURT	1
HORSESHOE PIT AREA	1
RESTROOM	1

Fee Boundary

Park Entrance

Restrooms

Boat Launch

Group Shelter

Horseshoe Pits

Volleyball Court

N

W E

S

200 100 0 200 Feet

WHITNEY DAM & RESERVOIR BRAZOS RIVER

WHITNEY LAKE MASTER PLAN

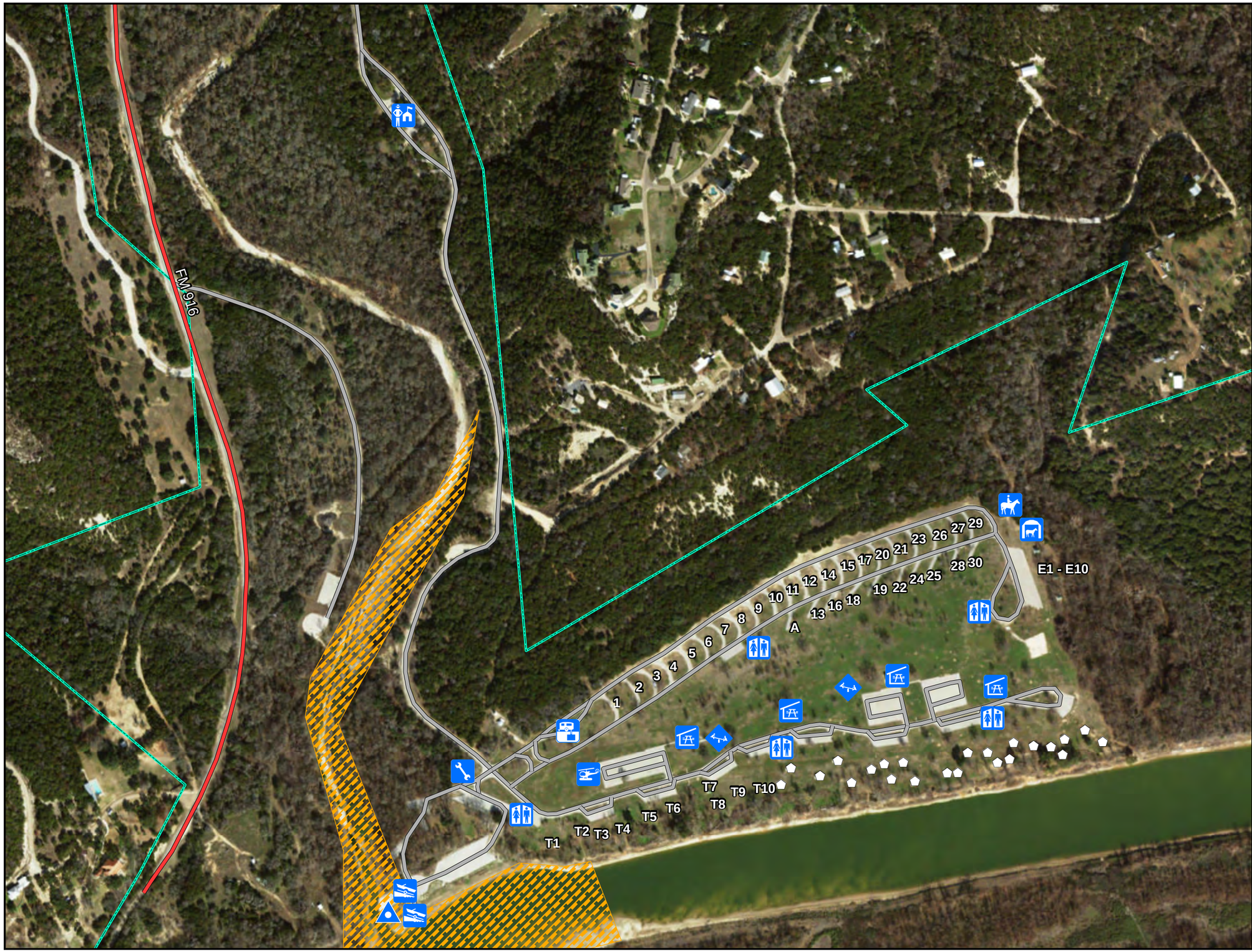
RECREATIONAL USE AREAS

CHISHOLM TRAIL PARK

US Army Corps of Engineers
Fort Worth District

Date: June 2016

Map No. WH15MP-OR-06



ITEM	EXISTING
BOAT RAMP LANES	3
COURTESY DOCK	1
GROUP PICNIC SHELTER	4
CAMPSITES	51
ELECTRIC	31
EQUESTRIAN	10
NON-ELECTRIC	10
HORSE STALLS	4
PLAYGROUNDS	2
RESTROOM	5
DUMP STATION	1

No Wake
Picnic Sites
Fee Boundary
Park Entrance
Restrooms
Dump Station
Boat Launch
Playground
Horse Stalls
Group Shelter
Courtesy Dock
Trail Head
Maintenance
Helipad

N
W E
S

300 150 0 300 Feet

WHITNEY DAM & RESERVOIR BRAZOS RIVER

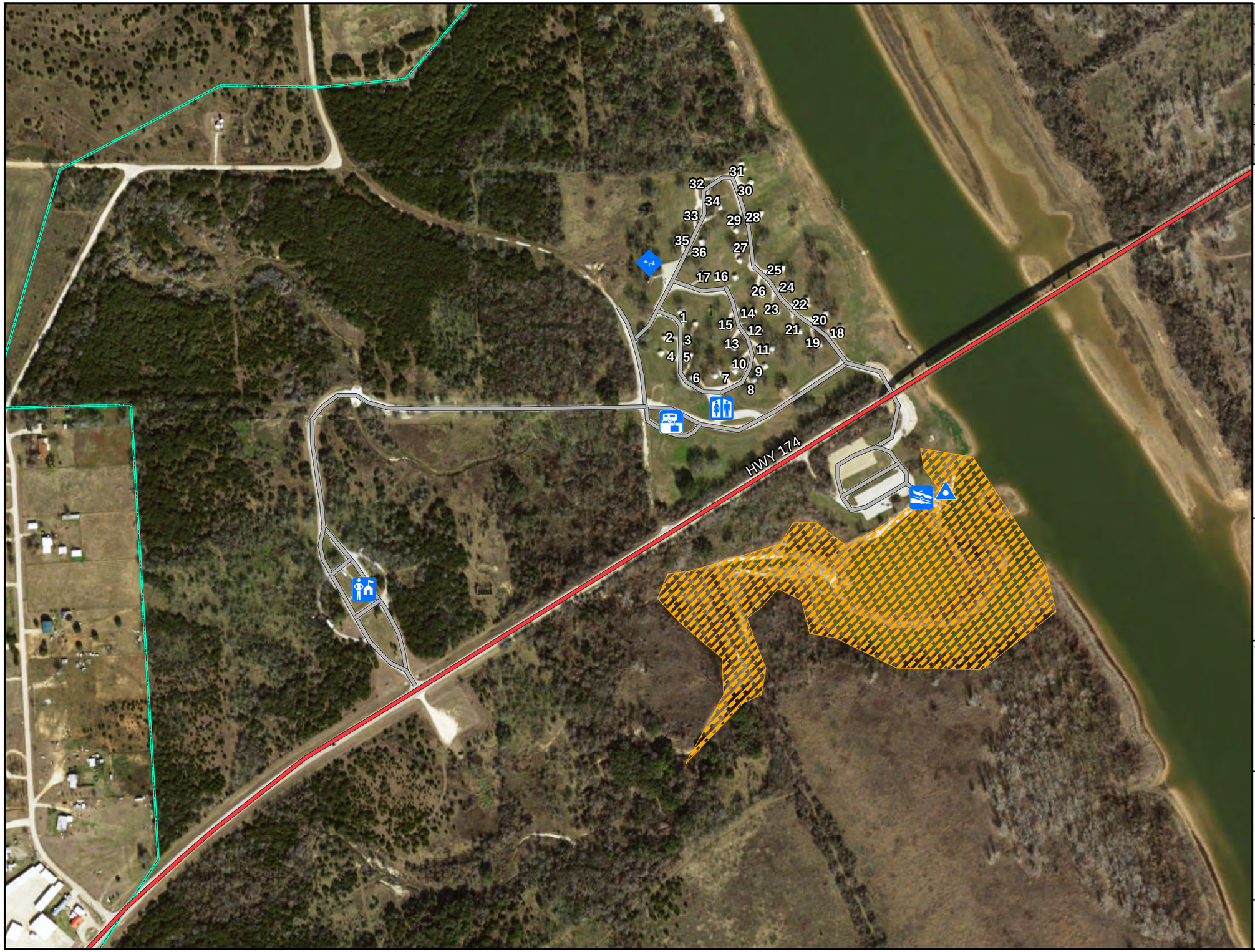
WHITNEY LAKE MASTER PLAN

RECREATIONAL USE AREAS

HAMM CREEK PARK

US Army Corps of Engineers
Fort Worth District

Date:	Map No.
June 2016	WH15MP-OR-07



ITEM	EXISTING
BOAT RAMP LANES	2
COURTESY DOCK	1
CAMPSITES	36
ELECTRIC	36
PLAYGROUNDS	1
RESTROOMS	1
DUMP STATION	1

No Wake

Fee Boundary

Park Entrance

Restrooms

Dump Station

Boat Launch

Playground

Courtesy Dock

N

W E

S

300 150 0 300 Feet

WHITNEY DAM & RESERVOIR BRAZOS RIVER

WHITNEY LAKE MASTER PLAN

RECREATIONAL USE AREAS

KIMBALL BEND PARK

US Army Corps of Engineers
Fort Worth District

Date: June 2016

Map No. WH15MP-OR-08

ITEM	EXISTING
BOAT RAMP LANES	2
COURTESY DOCK	1
CAMPSITES	44
ELECTRIC	22
EQUESTRIAN	10
NON-ELECTRIC	12
HORSE STALLS	4
PLAYGROUNDS	1
RESTROOMS	2
DUMP STATION	1

No Wake
Hopewell Trail
Fee Boundary
Park Entrance
Restrooms
Dump Station
Boat Launch
Playground
Horse Stalls
Courtesy Dock
Trail Head

N
W E
S

300 150 0 300 Feet

WHITNEY DAM & RESERVOIR BRAZOS RIVER

WHITNEY LAKE MASTER PLAN

RECREATIONAL USE AREAS

PLOWMAN CREEK PARK

US Army Corps of Engineers
Fort Worth District

Date: June 2016

Map No. WH15MP-OR-09

ITEM	EXISTING
BOAT RAMP LANES	4
COURTESY DOCK	2
CAMPSITES	21
NON-ELECTRIC	21
RESTROOMS	2

No Wake

Fee Boundary

Park Entrance

Restrooms

Boat Launch

Courtesy Dock

N

W E

S

300 150 0 300 Feet

WHITNEY DAM & RESERVOIR BRAZOS RIVER

WHITNEY LAKE MASTER PLAN

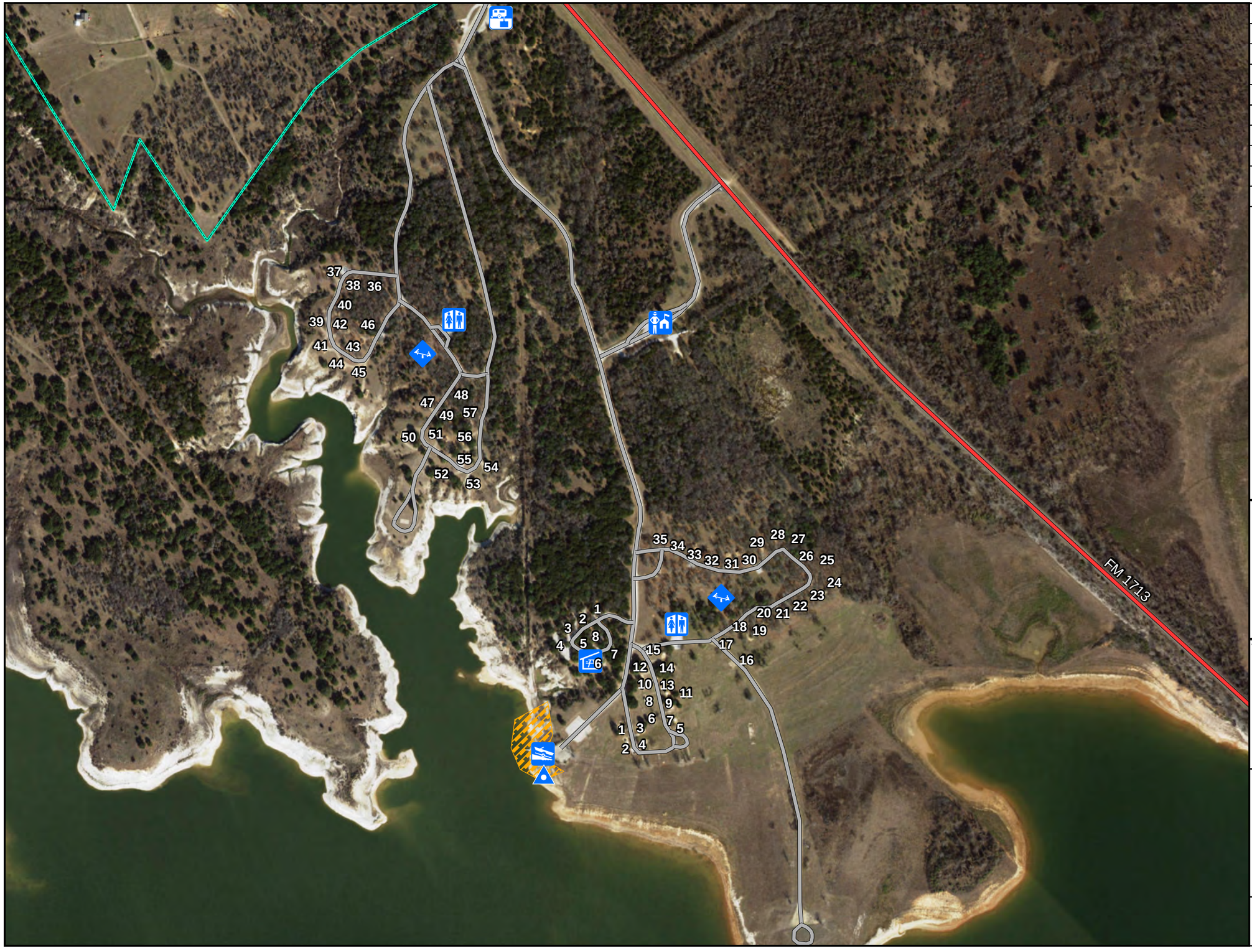
RECREATIONAL USE AREAS

STEELE CREEK PARK

US Army Corps of Engineers
Fort Worth District

Date: June 2016

Map No. WH15MP-OR-10



ITEM	EXISTING
BOAT RAMP LANES	2
COURTESY DOCK	1
GROUP CAMP AREA	1
HOOK-UPS	8
CAMPSITES	57
ELECTRIC	57
PLAYGROUNDS	2
RESTROOMS	2
DUMP STATION	1

- No Wake
- Fee Boundary
- Park Entrance
- Restrooms
- Dump Station
- Boat Launch
- Playground
- Group Shelter
- Courtesy Dock

N
W E
S

400 200 0 400 Feet

WHITNEY DAM & RESERVOIR BRAZOS RIVER

WHITNEY LAKE MASTER PLAN

RECREATIONAL USE AREAS

CEDRON CREEK PARK

US Army Corps of Engineers
Fort Worth District

Date:	Map No.
June 2016	WH15MP-OR-11

ITEM	EXISTING
BOAT RAMP LANES	4
COURTESY DOCK	2
GROUP PICNIC SHELTER	1
CAMPSITES	5
NON-ELECTRIC	5
PICNIC SITES	5
RESTROOMS	2

- No Wake
- Picnic Sites
- Fee Boundary
- Park Entrance
- Restrooms
- Boat Launch
- Group Shelter
- Courtesy Dock

N
W E
S

500 250 0 500 Feet

WHITNEY DAM & RESERVOIR BRAZOS RIVER

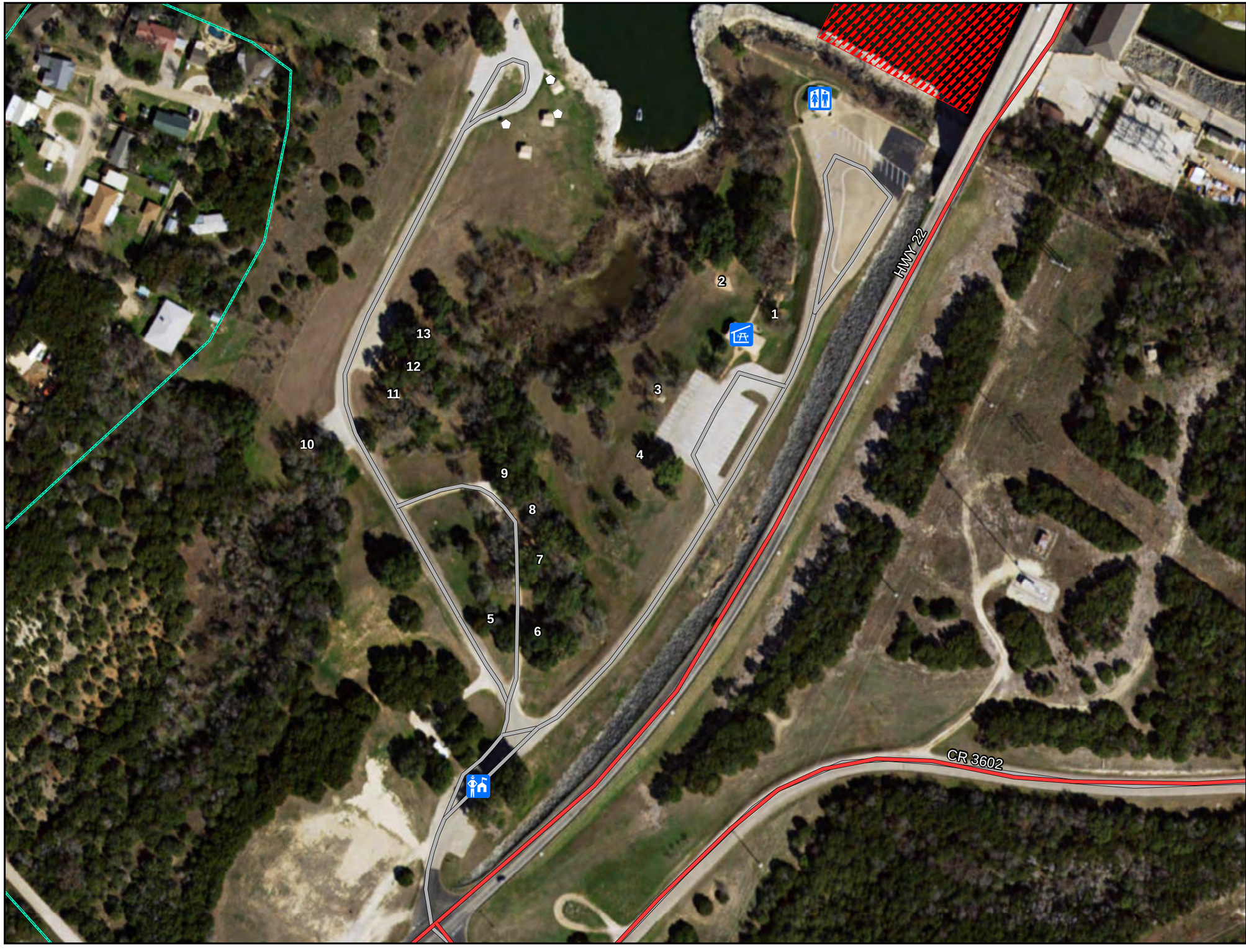
WHITNEY LAKE MASTER PLAN

RECREATIONAL USE AREAS

WALLING BEND PARK

US Army Corps of Engineers
Fort Worth District

Date:	Map No.
June 2016	WH15MP-OR-12



ITEM	EXISTING
GROUP PICNIC SHELTER	1
CAMPSITES	13
NON-ELECTRIC	13
PICNIC SITES	3
RESTROOMS	1

Boats Keep Out

Picnic Sites

Fee Boundary

Park Entrance

Restrooms

Group Shelter

N

W E

S

100 50 0 100 Feet

WHITNEY DAM & RESERVOIR BRAZOS RIVER

WHITNEY LAKE MASTER PLAN

RECREATIONAL USE AREAS

SOLDIERS BLUFF PARK

US Army Corps of Engineers
Fort Worth District

Date: June 2016

Map No. WH15MP-OR-13

ITEM	EXISTING
BALLFIELDS	5
BATTING CAGES	1
PLAYGROUND	1
CONCESSION STAND	1
RESTROOM	1

Fee Boundary

Ballfield

Playground

Concession Stand

Restroom

Batting Cages

N

W E

S

100 50 0 100 Feet

WHITNEY DAM & RESERVOIR BRAZOS RIVER

WHITNEY LAKE MASTER PLAN

RECREATIONAL USE AREAS

WHITNEY CITY PARK

US Army Corps of Engineers
Fort Worth District

Date:	Map No.
June 2016	WH15MP-OR-14

APPENDIX B – NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) DOCUMENTATION

DRAFT

Environmental Assessment for the Whitney Lake Master Plan

Brazos River Basin
Bosque, Hill, and Johnson Counties, Texas

June 2016

US Army Corps of Engineers ®
Fort Worth District

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DRAFT FINDING OF NO SIGNIFICANT IMPACT
ENVIRONMENTAL ASSESSMENT FOR THE
WHITNEY LAKE MASTER PLAN
BOSQUE, HILL, AND JOHNSON COUNTIES, TEXAS

In accordance with the National Environmental Policy Act of 1969, including guidelines in 33 Code of Federal Regulations Part 230, the Fort Worth District and the Regional Planning and Environmental Center (RPEC) of the U.S. Army Corps of Engineers (USACE) have assessed the potential impacts that the alternative management scenarios set forth in the 2016 Whitney Lake Master Plan (2016 Master Plan) would have on the natural, cultural, and human environments.

The 2016 Master Plan is a revision of the 1972 Master Plan entitled Design Memorandum No 1C, *Revised Master Plan for Development and Management of Whitney Lake, Brazos River Basin, Brazos River, Texas.* The 2016 Master Plan is the strategic land use management document that guides the efficient, cost-effective, comprehensive management, development, and use of recreation, natural resources, and cultural resources throughout the life of the Whitney Lake project. It is a vital tool for responsible stewardship and sustainability of the project's natural and cultural resources, and the provision of outdoor recreation facilities and opportunities on Federal land associated with Whitney Lake for the benefit of present and future generations. The 2016 Master Plan guides and articulates USACE responsibilities pursuant to Federal laws to preserve, conserve, restore, maintain, manage, and develop the land, water, and associated resources. It is a dynamic and flexible tool designed to address changing conditions. The 2016 Master Plan focuses on carefully crafted resource-specific goals and objectives. It ensures that the same attention is given to the management of Whitney Lake resources and facilities and that goals and objectives are accomplished on an appropriate scale.

The Environmental Assessment (EA) evaluated and analyzed two alternatives: a No Action Alternative (continued use of the 1972 Master Plan) and the implementation of the 2016 Master Plan. Under the No Action Alternative, the USACE would be taking no action, which means the Master Plan would not be revised. With this alternative, no new resources analysis, resource management objectives, revised land classifications, or resource plan would occur. The management of the lands and associated resources would continue as outlined in the 1972 Master Plan.

The Proposed Action includes a revised Master Plan, coordination with the public, and updates to comply with current USACE regulations and guidance and reflect ecological, socio-demographic, and outdoor recreation trends that are currently impacting the lake, as well as those anticipated to occur within the planning period of 2016 to 2041, a 25-year period. Land classifications were refined to meet authorized project purposes and current resource objectives that address a mix of natural resource and recreation management objectives that are compatible with regional goals. Required land and water surface classification changes associated with the Proposed

Action include five reclassifications to balance resource objectives, and include the following:

Land Classification	Proposed Action Description	Justification
Project Operations	The increase in Project Operations from 419 acres to 460 acres resulted from the following actions: • Conversion of former Recreational Areas below the dam on the east side of the Brazos River.	All lands converted to Project Operations have historically been used in support of critical operational requirements related to the primary missions of flood risk management and water conservation. The conversion of this additional 41 acres to Project Operations will have no effect on current or projected public use.
High Density Recreation	Lands under the prior classification of Recreational Areas were converted to the new and similar classification of High Density Recreation but were reduced from 5,049 to 3,608 acres through the following changes: • Lofers Bend, McCown Valley, Cedar Creek, and Kimball Bend Parks had areas originally designated as high density recreation that were much larger than the land area actually used to develop these parks. This area was designated as Wildlife Management. • Old Fort Park and Morgan Lakeside Park were converted to Low Density Recreation.	These six park areas that were converted to another, more appropriate classification had never been developed or had been closed to the public for intensive recreation use for many years. There is no public demand or plans to develop these areas or to re-open closed parks. Historically, these lands have been managed for the benefit of wildlife and are more appropriately classified as Wildlife Management lands. The conversion of these lands will have no effect on current or projected public use.
Environmentally Sensitive Areas (ESAs)	The classification of 2,268 acres as ESAs resulted from the following land classification changes: • Areas designated by U.S. Fish and Wildlife Service (USFWS) as important habitat for the endangered Golden-cheeked Warbler (GCWA), as well as unique aesthetics and Bottomland Hardwood Forest identified by the Wildlife Habitat Appraisal Procedures (WHAP) habitat assessment, were converted to ESAs. • The original classification of these lands included Aesthetics/Multiple Use Recreation, Recreation Intensive Use, and Wildlife Areas.	These classification changes were necessary for the following reasons: • The need to recognize those areas at the project having the highest ecological value including areas of high value bottomland hardwood and riparian forest and for protection of important habitat for the endangered GCWA as designated by the USFWS. • The conversion of lands will have little to no effect on current or projected public use. • Lands classified as ESAs are given the highest order of protection among possible land classifications.

Land Classification	Proposed Action Description	Justification
Multiple Resource Management Lands (MRML) -- Low Density Recreation	The 1,170 acres designated as Low Density Recreation were acres included in the former classification of Aesthetic and Multiple Use Recreation that were not suitable to convert to Wildlife Management. This current acreage consists of the areas of the project currently being used as access areas for private floating facilities, a small portion of Hamm Creek Park and the Nolan River Access Area.	The land areas in the former classification of Aesthetic and Multiple Use Recreation were retained as Low Density Recreation in areas where the historic land use patterns supported that retention. Other areas within that former classification were changed to other more appropriate new classifications such as Wildlife Management. The conversion of these lands will have no effect on current or projected public use.
MRML -- Wildlife Management	The classification of 16,278 acres to Wildlife Management resulted from the following changes: • Lands under the prior classification of Wildlife Areas were converted to Wildlife Management or ESAs. • A majority of the lands under the prior classification of Aesthetic and Multiple Use Recreation were converted to Wildlife Management. • A majority of the lands under the previous classification of Special Use Areas were also converted to Wildlife Management or ESAs.	The change from Wildlife Areas to Wildlife Management was a simple name change to current nomenclature. The change to ESAs was needed to reflect the high ecological value of some of those lands. The change from the prior classifications of Aesthetic and Multiple Use Recreation and Special Use Areas was needed to better reflect historic use and management patterns in those areas. The conversion of these lands will have no effect on current or projected public use.
Water Surface	The classification of 21,702 acres of water surface of the lake at the conservation pool elevation may resulted from the following four changes: • 23 acres of Restricted water surface at Whitney Lake include the water surface upstream and downstream of the Whitney Dam and designated swimming areas in the parks around Whitney Lake. Buoys mark the line in front of the dam, while a line of signs in the Brazos River marks the downstream side around the dam. Keep-out buoys and yellow poly buoy lines mark the designated swimming areas in each park. • 143 acres of Designated No-Wake areas are in place near the 14 boat ramps and four marina areas at Whitney Lake.	Restricted water surface includes areas where recreational boating is prohibited or restricted for project operations, safety, and security purposes. 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. The USACE coordinated with Texas Parks and Wildlife Department (TPWD) during preparation of the 2016 Master Plan, and this coordination resulted in a determination that no permanent Fish and Wildlife Sanctuary is currently needed at Whitney Lake.

Land Classification	Proposed Action Description	Justification
Water Surface, continued	• There are currently no water surface areas (0 acres) designated as a Fish and Wildlife Sanctuary at Whitney Lake. • There are 21,536 acres of Open Recreation water surface at Whitney Lake.	Open Recreation areas encompass the majority of the lake water surface and are open to general recreational boating. Boaters are advised through maps and brochures, or signs at boat ramps and marinas, that navigational hazards may be present at any time and at any location in these areas. Operation of a boat in these areas is at the owner's risk. Specific navigational hazards may or may not be marked with a buoy.

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

The EA and comments received from other agencies have been used to determine whether the Proposed Action requires the preparation of an Environmental Impact Statement (EIS). All environmental, social, and economic factors that are relevant to the recommended alternative were considered in this assessment. These include, but are not limited to, climate and climate change, environmental justice, cultural resources, air quality, visual aesthetics, prime farmland, water quality, wild and scenic rivers, wetlands, fish and wildlife, invasive species, migratory birds, recreational fisheries, and threatened and endangered species.

It is my finding, based on the EA, that the revision of the 1972 Master Plan for Whitney Lake will have no significant adverse impact on the environment and will not constitute a major Federal action significantly affecting the quality of the human environment. Therefore, an EIS will not be prepared.

Date

Calvin C. Hudson III
Colonel, U.S. Army
District Commander

ENVIRONMENTAL ASSESSMENT ORGANIZATION

This Environmental Assessment (EA) evaluates the potential environmental and socioeconomic impacts of the Whitney 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 *CUMULATIVE IMPACTS* describes the impact on the environment that may result from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions.

SECTION 5 *COMPLIANCE WITH ENVIRONMENTAL LAWS* provides a listing of environmental protection statutes and other environmental requirements.

SECTION 6 *IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES* identifies any irreversible and irretrievable commitments of resources that would be involved in the Proposed Action should it be implemented.

SECTION 7 *PUBLIC AND AGENCY COORDINATION* provides a listing of individuals and agencies consulted during preparation of the EA.

SECTION 8 *REFERENCES* provides bibliographical information for cited sources.

SECTION 9 *ACRONYMS/ABBREVIATIONS*

SECTION 10 *LIST OF PREPARERS* identifies persons who prepared the document and their areas of expertise.

APPENDICES *A* NEPA Coordination and Scoping

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DRAFT ENVIRONMENTAL ASSESSMENT

Master Plan

Whitney Lake
Brazos River, Bosque, Hill, and Johnson Counties, Texas

SECTION 1: INTRODUCTION

The United States Army Corps of Engineers (USACE) is proposing to adopt and implement the 2016 Whitney Lake Master Plan (2016 Master Plan). The 2016 Master Plan is a revision of the 1972 Master Plan entitled Design Memorandum No 1C, *Revised Master Plan for Development and Management of Whitney Lake, Brazos River Basin, Brazos River, Texas* (USACE 1972). The 2016 Master Plan is the strategic land use management document that guides the efficient, cost-effective, comprehensive management, development, and use of recreation, natural resources, and cultural resources throughout the life of the Whitney Lake project. It is a vital tool for responsible stewardship and sustainability of the project's natural and cultural resources, as well as the provision of outdoor recreation facilities and opportunities on Federal land associated with Whitney Lake for the benefit of present and future generations.

Adoption and implementation of the 2016 Master Plan (Proposed Action) would create potential impacts on the natural and human environments, and as such, this Environmental Assessment (EA), in accordance with the National Environmental Policy Act (NEPA) of 1969, (Public Law 91-190), and 33 Code of Federal Regulations (CFR) Part 230, was prepared.

1.1 PROJECT LOCATION AND SETTING

Whitney Lake is a multipurpose water resources project constructed and operated by the USACE, Fort Worth District. The lake and associated Federal lands are located in Bosque, Hill, and Johnson counties, Texas at river mile 442 on the Brazos River. The Whitney Lake dam extends in a southwest-northeast direction for a distance of approximately 1.3 miles and is situated in Hill and Bosque counties approximately 38 miles upstream from Waco, Texas. The dam and associated infrastructure, as well as all lands acquired for the Whitney Lake project, are Federally owned and are administered by the USACE. A vicinity map showing the location of Whitney Lake with respect to neighboring municipalities and major roadways associated with the lake can be found in Section 1.6 of the 2016 Master Plan.

The area surrounding Whitney Lake is a scenic region characterized by a gently sloping valley bordered by steep, stony bluffs. The valley varies in width from approximately 0.5 mile at the dam to a maximum of 2 miles, with an average width of 1 mile. At the top of the conservation pool elevation of 533.0 Mean Sea Level (msl), the

lake is approximately 42 miles long with a shoreline of 225 miles. Currently, there are six class A campgrounds, four class C campgrounds, and three day use parks operated by the USACE with other facilities operated by state, private entities, and local governments that have approximately 1 million to 1.5 million visitors annually.

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 Whitney Lake are in compliance with applicable environmental laws and regulations and to maintain quality lands for future public use. The 2016 Master Plan is intended to serve as a comprehensive land and recreation management plan with an effective life of approximately 25 years.

The need for the Proposed Action is to bring the 1972 Master Plan up to date and to reflect ecological, socio-political, and socio-demographic changes that are currently impacting Whitney Lake, as well as those changes anticipated to occur through 2041. The 1972 plan was sufficient for prior land use planning and management until recently as 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 Whitney Lake and the Central Texas region in general. In response to these continually evolving trends, the USACE determined that a full revision of the 1972 plan would be required.

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

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

1.3 SCOPE OF THE ACTION

This EA addresses the implementation of the 2016 Master Plan with special attention given to revised land classifications, new resource management objectives, and a conceptual resource plan for each land classification category. The EA also analyzes the potential impacts that implementing the 2016 Master Plan would have on the natural, cultural, and human environments.

The typical focus of NEPA compliance consists of environmental impact assessments for individual projects, rather than for long-range plans. However, application of NEPA to more strategic decisions not only meets the Council on Environmental Quality (CEQ) implementing regulations (CEQ 2005) and USACE regulations for implementing NEPA (USACE 1988), but also allows the USACE to consider the environmental consequences of its actions long before any physical activity is implemented. Multiple benefits can be derived from such early consideration. Effective and early NEPA integration with the master planning process can significantly increase the usefulness of the 2016 Master Plan to the decision maker.

NEPA documents prepared concurrently with an updated Master Plan can influence and modify strategic land use decisions, whereas environmental impact documents prepared after a Master Plan has been updated would have little influence on strategic decisions already included in the plan. The intention of the 2016 Master Plan is to develop a strategic land use management document that guides the efficient, cost-effective, comprehensive management, development, and use of recreation, natural resources, and cultural resources throughout the life of the Whitney Lake project. It is a vital tool for responsible stewardship and sustainability of the project's natural and cultural resources, and the provision of outdoor recreation facilities and opportunities on Federal land associated with Whitney Lake for the benefit of present and future generations. The 2016 Master Plan guides and articulates USACE responsibilities pursuant to Federal laws to preserve, conserve, restore, maintain, manage, and develop the land, water, and associated resources. It is not feasible to define the exact nature of potential impacts for all potential actions prior to receiving specific project proposals. Therefore, environmental consequences may be less than or may, in fact, exceed what is described in this EA. To ensure that future environmental consequences are identified and documented as accurately as possible, additional NEPA coordination will be conducted, as appropriate, for future projects that are the result of the implementation of the 2016 Master Plan.

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SECTION 2: PROPOSED ACTION AND ALTERNATIVES

The project need is to revise the 1972 Master Plan so that it is compliant with current USACE regulations and guidance, incorporates public needs, and recognizes surrounding land use and recreational trends. As part of this process, which includes public outreach and comment, two alternatives were developed for evaluation, including a No Action Alternative. The alternatives were developed using land classifications that indicate the primary use for which project lands would be managed. USACE regulations specify five possible categories of land classification: Project Operations, High Density Recreation, Mitigation, Environmentally Sensitive Areas (ESAs), and Multiple Resource Managed Lands (MRML). MRML are divided into four subcategories: Low Density Recreation, Wildlife Management, Vegetative Management, and Future/Inactive Recreation Areas. At Whitney Lake each of these land classifications are applicable with the exception of the Mitigation classification and the MRML – Vegetative Management and Future/Inactive Recreation Area subcategories.

The USACE guidance recommends the establishment of resource goals and objectives for purposes of development, conservation, and management of natural, cultural, and man-made resources at a project. Goals describe the desired end state of overall management efforts, whereas resource objectives are specific task-oriented actions necessary to achieve the overall 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.

In the context of the 2016 Master Plan, goals express the overall desired end state of the Master Plan, whereas resource objectives are specific task-oriented actions necessary to achieve the Master Plan goals. The objectives in the 2016 Master Plan are intended to provide project benefits, meet public needs, and foster environmental sustainability of Whitney Lake to the greatest extent possible. The goals for the Whitney Lake Master Plan include the following:

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

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

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

Specific resource objectives to accomplish these goals can be found in Chapter 3.2 of the 2016 Master Plan.

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

2.1 ALTERNATIVE 1: NO ACTION ALTERNATIVE

Under the No Action Alternative, the USACE would not approve the adoption or implementation of the 2016 Master Plan. Instead the USACE would continue to manage Whitney Lake’s natural resources as set forth in the 1972 Master Plan. The 1972 Master Plan would continue to provide the only source of comprehensive management guidelines and philosophy. However, the 1972 Master Plan is out of date and does not reflect the current ecological, socio-political, or socio-demographic conditions of Whitney Lake or those that are anticipated to occur through 2041. The No Action Alternative, while it does not meet the purpose of or need for the Proposed Action, serves as a benchmark of existing conditions against which Federal actions can be evaluated, and as such, the No Action Alternative is included in this EA, as prescribed by CEQ regulations.

2.2 ALTERNATIVE 2: PROPOSED ACTION

Under the Proposed Action, the USACE proposes to adopt and implement the 2016 Master Plan. The 2016 Master Plan would replace the 1972 Master Plan and provide an up-to-date management plan that follows current Federal laws and regulations while sustaining Whitney Lake's natural resources and providing recreational experiences for the next 25 years.

The 2016 Master Plan proposes to classify all Federal land lying above elevation 533.0 msl 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 Whitney 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.
- Water Surface: Allows for surface water zones.
    - Restricted: Water areas restricted for Whitney 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 Whitney Lake Land Classifications

1972 Land Classifications	Acres	Proposed New Land Classifications	Acres
Operations and Maintenance	419	Project Operations	460
Recreational Areas	5,049	High Density Recreation	3,608
Special Use Areas – Natural Area	565	ESAs	2,268
Special Use Areas – Group Use Areas	858	MRML – Low Density Recreation	1,170
Wildlife Areas	3,880	MRML – Wildlife Management	16,278
Aesthetic and Multiple Use Recreation	9,776		

*Land classification acreages were derived using geographic information system technology and do not reflect the official land acquisition records. The total land classification acres listed in the 1972 Whitney Lake Master Plan were 20,547. The current land classification acres in the 2016 Master Plan are 23,783.
Source: USACE 2016

Table 2-2. Proposed Whitney Lake Water Surface Classifications

Classification	Acres
Water Surface: Restricted	23
Water Surface: Designated No-Wake	143
Water Surface: Open Recreation	21,536

Source: USACE 2016

Table 2-3. Justification for the Proposed Reclassification

Land Classification	Proposed Action Description	Justification
Project Operations	The increase in Project Operations from 419 acres to 460 acres resulted from the following actions: • Conversion of former Recreational Areas below the dam on the east side of the Brazos River.	All lands converted to Project Operations have historically been used in support of critical operational requirements related to the primary missions of flood risk management and water conservation. The conversion of this additional 41 acres to Project Operations will have no effect on current or projected public use.
High Density Recreation	Lands under the prior classification of Recreational Areas were converted to the new and similar classification of High Density Recreation but were reduced from 5,049 to 3,608 acres through the following changes: • Lofers Bend, McCown Valley, Cedar Creek and Kimball Bend Parks had areas originally designated as high density recreation that were much larger than the land area actually used to develop these parks. This area was designated as Wildlife Management.	These six park areas that were converted to another, more appropriate classification had never been developed or had been closed to the public for intensive recreation use for many years. There is no public demand or plans to develop these areas or to re-open closed parks. Historically, these lands have been managed for the benefit of wildlife and are more appropriately classified as Wildlife Management lands. The conversion of these lands will have no effect on current or projected public use.

Table 2-3, continued

Land Classification	Proposed Action Description	Justification
High Density Recreation, continued	• Old Fort Park and Morgan Lakeside Park were converted to Low Density Recreation.	
ESAs	The classification of 2,268 acres as ESAs resulted from the following land classification changes: • Areas designated by USFWS as important habitat for the endangered Golden-cheeked Warbler (GCWA), as well as unique aesthetics and Bottomland Hardwood Forest identified by the Wildlife Habitat Appraisal Procedures (WHAP) habitat assessment were converted to ESAs. • The original classification of these lands included Aesthetics/Multiple Use Recreation, Recreation Intensive Use and Wildlife Areas.	These classification changes were necessary for the following reasons: • The need to recognize those areas at the project having the highest ecological value including areas of high value, bottomland hardwood and riparian forest and for protection of important habitat for the endangered GCWA as designated by the USFWS. • The conversion of lands will have little to no effect on current or projected public use. • Lands classified as ESAs are given the highest order of protection among possible land classifications.
MRML -- Low Density Recreation	The 1,170 acres designated as Low Density Recreation were acres included in the former classification of Aesthetic and Multiple Use Recreation that were not suitable to convert to Wildlife Management. This current acreage consists of the areas of the project currently being used as access areas for private floating facilities, a small portion of Hamm Creek Park and the Nolan River Access Area.	The land areas in the former classification of Aesthetic and Multiple Use Recreation were retained as Low Density Recreation in areas where the historic land use patterns supported that retention. Other areas within that former classification were changed to other more appropriate new classifications such as Wildlife Management. The conversion of these lands will have no effect on current or projected public use.
MRML -- Wildlife Management	The classification of 16,278 acres to Wildlife Management resulted from the following changes: • Lands under the prior classification of Wildlife Areas were converted to Wildlife Management or ESA. • A majority of the lands under the prior classification of Aesthetic and Multiple Use Recreation were converted to Wildlife Management. • A majority of the lands under the previous classification of Special Use Areas were also converted to Wildlife Management or ESAs.	The change from Wildlife Areas to Wildlife Management was a simple name change to current nomenclature. The change to ESAs was needed to reflect the high ecological value of some of those lands. The change from the prior classifications of Aesthetic and Multiple Use Recreation and Special Use Areas was needed to better reflect historic use and management patterns in those areas. The conversion of these lands will have no effect on current or projected public use.

Table 2-3, continued

Land Classification	Proposed Action Description	Justification
Water Surface	The classification of 21,702 acres of water surface of the lake at the conservation pool elevation may result from the following four changes: • 23 acres of Restricted water surface at Whitney Lake include the water surface upstream and downstream of the Whitney Dam and designated swimming areas in the parks around Whitney Lake. Buoys mark the line in front of the dam, while a line of signs in the Brazos River marks the downstream side around the dam. Keep-out buoys and yellow poly buoy lines mark the designated swimming areas in each park. • 143 acres of Designated No-Wake areas are in place near the 14 boat ramps and four marina areas at Whitney Lake. • There are 21,536 acres of Open Recreation water surface at Whitney Lake.	Restricted water surface includes areas where recreational boating is prohibited or restricted for project operations, safety, and security purposes. 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. Open Recreation areas encompass the majority of the lake water surface and are open to general recreational boating. Boaters are advised through maps and brochures, or signs at boat ramps and marinas, that navigational hazards may be present at any time and at any location in these areas. Operation of a boat in these areas is at the owner's risk. Specific navigational hazards may or may not be marked with a buoy.

Source: USACE 2016

Project Operations

In the 2016 Master Plan, there are 460 acres of land under this classification, all of which are managed by the USACE. Land designated as Project Operations lands are associated with the dam, spillway, powerhouse, levees, lake office, maintenance facilities, and other areas used primarily for the purposes of flood risk management, hydroelectric power generation, and water conservation. The management plan for this area is to continue providing physical security necessary to ensure sustained operations of the dam and related facilities, including restricting public access in hazardous locations near the dam and spillway.

High Density Recreation

The 2016 Master Plan stipulates that lands managed under this classification are lands developed for intensive recreational activities for the visiting public, including day use and campgrounds, and encompass 3,608 acres. National USACE policy set forth in Engineering Regulation (ER) and Engineer Pamphlet (EP) 1130-2-550, Chapter 16, limits recreation development on USACE lands to those activities that are dependent on a project's natural resources and typically include water-based activities, overnight use, and day use such as marinas, campgrounds, picnic areas, trails, swimming beaches, boat launching ramps, and comprehensive resorts. Examples of activities that are not

dependent on a project's natural resources include theme parks or ride-type attractions, sports or concert stadiums, and stand-alone facilities such as restaurants, bars, motels, hotels, and golf courses.

USACE operates and manages numerous areas designated as High Density recreation. The 2016 Master Plan, (Chapters 5.3.1, 5.3.2, and 5.3.3) describes the various parks under management by the USACE, as well as parks that are leased by non-Federal grantees from the USACE, and provides a conceptual management plan for each park by classification group. There are two USACE-managed classification groups, Class A (highly developed) and Class C (basic facilities). Maps showing existing parks and facilities managed by the USACE can be found in Appendix A of the 2016 Master Plan. In addition to the USACE-managed and USACE-operated High Density recreation areas, USACE leases four High Density recreation areas that are managed as parks by recreation partners (i.e., non-Federal grantees).

ESAs

In the 2016 Master Plan there are 2,268 acres designated as ESAs at Whitney Lake. These are areas where scientific, ecological, cultural, or aesthetic features have been identified. Designation of these lands is not limited to just lands that are otherwise protected by laws such as the Endangered Species Act, the National Historic Preservation Act (NHPA), or applicable state statues. These areas must be managed to ensure they are not adversely impacted. Typically, limited or no development of public use is allowed on these lands. No agricultural or grazing uses are permitted on these lands unless necessary for a specific resource management benefit, such as prairie restoration and management. These areas are typically distinct parcels located within another, and perhaps larger, land classification area. The majority of acreage in these areas is excellent habitat for the endangered Golden-cheeked warbler (*Dendroica chrysoparia* [GCWA]). In addition to endangered species habitat, a few areas are designated as ESAs due to the unique viewsheds and scenic qualities of the area, such as the limestone bluffs located along the western edge of Whitney Lake. Additional consideration was given to unique or scarce habitat types such as bottomland hardwood forests located along river and creek bottoms when determining which areas should be designated as ESAs.

MRML

MRML are, as the name implies, lands that serve multiple purposes but that are sub-classified and managed for a predominant use. The following paragraphs describe the various sub-classifications of MRML at Whitney Lake, as well as the resource objectives, acreages, and management plan for each sub-classification.

MRML – Low Density Recreation

These are lands with minimal development or infrastructure that support passive public use including, but not limited to, hiking, nature photography, bank fishing, and hunting. Future management of these lands calls for maintaining a healthy, ecologically

adapted vegetative cover to reduce erosion and improve aesthetics. Prevention of unauthorized use such as trespass or encroachments is an important management objective for all USACE lands, but is especially important for those lands in close proximity to private development. These lands are typically open to the public, including adjacent landowners, for pedestrian traffic and are frequently used by adjacent landowners for access to the shoreline near their homes. Adjacent landowners may apply for a permit to mow a meandering path to the shoreline, and if conditions warrant, may apply for a permit to mow a narrow strip along the USACE boundary line as a precaution against wildfire. Mowing activity by adjacent landowners is addressed in the Whitney Lake Shoreline Management Plan available at the Whitney Lake Project Office. The general public may use these lands for bank fishing, for hiking, and for access to the shoreline. Hunting may be allowed in select areas that are a reasonable and safe distance from adjacent residential properties. Future uses may include additional designated natural surface hike/bike/equestrian trails. The placement of public trails in areas near residential properties will require public involvement prior to trail design. In the 2016 Master Plan, there are 1,170 acres of MRML -- Low Density Recreation lands at Whitney Lake.

MRML – Wildlife Management

These are lands designated for the stewardship of fish and wildlife resources and are managed by the USACE. In the 2016 Master Plan, there are 16,278 acres of land designated as MRML – Wildlife Management at Whitney Lake. Future management of these lands calls for managing the habitat to support native, ecologically adapted vegetation which in turn supports native wildlife species. Specific management techniques including, but not limited to, placement of nesting structures, construction of water features or brush piles, prescription burning, fencing, and planting of specific food producing plants may be necessary to support the needs of wildlife Species of Greatest Conservation Need (SGCN) (see Appendix C of the 2016 Master Plan for the TPWD listing of SGCN). Migratory species, both game and non-game, are generally given priority over non-migratory species when implementing wildlife management measures. Other management activities include the improvement or restoration of existing wetlands, or where topography, soil type, and hydrology are appropriate, the construction of wetlands. Where beneficial to long-term ecological management goals, agricultural leases for grazing or hay production could be employed. Hunting and fishing activities are regulated by Federal and state laws. However, management of these lands is directed to giving priority to accomplishing the Natural Resources Management objectives as identified in Chapter 3 of the 2016 Master Plan.

Current public use of these lands includes hiking and horseback riding on existing trails, bank fishing, canoeing and kayaking, and hunting. Future public use includes all existing uses and expansion of trail opportunities where feasible. Some MRML – Wildlife Management may support the establishment of nature centers or environmental learning areas.

Water Surface

In accordance with the national USACE policy set forth in EP 1130-2-550, the water surface of Whitney Lake at the conservation pool elevation may be classified using the following four classifications:

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

At the conservation pool elevation of 533.0 msl, Whitney Lake has a water surface area of 21,702 acres. The following water surface classifications are designated at Whitney Lake:

Restricted

Restricted water surface includes those areas where recreation boating is prohibited or restricted for project operations, safety, and security purposes. There are 23 acres of water surface designated as restricted at Whitney Lake. These areas include the water surface upstream and downstream of the Whitney Dam and designated swimming areas in the parks around Whitney Lake. Standard U.S. Coast Guard (USCG) regulatory buoys are deployed around these areas and managed by the USACE in close coordination with TPWD. Buoys mark the restricted area in front of the dam and a line of signs in the Brazos River denotes the restricted area downstream of the dam. Keep-out buoys and yellow poly buoy lines mark the designated swimming areas

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. Designated No-Wake areas at Whitney Lake include approximately 143 acres at the four existing marinas and 14 public boat ramps. These areas are typically marked with standard USCG regulatory buoys.

Open Recreation

Open Recreation includes all water surface areas available for year-round or seasonal water-based recreational use. With the exception of the Restricted and Designated No-Wake areas described in the above paragraphs, the remaining water surface of approximately 21,536 acres at Whitney Lake water surface is designated as Open Recreation. USCG regulatory buoys are deployed throughout Whitney Lake's Open Recreation areas to aid the public in safely navigating the lake.

Fish and Wildlife Sanctuary

This surface water classification applies to areas that are managed with annual or seasonal restrictions to protect fish and wildlife species during periods of migration, resting, feeding, nesting, or spawning. No surface water at Whitney Lake is classified as Fish and Wildlife Sanctuary.

Project Easement Lands

Project Easement lands are lands on which easement interests were acquired. Fee title was not acquired on these lands, but the easement interests convey to the Federal government certain rights to use or restrict the use of the land for specific purposes. Easement lands are typically classified as Operations Easement, Flowage Easement, or Conservation Easement. At Whitney Lake, the only easement lands are those lands where a Flowage Easement was acquired. A Flowage Easement, in general, grants to the government the perpetual right to temporarily flood/inundate private land during flood risk management operations and to prohibit activities on the Flowage Easement that would interfere with flood risk management operations, such as placement of fill material or construction of habitable structures. In the 2016 Master Plan, there are 9,122 acres of land designated as Flowage Easement lands at Whitney Lake.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER CONSIDERATION

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

SECTION 3: AFFECTED ENVIRONMENT AND CONSEQUENCES

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

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

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

Whitney Lake was originally authorized by the Flood Control Acts of 1941 and 1944. Construction of the Whitney Lake Dam began in 1947 and was completed in 1950; it was later modified to include the powerhouse for hydroelectric power. This modification included the construction of two 15,000-kilowatt generator powerhouses and was completed in 1953. The total project area at Whitney Lake encompasses 52,693 acres. Of this total area, 43,571 acres were acquired in fee simple title by USACE, while a total of 9,122 acres were acquired in fee simple title for a perpetual Flowage Easement up to the contour line of 573 msl. When the pool elevation is at the normal or conservation pool elevation of 533.0 msl, the lake has a surface area of 21,720 acres.

The USACE lands above elevation 533.0 msl associated with Whitney Lake are listed in the 1972 Master Plan as follows:

- 419 acres of land managed as operations and maintenance
- 5,049 acres of land managed as recreational areas
- 565 acres of land managed as special use areas – natural areas
- 858 acres of land managed as special use areas – group use areas
- 3,880 acres of land managed as wildlife areas – wildlife areas
- 9,776 acres of land managed as aesthetic and multiple use recreation

The USACE operates and manages numerous areas designated as High Density Recreation. In addition to the USACE-operated parks, the USACE leases four areas to non-Federal partners referred to as grantees. Each grantee is responsible for the operation and maintenance of their leased area; USACE does not provide direct maintenance within any of the leased locations, but it may occasionally lend support where appropriate. The USACE reviews requests and ensures compliance with applicable laws and regulations for proposed activities in all leased and USACE-operated High Density Recreation areas. These parks are Hamm Creek Park, Chisholm Trail Park, Lake Whitney State Park, and Whitney City Park.

The following is a description of each park managed and operated by the USACE with the facilities they contain along with a conceptual management plan for parks by classification groups. Groups include Class A (highly developed) and Class C (basic facilities).

Class A Parks

Lofers Bend Park – Lofers Bend is divided into four distinct areas, East Lofers Bend Park, West Lofers Bend Park, Lofers Bend Day Use Area, and Harbor Master Marina. It is located off of State Highway 22 on the east side of the Whitney Lake Dam. There are approximately 455 acres in the park. The day use area is located adjacent to the dam and is physically separated from the camping areas and the marina. Harbor Master Marina is located between the two camping areas. The park facilities include 24

non-electric campsites, five screened shelters, 105 electrical campsites, 29 picnic sites, eight restrooms, two group camp areas, one group shelter, two dump stations, three boat ramps with 107 parking spots, three entrance gate complexes, a playground, three swim beaches, and a hike and bike trail.

McCown Valley Park – Encompassing 357 acres, McCown Valley Park is located on the eastern shore of Whitney Lake, 4 miles west of Farm-to-Market (FM) 933 and adjacent to the FM 1713 bridge. It is divided into three separate areas: the campground, Day Use, and the Equestrian areas. The park facilities include 48 electrical campsites, five screen shelters, 17 picnic sites, 39 equestrian campsites, five restrooms, a three-lane boat ramp with parking for 64 vehicles, two entrance gate complexes, two playgrounds, a swimming beach, dump station, group shelter, and 18 covered horse pens.

Cedron Creek Park – Cedron Creek Park is located on the west side of Whitney Lake in Bosque County at the midpoint of the lake on FM 1713 (just west of Katy Bridge). The park contains 299 acres of land within its boundaries. The park facilities include 57 campsites, two restrooms, two-lane boat ramp with parking for 20 vehicles, dump station, entrance gate complex, two playgrounds, and a group camp area.

Plowman Creek Park – Plowman Creek Park is located off FM 56, adjacent to the community of Kopperl, in Bosque County. It is a multi-use area consisting of approximately 231 acres. The park facilities include 44 campsites, two restrooms, entrance gate complex, playground, two-lane boat ramp, dump station, and four covered horse pens.

Kimball Bend Park – The park is situated on the south side of the Brazos River in the northeast corner of Bosque County. It is located approximately 30 miles south of Cleburne, and 20 miles north of Meridian on State Highway 174. The park contains 185 acres of land within its boundaries. Located within the park are remains of buildings from the Old Kimball Bend Town Site, at one time a cattle crossing on the Chisholm Trail. The park facilities include 36 campsites, restroom, two-lane boat ramp with parking for 44 vehicles, gate complex, and composed dump station.

Class C Parks

Riverside Park – The park is comprised of two areas, located on either side of the Brazos River, below the dam and embankment. West Riverside contains 24 acres, while East Riverside encompasses 2 acres. The park is open 24 hours, year-round, and provides free camping and river access for fishing and boating. The park is adjacent to the dam and may be temporarily closed during periods of elevated security risk. The east area provides canoe and small boat access to the Brazos River. The park facilities include two restrooms, fishing platform, and five multiple-use sites.

Cedar Creek Park – The park is located halfway up the lake on the north bank of Cedar Creek in Hill County. The park contains 43 acres of land within its boundaries.

The park facilities include a restroom, a two-lane boat ramp, group shelter, and 21 multiple-use sites.

Steele Creek Park – Steele Creek is a multi-use park located approximately 2 miles northeast of FM 56, adjacent to the community of Lakeside Village. The park contains 277 acres of land within its boundaries. The park facilities include 21 multiple use sites, two restrooms, and two boat ramps with parking for 20 vehicles.

Walling Bend Park – Walling Bend Park is located on the west side of Whitney Lake approximately 2.5 miles upstream from the dam on FM 2841. The park contains 262 acres of land within its boundaries. TPWD has leased 16 acres of the park on the north end for a boat ramp, parking lot, and access road. The park facilities include two restrooms, five picnic sites, two-lane boat ramp with parking for 30 vehicles, and a group shelter.

Soldiers Bluff Park – Soldiers Bluff Park is a 50-acre park located on the southwest end of Whitney Dam, adjacent to State Highway 22. The park facilities include a restroom, 16 multiple use sites, entrance complex, and a group shelter.

Nolan River Park – Nolan River Park is a 10-acre access area located on the Nolan River near the City of Blum, off FM 933. The park facilities include an access point, small parking lot, and a boat ramp that provide access to the Nolan River area of Whitney Lake.

The majority of the USACE park operations and maintenance activities, including mowing, cleaning, building repairs, road repairs, utility repairs, trash removal, and related tasks are accomplished through service contracts.

3.1.1 Alternative 1: No Action Alternative

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

3.1.2 Alternative 2: Proposed Action

The objectives for revising the Whitney Lake Master Plan were to describe current and foreseeable land uses, taking into account expressed public opinion and USACE policies that have evolved to meet day-to-day operational needs. The USACE intends to continue to operate the Class A Campgrounds and Day Use Areas, as well as Class C Day Use Areas and Access Points, by maintaining and improving existing facilities with no plans for expansion. Emphasis will be placed on improvements such as upgrading aging water and electrical infrastructure, improving energy efficiency and sustainability of facilities, repairing or replacing outdated restrooms, and paving gravel

roads in several parks. The changes required for the Proposed Action were developed to help fulfill regional goals associated with good stewardship of land and water resources that would allow for continued use and development of project lands. Therefore, implementation of the Proposed Action would not result in significant impacts on land uses on project lands.

3.2 WATER RESOURCES

Surface Water

The Brazos River watershed extends from eastern New Mexico in a southeasterly direction diagonally across the state of Texas to the Gulf of Mexico, with a watershed encompassing approximately 44,670 square miles. Approximately 8,950 square miles of the area, located in the northwest portion of the watershed, is classified as non-contributing drainage area. The total contributing drainage area is 35,720 square miles of which 17,656 square miles is controlled by Whitney Dam. The lake area is a scenic region characterized by a gently sloping valley bordered by steep, rocky bluffs. The valley varies in width from approximately 0.5 mile at the dam to a maximum of 2 miles, with an average width of 1 mile. At the top of the conservation pool elevation of 533.0 msl, the lake is approximately 42 miles long with a shoreline of 225 miles.

Whitney Lake and Dam is a unit of river improvement works in the Brazos River Basin. The project was initially authorized by the Flood Control Acts of 1941 and later in 1944. Authorized project purposes include hydroelectric power, flood control, water conservation, and recreation. In the design of the project, it was recognized that less flood control storage might be required at a later date when additional flood control reservoirs were constructed in the watershed and experience was gained in the operation of the lake. Accordingly, provisions were made in the design of the powerhouse and all electrical equipment for operation of the project at elevation 533.0 feet msl. The raising of the power pool from elevation 520.0 msl to elevation 533.0 msl was begun on 15 June 1972.

Whitney Lake has 2,100,400 acre-feet of storage that is utilized for flood control, water supply, and generation of hydroelectric power. The conservation pool, with top of elevation 533.00 msl, is fully allocated. Allocation of storage in Whitney Lake includes 248,100 acre-feet for water supply, 387,000 acre-feet for power drawdown storage, and 255,300 acre-feet of dead storage. The pool of record was reached on 29 May 1957 at an elevation of 570.25 msl and the record low was 509.26 msl on 1 November 1956.

Hydrology and Groundwater

Groundwater in the immediate Whitney Lake area and throughout Bosque, Hill, and Johnson counties is present in one major aquifer, the Trinity (subcrop) Aquifer. Johnson and Hill counties also have two minor aquifers, Woodbine (subcrop) and Marble Falls (Texas Water Development Board [TWDB] 2015). Administratively, these aquifers are included in Groundwater Management Area (GMA) 8 as designated by the TWDB. There

are 12 Groundwater Management Districts within GMA 8, including the North Texas Groundwater Conservation District, which takes in Bosque, Hill, and Johnson counties.

The Trinity, Marble Falls, and the Woodbine aquifers serve a very densely populated area and have been heavily used over the past several decades by numerous municipalities and other public water supply providers. Some of the largest aquifer level declines in Texas have occurred in the Trinity Aquifer in a broad corridor that encompasses and parallels Interstate Highway 35. These declines have ranged from 350 feet to more than 1,000 feet. The decline has slowed in recent years due to increasing reliance on surface water for municipal purposes. All recreational areas operated by the USACE and others at Whitney Lake are connected to municipal water supply providers.

Wetlands

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

Due to steep topography around Whitney Lake, wetlands generally occur near the rivers and flatter areas on the eastern side of the lake. Table 1-1 lists the acreages of various types of wetlands present at Whitney Lake. Wetland classifications presented are derived from the USFWS Trust Resource List generated using the Information, Planning, and Conservation System decision support system (USFWS 2016).

Table 3-1. Wetland Resources

Wetland Types	NWI Classification Code	Total Acres
Freshwater Emergent Wetland	PEM1Cx (Palustrine, Emergent, Persistent, Seasonally Flooded, Excavated)	0.3
Freshwater Emergent Wetland	PEM1Ah (Palustrine, Emergent, Persistent, Temporary Flooded, Impounded)	2,281.9
Freshwater Emergent Wetland	PEM1Fh (Palustrine, Emergent, Persistent, Semi-permanently Flooded, Impounded)	2.2
Freshwater Emergent Wetland	PEM1Ax (Palustrine, Emergent, Persistent, Temporary Flooded, Excavated)	2.3
Freshwater Emergent Wetland	PEM1C (Palustrine, Emergent, Persistent, Seasonally Flooded)	1.6
Freshwater Emergent Wetland	PEM1A (Palustrine, Emergent, Persistent, Temporary Flooded)	48.2

Table 3-1, continued

Wetland Types	NWI Classification Code	Total Acres
Freshwater Emergent Wetland	PEM1Ch (Palustrine, Emergent, Persistent, Seasonally Flooded, Impounded)	3.1
Freshwater Forested/ Shrub Wetland	PSS1Ch (Palustrine, Scrub-shrub, Broad-leaved Deciduous, Seasonally Flooded, Impounded)	766.4
Freshwater Forested/ Shrub Wetland	PFO1Ah (Palustrine, Forested, Broad-leaved Deciduous, Temporary Flooded, Impounded)	884.8
Freshwater Forested/ Shrub Wetland	PFO5Fh (Palustrine, Forested, Dead, Semi-permanently Flooded, Impounded)	10.6
Freshwater Forested/ Shrub Wetland	PSS1Cd (Palustrine, Scrub-shrub, Broad-leaved Deciduous, Seasonally Flooded, Ditched)	5.2
Freshwater Forested/ Shrub Wetland	PSS1Ah (Palustrine, Scrub-shrub, Broad-leaved Deciduous, Temporary Flooded, Impounded)	18.9
Freshwater Forested/ Shrub Wetland	PFO1Ch (Palustrine, Forested, Broad-leaved Deciduous, Seasonally Flooded, Impounded)	280.2
Freshwater Forested/ Shrub Wetland	PFO1/SS1Ch (Palustrine, Forested and Scrub-shrub, Broad-leaved Deciduous, Seasonally Flooded, Impounded)	14.1
Freshwater Forested/ Shrub Wetland	PFO1/SS1Ah (Palustrine, Forested and Scrub-shrub, Broad-leaved Deciduous, Temporary Flooded, Impounded)	57.2
Freshwater Forested/ Shrub Wetland	PSS1/EM1Ah Palustrine, Scrub-shrub and Emergent, Broad-leaved Deciduous, Temporary Flooded, Impounded)	221.1
Freshwater Forested/ Shrub Wetland	PFO1C (Palustrine, Forested, Broad-leaved Deciduous, Seasonally Flooded)	14.6
Freshwater Forested/ Shrub Wetland	PFO1A (Palustrine, Forested, Broad-leaved Deciduous, Temporary Flooded)	46.6
Freshwater Forested/ Shrub Wetland	PFO1/SS1A (Palustrine, Forested and Scrub-shrub, Broad-leaved Deciduous, Temporary Flooded)	4.1
Freshwater Forested/ Shrub Wetland	PSS1F (Palustrine, Scrub-shrub, Broad-leaved Deciduous, Semi-permanently Flooded)	0.9
Freshwater Forested/ Shrub Wetland	PSS1/EM1Ch (Palustrine, Scrub-shrub and Emergent, Broad-leaved Deciduous and Persistent, Seasonally Flooded, Imounded)	172.1
Freshwater Forested/ Shrub Wetland	PFO1/EM1Ah (Palustrine, Forested and Emergent, Broad-leaved Deciduous and Persistent, Temporary Flooded, Impounded)	16.6
Freshwater Pond	PUBFx (Palustrine, Unconsolidated Bottom, Semi-permanently Flooded, Excavated)	2.2

Table 3-1, continued

Wetland Types	NWI Classification Code	Total Acres
Freshwater Pond	PUBHx (Palustrine, Unconsolidated Bottom, Permanently Flooded, Excavated)	9.5
Freshwater Pond	PUSCh (Palustrine, Unconsolidated Shore, Seasonally Flooded, Impounded)	5.1
Freshwater Pond	PUSCx (Palustrine, Unconsolidated Shore, Seasonally Flooded, Excavated)	1.0
Freshwater Pond	PUBF (Palustrine, Unconsolidated Bottom, Semi-permanently Flooded)	3.4
Freshwater Pond	PUSAx (Palustrine, Unconsolidated Shore, Temporary Flooded, Excavated)	0.3
Freshwater Pond	PUBHh (Palustrine, Unconsolidated Bottom, Permanently Flooded, Impounded)	18.1
Freshwater Pond	PUBFh (Palustrine, Unconsolidated Bottom, Semi-permanently Flooded, Impounded)	2.3
Lake	L1UBHx (Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, Excavated)	0.7
Lake	L2EMCh (Lacustrine, Littoral, Emergent, Seasonally Flooded, Impounded)	401.8
Lake	L2USAh (Lacustrine, Littoral, Unconsolidated Shore, Temporary Flooded, Impounded)	6,862.4
Lake	L1UBHh (Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, Impounded)	15,929.2
Lake	L2USCh (Lacustrine, Littoral, Unconsolidated Shore, Seasonally Flooded, Impounded)	849.9
Riverine	R2UBH (Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded)	955.8
Riverine	R2USA (Riverine, Lower Perennial, Unconsolidated Shore, Temporary Flooded)	15.4

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

Water Quality

Whitney Lake is identified as segment 1203 within the Brazos River Basin. According to the Draft 2014 Texas Commission on Environmental Quality (TCEQ) 2014 Texas Integrated Report for Clean Water Act Section 305(b) and 303(d), no water quality parameters measured were considered impaired at Whitney Lake (TCEQ 2014). Depressed dissolved oxygen was identified as a concern for aquatic life use (CN) for the portion of the lake near the dam. Steele Creek, Nolan River, and Brazos River arms measurements were high enough for chlorophyll-a to cause concern for screening

levels but not high enough to be considered impaired. All other parameters measured show Whitney Lake as fully supported for aquatic life, contact recreation, public water supply and general uses.

Deep reservoirs such as Whitney Lake can exhibit a slow response to climatic factors that induce in-reservoir circulation. Such variables as temperature and temperature-induced circulation ("turnovers") impact water quality including salinity, algal productivity, and overall reservoir ecology. One unique physical feature of Whitney Lake is that the linear nature of the reservoir lines up with the dominant wind direction for the region, both in the summer, from the southeast, and in the winter, from the northwest. Thus, wind driven circulation mechanics likely play a significant role in the circulation of the reservoir.

The main issue regarding utilization of Whitney Lake as a water supply resource is its salinity. Past work by the United States Geological Survey, USACE, and the State of Texas have pointed to the elevated salinity levels in Whitney Lake, which have been traced to specific geologic units within the watershed itself. Specifically, the geology of the Salt Fork of the Brazos River is partially made up of high-salinity sandstone, which results in increased salinity of return flow into main tributaries. These higher-salinity waters eventually find their way into the lake. Even though the drainage area of the watershed is nearly 35,000 square miles, the proximity of Whitney Lake to the high-salinity inflow waters does not allow sufficient stream dilution distance to affect the elevated levels. Within the reservoir itself, initial data gathered by the Brazos River Authority shows concentrations of salinity during much of the year exceed the USEPA 300 part per million standards for drinking water by 20 to 30 percent. One additional issue that has been identified as a critical component of water quality in Whitney Lake is the presence of the toxin-producing golden algae *(Prymnesium parvum).* Whitney Lake has been subject to fish kills caused by large blooms of the algae.

TPWD, along with the TCEQ and the Baylor University Center for Reservoir and Aquatic Systems Research, monitors levels of golden algae and other microbial organisms in Whitney Lake. The last algae-related kill on Whitney Lake occurred in early 2007 and killed off numerous individuals from species of fish such as threadfin *(Dorosoma petenense)* and gizzard shad *(D. cepedianum),* freshwater drum *(Aplodinotus grunniens),* crappie *(Pomoxis* spp.), and gar *(Lepisosteus* spp.) (Baylor University Center for Reservoir and Aquatic Systems Research 2009). While it is not believed that golden algae is harmful to humans or other wildlife, the cost associated with managing such fish kills can be extensive. Monitoring of Whitney Lake, along with several other aquatic systems in Texas, is ongoing.

3.2.1 Alternative 1: No Action Alternative

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.

3.2.2 Alternative 2: Proposed Action

The reclassifications and resource management objectives required for the Proposed Action would allow land management and land uses to be compatible with the goals of good stewardship of water resources (e.g., conservation of emergent wetlands, erosion control, and maintaining good water quality); therefore, there would be no significant adverse impacts on water resources.

3.3 CLIMATE

Whitney Lake lies in a region characterized by moderate winters and comparatively long summers. In spring, summer, and fall, prevailing winds are from the south and southwest. The mean annual temperature in the vicinity of the dam site is 67 degrees (°) Fahrenheit (F). The maximum recorded temperature at Hillsboro, Texas, was 113° F. The recorded low was 1° below zero. The growing season, between killing frosts, is normally from the latter part of March to the middle of November. The mean annual precipitation over the contributing portion of the Brazos River Basin above Whitney Lake is approximately 24.8 inches.

3.3.1 Alternative 1: No Action Alternative

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

3.3.2 Alternative 2: Proposed Action

Revision of the Whitney Lake Master Plan would have no impact on the climate of the study area.

3.4 CLIMATE CHANGE AND GREENHOUSE GASES

CEQ drafted guidelines for determining meaningful greenhouse gas (GHG) decision-making analysis. The CEQ guidance states that if a project would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of carbon dioxide (CO_2)-equivalent (CO_2e) GHG emissions per year, the project should be considered in a qualitative and quantitative manner in NEPA reporting (CEQ 2015). CEQ proposes this as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis for agency actions involving direct emissions of GHG (CEQ 2015).

According to the most recent estimating tools from the USEPA, there are three GHG contributors within Bosque and Hill counties, one of which, Bosque County Power Plant, is located adjacent to Whitney Lake (USEPA 2016). The general operations and recreation facilities associated with Whitney Lake do not approach the proposed reportable limits. Whitney Lake Project Office does have management plans in place such as routine equipment maintenance, holistic vegetative management plans, natural resource management plans, and public education and outreach programs to protect

regional natural resources. In addition, the Whitney Lake Project Office will continue monitoring programs as required to meet applicable laws and policies.

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

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

The USACE manages project lands and recreational programs to advance broad national climate change mitigation goals including, but not limited to, climate change resilience and carbon sequestration, as set forth in EO 13653, EO 13693 and related USACE policy.

3.4.1 Alternative 1: No Action Alternative

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

3.4.2 Alternative 2: Proposed Action

Under the Proposed Action, current Whitney Lake project management plans and monitoring programs would not be changed. There would be no short- or long-term, minor, moderate, or major, beneficial, or adverse impacts on climate change or contributions to GHG emissions as a result of the updated 2016 Master Plan. In the event that GHG emission issues become significant enough to impact the current operations at Whitney Lake, the 2016 Master Plan and all associated documents would be reviewed and revised as necessary.

3.5 AIR QUALITY

The USEPA established nationwide air quality standards to protect public health and welfare in 1971. The State of Texas has adopted the National Ambient Air Quality Standards (NAAQS) as the state's air quality criteria. NAAQS standards specify maximum permissible short- and long-term and 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), particulate matter (PM_{10} and $PM_{2.5}$), and Lead (Pb). Based on both Federal and state air quality standards, an area can be classified as either an "attainment," "maintenance,"

or “non-attainment” area for each pollutant. According to TCEQ current State Implementation Plan (TCEQ 2015), the Whitney Lake area (Bosque and Hill counties) is an attainment area and does not require a pollutant control strategy. The closest state air quality monitoring station located in the Waco-Killeen area, southeast of Whitney Lake, describes the air quality as good. However, neighboring Johnson County, as well as several counties within the Dallas-Fort Worth (DFW) area are currently in nonattainment status for O_3 and Pb air pollution.

3.5.1 Alternative 1: No Action Alternative

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

3.5.2 Alternative 2: Proposed Action

Existing operation and management of Whitney Lake is compliant with the Clean Air Act and would not change with implementation of the 2016 Master Plan. No short- or long-term, minor, moderate, or major, beneficial, or adverse impacts on air quality would occur as a result of implementing the proposed revisions to the Whitney Lake Master Plan.

3.6 TOPOGRAPHY, GEOLOGY, AND SOILS

Topography

The topography of the lands surrounding Whitney Lake is controlled, for the most part, by the underlying and surface geology and soils. The predominant limestone subsurface geology (bedrock), where exposed, results in steep cliffs and bluffs due to the resistance of the limestone to erosion. Soils developed from thousands of years of slow erosion by major streams and tributaries cover most of the relatively flat areas of limestone surface, resulting in a rolling topography of hills bisected by steep bluffs where streams are located. Meandering stream beds and floodplains cut into the limestone are filled with relatively flat alluvial deposits in the stream valleys.

Geology

The underlying geology (bedrock) of the Whitney Lake area consists of Upper Cretaceous limestones, marls, and shales of the Fredericksburg Group. The bedrock is exposed in cliff outcrops wherever major streams have cut through the landscape, particularly along the shores of Whitney Lake, the core of which was cut by the Brazos River, and along larger tributaries. Quaternary alluvium and Pleistocene fluvial deposits of clay, silt, and sandy loams are formed in floodplains and on terraced hillsides. Seismic hazard probability in the vicinity of Whitney Lake is very low, on the order of 2 to 4 percent in 50 years (U.S. Geological Survey 2014).

Soils

Whitney Lake is situated at the juncture of two major soil complexes. The eastern side in Hill County falls in the East Cross Timbers Land Resource Area. This resource area contains sandy soils and Brazos River terrace soils of two major associations. The Bastrop-Travis Association is made up of deep, sandy soils located on level to gently sloping, old and high terraces. The Purves-Brackett-Bolar Association is comprised of moderately deep clayey soils on limestone slopes that range from gentle to steep in grade.

The western, or Bosque County side, is located in the Grand Prairie Land Resource Area. The three major soil associations are: Bastrop-Travis fine sandy loams; Tarrant-Brackett clays; and Denton-Tarrant clays. Physically, Bosque County soils are arranged much like those in Hill County except for frequent barren limestone outcroppings that are characteristic of the Grand Prairie blacklands.

Factors imposing the most serious limitations on the use of project lands include the following: severe rocky texture, limited permeability, depth of bedrock, and high shrink/swell potential. In general, the soils of Whitney Lake are in good condition, with the possible exception of some eroded areas in the upper regions of the project watershed. Complete information regarding the 34 specific soil types making up the Whitney Lake Project is found within the Soil Survey of Bosque and Hill counties, published by the United States Department of Agriculture, Natural Resources Conservation Service (NRCS). Copies of soil surveys are available for viewing at the Whitney Lake Project Office.

The lake inflow carries a minimum amount of sediment because of the stony soils upstream of the project. Much of the shoreline of Whitney Lake consists of limestone cliffs with very little erosion.

3.6.1 Alternative 1: No Action Alternative

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

3.6.2 Alternative 2: Proposed Action

Topography, geology, and soils were considered during the refining process of land reclassifications for the 2016 Master Plan. Some lands under the prior classification of Recreation-Intensive Use were reclassified to the new and similar classification of High Density Recreation, but total acreage was reduced from 5,049 acres to 3,648 acres. This reduction is solely based on the realization that the amount of acreage originally planned for intensive recreation use per the 1972 Master Plan significantly exceeded the amount necessary to meet public needs and was excessive and not being fully utilized. Areas currently developed as park would continue to operate as parks and no change would occur. However, some of the lands designated

as Recreation – Intensive Use would be reclassified to Wildlife Management to better reflect historic use patterns and current land management efforts. The conversion of these lands would have no effect on current or projected public use. Therefore, under the Proposed Action, there would be no short- or long-term, minor, moderate, or major, beneficial, or adverse impacts on topography, geology, or soils as a result of implementing the 2016 Master Plan.

3.7 NATURAL RESOURCES

Operational civil works projects administered by USACE are required, with few exceptions, to prepare an inventory of natural resources. The basic inventory required is referred to within USACE regulations (ER and EP 1130-2-540) as a Level One Inventory. This inventory includes the following: vegetation in accordance with the National Vegetation Classification System through the sub-class level; assessment of the potential presence of special status species including but not limited to Federal and state listed endangered and threatened species, migratory species, and birds of conservation concern listed by the USFWS; land (soils) capability classes in accordance with NRCS soil surveys; and wetlands in accordance with the USFWS Classification of Wetlands and Deepwater Habitats of the United States, which are previously discussed in Section 3.2. In addition to the data from the Level One Inventories, a Habitat Assessment was conducted on 9 to 11 September 2015 at Whitney Lake by USACE biologists and Whitney Lake staff using the TPWD's WHAP to assist in the preparation of the 2016 Master Plan. A total of 95 data collection sites were selected using aerial photography and knowledge of the Whitney Lake staff. The four major habitat types that were selected and assessed were Grassland, Savannah, Woodland, and Bottomland Hardwood. The WHAP assessment report is included as Appendix E of the 2016 Master Plan.

The Texas Conservation Action Plan (TCAP) 2012 and the accompanying Texas Cross Timbers Ecoregion Handbook (Handbook), published by TPWD in August 2012, were used in the preparation of the 2016 Master Plan. The TCAP and Handbook were invaluable in identifying SGCN, rare plant communities, regional conservation issues, and a suite of conservation actions needed to reduce negative effects on SGCN and rare plant communities. The TCAP and Handbook were especially valuable in preparing the Land Classifications and Resource Objectives in the 2016 Master Plan.

Vegetation

Whitney Lake is located within the Cross Timbers ecological region in north-central Texas. This region is a transitional area between tall grass prairies and oak savannas and is characterized by areas with high densities of trees and irregular plains and prairies.

The dominant trees include live oak (*Quercus virginiana*), post oak *(Q. stellata)*, American elm *(Ulmus americana)*, cedar elm *(U. crassifolia)*, eastern cottonwood *(Populus deltoides)*, black willow *(Salix nigra)*, pecan *(Carya illinoinensis)*, Ashe juniper *(Juniperus ashei)*, hackberry *(Celtis laevigata)*, and honey mesquite *(Prosopis*

glandulosa). Ashe juniper and honey mesquite have become more prevalent over time due to the absence of fire from the system. While not desirable in the plains and prairie areas of the project, Ashe juniper is a valuable species on the limestone slopes of the surrounding hills and canyons, providing nesting material for the endangered (Federally-listed) GCWA. Other common woody species include shrubs such as flame leaf sumac *(Rhus copallina)*, sand plum *(Prunus angustifolia)*, rough-leaf dogwood *(Cornus drummondii)*, deciduous yaupon *(Ilex decidua)*, elbowbush *(Forestiera pubescens)*, and coralberry *(Symphoricarpos orbiculatus),* as well as vines including mustang grapes *(Vitis mustangensis)*, Virginia creeper *(Parthenocissus quinquefolia),* green briar *(Smilax sp.),* and poison ivy *(Toxicodendron radicans)*.

Predominate herbaceous species include various grasses and forbs. The dominate forbs found on Whitney Lake lands include Illinois bundleflower *(Desmanthus virgatus)*, Engelmann daisy *(Engelmannia pinnatifida)*, Indian paintbrush *(Castilleja indivisa)*, bluebonnet *(Lupinus texensis)*, and Indian blanket *(Gaillardia pulchella)*. Common native grasses include little bluestem *(Schizachyrium scoparium)*, silver bluestem *(Bothriochloa saccharoides)*, bushy bluestem *(Andropogon glomeratus)*, switchgrass *(Panicum virgatum)*, Texas wintergrass *(Nassella leucotricha)*, and Virginia wildrye *(Elymus virginicus)*. Common non-native grasses include Johnsongrass *(Sorghum halepense)* and bermuda grass *(Cynodon dactylon)*.

Fisheries and Wildlife Resources

Whitney Lake provides habitat for an abundance of fish and wildlife species. The lake provides a quality fishery, as well as quality wildlife habitat on public land associated with the project.

Whitney Lake provides fishing opportunities for the boater and for the bank angler. Common sport fish species present in Whitney Lake include striped bass *(Morone saxatilis)*, white bass *(Morone chrysops)*, largemouth bass *(Micropterus salmoides)*, smallmouth bass *(M. dolomieu)*, spotted bass *(M. punctulatus)*, white crappie *(Pomoxis annularis)*, black crappie *(P. nigromaculatus)*, channel catfish *(Ictalurus punctatus)*, blue catfish *(I. furcatus)*, and flathead catfish *(Pylodictis olivaris)*. Other species include a variety of sunfish *(Lepomis* spp*.)*, carp (*Cyprinus carpio)*, gar, drum, buffalo, and shad. Stocking of Whitney Lake is conducted by TPWD and varies annually but has included striped bass, largemouth bass, smallmouth bass, and bluegill. Golden algae blooms can occur in the reservoir and these blooms are at times toxic to fish and may affect the quality of fishing. Since impoundment in 1951, the native forests that were submerged by the reservoir have provided structure and forage habitat for fish.

There are 23,783 acres of Federal land managed by USACE at Whitney Lake. There are 22 designated wildlife management areas with approximately 16,278 acres designated as MRML- Wildlife Management. These management areas are popular with hunters and individuals wishing to observe wildlife in their natural habitat. Species often observed in these areas include white-tailed deer *(Odocoileus virginiana)*, turkey (*Meleagris gallopavo*), feral hogs *(Sus scrofa)*, waterfowl (ducks and geese), bobwhite

quail *(Colinus virginianus)*, morning dove *(Zenaida macroura)*, fox squirrel (*Sciurus niger*), cottontail rabbit *(Sylvilagus floridanus)*, bobcat (*Lynx rufus*), coyote *(Canis latrans)*, gray fox *(Urocyon cinereoargenteus)*, raccoon *(Procyon lotor)*, opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), and various raptors, shore birds and song birds. These wildlife management areas provide a great benefit to the public in a region with a limited amount of public land.

3.7.1 Alternative 1: No Action Alternative

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

3.7.2 Alternative 2: Proposed Action

The reclassifications, resource management objectives, and resource plan required for the Proposed Action would allow land management and land uses to be compatible with the goals of good stewardship of natural resources. The Proposed Action would allow project lands to continue supporting 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 addition of ESA and MRML-Wildlife Management lands protects natural resources from various types of adverse impacts such as habitat fragmentation. In addition, the Proposed Action would be compatible with conservation principles and measures to protect migratory birds as mandated by EO 13186.

The reclassifications proposed in the 2016 Master Plan include 2,268 acres as ESAs and 16,278 acres as MRML – Wildlife Management. Under this reclassification, multiple land parcels that were previously classified as Recreation Areas, Special Use Areas – Natural Areas, Wildlife Areas, and Aesthetic and Multiple Use Recreation Areas were converted. These areas were converted because the USACE recognized the areas as having an extremely high ecological value, being significant for public use and enjoyment, and by reclassifying those areas it would ensure they are given the highest order of protection among possible land classifications. The reclassification of these lands will have minimal effect on current or projected public use. However, long-term, beneficial impacts on natural resources could occur as a result of implementing the reclassifications outlined in the 2016 Master Plan.

3.8 THREATENED AND ENDANGERED SPECIES

The Endangered Species Act was enacted to provide a program for the preservation of endangered and threatened species and to provide protection for the ecosystems upon which these species depend for their survival. All Federal agencies are required to implement protective measures for designated species and to use their authorities to further the purposes of the Endangered Species Act. The Secretary of the Interior and the Secretary of Commerce (marine species) are responsible for the identification of threatened or endangered species and development of any potential recovery plan.

USFWS is the primary agency responsible for implementing the Endangered Species Act, and is responsible for birds and other terrestrial and freshwater species. USFWS responsibilities under the Endangered Species Act include (1) the identification of threatened and endangered species; (2) the identification of critical habitats for listed species; (3) implementation of research on, and recovery efforts for, these species; and (4) consultation with other Federal agencies concerning measures to avoid harm to listed species.

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

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

There are six Federally listed species and two candidate species that could be found at Whitney Lake (USFWS 2016). A list of these species is presented in Table 3-2. No Critical Habitat has been designated within or near Whitney Lake. The species identified as Threatened, Endangered or Candidate Species by TPWD that are not Federally listed are included in Appendix C of the 2016 Master Plan.

Table 3-2. Federally Listed Endangered and Threatened Species with Potential to Occur at Whitney Lake

Common Name	Scientific Name	Federal Status	State Status
Piping Plover	*Charadrius melodus*	Threatened	Threatened
Whooping Crane	*Grus americana*	Endangered	Endangered
Interior Least Tern	*Sterna antillarum athalassos*	Endangered	Endangered
Red Knot	*Calidris canufus rufa*	Threatened	Not Listed
Golden-cheeked Warbler	*Setophaga chrysoparia*	Endangered	Endangered
Black-capped Vireo	*Vireo atricapilla*	Endangered	Endangered
Smooth Pimpleback	*Quadrula houstonensis*	Candidate	Threatened
Texas Fawnsfoot	*Truncilla macrodon*	Candidate	Threatened

Source: USFWS 2016

The GCWA is of unique interest and importance at Whitney Lake. Surveys for GCWA at Whitney Lake were performed in 1996, 1997, and 1998 by private consulting firms revealing presence at several locations. The USACE Engineering Research and Development Center conducted a study in 2005, which indicated continued presence at two previously surveyed locations. USFWS conducted an investigation in 2008 and observed 61 positive GCWA detections, and a subsequent survey in 2009 recorded 29 positive GCWA detections. USFWS also conducted investigations in 2011 (15 positive GCWA detections) and 2015 (22 positive GCWA detections). In addition to the GCWA, USFWS personnel also observed black-capped vireo on two occasions during the 2015 survey efforts.

The Federal property at Whitney Lake, much of which serves as habitat for the GCWA, is of unique importance regarding the recovery efforts for the species. The habitat at Whitney Lake occurs within GCWA Recovery Region 2 where less than 50 birds have been documented in years prior to 2008. However, due to the limited amount of public land and GCWA breeding habitat in Recovery Region 2, coupled with the updated survey observations, Whitney Lake may represent the most realistic opportunity to pursue substantial GCWA recovery efforts within the region. Photograph 3-1 represents typical GCWA habitat located at Whitney Lake.

Photograph 3-1. Typical GCWA habitat showing mature Ashe juniper with interspersed oaks.

3.8.1 Alternative 1: No Action Alternative

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

3.8.2 Alternative 2: Proposed Action

Under the Proposed Action, the USACE would continue cooperative management plans with the USFWS and TPWD to preserve, enhance, and protect wildlife habitat resources. To further management opportunities and beneficially impact habitat diversity, the reclassifications proposed in the 2016 Master Plan include 2,268 acres as ESAs. Under this reclassification, several land parcels that were previously classified as Aesthetics/Multiple Use Recreation, Recreation Intensive Use and Wildlife Areas were converted to ESAs 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. Included as Environmentally Sensitive were areas of high-value bottomland hardwood and areas designated by USFWS as essential habitat for GCWA. The conversion of these lands was supported by recommendations from the USFWS and TPWD. The conversion of these lands will have no effect on current or projected public use. However, long-term, beneficial impacts on natural resources could occur as a result of implementing the reclassifications outlined in the 2016 Master Plan. 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.

3.9 INVASIVE SPECIES

Invasive species are any kind of living organism which, if uncontrolled, causes harm to the environment, economy, or human health. Invasive species generally grow and reproduce quickly and spread aggressively. Non-native, or exotic, species have been introduced, either intentionally or unintentionally, and can out-compete native species for resources or otherwise alter the ecosystem. Native invasive species are those species that spread aggressively due to an alteration in the ecosystem, such as lack of fire or the removal of a predator from the food chain. Table 3-3 lists invasive and exotic species that occur at Whitney Lake.

Table 3-3. Invasive Species Found at Whitney Lake

Common Name	Scientific Name	Native/Non-native	Prevalence
Birds			
Brown-headed Cowbird	*Molothrus ater*	Native	Moderate
European Starling	*Sturnus vulgaris*	Non-native	Moderate
Eurasian Collared-dove	*Streptopelia decaocto*	Non-native	Minor
Mammals			
Feral Hog	*Sus scrofa*	Non-native	Major
Nutria	*Myocastor coypus*	Non-native	Minor

Table 3-3, continued

Common Name	Scientific Name	Native/Non-native	Prevalence
Reptiles			
Mediterranean House Gecko	*Hemidactylus turcicus*	Non-native	Minor
Mollusks			
Asian Clam	*Corbicula fluminea*	Non-native	Moderate
Insects			
Red Imported Fire Ant	*Solenopsis invicta*	Non-native	Major
Plants			
Ashe Juniper	*Juniperus ashei*	Native	Major
Bermudagrass	*Cynodon dactylon*	Non-native	Moderate
Blueweed	*Echium vulgare*	Non-native	Unknown
Bull Thistle	*Cirsium vulgare*	Non-native	Minor
Cheatgrass	*Bromus tectorum*	Non-native	Major
Chinaberry Tree	*Melia azedarach*	Non-native	Minor
Chinese Privet	*Ligustrum sinense*	Non-native	Minor
Chinese Tallow Tree	*Triadica sebifera*	Non-native	Major
Common Chickweed	*Stellaria media*	Non-native	Moderate
Common Dandelion	*Taraxacum officinale*	Non-native	Minor
Common Periwinkle	*Vinca minor*	Non-native	Minor
Dallisgrass	*Paspalum dilatatum*	Non-native	Minor
Deep-rooted sedge	*Cyperus entrerianus*	Non-native	Minor
Dotted Duckmeat	*Landoltia punctata*	Native	Moderate
Field Bindweed	*Convolvulus arvensis*	Non-native	Minor
Field Brome	*Bromus arvensis*	Non-native	Moderate
Giant Reed	*Arundo donax*	Non-native	Moderate
Glossy Privet	*Ligustrum lucidum*	Non-native	Moderate
Heavenly Bamboo	*Nandina domestica*	Non-native	Minor
Honey Mesquite	*Prosopis glandulosa*	Native	Moderate
Horehound	*Marrubium vulgare*	Non-native	Minor
Japanese Honeysuckle	*Lonicera japonica*	Non-native	Minor
Johnson Grass	*Sorghum halepense*	Non-native	Major
King Ranch Bluestem	*Bothriochloa ishaemum var. songarcia*	Non-native	Major
Lehman's Love Grass	*Eragrostis lehmanniana*	Non-native	Moderate
Mimosa	*Albizia julibrissin*	Non-native	Minor
Nodding Plumeless Thistle	*Carduus Nutans*	Non-native	Minor
Purple Nutsedge	*Cyperus rotundus*	Non-native	Minor
Popinac	*Leucaena leucocephala*	Non-native	Moderate
Purple Crown-vetch	*Coronilla varia*	Non-native	Minor

Table 3-3, continued

Common Name	Scientific Name	Native/Non-native	Prevalence
Rescuegrass	*Bromus catharticus*	Non-native	Moderate
Scotch Thistle	*Onopordum acanthium*	Non-native	Minor
Spiny Cocklebur	*Xanthium spinosum*	Non-native	Moderate
Spreading Hedgeparsley	*Torilis arvensis*	Non-native	Minor
Tall Fescue	*Lolium arundinaceum*	Non-native	Minor
Willow Baccharis	*Baccharis salicina*	Native	Moderate
Yellow Toadflax	*Linaria vulgaris*	Non-native	Minor

3.9.1 Alternative 1: No Action Alternative

The No Action Alternative does not involve any activities that would contribute to changes in existing conditions, so Whitney 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.

3.9.2 Alternative 2: Proposed Action

The land reclassifications, resource objectives, and resource plan required to revise the Whitney Lake Master Plan are compatible with the lake's invasive species management practices. Therefore, invasive species would continue to be managed, and no significant adverse impacts on resources would occur as a result of implementing the 2016 Master Plan.

3.10 CULTURAL, HISTORICAL, AND ARCHAEOLOGICAL RESOURCES

Cultural History Sequence

Prehistoric

The earliest well-documented evidence of human occupation in the middle Brazos 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 to 8,500 B.P.), Archaic (8,500 to 1.250 B.P.), and Late Prehistoric (1,250 to 300 B.P.).

Evidence for Paleo-Indian period occupation is relatively rare in the Whitney 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 camp sites may be buried deeply beneath Holocene floodplain alluvium. On private land downstream from the Whitney Lake Dam, Paleo-Indian materials have been documented in deeply stratified rockshelter deposits at Horn Shelter No. 2 (41BQ46). 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 that Paleo-Indians exploited a much broader range of animal and plant resources.

The Archaic period is divided into Early (8,500 to 6,000 B.P.), Middle (6,000 to 3,500 B.P.), and Late (3,500 to 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 Whitney Lake area and in north-central Texas generally. Archaic period sites at Whitney Lake include open campsites, burned rock midden features, and rockshelter occupations.

The Late Prehistoric period (1,250 to 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. Division of the Late Prehistoric period into early Austin phase (1,250 to 650 B.P.) and late Toyah phase (650 to 300 B.P.) sub-periods was based primarily on the results of excavations at two Whitney Lake sites (the Kyle and Blum Rockshelter Sites). The Toyah phase differs from the preceding Austin phase in terms of technology and subsistence strategies. Bison became an important economic resource. Evidence of horticulture also appears, but was of only minor importance to overall Toyah phase subsistence.

Historic

In the late 1700s, tribes of the southern Wichita Indians had established villages along the middle Brazos River, including a Towakoni village in the Whitney Lake area. In the early 1840s, Caddo Indians (displaced from east Texas) occupied at least two villages in the Whitney Lake area. Also in the 1840s, limited numbers of Anglo settlers were beginning to occupy the area.

Following the annexation of Texas by the United States in 1845, the U.S. Army established a series of forts along the western frontier. Fort Graham (1849 to 1853) was established in the present location of Whitney Lake, and the Native Americans were forced to relocate farther upstream along the Brazos River. The presence of Fort Graham attracted settlers to the area as the frontier advanced westward. In the 1850s, the town sites of Kimball, Towash, and Fort Graham were established in the Whitney Lake area. During the 1870s, the Chisolm Trail and its cattle drives passed through the Whitney Lake area. A major trail crossing of the Brazos River was located at the town of Kimball.

Population growth in the area accelerated following the arrival of the railroads in 1881. This improved access to major markets and led to a dramatic increase in the number of local farms and ranches. Most of the historic period resources at Whitney Lake are expected to be the archeological remains of house sites and outbuildings associated with farms and ranches dating from the late nineteenth century through the middle of the twentieth century.

Previous Investigations

The initial archeological investigations at Whitney Lake were conducted between 1947 and 1951 by the River Basin Surveys. During that period, 61 sites were recorded,

five of which were excavated. Plans to enlarge the lake in the 1970s led to additional investigations by Southern Methodist University, during which 29 new sites were recorded. This was followed by excavations at the Bear Creek Shelter by Southern Methodist University and the Fort Graham site by Wake Forest University. Limited survey work since then has added to the number of known archeological sites.

Recorded Cultural Resources

Currently, 121 archeological sites have been recorded at Whitney Lake. Only 26 of these sites have been evaluated to determine their eligibility for the National Register of Historic Places (NRHP) (6 listed, 7 eligible, 13 ineligible). Also, the Whitney Dam and Powerhouse were determined eligible for the NRHP in 2003. The remaining 95 archeological sites have not yet been evaluated for NRHP eligibility. Only about 1,100 acres of Whitney Lake property have been inventoried to current survey standards.

Cultural Resources Management at Whitney Lake

The cultural resources surveys of the 1970s and earlier were not systematic and are not considered adequate by current standards. As such, and dependent on funding, a Cultural Resources Management Plan for Federal property at Whitney Lake would be developed and incorporated into the Operational Management Plan in accordance with EP 1130-2-540. The purpose of the Cultural Resources Management Plan would be to provide a comprehensive program to direct the historic preservation activities and objectives at Whitney Lake. Completion of a full inventory of cultural resources at Whitney Lake is a long-term objective that is needed for compliance with Section 110 of the NHPA. All currently known and newly recorded sites would 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 the 2016 Master Plan or as may be proposed in the future by others for right-of-way easements, would 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 Whitney Lake would be coordinated with the State Historic Preservation Officer and Federally recognized Tribes to ensure compliance with the NHPA, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act.

3.10.1 Alternative 1: No Action Alternative

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

3.10.2 Alternative 2: Proposed Action

Impacts on cultural, historical, and archaeological resources were considered during the refinement processes of land reclassifications. Based on previous surveys at

Whitney Lake, the required reclassifications, 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 2016 Master Plan.

3.11 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

The zone of interest for this socioeconomic analysis includes Bosque, Hill, Johnson, and McLennan counties with additional economic influence extending up to a 100-mile radius of Whitney Lake. This four-county region, where the most impacts would be expected, has been utilized as the basis in summarizing the population characteristics of Whitney Lake.

Demographic Characteristics

The total estimated 2014 population for the zone of influence is 446,650 as shown in Table 3-4. Approximately 54 percent of the population is in McLennan County, 34 percent is in Johnson County, 8 percent is in Hill County, and 4 percent is in Bosque County. The average annual growth rate for the zone of interest over the 2000 to 2014 time period was 1.0 percent, which was lower than the 1.8 percent growth rate for the same time period for the State of Texas.

Table 3-4. Population Estimates for the Zone of Interest

Geographical Area	2000 Population Estimate	2014 Population Estimate	Average Annual Growth Rate 2000 to 2014	2020 Population Projection	Projected Average Annual Growth Rate 2014 to 2020
Texas	20,851,820	26,092,033	1.8%	30,541,978	2.8%
Bosque County	17,204	18,052	0.4%	20,522	2.3%
Hill County	32,321	35,027	0.6%	39,349	2.1%
Johnson County	126,811	153,854	1.5%	186,847	3.6%
McLennan County	213,517	239,717	0.9%	255,521	1.1%
Zone of Interest Total	**389,853**	**446,650**	**1.0%**	**502,239**	**2.1%**

Sources: U.S. Bureau of the Census 2000, 2014, and 2015a and Texas Department of State Health Services 2014

The population in the zone of interest makes up approximately 2 percent of the total population of the State of Texas. From 2014 to 2020, the population in the zone of interest is projected to increase by 55,589, an average annual growth rate of 2.1 percent. By comparison, the population of State of Texas is projected to increase at an average annual rate of 2.8 percent per year during the same time period (Table 3-4), well above the projected national growth rate of approximately 0.8 percent per year

(U.S. Census 2014). The distribution of the population among gender is approximately 49 percent male and 51 percent female in all geographical areas, as shown in Table 3-5.

Table 3-5. 2014 Population Estimates by Gender

Geographical Area	Male	Female
Texas	50%	50%
Bosque County	49%	51%
Hill County	49%	51%
Johnson County	50%	50%
McLennan County	49%	51%
Zone of Interest Total	49%	51%

Source: U.S. Bureau of the Census 2015a

The distribution of the population by age group is shown in Table 3-6. The largest age group in the zone of interest is the 45 to 54 age group (13.1 percent), followed by the 25 to 34 age group (12.5 percent). Bosque and Hill counties have older populations, as indicated by much higher percentages of the population over age 64 (22.5 and 19.1 percent, respectively) than Texas (10.9 percent) and Johnson and McLennan counties (12.4 and 12.9 percent, respectively).

Table 3-6. 2014 Percent of Population by Age Group

Geographic Area	Age Group (Percent)												
	Less than 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 34	35 to 44	45 to 54	55 to 59	60 to 64	65 to 74	75 to 84	85 and over
Texas	7.4	7.6	7.4	7.3	7.4	14.4	13.6	13.2	5.8	4.9	6.3	3.3	1.3
Bosque County	5.4	6.2	6.7	6.1	4.8	8.7	10.7	14.0	6.5	8.4	12.6	7.0	2.9
Hill County	6.2	6.9	6.8	6.7	5.7	10.6	11.2	13.4	7.1	6.4	11.0	6.2	1.9
Johnson County	6.8	7.6	7.7	7.2	6.2	12.7	13.3	14.4	6.8	5.0	7.6	3.7	1.1
McLennan County	7.1	6.9	6.8	8.6	10.3	12.9	11.2	12.2	6.1	5.0	6.8	4.2	1.9
Zone of Interest Total	6.9	7.1	7.1	7.9	8.3	12.5	11.9	13.1	6.4	5.2	7.6	4.3	1.7

Source: U.S. Census Bureau 2015a

Race and ethnicity for the zone of interest are shown in Table 3-7. The U.S. Census estimates show that the region is heavily White (86 percent). Black or African American accounts for an estimated 10.2 percent of the population and Hispanic or Latino accounts for 21.8 percent. The minority population in the zone of interest is estimated to be 44 percent.

Table 3-7. Race and Ethnicity (Percent of Total Population)

Geographic Area	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Hispanic or Latino	White, Not Hispanic or Latino
Texas	76.8	12.7	1.2	4.7	0.2	38.2	44.3
Bosque County	96.1	2.8	1.0	0.4	0.0	16.6	79.8
Hill County	90.3	7.5	1.3	0.5	0.0	19.1	72.5
Johnson County	94.2	3.3	1.4	1.1	0.5	19.1	75.2
McLennan County	79.3	15.6	0.8	1.9	0.1	24.4	58.1
Zone of Interest Total	86.0	10.2	1.1	1.5	0.2	21.8	66.0

Source: U.S. Census Bureau 2015a

Table 3-8 displays the highest level of education attained by the population age 25 and over in both Texas and the zone of interest. In the zone of interest, 17.5 percent of the population has less than a high school credential; 30.1 percent has a high school credential; 24.8 percent has some college but no degree; 8.4 percent has an Associate's degree; 13 percent has a Bachelor's degree; and 6.2 percent has a graduate or professional degree (Table 3-8). Data show that the zone of interest has higher percentages of the population with a high school credential, some college but no degree, and Associate's degrees than the State of Texas and lower percentages of the population with a Bachelor's degree or graduate of professional degree.

Table 3-8. Educational Attainment

Geographic Area	Less than High School Credential	High School Credential	Some College, No Degree	Associate's Degree	Bachelor's Degree	Graduate or Professional Degree
Texas	18.5	25.2	22.7	6.6	17.9	9.1
Bosque County	18.9	33.7	26.2	5.8	10.2	5.2
Hill County	20.9	31.0	25.4	8.0	10.0	4.6
Johnson County	17.1	32.5	26.4	7.5	11.8	4.8
McLennan County	17.1	28.0	23.4	9.3	14.6	7.5
Zone of Interest Total	17.5	30.1	24.8	8.4	13.0	6.2

Source: U.S. Census Bureau 2015b

Labor Force and Unemployment

Labor force and unemployment data for the zone of interest are presented in Table 3-9. The unemployment rate for the zone of interest, 5.1 percent, is the same as the unemployment rate for the State of Texas.

Table 3-9. Labor Force and Unemployment (2014 Annual Average)

Geographic Area	Labor Force	Unemployment Rate
Texas	13,111,571	5.1%
Bosque County	8,168	5.2%
Hill County	15,947	5.3%
Johnson County	74,914	5.0%
McLennan County	112,604	5.1%
Zone of Interest Total	211,633	5.1%

Sources: U.S. Bureau of Labor Statistics 2015a and 2015b

Income and Poverty

Data showing income and poverty in the zone of interest are presented in Table 3-10. Per capita personal incomes (PCPI) in the counties in the zone of interest are below the PCPI for Texas and below the U.S. PCPI of $28,555. Of the counties in the zone of interest, Johnson County has the highest PCPI, at 87 percent of the U.S. PCPI.

The percentage of the population living below the poverty rate in the zone of interest (17.9 percent) is slightly above the poverty rate for the State of Texas (17.7 percent). Johnson County has by far the lowest poverty rate of the zone of interest counties (12.5 percent), and McLennan County has the highest poverty rate, with 21.5 percent of the population living below the poverty level.

Table 3-10. Income and Poverty

Geographic Area	Per Capita Personal Income	Per Capita Personal Income Percent of U.S.	Median Household Income	Poverty (Percent)
Texas	$26,513	93	$52,576	17.7
Bosque County	$24,290	85	$44,339	14.3
Hill County	$21,041	74	$40,994	19.9
Johnson County	$24,787	87	$58,221	12.5
McLennan County	$21,852	77	$42,544	21.5
Zone of Interest Total	**NA**	**100**	**NA**	**17.9**

Source: U.S. Census Bureau 2015c

Environmental Justice

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

EO 12898 does not provide guidelines as to how to determine concentrations of minority or low-income populations. However, analysis of demographic data on race and ethnicity and poverty provides information on minority and low-income populations that could be affected by the proposed actions. The U.S. Census American Community Survey provides the most recent estimates available for race, ethnicity, and poverty. Minority populations are those persons who identify themselves as Black, Hispanic, Asian American, American Indian/Alaskan Native, Pacific Islander, or Other. Poverty status is used to define low-income. Poverty is defined as the number of people with income below poverty level, which was $24,230 for a family of four in 2014, according to the U.S. Census Bureau. A potential disproportionate impact may occur when the minority in the study area exceeds 50 percent or when the percent minority and/or low-income in the study area are meaningfully greater than those in the region.

Counties in the zone of interest have substantially lower minority populations than the State of Texas, as shown in Table 3-11, and all have minority populations that are below 50 percent. The percentage of the population living in poverty in Hill and McLennan counties is greater than in the State of Texas.

Table 3-11. Minority and Poverty

	Minority Population (Percent)	All Ages in Poverty (Percent)
Texas	55.7	17.7
Bosque County	20.2	14.3
Hill County	27.5	19.9
Johnson County	24.8	12.5
McLennan County	41.9	21.5
Zone of Interest Total	**34.0**	**17.9**

Sources: U.S. Census Bureau 2015a and 2015c

Protection of Children

EO 13045 requires each Federal agency "to identify and assess environmental health risks and safety risks that may disproportionately affect children" and "ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks." This EO was prompted by the recognition that children, still undergoing physiological growth and development, are more sensitive to adverse environmental health and safety risks than adults. The potential for impacts on the health and safety of children is greater where projects are located near residential areas. The U.S. Census estimates show that persons under 18 years of age range from 22 percent of the population in Bosque County to 26 percent of the population in McLennan County and in the State of Texas (U.S. Census Bureau 2015d).

3.11.1 Alternative 1: No Action Alternative

Under the No Action Alternative, there would be no changes to the existing Master Plan, with the USACE continuing to manage Whitney Lake's natural resources as set forth in the 1972 Master Plan. There would be no short- or long-term, minor, moderate, or major adverse impacts on socioeconomic resources. Beneficial socioeconomic impacts existing as a result of the implementation of the current Master Plan would continue, as visitors would continue to come to the lake from surrounding areas. In addition to camping in USACE-operated campgrounds, many visitors purchase goods such as groceries, fuel, and camping supplies locally, eat in local restaurants, stay in local hotels and resorts, play golf at local golf courses, and shop in local retail establishments. These activities would continue to bring revenues to local companies, provide jobs for local residents, and generate local and state tax revenues. There would be no disproportionately high or adverse impacts on minority or low-income populations or children with the implementation of the No Action Alternative.

3.11.2 Alternative 2: Proposed Action

Under the Proposed Action, the land reclassifications, resources objectives, and resource plan reflect changes in land management and land uses that have occurred since 1972. Lake Whitney offers a variety of free 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.

3.12 RECREATION

The primary area having a significant influence on the public use and management of Whitney Lake includes Hill, Bosque, McLennan and, Johnson counties located in north central Texas. The majority of visitors to Whitney Lake come from within a 100-mile radius of the lake. Whitney Lake visitors are a diverse group ranging from campers who utilize the campgrounds around the lake, full-time and part-time residents of the private housing developments that border the lake, hunters who utilize the Wildlife

Management Areas around the lake, day users who picnic in the state-operated and Federally operated parks, marina customers, and many other user groups.

The peak visitation months on Whitney Lake are April through September when 82 percent of the visits occur. June is the highest visitation month and accounts for 17 to 21 percent of the annual total. Approximately 95 percent of visits to recreation areas occur in USACE-managed recreation areas. The remaining visitation takes place on USACE lands that have been leased to marina operators and to TPWD, Johnson County, Hill County, and the City of Whitney for recreational purposes.

The USACE operates the following parks on Whitney Lake where user fees are charged: East Lofers Bend Park, West Lofers Bend Park, Lofers Bend Day Use Park, McCown Valley Park, Cedron Creek Park, Plowman Creek Park, and Kimball Bend Park. These parks, three of which are seasonal, have controlled access with 24-hour presence provided by contract gate attendants. All fee parks combined provide 270 campsites, seven boat ramps, three group camping areas with pavilions, seven playgrounds, two hiking trails, 38 day use picnic sites, four swim beaches, and 18 restrooms.

The USACE operates the following no-fee or “free” parks on Whitney Lake: Riverside Park, Cedar Creek Park, Steele Creek Park, Nolan River Park, Walling Bend Park, and Soldiers Bluff Park. These parks provide limited multi-use facilities (can be used for either camping or picnicking) and very basic amenities. All free parks combined provide 67 multiple use sites, eight restrooms, seven boat ramps, and three group-use shelters. In addition to the above-mentioned USACE-operated parks, there are four other parks not operated by the USACE that are located at Whitney Lake. The parks are Hamm Creek in Johnson County, Chisholm Trail Park in Hill County, Lake Whitney State Park in Hill County, and the Whitney City Park in Hill County.

Hamm Creek is leased to Johnson County and is situated in the extreme southwest corner of Johnson County, at the confluence of Hamm Creek and the Brazos River. The park is 8 miles southwest of Rio Vista on FM 916 and encompasses 220 acres. It is approximately 45 road miles from the Whitney Lake Project Office. The park contains 64 day use and camping sites, a boat ramp, four group pavilions, two restrooms, a dump station, and an entrance complex. The boat ramp is popular, when usable, because of trees lining the bank that serve as effective windbreaks, providing the smooth water surface preferred by skiers. Fishing pressure is heavy during the white bass "run" in the spring. During winter, the area is popular with hunters, fishermen, and, on warmer weekends, a few skiers.

Chisholm Trail Park is leased to Hill County and is located on the banks of the Brazos River, approximately 21 miles south of Cleburne, and encompasses 108 acres. Access is via a paved county road off State Highway 174. The park contains 30 day use and camping sites, a boat ramp, horseshoe pits, a restroom, and a playground. The park is used mainly by families, with camping, skiing, swimming, and fishing being the most common uses. The park receives heavy usage during summer weekends,

and relatively little usage at other times. There is no potable water in the park during winter months.

Whitney Lake State Park and Recreation Area is located on the east side of the lake in Hill County, approximately 2 miles west of the City of Whitney, and encompasses 725 acres. Access is from FM 1244. The recreation area is leased to the State of Texas and is operated by the TPWD. All development and construction in the lease area was performed by the state. The park contains 162 day use and camping sites, 17 screened shelters, a group campsite area, a recreation hall, a boat ramp, six restrooms, and two playgrounds. The visitors at the recreation area are typical of those at the other fee parks on the project. Visitation is primarily from campers, but the day use area is heavily occupied on weekends during the peak visitation months.

The Whitney City Park is located immediately west of the city limits of Whitney. This 22-acre park is leased to and operated by the City of Whitney. Individuals in the immediate area of the city of Whitney primarily use the area. The park's main use comes from activities associated with baseball games and practice. The park contains five baseball fields, playground equipment, and a concession stand with restrooms.

There are four marinas located at Whitney Lake including Juniper Cove, Uncle Gus, Harbor Master, and White Bluff. Harbor Master Marina is located between East and West Lofers Park in Hill County and provides 75 wet slips, dry storage slips, campsites, a restroom, a boat ramp, boat rental, gas, and a store. Juniper Cove Marina is located in Hill County off FM 1713 and provides 125 wet slips, dry storage slips, cabins, campsites, restrooms, boat ramps, boat rental, gas, a store, and a fish cleaning station. Uncle Gus Marina is located in Bosque County off State Highway 22 near Laguna Park and provides 181 wet slips, a boat ramp, boat rental, gas, a store, a courtesy dock, and a fish cleaning station. The White Bluff Marina is located in the White Bluff Subdivision off FM 933 in Hill County and provides 104 wet slips, a boat ramp, and gas. Recreational use at Whitney Lake continues to evolve.

There were 6,490 camping permits issued for USACE campgrounds through the National Recreation Reservation Service (NRRS) in Fiscal Year (FY) 2014. The majority of the reservations (52 percent) were made by individuals from within the zone of influence. Of that majority, 55 percent were from Johnson County, 25 percent from McLennan County, 21 percent from Hill County, and 13 percent from Bosque County. The county within the zone of influence that these individuals live in is also an indicator of where they are most likely to recreate on the lake. An individual from Johnson County is more likely to recreate at McCown Valley Park (32 percent of reservations) while a person from McLennan County is more likely to visit East Lofers Bend Park (38 percent of reservations).

The study of the camping permits issued in FY 2014 also indicates that the local small towns have a significant impact on the visitation of the lake and cannot be overlooked. The small McLennan County town of West, Texas (population 2,834), generated the most reservations (20 percent of 975 reservations) for East Lofers Bend

Park. The town of Whitney, Texas (population 2,083), in Hill County generated the most reservations (11 percent of 1,750 reservations) for McCown Valley Park.

While visitation in USACE-managed recreational areas remains strong, there is demand for recreational opportunities not offered in these parks. The 2012 Texas Outdoor Recreation Plan (TORP) published by TPWD pointed out the top five needs within all park systems in the state as identified by professional recreation providers and by Texas citizens. Outdoor recreation trends in Texas are similar to national trends identified through the most recent and extensive National Survey on Recreation and the Environment conducted by the U.S. Forest Service in 2009. These trends are described in Section 2.4.4 of the 2016 Master Plan. The results of the National Survey on Recreation and the Environment were used extensively by TPWD in developing the TORP. Using 2012 data generated by the NRRS, there were 986,714 visitations, with the majority occurring from April to September (USACE 2016).

In recent years, recreation has been significantly impacted at Whitney Lake by low water levels. Being an on-demand hydropower dam, there are constant releases of water even when there is little to no inflow. This causes the lake to drop to elevations that make most of the boat ramps inoperable. It also causes large areas of the lake surface to become unusable due to shallow lake elevations, which reduces the lake's useable surface area by a significant amount. The lake level has been below the conservation level of 533 msl 80 percent of the time between 1972 and 2014. Of this time, the lake has been between 533 msl and 523 msl 70 percent of the time.

Water-Use Recreation

Management of the water surface for recreational purposes at Whitney Lake rests primarily with the USACE, but close coordination is maintained with TPWD and Bosque, Hill, and Johnson counties Sheriff Offices with respect to enforcement of rules and regulations that apply to boating. Marina concessionaires are also important stakeholders in water-based recreation management. Water-based outdoor recreation includes, but is not limited to, fishing, boating, swimming, water skiing, scuba diving, and kayaking.

Recreational Carrying Capacity

Recreational carrying capacity is considered by the USACE to ensure that visitors have a high-quality and safe recreational experience, and that natural resources are not irreparably damaged. An example of a carrying capacity consideration at Whitney Lake is the management of public hunting on USACE lands, wherein hunting activity may be restricted by species or by area, depending on population or habitat conditions.

No recreation carrying capacity studies have been conducted at Whitney Lake. Presently, the USACE manages recreation areas at Whitney Lake using historic visitation data combined with best professional judgment to address recreation areas considered to be overcrowded, overused, underused, or well balanced. The USACE

will continue to identify possible causes and effects of overcrowding and overuse and apply appropriate BMPs and site management using NRRS utilization data.

Whitney Lake's six Class A parks (parks offering modern restrooms, potable water, and electrical and water hookups at campsites) are full on major summer holiday weekends but are not being over utilized by the public. Occupancy rates for these parks averaged 22 percent from 2010 to 2014, with the highest yearly average being 34 percent in Lofers Bend West in 2012 and the lowest being 16 percent in Kimball Bend in 2011. In June of FY 2014, the average occupancy rate ranged from 19 percent on weekdays to 43 percent on weekends with an overall occupancy of 29 percent. The month of June is Whitney Lake's peak month for visitation, which indicates that, while on some summer weekends these parks are completely full, there is additional capacity in these areas and no need for additional campsites.

There have been no water-related recreation development studies on Whitney Lake to determine the carrying capacity of the lake with regard to the number of boats that could safely operate on the lake surface. However, using data and findings from a 1999 comprehensive Water-Related Recreation Use Study at Lewisville Lake, the USACE, Fort Worth District established a target carrying capacity of no less than 22 acres of water per boat on its lakes during peak use times as its standard for resource protection and user enjoyment (USACE 2016). The current Potential Lake Surface Boat Load for Whitney Lake is 38.2 acres of water per boat on peak use days (USACE 2016). This is a potential level of use that assumes the lake level is at the conservation pool elevation of 533.0 msl and that every wet slip is leased and every boat in a leased wet slip is on the water. It also assumes all boat ramp parking spaces are occupied. This potential level of use is well above the Fort Worth District target of 22 acres of water per boat. Actual use levels can only be determined through careful on-the-water boat counts coupled with counts of empty wet slips at marinas and occupied boat ramp parking spaces on peak use days. Furthermore, since the physiography of Whitney Lake creates distinct open-water segments, the lake has very definable use zones, which would be taken into account when considering any future water-related recreation development on the lake.

3.12.1 Alternative 1: No Action Alternative

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 Master Plan.

3.12.2 Alternative 2: Proposed Action

Whitney 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 and Low Density Recreation would decrease with implementation of the 2016 Master Plan, these land reclassifications reflect changes in land management and land uses that have occurred since 1972 at Whitney Lake. The conversion of these lands would have no effect on current or projected public use. Therefore, no adverse

impacts on area recreational resources would result from the revision of the Whitney Lake Master Plan.

3.13 AESTHETIC RESOURCES

Whitney Lake is known for its beautiful limestone cliffs and abundant wildlife viewing opportunities; this makes it a popular destination for boating and camping. While Whitney Lake does not have a Visitor Center, the Lofers Bend Pak Walking Trail can be used for interpretation, including nature walks and plant identification. Programs promoting natural resources are also conducted at local schools and libraries.

3.13.1 Alternative 1: No Action Alternative

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 Master Plan.

3.13.2 Alternative 2: Proposed Action

Whitney Lake currently plays a pivotal role in availability of parks and open space in Bosque, Hill, and Johnson counties. Even though the amount of acreage available for High Density Recreation and Low Density Recreation would decrease with implementation of the 2016 Master Plan, these land reclassifications reflect changes in land management and land uses that have occurred since 1972 at Whitney Lake. The conversion of these lands would have no effect on current or projected public use or visual aesthetics. Furthermore, the increase in the acreage of land classified as ESAs and MRML – Wildlife Management would protect lands that are aesthetically pleasing at Whitney Lake and limit future development. Therefore, no adverse impacts on visual resources would result from implementation of the 2016 Master Plan.

3.14 HAZARDOUS MATERIALS AND SOLID WASTE

This section describes existing conditions within the Whitney Lake area with regard to potential environmental contamination and the sources of releases to the environment. Contaminants could enter the Whitney Lake environment via air or water pathways. The highways and roads, marinas, and private residences in the vicinity of the lake could also provide sources of contaminants. There are a number of private marinas and residential boat docks around Whitney Lake, many of which provide boat fueling service. These fuel docks are regulated by the USCG with regard to spill containment and cleanup requirements. There have been no major releases of boating fuel to the lake in the past 5 years (USACE 2016). There are also numerous public campgrounds/resorts and recreation areas/parks around the lake that could contribute small amounts of hazardous materials and waste to the watershed. Illegal trash dumping on project lands by individuals and businesses is a persistent problem. USACE and area law enforcement officials work cooperatively to apprehend those responsible for illegal trash dumping.

Several golf courses and numerous private residences and commercial facilities also surround the lake shores, and fertilizer and pesticide/herbicide use at those

locations could contribute minor amounts of hazardous materials to the lake. Public trash and garbage pickup and disposal is provided for all properties around Whitney Lake by commercial solid waste removal contractors (USACE 2016).

3.14.1 Alternative 1: No Action Alternative

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

3.14.2 Alternative 2: Proposed Action

The land reclassifications required to revise the Master Plan would be compatible with Whitney Lake hazardous and toxic waste and solid waste management practices. Therefore, no short- or long-term, minor, moderate, or major, beneficial, or adverse impacts due to hazardous, toxic, radioactive, or solid wastes would occur as a result of implementing the 2016 Master Plan.

3.15 HEALTH AND SAFETY

As mentioned earlier in this document, Whitney Lake's authorized purposes include hydroelectric power, flood risk management, water conservation, 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 in place to protect the public. These include safe boating and swimming regulations, safe hunting regulations, and speed limit and pedestrian signs for park roads. Whitney Lake also has solid waste management plans in place for camping and day use areas. Whitney Lake has personnel in place to enforce these policies, rules, and regulations during normal park hours.

3.15.1 Alternative 1: No Action Alternative

Under the No Action Alternative, the 1972 Master Plan would not be revised. No significant adverse impacts on human health or safety would be anticipated.

3.15.2 Alternative 2: Proposed Action

Under the Proposed Action, the proposed revisions to the Whitney Lake Master Plan would be compatible with project safety management plans. The revised classifications of Restricted water surface and Designated No-Wake areas would improve boating safety near key recreational water access areas such as boat ramps. 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 Whitney Lake Project area would continue to be enforced to ensure public safety. There would be no short- or long-term, minor, moderate, or major, adverse impacts on public health and safety as a result of implementing the Proposed Action.

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SECTION 4: CUMULATIVE IMPACTS

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

By Memorandum dated June 24, 2005, from the Chairman of the CEQ to the Heads of Federal Agencies, entitled "Guidance on the Consideration of Past Actions in Cumulative Effects Analysis", CEQ made clear its interpretation that "…generally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions…" and that the "…CEQ regulations do not require agencies to catalogue or exhaustively list and analyze all individual past actions." This cumulative impacts analysis summarizes expected environmental impacts from the combined impacts of past, current, and reasonably foreseeable future activities affecting any part of the human or natural environments impacted by the Proposed Action.

4.1 PAST IMPACTS WITHIN THE ZONE OF INTEREST

Whitney Lake was originally authorized by the Flood Control Acts of 1941 and late in 1944. Construction of the Whitney Lake Dam began in 1947 and was completed in 1950; it was later modified to include the powerhouse for hydroelectric power. This modification included the construction of two 15,000-kilowatt generator powerhouses and was completed in 1953. The total project area at Whitney Lake encompasses 52,693 acres. Of this total area, 43,571 acres were acquired in fee simple title by USACE, and perpetual Flowage Easements were acquired on an additional 9,122 acres up to elevation 573 msl.

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

Future management of the 9,122 acres of Flowage Easement Lands at Whitney 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.

Within Bosque, Hill, Johnson, and McLennan counties there is no Regional Mobility Authority. However, Johnson County is included in the North Central Texas Council of Governments, which is a Metropolitan Planning Organization with regional transportation planning responsibilities. The Heart of Texas Council of Governments

(HOTCOG) includes Hill and Bosque counties but does not perform mobility or transportation planning. In general, the primary planning responsibilities for the road network serving the four counties surrounding Whitney Lake is a function of the Texas Department of Transportation (TXDOT). The Waco Region TXDOT office performs most of the highway planning for the four counties of immediate concern. There are currently no significant highway projects planned for the four-county region that would have a major effect on the actions set forth in the 2016 Master Plan. Relatively minor highway projects that are in the pre-construction or planning stages include the rehabilitation of the State Highway 174 bridge and bridge approaches where it crosses the upper end of Whitney Lake; the widening of FM 933 from two lanes to four lanes from the city of Whitney to FM 1713; and repainting the FM 1713 bridge across Whitney Lake (TXDOT 2016). A light rail line to be completed by 2035 is planned within Johnson County running from the City of Cleburne to downtown Fort Worth. The presence of this light rail line could encourage people to live farther out from downtown Fort Worth.

4.3 ANALYSIS OF CUMULATIVE IMPACTS

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

4.3.1 Land Use

A major impact would occur if any action is inconsistent with adopted land use plans or if an action would substantially alter those resources required for, supporting, or benefiting the current use. Land use around Whitney Lake has experienced little change in the past several years. 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. Therefore, cumulative impacts on land use within the area surrounding Whitney Lake, when combined with past and proposed actions in the region, are anticipated to be negligible.

4.3.2 Water Resources

A major impact would occur if any action 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. Whitney Lake was developed for flood risk management, hydroelectric power, and recreation purposes. The reclassifications and resource objectives required to revise the Whitney Lake

Master Plan 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 Whitney Lake. Therefore, cumulative impacts on water resources within the area surrounding Whitney 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 2016 Master Plan, when combined with other existing and proposed projects in the region, would not result in major cumulative impacts on the climate.

4.3.4 Climate Change and GHG

Under the Proposed Action, current Whitney 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 Whitney Lake, the 2016 Master Plan and all associated documents would be reviewed and revised as necessary. Therefore, implementation of the 2016 Master Plan, when combined with other existing and proposed projects in the region, would result in negligible cumulative impacts on climate change or GHG.

4.3.5 Air Quality

No major highway or roadway projects are scheduled near the zone of interest for Whitney 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, due to the remote nature of the area, those impacts are negligible. Seasonal prescribed burning could occur on Whitney Lake and 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. A light rail line to be completed by 2035 is planned within Johnson County running from the City of Cleburne to downtown Fort Worth. The presence of this light rail line could encourage people to live farther out from downtown Fort Worth, possibly living as far out as the north end of Whitney Lake. This could increase use of Whitney Lake for recreational purposes and could increase emissions. Conversely, the use of the light rail system by citizens using Whitney Lake could also have a beneficial impact on air quality in the region due to the reduction of vehicle emissions. Implementation of the 2016 Master Plan, when combined with other existing and proposed projects in the region, could result in minor adverse and beneficial cumulative impacts on air quality.

4.3.6 Topography, Geology, and Soils

A major impact would occur if the action exacerbates or promotes long-term erosion, if the soils are inappropriate for the proposed construction and would create a risk to life or property, or if there would be a substantial reduction in agricultural

production or loss of Prime Farmland soils. Cumulative impacts on topography, geology, and soils within the area surrounding Whitney Lake, when combined with past and proposed actions in the region, are anticipated to be negligible.

4.3.7 Natural Resources

By implementing the 2016 Master Plan, the required reclassifications, resource objectives, and resource plan would allow land management and land uses to be compatible with the goals of good stewardship of natural resources. The Proposed Action would allow project lands to continue supporting USFWS and TPWD missions associated with wildlife conservation and implementation of operational practices that would protect and enhance wildlife and fishery populations and habitat. In addition, the Proposed Action would be compatible with conservation principles and measures to protect migratory birds as mandated by EO 13186. Long-term, beneficial impacts on natural resources could occur as a result of implementing the reclassifications outlined in the 2016 Master Plan. Therefore, implementation of the 2016 Master Plan, when combined with other existing and proposed projects in the region, would result in minor to moderate beneficial cumulative impacts on natural resources in the Whitney Lake area.

4.3.8 Threatened and Endangered Species

A major impact on protected species would occur if any action resulted in a jeopardy opinion for any endangered, threatened, or rare species. Under the Proposed Action, the USACE would continue cooperative management plans with USFWS and TPWD to preserve, enhance, and protect wildlife habitat resources. To further management opportunities and beneficially impact habitat diversity, the reclassifications, resources objectives, and resource plan proposed in the 2016 Master Plan include 2,268 acres as ESAs and 16,278 acres as MRML- Wildlife Management Lands. Cumulative impacts would be the same as described in Section 4.3.7.

4.3.9 Invasive Species

The Proposed Action would have beneficial impacts on native species as a result of programs such as the Whitney Lake hunting program, which encourages hunters to harvest feral hogs during legal seasons. Whitney Lake currently also implements the Whitney Lake Invasive Species Management program and would continue to do so regardless of the Proposed Action. Therefore, implementation of the 2016 Master Plan, when combined with other existing and proposed projects in the region, would not result in adverse cumulative impacts on native species as a result of invasive species control efforts. In fact, beneficial cumulative impacts would occur on native species through implementation of the 2016 Master Plan and other programs within the region supported by agencies such as TPWD and USFWS.

4.3.10 Cultural, Historical, and Archaeological Resources

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

4.3.11 Socioeconomics and Environmental Justice

The Proposed Action would not result in the displacement of persons (minority, low-income, children, or otherwise) as a result of implementing the reclassifications, resources objectives, and resource plan proposed in the 2016 Master Plan. 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 Whitney Lake area, would not be considered a major cumulative effect.

4.3.12 Recreation

Whitney Lake provides regionally significant outdoor recreation benefits including a variety of free 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 2016 Master Plan, these changes reflect changes in land management and historic recreation use patterns that have occurred since 1972 at Whitney Lake. The conversion of these lands would have no effect on current or projected public use. Therefore, the Proposed Action, when combined with other existing and proposed projects in the region, would result in negligible beneficial cumulative impacts on area recreational resources.

4.3.13 Aesthetic Resources

No impacts on visual resources would occur as a result of implementing the reclassifications, resources objectives, and resource plan proposed in the 2016 Master Plan. The Proposed Action, especially the classification of ESAs, in conjunction with other projects in the region, would result in minor beneficial cumulative impacts on the visual resources in the Whitney Lake area.

4.3.14 Hazardous Materials and Solid Waste

No hazardous material or solid waste concerns would be expected with implementation of the 2016 Master Plan; therefore, when combined with other ongoing and proposed projects in the Whitney Lake area, there would be no major cumulative 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 2016 Master Plan, when combined with other ongoing and proposed projects in the Whitney Lake area, would not be considered a major cumulative effect.

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SECTION 5: COMPLIANCE WITH ENVIRONMENTAL LAWS

This EA has been prepared to satisfy the requirements of all applicable environmental laws and regulations, and has been prepared in accordance with the CEQ's implementing regulations for NEPA, 40 CFR Parts 1500 – 1508, and the USACE ER 200-2-2, *Environmental Quality: Procedures for Implementing NEPA*. The revision of the 2016 Master Plan is consistent with the USACE's Environmental Operating Principles. The following is a list of applicable environmental laws and regulations that were considered in the planning of this project and the status of compliance with each:

Fish and Wildlife Coordination Act of 1958, as amended – The USACE initiated public involvement and agency scoping activities to solicit input on the 2016 Master Plan 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 2016 Master Plan.

Endangered Species Act of 1973, as amended – Current lists of threatened or endangered species were compiled for the revision of the 2016 Master Plan. There would be no adverse impacts on threatened or endangered species resulting from the revision of the 2016 Master Plan. However, beneficial impacts, such as habitat protection, could occur as a result of the revision of the 2016 Master Plan.

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 2016 Master Plan revision will not result in adverse impacts on migratory birds or their habitat. Beneficial impacts could occur through protection of habitat as a result of the 2016 Master Plan revision.

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

CWA of 1977 – 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 2016 Master Plan revision. There will be no change in the existing management of the reservoir that would impact water quality.

National Historic Preservation Act (NHPA) of 1966, as amended – Compliance with the NHPA of 1966, as amended, requires identification of all properties in the project area listed in, or eligible for listing in, the NRHP. All 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 will need to do so prior to any earthmoving or other potentially impacting activities.

Clean Air Act of 1977 – The USEPA established nationwide air quality standards to protect public health and welfare. Existing operation and management of the reservoir is compliant with the Clean Air Act and will not change with the 2016 Master Plan revision.

Farmland Protection Policy Act (FPPA) of 1980 and 1995 – The FPPA's purpose is to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses. There is no Prime Farmland on Whitney Lake Project Office Lands.

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

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

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

Executive Order 12898, Environmental Justice – This EO directs Federal agencies to achieve environmental justice to the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review. Agencies are required to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. The revision of the 2016 Master Plan will not result in a disproportionate adverse impact on minority or low-income population groups.

SECTION 6: IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES

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

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SECTION 7: PUBLIC AND AGENCY COORDINATION

In accordance with 40 CFR §§1501.7, 1503, and 1506.6, the USACE initiated public involvement and agency scoping activities to solicit input on the 2016 Master Plan revision process, as well as identify reclassification proposals, and identify significant issues related to the Proposed Action. The first action was a scheduled public scoping meeting providing an avenue for public and agency stakeholders to ask questions and provide comments. The public scoping meeting was held on 14 July 2015 at the Whitney Independent School District Auditorium in Whitney, Texas. The USACE, Fort Worth District, placed advertisements on the USACE webpage, social media, and print publications 2 weeks prior to the public scoping meeting. Appendix A includes the ads published in the local newspaper, the agency coordination letters, and the distribution list for the coordination letters. Please refer to Section 7.1 of the 2016 Master Plan for a summary of comments received at the public meeting. The EA was coordinated with agencies having legislative and administrative responsibilities for environmental protection. A copy of the correspondence from the agencies that provided comments and planning assistance for preparation of the EA are included in Appendix A.

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SECTION 9: ACRONYMS/ABBREVIATIONS

%	Percent
°	Degrees
BMP	Best Management Practice
BP	Before Present
CAP	Climate Action Plan
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO2e	CO2-equivalent
CWA	Clean Water Act
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EP	Engineer Pamphlet
ER	Engineer Regulation
ERS	Environmental Radiation Surveillance
ESA	Environmentally Sensitive Area
F	Fahrenheit
FAA	Federal Aviation Administration
FONSI	Finding of No Significant Impact
GHG	Greenhouse Gas
GCWA	Golden-cheeked Warbler
MRML	Multiple Resource Management Lands
msl	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO	Nitrogen Oxide
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRRS	National Recreation Reservation Service
O_3	Ozone
OAQPS	Office of Air Quality Planning and Standards
Pb	Lead
PCB	Polychlorinated Biphenyls
PCPI	Per Capita Personal Incomes
$PM_{2.5}$	Particulate Matter Less than 2.5 Microns
PM_{10}	Particulate Matter Less than 10 Microns
ROD	Record of Decision
RPEC	Regional Planning and Environmental Center
SGCN	Species of Greatest Conservation Need
SO_2	Sulfur Dioxide

SUPER	USACE Suite of Computer Programs
TCAP	Texas Conservation Action Plan
TCEQ	Texas Commission on Environmental Quality
TCLP	Toxicity Characteristic Leaching Procedure
TPWD	Texas Parks and Wildlife Department
U.S.	United States
U.S.C.	U.S. Code
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VOC	Volatile Organic Compounds
WHAP	Wildlife Habitat Appraisal Procedures

SECTION 10: LIST OF PREPARERS

Josh McEnany - NEPA Specialist, Gulf South Research Corporation; 16 years of experience.

Mandy McGuire - Environmental Resources Planner, Regional Planning and Environmental Center; 5 years of USACE experience.

William HaferKamp – Environmental Stewardship BLM, Three Rivers Regional Project Office, Fort Worth District; X years of USACE experience.

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APPENDIX A
PUBLIC AND AGENCY COORDINATION

News Release

U.S. ARMY CORPS OF ENGINEERS BUILDING STRONG®

For Immediate Release:

Contact: Denisha Braxton 817-886-1435
denisha.l.braxton@usace.army.mil

Corps to host public meeting for the Whitney Lake Master Plan revision

FORT WORTH, Texas – The Fort Worth District, U.S. Army Corps of Engineers (USACE) will host a public meeting on July 14, 2015 to gain public input as it prepares to update and revise the Master Plan for Whitney Lake.

The public meeting will be held at the Whitney High School Auditorium, 1400 N Brazos St, Whitney, TX 76692 and is open to the general public. An "Open House" will begin at 6:00 p.m. followed by a formal presentation at 6:15 p.m. At the conclusion of the presentation there will be time for the public to view maps, ask questions and provide comments about the project.

Whitney Lake was constructed by USACE in 1951 for congressionally authorized purposes of flood control and hydroelectric power generation. After a record-breaking drought in Texas in the 1950's, most USACE reservoirs, including Whitney Lake, were congressionally authorized to serve a water conservation purpose. The current Master Plan for Whitney Lake was prepared in June 1972 and 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, 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.

A Master Plan is defined 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 used by the general public. The Master Plan does not directly address the Shoreline Management Plan which governs private boat docks , nor does the Master Plan address in detail the technical operational aspects of the lake with respect to flood risk management or hydroelectric power generation.

The Master Plan study area will include the Whitney Lake proper and all adjacent recreational and natural resource properties under federal control.

Questions pertaining to the proposed revision can be addressed to: Mr. Billy Haferkamp, Project Manager, CESWF-OD-R, U.S. Army Corps of Engineers, Whitney Lake Office, 285 CR 3602, Clifton, TX 76634, (254) 622-7405, and Ms. Susan Wolters, Project Manager, CESWF-PEC-PM, U.S. Army Corps of Engineers, Fort Worth District, P.O. Box 17300, Fort Worth, TX 76102-0300, (817) 886-1923.

About the Fort Worth District: The Fort Worth District, U.S. Army Corps of Engineers was established in 1950. The District is responsible for water resources development in two-thirds of Texas, and design and construction at military installations in Texas and parts of Louisiana and New Mexico. Visit the Fort Worth District Web site at: www.swf.usace.army.mil and SWF Facebook at: http://www.facebook.com/pages/Fort-Worth-District-US-Army-Corps-of-Engineers/188083711219308.

DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
WHITNEY LAKE PROJECT OFFICE
285 CR 3602
CLIFTON, TX 76634

June 17, 2015

CESWF-OD-R

MEMORANDUM FOR: Whitney Lake Partners, Local Municipalities, and Stakeholders

SUBJECT: Whitney Lake Master Plan

The Fort Worth District, U.S. Army Corps of Engineers (USACE) will host two meetings on July 14, 2015 to gain public input as we prepare to revise the Master Plan for Whitney Lake.

The first meeting will be held for our partners, local municipalities, and key stakeholders. The meeting will be held at the Whitney ISD Auditorium, 305 San Jacinto, Whitney, TX 76692. The formal presentation will begin at 3:00 p.m. At the conclusion of the presentation there will be time for attendees to view maps, ask questions, and provide comments about the project.

A public meeting will also be conducted at the Whitney ISD Auditorium, 305 San Jacinto, Whitney, TX 76692, and will be open to the general public. An “Open House” will begin at 6:00 p.m. followed by a formal presentation at 6:15 p.m. At the conclusion of the presentation there will be time for the public to view maps, ask questions, and provide comments about the project.

Whitney Lake was constructed by USACE in 1951 for congressionally authorized purposes of flood control and hydroelectric power generation. After a record-breaking drought in Texas in the 1950’s, most USACE reservoirs, including Whitney Lake, were congressionally authorized to serve a water conservation purpose. The current Master Plan for Whitney Lake was prepared in June 1972 and 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, 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.

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generation. The Master Plan study area will include Whitney Lake proper and all adjacent recreational and natural resource properties under federal control.

Questions pertaining to the proposed revision can be addressed to Mr. Billy Haferkamp, Project Manager, CESWF-OD-R, U.S. Army Corps of Engineers, Whitney Lake Office, 285 CR 3602, Clifton, TX 76634, (254) 622-7405, and Ms. Susan Wolters, Project Manager, CESWF-PEC-PM, U.S. Army Corps of Engineers, Fort Worth District, P.O. Box 17300, Fort Worth, TX 76102-0300, (817) 886-1923.

Sincerely,

Abraham Phillips
Whitney Lake Manager

Whitney Lake Master Plan Revision
Public Meeting Notification
Agency Distribution List

The following agencies and contacts received email notification of the Whitney Lake Master Plan Public Meeting which was held July 14, 2015 at the Whitney Independent School District Auditorium in Whitney, Texas:

Texas Historical Commission
State Historic Preservation Office
Ms. Rebecca Shelton
rebecca.shelton@thc.state.tx.us
Mr. Bill Martin
bill.martin@thc.state.tx.us

Texas Parks and Wildlife Department
Mr. Tom Heger
tom.heger@tpwd.texas.gov
Ms. Julie Wicker
julie.wicker@tpwd.texas.gov

Texas Commission on Environmental Quality
Mr. David Galindo
david.galindo@tceq.texas.gov
Mr. Gregg Easley
gregg.easley@tceq.texas.gov

U.S. Fish and Wildlife Service
Ms. Sidney Puder
sidney_puder@fws.gov
Ms. Debra Bills
debra_bills@fws.gov

U.S. Environmental Protection Agency
Mr. Michael Jansky
jansky.michael@epa.gov
Ms. Rhonda Smith
smith.rhonda@epa.gov

Mr. James Arterberry
Comanche Nation THPO
584 NE Bingo Rd
Lawton, OK 73507

Honorable Amber Toppah, Chairman
Kiowa Tribe of Oklahoma
Hwy 9 West
Carnegie, OK 73015

Wichita Tribe
Wichita Executive Committee
Honorable Terri Parton, President
1 1/2 Mile North on Hwy 281,
Anadarko, OK 73 005

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arlington Ecological Services Field Office
2005 NE GREEN OAKS BLVD, SUITE 140
ARLINGTON, TX 76006
PHONE: (817)277-1100 FAX: (817)277-1129
URL: www.fws.gov/southwest/es/arlingtontexas/;
www.fws.gov/southwest/es/EndangeredSpecies/lists/

Consultation Code: 02ETAR00-2016-SLI-0713 May 31, 2016
Event Code: 02ETAR00-2016-E-00773
Project Name: Whitney Lake Master Plan Update

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

To Whom It May Concern:

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

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

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

After evaluating the potential effects of a proposed action on federally listed species, one of the

following determinations should be made by the Federal agency:

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

The Service recommends that candidate species, proposed species, and proposed critical habitat be addressed should consultation be necessary. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:
http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

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.

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

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

For additional information concerning migratory birds and eagle conservation plans, please contact the Service's Migratory Bird Office at 505-248-7882.

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

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Whitney Lake Master Plan Update

Official Species List

Provided by:

Arlington Ecological Services Field Office
2005 NE GREEN OAKS BLVD
SUITE 140
ARLINGTON, TX 76006
(817) 277-1100
http://www.fws.gov/southwest/es/arlingtontexas/
http://www.fws.gov/southwest/es/EndangeredSpecies/lists/

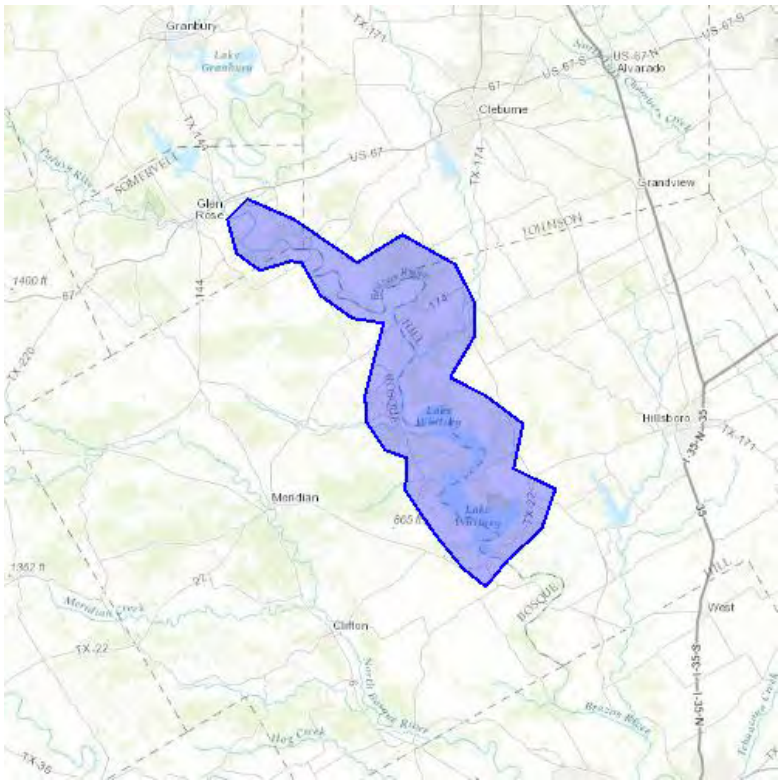
Consultation Code: 02ETAR00-2016-SLI-0713
Event Code: 02ETAR00-2016-E-00773

Project Type: LAND - MANAGEMENT PLANS

Project Name: Whitney Lake Master Plan Update
Project Description: The study area includes all lands managed by US Army Corps of Engineers at the Whitney Lake Project. This revision of the Whitney Lake Master Plan is intended to bring the master plan up to date to reflect ecological, socio-demographic, and outdoor recreation trends that are currently impacting the lake, as well as those anticipated to occur within the planning period of 2016 to 2041, a 25-year period. The Master Plan, is the strategic land use management document that guides the efficient, cost-effective, comprehensive management, development, and use of recreation, natural resources, and cultural resources throughout the life of the Whitney Lake project. It is a vital tool for responsible stewardship and sustainability of the project's natural and cultural resources, and the provision of outdoor recreation facilities and opportunities on federal land associated with Whitney Lake for the benefit of present and future generations. The Master Plan guides and articulates USACE responsibilities pursuant to federal laws to preserve, conserve, restore, maintain, manage, and develop the land, water, and associated resources.

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

Project Location Map:



Project Coordinates: The coordinates are too numerous to display here.

Project Counties: Bosque, TX | Hill, TX | Johnson, TX | Somervell, TX

Endangered Species Act Species List

There are a total of 8 threatened, endangered, or candidate species on your 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 3 of these species should be considered only under certain conditions. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Birds	**Status**	**Has Critical Habitat**	**Condition(s)**
Black-Capped Vireo *(Vireo atricapilla)* Population: Entire	Endangered		
golden-cheeked warbler *(Dendroica chrysoparia)* Population: Entire	Endangered		
Least tern *(Sterna antillarum)* Population: interior pop.	Endangered		Wind Energy Projects
Piping Plover *(Charadrius melodus)* Population: except Great Lakes watershed	Threatened	Final designated	Wind Energy Projects
Red Knot *(Calidris canutus rufa)*	Threatened		Wind Energy Projects
Whooping crane *(Grus americana)* Population: except where EXPN	Endangered	Final designated	
Clams			
Smooth Pimpleback *(Quadrula houstonensis)*	Candidate		
Texas Fawnsfoot *(Truncilla*	Candidate		

macrodon)			

Critical habitats that lie within your project area

There are no critical habitats within your project area.

APPENDIX C – TEXAS PARKS AND WILDLIFE SPECIES OF GREATEST CONSERVATION NEED

CROSS TIMBERS SPECIES OF GREATEST CONSERVATION NEED				
Scientific Name	**Common Name**	**Status**		**General Habitat Type(s) in Texas** **These are VERY broad habitat types as a starting place**
		Federal	**State**	
MAMMALS				
Conepatus leuconotus	Hog-nosed skunk			Shrubland, Savanna/Open Woodland, Barren/Sparse Vegetation,
Dipodomys elator	Texas kangaroo rat		T	Shrubland, Agricultural
Lutra canadensis	River otter			Riparian
Mustela frenata	Long-tailed weasel			Forest, Woodland, Desert Scrub, Shrubland, Savanna/Open Woodland
Myotis velifer	Cave myotis			Caves/Karst,
Neovison vison	Mink			Riparian, Riverine, Lacustrine, Freshwater Wetland
Puma concolor	Mountain lion			Forest, Woodland, Desert Scrub, Shrubland, Savanna/Open Woodland, Riparian
Spilogale putorius	Eastern spotted skunk			Savanna/Open Woodland, Grassland
Sylvilagus aquaticus	Swamp rabbit			Riparian, Freshwater Wetland
Tadarida brasiliensis	Brazilian free-tailed bat			Cave/Karst, Artificial Refugia
Taxidea taxus	American badger			Grassland, Desert scrub, Woodland, Savanna/Open Woodland, Forest
BIRDS				
Anas acuta	Northern Pintail			Lacustrine, freshwater wetland, saltwater wetland, coastal, marine

CROSS TIMBERS SPECIES OF GREATEST CONSERVATION NEED				
Scientific Name	**Common Name**	**Status**		**General Habitat Type(s) in Texas** **These are VERY broad habitat types as a starting place**
Colinus virginianus	Northern Bobwhite			Grassland, Shrubland, Savanna/Open Woodland
Tympanuchus cupido	Greater Prairie-Chicken (Interior)			Grassland
Meleagris gallopavo	Wild Turkey			Shrubland, Savanna/Open Woodland, Forest, Riparian, Agricultural
Egretta thula	Snowy Egret			Riparian, Riverine, Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary, Coastal, Cultural Aquatic
Egretta caerulea	Little Blue Heron			Riparian, Riverine, Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary, Coastal, Cultural Aquatic
Butorides virescens	Green Heron			Riparian, Riverine, Lacustrine, Freshwater Wetland, Cultural Aquatic
Ictinia mississippiensis	Mississippi Kite			Woodland, Forest, Riparian, Developed:Urban/Suburban/Rural
Haliaeetus leucocephalus	Bald Eagle			Riparian, Lacustrine, Freshwater Wetland, Saltwater Wetland
Circus cyaneus	Northern Harrier			Grassland, Shrubland
Buteo lineatus	Red-shouldered Hawk			Woodland, Forest, Riparian, Freshwater Wetland
Buteo swainsoni	Swainson's Hawk			Desert Scrub, Grassland, Shrubland
Pluvialis dominica	American Golden-Plover			Grassland, Freshwater Wetland, Agricultural
Sternula antillarum	Least Tern	LE*	E*	Riverine, Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary, Coastal, Marine, Developed: Industrial

CROSS TIMBERS SPECIES OF GREATEST CONSERVATION NEED				
Scientific Name	**Common Name**	**Status**		**General Habitat Type(s) in Texas** **These are VERY broad habitat types as a starting place**
Athene cunicularia	Burrowing Owl			Desert Scrub, Grassland, Shrubland, Agricultural, Developed
Asio flammeus	Short-eared Owl			Grassland, Shrubland, Agricultural
Caprimulgus carolinensis	Chuck-will's-widow			Woodland, Forest, Riparian
Melanerpes erythrocephalus	Red-headed Woodpecker			Savanna/Open Woodland, Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural
Tyrannus forficatus	Scissor-tailed Flycatcher			Desert Scrub, Grassland, Shrubland, Agricultural, Developed
Lanius ludovicianus	Loggerhead Shrike			Desert Scrub, Grassland, Shrubland, Savanna/Open Woodland, Agricultural, Developed
Vireo bellii	Bell's Vireo			Desert scrub, Shrubland, Riparian
Vireo atricapilla	Black-capped Vireo	LE	E	Shrubland
Poecile carolinensis	Carolina Chickadee			Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural
Anthus spragueii	Sprague's Pipit	C		Barren/Sparse Vegetation, Grassland, Shrubland, Agricultural
*Dendroica chrysoparia**	Golden-cheeked Warbler	LE	E	Woodland
Aimophila cassinii	Cassin's Sparrow			Grassland, Shrubland
Aimophila ruficeps	Rufous-crowned Sparrow			Grassland
Spizella pusilla	Field Sparrow			Grassland, Shrubland, Savanna/Open Woodland
Ammodramus savannarum	Grasshopper Sparrow			Grassland, Agricultural

CROSS TIMBERS SPECIES OF GREATEST CONSERVATION NEED				
Scientific Name	**Common Name**	**Status**		**General Habitat Type(s) in Texas** **These are VERY broad habitat types as a starting place**
Chondestes grammacus	Lark Sparrow			Grassland, Shrubland, Savanna/Open Woodland
Ammodramus leconteii	Le Conte's Sparrow			Grassland
Zonotrichia querula	Harris's Sparrow			Shrubland, Agricultural
Calcarius mccownii	McCown's Longspur			Grassland, Agricultural
Piranga rubra	Summer Tanager			Savanna/Open Woodland, Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural
Passerina ciris	Painted Bunting			Shrubland, Agricultural
Spiza americana	Dickcissel			Grassland, Agricultural
Sturnella magna	Eastern Meadowlark			Grassland, Shrubland, Savanna/Open Woodland
Icterus spurius	Orchard Oriole			Shrubland, Savanna/Open Woodland, Woodland, Riparian
REPTILES AND AMPHIBIANS				
Anaxyrus (Bufo) woodhousii	Woodhouse's toad			Woodland, forest, freshwater wetland
Apalone mutica	smooth softshell turtle			Riparian, riverine, lacustrine, freshwater wetland
Cheylydra serpentina	Common snapping turtle			Riparian, riverine
Crotalus atrox	Western diamondback rattlesnake			Barren/sparse vegetation, desert scrub, grassland, shrubland, savanna, woodland, caves/karst
Crotalus horridus	Timber (Canebrake) Rattlesnake		T	Woodland, forest, riparian
Eurycea chisolmensis	Salado Springs salamander	C		Freshwater wetland (springs)

CROSS TIMBERS SPECIES OF GREATEST CONSERVATION NEED				
Scientific Name	**Common Name**	**Status**		**General Habitat Type(s) in Texas** **These are VERY broad habitat types as a starting place**
Eurycea naufragia	Georgetown Salamander	C		Caves and karst, freshwater wetland (springs)
Graptemys versa	Texas map turtle			Riparian, riverine
Heterodon nasicus	Western hognosed snake			Desert scrub, grassland, shrubland
Macrochelys temminckii	alligator snapping turtle		T	Riparian, riverine, cultural aquatic
Nerodia harteri	Brazos Water Snake		T	Riparian, riverine, cultural aquatic
Phrynosoma cornutum	Texas horned lizard		T	Desert scrub, grassland, savanna
Pseudacris streckeri	Strecker's Chorus Frog			Grassland, savanna, woodland, riparian, cultural aquatic, freshwater wetland
Sistrurus catenatus	massasauga			Grassland, barren/sparse vegetation, shrubland, coastal,
Terrapene ornata	Ornate box turtle			Grassland, barren/sparse vegetation, deset scrub, savanna, woodland
Thamnophis sirtalis annectans	Texas Garter Snake (Eastern/Texas/ New Mexico)			Riparian, around lacustrine and cultural aquatic sites
Trachemys scripta	Red-eared slider			Riparian, riverine, lacustrine, freshwater wetland, cultural aquatic
FRESHWATER FISHES				
Anguilla rostrata	American eel			Streams and reservoirs in drainages connected to marine environments
Cycleptus elongatus	Blue sucker		T	Large, deep rivers, and deeper zones of lakes
Hiodon alosoides	Goldeye			Variety of habitats: medium to large rivers, small lakes, ponds and connected marshes, and

CROSS TIMBERS SPECIES OF GREATEST CONSERVATION NEED				
Scientific Name	**Common Name**	**Status**		**General Habitat Type(s) in Texas** **These are VERY broad habitat types as a starting place**
				muddy shallows of large lakes; backwaters
Ictalurus lupus	Headwater catfish			Clear streams and rivers with moderate gradients, deep spring runs
Macryhbopsis storeriana	Silver chub			Broad rivers with low gradient which flow through old mature valley; bottoms gravel to silt, but more common over silt or mud, turbid water with very soft sand/silt substrate. Normally inhabits pools, will move to riffle if siltation is heavy; when large streams very turbid or depositing unusually large amounts of silt, will temporarily migrate into clearer streams of higher gradients; when waters were very clear individuals move to deeper water
Micropterus treculii	Guadalupe bass			Small lentic environments; commonly taken in flowing water
Notropis bairdi	Red River shiner			turbid waters of broad, shallow channels of main stream, over bottom mostly of silt and shifting sand; streambeds with widely fluctuating flows subject to high summer temperatures, high rates of evaporation, and high concentrations of dissolved solids; tolerant of high salinities
Notropis oxyrhynchus	Sharpnose shiner	C		Moderate current velocities and depths, sand bottom
Notropis potteri	Chub shiner		T	Turbid, flowing water with silt or sand substrate; tolerant of high salinities

CROSS TIMBERS SPECIES OF GREATEST CONSERVATION NEED				
Scientific Name	**Common Name**	**Status**		**General Habitat Type(s) in Texas** **These are VERY broad habitat types as a starting place**
Polyodon spathula	Paddlefish		T	Large river systems and tributaries; deepwater channel habitats; low-gradient areas of moderate to large-sized rivers, sluggish pools, backwaters, bayous, and oxbows with abundant zooplankton; large reservoirs if connected to/can access free-flowing streams in the spring for spawning
INVERTEBRATES				
Amblycorypha uhleri	A katydid			Savanna/Open Woodland
Arethaea ambulator	A katydid			Savanna/Open Woodland
Bombus pensylvanicus	American bumblebee			Grassland, Savanna/Open Woodland
Pleurobema riddellii	Louisiana pigtoe		T	Riverine
Pogonomyrmex comanche	Comanche harvester ant			Barren/Sparse Vegetation
Potamilus amphichaenus	Texas heelsplitter		T	Riverine
Quadrula aurea	Golden orb		T	Riverine
Quadrula houstonensis	Smooth pimpleback		T	Riverine
Quadrula mitchelli	False Spike		T	Riverine
Taeniopteryx starki	Texas willowfly			Riparian, Riverine
Truncilla macrodon	Texas fawnsfoot		T	Riverine
PLANTS				
Agalinis auriculata	earleaf false foxglove			Savanna/Open Woodland; Grrassland
Agalinis densiflora	Osage Plains false foxglove			Savanna/Open Woodland - Outcrops
Argythamnia aphoroides	Hill Country wild-mercury			Savanna/Open Woodland

CROSS TIMBERS SPECIES OF GREATEST CONSERVATION NEED				
Scientific Name	**Common Name**	**Status**		**General Habitat Type(s) in Texas** **These are VERY broad habitat types as a starting place**
Carex edwardsiana	canyon sedge			Woodland (slopes above Riparian)
Carex shinnersii	Shinner's sedge			Grassland
Clematis texensis	scarlet leather-flower			Woodland
Croton alabamensis var. texensis	Texabama croton			Woodland
Cuscuta exaltata	tree dodder			Woodland
Dalea reverchonii	Comanche Peak prairie-clover			Savanna/Open Woodland; Grassland
Echinacea atrorubens	Topeka purple-coneflower			Savanna/Open Woodland
Festuca versuta	Texas fescue			Woodland
Gaura triangulata	prairie butterfly-weed			Grassland
Hexalectris nitida	Glass Mountains coral-root			Woodland
Ipomoea shumardiana	Shumard's morning glory			Savanna/Open Woodland
Liatris glandulosa	glandular gay-feather			Savanna/Open Woodland
Oenothera coryi	Cory's Evening-primrose			Savanna/Open Woodland
Pediomelum cyphocalyx	turnip-root scurfpea			Grassland
Pediomelum reverchonii	Reverchon's curfpea			Grassland
Physaria engelmannii	Engelmann's bladderpod			Savanna/Open Woodland
Prunus minutiflora	Texas almond			Savanna/Open Woodland

CROSS TIMBERS SPECIES OF GREATEST CONSERVATION NEED				
Scientific Name	**Common Name**	**Status**		**General Habitat Type(s) in Texas** **These are VERY broad habitat types as a starting place**
Schoenoplectus hallii	Hall's baby bulrush			Freshwater Wetland (ponds)
Senecio quaylei	Quayle's butterweed			Savanna/Open Woodland
Styrax platanifolius subsp. platanifolius	sycamore-leaf snowbell			Woodland
Valerianella stenocarpa	bigflower cornsalad			Savanna/Open Woodland
Yucca necopina	Glen Rose yucca			Savanna/Open Woodland

APPENDIX D – US FISH AND WILDLIFE SERVICE (USFWS) GOLDEN CHEEKED WARBLER (GCWA) SURVEY REPORT

U.S. Fish & Wildlife Service
Arlington, Texas, Ecological Services

INVESTIGATIONS OF U.S. ARMY CORPS OF ENGINEERS LANDS AT WHITNEY LAKE FOR THE ENDANGERED GOLDEN-CHEEKED WARBLER AND BLACK-CAPPED VIREO 2015

Prepared by
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September 2015

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Acknowledgements: The authors are grateful to William Haferkamp and Brady Dempsey of the U.S. Army Corps of Engineers, and Whitney Lake staff during the execution of this project, whose assistance and accommodation was essential in conducting this study. The authors wish to further acknowledge Debra Bills and Omar Bocanegra for reviewing this document and providing input vital to its completion. Sean Edwards would also like to acknowledge Dr. Robert M. Neill for his lasting instruction.

Golden-cheeked warbler and black-capped vireo cover photos: Service Images

1.0 INTRODUCTION

An investigation of the status of the endangered golden-cheeked warbler (*Setophaga chrysoparia* [GCWA]) was conducted by the U.S. Fish and Wildlife Service (Service) spanning March 16 to April 30, 2015 on U.S. Army Corps of Engineers (Corps) lands at Whitney Lake in Bosque, Hill, and Johnson Counties, Texas. The purpose of this investigation was threefold: 1) to conduct presence/absence surveys for GCWAs at suspected locations which had not been previously surveyed and to confirm continued presence at an area (Upper Brazos) where detections had been recorded prior to recent recreational development and an unauthorized timber harvest, 2) to evaluate habitat suitability of unexplored areas suspected to contain potential habitats for GCWAs and to determine presence if found suitable, and 3) to search for habitat for and presence of the endangered black-capped vireo (*Vireo atricapilla* [BCVI]). Potential habitat for BCVIs occurs at Whitney Lake, often adjacent to GCWA habitat areas. Data resulting from this investigation would aid in the assessment of the Corps' inventory of protected resources and in their recovery efforts for federally listed-species pursuant to section 7(a)(1) of the Endangered Species Act of 1973, as amended. The Service would also benefit from these activities by furthering the recovery of the GCWA; recovery of federally-listed species being one of the Service's highest priorities. The *Golden-cheek Warbler Recovery Plan* (Service 1992) includes criteria for the recovery and delisting of this species, including the provision that "all existing GCWA populations on public lands are protected and managed to ensure their continued existence." This study is supplemental to the 2008, 2009 and 2011 efforts of the Service to investigate the presence of federally-listed species and their habitats at Whitney Lake.

Upon completion of surveys and results analysis, the surveyors recorded a minimum of 22 GCWA detections. GCWA presence was confirmed at four of the five selected study areas. A single BCVI detection was also recorded. The surveyors covered approximately (≈) 52 miles on foot during this investigation. An additional ≈85 miles was covered by boat during survey staging and visual reconnaissance for additional habitat areas.

2.0 BACKGROUND INFORMATION

Construction of Whitney Lake was authorized in the Flood Control Act of 1944. In addition to flood control, other purposes of the reservoir include water conservation, production of hydroelectric power, and public recreation. Construction began on the dam in May 1947 and was completed in December 1951. Construction of the powerhouse began in April 1951 and was completed in June 1953. Approximately 20,000 acres of *in fee* property surrounding Whitney Lake is owned and managed by the Corps and spans portions of Bosque, Hill, and Johnson Counties in north central Texas.

Prior surveys for GCWA at Whitney Lake were performed in 1996, 1997, and 1998 by private consulting firms revealing presence at several locations. A 2005 study conducted by the U.S. Army Engineer Research and Development Center indicated continued presence at two previously surveyed locations. A 2008 investigation by the authors of this report recorded 61 positive GCWA detections and mapped suitable habitat areas. Subsequent 2009 and 2011 efforts

recorded 29 and 15 positive GCWA detections respectively, and investigated habitat and potential presence for the BCVI although this species was not found. Each of these prior investigations is detailed in Appendix C.

The Corps property at Whitney Lake which functions as habitat for the GCWA is of unique importance to the Service regarding recovery efforts for this species. The Service's Recovery Plan (Service 1992) for the GCWA dictates that recovery efforts must include "…protection of sufficient breeding habitat to ensure the continued existence of at least one viable, self-sustaining population in each of the eight recovery regions, and all existing GCWA populations on public lands are protected and managed to ensure their continued existence." The habitat at Whitney Lake occurs within GCWA Recovery Region 2 where less than 50 birds have been documented in years prior to 2008. Due to the limited amount of public land and GCWA breeding habitat in Recovery Region 2, Whitney Lake may represent the most realistic opportunity to pursue substantial GCWA recovery efforts within this region.

Although BCVIs have been sporadically recorded in typically non-nesting habitat on Corps property at Whitney Lake, very little is known regarding their presence or the availability of nesting habitat. Determination of BCVI presence/absence or identification of suitable habitat at Whitney Lake is important for this poorly documented portion of their breeding range and may be useful in the recovery of this species for reasons similar to those for the GCWA listed above.

3.0 GOLDEN-CHEEKED WARBLER INFORMATION

Species Description and Life History

The GCWA was emergency listed as endangered on May 4, 1990 (55 FR 18844). The final rule listing the species was published on December 27, 1990 (55 FR 53160). No critical habitat is designated for this species.

The GCWA is a small, insectivorous songbird, 4.5 inches to 5 inches long with a wingspan of approximately 8 inches (Pulich 1965 and 1976, Oberholser 1974). GCWAs breed exclusively in the mixed Ashe juniper (*Juniperus ashei)*/deciduous woodlands of the central Texas Hill Country west and north of the Balcones Fault (Pulich 1976). GCWAs require the shredding bark produced by mature Ashe junipers for nest material. Typical deciduous woody species include Texas red oak (*Quercus buckleyi*), Lacey oak (*Q. laceyi*), plateau live oak (*Q. fusiformis*), Texas ash (*Frazinus texensis*), cedar elm (*Ulmus crassifolia*), hackberry (*Celtis occidentalis*), bigtooth maple (*Acer grandidentatum*), sycamore (*Platanus occidentalis*), Arizona walnut (*Juglans major*), and pecan (*Carya illinoinensis*) (Pulich 1976, Ladd 1985, Wahl et al. 1990). Breeding and nesting GCWAs feed primarily on insects, spiders, and other arthropods found in Ashe junipers and associated deciduous tree species (Pulich 1976).

Male GCWAs arrive in central Texas around March 1st and begin to establish breeding territories, which they defend against other males by singing from visible perches within their territories. Females arrive a few days later, but are more difficult to detect in the dense woodland habitat (Pulich 1976). Three to five eggs are generally incubated in April, and unless there are additional

nesting attempts, nestlings fledge in May to early June (Pulich 1976). If there is a second nesting attempt, it is typically in mid-May with nestlings fledging in late June to early July (Pulich 1976). By late July, GCWAs begin their migration south (Chapman 1907, Simmons 1924). GCWAs winter in the highland pine-oak woodlands of southern Mexico and northern Central America (Kroll 1980).

Historical and Current Distribution

The GCWA's entire breeding range occurs on the Edwards Plateau and Lampasas Cut Plain of central Texas. GCWAs have been confirmed in 39 counties: Bandera, Bell, Bexar, Blanco, Bosque, Burnet, Comal, Coryell, Dallas, Eastland, Edwards, Erath, Gillespie, Hamilton, Hays, Hill, Hood, Jack, Johnson, Kendall, Kerr, Kimble, Kinney, Lampasas, Llano, Mason, McLennan, Medina, Menard, Palo Pinto, Real, San Saba, Somervell, Stephens, Tom Green, Travis, Uvalde, Williamson, and Young. However, many of the counties where it is known to occur, now or in the past, have only small amounts of suitable habitat (Pulich 1976, Service 1996, Lasley et al. 1997). Studies have attributed this trend to be the result of residential and commercial development, highways, transmission corridors, reservoirs, and human population growth (Groce et al. 2010, Service 2014). Diamond (2007) estimated that the amount of suitable GCWA habitat across the species' range was approximately 4.2 million acres, much of this habitat occurring on private lands. As a result, the population status for the GCWA on private lands remains undocumented throughout major portions of the breeding range.

Reasons for Decline and Threats to Survival

Before 1990, the primary reason for GCWA habitat loss was juniper clearing to improve conditions for livestock grazing. Since then, habitat loss has occurred as suburban developments spread into prime GCWA habitat. Groce et al. (2010) summarized the rates of expected human population growth within the range of the GCWA and found by 2030 the growth rate ranges from 17 percent around the Dallas-Fort Worth area to over 164 percent around San Antonio. As the human population continues to increase, so do associated roads, single and multi-family residences, and infrastructure, resulting in continued habitat destruction, fragmentation, and increased edge effects (Groce et al. 2010).

Fragmentation is the reduction of large blocks of habitat into several smaller patches. While GCWAs have been found to be reproductively successful in small patches of habitat <50 acres), there is an increased likelihood of occupancy and abundance as patch size increases (Coldren 1998, Butcher et al. 2010, DeBoer and Diamond 2006). Increases in pairing and territory success are also correlated with increasing patch size (Arnold et al. 1996, Coldren 1998, Butcher et al. 2010). In addition, while some studies have suggested that small patches that occur close to larger patches are likely to be occupied by GCWAs, the long-term survival and recovery of the GCWA is dependent on maintaining the larger patches (Coldren 1998, Peterson 2001, The Nature Conservancy [TNC] 2002).

As GCWA habitat fragmentation increases the amount of GCWA habitat edge, where two or more different vegetation types meet, also increases. For the GCWA, edge habitat where woodland becomes shrubland, grassland, a subdivision, etc., and depending on the type of edge, can act as a

barrier for dispersal; act as a territory boundary; favor certain predators; increase nest predation; and reduce reproductive output (Johnston 2006, Arnold et al. 1996). Canopy breaks (the distance from the top of one tree to another) as little as 36 feet have been shown to be barriers to GCWA movement (Coldren 1998). Territory boundaries have not only been shown to stop at edges, but GCWAs are more often farther from habitat edges (Beardmore 1994, DeBoer and Diamond 2006, Sperry 2007).

Other threats to GCWAs include the clearing of deciduous oaks where the GCWA forage, oak wilt infection in trees, nest parasitism by brown headed cowbirds (*Molothrus ater*) (Engels and Sexton 1994), drought, fire, stress associated with migration, competition with other avian species, and particularly, loss of habitat from urbanization (Ladd and Gass 1999). Human activities have eliminated GCWA habitat throughout portions of their range, particularly areas associated with the I-35 corridor between the Austin and San Antonio metropolitan areas.

Range-wide Survival and Recovery Needs

The recovery strategy outlined in the *Golden-cheeked Warbler Recovery Plan* (Service 1992), which is being revised, divides the breeding range of the GCWA into eight regions, or units, and calls for the protection of sufficient habitat to support at least one self-sustaining population in each unit. These recovery units were delineated based primarily on watershed, vegetation, and geologic boundaries (Service 1992).

Based on the *Golden-cheeked Warbler Recovery Plan* (Service 1992), and the 2014 Five-Year Review (Service 2014), protection and management of occupied habitat and minimization of degradation, development, or environmental modification of unoccupied habitat necessary for buffering nesting habitat are necessary to provide for the survival of the species. Habitat protection must include elements of both breeding and non-breeding habitat (i.e., associated uplands and migration corridors). Current and future efforts to create new and protect existing habitat will enhance the GCWA's ability to expand in distribution and numbers. Efforts, such as land acquisition and conservation easements, to protect existing viable populations are critical to the survival and recovery of this species, particularly when rapidly expanding urbanization continues to result in the loss of prime breeding habitat.

According to the Golden-cheeked Warbler Population and Habitat Viability Assessment Report (Service 1996) (Golden-cheeked warbler PHVA) a viable population needs to consist of at least 3,000 breeding pairs. This and other population viability assessments on GCWAs have indicated the most sensitive factors affecting their continued existence are population size per patch, fecundity (productivity or number of young per adult), and fledgling survival (Service 1996, Alldredge et al. 2002). These assessments estimated one viable population will need a minimum of 32,500 acres of prime unfragmented habitat to reduce the possibility of extinction of that population to less than five percent over 100 years (Service 1996). Further, this minimum carrying capacity threshold estimate increases with poorer quality habitat (e.g., patchy habitat resulting from fragmentation).

Several state and federally owned lands occur within the breeding range of the GCWA, but the overriding majority of the species' breeding range occurs on private lands that have been either

occasionally or never surveyed. Currently there are five large GCWA populations receiving some degree of protection: those at the Balcones Canyonlands Preserve in Travis County; the nearby Balcones Canyonlands National Wildlife Refuge in Travis, Burnet, and Williamson counties; Camp Bullis Military Installation and TPWD's Government Canyon State Natural Area in Bexar County; and at Fort Hood in Bell and Coryell counties. There are also several conservation banks (CB) whose goal is to protect GCWA habitat (acreages represent the total if the entire bank of credits are sold): Hickory Pass CB (3,003 acres) in Burnet County, Bandera Corridor CB (6,946 acres) in Bandera and Real counties, Clearwater CB (21,305 acres) in Burnet County, and Festina Lente CB (1,147 acres) in Bandera County.

Although threats to the species are ongoing, information on the abundance and distribution of the species shows some expansion of the GCWA (Service 2014). In June, 2015 several parties including the Center for the American Future and the Texas Public Policy Foundation signed a petition to delist the GCWA. The petition asserts that the science that prompted the Service to list the GCWA in 1990 was inaccurate, and that new information on the species status warrants its delisting and removal from the Endangered Species List. The Service is currently reviewing this petition, as well as continuing to work with Federal, State and private partners on conservation of the species.

3.1 METHODOLOGY

Five study areas within Corps lands at Whitney Lake were surveyed for the presence or absence of the GCWA during the 2015 breeding season. Study areas were selected by the following process:

1. Remote sensing utilizing ESRI© ArcGIS was used to evaluate which areas within the Corps boundary were likely to contain the largest contiguous patches of forested habitat. Priority was then given to those areas contiguous with large patches of off-property forested habitat. A habitat modeling software tool (Diamond, 2007) was also utilized to predict areas of potential habitat depicted in Figure 3-1.
2. Eleven resulting focus areas were evaluated based upon the likelihood of supporting appropriate GCWA habitat. Predictive factors include vegetation, topography, patch size, and remoteness from human disturbance.
3. A groundtruthing exercise on March 11, 2015 was conducted across 10 sites spanning the Whitney Lake Corps property to evaluate the presence and quality of potential GCWA habitats.
4. The importance of investigating areas under concern for future development was considered per the Corps' request. One area where detections have been recorded in past years (Upper Brazos) was included in order to investigate whether GCWAs continue to use this area after an unauthorized timber harvest and an authorized equestrian trail project had been constructed.
5. Further decisions were made based upon feasibility of completing the project within the limitations of time needed to survey given acreages.
6. Final decisions were made with input from Corps staff after evaluation of information.

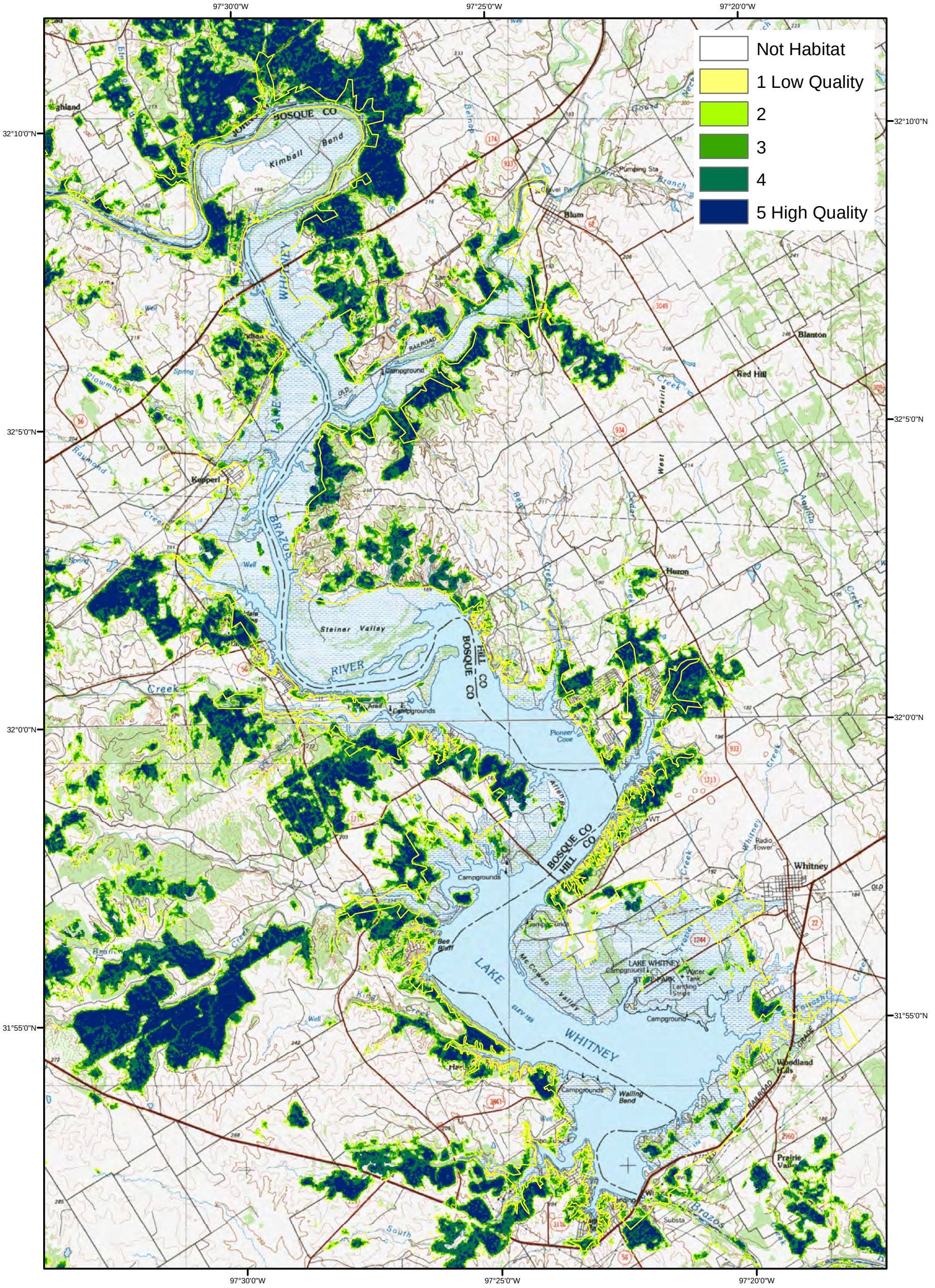


Figure 3-1: Potential GCWA habitats derived from Daimond Model D software tool (Diamond et al., 2007)

The Service's Survey Protocol for the GCWA dictated the procedures followed throughout the remainder of this section. Surveys were conducted beginning March 17 and completed April 30, 2015. Each study area was visited a minimum of five times with visits to individual areas no fewer than five days apart. The surveys were performed by federally-permitted Service wildlife biologists by hiking slowly along roughly pre-determined routes, seeking potential habitat, and listening for GCWA vocalizations. Surveys days began at or near sunrise when possible and lasted until 2 p.m. or later when necessary. Hand-held Trimble GeoXT units were carried by surveyors to provide an accurate tracklog of routes taken, maintain awareness of Corps boundaries, and record GPS coordinates of GCWA detections and other notable observations. At all locations where GCWAs were detected, the following notes were recorded:

1. approximate distance from detection point to actual GCWA location
2. vocalization specifics
3. vegetation species in order of abundance
4. percent tree canopy cover
5. percentage of mature Ashe juniper in tree canopy
6. percent cloud cover
7. wind speed and direction
8. GCWA movement and behavior
9. other related information

Summaries of these field notes are included in the Survey Data Tables for each study area located within the Results and Discussion section. Efforts were also made to make visual confirmation at each detection site. Photographs were taken at each survey site primarily at detection locations to demonstrate habitat type and quality, and a selection of these photographs is included in Appendix A.

Survey route directions (east/west or north/south) were generally alternated in an attempt to avoid investigating each point at the same time of day throughout the survey season. Likewise, if multiple study areas were routinely surveyed on the same day, the order of survey routes was also alternated. Access to each study area was obtained by vehicle and/or Service-owned boat when necessary and remoteness dictated the need to camp overnight near a study area.

Upon completion of surveys and data collection, all records were analyzed using ArcGIS to verify detection accuracy. In situations where detections were recorded less than 984 feet apart on the same day, one was omitted (300 meters (984 feet) is the standard minimum distance between individual GCWA detections). This conservative approach may have inadvertently excluded legitimate detections but was necessary to prevent potentially double-counting the same individual bird. However, multiple GCWA detection points recorded less than 984 feet apart (300 meters) were not omitted in the following instances:

1. Two were heard at the same time (countersinging).
2. When field notes indicated the estimate of distance to bird locations were beyond 984 feet from where the two GPS locations were taken.

3.2 STUDY AREAS

3.2.1 UPPER BRAZOS STUDY AREA

This general area is located on the northern and eastern side of the Brazos River beginning at the eastern boundary of Ham Creek Park and extends downriver around Kimball Bend to the southern Corps boundary near the feature known as Broke Rock Hallow. The re-development of the adjacent Ham Creek Park was the subject of a 2006 formal consultation with the Service (consultation number 21420-2006-F-0055). The Service conducted a presence/absence survey for the GCWA within the Upper Brazos Study Area prior and recorded 22 positive detections (Service 2008). Since that time, an equestrian trail has been constructed eastward from Ham Creek Park extending into GCWA habitat within the Upper Brazos Study Area. The presence of this new disturbance, as well as a prior unauthorized timber harvest led the authors to re-survey the Upper Brazos Study Area to determine if the GCWA continued to utilize this area in numbers similar to the results of the 2008 survey.

Areas were excluded from consideration that did not likely meet GCWA nesting or foraging habitat resulting in a final study area encompassing approximately 260 acres. Elevations range from approximately 525 feet to approximately 705 feet above mean sea level (msl). Much of the edges of the highest elevations consist of limestone bluffs three to 26 feet high topped with mature Ashe juniper/oak woodlands as do the canyon slopes below representing ideal habitat for nesting GCWAs. Ashe juniper is the most dominant overstory tree species within these areas. Hardwood overstory species in descending abundance include Texas red oak, white shin oak (*Quercus sinuata*), cedar elm, Texas ash, netleaf hackberry, plateau live oak, mesquite (*Prosopis glandulosa*), and bumelia (*Bumelia lanuginosa*). Slope bottoms contain a higher percentage of most of these hardwood tree species and also include pecan, boxelder (*Acer negundo*), and American elm (*Ulmus americana*) and represent suitable GCWA foraging habitat when in reasonably close proximity to nesting habitat. Woody shrub understory species include Mexican buckeye (*Ungnadia speciosa*), prairie flame-leaf sumac (*Rhus lanceolata*), Texas buckeye (*Aesculus glabra*), skunkbush sumac (*Rhus trilobata*), Texas mountain-laurel (*Sophora secundiflora*), and catclaw acacia (*Acacia greggii*).

At least 75% of this study area contains good to high quality GCWA nesting habitat with approximately 15% of the remaining area representative of foraging habitat. Approximately 5% of the study area would be considered temporarily unsuitable for GCWA due to large-scale unauthorized clear cutting of two areas previously containing old-growth Ashe juniper/oak woodland, very likely to have formerly been high quality habitat. The authors were invited by the Corps in August, 2007 to assess and estimate the extent of loss from this clearcutting. Regeneration of these areas into suitable nesting habitat would likely take no less than 25 years while a return to their original state may take at least 50 years. Approximately 1500 off-property ac of potential GCWA habitat is relatively contiguous with this study area. Potential BCVI habitat is scattered throughout the study area, mostly in small patches along the blufftop edges and in areas of new growth where fire, timber harvest, or heavy storms have opened the overstory tree canopy. Potential BCVI habitat within these areas consists of early-successional shin oak, elbowbush (*Forestiera pubescens*), plateau live oak, agarita (*Mahonia trifoliolata),* Texas

mountain laurel, Texas and Mexican buckeye, and various sumacs. The location of the Upper Brazos study area and each of the other study areas is represented in Figure 3-2.

3.2.2 ROCKY CREEK STUDY AREA

This ≈ 105-acre study area is located along the drainages of Rocky Creek and South Fork Rocky Creek northwest of Whitney Dam in Bosque County. This area was chosen for survey due to its apparent habitat quality, sloping topography, lack of human disturbance, and the presence of ≈2,300 acres of moderately contiguous GCWA off-property habitat to the west. This area had not been surveyed in prior efforts.

Other than lowland areas along the shorelines, this study area is almost entirely forested and largely rugged with elevations ranging from ≈ 530 to 610 feet above msl. Much of the study area above 560 feet above msl is comprised of mature Ashe juniper/oak woodland along canyon slopes and blufftops typical of preferred GCWA nesting/foraging habitat. Ashe juniper is the most dominant overstory tree species in this area while the remaining hardwood overstory species in descending abundance include cedar elm, hackberry, and blackhaw virburnum (*Viburnum prunifolium*). Woody shrub understory species include Mexican buckeye and redbud (*Cercis canadensis* var. *texensis.* Much of the study area above 560 feet msl is suitable nesting and/or foraging habitat for GCWAs with ≈ 60% characterized as good to high quality nesting habitat in the highest uplands while the remaining 40% in the lower elevations represents fair quality nesting habitat and/or foraging habitat. Potential BCVI habitat is limited and resembles that found within the Upper Brazos Study Area in location, structure, and vegetation.

3.2.3 LAGUNA PARK STUDY AREA

This study area is located just west of the Whitney Dam near the community of Laguna Park in Bosque County. It was chosen for investigation after repeated views of a small canyon visible from FM 22 appeared to contain suitable habitat for GCWA during prior survey years. A groundtruthing exercise on March 11, 2015 confirmed the presence of habitat for GCWA in this canyon as well as other nearby drainage areas of Little Rocky Creek. Although relatively small (≈53 acres), this study area contains patches of moderately suitable GCWA habitat comprised of Ashe juniper/oak woodlands along the Little Rocky Creek shoreline and on limestone blufftops above; Ashe juniper being the most abundant overstory tree. Elevation ranges from ≈530 feet above msl to ≈580 feet above msl. Hardwood overstory species in descending abundance include plateau live oak, hackberry, cedar elm, and bumelia. Woody shrub understory species include bumelia, prairie flame-leaf sumac, and skunkbush sumac. Approximately 20% of the entire study area is characterized as good to high quality nesting habitat while 30% represents fair quality nesting habitat and/or foraging habitat. Most of this suitable habitat is found within the study area's southwestern reaches on the blufftops above Little Rocky Creek. Approximately 50% of the study area was found to be unsuitable for GCWAs due to open canopy, vegetation composition, and/or human disturbance. Residential development surrounds much of this study area and no off-property GCWA habitat is contiguous. Potential BCVI habitat is very limited and resembles that found within the Upper Brazos Study Area in location, structure, and vegetation.

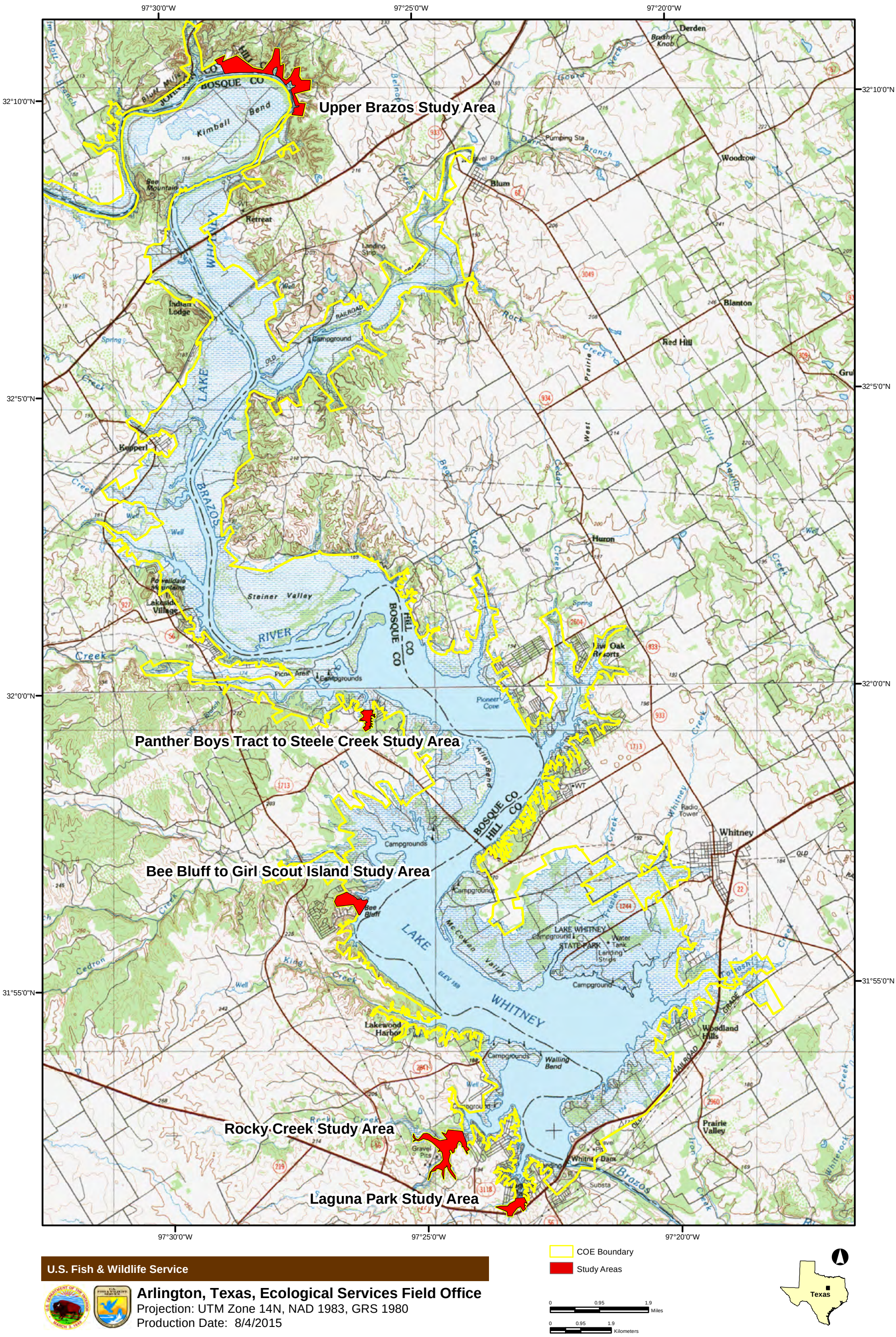


Figure 3-2: Golden-cheeked warbler study area locations at Whitney Lake - 2011.

3.2.4 PANTHER BOYS TRACT TO STEELE CREEK STUDY AREA

This study area is located between the former Boy Scout facility known as Panther Boys Track and the confluence of Steele Creek and the lake. It is further located along the drainage of an unnamed tributary within the vicinity of its confluence with the lake. Elevation ranges from ≈541 to 586 feet above msl. Although only ≈31 ac of this study area might be considered potential GCWA habitat, it was chosen for investigation due to its apparent high suitability, and the presence of ≈305 ac of similar contiguous habitat off-property to the south. Within these habitats, Ashe juniper is the dominant overstory tree, while hardwood overstory species in descending abundance include Texas red oak, Texas ash, shin oak, and cedar elm. Lower elevations near the water's edge contain a higher percentage of most of these hardwood tree species and largely represent suitable GCWA foraging habitat. Potential BCVI habitat is very limited and resembles that found within the Upper Brazos Study Area in location, structure, and vegetation. Several residences are located immediately adjacent to Corps property to the northwest and northeast.

3.2.5 BEE BLUFF TO GIRL SCOUT ISLAND STUDY AREA

This ≈84 ac study area is comprised of the inlets and coves along the shoreline and the inland area between Bee Bluff northwestward to the Girl Scout Island peninsula. Approximately 65 ac (77% of the total study area) of potential GCWA habitat exists within these areas consisting of mature juniper-oak woodlands growing along the sloping drainages ranging between ≈ 530 to 650 feet above msl. Many essential elements are of preferred GCWA habitat are present, including large patches of abundant mature Ashe juniper and red oak on steep slopes above the shoreline. The study area is also in fairly close proximity to the Cedron Creek study area where the authors found abundant GCWAs during a 2008 survey (Service 2008). Approximately 525 ac of potentially suitable GCWA habitat (located on and off-property) is relatively contiguous. Potential BCVI habitat is limited and resembles that found within the Upper Brazos Study Area in location, structure, and vegetation.

3.3 RESULTS AND DISCUSSION

The surveyors covered ≈ 52 miles on foot during this investigation. An additional ≈ 85 miles was covered by boat during survey staging and visual reconnaissance of habitat areas. Twenty-two individual GCWA detections were confirmed. A single BCVI detection was also recorded. Survey specifics for each study area are as follows:

3.3.1 UPPER BRAZOS STUDY AREA

Surveys were conducted during the period March 17 through April 30. Because GCWAs were readily detected throughout this study area upon the first survey visit, it was determined to be unnecessary (and impractical) to survey this entire study area upon each visit. With GCWA presence confirmed, further survey routes were designed to cover approximately two-thirds of the study area per visit and alternate eastward and westward approaches. Because of this study area's

remoteness, it was necessary to camp near the feature known as Broke Rock Hollow in order to be in position to begin surveys near sunrise. The surveys began at the features known as Bailey Hollow and Elm Hollow. Actual survey routes taken were recorded utilizing hand-held Trimble GeoXT units and are depicted in Figure 3-3.

Eighteen positive GCWA detections were confirmed after results analysis (Figure 3-3). One late-evening detection at the Broke Rock Hollow campsite was omitted when presumably the same GCWA was heard and recorded the next morning. Detections in descending order were recorded within the canyons located at Elm Hollow (6), Bailey Hollow (5), and Broke Rock Hollow (5) and along sloping hillsides east of Ham Creek Park (2). The number of GCWA detections corresponds reasonably well with the presence of preferred suitable habitat within each of these locations, on and off-property. Bailey Hollow has the largest concentration of sloping topography vegetated with mature Ashe juniper/oak woodland composed of 70-100% closed tree canopy. In contrast, much of the area east of Ham Creek is relatively flat, containing many open grassy areas and dense juniper monocultures. GCWAs were only detected within this area along the sloping hillsides where the aforementioned clear-cutting operation had removed some but not all of the mature Ashe junipers. As part of the development of the adjacent Ham Creek Park (the subject of a 2006 formal consultation (21420-2006-F-0055 Service 2006)), an equestrian trail had been cleared since the authors' prior 2008 survey of the Upper Brazos. Although the equestrian trail was constructed within GCWA nesting/foraging habitat, it did not appear to be wide enough to substantially disrupt the tree canopy to an extent which would adversely affect GCWAs. Daily survey details and detection specifics are provided in Table 3-1.

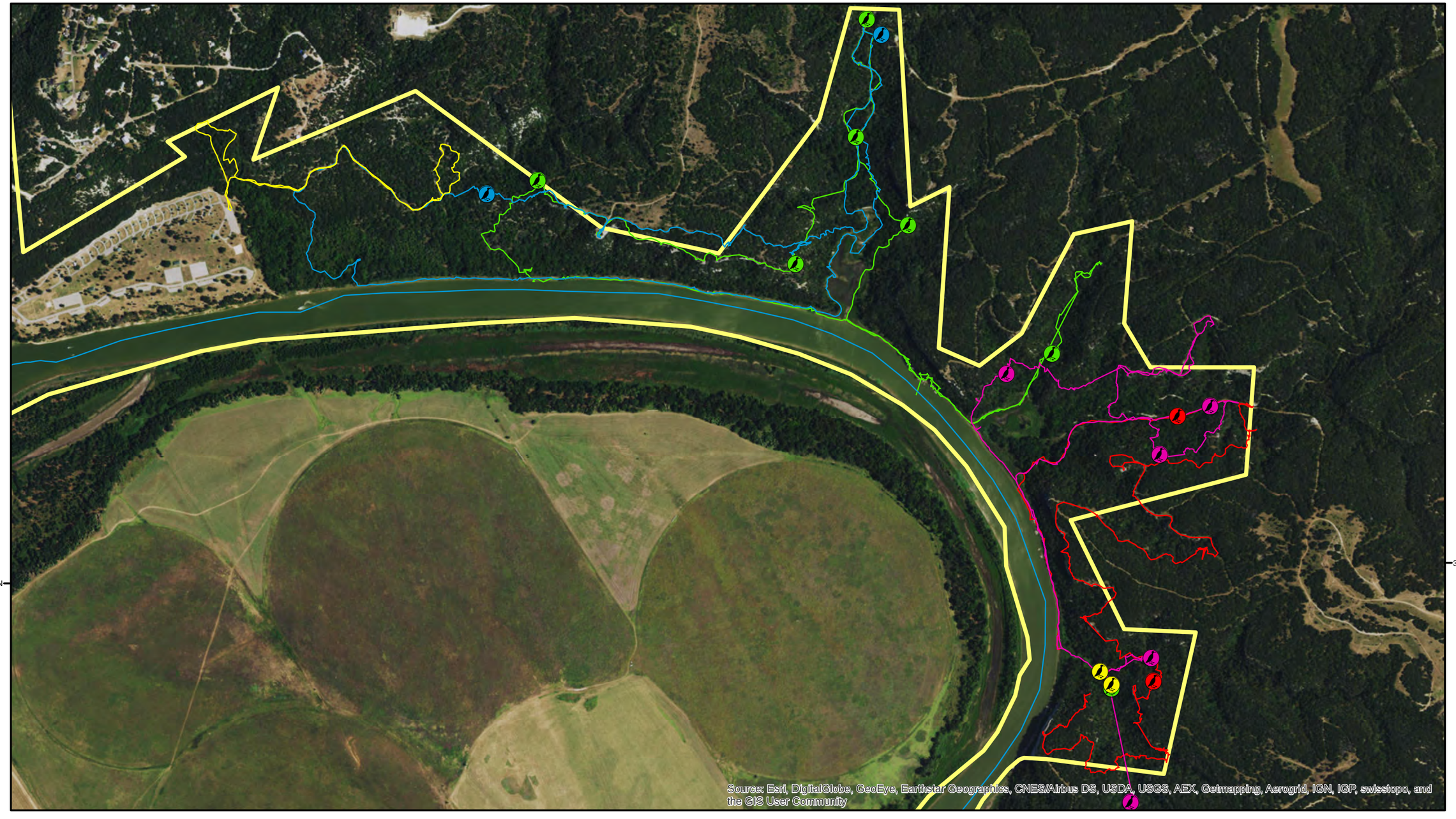
Given what is known regarding average GCWA territory size, the clustering of detections across survey visits suggests the presence of at least 11 individual GCWA territories within the Upper Brazos study area. Considering the size of this study area and the abundance of suitable habitat, it is entirely possible that additional, undetected territories are present, and even more likely that off-property oriented territories overlap with Corps lands. The construction of the equestrian trail and the unauthorized timber harvest does not appear to have substantially adversely affected GCWA presence within this study area when compared with the results of our 2008 survey the same area. In total, survey results continue to imply that this study area is highly suitable for GCWAs.

3.3.2 ROCKY CREEK STUDY AREA

Surveys were conducted during the period March 18 through April 29. Access was gained by vehicle at a point near the County Road 1600 bridge spanning Rocky Creek. Surveys were conducted on the same day with the Laguna Park Study Area and each was alternated in daily order and alternated eastward to westward in direction (where possible). Actual survey routes for Rocky Creek are depicted in Figure 3-4.

This study area was thoroughly surveyed across five visits and several locations along the Corps boundary appeared to contain highly suitable GCWA habitat. These locations were utilized as listening stations for extended time periods during each weekly survey visit. Upon the fourth

Figure 3-3: GCWA detections and survey routes by week within the Upper Brazos Study Area



U.S. Fish & Wildlife Service

Arlington, Texas, Ecological Services Field Office
Projection: UTM Zone 14N, NAD 1983, GRS 1980
Production Date: 8/3/2015

GCWA Detections by week
1
2
3
4
5

Routes by week
1
2
3
4
5

0 0.1 0.2 Miles
0 0.25 0.5 Kilometers

Texas

COE Property Boundary

Table 3-1. Golden-cheeked Warbler Survey Data – Upper Brazos Study Area

a. Survey visit details:

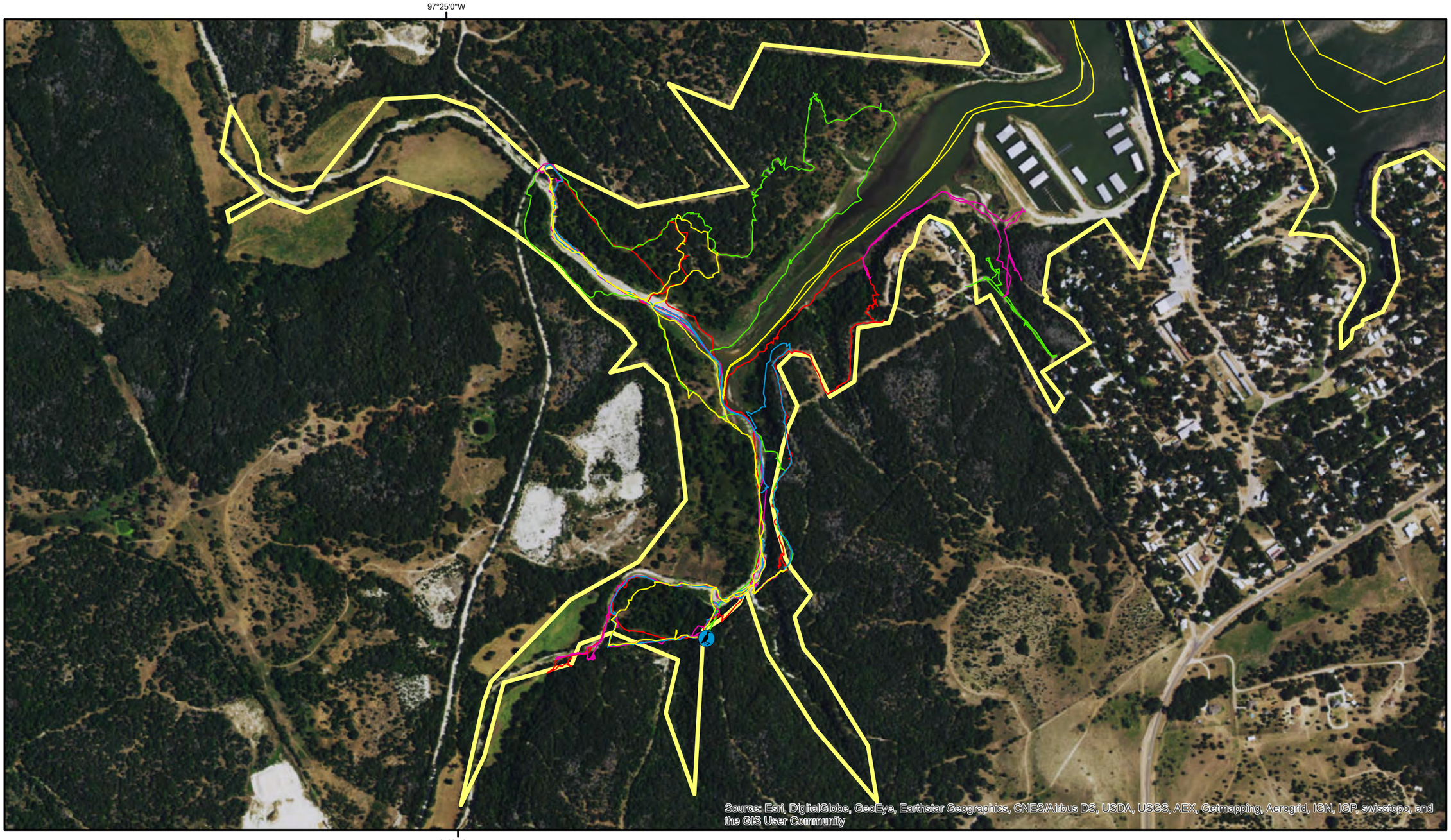
Date	Sunrise Time	Time			Temperature (degrees F.)		Wind Direction		Wind Speed (mph)		Cloud Cover (percent)		Surveyors/Observers	Comments
		Start	End	Total hrs	Start	End	Start	End	Start	End	Start	End		
3/17/15	7:38	7:06	1:41	6:40	56°	74°	S	SSE	0-2	7	100	100	SE, JL	Broke Rock to Bailey Hollow, cold early, much birdsong, damp
3/31/15	7:20	6:50	1:10	6:20	61°	70°	S	S	5	5	100	70	SE, JL	Ham Creek to Bailey Hollow, calm, much song, many turkeys
4/14/15	7:03	6:35	12:47	6:12	55°	73°	NW	NW	5	0-5	100	100	SE, JL	Bailey Hollow to Broke Rock, rained night before, much song
4/21/15	6:54	6:50	1:25	6:35	57°	66°	SE	SE	8	5-10	20	0	SE, JL	Ham Creek to Elm Hollow, mild, much song
4/28/15	6:47	8:08	10:22	2:14	52°	69°	SE	SE	0-5	0-5	100	100	SE, JL	Began late due to rain, abbreviated due to more rain, Ham Creek

b. GCWA detections: Total after analysis: 18 positive detections

Date	GCWA			%Canopy/ %MAJ	Vegetation in descending abundance	Distance and Direction to GCWA	Time of Day	GPS Coordinates		Comments
	Heard/ Seen	Sex	Song A/B/C					Latitude	Longitude	
3/17/15	H	M	A&B	50%-50%	AJ, TxA, SO, RO, MB	80m W	9:38	32.163844	-97.453244	Broke Rock Hallow, A then B songs, 64°, Overcast, 7mph wind
3/17/15	H	M	C	30%-50%	CE, AJ, GB	60m W	12:08	32.170386	-97.452434	Bailey Hallow, 70°, SSW 5mph wind, heard on bluff above with better habitat
3/30/15	H	M	A&B	50%-40%	AJ, CE, TxA, MB, RO, RB	50m W	4:20	32.163683	-97.454464	Heard near Broke Rock Hallow campsite, much birdsong, 10%, cloud cover, wind SSE 10mph, sang sang A&B songs ≈2.5 hours (recorded the evening before an actual survey day)
3/30/15	H	M	A&B	50%-40%	AJ, CE, TxA, MB, RO, RB	90m NW	4:20	32.163683	-97.454464	Heard countersinging with above GCWA, sang A&B songs≈30min
3/31/15	H	M	A	60%-60%	AJ, RO, TxA, SO, RB	110m NNW	8:03	32.176427	-97.470925	Heard A song ≈8X from top of W facing slope, good habitat despite juniper clearing downslope
3/31/15	H	M	A	75%-60%	AJ, RO	120m E	9:03	32.174279	-97.463469	A song heard 3X distant to the E on Elm Hollow slope, good habitat
3/31/15	H	M	A	40%-30%	CE, PC, DH, BV, AJ	100m ENE	9:32			A song heard on blufftop from creekbed, AJ only on blufftops above
3/31/15	H	M	A&B	60%-40%	RO, AJ, TxA, SO, PFLS	110m WSW	9:56	32.180298	-97.461296	Heard countersinging with previous, E facing slope, very good habitat, cloud cover 65%, wind 5-7 from S
3/31/15	H	M	A	75%-45%	AJ, RO, TxA, BV, PI, CE	80m SSE	10:36	32.175203	-97.460183	Heard from blufftop on N facing slope, cloud cover 80%, wind increasing gusts to ≈15mph, much birdsong
3/31/15	H	M	A	75%-40%	CE, AJ, TxA, HB, PC, DH, MB	Directly overhead	11:24	32.17197	-97.456066	Seen overhead in large CE, sang A song continuously and flew around a small area of trees, wind 5-7 from S, cloud cover 25%
4/14/15	H&S	M	A	60%-70%	AJ, RO, TxA, SO	75m ENE	7:46	32.171491	-97.457386	Heard ≈5X on E facing slope, 100% cloud cover, wind 0-5mph
4/14/15	H	M	A	40%-60%	AJ, RO, SO, BU, RB, CE, PFLS, TxA	60m W	9:44	32.17062	-97.451482	Heard ≈15X on E facing slope, cloud cover 100%, wind 0-5mph, much birdsong, humid and damp
4/14/15	H	M	A	80%-60%	AJ, HB, MB, CE, RB, SO, PI, VC	20m SSE	10:20	32.169439	-97.452979	Heard ≈15X on S facing slope from Broke Rock Hollow creekbed, cloud cover 100%, 56°, humid and damp, wind NW 11mph
4/14/15	H	M	A	55%-20%	CE, TxA, SO, PI, VC, RB	25m NNE	11:08	32.164429	-97.453305	Heard ≈20X on W facing slope from Broke Rock Hollow creekbed, wind NW 0-10, 57°, very quiet
4/14/15	H	M	A	45%-5%	CE, TxBE, HB, TxA, SA	60m S	11:45	32.160865	-97.45396	Heard ≈20X on N facing slope from creekbed, abundant AJ upslope where bird was heard
4/21/15	H	M	B	80%-40%	RO, AJ, RB, SO, SBS, TxA, ML	180m NW	8:38	32.176113	-97.472414	B song heard ≈3X distant, wind 0-5, cloud cover 20%, 57°, mild, wind SE mph, much birdsong
4/21/15	H	M	B	85%-60%	AJ, RO, TxA, SO, PFLS, RB, CE	120m NW	11:20	32.179912	-97.460882	B song heard ≈25X on E facing slope, 67°, cloud cover 30%, wind 13 mph SSE
4/27/15	H	M	A	70%-20%	CE, HB, PC, AJ	70m E	5:05	32.164105	-97.454796	Heard upslope ≈8X from Broke Rock campsite, wind SE 10mph, cloud cover 100%, calm, minimal birdsong, (recorded the evening before an actual survey day) **OMITTED – likely same GCWA detected the next morning 4/28/2015 during actual survey day**
4/28/15	H	M	A	50%-40%	AJ, CE, TxA, MB, RO, RB	50m NNE	7:40	32.163775	-97.454463	Heard upslope ≈15X at Broke Rock campsite from inside tent during break in morning rainstorm, likely same GCWA as heard at 5:05 PM on 4/27/15, wind SE 10mph, cloud cover 100%, calm, much birdsong

(*abbreviations for survey data tables found in Appendix C)

Figure 3-4: GCWA detections and survey routes by week within the Rocky Creek Study Area



U.S. Fish & Wildlife Service

Arlington, Texas, Ecological Services Field Office
Projection: UTM Zone 14N, NAD 1983, GRS 1980
Production Date: 8/3/2015

GCWA Detections by week
4

Routes by week
1
2
3
4
5

0 0.1 0.2 Miles
0 0.15 0.3 Kilometers

Texas

COE Property Boundary

visit, a single GCWA was heard and recorded (Figure 3-4). Daily survey details and detection specifics are provided in Table 3-2. Aside from these listening stations, much of the rest of the study area appeared to contain either moderately suitable nesting habitat or foraging habitat.

Although only a single GCWA was detected during our 5-week survey, the presence of suitable habitat along the Corps boundary and the presence of ≈2,300 ac of moderately contiguous GCWA habitat off-property suggest that additional territories might be present within and/or overlap with this study area. In total, survey results imply that this study area is moderately suitable for GCWAs.

3.3.3 LAGUNA PARK STUDY AREA

Surveys were conducted during the period March 18 through April 29. Access was gained by vehicle at points near County Roads 1743 and 1700. Surveys were conducted on the same day with the Rocky Creek Study Area and each was alternated in daily order and alternated eastward to westward in direction (where possible). Actual survey routes for Laguna Park are depicted in Figure 3-5. Daily survey details and detection specifics are provided in Table 3-3.

No GCWA detections were recorded during our 5 weekly survey visits. Although moderately suitable habitat is present in several areas, the relatively small size and the presence of ongoing human disturbance likely reduces the likelihood of GCWAs nesting or foraging within this area. It is possible that undetected GCWAs might currently utilize this study area.

Because suitable habitat is present albeit limited, we conclude that this study area is marginally suitable for GCWAs although it may not currently be populated. In many areas, widespread off-property residential development may limit patch size and suitability. Although this area does not appear to be currently occupied by GCWAs, it should be considered an important area for GCWAs to potentially utilize in the future if populations at Whitney Lake expand.

3.3.4 BEE BLUFF TO GIRL SCOUT ISLAND STUDY AREA

Surveys were conducted during the period March 19 through April 30. Access was gained by vehicle at several points where public roads crossed the Corps boundary. The surveyors alternated approach directions upon each visit and focused efforts in areas determined to contain the most likely suitable habitat. These areas consisted of the coves and blufftops along the shoreline and the inland canyons which contained the largest patches of juniper/hardwood woodlands. Actual survey routes taken are depicted in Figure 3-7 and daily survey details and detection specifics are provided in Table 3-5.

This study area was chosen based upon its similarities with the 2008 King Creek to Bee Bluff study area (Service 2008) where GCWAs were detected under comparable conditions. Large patches of abundant mature Ashe juniper and red oak covering steep slopes provide ideal GCWA habitat throughout much of this study area. As predicted, two GCWA detections on separate weeks were recorded during the survey of this study area. These were possibly the same GCWA due to somewhat close proximity of the detections. Although only one (possibly two) GCWAs

Table 3-2. Golden-cheeked Warbler Survey Data – Rocky Creek Study Area

a. Survey visit details:

Date	Sunrise Time	Time			Temperature (degrees F.)		Wind Direction		Wind Speed (mph)		Cloud Cover (percent)		Surveyors/Observers	Comments
		Start	End	Total hrs	Start	End	Start	End	Start	End	Start	End		
3/18/15	7:37	8:06	12:28	4:22	57°	60°	NW	NNW	5	5-7	100	100	SE, JL	Overcast, still, slight drizzle
4/1/15	7:19	10:44	1:10	2:26	74°	77°	S	S	12	5-10	60	95	SE, JL	Clear, mild, much birdsong
4/15/15	7:01	8:24	12:14	3:50	59°	61°	S	S	0-5	5	0	0	SE, JL	Clear sky, damp, calm, much birdsong
4/22/15	6:53	8:27	11:22	2:55	62°	73°	SE	SE	0-7	0-10	20	80	SE, JL	Mild, much birdsong, began with clear sky
4/29/15	6:46	9:33	12:31	2:58	59°	71°	SE	S	5-10	5-15	0	15	SE, JL	Sunny, gusty, much birdsong, water level substantially higher due to rain the weekend prior

b. GCWA detections: Total after analysis: 1 positive detection

Date	GCWA			%Canopy/ %MAJ	Vegetation in descending abundance	Distance and Direction to GCWA	Time of Day	GPS Coordinates		Comments
	Heard/ Seen	Sex	Song A/B/C					Latitude	Longitude	
4/22/15	H	M	A	85%-40%	CE, AJ, HB, TxBE, BV	≈80m WSW	9:18	31.865689	-97.411323	Heard ≈25X singing continuously on nearby SSE facing canyon slope, likely a territorial defense singing this late in the season, heard from listening station visited all 5 survey dates, 68°, wind from S 13mph, calm with gusts

Table 3-3. Golden-cheeked Warbler Survey Data – Laguna Park Study Area

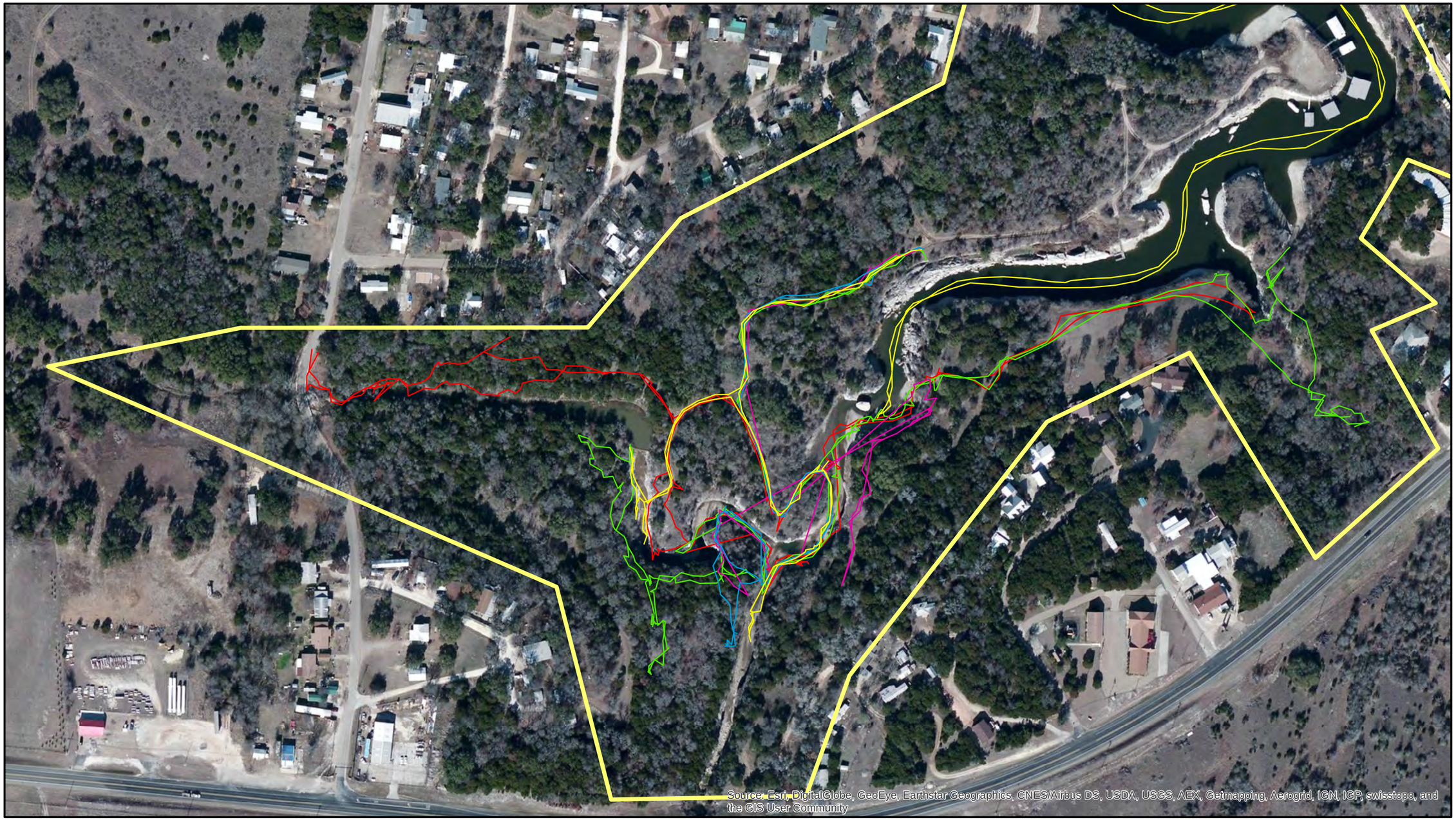
a. Survey visit details:

Date	Sunrise Time	Time			Temperature (degrees F.)		Wind Direction		Wind Speed (mph)		Cloud Cover (percent)		Surveyors/Observers	Comments
		Start	End	Total hrs.	Start	End	Start	End	Start	End	Start	End		
3/18/15	7:37	12:40	2:19	1:39	60°	64°	NNW	NNW	7	7	95	95	SE, JL	Earlier drizzle stopped, occasional sun, moderate birdsong
4/1/15	7:19	8:27	10:31	2:04	70°	74°	S	S	11	12	98	60	SE, JL	Clear, mild, much birdsong
4/15/15	7:01	12:28	2:06	1:38	61°	61°	S	S	5	0-5	0	0	SE, JL	Sunny, cool, moderate song
4/22/15	6:53	11:35	1:53	2:18	73°	75°	SE	SE	0-7	5-7	80	100	SE, JL	Clouds increasing, gusty, storm conditions developing
4/29/15	6:46	12:49	1:51	1:02	73°	73°	S	S	5-7	5-7	25	20	SE, JL	Sunny, mild, moderate birdsong, survey shortened due to some areas being inaccessible due to higher water from recent heavy rains

b. GCWA detections: Total after analysis: 0 positive detections

Date	GCWA			%Canopy/ %MAJ	Vegetation in descending abundance	Distance and Direction to GCWA	Time of Day	GPS Coordinates		Comments
	Heard/ Seen	Sex	Song A/B/C					Latitude	Longitude	
										No GCWAs detected within the Laguna Park Study Area

Figure 3-5: GCWA survey routes by week within the Laguna Park Study Area



U.S. Fish & Wildlife Service

Arlington, Texas, Ecological Services Field Office
Projection: UTM Zone 14N, NAD 1983, GRS 1980
Production Date: 8/3/2015

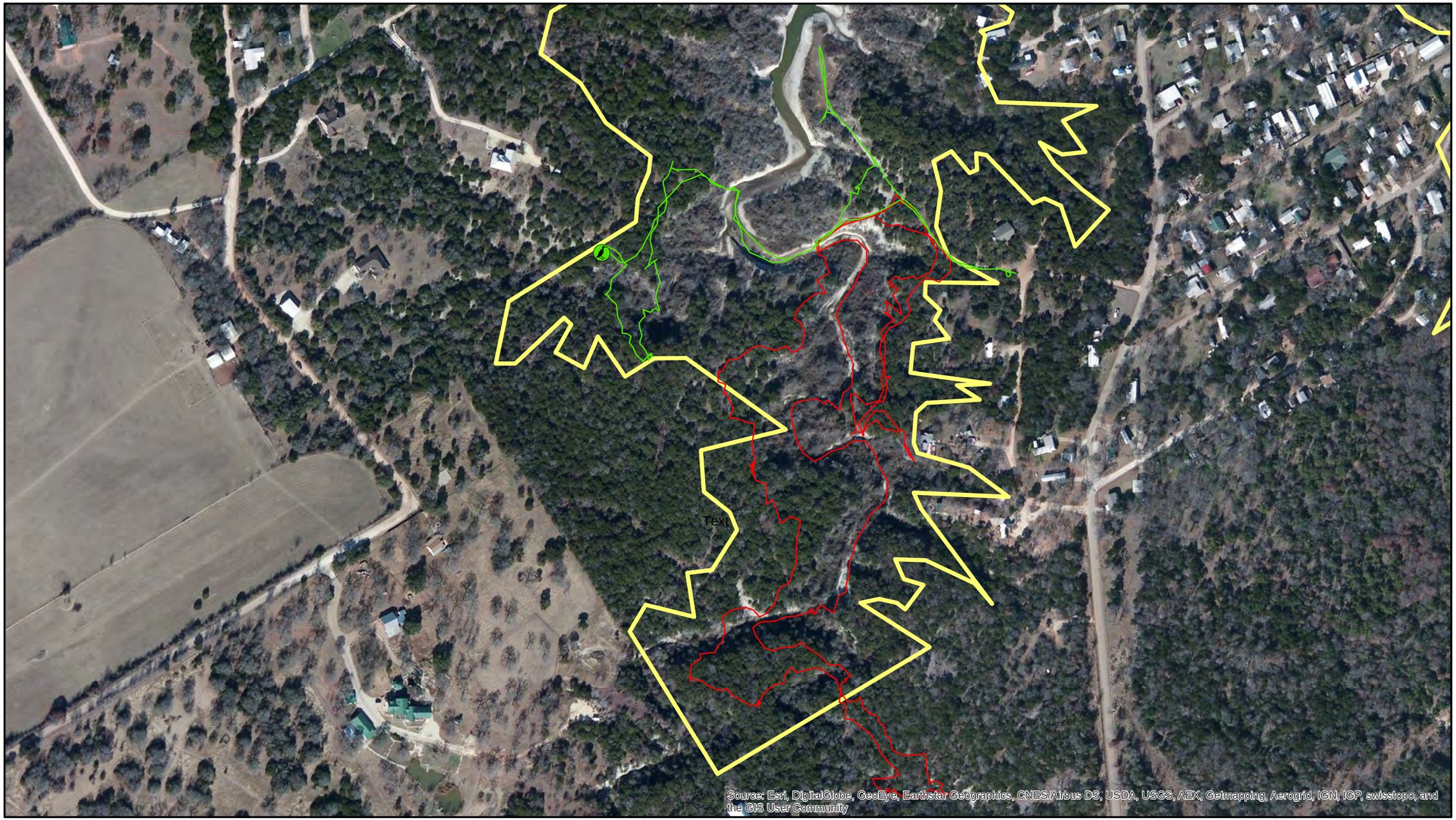
Routes by week
1
2
3
4
5

0 0.03 0.06 Miles
0 0.06 0.12 Kilometers

Texas

COE Property Boundary

Figure 3-6: GCWA detections and survey routes by week within the Panther Boys Tract to Steele Creek Study Area



U.S. Fish & Wildlife Service

Arlington, Texas, Ecological Services Field Office
Projection: UTM Zone 14N, NAD 1983, GRS 1980
Production Date: 8/3/2015

GCWA Detections by week
2

Routes by week
1
2

0 0.04 0.08 Miles
0 0.07 0.14 Kilometers

Texas

COE Property Boundary

Table 3-4. Golden-cheeked Warbler Survey Data – Panther Boys Tract to Steele Creek Study Area

a. Survey visit details:

Date	Sunrise Time	Time			Temperature (degrees F.)		Wind Direction		Wind Speed (mph)		Cloud Cover (percent)		Surveyors/Observers	Comments
		Start	End	Total hrs.	Start	End	Start	End	Start	End	Start	End		
3/19/15	7:35	11:10	1:13	2:03	66°	71°	S	S	7	10	100	100	SE, JL	Habitat & Slope decent for GCWA, abundant green brier, much birdsong
4/2/15	7:17	12:18	1:46	1:28	76°	81°	S	S	20	14	45	30	SE, JL	Wind gusty, much birdsong

b. GCWA detections: Total after analysis: 1 positive detections

Date	GCWA			%Canopy/ %MAJ	Vegetation in descending abundance	Distance and Direction to GCWA	Time of Day	GPS Coordinates		Comments
	Heard/ Seen	Sex	Song A/B/C					Latitude	Longitude	
4/2/15	S	F	N/A	85%-70%	AJ, RO, TxA, SO, CE	7m S	12:56	31.99249	-97.436163	Female GCWA seen 2X for ≈2 seconds, very good habitat w/ mature AJ and RO along sloping creek channel. The Panther Boys Tract to Steele Creek Study Area was not visited again after this detection to focus attention on the much larger Bee Bluff to Girl Scout Island Study Area.

Table 3-5. Golden-cheeked Warbler Survey Data – Bee Bluff to Girl Scout Island Study Area

a. Survey visit details:

Date	Sunrise Time	Time			Temperature (degrees F.)		Wind Direction		Wind Speed (mph)		Cloud Cover (percent)		Surveyors/Observers	Comments
		Start	End	Total hrs	Start	End	Start	End	Start	End	Start	End		
3/19/15	7:35	8:15	10:51	2:36	61°	66°	NNW	S	0-5	5-7	100	100	SE, JL	Decent GCWA habitat in first canyon transversed, much birdsong including an individual BCVI, although habitat for BCVI was sparse. BCVI encountered was likely moving through the area looking for potential habitats; it was not heard again in subsequent weeks
4/2/15	7:17	9:19	12:03	2:44	72°	75°	S	S	17	17	80	45	SE, JL	Mild, wind gusts, minimal birdsong
4/16/15	7:00	8:58	1:14	4:16	65°	73°	S	S	15	10-15	100	100	SE, JL	Overcast, gusty
4/23/15	6:52	8:27	1:22	4:55	69°	75°	S	SE	5-15	5-15	100	80	SE, JL	Mild, much birdsong, began with clear sky
4/30/15	6:45	9:33	1:31	3:58	59°	71°	SE	SE	0	0	0	15	SE, JL	Sunny, gusty, much birdsong, water level substantially higher due to rain the weekend prior

b. detections: Total after analysis: 2 positive GCWA detections, 1 positive BCVI detection

Date	GCWA			%Canopy/ %MAJ	Vegetation in descending abundance	Distance and Direction to GCWA	Time of Day	GPS Coordinates		Comments
	Heard/ Seen	Sex	Song A/B/C					Latitude	Longitude	
3/19/15	H	M	BCVI	60%-50%	AJ, RO, SO, TxA, AG, YC	N/A	9:41	31.940605	-97.439435	BCVI heard ≈15X on opposite W facing slope, minimal BCVI habitat is present in narrow areas along blufftops, this area was investigated on each of the following four survey visits but the BCVI was not heard again. It likely moved on in search of better habitat.
4/23/15	H&S	M	A	80%-75%	AJ, RO, SO, TxA, SBS, AG	5m NNE	9:58	31.939422	-97.43754	Heard ≈25X and seen nearby at top of AJ on blufftop, heard on both sides of N & S slopes, flew about our general area and appeared to be aware of our presence
4/30/15	H	M	A	70%-60%	AJ, RO, TxA, SO, EB, SBS	3Om NE	8:58	31.93768	-97.437785	Heard ≈8X on N facing slope, 57°, calm, minimal wind, clear sky and sunny

were recording during the five weeks of surveys, it is very likely that additional GCWAs utilize the study area for nesting and foraging either on-property, or overlapping with the additional ≈525 acre of off-property suitable habitat.

Interestingly, a BCVI was also heard and recorded on March 19 along the blufftop of a canyon area which did not contain a substantial amount of typical BCVI nesting habitat. This BCVI was likely moving through the area looking for potential habitat and mates. It is possible that this BCVI was nesting within the elbowbush/shin oak shrub habitat along the blufftop, although it was not heard again during the four subsequent survey weeks.

3.3.5 PANTHER BOYS TRACT TO STEELE CREEK STUDY AREA

Surveys were conducted during the period March 19 through April 2. Only a single public access point was available by vehicle from County Road 1433. This study area was surveyed on the same day as the Bee Bluff to Girl Scout Island study area and daily order was alternated between the two. Actual survey routes for this study area are depicted in Figure 3-6. Daily survey details and detection specifics are provided in Table 3-4.

Upon the second survey visit on April 2, a female GCWA was seen briefly two times within suitable habitat consisting of mature Ashe juniper and red oak along a sloping creek channel. This female was engaged in typical foraging behavior and appeared to be aware of our presence. In total, survey results imply that this study area, as a whole, is at least moderately suitable for GCWAs. Surrounding development prevents a higher suitability ranking. Because GCWA presence was confirmed within this small (≈31 acre) habitat patch, this study area was no longer visited after the second week in order to focus more time and attention on the much larger and rugged Bee Bluff to Girl Scout Island Study Area.

3.3.6 SUMMARY

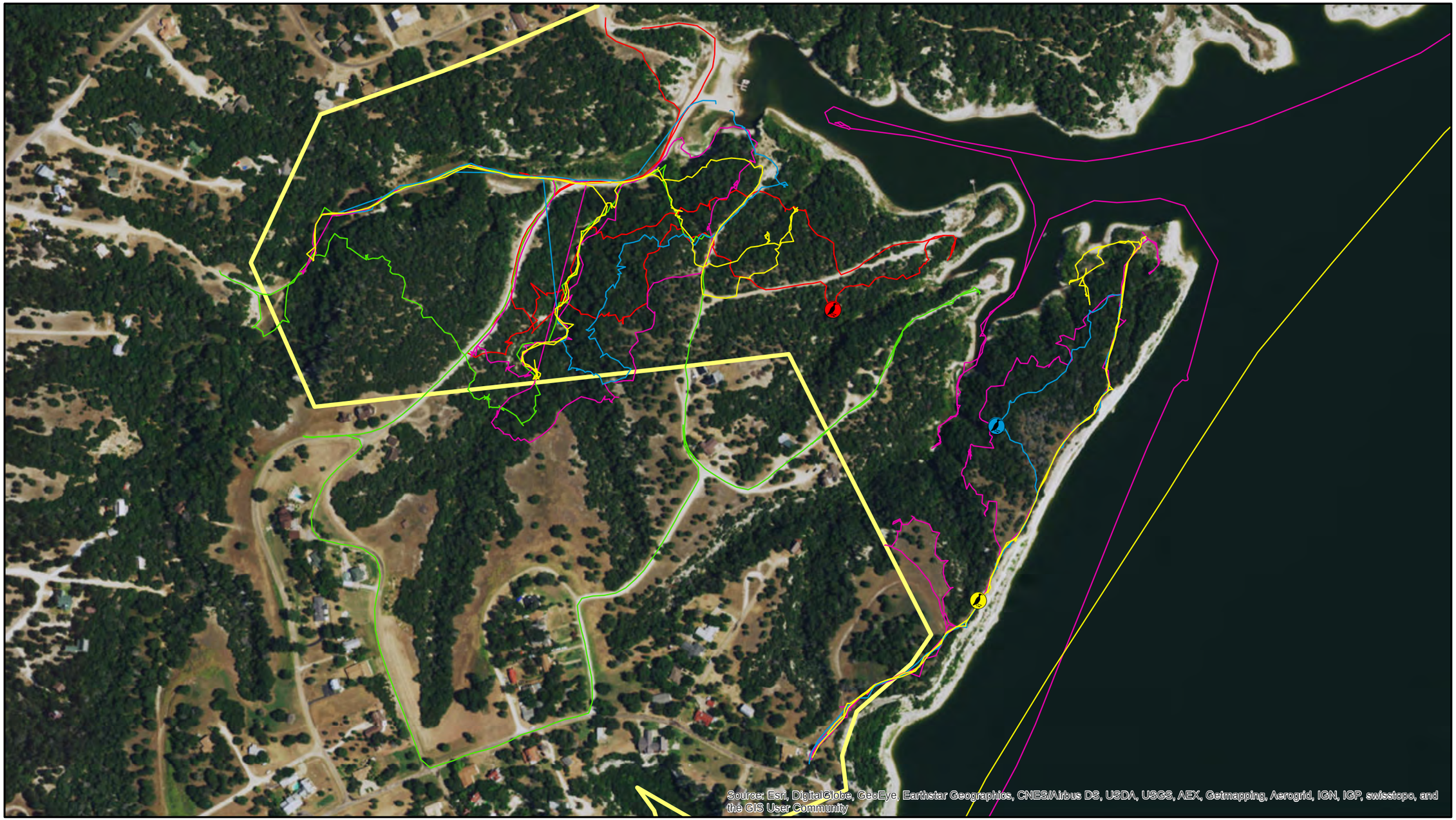
Our cumulative results from surveys spanning 2008, 2009, 2011, and 2015 suggest a stable GCWA population within the Whitney Lake Corps property. It is not possible to accurately assess the status of the GCWA from these investigations because study areas were rarely visited across multiple years, small sample size, and nesting productivity was not measured. However, our 2015 results did match our predictions reasonably well based upon habitat conditions, and suggest that the GCWA population at Whitney Lake would continue to remain stable provided that suitable habitat is protected from removal and/or disturbance.

3.4 RECOMMENDATIONS FOR GCWA

Based upon the results of this investigation, past coordination, the Service's knowledge of the local status of the GCWA, and potential threats within the foreseeable future, we offer the following recommendations:

1. We suggest that Corps staff amend the Whitney Lake Master Plan in order to designate areas in which GCWAs have been documented in this and prior investigations (Appendix

Figure 3-7: GCWA & BCVI detections and survey routes by week within the Bee Bluff to Girl Scout Island Study Area



U.S. Fish & Wildlife Service

Arlington, Texas, Ecological Services Field Office
Projection: UTM Zone 14N, NAD 1983, GRS 1980
Production Date: 8/3/2015

GCWA Detections by week
- 4
- 5

BCVI Detections by week
- 1

Routes by week
- 1
- 2
- 3
- 4
- 5

0 0.055 0.11 Miles
0 0.1 0.2 Kilometers

Texas

COE Property Boundary

C) as Environmentally Sensitive Areas. This designation should apply to all on-property areas characterized as nesting/foraging habitat contiguous with areas where GCWAs have been documented. This designation should not preclude these areas from public use such as hunting, hiking or camping, but might serve as a safeguard to ensure that future development proposals fully evaluate possible impacts to protected resources. The designation of Environmentally Sensitive Areas for this purpose should be ongoing if GCWA presence is discovered in additional areas. Securing these properties will contribute to the species' conservation.

2. We recommend that Corps staff develop a monitoring plan to assess the status of the GCWA on Whitney Corps lands over time. Those areas which contain suitable habitat but have not been surveyed should be investigated in order to fully inventory GCWA presence at Whitney Lake. Continual detailed surveys of areas where GCWAs have been detected would not be necessary; however, it would be beneficial to monitor GCWA persistence in these areas as well. Corps staff should be familiar with GCWA vocalizations in order to document presence when in the field. Monitoring should also include records of potential adverse impacts to habitat quality from encroachments, unauthorized timber harvests, or any other authorized or unauthorized activities. Our office would willingly participate in the development and implementation of a monitoring plan which would meet the needs of the GCWA and the Corps without being overly burdensome to the Corps' duties or finances.

3. The GCWA population at Whitney Lake may also benefit from a habitat management plan to maintain existing habitat and possibly increase habitat abundance long term. GCWA habitat typically needs no ongoing maintenance and is most productive when unaltered. However, certain areas identified as currently unsuitable might be made suitable over time with appropriate enhancement efforts. For example, areas with dense Ashe juniper growth lacking hardwood species could be thinned and hardwoods planted. Although funding may not be available for enhancement projects, habitat restoration plans should be in place in the event that an unauthorized encroachment results in compensatory mitigation being obtained from a violator or any other funding source. Assistance from our office to develop a habitat management plan would be available.

4. Future activities conducted, funded, or authorized by the Corps occurring within GCWA habitat should be designed to avoid impacts to GCWAs. For example, fence-building around Corps property containing GCWA habitat could serve to benefit the species long-term via habitat protection. However, rights-of-way widths should be 16 or less and should be constructed outside the breeding season (generally March through August). Other activities might include rights-of-way construction for other purposes, tree removal practices, erosion control, or other projects which could adversely impact GCWAs or their habitat. If projects cannot be designed to avoid impacts to GCWAs with certainty, we recommend that the Service be contacted for assistance. The value of non-nesting, foraging habitat (hardwoods lacking sufficient Ashe juniper) located near suitable nesting habitat should not be underestimated in its importance to the GCWA population at Whitney Lake and consideration should also be given to safeguarding these areas for the

species conservation.

5. Although GCWAs were not detected at the Laguna Park study area, this area and others like it containing potentially suitable habitat should be considered important to the GCWA population at Whitney Lake. As higher quality habitat areas become fully populated by nesting/foraging GCWAs, adjacent lesser-quality habitats may eventually be utilized as observed at Fort Hood Military Reservation (Gil Eckrich, pers. comm. 2009).

6. Larger patches of GCWA habitat generally are much more productive than smaller, fragmented patches and the protection of GCWA habitat adjacent to Corps property could be highly beneficial to GCWA conservation. For this reason, we recommend that the Corps and the Service develop a list of options to provide willing landowners interested in furthering the conservation of the GCWA on private lands. There are over forty land trust organizations operating in Texas which provide these types of opportunities, typically in the form of conservation easements. This would not result in the Corps assuming additional management responsibilities, since conservation easement lands are typically enrolled and managed by the land trust organization and/or the landowner.

7. The Corps, in coordination with the Service, should develop a public relations plan to ensure that the public is aware of the GCWA at Whitney Lake. Public perception of the GCWA is often tainted by misinformation; this was evident several times during our surveys. A public relations plan might include "talking points" to better explain the Federal Government's role in endangered species conservation. This information could possibly benefit the Corps' efforts at Whitney Lake as well as GCWA recovery efforts by decreasing negative perceptions.

4.0 BCVI RECOMMENDATIONS

Although a single BCVI was detected, nesting presence at Whitney Lake was not confirmed and suitable habitat was scarce; therefore, the Service has limited cause to issue strong recommendations regarding the protection of BCVIs and their habitats within the Corps property. However, BCVIs are listed by the Service as occurring in Bosque, Hill, and Johnson Counties, Texas; have been detected at Whitney Lake at least once in the recent past; and suitable habitats do exist on Corps property. For these reasons, we offer the following suggestions:

1. Future activities conducted, funded, or authorized by the Corps should be evaluated for potential impact to suitable BCVI habitat and should be designed to avoid impacts to BCVIs. For example, fence-building around Corps property, recreational development, new utility rights-of-way, and other activities should be evaluated for potential impacts. If projects cannot be designed to avoid impacts to BCVIs with certainty, we recommend that the Service be contacted for assistance.

2. Because the most suitable BCVI habitat identified during this investigation was typically found upon the edges of blufftops adjacent to GCWA habitats, we reiterate our prior

recommendation to amend the Whitney Lake Master Plan in order to designate areas in which GCWAs have been documented in this and prior (Appendix B) investigations as Environmentally Sensitive Areas. Because habitats for both species are often found together at Whitney Lake, this designation may serve to protect habitats for each.

3. Although a BCVI nesting presence has yet to be confirmed, it should not be assumed that BCVIs do not inhabit the Whitney Lake Corps property. BCVIs are known to utilize smaller habitat patches, and are somewhat more tolerant than other birds of human disturbance. Smaller, marginal habitat patches should be considered potentially important to BCVI recovery, habitat loss being one of the main threats faced by this species.

4. Fire is a natural component of Texas rangelands, and prescribed burning has many range and wildlife management benefits. Prescribed burning in this portion of the vireo's range can be an excellent tool used to maintain the desired vegetation structure for vireo nesting; i.e., a mosaic of shrubs and open grassland with abundant foliage to ground level. Cool season burns, conducted prior to March 15, are often recommended to control small juniper, thus maintaining the relatively open shrublands preferred by vireos. Prescribed burns conducted during late spring and early fall, under hotter conditions, can be used to set back plant succession in order to create vireo habitat. Prescribed burning can also limit fuel loads within the landscape, thereby reducing the severity and unpredictability of wildfires. Fire management should not be used to manipulate established GCWA habitat into hopeful BCVI habitat.

5. We recommend that investigations to update the status of BCVIs on Whitney Lake Corps property continue as funding permits. According to our aerial photography, several potential habitats remain unsurveyed.

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APPENDIX A

PHOTOS: GCWA HABITAT WITHIN STUDY AREAS

Upper Brazos

blufftop above Bailey Hollow – direction of 7:46 AM detection 04/19/2015

Upper Brazos

East of Ham Creek – top of west facing slope in direction of 8:03 AM detection, 03/31/2015

Upper Brazos

Broke Rock Hollow – creekbed below 11:45 AM detection, GCWA habitat upslope, 04/14/2015

Upper Brazos

Broke Rock Hollow – upslope toward 9:38 AM detection, before spring leaf out, 03/17/2015

Upper Brazos

Blufftop between Ham Creek and Elm Hollow, 03/31/2015

Upper Brazos

Elm Hollow toward 9:03 AM detection, GCWA nesting habitat on blufftop above, 3/31/2015

Rocky Creek

Creekbed, GCWA nesting/foraging habitat on blufftops above, 04/15/2015

Rocky Creek

Headed upslope in vicinity of 9:18 AM detection, 04/22/2015

Rocky Creek

At top of slope at Corps boundary during 9:18 AM detection, 04/22/2015

Rocky Creek

At bottom of slope toward habitat in direction of 9:18 AM detection, 04/22/2015

Laguna Park

Little Rocky Creek, GCWA habitat above, unauthorized ORV stuck on large rock, 04/22/2015

Laguna Park
GCWA habitat above limestone bluffs, no GCWAs detected during surveys 04/22/2015

Panther Boys Tract to Steele Creek

Downslope in vicinity of 12:56 PM detection 04/22/2015

Panther Boys Tract to Steele Creek

Downslope moments after 12:56 detection of foraging female GCWA, 04/22/2015

Bee Bluff to Girl Scout Island

Facing downslope, mature juniper/red oak woodland, 04/16/2015

Bee Bluff to Girl Scout Island – 9:58 AM detection (inset), 04/23/2015

Bee Bluff to Girl Scout Island

At blufftop above Bee Bluff in vicinity of 8:58 AM detection, 04/30/2015

APPENDIX B

CUMULATIVE GCWA SURVEYS AT WHITNEY LAKE
SURVEY ACCOUNTS AND MAP

Prior GCWA Surveys on Whitney Lake Corps Property

2011 – Investigations of U.S. Army Corps of Engineers lands at Whitney Lake for the Endangered Golden-cheeked Warbler and Black-capped Vireo– 2011

Phelps Creek - five pres. /abs. survey visits – four GCWA detections

Ham Creek Park - five pres. /abs. survey visits – three GCWA detections

Live Oak Resorts - five pres. /abs. survey visits – one GCWA detection

Bear Creek - five pres. /abs. survey visits – zero GCWA detections

McCown to Live Oak Resorts - five pres. /abs. survey visits – zero GCWA detections

Nolan River Segment 1 - five pres. /abs. survey visits for BCVI – four GCWA detections

Upper Brazos at Broke Rock Hollow – one GCWA heard during brief single day visit

Cedron Creek Park – one GCWA heard during brief stop for training exercise

2009 – Investigations of U.S. Army Corps of Engineers lands at Whitney Lake for the Endangered Golden-cheeked Warbler and Black-capped Vireo– 2009

Nolan River Segments 1, 2, & 3– ten pres. /abs. survey visits – 13 GCWA detections

Owl Hollow – five pres. /abs. survey visits – seven GCWA detections

Chisholm Trail Park - five pres. /abs. survey visits – six GCWA detections

White Bluff - five pres. /abs. survey visits – three GCWA detections

Panther Boys Tract - five pres. /abs. survey visits – zero GCWA detections

Upper Brazos East of Ham Creek Park – 1 visit investigation possible presence of BCVI habitat
– one GCWA detection

Upper Brazos at Broke Rock– 1 visit investigation possible presence of BCVI habitat
– one GCWA detection

2008 – Surveys of U.S. Army Corps of Engineers Lands at Whitney Lake for the Endangered Golden-cheeked Warbler - 2008

Upper Brazos – five pres. /abs. survey visits – 29 GCWA detections

Cedron Creek Park – five pres. /abs. survey visits – 16 GCWA detections

Steele Creek Park - five pres. /abs. survey visits – seven GCWA detections

King Creek to Bee Bluff - five pres. /abs. survey visits – nine GCWA detections

2006 – May 16 Site Visit by Service Staff

Girl Scout Island – single-day site visit by Arlington ES staff and Sam Masters (Corps) – one, possibly two GCWAs detected

2005 - Guilfoyle & Fischer. 2005. Golden-Cheeked Warbler Surveys on U.S. Army Corps of Engineers Reservoirs in the Fort Worth District. USACE., Fort Worth

Powelldale Mountains (AKA "**The Mountain**") **-** one point count station – one GCWA detected

Ham Creek – four point count stations – one GCWA detected

Loafers Bend Park – two point count stations – no GCWA detections

Cedar Creek Park – one point count station – no GCWA detections

Panther Boys Tract- two point count stations – no GCWA detections

Cedron Creek Park South of 1713 Bridge (Bosque County Side) - two point count stations – no GCWA detections

Cedron Creek (near Girl Scout Island Corridor)- two point count stations – no GCWA detections

McCowan Valley Park - one point count station – no GCWA detections

North of Katy Bridge (Hill County Side) - one point count station – no GCWA detections

<u>1998</u> - Espy, Houston, & Associates, Inc. 1998. Mid-Brazos project – Lake Whitney 1998 endangered species investigations. Espy, Houston, & Associates, Inc., Austin, Texas

Upper Brazos incl. Ham Creek – nine pres. /abs. survey visits – 24 GCWA detections

Nolan River area – six pres. /abs. survey visits – two GCWA detections

Powelldale Mountains (AKA "**The Mountain**") – two pres. /abs. survey visits – two GCWA detections

<u>1997</u> - Espy, Houston, & Associates, Inc. 1997. Mid-Brazos project – Lake Whitney 1997 endangered species investigations. Espy, Houston, & Associates, Inc., Austin, Texas

Powelldale Mountains (AKA "**The Mountain**") – two pres. /abs. survey visits – two GCWA detections

Nolan River - eight pres. /abs. survey visits - two GCWA detections

Cedron Creek North (note: this is not Cedron Creek Park, this area is slightly north of the Park) - eight pres. /abs. survey visits – no GCWA detections (one BCVI sighting in non-habitat)

Panther Boys Tract - seven pres. /abs. survey visits – no GCWA detections (two BCVI detections)

<u>1996</u> - DLS Associates. 1996. Endangered species investigations Mid-Brazos Project – Lake Whitney Hill and Bosque Counties, Texas. DLS Associates. Austin, Texas.

Powelldale Mountains (AKA "**The Mountain**") – six pres. /abs. survey visits – two GCWA detections

Cedron Creek (not Cedron Creek "North" or "Park," this area is on the south shore of Cedron Creek approx. ¼ mile west of FM 56) – seven pres. /abs. survey visits – three GCWA detections

Girl Scout Island and Girl Scout Corridor - six pres. /abs. survey visits – no GCWA detections

Panther Boys Tract – 8 pres. /abs. survey visits - two (possibly four) GCWA detections

Cumulative Golden-cheeked Warbler Survey Results on Whitney Lake Corps Property - Johnson, Bosque, and Hill Counties, Texas

97°30'0"W 97°25'0"W 97°20'0"W

32°10'0"N 32°5'0"N 32°0'0"N 31°55'0"N

HAM CREEK PARK
2011 - five pres./abs/ survey visits - 3 GCWA detections
2005 - four point count stations - one GCWA detection

UPPER BRAZOS
2015 - five pres./abs/ survey visits - 18 positive detections
2011 - one GCWA detection during single day visit
2009 - two GCWA detections during single day visit
2008 - five pres./abs. survey visits - 29 GCWA detections
1998 - nine pres./abs. survey visits - 24 GCWA detections

OWL HOLLOW
2009 - five pres./abs. survey visits - seven GCWA detections

CHISHOLM TRAIL PARK
2009 - five pres./abs. survey visits - six GCWA detections

NOLAN RIVER
2011 - five BCVI pres./abs. survey visits - five GCWA detections
2009 - ten pres./abs. survey visits - twelve GCWA detections
1998 - six pres./abs. survey visits - two GCWA detections
1997 - eight pres./abs. survey visits - two GCWA detections

PHELPS CREEK
2011 - five pres./abs. survey visits - four GCWA detections

WHITE BLUFF
2009 - five pres./abs. survey visits - three GCWA detections

BEAR CREEK
2011 - five pres./abs. survey visits - no GCWA detections</CLR>

LIVE OAK RESORTS
2011 - five pres./abs. survey visits - one GCWA detection

POWELLDALE MOUNTAINS
2005 - one point count station - one GCWA detection
1998 - two pres./abs. survey visits- two GCWA detections
1997 - two pres./abs. survey visits- two GCWA detections
1996 - six pres./abs. survey visits- two GCWA detections

PANTHER BOYS TRACT TO STEELE CREEK
2015 - two pres./abs. survey visits - one GCWA detection

STEELE CREEK DRAINAGE
2008 - five pres./abs. survey visits - seven GCWA detections

CEDAR CREEK PARK
2005 - one point count station - no GCWA detections

PANTER BOYS TRACT
2009 - five pres./abs. survey visits - no GCWA detections
2005 - two point count stations - no GCWA detections
1997 - seven pres./abs. survey visits- no GCWA detections
1996 - eight pres./abs. survey visits - two to four GCWA detections

CEDRON CREEK PARK
2005 - two point count stations - no GCWA detections

MCCOWN VALLEY TO LIVE OAK RESORTS
2011 - five pres./abs. survey visits - no GCWA detections

CEDRON CREEK NORTH
1997 - eight pres./abs. survey visits - no GCWA detections
(BCVI sighting in non-habitat)

KATY BRIDGE (HILL CO.)
2005 - one point count station - no GCWA detections

GIRL SCOUT ISLAND AND CORRIDOR
2006 - single-day site visit - one, possibly two GCWA detections
1996 - six pres./abs. survey visits - no GCWA detections

CEDRON CREEK (near GSI corridor)
2005 - two point count stations - no GCWA detections

McCOWEN VALLEY
2005 - one point count station - no GCWA detections

CEDRON CREEK
2011 - one GCWA detection during single day visit
2009 - one GCWA detection during single day visit
2008 - five pres./abs. survey visits - 16 GCWA detections
1996 - seven pres./abs. survey visits - three GCWA detections

BEE BLUFF TO GIRL SCOUT ISLAND
2015 - five pres./abs. survey visits - two GCWA detections, one BCVI detection

KING CREEK TO BEE BLUFF
2008 - five pres./abs. survey visits - nine GCWA detections

ROCKY CREEK
2015 - five pres./abs. survey visits - one GCWA detection

LOFERS BEND PARK
2005 - two point count stations - no GCWA detections

LAGUNA PARK
2015 - five pres./abs. survey visits - no GCWA detections

97°30'0"W 97°25'0"W 97°20'0"W

U.S. Fish & Wildlife Service

Arlington, Texas, Ecological Services Field Office
Projection: UTM Zone 14N, NAD 1983, GRS 1980
Production Date: 8/4/2015

FWS_GCW_Survey_Areas
COE Property Boundary

0 0.95 1.9 Miles
0 0.95 1.9 Kilometers

APPENDIX C

SURVEY DATA TABLE ABBREVIATIONS

Survey Data Table Abbreviations

Surveyors / Observers

SE – Sean Edwards (USFWS)
JL – Jacob Lewis (USFWS)

Vegetation

AmE – American elm
AJ – Ashe juniper
BE – boxelder
BO – bur oak
BU – bumelia
CB – chinaberry
CCA – catclaw acacia
CE – cedar elm
DH – deciduous holly
EB – elbowbush
FLS – prairie flame-leaf sumac
HB – hackberry
LO – plateau live oak
MAJ – mature Ashe juniper
ML – Texas mountain laurel
MQ – mesquite
MxBE – Mexican buckeye
PC – pecan
RO – Texas red oak
SBS – skunkbush sumac
SO – white shin oak
TxA – Texas ash
TxBE – Texas buckeye

Miscellaneous

USFWS – U.S. Fish & Wildlife Service
GCWA – golden-cheeked warbler
BCVI – black-capped vireo
CR – County Road
FM – Farm to Market Road
N – North
S – South
E – East
W – West

APPENDIX E – WILDLIFE HABITAT APPRAISAL PROCESS (WHAP) SUMMARY REPORT

A Habitat Assessment for the Whitney Lake Master Plan Update was conducted on 9-11 September, 2015 at Whitney Lake using the Texas Parks and Wildlife Department's Wildlife Habitat Appraisal Procedures (WHAP). Sites were preselected based on aerial imagery from existing GIS data. A total of 95 sites around the lake were selected. The four major habitat types that were selected and assessed include Grassland, Savannah, Woodland and Bottomland Hardwood. These habitat types were ranked according to their suitability for wildlife. Habitat quality values were combined with acreage figures to provide available Habitat Units (HU).

There were 16 Grassland sites assessed that had WHAP scores ranging from a low of 0.33 to a high of 0.63. The average score for this habitat type was 0.43. Generally, the grasslands observed around Lake Whitney were in fair to good condition, but did show that most were transitioning to Shrubland or Savannah habitat. The dominant herbaceuous species found were Western Ragweed, Snow on the Prairie, Silver Bluestem, Wildrye, Scribners Panicum, Goldenrod, Little Bluestem, Johnson Grass, Croton and Bermuda Grass. There were a few woody species encountered that were encroaching on these grassland areas, the dominant woody species were Yaupon, Hackberry, Virginia Creeper, Mesquite, Elm, Prickly Pear and Salt Cedar.

There were 26 Savannah sites assessed that had WHAP scores that ranged from a low of 0.39 to a high of 0.80. The average score for this habitat type was 0.52. Generally the savannahs observed around Lake Whitney were in Good condition. The dominant herbaceuous species found were Johnson Grass, Big Bluestem, Croton, Western Ragweed, Vetch, Beggars Lice, Little Bluestem, Scribners Panicum and Silver Bluestem. The dominant woody species observed were Mesquite, Red Oak, Live Oak, Post Oak, Elm, Hackberry, Juniper, Bumelia, Sumac, Prickly Pear, Greenbriar and Dewberry.

There were 40 Woodland sites assessed that had WHAP scores that ranged from a low of 0.43 to a high of 0.86. The average score for this habitat type was 0.60. Generally the woodlands observed around Lake Whitney were in Good condition. The dominant herbaceuous species found were Carex, Scribners Panicum, Croton, Silver Bluestem. The dominant woody species observed were

Hackberry, Juniper, Live Oak, Post Oak, Bumelia, Elm, Ash, Blackjack Oak, Pecan, Locust, Greenbriar, Poison Ivy, Prickly Pear, Red Oak and Yaupon.

There were 13 Bottomland Hardwood sites assessed that had WHAP scores that ranged from a low of 0.61 to a high of 0.83. The average score for this habitat type was 0.70. Generally the Bottomland Hardwoods observed around Lake Whitney were in Fair-Good condition. The dominant herbaceuous species found were Croton, Cocklebur, Dropseed, Broomweed, Clover, Beggars Lice, Scribners Panicum, Wild Onion and Cherokee Sedge. The dominant woody species observed were Hackberry, Greenbriar, Poison Ivy, Virginia Creeper, Live Oak, Bur Oak, Red Oak, Pecan, Elm, Ash, Boxelder, Willow, Cottonwood, Buttonbush and Soapberry.

Whitney Master Plan WHAP Assessment - Grassland				
Site Number	**Habitat Type**	**Habitat Score**	**Dominant Woody Species**	**Dominant Herbaceous Species**
5	Grassland	0.44	Hackberry, Bumelia, Juniper, Locust, Mesquite, Pecan, Elm	Ragweed, Snow on the Prairie, Dodder, Silver Bluestem, Wildrye, Scribners Panicum, Sedge, Goldenrod, Purple Thistle, Sumpweed
6	Grassland	0.63	Elm, Buttonbush	Cocklebur, Rush, Western Ragweed, Smartweed, Scribners Panicum, Croton
8	Grassland	0.33	Bumelia, Greenbriar, Locust, Poison Ivy, Dewberry, Live Oak, Elm	Croton, Cocklebur, Broomweed, Scribners Panicum
10	Grassland	0.36	Dewberry, Greenbriar, Locust, Willow	Croton, Bermuda Grass
13	Grassland	0.58	Juniper, Dewberry, Soapberry, Bumelia, Blackjack Oak, Pecan	Partridge Pea, Croton, Little Bluestem, Scribners Panicum, Menarda, Bull Nettle, Dropseed

Whitney Master Plan WHAP Assessment - Grassland				
Site Number	**Habitat Type**	**Habitat Score**	**Dominant Woody Species**	**Dominant Herbaceous Species**
26	Grassland	0.38	Grapevine, Dewberry, Greenbriar, Mesquite, Locust, Eves Necklace, Pecan	Fair- 4-7 species readily observable.
35	Grassland	0.37	Boisdarc, Juniper, Buttonbush	Good- 8 or more species readily observable.
41	Grassland	0.48	Hackberry, Bumelia, Juniper, Greenbriar, Mesquite, Locust	Good- 8 or more species readily observable.
48	Grassland	0.45	Locust, Boisdarc	Fair- 4-7 species readily observable.
49	Grassland	0.46	Hackberry, Locust, Boisdarc	Fair- 4-7 species readily observable.
58	Grassland	0.37	None	Poor- 1-3 Combined Species
64	Grassland	0.42	Juniper, Bumelia, Mesquite, Prickly Pear	Good- 8 or more species readily observable.
67	Grassland	0.33	Mesquite, Locust, Elm	Fair- 4-7 species readily observable.
75	Grassland	0.40	Juniper, Mesquite, Locust, Live Oak	Western Ragweed, Three Awn, Scribners Panicum, Silver Bluestem, Broomweed, Blackeyed Susan, Bitter Sneezeweed, Love Grass, Sensitive Briar, Fimbry, Sedge
77	Grassland	0.43	Juniper, Greenbriar, Mesquite, Elm	Croton, Sneezeweed, Scribners Panicum, Little Bluestem, Silver Bluestem, Johnson Grass, Partridge Pea
86	Grassland	0.50	Greenbriar, Sumac	Good- 8 or more species readily observable.
90	Grassland	0.40	Yaupon, Hackberry, Virginia Creeper, Mesquite, Elm, Prickly Pear, Salt Cedar	Good- 8 or more species readily observable.

Whitney Master Plan WHAP Assessment - Grassland				
Site Number	**Habitat Type**	**Habitat Score**	**Dominant Woody Species**	**Dominant Herbaceous Species**
Grassland Summary Data				
Low Habitat Score		0.33	Bumelia, Greenbriar, Locust, Boisdarc, Hackberry, Mesquite	Western Ragweed, Snow on the Prairie, Silver Bluestem, Wildrye, Scribners Panicum, Goldenrod, Little Bluestem, Johnson Grass, Croton, Bermuda Grass
High Habitat Score		0.63		
Average Habitat Score		0.43		

Whitney Master Plan WHAP Assessment - Savannah				
Site Number	**Habitat Type**	**Habitat Score**	**Dominant Woody Species**	**Dominant Herbaceous Species**
0	Savannah	0.63	Mesquite, Dewberry, Live Oak, Juniper, Sumac, Red Oak, Elm, Hercules Club, Elbowbush, Ash, Prickly Pear, Grapevine	Little Bluestem, Scribners Panicum, KR Bluestem, Rescue Grass, Western Ragweed, Wood Sorrel, Beggars Lice, Vetch, Croton, Johnson Grass, Side Oats Gramma
1	Savannah	0.56	Mesquite, Post Oak, Dewberry, Chinaberry, Live Oak, Juniper, Willow Baccharis, Sumac, Red Oak, Elm, Hercules Club, Elbowbush, Ash, Prickly Pear	Little Bluestem, Indian Paintbrush, Scribners Panicum, KR Bluestem, Rescue Grass, Western Ragweed, Wood Sorrel, TX Wintergrass, Wild Geranium, Black Eyed Susan, Beggars Lice, Vetch, Smartweed, Verbena

Whitney Master Plan WHAP Assessment - Savannah				
Site Number	**Habitat Type**	**Habitat Score**	**Dominant Woody Species**	**Dominant Herbaceous Species**
3	Savannah	0.39	Prickly Pear, Greenbriar, Elm, Juniper, Ash, Elbowbush, Bumelia, Hackberry, Post Oak, Live Oak	Crow's Poison, Scribners Panicum, Aster, Wood Sorrel, Silver Bluestem, Sumpweed, Clover, Black Eyed Susan, Indian Paintbrush, Cherokee Sedge, Wild Geranium, Wild Onion, Beggars Lice, Broomweed
11	Savannah	0.53	Hackberry, Greenbriar, Dewberry, Poison Ivy, Persimmon, Grapevine, Juniper, Locust, Mesquite, Pecan, Hickory, Elm	Croton, Bermuda Grass
15	Savannah	0.56	Plum, Juniper, Hackberry, Poison Ivy, Greenbriar, Dewberry, Mesquite, Locust, Pecan, Elm, Prickly Pear	
16	Savannah	0.53	Juniper, Hackberry, Mulberry, Bumelia, Dewberry, Greenbriar, Poison Ivy, Mesquite, Live Oak, Red Oak, Elm, Prickly Pear	Good- 8 or more species readily observable.
18	Savannah	0.45	Juniper, Hackberry, Bumelia, Mesquite, Elm, Ash, Prickly Pear	Good- 8 or more species readily observable.
23	Savannah	0.45	Juniper, Mesquite, Live Oak, Prickly Pear	Good- 8 or more species readily observable.
28	Savannah	0.52	Greenbriar, Sumac, Mesquite, Locust, Partridge Pea, Pecan, Elm	Good- 8 or more species readily observable.
30	Savannah		Not Surveyed-Covered in Flood Debris	

Whitney Master Plan WHAP Assessment - Savannah				
Site Number	**Habitat Type**	**Habitat Score**	**Dominant Woody Species**	**Dominant Herbaceous Species**
34	Savannah	0.43	Willow, Buttonbush, Cottonwood	Good- 8 or more species readily observable.
45	Savannah	0.42	Hackberry, Bumelia, Juniper, Greenbriar, Mesquite, Locust	Good- 8 or more species readily observable.
46	Savannah	0.57	Juniper, Sumac, Skunkbush, Hackberry, Acacia, Live Oak, Elm, Willow Baccharis, Yucca	Good- 8 or more species readily observable.
51	Savannah	0.53	Locust, Willow, Cottonwood	Good- 8 or more species readily observable.
52	Savannah	0.80	Hackberry, Greenbriar, Juniper, Virginia Creeper, Locust, Mesquite, Live Oak, Elm, Cactus, Boisdarc	Good- 8 or more species readily observable.
56	Savannah	0.39	Juniper, Poison Ivy, Greenbriar, Bumelia, Skunkbush, Red Oak, Ash	Good- 8 or more species readily observable.
62	Savannah	0.53	Hackberry, Bumelia, Juniper, Greenbriar, Dewberry, Poison Ivy, Grapevine, Locust, Mesquite, Live Oak	Croton, KR Bluestem, Indian Grass, Western Ragweed, Balloon Vine, Dropseed, Milkweed, Scribners Panicum, Silver Bluestem, Sedge
63	Savannah	0.46	Hackberry, Mesquite, Elm, Juniper, Prickly Pear	Good- 8 or more species readily observable.
65	Savannah	0.67	Mesquite, Bumelia, Sumac, Live Oak, Elm, Ash, Juniper	Good- 8 or more species readily observable.
66	Savannah	0.59	Hackberry, Greenbriar, Bumelia, Locust, Elm, Ash, Boisdarc	Good- 8 or more species readily observable.

Whitney Master Plan WHAP Assessment - Savannah				
Site Number	**Habitat Type**	**Habitat Score**	**Dominant Woody Species**	**Dominant Herbaceous Species**
76	Savannah	0.50	Bumelia, Greenbriar, Ivy Tree Vine, Grapevine, Dewberry, Beautyberry, Hercules Club, Hackberry, Juniper, Mesquite, Locust, Elm, Prickly Pear	Nightshade, Snow on the Prairie, Western Ragweed, Purpletop, Little Bluestem, Silver Bluestem, Croton, Scribners Panicum, Bull Nettle, Beggars Lice, Clover
79	Savannah	0.54	Juniper, Bumelia, Poison Ivy, Plum, Prickly Ash, Greenbriar, Hackberry, Mesquite, Live Oak, Elm, Prickly Pear	Western Ragweed, Silver Bluestem, Little Bluestem, Croton, Gayfeather, Milkweed, Snakeweed, Sensitive Briar, Three Awn, Love Grass
80	Savannah	0.44	Bumelia, Sumac, Grapevine, Plum, Live Oak, Pecan, Elm, Boisdarc	Fair- 4-7 species readily observable.
85	Savannah	0.48	Bumelia, Sumac, Juniper, Plum, Greenbriar, Hackberry, Locust, Acacia, Live Oak, Boisdarc, Salt Cedar, Prickly Pear	Good- 8 or more species readily observable.
92	Savannah	0.50	Hackberry, Persimmon, Greenbriar, Poison Ivy, Grapevine, Juniper, Mesquite, Locust, Prickly Pear, Dewberry, Hercules Club	Johnson Grass, Big Bluestem, Croton, Western Ragweed, Vetch, Beggars Lice, Little Bluestem, Scribners Panicum
93	Savannah	0.48	Hackberry, Greenbriar, Poison Ivy, Grapevine, Juniper, Mesquite, Locust, Prickly Pear, Dewberry, Hercules Club	Johnson Grass, Big Bluestem, Croton, Western Ragweed, Vetch

Whitney Master Plan WHAP Assessment - Savannah				
Site Number	**Habitat Type**	**Habitat Score**	**Dominant Woody Species**	**Dominant Herbaceous Species**
Savannah Summary Data				
Low Habitat Score		0.39	Mesquite, Red Oak, Live Oak, Post Oak, Elm, Hackberry, Juniper, Bumelia, Sumac, Prickly Pear, Greenbriar, Dewberry	Johnson Grass, Big Bluestem, Croton, Western Ragweed, Vetch, Beggars Lice, Little Bluestem, Scribners Panicum, Silver Bluestem
High Habitat Score		0.80		
Average Habitat Score		0.52		

Whitney Master Plan WHAP Assessment - Woodland				
Site Number	**Habitat Type**	**Habitat Score**	**Dominant Woody Species**	**Dominant Herbaceous Species**
4	Woodland	0.80	Hackberry, Hercules Club, Juniper, Greenbriar, Dewberry, Poison Ivy, Yaupon, Grapevine, Bumelia, Locust, Live Oak, Blackjack Oak, Pecan, Ash, Elm, Boisdarc, Prickly Pear	Giant Ragweed, Scribners Panicum, Johnson Grass, Wild Petunia, Carex, Wild Poinsetia, Wildrye, Silver Bluestem
7	Woodland	0.52	Hackberry, Greenbriar, Bumelia, Dewberry, Poison Ivy, Live Oak, Pecan, Elm, Boisdarc	Croton, Cocklebur, Silver Bluestem
12	Woodland	0.69	Yaupon, Hackberry, Elbowbush, Greenbriar, Juniper, Poison Ivy, Bumelia, Locust, Post Oak, Live Oak, Elm	Carex, Wildrye, Beggars Lice, Boneset, Scribners Panicum, Poinsetia

Whitney Master Plan WHAP Assessment - Woodland				
Site Number	**Habitat Type**	**Habitat Score**	**Dominant Woody Species**	**Dominant Herbaceous Species**
14	Woodland	0.67	Juniper, Poison Ivy, Beautyberry, Dewberry, Greenbriar, Bumelia, Carolina Snailseed, Locust, Blackjack Oak, Post Oak, Ash, Prickly Pear	Scribners Panicum, Silver Bluestem
17	Woodland	0.59	Juniper, Hackberry, Elbowbush, Poison Ivy, Greenbriar, Holly, Live Oak, Elm, Ash, Boisdarc, Yucca, Prickly Pear	Good- 8 or more species readily observable.
19	Woodland	0.59	Juniper, Poison Ivy, Hackberry, Elbowbush, Beautyberry, Live Oak, Red Oak, Ash	Good- 8 or more species readily observable.
20	Woodland	0.49	Juniper, Poison Ivy, Bumelia, Hackberry, Greenbriar, Live Oak, White Oak, Spanish Oak, Ash, Elm	Fair- 4-7 species readily observable.
21	Woodland	0.44	Juniper, Poison Ivy, Hackberry, Post Oak, Red Oak, Ash, Prickly Pear	Good- 8 or more species readily observable.
22	Woodland	0.50	Sumac, Juniper, Hackberry, Poison Ivy, Elbowbush, Bumelia, Greenbriar, Mesquite, Red Oak, Ash, Elm, Prickly Pear	Good- 8 or more species readily observable.
24	Woodland	0.61	Hackberry, Plum, Juniper, Grapevine, Greenbriar, Elbowbush, Poison Ivy, Dewberry, Mesquite, Live Oak, Pecan, Elm, Prickly Pear, Buttonbush	Good- 8 or more species readily observable.
25	Woodland	0.50	Grapevine, Poison Ivy, Dewberry, Locust, Live Oak, Pecan, Ash, Elm	Fair- 4-7 species readily observable.

Whitney Master Plan WHAP Assessment - Woodland				
Site Number	**Habitat Type**	**Habitat Score**	**Dominant Woody Species**	**Dominant Herbaceous Species**
27	Woodland	0.60	Grapevine, Greenbriar, Chinaberry, Boxelder, Peppervine, Beautyberry, Juniper, Live Oak, Indian Pea, Spanish Oak, Pecan, Ash, Elm	Fair- 4-7 species readily observable.
29	Woodland		Not Surveyed-Covered in Flood Debris	
31	Woodland		Not Surveyed-Covered in Flood Debris	
32	Woodland	0.49	Hackberry, Elbowbush, Greenbriar, Juniper, Grapevine, Beautyberry, Sumac, Redbud, Bumelia, Poison Ivy, Live Oak, Red Oak, Elm, Ash	Fair- 4-7 species readily observable.
33	Woodland	0.62	Hackberry, Greenbriar, Poison Ivy, Bumelia, Juniper, Virginia Creeper, Grapevine, Locust, Water Oak, Pecan, Ash, Elm, Prickly Pear	Good- 8 or more species readily observable.
36	Woodland	0.60	Hackberry, Greenbriar, Poison Ivy, Virginia Creeper, Mulberry, Dewberry, Locust, Mesquite, Live Oak, Pecan, Elm, Ash	Fair- 4-7 species readily observable.
37	Woodland	0.62	Greenbriar, Hackberry, Poison Ivy, Elbowbush, Beautyberry, Grapevine, Bumelia, Virginia Creeper, Eves Necklace, Live Oak, Pecan, Boxelder, Ash, Elm	Fair- 4-7 species readily observable.

Whitney Master Plan WHAP Assessment - Woodland				
Site Number	**Habitat Type**	**Habitat Score**	**Dominant Woody Species**	**Dominant Herbaceous Species**
38	Woodland	0.65	Poison Ivy, Hackberry, Greenbriar, Grapevine, Mulberry, Juniper, Bumelia, Locust, Live Oak, Bur Oak, Walnut, Pecan, Elm, Ash	Good- 8 or more species readily observable.
39	Woodland	0.63	Greenbriar, Poison Ivy, Hackberry, Juniper, Grapevine, Mulberry, Locust, Eves Necklace, Bur Oak, Live Oak, Pecan, Elm, Ash	Fair- 4-7 species readily observable.
47	Woodland	0.55	Greenbriar, Juniper, Chinaberry, Hackberry, Beautyberry, Grapevine, Poison Ivy, Yaupon, Live Oak, Red Oak, Ash	Poor- 1-3 Combined Species
50	Woodland	0.44	Juniper, Agarito, Acacia, Red Oak, Live Oak, Barrel Cactus	Fair- 4-7 species readily observable.
53	Woodland	0.73	Poison Ivy, Greenbriar, Juniper, Beautyberry, Hackberry, Bumelia, Yaupon, Mesquite, Locust, Red Oak, Live Oak, Ash, Elm, Cactus	Fair- 4-7 species readily observable.
54	Woodland	0.43	Greenbriar, Mulberry, Bumelia, Juniper, Poison Ivy, Yaupon, Red Oak, Ash, Elm, Prickly Pear	Fair- 4-7 species readily observable.
57	Woodland	0.61	Juniper, Hackberry, Dewberry, Greenbriar, Poison Ivy, Holly, Nandina, Redbud, Locust, Bur Oak, Pecan, Walnut, Elm, Ash	Fair- 4-7 species readily observable.
60	Woodland	0.60	Hackberry, Bumelia, Juniper, Chinaberry, Greenbriar, Mesquite, Locust, Live Oak, Elm, Boisdarc	Good- 8 or more species readily observable.

Whitney Master Plan WHAP Assessment - Woodland				
Site Number	**Habitat Type**	**Habitat Score**	**Dominant Woody Species**	**Dominant Herbaceous Species**
68	Woodland	0.57	Greenbriar, Bumelia, Yaupon, Virginia Creeper, Mesquite, Acacia, Blackjack Oak, Ash, Juniper, Prickly Pear	Good- 8 or more species readily observable.
69	Woodland	0.54	Ashe Juniper, Greenbriar, Poison Ivy, Plum, Redbud, Red Oak, Live Oak, Ash	Good- 8 or more species readily observable.
70	Woodland	0.86	Paw Paw, American Beautyberry, Dogwood, Poison Ivy, Grapevine, Hackberry, Redbud, Bur Oak, Walnut, Pecan, Elm	Fair- 4-7 species readily observable.
71	Woodland	0.70	Ashe Juniper, Bumelia, Hackberry, Poison Ivy, Beautyberry, dogwood, Redbud, Red Oak, Elm, Ash	Good- 8 or more species readily observable.
72	Woodland	0.63	Hackberry, Yaupon, Greenbriar, Poison Ivy, Grapevine, Juniper, Sumac, Bumelia, Mesquite, Live Oak, Red Oak, Pecan, Elm, Ash, Willow Bacharis	Little Bluestem, Johnson Grass, Croton, Curly Mesquite, Hairy Vetch, Plains Bristlegrass, Purpletop
74	Woodland	0.59	Juniper, Yaupon, Beautyberry, Greenbriar, Live Oak, Post Oak, Ash, Elm, Prickly Pear	Clover, Carex, Scribners Panicum, Purpletop, Croton, Boneset
78	Woodland	0.61	Dogwood, Greenbriar, Yaupon, Bumelia, Juniper, Hackberry, Live Oak, Walnut, Elm, Prickly Pear	Carex, Croton, Broomweed, Three Awn, Black Eyed Susan, Silver Bluestem

Whitney Master Plan WHAP Assessment - Woodland				
Site Number	**Habitat Type**	**Habitat Score**	**Dominant Woody Species**	**Dominant Herbaceous Species**
81	Woodland	0.77	Hackberry, Greenbriar, Poison Ivy, Yaupon, Sumac, Bur Oak, Pecan, Walnut, Elm, Ash, Sycamore, Boisdarc	Fair- 4-7 species readily observable.
82	Woodland	0.64	Paw Paw, Beautyberry, Poison Ivy, Bumelia, Juniper, Yaupon, Redbud, Greenbriar, Honeysuckle, Bur Oak, Red Oak, Walnut, Pecan, Elm, Yucca	Good- 8 or more species readily observable.
83	Woodland	0.56	Juniper, Poison Ivy, Yaupon, Mulberry, Greenbriar, Honeysuckle, Mesquite, Blackjack Oak, Red Oak, Ash, Elm	Good- 8 or more species readily observable.
84	Woodland	0.54	Juniper, Greenbriar, Poison Ivy, Blackjack Oak, Red Oak, Live Oak, Ash, Elm, Prickly Pear, Yucca	Good- 8 or more species readily observable.
87	Woodland	0.65	Greenbriar, Sumac, Poison Ivy, Red Oak, Live Oak, Walnut, Pecan, Elm	Fair- 4-7 species readily observable.
88	Woodland	0.53	Juniper, Poison Ivy, Greenbriar, Sumac, Honeysuckle, Yaupon, Mulberry, Blackjack Oak, Live Oak, Red Oak, Ash, Elm, Boisdarc	Fair- 4-7 species readily observable.
89	Woodland	0.55	Juniper, Bumelia, Privet, Sacred Bamboo, Poison Ivy, Greenbriar, Yaupon, Live Oak, Walnut, Ash, Elm, Boisdarc	Fair- 4-7 species readily observable.

Whitney Master Plan WHAP Assessment - Woodland				
Site Number	**Habitat Type**	**Habitat Score**	**Dominant Woody Species**	**Dominant Herbaceous Species**
91	Woodland	0.52	Juniper, Bumelia, Sumac, Greenbriar, Yaupon, Plum, Hackberry, Redbud, Live Oak, Red Oak, Buckeye, Elm	Fair- 4-7 species readily observable.
94	Woodland	0.57	Black Persimmon, Prickly Pear, Greenbriar, Grapevine, Juniper, Ash, Elbowbush, Bumelia, Hackberry, Buttonbush, Live Oak, Sumac	Crow's Poison, Scribners Panicum, Aster, Wood Sorrel, Croton, Silver Bluestem, Sumpweed, Clover, Beggars Lice,
Woodland Summary Data				
Low Habitat Score		0.43	Hackberry, Juniper, Live Oak, Post Oak, Bumelia, Elm, Ash, Blackjack Oak, Pecan, Locust, Greenbriar, Poison Ivy, Prickly Pear, Red Oak, Yaupon	Carex, Scribners Panicum, Croton, Silver Bluestem
High Habitat Score		0.86		
Average Habitat Score		0.60		

Whitney Master Plan WHAP Assessment - Bottomland Hardwood				
Site Number	**Habitat Type**	**Habitat Score**	**Dominant Woody Species**	**Dominant Herbaceous Species**
2	Bottomland Hardwood	0.74	Greenbriar, Prickly Pear, Elm, Ash, Elbowbush, Bumelia, Hackberry, Post Oak, Pecan, Live Oak, Sumac,	Scribners Panicum, Wood Sorrel, Silver Bluestem, Little Bluestem, Sumpweed, Clover, Smartweed, Croton, Cherokee Sedge, Wild Onion, Broomweed, Beggars Lice
9	Bottomland Hardwood	0.70	Hackberry, Dewberry, Greenbriar, Persimmon, Grapevine, Poison Ivy, Locust, Pecan, Hickory, Elm, Willow, Prickly Pear	Croton, Balloon Vine, Cocklebur, Dropseed, Broomweed
40	Bottomland Hardwood	0.65	Hackberry, Greenbriar, Pecan, Cedar Elm, Ash, Boisdarc	Poor- 1-3 Combined Species
42	Bottomland Hardwood	0.80	Hackberry, Poison Ivy, Greenbriar, Mulberry, Sesbania, Pecan, Elm, Ash, Boisdarc	Fair- 4-7 species readily observable.
43	Bottomland Hardwood	0.64	Hackberry, Locust, Pecan, Ash, Boisdarc	Fair- 4-7 species readily observable.
44	Bottomland Hardwood	0.74	Bumelia, Soapberry, Hackberry, Plum, Pecan, Elm, Boxelder, Boisdarc	Good- 8 or more species readily observable.
55	Bottomland Hardwood	0.69	Juniper, Poison Ivy, Yaupon, Greenbriar, Soapberry, Virginia Creeper, Bumelia, Hackberry, Live Oak, Pecan, Elm, Ash, Cactus	Good- 8 or more species readily observable.
59	Bottomland Hardwood	0.61	Greenbriar, Grapevine, Locust, Pecan, Elm, Cottonwood, Willow, Buttonbush	Fair- 4-7 species readily observable.

Whitney Master Plan WHAP Assessment - Bottomland Hardwood				
Site Number	**Habitat Type**	**Habitat Score**	**Dominant Woody Species**	**Dominant Herbaceous Species**
61	Bottomland Hardwood	0.73	Virginia Creeper, Peppervine, Greenbriar, Dewberry, Locust, Cottonwood	Fair- 4-7 species readily observable.
73	Bottomland Hardwood	0.83	Hackberry, Greenbriar, Poison Ivy, Virginia Creeper, Live Oak, Bur Oak, Red Oak, Pecan, Elm, Ash, Boxelder, Willow, Cottonwood, Buttonbush	Fair- 4-7 species readily observable.
Bottomland Hardwood Summary Data				
Low Habitat Score		0.61	Hackberry, Greenbriar, Poison Ivy, Virginia Creeper, Live Oak, Bur Oak, Red Oak, Pecan, Elm, Ash, Boxelder, Willow, Cottonwood, Buttonbush, Soapberry	Croton, Cocklebur, Dropseed, Broomweed, Clover, Beggars Lice, Scribners Panicum, Wild Onion, Cherokee Sedge
High Habitat Score		0.83		
Average Habitat Score		0.70		

ACRONYMS

CRMP	Cultural Resources Management Plan
CRASR	Baylor University Center for Reservoir and Aquatic Systems Research
DM	Design Memorandum
EA	Environmental Assessment, NEPA Document
EC	Engineer Circular
EM	Engineering Manual
EP	Engineering Pamphlet
EPA	United States Environmental Protection Agency
ER	Engineering Regulation
ERDC	Engineers Research and Development Center
FONSI	Finding of No Significant Impact
GCWA	Golden-cheeked Warbler
GIS	Geographical Information Systems
HQ	U. S. Army Corps of Engineers Headquarters
MP	Master Plan or Master Planning
MSL	Mean Sea Level
NEPA	National Environmental Policy Act, 1970
NHPA	National Historic Preservation Act
NOA	Notice of Availability
NRHP	National Register of Historic Places
NWS	National Weather Service
O&M	Operations and Maintenance
OMP	Operations Management Plan for a specific lake Project
OPM	Operations Project Manager
PDT	Project Delivery Team
PM	Project Management or Project Manager
PMP	Project Management Plan
SHPO	State Historical Preservation Office
USACE	U. S. Army Corps of Engineers, Fort Worth District
SWF-OD	Operations Division, U. S. Army Corps of Engineers, Fort Worth
RPEC	Regional Planning & Environmental Center
TCAP	Texas Conservation Action Plan
TCEQ	Texas Commission on Environmental Quality
TORP	Texas Outdoor Recreation Plan
TPWD	Texas Parks and Wildlife Department
TXDOT	Texas Department of Transportation
USFWS	U. S. Fish and Wildlife Service
WHAP	Wildlife Habitat Appraisal Procedures