



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

CESWF-PEM

27 September 2022

MEMORANDUM FOR Commander, U.S. Army Corps of Engineers (USACE), Fort Worth District (SWF)

SUBJECT: Grapevine Lake, Texas Master Plan Revision (September 2022)

1. **PURPOSE:** Enclosed subject Master Plan is submitted for review and approval in accordance with Engineering Regulations (E.R.) 1130-2-550, Change 7 and Engineering Pamphlet (E.P.) 1130-2-550, Change 5.
2. **BACKGROUND/DISCUSSION:** In accordance with E.R. 1130-2-550 Change 07, dated 30 January 2013 and E.P. 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 Grapevine Lake Master Plan is intended to bring the master plan up to date to reflect ecological, socio-demographic, and outdoor recreation trends currently affecting the lake, as well as those anticipated to occur within the 25-year planning period of 2022 to 2047.
3. **SUMMARY OF CHANGES:** The revision resulted in the preparation of new resource management objectives and the following changes to land use classifications:

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Prior Land Classifications (1971 Plan and 2001 Supplement)		Acres*	New Land Classifications (2022)		Acres
Operations and Maintenance		756	Project Operations		196
Environmentally Sensitive Areas*		2,374	Environmentally Sensitive Areas		4,481
Intense Recreation		2,355	High Density Recreation		2,597
MRML – Low Density Recreation		257	MRML – Low Density Recreation		211
MRML – Wildlife Management Area		1,952	MRML – Wildlife Management		1,259
MRML – Low Density Recreation/Wildlife Management Area		1,048	—		—
Total Land Acres		8,742	Total Land Acres		8,742
Prior Land Classifications (1971 Plan and 2001 Supplement)		Acres*	New Land Classifications (2022)		Acres
Permanent Pool		7,380	Permanent Pool		6,943
—		—	– Restricted		29
—		—	– Designated No Wake		693
—		—	– Open Recreation		6,221
TOTAL Water Surface Acres		7,380	TOTAL Water Surface Acres		6,943

* Land classification acres classified as E.S.A. in the 2001 Supplement were represented as a hatched overlay of other classifications. To avoid double-counting acres, the land acres are represented as E.S.A. and the water surface as Permanent Pool in this table. Some acreage differences are due to improvements in mapping and measurement technology, deposition/siltation, and erosion. Acres based on Conservation Pool of 535.0 NGVD29.

a. The above changes resulted from public and stakeholder review and comment, review of regional trends in outdoor recreation and resource protection, and compliance with Federal policies and mandates governing Federal land use. Environmentally Sensitive Areas were identified for the protection of threatened and endangered species and their habitat, as well as culturally significant sites and unique views and landscapes.

b. In accordance with the National Environmental Policy Act of 1969, including guidelines in 33 Code of Federal Regulations Part 230, an Environmental Assessment (E.A.) was prepared to assess the potential impacts that the alternative management scenarios outlined in the 2022 Grapevine Lake Master Plan (2022 Master Plan) would have on the natural, cultural, and human environments. The E.A. evaluated and analyzed two alternatives: No Action Alternative (continued use of the 1971 Master Plan and 2001 Master Plan Supplement) and the implementation of the 2022 Master Plan. Based on the findings of the E.A., implementing the 2022 Master Plan would not result in significant adverse impacts on the environment or constitute a major Federal action significantly affecting the quality of the human environment.

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c. The Master Plan and E.A. have been reviewed by the Regional Planning and Environmental Center, SWF Operations, and SWF Office of Counsel. The final version of the documents went through a 30-day public and agency review. All comments from the reviews have been addressed.

4. RECOMMENDATION: The Project Delivery Team members have reviewed and approved the Master Plan revision. The team recommends approval by each signatory, as well as approval and signature of the Finding of No Significant Impact by the commander.

Approve ✓
Disapprove

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KEVIN DAVEE, P.G., PMP
Director, Regional Planning & Environmental
Center

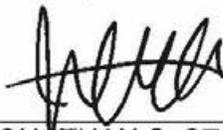
Approve ✓
Disapprove

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SHANE DEMMEER
Chief, Real Estate Division

Approve ✓
Disapprove

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TIMOTHY L. MACALLISTER
Chief, Operations Division

Approve ✓
Disapprove


JONATHAN S. STOVER, P.E., PMP
Colonel, EN
Commanding

30 SEP 2022

**FINDING OF NO SIGNIFICANT IMPACT
ENVIRONMENTAL ASSESSMENT FOR THE
GRAPEVINE LAKE MASTER PLAN 2022
TRINITY RIVER BASIN
TARRANT AND DENTON COUNTIES, TX**

In accordance with the National Environmental Policy Act of 1969, as amended, and implementing regulations in 40 Code of Federal Regulations (CFR) Parts 1500 – 1508, including guidelines in 33 CFR Part 230, the Ft. Worth District and the Regional Planning and Environmental Center (RPEC) of the U.S. Army Corps of Engineers (USACE) have assessed the potential environmental impacts of the 2022 Grapevine Lake Master Plan revision.

Engineering Regulation (ER) 1130-2-550 Change 07, dated January 2013 and Engineering Pamphlet (EP) 1130-2-550 Change 05, dated 30 January 2013, require Master Plans for most USACE water resources development projects having a federally owned land base. The revision of the 1971 Grapevine Lake Master Plan and 2001 Supplement was conducted pursuant to this ER and EP, and is necessary to meet current policy, and bring it up to date to reflect current ecological, socio-demographic, and outdoor recreation trends that are affecting the lake, as well as those anticipated to occur within the planning period of 2022 to 2047. The final recommendation is contained in the Master Plan dated September 2022.

The revision of the 1971 Grapevine Lake Master Plan and 2001 Supplement (hereafter Plan or Master Plan) is a framework built collaboratively to serve as a guide toward appropriate stewardship of USACE administered resources at Grapevine Lake over the next 25 years. The Final Environmental Assessment (EA) for the 2022 Master Plan evaluated various alternatives that would revise the 1971 Grapevine Lake Master Plan and 2001 Supplement to meet current policy.

In addition to a "no action" plan, one alternative that fully meets the project purpose was evaluated in detail (proposed action/plan). Section 2.0 of the 2022 Grapevine Lake Master Plan EA discusses the alternative formulation and selection as well the summary of the new goals and objectives. Section 8, Tables 8-1, and 8-2 of the Master Plan summarizes the changes to the land classifications. The proposed plan includes coordination with the public, updates to comply with the USACE regulations and guidance, and reflects changes in land management and land uses that have occurred since 1971 and 2001. Land classifications were refined to meet authorized project purposes and current resource objectives that address a mix of natural resources and recreation management objectives that are compatible with regional goals, recognize outdoor recreation trends, and are responsive to public comments.

Table 1: Summary of Potential Effects of the Proposed Plan

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

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

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

Public review of the draft Master Plan, Environmental Assessment, and Finding of No Significant Impact (FONSI) was completed on July 10, 2022. All comments submitted during the public review period have been incorporated in the final Master Plan, as appropriate.

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

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

All applicable environmental laws were considered and coordination with appropriate agencies and officials has been completed.

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

30 SEP 22
Date



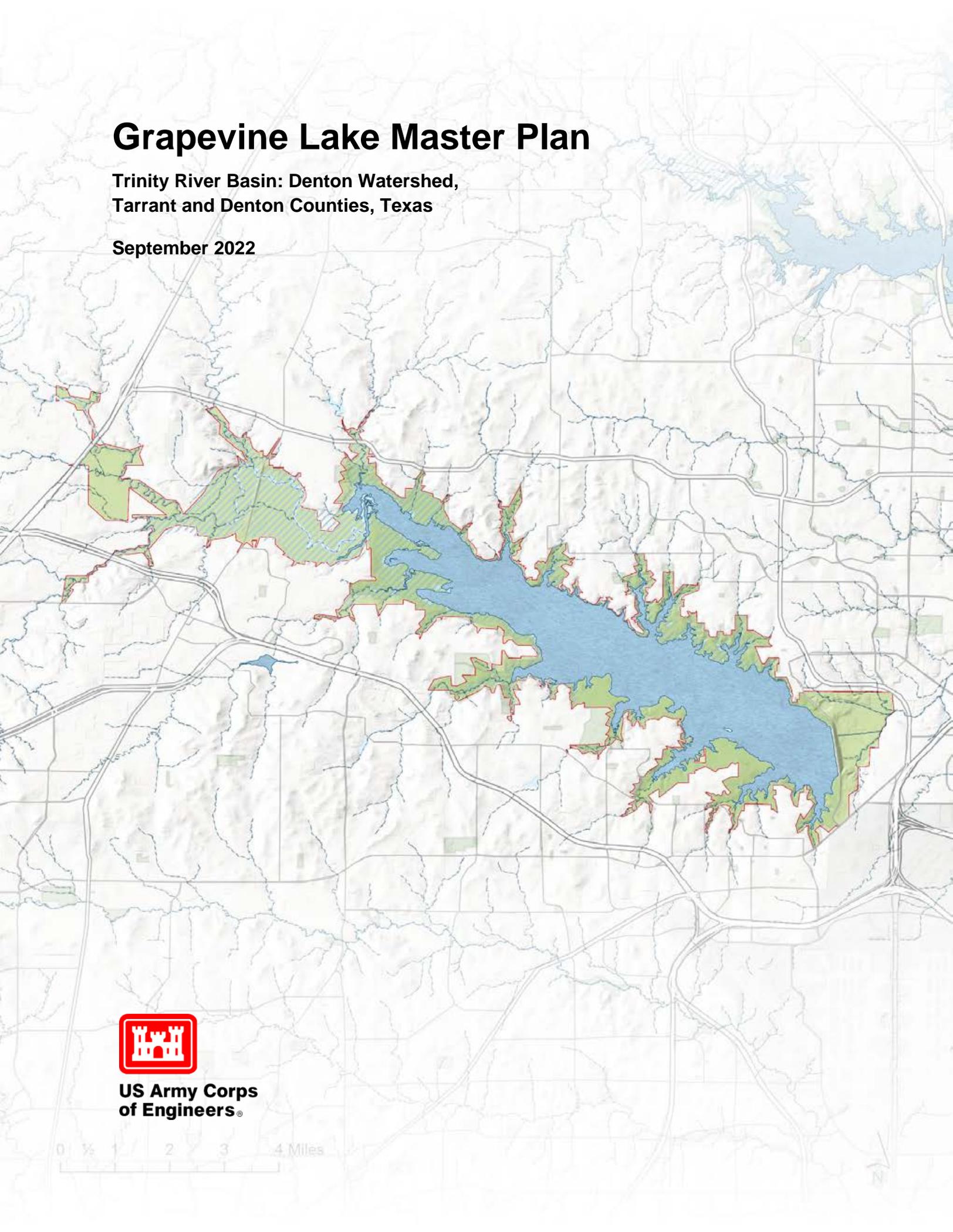
Jonathan S. Stover, P.E., PMP
Colonel, EN
Commanding

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Grapevine Lake Master Plan

Trinity River Basin: Denton Watershed,
Tarrant and Denton Counties, Texas

September 2022



**US Army Corps
of Engineers®**

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EXECUTIVE SUMMARY

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

ES.1 PURPOSE

The revision of the 1971 Grapevine Lake Master Plan (hereafter Plan or Master Plan) is a framework built collaboratively to guide appropriate stewardship of U.S. Army Corps of Engineers (USACE) administered resources at Grapevine Lake over the next 25 years. The 1971 Plan and 2001 Supplement have served well past the intended 25-year planning horizon and do not reflect the growing population around the lake and regional recreation needs. When originally built, the dam and lake's purposes were flood risk management, navigation, recreation, and water conservation storage for water supply. However, the navigation mission was deauthorized, and navigation storage has been converted to water supply. In addition to these primary missions, USACE has an inherent mission for environmental stewardship of project lands, working closely with the Texas Parks and Wildlife Department and local cities to provide regionally important outdoor recreation opportunities. The Master Plan is primarily a land use and outdoor recreation strategic plan that does not address the specific authorized purposes of flood risk management or water supply.

Grapevine Lake is located in the Dallas-Fort Worth Metroplex and spans across Tarrant and Denton Counties, both within the North Central Texas Council of Governments (NCTCOG) as shown in Figure ES.1. The 1971 Master Plan and 2001 Supplement included a total of 15,662 acres of fee simple, including 8,282 acres of land and 7,380 acres of water at the normal or conservation pool elevation of 535.0 feet National Geodetic Vertical Datum of 1929 (NGVD29). The acres figure was derived using land measurement technology dating from the 1970s to describe the size of the pool at the normal elevation. The mapping used for this Master Plan revision uses modern satellite imagery, Lidar (3-dimensional laser scanning) and Geographic Information System (GIS) mapping, resulting in different acreage calculations than that of the 1971 Master Plan and 2001 Supplement. There are approximately 60 miles of shoreline at the top of the conservation pool. Grapevine Dam and Lake Project (Grapevine Lake hereafter) is part of an integral flood control and water conservation project in the Trinity River Basin consisting of eight major projects. This Plan and supporting documentation provide an inventory and analysis, goals, objectives, and recommendations for USACE lands and waters at Grapevine Lake, Texas, with input from the public, stakeholders, and subject matter experts.

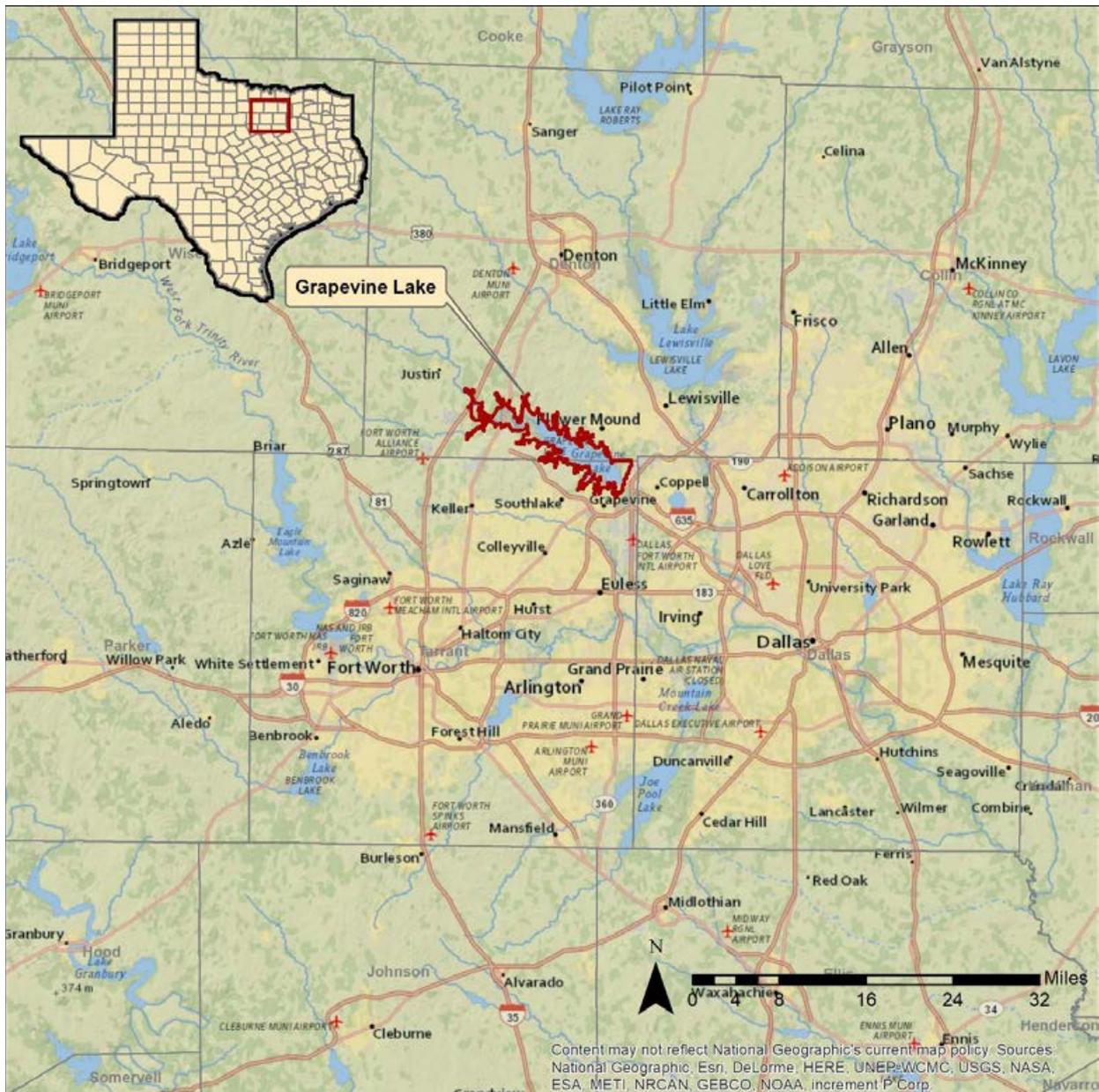


Figure ES.1 Vicinity Map of Grapevine Lake and Dam within the larger Dallas-Fort Worth Metropolitan Area

ES.2 PUBLIC INPUT

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

The first public input meeting was originally scheduled for the spring of 2020. In the interest of public health and well-being due to the COVID-19 pandemic, the public input process was changed from a face-to-face meeting to a virtual presentation

detailing the specifics of the master plan revision. The presentation and public input process remained open for 45 days. The public comment period began May 11, 2020 and ran through June 26, 2020.

During the public comment period, the USACE received 39 comments. Issues addressed in the comments included wildlife and habitat concerns, hiking and boaters' safety, and land development. Comments received, and government responses are listed in Section F.1 in Appendix F and were considered in developing the Draft Master Plan.

A public meeting was held at The REC of Grapevine on June 9, 2022 to release the Draft Master Plan. This initiated a 30-day comment period when members of the public, agencies, and other stakeholders could provide comments on the Draft Master Plan. The USACE received 88 comments from 59 individuals, agencies, and other stakeholders. Comments received and government responses are listed in Section F.2 in Appendix F. In response to comments, the following changes were made for the Final Master Plan:

- ESA 7 was expanded to include portions of surrounding shoreline resulting in minor changes to the maps, ESA 7 descriptions, land classification descriptions, and acreage tables.
- Clarification was added in the Master Plan to avoid ambiguous descriptions.
- Errors and omissions were corrected.
- Comments from the initial Public Scoping Meeting, Draft Public Meeting, and government responses were placed in Appendix F.
- A summary of public and agency review of the Draft Master Plan and consultation with Tribal Nations were added to Chapter 7.

ES.3 RECOMMENDATIONS

The following land and water classification changes (detailed in Chapter 8) were a result of the inventory, analysis, synthesis of data, documents, and public and agency input. In general, all USACE land at Grapevine Lake was reclassified either by a change in nomenclature required by regulation or changes needed to identify actual and projected use. The 2001 Supplement made changes to the land classifications and added Environmentally Sensitive Areas (ESA) and Utility Corridors to the Master Plan. Those ESA were shown as a hatch overlay of different land classifications. Today, ESAs are a separate land classification rather than an overlay of other land classifications. Those ESAs have been further refined to reflect current management practices and natural resource assessments.

The 2001 Supplement had similar land classifications to current land classifications with slightly different designations. The areas designated as Operations Area in the 2001 Supplement are now called Project Operations. The areas designated as Intense Recreation in the 2001 Supplement are now called High Density Recreation. Multiple Resource Management Lands (MRML) had one or more designations in the earlier plans, but now just a single designation. Those MRML designations are the

same as today: Low Density Recreation and Wildlife Management areas. Changes from prior land and water classification to new land and water classifications are reflected in Table ES.1. The 1971 Plan and 2001 Supplement only classified the water surface as Permanent Pool. The current Master Plan subdivides the water surface into Restricted, No Wake, and Open Recreation designations.

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

Prior Land Classifications (1971 Plan and 2001 Supplement)	Acres*	New Land Classifications (2022)	Acres
Operations and Maintenance	756	Project Operations	196
Environmentally Sensitive Areas*	2,374	Environmentally Sensitive Areas	4,481
Intense Recreation	2,355	High Density Recreation	2,597
MRML – Low Density Recreation	257	MRML – Low Density Recreation	211
MRML – Wildlife Management Area	1,952	MRML – Wildlife Management	1,259
MRML – Low Density Recreation/Wildlife Management Area	1,048	—	—
Total Land Acres	8,742	Total Land Acres	8,742
Prior Land Classifications (1971 Plan and 2001 Supplement)	Acres*	New Land Classifications (2022)	Acres
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—	—	– Restricted	29
—	—	– Designated No Wake	693
—	—	– Open Recreation	6,221
TOTAL Water Surface Acres	7,380	TOTAL Water Surface Acres	6,943

* Land classification acres classified as ESA in the 2001 Supplement were represented as a hatched overlay of other land classifications. To avoid double-counting acres, the land acres are represented as ESA and the water surface as Permanent Pool in this table.

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

The acreages of the conservation pool and USACE land lying above the conservation pool was measured using satellite imagery and Geographical Information System (GIS) technology. The GIS software allows for more finely tuned measurements and, thus, stated acres may vary from official land acquisition records and acreage figures published in the 1971 Master Plan and 2001 Supplement. Some changes may also be due to erosion and siltation. A more detailed summary of changes and rationale can be found in Chapter 8.

ES.4 PLAN ORGANIZATION

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

An Environmental Assessment was developed with the master plan, which analyzed alternative management scenarios for Grapevine Lake, in accordance federal regulations including the National Environmental Policy Act of 1969, as amended (NEPA); regulations of the Council on Environmental Quality; and USACE regulations, including Engineer Regulation 200-2-2: Procedures for Implementing NEPA. The EA is a separate document that informs this Master Plan and can be found in its entirety in Appendix B.

The EA evaluated two alternatives as follows: 1) No Action Alternative, which would continue the use of the 1971 Master Plan and 2001 Supplement, and 2) Proposed Action. The EA analyzed the potential impact these alternatives would have on the natural, cultural, and human environments. The Master Plan is conceptual and broad in nature, and any action proposed in the plan that would result in significant disturbance to natural resources or result in significant public interest would require additional NEPA documentation at the time the action takes place.

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CHAPTER 1 – INTRODUCTION

1.1. GENERAL OVERVIEW

Grapevine Dam and Lake (hereafter Grapevine Lake) is located at river mile (RM) 11.7 on the Denton Creek, a tributary of the Trinity River. The damsite is located in Tarrant County, about 3 miles northeast of downtown Grapevine and 6 miles southwest of downtown Lewisville (Figure 1.1). The lake spans Tarrant and Denton Counties and borders the Cities of Grapevine, Flower Mound, Trophy Club and Southlake. The construction of Grapevine Dam began in May 1948, and the main dam was completed in July 1952. Deliberate impoundment began on July 3, 1952, and the conservation pool was filled on May 4, 1957.

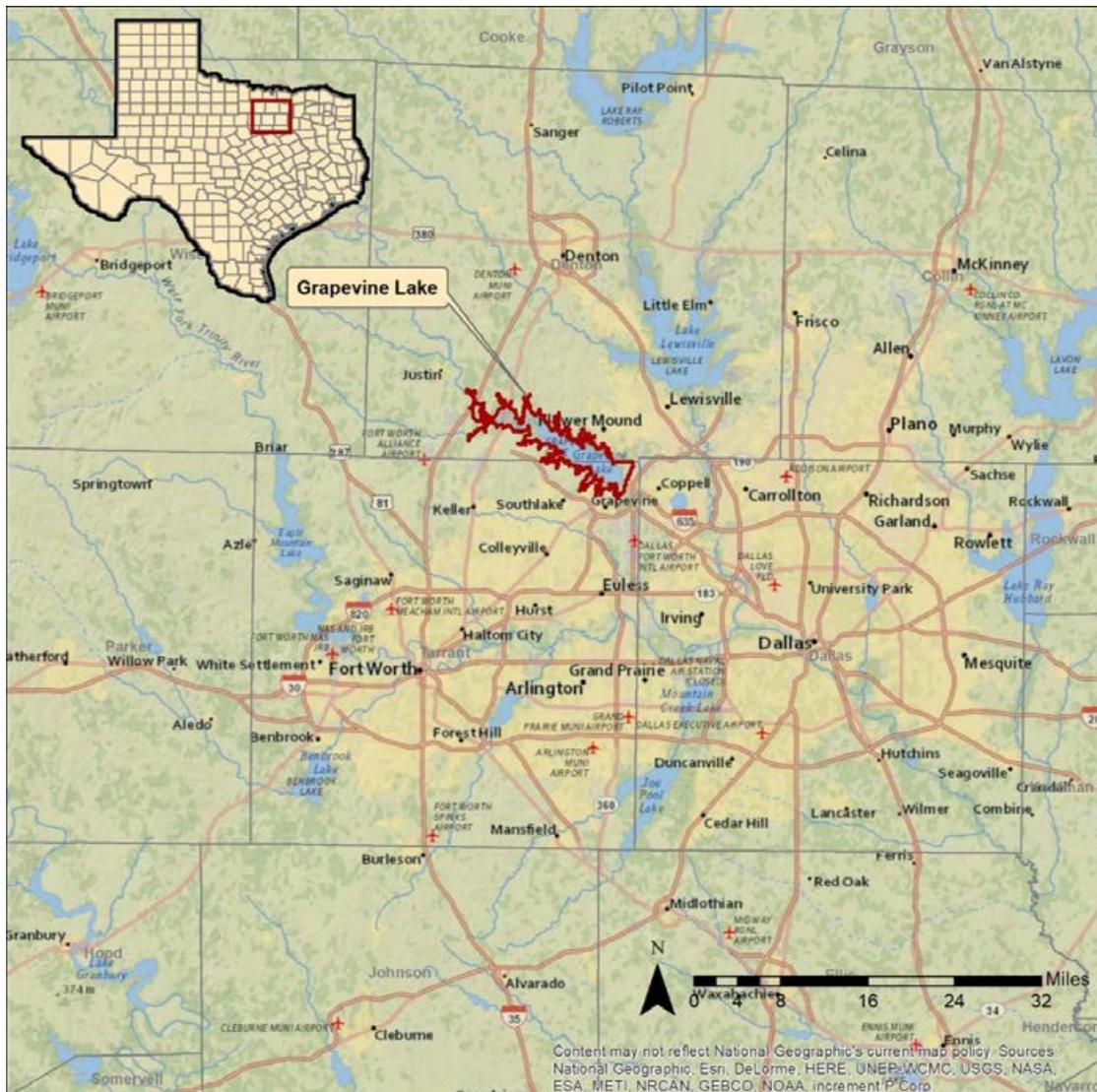


Figure 1.1 Vicinity Map of Grapevine Lake and Dam within the larger Dallas-Fort Worth Metropolitan Area

Grapevine Lake is an integral part of the U.S. Army Corps of Engineers (USACE) plan for flood control and water conservation in the Trinity River Basin. The plan presently consists of eight major flood control projects, known as Grapevine Dam, Bardwell Dam, Benbrook Dam, Joe Pool Dam, Lavon Dam, Lewisville Dam, Navarro Mills Dam, and Ray Roberts Dam. The eight flood mitigation projects in the Trinity River system mitigate approximately 1,591,300 acre-feet (ac-ft) of flood mitigation area. Grapevine mitigates 688 square miles of drainage area within the Trinity River Basin. USACE operates and maintains the dam and associated facilities and administers the Federal lands and flowage easements comprising the project through a combination of direct management and leases for park and recreation purposes.

A water supply storage contract with the city of Grapevine was approved 14 September 1953 for 0.8 percent (1,250 acres feet (ac-ft)) of the storage between elevations 500.5 and 535.0 NGVD29. A subsequent contract was approved 27 February 1981 for interim use of 15.5 percent (25,000 ac-ft) of the conservation pool until such time as the storage may be needed for navigation purposes. A contract with the City of Dallas was approved 17 March 1954 for 52.7 percent (85,000 ac-ft) of the conservation storage between the same elevations. A contract with the Dallas County Park Cities (DCPC) was approved 21 March 1955 for 31.0 percent (50,000 ac-ft) of the conservation storage between the same elevations.

The Master Plan is intended to serve as a comprehensive land and recreation management guide with an effective life of approximately 25 years. The focus of the Plan is to guide the stewardship of natural and cultural resources and make provision for outdoor recreation facilities and opportunities on federal land associated with Grapevine Lake. The Master Plan identifies conceptual types and levels of activities, but does not include designs, project sites, or estimated costs. All actions carried out by USACE, other agencies, and individuals granted leases to USACE lands must be consistent with the Master Plan. The Plan does not address the flood risk management or water supply purposes of Grapevine Lake (see the 2018 USACE Water Control Manual for Grapevine Lake for a description of these project purposes). The Grapevine Lake Master Plan was last updated in 1971, which is well past the intended planning horizon of 25 years. There was also a Supplement in 2001 that redesignated the lands to the land classifications available in 2001 and introduced Environmentally Sensitive Areas (ESA) and Utility Corridors. In 2001, ESAs were shown as a hatch overlay of other land classifications, but today they are a separate land classification distinct from the others.

National USACE missions associated with water resource development projects may include flood risk management, water conservation, navigation, recreation, fish and wildlife conservation, and hydroelectric power generation. Most of these missions serve to protect the built environment and natural resources of a region from the climate extremes of drought and floods. This helps to create a more resilient and sustainable region for the health, welfare, and energy security of its citizens. Mitigation, while not a formal mission at USACE lakes, may be implemented to achieve the fish and wildlife and recreation missions. Maintaining a healthy vegetative cover and including a native prairie or tree cover where ecologically appropriate on Federal lands within the

constraints imposed by primary project purposes helps reduce stormwater runoff and soil erosion, mitigates air pollution, and moderate temperatures. To this end, USACE has developed the following statements.

The USACE Sustainability Policy and Strategic Plan states:

The U.S. Army Corps of Engineers strives to protect, sustain, and improve the natural and man-made environment of our Nation, and is committed to compliance with applicable environmental and energy statutes, regulations, and Executive Orders. Sustainability is not only a natural part of the Corps' decision processes, it is part of the culture.

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

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

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

1.2. PROJECT AUTHORIZATION

Grapevine Lake was authorized March 2, 1945 with the primary missions of flood risk management, navigation, recreation, and water conservation storage for water supply as contained in the River and Harbor Act of 1945 (Public Law [PL] 14, 79th Congress, 1st Session), in accordance with the total plan of improvements for the Trinity River basin outlined in House Document Number 403 (77th Congress, 1st Session). However, the navigation mission was deauthorized, and navigation storage has since been converted to water supply. The dam and lake are named for the City of Grapevine, whose border abuts the lake. The construction of Grapevine Dam began in May 1948, and the main dam was completed in July 1952. Deliberate impoundment began on July 3, 1952, and the conservation pool was filled on May 4, 1957.

1.3. PROJECT PURPOSE

When originally built, Grapevine Dam and Lake's purposes were primarily flood risk management, navigation, recreation, and water conservation storage for water supply. However, the navigation mission was deauthorized, and navigation storage has since been converted to water supply, and today it is a multi-purpose water resource operated by the USACE for the purposes of flood risk management, water supply,

recreation, and fish and wildlife management within the Trinity River Basin. The USACE administers the surrounding federal lands and water surface to provide a variety of public, outdoor recreation opportunities. In addition to land managed by the USACE, recreation facilities on Federal land at Grapevine Lake are currently leased to and operated and maintained by neighboring cities and businesses. Refer to the maps in Appendix A for an overview of the lands managed by each managing entity. Environmental stewardship of Federal lands is carried out to recognize and protect important fish and wildlife habitats and species.

1.4. MASTER PLAN PURPOSE AND SCOPE

The Grapevine Lake Master Plan is the living, flexible, long-term strategic land-use management document that guides the comprehensive management and development of all the project's recreational, natural, and cultural resources. Under the guidance published in Engineering Regulation (ER) 1130-2-550 Change 7, and the accompanying Engineer Pamphlet (EP) 1130-2-550 Change 5, the Master Plan guides the efficient and cost-effective development, management, and use of project lands. It is a dynamic tool that provides for the responsible stewardship and sustainability of the project's resources for the benefit of present and future generations. The Master Plan works in tandem with the Operational Management Plan (OMP), which is the task-oriented implementation tool for the resource objectives and development needs identified in the Master Plan. The Master Plan guides and articulates the USACE responsibilities pursuant to federal laws. The USACE vision for the future management of the natural resources and recreation program at Grapevine Lake is set forth as follows:

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

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

The master planning process encompasses the examination and analysis of past, present, and future environmental, recreational, and socioeconomic conditions

and trends. Within a generalized conceptual framework, the process focuses on the following four primary components:

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

The original Grapevine Lake Master Plan was Revised in 1971, with the first supplement having been approved in 1994. The latest supplement was approved January 2001 replacing Chapter 2, Chapter 4, and Figure 1, designated Environmentally Sensitive Areas, adjusted the location and description of a park, and established utility corridors. Due to the age and format of the 1971 Master Plan, it was determined to be more cost effective to describe the changes in a narrative summary instead of incorporating changes by reprinting the entire 1971 Master Plan. Due to this decision, the 1971 Plan must be reviewed with the 2001 supplement for a complete understanding of the previous Grapevine Lake Master Plan.

Although the previous revision was sufficient for prior land use planning and management, many changes are affecting the region. Outdoor recreation trends, regional land use, rapidly growing population, current legislative requirements, and USACE management policy have evolved. Increased urbanization, fragmentation of wildlife habitat, impacts of climate change, and the growing demand for recreational access and natural resource management have affected the region and Grapevine Lake. In response to these escalating pressures, a full revision of the 1971 Master Plan is required. The Master Plan revision will update land classifications, include new resource management objectives, and describe future plans proposed by key partners and stakeholders. The Plan will also inform the management of vegetation, wildlife, and other natural resources for the next 25 years.

1.5. BRIEF WATERSHED AND PROJECT DESCRIPTION

Grapevine Lake is located in the Denton Creek watershed in the Upper Trinity River Basin. The headwaters of Denton Creek originate in central Montague County in north central Texas and flow southeast until it joins the Elm Fork of the Trinity River, then turns south until it meets the Trinity River. The watershed is northwest of Dallas, Texas and comprises portions of Cooke, Dallas, Denton, Montague, Tarrant, and Wise Counties. The entire watershed is about 66 miles long along its longest axis, with an average width of 11 miles and has a total drainage area of 712 square miles, among which 688 square miles drain to Grapevine Dam.

The Denton Creek has two principal tributaries, Elizabeth Creek and Oliver Creek. Elizabeth Creek has a drainage area of 90 square miles and Oliver Creek has a drainage area of 52 square miles. Sweetwater Creek and Dry Valley Creek are the next two largest tributaries of the Denton Creek. Sweetwater Creek is a right bank tributary and Dry Valley Creek is the major left bank tributary.

There are not any sizable impoundments upstream of Grapevine Dam. The Natural Resource Conservation Service (NRCS), formally the U.S. Soil Conservation Service of the U.S. Department of Agriculture (USDA), has constructed 97 flood mitigation and retention structures in the Denton Creek watershed upstream from Grapevine Lake. These structures have a combined drainage area of 221 square miles and a cumulative flood storage area of 54,814 acre-feet. Two additional structures with a total drainage of 13.1 square miles and storage of 70 acre-feet, are planned. The structures are responsible for slowing floods waters, storing water, trapping sediment, and controlling local erosion.

Grapevine Dam consists of a compacted earthfill embankment, an uncontrolled ogee spillway, and outlet works. The total length of the dam is 12,580 feet. The outlet works consist of an intake tower in the lake, a 13-foot diameter discharge conduit through the dam, a stilling basin and a discharge channel. The outlet works are used for flood control and water supply releases.

A total of 15,685 fee simple acres and 2,163 flood flowage easement acres were acquired for the construction of Grapevine Lake. The real estate acquisition was based on contour elevation 565.0 feet NGVD29 near the dam and 571.0 feet NGVD29 in the upper reaches of the lake. Flood easements were obtained in the upper reaches of the lake. Land up to elevation 575.0 feet NGVD29, 15 feet above the top of the flood control pool, was acquired in fee simple to allow for the operation of Grapevine Lake.

1.6. DESCRIPTION OF RESERVOIR

Grapevine Lake is small by comparison to many USACE lakes, with a conservation (normal) pool of 6,943 surface acres at elevation 535.0 feet NGVD29. The maximum depth is approximately 60 feet deep within the original river channel upstream of the dam, but depths decrease further south of the dam. The top of the flood control pool and uncontrolled spillway crest is at elevation 560.0 feet NGVD29. The dam is a rolled earth fill of impervious material, approximately 12,850 feet long, including the spillway. The dam has a maximum height of 137 feet.

The lake was originally designed to allow the accumulation of 28,200 ac-ft of sediment below elevation 535.0 and 1,350 ac-ft between elevations 535.0 and 560.0 feet NGVD29. A 2011 survey estimated that 25,000 ac-ft had been lost, which is less than had been forecasted for the 50-years. However, caution should be taken in interpreting the comparisons due to changed survey methods. Resurveys were originally planned for about 5-year intervals; however, currently sediment surveys are done periodically depending on need and available funding.

1.7. PROJECT ACCESS

Grapevine Lake is easily accessed by several primary, secondary, and tertiary roads. The two main east-west access roads include State Highway (SH) 114, also known as Northwest Parkway which connect Interstate (I)-35W to SH-26; Farm to Market Road (FMR) 1171 which connects I-35W to I-35E; Flower Mound Road (Rd)

which connects FMR 1171 to Long Prairie Rd; which then connects to SH-121. The three main north-south access roadways are I-35W, which is on the western most side of the lake; 2.5 miles east of I-35 is U.S. Route (RTE) 377 which connects FMR 1171 to the north to SH-114; and to the far east of Grapevine Lake is Fairway Drive (Dr) which runs directly across Grapevine Dam.

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

- Improvements to US 377 to the west of Grapevine Lake
- Improvements to FM 1171 to the north of Grapevine Lake
- Increased capacity to TX 114 to the south of Grapevine Lake
- Improvements to I-35W to the west of Grapevine Lake
- High speed rail located to the west of Grapevine Lake
- Road and safety improvements to road and highway exchange at TX 26, TX 121, and I 635 to the east of Grapevine Lake

In addition, local cities including Grapevine, Flower Mound, Southlake, Trophy Club, Roanoke, and Northlake have transportation and mobility plans which include roadway improvements, bike lanes, sidewalks, right-of-way improvements, hiking trails, and signage improvements to surface streets, parks, and neighborhoods around Grapevine Lake.

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

1.8. PRIOR DESIGN MEMORANDA

Design Memorandums were prepared setting forth design criteria for all aspects of the project including the prime flood risk management facilities, real estate acquisition, road and utility relocations, reservoir clearing, and the master plan for recreation development and land management. A few supplements and project related reports and manuals were added with the latest being the Master Plan Supplement Number 2 in 2001. Table 1.1 lists the Design Memoranda as well as other manuals and reports for Grapevine Lake.

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

DM	Title	Date
	Definite Project Report on Grapevine Dam and Reservoir	July 1947
	Analysis of Design for Construction of Spillway and Outlet Works - Grapevine Dam and Reservoir	April 1948
DM 1	Design Memorandum 1 - Relocation of Denton County Road at White's Branch	January 1961
DM 2	Design Memorandum 2 - Real Estate - Relocation of Denton County Road at White's Branch	February 1961
DM 1C	Design Memorandum 1C - Updated Master Plan for Grapevine Lake (Revised)	September 1971
	Report on Sedimentation - Resurveys of November 1961 and November 1966	November 1971
	Environmental Assessment - Grapevine Lake - Grapevine Golf Course and Nature Park	1972
	Operation and Maintenance Manual	September 1974
	Grapevine Lake Spillway Design Flood Study - Hydrology	August 1980
	Grapevine Dam and Reservoir Reconnaissance Report	August 1982
DM 3	Design Memorandum 3 - Grapevine Lake - Modification of Embankment and Spillway	June 1983
	Trinity Master Manual Appendix A - Grapevine Lake Water Control Manual, Revised	July 1996 September 2018
	Water Quality Report – Grapevine Lake	December 1999
	Master Supplement No. 2 to Grapevine Lake Master Plan Design Memorandum No 1C. (Revised)	January 2001
	Periodic Inspection Report #10	September 2014

Source: USACE

1.9. PERTINENT PROJECT INFORMATION

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

Table 1.2 Elevations and Water Storage Capacity

Feature	Elevation (Feet NGVD)	Lake Area (Acres)	Storage (Acre-Feet)	Runoff (inches)
Top of Dam	588.0	–	–	–
Maximum Design Water Surface Elevation (1983 Study)	581.0	19,430	769,600	20.97
Spillway Crest and Top of Flood Control Pool (1983 Study)	560.0	12,740	398,200	10.85
Top of Conservation Pool (2011 Survey)	535.0	6,707	163,064	4.44
Invert of Lowest Outlet (2011 Survey)	475.0	–	–	–
Streambed (2011 Survey)	451.0	0	0	0

Source: USACE 2018 Grapevine Lake Water Control Manual

CHAPTER 2 – PROJECT SETTING AND FACTORS INFLUENCING MANAGEMENT AND DEVELOPMENT

2.1. PHYSIOGRAPHIC SETTING

2.1.1. Ecoregion Overview

Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources. The Environmental Protection Agency (EPA) has developed a series of maps that categorizes these regions across the United States. Levels I and II divide the North American continent into 15 and 52 regions, respectively, while Level III ecoregions represent a subdivision of those into 104 unique regions and Level IV a finer sub-classification of those. Grapevine Lake and its watershed is located in the Level III Cross Timbers and Texas Blackland Prairie ecoregions as seen in Figure 2.1. Within the finer Level IV ecoregions, Grapevine Lake is located mostly in the Grand Prairie and Eastern Cross Timbers ecoregions, and a very small amount within the Northern Blackland Prairies ecoregion.

The Grapevine watershed is underlain by Lower and Upper Cretaceous sediments, dipping to the southeast. These soils are then sub classified as sandy, erodible soils of the West Cross Timbers, the black to dark brown friable soils of the Grand Prairie, the moderately pervious reddish, light brown, and gray soils of the East Cross Timbers, and the black, productive soils of the Blackland Prairie. The overburden at the dam ranges from silty and clayey on the left abutment to sandy and clayey on the right abutment. Soil depths average about 20 feet at the left abutment and 5 feet at the right abutment, with maximum 50 feet depth of overburden on the valley floor.

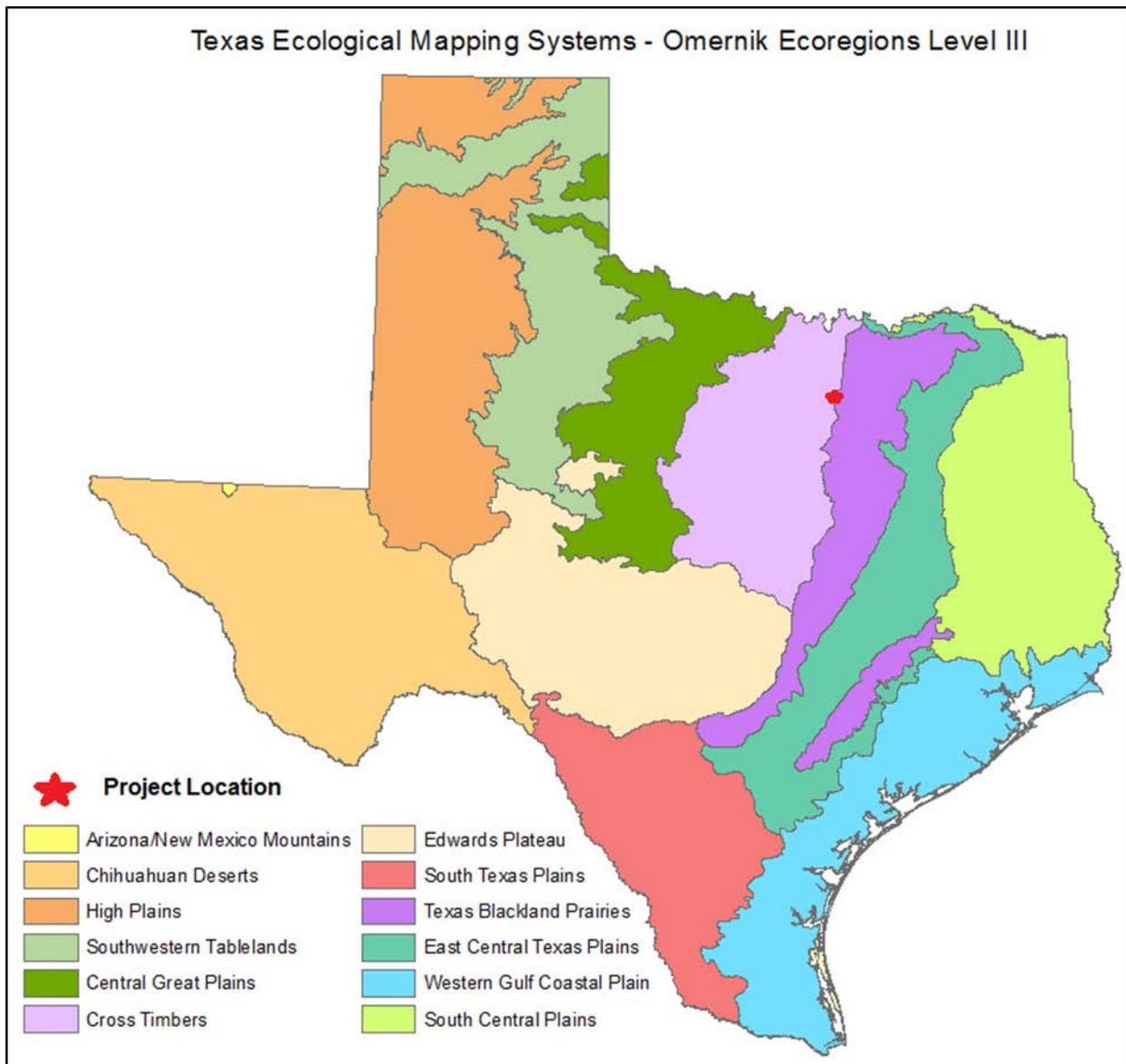


Figure 2.1 Grapevine Lake within Texas Level III Ecoregions

Source: TPWD (2019)

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

2.1.2. Climate

Grapevine Lake lies in the north central part of the state of Texas. The region has a warm, temperate, continental climate with cool winters and hot, humid summers. Tropical maritime air masses from the Gulf of Mexico play a dominant role in the climate from late spring through early fall, while polar air masses determine the winter climate. The mean annual temperature over the lake is about 68.2 degrees Fahrenheit (°F) (NOAA, 2020C). January, the coldest month, has an average temperature of 45.3°F and average minimum daily temperature of about 40.7°F. August, the warmest month, has an average daily temperature of 85.9°F and average maximum daily temperature of 92.2°F. The average length of the growing season is 237 days (NOAA, 2020B). Grapevine Lake lies within the USDA Plant Hardiness Zone 8A, which is determined by the winter extreme low temperatures, with 8A having normal winter lows between 10°F and 15°F (USDA, 2020). Figure 2.2 shows the monthly climate average precipitation and the mean maximum, mean minimum, and mean average temperatures between 1991 to 2020.

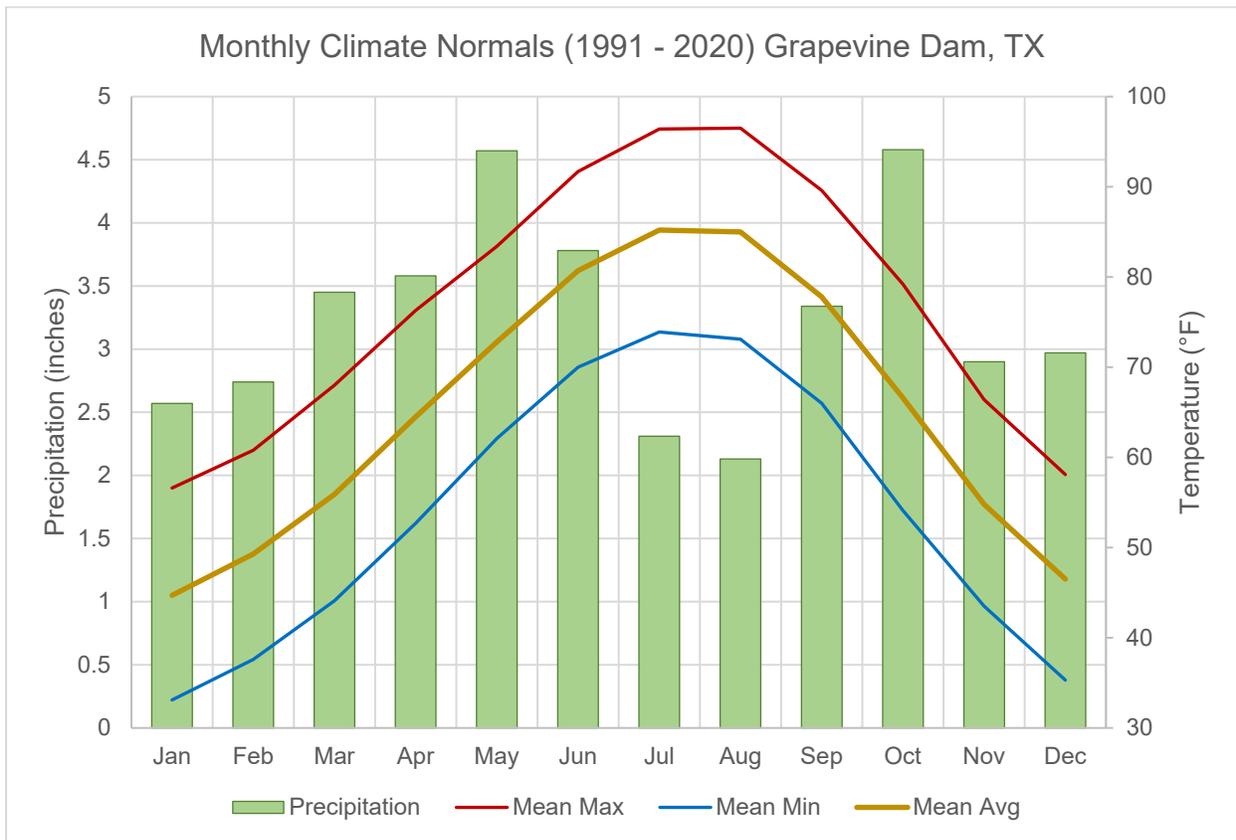


Figure 2.2 Average Monthly Climate Grapevine Lake, 1991 – 2020

Source: NOAA, 2022.

The normal annual precipitation is 38.8 inches with greater precipitation during spring and fall, and less precipitation during summer and winter. Because of the preponderance of tropical maritime air, heavy showers of short duration may occur at any time during the year (USACE, 2018).

The relative humidity typically ranges from 20% to 80% over the course of a year. The air is driest around the end of November – February timeframe and is most humid between June – August (USACE, 2018). The average annual evaporation rate at Grapevine Lake, as calculated using the measured pan evaporation multiplied by the monthly pan coefficient, is about 57 inches with the lowest evaporations rates occurring during the winter and greatest evaporation occurring during the summer (USACE, 2018).

2.1.3. Climate Change and Green House Gas Emissions

The U.S. Global Change Research Program (USGCRP) looks at potential impacts of climate change globally, nationally, regionally, and by resource (e.g., water resources, ecosystems, human health). Grapevine Lake lies within the Great Plains region of analysis. The Great Plains region has already seen evidence of climate change in the form of rising temperatures that are leading to increased demand for water and energy and impacts on agricultural practices. Over the last few decades, the Great Plains Region has seen fewer cold days and more hot days, as well as an overall increase in total precipitation. The decrease in the cold days has resulted in an overall shortening of the frost-free season by one to two weeks.

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

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

Over the past 100 years (from 1921 – 2020), some of these climate trends have already been documented in the local area. Average annual precipitation has increased by approximately 10 inches in the past 100 years while having much more variability (Figure 2.3). The number of days with greater than 1 inch of precipitation has increased over that same time, demonstrating the increasing frequency of heavy storms and local flood events (Figure 2.4). Over that same period, the number of days below freezing has progressively declined (Figure 2.5), which is due to both the changing climate and growing urban heat island effect. The USDA projects further shifts in climate through the

21st century, with the number of growing degree days changing from approximately 5,000 in 1980 to over 5,500 by 2099 under low emissions or as much as 6,500 by 2099 under higher emissions. The plant hardiness zone has already seen a shift from 7B to 8A during the 20th century and is projected to shift from 8A to 8B by 2099 under low emissions or to 9A by 2099 under higher emissions (USDA, 2022). These changes will affect local agricultural practices, water supply, flood management, infrastructure, recreation access and opportunities, local habitats, and threatened or endangered species – placing an increased strain on those species already pressured from reduced populations and habitat loss.

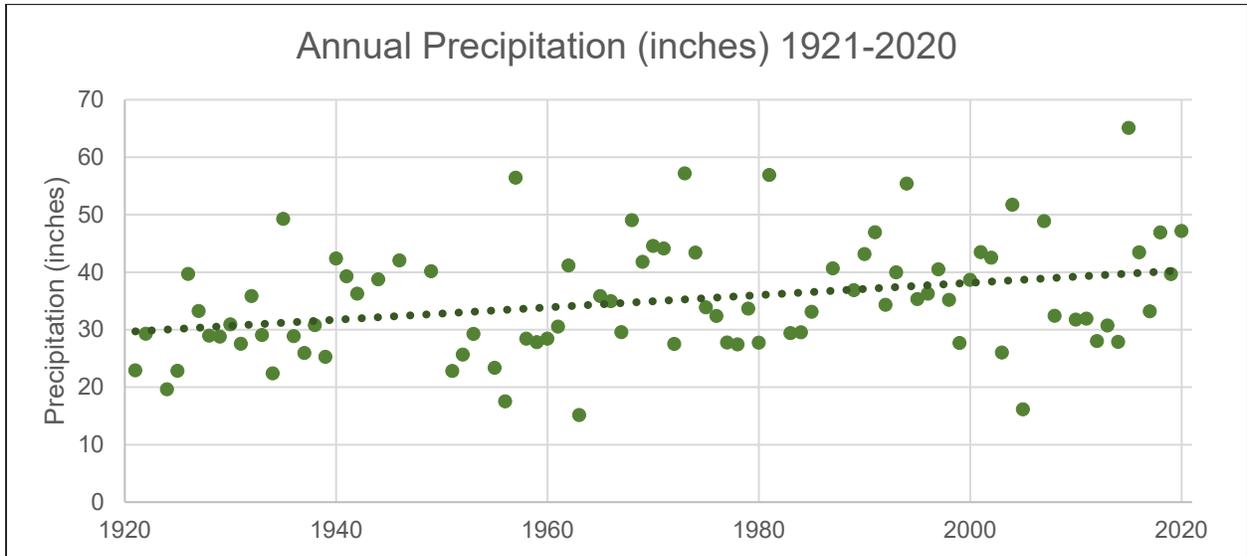


Figure 2.3 Annual Precipitation 1921 – 2020

Source: NOAA, 2022, DFW International Airport

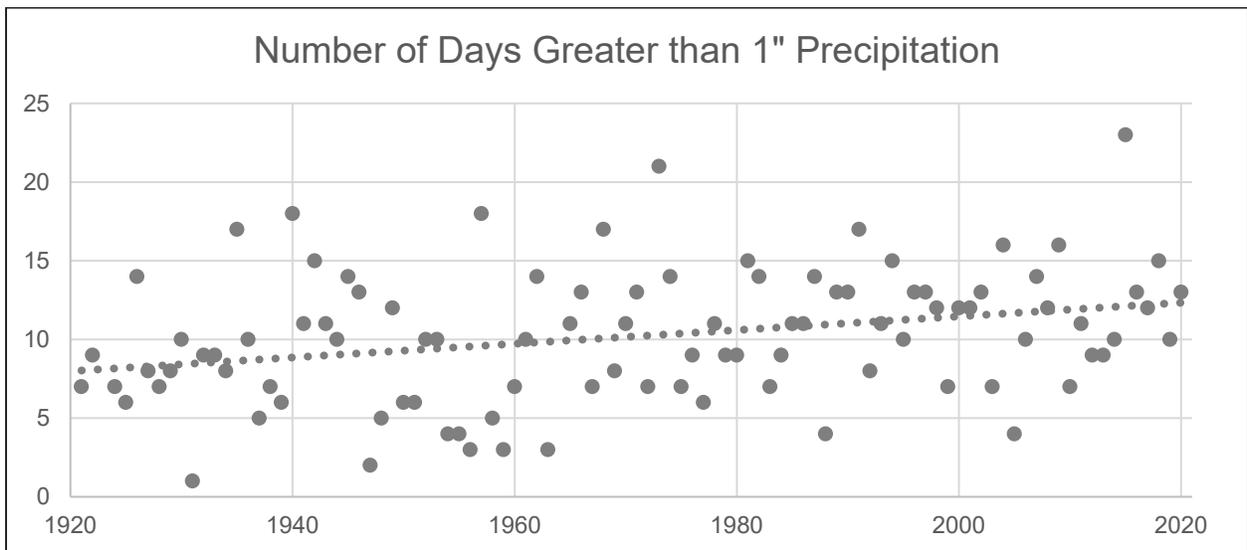


Figure 2.4 Number of Days with Greater than 1-inch Precipitation 1921 – 2020

Source: NOAA, 2022, DFW International Airport

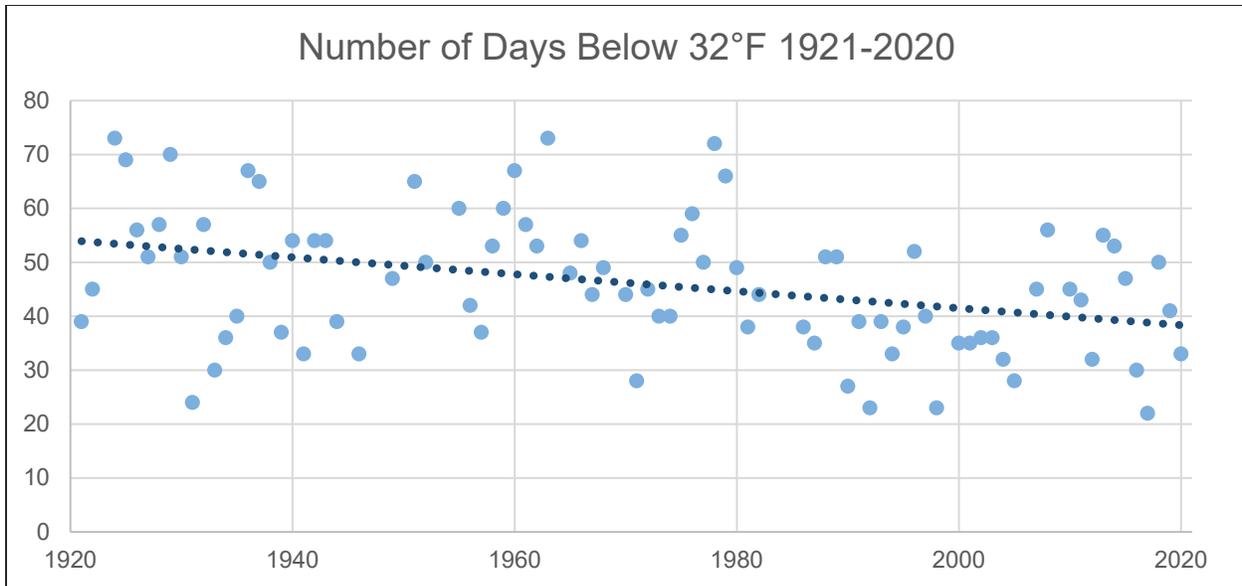


Figure 2.5 Number of Days Below 32 °F 1921 – 2020

Source: NOAA, 2022, DFW International Airport

2.1.4. Air Quality

The U.S. Environmental Protection Agency (EPA) established nationwide air quality standards to protect public health and welfare in 1971. The State of Texas has adopted the National Ambient Air Quality Standards (NAAQS) as the state’s air quality criteria. NAAQS standards specify maximum permissible short- and long-term concentrations of various air contaminants including primary and secondary standards for six criteria pollutants: Ozone (O₃), Carbon Monoxide (CO), Sulfur Dioxide (SO₂), Nitrous Oxides (NO_x), particulate matter (PM₁₀ and PM_{2.5}), and Lead (Pb). If the concentrations of one or more criteria pollutants in a geographic area is found to exceed the regulated “threshold” level for one or more of the NAAQS, the area may be classified as a non-attainment area. Areas with concentrations that are below the established NAAQS levels are considered either attainment or unclassifiable areas.

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

Emissions in the DFW non-attainment area come from a variety of stationary and mobile sources. Approximately 70% of the region’s air pollution comes from mobile sources such as cars, trucks, airplanes, construction equipment, and lawn equipment. The majority of pollutants emitted from motor vehicles include VOCs, NO_x, CO, PM₁₀, and PM_{2.5}. The largest regional sources of VOCs, NO_x emissions, and ozone levels are

non-road vehicles (construction equipment, airplanes, and locomotive) and on-road vehicles (cars and trucks) (TCEQ 2011).

2.1.5. Topography, Geology, and Soils

Topography

Grapevine Lake and its watershed are located in the Grand Prairie, West Cross timbers and Eastern Cross Timbers subdivisions of the Gulf Coastal Plain physiographic province. The Lower Cretaceous Main Street Limestone and Grayson Marl outcrop in the reservoir's upstream areas. The downstream areas, including the dam site, are underlain by Upper Cretaceous sandstones and shales of the Woodbine formation. The foundations of the dam and appurtenant structures rest on alternating bands of soft to moderately hard Woodbine sandstone and shale. No structural anomalies such as faulting, or folding have been noted in the vicinity of the dam.

Geology

Grapevine Lake and the surrounding cities of Denton, Grapevine, and Arlington are known to sit on Woodbine Sandstone soils. This is evident from the reddish sandy soils found in this area, and the absence of the black gumbo clay that is found in the majority of the Dallas Fort Worth Metroplex. Around this deposit of Woodbine Sandstone are Upper Cretaceous Sediments. Geologic and paleontological resources at Grapevine lake are discussed in detail in Section 2.3.

Soils

The main soil series within Grapevine Lake Project Lands is the Frio Silty Clay, frequently flooded soil. The Frio Silty Clay, frequently flooded soil makes up 20.77% of soils found within Grapevine Lake project lands, occurs in more than 80 inches thick surface layers, normally found in flood plains, is well drained, contains loamy alluvium derived from limestone and shale, and it is not a prime farmland soil.

The Grapevine watershed is underlain by Lower and Upper Cretaceous sediments, dipping to the southeast. These soils are then sub classified as sandy, erodible soils of the West Cross Timbers, the black to dark brown friable soils of the Grand Prairie, the moderately pervious reddish, light brown and gray soils of the East Cross Timbers, and the black, productive soils of the Blackland Prairie. The overburden at the dam ranges from silty and clayey on the left abutment to sandy and clayey on the right abutment. Soil depths average about 20 feet at the left abutment and 5 feet at the right abutment, with maximum 50 feet depth of overburden on the valley floor.

The NRCS Web Soil Survey (2018) reports 63 soil types occurring within Grapevine Lake project lands. Table 2.1 shows the acreage and farmland status associated with each soil & surface type in the detention area. The vast size and the overall different number of soils makes it impossible to make a coherent visible map for this report.

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

Soil Type	Number of Acres	Percent Total	Farmland Status
Aledo association, undulating	84.4	0.93%	None
Altoga silty clay loam, 5 to 12 percent slopes	0.2	0.00%	Statewide
Altoga silty clay, 2 to 5 percent slopes	144.1	1.58%	Statewide
Altoga silty clay, 5 to 12 percent slopes, eroded	162.0	1.78%	None
Altoga silty clay, 5 to 8 percent slopes	84.6	0.93%	None
Arents, frequently flooded	177.5	1.95%	None
Arents, gently undulating, occasionally flooded	4.7	0.05%	None
Arents, hilly, occasionally flooded	210.7	2.31%	None
Arents, loamy	72.8	0.80%	None
Bastil fine sandy loam, 0 to 3 percent slopes	516.3	5.67%	Prime
Bastil fine sandy loam, 3 to 5 percent slopes	86.6	0.95%	Prime
Birome fine sandy loam, 1 to 3 percent slopes	54.4	0.60%	None
Birome fine sandy loam, 1 to 5 percent slopes	27.5	0.30%	None
Birome fine sandy loam, 3 to 5 percent slopes	153.5	1.69%	None
Birome-Aubrey-Rayex complex, 5 to 15 percent slopes	682.7	7.50%	None
Birome-Rayex-Aubrey complex, 2 to 15 percent slopes	1,129.8	12.40%	None
Bunyan fine sandy loam, frequently flooded	73.5	0.81%	None
Callisburg fine sandy loam, 1 to 3 percent slopes	168	1.84%	Prime
Callisburg fine sandy loam, 3 to 5 percent slopes	23.2	0.25%	Prime
Callisburg soils, 2 to 5 percent slopes, severely eroded	47.8	0.52%	None
Crosstell fine sandy loam, 1 to 3 percent slopes	98.3	1.08%	None
Crosstell fine sandy loam, 3 to 8 percent slopes	322.7	3.54%	None
Crosstell-Urban land complex, 1 to 5 percent slopes	4.0	0.04%	None
Energy fine sandy loam, frequently flooded	47.7	0.52%	None
Ferris-Heiden complex, 2 to 5 percent slopes	18.6	0.20%	Prime
Frio silty clay, 0 to 1 percent slopes, occasionally flooded	36.0	0.40%	Prime
Frio silty clay, frequently flooded	1,892.0	20.77%	None
Gasil and Konsil soils, 1 to 5 percent slopes	124.1	1.36%	Prime
Gasil fine sandy loam, 1 to 3 percent slopes	288.2	3.16%	Prime
Gasil fine sandy loam, 3 to 8 percent slopes	269.2	2.96%	None
Gasil-Urban land complex, 1 to 8 percent slopes	3.4	0.04%	None
Gowen clay loam, frequently flooded	100.9	1.11%	None
Gowen clay loam, occasionally flooded	151.2	1.66%	None
Heiden clay, 1 to 3 percent slopes	23.8	0.26%	Prime
Justin fine sandy loam, 1 to 3 percent slopes	36.5	0.40%	Prime
Justin fine sandy loam, 3 to 5 percent slopes	4.6	0.05%	Prime

Soil Type	Number of Acres	Percent Total	Farmland Status
Justin loam, 1 to 3 percent slopes	0.2	0.00%	Prime
Konsil fine sandy loam, 1 to 3 percent slopes	30.0	0.33%	Prime
Konsil fine sandy loam, 1 to 5 percent slopes	95.2	1.05%	Prime
Konsil fine sandy loam, 3 to 8 percent slopes	99.4	1.09%	None
Lewisville clay loam, 1 to 3 percent slopes	37.9	0.42%	Prime
Lewisville clay loam, 3 to 5 percent slopes	3.3	0.04%	Prime
Mabank fine sandy loam, 0 to 1 percent slopes	4.5	0.05%	Statewide
Medlin-Sanger clay, 5 to 15 percent slopes	57.6	0.63%	None
Medlin-Sanger stony clay, 5 to 15 percent slopes	35.3	0.39%	None
Mingo clay loam, 1 to 3 percent slopes	1.7	0.02%	Statewide
Navo clay loam, 0 to 1 percent slopes	8.3	0.09%	Statewide
Navo clay loam, 1 to 3 percent slopes	62.3	0.68%	Statewide
Navo clay loam, 3 to 5 percent slopes	22.7	0.25%	Statewide
Ovan clay, occasionally flooded	142.6	1.57%	None
Ponder loam, 1 to 3 percent slopes	3.0	0.03%	Prime
Pulexas fine sandy loam, frequently flooded	85.2	0.94%	None
Rader fine sandy loam, 0 to 3 percent slopes	77.8	0.85%	Prime
Sanger clay, 1 to 3 percent slopes	18.9	0.21%	Prime
Sanger clay, 3 to 5 percent slopes	0.3	0.00%	Prime
Seagoville clay, occasionally flooded	34.3	0.38%	Prime
Silawa fine sandy loam, 3 to 8 percent slopes	11.1	0.12%	None
Silstid loamy fine sand, 1 to 5 percent slopes	82.5	0.91%	None
Somervell gravelly loam, 1 to 5 percent slopes	2.6	0.03%	None
Tinn clay, frequently flooded	659.6	7.24%	None
Whitesboro loam, frequently flooded	204.6	2.25%	None
Wilson clay loam, 1 to 3 percent slopes	2.3	0.03%	Statewide
TOTAL ACRES	9,108.7	100%	TOTAL

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

Prime Farmland

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

There are several soil types in the study area that are considered prime farmland soils or soils associated with farmlands of state importance. However, the lands represented by these soil types have not been used for farming since the lands were acquired prior to the initiation of construction of Grapevine Lake in May 1947.

2.1.6. Water Resources

Surface Water

Denton Creek originates in central Montague County and flows 98 miles in a generally southeasterly direction through Denton, Wise, Tarrant, and Dallas Counties until it joins the Elm Fork of the Trinity River at river mile 18.6. The watershed lies between north latitudes 32°56' and 33°39' and west longitudes 97°05' and 97°50'. It is about 66 miles long along its longest axis, with an average width of 11 miles. The watershed of the Denton Creek of the Trinity River has a total drainage area of 712 square miles, among which 688 square miles drain to Grapevine Dam. The watershed comprises parts of Cooke, Dallas, Denton, Montague, Tarrant, and Wise Counties.

Grapevine Dam is located on the Denton Creek at river mile 11.7. Denton creek drops from elevation 1,102.0 feet at its source to elevation 451.0 feet at Grapevine Dam to elevation 424.0 feet at its confluence with Elm Fork Trinity River. The average stream slope is 6.9 feet per mile, and the average slope downstream from Grapevine Dam is 2.3 feet per mile.

The Denton Creek has two principal tributaries, Elizabeth Creek and Oliver Creek. Elizabeth Creek has a drainage area of 90 square miles and Oliver Creek has a drainage area of 52 square miles. Sweetwater Creek and Dry Valley Creek are the next two largest tributaries of the Denton Creek. Sweetwater Creek is a right bank tributary and Dry Valley Creek is the major left bank tributary.

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.

Wetland classifications presented are derived from the National Wetlands Inventory, which was established by USFWS to aid in conservation efforts by collecting nationwide wetland distribution and type information (USFWS 2019B). The inventory is based on a single “snapshot” at the time of their survey and may not reflect conditions at conservation pool. Within the Grapevine Lake project lands, wetlands generally occur near the rivers and flatter areas in the southern end of the lake. Table 2.2 lists the acreages of various types of wetlands present at Grapevine Lake and Figure 2.6 displays the distribution of wetland habitat at Grapevine Lake.

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

Wetland Type	Acres
Freshwater Emergent Wetland	1,610.17
Freshwater Forested/Shrub Wetland	2,646.21
Freshwater Pond	24.21
Lake	6,450.87
Riverine	209.71
TOTAL ACRES of Water Resources	10,941.17

Source: USFWS 2019. Note: Total acres differ from total water surface acres in the Master Plan due to USFWS using different measuring technology and a snapshot of water surface that may not be at the conservation pool.

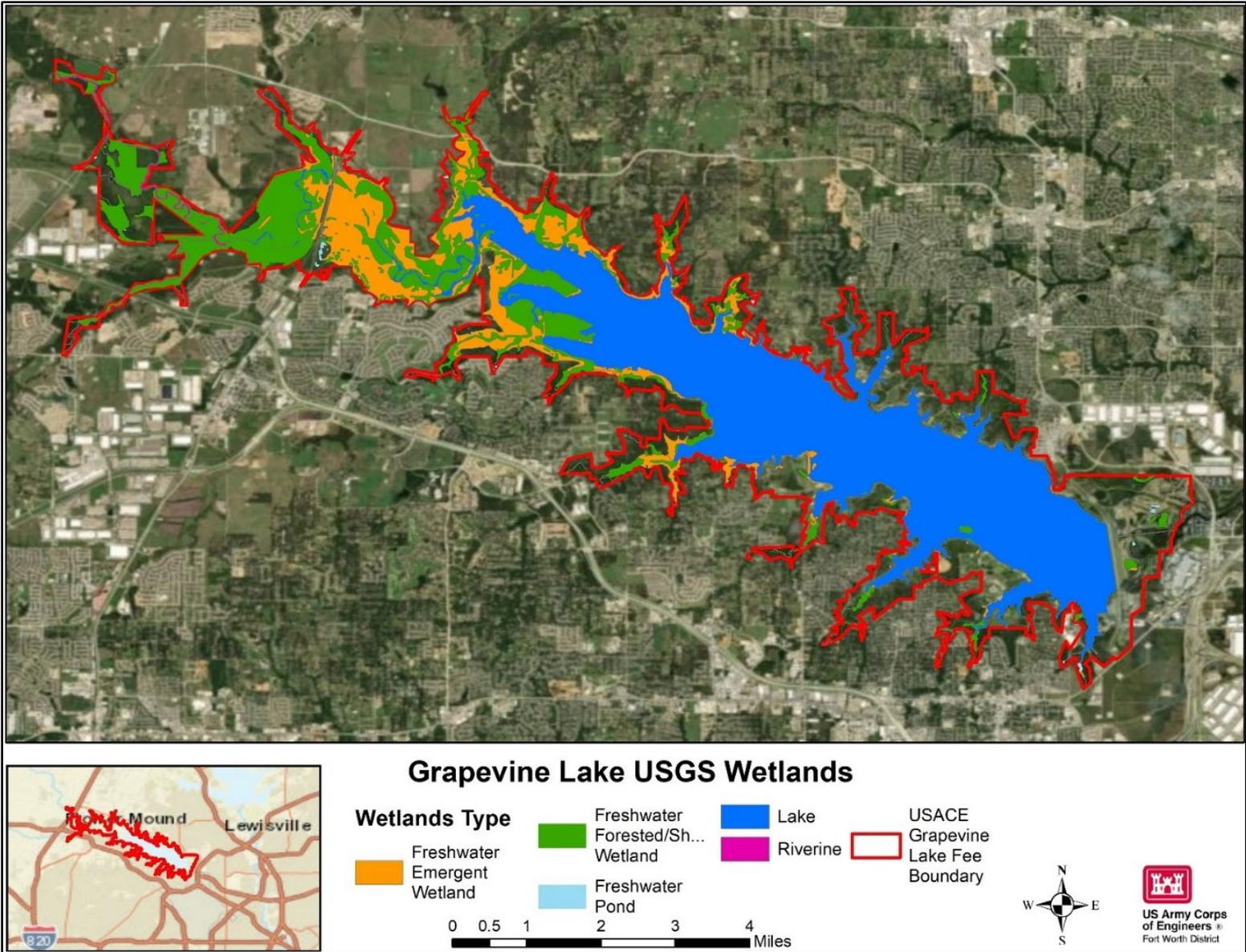


Figure 2.6 Wetland Types Found at Grapevine Lake

Groundwater

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

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

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

Hydrology

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

Grapevine Dam and Lake are an integral part of the USACE plan for flood control and water conservation in the Trinity River Basin. The plan presently consists of eight major USACE flood control projects - Grapevine Dam, Bardwell Dam, Benbrook Dam, Joe Pool Dam, Lavon Dam, Lewisville Dam, Navarro Mills Dam, and Ray Roberts Dam. The eight USACE dam projects in the Trinity River system work in concert to control approximately 1,591,300 acre-feet (ac-ft) of flood control area. Specifically, Grapevine Lake has a flood control pool capable of storing 6,707 surface acres at elevation 535.0 feet above sea level. Once the water elevation reaches 560.0 feet above sea level and fills an additional 6,033 surface acres of storage space, water overtops the spillway and is uncontrollably released downstream. The pool of record occurred on November 1, 1981, with an elevation of 563.5 feet above sea level.

Water Quality

Texas Commission on Environmental Quality (TCEQ) sets and implements standards for surface water quality to improve and maintain the quality of water in the

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

Existing water quality within Grapevine Lake is affected by rainfall and associated stormwater flows originating from residential, commercial, and industrial point and nonpoint sources from properties upstream of the dam and reservoir. These stormwater flows have increased over time as a result of increased urbanization and development.

The 2020 Texas Integrated Report - Texas 303(d) List (TCEQ, 2020B) does identify a segment within Grapevine Lake as to exceeding TSWQS. The segment is the upper portion of the lake east of the Marshall Creek Park, and that was for pH levels.

The Texas Department of State Health Services (DSHS) Seafood and Aquatic Life Group purpose is to address and prevent/reduce any disease-causing agent from occurring that can be transferred from aquatic life to humans within the State of Texas. As of October 2020, no fish consumption advisories have been issued for Grapevine Lake, nor for Denton Creek below Grapevine Dam within USACE Fee Owned Property.

2.1.7. Hazardous Materials and Solid Waste

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

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

2.1.8. Health and Safety

Grapevine Lake's authorized purposes include flood control, water conservation, fish and wildlife, and recreation. Compatible uses incorporated in project operation management plans include conservation and fish and wildlife habitat management components. The USACE, with assistance from the TPWD and USFWS, has established public outreach programs to educate the public on water safety and conservation of natural resources. In addition to the water safety outreach programs, the project has established recreation management practices to protect the public.

These include safe boating and swimming regulations and speed limit and pedestrian signs for park roads. Grapevine Lake also has solid waste management plans in place for camping and day use areas that are maintained by the respective partners that hold the lease.

2.2. ECOREGION AND NATURAL RESOURCE ANALYSIS

2.2.1. Natural Resources

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

TPWD's Wildlife Habitat Appraisal Procedure (WHAP) was used to assist in the preparation of the 2022 MP. The assessment was conducted June 22-25, 2020 at Grapevine Lake by USACE biologists, foresters, and park rangers. A total of 56 data collection sites were selected using aerial photography and knowledge of the Grapevine Lake staff. The four major habitat types that were selected and assessed were marsh, riparian/bottomland hardwood forests (BHF), upland forests, and grasslands. The WHAP assessment report can be found in Appendix C of this Plan.

The WHAP assessment revealed that the two most abundant habitat types surveyed were riparian/BHF and upland forests. However, the two habitat types that scored the highest on average were grassland and upland forest habitats. Overall grassland points scored medium to high values. It was determined that much of the land west of the Southlake Girls Softball Association Bob Jones Softball Fields in Southlake, Texas has high quality habitat based on the scores calculated from the WHAP habitat assessment, with some of the highest scoring habitats in the DFW area.

2.2.2. Vegetation

Grapevine Lake is located within the Cross Timbers and in Texas Blackland ecological regions. The Cross Timbers Ecoregion encompasses approximately 26,000 square miles in north and central Texas and is the primary ecoregion of northcentral Texas. It can be further divided into four vegetative sub-regions: Eastern Cross Timbers, Fort Worth Prairie, Lampasas Cut Plain, and Western Cross Timbers. Areas of Denton County, where Grapevine Lake is located, include both the Eastern Cross Timbers and Fort Worth Prairie vegetative sub-regions of the Cross Timbers Ecoregion. The Texas Blackland Prairie is divided into distinct Northern and Southern regions.

Grapevine Lake is located in the Northern Blackland Prairie, which stretches over 300 miles from Sherman in the north to San Antonio in the south. Prairie vegetation includes various grasses and forbs, while the bottomland hardwood forests is predominantly oak and other hardwood trees. Elevations range from approximately 95 to 850 NGVD.

The common grass and forb species for the Cross Timber Ecoregion include little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardi*), buffalograss (*Bouteloua dactyloides*), big muhly (*Muhlenbergia lindheimeri*), eastern gamagrass (*Tripsacum dactyloides*), and sideoats grama (*Bouteloua curtipendula*). Slopes and upland forests support mesquites (*Prosopis laevigata*) and several cedars and junipers (*Juniperus spp.*), and have become more prevalent due to the absence of regular fires. What areas that are not prairies are dominated by junipers, post oaks (*Quercus stellata*) and blackjack oaks (*Quercus marilandica*). These oak forests are incredibly dense in tree count and are diversified with other tree species like pecan (*Carya illinoensis*), black walnut (*Juglans nigra*), little walnut (*Juglans microcarpa*), American sycamore (*Platanus occidentalis*), eastern cottonwood (*Populus deltoides*), plateau liveoak (*Quercus fusiformis*), bur oak (*Quercus macrocarpa*), American elm (*Ulmus Americana*), Texas persimmon (*Diospyros texana*), honey mesquite (*Prosopis glandulosa*), lance-leaf sumac (*Rhus lanceolate*), and Mexican plum (*Prunus mexicana*).

The Texas Blackland Prairies Ecoregion originally contained a diverse range of prairie species including little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardi*), yellow Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), eastern gamagrass (*Tripsacum dactyloides*), tall dropseed (*Sporobolus compositus*), asters (*Symphyotrichum spp.*), prairie bluet (*Stenaria nigricans*), prairie clovers (*Dalea spp.*), and coneflowers (*Echinacea spp.*). Bottomland hardwood forests are not as prevalent, but where they occur contain bur oak (*Quercus macrocarpa*), Shumard oak (*Quercus shumardii*), post oak (*Quercus stellata*), blackjack oak (*Quercus marilandica*), green ash (*Fraxinus pennsylvanica*), pecan (*Carya illinoensis*), cedar elm (*Ulmus crassifolia*), American elm (*Ulmus americana*), winged elm (*Ulmus alata*), sugar hackberry (*Celtis laevigata*), and eastern cottonwood (*Populus deltoides*). Some slopes and upland forests support honey mesquite (*Prosopis glandulosa*) and several cedars and junipers (*Juniperus spp.*) that have become more prevalent due to the absence of regular fires.

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

Two of the most populous metropolitan areas of Texas are located in part of the Cross Timbers and Texas Blackland Prairie Ecoregions. The close proximity to urban and suburban landscapes has led to many plants escaping into wild plant communities,

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

2.2.3. Fisheries and Wildlife Resources

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

Many of the undeveloped open spaces provide habitat for wildlife including mountain lions (*Puma concolor*), coyotes (*Canis latrans*), bobcats (*Lynx rufus*), eastern cottontail rabbit (*Sylvilagus floridanus.*), fox squirrel (*Sciurus niger*), nine-banded armadillo (*Dasypus novemcinctus*), striped skunks (*Mephitis mephitis*), and raccoons (*Procyon lotor*). The area also provides habitat for a diverse range of birds and acts as a stopover for migratory birds. Parts of USACE land holding at Grapevine Lake are located within the corporate city limits of Grapevine, Southlake, Trophy Club, Roanoke, Northlake, and Flower Mound.

2.2.4. Threatened and Endangered Species

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

An endangered species is a species officially recognized by USFWS as being in danger of extinction throughout all or a significant portion of its range. A threatened species is a species likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Proposed species for listing under the Endangered Species Act (ESA) are those candidate species that were found to warrant

listing as either threatened or endangered, after completion of a status review and consideration of other protective conservation measures, however formal listing has yet to occur. 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, the USFWS has identified candidate species whose status is currently being reviewed to determine whether they warrant listing under the ESA. Although not afforded protection by the Endangered Species Act, candidate species may be protected under other federal or state laws.

The USFWS’s Information for Planning and Consultation (IPaC) database (2022) lists the threatened and endangered species, and trust resources that may occur within the Grapevine Lake Federal Fee Boundary (see USFWS Species List and the IPaC Report in Appendix C of the 2020 MP). Based on the IPaC report, there is one federally listed species that could be found within Grapevine Lake, whooping crane (USFWS 2022). A list of these species is presented in Table 2.3. No Critical Habitat has been designated within or near Grapevine Lake. The species identified as Threatened, Endangered or Candidate Species by TPWD that are not federally listed are included in Appendix C of the 2020 Master Plan as well as a list of Species of Greatest Conservation Need (SGCN) for the Cross Timbers and Texas Blackland Prairie Ecoregions.

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

Common Name	Scientific Name	Federal Status	State Status
Whooping Crane	<i>Grus americana</i>	Endangered	Endangered
Monarch Butterfly	<i>Danaus plexippus</i>	Candidate	Not Listed

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

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

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

Texas Parks and Wildlife Department's (TPWD 2020) Annotated County Lists of Rare Species database records the threatened and endangered species that may occur on Grapevine Lake project lands (see Appendix C of the 2022 MP for the full report).

Texas Natural Diversity Database

The Texas Natural Diversity Database (TXNDD) (2020), administered by TPWD, manages and disseminates information on occurrence of rare species, native plant communities, and animal aggregations in Texas to help guide project planning efforts. TXNDD provided information for the following U.S. Geological Survey (USGS) quadrangles that encompass Grapevine project lands: Colleyville, Lewisville West, Argyle and Grapevine. This information is summarized in the next three paragraphs.

- 1) Within Grapevine Lake project lands, several locations were identified by the TXNDD to contain unique communities and species. Among these communities were those that contain the Texas heelsplitter (*Potamilus amphichaenus*) as well as the Mollisol Blackland Prairie (*Schizachyrium scoparium*, *Andropogon gerardii*, *Sorghastrum nutans*, *Bifora Americana*) mixed plant community and the Little Bluestem-indiangrass Series (*Schizachyrium scoparium-Sorghastrum nutans*).
- 2) The last recorded siting of a Texas heelsplitter (*Potamilus amphichaenus*) within the project lands of Grapevine Lake by TXNDD was in 1975. However, Mussels of Texas Database managed by Texas A&M Natural Resources Institute indicates two observations of Texas heelsplitter in 1998 and 2012 within Grapevine Lake and UT Tyler documented Texas heelsplitters in Grapevine Lake with DNA confirmation in 2019. The ideal habitat for this species is of the muddy to sandy areas of streams, rivers, and lakes (NatureServe 2019). Because of this information and lack of recent sightings, the occurrence of this species on Grapevine Lake project lands is considered rare.
- 3) The TXNDD reports and the data collected from the survey confirms that pockets Mollisol Blackland Prairie mixed plant community and that Little Bluestem-indiangrass Series (*Schizachyrium scoparium-Sorghastrum nutans*) can be found on the project lands at Grapevine Lake; thus, the occurrence of this community on project lands is considered common, even though less than one percent of original Blackland Prairie remains across the state and its occurrence is uncommon across most of the state.

2.2.5. Invasive Species

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

Table 2.4 lists many of the invasive and exotic species found at Grapevine Lake. Other species are currently being researched for their invasive characteristics.

Table 2.4 Invasive and Noxious Native Species Found at Grapevine Lake

Common Name	Scientific Name	Native/Non-Native
Birds		
Cattle Egret	<i>Bubulcus ibis</i>	Non-native
Brown-headed Cowbirds	<i>Molothrus ater</i>	Native
Eurasian Collared Dove	<i>Streptopelia decaocto</i>	Non-native
European Starling	<i>Sturnus vulgaris</i>	Non-native
House Sparrow	<i>Passer domesticus</i>	Non-native
Fish		
European Carp	<i>Cyprinus carpio</i>	Non-native
Mammals		
Nutria	<i>Myocastor coypus</i>	Non-native
Wild Boar	<i>Sus scrofa</i>	Non-native
Insects		
Emerald Ash Borer	<i>Agrilus planipennis</i>	Non-native
Red Imported Ant	<i>Solenopsis invicta</i>	Non-native
Western Honeybee	<i>Apis mellifera</i>	Non-native
Plants		
Bastard Cabbage	<i>Rapistrum rugosum</i>	Non-native
Bermuda Grass	<i>Cynodon spp.</i>	Non-native
Bushclovers	<i>Lespedeza spp.</i>	Non-native
Callery Pear	<i>Pyrus calleryana</i>	Non-native
Chinaberry	<i>Melia azedarach</i>	Non-native
Chinese Pistache	<i>Pistacia chinensis</i>	Non-native
Chinese Privet	<i>Ligustrum sinense</i>	Non-native
Chinese Tallow	<i>Triadica sebifera</i>	Non-native
Giant Reed	<i>Arundo donax</i>	Non-native

Common Name	Scientific Name	Native/Non-Native
Glossy Privet	<i>Ligustrum lucidum</i>	Non-native
Heavenly Bamboo	<i>Nandina domestica</i>	Non-native
Hydrilla	<i>Hydrilla verticillata</i>	Non-native
Japanese Brome	<i>Bromus japonicus</i>	Introduced
Japanese Honeysuckle	<i>Lonicera japonica</i>	Non-native
Johnson Grass	<i>Sorghum halepense</i>	Non-native
King Ranch Bluestem	<i>Bothriochloa ischaemum</i> <i>var. songarica</i>	Non-native
Lilac Chaste Tree	<i>Vitex agnus-castus</i>	Non-native
Multiflora Rose	<i>Rosa multiflora</i>	Non-native
Quihoi Privet	<i>Ligustrum quihoi</i>	Non-native
Reptiles		
Mediterranean Gecko	<i>Hemidactylus turcicus</i>	Non-native
Mollusks		
Asian Clam	<i>Corbicula fluminea</i>	Non-native
Zebra Mussels	<i>Dreissena polymorpha</i>	Non-native

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

Other invasive animals include several species of introduced fish (including released baitfish and “aquarium dumping”). Invasive mollusks including zebra mussels (*Dreissena polymorpha*) are an ongoing threat to native aquatic species and infrastructure due to their ability to infest and expand rapidly. Asian clams (*Corbicula fluminea*) and decollate snails (*Rumina decollate*) are common in waterways throughout Texas and often out-compete native mollusks.

Although native, brown-headed cowbirds (*Molothrus ater*) have become problematic due to their expanding range associated with agriculture and human development and are considered a nuisance because they parasitize other native songbird’s nests. Honey mesquites (*Prosopis glandulosa*) and juniper are also native but are spreading rapidly into native prairies where their aggressive growth was historically kept in check by periodic wildfires and grazing. The close proximity to urban landscaping has led to many common landscape plants becoming aggressive colonizers and are now invasive at Grapevine Lake.

Emerald ash borer (*Agilus planipennis*) was recently discovered in northern Tarrant County and Dallas County including at Lewisville Lake and Lake Worth, which is concerning for Grapevine Lake due to its location between those two lakes. It is now a potential invasive species of concern for the entire Dallas-Fort Worth Metropolitan Area.

2.2.6. Aesthetic Resources

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

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

2.3. PALEONTOLOGICAL RESOURCES

2.3.1. Introduction

No paleontological resources were known from property around Grapevine Lake managed by the United States Army Corps of Engineers until the 1980s. During the record flood of 1981, a series of dinosaur tracks in the freshly exposed sedimentary rocks provided the first paleontological discovery around the lake. Grapevine Lake and its surroundings have since attracted the attention of paleontologists who continue to discover important paleontological resources on the property that warrant continued investigation and proper management.

2.3.2. Geology

Most of the rocks in the DFW area are marine in origin, originally laid down as sediment deposited on the floor of ancient seas. Throughout much of the Cretaceous Period (145 million to 66 million years before present) global temperatures and sea levels were much higher than today. Global sea levels were high enough that water covered the low, flat-lying mid-part of the North American continent, forming a warm, shallow, Western Interior Seaway that stretched from the modern Gulf of Mexico area to the Arctic Ocean. Global tectonic activity and shifts in temperatures caused global sea levels to rise and fall repeatedly, causing the seaway to repeatedly shrink and expand. It was during one of the times of seaway retreat that the rocks around and beneath Grapevine Lake were deposited. Unlike the marine rocks west and east of the lake, the

sediments that would eventually become the rocks around Grapevine Lake were deposited in a mix of terrestrial, shoreline, estuary, and shallow, near-shore marine environments along the southeastern margin of the seaway. Geologists named this package of rock the Woodbine Group, (in some older works it is called the Woodbine Formation) (Hill, 1901; Dodge, 1969; Denne, et al 2016).

The Woodbine is a relatively complex assemblage of overlapping and inter-fingering layers of sandstones and mudstones across the region and deep into the subsurface, but the surface exposures of rock around Grapevine Lake belong to just two formations. The lower unit is the Dexter Formation, which consists of massive, hard, sometimes cross-bedded sandstone. Above the massive sands of the Dexter is the Lewisville Formation, which is a mix of gray mudstone formed in shallow near-shore or lagoon-like settings, and thinly bedded sandy layers formed by ancient tidal channels, streams, and their associated levee and floodplain sediments. Fossils in these sediments indicate the layers of the Woodbine formed approximately between 97 million and 95.5 million years ago. There are relatively few fossils known from the massive sandstones of the Dexter Formation around Grapevine Lake. This may be the result of less scientific exploration and investigation of the solid boulders and rocky ledges comprised of the Dexter. Exposures of the Lewisville Formation produce far more fossils, in part because the silty mudstones and sandstones of the upper Lewisville weather easily and erode quickly, frequently exposing fossil remains previously preserved inside them.

2.3.3. Paleontological Resources at Grapevine Lake

The North American fossil record from the age of the Woodbine is dominantly marine, with few rocks of this age formed in more terrestrial environments. This is not surprising given the high global sea levels at the time, and because marine environments have far better conditions for preserving organic remains. There are relatively few fossils known from comparable rocks in Kansas, Colorado, and Utah. In contrast, over the past twenty-five years, the Woodbine sediments of north Texas have produced one of North America's richest, most diverse terrestrial fossil flora and fauna from this narrow time interval, and new finds continue to be uncovered.

Fossils fall into one of two broad categories, trace fossils and body fossils. Trace fossils preserve evidence of the activity of past life, while body fossils are remains or altered remains of organisms themselves. Numerous trace fossils are present around Grapevine Lake, including traces of invertebrate activity such as crab burrows and feeding traces (Jacobs, et al. 2013). The dinosaur tracks first found at Grapevine Lake in the 1980s represent traces of large, plant eating dinosaurs wandering the ancient eastern shoreline of the interior seaway at the time. Additional dinosaur track localities were later found around the lake, and described in the scientific literature (Lee, 1997a). The tracks were the basis for three new ichnospecies ("track species") made by at least three different kinds of dinosaurs. *Caririchnium protohadrosaurichnos* tracks were made by large plant-eaters similar to later 'duck-billed' dinosaurs. *Fuscinapedis woodbinensis* tracks were made by a variety of yet-unidentified, medium-sized carnivorous dinosaur.

Magnoavipes lowei are narrow-toed tracks attributed to a large bird or bird-like dinosaur that had heron-like or egret-like foot proportions (Lee, 1997a).

Body fossils make up the majority of paleontological resources at Grapevine Lake, particularly from some exposures of the Lewisville Formation. Vertebrate bones and teeth from many kinds of animals are known, including, in increasing rarity, sharks, rays, bony fish, turtles, multiple species of crocodylians (Lee, 1997b), and dinosaurs (Lee, 1997b, Head, 1998). Among the dinosaur remains known from the lake area is the holotype (name-holding) specimen of the fossil bird *Flexomornis howei* (Tykoski & Fiorillo, 2010), one of North America's oldest, definitive birds. Paleobotanical investigations are also producing fossils that show a previously unrecognized diversity of fossil plant remains in the rocks surrounding the lake. Some of these plant fossils, including ancient fire-charred logs and wood fragments, hint at the existence of ancient forest-fire-influenced ecosystems in the region at the time.

In addition to the growing research interest in and importance of the Cretaceous aged rocks around Grapevine Lake, there are also much younger paleontological resources in the area. The Pleistocene Epoch (2.6 million to 10,000 years ago) is commonly referred to as the "Ice Age". It was marked by repeated cycles of planetary cooling and warming that resulted in massive continental ice sheets expanding and receding back and forth across the northern parts of North America and Eurasia. The closest these ice sheets came to Texas was parts of modern-day Iowa, so Texas was not ice-covered at any point during the Ice Age. However, environmental conditions were still markedly different during times of glacial expansion compared to today's current interglacial retreat conditions. Temperatures were generally cooler and wetter in north Texas than in modern times, and this influenced the kinds of plants and animals that inhabited the region.

The creeks and streams that feed into modern-day Grapevine Lake were also present in or near their current locations for thousands of years, well back into the Pleistocene. The sediments they deposited in their terraces, sand and gravel bars, and adjacent floodplains also buried and preserved the remains of animals and plants that lived at the time. Bones of extinct mammoths have turned up in the Pleistocene sediments around Grapevine Lake, and although few other confirmed fossils of this age have been reported, it is possible that remains of other extinct species (such as Bison, horses, dire wolves, bears, saber-toothed cats, etc.) may also be present in these Ice Age deposits.

2.4. CULTURAL RESOURCES

2.4.1. Prehistoric

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

Evidence for Paleo-Indian period occupation is relatively rare in the Grapevine 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, as was the case with the Aubrey Clovis site upstream on the Elm Fork Trinity River at Grapevine Lake. Evidence suggests that the region was occupied by small groups of highly mobile hunter-gatherers that traveled over very large territories. Traditionally thought of as big-game hunters of mammoth and bison, more recent evidence indicates Paleo-Indians exploited a much broader range of animal and plant resources.

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

The Late Prehistoric Period (1,250-300 B.P.) is marked by the presence of the bow and arrow and pottery. During the early portion of this time span, subsistence strategies remained similar to those of the preceding Late Archaic. By around 800 B.P., there is limited evidence for maize horticulture and more sedentary occupations in some North Central Texas sites. After around 600 B.P., there is widespread evidence for an increase in bison hunting. Pottery from Grapevine Lake sites includes plain and decorated grog-tempered specimens in the Caddo ceramic tradition. It is unclear whether this pottery was made locally or represents trade with East Texas Caddo groups. Plain, shell-tempered pottery is the most common ceramic type found at Grapevine Lake sites and is thought to show connections with southern plains groups to the north and west. This shell-tempered pottery is generally thought to date to the late portion of the Late Prehistoric period (after ca. 600 B.P.) when bison hunting became more important.

2.4.2. Historic

Local tradition holds that Native Americans of the Wichita and Caddo Nations inhabited the Grapevine Lake area prior to the arrival of the first white settlers in the early 1840s. The first large colonization occurred after W.S. Peters of St. Louis obtained a land grant from the Republic of Texas in 1841. The first “Peters Colony” contract included the Grapevine Lake area. The majority of these early settlers were farmers operating small family farms growing mainly wheat and corn. When Denton County was created out of Fannin County in 1846, the estimated population was only 150. The population grew steadily between the 1840s and 1870s. The arrival of the railroads in the early 1870s allowed farmers access to markets and led to a major increase in the number of farms. Cotton farming became an important agricultural activity in the Blackland Prairie region and tenant farming was a major social institution. Most of the historic resources at Grapevine Lake include the archeological remains of house sites and farmsteads dating from the late 19th century through the mid-20th century.

2.4.3. Previous Investigations at Grapevine Lake

The initial archeological investigation at Grapevine Lake was conducted in 1948 by the River Basin Surveys. During that survey, 10 sites were recorded, eight of which are currently located on USACE fee property. In 1978 and 1983, salvage excavations of two human burials by USACE archeologists led to the eventual recording of sites 41DN493 and 41DN235, respectively. More recent surveys have been conducted at several park areas and at the golf courses located downstream from the dam. The most recent of these was a complete survey of Murrell Park (640 acres) in 2009. Of the 8,276 fee acres located outside the Conservation Pool, 1,357 fee acres have now been surveyed to current survey standards.

2.4.4. Recorded Cultural Resources

Currently, 35 archeological sites have been recorded at Grapevine Lake. One of these archeological sites (41TR55) has been determined eligible for the National Register of Historic Places (NRHP). The remaining 34 recorded sites have not yet been evaluated for NRHP eligibility.

2.4.5. Long-term Objectives for Cultural Resources

As funding allows, a Cultural Resources Management Plan (CRMP) shall be developed and incorporated into the Operational Management Plan in accordance with EP 1130-2-540. The purpose of the CRMP is to provide a comprehensive program to direct the historic preservation activities and objectives at Grapevine Lake. Completion of a full inventory of cultural resources at Grapevine 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 any 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 Grapevine Lake must be coordinated with the State Historic Preservation Officer and federally-recognized Tribes to insure compliance with the National Historic Preservation Act, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act

2.5. DEMOGRAPHIC AND ECONOMIC ANALYSIS

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

2.5.1. Zone of Influence

Grapevine Lake is located in Tarrant and Denton Counties in North Central Texas. The zone of interest for the socioeconomic analysis of Grapevine Lake is defined as Collin, Cooke, Dallas, Denton, Montague, Tarrant and Wise Counties in Texas.

2.5.2. Population

The total population for the zone of interest in 2019 was estimated at approximately 6.6 million, as shown in Table 2.5. Approximately 40% of the zone of interest's total population is within Dallas County and 31% is within Tarrant County. Collin County makes up 15%, Denton County 13%, Wise County 1% and Cooke and Montague with less than 1% each. The zone of interest accounts for approximately 23% of the population for Texas.

The zone of interest's population is projected to increase by about 5.4 million people by 2050, and annual growth rate of 1.9%. Most of the growth is projected to occur in Denton County, which is projected to grow by 1.5 million people in 2050, an annual growth rate of 3.4%, Collin County, projected to grow by 1.5 million people, an annual growth rate of 3.0%, Dallas County, projected to grow by 1.3 million people, an annual growth rate of 1.3%, and Tarrant County, projected to grow by just over 1.1 million people, and annual growth rate of 1.4%. Wise County is projected to grow by 11 thousand people, an annual growth rate of 0.5%. Cooke County and Montague County are projected to lose population.

Table 2.5 2000 and 2019 Population Estimates and 2050 Projections

Geographic Area	2000 Population Estimate	2019 Population Estimate	2050 Population Projection
Texas	20,851,820	28,260,856	47,342,105
Collin County	491,675	973,977	2,456,914
Cooke County	36,363	40,041	39,873
Dallas County	2,218,899	2,606,868	3,869,605
Denton County	432,976	833,822	2,332,629
Montague County	19,117	19,489	15,349
Tarrant County	1,446,219	2,049,770	3,196,603
Wise County	48,793	66,290	77,081
Zone of Interest	4,694,042	6,590,257	11,988,054

2000 Estimates - U.S. Census Bureau, 2000 Decennial Census
 2019 Estimate - U.S. Census Bureau, 2019 ACE 5 Year Survey
 2050 Projections - Texas State Data Center

The distribution of the population by gender is shown in Table 2.6. For the zone of interest, the population is 49% male and 51% female, as compared to an almost 50% male and 50% female distribution for the state. All of the remaining counties are very similar to near 49%/51% distributions between male and female.

Table 2.6 2018 Population by Gender

Geographic Area	Total Population	Male	Female
Texas	28,260,856	14,034,009	14,226,847
Collin County	973,977	479,151	494,826
Cooke County	40,041	19,871	20,170
Dallas County	2,606,868	1,285,388	1,321,480
Denton County	833,822	410,114	423,708
Montague County	19,489	9,460	10,029
Tarrant County	2,049,770	1,002,709	1,047,061
Wise County	66,290	33,406	32,884
Zone of Interest	6,590,257	3,240,099	3,350,158

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

Figure 2.7 shows the population by age group expressed as a percent of total population for Texas, the zone of interest and Tarrant and Denton Counties, where the lake is located. While the percentages are roughly similar for most of the age groups, it can be seen that there is a slightly larger percentage of 25- to 34-year-olds, 35- to 44-year-olds, and 45- to 54-year-olds in the zone of interest compared to Texas, with almost 15%, 14%, and 13% of the zone of interest's population in these age groups, respectively. The zone of interest also shows larger percentages in the under 5 years age group (8%) and the 5- to 9-year-old age group (7%), and 10- to 14-year-old group (8%) when compared to the state.

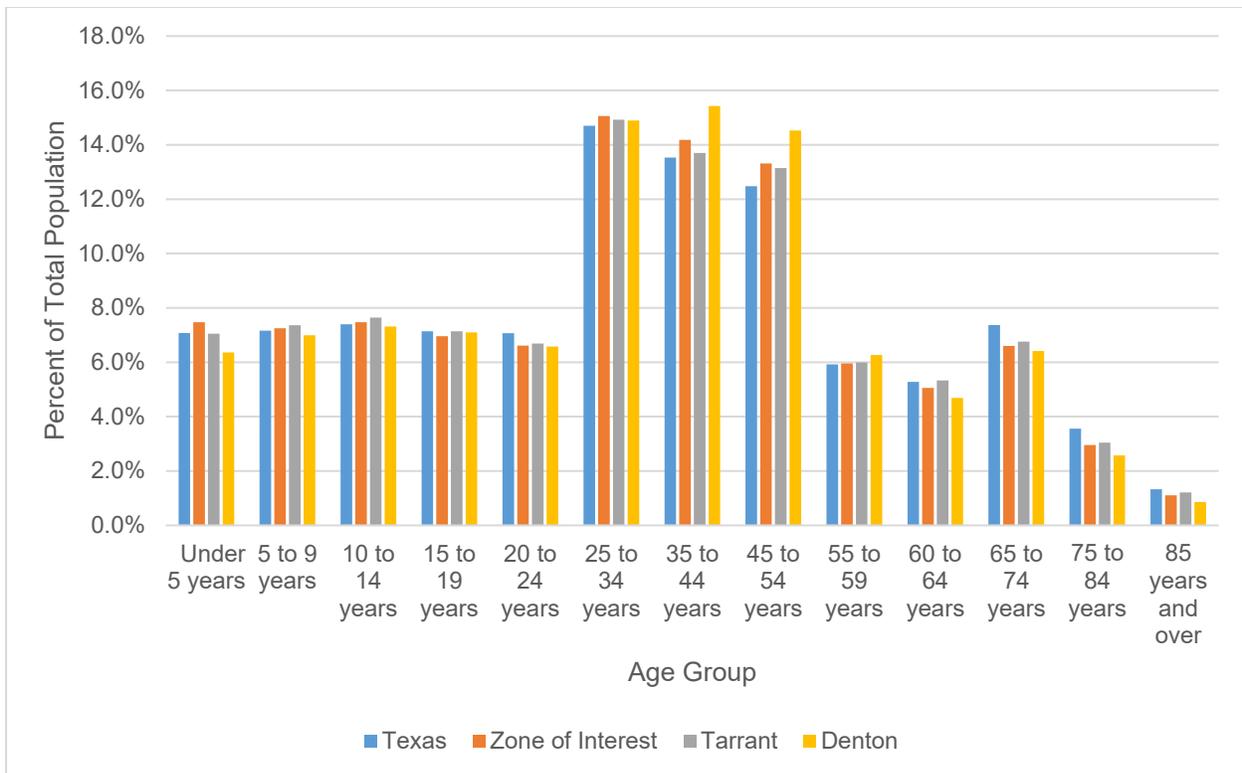


Figure 2.7 Percent of Population by Age Group, 2019 (U.S. Bureau of the Census, American Community Survey, 5 Year Estimate)

The 2019 population by race and Hispanic origin is shown in Table 2.7. In the zone of interest, approximately 44% of the population is White, 30% are Hispanic or Latino, 17% Black, 8% Asian, and 2% two or more races, with each of the other races making up less than 1% each of the total population. The zone of interest has a higher percentage of Blacks, and Asian than the state, but a lower percentage of Hispanic or Latino. For the state, 41% are White, 39% are Hispanic or Latino, 12% Black, 5% Asian, and 2% two or more races, with each of the remaining races making up less than 1% each.

Table 2.7 2019 Population by Race and Hispanic Origin

Geographic Area	Total	White	Black	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Hispanic or Latino	Some other race	Two or more races
Texas	28,260,856	11,856,336	3,328,707	71,081	1,340,554	21,739	11,116,881	44,465	481,093
Collin County	973,977	554,789	93,804	3,261	146,966	622	148,696	2,542	23,297
Cooke County	40,041	30,166	1,121	278	344	24	7,269	54	785
Dallas County	2,606,868	759,485	580,189	5,411	162,770	1,014	1,047,434	4,810	45,755
Denton County	833,822	494,029	79,871	3,045	72,148	629	160,933	1,191	21,976
Montague County	19,489	16,720	131	159	0	0	2,138	0	341

Geographic Area	Total	White	Black	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Hispanic or Latino	Some other race	Two or more races
Tarrant County	2,049,770	957,676	330,853	6,154	110,144	3,802	590,485	4,441	46,215
Wise County	66,290	50,878	845	236	338	121	12,822	2	1,048
Zone of Interest	6,590,257	2,863,743	1,086,814	18,544	492,710	6,212	1,969,777	13,040	139,417

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

2.6. EDUCATION AND EMPLOYMENT

Table 2.8 shows the highest educational attainment for the 2019 population 25 years of age and older. In the zone of interest, 22% of the population had earned a high school diploma or equivalent, 21% had some college, but no degree, and 24% had earned a bachelor's degree. Approximately 23% held a graduate degree or higher and 7% had earned an associate's degree. Only 7% of the population had attended school between the 9th and 12th grades but did not earn a diploma. About 7% of the population had less than a 9th grade education. The area interest educational attainment is representative of the state overall. For Texas, 25% had earned a high school diploma or equivalent, 22% had some college but no degree, and 20% has a bachelor's degree. About 10% had a graduate degree or higher, and 7% had an associate's degree. Only 8% had 9 to 12 years of education but without degree, and 8% had less than 9 years of education.

Table 2.8 2019 Population Estimate by Highest Level of Educational Attainment, Population 25 Years of Age and Older

Educational Attainment	Texas	Collin County	Cooke County	Dallas County	Denton County	Montague County	Tarrant County	Wise County	Zone of Interest
Population 25 years and over	18,131,554	638,328	27,025	1,669,564	547,409	13,632	1,314,012	44,452	4,254,422
Less than 9th grade	1,482,952	21,157	1,352	185,885	18,245	808	85,902	2,609	315,958
9th to 12th grade, no diploma	1,475,007	18,294	2,414	159,003	22,790	1,139	96,589	3,924	304,153
High school graduate (includes equivalency)	4,525,099	95,753	8,507	377,558	97,623	5,130	314,880	15,461	914,912
Some college, no degree	3,918,815	122,178	6,715	326,932	120,316	3,087	292,589	10,949	882,766
Associate's degree	1,309,005	46,793	2,398	94,661	41,566	1,161	99,985	3,506	290,070
Bachelor's degree	3,534,714	212,007	3,800	332,957	165,827	1,579	284,540	6,042	1,006,752

Educational Attainment	Texas	Collin County	Cooke County	Dallas County	Denton County	Montague County	Tarrant County	Wise County	Zone of Interest
Graduate or professional degree	1,885,962	122,146	1,839	192,568	81,042	728	139,527	1,961	539,811

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

Figure 2.8 shows the 2019 employment by sector expressed as a percent of total employment for the area of interest and the number of employment by sector for Texas, the area of interest and the constituent counties is presented in Table 2.9. For the area of interest, 19% of the employment is in the educational, health care and social assistance services sector, followed by 13% in professional, scientific and management, 11% in retail trade. About 9% of the employment is in each of finance, insurance, real estate and arts, entertainment, recreation and accommodations. This indicates over 62% of total employment are in the services sector. About 9% are in manufacturing, 8% in construction, and 7% in transportation and warehousing. The remaining sectors represent 5% or less each of total employment.

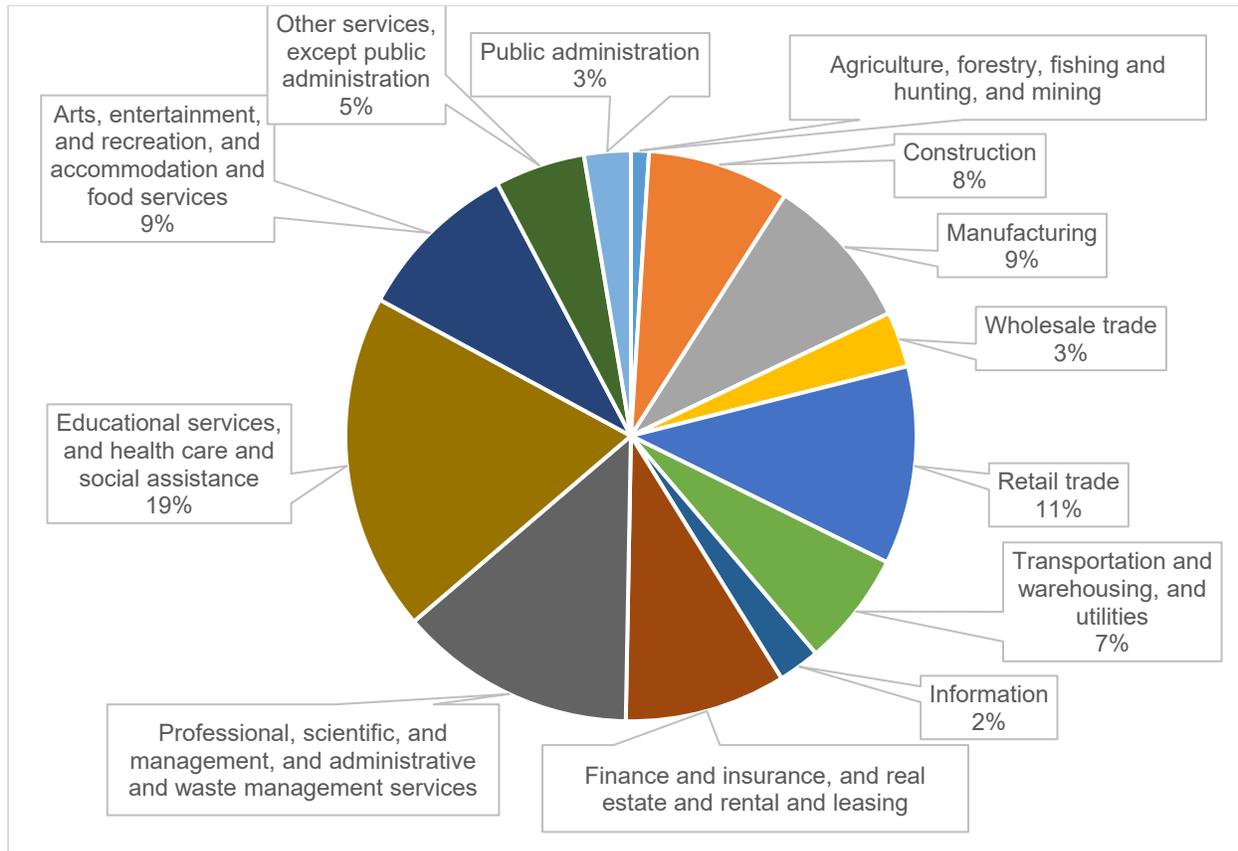


Figure 2.8 Percent Employment by Sector for Area of Interest (2019)

Table 2.9 Employment by Sector (2019)

Employment Sector	Texas	Collin County	Cooke County	Dallas County	Denton County	Montague County	Tarrant County	Wise County	Zone of Interest
Civilian employed population 16 years and over	13,253,631	509,180	19,303	1,305,009	453,391	8,132	1,017,012	30,152	3,342,179
Agriculture, forestry, fishing and hunting, and mining	397,032	4,349	1,558	9,133	4,190	1,052	11,329	2,265	33,876
Construction	1,137,958	26,036	1,181	137,272	24,451	536	76,911	2,456	268,843
Manufacturing	1,125,176	42,228	3,030	107,817	36,763	814	103,274	2,725	296,651
Wholesale trade	378,542	14,663	360	39,295	15,488	158	33,955	977	104,896
Retail trade	1,507,002	57,786	1,802	140,355	53,955	1,044	116,633	3,704	375,279
Transportation and warehousing, and utilities	777,044	17,444	955	85,121	25,398	351	85,083	2,743	217,095
Information	227,928	19,280	196	28,953	12,580	109	17,411	447	78,976
Finance and insurance, and real estate and rental and leasing	884,408	59,731	723	113,413	49,239	483	80,102	1,418	305,109
Professional, scientific, and management, and administrative and waste management services	1,524,750	88,753	1,141	187,301	61,857	333	107,980	1,992	449,357
Educational services, and health care and social assistance	2,863,828	101,977	3,655	232,477	93,677	1,651	201,816	5,740	640,993
Arts, entertainment, and recreation, and accommodation and food services	1,216,771	41,627	3,055	125,254	42,220	668	97,063	2,317	312,204
Other services, except public administration	684,780	22,969	1,006	69,968	21,387	541	52,637	2,118	170,626
Public administration	528,412	12,337	641	28,650	12,186	392	32,818	1,250	88,274

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

The civilian labor force for the area of interest makes about 25% of the civilian labor force for the entire state, as shown in Table 2.10. The unemployment rate for the zone of interest was 4.5%, lower than the state overall, which had an unemployment rate of 5.1%. The constituent counties ranged from 3.7% in Collin County to 5.4% in Montague County.

Table 2.10 Civilian Labor Force, Employment and Unemployment (2019)

Geographic Area	Civilian Labor Force	Number Employed	Number Unemployed	Unemployment Rate
Texas	13,962,458	13,253,631	708,827	5.1%
Collin County	528,839	509,180	19,659	3.7%
Cooke County	20,211	19,303	908	4.5%
Dallas County	1,370,333	1,305,009	65,324	4.8%
Denton County	471,606	453,391	18,215	3.9%
Montague County	8,594	8,132	462	5.4%
Tarrant County	1,067,061	1,017,012	50,049	4.7%
Wise County	31,526	30,152	1,374	4.4%
Zone of Interest	3,498,170	3,342,179	155,991	4.5%

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

2.7. HOUSEHOLDS, INCOME, AND POVERTY

Table 2.11 shows the number and size of households for Texas and the zone of interest. The zone of interest has approximately 2.3 million households, which makes up about 24% of the number of households statewide. About 40% of the households are in Dallas County (928,000), about 31% are in Tarrant County (708,000), 15% in Collin County (341,000), and 13% in Denton County (290,000). The average household size for the area of interest is 2.82 persons, with the constituent counties ranging from 2.45 to 2.92. These are generally similar to the state overall, with 2.85 persons per household.

Table 2.11 Number of Households and Average Household Size (2019)

Geographic Area	Total Households	Average Household Size
Texas	9,691,647	2.85
Collin County	341,163	2.84
Cooke County	15,351	2.57
Dallas County	928,341	2.78
Denton County	290,229	2.83
Montague County	7,800	2.45
Tarrant County	708,252	2.86
Wise County	22,369	2.92
Zone of Interest	2,313,505	2.82

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

Median household income and per capita income are shown in Table 2.12. While the median household income for the zone of interest was not available, for the constituent counties, it ranged from \$52 thousand in Montague County to \$97 thousand

in Collin County. By comparison, the state’s median household income was \$62 thousand. Three of the constituent counties were below the state, and four had higher median household incomes.

The per capita income for the zone of interest was approximately \$36 thousand, higher than the state’s per capita income of \$31 thousands. Three counties had per capita incomes below the state’s per capita income, and four were at or above, which is similar to the median household incomes.

Table 2.12 Median and Per Capita Income (2019)

Geographic Area	Median Household Income	Per Capita Income
Texas	\$61,874	\$31,277
Collin County	96,913	44,548
Cooke County	60,202	30,704
Dallas County	59,607	32,653
Denton County	86,913	41,153
Montague County	51,765	28,096
Tarrant County	67,700	33,292
Wise County	64,536	29,418
Zone of Interest	N/A	35,627

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

Percentages of families and persons falling below the poverty level is shown in Table 2.13. The percent of all families for the zone of interest was not available, but for the constituent counties, it ranged from 4.4% in Collin County to 12.1% in Dallas County. Only Dallas County had a higher percentage than the state overall, Montague County was similar and the remainders below the state’s percentage

Approximately 12% of all persons in the zone of interest had incomes below the poverty level, lower than the states percentage of 15%. Collin, Cooke, Denton, Tarrant and Wise Counties were below the state percentage while Dallas and Montague higher percentage of persons below the poverty level than the state.

Table 2.13 Percentage of Families and People Whose Income in the Past 12 Months is Below the Poverty Level (2019)

Geographic Area	All Families	All People
Texas	11.3%	14.7%
Collin County	4.4%	6.3%
Cooke County	9.3%	12.8%
Dallas County	12.1%	15.4%
Denton County	4.6%	7.6%
Montague County	10.8%	15.6%
Tarrant County	8.9%	11.9%

Geographic Area	All Families	All People
Wise County	8.2%	10.7%
Zone of Interest	N/A	11.9%

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

2.8. RECREATION FACILITIES, ACTIVITIES, AND NEEDS

The initial development of outdoor recreation facilities at Grapevine Lake was addressed in the previous Master Plan. This document laid out a plan for the comprehensive management of the lake’s lands and water surface including plans for a significant investment in outdoor recreation facilities.

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

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

- Located in the northern portion of the Dallas-Fort Worth Metroplex, approximately 20 miles from downtown Dallas and downtown Fort Worth and 5 miles from DFW International Airport.
- Easily accessed by nearby highways
- Provides full-service campgrounds and day-use areas
- Access to water-based recreation at marinas, boat ramps, and swim beaches
- Provides hiking and mountain biking trails
- Many natural areas provide opportunities for bird watching and other wildlife viewing
- Provides rare opportunity for hunting on public land in the DFW metropolitan area.

2.8.1. Visitor Profile Zone of Influence

Grapevine Lake is located in Tarrant and Denton Counties in North Central Texas. The zone of interest for the recreation analysis of Grapevine Lake is defined as Collin, Cooke, Dallas, Denton, Montague, Tarrant and Wise Counties in Texas. Most visitors to Grapevine Lake come from the zone of influence and is one of many options for recreators within the larger DFW metropolitan area.

2.8.2. Recreation Areas and Facilities

Recreation areas at Grapevine Lake are managed by the USACE and local cities with local parks managed under a lease agreement. The lake provides camping, picnic sites and shelters, group shelters, boat ramps, swimming beaches, playgrounds, many miles of trails, and more. Popular activities include sailing, kayaking, and mountain bike riding. One unique activity is off-road vehicle trails for off-road vehicles and motorbikes

within Trophy Club Park. A full list of amenities, maps, rules and regulations, hours, fees, reservation instructions, and other important information on are the websites for each managing entity.

2.8.3. Recreational Analysis - Trends

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

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

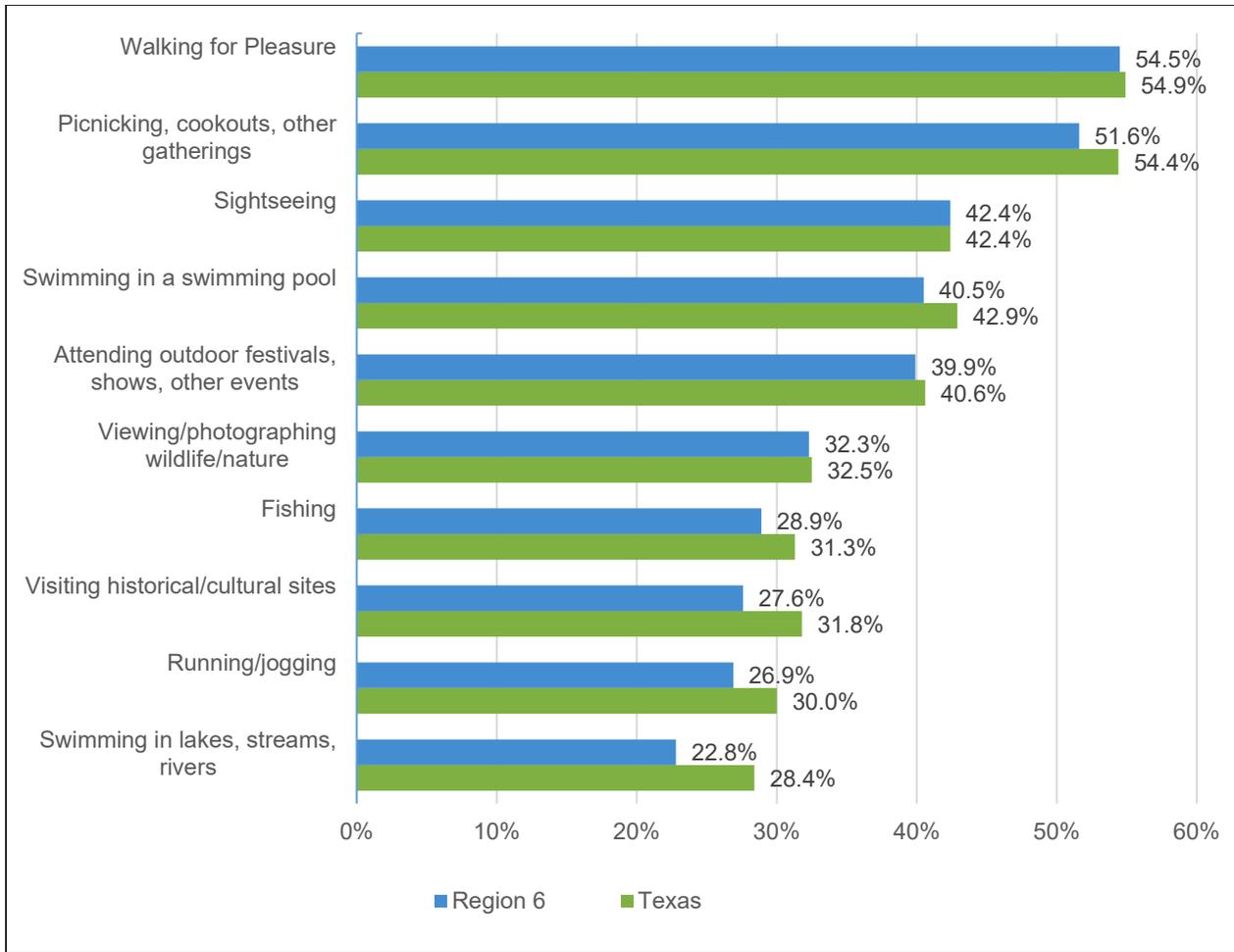


Figure 2.9 Top 10 Areas of Participation for Outdoor Recreation Activities

Source: TPWD TORP 2018

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

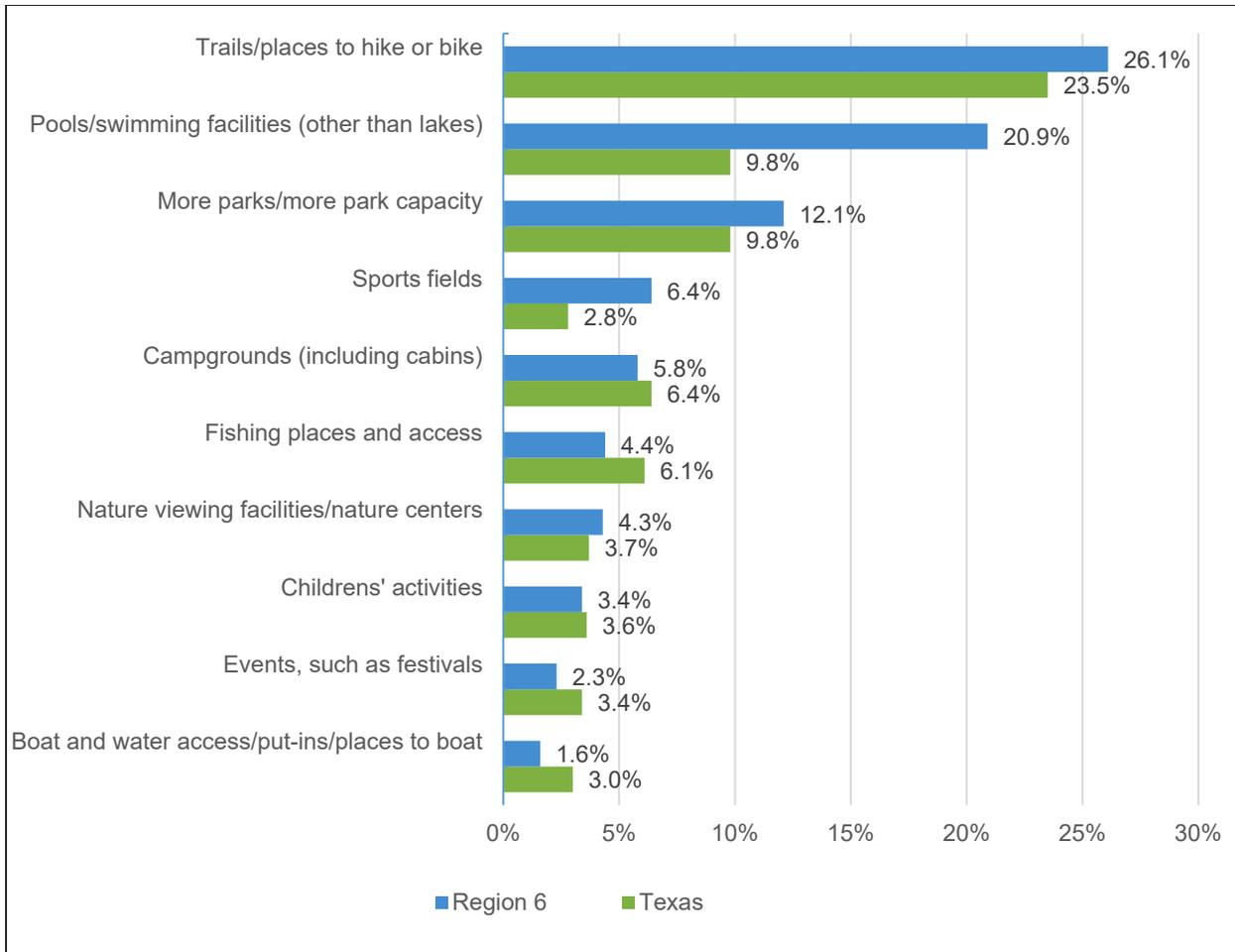


Figure 2.10 “Which outdoor recreation opportunities does your community currently lack or would like to see more of in your community?”

Source: TPWD TORP 2018

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

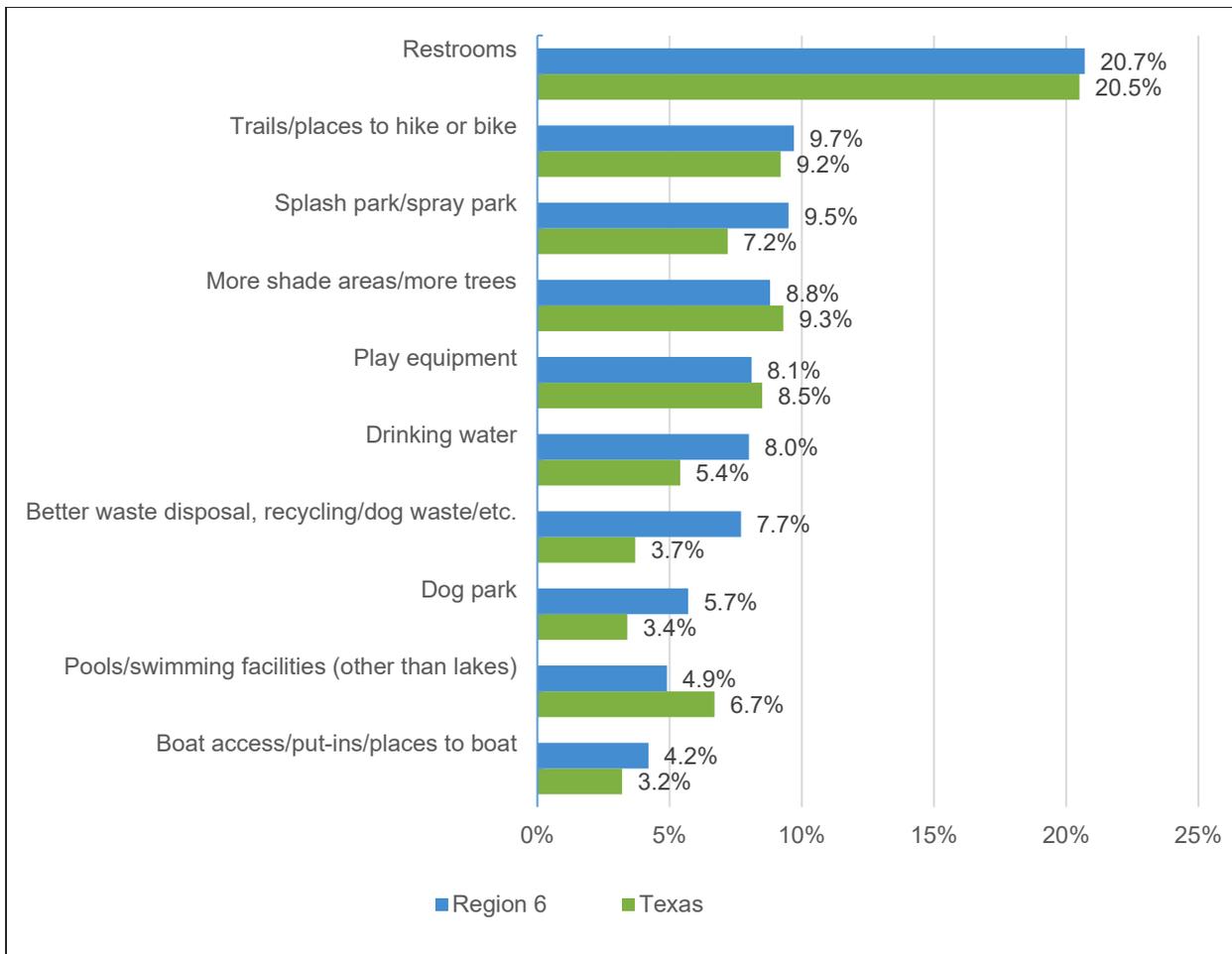


Figure 2.11 “Which features or facilities do your local parks currently lack, or would you like to see more of at your local parks?”

Source: TPWD TORP 2018

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

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

2.9. REAL ESTATE

In January 1948, under the authorization of The River and Harbor Act of 1945, construction of Grapevine Lake began for the purposes of both flood control and navigation. This generally required fee simple acquisition of the area that closely followed and encompassed the 565.0 feet NGVD29 contour and in some cases up to 572.0 NGVD29. In lieu of fee simple acquisition, flowage easements were acquired in the upper reaches of tributaries where the configuration of required lands was relatively narrow.

After prior reconveyances of land, the current fee simple owned lands total 15,685 acres. In addition to the fee land acquisition, approximately 2,163 acres of flowage easement were acquired up to and often beyond elevation 572.0 NGVD29 and in some cases up to 575.0 NGVD29. A flowage easement, in general, grants to the government the perpetual right to temporarily flood/inundate private land during flood risk management operations and to prohibit activities on the flowage easement that would interfere with flood risk management operations such as placement of fill material or construction of habitable structures on flowage lands.

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

Table 2.14 Real Estate Fee and Flowage Acreage

Land	Acres
Total Fee Acres	15,685
Flowage Easement Acres	2,163

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

Table 2.15 Outgrants at Grapevine Lake

Outgrant Type	Number
Leases	
Nonprofit Leases	2
Model Airplane Field	1
Marina Leases	3
Park and Recreation Leases	10
Telecommunications Tower Lease	1
Water Treatment Plant	1
BLM Oil and Gas Lease	3
Easements, Consents, and Other	
Sewer/water/storm drain	83
Oil/Gas pipeline	20
Roadway/Driveway	55
Electric/Communication Lines	51
Earthworks/Pond/Pool	76
Garage/Fence/Deck/Gazebo	34
Barn/Shed	23
Other	47
Total Outgrants	410
<i>NOTE: Boathouses (Personal Floating Facilities) and other shoreline permits are managed under the Shoreline Management Plan (SMP) which is briefly discussed in Chapter 6.</i>	
Boathouse Permits	40

2.9.1. Guidelines for Property Adjacent to Public Land

It is the policy of the USACE to manage the natural, cultural, and developed resources of Grapevine Lake to provide the public with safe and healthful recreational opportunities, while protecting and enhancing those resources. While private exclusive use of public land is not permitted, property owners adjacent to public lands do have all the same rights and privileges as any other citizen. Therefore, the information contained in these guidelines is designed to acquaint the adjoining landowner and other interested persons with the types of property involved in the management of Grapevine Lake. Adjoining landowners interested in more information should request additional information from the USACE project office at Grapevine Lake.

2.9.2. Trespass and Encroachment

Government property is monitored by USACE personnel to identify and correct instances of unauthorized use, including trespasses and encroachments. The term “trespass” includes unauthorized transient use and occupancy, such as mowing, tree

cutting and removal, livestock grazing, cultivation and harvesting crops, and any other alteration to Government property done without USACE approval. Unauthorized trespasses may result in a Title 36 citation to appear in Federal Magistrate Court, which could subject the violator to fines or imprisonment (See Title 36 Code of Federal Regulations (CFR) Part 327 Rules and Regulations Governing Public Use of Water Resources Development Projects Administered by the Chief of Engineers). More serious trespasses will be referred to the USACE Office of Counsel for enforcement under state and federal law, which may require restoration of the premises and collection of monetary damages.

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

2.10. PERTINENT PUBLIC LAWS

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

- PL 59-209, Antiquities Act of 1906. - This was the first federal law established to protect what are now known as "cultural resources" on public lands. It provides a permit procedure for investigating "antiquities" and consists of two parts: An act for the Preservation of American Antiquities, and Uniform Rules and Regulations.
- PL 74-292, Historic Sites Act of 1935. - This act declares it to be a national policy to preserve for (in contrast to protecting from) the public, historic (including prehistoric) sites, buildings, and objects of national significance. This act provides both authorization and a directive for the Secretary of the Interior, through the National Park Service, to assume a position of national leadership in the area of protecting, recovering, and interpreting national archeological historic resources. It also establishes an "Advisory Board on National Parks; Historic Sites, Buildings, and Monuments, a committee of eleven experts appointed by the Secretary to recommend policies to the Department of the Interior".
- Title 16 U.S. Code §§ 668-668a-d, 54 Stat. 250, Bald Eagle Protection Act of 1940, as amended. - This act prohibits anyone, without a permit issued by the Secretary of the Interior, from taking bald eagles, including their parts, nests, or eggs. The act provides criminal penalties for persons who take, possess, sell, purchase, barter, offer to sell, transport, export or import, at any time or any manner, any bald eagle [or any golden eagle],

alive or dead, or any part, nest, or egg thereof. The act defines “take” as pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.

- PL 78-534, Flood Control Act of 1944. - Section 4 of the act as last amended in 1962 by Section 207 of Public Law 87-874 authorizes USACE to construct, maintain, and operate public parks and recreational facilities in reservoir areas and to grant leases and licenses for lands, including facilities, preferably to Federal, State or local governmental agencies.
- PL 79-14, River and Harbor Act of 1945 (PL 14, 79th Congress, 1st Session), in accordance with the total plan of improvements for the Trinity River basin outlined in House Document Number 403. Section 603a authorized improvements to rivers and harbors for removing accumulated snags, obstructions, and other debris located in or adjacent to a Federal channel, and for protecting, clearing, and straightening channels in navigable harbors and navigable streams and tributaries thereof, when in the opinion of the Chief of Engineers such work is advisable in the interest of navigation, flood control, or recreation.
- PL 79-526, Flood Control Act of 1946 (24 July 1946). - This law amends PL78-534 to include authority to grant leases to non-profit organizations at recreational facilities in reservoir areas at reduced or nominal fees.
- PL 83-780, Flood Control Act of 1954. - This act authorizes the construction, maintenance, and operation of public park and recreational facilities in reservoir areas under the control of the Department of the Army and authorizes the Secretary of the Army to grant leases of lands in reservoir areas deemed to be in the public interest.
- PL 85-624, Fish and Wildlife Coordination Act 1958. - This act as amended in 1965 sets down the general policy that fish and wildlife conservation shall receive equal consideration with other project purposes and be coordinated with other features of water resource development programs. Opportunities for improving fish and wildlife resources and adverse effects on these resources shall be examined along with other purposes which might be served by water resources development.
- PL 86-523, Reservoir Salvage Act of 1960, as amended. - This act provides for (1) the preservation of historical and archeological data that might otherwise be lost or destroyed as the result of flooding or any alteration of the terrain caused as a result of any Federal reservoir construction projects; (2) coordination with the Secretary of the Interior whenever activities may cause loss of scientific, prehistoric, or archeological data; and (3) expenditure of funds for recovery, protection, and data preservation. This Act was amended by Public Law 93-291.
- PL 86-717, Forest Conservation. - This act provides for the protection of forest and other vegetative cover for reservoir areas under the jurisdiction of the Secretary of the Army and the Chief of Engineers.
- PL 87-88, Federal Water Pollution Control Act Amendments of 1961, as amended. - Section 2(b)(1) of this act gives the USACE responsibility for water quality management of USACE reservoirs. This law was amended

by the Federal Water Pollution Control Act Amendment of 1972, Public Law 92-500.

- PL 87-874, Rivers and Harbors Act of 1962. This act authorizes the construction, repair, and preservation of certain public works on rivers and harbors for navigation, flood control, and for other purposes.
- PL 88-29, Recreation Coordination and Development Act of 1963. - This act authorized the Secretary of the Interior to inventory and classify outdoor recreation needs and resources and to prepare a comprehensive outdoor recreation plan taking into consideration the plans of the various Federal agencies, States, and other political subdivisions. It also stated that Federal agencies undertaking recreational activities shall consult with the Secretary of the Interior concerning these activities and shall carry out such responsibilities in general conformance with the nationwide plan.
- PL 88-578, Land and Water Conservation Fund Act of 1965. - This act established a fund from which Congress can make appropriations for outdoor recreation. Section 2(2) makes entrance and user fees at reservoirs possible by deleting the words "without charge" from Section 4 of the 1944 Flood Control Act as amended.
- PL 89-72, Federal Water Project Recreation Act of 1965. - This act requires that not less than one-half of the separable costs of developing recreational facilities and all operation and maintenance costs at Federal reservoir projects shall be borne by a non-Federal public body. A Head Quarters USACE (HQUSACE)/OMB implementation policy made these provisions applicable to projects completed prior to 1965.
- PL 89-90, Water Resources Planning Act (1965). - This act established the Water Resources Council and gives it the responsibility to encourage the development, conservation, and use of the Nation's water and related land resources on a coordinated and comprehensive basis.
- PL 89-272, Solid Waste Disposal Act, as amended by PL 94-580, dated October 21, 1976. - This act authorized a research and development program with respect to solid-waste disposal. It proposes (1) to initiate and accelerate a national research and development program for new and improved methods of proper and economic solid-waste disposal, including studies directed toward the conservation of national resources by reducing the amount of waste and unsalvageable materials and by recovery and utilization of potential resources in solid waste; and (2) to provide technical and financial assistance to State and local governments and interstate agencies in the planning, development, and conduct of solid-waste disposal programs.
- PL 89-665, Historic Preservation Act of 1966. - This act provides for: (1) an expanded National Register of significant sites and objects; (2) matching grants to states undertaking historic and archeological resource inventories; and (3) a program of grants-in aid to the National Trust for Historic Preservation; and (4) the establishment of an Advisory Council on Historic Preservation. Section 106 requires that the President's Advisory Council on Historic Preservation have an opportunity to comment on any

undertaking which adversely affects properties listed, nominated, or considered important enough to be included on the National Register of Historic Places.

- PL 90-483, River and Harbor and Flood Control Act of 1968, Mitigation of Shore Damages. - Section 210 restricted collection of entrance fee at USACE lakes and reservoirs to users of highly developed facilities requiring continuous presence of personnel.
- PL 91-190, National Environmental Policy Act of 1969 (NEPA). - NEPA declared it a national policy to encourage productive and enjoyable harmony between man and his environment, and for other purposes. Specifically, it declared a “continuing policy of the Federal Government... to use all practicable means and measures...to foster and promote the general welfare, to create conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.” Section 102 authorized and directed that, to the fullest extent possible, the policies, regulations, and public law of the United States shall be interpreted and administered in accordance with the policies of the Act. It is Section 102 that requires consideration of environmental impacts associated with Federal actions. Section 101 of NEPA requires the federal government to use all practicable means to create and maintain conditions under which man and nature can exist in productive harmony.
- PL 89-665, Historic Preservation Act of 1966. - This act provides for: (1) an expanded National Register of significant sites and objects; (2) matching grants to states undertaking historic and archeological resource inventories; and (3) a program of grants in aid to the National Trust for Historic Preservation; and (4) the establishment of an Advisory Council on Historic Preservation. Section 106 requires that the President’s Advisory Council on Historic Preservation have an opportunity to comment on any undertaking which adversely affects properties listed, nominated, or considered important enough to be included on the National Register of Historic Places.
- PL 91-611, The Flood Control Act of 1970. - This act authorizes the project and establishes the requirement (Section 122) for evaluating the economic, social, and environmental impact of projects.
- PL 92-347, Golden Eagle Passbook and Special Recreation User Fees. - This act revises Public Law 88-578, the Public Land and Water Conservation Act of 1965, to require Federal agencies to collect special recreation user fees for the use of specialized sites developed at Federal expense and to prohibit the USACE from collecting entrance fees to projects.
- PL 92-500, Federal Water Pollution Control Act Amendments of 1972. - The Federal Water Pollution Control Act of 1948 (PL 845, 80th Congress), as amended in 1956, 1961, 1965 and 1970 (PL 91- 224), established the basic tenet of uniform State standards for water quality. Public Law 92-500 strongly affirms the Federal interest in this area. "The objective of this act

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

- PL 92-516, Federal Environmental Pesticide Control Act of 1972. - This act completely revises the Federal Insecticide, Fungicide and Rodenticide Act. It provides for complete regulation of pesticides to include regulation, restrictions on use, actions within a single State, and strengthened enforcement.
- PL 93-205, Conservation, Protection, and Propagation of Endangered Species Act of 1973, as amended. - This law repeals the Endangered Species Conservation Act of 1969. It also directs all Federal departments/agencies to carry out programs to conserve endangered and threatened species of fish, wildlife, and plants and to preserve the habitat of these species in consultation with the Secretary of the Interior. This act establishes a procedure for coordination, assessment, and consultation. This act was amended by Public Law 96-159.
- PL 93-251, Water Resources Development Act of 1974. - Section 107 of this law establishes a broad Federal policy which makes it possible to participate with local governmental entities in the costs of sewage treatment plant installations.
- PL 93-291, Archeological Conservation Act of 1974. - The Secretary of the Interior shall coordinate all Federal survey and recovery activities authorized under this expansion of the 1960 act. The Federal Construction agency may transfer up to one percent of project funds to the Secretary with such transferred funds considered non-reimbursable project costs.
- PL 93-303, Recreation Use Fees. - This act amends Section 4 of the Land and Water Conservation Act of 1965, as amended, to establish less restricted criteria under which Federal agencies may charge fees for the use of campgrounds developed and operated at Federal areas under their control.
- PL 93-523, Safe Drinking Water Act. - The act assures that water supply systems serving the public meet minimum national standards for protection of public health. The act (1) authorizes the Environmental Protection Agency to establish Federal standards for protection from all harmful contaminants, which standards would be applicable to all public water systems, and (2) establishes a joint Federal-State system for assuring compliance with these standards and for protecting underground sources of drinking water.
- PL 93-81, Collection of Fees for Use of Certain Outdoor Recreation Facilities. - This act amends Section 4 of the Land and Water Conservation Act of 1965, as amended to require each Federal agency to collect special recreation use fees for the use of sites, facilities, equipment, or services furnished at Federal expense.
- PL 94-422, Amendment of the Land and Water Conservation Fund Act of 1965. - This act expands the role of the Advisory Council. Title 2 - Section 102a amends Section 106 of the Historical Preservation Act of 1966 to say that the Council can comment on activities which will have an adverse

effect on sites either included in or eligible for inclusion in the National Register of Historic Places.

- PL 95-217, Clean Water Act of 1977, as amended. - This act amends the Federal Water Pollution Control Act of 1970 and extends the appropriations authorization. The Clean Water Act is a comprehensive Federal water pollution control program that has as its primary goal the reduction and control of the discharge of pollutants into the nation's navigable waters. The Clean Water Act of 1977 has been amended by the Water Quality Act of 1987, Public Law 100-4.
- PL 95-341, American Indian Religious Freedom Act of 1978. - The act protects the rights of Native Americans to exercise their traditional religions by ensuring access to sites, use and possession of sacred objections, and the freedom to worship through ceremonials and traditional rites.
- PL 95-632, Endangered Species Act Amendments of 1978. - This law amends the Endangered Species Act Amendments of 1973. Section 7 directs agencies to conduct a biological assessment to identify threatened or endangered species that may be present in the area of any proposed project. This assessment is conducted as part of a Federal agency's compliance with the requirements of Section 102 of NEPA.
- PL 96-95, Archeological Resources Protection Act of 1979. - This act protects archeological resources and sites that are on public and tribal lands and fosters increased cooperation and exchange of information between governmental authorities, the professional archeological community, and private individuals. It also establishes requirements for issuance of permits by the Federal land managers to excavate or remove any archeological resource located on public or Indian lands.
- PL 98-63, Supplemental Appropriations Act of 1983. - This act authorized the USACE Volunteer Program. The United States Army Chief of Engineers may accept the services of volunteers and provide for their incidental expenses to carry out any activity of the USACE, except policymaking or law or regulatory enforcement.
- PL 99-662, The Water Resources Development Act (WRDA) 1986. - This act provides for the conservation and development of water and related resources and the improvement and rehabilitation of the Nation's water resources infrastructure and establishes new requirements for cost sharing.
- PL101-233, North American Wetland Conservation Act (13 Dec 1989). - This act directs the conservation of North American wetland ecosystems and requires agencies to manage their lands for wetland/waterfowl purposes to the extent consistent with missions.
- PL101-336, Americans with Disabilities Act of 1990 (ADA), 26 July 1990, as amended by the ADA Amendments Act of 2008 (PL110-325). - This law prohibits discrimination based on disabilities in, among others, the area of public accommodations and requires reasonable accommodations for persons with disabilities.

- PL 101-601, Native American Graves Protection and Repatriation Act (16 November 1990). - This Act requires Federal agencies to return Native American human remains and cultural items, including funerary objects and sacred objects, to their respective peoples.
- PL 102-580, Water Resources Development Act (WRDA) of 1992 (31 Oct 1992). - This act authorizes the USACE to accept contributions of funds, materials and services from non-Federal public and private entities to be used for managing recreational sites and facilities and natural resources.
- PL 103-66 Omnibus Reconciliation Act-Day use fees (10 Aug 1993). - This authorizes the USACE to collect fees for the use of developed recreational sites and facilities, including campsites, swimming beaches and boat ramps.
- PL 104-303, WRDA 1996. - Authorizes recreation and fish and wildlife mitigation as purposes of a project, to the extent that the additional purposes do not adversely affect flood control, power generation, or other authorized purposes of a project.
- PL 104-333, Omnibus Parks and Public Lands Management Act of 1996, (12 Nov 1996). - This act created an advisory commission to review the current and anticipated demand for recreational opportunities at lakes or reservoirs managed by the Federal Government and to develop alternatives to enhance such opportunities for such use by the public.
- PL106-147, Neo-tropical Migratory Bird Conservation Act (20 July 2000). - This act promotes the conservation of habitat for neo-tropical migratory birds.

CHAPTER 3 – RESOURCE GOALS AND OBJECTIVES

3.1. INTRODUCTION

This chapter sets forth goals and objectives necessary to achieve the USACE vision for the future of Grapevine Lake. The terms “goal” and “objective” are often defined as synonymous, but in the context of this Master Plan goals express the overall desired end state of the Master Plan whereas resource objectives are specific task-oriented actions necessary to achieve the overall Master Plan goals.

3.2. RESOURCE GOALS

The following goals are the priorities for consideration when determining management objectives and development activities. Implementation of these goals is based upon time, manpower, and budget. The objectives provided in this chapter are established to provide high levels of stewardship to USACE managed lands and resources while still providing a high level of public service. These goals will be pursued through the use of a variety of mechanisms such as: assistance from volunteer efforts, hired labor, contract labor, permit conditions, remediation, and special lease conditions. It is the intention of Grapevine Lake staff to provide a realistic approach to the management of all resources. The following statements, based on EP 1130-2-550, Chapter 3, express the goals for the Grapevine Lake Master Plan:

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

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

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

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

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

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

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

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

3.3. RESOURCE OBJECTIVES

Resource objectives are clearly written statements that respond to identified issues and that specify measurable and attainable activities for resource development and/or management of the lands and waters under the jurisdiction of the Fort Worth District, Grapevine Lake Project Office. The objectives stated in this Master Plan support the goals of the Master Plan, USACE Environmental Operating Principles (EOPs), and applicable national performance measures. They are consistent with authorized project purposes, Federal laws and directives, regional needs, resource capabilities, and they consider public input. Recreational and natural resources carrying capacities are also accounted for during development of the objectives found in this Master Plan. Regional and State planning documents including TPWD's 2012 Texas Conservation Action Plan (TCAP) and TORP are monitored for applicability to Grapevine Lake. Finally, these objectives are consistent with the management objectives of local cities within the distinct parcels of USACE land they manage under lease agreements with USACE.

The objectives in this master plan provide project benefits, meet public needs, and foster environmental sustainability for Grapevine Lake to the greatest extent possible. Implementation of the objectives will require close coordination between TPWD and the USACE and are dependent upon available funds. Table 3.1 through Table 3.5 lists the objectives for the following objective categories: recreational objectives; natural resource management objectives; visitor information, education, and outreach objectives; general management objectives; and cultural resource management objectives.

Table 3.1 Recreational Objectives

Recreational Objectives	Goals				
	A	B	C	D	E
In cooperation with TPWD and local stakeholders, evaluate the demand for improved recreation facilities and increased public access on USACE-administered public lands and water for recreational activities (i.e., camping, walking, hiking, biking, boating, fishing, wildlife viewing, etc.) and facilities (i.e., campsites, picnic facilities, overlooks, all types of trails, boat ramps, courtesy docks, interpretive signs/exhibits, and parking lots).	*		*		
Monitor the condition and quality of day use and campground facilities within the USACE as well as leased areas including, but not limited to roads, sewer hook ups, potable water systems, electrical service, concrete or asphalt recreational vehicle pads, tent pads, restrooms, trails, pavilions, and park entrances.	*		*		
Monitor public use levels (with a special focus on boating congestion and marina capacity) and evaluate potential impacts from overuse and crowding. Take action to prevent/remediate overuse, conflict, and public safety concerns.	*		*		
Evaluate water surface classification and regulations with emphasis on designated quiet water or no-wake areas, natural resource protection, quality recreational opportunities, and public safety concerns.	*				
Follow the Environmental Operating Principles associated with recreational use of waterways for all water-based management activities and plans.		*	*		*
Encourage lessees to increase universally accessible facilities on Grapevine Lake.	*		*		*
Consider flood/conservation pool elevations to address potential impact to recreational facilities (i.e., campsites, boat ramps, courtesy docks, etc.).	*	*	*	*	
Ensure consistency with USACE NRM Strategic Plan.					*
Monitor the TCAP, the TORP, and adjacent municipality plans to ensure that USACE is responsive to outdoor recreation trends, public needs and resource protection within a regional framework. All plans by others will be evaluated in light of USACE policy and operational aspects of Grapevine Lake.	*	*	*		*
Continue working with the city of Trophy Club to manage the off-highway vehicle (OHV) area to ensure it continues to comply with ER-550.	*	*	*		*

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

Table 3.2 Natural Resource Management Objectives

Natural Resource Management Objectives	Goals:				
	A	B	C	D	E
Consider flood/conservation pool levels to ensure that natural resources are managed in ways that are compatible with primary project purposes of flood risk management and water supply.	*	*		*	
Coordinate with stakeholders to ensure project lands are managed with preservation and conservation of natural habitat and open space as a primary objective in order to maintain availability of public open space.	*			*	
Actively manage and conserve fish and wildlife resources, especially migratory, Partners in Flight species, native prairies, Cross Timbers, and other special status species, by implementing ecosystem management principles. Key among these principles is the use of native species adapted to the ecological region in restoration and mitigation plans.	*	*		*	*
Consider watershed approach during decision-making process.					*
Optimize resources, labor, funds, and partnerships for protection and restoration of fish and wildlife habitats.		*			*
Minimize activities that disturb the scenic beauty and aesthetics of the lake.	*	*	*	*	
Continually evaluate erosion control and sedimentation issues at Grapevine Lake and develop alternatives to resolve the issues.	*	*			*
Address unauthorized uses of public lands such as off-highway vehicle (OHV) use, trash dumping, unauthorized fires, fireworks, poaching, clearing of vegetation, unauthorized trails and paths, and placement of advertising signs that create negative environmental impacts.	*	*	*	*	*
Monitor lands and waters for invasive, non-native, and aggressively spreading native species and take action to prevent and/or reduce the spread of these species. Implement prescribed fire as a management tool to control the spread of noxious and invasive plants and to promote the vigor of native prairie grasses and forbs.	*	*		*	*
Protect and/or restore important native habitats such as riparian zones, wetlands, Cross Timbers upland habitats, and native prairie where they occur, or historically occurred on project lands. Special emphasis should be taken to protect and/or restore special or rare plant communities like Cross Timbers forested areas, to include actions that promote butterfly and/or pollinator habitat, migratory bird habitat, and habitat for birds listed by USFWS as Birds of Conservation Concerns and Partners in Flight species.	*	*	*	*	*
Administer the Shoreline Management Program to balance private shoreline uses (such as mowing or vegetation removal requests along the Federal property boundary, or	*		*		

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

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

Table 3.3 Visitor Information, Education, and Outreach Objectives

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

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

Table 3.4 General Management Objectives

General Management Objectives	Goals:				
	A	B	C	D	E
Maintain the USACE boundary line to ensure it is clearly marked and recognizable in all areas to reduce habitat degradation and encroachment actions.	*	*		*	
Secure sustainable funding for the shoreline management program.	*	*	*	*	*
In cooperation with all stakeholders; ensure green design, construction, and operation practices, such as the Leadership in Energy and Environmental Design (LEED) criteria for government facilities, are considered as well as applicable Executive Orders.					*
Carefully manage non-recreation outgrants such as utility and road easements in accordance with national guidance set forth in ER-1130-2-550 and applicable chapters in ER 405-1-12.	*	*			*
Manage project lands and recreational programs to advance broad national climate change mitigation goals, including but not limited to climate change resilience and carbon sequestration, as set forth in USACE policy.					*
The USACE will continue to monitor both current and projected climate change impacts to operations and the authorized project purposes within USACE federal fee boundary and react through adaptation and resiliency projects, as funding becomes available.	*	*	*		*

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

Table 3.5 Cultural Resources Management Objectives

Cultural Resources Management Objectives	Goals:				
	A	B	C	D	E
Monitor and coordinate lake development and the protection of cultural with lessees and appropriate entities.	*	*		*	*
Increase public awareness and education of regional history.		*		*	*
The project office will ensure any future historical preservation is fully integrated into the Grapevine Lake Master Plan and the planning decision making process (Section 106 and 110 of the National Historic Preservation Act) on public lands surrounding the lake.		*		*	*
Develop partnerships that promote and protect cultural resources at Grapevine Lake.		*	*	*	*
Stop unauthorized use of public lands as it pertains to the illegal excavation and removal of cultural resources.		*		*	*
Complete an inventory of cultural and historic resources and request funding for a Cultural Resources Management Plan (CRMP).	*	*		*	*

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

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

4.1. LAND ALLOCATION

All lands at USACE water resource development projects are allocated by USACE into one of four categories in accordance with the congressionally authorized purpose for which the project lands were acquired: Operations, Recreation, Fish and Wildlife, and Mitigation. At Grapevine Lake, the only land allocation category that applies is Operations, which is defined as those lands that are required to operate the project for the primary authorized purposes of flood risk management, hydroelectric power, and water conservation. The remaining allocations of Recreation, Fish and Wildlife, and Mitigation would apply only if lands had been acquired specifically for these purposes. The entire fee simple federal estate at Grapevine Lake is 15,685 acres, of which 6,943 acres is inundated at conservation pool.

4.2. LAND CLASSIFICATION

The previous version of the Grapevine Lake Master Plan included some land classification criteria that were similar to the current criteria. These prior land classifications were based on predicted projected need rather than actual experience, which resulted in some areas being classified for a type of use that has not or is not likely to occur. Additionally, in the 51 years since the previous Master Plan was published, wildlife habitat values, surrounding land use, and regional recreation trends have changed giving rise to the need for revised classifications. Refer to Table 8.1 in Chapter 8 for a summary of land classification changes from the prior classifications to the current classifications. The following are the previous land classifications as designated and defined in the 1971 Master Plan and 2001 Supplement:

- **Recreational Areas:** Areas under constant intense use with a variety of activities and development.
- **Aesthetics Areas and Multiple Use Recreation Areas:** Natural areas under vegetative and wildlife management; recreation activities that do not require support facilities.
- **Special Use Areas:** Areas set aside for the people with disabilities and special youth groups to be used on a reservation basis; administered by local nonprofit groups.
- **Wildlife Areas:** Wildlife and waterfowl in this area are free from human threat since hunting is permitted. This area is accessible only by trails and boats.
- **Flowage Easement:** These areas provide for periodic inundation by lake waters and are not owned or managed by USACE. Buildings for human habitation will not be constructed on these lands.

4.2.1. Current Land and Water Surface Classifications

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

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

The revised land and water surface classifications for Grapevine Lake were established after considering public comments, key stakeholder's input including elected officials, city and county governments, lessees operating on USACE land, and USACE expert assessments. Additionally, wildlife habitat values and the trends analysis provided in TPWD's TORP and 2012 TCAP were used in decision making. Maps showing the various land classifications can be found in Appendix A. Each of the land classifications, including the acreage and description of allowable uses, is described in the following paragraphs.

4.2.2. Project Operations

This classification includes the lands managed for operation of the dam, project office, and maintenance yards, all of which must be maintained to carry out the authorized purpose of flood risk management. In addition to the operational activities taking place on these lands, limited recreational use may be allowed for activities such as public access to the road on top of the dam. Regardless of any limited recreation use allowed on these lands, the primary classification of Project Operations will take precedent over other uses. There are 196 acres of Project Operations land specifically managed for this purpose.

4.2.3. High Density Recreation (HDR)

These are lands developed for intensive recreational activities for the visiting public including day use areas, campgrounds, marinas, and related concession areas. Recreation development by lessees operating on USACE lands must follow policy

guidance contained in USACE regulations at ER 1130-2-550, Chapter 16. That policy includes the following statement:

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

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

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

At Grapevine Lake, prior land classifications included a number of areas under the recreation classification. Several of these areas, including Murrell Park, Trophy Club Park, Twin Coves Park, Silverlake Park, Meadowmere Park, Oak Grove Park, The Vineyards Campground, Rockledge, and Marshal Creek Park. Using public, agency, and lessee input, the planning team revised the classification of some of these lands to reflect current and projected outdoor recreation needs and trends. At Grapevine Lake there are 2,597 acres classified as High Density Recreation land. Each of the High Density Recreation areas is described briefly in Chapter 5 of this Plan.

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

4.2.4. Mitigation

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

4.2.5. Environmentally Sensitive Areas (ESA)

These are areas where scientific, ecological, cultural, and aesthetic features have been identified. At Grapevine Lake several distinct areas have been classified as Environmentally Sensitive Areas (ESA), primarily for the protection of sensitive habitats or cultural resources. Each of these areas is discussed in Chapter 5 of this Plan and illustrated on the maps in Appendix A. There are 4,481 acres classified as ESA at Grapevine Lake.

4.2.6. Multiple Resource Management Lands (MRML)

This classification is divided into four sub-classifications identified as: Low Density Recreation, Wildlife Management, Vegetative Management, and Future/Inactive Recreation Areas. Typically, Multiple Resource Management Lands support only passive, non-intrusive uses with very limited facilities or infrastructure. Where needed, some areas may require basic facilities that include, but are not limited to minimal parking space, a small boat ramp, and/or primitive sanitary facilities. There are 1,470 acres of land under this classification at Grapevine Lake. The following paragraphs list each of the sub-classifications, and the number of acres and primary uses of each.

Low Density Recreation (LDR)

These are lands that may support passive public recreational use (e.g., fishing, hunting, wildlife viewing, natural surface trails, hiking, etc.). Under prior land classifications, numerous areas were classified to support “low use” recreation and wildlife management. The planning process resulted in most of these areas being reclassified as either LDR or Wildlife Management. In general, the relatively narrow tracts that have shoreline along the main body of the lake and are located immediately adjacent to residential areas have been reclassified as LDR. There are 211 acres under this classification at Grapevine Lake.

Wildlife Management (WM)

This land classification applies to lands managed primarily for the conservation of fish and wildlife habitat. These lands generally include comparatively large contiguous parcels, most of which are located within the flood pool of the lake. Passive recreation uses such as natural surface trails, fishing, hunting, and wildlife observation are compatible with this classification unless restrictions are necessary to protect sensitive species or to promote public safety. There are 1,259 acres of land included in this classification at Grapevine Lake.

Vegetative Management (VM)

These are lands designated for stewardship of forest, prairie, and other native vegetative cover. Passive recreation activities previously described may be allowed in these areas. There are no acres of land included in this classification at Grapevine Lake.

Future or Inactive Recreation

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

4.2.7. Water Surface

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

Restricted.

Restricted water surface includes those areas where recreational boating is prohibited or restricted for project operations, safety, and security purposes. The areas include the water surface immediately surrounding the gate control tower upstream of the Grapevine Lake Dam as well as around the water intake towers and three designated swim beaches at Grapevine Lake parks. There are 29 acres of restricted water surface at Grapevine Lake.

Designated No-Wake

Designated No-Wake areas are intended to protect environmentally sensitive shorelines and improve boating safety near key recreational water access areas such as boat ramps. There are seven boat ramps and one marina at Grapevine Lake where no-wake restrictions are in place for reasons of public safety and protection of property. There are 693 acres of designated no-wake water surface at Grapevine Lake.

Fish and Wildlife Sanctuary

This water surface classification applies to areas with annual or seasonal restrictions to protect fish and wildlife species during periods of migration, resting, feeding, nesting, and/or spawning. Grapevine Lake has no water surface areas designated as a Fish and Wildlife Sanctuary.

Open Recreation

Open Recreation includes all water surface areas available for year-round or seasonal water-based recreational use. This classification encompasses the majority of the lake water surface and is open to general recreational boating. Boaters are advised through maps and brochures, or signs at boat ramps and marinas, that navigational hazards may be present at any time and at any location in these areas. Operation of a boat in these areas is at the owner's risk. Specific navigational hazards may or may not be marked with a buoy. There are 6,221 acres of open recreation water surface at Grapevine Lake.

4.3. PROJECT EASEMENT LANDS

Project Easement Lands are primarily lands on which easement interests were acquired. Fee title was not acquired on these lands, but the easement interests convey to the Federal government certain rights to use and/or restrict the use of the land for specific purposes. Easement lands are typically classified as Operations Easement, Flowage Easement, and/or Conservation Easement. Flowage easement lands are the only easements that exist at Grapevine Lake. A flowage easement, in general, grants to the government the perpetual right to temporarily flood/inundate private land during flood risk management operations and to prohibit activities on the flowage easement that would interfere with flood risk management operations such as placement of fill material or construction of habitable structures. There are 2,163 acres of flowage easements lands at Grapevine Lake.

CHAPTER 5 – RESOURCE PLAN

5.1. RESOURCE PLAN OVERVIEW

This chapter describes in broad terms how each land classification within the Master Plan will be managed. The classifications that exist at Grapevine Lake are Project Operations (PO), High Density Recreation (HDR), Environmentally Sensitive Area (ESA), and Multiple Resource Management Lands (MRML) on which a predominant use is specified including Low Density Recreation (LDR) and Wildlife Management (WM). The water surface is also classified into sub-classifications of Restricted, Designated No Wake, and Open Recreation. The management plans describe how the project lands and water surface will be managed in broad terms. A more descriptive plan for managing these lands can be found in the Grapevine Lake Operations Management Plan (OMP). Acreages shown for the various land classifications were calculated using satellite imagery and GIS technology and may not agree with lease documents, prior publications, or official land acquisition records.

5.2. PROJECT OPERATIONS

The Project Operations (PO) classification is land associated with the dam, spillway, levees, project office, maintenance facilities, and other areas managed solely for the operation and fulfillment of the primary mission of the project. There are 196 acres of lands under this classification, which are managed by the USACE. The management plan for this area is to continue providing physical security necessary to ensure sustained operations of the dam and related facilities including restricting public access in hazardous locations near the dam and spillway.

5.3. HIGH DENSITY RECREATION

Grapevine Lake has 2,597 acres classified as High Density Recreation. These lands are developed for intensive recreational activities for the visiting public including day use areas and campgrounds. National USACE policy set forth in ER 1130-2-550, Chapter 16, limits recreation development on USACE lands to those activities that are dependent on a project's natural resources and typically include water-based activities, overnight use, and day use such as marinas, campgrounds, picnic areas, trails, swimming beaches, boat launching ramps and comprehensive resorts. Examples of activities that are not dependent on a project's natural resources include theme parks or ride-type attractions, sports or concert stadiums, and stand-alone facilities such as restaurants, bars, motels, hotels, and golf courses. The following sections describe areas designated as High Density Recreation at Grapevine Lake.

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

leases recreation areas to the Town of Flower Mound, Marinas International, City of Grapevine, Town of Trophy Club, and City of Southlake. Following is a brief description of these parks and notes the recreational partners who manage them.

5.3.1. Parks Operated by USACE

Murrell Park – A day use park located on the north shore of Grapevine Lake and next to the city of Flower Mound, Murrell Park offers day use facilities with restrooms, and boat ramps. Murrell Park also offers picnic tables with fire rings, grills, and tables. Trail users can access the Northshore Trail from the park at the trailhead near the marina. Primitive camping is available year-round, with water and restrooms but no shower facilities. Murrell Park offers good shoreline access for fishermen. Twin Coves Marina operated under a lease is also located in the park.

The management plan is to provide a quality outdoor recreation experience which includes an accessible, safe, and healthful environment for a diverse population and to increase the level of self-sufficiency for the USACE recreation program. While also providing outdoor recreation opportunities on USACE administered land and water on a sustained basis and to optimize the use of leveraged resources to maintain and provide quality experiences at USACE water resource projects.

Northshore Park – Northshore Park is located on the north shore of Grapevine Lake adjacent to US 377 and contains access points for hiking and biking trails within the Knob Hills Trail hike and bike system. The management plan for Northshore Park is to continue to operate day use areas and access points by maintaining and improving existing facilities. Emphasis will be placed on eroding or degrading trails and making other improvements to trails and trailheads as resources allow.

Knob Hills Park – Located to the northwest of Grapevine Lake to the north of Denton Creek and just east of US 377 lies Knob Hills Park day use area which contains a trailhead for hiking and biking along Knob Hills Trail, along with equestrian access to Cross Timbers Horse trail. The parking lot and trailhead is leased and managed by the Town of Flower Mound and the rest of the park is managed by the USACE. The management plan for Northshore Park is to continue to operate day use areas working with the Town of Flower Mound on maintenance and access. Emphasis will be placed on eroding or degrading trails and making other improvements to trails and trailheads as resources allow.

Roanoke Park – Roanoke Park is an undeveloped park managed by the USACE. It is located south of Denton Creek and adjacent to US 377 in Roanoke. Future management plans include building a parking lot for access as resources allow.

Rocky Point Park – Rocky Point Park is an undeveloped day use area managed by the USACE. There are trails running through the park but no trailhead. There are no plans to develop the park.

5.3.2. Parks and/or Recreation Areas Operated by Others through Lease Agreements

Recreational outgrants are issued in the form of permits or leases to recreational partners, referred to as grantees, at the lake. Each grantee is responsible for the operation and maintenance of their leased area, and although USACE does not provide direct maintenance within any of the leased locations, it may occasionally lend support where appropriate. The USACE reviews requests and ensures compliance with applicable laws and regulations for proposed activities in all leased HDR areas. USACE works with partners to ensure that recreation areas are managed and operated in accordance with the objectives prescribed in Chapter 3 of this Plan. The following is a description of each leased park.

Twin Coves Park – Located on the north shore of Grapevine Lake, to the northwest of Murrell Park, and next to the city of Flower Mound, lies Twin Coves Park. Twin Coves provides a boat ramp, courtesy dock, cabins, RV sites, primitive campsites, game and sports fields and courts, playground, restrooms, and access to the Northshore Trail. Future Management of Twin Coves Park is managed by the Town of Flower Mound.

Meadowmere Park – Located on the south shore of Grapevine Lake next to the cities of Grapevine and Southlake, Meadowmere park provides a mixed use of recreational facilities and connections to popular trails. Some of the facilities include restrooms, ball fields, boat ramps, courtesy dock, swimming beach, floating aqua park, primitive campsites, day use, picnic tables, group pavilion, playground, and trail access. Meadowmere Park is leased and managed by the City of Grapevine.

Paradise Cove – Paradise Cove is located within Meadowmere Park on the south shore of Grapevine Lake west of Meadowmere Park and adjacent to the City of Grapevine. Paradise Cove is a day use area with event center operated as a lease by Scott's Expansion #1, LTD. The lease is within a larger area of Meadowmere Park leased and managed by the City of Grapevine.

Oak Grove Park – Oak Grove Park is located on the south shore of Grapevine Lake next to the city of Grapevine and between Meadowmere Park and The Vineyards. Oak Grove Park contains a ballfield complex with baseball, softball, and soccer fields. It also contains other popular facilities including picnic sites, a boat ramp, trails, workout station, playground, group pavilion, as well as Scott's Landing Marina via a lease. Oak Grove Park is leased and managed by the City of Grapevine.

Lakeview Park – Located within Oak Grove Park on the south shore between Meadowmere Park and Oak Grove Park lies Lakeview Park, adjacent to the City of Grapevine. Lakeview Park is a day use area with restrooms, picnic tables, playgrounds, paddling trail, hike/bike trail, pavilion, and boat ramps and is leased and managed by the City of Grapevine.

McPherson Slough Park – Located on the south shore of Grapevine Lake adjacent to Oak Grove Park and the City of Grapevine lies McPherson Slough Park and contains a day use area with picnic tables, trails, fishing pier, and boat ramp. McPherson Slough Park is leased and Managed by the City of Grapevine.

Rockledge Park – Located on the north shore of Grapevine Lake immediately northwest of the dam and spillway and adjacent to the town of Flower Mound is Rockledge Park. Popular facilities at Rockledge Park include day use, group pavilion, the Northshore Trail trailhead, restrooms, playground, general store, and popular views from the rocky bluffs above the lake. Rockledge Park is leased and managed by the City of Grapevine.

Marshall Creek Park – Marshall Creek Park is located at the northwest end of Grapevine Lake next to the Town of Trophy Club. Marshall Creek Park is known locally as Trophy Club Park and contains a variety of popular amenities including off-road vehicle trails, hiking trails, disc golf, day use, boat ramp, and restrooms. Marshall Creek Park is leased and managed by the Town of Trophy Club.

Radio Controlled (RC) Flying Field – The RC Flying Field is located on the south shore of Grapevine Lake south of Meadowmere Park and adjacent to the City of Grapevine. The RC Flying Field is leased and managed by 114th RC Aero Squadron.

Walnut Grove Park – Located on the south shore of Grapevine Lake to the northwest of Meadowmere Park and adjacent to the Cities of Southlake and Trophy Club lies Walnut Grove Park. Known locally as Bob Jones Nature Center and Preserve, Walnut Grove Park contains hiking and equestrian trails with multiple trailheads and is contiguous with additional park space outside of USACE property. Walnut Grove Park is leased and managed by the City of Southlake.

Twin Coves Park – Located on the north shore near the center of the lake lies Twin Coves Park and Campground. Twin Coves Park is a mixed-use park with restrooms, picnic tables, pavilion, trails, RV sites, cabins, primitive camping, disc golf, kayak rental, and boat ramp. Twin Coves Park is leased and managed by the Town of Flower Mound.

The Vineyards – Located within Silver Lake Park on the south shore of Grapevine Lake and across the cove from Scott's Landing Marina and Oak Grove Park is The Vineyards (also known as The Vineyards Campgrounds & Cabins). The Vineyards provides RV sites, cabins, campsites, picnic facilities, restrooms, nature trail, swimming beach, boat ramp, and fishing access. The Vineyards Campground is leased and managed by the City of Grapevine.

Katie's Woods Park – Katie's Woods Park is located within Silver Lake Park on the south shore of Grapevine Lake adjacent to the city of Grapevine and the Gaylord Texan Resort & Convention Center off USACE property and to the northwest of Silver Lake Marina. Katie's Woods contains day use facilities with picnic tables, restrooms,

courtesy docks, hiking and biking trails, and a boat ramp. Katie's Woods Park is leased and managed by the City of Grapevine.

Dallas Park Cities Lions Club – Located on the northwest end of Grapevine Lake within Walnut Grove Park lies the Dallas Park Cities Lions Club. The club is for organization group activities and is leased and managed by the Dallas Park Cities Lions Club.

Helping Inner-city Kids In Danger (HIKIDS) – Located within Rocky Point Park, HIKIDS leases an area to help inner-city, at-risk kids learn about nature. The area is leased and managed by HIKIDS.

Grapevine Municipal Golf Course – Located just below the dam and to the east of Grapevine Lake, Grapevine Municipal Golf Course provides a golf course and related facilities. The Grapevine Municipal Golf Course is leased and managed by City of Grapevine.

Cowboys Golf Club – Cowboy Golf Club is located to the southeast of the lake and between the dam and USACE Lake Office. Cowboy Golf Club contains golf course and related facilities as well as a clubhouse. The Cowboys Golf Club is subleased and managed by CF Cowboys Arcis LLC as part of a larger lease from the City of Grapevine.

5.3.3. Boat Ramps and Marinas

There is one (1) two lane boat ramp operated by USACE at Grapevine Lake, and twelve (12) other boat ramps operated by others that provide recreational access to the lake. Grapevine Lake has three (3) marinas operated by lease entities. These have varying hours of operation and have a fee associated with their use. Ramps may be closed from time to time due to flooding or other damage. The maps in Appendix A of this Plan indicate the location of these ramps. Currently, there are no plans to expand or add additional boat ramps at Grapevine Lake. Management of USACE operated facilities will include maintaining and improving facilities as time and funding permits. Future management of leased facilities will be by the grantee with coordination and approved by the USACE.

Twin Coves Marina – Located on the Northwest end of Grapevine Lake and surrounded by Murrell Park. Twin Coves Marina offers wet and dry storage, full-service fuel dock and pump-out, private boat ramp, Rockin' S Bar and Grill, and The Buoys on the Lake Store. The marina is operated under a lease with Scott's Marinas at Grapevine Lake, LTD.

Silver Lake Park and Marina – Silver Lake Marina is located at the southeast corner of Grapevine Lake, between the USACE Lake Office and the Dam, and across the cove from the Gaylord Texan Convention Center Resort and Hotel. Silver Lake Marina offers picnic facilities, restrooms, boat ramp, fishing access, wet slips, dry

storage, boat rentals and charters, boat refueling, and a waterside restaurant. It is leased and managed by Scott's Marinas at Grapevine Lake, LTD.

Scotts Landing Marina – Located on the south side of Grapevine Lake in Oak Grove Park, the marina amenities include wet and dry storage options, a private boat ramp, member's restroom and shower facilities, full-service fuel dock and pump out station, and Big Daddy's Ship Store.

5.3.4. Trails

C. Shane Wilbanks Trail – At 3.19 miles, the C. Shane Wilbanks Trail is one of the longer trails in the Grapevine Trail system, connecting Dove Road to Oak Grove Park. To gain more distance, the trail can be combined with nearby Oak Grove Trail. Meandering through Oak Grove Park, McPherson Slough, and the Horseshoe Trail system; users will enjoy scenic lake views, nice bridges, and areas of natural beauty.

Cross Timbers Trail – Located at the northwest end of Grapevine Lake, the Cross Timbers Trail is 3.5 miles long with a side loop that is about 1.5 miles long. The trail allows both horses and hikers. The trailhead starts at a small section of trail that is shared with mountain bikers before the two trail systems split to their own sections. The trail is a generally easy trail with two small open bridge crossings at the beginning. Users should exercise caution when crossing the bridges. In this section of the lake, floods can occur easily, so conditions change frequently. The footing is mostly sandy with some rocky areas along the way. This trail has some water access, but users should watch for boggy areas along the edge of the lake.

Horseshoe Trails – To the west of Oak Grove Park, Horseshoe Trail is an old trail system on the south shore of Grapevine Lake that provides intermediate trail with enough elevation change over rocks and roots to keep its roughly 5.6 miles fun and interesting. While most of the trail is ride-able by any skill set, there are a couple brief steep, rocky challenges.

Katie's Woods Trails – Located in Katie's Woods Park, the Katie's Woods Trails are a favorites of dog walkers, hikers, bike riders, naturalist, and more. These trails loop shore-side and woods-side, providing stunning lake views, excellent fishing hole access, and the best fall butterfly watching available in the region. The 2.1-mile natural surface trail is both hike and bike friendly.

Knob Hills Trail – Located north of Denton Creek near its intersection with US 377, Knob Hills Trail offers the intermediate rider a little bit of everything North Texas has to offer. All single track, loose rock, fixed rock, hard pack, a few roots, punchy technical climbs and descends, roller coasters, slower tight switchbacks, flat out fast XC runs, etc. It's one of the long rides in the area. It's a six stacked loop design, with difficulty increasing slightly the further out you go. It offers a mix of tree cover and open sky. Ample parking is available at the west end trail head.

Lakeview Trails – Lakeview Park’s trail system is expansive, both in size and diversity. Not five feet through the trailhead at Lakeview Park you are offered your first choice of experience: left through the post oak hills, straight to the red clay plateau, or right to the prairie grasslands along the lake shore. The pristine, shoreside hills of Lakeview Trails are a treasure of native biodiversity on the lake, guaranteed to satisfy any nature-seeking impulse that drives users to the lake.

Meadowmere Park Trail – Meadowmere Park Trail winds through the wild landscape of one of Grapevine Lake’s undisturbed coves. Composed of reclaimed asphalt millings, this trail provides an excellent alternative for runners wanting to give their knees a break from ponding the concrete and is stable enough for bikes to carve turns without feeling skid-out.

North Shore Trail – Located along the north shoreline of Grapevine Lake, the North Shore Trail is one of the most well-known and most-used trails in the entire metroplex. The eastern-most trailhead is in Rockledge Park, and the western-most trailhead is along Twin Coves Park Road with several other trailheads between. The trail is an old motocross trail that is one-way going counterclockwise. The trail runs between Rockledge Park and Murrell Park, then west to Twin Coves Park on the north shoreline providing a total of 22.5 miles of multi-terrain, multi-skill level trail. The East side loops 1-4 are good for intermediate rides while the West side loops 5-7 are considerably more technical. There are several “rock gardens” on this side, very technical to ride through. An average of 800 bikers visits per week.

Oak Grove Trail – Oak Grove Trail offers a large workout station covered with shade trees along the trail. The Oak Grove Trail allows the user to stay off Oak Grove Loop. The workout station allows the user a fantastic place to warm up or cool down after a jog or bike ride on the trail. The trail combines with C. Shane Wilbanks if the extra distance is desired. The trail is paved and runs 1.3 miles and is connected to the C. Shane Wilbanks and Dove Loop Trails.

Rocky Point Trail – Located along Rocky Creek Cove on the north shore of Grapevine Lake, Rocky Point Trail provides 4.8 miles of trail used by horse riders and hikers. The trail is moderately difficult due to narrow sections, creek crossings, and a few steeper hill sections along a creek shoreline. The footings are varied but mostly sand and sandy loam with one rocky slope. There are several unofficial side trails. Users should look for orange ribbons for main trail and signage and use GPS and maps to stay on track. This is a challenging trail and a good opportunity to ride with someone who knows the area

Trophy Club Park Trail – Located on the south shore next to the Town of Trophy Club, the Trophy Club Park Trail provides horseback riding experience with open and wooded trails while offering breathtaking scenery. Hikers can experience the fresh air that blows onshore from Grapevine Lake while riding through miles of trails. The equestrian trails are open year-round during designated park hours. The Trail Head is located inside the Trophy Club Park. The trails are shared between equestrian users

and hikers. There are several wide, shallow water crossings and a few banks to traverse, but trails are generally sandy and well maintained.

Vineyard's Campground Nature Trail – Lying on the South shore of Grapevine Lake is an unpaved trail within the Vineyard's Campground. This trail is only available to campground guests.

Walnut Grove Trail – Located on Grapevine Lake's south shore, and near the City of Southlake's Bob Jones Park and Bob Jones Nature Center and Preserve, Walnut Grove Trail can be used by hikers and horses and ridden for short distances and up to 10 miles by combining side loops. The one-way length of the main trail is 6 miles. This trail is located on the southwest portion of the lake and is divided into an upper woodland trail and lower shoreline trail. The trail can be used by hikers and horses. This trail is fairly easy and mostly wide trail with gentle slopes and lake access for watering horses. Footing is mainly sandy loam. There are a couple of creek crossings that are relatively steep.

5.4. MITIGATION

The Mitigation classification is applied to lands that were acquired specifically for the purpose of offsetting losses associated with the development of the project. There are no acres at Grapevine Lake under this classification. USACE lands at Grapevine Lake where environmental mitigation activities have taken place in association with real estate easements or other outgrants are not included in lands classified for Mitigation.

5.5. ENVIRONMENTALLY SENSITIVE AREAS

Twenty-five areas totaling approximately 4,481 acres at Grapevine Lake were selected by the planning team for classification as ESA. The results of the Wildlife Habitat Appraisal Procedure conducted June 2020 were used, in part, to assist in determining which areas should be classified as ESA. Other factors, including public and stakeholder comment, the presence of cultural resources, presence of species of conservation concern, and visual esthetics were also included in the selection of ESA areas. By definition, these areas are to be protected from intense development or disturbance from future land use actions such as utility or road easements. Passive public use such as natural surface trails, bank fishing, and nature study are appropriate for these areas.

Each of these areas are numbered on the land classification maps in Appendix A. Table 5.1 provides a listing of the ESA areas, acreage, location description, and future management priorities.

Table 5.1 ESA Listing

ESA#	Acres	Location and Description
ESA 1	64	<p><u>Golf Course Remnant Woodlands Area.</u> This 64-acre ESA occurring primarily within the two golf courses represents the native habitat areas below the Grapevine Lake Dam and includes bottomland hardwoods, Cross Timbers Ecoregion remnant upland hardwoods, and the old Denton Creek Channel riparian corridor. The area has relatively high habitat value throughout, but these values are anticipated to gradually improve on the entire area over time. This area also includes the outlet channel that supports riparian habitat along its banks, and it supports approximately seven species of native freshwater mussels. If work is to be completed along the outlet channel for various reasons including maintenance, mitigation of this ESA will be required. Protection and restoration of native rare habitats occur here with management of any invasive species such as Chinese privet, other privet species, Johnsongrass, King Ranch Bluestem, and heavenly bamboo. This ESA also contains other sensitive resources that require monitoring and protection. The presence of this ESA will not hinder current recreational opportunities at these two neighboring golf courses. Future use includes passive recreation by walkers, hikers, and those traveling between the golf courses.</p>
ESA 2	9	<p><u>Adjacent to Katy's Woods.</u> This 9-acre linear tract of mature upland Cross Timbers woodland parallels the park road of Katy's Woods park. It is a narrow shoreline tract bordering the park road and Katy's Woods, it has high aesthetic and wildlife habitat value. Passive use of the area for natural surface trails are appropriate. The area is managed by City of Grapevine.</p>
ESA 3	15	<p><u>Adjacent to The Vineyards.</u> This 15-acre linear tract of mature upland Cross Timbers woodland parallels the park road of The Vineyards park. Portions of this ESA are located along an intermittent stream near the entrance of The Vineyards park. The area has a high wildlife habitat value however disturbance to this area has been limited to construction of a sewage lift station by the City of Grapevine near the south end of the tract. A walking/nature trail goes through portions of the area and the area serves as a critical visual screen next to private property. Passive use of the area for natural surface trails are appropriate. The area is managed by City of Grapevine.</p>

ESA#	Acres	Location and Description
ESA 4	135	<u>Oak Grove Park 1.</u> This 135-acre area managed by the City of Grapevine follows two relatively narrow tributaries, Morehead and Farris Branches featuring high quality riparian and upland Cross Timbers habitat. The City of Grapevine Sewage Treatment Plant discharges a steady flow of treated effluent into Morehead Branch, adding significantly to the habitat value of the tributary. This area also serves a critical function as visual barrier along the Oak Grove Park entrance and circulatory roads, screening the park from adjacent residential areas. Future use may include low impact trail development for hiking, biking, and interpretive use.
ESA 5	17	<u>Oak Grove Park 2.</u> This 17-acre tract is of good quality upland Cross Timbers habitat serving a critical function as a visual barrier along the Oak Grove Park entrance and circulatory roads, screening the park from adjacent residential areas.
ESA 6	157	<u>Along Shane Wilbanks Trail.</u> This 157-acre area includes an area of high-quality upland Cross Timbers hardwoods currently used by mountain biking enthusiasts, and sizeable riparian areas on the south and north side of Dove Road. Most of the area has high value as a visual screen adjacent to residential development. Continued use of the area north of Dove Road for trails and related activities is anticipated. No new future uses are recommended for the area south of Dove Road. The area is managed by City of Grapevine.
ESA 7	4	<u>Lake Forest Boat Club.</u> This area is comprised of 4 acres of upland mature Cross Timbers habitat situated as an island of trees on a peninsula and includes adjacent shoreline to provide additional protection. No future use planned at this time. This area is managed by the City of Grapevine.
ESA 8	46	<u>Adjacent to Lakeview Park.</u> This 46-acre undeveloped tract of upland Cross Timbers hardwoods with interspersed patches of native prairie is good quality wildlife habitat and serves as a visual screen adjacent to residential development. Locally referred to as Heron Point, it is a prominent, forested peninsula with exceptional aesthetic appeal. Future uses may include a low impact trail. The area is managed by City of Grapevine.
ESA 9	83	<u>Meadowmere Entrance.</u> This relatively large riparian corridor totaling 83 acres along Dove Creek supports closed canopy, mature woodlands of cedar elm, pecan, post oak, and associated species. The drought of 2000 has caused noticeable mortality among dominant trees which could serve as snags and roosts enhancing existing wildlife habitat. The east end of the corridor has the woodlands giving way to shoreline and wetland vegetation. Future use may include hike and bike trails which parallel the Meadowmere Park Road. Low impact hiking trails would be suitable along the banks of Dove Creek. The area is managed by City of Grapevine.

ESA#	Acres	Location and Description
ESA 10	10	<u>Adjacent to 114th RC Flying Field.</u> This 10-acre tract supports a mature stand of pecan and post oak which follow the course of a small tributary. Across from this ESA the pasture that used to occur is now developed into soccer fields. This tract is centrally located in Meadowmere Park and contributes significantly to the park's open space character. Future use should be limited to low impact trails. The area is managed by City of Grapevine.
ESA 11	355	<u>Walnut Grove.</u> This 355-acre area is a shoreline riparian tract. Most of the area is heavily wooded with small riparian areas along Kirkwood Branch and small un-named tributaries. The area has significant aesthetic value as well as high value for wildlife habitat. Along Kirkwood Branch exhibits exceptional habitat diversity. The higher elevations have remnant patches of native prairie while the areas closer to the Kirkwood Branch are dominated by mature cedar elm, American elm, oaks, and pecans. The perennial nature of Kirkwood Branch adds significant habitat value. Future uses should be limited to low impact trails. The area is managed by the City of Southlake.
ESA 12	36	<u>Adjacent to Bob Jones Nature Center.</u> This 36-acre tract is one of the finest examples of closed canopy mature upland Cross Timbers forest at Grapevine Lake. The wildlife habitat value is exceptional and the location within Walnut Grove Park adds significantly to the open space value of the park. Future uses should include low impact trails. The area is managed by the City of Southlake.
ESA 13	34	<u>West End of Walnut Grove.</u> This 34-acre tract of high-quality upland and riparian hardwoods follows a small tributary lying just east of TW King Road. This tract has high quality wildlife habitat and serves an important water quality function along the un-named tributary. Future uses may include low impact hiking or equestrian trails.
ESA 14	150	<u>Marshall Creek.</u> This 150-acre area takes in the main riparian corridors in Marshall Creek Park as well as a diverse upland prairie site north of Trophy Club's sewage treatment plant. Large portions of the area take in a significant shallow water area and brushy peninsula within the reservoir. This area is of significant value to waterfowl, shorebirds, and neotropical migrant songbirds. During field reconnaissance the calls of painted buntings and dickcissels were noted. An indigo bunting and a nesting pair of redheaded woodpeckers were also sighted in the area. Future uses may include future low impact trail development and facilities, which would facilitate wildlife viewing and photography.

ESA#	Acres	Location and Description
ESA 15	2,200	<u>Denton Creek</u> . This large area consists of approximately 2,200 acres and is located on the extreme west side of the lake where Denton Creek flows into the lake. The area encompasses land just east of I 35 and continues across US 377 east toward the lake. It is comprised of mostly mature riparian forest and bottomland hardwoods intermixed with some upland Cross Timbers habitat. It is a large contiguous band of high-quality habitat for numerous species of wildlife including neo-tropical migrant songbirds and waterfowl. Future uses may include future low impact trail development and facilities, which would facilitate wildlife viewing and photography.
ESA 16	177	<u>Surrounding Cross Timbers Trailhead</u> . This area of approximately 177 acres supports the largest and finest examples of native tall grass prairie at Grapevine Lake. There are also important Cedar-Hackberry-Pecan woodlands where the prairie begins to give way to woody vegetation at lower elevations. The northern area of this ESA is relatively narrow but heavily wooded riparian area leading into Knob Hill Park. This area serves an important water quality function and has high wildlife habitat value. Future use may include additional hike-bike-equestrian trail development compatible with the existing trail. Management favoring continued improvement of the prairie should be a priority.
ESA 17	98	<u>Sharps Branch</u> . This 98-acre heavily wooded riparian area on Sharps Branch is excellent wildlife habitat and serves to filter storm water runoff from adjacent residential areas. Future development should be limited to spur trails providing links to the main hiking/equestrian trails along the Flower Mound shoreline.
ESA 18	144	<u>Rocky Point</u> . This 144-acre heavily wooded area is located totally within the Rocky Point plate and makes up the majority of the higher elevations within the park. The woodlands are mature and very diverse and are interspersed with small patches of native tallgrass prairie. The entire area serves as an important visual buffer next to rapidly growing residential areas. Future development could include continued development of the existing trail system.
ESA 19	225	<u>Twin Coves Park</u> . This area totaling 225 acres is a relatively long, narrow riparian corridor supporting mature stands of riparian and upland Cross Timbers woodland. This area is excellent wildlife habitat and also serves to preserve open space and provide a visual buffer along the entrance road to Twin Coves Park and next to adjacent residential areas. Future uses may include continued hiking and biking trail development. This is managed by the Town of Flower Mound.
ESA 20	70	<u>Area North of Madd Shelter</u> . This 70-acre area is a relatively long, narrow riparian corridor serving the same protection and function of the Twin Coves ESA. This is managed and operated by the USACE. Future development could include continued development of the existing trail system.

ESA#	Acres	Location and Description
ESA 21	11	<u>West Side Murrell Park.</u> This 11-acre area is a flat open field centrally located within the western end of Murrell Park. This field exhibits excellent wildflower blooms throughout spring and summer and is managed to support continued blooms and native tallgrass prairie. This area is managed by the USACE. Future uses may include future low impact trail development.
ESA 22	58	<u>East Side Murrell Park.</u> This 58-acre area supports dense, mature stands of riparian and upland woodlands and is a boundary tract line next to residential development. The southern half also supports native tallgrass prairie habitat along both sides of the main circulatory road of Murrell Park. Future use should be limited to hike-bike trail development, which is complementary to the existing North Shore trail. This area is managed by the USACE.
ESA 23	67	<u>Area Between Murrell Park and Rockledge Park.</u> This 67-acre area supports a relatively large, dense stand of mature upland Cross Timber hardwoods and runs adjacent to approximately 16,000 feet of government boundary which borders existing or planned residential/commercial areas. Future use of this area should include continued operation of the North Shore Trail. This area is managed by the USACE.
ESA 24	3	<u>Across Cove from Murrell Park Low Water Boat Ramp.</u> This relatively small, 3-acre parcel contains wetland habitat and has the presence or high probability presence of sensitive resources that must be monitored and preserved. This area is managed by the USACE.
ESA 25	103	<u>Spillway.</u> This 103-acre mature upland Cross Timbers forest may be the largest tract of intact upland Cross Timbers forest at Grapevine Lake as well as high-quality riparian and bottomland hardwood forest. The area is bisected by the uncontrolled spillway channel and features an intermittent stream along the northern boundary of the tract. This area also has the presence or high probability presence of sensitive resources that must be monitored and preserved. This area is managed by the USACE, and future use could include low-impact trails and access facilities.

5.6. MULTIPLE RESOURCE MANAGEMENT LANDS

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

5.6.1. Low Density Recreation (LDR)

These lands include narrow parcels of land that are adjacent to private residential developments as well as lands where current or potential public use is limited to

passive, pedestrian-oriented recreation such as hiking, bank fishing, nature study, and photography. Future management of these lands calls for maintaining a healthy, ecologically adapted vegetative cover to reduce erosion and improve aesthetics. Prevention of unauthorized use such as trespass or encroachments is an important management objective for all USACE lands but is especially important for those lands in close proximity to private development. These lands are typically open to the public, including adjacent landowners, for pedestrian traffic, and are frequently used by adjacent landowners for access to the shoreline near their homes. The general public may use these lands for bank fishing, hiking, and for access to the shoreline. Future uses may include additional designated natural surface trails, interpretive and directional signage, and other less intensive recreation activities. There are 211 acres classified for the primary use of Vegetative Management at Grapevine Lake.

5.6.2. Wildlife Management (WM)

These are lands designated primarily for the stewardship of fish and wildlife resources but are open to passive recreation use such as natural surface trails, hiking, and nature study. There are currently 1,259 acres under this classification. The management priority will be to restore these lands to support native vegetation adapted to soil type and elevation with respect to the flood control pool. Where topography, soil type, and hydrology are suitable; areas within the riparian floodplains may be selected for wetland development.

5.6.3. Vegetative Management (VM)

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

5.6.4. Future/Inactive Recreation Areas

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

5.7. WATER SURFACE

At conservation pool level of 535.0 NGVD29 there are 7,380 acres of surface water. Buoys are managed by USACE. These buoys help mark hazards, swim beaches, boats keep-out, and no-wake areas. Future management of the water surface includes

the maintenance of warning, information, and regulatory buoys as well as routine water safety patrols during peak use periods.

5.7.1. Restricted

Restricted areas are around swim beaches, public water supply intakes and near the USACE gate control tower on the dam. Vessels are not allowed to enter Restricted water surface. Water surface zoned as Restricted totals approximately 29 acres at Grapevine Lake.

5.7.2. Designated No-wake

No-wake areas are located near boat launch areas for the safety of launching and loading boats or personal watercraft, and in areas where boats approach marinas. At Grapevine Lake, no-wake buoy information is available at the lake office. Growing interest in kayaks and paddle boats indicates a possible future need for designated no-wake areas where kayaks or paddle boats can be operated without competing with motorized vessels. USACE is open to the concept of paddle trails and will work with interested parties to fulfill this need. Currently, approximately 693 total acres of Grapevine Lake are designated for No-wake.

5.7.3. Fish and Wildlife Sanctuary

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

5.7.4. Open Recreation.

The remaining water surface area is open to recreational use. No specific zoning exists for these areas, but the buoy system mentioned above is in place to help aid in public safety. It is incumbent on boaters to be aware of lake conditions and to operate vessels responsibly. Approximately 6,221 acres of Grapevine Lake is classified for Open Recreation.

5.7.5. Future Management of the Water Surface

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

5.7.6. Recreational Seaplane Operations

Seaplane restrictions are part of Title 36 Code of Federal Regulations. At Grapevine Lake and other USACE lakes across the nation, areas where recreational seaplane operations are prohibited were established through public meetings and environmental assessments circa 1980. The seaplane policy for USACE Fort Worth

District is found in the Notice to Seaplane Pilots (see Appendix E), which lays out the general restrictions as well as lake-specific restrictions for seaplane operation. Due to the proximity to Dallas-Fort Worth International Airport and Federal Aviation Administration controlled airspace, seaplane operations at Grapevine Lake are generally prohibited in all areas.

CHAPTER 6 – SPECIAL TOPICS/ISSUES/CONSIDERATIONS

6.1. COMPETING INTERESTS ON THE NATURAL RESOURCES

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

6.2. UTILITY CORRIDORS

USACE policy encourages the establishment of designated corridors on project lands, where feasible, to serve as the preferred location for future outgrants such as easements for roads or utility lines. After obtaining public input and examining the location of existing roads and utility lines on project lands, USACE determined that utility corridors would be designated at Grapevine Lake.

The following 20 utility corridors have been designated across USACE land with each corridor incorporating and/or running parallel to an existing easement. These corridors are shown on the maps in Appendix A. Future use of these corridors, where the corridor is limited to, or incorporates an existing easement, would in most cases require prior approval of those entities that have legal rights to the easement. Some existing easements at Grapevine Lake have not been designated as utility corridors. These non-corridor easements may be used for placement of additional utilities only by the grantee holding the easement, but only for purposes which directly serve the grantee or are of direct benefit to the Government. Expansion or widening of existing non-corridor easements will generally not be permitted.

Table 6.1 Utility Corridors (see map in Appendix A)

UC#	Description
Corridor 1	This corridor follows the route of Fairway Dr from State Highway (SH) 26 where it crosses in front of Grapevine Lake Project Office. From the lake office it parallels the toe of Grapevine Dam to where it starts to loop around the eastern edge of the stilling basin. Once it loops around the stilling basin it proceeds to intersect Lakeside Dr. The corridor is 2.64 miles in length and 50 feet wide. Any new utilities built will need to receive SWF Dam Safety approval in addition to SWF Operations approval. New utilities will be placed as close as possible to existing roads or utilities. Future use of this corridor is restricted to sub-surface boring. No bore pits will be permitted within riparian or other sensitive habitats, and bore pits will be placed off USACE property unless no feasible alternative exists.
Corridor 2	This corridor starts just northwest of the Hilton Executive Conference Center where it proceeds southwest until it reaches the Hilton Garden Inn Grapevine where it then proceeds south until it reaches SH 26. From SH 26 the corridor proceeds southwest until it reaches Fairway Dr, which it then proceeds west until it reaches Ruth Wall St. The corridor is 1.42 miles in length and 50 feet wide. The corridor does cross open water. Future use of this corridor would be restricted to underground utilities placed within or as close as possible to the limits of the existing road easement, on either side of the road. The total width of the corridor will not exceed 70 feet, including the space occupied by the road. The length of the corridor is approximately 5,500 feet.
Corridor 3	This corridor follows along Gaylord Trail Rd. from where it meets SH 26 on the southernmost extent and ends just north of the Gaylord Texan Resort. The length of this corridor is approximately 470 yards and is 100 feet wide. Future utilities in this corridor must be placed on the east side of Gaylord Trail Rd. between the road and federal boundary, within or as close as possible to the limits of the existing road easement, not to exceed 100 feet in width, including the road easement.
Corridor 4	This corridor is in two parts; the entire corridor lies along Dove Loop Rd. The northern most segment lies between North Dove Rd and Canyon Lake Dr. The southernmost segment lies between Meadow Brook Dr and Murrell Rd. The two segments when combined have a total length of 585 yards. Future use of this corridor is restricted to sub-surface boring, and no bore pits will be permitted on USACE property in order to protect the riparian habitat along FM 922. This corridor is restricted to the existing road right-of-way not to exceed 50 feet from the center of the road.
Corridor 5	This corridor begins at Horseshoe Park Trail in Grapevine, TX proceeds northwest until it reaches Silvercrest Ln and follows along Dove Rd. The length of this corridor is approximately 430 yards in length and 100 feet in width. Future use of this corridor is restricted to sub-surface boring, and no bore pits will be permitted on USACE property in order to protect the riparian habitat. This

UC#	Description
	corridor is restricted to the existing road right-of-way not to exceed 100 feet from the center of the road.
Corridor 6	This corridor follows Silvercreek Lane in Grapevine, Texas, the southernmost extent begins where it intersects Dove Rd where it proceeds north until it reaches Warwick Way. The length of this corridor is approximately 723 yards in length and the width is 200 feet. Future utilities in this corridor must be placed within or as close as possible to the limits of the existing road easement. The corridor is restricted to the existing road right-of-way not to exceed 100 feet from the center of the road.
Corridor 7	This corridor follows Meadowmere Lane in Grapevine, Texas. The southernmost extent of the corridor begins where Meadowmere Lane intersects Kimball Avenue, from there it proceeds north until Meadowmere Lane intersects Meadowmere Park Rd. From this intersection the corridor follows west along Meadowmere Park Rd until it intersects Midway Rd. From Midway Rd the corridor proceeds south until it reaches USACE federal fee boundary. The length of this corridor is approximately 1.5 miles long and the width is 200 feet. Future utilities in this corridor must be placed within or as close as possible to the limits of the existing road easement. The corridor is restricted to the existing road right-of-way not to exceed 100 feet from the center of the road. Future use of this corridor is restricted to sub-surface boring, and no bore pits will be permitted on USACE property in order to protect the riparian habitat along FM 922.
Corridor 8	This corridor occurs in two segments, the first segment lies between Burney Lane and Harbor Haven Rd in Grapevine, Texas. The second segment occurs between Loch Meadow Dr and Harbor CT Road in Grapevine, Texas. The length of these two segments when combined is approximately 482 yards and the width is 100 feet. Future utilities in this corridor must be placed within or as close as possible to the limits of the existing road easement, not to exceed 100 feet in width, including the road. Future use of this corridor is restricted to sub-surface boring, and no bore pits will be permitted on USACE property in order to protect the riparian habitat along County Rd 215.
Corridor 9	This corridor follows along North White Chapel Blvd in Grapevine, Texas. The southernmost boundary of the corridor begins near the intersection of North White Chapel Blvd and Sabre Dr. from which it proceeds north until it reaches Bluestem Trailhead. This corridor along with North White Chapel Blvd. cuts through ESA 11. Future utilities in this corridor must be placed within or as close as possible to the limits of the existing road easement. The corridor is restricted to the existing road right-of-way not to exceed 50 feet from the center of the road. Future use of this corridor is restricted to sub-surface boring, and no bore pits will be permitted on USACE property in order to protect the riparian habitat within the ESA along FM 922. The length of this corridor is approximately 350 and the width is 100 feet (50 feet in each direction from the center of the road).

UC#	Description
Corridor 10	This corridor lies within Trophy Club Park in Trophy Club, Texas. Corridor lies between T W King Rd and Mona Vale Rd. Length of this corridor is approximately 1.12 miles and the width is 100 feet. Future utilities in this corridor must be placed within or as close as possible to the limits of the existing road easement. The corridor is restricted to the existing road right-of-way not to exceed 50 feet from the center of the road. Future use of this corridor is restricted to sub-surface boring, and no bore pits will be permitted on USACE property in order to protect the riparian habitat along FM 922.
Corridor 11	This corridor follows along US 377 in Roanoke, Texas. The southern most extent begins where US 377 intersect Schooling Rd and ends at Knobhill Bike Trail Parking Lot. There is a western branch to the corridor that gives it a two prong fork appearance. The left branch begins just northwest of Fairstaff Rd, where it proceeds northeast until it intersect the main portion of the corridor. The length of this corridor is approximately 3 miles is 100 feet wide. Future utilities in this corridor must be placed within or as close as possible to the limits of the existing road easement. The total width of the corridor will not exceed 100 feet, including the space occupied by the road. Future use of this corridor is restricted to sub-surface boring, and no bore pits will be permitted on USACE property in order to protect the riparian habitat.
Corridor 12	This corridor occurs in two segments, north and south. The north segment is between U.S 377 and the Northwest Regional Airport, this segment crosses Denton Creek. The south segment is located between Cleveland Gibbs Rd and Crosstimbers Rd, it crosses the Graham Branch of Denton Creek. The length of this corridor is approximately 1.3 miles, and the width is 70 feet. Future utilities in this corridor must be placed within or as close as possible to the limits of the existing road easement. The total width of the corridor will not exceed 70 feet, including the space occupied by the road. Future use of this corridor is restricted to sub-surface boring, and no bore pits will be permitted on USACE property in order to protect the riparian habitat.
Corridor 13	This corridor follows a north to south path that crosses Denton Creek, it situated between Northwest Regional Airport and Sam Lee Lane in Roanoke, Texas. The length of this corridor is approximately 13,270 yards long and 50 feet in width. Future utilities in this corridor must be placed within or as close as possible to the limits of the existing railroad easement. Future use of this corridor is restricted to sub-surface boring; no bore pits will be permitted within riparian or other sensitive habitat; and bore pits will be placed off USACE property unless no feasible alternative exists.
Corridor 14	This corridor follows a northeast path that crosses Denton Creek between Dale Earnhardt Rd and Cleveland Gibbs Rd. before turning east. The length of this corridor is approximately 1,265 yards and the width is 140 feet. Future utilities in this corridor must be placed within or as close as possible to the limits of the existing

UC#	Description
	road easement. The corridor is restricted to the existing road right-of-way not to exceed 70 feet from the center of the road. Future use of this corridor is restricted to sub-surface boring, and no bore pits will be permitted on USACE property in order to protect the riparian habitat along the road.
Corridor 15	This corridor is runs parrel to I-35 W in Roanoke, Texas and crosses through Denton Creek, Catherine Branch of Denton Creek, and an unnamed tributary. It lies on the southeast side of I-35 within Grapevine federal fee boundary. The length of the corridor is approximately 1,350 yards and the width is 140 feet. The corridor is restricted to the existing road right-of-way not to exceed 70 feet from the center of the road. For both portions, future use of this corridor is restricted to sub-surface boring, and no bore pits will be permitted on USACE property in order to protect the riparian habitat along the roads.
Corridor 16	The corridor occurs in two east to west segments within Knobs Hills Park in Roanoke, Texas. The northernmost segment follows Crosstimbers Road within Knobbs Hills Park and crosses through White Branch of Denton Creek. The southernmost segment also cross White Branch of Denton Creek, however it follows Durham Road until reaches the creek, once it reaches the creek the corridor proceeds towards Cherokee Trail. The total length of these two segments is 1,400 yards and are 50 feet wide.
Corridor 17	This corridor occurs in an east to west direction that crosses Sharps Branch of Grapevine Lake. This corridor occurs between High Road and Hidden Valley Road in Flower Mound, Texas. Total length of this corridor is 470 yards is 50 feet wide.
Corridor 18	This corridor follows along Cardinal Drive in Flower Mound, Texas in a northeast direction within Grapevine Lake federal fee boundary. It crosses an unnamed creek. Total length of this corridor is 370 yards and is 50 feet wide.
Corridor 19	This corridor follows Wichita Trails Road in Flower Mound, Texas within Grapevine Lake federal fee boundary. It crosses an unnamed creek. Total length of this corridor is 310 yards long and is 50 feet wide.
Corridor 20	This corridor follows along Sentinal Oak Trail in Flower Mound, Texas within Grapevine Lake federal fee boundary. It located between Three Bridges Drive and Bent Oak Drive. Total length of this corridor is 353 yards long and 50 feet wide.

6.3. SHORELINE MANAGEMENT PLAN

On December 13, 1974 USACE published a regulation, ER 1130-2-406, in the Federal Register entitled “Civil Works Projects: Lakeshore Management.” This regulation was published as Part 327.30 of Chapter III, Title 36 of the Code of Federal Regulations. A subsequent change to the regulation was published in the Federal Register on October 31, 1990, incorporating the results of recent legislation and changing the name to “Shoreline Management at Civil Works Projects.” The focus of

this regulation is to establish national policy, guidelines, and administrative procedures for management of certain private uses of Federal lands administered by USACE. A key requirement in the regulation is that private shoreline uses, as defined in the regulation, are not allowed at lakes where no such private uses existed as of December 13, 1974. Grapevine Lake was officially impounded in the 1950's, and by 1974 numerous private floating facilities and vegetation modification by private individuals had been permitted on the lake.

The private uses described in the regulation primarily include privately-owned floating facilities such as floating boat docks, fixed or movable piers, and vegetation modification activities such as plantings, mowing, and selective removal of shrubs and trees. USACE regulations at ER 1130-2-406 requires the preparation of a Shoreline Management Plan (SMP) for those lakes where permitted private floating facilities and/or vegetation modification activities had been permitted and existed as of December 13, 1974. In response to this requirement, a SMP was prepared for Grapevine Lake and was published in 1976. This SMP remains in effect today except for changes resulting from a 2004–2005 review of vegetation management activities at Grapevine and Lewisville Lakes described below. Changes in public law in the late 1980's granted grandfather rights to all private floating facilities in good standing at the time. Consequently, all existing private floating facilities on Grapevine Lake currently enjoy grandfather privileges and can be removed from the lake only under conditions of substantial non-compliance with the terms of the Shoreline Use Permit.

In 2004–2005, the USACE reviewed the vegetation modification activities at Lewisville and Grapevine Lakes. This review was conducted with significant public involvement in the form of neighborhood workshops and public meetings. The end result of the review was publication of an Environmental Assessment entitled “Programmatic Environmental Assessment (2005 PEA) on Allowable Adjacent Landowner Activities Incorporating Ecosystem Management Practices on Federal Lands at Grapevine and Lewisville Lakes, Texas. The 2005 PEA concluded that all adjacent property owners could apply for a written permit to mow and remove underbrush from a narrow strip of land (50 feet at Lewisville Lake and 25 feet at Grapevine Lake) along the Federal property line. These allowable mowing distances reflected past vegetation modification guidelines at both lakes. At Lewisville Lake, the 2005 PEA also led to the designation of approximately 19 Narrow Shoreline Variance Areas (NSVA) where adjacent landowners may, with a written permit, mow to the water's edge. The 2005 PEA created a policy encouraging adjacent cities to assume responsibility for administering vegetation modification permits on the Federal land within their respective, incorporated city limits. There are currently no vegetation modification permits at Grapevine Lake.

Significant growth and development in surrounding towns and cities has occurred since the 1976 SMP and the 2004-2005 review. Although the topics of the SMP are outside the scope of the Master Plan, any future changes to the SMP should be consistent with the changes of the Master Plan. Due to the significant growth and development in the area and the revision to the Master Plan, the SMP is scheduled to

be revised after the completion of the Master Plan as soon as resources become available.

6.4. PUBLIC HUNTING PROGRAM

The Grapevine Lake Project offers over 2,500 acres for public hunting. Rising costs of private land hunting opportunities, coupled with a general scarcity of public land available for hunting within the zone of influence, has resulted in significant public interest in hunting opportunities at Grapevine Lake. Other public lands available for hunting within the zone of influence include USACE land at Benbrook Lake, Lavon Lake, Lewisville Lake, and Ray Roberts Lake. Hunting is not the exclusive use of these hunting areas; hunters must exercise caution, because areas may be used by hikers, equestrian riders, bird watchers, and others. While much of the boundary is fenced and marked, some areas are not. It is the hunter's responsibility to become familiar with the hunting area and the limits of public lands. Hunting on public land does not give any person the right to cross or enter private property.

The Grapevine Lake Hunting Program offers 4 types of hunting permits, white-tailed deer, waterfowl, general, and youth white-tailed deer. The white-tailed deer permit is offered via a lottery. The general and waterfowl permits are first come-first serve while the youth white-tailed permit is open to any youth 16 years old or younger. Administration of a hunting program of this size requires significant investment of resources, including labor and materials. Lottery and permit rules and requirements as well as the area hunting map are subject to change and are available on the Grapevine Lake hunting webpage and the lake office. Permit periods will be concurrent with the Texas Parks and Wildlife hunting license renewal dates. All hunters must have a Texas state hunting license and are expected to follow all Texas Parks and Wildlife Department hunting rules and regulations.

6.5. RECREATIONAL BOATING STUDY

In the summer of 2021, the USACE conducted a Recreational Boating Survey at Grapevine Lake. The survey involved extensive counting of boat trailers and empty slips at boat ramps and marinas and the use of opinion surveys administered at boat ramps and sent to marina owners and key stakeholders. The purpose was to determine if water-based recreation was exceeding a safe and enjoyable capacity. Due to fluctuating demand from the COVID-19 pandemic as well as inclement weather leading to the rescheduling of survey days, the results of the survey are mostly inconclusive. The USACE will continue to monitor water-based recreation demand as well as usage of boat ramps, marinas, and boat trailer parking and may conduct a more detailed boating capacity study if resources become available.

CHAPTER 7 – PUBLIC AND AGENCY COORDINATION

7.1. PUBLIC AND AGENCY COORDINATION OVERVIEW

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

The USACE began planning to revise the Grapevine Lake Master Plan in November of 2019. The objectives for the Master Plan revision are to (1) revise land classifications to reflect changes in USACE land management policies since 1971, (2) prepare new resource objectives, and (3) revise the Master Plan to reflect new agency requirements for Master Plan documents in accordance with ER 1130-2-550, Change 7, January 30, 2013 and EP 1130-2-550, Change 5, January 30, 2013.

- 11 May- 26 June 2020: Online Review open to the public for initial scoping. Requested public input and received 39 comments.
- 22-25 June 2020: USACE conducted wildlife habitat evaluation field work on Grapevine Lake project lands.

7.2. INITIAL STAKEHOLDER AND PUBLIC MEETINGS

Due to precautions associated with the COVID-19 virus, USACE hosted an online virtual review to provide information and receive public input on the Grapevine Lake Master Plan. Stakeholders were presented with the existing master plan documents and maps, as well as a video presentation of the master plan update process. The information was made available to the public on 11 May 2020, and comments were accepted through 26 June 2020.

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

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

Much like national forests or parks, Grapevine Lake is a federally owned and managed public property. It is USACE's goal to be a good neighbor as well as steward of the public interest as it concerns Grapevine Lake. As such, USACE is bound to the equal enforcement of policies and rules for this publicly held national asset. Section F.1 in Appendix F provides the comments received during the initial scoping comment period for the Master Plan, as well as the USACE response.

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

A public meeting was held at The REC of Grapevine on June 9, 2022 to release the Draft Master Plan. This initiated a 30-day comment period when members of the public, agencies, and other stakeholders could provide comments on the Draft Master Plan. A total of 29 individuals, not including USACE staff, attended the 9 June 2022 meeting. During the 30-day comment period following the meeting, the USACE received 88 comments from 59 individuals, agencies, and other stakeholders. Comments received and government responses are listed in Section F.2 in Appendix F. In response to comments, the following changes were made for the Final Master Plan:

- ESA 7 was expanded to include portions of surrounding shoreline resulting in minor changes to the maps, ESA 7 descriptions, land classification descriptions, and acreage tables.
- Clarification was added in the Master Plan to avoid ambiguous descriptions.
- Errors and omissions were corrected.
- Comments from the initial Public Scoping Meeting, Draft Public Meeting, and government responses were placed in Appendix F.
- A summary of public and agency review of the Draft Master Plan and consultation with Tribal Nations were added to Chapter 7.

7.4. CONSULTATION WITH TRIBAL NATIONS FOR REVIEW OF DRAFT MP, EA, AND FONSI

The project consulted with the Native American tribes whose historic territory included Grapevine Lake and the surrounding area. These tribes included the Apache Tribe of Oklahoma, the Caddo Nation of Oklahoma, the Comanche Nation of Oklahoma, the Delaware Nation, the Tonkawa Tribe of Oklahoma, and the Wichita and Affiliated Tribes. The consultation process includes contacting the tribes about the project, explaining what would take place and inviting them to comment on and/or be a part of the project. The consultation continues throughout the entire project with continual conversation between USACE and the tribes. In terms of cultural resources, they are also able to ask that a cultural monitor from their tribe be present during a cultural resource survey. Even if the tribe does not want to take part of the project, they can ask to be contacted if any cultural material has been found.

Laws and regulations that pertain to consultation with Native American tribes include the following:

- American Indian Religious Freedom Act (AIRFA) requires consultation with Native American traditional religious leaders to determine how to protect and preserve Native American religious rights and practices.
- Archaeological Resource Protection Act (ARPA) requires notification of permits that may affect Native American religious and cultural sites
- Native American Graves Protection and Repatriation Act (NAGPRA) requires consultation if human remains are discovered, prior to excavation of Native American human remains and cultural items, preparation of an inventory of the human remains and finally to help establish cultural affiliation of the remains
- National Historic Preservation Act (NHPA) requires consultation during the Section 106 process tribes if the project activities effect sites of religious and cultural significance, before carrying out preservation-related activities, and during identification and evaluation of historic properties
- EO 13007 (Indian Sacred Sites) requires agencies to develop procedures to facilitate consultation with Indian tribes regarding agency actions and might adversely affect access to, ceremonial use of, or the physical integrity of sacred sites
- EO 13175 (Consultation and Coordination with Indian Tribal Governments) requires agencies to establish regular and meaningful consultation collaboration with tribal officials. In the development of federal policies that have tribal implications, strengthen government-to-government relationships with Indian tribes, and reduce the imposition of unfunded mandates upon Indian tribes.

CHAPTER 8 – SUMMARY OF RECOMMENDATIONS

8.1. SUMMARY OVERVIEW

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

- Flower Mound Master Plan Documents
- Fort Worth Master Plan Documents
- Grapevine Master Plan Documents
- NCTCOG Planning Documents
- Northlake Master Plan Documents
- Southlake Master Plan Documents
- TCAP – Cross Timbers and Texas Blackland Prairie Ecoregions Reports
- TPWD’s 2018 and 2012 TORP and Survey
- TRWD Integrated Water Supply Plan

This Master Plan will ensure the long-term sustainability of the outdoor recreation program and natural resources associated with Grapevine Lake.

8.2. LAND CLASSIFICATION PROPOSALS

A key component in preparing this Master Plan was examining prior land classifications and addressing the needed transition to the new land classification standards. During the public involvement process USACE sought public input into whether, besides the simple change in nomenclature, a shift in land classification was desired (for example, should lands with a recreation classification be reclassified to a wildlife classification or vice versa.). Chapter 7 of the Plan describes the public input process.

Based on an evaluation of documents such as the TORP and the TCAP, development of goals and objectives, public and stakeholder comments, interviews with

adjacent cities and concerned agencies, as well as subject matter experts, the planning team prepared the land reclassification proposal for Grapevine Lake. All changes reflect historic and projected public use and new guidance from ER 1130-2-550 and EP 1130-2-550. A summary of acreage changes from prior land and water classifications to the new classifications is provided in Table 8.1, and key decision points in the reclassification of project lands are presented in Table 8.2.

Table 8.1 Changes from Prior Classification to New Classification

Prior Land Classifications (1971 Plan and 2001 Supplement)	Acres*	New Land Classifications (2022)	Acres
Operations and Maintenance	756	Project Operations	196
Environmentally Sensitive Areas*	2,374	Environmentally Sensitive Areas	4,481
Intense Recreation	2,355	High Density Recreation	2,597
MRML – Low Density Recreation	257	MRML – Low Density Recreation	211
MRML – Wildlife Management Area	1,952	MRML – Wildlife Management	1,259
MRML – Low Density Recreation/Wildlife Management Area	1,048	—	—
Total Land Acres	8,742	Total Land Acres	8,742
Prior Land Classifications (1971 Plan and 2001 Supplement)	Acres*	New Land Classifications (2022)	Acres
Permanent Pool	7,380	Permanent Pool	6,943
—	—	– Restricted	29
—	—	– Designated No Wake	693
—	—	– Open Recreation	6,221
TOTAL Water Surface Acres	7,380	TOTAL Water Surface Acres	6,943

* Land classification acres classified as ESA in the 2001 Supplement were represented as a hatched overlay of other land classifications. To avoid double-counting acres, the land acres are represented as ESA and the water surface as Permanent Pool in this table.

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

There are several major differences in the acres between the 1971 Master Plan and 2001 Supplement and the new 2022 Master Plan which are not accounted for in Table 8.1, Table 8.2, or the maps in Appendix A. These differences are due to the following:

- The previous maps were digitized and converted to the current GIS files in order to make a direct comparison between water and surface acres. The conversion

led to starting acre totals that are not identical to the acres listed in the Master Plan and 2001 Supplement.

- The areas designated as ESAs in the 2001 Supplement were represented as a hatched overlay of other land and water surface classifications. As such, the acres would have been counted twice in the previous Master Plan Supplement. In an effort to avoid double-counting acres, an effort was made to represent the land acres as only ESA and those over water surface only as open water, since ESA is only supposed to be applied towards land. ER and EP 1130-2-550 require the land classification to be just one land classification and should not be applied to water surface.
- In the 2001 Supplement, some MRML areas were given two sub-designations, specifically MRML – LDR and WM. For comparison purposes, this was treated as a separate land classification in Table 8.2 as LDR/WMA.
- Current mapping and measuring technology have improved since the 1971 Master Plan, providing more precise measurements. The current Plan uses GIS computer software, LiDAR spatial mapping, and updated boundary surveys.
- Since the 1971 Master Plan, erosion and deposition/siltation have led to changes in the water surface acres and land acres, with some areas increasing and other areas decreasing the total acres.

Table 8.2 Reclassification Proposals

Proposal	Acres	Justification
ESA to HDR	60	60 acres of land that were classified as ESA have been reclassified as HDR. The 2001 Supplement classified these acres as Intense Recreation with an ESA hatch overlay. ER and EP 1130-2-550 require the land classification to be either ESA or HDR, but not both. This change reflects areas that have historically been used for intensive recreation as well as areas that could see additional intensive recreation amenities and facilities and were determined to not be as sensitive as other areas designated as ESA. Some areas have also been changed to HDR to allow the installation of hard-surface trails (such as asphalt or concrete) and parking lots which are typically not permitted in ESA.
ESA to WM	73	73 acres of land that were classified as ESA have been reclassified as WM. The 2001 Supplement classified these acres as WM with an ESA hatch overlay. ER and EP 1130-2-550 require the land classification to be either ESA or WM, but not both. This change reflects areas that have historically been used for WM and were determined to not be as sensitive as other areas designated as ESA. Hunters should reference the most recent public hunting maps from the Grapevine Lake Office or website for public hunting areas as well as TPWD rules and regulations.
Intense Recreation to ESA	165	165 acres have been reclassified from Intense Recreation to ESA. Most of these acres are not ideal for intensive recreation due to steep or changing topography. These

		areas include quality habitat as well as soft surface trails and public access points and will be managed to protect the natural resources in the area as well as including passive, less-intensive recreation.
Intense Recreation to LDR	21	21 acres have been reclassified from Intense Recreation to LDR. Most of these acres are not ideal for intensive recreation due to steep or changing topography. These areas include soft surface trails and public access points and will be managed for passive, less-intensive recreation.
Intense Recreation to PO	13	13 acres of land that was previously classified as Intense Recreation has been reclassified as PO. This change reflects the area currently being used for maintaining project operations activities as well as safety and security.
Intense Recreation to WM	188	188 acres that was previously classified as Intense Recreation has been reclassified to WM. This change reflects how the area is currently being utilized and managed and is planned to be utilized in the future. These areas could include hunting access points and soft surface (unpaved) trails. Hunters should reference the most recent public hunting maps from the Grapevine Lake Office or website for public hunting areas as well as TPWD rules and regulations.
LDR to ESA	41	41 acres have been reclassified from LDR to ESA. These areas include quality habitat and sensitive resources. Although these areas include passive trails and public access points, they will be managed to protect the sensitive resources in the area while providing less intensive recreation opportunities.
LDR to WM	69	69 acres that were previously classified as LDR has been reclassified to WM. This change reflects how the area is currently being utilized and managed and is planned to be utilized in the future. These areas could include hunting access points and soft surface (unpaved) trails. Hunters should reference the most recent public hunting maps from the Grapevine Lake Office or website for public hunting areas as well as TPWD rules and regulations.
LDR/WMA to ESA	525	525 acres of Multiple Resource Management Land subclassified as both LDR and WMA have been reclassified to ESA. These areas include quality habitat and sensitive resources. Although these areas include passive trails and public access points, they will be managed to protect the sensitive resources in the area while providing less intensive recreation opportunities.
LDR/WMA to HDR	17	17 acres of Multiple Resource Management Land subclassified as both LDR and WMA have been reclassified to HDR. This change reflects areas that have historically been used for intensive recreation as well as areas that could see additional intensive recreation amenities and facilities. Some areas have also been changed to HDR to allow the installation of hard-surface trails (such as asphalt

CHAPTER 9 – BIBLIOGRAPHY

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