



**US Army Corps
of Engineers**

**Aerial Image
2005**

Lewisville Lake 2020 Master Plan

Elm Fork of the Trinity River – Denton County, Texas

**Aerial Image
2019**

Map/Image Data: Google Earth
Landsat/Copernicus 2020



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

CESWF-PE

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

SUBJECT: Lewisville Lake, Texas, Master Plan Revision (December 2020)

1. PURPOSE: Subject Master Plan is available at the following link:

\\swf-netapp1.swf.ds.usace.army.mil\Operations\Trinity_Region\Lewisville\Planning\MasterPlan_FINAL

The Master Plan is submitted for review and approval in accordance with Engineering Regulations (ER) 1130-2-550, Change 7 and Engineering Pamphlet (EP) 1130-2-550, Change 5. The digital version of the Master Plan is being used instead of a printed copy as a precaution associated with the COVID-19 pandemic.

2. BACKGROUND/DISCUSSION: In accordance with ER 1130-2-550 Change 07, dated 30 January 2013 and EP 1130-2-550 Change 05, dated 30 January 2013, Lake Project master plans are required for most USACE water resources development projects having a federally owned land base. The current Lewisville Lake Master Plan is dated 1985 with a major supplement added in 2004. This revision of the 1985 Lewisville Lake Master Plan is intended to bring the Master Plan up to date to reflect ecological, socio-demographic, and outdoor recreation trends that are currently affecting the lake, as well as those anticipated to occur within the planning period of 2020 to 2045, a 25-year period.

3. SUMMARY OF CHANGES: The revision resulted in the preparation of new resource management objectives and the following changes to land use classifications:

Prior Land Classifications	Acres	New Land Classifications	Acres
Project Operations	1,170	Project Operations	1,083
Recreation	8,935 ²	High Density Recreation	4,559 ³
Fish and Wildlife Management	6,738		
		Separable Recreation Lands ⁴	1,110
Environmentally Sensitive Areas (as an overlay on certain Fish & Wildlife and Recreation lands) The Fish and Wildlife portion totaled 6,738 acres.	7,292	Environmentally Sensitive Areas	11,188
		Multiple Resource Management - Low Density Recreation	542
		Multiple Resource Management – Wildlife Management	3,268
Permanent pool	28,980	Permanent pool	27,175 ⁵
Flowage Easement	5,213	All Easements	8,712
Conservation Easements	500	Conservation Easements	475
		Water surface: Restricted	82
		Water Surface: No Wake	1,079
		Water Surface: Open Recreation	25,475

***Note:** ¹The new land classification acreage figures were measured using GIS technology and may vary from prior, similar classifications, and from official land acquisition records. Also, with the exception of the Project Operations classification, there is no direct relationship between the prior land classifications and the new land classifications.

²The 8,935 acre number was copied from the 2004 MP supplement. Although not stated in the 2004 supplement, it is assumed that this number included the cumulative acreage of recreation-related lands identified in the 1985 MP.

³The 4,559 acres figure includes 1,110 acres of Separable Recreation Lands acquired for the Ray Roberts Lake State Park – Greenbelt Corridor.

⁴Separable Recreation Lands is not a land classification but is required by USACE regulations to be described in project Master Plans. Separable Recreation Lands are those lands acquired only for the purpose of recreation and are otherwise not required for the successful operation of Lewisville Lake for the primary missions of flood risk management and water conservation. The acreage of Separable Recreation Lands is included in the acreage totals for High Density Recreation lands. The 1,110 acres of Separable Recreation Lands existed in 2004 but were not identified as such in the 2004 Master Plan Supplement.

⁵As measured during the 2007 Sedimentation Survey conducted by TWDB.

a. The above changes were the result of 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 (EA) was prepared to assess the potential impacts that the alternative management scenarios set forth in the Lewisville Lake 2020 Master Plan (2020 Master Plan) would have on the natural, cultural, and human environments. The EA evaluated and analyzed two alternatives: a No Action Alternative (continued use of the 1985 Master Plan and 2004 Supplement to the 1985 Master Plan) and the implementation of the 2020 Master Plan. Based on the findings of the EA, the implementation of the 2020 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.

c. The Master Plan and EA 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 ☐

NEWMAN.ARNOL
D.R.1231040958
ARNOLD R. NEWMAN
Director, Regional Planning & Environmental Center

Digitally signed by
NEWMAN.ARNOLD.R.1231040958
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Approve ☒
Disapprove ☐

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ROCKY D. LEE
Chief, Real Estate Division

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Approve ☒
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Chief, Operations Division

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Approve ☒
Disapprove ☐

KENNETH N. REED, PMP
Colonel, EN
Commanding

STAFF COORDINATION AND ROUTER

TO: CESWF-PE, CESWF-OC, CESWF-RE, CESWF-OD

SUBJECT: DQC Review of Final Lewisville Lake Master Plan

FROM: CESWF-PEM-E

DATE: 4 Dec 2020

SUMMARY OF ACTION REQUIRED, NOTES, REMARKS, ETC:

Please review the final draft of the Lewisville Lake Master Plan. This is the final phase of the District Quality Control review and is limited to key technical staff and relevant supervisory staff and Chiefs within PE, OD, OC and RE. The final reviewed Master Plan will be provided to Chiefs of OD and RE for hand signature. After signature by the Chiefs, the Master Plan and associated FONSI will be sent to the District Commander for final approval and signature.

Once approved by the District Commander, the Master Plan and all associated Appendices, including the Environmental Assessment will be posted on the District website and all stakeholders, and persons who attended public meetings will be notified of the availability of the Master Plan.

If you have comments on the Master Plan, please provide them using the Excel spreadsheet furnished to you via email. Please reference page/paragraph numbers when making comments. Save a copy of your comments on the spreadsheet and send directly to Don Wiese via email.

Please complete your review by 18 Dec 2020 and sign the staff router. The router has been sent to you via email.


ACTION POINT OF CONTACT: Don Wiese

TELEPHONE NO: 817-886-1568 or mobile 940-372-3136

OFFICE /STAFF COORDINATION

OFFICE	CONCUR	NON-CONCUR	DATE
CESWF-PEM-E/WIESE	WIESE DONALD M. Digitally signed by DONALD M. WIESE DN: cn=Don Wiese, o=CESWF, ou=PEM-E, email=don.wiese@ceswf.com, c=US Date: 2020.12.04 13:28:20 -0500		
CESWF-PEM-E/IRWIN	IRWIN.ERIC.J. Digitally signed by ERIC J. IRWIN DN: cn=Eric J. Irwin, o=CESWF, ou=PEM-E, email=eric.irwin@ceswf.com, c=US Date: 2020.12.04 13:23:29 -0500		
CESWF-PEM-E/MORROW	MORROW.ROBERT T.M. Digitally signed by ROBERT T. MORROW DN: cn=Robert T. Morrow, o=CESWF, ou=PEM-E, email=robert.morrow@ceswf.com, c=US Date: 2020.12.07 09:14:38 -0500		
CESWF-PEE-C-ROBERTS	ROBERTS.PAUL E. Digitally signed by PAUL E. ROBERTS DN: cn=Paul E. Roberts, o=CESWF, ou=PEE-C, email=paul.roberts@ceswf.com, c=US Date: 2020.12.07 09:14:38 -0500		
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CESWF-OD-TN/GATELY	GATELY.KATHLEEN E. Digitally signed by KATHLEEN E. GATELY DN: cn=Kathleen E. Gately, o=CESWF, ou=OD-TN, email=kathleen.gately@ceswf.com, c=US Date: 2020.12.07 09:14:38 -0500		
CESWF-OD-TN/HAFERKAMP	HAFERKAMP.WILLIAM W. Digitally signed by WILLIAM W. HAFERKAMP DN: cn=William W. Haferkamp, o=CESWF, ou=OD-TN, email=william.haferkamp@ceswf.com, c=US Date: 2020.12.07 09:14:38 -0500		
CESWF-RE-M-FLANNERY	FLANNERY.LEE A. Digitally signed by LEE A. FLANNERY DN: cn=Lee A. Flannery, o=CESWF, ou=RE-M, email=lee.flannery@ceswf.com, c=US Date: 2020.12.07 09:14:38 -0500		
CESWF-OC-TALBOT	TALBOT.KATHARIN E. Digitally signed by KATHARIN E. TALBOT DN: cn=Katharin E. Talbot, o=CESWF, ou=OC, email=katharin.talbot@ceswf.com, c=US Date: 2020.12.07 09:14:38 -0500		
CESWF-OC-MERCHANT			
CESWF-PEM-WRIGHT	WRIGHT.ANDREW D. Digitally signed by ANDREW D. WRIGHT DN: cn=Andrew D. Wright, o=CESWF, ou=PEM, email=andrew.wright@ceswf.com, c=US Date: 2020.12.07 09:14:38 -0500		
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CESWF-OD-JORDAN	JORDAN.ROBERT S. Digitally signed by ROBERT S. JORDAN DN: cn=Robert S. Jordan, o=CESWF, ou=OD, email=robert.jordan@ceswf.com, c=US Date: 2020.12.07 09:14:38 -0500		
CESWF-OD-T-MURPHY	MURPHY.JAME S.A. Digitally signed by JAME S.A. MURPHY DN: cn=Jame S.A. Murphy, o=CESWF, ou=OD-T, email=jame.murphy@ceswf.com, c=US Date: 2020.12.07 09:14:38 -0500		
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EXECUTIVE COORDINATION

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

EXECUTIVE REMARKS:

15 JAN 2021

EXECUTIVE SUMMARY

Lewisville Lake 2020 Master Plan

U.S. Army Corps of Engineers
Prepared by the Regional Planning and Environmental Center
2020

PURPOSE

The revision of the Lewisville Lake Master Plan (hereafter Plan or Master Plan) is a framework built collaboratively to serve as a guide toward appropriate stewardship of U.S. Army Corps of Engineers (USACE) administered resources at Lewisville Lake over the next 25 years. The 1985 Lewisville Lake Master Plan, including a major supplement in 2004, is the most recent version of the Plan and has served well for the past 33 years, but dynamic population growth around the lake, the addition of new recreation facilities, the leasing of USACE lands to several adjacent municipalities for lake-related outdoor recreation, and an increased public awareness of the value of USACE lands as recreation open space and wildlife habitat has led to the need for a complete revision of the 1985 Master Plan.

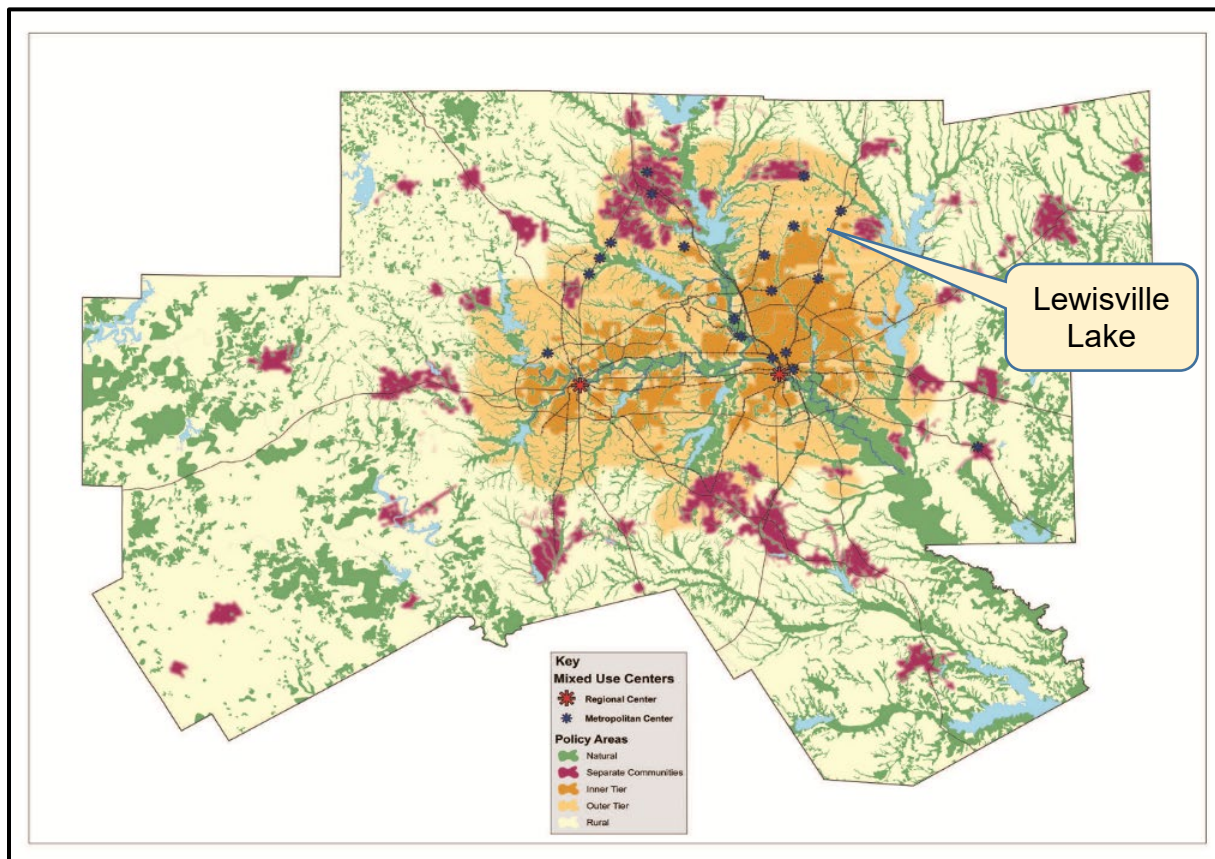


Figure ES.1 Preferred Physical Development Pattern for the Sixteen County NCTCOG for Year 2050 (Source: NCTCOG: Vision North Texas)

The Master Plan is primarily a land use and outdoor recreation strategic plan that does not address the specific authorized project purposes of water storage for flood risk management or water supply. Water management is addressed in the 2018 USACE Water Control Manual for Lewisville Lake. The 1985 Master Plan classified a total of 45,823 acres of USACE land, which included 29,980 acres of surface water at the conservation pool elevation of 522.0 feet National Geodetic Vertical Datum of 1929 (NGVD). The 28,980 acre figure was derived using land measurement technology dating to the 1950's and 60's and has been used since 1985 to describe the size of the pool at the normal elevation of 522.0 NGVD. A survey in 2007 by the Texas Water Development Board, in cooperation with USACE, used more sophisticated, Geographic Information Systems (GIS) technology and determined the size of the pool to be approximately 27,175 acres. The difference between the earlier figure of 28,980 acres and the 2007 figure can be attributed to a combination of factors including land accretion through sediment deposition (thus shrinking the surface area of the pool), the elevation of the lake when measurements were made, and the use of better measurement technology.

For the purpose of preparing this Master Plan, the conservation pool is considered to be 27,175 acres with approximately 20,592 acres of land lying above the conservation pool. This Plan also addresses management of the Ray Roberts Lake State Park – Greenbelt Corridor which consists partly of lands originally acquired for Lewisville Lake and partly of lands acquired specifically for establishment of the Greenbelt Corridor. It is notable that the 27,175 acre conservation pool, plus the 20,592 acres lying above the conservation pool, when added together equal 47,767 acres which is a sum greater than the official USACE real estate records that show the total fee ownership at Lewisville Lake to be 46,001 acres, plus 1,110 acres acquired for the Greenbelt, for a grand total of 47,111 acres. This difference of 656 acres is approximately 1.4% of the deed-recorded acreage and is easily attributed to the difference in the way the conservation pool was measured in the 1980's compared to the current GIS estimate. This Plan and supporting documentation provides an inventory, analysis, goals, objectives and recommendations for USACE lands and water surface at Lewisville Lake, Texas.

PUBLIC INPUT

Public and agency input obtained for the development of the Master Plan was obtained to ensure a balance between operational, environmental, and recreational outcomes. An Environmental Assessment (EA) was completed in conjunction with the Master Plan Revision to evaluate the impacts of alternatives. The EA is included in Appendix B.

A public information meeting was held on May 2, 2017 in Lewisville, Texas and on May 4, 2017 in Little Elm, Texas to announce the initiation of the master plan revision, explain the process involved and to solicit input. A total of 72 individuals, not

including USACE personnel, attended the two information meetings. In addition to the two initial public information meetings, USACE personnel met personally with representatives from 19 separate entities involved in the daily management of USACE lands and water surface. The 19 entities included representatives from Texas Parks & Wildlife Department, cities, marina operators and non-profit organizations. A total of 24 written comments were received during the 30-day public comment period following the information meetings and the 19 separate meetings with stakeholders. A summary of public comments and the USACE response is provided in Chapter 7 of this Plan.

The final Master Plan was developed after obtaining public and agency comment through a virtual (online) process beginning May 8, 2020 and ending June 22, 2020. The virtual public involvement process was necessary due to the public meeting constraints resulting from the COVID-19 pandemic. A video explaining the virtual process and high points of the draft Master Plan was posted on the USACE Fort Worth District Website and was viewed several hundred times. A total of 56 comments were received within the 45-day comment period, of which a summary can be found in Table 7.2 of this Plan.

RECOMMENDATIONS

The land classifications changes set forth in Table ES-1 below and detailed in Chapter 8, Table 8.2, resulted from the inventory, analysis, and synthesis of data, documents, and public and agency input. With the exception of Project Operations acreage, it is not possible to make a direct comparison of the new land classification with the prior, 2004 land classifications. In the 2004 MP supplement, the Recreation classification showed 8,935 acres but a careful measurement of the same areas for this 2020 MP shows that 4,780 are included in the High Density Recreation classification. The 2004 MP does not explain why so many acres are shown to be in the Recreation classification. One possible explanation is that the 1985 Master Plan described approximately 9,000 acres in a recreation-related land classification and those figures may have been used in the 2004 MP supplement. In general, 20,592 acres were reclassified, with fee and conservation pool acreage changes due in part to siltation, land conveyance, and improvements in measurement technology using Geographical Information System (GIS) technology. This technology allows for more finely tuned measurements and thus acreages may vary slightly from official land acquisition records and prior master plan measurements.

Table ES.1 Land Use Acreage Changes

Prior (2004) Land Classifications	Acres	New Land Classifications	Acres
Operation and Maintenance	1,170	Project Operations	1,083
Recreation	8,935	High Density Recreation	4,559
		Separable Recreation Lands	1,110 ³
Environmentally Sensitive Areas	7,292 ¹	Environmentally Sensitive Areas	11,188
Fish and Wildlife Management	6,738 ²	Multiple Resource Management – Low Density Recreation	542
		Multiple Resource Management – Wildlife Management	3,268
Conservation Pool 522.0 NGVD29	28,980	Conservation Pool 522.0 NGVD29	27,175 ⁵
Flowage Easement	5,746 ⁴	Easements	8,712 ⁶

1. The majority of these acres were also included in the acres shown for Fish and Wildlife Management

2. A majority of these acres were also classified as ESA.

3. Separable Recreation Lands is not a land classification but is required by USACE regulations to be described in project Master Plans. Separable Recreation Lands are those lands acquired only for the purpose of recreation and are otherwise not required for the successful operation of Lewisville Lake for the primary missions of flood risk management and water conservation. The acreage of Separable Recreation Lands is included in the acreage totals for High Density Recreation lands. The 1,110 acres of Separable Recreation Lands existed in 2004 but were not identified as such in the 2004 Master Plan Supplement.

4. This figure was incorrectly stated in the 2004 Master Plan Supplement. The correct number of 8,712 acres is shown under the column for New Land Classifications.

5. This acreage was the result of a 2007 volumetric survey of Lewisville Lake conducted cooperatively by USACE and the Texas Water Development Board. Throughout this Plan, this figure is used as the conservation pool elevation.

6. This figure includes all easements, the largest acreage being flowage easements

PLAN ORGANIZATION

Chapter 1 of the Master Plan presents an overall introduction of Lewisville Lake. Chapter 2 consists of an inventory and analysis of project resources. Chapters 3 and 4 lay out management goals, resource objectives, and land allocation and classification. Chapter 5 is the resource plan that identifies how project lands will be managed through a resource use plan for each land use classification. This includes current and projected park facility needs, an analysis of existing and anticipated resource use, and anticipated influences on overall project operation and management. Chapter 6 details topics that are unique to Lewisville Lake. Chapter 7 identifies the coordination 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 EA analyzing alternative management scenarios for Lewisville Lake has been prepared in accordance with the National Environmental Policy Act of 1969, as amended (NEPA); regulations of the Council on Environmental Quality; and USACE regulations, including Engineer Regulation 200-2-2: Procedures for Implementing NEPA. The EA is a separate document that informs this Master Plan and can be found in its entirety in Appendix B.

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

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CHAPTER 1 - INTRODUCTION

1.1. OVERVIEW

Lewisville Dam and Lake (hereafter Lewisville Lake) is a multipurpose water resources project constructed and operated by the U.S. Army Corps of Engineers (USACE), Fort Worth District. The lake and associated federal lands are located entirely within Denton County, Texas (TX). Lewisville Lake Dam is located on the Elm Fork of the Trinity River in the Trinity River Basin at river mile 30 along the northern edge of the City of Lewisville, Texas and approximately 24 miles from the central business district of the City of Dallas. The dam and associated infrastructure, as well as all lands acquired for the Lewisville Lake project, are federally-owned and administered by the USACE.



Photo 1.1 Lewisville Lake Dam Looking West (USACE Photo)

The Lewisville Lake Master Plan (hereafter Plan or Master Plan) is the revision of the 1985 Master Plan, including the 2004 Supplement, and 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 Lewisville Lake. The Plan does not address the flood risk management or water supply purposes of Lewisville Lake (see the USACE Water Control Manual for Lewisville Lake for a description of these project purposes).

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 creates 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 tree canopy 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 moderates' temperatures. To this end, USACE has developed the following statements.

The USACE Sustainability Policy and Strategic Plan states that:

“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 of the Responses to Climate Change Program is:

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

The history of Lewisville Lake extends back in time approximately 100 years from the date of this Plan. The City of Dallas constructed the Garza Dam on the Elm Fork of the Trinity River in the early 1920's, completing the dam in 1927. The reservoir impounded by this early dam was referred to by several names but was most often called Lake Dallas. The water supply from Lake Dallas served the City of Dallas for many years, but following World War II in the late 1940's, the need for additional water supply coincided with the need for improved flood control along the Trinity River where it traverses through Dallas. In response to these needs, planning for Lewisville Lake and Dam was initiated, with completion of Lewisville Dam in 1955. The boundary of the new reservoir, Lewisville Lake, completely incorporated the original Lake Dallas. After completion of Lewisville Dam, the old Garza Dam was intentionally breached in two

spots, but much of the old dam remained in place and is still visible in the northeast sector of Lewisville Lake. All lands surrounding the old Lake Dallas were owned by the City of Dallas and as part of the Lewisville Lake project were deeded over to USACE.

Another major chapter in the history of Lewisville Lake was the construction of Ray Roberts Dam and Lake (formerly Aubrey Lake) in the 1980s. Ray Roberts Dam is on the Elm Fork of the Trinity River a few miles upstream from Lewisville Lake and was completed in 1987. By design, the construction of Ray Roberts Dam and Lake resulted in a permanent seven-foot increase in the conservation pool at Lewisville Lake raising the pool from 515.0 NGVD to 522.0 NGVD. The permanent increase in the conservation pool resulted in the relocation of many recreation facilities at Lewisville Lake as well as the acquisition of several parcels of land around the perimeter of the lake and the raising of numerous boat ramps.

One of the most significant changes at Lewisville Lake associated with construction of Ray Roberts Dam and Lake was the significant expansion and modernization of Hickory Creek Park bringing the total number of campsites in the park to 128, and the construction of three large camper service buildings and a beach. Hickory Creek Park is currently operated by USACE. Another major recreation feature associated with the construction of Ray Roberts Dam and Lake was the acquisition of land and conservation easements along the Elm Fork of the Trinity River above Lewisville Lake for the purpose of developing the Greenbelt Corridor between Lewisville Lake and Ray Roberts Lake. The Greenbelt Corridor features hike, bike and equestrian trails and is managed by the Texas Parks & Wildlife Department (TPWD) as a part of Ray Roberts Lake State Park. The Greenbelt Corridor is described in more detail in Chapters 4 and 5 of this Plan.

Lewisville Dam and Lake is a multi-purpose project used for flood control, water supply, hydropower, fish and wildlife, and recreation. The project is a unit of the Trinity River Basin System, which consists of eight USACE lakes and various channel improvements and levees operated to provide flood protection along the Trinity River. Lewisville Dam and Lake operates in conjunction with Ray Roberts Dam on the Elm Fork of the Trinity River to provide flood control for the lower Elm Fork Trinity River and the mainstem Trinity River through Dallas and downstream. The lake provides water supply to the cities of Denton and Dallas, Texas. Major municipal water intakes on the lake are operated by the City of Denton, City of Lewisville, and the Upper Trinity Regional Water District (UTRWD). The city of Dallas obtains a large volume of water from the lake for municipal purposes via water releases through low-flow gates at the USACE gate control tower. Some of the releases are channeled through a small hydroelectric turbine constructed by the City of Denton in 1991. The small turbine is now operated by the City of Garland, Texas. Low flow releases required by the city of Dallas flow downstream to a water intake facility operated by Dallas on land owned by the City.

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 Lewisville 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 Lewisville Lake (see the USACE Water Control Manual for Lewisville Lake for a description of these project purposes). The Lewisville Lake Master Plan was last updated in 1985 with a major supplement published in 2004.

1.2 PROJECT AUTHORIZATION

The initiation and partial construction of Lewisville Dam and Lake on the Trinity River was authorized by the River and Harbor Act approved 2 March 1945 (Public Law 14, 79th Congress, and 1st Session). The River and Harbor Act of 1945 was approved in accordance with recommendations made by the Chief of Engineers contained in House Document Number 403 (77th Congress, 1st Session). Authority to initiate advance planning is contained in a letter by the Chief of Engineers to the Division Engineer, Southwestern Division (SWD), dated 2 April 2 1945, subject "Advance Planning of River and Harbor Projects Authorized in the Act Approved 2 March 1945". The preliminary examination titled "Preliminary Report on Hydrology of Elm Fork Trinity River and Spillway Design Flood for Garza-Little Elm Dam and Reservoir" was published in February 1947. The Definite Project Report for Lewisville Dam was submitted to the Chief of Engineers in October 1947. Public Law 329, 84th Congress, 1st Session changed the name of the dam from "Garza-Little Elm" to "Lewisville" dam. Congressional authority for the modification of Lewisville Lake including the construction of Ray Roberts Lake (formerly Aubrey Lake) is contained in the River and Harbor Act of 1965 (PL 89 298) in accordance with the total plan of improvements for the Trinity River as presented in House Document No. 276 (89th Congress, 1st Session).

1.3 PROJECT PURPOSE

Lewisville Lake is a multipurpose water resources project designed, constructed and operated by USACE for the primary purposes of flood risk management and water conservation within the Trinity River Basin. USACE administers the surrounding federal lands and water surface to provide a variety of public, outdoor recreation opportunities, and to conserve important natural and cultural resources. Recreation facilities on Federal land at Lewisville Lake are currently operated by nine different municipalities, several private concessionaires, four private non-profit organizations ((Dallas Corinthian Yacht Club (DCYC), Young Men's Christian Association (YMCA), Lewisville Lake Environmental Learning Area (LLELA) and the Falcons of Lake Dallas)), the University of North Texas, Texas Parks and Wildlife Department and USACE. Refer to map LE19MP-OM-01 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, and cultural resources.

1.4 MASTER PLAN PURPOSE AND SCOPE

The Lewisville 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 Chapter 3 Engineering Regulation (ER) 1130-2-550, and the accompanying Engineer Pamphlet (EP) 1130-2-550, the Plan guides the efficient and cost-effective development, management, and use of project lands. It is a dynamic tool that provides for the responsible stewardship and sustainability of the project's resources for the benefit of present and future generations. The Plan works in tandem with the Operational Management Plan (OMP), which is the 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 Lewisville Lake is set forth as follows:

“The land, water and recreational resources of Lewisville 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 management and administration and implementation are not addressed here but are covered in the Lewisville Lake OMP. In addition, the Master Plan does not address the specifics of regional water quality, shoreline management (a term used to describe the management of private docks and vegetation modification 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 Lewisville Lake with respect to management of the water level in the lake (see the USACE Water Control Manual for Lewisville 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 Lewisville Lake's authorized purposes
- Environmental sustainability elements

The Lewisville Lake Master Plan originally published as Design Memorandum No. 1C in 1966 was updated in 1973 and then completely revised in 1985 just prior to completion of Ray Roberts Dam and Lake. A major supplement to the Master Plan was added in 2004 to address, new and proposed recreation facilities, land classification, mitigation, and utility corridors. Since publication of the 1985 Master Plan and subsequent supplement, outdoor recreation trends, regional land use, population, 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 resources management has affected the region and Lewisville Lake. In response to these escalating pressures, a full revision of the 1985 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 USACE. The Plan will also inform the management of wildlife and other resource lands for the next 25 years.

1.5 BRIEF WATERSHED AND PROJECT DESCRIPTION

Lewisville Lake is located in the Elm Fork of the Trinity River watershed in the Upper Trinity River Basin. The Elm Fork of the Trinity River originates in eastern Montague County, Texas and flows in a southeasterly direction for approximately 110 miles through Cooke, Denton and Dallas Counties to its confluence with the West Fork of the Trinity in the City of Dallas. The watershed lies in the north central portion of Texas extending across the state between north latitudes 33°44' and 32°42' and west longitudes 96°43' and 97°50'. The watershed is comprised of parts of Montague, Cooke, Grayson, Collin, Wise, Tarrant, Denton and Dallas Counties. It is about 80 miles long along its axis and has a maximum width of 60 miles. The watershed of the Elm Fork of the Trinity River has a total drainage area of 2,577 square miles of which 917 square miles are downstream from Lewisville Dam. Lewisville Lake controls 1,660 square miles of the drainage area.

Lewisville Dam is located on the Elm Fork of the Trinity River at river mile 30.0. The river drops from an elevation of about 1,210 feet at its source to 435 feet at the Lewisville Dam site. The Elm Fork continues to drop to elevation 387 feet at its confluence with the West Fork in Irving/Dallas. The average slope of the stream bed is 7.5 feet per mile, and the average slope downstream of Lewisville dam is 1.6 feet per mile.

The principal tributaries contributing to the Elm Fork of the Trinity River are the right bank tributaries, Denton Creek, Hickory Creek and Clear Creek, and the left bank tributaries, Isle Du Bois Creek and Little Elm Creek. With the exception of Denton Creek, all of these principal tributaries are located upstream of Lewisville Lake.

Lewisville Lake Dam consists of a rolled, earthfill embankment. The embankment is essentially a homogeneous fill constructed of impervious clays and shales. Water is released from Lewisville Lake through the outlet works consisting of an approach channel, an intake structure, a concrete conduit through the dam, stilling basin and a discharge channel. The discharge conduit passes through the embankment. The intake

structure is equipped with gates and a trash rack. In addition to the discharge conduit the outlet works also has two smaller conduits used for the release of water for municipal purposes. Located near the east end of the embankment is the spillway consisting of an uncontrolled ogee weir and a 1300 feet long approach channel. Flow over the spillway discharges into a 3,200 feet long pilot channel. The discharge capacity of the spillway is 216,800 cubic feet per second (cfs) when the water surface elevation is at 553.0 feet.

According to the first Master Plan for Lewisville Lake dated 1966, the total area initially acquired in fee simple was 49,234 acres. Flowage easements were required for 5,654 acres. These numbers changed over time due to land disposals and land acquisitions. Refer to Section 2.6 of this Plan for a description of why and when these lands and flowage easements were acquired and how the numbers changed. In general, land up to elevation 537.0 was acquired in fee. Flowage easements were acquired in numerous locations from approximately elevation 527.5 up to elevation 537.0. In most areas, the acquisition of lands and flowage easements followed a blocked out line sufficient to encompass the 537.0 contour. Today, at the normal or conservation pool elevation of 522.0 NGVD, the lake has approximately 187 shoreline miles and a surface area of 27,175 acres.

There are 23 distinct areas designated for public recreation use at Lewisville Lake. Three of these areas are used only as a boat ramp access point. These 23 areas are managed by 11 different entities including nine cities, TPWD, and USACE. There are five public, concessionaire-operated marinas on the lake with each marina being located within or adjacent to a larger recreation area. One private marina, the Dallas Corinthian Yacht Club, is located on the Elm Fork arm of Lewisville Lake. There are also two major natural/environmental areas on the lake; the Lewisville Lake Environmental Learning Area operated by a consortium of entities and the Clear Creek Natural Heritage Area operated by the City of Denton. Finally, the YMCA and the Falcons of Lake Dallas each manage an area on Lewisville Lake for public benefit.

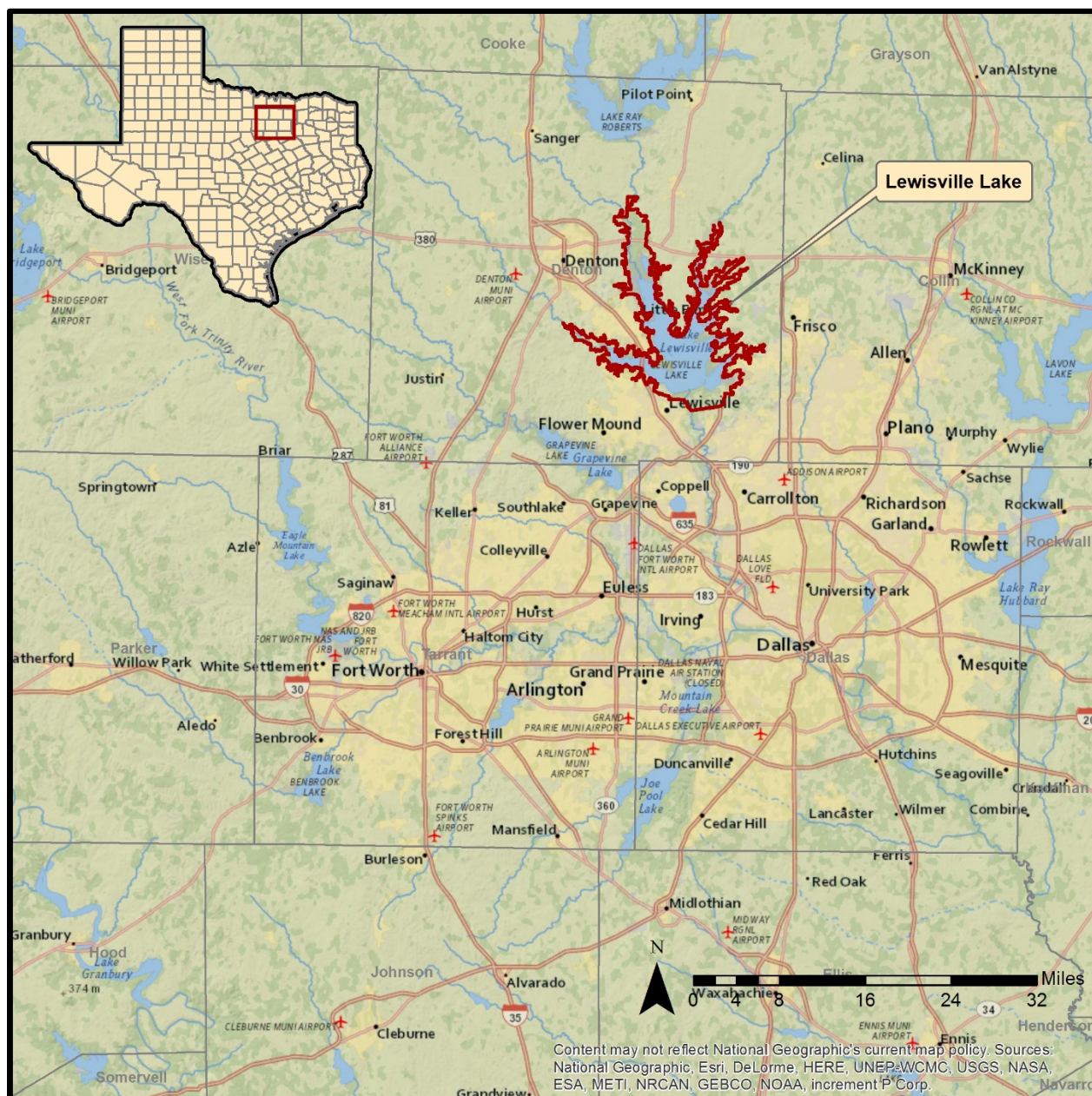


Figure 1.1 Vicinity Map of Lewisville Lake

1.6 DESCRIPTION OF RESERVOIR

Lewisville Lake is, by comparison to many USACE lakes, a medium to large size reservoir with a normal or conservation pool of 27,175 surface acres at elevation 522.0 NGVD. The depth of the lake near the outlet works is approximately 87 feet based on a streambed elevation of 435.0 feet at the outlet works, but depths decrease as one moves north from the dam. The top of the flood control pool is elevation 532.0 NGVD which is also the elevation of the uncontrolled spillway crest. Design criteria from the 1947 Definite Project Report indicated that Lewisville Lake would provide 53,500 acre-

feet of sediment storage over a period of 57 years. A volumetric survey conducted by USACE in 1965 indicated that 31,849 acre-feet of the original 53,500 acre-feet remained available in the lake. After construction of Ray Roberts Dam and Lake, the storage in Lewisville Lake was reallocated in 1987. The reallocation estimated that an additional 73,800 acre-feet of sediment would accumulate in Lewisville Lake by the year 2087. The TWDB last performed a standard volumetric survey for Lewisville Lake in 2007. Results from the survey indicate Lewisville Lake encompasses 27,175 surface acres and contains a total volume of 598,902 acre-feet at conservation pool elevation 522.0 feet. Comparing the 2007 figures with the USACE figures from the 1965 survey reveals a predictable steady accumulation of sediment within the conservation pool of Lewisville Lake. More information on sedimentation of Lewisville Lake can be found in Section 2.2.10.

At the conservation pool elevation of 522.0 NGVD, Lewisville Lake provides long vistas of open water. In general terms, the western half of the lake is located in the Cross Timbers Ecoregion whereas the eastern half of the lake is in the Texas Blackland Prairies Ecoregion. The western half of the lake has more topographic relief and is generally more aesthetically pleasing than the eastern half, but overall, the entire lake and surrounding public land is a green oasis almost entirely surrounded by residential and commercial development.

1.7 PROJECT ACCESS

The general setting of Lewisville Lake in Denton County is one of intense population growth and fast-paced development. Denton County is the ninth most populated county in Texas with an estimated 2017 population of 781,321. The county population was 432,976 in 2000 and the Census Bureau predicts a 2045 population of 1,990,969. See Chapter 6 of this Plan for more discussion about the rapidly increasing population surrounding the lake. This high growth rate, coupled with similar high growth rates in the surrounding region, has dictated a vastly expanded road and transportation network in the immediate area surrounding Lewisville Lake. In the ten years prior to publication of this plan the major road and transportation expansions listed below have been completed. Each of these projects required close coordination between USACE and road proponents (primarily the Texas Department of Transportation (TXDOT), North Texas Toll Authority (NTTA) and numerous cities.)

- The Lewisville Lake Toll Bridge was completed by the NTTA in 2009. The bridge is an extension of FM 2181 (Swisher Road) on the west and SH 720 (Eldorado Parkway) on the east. The linkage of FM 2181 and FM 720 provides a major east-west corridor across the middle-upper portions of Lewisville Lake.
- Replacement of the FM 720 (Eldorado Parkway) Bridge over the Little Elm Creek arm of Lewisville Lake. The FM 720 bridge was a relocation project completed by USACE as part of the Lewisville Lake Project in the 1950s. Replacement of the bridge involved widening and raising the bridge.
- The extension of FM 2499 across USACE land in the Hickory Creek Arm of the lake was completed in 2011. This project involved construction of two bridges and is a major 4-lane, divided roadway that provides an alternative north-south

transportation corridor roughly parallel to and west of Interstate Highway (IH) 35E.

- Widening of IH 35E where it crosses the Hickory Creek Arm of the lake. This project involved construction of a new south bound bridge and increased free traffic lanes going north and south from 3 to 4 lanes in both directions as well as two toll lanes each going north and south. The bridge provides a pedestrian lane as well. IH 35E is a major access corridor on the west side of Lewisville Lake.
- The widening of portions of FM 423 on the east side of Lewisville Lake has been going on for several years where it traverses through The Colony. FM 423 is a major north-south corridor providing access to the east side of Lewisville Lake.
- US Highway 380 (US 380) is a major east-west corridor across the upper end of Lewisville Lake. The highway was widened to six lanes in the early 2000s where it crosses the Elm Fork Arm on the upper end of Lewisville Lake.
- In June 2011 the Denton County Transit Authority (DCTA) opened the A-Train light rail from the Denton central business district to the Trinity Mills Station where the A-Train connects to the Green Line of the Dallas Area Rapid Transit (DART) system. The A-Train route roughly parallels IH-35E and includes the Highland Village/Lewisville Lake Station at the intersection of IH-35E and Garden Ridge Boulevard.



Photo 1.2 Lewisville Lake Toll Bridge (FM 2181) completed in 2011 by North Texas Tollway Authority (USACE Photo)

Completion of the above-listed projects has met many of the immediate transportation needs surrounding Lewisville Lake. In spite of this significant amount of road improvement work, most of the major roads surrounding Lewisville Lake remain congested during periods of high traffic and are likely to remain that way for the foreseeable future. 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. The 2017 Denton County Thoroughfare Plan (DCTP) was also used as a reference. Items recommended for implementation in the Mobility 2045 plan and/or the DCTP that are of significance to the area surrounding Lewisville Lake include the following:

- Widening of Highway 380 in the area east of the City of Denton.
- Widening of FM 423 from US 380 to SH 121
- Widening of FM 2499 from IH 35E to FM 407
- Widening of FM 428 where it crosses USACE land on the Greenbelt Corridor

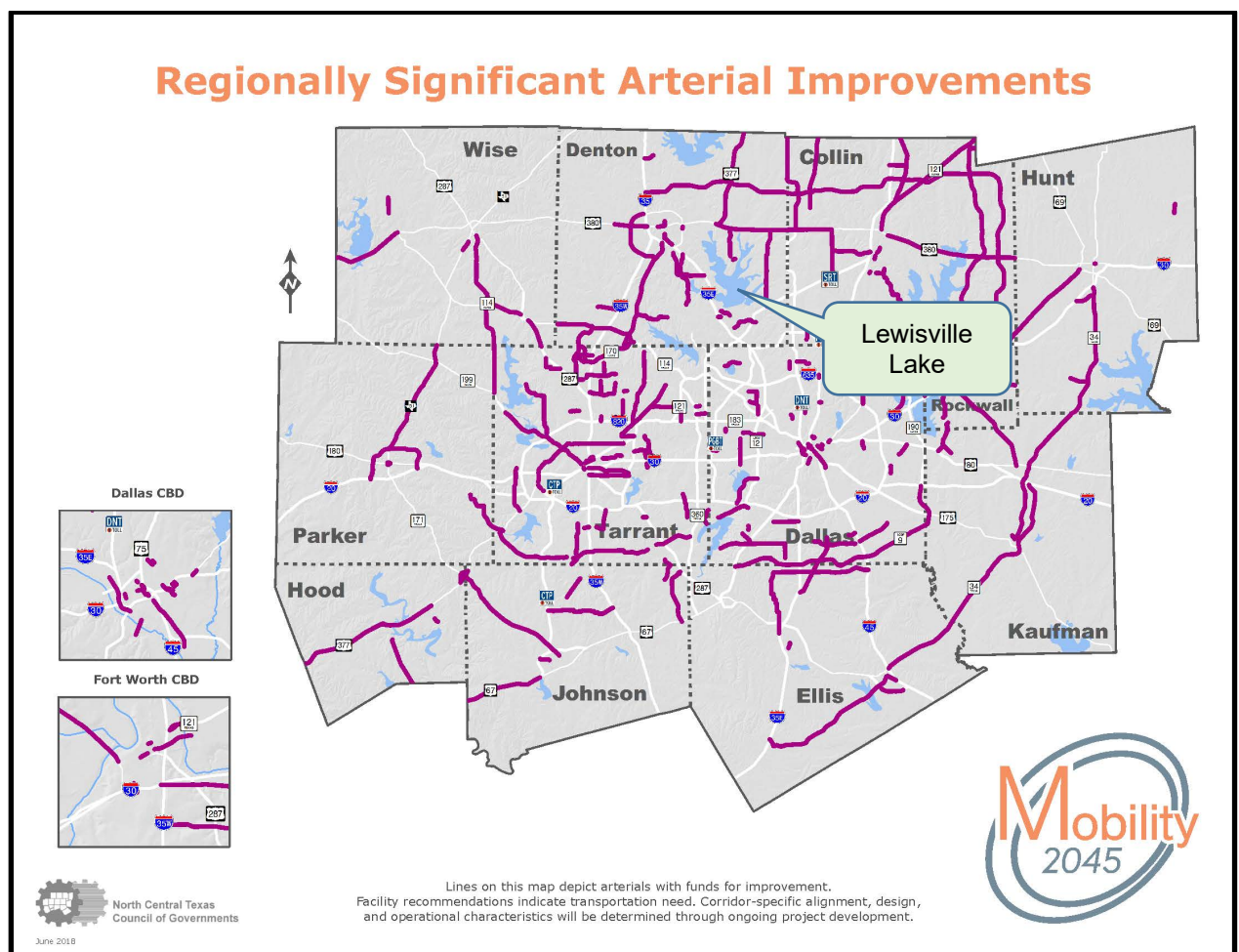


Figure 1.2 Recommended Improvements to Regionally Significant Arterials
(Source: NCTCOG)

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, MANUALS AND REPORTS

Design Memorandums and reports were prepared from 1947 thru 2017 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, dam safety modifications, and the master plan for recreation development and land management. Table 1.1 lists the Design Memoranda as well as other manuals and reports for Lewisville Lake.

Table 1.1 Design Memoranda, Manuals and Reports – Lewisville Lake

Item Number	Title of Design Memorandum, Manual or Report	Date
1.	Preliminary Report on Hydrology of Elm Fork Trinity River, and Spillway Design Flood for Garza-Little Elm Dam and Reservoir	February 1947
2.	Preliminary Report on Investigation of Proposed Reservoirs for Flood Control and Water Conservation on Elm Fork Trinity River	March 1947
3.	Definite Project Report	October 1947
4.	Design Memorandum for the East Portion of Embankment Garza-Little Elm Dam and Reservoir	August 1949
5.	Real Estate Planning Report, Part I	September 1949
6.	Analysis of Design for Construction of Outlet Works Garza-Little Elm Dam and Reservoir	September 1950
7.	Real Estate Planning Report, Part II	January 1950
8.	Design Memorandum for Construction of Spillway Garza Little Elm Dam and Reservoir	November 1951
9.	Design Memorandum for Reservoir Clearing Garza-Little Elm Dam and Reservoir	September 1952
10.	Design Analysis for Completion of Embankment and Construction of Service Bridge	September 1952
11.	Plan for Reservoir Regulation - Garza-Little Elm Reservoir	September 1956
12.	Draft Master Plan	September 1959

Item Number	Title of Design Memorandum, Manual or Report	Date
13.	Report of Sedimentation Resurvey Garza-Little Elm Reservoir	April 1960
14.	Design Memorandum No. 1C - Updated Master Plan	April 1966
15.	Aubrey Lake - Design Memorandum No. 1 - Hydrology - Supplement No. 1 - Supplement No. 2 - Supplement No. 3	August 1972 February 1973 September 1973 October 1974
16.	Revised Design Memorandum No. 1C - Updated Master Plan	January 1973
17.	Design Memorandum No. 2 - Real Estate Addition Reservoir Land	October 1973
18.	Environmental Impact Statement - Lewisville Lake	December 1973
19.	Aubrey Lake - Design Memorandum No. 5 - Embankment and Spillway	July 1974
20.	Revised Aubrey Lake - Design Memorandum No. 5 - Embankment and Spillway	June 1976
21.	Report on Sedimentation - Lewisville Lake - Resurvey of September 1965	July 1975
22.	Aubrey Lake - Design Memorandum No. 6 - Outlet Works	September 1976
23.	Design Memorandum No. 3 - Lewisville Dam - Modification of Embankment	October 1976
24.	Reconnaissance Report - Lewisville Dam - Modification of Embankment	June 1977
25.	Design Memorandum No. 3 - Lewisville Dam - Modification of Embankment Supplement No. 1	April 1979
26.	Spillway Design Flood Study - Lewisville Lake	August 1981
27.	Reconnaissance Report - Adding Hydropower to Lewisville Dam	September 1981
28.	Design Memorandum No. 3 - Lewisville Dam - Modification of Embankment - Supplement No. 2	November 1982
29.	Dam Safety Assurance Study - Lewisville Lake - Hydrology and Hydraulics (With Ray Roberts)	March 1983
30.	Lewisville Lake - Operation and Maintenance Manual - Volume II - Flood Emergency Plan	June 1984

Item Number	Title of Design Memorandum, Manual or Report	Date
31.	Design Memorandum No. 1C - Master Plan Lewisville Lake	June 1985
32.	Drought Contingency Plan - Trinity River Basin, Texas - (including Lewisville Lake)	August 1991
33.	Ray Roberts Lake - Operation and Maintenance Manual - Flood Emergency Plan	February 1993
34.	Flood Insurance Study - Denton County, Texas - Unincorporated Areas - Revised	June 1994
35.	Water Quality Report - Lewisville Lake	February 1996
36.	Sediment Survey of 2007 TWDB	December 2008
37.	Dam Safety Modification Report (DSMR)	March 2017

Source: USACE 2018 Water Control Manual for Lewisville Lake

1.9 PERTINENT PROJECT INFORMATION

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

Table 1.2 Elevations and Water Storage Capacity

	Elevation (Feet NGVD)	Lake Area (Acres)	Storage (Acre-Feet)	Runoff (inches)
Top of Dam	560.0			
PMF Water Surface (2017 IDF Study)	554.10	67,073	2,082,608	23.52
Maximum Design Water Surface Elevation (1951 Study)	553.0	66,100	2,051,200	23.34
Top of Flood Pool & Spillway Crest (1965 Survey)	532.0	39,168	981,763	11.09
Top of the Conservation Pool (2007 Survey)	522.0	27,175	598,902	7.24
Sediment Reserve-Flood Pool Storage(1987-2087)	532.0-522.0		10,400	
Sediment Reserve- Conservation Pool Storage (1987-2087)	Below 522.0		63,400	
Maximum Tailwater	533.0			
Streambed (2007 Survey)	435.0	0	0	

Source: USACE



Figure 1.3 Construction of Lewisville Dam Spillway, 9 Dec 1952

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. Lewisville Lake lies within the Northern Blackland Prairie (Level III) and Eastern Cross Timbers ecoregion (Level III) as depicted in Figure 2.1.

The Blackland Prairie is divided into distinct Northern and Southern regions, with the Northern region stretching over 300 miles from Sherman in the north to San Antonio in the south. The region is characterized by fine-textured, clayey soils and predominantly prairie vegetation. Prairie vegetation includes various grasses and forbs, while the bottomland hardwood forests is predominantly oak and other hardwood trees.

The Eastern Cross Timbers stretches from Waco to the Texas-Oklahoma State border. The Cross Timbers ecoregion is a complex mosaic of upland deciduous forest, savanna, and prairie communities that vary geographically depending upon soil conditions, rainfall, and fire history, highlighting the broad and overlapping ecotone transition areas between the eastern forests and the grasslands of the Great Plains. The region supports an evolving plant life as it radiates outward on an upward gradient, from open lake waters, shallow wetlands, and shoreline transition toward more elevated and better drained sites. The vegetation types parallel the progression from wetland herbaceous/shrub plants and grasses to bottomland forest, oak forests, and then grasslands/prairies on the deeper soiled, well drained areas at the higher elevations. Scrub and marginal/transitional forest trees can be found where the soil is shallow or has rock outcrops. Cross Timbers type oak forests cover most of the ridged and hilly terrain between the prairies and the bottomland forests, and account for the major portion of land area and vegetative cover surrounding the lake. Elevations range from approximately 400 feet to 1700 feet NGVD29 in the Cross Timbers region, with Lewisville Lake conservation pool at 522 feet NGVD29.

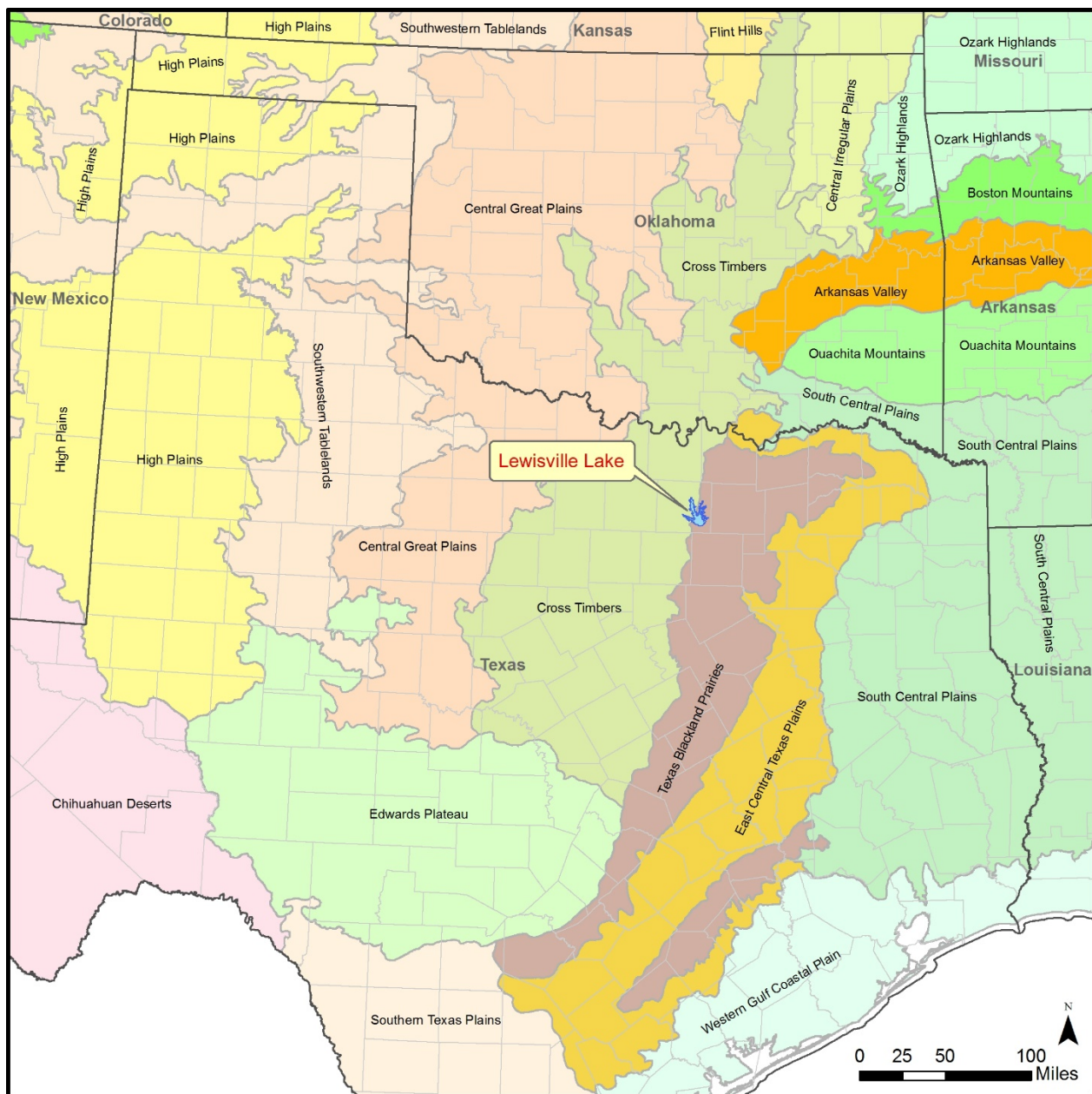


Figure 2.1 Lewisville Lake within Texas Ecoregions (Source: EPA)

Before Anglo settlement, the Cross Timbers and Blackland Prairie region was habitat for bison, pronghorn antelope, mountain lion, bobcat, ocelot, black bear, collared peccary, deer, coyote, fox, badger, river otter, and many species of birds. In 1886, the naturalist Washington Irving stated that wandering through the Cross Timbers area was like “struggling through forests of cast iron.” Much of the original prairie and forest has been converted to cropland and pasture or cleared for urbanization, with less than one percent of both the original Blackland Prairie and Cross Timbers vegetation remaining today.

2.1.2 Climate

Located within the Elm Fork Trinity River Basin, the climate of Lewisville Lake is a warm, temperate, humid, subtropical climate. Summers are usually hot and often humid during the day and warm at night, while winter temperatures are normally mild with short durations of freezing temperatures. 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. Warm seasonal rainfall is largely the result of thunderstorm activity, with amounts varying considerably in both intensity and location.

2.1.2.1 Temperature

The mean annual temperature over the basin is about 65 degrees Fahrenheit (°F). The average low and high temperatures range from 33°F in January to 96°F in August. The lowest minimum-recorded temperature is -7°F, while the highest-recorded temperature was 114°F. The area has a growing season ranging from 226 days at Gainesville in the upper part of the watershed to 267 days at Dallas near the lower watershed boundary. Table 2.1 gives temperature averages and extremes for the Elm Fork Trinity River basin.

Table 2.1 Temperature Averages and Extremes

Average Low January Temperature	33°F
Average High August Temperature	96°F
Average Annual Temperature	65°F
Average Days with Temperature ≤ 32°F	33 days
Average Days With Temperature ≥ 100°F	18 days
Record Low Temperature	-7°F
Record High Temperature	114°F

Source: NOAA & National Weather Service

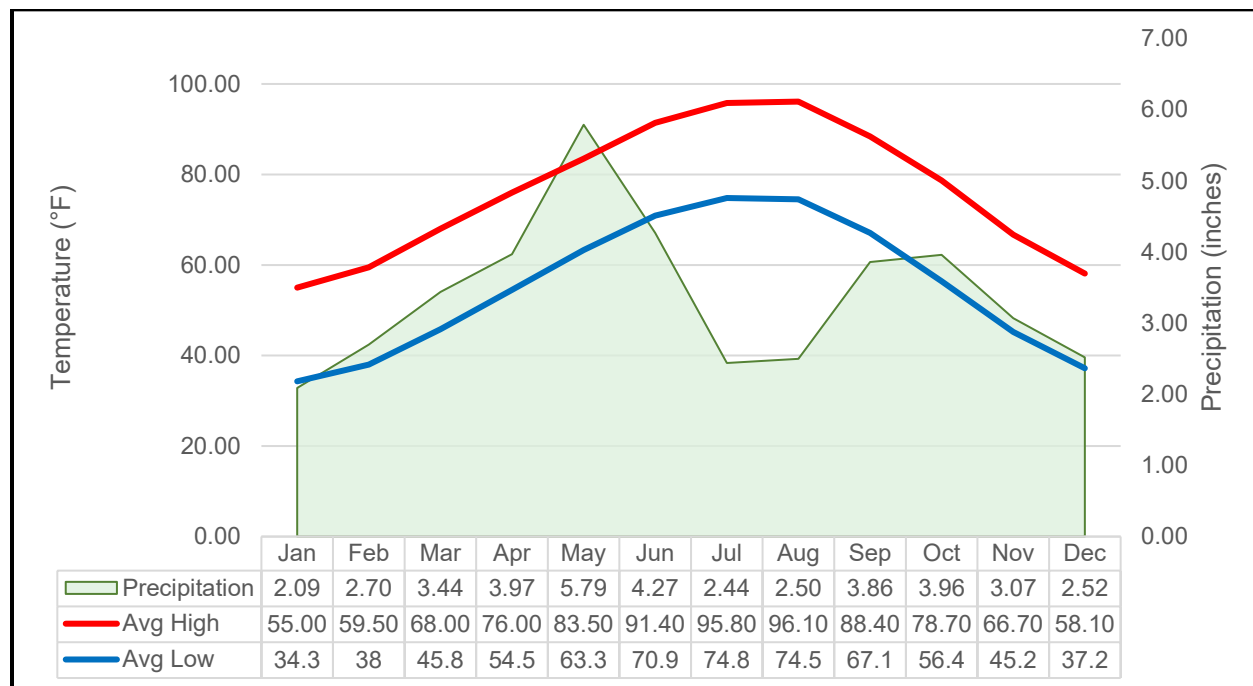
2.1.2.2 Precipitation

The normal annual precipitation over the Elm Fork Trinity River watershed varies from approximately 36 inches at Carrollton in the southeastern part of the watershed, to 41 inches at Pilot Point, in the north central portion of the watershed. Across the watershed, precipitation levels are higher in the late-spring and early-summer months, peaking in May-June and lowest in November-February. Tropical maritime air can bring heavy showers of short duration at any time during the year. Rainfall can occur through short rainstorms or even torrential thunderstorms delivering over 5 inches of rain in a 24-hour period. Those torrential storms, when combined with poorly draining soil, can lead to significant runoff and a threat of flooding. The precipitation averages and extremes within the watershed area are documented in Table 2.2, while average annual precipitation and temperature are documented in Figure 2.2. Minor accumulations of snowfall (about 2.5 inches) occur periodically during the winter months; however, snowfall does not contribute significantly to area precipitation or runoff.

Table 2.2 Watershed Precipitation Averages and Extremes

Mean Annual Precipitation	36.2 inches (Watershed)
Maximum Annual Precipitation	87.72 inches (2015, Gainesville)
Minimal Annual Precipitation	15.11 inches (1963, Denton)
Maximum Monthly Precipitation	30.30 inches (May 1982, Pilot Point)
Minimum Monthly Precipitation	0.00 inches (Several)
Maximum 24-hour Rainfall	13.00 (13 May 1982, Pilot Point)
Average Annual Snowfall	2.5 inches (Watershed)
Maximum Monthly Snowfall	13.5 inches (Feb 1978)
Maximum 24-hour Snowfall	12.5 inches (Feb 2010)

Source: NOAA, National Weather Service, and Water Control Manual

**Figure 2.2 Precipitation and Temperature Averages per Month**

Source: NOAA, National Weather Service, and Water Control Manual

2.1.2.3 Storms and Floods

The Elm Fork Trinity River 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. The maximum 24-hour rainfall reported in or adjacent to the basin was 13.00 inches, which occurred at Pilot Point, a small town in Denton County, on 13 May 1982. The maximum monthly rainfall reported was 30.30

inches for May 1982 at Pilot Point. Generally the Elm Fork Trinity River's large floods are long-duration type having two or more peaks spaced as close as ten days apart. However, it is possible that large peak and volume floods could occur in about two weeks duration. The major storms experienced over the watershed for which rainfall data are available, together with the average rainfall depths produced on the watershed above the dam, are listed in Table 2.2.

2.1.2.4 Runoff Characteristics

Floods may occur at almost any time of year in the Elm Fork Trinity River watershed. Steep slopes in the upper part of the Elm Fork Basin produce high runoff during periods of heavy rainfall. Initial rainfall losses range from 0.30 inches to 1.00 inches, with uniform infiltration rates between 0.04 to 0.15 inches per hour.

2.1.2.5 Evaporation

The major factors affecting the rate of evaporation are temperature, humidity, and wind. Normally, evaporation is measured with an evaporation pan, but there is no evaporation pan currently at Lewisville Lake. A NWS "Class A" evaporation pan at Grapevine Lake is used to estimate evaporation at Lewisville Lake since the two dams are close to each other. The evaporation pan has a higher rate of evaporation than the lake, so a coefficient is used to estimate the actual lake evaporation. The evaporation pan at Grapevine Lake is 10-inch deep with 47.5-inch diameter. From measurements collected between August 1953 and September 2012, the estimated average annual evaporation from the lake is about 83 inches. The average monthly and annual evaporation from Lewisville Lake are given in Figure 2.3. The highest recorded annual evaporation was 113.4 inches in 1956, while the lowest was 69.59 in 2007. The highest evaporation during a single month was 13.86 inches in July 2011.

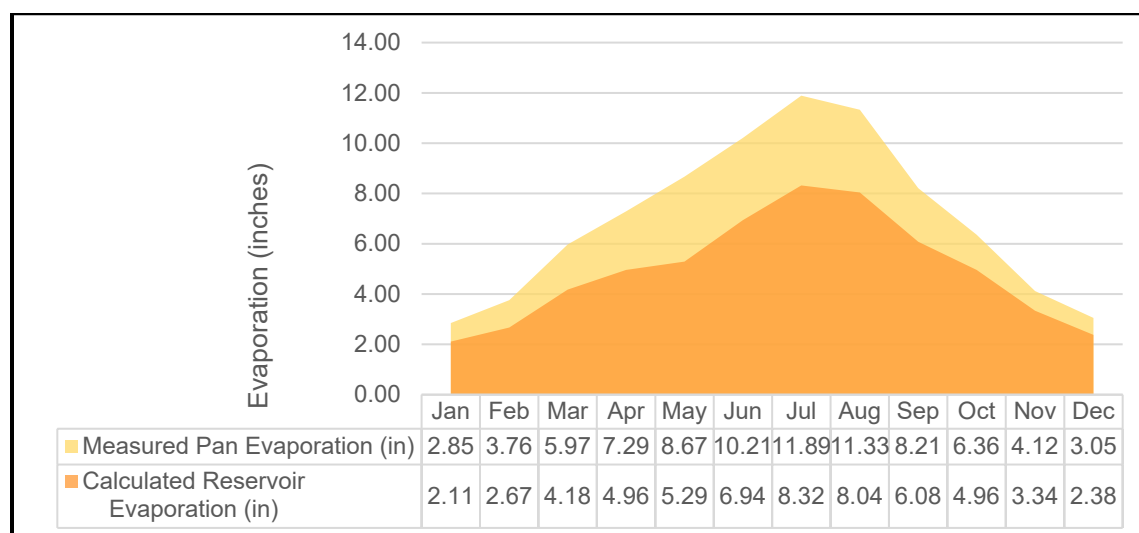


Figure 2.3 Evaporation Monthly Average Lewisville Lake

Source: Water Control Manual

2.1.2.6 Wind

The prevailing winds over the watershed are from the south during the spring, summer, and fall months, while northerly winds prevail during the winter months. Severe winds have been experienced near Lewisville Lake. Gusts as fast as 110 miles per hour have been recorded near NWS Station in Denton, approximately 16 miles northwest of the dam site on 13 June 1989. Data from a wind monitoring station at nearby Denton Airport are diagrammed in Figure 2.4 showing the wind intensity, frequency, and direction.

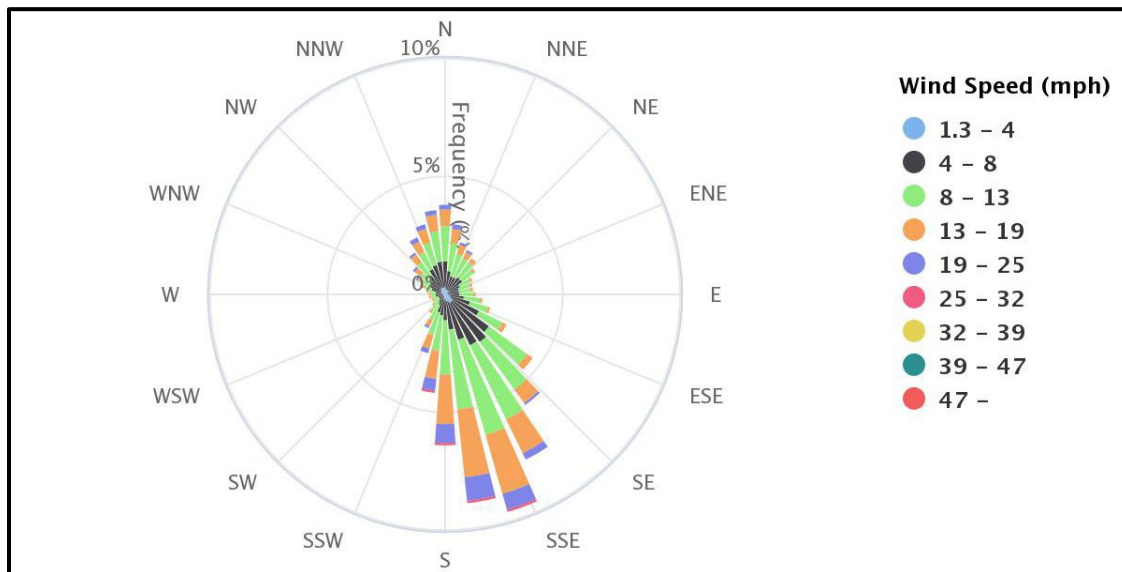


Figure 2.4 Wind Rose at Denton Municipal Airport

Source: MRCC Cli-MATE Tool, Wind Rose from Denton Municipal Airport, 1996-2017

The design wind speed of Lewisville Lake is 54 mph, the fetch for wind setup is 15.42 miles, and the computed required freeboard is 5.9 feet. This freeboard was computed for the 2017 Inflow Design Flood elevation of 560.0 feet, which is adequate and equal to the top of dam. The average annual wind speed at Dallas, Texas, 29 miles southeast of the Lewisville Dam, is 11 miles per hour over the entire year. Tornadoes are a somewhat rare occurrence in the watershed. In 2015 a series of tornados reaching EF4 level left 13 people dead and injured over 300 across parts of North and Central Texas.

2.1.3 Geology

Lewisville Lake is founded on the basal Eagle Ford Formation and the upper part of the underlying Woodbine Formation. The eastern abutment of the dam and most of the valley embankment is underlain by Eagle Ford Shale an Eagle Ford residual overburden.

The western abutment is composed of Woodbine sandstone shale and residual soil material. The trace of contact between these two upper Cretaceous Formations begins near the west abutment tending northward across the divide between Elm Fork

and Pecan Creek, then northeastward along the lower reaches of Little Elm Creek. The regional strike of these formations is 12 degrees east and the drop is to the southeast at 50 to 60 feet per mile. The lower Eagle Ford Shale is selenic, bituminous and medium to dark gray, weathering to tan. It contains calcareous concretions, setaria, and marine megafossils. Overburden consists of residual clay and reworked Eagle Ford Shale. The Woodbine Formation consists of 70 to 80 feet of glauconitic shale with sand lenses, underlain by about 260 feet of sandstone. The sandstone beds are highly variable, featuring cross bedding, minor shale beds, tuffaceous clay lenses, carbonaceous clay, and lignite. The upper sandstones are glauconitic and contain fossil oyster reefs and other megafossils. Overburden on the Woodbine generally consists of clay sands and silts. The maximum overburden thickness on the periphery of the lake is about 50 feet.

2.1.4 Topography

Lewisville Lake and its tributaries are located in the Blackland Prairie, East Cross Timbers, Grand Prairie, and West Cross Timbers subdivisions of the Gulf Coastal Plain physiographic province. The topography throughout the basin is predominantly gently rolling. Basin topography varies from level or gently rolling in the lower reaches to broken prairie in the north and northwestern reaches. Some rough land occurs along the streams in the lower reaches.

In the Eastern Cross Timbers area, soils are mainly red and yellow sands that have been leached of nutrients. Post oaks and blackjack oaks have adapted to life in sandy soils and they dominate the overstory, with scattered honey mesquite and grasses, such as little bluestem and threeawn, growing beneath them. Although the rural land use is predominantly cattle grazing, there is some farming for peanuts, grain sorghum, pecans, peaches, and vegetables.

In the Blackland Prairie, Soils are mostly fine-textured, dark, calcareous, and productive Vertisols. Historical vegetation was dominated by little bluestem, big bluestem, yellow Indiangrass, and tall dropseed. The rolling to nearly level plains of the Northern Blackland Prairie ecoregion are underlain by interbedded chinks, marls, limestones, and shales of Cretaceous age. This region now contains a higher percentage of cropland than adjacent regions; pasture and forage production for livestock is common. Large areas of the region are being converted to urban and industrial uses.

2.1.5 Hydrology and Groundwater

The Trinity River Basin is the third largest river basin in Texas by average volume and the largest river basin that both begins and ends in the state. The Trinity River provides water to over half of the state's population, serving two major population centers: Dallas/Fort Worth in the north and Houston in the South. The basin has an overall length of 360 miles, where the Trinity River meanders a total of 715 miles before draining into the Galveston Bay and estuary system, a very productive ecosystem and commercial fishery.

The Elm Fork of the Trinity River originates in eastern Montague County, Texas and flows in a southeasterly direction for approximately 110 miles through Cooke, Denton and Dallas Counties to its confluence with the West Fork of the Trinity in the City of Dallas. The watershed lies in the north central portion of Texas extending across the state between north latitudes 33°44' and 32°42' and west longitudes 96°43' and 97°50'. The watershed is comprised of parts of Montague, Cooke, Grayson, Collin, Wise, Tarrant, Denton and Dallas Counties. It is about 80 miles long along its axis and has a maximum width of 60 miles. The watershed of the Elm Fork of the Trinity River has a total drainage area of 2,577 square miles of which 917 square miles are downstream from Lewisville Dam. Lewisville Lake controls 1,660 square miles of the drainage area.

Lewisville Dam is located on the Elm Fork of the Trinity River at river mile 30.0. The river drops from an elevation of about 1,210 feet at its source to 435 feet at the Lewisville Dam site. The Elm Fork continues to drop to elevation 387 feet at its confluence with the West Fork in Irving/Dallas. The average slope of the stream bed is 7.5 feet per mile, and the average slope downstream of Lewisville dam is 1.6 feet per mile.

The principal tributaries contributing to the Elm Fork of the Trinity River are the right bank tributaries, Denton Creek, Hickory Creek and Clear Creek, and the left bank tributaries, Isle Du Bois Creek and Little Elm Creek. With the exception of Denton Creek, all of these principal tributaries are located upstream of Lewisville Lake.

The Elm Fork basin has gently rolling hills and broad river valleys, with generally greater relief in the upper reaches. Basin vegetation is divided between the tall prairie grasses of the Grand Prairie physiographic region and the dense growth of Blackjack and Post Oaks of the Eastern Cross Timbers Region. The majority of the Lewisville Lake watershed lies within the Cross Timbers ecoregion to the west, and the Texas Blackland Prairie ecoregion to the east. The Trinity River basin is supported by numerous industries, including trade, transportation and utilities, professional business service, and education and healthcare.

Deep below Lewisville Lake lies the Trinity Aquifer, a major aquifer, and the Woodbine (subcrop) aquifer, which is a minor aquifer. Water in the aquifer is very fresh with slight to moderate salinity and dissolved solids. The aquifer discharges to several natural springs on the western edge of the aquifer, but most springs discharge at less than 10 cubic feet per second. The aquifer is one of the most extensive and highly used groundwater resources in the state, and is used primarily as a municipal water source, but also for irrigation, livestock, and other domestic uses.

The Trinity River Authority of Texas (TRA) has contracted with USACE for all water supply storage in Lewisville Lake for the cities of Denton and Dallas, as well as surrounding communities. Recently, the aquifer has suffered some of the state's worst water level declines, both lowering the depth and reducing the pressure of water within the aquifer. This has been due to recent droughts combined with increasing pumping for

municipal water use. The regional water planning group has recommended that municipalities start developing other water sources, including increasing surface water use as municipal demand for water is expected to increase.

2.1.6 Soils

Soils in the primary strata along the sides of the valley of the Elm Fork are terraces of sandy clay, sands, and gravel that were deposited during the Pleistocene geologic age. These terrace deposits cover the flood plain east of the Elm Fork, reaching a thickness of approximately 35 feet. The valley of the Elm Fork and its tributaries are filled with recent flood plain deposits consisting of clay and sandy clay. These overlay the sand and gravel of the Pleistocene deposits.

Many different soils, comprising more than 15 major series, occur in the Lewisville Lake vicinity. Residual soils east of the Elm Fork overlaying the Eagle Ford formation are predominantly clay soils. Soils west of the Elm Fork overlying the Woodbine formation are somewhat sandy. The sandy soils are fairly shallow and overlie clay based subsoil with a deep profile to bedrock.

A soil survey by the Natural Resource Conservation Service (NRCS) shows there are seven out of the eight possible general soil classifications occurring in the reservoir area. The erosion hazards and limitations for use increase as the class number increases. Class I has few limitations, whereas Class VIII has many. The soil class data for project lands is provided in Table 2.3. This data is compiled by the NRCS and is a standard component of natural resources inventories on USACE lands. This, and other inventory data, is recorded in the USACE Operations and Maintenance Business Information Link (OMBIL). A general soil type map is provided in Figure 2.5.

Table 2.3 NRCS/USDA Soil Classification

Class	Acreage	Description
I	50	Class I (1) soils have slight limitations that restrict their use.
II	1,000	Class II (2) soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.
III	2	Class III (3) soils have severe limitations that reduce the choice of plants or require special conservation practices, or both.
IV	6,058	Class IV (4) soils have very severe limitations that restrict the choice of plants or require very careful management, or both.
V	4,050	Class V (5) soils have little or no hazard of erosion but have other limitations, impractical to remove, that limit their use mainly to pasture, range, forestland, or wildlife food and cover.
VI	4,000	Class VI (6) soils have severe limitations that make them generally unsuited to cultivation and that limit their use mainly to pasture, range, forestland, or wildlife food and cover.
VII	3,000	Class VII (7) soils have very severe limitations that make them unsuited to cultivation and that restrict their use mainly to grazing, forestland, or wildlife.
VIII	1,000	Class VIII (8) soils and miscellaneous areas have limitations that preclude their use for commercial plant production and limit their use to recreation, wildlife, or water supply or for esthetic purposes.

Source: OMBIL; Class descriptions from NRCS/USDA

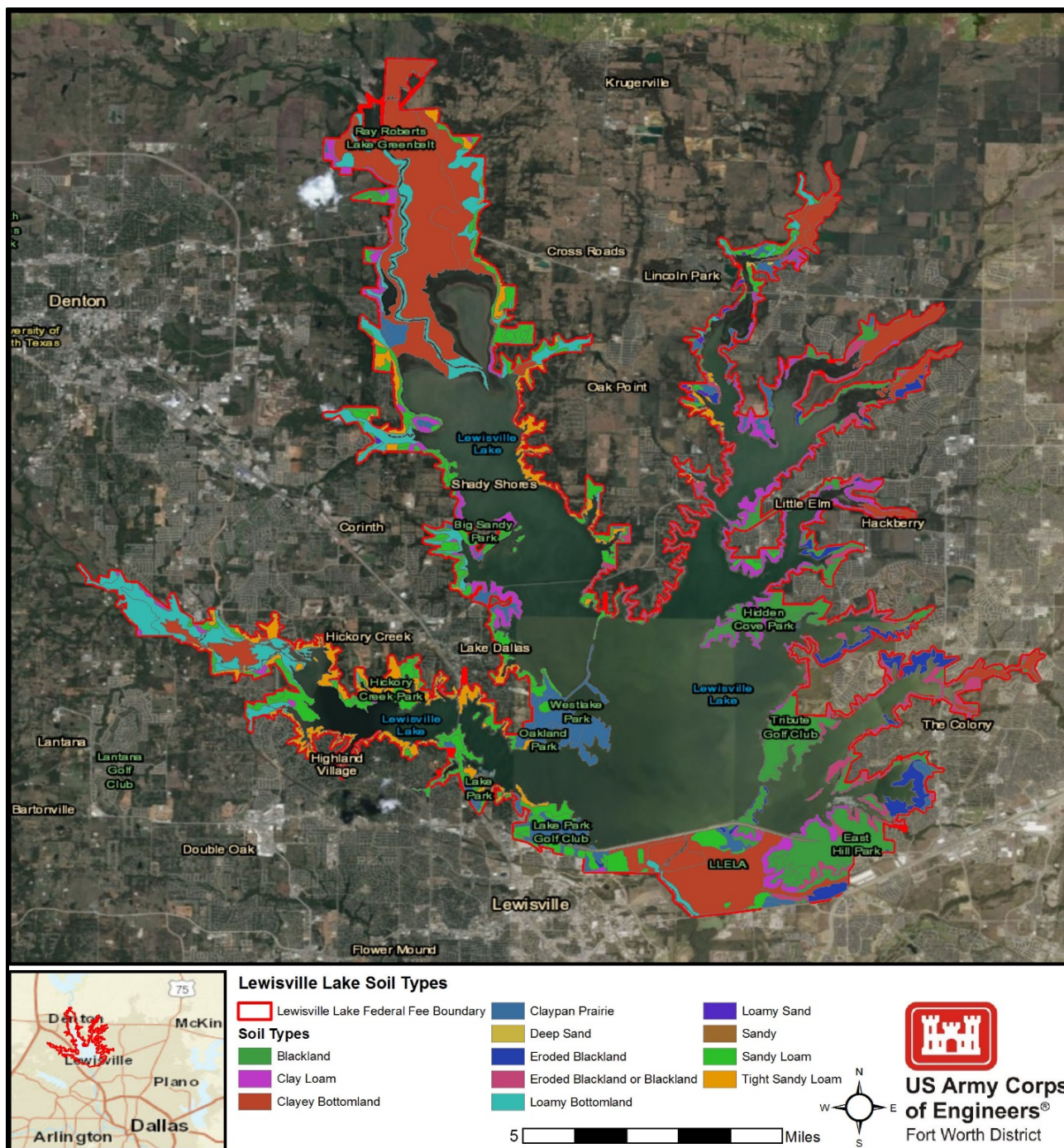


Figure 2.5 Soils Map for Lewisville Lake

2.2 ECOREGION AND NATURAL RESOURCE ANALYSIS

2.2.1 Natural Resource Stewardship and Analysis

The natural resources present at Lewisville Lake include the water, wetlands, soil, vegetation, and fish and wildlife, including those species listed as endangered or threatened by the U.S. Fish and Wildlife Service (USFWS) and the state of Texas. The

most common habitat types include grassland, marsh, riparian/bottomland hardwood forest, and upland forest. The stewardship of natural resources adheres to ecosystem management principles as described in the USACE regulations ER and EP 1130-2-540. Effective stewardship is imperative to the sustainability and use of project resources. The ecoregion and the local natural resources are described in further detail in the following section.

As part of the master planning process, USACE completed a habitat study for the Environmental Assessment (EA, located in Appendix B) based on Texas Parks and Wildlife Department's (TPWD) Wildlife Habitat Appraisal Procedure (WHAP). The WHAP was developed to allow a qualitative and holistic evaluation of wildlife habitat for a particular location without requiring significant time for field work or compiling data. In the fall of 2017, a total of 94 points were surveyed from the known major habitat types throughout USACE lands around the lake to assess the quality of the habitat around Lewisville Lake. Overall marsh and grassland habitats exhibited the highest average total score (0.70 and 0.66), as these habitats generally exhibited more herbaceous vegetative species and structural diversity. On average, all habitat types, including riparian/BHF and upland forest, displayed at least medium quality habitat. The grassland site receiving a score of 1.00 is likely to transition to upland forest in the near future. The surrounding forest will continue to encroach into the grassland area as supported by the diversity of young woody species detected within the site. The results of the WHAP provided critical data to identify unique, diverse, or sensitive environments around the lake for the EA as well as updating land classifications for this master plan. A summary of WHAP scores tallied at Lewisville Lake is provided in Table 2.4. The WHAP Report is included in Appendix C.

Table 2.4 Average, Maximum, and Minimum Total WHAP Scores per Habitat Type

Habitat Type	Average Total Score	Maximum Total Score	Minimum Total Score
Grassland	0.66	1.00	0.47
Marsh	0.77	0.98	0.41
Riparian/BHF	0.63	0.81	0.45
Upland Forest	0.61	0.89	0.43

2.2.2 Vegetative Resources

USACE regulations and policy require a basic inventory of the vegetation at all operational projects. This inventory, referred to in EP 1130-2-540 as a Level 1 inventory, classifies the vegetation in accordance with the National Vegetation Classification System (NVCS) down to the Sub-Class level which is a very broad classification level. The inventory data presented in Table 2.5 is recorded in the USACE national database referred to as OMBIL and is useful in providing a general characterization of the vegetation on all operational projects. Daily management of USACE lands requires more detailed knowledge of the vegetation down to the

Association level within the NVCS, and for most management prescriptions, down to the individual species level of dominant vegetation.

Table 2.5 Vegetation Classification and Acres at Lewisville Lake

Order	Class	Sub-class	Total Sub-Class Acreage	Sustainable Acres	Total Condition Acres
Non-Vegetated	Non-Vegetated	Non-Vegetated	29,592	29,592	29,592
Herb Dominated	Herbaceous Vegetation	Hydromorphic Rooted Vegetation	350	350	350
Herb Dominated	Herbaceous Vegetation	Perennial Graminoid Vegetation (Grassland)	3,858	3,858	3,858
Tree Dominated	Closed Tree Canopy	Deciduous Closed Tree Canopy	9,545	9,545	9,545
Tree Dominated	Closed Tree Canopy	Evergreen Forest	1	1	1
Tree Dominated	Closed Tree Canopy	Mixed Evergreen-Deciduous Closed Tree Canopy	75	75	75
Tree Dominated	Open Tree Canopy	Deciduous Open Tree Canopy	5,331	5,331	5,331

Source: OMBIL Report Project Site Vegetation Classification and Condition Records for Fiscal Year 2017

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 (*Aster spp.*), prairie bluet (*Stenaria nigricans*), prairie clovers (*Dalea spp.*), and coneflowers (*Echinacea spp.*). Bottomland hardwood forests are not as prevalent, but where they occur contain bur oak (*Quercus macrocarpa*), Shumard oak (*Quercus shumardii*), post oak (*Quercus stellata*), blackjack oak (*Quercus marilandica*), green ash (*Fraxinus pennsylvanica*), pecan (*Carya illinoensis*), cedar elm (*Ulmus crassifolia*), American elm (*Ulmus americana*), Winged elm (*Ulmus alata*), sweetgum (*Liquidambar styraciflua*), sugar hackberry (*Celtis laevigata*), and eastern cottonwood (*Populus deltoides*). Some slopes and upland forests support honey mesquite (*Prosopis glandulosa*) and several cedars and junipers (*Juniperus spp.*) and have become more prevalent due to the absence of regular fires.

The vegetation of the Cross Timbers section of the Limestone Cut Plain is composed of numerous tree species including post oak (*Quercus stellata*), white shin oak (*Quercus sinuata var. breviloba*), cedar elm (*Ulmus crassifolia*), Texas ash (*Fraxinus albicans*), plateau live oak (*Quercus fusiformis*), and bur oak (*Quercus macrocarpa*). Although the grasslands of the Limestone Cut Plain are a mix of tall, mid, and short grasses, some consider it a westernmost extension of the tallgrass prairie,

which distinguishes this ecoregion from the Edwards Plateau Woodland. Grasses include big bluestem (*Andropogon gerardi*), little bluestem (*Schizachyrium scoparium*), yellow Indiangrass (*Sorghastrum nutans*), silver bluestem (*Bothriochloa saccharoides*), Texas wintergrass (*Nassella leucotricha*), tall dropseed (*Sporobolus compositus*), sideoats grama (*Bouteloua curtipendula*), and common Curly mesquite (*Hilaria belangeri*). The Cross Timbers wooded areas consist primarily of post oak (*Quercus stellata*), blackjack oak (*Quercus marilandica*), and hickories (*Carya spp.*), along with tall and midgrasses. A denser woody understory forms in the absence of fire.



Photo 2.1 Post oak acorns. The post oak (*Quercus stellata*) is a dominant tree species in the Cross Timbers Ecoregion at Lewisville Lake
(USACE Photo by Don Wiese)

2.2.3 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 (EPA). Wetlands are a subset of the waters of the United States that may be subject to regulation under Section 404 of the CWA (40 CFR 230.3).

Wetlands are defined as 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. For the purpose of preparing and implementing this Plan, the

National Wetlands Inventory (NWI) established by US Fish and Wildlife Service (USFWS) is used to identify wetland types in the project area. As Figure 2.6 shows, Lewisville Lake has areas of Freshwater Emergent Wetlands and Freshwater Forested/Shrub Wetlands, predominantly to the north of the lake.

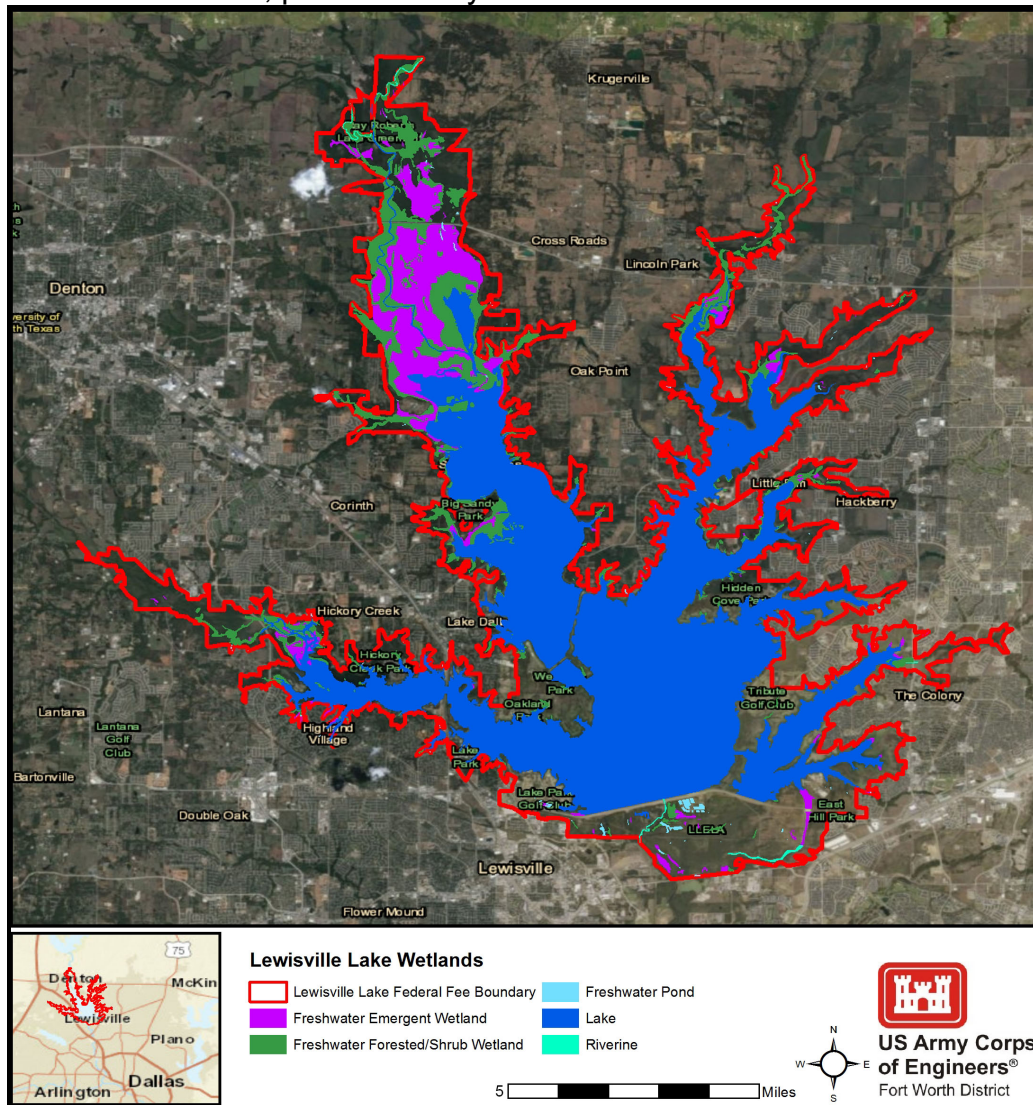


Figure 2.6 National Wetland Inventory Data for Lewisville Lake

Source: NWI Data from USFWS

Table 2.6 lists the acreages of various types of wetlands present at Lewisville Lake. Wetland classifications presented are derived from the U.S. Fish & Wildlife Service's (USFWS) Trust Resource List generated using the Information, Planning, and Conservation System decision support system.

Table 2.6 Wetland Acreages at Lewisville Lake

System	Sub-system	Class	Class Acres
Lacustrine	Limnetic	Unconsolidated Bottom	19,370
Palustrine	No Sub-System	Freshwater Emergent Wetland	2,806
Palustrine	No Sub-System	Freshwater Forested/Emergent Wetland	4,670
Riverine	Lower Perennial	Unconsolidated Bottom	159

Source: OMBIL

2.2.4 Fish and Wildlife Resources

Lewisville Lake provides habitat for an abundance of fish species, providing fishing opportunities from the shoreline, boats, and fishing platforms at the marina. 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. Several species have been stocked periodically since 1981 with bass and catfish being the most popular. There is significant fishing pressure at the lake, since it is located within one of the most populated urban metro areas in the United States. TPWD has set special size restrictions for largemouth bass at Lewisville Lake.

Many of the undeveloped opens spaces provide habitat for wildlife including 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 or nesting area for migratory birds. Approximately 5,400 acres are included in the Lewisville Lake Environmental Learning Area on the south end of the Lake and the Clear Creek Natural Heritage Center on the north end. Both areas are managed for the benefit of wildlife. These two areas are described in more detail in Chapter 5 of this Plan. The entire USACE land holding at Lewisville Lake is located in Denton County. The lake is surrounded by 13 incorporated cities and a few areas of unincorporated Denton County. Due to the proximity to urban development, hunting is controlled by USACE and the City of Denton through permit systems at Lewisville Lake. The major ecological habitat types at Lewisville Lake are depicted in Figure 2.7.

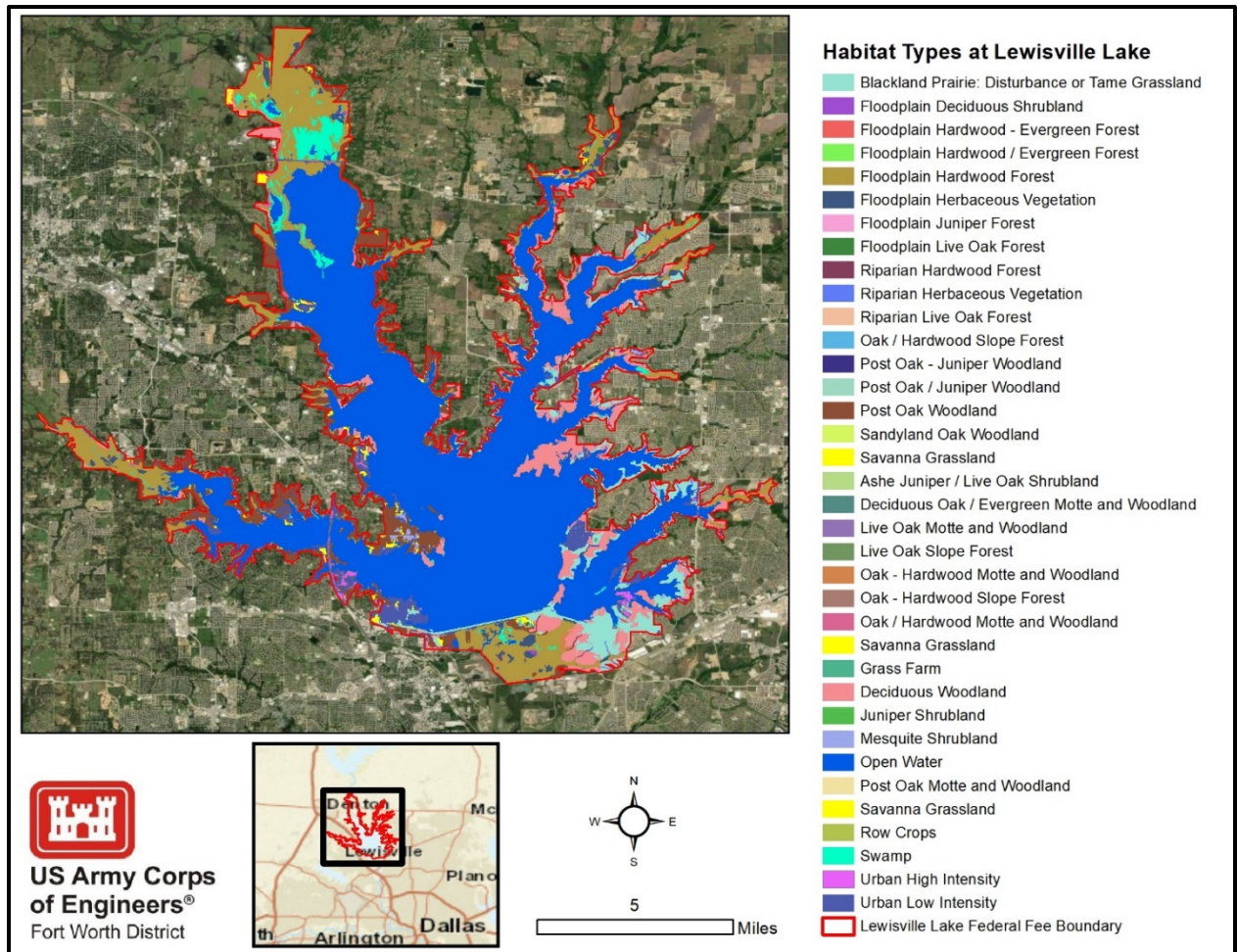


Figure 2.7 Ecological Habitat Types at Lewisville Lake

Source: TPWD Ecological Mapping Service

2.2.5 Threatened and Endangered Species

Threatened species are those which are likely to become endangered within the foreseeable future. Endangered species are in danger of extinction throughout all or a significant portion of their range. Section 7(a)(2) of the Endangered Species Act requires federal agencies to ensure that any action authorized, funded, or carried out by such agency is not likely to: (1) jeopardize the continued existence of any endangered or threatened species or (2) result in the destruction or adverse modification of critical habitat. The term, "jeopardize the continued existence of", means to reduce appreciably the likelihood of both the survival and recovery of listed species in the wild by reducing the species' reproduction, numbers, or distribution. Jeopardy opinions must present reasonable evidence that the project will jeopardize the continued existence of the listed species or result in destruction or adverse modification of critical habitat.

The USFWS's Information for Planning and Consultation (IPaC) database (2018a) lists the threatened and endangered species and trust resources that may occur within the Lewisville Lake project lands. There are three Federally-listed species and no candidate species that have the potential to utilize Lewisville Lake project lands.

No Critical Habitat has been designated within or near Lewisville Lake. The species identified as Threatened, Endangered, or Candidate Species by Texas Parks and Wildlife Department (TPWD) that are not Federally-listed are included in Appendix C of the 2018 Master Plan. Federally-listed threatened and endangered species having potential to occur on USACE lands and waters at Lewisville Lake are listed in Table 2.7.

Table 2.7 USFWS List of Threatened and Endangered Species That May Occur Within Lewisville Lake Federal Fee Boundary

Common Name	Scientific Name	Federal Status	State Status
Least Tern	<i>Sterna antillarum</i>	Endangered	Endangered
Whooping Crane	<i>Grus americana</i>	Endangered	Endangered

Source: USFWS IPaC Report

In addition to those federally endangered species, there are also many threatened and vulnerable species, most of which are migratory birds which could include stopovers at Lewisville Lake. The species and their potential presence are documented in detail in the IPaC report by the USFWS. TPWD also lists threatened and endangered species within the state as shown in Table 2.8. Additionally, TPWD also lists Species of Greatest Conservation Need (SGCN) for the Texas Blackland Prairie and Cross Timbers ecoregions. The SGCN list is provided in Appendix C.



Photo 2.2 Male Dickcissel. This neotropical migratory bird nests on the Lewisville Lake Environmental Learning Area (LLELA). The dickcissel is on TPWD's list of Species of Greatest Conservation Need (SGCN) in the Cross Timbers Ecoregion (USACE Photo by Jennifer Linde)

Table 2.8 TPWD List of Threatened and Endangered Species That May Occur Within the Lewisville Lake Federal Fee Boundary

Common Name	Scientific Name	Type	Listing Status
Alligator snapping turtle	<i>Macrochelys temminckii</i>	Reptile	Threatened
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	Bird	Threatened
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Bird	Threatened
Interior Least Tern	<i>Sterna antillarum athalassos</i>	Bird	Endangered
Louisiana pigtoe	<i>Pleurobema riddellii</i>	Mollusk	Threatened
Peregrine Falcon	<i>Falco peregrinus</i>	Bird	Threatened
Red wolf	<i>Canis rufus</i>	Mammal	Endangered
Texas heelsplitter	<i>Potamilus amphichaenus</i>	Mollusk	Threatened
Texas horned lizard	<i>Phrynosoma cornutum</i>	Reptile	Threatened
Texas pigtoe	<i>Fusconaia askewi</i>	Mollusk	Threatened
Timber rattlesnake	<i>Crotalus horridus</i>	Reptile	Threatened
White-faced Ibis	<i>Plegadis chihi</i>	Bird	Threatened
Whooping Crane	<i>Grus americana</i>	Bird	Endangered
Wood Stork	<i>Mycteria americana</i>	Bird	Threatened

2.2.6 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. They are often associated with disturbed ecosystems and human developments.

Because several metropolitan areas are located in the Texas Blackland Prairie and Cross Timbers ecoregions, it has led to a greater number of invasive species than most other regions of the state. Feral and free-ranging pets (cats and dogs in particular) have made a significant impact on populations of small mammals, reptiles, and birds. Across the entire ecosystem, feral hogs (*Sus scrofa*) have decimated several fragile habitats and can change topography and worsen erosion in areas with large hog populations.

Other invasive animals at Lewisville Lake include red imported fire ants (RIFA, *Solenopsis invicta*), several species of introduced fish (including released baitfish and species associated with “aquarium dumping”), house sparrows (*Passer domesticus*), common starlings (*Sturnus vulgaris*), and mollusks including zebra mussels (*Dreissena polymorpha*). Although native, cowbirds (*Molothrus ater*) have become problematic due to their expanding range associated with agriculture and human development. The

close proximity to urban landscaping has led to many common landscape plants becoming aggressive colonizers and becoming established at Lewisville Lake. Table 2.9 lists many of the invasive species found at Lewisville Lake. Other species are currently being researched for their invasive characteristics and may be added to this list.

Table 2.9 Invasive Species

Common Name	Scientific Name	Status	Type
Africanized honeybee	<i>Apis spec</i>	Non-native	Animal
Bahiagrass	<i>Paspalum notatum</i>	Non-native	Plant
Bermuda Grass	<i>Cynodon dactylon</i>	Non-native	Plant
Brown-headed Cowbirds	<i>Molothrus ater</i>	Native aggressive	Animal
Chinaberry	<i>Melia azedarach</i>	Non-native	Plant
Chinese Privet	<i>Ligustrum sinense</i>	Non-native	Plant
Chinese Tallow Tree	<i>Tridica sebifera</i>	Non-native	Plant
Common Starling	<i>Sturnus vulgaris</i>	Non-native	Animal
Feral Cats	<i>Felis silvestris</i>	Non-native	Animal
Feral Hogs	<i>Sus scrofa</i>	Non-native	Animal
Giant Reed	<i>Arundo donax</i>	Non-native	Plant
Giant Salvinia	<i>Salvinia molesta</i>	Non-native	Plant
Heavenly bamboo	<i>Nandina domestica</i>	Non-native	Plant
Honey Mesquite	<i>Prosipis gladiolosa</i>	Native aggressive	Plant
House Sparrow	<i>Passer domesticus</i>	Non-native	Animal
Hydrilla	<i>Hydrilla verticillata</i>	Non-native	Plant
Johnsongrass	<i>Sorghum halepense</i>	Non-native	Plant
Juniper	<i>Juniperus spp.</i>	Native aggressive	Plant
King Ranch Bluestem (KR)	<i>Bothriochloa ischaemum</i> var. <i>songarica</i>	Non-native	Plant
Mediterranean Mustard	<i>Hirschfeldia incana</i>	Non-native	Plant
Nutria	<i>Myocastor coypus</i>	Non-native	Animal
Pincushions	<i>Scabiosa atropurpurea</i>	Non-native	Plant
Red Imported Fire Ants (RIFA)	<i>Solenopsis invicta</i>	Non-native	Animal
Purple loosestrife	<i>Lythrum salicaria</i>	Native	
Tree of Heaven	<i>Ailanthus altissima</i>	Non-native	Plant
Water hyacinth	<i>Eichhornia crassipes</i>	Non-native	Plant
Whitebrush	<i>Aloysia grati</i>	Native aggressive	Plant
Yellow Sour Clover	<i>Melilotus indicus</i>	Non-native	Plant
Zebra Mussel	<i>Dreissena polymorpha</i>	Non-native	Animal

Source: USACE OMBIL



Photo 2.3 Johnsongrass – A major invasive species at Lewisville Lake

In 2015, 1,655 acres were treated for invasive species. Of that total, 55 acres were treated for four (4) terrestrial animals and 1,600 acres for 10 terrestrial plants. In 2016 and 2017, the number of acres treated and the number of plants and animals remained the same. Over the course of those two (2) years, 105 acres were treated: 100 acres were treated for five (5) terrestrial plants and five (5) acres were treated for two (2) terrestrial animals (USACE 2018).

2.2.7 Interpretation and Visual Qualities (Visual and Scenic Resources)

Lewisville 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 Lewisville 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 or Environmentally Sensitive Areas to preserve specific animal, plant, or environmental features which 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.

Lewisville Lake is located in the Cross Timbers and Blackland Prairie ecoregions, which is a unique convergence of local geography and habitats. The area provides many naturalistic views of the rugged terrain within an oak canopy juxtaposed with open prairies alive with spring wildflowers and native grasses, giving visitors an escape from the surrounding urban communities.

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. 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 by the Shoreline Management Plan (SMP). The SMP is not changed by this Master Plan but is summarized in Chapter 6.

2.2.8 Mineral and Timber

Minerals

Oil and natural gas are the principal minerals known to exist near Lewisville Lake, primarily in the western reaches of the lake within the Hickory Creek watershed. Since the late 1990's and continuing today, active drilling for natural gas in the Barnett Shale formation has comprised the majority of mineral exploration near the lake. Currently, there are no well surface locations on USACE property. According to maps available on the Railroad Commission website there are several well surface locations near USACE property with multiple well bores that extend horizontally. None of the current well bores appear to extend under USACE property, including under the water surface. This is typical for most wells in the region wherein natural gas is retrieved through a process of horizontal drilling and hydraulic fracturing. See Figure 2.8 for a map of existing oil and natural gas activity near Lewisville Lake.

During acquisition of lands for Lewisville Lake, only relatively small areas of the mineral estate were acquired. Those areas include the mineral estate immediately under and adjacent to the dam which were acquired to protect the structural integrity of the dam and associated prime facilities, as well as a few isolated tracts upstream from the dam. The majority of the mineral estate underlying the lake remains in private ownership. USACE has implemented a "no hydraulic fracturing" zone around each dam operated and maintained by USACE. This zone is 3,000 horizontal feet from the toe of the dam at Lewisville Lake. USACE also monitors proposed locations of wastewater injection wells where contaminated water from drilling and hydraulic fracturing operations are injected deep within the earth.

On several USACE tracts remote from the dam where the mineral estate was acquired by USACE, the minerals have been leased to a private operator. In February 2020, there are 5 active mineral leases on Federally-owned minerals at Lewisville Lake.

These mineral leases are in the far western reaches of fee-owned USACE lands. As with all federally-owned minerals, leases are administered by the Department of Interior, Bureau of Land Management, and contain protective stipulations required by USACE, including the stipulation that no surface occupancy is allowed.

Timber

Lewisville Lake is not located in a region having viable commercial timber resources. The woodlands that exist on USACE lands have value primarily as wildlife habitat and as an aesthetic resource but have no commercial timber value.

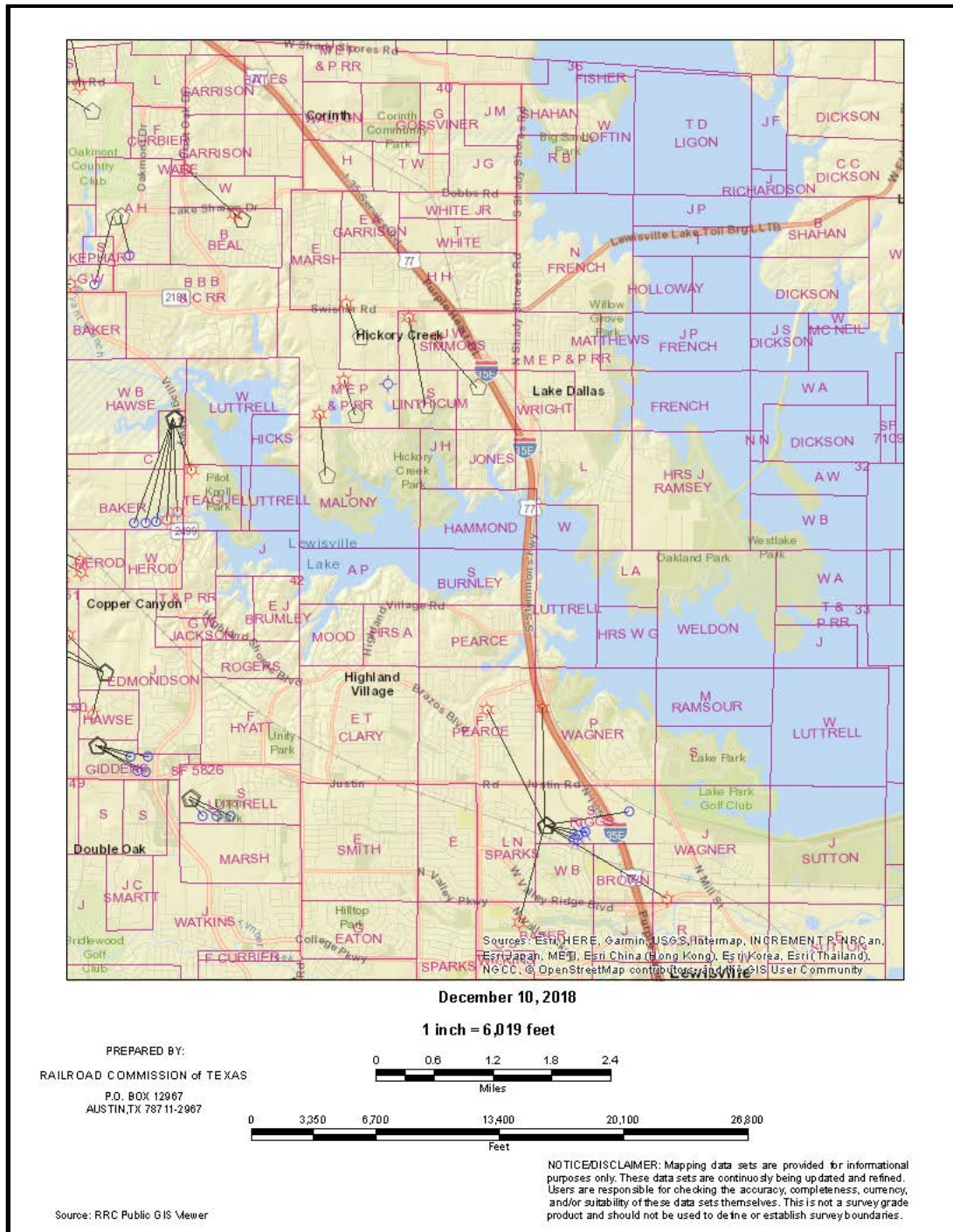


Figure 2.8 Natural Gas Wells near Lewisville Lake.

Source: Railroad Commission GIS Map Viewer

2.2.9 Water Usage and Quality

Texas Commission on Environmental Quality (TCEQ) publishes the assessment reports for the quality of surface waters for Trinity River basin in the biennial Integrated Report (formerly called the “Texas Water Quality Inventory and 303(d) List”) that

evaluates the quality of all surface waters in Texas. The Integrated Report is prepared according to Clean Water Act Sections 305(b) and 303(d). In the report, the TCEQ classifies water bodies based on the body's ability to support its designated uses (Level of Support.)

The designated uses for Lewisville Lake are flood control, water supply, aquatic habitat, and contact recreation. According to the 2014 TCEQ report, Lewisville Lake (Segment ID 0823) had no water quality issues with the exception of a "Screening Level Concern" for Chlorophyll-a. All other monitored parameters were classified as either "Fully Supporting" their designated uses of public water supply and fish consumption, "No Concern", or "Not Assessed."

The United States Environmental Protection Agency (EPA) also released the water body reports and water quality assessment for Lewisville Lake for period 2002 to 2010. The designated uses of the lake were assessed, and all of them were found to be "good."

The USGS sampled eight sites for Lewisville Lake on three different occasions in 1997 (23 January 1997, 13 May 1997, 2 July 1997) for various biological and chemical parameters.¹⁴ The sampling results indicate that the levels of the various biological and chemical constituents monitored are generally within the criteria set by the Texas Department of Water Resources, and does not have any present or potential water quality problems.

Lewisville Lake receives effluent from eighteen municipal wastewater treatment plants under permits from the Texas Commission on Environmental Quality. In addition, Lewisville Lake has a substantial amount of shoreline development which contributes to nonpoint source pollution. A major potential contributor of non-point source loading is the nearby city of Denton. The point source dischargers and nonpoint pollutant sources plus modest loadings of nitrogen and suspended solids from tributary streams supply sufficient nutrient concentrations to support substantial phytoplankton communities.

The phytoplankton populations are potentially responsible for occasional taste and odor problems in the Dallas water supply. Measured chlorophyll concentrations have indicated relatively high levels of phytoplankton. During several summer seasons phytoplankton productivity has been especially high. At those times, blue green algae generally predominated over green algae and diatoms. According to the Engineering Research and Development Center (ERDC) Lewisville Lake Aquatic Plant and Environmental Research Facility (LLAERF) at Lewisville Lake, Hydrilla infestation has existed at Lewisville Lake in the past. Isolated populations of Hydrilla are occasionally found in Lewisville Lake and control measures are taken as needed.

2.2.10 Sedimentation and Shoreline Erosion

A system of 110 sedimentation ranges and 9 degradation ranges were established and surveyed with monuments placed within the reservoir area and below the dam during the design of the dam. Initial storage allocations, in the Definite Project

Report dated October 1947, provided for a total of 53,500 acre-feet of sediment deposition in the lake. The storage allocation was expected to provide for 57 years of sediment accumulations. At the time of the 1965 sediment resurvey, 31,849 acre-feet of the original 53,500 acre foot sediment pool remained in the lake.

The storage in Lewisville Lake was reallocated after the construction of Ray Roberts Dam in June 1987. An estimated 35,200 acre-feet of sediment was deposited in Lewisville Lake prior to the completion of Ray Roberts Dam. It is estimated that an additional 73,800 acre-feet of sediment will accumulate in Lewisville Lake during the ensuing 100-year period. Approximately 63,400 acre-feet of this sediment is expected to be deposited in the conservation pool and the remaining 10,400 acre-feet will be deposited in the flood control pool. A schedule prepared in the Office of the Division Engineer, Southwestern Division (SWD), indicates that resurveys were planned for about 5-year intervals. However, currently sediment surveys are done periodically depending on need and available funding.

In 1991, the Texas Legislature authorized the Texas Water Development Board (TWDB) to develop a non-profit, self-supporting, reservoir volumetric survey program, which is named the Hydrographic Survey Program. The program includes a standard volumetric survey and a sedimentation survey. Since 1992, TWDB's Hydrographic Survey Program has completed 161 hydrographic surveys on 106 unique reservoirs. This includes 85 of the 114 water supply reservoirs monitored for inclusion in TWDB's monthly Water Conditions Report.

The TWDB last performed a standard volumetric survey for Lewisville Lake in 2007. Results from the survey indicate Lewisville Lake encompasses 27,175 surface acres and contains a total volume of 598,902 acre-feet at conservation pool elevation 522.0 feet.

Original design information was based on topographic maps with a 10-foot contour interval. The storage at the current top of conservation pool elevation of 522.0 feet, was estimated as 670,000 acre-feet and a corresponding surface area of 29,000 acres. In 1960, USACE performed a survey for Lewisville Lake. Records indicate that Lewisville Lake had a volume of 648,400 acre-feet of water at the top of conservation pool elevation 522.0 feet. In 1965, USACE resurveyed Lewisville Lake and estimated the capacity to be 640,986 acre-feet. Between the 1960 USACE survey and the 2007 TWDB volumetric survey, Lewisville Lake lost 49,498 acre-feet of water or 7.63 percent in conservation storage. The difference in storage indicated the sediment fill during the fiscal years from 1960 to 2007. Comparisons between the 1960 USACE survey, the 1965 USACE survey, and the 2007 TWDB volumetric survey are presented in Table 2.10.

Table 2.10 Area and Capacity Comparisons of Lewisville Lake

FEATURE	USACE DPR	USACE Survey	USACE Survey	TWDB Latest Survey
Year	1947	1960	1965	2007
Surface Area at Conservation Pool Elevation 522.0 feet NGVD29 (acres)	29,500	N/A	N/A	27,175
Volume at Conservation Pool Elevation 522.0 feet NGVD29 (acre-feet)	670,000	648,400	640,986	598,902

2.2.11 Air Quality

In 2018 the US Environmental Protection Agency (EPA) designated nine counties in the North Central Texas region as marginal nonattainment for the pollutant ozone in accordance with the 2015 eight-hour ozone National Ambient Air Quality Standards (NAAQS). The NAAQS standard for ozone is 70 parts per billion (ppb) which is a level that ensures a good quality of life for people of all ages. The NAAQS standards are designed to protect human and environmental health, and ground-level ozone is monitored and targeted for reductions due to its potentially harmful effects. The nine counties that are marginal nonattainment in North Central Texas are Wise, Denton, Collin, Parker, Tarrant, Dallas, Johnson, and Ellis.

In order to receive some forms of federal assistance, nonattainment areas must have a State Implementation Plan (SIP) to reduce ozone to levels compliant with the NAAQS and have EPA reviews every five years. Four main sources of ozone-causing emissions include on-road mobile sources like cars and trucks, non-road mobile sources like construction equipment, point sources like electricity-generating utilities and industrial boilers, and area sources like solvent use and agriculture. The Dallas-Fort Worth area SIP includes programs to get older cars off the road, technologies to clean up vehicles already on the road, and education programs so residents in the region can do their part in improving air quality in Northern Texas. For more information about what individuals and businesses can do to clean the air, visit the Air North Texas website

There are no air monitoring stations on USACE property at Lewisville, but there are several nearby operated by the Texas Commission on Environmental Quality (TCEQ). Those stations monitor for Nitric Oxide (NO), Nitrogen Dioxide (NO₂), other Nitrogen Oxides (NO_x), Ozone (O₃), PM_{2.5}, as well as weather and climate data. Because Lewisville Lake is located within an urban area, all monitored substances can reach moderate levels on occasion, normally when weather patterns cause the air to stagnate. TCEQ's Air Quality Index (AQI) is based on ozone and PM_{2.5} levels, and sometimes reaches "unhealthy for sensitive groups," which could affect people with asthma and those with prolonged or heavy outdoor exertion. The AQI occasionally reaches "unhealthy" levels, but rarely reaches "very unhealthy" or "hazardous" levels and would likely be related to fires or unusual atmospheric events. The region is also prone to "very high" pollen counts for much of the year, affecting those with allergies and allergy-related asthma. The tree canopy and other vegetation around Lewisville

Lake help to mitigate local air pollution by absorbing carbon dioxide (CO₂), filtering airborne particulates and other airborne pollutants, and modulating local temperatures influencing the urban heat island effect.

In conducting routine operations and maintenance activities at Lewisville Lake, the USACE will comply with all Federal, state, and local laws governing air quality and will implement Best Management Practices (BMPs) to protect air quality. Prescribed fire is a useful land management tool for improving native prairie and certain forested areas and will be conducted in accordance with the Texas Administrative Code, Section 111.211(1). Statutory requirements governing prescribed fire and other types of outdoor burning are explained in the TCEQ publication “Outdoor Burning in Texas” available on the TCEQ website. USACE guidance for wildland fire management is set forth in EP 1130-2-540.

2.3 CULTURAL RESOURCES

2.3.1 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 Lewisville 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. 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 Lewisville 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 Lewisville 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 Lewisville 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.

2.3.2 Historic

Local tradition holds that Native Americans of the Wichita and Caddo Nations inhabited the Lewisville 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 Lewisville 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 Lewisville Lake include the archeological remains of house sites and farmsteads dating from the late 19th century through the mid 20th century, although a few sites dating to the earlier Peters Colony occupation have been recorded.

2.3.3 Previous Investigations at Lewisville Lake

The initial archeological investigations at Lewisville Lake were conducted between 1948 and 1950 by the River Basin Surveys. During that period, 27 sites were recorded, and three sites (41DN5, 41DN6, 41DN12) were tested. Plans to enlarge the lake led to additional survey in 1986 and 1987 by the University of North Texas (UNT), followed by test excavations at 23 prehistoric and 16 historic sites. In 1988, UNT performed data recovery excavations at five prehistoric (41DN20, 41DN26, 41DN27, 41DN372, 41DN381) and three historic (41DN401, 41DN404, 41DN429) sites. Limited survey work since then has added to the number of known archeological sites.

2.3.4 Recorded Cultural Resources

Currently, 161 archeological sites have been recorded at Lewisville Lake. One of these archeological sites (Cranston Pottery Kiln - 41DN16) and the historic Old Alton Bridge (see Photo 2.4) are listed on the National Register of Historic Places (NRHP). Of the remaining 160 archeological sites, ten have been determined eligible for NRHP and 136 have been determined ineligible. Fourteen of the recorded sites have not yet been evaluated for NRHP eligibility.



Photo 2.4 Old Alton Bridge National Historic Site
(Photo Courtesy of Wikipedia)

2.3.5 Long-term Objectives for Cultural Resources

As funding allows, a Cultural Resources Management Plan (CRMP) shall be developed and incorporated into the Operational Management Plan in accordance with EP 1130-2-540. The purpose of the CRMP is to provide a comprehensive program to direct the historic preservation activities and objectives at Lewisville Lake. Completion of a full inventory of cultural resources at Lewisville 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 Lewisville 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

2.4 DEMOGRAPHIC AND ECONOMIC ANALYSIS

2.4.1 Zone of Interest

Lewisville Lake is located in the North Central Texas area, lying entirely within Denton County. The zone of interest for the socioeconomic analysis of Lewisville Lake is defined as Denton County plus the counties that surround the lake to the south and east, which are Collin, Dallas, and Tarrant Counties in Texas.

2.4.2 Population

The total population for the zone of interest in 2017 was 6,231,284, as shown in Table 2.11. Approximately 41% of the zone of interest population resides in Dallas County, 32% in Tarrant County, 15% in Collin County, and 13% in Denton County.

The zone of interest's population makes up almost 23% of the total population of Texas. From 2017 to 2045, the population in the zone of interest is expected to increase from 6.2 million to 10.8 million, an annual growth rate of 2%. By comparison, the population of Texas is projected to increase at a rate of 1.7% per year during that same timeframe, and the national growth rate is expected to be 0.6% per year. All counties within the zone of interest are projected to have positive growth, with Collin and Denton Counties growing the fastest at annual rates of 3.1% and 3.4%, respectively.

Table 2.11 Population Estimates and 2045 Projections, 2000 and 2018

Geographical Area	2000 Population Estimate	2018 Population Estimate	2045 Population Projection
Texas	20,851,820	27,885,195	43,867,040
Collin County	491,675	944,350	2,137,242
Dallas County	2,218,899	2,586,552	3,667,351
Denton County	432,976	807,047	1,990,969
Tarrant County	1,446,219	2,019,977	3,023,145
Zone of Interest Total	4,589,769	6,357,926	10,818,707

Source: U.S. Census Bureau, Population Division (2000 Estimate); U.S. Census Bureau, American Community Survey 1-Year Estimates (2018 Estimate); Texas State Data Center, The University of Texas at San Antonio (2045 Projections)

The distribution of the population among gender, as shown in Table 2.12, is approximately 49% male and 51% female in the zone of interest, similar to the overall gender distribution in Texas.

Table 2.12 Percent of Population Estimate by Gender, 2017

Geographical Area	Male	Female
Texas	13,616,977	13,802,635
Collin County	448,915	465,160
Dallas County	1,257,751	1,294,462
Denton County	384,390	396,931
Tarrant County	971,142	1,012,533
Zone of Interest Total	3,062,198	3,169,086

Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates (2016 Estimate)

Figure 2.9 shows the zone of interest's population by age group in 2017 compared to the population projections by age group for 2045. The forecast shows that the population ages 0 to 59 will decrease slightly while ages 60 and over will increase between 2017 and 2045.

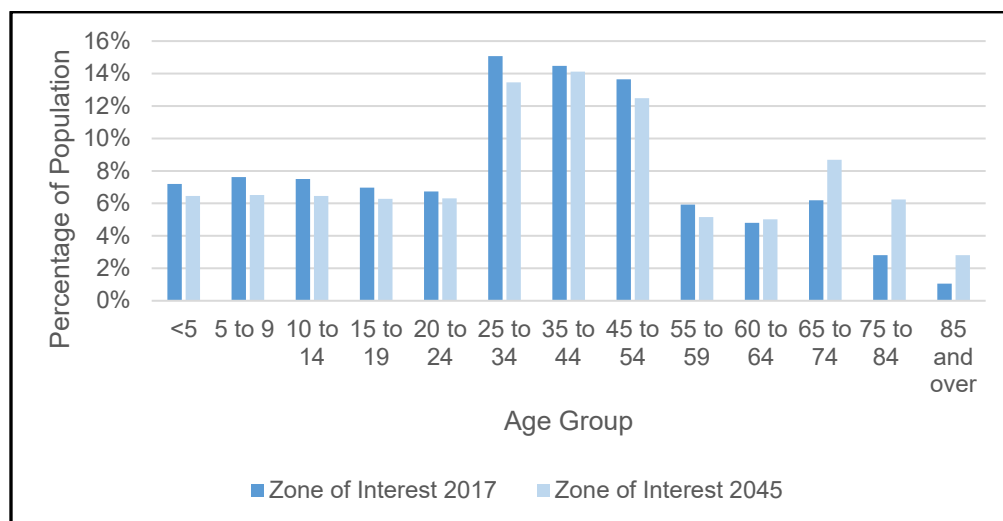


Figure 2.9 2017 Population Estimate and 2045 Projection by Age Group

Source: U.S. Census Bureau, 2012-2017 American Community Survey 5-Year Estimates (2017 Estimate); Texas State Data Center, The University of Texas at San Antonio (2045 Projections)

Population by race and Hispanic Origin is displayed in Table 2.13. The population in the zone of interest is approximately 44% White, 16% Black, 30% Hispanic or Latino, 7% Asian, and 2% two or more races. The other race categories account for less than 1% each of the population. By comparison, the state's population is approximately 43% White, 12% Black, 39% Hispanic or Latino, 4% Asian, and 2% two or more races. Figure 2.10 shows the 2017 estimate and the 2045 projections of

race/ethnicity in the zone of interest distributed between five categories, White, Black, Hispanic or Latino, Asian, and Other. The figure shows that the Black, Hispanic or Latino, Asian, and Other categories are expected to increase in the zone of interest, while the White category decreases by 15%.

Table 2.13 2017 Population Estimate by Race/Hispanic Origin

Area	White	Black	Asian alone	American Indian and Alaska Native alone	Native Hawaiian and Other Pacific Islander alone	Some other race alone	Two or more races	Hispanic or Latino
Texas	11,755,493	3,199,022	1,222,975	65,883	20,170	39,153	443,007	10,673,909
Collin County	540,387	84,259	123,495	2,858	568	2,377	22,260	137,871
Dallas County	771,258	563,220	152,045	4,450	1,098	4,485	44,283	1,011,374
Denton County	475,452	70,796	60,788	2,289	579	1,602	20,529	149,286
Tarrant County	959,103	308,577	100,560	5,443	3,298	3,539	44,130	559,025
Zone of Interest Total	2,746,200	1,026,852	436,888	15,040	5,543	12,003	131,202	1,857,556

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates (2017 Estimate)

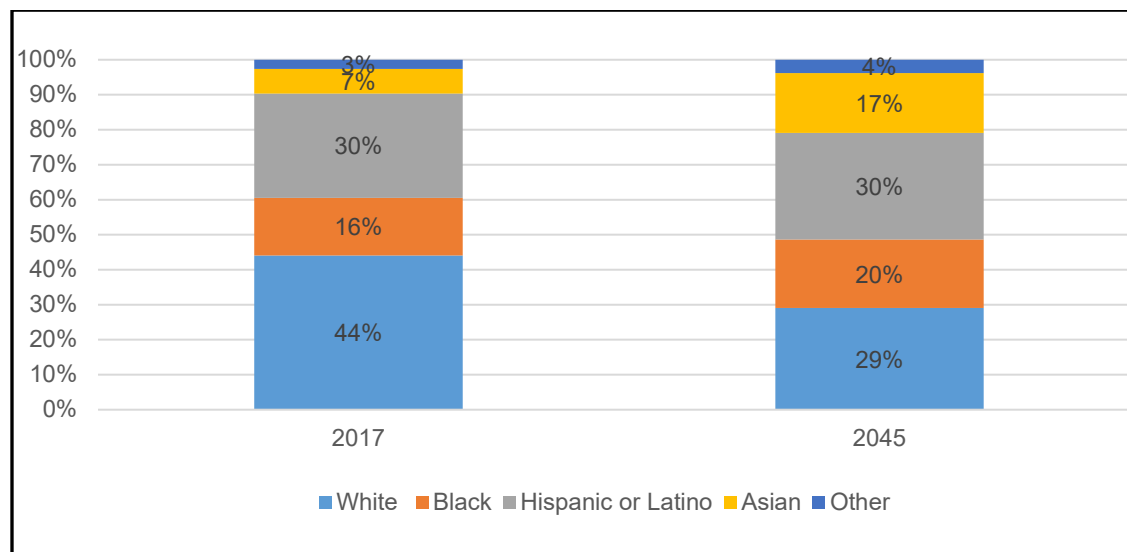


Figure 2.10 Zone of Interest Population Estimate and Projection by Race/Ethnicity

Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates (2017 Estimate); Texas State Data Center, The University of Texas at San Antonio (2045 Projections)

2.4.3 Education

Table 2.14 displays the highest level of education attained by the population ages 25 and over. In the zone of interest, 8% of the population has less than a 9th grade education, and another 8% has between a 9th and 12th grade education; 21% has a high

school diploma or equivalent, and another 21% has some college and no degree; 7% has an Associate's degree; 23% has a Bachelor's degree; and 12% has a graduate or professional degree. In the state of Texas, 9% of the population has less than a 9th grade education; another 9% has between a 9th and 12th grade education; 25% has at least a high school diploma or equivalent; 22% has some college; 7% has an Associate's degree; 19% has a Bachelor's degree; and 10% has a graduate or professional degree.

Table 2.14 2017 Population Estimate by Highest Level of Educational Attainment, Population 25 Years of Age and Older

Area	Highest Level of Educational Attainment							
	Population 25 years and over	Less than 9th grade	9th to 12th grade, no diploma	High school graduate (includes equivalency)	Some college, no degree	Associate's degree	Bachelor's degree	Graduate or professional degree
Texas	17,454,431	1,513,995	1,491,909	4,372,430	3,857,193	1,208,509	3,288,777	1,721,618
Collin County	594,927	19,284	18,547	89,904	119,639	44,498	194,541	108,514
Dallas County	1,621,762	185,820	165,784	364,902	325,074	91,567	311,327	177,288
Denton County	506,132	19,149	21,220	93,186	115,250	37,863	148,204	71,260
Tarrant County	1,263,581	86,262	97,843	301,127	292,669	92,421	264,881	128,378
Zone of Interest Total	3,986,402	310,515	303,394	849,119	852,632	266,349	918,953	485,440
Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates (2017 Estimate)								

Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates (2016 Estimate)

2.4.4 Employment

Employment by sector is presented in Figure 2.11 and Table 2.15 shows that the largest percentage of the zone of interest is employed in the Educational services, and health care and social assistance sector at 19%, followed by 14% in the Professional, scientific, and management, and administrative and waste management services sector, and 11% in Retail Trade. Approximately 9% of the zone of interest population is employed in each of the following sectors: the Manufacturing sector, the Arts, entertainment, and recreation, and accommodation and food services sector, and the Finance and insurance, and real estate and rental and leasing sector. Approximately 8% of the zone of interest population is employed in the Construction sector, 6% in the Transportation and warehousing, and utilities sector, and 5% in Other services, except public administration. The remainder of the employment sectors each comprise less than 5% of the zone of interest's labor force.

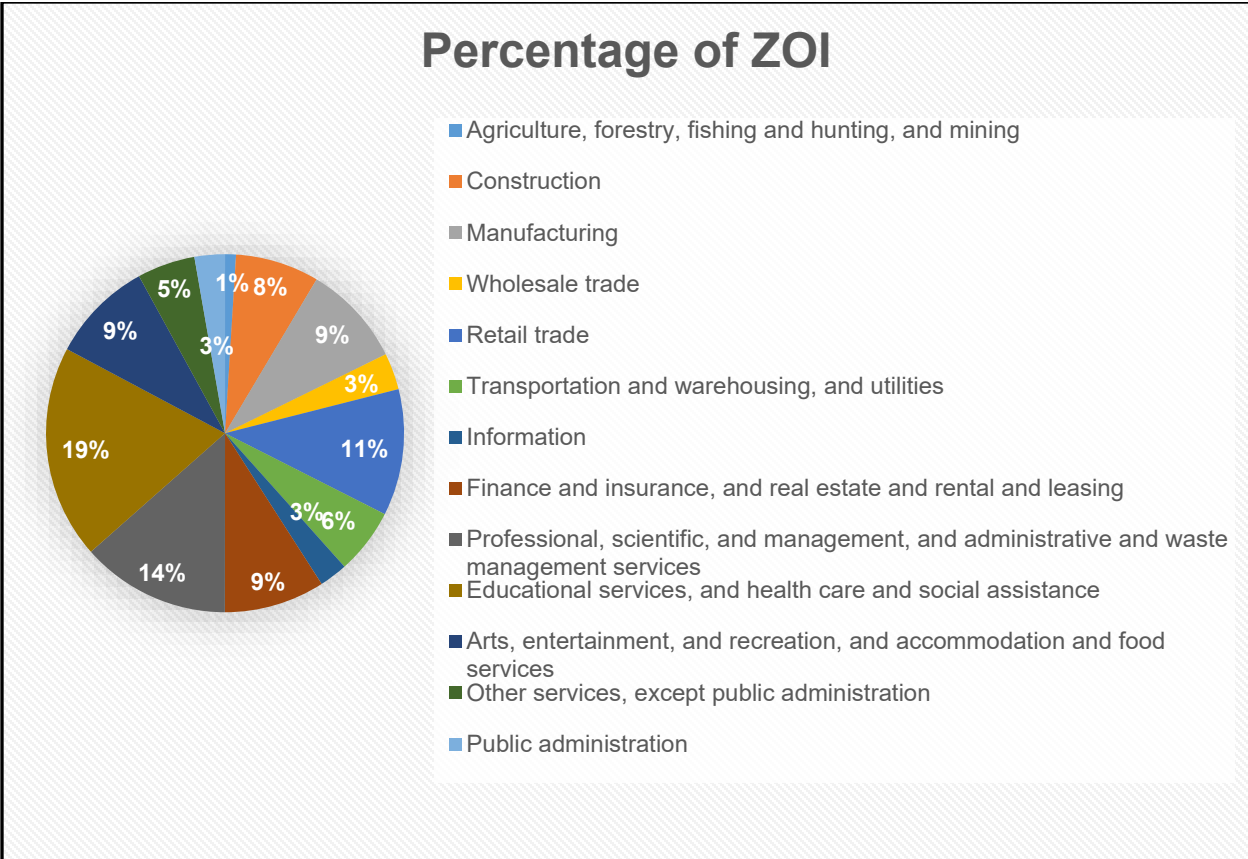


Figure 2.6 Employment by Sector for the Zone of Interest
Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates (2017 Estimate)

Table 2.15 includes three columns displaying the growth rate of each industry by Workforce Development Area (WDA) between 2016 and 2026. Collin and Denton Counties both fall in to the North Central WDA, while Dallas and Tarrant Counties each have their own WDA. Projected industry growth for each of the WDAs is displayed in the table. When considering all three WDAs as a whole, the most growth is anticipated in the Educational services, and health care and social assistance sector, followed by the Arts, entertainment, and recreation, and accommodation and food services sector, and the Construction sector.

Table 2.15 Annual Average Employment by Sector

Employment Sector	Geographic Area								
	Texas	Collin County	Dallas County	Denton County	Tarrant County	Zone of Interest Total	Dallas County WDA Growth Rate (2016-2026)	North Central WDA Growth Rate (2016-2026)	Tarrant County WDA Growth Rate (2016-2026)
Civilian employed population 16 years and over	12,689,069	474,671	1,252,101	419,189	974,947	3,120,908	NA	NA	NA
Agriculture, forestry, fishing and hunting, and mining	412,873	5,174	8,812	4,622	12,077	30,685	-4%	17%	9%
Construction	1,038,063	23,634	120,569	23,087	68,819	236,109	23%	29%	23%
Manufacturing	1,116,657	42,794	108,592	32,984	102,185	286,555	0%	14%	7%
Wholesale trade	381,774	14,702	39,711	15,253	33,565	103,231	12%	27%	17%
Retail trade	1,454,504	54,365	139,454	50,490	112,289	356,598	13%	23%	13%
Transportation and warehousing, and utilities	702,367	15,508	73,468	21,912	73,786	184,674	17%	18%	12%
Information	227,592	18,657	29,235	13,126	18,470	79,488	1%	11%	5%
Finance and insurance, and real estate and rental and leasing	839,234	54,727	107,613	44,490	76,746	283,576	11%	28%	15%
Professional, scientific, and management, and administrative and waste management services	1,437,711	79,358	177,922	58,449	104,554	420,283	23%	30%	19%
Educational services, and health care and social assistance	2,739,219	94,775	226,948	85,793	194,866	602,382	24%	31%	26%
Arts, entertainment, and recreation, and accommodation and food services	1,154,649	38,560	121,123	38,034	90,705	288,422	16%	42%	18%
Other services, except public administration	663,422	20,961	70,223	19,847	52,148	163,179	17%	15%	18%
Public administration	521,004	11,456	28,431	11,102	34,737	85,726	12%	27%	4%

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates (2017 Estimate), Texas Workforce Commission Labor Market and Career Information (WDA Growth Rates)

**Table 2.16 Labor Force, Employment and Unemployment Rates, 2017
Annual Averages**

Geographic Area	Civilian Labor Force	Number Employed	Number Unemployed	Unemployment Rate
Texas	13,538,385	12,960,595	577,790	4.3%
Collin County	527,317	509,347	17,970	3.4%
Dallas County	1,333,933	1,282,785	51,148	3.8%
Denton County	464,581	449,263	15,318	3.3%
Tarrant County	1,033,317	995,339	37,978	3.7%
Zone of Interest Total	3,359,148	3,236,734	122,414	3.6%
Source: Bureau of Labor Statistics, Current Population Survey (State estimate), LAUS (County estimates)				

The civilian labor force in the zone of interest accounts for approximately 25% of the civilian labor force in the state of Texas. As shown in Table 2.16, the zone of interest experienced an unemployment rate of 3.6% in 2017, lower than that of the state of Texas, which had an unemployment rate of 4.3% that same year. The unemployment rate in each of the counties in the zone of interest were lower than that of Texas, ranging from 3.3% in Denton County to 3.8% in Dallas County.

2.4.5 Households, Income and Poverty

Table 2.17 displays the number of households and average household sizes in 2017. There were approximately 9.4 million households in the state of Texas with an average household size of 2.84 in 2017. The zone of interest contained approximately 2.2 million of those homes and also had an average household size of 2.84.

Table 2.17 2017 Households and Household Size

Geographic Area	Total Households	Average Household Size
Texas	9,430,419	2.84
Collin County	323,905	2.81
Dallas County	906,179	2.78
Denton County	275,164	2.79
Tarrant County	689,921	2.84
Zone of Interest Total	2,195,169	2.84
Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates (2017 Estimate)		

The median household income in the zone of interest ranged from \$53,626 in Dallas County to \$90,124 in Collin County in 2017, as displayed in Table 2.18. Per

capita income in the zone of interest was \$32,892 in 2017, which was slightly higher than the state of Texas, which had a per capita income of \$28,985.

Table 2.18 2017 Median and Per Capita Income

Geographic Area	Median Household Income	Per Capita Income
Texas	\$57,051	\$28,985
Collin County	\$90,124	\$41,609
Dallas County	\$53,626	\$29,810
Denton County	\$80,290	\$37,928
Tarrant County	\$62,532	\$30,857
Zone of Interest Total	N/A	\$32,892
Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates (2017 Estimate)		

Table 2.19 displays the percentage of persons and families whose incomes fell below the poverty level in the past twelve months as of 2017. The zone of interest as a whole had a smaller percentage of people with incomes below the poverty level at 13.6% when compared to the state, which had 16.0% of people below the poverty level. Dallas County had the most persons with incomes below the poverty level at 17.7%, followed by Tarrant County at 13.5%, Denton County at 8.4%, and Collin County at 6.9%. In terms of families with incomes below the poverty level, the only county with a greater percentage of poverty than the state of Texas was Dallas County, which had 14.4% of families below the poverty level compared to 12.4% of the state. The remainder of the counties in the zone of interest had between 5.1% and 10.1% of families below the poverty level in 2017.

Table 2.19 Percent of Families and People Whose Income in the Past 12 Months is Below the Poverty Level (2017)

Geographic Area	All Persons	All Families
Texas	16.0%	12.4%
Collin County	6.9%	5.1%
Dallas County	17.7%	14.4%
Denton County	8.4%	5.5%
Tarrant County	13.5%	10.1%
Zone of Interest Total	13.6%	N/A
Source: Census Bureau		

2.4.6 Economic Impact

The overall economic impact of Lewisville Lake includes the economic benefits derived from the flood damage reduction, water conservation, outdoor recreation, and

environmental stewardship missions. For the purpose of this Master Plan, only the economic impact associated with the outdoor recreation and environmental stewardship missions will be documented.

The money spent by visitors to USACE lakes on trip expenses adds to the local and national economies by supporting jobs and generating income. In 2016, there were nearly 2.7 million visits (person-trips) to Lewisville Lake. . Visitor spending represents a sizable component of the economy in many communities around USACE lakes. Within 30 miles of the lake, visitors spent an additional \$65.4 million with \$47.3 million coming from retail sales. This spending led to an additional 601 jobs and \$18.6 million in labor income. Predicted population growth in Denton, Collin, Dallas and Tarrant counties would likely lead to increased economic benefits to the surrounding communities for years to come.

2.4.7 Social, Economic, and Environmental Benefits

USACE recognized the importance of Lewisville Lake and the activities on USACE lands and waters as being an important part of the local economy. Besides the obvious economic savings through flood risk management and development advantages afforded by water conservation businesses can see investment opportunities, and people are drawn to the natural areas surrounding Lewisville Lake, as is evidenced by the growing number of adjacent residents. The economic benefit from the USACE outdoor recreation and environmental stewardship missions are well documented. Nationally, USACE lakes attract about 335 million recreation visits every year, with direct economic benefits on local economies within a 30 mile radius. The following information in Table 2.20 describes some of the extended social and environmental benefits of Lewisville Lake for surrounding communities in 2016. By providing opportunities for active recreation, Corps lakes help combat one of the most significant of the nation's health problems: lack of physical activity. Recreational programs and activities at Corps lakes also help strengthen family ties and friendships; provide opportunities for children to develop personal skills, social values, and self-esteem; and increase recreational water safety.

Table 2.20 Social Benefits at Lewisville Lake in FY 2016

Facilities in FY 2016	Visits (person-trips) in FY 2016
30 recreation areas <ul style="list-style-type: none"> • 400 picnic sites • 449 camping sites • 21 playgrounds • 8 swimming areas • 23 number of trails • 51 trail miles • 0 fishing docks • 24 boat ramps • 2,708 marina slips 	2,692,843 in total <ul style="list-style-type: none"> • 284,218 picnickers • 47,792 campers • 341,130 swimmers • 189,100 water skiers • 318,616 boaters • 967,438 sightseers • 474,181 anglers • 0 hunters • 737,646 others

Source: USACE Value to the Nation Website (Note: Although 0 hunters are shown in the table, as of the date of this Master Plan, USACE issues 600 annual first-come, first-served hunting permits at Lewisville Lake. The majority of Lewisville Lake hunters are waterfowl hunters.

There have also been many economic benefits to the nation and economy at Lewisville Lake. The money spent by visitors to Corps lakes on trip expenses adds to the local and national economies by supporting jobs and generating income. Visitor spending represents a sizable component of the economy in many communities around Corps lakes as summarized in Table 2.21.

Table 2.21 Economic Benefits at Lewisville Lake in FY 2016

Visitation per year resulted in:	With multiplier effects, visitor trip spending resulted in:
<ul style="list-style-type: none"> • \$65,363,097 in visitor spending within 30 miles of the Corps lake. • \$47,266,484 in sales within 30 miles of the Corps lake. • 601 jobs within 30 miles of the Corps lake. • \$18,589,336 in labor income within 30 miles of the Corps lake. • \$26,058,315 in value added within 30 miles of the Corps lake. • \$15,524,707 in National Economic Development Benefits. 	<ul style="list-style-type: none"> • \$87,663,542 in total sales. • 839 jobs. • \$32,869,793 in labor income. • \$50,256,111 in value added (wages & salaries, payroll benefits, profits, rents, and indirect business taxes).

Source: USACE

Lewisville Lake provides environmental benefits to the local community by providing the public with access to a large expanse of natural area and recreational water surface. Recreation experiences increase motivation to learn more about the environment; understanding and awareness of environmental issues; and sensitivity to the environment. The land acres, water acres, and shoreline miles are summarized in Table 2.22.

Table 2.22 Environmental Resource Summary in FY 2020

Resources in FY 2020	
	• 19,160 land acres
	• 27,175 water acres
	• 187 shoreline miles

2.5 RECREATION FACILITIES, ACTIVITIES, AND NEEDS

The initial development of outdoor recreation facilities at Lewisville Lake was addressed in the 1985 Master Plan for Lewisville Lake Design Memorandum (DM) No. 1C and Supplement No. 1 published in 2004. These two documents laid out a robust plan for the comprehensive management of the lake's lands and water surface including plans for a significant investment in outdoor recreation facilities. USACE directly manages 5 parks and/or access points at Lewisville Lake and partners with the cities of Lewisville, Highland Village, Copper Canyon, Hickory Creek, Lake Dallas, Oak Point, Little Elm, and The Colony to provide 16 parks, numerous boat ramps, and several trails. USACE also partners with Lewisville Lake Environmental Learning Area (LLELA) and the City of Denton at their Clear Creek Natural Heritage Center to provide two wildlife/nature centers for the public. Various commercial and non-profit entities also provide 6 marinas on Lewisville Lake. Texas Parks & Wildlife Department operates the Ray Roberts Lake State Park - Greenbelt Corridor along the Elm Fork of the Trinity River in the stretch between Lewisville Lake and Ray Roberts Lake.

USACE has a moderate role in directly managing outdoor recreation at the lake, relying heavily on partnerships and leases with surrounding cities. This role consists of managing fishing use, boating and water activities, and general pedestrian access to lands that are not leased to other agencies. Hunting is permitting in designated areas with a valid state hunting license and USACE permit. All hunters must obey hunting regulations issued Texas Parks & Wildlife Department, the U.S. Fish & Wildlife Service, and USACE through its Fort Worth District hunting policy.

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

- Close proximity to population centers in the Dallas-Fort Worth metropolitan area: by road, Lewisville Lake Dam is located 24 miles from downtown Dallas, 40 miles from downtown Fort Worth, and conveniently located at the northern end of the Dallas-Fort Worth Metropolitan Area;
- Parks leased to neighboring municipalities provide day use activities, camping, boat access, and trails;
- Full service marinas and boat ramps provide access for boating recreation;
- LLELA and the City of Denton seek to preserve and restore native Texas ecosystems and biodiversity, providing opportunities for environmental education, research, and recreation;

- Located entirely within fast growing Denton County and shares a common boundary with 13 cities or towns.

2.5.1 Zone of Influence

The zone of influence for Lewisville Lake as it relates to this Master Plan includes Denton, Collin, Tarrant and Dallas counties.

2.5.2 Visitation Profile

The majority of visitors to Lewisville Lake come from within the zone of influence. An examination of over 23,700 zip codes collected from visitors at Hickory Creek Park between 2013 through 2017 revealed that 86.7% of visitors came from Texas, and 76.1% came from within 50 miles of the lake. It is notable that out-of-state campers total 13.3% of total campers. This relatively high number for out-o-state campers may owe to the location of Hickory Creek Park only a short distance west of Interstate Highway 35. Table 2.23 provides examples of the percentage of campers coming from the top eleven cities within 50 miles of the lake. USACE checked with all entities managing campgrounds at Lewisville Lake and none of them keep track of the origin of their visitors.

Table 2.23 Eleven Top Cities of Origin for Campers at Hickory Creek Park, Lewisville Lake

City/Zip Code	Percent of Campers
Lewisville	8.3%
Denton	6.7%
Carrollton	4.6%
Corinth	4.5%
Flower Mound	4.3%
Dallas	3.7%
Plano	3.3%
Fort Worth	2.6%
Lake Dallas	2.2%
Frisco	2.0%
Highland Village	2.0%

SOURCE: Recreation.gov

2.5.3 Visitation Data

USACE has recently reorganized the method in which visitation is calculated at each lake. Reliable numbers are available from approximately 2014 thru 2018. The total visitation at Lewisville Lake is estimated Fiscal Year (FY Oct 1 thru Sep 30) to be as follows:

FY 14: 2,505,357
FY 15: 2,146,342
FY 16: 2,693,465
FY 17: 3,665,095
FY 18: 3,881,804

A major flood event in 2015 damaged many recreation areas to the extent that some areas were closed for extended periods. Some, but not all areas reopened in 2016 and most areas were operational by 2017 resulting in a rebound in visitation.

2.5.3 Recreation Areas and Facilities

The primary outdoor recreation facilities at Lewisville Lake are managed by neighboring cities and other agencies with USACE managing Hickory Creek, Oakland, and Westlake Parks in addition to boat ramps at Big Sandy Ramp and Doe Branch Access. Table 2.24 provides a summary of the recreation facilities at Lewisville Lake, and Figure 2.12 lists the recreation areas with various amenities in each of those areas.

Table 2.24 Summary of Recreation Facilities

Facilities	Number (and Detail)
Campsites: Total	449
Campsites: Electric and Water	400
Campsites: Electric, Water, and Sewer	16
Campsites: Group Campsites	25
Picnic Sites	400
Group Picnic Sites	22
Group Picnic Shelters	23
Cabins	44
Lodge/Inn/Hotel/Motel	1 (8 rooms)
Playgrounds	21
Court: Multipurpose	1
Court: Volleyball	19
Field: Baseball	19
Field: Soccer	24
Frisbee/Disc Golf Course	1
Golf Course	5
Trails: Equestrian	3 (16 miles – includes Greenbelt Corridor equestrian trail)
Trails: Hiking	9 (12.4 miles)
Trails: Multipurpose	11 (31.2 miles)
Trails: Paddle Trail	1 (1 mile)
Marinas	6
Slips: Dry Storage	824
Slips: Wet Slips	2,708
Boat Ramps	23
Swimming Beaches	7
Interpretive Sites	4
Activity Center Buildings	3

Source: OMBIL

**USACE Managed**

\$ USACE Fees Collected

Managed by Others in *Italics***Camping**

- E** Electric Campsites
N Non-electric Campsites
T Pull Through Campsites
G Group Camping
D Dump Station

Fishing

- C** Fish Cleaning Stations
D Fishing Docks
P Fishing Piers

Other

- X** Exists At Lake

Picnic

- A** Picnic Area
G Group Picnic
GS Group Picnic Shelter

Swimming

- BE** Beach
P Swimming Pool

Trails

- B** Bike Trails
Q Equestrian Trails
H Hiking Trails
I Hiking Trails – Interpretive
R Off-Road Vehicle Trails
M Multipurpose Trails
W Water Trails

Recreation Area

	Camping	Lodging	Showers	Boat Ramps	Marina	Gas	Fishing Facilities	Picnic Area/Shelter	Playground	Swimming Area	Trails	Golf Course	Amphitheater	Grocery/Snack Bar
Arrowhead				X				A GS	X					
Big Sandy Ramp				X										
Clear Creek Natural Heritage Area											H			
Copperas Branch Cottonwood								A	X		H			
Cottonwood Creek Marina					X									
Crescent Oak Ramp				X										
Dallas Corinthian Yacht Club				X	X									
Doe Branch Access				X										
Eagle Point Marina				X	X									
East Hill			X	X				A GS	X	BE				
Eastvale				X				A			M			S
Falcons Flying Club								GS						
Greenbelt Access 380				X				A			Q M			
Harbor Lane								A	X					
Hickory Creek \$	E N D		X	X				A GS	X		M			
Hidden Cove Park	E N		X	X	X		C	A GS	X	BE	H			
Lakeview Marina				X	X			GS						
Lewisville Lake Environmental Learning Area	N G							GS			H W			
Lewisville Lake Park	E D		X	X			P	A G GS	X	BE		X		S
Little Elm	N			X				A GS	X	BE	M		X	S
Oakland			X	X				A GS	X					
Pier 121 Marina				X	X									
Pilot Knoll	E D		X	X				A GS	X		M			
Point Vista				X				A	X					


Recreation Area	Camping	Lodging	Showers	Boat Ramps	Marina	Gas	Fishing Facilities	Picnic Area/Shelter	Playground	Swimming Area	Trails	Golf Course	Amphitheater	Grocery/Snack Bar
Stewarts Creek	E D			X				A GS	X	BE	M	X		
Sycamore Bend	N			X				A GS	X		M			
Tower Bay Access				X										
Tribute Golf Course		X	X								M	X		S
Westlake \$ 			X	X				A GS						
Willow Grove	E D		X	X			P	A GS	X	BE	H			
YMCA of Dallas								A GS		BE	H Q		X	

Figure 2.72 Recreation Areas and Amenities at Lewisville Lake (Source: OMBIL)

2.5.3 Recreational Analysis – Trends

The Texas Outdoor Recreation Plan (TORP) published by TPWD in 2012 and 2017 is a comprehensive recreational demand study completed by Texas Parks and Wildlife. Some of the information in the TORP was extracted directly from the National Survey on Recreation and the Environment (NSRE) and reports generated by the USFWS. The top five needs identified in the 2017 TORP Survey by Texas residents are listed in Table 2.25, while the top five needs of those in Region 6, which includes Lewisville Lake, are listed in Table 2.26. The needs highlighted in these tables will increase as the population continues to grow and urban environments expand. Many of these needs can be met by having a regional resource like Lewisville Lake that can provide some of these amenities to the rapidly expanding population of the Dallas-Fort Worth Metropolitan Area.

Table 2.25 Top Five Recreation Opportunities Needed across Texas

Recreation Opportunity	Percent Wanting the Opportunity
Trails / places to hike or bike	23.5%
Pools / swimming facilities (other than lakes)	9.8%
More parks / more park capacity	9.8%
Campgrounds (including cabins)	6.4%
Fishing places and access	6.1%

SOURCE: 2017 TORP Survey Report

Table 2.26 Top Five Recreation Opportunities Needed by Residents in Region 6

Recreation Opportunity	Percent Wanting the Opportunity
Trails / places to hike or bike	26.1%
Pools / swimming facilities (other than lakes)	20.9%
More parks / more park capacity	12.1%
Sports Fields	7.0%
Boat and water access / put-ins / places to boat	6.4%

SOURCE: 2017 TORP Survey Report

Interest in watercraft sports such as boating, canoeing and kayaking continue to hold strong interest in recreation. Table 2.27 illustrates that over 35% of the U.S. population surveyed participate in boating activities. Canoeing and Kayaking are seeing an increase in participation amongst those surveyed. Table 2.28 shows that watercraft sports are also popular with Texas residents and specifically to those in the region.

Table 2.27 Percent of U.S. Residents Participating in Recreational Boating over Time

Activity	1982-1983	1994-1995	1999-2001	2005-2009
Boating	28.0%	37.8%	36.3%	35.6%
Canoeing/Kayaking	8.0%	9.5%	11.5%	12.4%

SOURCE: Cordell & Green, National Survey on Recreation and the Environment, Texas Reports 1994-95, 2000-01 and 2006-09, 2009; TORP – 2012

Table 2.28 Percent of Texas and Region 6 Residents Participating in Recreational Boating in 2017

Activity	Texas	Region 6
Motorized boating, such as boating with a motorboat, speedboat, powerboat, or personal watercraft	16.9%	17.0%
Non-motorized boating, such as boating with a sailboat, canoe, kayak, or rowing	13.0%	11.0%
Kayaking	9.0%	7.1%

SOURCE: 2017 TORP Survey Report

While participation in hunting and fishing show stable growth across those surveyed, there is a large jump in the population who are participating in the more passive activity of wildlife watching. As seen in Table 2.29, from 2001 to 2006 almost a million more people reported participating in this activity. The 2017 TORP reports that fishing is the top outdoor activity for Texas children with 22% of Texas children having participated in fishing. Across the entire state, 31% of all residents have participated in fishing, and within Region 6, 29% have participated in fishing. Hunting remains popular, with 13.5% of all Texas residents and 14.1% of Region 6 residents having participated in hunting.

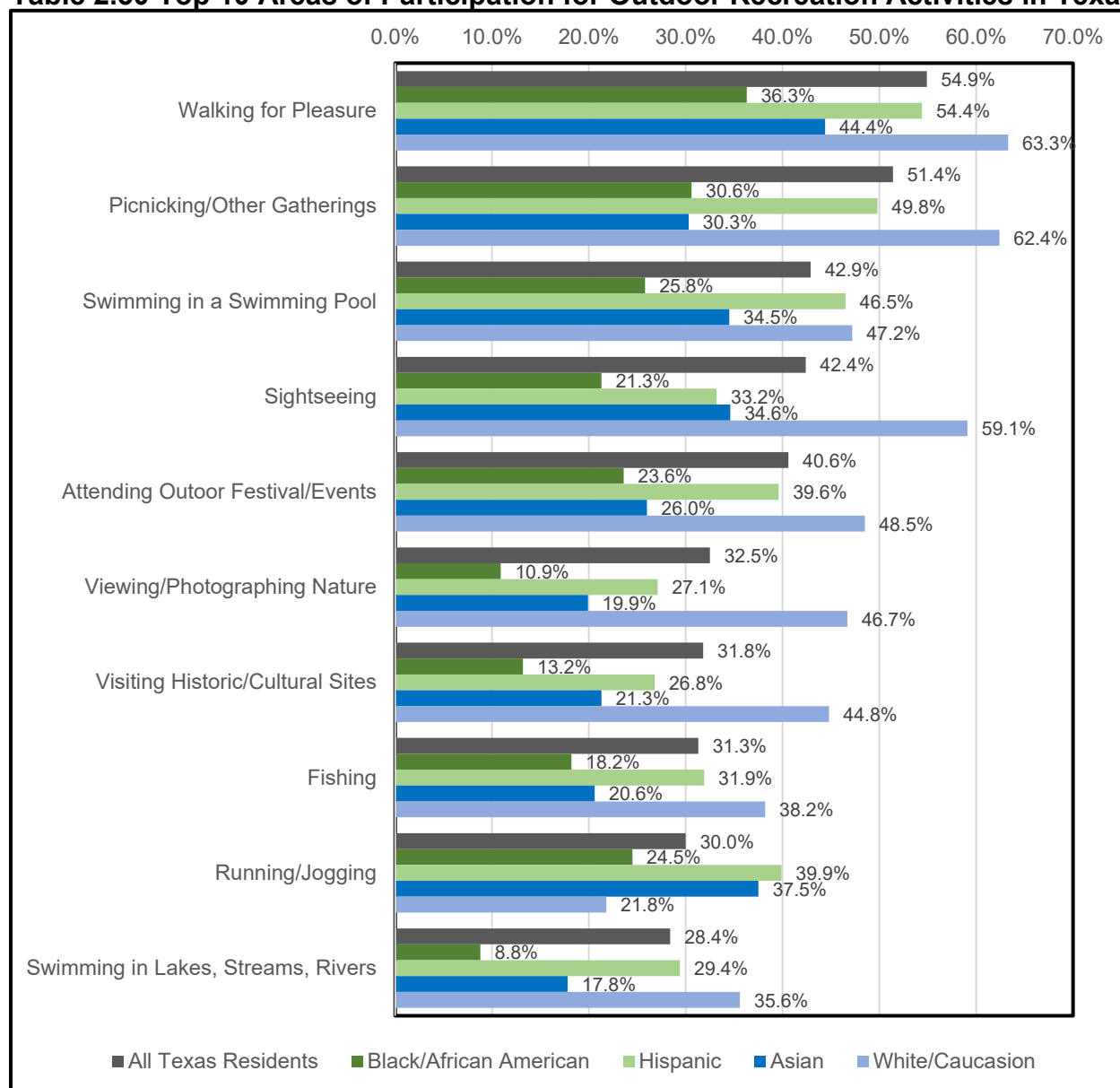
Table 2.29 Participation in Hunting, Fishing, and Wildlife Watching in Texas

Participation in Hunting, Fishing and Wildlife Watching in Texas (Residents and Non-Residents, 16 years and older)				
Texas	Fishing	Hunting	Wildlife Watching	Total Participants (Fishing + Hunting + Wildlife Watching)
1996 Survey	2.5 million	829 thousand	3.6 million	4.7 million
2001 Survey	2.4 million	1.2 million	3.2 million	4.9 million
2006 Survey	2.5 million	1.1 million	4.2 million	6.0 million

Source: 1996, 2001, 2006 National Survey of Fishing, Hunting and Wildlife-Associated Recreation for Texas, USFWS; TORP 2012

No specific survey has been conducted at Lewisville Lake to determine the ethnic/racial makeup of visitors, but the TORP provides an indication of Texas residents who participate in the top 10 outdoor recreation activities by different ethnic/racial groups, as shown in Table 2.30. This figure presents in graphical form how minority groups often participate much less in the top outdoor recreation activities when compared to white/Caucasian residents. Parks near populated regions, such as those at Lewisville Lake, presents a prime opportunity to meet the needs of people across all ethnic/racial groups.

Table 2.30 Top 10 Areas of Participation for Outdoor Recreation Activities in Texas



Source: TORP 2018

Several cities around Lewisville Lake have parks and recreation master plans, and some even have trail system master plans. These plans describe that many nearby cities place a priority on having an extensive and connected multi-use trail network. In addition to trails, other top priorities for residents include access to nature, access to the lake, fishing, athletic fields, picnic areas, and improved accessibility.

2.6 REAL ESTATE

Initial land acquisition for Lewisville Lake followed the pre-1953 acquisition policy which generally required fee simple acquisition up to a blocked-out line that closely encompassed the 537.0 contour. In lieu of fee simple acquisition, flowage easements

were acquired in the upper reaches of most tributaries where the configuration of required lands was relatively narrow. Implementation of the 1953 – 1962 acquisition policy, sometimes referred to as the Eisenhower Policy, resulted in USACE reconveying (selling) approximately 2,752 acres back to the original landowners in the early 1960s. In general, these lands were sold down to about the 527.5 contour with flowage easements retained up to elevation 537.0. When the conservation pool was raised from 515.0 to 522.0 in the 1980s, a few tracts of additional land were acquired around Lewisville Lake totaling 681 acres.

Greenbelt Corridor

Development of recreation facilities associated with Ray Roberts Lake included land acquisition and construction of trails and trail access points on what is now known as the Ray Roberts Lake State Park Greenbelt Corridor. The Greenbelt Corridor runs approximately ten miles from an access point on Highway 380 north to Ray Roberts Dam. Much of the Greenbelt Corridor is located on fee-owned lands that are part of Lewisville Lake, but much of the northern portion of the Corridor required the acquisition of a strip of land along both sides of the Elm Fork of the Trinity River. The lands acquired for the Greenbelt Corridor totaled 1110 acres. In addition to the fee simple acquisition of lands for the Greenbelt Corridor, approximately 475 acres of conservation easements were also acquired to serve as a buffer between private land and the Greenbelt.

The area acquired in fee simple title at Lewisville Lake, taking into account the reconveyance of lands and the additional land acquisition required for the pool raise, is 46,001 acres, which includes land for construction of the dam and for the operation and maintenance of the project and public use areas. In addition to the fee land acquisition, approximately 8,712 acres of various easements, the majority being flowage easements acquired in the upper reaches of several tributaries up to elevation 537.0 NGVD. The flowage easement estate conveys to the Government the right to periodically inundate the land for project operations purposes and to prevent human habitation on the easement or placement of fill material and changing contours in a manner that would reduce flood storage capacity. The fee simple and easement acreage identified in this master plan was obtained from the USACE Real Estate Management Information System and is subject to change as the acquisition documents are audited.

Urban expansion in the cities of Lewisville, The Colony, Frisco, Little Elm, Denton, Shady Shores, Lake Dallas, Corinth, Hickory Creek, Copper Canyon, and Highland Village has almost completely surrounded Lewisville Lake. The road and utility network serving the expansion has resulted in numerous real estate outgrants on USACE fee and flowage easement lands. A summary of existing outgrants is provided in Table 2.30 as follows:

Table 2.31 Listing of Outgrants at Lewisville Lake

Leases:	21
Park and Recreation Lease	11
YMCA	1
Water Storage Tanks	1
Fish and Wildlife Lease	4
Marinas	6
Model Airplane Field	1
LLELA	1
Easements:	185
Sewer/water/storm drainage	64
Gas pipeline	8
Road	31
Electric	62
Water structure	7
Railroad	4
Other	9
Licenses:	154
Electric line	31
Waterline	104
Erosion control	13
Permits:	1
Doppler Weather Radar Site	1
Consent/Other:	341
Pond	7
Pool	29
Erosion Control	36
Driveway	15
Garage	6
Storage Building/Shed/Barn	19
Porch/Deck/Patio	41
Septic/Sewer/Waterline	85
Gazebo	6
Electric Line	31

Some lands were acquired subject to existing easements which are not recorded in the permanent real estate outgrant database.

2.7 PERTINENT PUBLIC LAWS

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

- Public Law 78-534, Flood Control Act of 1944. - Section 4 of the act as last amended in 1962 by Section 207 of Public Law 87-874 authorizes USACE to construct, maintain, and operate public parks and recreational facilities in reservoir

areas and to grant leases and licenses for lands, including facilities, preferably to Federal, State or local governmental agencies.

- Public Law 85-624, Fish and Wildlife Coordination Act 1958. - This act as amended in 1965 sets down the general policy that fish and wildlife conservation shall receive equal consideration with other project purposes and be coordinated with other features of water resource development programs. Opportunities for improving fish and wildlife resources and adverse effects on these resources shall be examined along with other purposes which might be served by water resources development.
- Public Law 86-717, Forest Conservation. - This act provides for the protection of forest and other vegetative cover for reservoir areas under this jurisdiction of the Secretary of the Army and the Chief of Engineers.
- Public Law 89-72, Federal Water Project Recreation Act of 1965. - This act requires that not less than one-half the separable costs of developing recreational facilities and all operation and maintenance costs at Federal reservoir projects shall be borne by a non-Federal public body. A HQUSACE/OMB implementation policy made these provisions applicable to projects completed prior to 1965.
- Public Law 91-190, National Environmental Policy Act of 1969 (NEPA). – NEPA declared it a national policy to encourage productive and enjoyable harmony between man and his environment, and for other purposes. Specifically, it declared a “continuing policy of the Federal Government... to use all practicable means and measures...to foster and promote the general welfare, to create conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.” Section 102 authorized and directed that, to the fullest extent possible, the policies, regulations and public law of the United States shall be interpreted and administered in accordance with the policies of the Act. It is Section 102 that requires consideration of environmental impacts associated with Federal actions. Section 101 of NEPA requires the federal government to use all practicable means to create and maintain conditions under which man and nature can exist in productive harmony.

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

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

- Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.
- PL 89-665, Historic Preservation Act of 1966. - This act provides for: (1) an expanded National Register of significant sites and objects; (2) matching grants to states undertaking historic and archeological resource inventories; and (3) a program of grants-in aid to the National Trust for Historic Preservation; and (4) the establishment of an Advisory Council on Historic Preservation. Section 106 requires that the President's Advisory Council on Historic Preservation have an opportunity to comment on any undertaking which adversely affects properties listed, nominated, or considered important enough to be included on the National Register of Historic Places.
- PL 101-601, Native American Graves Protection and Repatriation Act (16 November 1990), requires Federal agencies to return Native American human remains and cultural items, including funerary objects and sacred objects, to their respective peoples.

CHAPTER 3 - RESOURCE GOALS AND OBJECTIVES

3.1 INTRODUCTION

This chapter sets forth goals and objectives necessary to achieve the USACE vision for the future of Lewisville 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 statements, paraphrased from *EP 1130-2-550*, Chapter 3, express the goals for the Lewisville Lake Master Plan:

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

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

3.3 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, Lewisville 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 Texas Conservation Action Plan (TCAP) and TORP are monitored for applicability to Lewisville Lake. Finally, these objectives are consistent with the management objectives of numerous lessees that manage parks and other USACE lands at Lewisville Lake.

The objectives in this master plan provide project benefits, meet public needs, and foster environmental sustainability for Lewisville Lake to the greatest extent possible. They include 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 all lessees operating recreation areas at Lewisville Lake, 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 leased areas and areas managed directly by USACE 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 EOP associated with recreational use of waterways for all water-based management activities and plans.		*	*		*
Increase universally accessible facilities on Lewisville Lake and encourage lessees to do the same.	*		*		*
Consider flood/conservation pool elevations to address potential impact to recreational facilities (i.e. campsites, boat ramps, courtesy docks, etc.).	*	*	*	*	
Ensure consistency with USACE Recreation Strategic Plan.					*
Monitor the TCAP, the TORP, and adjacent municipality plans to insure that USACE is responsive to outdoor recreation trends, public needs and resource protection within a regional framework. All plans by others will be evaluated in light of USACE policy and operational aspects of Lewisville Lake.	*	*	*		*

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

Table 3.2 Natural Resource Management Objectives

Natural Resource Management Objectives	Goals:				
	A	B	C	D	E
Consider flood/conservation pool levels to ensure that natural resources are managed in ways that are compatible with primary project purposes of flood risk management and water supply.	*	*		*	
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 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 Lewisville Lake and develop alternatives to resolve the issues.	*	*			*
Address unauthorized uses of public lands such as off-road vehicle 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. Potential invasive species of great concern are the zebra mussel, Chinese privet (<i>Ligustrum sinense</i>), and emerald ash borer. Implement prescribed fire as a management tool to control the spread of noxious plants including Johnsongrass, King Ranch bluestem, and eastern redcedar, and to promote the vigor of native prairie grasses and forbs.	*	*		*	*

Protect and/or restore important native habitats such as riparian zones, wetlands, 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, 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. Some of these habitats may be classified as Environmentally Sensitive Areas.	*	*	*	*	*
Administer the Shoreline Management Program to balance private shoreline uses (such as mowing or vegetation removal requests along the Federal property boundary, or paths to the shoreline) with wildlife habitat protection and impacts to public use.	*		*		

*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: 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.	*		*	*	*
Promote USACE Water Safety message.	*		*	*	*
Educate adjacent landowners on shoreline management policies and permit processes in order to reduce encroachment actions.	*	*	*	*	*

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

Table 3.4 General Management Objectives

General Management Objectives	Goal				
	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.	*	*	*	*	*
Ensure consistency with USACE Campaign Plan (national level), IPlan (regional level), and OPlan (District level).					*
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 sustainability goals including energy conservation, increased use of renewable energy, reduced use of potable water, waste reduction and recycling, as set forth in Executive Order 13834 and related USACE policy.					*

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

Table 3.5 Cultural Resources Management Objectives

Cultural Resources Management Objectives	Goal				
	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.		*		*	*
Two sites at Lewisville Lake, the Cranston Pottery Kiln and the Old Alton Bridge are listed on the National Register of Historic Places (NRHP). Of the remaining 160 known sites ten have been determined eligible for the NRHP and 136 have been determined ineligible. Fourteen sites have not been evaluated for eligibility. The project office will ensure any future historical preservation is fully integrated into the Lewisville 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 Lewisville Lake.		*	*	*	*
Stop unauthorized use of public lands as it pertains to the illegal excavation and removal of cultural resources.		*		*	*

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



Photo 3.1 The Minor-Porter Log Cabin and Pioneer Homestead reconstructed by the LLELA consortium on the LLELA area

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. There are four possible categories of allocation identified in USACE regulations including Operations, Recreation, Fish and Wildlife, and Mitigation. At Lewisville Lake, the land allocation categories that apply are Operations and Recreation. Operations allocation, is defined as those lands that are required to operate the project for the primary authorized purposes of flood risk management, hydroelectric power, and water conservation. Recreation allocation, is defined as lands acquired specially for the authorized purpose of recreation, referred to as separable recreation lands. The remaining allocations of Fish and Wildlife, and Mitigation would apply only if lands had been acquired specifically for these purposes. The entire fee simple federal estate at Lewisville Lake, including fee-owned land acquired for the Ray Roberts Greenbelt is 47,111 acres (46,001 associated with Lewisville Lake plus 1,110 acres acquired for the Greenbelt) of which 27,175 acres is inundated at conservation pool. The 1,110 acres acquired for the Greenbelt are allocated as Separable Recreation lands with the remaining 46,001 acres allocated to Project Operations.

4.2 LAND CLASSIFICATION

The 2004 MP supplement used only three land classifications including Project Operations, Recreation and Wildlife. This MP reclassifies project lands according to standard protocol set forth in Chapter 3 of EP 1130-2-550, dated January 2013. The new land classifications in this MP include classifications that are similar to prior classifications, but a direct comparison of prior and new classifications is not possible. The prior land classifications were intended to simplify the overall classification of lands but are not refined sufficiently to describe existing and potential public uses. Additionally, in the 15 years since the 2004 MP supplement was published, wildlife habitat values, surrounding land use, and regional recreation trends have changed giving rise to the need for revised classifications. Refer to Table 8.1 in Chapter 8 for a summary of land classification changes from the prior classifications to the current classifications.

4.2.1 Current Land and Water Surface Classifications

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

- Project Operations
- High Density Recreation

- Mitigation
- Environmentally Sensitive Areas
- Multiple Resource Management Lands
- Water Surface

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

4.2.2 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 fishing near the stilling basin. Regardless of any limited recreation use allowed on these lands, the primary classification of Project Operations will take precedent over other uses. There are 1,083 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 Lewisville Lake, prior land classifications included a number of areas under the high density recreation classification. Using public, agency, and lessee input, the planning team changed the classification of some of these lands to reflect current and projected outdoor recreation needs and trends. At Lewisville Lake there are 4,559 acres classified as High Density Recreation land. Refer to Figure 2.12 for a listing of the recreation facilities currently provided on the HDR lands at Lewisville Lake. Each of the High Density Recreation areas is described briefly in Chapter 5 of this Plan.

4.2.4 Mitigation

This classification is used only for lands allocated for mitigation for the purpose of offsetting losses associated with the development of the project. There are no lands at Lewisville 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 Lewisville 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 11,188 acres classified as ESA at Lewisville Lake.

4.2.6 Multiple Resource Management Lands (MRML)

This classification is divided into four sub-classifications identified as: Low Density Recreation, Wildlife Management, Vegetative Management, and Future/Inactive Recreation Areas. A given tract of land may be classified using one or more of these sub-classifications but the primary sub classification should reflect the dominant use of the land. Typically, Multiple Resource Management Lands support only passive, non-intrusive uses with very limited facilities or infrastructure. Where needed, some areas may require basic facilities that include, but are not limited to minimal parking space, a small boat ramp, and/or primitive sanitary facilities. The following paragraphs list each of the sub-classifications, and the number of acres and primary uses of each.

4.2.6.1 Low Density Recreation (LDR). These are lands that may support passive public recreational use (e.g., fishing, hunting, wildlife viewing, natural surface trails, hiking, etc.). Under prior land classifications, numerous areas were classified to support “low use” recreation and wildlife management. The planning

process resulted in most of these areas be 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 542 acres under this classification at Lewisville Lake.

4.2.6.2 Wildlife Management (WM). This land classification applies to those lands managed primarily for the conservation of fish and wildlife habitat. These lands generally include comparatively large contiguous parcels, most of which are located within the flood pool of the lake. Passive recreation uses such as natural surface trails, fishing, hunting, and wildlife observation are compatible with this classification unless restrictions are necessary to protect sensitive species or to promote public safety. There are 3,268 acres of land included in this classification at Lewisville Lake.

4.2.6.3 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 Lewisville Lake.

4.2.6.4 Future or Inactive Recreation. These are lands with site characteristics compatible with High Density Recreation development. Prior land classifications at Lewisville Lake identified several tracts for future high density recreation development. In this MP there are no areas classified as Future or Inactive Recreation.

4.2.7 Water Surface

USACE regulations specify four possible sub-categories of water surface classification. These classifications are intended to promote public safety, protect resources, or protect project operational features such as the dam and spillway. These areas are typically marked by USACE or lessees with navigational or informational buoys or signs or are denoted on public maps and brochures. The Water Surface Classifications are shown on the Land Classification maps found in Appendix A of this Plan. The four sub-categories of water surface classification include:

- Restricted. Restricted water surface includes those areas where recreational boating is prohibited or restricted for project operations, safety, and security purposes. The areas include water intake towers and designated swim beaches at Lewisville Lake parks. There are 82 acres of restricted water surface at Lewisville 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 and in select coves where paddle craft are popular. There are 23 boat ramps and 6 marinas at

Lewisville Lake where no-wake restrictions are in place for reasons of public safety and protection of property. There are 1,079 acres of designated no-wake water surface at Lewisville 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. Lewisville 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, including areas where standing dead timber may be present as depicted on the land and water surface classification maps in Appendix A, 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 25,475 acres of open recreation water surface at Lewisville Lake.

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.

4.2.8 Recreational Seaplane Operations

Seaplane restrictions are part of Title 36 Code of Federal Regulations. At Lewisville 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 general restrictions as well as lake-specific restrictions for seaplane operation. In general, recreational seaplane landings and takeoffs on Lewisville Lake are prohibited west of Interstate Highway 35, north of Highway 720 on the Little Elm arm of the lake, north of the Crescent Oaks boat ramp, and in the uncleared portions of the eastern half of the lake and within 500 feet of structures such as bridges and the dam. Once on the water, seaplanes are considered to be water vessels and fall under guidelines for watercraft. Commercial seaplane operations, such as pilot training exercises, are prohibited unless authorized by written permission from the District Engineer.

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

Table 4.1 Land and Water Surface Classification Acres at Lewisville Lake

CLASSIFICATION	ACRES
Project Operations	1,083
High Density Recreation	4,559
Environmental Sensitive Areas	11,188
Multiple Resource Managed Lands - Low Density Recreation	542
Multiple Resource Managed Lands - Wildlife Management	3,268
Water Surface: Restricted	82
Water Surface: Designated No-Wake	1,079
Water Surface: Open Recreation	25,475

Note: Acreages were measured using GIS technology and may vary from the official land acquisition records. Acreage varies depending on changes in lake levels, sedimentation and shoreline erosion.

4.3 PROJECT EASEMENT LANDS

Project Easement Lands are primarily lands on which easement interests were acquired. Fee title was not acquired on these lands, but the easement interests convey to the Federal government certain rights to use and/or restrict the use of the land for specific purposes. Easement lands are typically classified as Operations Easement, Flowage Easement, and/or Conservation Easement. At Lewisville Lake, flowage easement lands exist for one primary purpose. A flowage easement, in general, grants to the government the perpetual right to temporarily flood/inundate private land during flood risk management operations and to prohibit activities on the flowage easement that would interfere with flood risk management operations such as placement of fill material or construction of habitable structures. There are approximately 8,712 acres of flowage easements lands and 475 acres of conservation easements at Lewisville Lake.

CHAPTER 5 - RESOURCE PLAN

5.1 MANAGEMENT BY CLASSIFICATION

This chapter describes the management plans for each land use classification within the Master Plan. The classifications that exist at Lewisville 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), Vegetative Management (VM) 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 these project lands and water surface will be managed in broad terms. A more descriptive plan for managing these lands can be found in the Lewisville Lake OMP or the park master plans prepared by the various land managing lessees. Acreages shown for the various land classifications was calculated using GIS technology and may not agree with lease documents, prior publications, or official land acquisition records.

5.2 PROJECT OPERATIONS

The Project Operations (PO) classification is land associated with the dam, spillway, levees, lake office, maintenance facilities, and other areas managed solely for the operation and fulfillment of the primary missions of flood risk management and water conservation at Lewisville Lake. There are 1,083 acres of lands under this classification, all of which are managed by the USACE. Public fishing access as well as access for launching paddle craft is currently allowed in the area immediately downstream from the stilling basin. This recreational public use is considered by USACE to be incidental to operational needs and is subject to termination if necessary, for project operational purposes. USACE currently has no plans to curtail this recreational use, but future dam maintenance needs or security concerns could result in cessation of this use. The management plan for the PO lands 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

Lewisville Lake has 4,559 acres classified as High Density Recreation (HDR). These lands are referred to as parks and are developed, or suitable to be developed, for intensive recreational activities for the visiting public including day use areas, campgrounds and commercial concessions within the areas classified as HDR. Other land classifications exist within designated parks including ESA, MRML-WM, and MRML-LDR.

As noted in Chapter 4, 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 includes 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, athletic fields for organized sports, theme parks or ride-type attractions, sports or concert stadiums, and stand-alone facilities such as restaurants, bars, motels, hotels, and golf courses.

The currently developed parks operated by USACE and others are listed in Chapter 2 in Figure 2.12. The primary recreation facilities offered in each park are listed in the table. Provided in the following sections is a description of HDR areas currently operated by USACE followed by a description of each HDR area operated by others. Campgrounds or campsites managed directly by USACE at Lewisville Lake are defined by USACE as Class A campgrounds which provide a full range of facilities but may or may not have sewer hookups (see Appendix M of EP 1130-2-550 for a full definition of Class A campgrounds).

5.3.1 Current Campgrounds Operated by USACE

Hickory Creek Park

General Description: This park is a premier campground operated by USACE. The park consists of 246 acres of which 100 acres are currently developed. The park has 137 campsites (10 primitive campsites and 20 group sites), 4 restrooms, 2 vault toilets, a 2-lane boat ramp, and a dump station. A controlled entrance area is open year around from 6 a.m. – 10 p.m.

Management: At this time, no serious management concerns exist. The park opened in October 1990. During original construction of the park in the mid 1980's, a water tower was installed as part of the potable water system for the park. Subsequently, the park was hooked up to the Lake Cities Municipal Utility Authority water supply and use of the tower was discontinued. Options are being considered for removal of the old water tower.

Needed Facilities: Significant repair work is underway and no new facilities or upgrades are envisioned until repair work from periodic flooding is complete. Part of the repair work includes the upgrade of all campsites to 50 AMP electrical service.

5.3.2 Current Day Use Parks Operated by USACE

Oakland and Westlake Parks

General Description: The two parks consist of 853 acres with approximately 120 acres presently developed. A controlled entrance area is open year around from 6 a.m. – 10 p.m. and controls access into both parks. There are 4 waterborne toilets – 3 with showers, 2, 2-lane boat ramps, a beach area, 4 group shelters, 69 picnic sites, and a dump station. Undeveloped area is available for fishing, hiking, and swimming by

pedestrian traffic. Oakland Park was formerly operated by USACE as a campground but has been converted to day use.

Management: Flooding is an issue along the south shoreline of Oakland Park. This south shoreline area remains closed indefinitely due to flood damages.

Needed Facilities: Oakland and Westlake Parks were damaged extensively by the extended flooding that occurred in the summer of 2015. No new facilities or upgrades are envisioned until repairs are completed. Most repairs have been accomplished in Westlake Park allowing the park to be operational, but repairs in Oakland Park are contingent on funding.

Doe Branch Park

General Description: This 100-acre area is currently designated as an open hunting area with an access road to a 1 lane boat ramp.

Needed Facilities: Minor improvements are anticipated for Doe Branch Park, but for the foreseeable future, the primary focus will be basic maintenance until flood-related damages are repaired in other higher priority areas. Repairs completed in (INSERT YEAR) included installation of pipe rail barriers as needed to prevent off-road vehicle traffic.

Fish Trap Access Area

General Description: Formerly Fish Trap Park, this 40-acre area is presently closed and undeveloped but is used extensively by fishermen and hunters for access to the Elm Fork of the Trinity River. There is a canoe launch and gravel parking area. Management Problems: The area is often used for illegal trash dumping.

Needed Facilities: As with Doe Branch Park minor improvements are anticipated for Fish Trap Access Area, but for the foreseeable future, the area will continue to serve as a walk-in access point until flood-related damages are repaired in other higher priority areas.

Big Sandy Access Area

General Description: This 20-acre park currently has approximately 3 acres developed. The area contains a 2-lane boat ramp and a paved boat trailer parking lot. This area is open year around and along with the boat ramp at Doe Branch Park is currently available for public use without charge.

Management: The courtesy dock is frequently used for fishing and loitering by non-boaters. Non-trailer vehicles frequently park in trailer spots, thereby forcing the trailers to park in prohibited areas along the roadway.

Needed Facilities: Traffic control measures and improvement of the courtesy dock were completed in 2019. No further improvements are planned.

5.3.3 Parks and/or Recreation Areas Not Operated by USACE

Lewisville Lake Park – Leased to the City of Lewisville

General Description: Lewisville Lake Park currently consists of a 151-acre multi-use area. The park is developed to near capacity and includes 51 picnic units; 106 camping

units (23 with 50 AMP service); 1 group pavilion; 2 boat launching areas (7 lanes total); 1 buoyed swimming area; 12 soccer fields; 9 softball fields; 1, 18-hole golf course; 1, 9-hole, Par 3 golf course; 1 fishing barge; 1 fee control station; 2 waterborne restrooms; 2 vault restrooms, individual camper pullouts, day use and boat ramp parking.

Management: In 2014, voters approved \$7.7 million in general obligation bonds to improve the day use, campground and pavilion areas of the park. The city council authorized preparation of a master plan for the park to determine priorities for use of these funds. A contract for preparation of the master plan was awarded in February, 2020 with initiation of the effort to begin in March 2020. Improvements or enhancements to existing facilities such as boat ramps, pavilions, restrooms, playgrounds, trails, the disc golf course, campgrounds and parking areas will be considered. Shoreline stabilization, mobile concession areas, an additional toll booth, reforestation/restoration of native prairie areas and additional spaces for public gathering will be considered as well.

Tower Bay Boat Ramp and Access Area – Leased to the City of Lewisville

General Description: This area includes the Tower Bay boat ramp, parking for approximately 20 private boathouses, and a trail that leads north and traverses an undeveloped peninsula of land that was formerly known as Copperas East Park. The peninsula of land in question is entirely on the east side of Interstate Highway 35E and extends north to the highway bridge. The only facilities on the peninsula are a pedestrian trail and vault toilets. The area includes a boat launching area. The boat ramp has 4 lanes, a courtesy dock, parking lot, and a vault restroom. There is a parking lot to accommodate approximately 20 private boathouses moored along the shoreline. The City of Lewisville is not responsible for the oversight of the boathouses. The City of Lewisville has no plans for further development of the area.

Management: The boat ramp is very popular and fills to capacity on busy days. Measures are needed to control traffic in the limited available space. Conversion of the vault toilet to a waterborne toilet is needed.

Copperas Branch Park – Leased to the City of Highland Village

General Description: This 100-acre park, which includes USACE land adjacent to the west side of IH-35 E has a significant section of shoreline and includes an Environmentally Sensitive Area known as Wichita Forest, was reduced significantly in size by the construction of the south-bound bridge of IH-35E where it crosses Lewisville Lake. All park facilities and natural resources lost to the construction were fully mitigated by TXDOT. Some of the mitigation involved construction of a pedestrian bridge over a small arm of Lewisville Lake immediately south of Highland Village Road. This small arm of Lewisville Lake is commonly referred to as Copperas Branch Lake. When Lewisville Lake drops below elevation 517.0 NGVD, water no longer flows through a culvert in Highland Village Road and Copperas Branch Lake becomes isolated from the main body of Lewisville Lake. The City of Highland Village has requested to lease all USACE land located south of Highland Village Road, and surrounding Copperas Branch Lake, and proposes to construct hiking trails along portions of Copperas Branch Lake with the intent to connect to other trails running through the town of Highland Village.

Adding this land to Highland Village's current park and recreation lease will roughly double the size of Copperas Branch Park. This master plan changes the land classification around Copperas Branch Lake from the prior classification of Wildlife Management to High Density Recreation. Within the 100-acre day use area, approximately 40 acres are developed. Amenities include 2 swimming areas, 19 picnicking units, 1 boat launch area, 1 courtesy dock, 2 restrooms, 1 fee control station, 2 athletic fields and parking for day use sites and boat ramp.

Needed Facilities: Construct additional amenities such as picnic units, sand volleyball court, fish cleaning station, and a pavilion to accommodate public use. Modify the existing athletic field with multiuse lighting. Modify the existing trail. The City of Highland Village is currently preparing a master plan for Copperas Branch Park. The master plan will be coordinated with USACE and is scheduled for completion in 2020.

YMCA Lease Area

General Description: The YMCA leases a 25-acre linear tract from USACE that begins at the common boundary with Copperas Branch Park, which is leased to the City of Highland Village, on the east end and proceeds up lake (generally west) to a small unnamed cove located between Highland Lakes Drive to the west and Horseshoe Drive to the east. The lease area, known as Camp on the Lake, has been in existence since 1969. Most of the area lies below the 537.0 contour and is therefore subject to flooding. The YMCA organization maintains a chapel/office buildings, storage building, two group camp areas, an archery range, swim beach, courtesy dock, and amphitheater on the site. There are currently no plans to develop the site any further.

Pilot Knoll Park

General Description: This 90-acre park, operated by the City of Highland Village under a lease agreement with USACE, is located on the Hickory Creek Arm of the Lake on the east side of FM 2499. Prior to leasing the park to the City in the mid-2000s, USACE operated Pilot Knoll Park for many years. In meetings with representatives from the City of Highland Village, the City requested that a portion of the park classified as Wildlife Management/Environmentally Sensitive Area be reclassified to Multiple Resource Management Land – Low Density Recreation to allow for primitive camping. USACE has determined that the area in question should remain as an Environmentally Sensitive Area. The City also stated that if municipal sewer is brought close to the park, then the City would hook the park up to that service and would abandoned the current septic tank field. The City of Highland Village did not propose additional improvements to the park. The park has 56 camping sites, 3 group pavilions, 1 boat launch, 1 courtesy dock, 1 fee control station, 37 picnic sites, 1 equestrian overnight site, a trailhead for the Elm Fork Trail, 1 waterborne public restroom, 1 vault restroom, 1 shower facility, 1 dump station, 1 playground and a swim beach.

Needed facilities: The park is currently well utilized but could use additional picnic sites, a trail connecting the camping area to the day use area, and general landscaping.

Sycamore Bend Park

General Description: This 105-acre park is located on the north side of the Hickory Creek Arm of Lewisville Lake. The park is leased to the City of Hickory Creek and currently has approximately 15 acres developed. The park extends from the west end of Harbor Lane Park (also on USACE land and leased to the City of Hickory Creek) in a westerly direction to the south side of a cove that is formed by an unnamed creek that crosses Hidden Hills Road. The City of Hickory Creek currently charges a fee to enter the park via a self-pay station. Camping is allowed in the park but is primitive with no individual water or electric hook ups. The area has 1 boat ramp, random primitive campsites, 9 picnic sites, 3 parking areas, and 2 vault, non-flush restrooms.

Management: The park floods relatively easily and can remain closed for extensive periods during flood events.

Needed Facilities: In meetings with the City Manager, the City of Hickory Creek provided USACE with a list of desired improvements in the park as follows: swim beach, disc golf course, fishing dock, new bathroom in the primitive camping area, electric hookups in the primitive campsites, larger playground, access to the current pavilion by boat trailers for fishing tournaments, campsites for recreational vehicles (RVs). These proposed facilities comply with USACE policies governing recreation outgrants (leases).

Harbor Lane Park (also referred to as Harbor Grove Park)

General Description: The 25-acre day use park is bounded on the west by Sycamore Bend Park and on the east by Hickory Creek Park. Harbor Lane Park is leased to and operated by the City of Hickory Creek. Approximately 15 acres of the park are developed with 7 picnic tables, a vault toilet, a walking trail and playground.

Needed Facilities: The City of Hickory Creek has expressed interest in constructing a disc golf course and a dog park within Harbor Lane Park. USACE does not allow dog parks within High Density Recreation areas so this proposal would not be approved.

Point Vista Boat Ramp and Access Area

General Description: This 37-acre area was once operated by USACE but is now leased to, and operated by, the City of Hickory Creek. The area is operated for day use only with the principal facility in the area being the Point Vista boat ramp, vault restroom, courtesy dock and parking area. The remainder of the area is largely undeveloped but includes an access road and primitive picnic sites

Management: Uncontrolled vehicular access can result in unwanted activity in the area. The road used to access the entire area also serves as a city street, Point Vista Road, providing access to numerous homes.

Needed Facilities: The City of Hickory Creek currently has no plans for improvements or upgrades in the Point Vista Boat Ramp and Access Area.

Arrowhead Park

General Description: This 55-acre park, formerly operated by USACE, is currently leased to, and operated by the City of Hickory Creek as a day use park. The park

extends from its entrance on Kelton Drive on the east side of IH-35E to the common boundary with Oakland Park. Approximately 22 acres of the park are currently developed with 2 boat launch areas with 2 and 4 lanes respectively, 2 courtesy docks, 5 picnic sites, group shelter, 2 vault restrooms, and parking for the boat ramps. The City of Hickory Creek charges a user fee to enter the park and collects the fees at the park entrance via a self-pay station.

Management: The two boat ramps are conveniently located adjacent to IH-35E and are often used to capacity. Better traffic control and designated parking is needed to prevent unauthorized parking of boat trailers throughout the park.

Needed Facilities: Improved traffic control and parking at boat ramps. The City of Hickory Creek has also expressed interest in constructing a volleyball court and basketball court.

Willow Grove Park

General Description: This 186-acre park is currently leased to, and operated by the City of Lake Dallas as a multi-function day use area. Approximately one-half of the park is developed and currently features a single lane boat ramp, 6 picnic units, parking lots, playground, fishing pier, swimming area, kayak rentals, 2 athletic fields, 1 vault restroom, and a trail.

Needed and Proposed Facilities: Replace the entrance kiosk with a newer version. Install new solar lights at the park on the existing solar light poles. The solar lights were damaged with the park flood of 2015. Examine and possibly implement an Aqua-Park similar to the one that is operational at Meadowmere Park on Grapevine Lake. Expand the trails leading north and south of Willow Grove Park. Work with the Town of Hickory Creek to determine if we are able to connect Willow Grove Park to one of their parks with a natural or crushed rock type of trail.

Crescent Oaks Boat Ramp

General Description: The Crescent Oaks boat ramp is a small, one-lane boat ramp that is licensed by USACE to the City of Oak Point. There is boat trailer parking space near the ramp for several vehicles. The city has expressed interest in making minor improvements to the boat ramp to make it more usable when the lake elevation is slightly above or below the normal elevation of 522.0 NGVD. The city may also propose to improve existing parking space at the ramp.

Little Elm Park

General Description: This park is conveniently located adjacent to Highway 720 (Eldorado Parkway) in the Town of Little Elm. The park is leased to and operated by the Town of Little Elm. The park is primarily a day-use park but limited camping is available. The town charges a user fee to enter the park. This park is approximately 150-acres in size with approximately 100 acres developed. The park is well developed and includes a swimming beach, playground, amphitheater, pavilion with grill, numerous picnic sites, sand volleyball court, restrooms, limited tent camping, athletic fields and a hiking/biking trail.

Cottonwood Park

General Description: This park consists of approximately 135 acres of which about 35 acres is developed. The park is leased to and operated by the Town of Little Elm and includes a sublease to Cottonwood Creek Marina. The marina will be addressed separately. The park currently includes nine lakefront picnic sites and the Cottonwood Sports Complex that feature four ball fields for organized sports activities. The Sports Complex includes a restroom.

Proposed Facilities: The Town of Little Elm completed a Master Plan for Cottonwood Park in August 2019. The plan calls for four major recreational developments within the park to include:

- Active Outdoor Recreation Area (Trails, Ropes Course, Lookout Tower, Zip Line, Fishing Pier, Overlooks, Pavilions, Buffer Zone adjacent to neighborhood)
- Lakefront Park (Pavilions, Lakefront Playground, Picnic Area, Restrooms, Restaurant)
- Nature Activities Area (Trails, Interpretive Facilities)
- Cabins and RV Park (Rental Cabins, Primitive Campsites, RV camping, Treehouse Lodging, Shoreline Dock, General Store)

Hidden Cove Park

General Description: Formerly Lewisville Lake State Park (was Hackberry Park operated by USACE prior to the State Park Status). The State relinquished the park in the mid 1990's when it was taken over under a lease agreement between USACE and The Colony. The park was renamed Hidden Cove Park by The Colony when leased from USACE. The park is currently operated by Marine Quest under a sublease arrangement with The Colony. This 584 acre mixed use park includes approximately 200 developed acres with 69 picnic units, 85 camping units, 38 screened shelters, 3 group pavilions, 1 dump station, 1 fish cleaning station, 1 group camping facility, 1 boat launching area, 4 restrooms with showers, 1 maintenance area, and a sewage treatment plant. Parking areas are paved for day, overnight, and boat use, trail, and playground. The two original park staff residences have been converted to rental lodges and additional rental cabins have been constructed. Marine Quest is currently placing movable cabins on key campsites throughout the campgrounds and has converted an original dining hall facility into a marina office. Marine Quest has also constructed a boat trailer and RV storage compound. The Hidden Cove Marina will be addressed separately.

Proposed Facilities: Marine Quest has a development plan for the park that includes the following facilities:

- New Playgrounds
- Expand Dining hall/conference center
- 125 room lodge/activity center with pool

- Additional parking for lodge/activity center
- High ropes/challenge course
- Hike/bike trail improvements
- Mountain bike trails
- Archery range
- Disc Golf course
- Renovate athletic fields
- Upgrade water and sewer system
- Renovate entry area/add automation
- 50 Cabins
- Fishing pier
- Additional RV Park host sites
- Additional tent area sites
- Laundry facility

Wynnewood Park

General Description: The park consists of approximately 600 acres and is home to the 18-hole Tribute Golf Course and the 18-hole Old American Golf Course. The park is leased to the City of The Colony who has subleased the park to Wynnewood Peninsula, L.P., who operates the two golf courses. A marina is planned for Wynnewood Park and the City of The Colony operates a trail within the park. Wynnewood Park consists of approximately 600 acres of which approximately 400 acres is developed into golf courses. Of the remaining acreage approximately 11 acres is associated with a planned marina site and The Colony directly manages approximately 189 acres as a natural area where a 1.5 mile trail is proposed.

Proposed Facilities: Additional facilities planned for Wynnewood Park include:

- Tribute and Old American Golf Courses
 - New cart barn
 - New maintenance building
 - Expand existing maintenance building
 - Cleaning station
 - Chemical storage building
 - Material bins
 - Lean to
 - Guest cabins
 - Tree plantings
- Natural Area and Trails
 - Tribute Shoreline Nature Trail (Phase 4-one mile) to be connected to the existing The Tribute Shoreline Nature Trail (4.8 miles) The 4.8 mile existing trail segment is not located within the boundary of Wynnewood Park but is located on USACE land and is maintained by The Tribute Property Owners Association under an agreement with The Colony.

- Wildlife observation areas
 - Pollinator fields
 - Shoreline vegetation (as needed)
 - Kayak/canoe/paddleboard rental facility
- Marina and Lakeside Park (Note: The marina development is currently being addressed in a supplemental Environmental Assessment (EA) and Feasibility Study. Approval of the following list of proposed items is contingent on completion of the EA)
 - 840 wet slips
 - Floating breakwater
 - Ship store and offices
 - Fuel dock
 - Boat and jet ski rentals
 - Restaurant
 - Parking area with entry gates
 - Event lawn
 - Sand volleyball/horseshoes/ bocce ball/ pickle ball
 - Restrooms
 - Fuel storage tanks for marina
 - Storage
 - Trees and landscape plantings with some irrigation
 - Picnic tables
 - Shoreline revetment and vegetation (as needed)

Eastvale Park

General Description: This small park is located on the west side of FM 423 in The Colony. The park is leased to the City of The Colony who has subleased the park to Blue Sky Sports Center. The park features an indoor/outdoor soccer complex, several picnic sites and a single lane boat ramp. The outdoor soccer fields occupy almost the entire park with little room left for additional development.

Stewart Creek Park

General Description: This 135-acre park is leased to the City of The Colony and currently features 28 picnic sites, several camp sites, 2 launching areas, 1 courtesy dock, 1 restroom, 1 buoyed swimming area, 1 pavilion, parking lot, playground, 1 dump station, 1 9-hole, par 3 golf course and driving range. Approximately 90 acres of the park are developed. The par 3 golf course and driving range, known as Stewart Peninsula Golf Course is separated from the main body of the park and is operated as a concession under a sublease agreement.

Proposed Facilities: The Colony has plans to upgrade the portion of the park that supports lakeside recreation as follows:

- Relocate swim beach area
- Install shelters over uncovered picnic units

- Install kiosk entry system with automated gates
- Install security cameras
- Install a new gatehouse and reconfigure entry area
- Add separate exit lane to improve boat ramp circulation
- Plant additional trees
- Add dumpster enclosures
- Resurface roadways
- Install paddle sport launch and storage
- Provide paddle sport rentals
- Add 2 pavilions with picnic tables
- New restroom buildings
- Extend trail within the park
- Install a climate controlled grand event pavilion
- Add parking for event pavilion, fishing pier and swim beach
- Add more RV sites
- Maintain and upgrade other existing amenities within the park

East Hill Park

General Description: This park consists of approximately 256 acres and is operated under a direct lease to Safe Harbor Marinas. Approximately 34 acres of the park are developed and features a day use area with 28 picnic sites, 2 group shelters, courtesy dock, picnic shelter, parking area, swimming area, 4 lane boat ramp, restroom (vault w/showers). High visitation for boat ramp use has created the need for a pass system to avoid over-capacity. The park also includes the Pier 121 Marina complex addressed under a separate section in this Plan.

Management: The day use area is too small to accommodate the number of people desiring to use the area. Solutions to addressing the problem of overcrowding are being considered for the long term management and sustainability of the recreational resource.

Proposed Facilities: The lessee envisions numerous developments within the East Hill Park in areas separate from Pier 121 Marina. Proposed developments include:

- Campground
- Hotel
- Trail System
- Dog Park
- Playground
- Amphitheater
- RV Park
- Additional Parking

The marina owner has also proposed items such as a wave park, RV sales, model homes park, restaurant, and gym/spa. Some of the proposed facilities may not be authorized and approval of some items will require analysis pursuant to NEPA.

5.3.4 Marinas

There are six operational marinas on Lewisville Lake and one marina in the planning phase. Each is described as follows:

Eagle Point Marina

General Description: The Eagle Point Marina is located in Lewisville Lake Park (leased by USACE to the City of Lewisville) and is operated under a sublease arrangement with the City of Lewisville. The marina currently has approximately 738 slips for a combination of sailboats, cabin cruisers and smaller water craft. The marina offers boat sales, boat repairs and has full service restaurant on site. The marina owner prepared a development plan in 2013 that includes the following facilities:

- Hotel and Conference Center (Conceptually approved in a Lewisville Lake Master Plan supplement dated May 2004)
- Resort Lodge and Cabins
- Restaurant Complex

Note: The above proposed developments have never been submitted for formal approval by USACE and are conceptual in nature. Some items may not be authorized by USACE and some items may require additional analysis pursuant to the National Environmental Policy Act (NEPA).

Lakeview Marina

General Description: Lakeview Marina is the oldest marina on the lake and is located on approximately 72 acres and is operated under a direct lease agreement with USACE. The southern boundary of the lease area is the northern boundary of Willow Grove Park. The marina currently provides 451 wet slips. The marina owner did not wish to include future development plans in this Master Plan. An airstrip is partly located on the marina lease area and is operated by an adjacent private airplane hangar complex under a sublease agreement with the marina. The marina also operates a ski lagoon on the leased premises.

Dallas Corinthian Yacht Club

General Description: The Dallas Corinthian Yacht Club operates as a private, non-profit, corporation under a direct lease with USACE. This lease dates back many years and such leases are no longer granted by USACE. The lease area is approximately 4.5 acres of land. Currently, DCYC has approximately 185 wet slips offered to members only. The DCYC serves primarily sailboat enthusiasts but some slips are occupied by motor-driven craft. The current lease area includes a members-only boat ramp, wet slips, and several picnic tables. Facilities located on adjacent private land include a clubhouse, swimming pool and caretaker quarters. The DCYC has plans to improve an existing rock and earth fill breakwater and has authorization for approximately 100 additional wet slips.

Cottonwood Creek Marina

General Description: Cottonwood Creek Marina is located in Cottonwood Park and is operated under a sublease agreement with the Town of Little Elm. The marina has

approximately 327 wet slips. The marina offers fuel sales, boat rentals, a ship's store, and a marine sewage pump out facility. The marina has authority from USACE to expand the number of slips, but has no other plans for additional facilities. The surrounding Cottonwood Park is operated by the Town of Little Elm. See Section 5.3.3 for a description of the Town of Little Elm's plans for Cottonwood Park.

Hidden Cove Marina

General Description: Hidden Cove Marina is located within Hidden Cove Park and is operated by Marine Quest who operates all of Hidden Cove Park under a sublease agreement with The Colony. The marina currently has 340 wet slips with authority for expansion. Current services offered by the marina include fuel sales, boat rentals, ship's store, sewage pump out station, and restaurant. The marina is located near a public boat ramp within Hidden Cove Park.

Pier 121 Marina

General Description: Pier 121 Marina is located within East Hill Park and is operated by Safe Harbor Marinas under a direct lease with USACE. This is the largest marina on Lewisville Lake offering 930 wet slips and 377 dry storage units. Services offered by the marina include ship's store, fuel sales, sewage pump out, boat rentals, boat sales, and boat repair. The marina owner has proposed numerous additional facilities to be added to East Hill Park. See Section 5.3.3 of this Plan for a listing of proposed facilities.

5.3.5 Ray Roberts Lake State Park Greenbelt Corridor

General Description: The Texas Parks & Wildlife Department operates the Ray Roberts Lake State Park Greenbelt Corridor that spans a distance of approximately 10 miles from Highway 380 where it crosses Lewisville Lake, north to the dam at Ray Roberts Lake. The lower, or southern, portion of the Greenbelt is located on land that was originally acquired for Lewisville Lake in the late 1940's and early 50's. In this southern portion, the Greenbelt Corridor runs through the Clear Creek Natural Heritage Center (CCNHC) operated by the City of Denton. The upper, or northern, section of the Greenbelt was acquired as part of the separable recreation lands associated with Ray Roberts Lake. The Greenbelt Corridor is leased to the Cities of Dallas and Denton as part of their responsibilities for providing recreation facilities associated with Ray Roberts Lake. The cities, in turn, struck an agreement with TPWD for operation of the Greenbelt as a unit of Ray Roberts Lake State Park. The Greenbelt has proven to be extremely popular with hikers, bicyclists, and equestrian users who enjoy the trails that run the length of the Corridor. The trail for hikers and bikers runs parallel to the equestrian trails so the two groups do not use the same trail. Rest stops are provided at both ends as well as near the middle of the Corridor where it is crossed by FM 428. TPWD works with multiple partners to maintain the trails on the Greenbelt. Maintaining the trails on the southern end has proven to be a challenge due to silt accumulation during major flood events on Lewisville Lake. This master plan classifies much of the Greenbelt Corridor as an Environmentally Sensitive Area although the hike/bike trails running through the Corridor are classified as High Density Recreation lands due to the need for bridges and concrete reinforcement on some portions of the trail. The High

Density classification also allows TPWD to place needed recreation facilities such as benches and picnic tables along the trail.

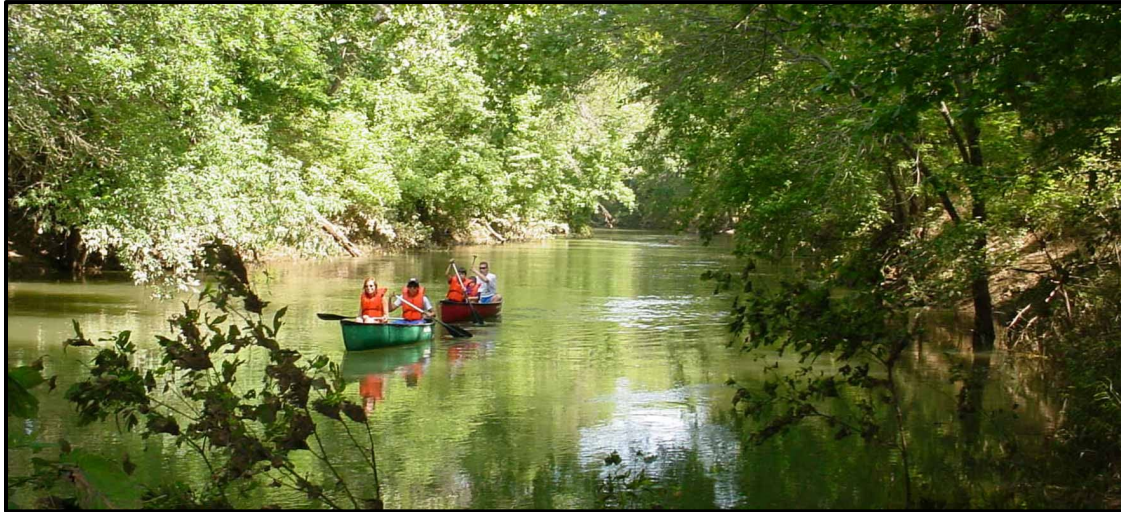


Photo 5.1 Canoes on the Elm Fork of the Trinity – Greenbelt Corridor
(Photo courtesy of TPWD)

5.4 MITIGATION

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

5.5 ENVIRONMENTALLY SENSITIVE AREAS (ESA)

Eighteen areas totaling approximately 11,188 acres at Lewisville Lake were selected by the planning team for classification as ESA. The results of the Wildlife Habitat Appraisal Procedure conducted on October 16-20, 2017, 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, WHAP scores and a location description. Each area, including future management priorities, is briefly described as follows:

- ESA 1 – LLELA Area. This 2,704 -acre ESA represents the habitat areas below the Lewisville Lake Dam and includes bottomland hardwoods, native remnant tall grass prairie, Cross Timbers Ecoregion remnant upland hardwoods, and Elm Fork of the Trinity River riparian corridor. The area has relatively high habitat value throughout, but these values are anticipated to gradually improve on the entire area over time. Protection and restoration of native rare habitats occurs here with management by the LLELA. Control of any invasive species such as Chinese privet, Johnsongrass, and KR Bluestem is included in overall management. The discharge channel was excavated by USACE through the woodlands below the dam and is maintained by USACE. While USACE will endeavor to protect the habitat integrity of the ESA, maintenance of the channel may require periodic disturbance of the area. In addition, the current initiative to make dam safety modifications to Lewisville Lake Dam will require acquisition of borrow material from within the ESA. Disturbed areas will be fully mitigated within the ESA.

LLELA is managed through the efforts of several partners who joined forces under a lease agreement with USACE in the early 1990's. Today the principal partners include USACE, City of Lewisville, University of North Texas, Lewisville Independent School District, Audubon, and the Friends of LLELA. The stated mission of LLELA is "To preserve and restore native Texas ecosystems and biodiversity while providing opportunities for environmental education, research and recreation". LLELA is considered to be the "Green Centerpiece" in the City of Lewisville's strategic vision document "Lewisville 2025".



Photo 5.2 Birding and bird banding research at LLELA
(Photos courtesy of LLELA)



Photo 5.3 Restoring Native Prairie Grasses on LLELA
(Photos courtesy of LLELA)

- ESA 2 – North Side of Lewisville Lake Dam. These two comparatively small, parcels total 173 acres and are located west of the USACE auxiliary spillway on the north side of the dam. These two areas are comprised of bottomland hardwoods and native tall grass prairie. Protection of this area from disturbance is a priority. Passive use of the area for natural surface trails is appropriate. The area is managed by USACE.
- ESA 3 – Stewart Creek. This 268-acre parcel of land is located on the east side of the lake and includes the headwaters of Stewart Creek located on USACE fee property. The area consists of a riparian corridor and is adjacent to residential development upstream. Protection and potential restoration of the area are a priority maintaining the area as a visual and esthetic buffer are important for this area. The area is managed by USACE. This ESA was the site of a Section 1135 Environmental Restoration Project that was cost-shared with the City of Frisco. The project involved construction of shallow marsh areas and restoration of riparian hardwoods. As of the date of this Plan a lease has not yet been executed between USACE and the City of Frisco to enable the City to maintain the environmental restoration project that was cost-shared between USACE and Frisco in the Stewart Creek and Hackberry Creek drainages. The restoration work involved construction of several wetland

cells and the planting of old agricultural fields with several species of bottomland hardwood trees. Frisco envisions maintaining natural surface trails and wildlife observation facilities on the leased premises when a lease is promulgated.

- ESA 4 – Hackberry Creek. This small 25-acre area is located on the headwaters of Hackberry Creek where it enters Lewisville Lake on the west side of FM 423. This location was included in the Frisco Section 1135 Environmental Restoration Project (see the description for ESA 3 above). The work along Hackberry Creek consisted of construction of shallow wetland cells that were planted with beneficial aquatic plants. WHAP points were low for this area, but the project is just starting out and USACE and the City of Frisco see great potential for this area. The area is managed by the City of Frisco and is located on USACE fee property. USACE can work cooperatively with the city to improve the wildlife habitat value of the area. Passive use such as natural surface trails and general pedestrian access are appropriate for the area.
- ESA 5 – Cottonwood Branch. This 77-acre area consists primarily of relatively undisturbed riparian forest habitat on both sides of Cottonwood Branch upstream of where Cottonwood Branch enters Lewisville Lake on federal land. The entire area has high wildlife habitat value and serves as a filter for surface water runoff.
- ESA 6 – Doe Branch. This 441-acre area is a riparian corridor on both banks of Doe Branch. The area has relatively high wildlife habitat value and serves as a filter for surface water runoff. Supplemental plantings to improve wildlife habitat values, and control of invasive species are management priorities. Passive use of the area for natural surface trails and nature study are appropriate for the area. The area is managed by USACE.
- ESA 7 – Little Elm Creek and Pecan Creek. This 569-acre riparian area encompasses both creeks above their confluence as well as a significant area of USACE land on Little Elm Creek below the confluence of Little Elm Creek and Pecan Creek. This ESA extends downstream from the confluence of both creeks to a point where the Federal property line is near Golden Eagle Court. This ESA has relatively high wildlife habitat value and serves as a filter for surface water runoff. USACE can work cooperatively with various entities to improve wildlife habitat values on the area.
- ESA 8 – Wildridge. This 40-acre area includes upland and riparian woodlands representative of the Cross Timbers Ecoregion. This area is located due north of the unincorporated Wildridge subdivision. One of the

highest WHAP scores was recorded in this area. Passive recreational use in the form of natural surface trails and nature study is appropriate.



Photo 5.4 Providing stopover habitat for migrating pollinators like this monarch butterfly is a USACE priority.
(USACE Photo by Jennifer Linde)

- ESA 9 – Rocky Point This relatively small, 36-acre parcel located West of Garza Lane and south of the Lewisville Lake Toll Bridge (El Dorado Parkway on the east end and Swisher Road on the west end) is located in an unincorporated area of Denton County commonly referred to as the Rocky Point area. This ESA is entirely within USACE fee property and has relatively high wildlife habitat value because it supports remnants of the Cross Timbers Ecoregion and serves as a filter for surface water runoff. USACE can work cooperatively with various entities to improve wildlife habitat values on the area.
- ESA 10 – Nix Slough and Jefferson Slough This 188-acre riparian area is entirely within USACE fee property and has relatively high wildlife habitat value and serves as a filter for surface water runoff. Passive recreational use in the form of natural surface trails and nature study is appropriate.
- ESA 11 – Old Lake Dallas Area This narrow shoreline area consists of approximately 787 acres of upland forested area located south of HWY 380 and on the shoreline of Old Lake Dallas including the headwaters of Cantrell Slough. The area is managed by USACE.

- ESA 12 – Greenbelt Corridor and City of Denton Wetland Complex. This large area of 3,124 acres north of HWY 380 encompasses periodically flooded areas of the Elm Fork of the Trinity River. This area includes mature bottomland hardwoods, mature riparian corridor, and constructed shallow water wetlands managed by the City of Denton. TPWD manages the narrow portion of this area known as the Greenbelt Corridor. The corridor hike and bike trail is generally defined as an area lying 50 feet either side of the trail center line. Lying generally parallel and east of the developed hike and bike trail is a largely unimproved equestrian trail. The equestrian trail is generally defined as an area lying 30 feet either side of the trail center line. These narrow trail parcels are both classified for High Density Recreation use to allow for bridges, hardened trail surfaces, and amenities such as picnic sites. The remainder of the Greenbelt Corridor is available for passive recreational use in the form of natural surface trails, river fishing and nature study. USACE can work cooperatively with the various entities to improve wildlife habitat values on the area. Some grassland portions of the Greenbelt Corridor are managed as grassland by TPWD. Maintaining grassland areas periodically results in the areas being cut and baled for hay to reduce wildfire fuel loads, encourage native wildflowers, and reduce the potential for invasive species such as Japanese privet and feral hogs. Some grassland areas in ESA-12 can support thick stands of giant ragweed which, although native, can become the dominant vegetation in the absence of management. For the purpose of this Plan, the ESA does not include the High Density Recreation lands immediately below Ray Roberts Dam, referred to as the Elm Fork Unit of Ray Roberts Lake State Park.

The City of Denton operates the Clear Creek Natural Heritage Center (CCNHC) within ESA 12. This area of approximately 2,875 acres is located on USACE land north of, and adjacent to Highway 380. The entire area is leased to the City. The mission for CCNHC is similar to LLELA, but the geographic location is much more convenient to the large population centered near the City of Denton. The vision for the CCNHC is “To inspire environmental citizenship through an understanding of the natural heritage of North Central Texas by providing nature experiences, education and research programs, and conservation and restoration projects. CCNHC has existed since the late 1990’s when USACE and the City of Denton cooperated in an environmental restoration project pursuant to Section 1135 of the 1986 Water Resources Development Act. The restoration project involved construction of two wetland cells and the planting of several hundred acres of old agricultural fields with bottomland hardwood tree species.



Photo 5.5 Entrance to Clear Creek Natural Heritage Area and wetland cell constructed by USACE and City of Denton
(Photos courtesy of the City of Denton, Texas and USACE)

- ESA 13. West Shore. This relatively large, 1,714-acre parcel is located along the West shoreline of Lewisville Lake and runs south from the HWY 380 bridge to include the delta formed by inflow from the Elm Fork of the Trinity River. The area extends south to the northern boundary of the Big Sandy Boat Ramp and Access Area. The area includes those portions of the Pecan Creek watershed that is located on USACE land. Effluent flows from the City of Denton sewage treatment plant keeps Pecan Creek flowing on a daily basis. This parcel is made of riparian and bottomland hardwoods and shallow emergent wetlands that provide excellent habitat for wintering waterfowl. The area has relatively high wildlife habitat value and serves as a filter for surface water runoff. USACE can work cooperatively with various entities to improve wildlife habitat values on the area.
- ESA 14 – Shady Shores Peninsula. This relatively small, 34-acre parcel is the peninsula just north of the Cielo Ranch subdivision in Shady Shores. The area has mature upland forest reminiscent of the Cross Timbers Ecoregion which has relatively high wildlife habitat value. USACE can work cooperatively with various entities to improve wildlife habitat values on the area but passive use is recommended.
- ESA 15 – Hickory Creek Park and Point Vista. This area consists of approximately 75 acres and is located along the northern shoreline of the Hickory Creek Arm of Lewisville Lake. The area supports native upland and riparian forest characteristic of the Cross Timbers Ecoregion. USACE can work cooperatively with the various entities to improve wildlife habitat values on the area.
- ESA 16 – Hickory Creek Arm. This relatively large area of approximately 908 acres supports some of the larger contiguous tracts of mature upland and bottomland hardwoods at Lewisville Lake with habitats characteristic of the Cross Timbers Ecoregion. This area starts on the east side of the

north end of the FM 2499 bridge and includes all USACE land west of FM 2499. This is an ESA designation from a previous Master Plan Revision. USACE can work cooperatively with various entities to improve wildlife habitat values on the area. The Cross Timbers Equestrian Trail runs through this area to include the Old Alton Bridge, a National Historic Site.

- ESA 17 – Pilot Knoll Area. This relatively small, 42-acre parcel is immediately adjacent the park limits of Pilot Knoll Park and has relatively high wildlife habitat value and serves as a filter for surface water runoff. USACE can work cooperatively with the various entities to improve wildlife habitat values on the area.
- ESA 18 – Wichita Forest Area. This relatively small area of 25 acres is leased to the Town of Highland Village and is located south of and adjacent to Highland Village Road. The area is entirely on USACE property, has relatively high wildlife habitat value and serves as a filter for surface water runoff. USACE can work cooperatively with various entities to improve wildlife habitat values on the area.

Table 5.1 Environmentally Sensitive Area (ESA) Listing

ESA Area Number ¹	Acres	WHAP Scores Per Sample Point Number	Location/Description
LE-ESA-1	2,704	Pt 5: .63, Pt 10: .47, Pt 13: .81	LLELA leased area below Dam
LE-ESA-2	173	Pt 27: .65	Two areas just West of Auxillary Spillway, one is a peninsula.
LE-ESA-3	268	NA	Stewart Creek Frisco Section 1135 Project
LE-ESA-4	25	Pt 36: .41	Location of USACE Frisco Section 1135 Wetland Project
LE-ESA-5	77	Pt 39: .53	Cottonwood Branch Riparian Area
LE-ESA-6	441	Pt 43: .45	Doe Branch Riparian Area
LE-ESA-7	569	Pt 45: .89	Little Elm and Pecan Creek Riparian Area
LE-ESA-8	40	Pt 48: 1.00	Wildridge
LE-ESA-9	36	Pt 50: .73	Rocky Point
LE-ESA-10	188	Pt 51: .64, Pt 52: .71 Pt 53: .68	Shoreline Including portion of Nix Slough and Jefferson Slough
LE-ESA-11	787	Pt 54: .49, Pt 55: .56 , Pt 57: .52	South of HWY 380, East side of Old Lake Dallas includes portions of Cantrell Slough
LE-ESA-12	3,122	Pt 58: .62, Pt 59: .50	Encompasses most of USACE fee lands North of HWY 380,

ESA Area Number ¹	Acres	WHAP Scores Per Sample Point Number	Location/Description
			including Greenbelt Corridor and City of Denton Wetlands
LE-ESA-13	1,714	Pt 62: .72, Pt 63: .54, Pt 64: .72, Pt 65: .73	West Shore from Hwy 380 south to Big Sandy Boat Ramp
LE-ESA-14	34	Pt 66: .73	Shady Shore Peninsula
LE-ESA-15	75	Pt 79: .73, Pt 80: .62, Pt 81: .55, Pt 82: .	Hickory Creek Park and Point Vista Ramp
LE-ESA-16	908	Pt 84: ., Pt 85: ., Pt 86: .69, Pt 87: .69 , Pt 88: .64	Hickory Creek Arm of Lewisville Lake
LE-ESA-17	42	Pt 89: .55 (point location just west of ESA)	Pilot Knoll
LE-ESA-18	25	Pt 91: .54	Wichita Forest

Note: Each ESA area was measured individually and as a whole using GIS technology. The individual area acreages, when summed, vary by approximately 40 acres slightly from the (0.33 %).

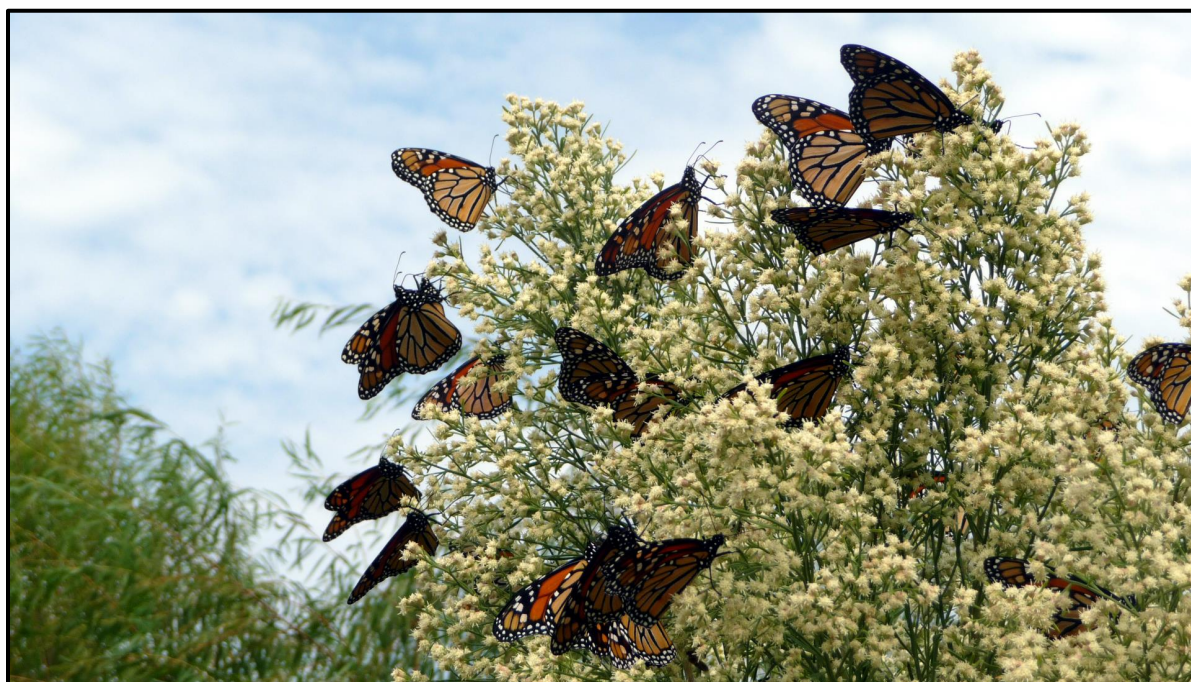


Photo 5.6 Migrating monarch butterflies on LLELA (ESA #1)
(Photo courtesy of LLELA)

5.6 MULTIPLE RESOURCE MANAGEMENT LANDS

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

- Low Density Recreation. These lands are generally narrow parcels of land that are adjacent to private residential developments, but also include lands where current or potential public use is limited to passive pedestrian-oriented recreation such as hiking, bank fishing, nature study and photography. At Lewisville Lake, approximately 19 shoreline segments were designated in 2005 as "Narrow Shoreline Variance Areas" (NSVA) during a process to revise allowable adjacent landowner activities, primarily mowing and other vegetation modification activities. These NSVAs have all been classified as MRML-LDR. In addition to the NSVAs, the lands surrounding the Camp Copass development, and a parcel of land on the Ray Roberts State Park Greenbelt Corridor along Wildcat Road, have been classified as MRML-LDR. 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. With the exception of lands associated with the Greenbelt Corridor, adjacent landowners may apply for a permit to mow a meandering path to the shoreline and may apply for a permit to mow a narrow strip along the USACE boundary line as a precaution against wildfire. 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 hike and bike trails. There are 542 acres classified as Low Density Recreation. With the exception of lands associated with the Greenbelt Corridor and managed by TPWD, and lands leased to the City of The Colony for trail development, all LDR lands are managed by USACE.
- Wildlife Management. These are lands designated primarily for the stewardship of fish and wildlife resources but are open to passive recreation use such as natural surface trails, hiking, hunting and nature study. There are currently 3,268 acres under this classification and with the exception of those WM lands leased to the City of The Colony for trail development, all WM lands are managed by USACE. Management priority for WM lands 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, some areas may be selected for wetland development. Within the areas classified for MRML-WM, two low density recreation leases have been granted as described below.

Low Density Recreation Lease to The Colony

General Description: This lease was approved between USACE and The Colony in 2009 and covers approximately 600 acres of USACE lands located on shoreline areas between major park areas. This lease enables The Colony to develop and maintain natural surface pedestrian trails, wildlife observation facilities, trailheads and parking areas, and to manage vegetation modification activities on the leased premises that may be conducted by neighbors adjoining the leased area. The lands included in the lease are classified in this Plan as MRML-WM or MRML-LDR lands.

Low Density Recreation Lease to Little Elm

General Description: This lease was approved between USACE and the City of Little Elm in 2016. The lease cover approximately 314 acres and is very similar to the lease executed with The Colony. The City of Little Elm maintains trails on the leased area and intends to expand trail opportunities. The lands included in the lease are classified in this Plan as MRML-WM



Photo 5.7 Waterfowl hunting is a popular recreation activity at Lewisville Lake.

(USACE Photo by Adam Tarplee)

5.7 WATER SURFACE

At conservation pool level of 522.0 NGVD there are 27,175 acres of surface water. Regulatory buoys are managed by USACE and numerous lessees. These buoys help mark hazards, swim beaches, restricted areas (boats prohibited), and no-wake areas.

- Restricted. Restricted areas are around swim beaches, public water supply intakes, the Old Lake Dallas dam spillway structure, 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 82 acres.
- 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 Lewisville Lake, no-wake buoys are posted along the Interstate Highway 35E bridge, the FM 2181 Toll Bridge, and the FM 720 (Eldorado Parkway) bridge. A small cove adjacent to Wynnewood Park and the cove referred to as Copperas Branch Lake in Highland Village are designated no wake areas for the purpose of providing paddle craft a place to maneuver without competing with high-speed boat traffic. Placement of regulatory buoys in these two no-wake areas will be the responsibility of The Colony and Highland Village respectively. TPWD also welcomes paddle craft on the Elm Fork of the Trinity River where it meanders through the Greenbelt Corridor between Ray Roberts Lake and Lewisville Lake. This Plan designates 1,079 acres of water surface as Designated No Wake areas. USACE is open to the concept of paddle trails and will work with interested parties to further fulfill this need.
- Fish and Wildlife Sanctuary. These areas are managed with annual or seasonal restrictions to protect fish and wildlife species during periods of migration, resting, feeding, nesting, and/or spawning. There are no water surface acres under this classification at Lewisville Lake.
- Open Recreation. The remaining lake area not in the above classifications 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. During the construction phase of Lewisville Lake, timber and man-made structures were cleared in the majority of the lake area lying below the conservation pool elevation of 515.0 feet NGVD. However, shortly after official impoundment in the mid-1950, a rapidly rising pool prevented the clearing of timber in a large area of the lake on the east side. The uncleared area is depicted on public handout maps and is generally described as the area lying between Wynnewood Park and Hidden Cove Park as well as the water surface between Hidden Cove Park and the FM 720 (El Dorado Parkway) bridge. Other areas located in the upper end of the lake and incoming tributaries were intentionally not cleared. These uncleared areas, as well as areas where the timber was cleared, are included in the Open Recreation designation. It is incumbent on boaters to be aware of lake conditions and to operate vessels responsibly. Approximately 25,475 acres of Lewisville Lake is classified for Open Recreation.

Note: The designated water surface acreages were measured using GIS technology and do not equal the total conservation pool acreage of 27,175 acres calculated during the 2007 Volumetric Survey conducted by the Texas Water Development Board. Measurement of the pool acreage will vary slightly depending on the elevation of the lake at the time of measurement.

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 TPWD Game Wardens, Denton County Sheriff's office, City of Little Elm police, Coast Guard Auxillary, and USACE Park Rangers. USACE conducted a comprehensive Recreational Boating Study at Lewisville Lake in 1999 and conducted a Recreational Boating Survey in 2019. The results of the 1999 study resulted in a Water Related Development Policy specific to Lewisville Lake. The results of the 2019 survey will be used by USACE to refine the Water Related Development Policy. See Chapter 6 for a summary discussion of the Water Related Development Policy for Lewisville Lake.



Photo 5.8 Parasail near North Texas Tollway Authority Bridge – July 7, 2019 (USACE Photo by Don Wiese)

CHAPTER 6 - SPECIAL TOPICS/ISSUES/CONSIDERATIONS

6.1 UTILITY CORRIDORS

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

Thirty-eight utility corridors have been designated across USACE land at Lewisville Lake with each corridor incorporating and/or running parallel to an existing road or utility easement. These corridors have been in use since 2004. Analysis of the corridors designated in 2004 indicated that 4 corridors were no longer needed and could be deleted from the list. No new corridors were added. The 38 designated corridors are shown on maps LE20MP-OU- 01 through 09 in Appendix A and are described in Table 6.1. 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 Lewisville Lake have not been designated as corridors. These non-corridor easements may be used for placement of additional utilities by the grantee holding the easement, but only for purposes which directly serve the grantee or are of direct benefit to the Government. Expansion or widening of existing non-corridor easements will generally not be permitted. Future use of a designated corridor that may not qualify as a Categorical Exclusion, may require preparation of an Environmental Assessment pursuant to the National Environmental Policy Act of 1969.

In summary, the following best management practices shall be applied in the future use of the thirty-eight corridors described above:

- Use existing easements before using additional space.
- Efficient use of the designated corridor space to allow the maximum number of utilities possible to occupy the space. Reduced cost is not a reason to occupy more space. A typical drawing depicting how utility lines can be placed efficiently within a corridor is provided in Appendix A following the map of corridor locations.
- In accordance with USACE policy at Chapter 17 of EP 1130-2-550, Non-Recreation Outgrant Policy, avoid placement of utility lines on USACE land unless there is no reasonable alternative route.
- Underground utilities shall be installed by boring at all creek crossings, and where feasible, across the full extent of designated corridors. Bore pits shall be a minimum of 100 feet from the centerline of creeks and, depending on site conditions, may need to be placed farther than 100 feet.

- Overhead electric and communication lines must meet minimum sag height requirements to be specified by USACE.
- Natural resources damaged or destroyed within corridors shall be mitigated per USACE requirements.
- Current and future identified cultural resources will be protected.

Table 6.1 Listing of Utility Corridors at Lewisville Lake

Corridor Number	Location and General Description
Corridor 1	This corridor is restricted to a 20-foot wide strip of federal land lying parallel to the north and south right-of-way limits of Farm-to-Market Road FM 428 where it crosses the Ray Roberts Green Belt Corridor. The highway right-of-way is not under federal ownership. Therefore, the USACE does not have direct control of utilities that might be placed in the right-of-way. Future use of this corridor is restricted to sub-surface boring. No ground disturbance will be permitted on the adjacent conservation easements. The corridor on the north side of FM 428 is approximately 1,000 feet long and on the south side of FM 428 the corridor is approximately 700 feet long.
Corridor 2	This corridor follows the route of an existing underground natural gas pipeline. Future use of this corridor would be restricted to underground utilities placed within or as close as possible to the limits of the existing easement. Any future utility crossing of the Elm Fork of the Trinity River along this corridor would be installed by sub-surface boring and no bore pits will be permitted on USACE property in order to protect the riparian vegetation along the Elm Fork. The length of the corridor is approximately 5,500 feet.
Corridor 3	This corridor follows the Government property boundary where it parallels Collins Road. The federal land in this area is leased to the city of Denton and is designated by the city as the Clear Creek Natural Heritage Center. Use of this

Corridor Number	Location and General Description
	corridor in this sensitive area would be restricted to underground utilities placed within a 15-foot wide strip along Collins Road. Corridor 3 is approximately 4,200 feet long.
Corridor 4	This corridor parallels an existing railroad track and an existing high-voltage electric transmission line. The existing railroad track and transmission line run roughly parallel to each other separated by a distance varying from only a few feet on the east end to several hundred feet on the west end. Future utilities in this corridor must be placed on the south side of the railroad track within the existing easement for the railroad or be located completely within the existing easement for the transmission line. Corridor 4 is approximately 8,350 feet long.
Corridor 5	This corridor runs parallel to Rock Hill Road where the road runs across or adjacent to federal land. Future utility installations should be placed within the existing road right-of-way if possible and restricted to underground utilities only. The maximum width of the corridor extends 20 feet outside the existing east right-of-way line for Rock Hill Road. Corridor 5 is approximately 7,300 feet long.
Corridor 6	This corridor includes the existing right-of-way of Highway 380 where it crosses federal land. Future utility installations will be restricted to underground utilities. Attaching utilities to bridge structures will be given consideration. Corridor #6 is approximately 7,600 feet long.
Corridor 7	This corridor runs parallel to North Trinity Road where it crosses or runs adjacent to federal land. Future utilities should be located within 15 feet of the existing road right-of-way. Corridor 7 is approximately 1,350 feet long.
Corridor 8, 9, 10, 11, 17, 20	These corridors run parallel to several city streets and/or county roads which cross

Corridor Number	Location and General Description
	<p>federal land for relatively short distances. The roads include Mosley Road, Key Lane, Mill Creek Road, and Naylor Road. All of these corridors are located in Environmentally Sensitive Areas. Therefore, future utilities in these corridors must be located within 15-feet of the existing road right-of-way and must be installed by sub-surface boring. Bore pits will not be permitted on USACE property. The approximate length of each corridor is: Corridor 8 - 2,200 feet; Corridor 9 - 1,800 feet; Corridor 10 - 1,875 feet; Corridor 11 - 500 feet; Corridor 17 - 750 feet; Corridor 20 - 1,100 feet. These corridors are in close proximity to one another.</p>
Corridor 12	<p>This corridor follows the route of a large water pipeline which spans the entire Elm Fork arm of Lewisville Lake. Future use of this corridor would be limited to subsurface utilities placed within 15-feet of the existing easement for the water pipeline. Where installation may occur above conservation pool, utilities must be installed with subsurface boring. No bore pits will be permitted on USACE property. Corridor 12 is approximately 7,750 feet long.</p>
Corridor 13, 14, 21	<p>These corridors include and run parallel to Shady Shores Road where the road crosses or is adjacent to federal land. Future use of these corridors should be within or as close as possible to the existing road right-of-way. The approximate length of each of these corridors is: Corridor 13 - 300 feet; Corridor 14 - 3,150 feet; Corridor 21 - 900 feet.</p>
Corridor 15 and 15a	<p>Corridor 15 follows the route of an existing high voltage electric transmission line for a distance of 2,750 feet. Future use of the corridor shall be within the existing easement for the transmission line.</p>

Corridor Number	Location and General Description
	Corridor 15a follows the route of Fish Trap Road where it crosses Little Elm Creek for a distance of 6,750 feet. Future use of this corridor should be within the existing right-of-way plus an additional 20-feet parallel to the north and south right-of-way line of active and closed portions of Fish Trap Road.
Corridor 16	This corridor runs parallel to Highway 380 where it crosses federal land at Little Elm Creek. The highway right-of-way at this location is not under federal ownership. Therefore, the USACE does not have direct control over use of the highway right-of-way. Future use of corridors 16 shall be restricted to an area within 15-feet of the north and south right-of-way lines for Highway 380. Corridor 16 is approximately 1,000 feet long.
Corridor 18	This corridor follows the route of the existing Highway 720 where it crosses the Little Elm arm of Lewisville Lake. Use of this corridor would be confined to within the existing right-of-way plus an additional 50-feet on either side of the right-of-way for Highway 720. Corridor 18 is approximately 2,800 feet long.
Corridor 19	This corridor runs parallel to Rose Lane where it crosses federal land. Use of this corridor shall be within or as close as possible to the existing road right-of-way. Corridor 19 is approximately 550 feet long.
Corridor 22	This corridor includes and runs parallel to the existing route of the North Texas Tollway Authority toll bridge over the Elm Fork arm of Lewisville Lake. Use of this corridor will be within the existing right-of-way plus an additional 50-feet on either side of the right-of-way for the NTTA Toll Bridge. Corridor 22 is approximately 10,550 feet long.
Corridor 23	This corridor runs parallel to Interstate Highway 35E and a railroad trestle where the highway and railroad cross the

Corridor Number	Location and General Description
	Hickory Creek arm of Lewisville Lake. Use of this corridor shall be within the existing TXDOT and railroad rights-of-way plus an additional 50-feet on either side of the existing rights-of-way. Corridor 23 is approximately 8,000 feet long.
Corridor 24	This corridor runs within the existing easement for FM 2499 where it crosses USACE land. Future utilities would be required to be placed within the existing road easement plus an additional 50-feet on either side of the existing easement. Corridor 24 is approximately 3,250 feet long.
Corridor 25	This corridor follows the route of an existing underground pipeline which traverses the Hickory Creek arm of Lewisville Lake. Future use of this corridor shall be placed within 15 feet of the existing right-of-way for the underground pipeline and is restricted to sub-surface boring. No ground disturbance will be permitted and bore pits will not be allowed on USACE property. Corridor 25 is approximately 4,200 feet long.
Corridor 26	This corridor runs parallel to the south right-of-way line of FM 2181 where it crosses an unnamed tributary to Lewisville Lake. Future use of this corridor shall be within 20-feet of the south right-of- way line of FM 2181. Corridor 26 is approximately 650 feet long.
Corridor 27, 30, 31	These corridors run along and parallel to three separate high voltage electric transmission lines, all of which are located in the upper end of the Hickory Creek arm of Lewisville Lake. Future use of these corridors shall be within 20 feet of either side of the existing rights-of-way for the transmission lines. The approximate length of each of these corridors is: Corridor 27 - 7,450 feet;

Corridor Number	Location and General Description
	Corridor 30 - 4,850 feet; Corridor 31 - 3,500 feet.
Corridor 28	This corridor runs along and parallel to Old Alton Road where it crosses the Hickory Creek arm of Lewisville Lake. Future use of this corridor shall be restricted to underground utilities within 30 feet of the west right-of-way for Old Alton Road. Existing utilities already located in this corridor include an underground natural gas pipeline and a sewer line operated by the Upper Trinity Regional Water District. Corridor 28 is approximately 2,400 feet long.
Corridor 29	This corridor is along, parallel, and adjacent to a railroad track which crosses, or is adjacent to, Federal land at Lewisville Lake. Future use of this corridor should be within 20-feet of the existing right- of way for the railroad. Corridor 29 is approximately 1,800 feet long.
Corridor 32, 34	These two corridors run along and parallel to the route of FM 423 at all locations where it crosses federal land. Future use of this corridor shall be within or as close as possible to the existing right-of- way for FM 423. The approximate length of these two corridors is: Corridor 32 - 5,850 feet; Corridor 34 - 150 feet.
Corridor 33	This corridor crosses Stewart Creek at the approximate location of an old ranch road crossing where Federal land is only about 600 feet wide. Because no utilities currently exist in this corridor, the width of the corridor shall be as small as possible to accommodate the first proposed use, but in no case shall exceed 100 feet. Future use of this corridor shall be restricted to underground utilities.
Corridor 35	This corridor follows the route of an existing gravity- flow sewer line easement issued to the city of Lewisville. Future use of this corridor would require coordination

Corridor Number	Location and General Description
	with the Lewisville Lake Environmental Learning Area and would be restricted to underground utilities within the existing right-of-way for the sewer line. The approximate length of Corridor 35 is 7,400 feet.
Corridor 36	This corridor follows the route of Fish Hatchery Road. Future use of this corridor would require coordination with the Lewisville Lake Environmental Learning Area and would be within 40 feet either side of the centerline of Fish Hatchery Road. The approximate length of Corridor 36 is 11,100 feet.
Corridor 37	This corridor runs parallel to the north right-of-way line of State Highway 121 at all locations where it is adjacent to federal land. Future use of this corridor would require coordination with the Lewisville Lake Environmental Learning Area and would be within 20- feet of the right-of-way for SH 121. Corridor 37 is approximately 11,000 feet long.
Corridor 38	This corridor runs parallel to a railroad track which completely traverses the large tract of federal land below Lewisville Lake dam. Future use of this corridor would require coordination with the Lewisville Lake Environmental Learning Area and would be restricted to a 50-foot wide strip of land adjacent to the existing south right-of-way line for the railroad track. Utilities currently located within this corridor include pipelines operated by the Upper Trinity Regional Water District. The approximate length of Corridor 38 is 22,500 feet.

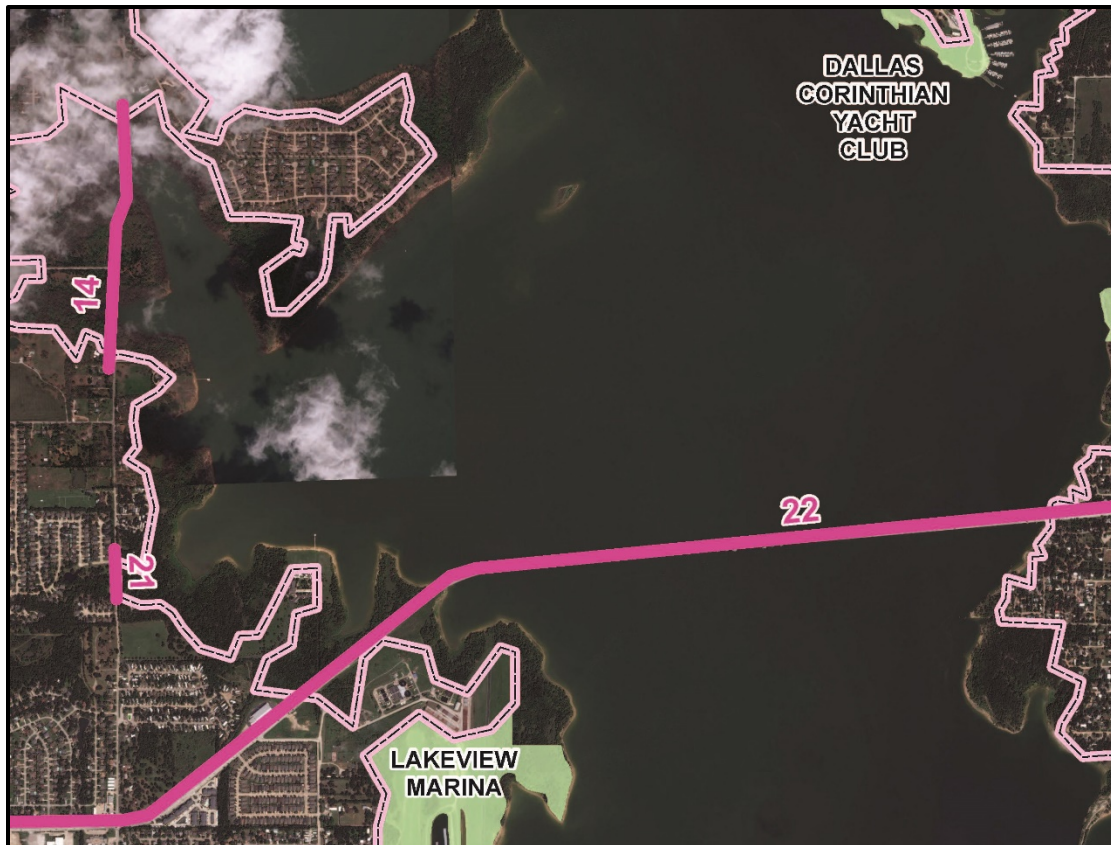


Figure 6.1 Utility Corridors 14, 21 & 22
See all utility corridor maps in Appendix A

6.2 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. Lewisville 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 Lewisville Lake and was published in July 1976. This SMP and remains in effect today except for changes resulting from a 2004-2005 review of vegetation management activities at Grapevine and Lewisville Lakes described in subsequent paragraphs. 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 Lewisville 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, 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. The Colony and Little Elm did assume that responsibility. Adjacent landowners are encouraged to contact the USACE office at Lewisville and/or Grapevine Lakes for details and requirements set forth in the SMP and 2005 PEA.

6.3 RECREATIONAL BOATING STUDY

In February 1999, following a 1998 comprehensive Recreational Boating Study at Lewisville Lake, USACE adopted a Water-Related Development Policy (WRDP) specific to Lewisville Lake. The comprehensive study was a collaborative undertaking by USACE, the North Central Texas Council of Governments, and numerous municipalities and marinas surrounding the lake. The study involved thorough counting of boat trailers and empty slips at boat ramps and marinas as well as opinion surveys administered at boat ramps and sent to adjacent landowners and area stakeholders. The resulting WRDP remains effective to date and sets a target boating capacity for Lewisville Lake to the extent that boating access to the lake will be managed to prevent boating traffic from exceeding 18 acres of boatable water surface on peak use days.

In the summer of 2019, USACE conducted a Recreational Boating Survey at Lewisville Lake. The survey involved extensive counting and the use of questionnaires similar to the study conducted in the summer of 1998. Preliminary results from the 2019

survey indicate that boating traffic has not increased substantially at Lewisville Lake since the 1998 study. USACE will use the 2019 survey results to refine the current WRDP for Lewisville Lake as well as the 2002 District Policy on Water-Related Recreation Development that applies to the District's remaining 24 lakes.



Photo 6.1 2019 Boating Survey Station at Lewisville Lake

6.4 SUBURBAN EXPANSION SURROUNDING LEWISVILLE LAKE

Lewisville Lake is one of the most metropolitan lakes managed by USACE. It is bordered by 13 incorporated cities and is located completely within Denton County, Texas with a 2020 population of approximately 860,000, essentially doubling since the year 2000, and a 2045 estimated population of almost two million. Refer to Table 6.2 for population estimates within the zone of interest provided by the Census Bureau. Population growth around Lewisville Lake has been rapid for the past 40 years. This growth has brought with it increasing public demand for expanded recreation opportunities and access to public lands and water surface. This growth has also brought increased demand for utility easements and expansion of roads. Major road expansions in the recent past are described in Section 1.7 of this Plan.

Table 6.2 Population estimates for the zone of Interest – Lewisville Lake

Geographical Area	2000 Population Estimate	2018 Population Estimate	2045 Population Projection
Texas	20,851,820	27,885,195	43,867,040
Collin County	491,675	944,350	2,137,242
Dallas County	2,218,899	2,586,552	3,667,351
Denton County	432,976	807,047	1,990,969
Tarrant County	1,446,219	2,019,977	3,023,145
Zone of Interest Total	4,589,769	6,357,926	10,818,707

Using information from the 2012 and 2017 Texas Outdoor Recreation Plan, park master plans prepared by several surrounding cities, the Vision Texas – 2050 report by the NCTCOG, and public input on this Plan, the land and water surface classifications, management objectives, and utility corridors set forth in this plan present a balanced approach to meeting the many and varied needs of a rapidly expanding population. Chief among expressed needs is the protection and conservation of natural landscapes where people can hike and enjoy nature-based activities. Photos 6-2 and 6-3 vividly show how residential growth, particularly on the east side of the lake has dramatically expanded over time from 2005 to 2019. USACE-administered Federal lands surrounding Lewisville Lake are poised to meet this need.

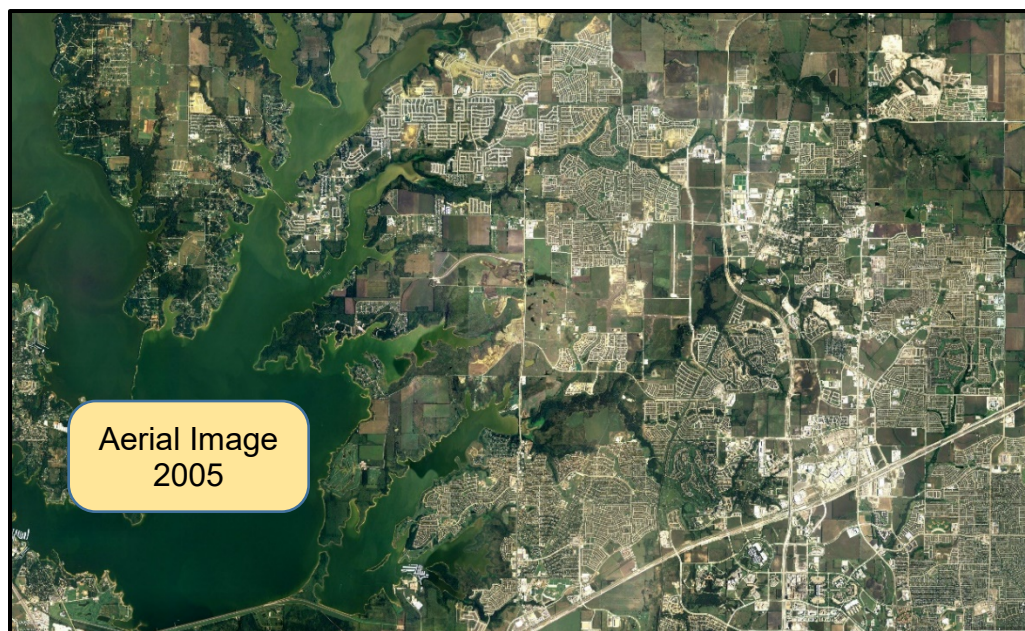


Figure 6.2 Aerial image of the east side of Lewisville Lake in 2005

Image courtesy of Google Earth: Landsat/Copernicus 2020

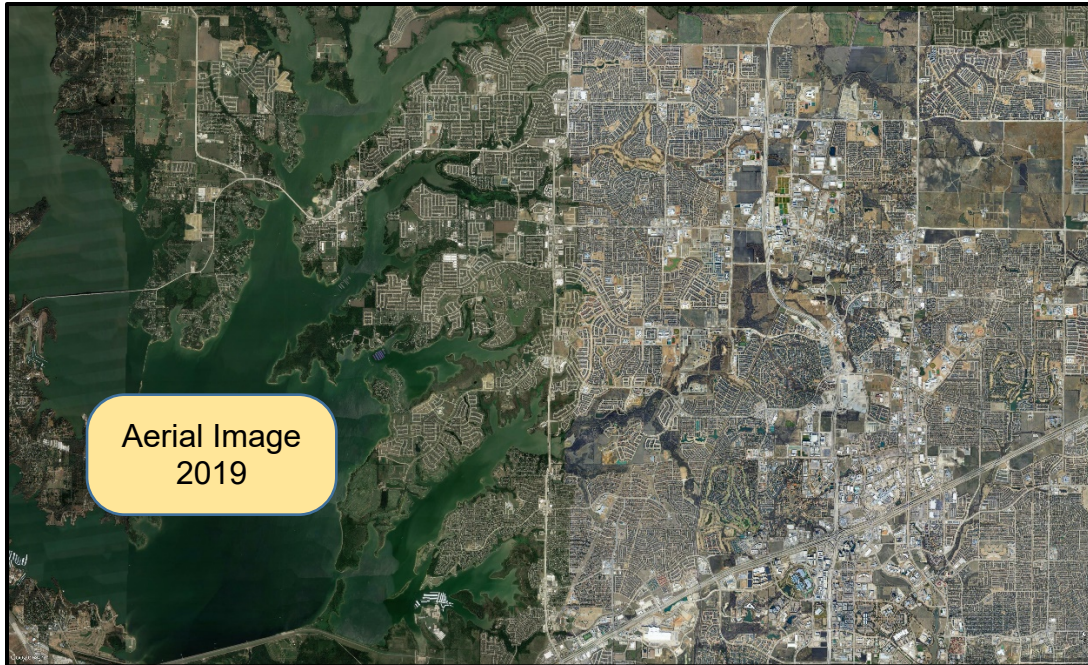


Figure 6.3 Aerial image of the east side of Lewisville Lake in 2019

(Image courtesy of Google Earth: Landsat/Copernicus 2020)

6.5 TRAILS

USACE lands at Lewisville Lake provide many trail opportunities to the visiting public. USACE has partnered with numerous entities to provide pedestrian, bike, and equestrian trails in every quarter of the lake. Major trail providers include TPWD, cities of Highland Village, Copper Canyon, Corinth, Hickory Creek, Lake Dallas, Denton, Little Elm, The Colony and Lewisville. Denton County has also been a player in trail creation through their work on the Old Alton Bridge that is an important link on the Pilot Knoll Trail. A listing of active trails on USACE lands (moving clockwise around the lake starting at the dam), includes:

- Trails in LLELA. Many trails are offered within the boundaries of LLELA. These trails are limited to pedestrian traffic and are designed to give visitors access to some of the outstanding natural resources found within LLELA. Future plans call for maintaining existing trails and working with partners and other LLELA consortium members to expand trails where needed.



Figure 6.4 LLELA Trails Map (Source: LLELA)

- **Trails in Lewisville Lake Park and Tower Bay Access Area:** The City of Lewisville, Parks & Recreation Department, maintains a combined pedestrian and bike path that traverses along the Lewisville Lake Shoreline in Lewisville Lake Park and the Tower Bay Access Area. The City's 2014 Trails Master Plan shows the existing trails in Lewisville Lake Park and Tower Bay Access Area. The trail in the Tower Bay Access Area was funded as a mitigation project during highway construction that resulted from the widening of IH-35E. This trail crosses IH35E and continues to the south side of Copperas Branch Lake (aka Highland Village Lake, which is part of Lewisville Lake) where the trail will link to trails in the City of Highland Village. The trail at Copperas Branch Lake includes a pedestrian bridge that spans a portion of Copperas Branch Lake.
- **Trails in Highland Village:** The City of Highland Village intends to link up with the Tower Bay Access Trail with a trail leading to Copperas Branch Park and to trails located on city property. The planned trail is for pedestrian use and will serve Highland Village residents and visitors to Copperas Branch Park.
- **Pilot Knoll Multipurpose Trail:** This trail is the oldest authorized trail on USACE lands at Lewisville Lake. It has been in existence since the late 1980s. The trail was granted to the town of Copper Canyon as an easement. The trail originates in the town of Copper Canyon, traverses through Pilot Knoll Park (leased by USACE to Highland Village), and then roughly follows the USACE property

boundary line to a trail head on Old Alton road where the trail terminates. The trail serves both hikers and equestrian users. The Cross Timbers Equestrian Trails Association provides most of the maintenance on the trail. A tunnel was constructed by TXDOT under FM 2499 during construction of the road to allow trail users safe passage across FM 2499.

- Elm Fork Trail: This trail was initially constructed as a multipurpose trail open to hikers and equestrian users under a cooperative agreement between USACE, Denton County, and the cities of Corinth and Hickory Creek as an extension of the Pilot Knoll Trail. Denton County assisted with a small trail head and made repairs to the historic Old Alton Bridge to allow safe pedestrian and equestrian passage. Corinth assisted in placement of a prefabricated bridge over a deep ravine near Lake Bluff Estates. USACE granted a lease to Corinth for the bridge. Hickory Creek has assisted in constructing a trail head in Sycamore Bend Park and in maintaining that portion of the trail in their city limits. It is important to note that this trail crosses some very narrow and steep portions of USACE land and as of the preparation of this plan the trail does not meet USACE trail standards. Additionally, a portion of the trail has crossed private property in the past and that portion is currently closed. As a result, USACE cannot recommend public use of the trail until basic standards are met and legal alignment of the trail is assured. Pedestrians are free to use the trail but at their own risk. This trail is currently advertised on the Cross Timbers Equestrian Trails Association website as being open for use. Nonetheless, USACE advises trail users that trespass onto private land is not authorized and portions of the trail do not meet safety standards. USACE will continue to work with partners to resolve these issues.

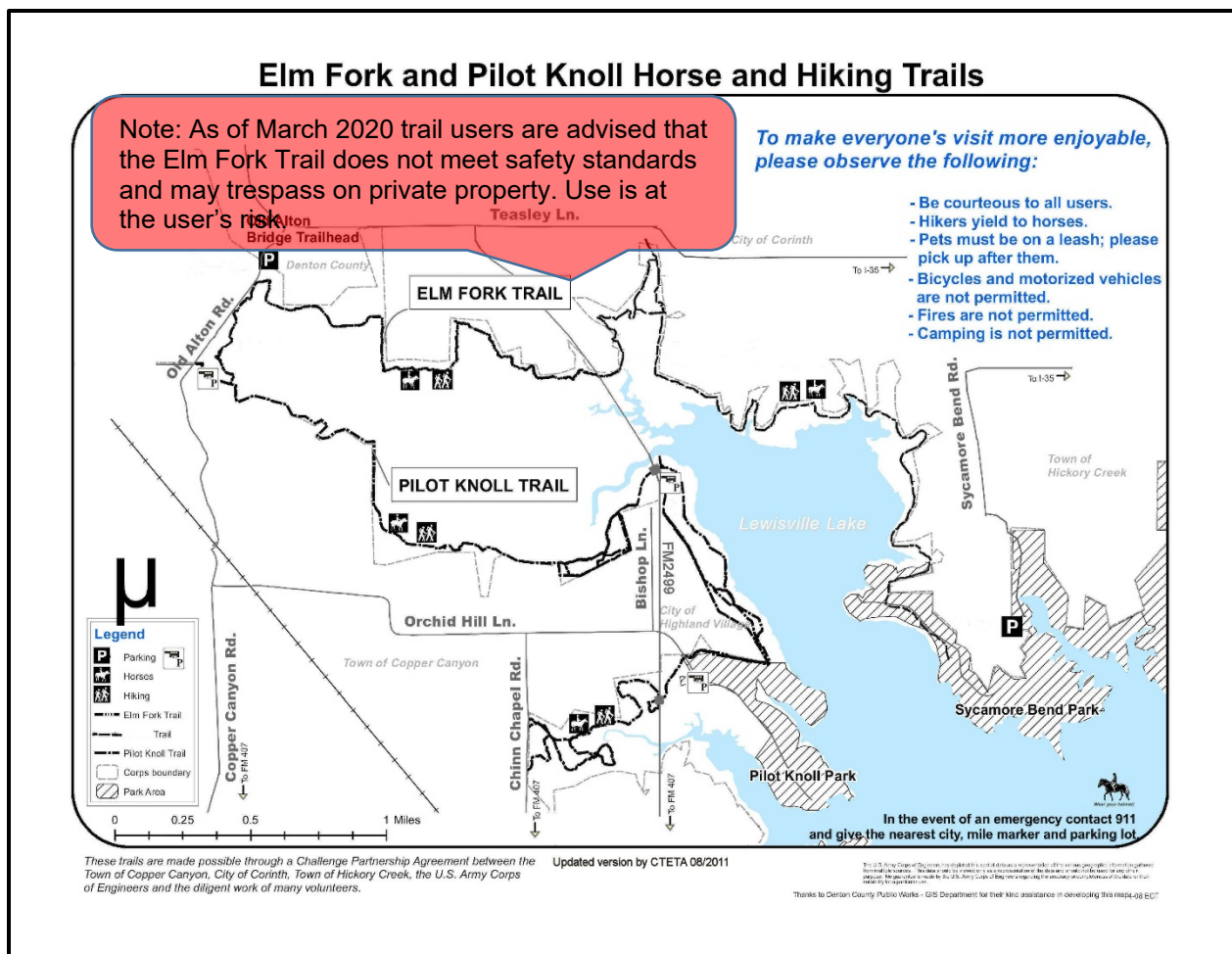


Figure 6.5 Trail map for Elm Fork and Pilot Knoll Horse and Hiking Trails
(Source: Cross Timbers Equestrian Trails Association)

- Hickory Creek Park: USACE maintains a small pedestrian hiking path in Hickory Creek Park intended for use by park patrons.
- Willow Grove Park: The city of Lake Dallas maintains a small hiking path in Willow Grove Park that leads from the main park area and traverses along the USACE boundary to the south. The city plans to extend the trail in the future to include the entire southern portion of Willow Grove Park.
- The Greenbelt Corridor Trails: These trails are maintained by Texas Parks and Wildlife Department and are the most prominent and longest trails on Lewisville Lake. The trails include hike, bike, and equestrian trails traversing 10 miles from Highway 380 on the south end, along the Elm Fork of the Trinity River, to the trails terminus near the dam at Ray Roberts Lake. Trailheads are maintained at both ends and in the middle at FM 428. The southern portion of the trail was damaged by flooding and silt deposition during the flood event of 2015. The trailhead at Highway 380 will remain closed until repairs are completed on the southern portion of the trail. A future primitive trailhead could be located on the

east side of the Greenbelt Corridor on a parcel of USACE land that is managed by TPWD and is classified for Low Density Recreation. Equestrian groups and other non-profit entities help in maintaining the Greenbelt Corridor trails.

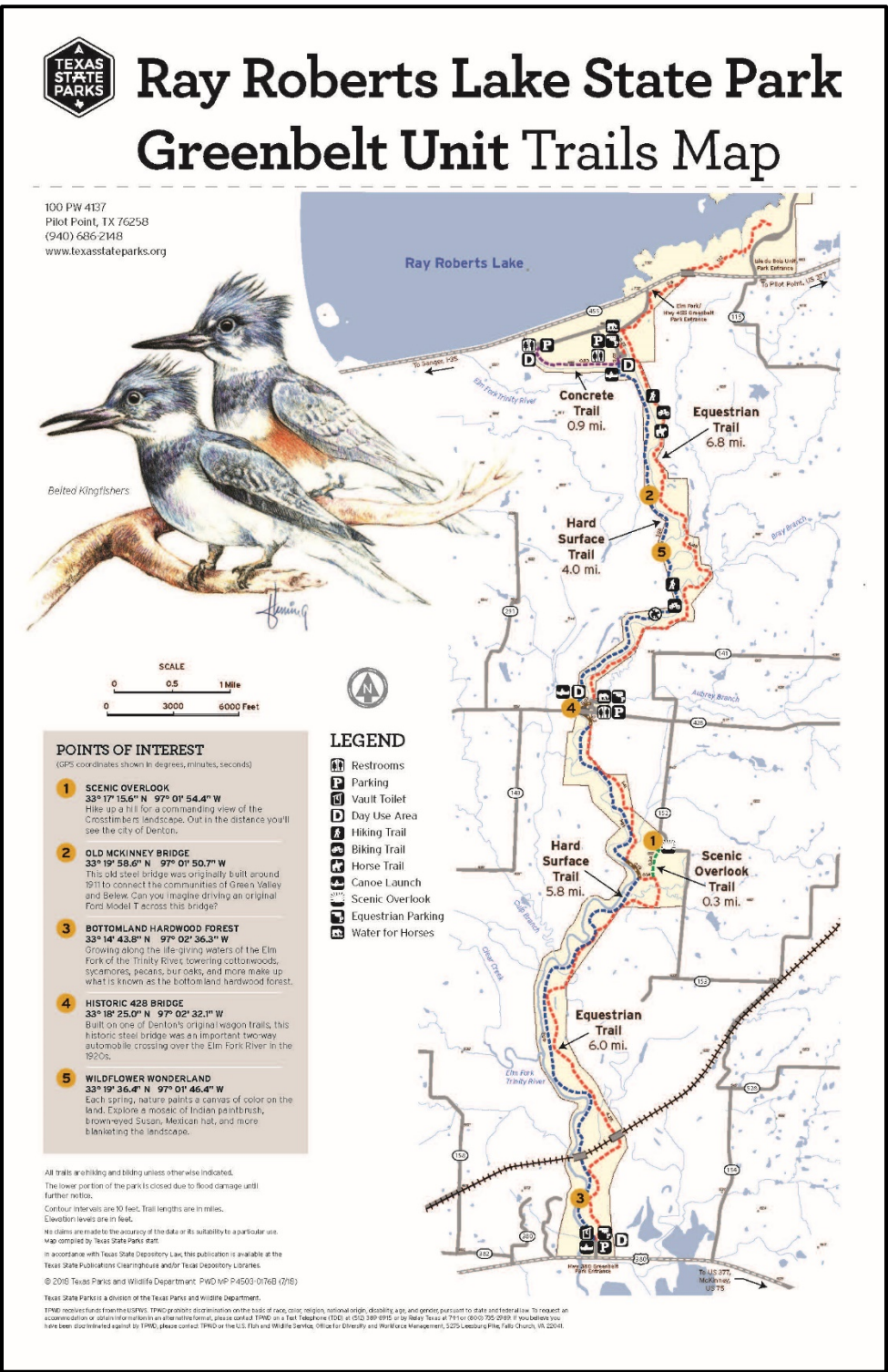


Figure 6.6 Ray Roberts Lake State Park – Greenbelt Trails Map (Source: TPWD)

- Trails at Clear Creek Natural Heritage Center (CCNHC): The City of Denton maintains hiking and interpretive trails on the lands they lease from USACE as part of their CCNHC. The trails total 10 miles and traverse through large areas of the City's 2,900 acre leased area. The four trails provide access for fishing along Clear Creek, and to bottomland hardwood forests and wetlands.

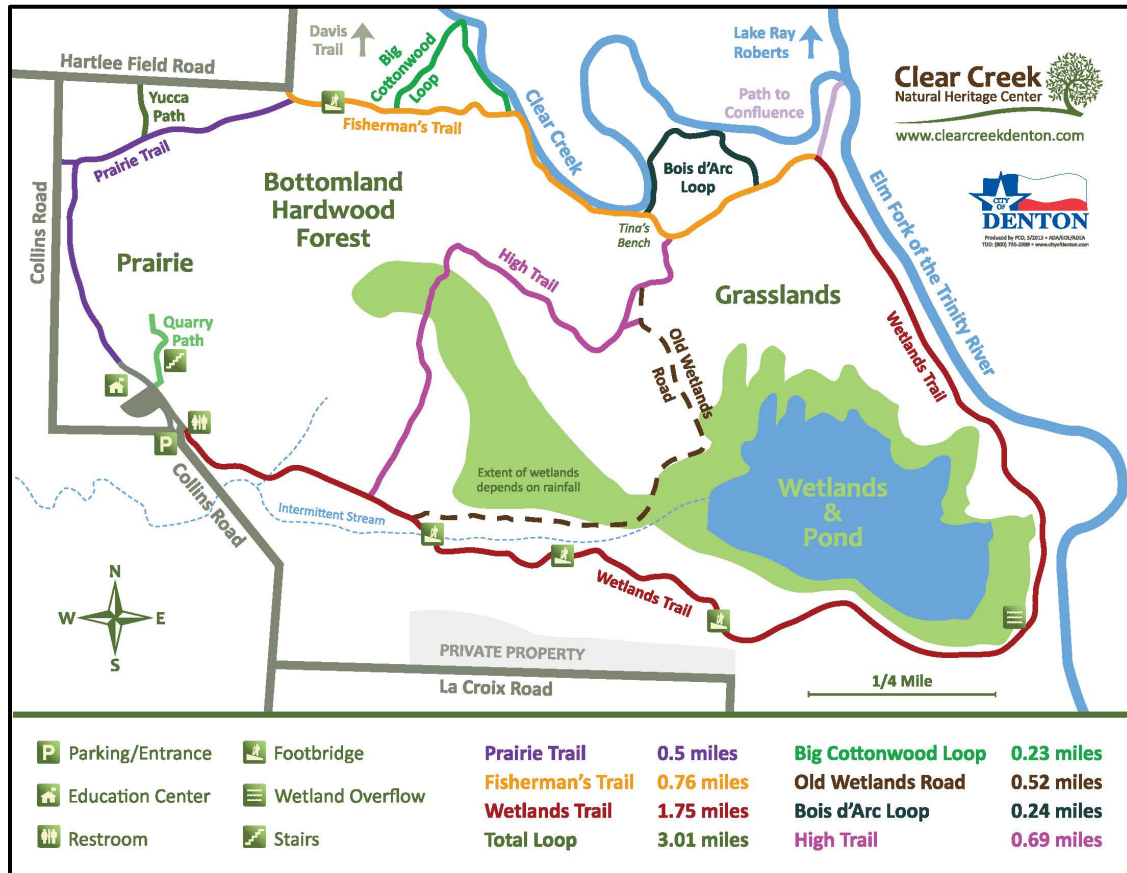


Figure 6.7 Trail map for the Clear Creek Natural Heritage Center
(Source: City of Denton)

- Trails in Little Elm and Cottonwood Parks: The city of Little Elm holds a lease from USACE for Little Elm Park, Cottonwood Park, and a segment of shoreline running from a trailhead near the Hula Hut restaurant, around Cottonwood Creek cove to a trailhead at McCord Park. The city provides the Johnny Broyles trail in Little Elm Park, the Cottonwood Park Nature Trail in Cottonwood Park, and the 4-mile Lakefront Trail on the segment of shoreline described above.

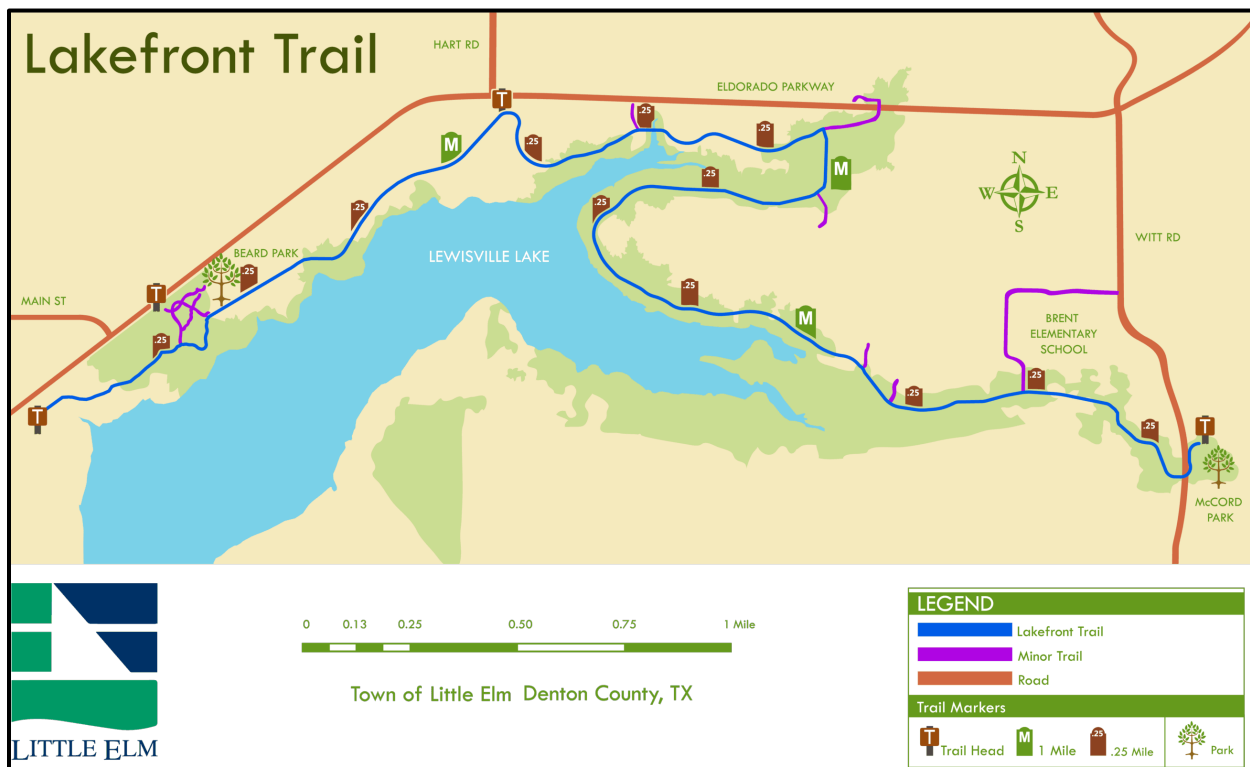


Figure 6.8 Map of the City of Little Elm's Lakefront Trail (Source: City of Little Elm)

- Trails provided by The Colony: The Colony maintains several trails on lands they have leased from USACE. The trails include The Colony Shoreline Trail, The Tribute Shoreline Nature Trail, and Hidden Cove Park Nature Trail. Combined, these trails offer approximately 8.3 miles of hiking and biking opportunities in a natural setting.



Figure 6.9 The Colony Shoreline Trail (Source: The Colony)

- NCTCOG Veloweb: The North Central Texas Council of Governments, Transportation Planning Unit, is conducting long-range planning for bike paths and trails that would serve and interconnect the 16-county COG. The plans near Lewisville Lake show some of the significant existing trails such as the Greenbelt Corridor trails as well as “planned off-street trails” that may involve USACE land. For example, one of the planned off-street trails show a route that going across the dam at Lewisville Lake which USACE may not approve due to security concerns. Other routes shown on the NCTCOG map follow the shoreline in numerous areas. While some of these routes may be feasible, others may be too frequently inundated to be economically maintained. In summary, USACE is willing to work with various entities to provide hiking and biking trails on USACE lands where the planned trails would not interfere with existing public use patterns or result in a serious loss of wildlife habitat or other ecologically sensitive resources.

6.6 LEWISVILLE LAKE DAM SAFETY MODIFICATIONS

USACE has determined that certain modifications to the dam at Lewisville Lake are needed to ensure that the dam continues to function safely for the foreseeable future. The effort to implement needed modifications has been ongoing for several years prior to this Plan, but the modifications are beginning as this Plan is being published. The current construction contract includes embankment modifications which will reduce risk by constructing improved seepage collection systems, and several earthen berms. Additionally, a filter will be placed at the downstream end of the outlet works conduit and a portion of the crest road used for surveillance of the dam will be replaced. Two construction locations are in the publicly accessible part of the Lewisville Lake Environmental Learning Area. Visitors will notice modifications being made to the dam embankment in one location to control a seep in that area, as well as some modification work being done on the concrete river outlet structure. Recreation users at Lewisville Lake will see an increase in construction traffic near the dam with building of a temporary road and delivery of material and equipment. Recreation access will be rerouted during construction, and some areas may be temporarily inaccessible during construction for the safety of our recreational users. USACE will obtain needed fill material from select locations within LLELA. Any natural resources losses associated with these locations will be fully mitigated within LLELA.

CHAPTER 7 - PUBLIC AND AGENCY COORDINATION

7.1 PUBLIC AND AGENCY COORDINATION OVERVIEW

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

The USACE began planning to revise the Lewisville Lake Master Plan in January of 2015. The objectives for the master plan revision are to (1) update land classifications to reflect changes in USACE land management policies since 1985, prepare new resource objectives, and 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.

- May 2015 – USACE submits budget package to initiate a Master Plan revision at Lewisville Lake in October 2016.
- December 2016 – USACE holds internal meetings to initiate master plan revision process.
- January – May 2017 – USACE gathers preliminary information to initiate revision.
- 2 & 4 May 2017 – Initial public scoping meetings held in Lewisville and Little Elm to announce initiation of the revision process and to request public input.
- June – August 2017 – Public comments considered, and preparation of draft MP initiated.
- September 2017 – March 2018 – USACE conducts meetings with key individual stakeholders including marinas and park and recreation lessees.
- 16-20 October 2017 – USACE, TPWD, and USFWS conduct wildlife habitat evaluation field work on Lewisville Lake project lands.
- March 2018 – February 2020 – USACE works on draft MP and prepares new maps for the revised MP. Reminders sent to stakeholders and public meeting attendees that work is continuing. Continue gathering input from key stakeholders.
- February 2020 – Public meeting scheduled for March 2020 to announce the final draft MP.
- May 2020 – COVID pandemic restrictions result in a virtual public meeting process to include a narrated video and draft Master Plan revision posted on the USACE website. Public comment on the draft Master Plan were accepted through June 22,

2020. During the comment period, 54 distinct comments were received from several entities and the general public. Entities offering comments included Upper Trinity Regional Water District (UTRWD), TPWD, and three cities.

7.2 INITIAL STAKEHOLDER AND PUBLIC MEETINGS

The first action was a scheduled public scoping meeting providing an avenue for public and agency stakeholders to ask questions and provide comments. Two public scoping meetings were held on May 2 & 4, 2017 at the Armed Forces Reserve Center in Lewisville and Lakeside Middle School Auditorium in Little Elm, Texas, respectively.. The Fort Worth District placed advertisements on the USACE webpage, social media, and print publications approximately three weeks prior to the public scoping meeting.

USACE employees hosted the meetings, which were conducted in an open format. Participants were asked to sign in at a table where staff provided the participants with information regarding the structure of the scoping meeting and comment forms. After signing in, participants were directed to be seated in the auditorium and a slide presentation was presented by the Lake Manager on behalf of the Master Plan Revision Project Delivery Team (PDT) to convey information about the following topics:

- Public Involvement Process
- Project Overview
- Overview of the NEPA process
- Master Plan and current land classifications
- How to Submit Comments

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

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

In total, approximately 77 individuals, not including USACE personnel, attended the two public scoping meetings. Attendees included elected officials, the public at large, interest groups, partner agencies, marina operators, other government agencies, and area businesses. Written comments were received from Texas Parks and Wildlife Department, 8 cities, one marina, and 17 individuals. Most of the cities offering comment hold park and recreation leases from USACE and two cities responded on behalf of marina sublessees. Much like national forests or parks, Lewisville Lake is a Federally-owned and managed public property. It is USACE goal to be a good neighbor

as well as steward of the public interest as it concerns Lewisville Lake. As such, USACE is bound to the equal enforcement of policies and rules for this publically held national asset. Table 7.1 gives a summary list of the comments received during and following the initial scoping comment period for the master plan, as well as the USACE response.

Table 7.1 Comments and Government Response – from Public Meetings, May 2017

COMMENT	USACE RESPONSE
COMMENTS FROM TEXAS PARKS AND WILDLIFE DEPARTMENT	
TPWD operates and maintains the Greenbelt Corridor that runs along the Elm Fork of the Trinity River between the dam at Ray Roberts and Highway 380 on Lewisville Lake. We agree with the Environmentally Sensitive Area classification of the Greenbelt Corridor as long as that classification will not prevent the Department from performing necessary trail maintenance, adding new segments of trail or adding picnic and rest areas along the trail.	The proposed land classification for the Greenbelt Corridor is Environmentally Sensitive Area (ESA) for all USACE lands within the corridor except for the immediate area where the hike and bike trail is located. The hike and bike trail, as well as associated trail head locations are proposed to be classified as High Density Recreation (HDR) areas. This HDR classification will not prohibit trail maintenance or the addition of picnic and rest areas along the trail. The addition of new trail segments within ESA would be possible if any new segments are proposed as natural surface pedestrian trails with allowances for reinforcement in wet or steep locations.
The portion of the Greenbelt lands adjacent to Wildcat Road should have a land classification that would allow for development of a trailhead and low impact trails that connect to the main Greenbelt trail when public demand warrants such development.	Concur. The area in question is proposed for classification as a Multiple Resource Management Area – Low Density Recreation which will allow for development of a low impact trailhead facility.
The Department wishes to note the existence of aggressive and invasive privet shrubs throughout the Greenbelt Corridor and that steps should be taken to reduce this invasive species.	Concur.
COMMENTS FROM CITY OF THE COLONY	
Designate “Low Impact” and/or “Wildlife Management Areas” on the lake: The Corps has this designation for federal land, and a similar designation on the lake would be beneficial. There are certain areas on	This recommendation has significant merit but will require coordination with multiple entities involved in managing the lands and waters of Lewisville Lake. Public comment, including this comment,

COMMENT	USACE RESPONSE
<p>the lake where motorized vessels should not be allowed or at the least, should be designated as permanent no wake zones. Examples would be: shallow or stumpy coves that are not on the main body of the lake that provide great habitat for a variety of shorebirds (herons, egrets, ducks, and migratory pelicans, etc.); and zones or “lanes” designated as Kayak/SUP paddle trails (now and in the future).</p>	<p>has indicated a desire for “no wake” zones at various locations, but the designation of these areas must first be coordinated with those entities involved in the enforcement of rules that govern the water surface. Secondly, setting aside areas as “no wake” zones must also be coordinated with marinas to ensure their voice is heard. Lastly, the designation of “no wake” zones requires on-the-water buoys and markers to make enforcement possible. USACE cannot unilaterally assume responsibility for placement and maintenance of the buoys and markers needed to set aside no wake zones.</p>
<p>Establish lake-wide nuisance noise regulations: One of the most frequent lake related complaints our city gets from residents is regarding loud and/or profane music being played on boats “coving out” near residents’ homes. For easier and consistent enforcement, rather than each jurisdiction trying to address this, a lake-wide mandate prohibiting loud and/or profane music within a certain distance of people’s homes should be implemented and enforced.</p>	<p>Undesirable noise related to loud and or profane music being played on boats that are moored near residential areas is a universal complaint at most USACE lakes. USACE does not have a rule that prohibits such noise except for the quiet hours rule in Title 36 of the Code of Federal Regulations that prohibits excessive noise in public use areas from 10:00 PM until 6:00 AM. This rule can be applied to the water surface, but most noise complaints occur during daylight hours.</p>
<p>Review and consider re-classifying designated hunting areas: In 1985 when the hunting areas were designated, there were no homes near some of those areas. Residential development over the past 30 years has been significant, and now puts many homes in close proximity to those hunting areas. Not all hunters are cognizant of or follow the regulations of how far they must be from houses before discharging their firearms. If the hunting areas aren’t re-classified, better enforcement of distance regulations needs to take place during hunting season.</p>	<p>Public hunting rules and areas at Lewisville Lake are reviewed by USACE each year to address public safety issues, hunting rules changes by Texas Parks and Wildlife Department, and wildlife conservation and protection needs. Currently, USACE issues 600 first-come, first-served hunting permits and all hunting is in accordance with state law except that firearms are restricted to shotguns only with shot size no larger than #2. Archery equipment (including crossbows) may be used only for hunting feral hogs. Hunters must provide evidenced of having completed Hunter Education training and are</p>

COMMENT	USACE RESPONSE
	<p>provided a map of allowable hunting areas when permits are issued. Hunting or shooting within 600 feet of homes, developed parks, roads, fishing piers or platforms, farm and ranch yards, outlet structures, emergency spillways, or other areas is prohibited unless otherwise stated or posted. USACE encourages surrounding cities to comment on allowable hunting areas each year in order to take into account expanding residential development.</p>
<p>Implement a boating moratorium during flood events: During extreme flood events like in 2015, as a park leaseholder, we focus an enormous amount of time and energy on protecting park assets and the homes along our shorelines from boaters. The additional wake caused by these boats damages public and private property, and new underwater hazards exist that most boaters aren't aware of. Waiting to close the lake when it was almost at 537 msl was too long in 2015. Recommend establishing a "lake closed policy" to all motorized vessels at no higher than 533 or 534 msl. At that level, all boat ramps on the lake are inaccessible, and boats at marinas should be prohibited from leaving their docks too. This needs to be an established lake-wide policy implemented for safety so everyone knows what to expect when flood events happen.</p>	<p>Concur that a policy is needed to address boating traffic during high-water lake levels. Such a policy is outside the scope of this Plan but can be addressed in meetings with all concerned stakeholders to include adjoining cities, and marinas.</p>
<p>Streamline development review and approval process: Allow Corps staff at the local offices more flexibility and authority to approve projects that are within the scope of allowable uses of Corps property. The Corps relies on many cities and other leaseholders to operate and maintain federal parkland, but the approval process to make needed improvements or to provide better amenities and access to the public in those parks is at times ridiculously long (several months to two years). Long</p>	<p>Noted.</p>

COMMENT	USACE RESPONSE
<p>delays in approvals can result in lost revenue and/or added costs due to increase in construction pricing, loss of contractors, etc., To my knowledge, we have never had a project rejected at the District level after it was reviewed and vetted at the local Corps office. That indicates the local Corps staff know what they are doing, so they should be more empowered to approve projects to streamline the process.</p>	
COMMENTS FROM CITY OF LITTLE ELM	
<p>Adding additional recreation land area to Doe Branch Park to the west. There is a small section already recreational and it makes geographical sense that the entire tip of the peninsula be recreational. The Town would like to eventually work out a park lease to improve and maintain this area, similar to our current leased areas. Please see attached exhibit.</p>	<p>Non-concur. The described area lying west of Doe Branch Park was removed from park status in 2004. USACE believes the area in question is properly classified as wildlife habitat. If the city of Little Elm wishes to someday lease Doe Branch Park, the wildlife area to the west could also be leased with the understanding it would remain as wildlife habitat with public use restricted to low impact use including but not limited to bank fishing and natural surface pedestrian trails.</p>
<p>Adding additional recreation area to the shoreline around our Beard Park and Lakefront area. Near Hardwicke Lane to Hillside Beach, south side of Eldorado Parkway. This area already has a recreational trail through the current wildlife management section. Within portions of Town owned land, we have public parking, Beard Park, restrooms, playgrounds. The Town would like to have this area be deemed recreation to continue to grow and manage, similar to our other park leases. Please see attached exhibit.</p>	<p>Non-concur. The area in question is currently classified for Fish & Wildlife Management and under the 2020 MP the planning team determined that the area should continue to have a primary use as focused on wildlife benefits. The area in question will be classified as MRML-WM. The city of Little Elm currently has the area under a Low Density Recreation lease which will allow for passive uses, including the trail that the City maintains through the area.</p>
<p>Provide a transportation corridor adjacent to the current utility crossing between the Town of Little Elm and Hackberry for the</p>	<p>Proposed roads and bridges are not addressed in the master plan revision process. USACE has examined the</p>

COMMENT	USACE RESPONSE
<p>proposed King Road Bridge. This bridge would connect King Road to Eldorado Parkway at the intersection of Crestlake Drive. It would provide a needed secondary access to the peninsula for life safety and allow pedestrians to cross. This route is historically a transportation crossing with the old “twin bridges”; Hwy 24 route. Please see attached exhibit.</p>	<p>proposed King Road Bridge in the past and has determined that construction of a bridge along the old Highway 720 alignment would detract from the aesthetics of the USACE land and water surface in question.</p>
COMMENTS FROM THE TOWN OF HICKORY CREEK	
<p>Hickory Creek envisions extending walking trails in Arrowhead Park to the east where Arrowhead Park joins Oakland Park. We would like to see the entire park remain in a HDR classification.</p>	<p>Concur. The land classification of Arrowhead Park is proposed to remain as HDR.</p>
<p>The Town of Hickory Creek Parks Board discussed many topics and improvements for the Corp parks located in Hickory Creek. Below are the comments and future goals for each park:</p> <p>Sycamore Bend Park- Swim beach, disc golf course, fishing dock, new bathroom in the primitive camping area, electric in the primitive camp sites, larger playground, access to the current pavilion by boat trailers for fishing tournaments, RV campsites.</p> <p>Harbor Lane Park – Disc golf, dog park.</p> <p>Point Vista – Dog park.</p> <p>Arrowhead Park – Volleyball court, basketball court.</p>	<p>Concur with proposals with the exception of Dog Parks. The request for a dog park at Harbor Lane Park and Point Vista Access Area cannot be approved. The allowable proposed facilities will be described in Chapter 5 of the Master Plan.</p>
<p>Wichita Forest, 700 Highland Village Road</p> <p>Currently this park site is designated as fish and wildlife/environmentally sensitive. Our recommendation is for the park site to remain with the current designation.</p>	<p>Concur. The land in question is proposed for reclassification to Environmentally Sensitive Area.</p>

COMMENT	USACE RESPONSE
<p>Additionally, the City is willing to remove trail markers and allow the site to remain in its natural state to protect current and future vegetation and animal habitat. The park site would remain open to public use under the CORPS restrictions assigned to this designation, however no future planned construction of trails within the site would occur.</p>	
<p>YMCA Leased Area, 709 Highland Village Road</p> <p>The YMCA has this area leased and utilizes it in the summer months for their Camp on the Lake program. The Camp on the Lake is a waterfront day camp for ages 6 – 13. The current classification for this area is fish and wildlife, however the current use is more recreation. There are several permanent structures located on the site utilized by the YMCA for their camp program. Some of the structures include several restrooms, covered slab areas for outdoor games, storage building, sand volleyball court, and indoor gathering facility complete with kitchen and air conditioning. Would recommend that the designation be reclassified as high density recreation which would coincide with the current use.</p>	<p>Concur. The YMCA leased area is proposed for reclassification to High Density Recreation</p>
<p>CORPS land south end of Doubletree Ranch Park (310 Highland Village Road) and runs along Copperas Branch Lake (aka, Highland Village Lake) to Highland Village Road.</p> <p>The area in question is currently classified for fish and wildlife purposes. In accordance with mitigation plans associated with the widening of Interstate 35, pedestrian trails, including a pedestrian bridge over Copperas Branch Lake, are being constructed to provide pedestrian trails that will connect to Copperas Branch</p>	<p>Concur. The land in question is proposed for reclassification to High Density Recreation.</p>

COMMENT	USACE RESPONSE
Park and other trails in Highland Village. Recommend the land in question be reclassified to a recreation status.	
Pilot Knoll Park, 218A Orchid Hill Road This active park site provides a day use area as well as overnight camping. However, there is one small section of the park that was reclassified years ago as fish and wildlife management/environmentally sensitive area. We understand that this may have been due to the loss of a similar area as a result of the construction of FM2499. As a result this area was reclassified to serve as a “swap” for that loss. We would like to have this area reclassified as low density recreation which would allow for primitive camping and hiking, but continue to protect the area for low impact activities such as bird watching, environmental education, etc. The remainder of the park should continue to be classified for High Density Recreation.	Non-concur. The area in question is a good example of typical Cross Timbers habitat and as such has moderate to high ecological value. Pedestrian trails and hiking are both allowed in Environmentally Sensitive Areas. Depending on the extent and degree of primitive camping, with proper safeguards, this activity may be permitted by special event permit.
Peninsula Park, 814 Tree Haven Court Recommend this area be reclassified from the current Recreation classification to Low Density Recreation or fish and wildlife.	Concur. The area is proposed for reclassification to Multiple Resource Management Lands – Wildlife Management.
COMMENTS FROM THE TOWN OF SHADY SHORES	
We would not want any of our adjacent shoreline lands to become subject to more stringent designations of management than they currently are so designated. Example: we would not want to have lands, for instance, designated "Wildlife Refuge" if such change of designation puts more restricted access for our residents, than that which we currently are subject	Noted. With one exception, USACE lands in the vicinity of Shady Shores are proposed for classification as Multiple Resource Management Lands – Wildlife Management. The exception being a small tract east of the Cielo subdivision that is proposed for classification as an Environmentally Sensitive Area. Each of these proposed classifications would allow for passive recreational use and pedestrian, natural surface trails.
We would not particularly want a higher Conservation Pool level above 522' to be placed in operation for this Lake, specifically as it may impact that "Shady Shores Bridges" project currently under	Noted. Plans related to pool elevations are not part of the Master Plan process. Regardless, there are currently no proposals under consideration for an

COMMENT	USACE RESPONSE
funding consideration by NCTCOG, and at such planning meetings you have jointly participated. We have not yet heard this mentioned, and I have separately e-mailed you on this subject of Conservation Pool level maintenance too.	increase in the conservation pool elevation at Lewisville Lake.
We want to enter into discussions with you about how to better, and more proactively, manage and maintain the Big Sandy Boat Ramp in our town limits. It is consistently dotted with lots and lots of trash, in various states of disrepair, excess parking on our Lakeshore St drainage easements, etc. (example now: Post/cable fence has lots of damage, there is a rock-beached boat there that needs to be extracted, etc.)	Noted. Following receipt of this comment in July 2017, USACE has completed repairs and renovations to the boat ramp complex.
COMMENTS FROM THE TOWN OF LAKEWOOD VILLAGE	
All USACE land adjacent to Lakewood Village is classified as Wildlife Management. The town requests that a piece of USACE land at the termination of Garza Road near the north end of the Old Lake Dallas Dam be reclassified to High Density Recreation so the town can have its own park and not be subject to the non-resident fees imposed by other entities that lease USACE park land.	USACE would consider a small High Density Recreation area where Garza Road terminates, but a comprehensive proposal is needed before that land classification change is implemented. USACE would need to know what Lakewood Village proposes to construct and how the area would be maintained. The area in question is proposed to be reclassified as Multiple Resource Management Lands – Wildlife Management. Lakewood Village could lease the area under this classification, but development would be limited to natural surface pedestrian trails and minimal parking space. Changing the area to a High Density Recreation classification in future years is possible but would require a minor Master Plan supplement.
Lakewood Village fully supports the USACE mission to protect and conserve wildlife habitat	Concur

COMMENT	USACE RESPONSE
Lakewood Village supports the “narrow shoreline variance areas” identified in the 2005 USACE environmental assessment on allowable adjacent landowner activity.	The Master Plan revision does not address shoreline management issues such as the “narrow shoreline variance areas”, and USACE has no plan to change the narrow shoreline variance areas in the foreseeable future.
COMMENTS FROM THE TOWN OF CROSS ROADS	
Utility Corridors 8 and 10 on Mosely Road and Keyes Lane) are in the Town of Cross Roads. Can the master plan identify these roads as needing to eventually be widened?	The master plan revision does not address proposed road projects. USACE policy states that proposed changes to existing roads are addressed on a case-by-case basis. Utility Corridors 8 and 10 are proposed to remain as originally described in the 2004 Lewisville Lake Master Plan Supplement.
GENERAL PUBLIC COMMENTS	
Nine residents of Lake Bluff Estates in the City of Corinth expressed opposition to any extension of the existing trails on USACE land to a point near Lake Bluff Estates. The residents do not want the trail near their homes, nor do they want the City of Corinth to pursue additional public access points to the existing trail on city streets that are near the USACE boundary line.	Noted. USACE and trail advocates have no plans to extend the existing trail that traverses near the USACE property boundary in the City of Corinth. Communication with City staff members indicates the City has no plans for additional public access points to the trail on USACE land.
<p>I very strongly oppose any commercial building, such as hotels, restaurants, water parks, or resorts, etc. I would also loudly oppose any permission given to a developer to cut down trees to facilitate lake views for their housing developments, as happened several years ago in Corinth along the shores (and in the water) of Lake Lewisville.</p> <p>The natural landscape should be managed as just that, with trails as natural as possible. No playgrounds, pavilions, baseball fields, campgrounds...there are plenty of inland locations for these types of amenities.</p>	<p>Any proposed commercial development such as marinas or resorts, which may include amenities such as lodging, restaurants, or appropriate recreational features may only be placed in areas designated for High Density Recreation (HDR). Refer to Chapter 5 for actions that are proposed within HDR areas and to Chapter 6 for a discussion on comprehensive resorts.</p> <p>Developers and/or individual property owners are never permitted to remove trees or other vegetation on USACE land for a view of the lake. Removal of vegetation may be allowed by written</p>

COMMENT	USACE RESPONSE
	<p>permit only and is governed by the USACE Shoreline Management Plan.</p> <p>Preservation of the natural landscape is given a high priority in all land classifications, but some development is appropriate within HDR areas to accommodate lake and natural resources related recreation such as boating, picnicking, hiking and camping.</p>
<p>I live in Shady Shores, but have been living around the Lewisville area for many years now. It would be great to have long hiking trails added around Lake Lewisville, especially on the west, north/west side of the lake, if possible. Previously, I lived in Flower Mound and the access to trails over at Lake Grapevine was fantastic. The lack of sidewalks in the area I live in, makes it dangerous to walk. So, trails would be of great value for safety reasons, too.</p>	<p>Concur. USACE supports the establishment of public trails in most areas, but typically must work with partners to construct and maintain any trail. Currently, Texas Parks & Wildlife Department operates the Greenbelt Corridor trail on the north end of Lewisville Lake. On the west side of the lake public trails are maintained by Copper Canyon and Highland Village. Other cities including Lake Dallas and Hickory Creek have discussed and or proposed public trails.</p>
<p>We would like to see more development on the lake in terms of restaurants that you can dock a boat at and eat at the lake. It seems Lake Lewisville is behind other lakes in this regard.</p> <p>We would also like to see more beach areas / volleyball courts like the new one in Little Elm. This is a great park, but it is way up on one side of the lake. We need another one or two on other parts of the lake.</p>	<p>Noted. Restaurants are currently operating at Eagle Point Marina and Pier 121 Marina. Additional restaurants are proposed by some lessees, but there are no firm plans to date. USACE does not allow stand-alone placement of restaurants on USACE land. Restaurants are generally allowed only as an amenity associated with a marina or comprehensive resort.</p> <p>Designated beaches must meet certain design criteria and be properly maintained. There are currently nine designated beaches at Lewisville Lake including beaches in Lewisville Lake Park, Copperas Branch Park, Pilot Knoll Park, Hickory Creek Park, Willow Grove Park, Little Elm Park, Hidden Cove Park, Stewart Creek Park and East Hill Park. Some of these beaches are equipped with amenities such as a volleyball court.</p>

COMMENT	USACE RESPONSE
<p>My family and friends have enjoyed the many activities that the lake has to offer. We especially enjoy waterfowl hunting the lake and hope that the Corps continues to allow access for hunting on a permit basis.</p>	<p>Noted. USACE intends to continue to allow hunting access as long the activity does not create a public safety hazard or conflicts with natural resources management goals. USACE evaluates the public hunting program throughout Fort Worth District lakes on an annual basis. The annual Public Hunting Guide is available online at https://www.swf.usace.army.mil/About/Lakes-and-Recreation-Information/</p>
<p>I am a wildlife rehabilitator permitted by the TX Parks and Wildlife department. I live in Little Elm on a lakefront property and my experience with my neighbors regarding wildlife has not been the best. Most of them simply don't understand how certain species exist and are unnecessarily scared, concerned and worried about themselves, their children and pets and end up killing animals, such as non-venomous snakes for example. Therefore I would like to suggest more education regarding this matter, maybe in form of workshops. I have written and published many articles about urban mammals and would be happy to assist.</p>	<p>Noted. The offer to assist is appreciated. USACE encourages wildlife rehabilitators and Master Naturalists to contact the Lewisville Lake Office to inquire about natural resources needs and programs.</p>
<p>We have lived on the lake for many years. Please do not let Hula Hut build a dock. The area is too shallow, narrow, and already too crowded with boats. Wakeboard boats and other boats playing loud music and using alcohol and profanity make it difficult to enjoy the area with grandkids.</p>	<p>Noted. USACE has no plans to authorize a commercial dock in the area. The issue of boating congestion and loud music, profanity and alcohol use by boaters is a problem lake wide. Reducing the occurrence of this nuisance activity will require a coordinated effort by USACE, Texas Parks & Wildlife, Denton County Sheriff, and law enforcement officers from communities that surround the lake.</p>
<p>Our home adjoins Arrowhead Park and is only about 10 feet from Corps land. We do not want a public trail to be constructed on Corps land in this location. We have lived here 30 years and will not go out on the lake on weekends due to</p>	<p>Noted. Trails are very popular and favored by many area residents and lake visitors alike. Placement of a trail on USACE land does require coordination with adjacent communities.</p>

COMMENT	USACE RESPONSE
unsafe boaters that do not know boating rules. Perhaps boaters need training. Drinking, noise and parties are also a real problem.	Unsafe boating, and noise, profanity and parties related to boating have been identified as a problem by others. The problem is lake-wide. Refer to the above response.

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

Table 7.2 provides public comments and the Government response following the virtual public involvement process with a public comment period that began May 8, 2020 and ended June 22, 2020. As noted in the Executive Summary, the virtual public involvement process was necessary due to the constraints imposed by the COVID-19 pandemic.

Table 7.2 - Public Comments From the Virtual Public Involvement Process Initiated May 8, 2020 to Announce the Final Draft of the Lewisville Lake Master Plan

COMMENT	USACE RESPONSE
COMMENTS FROM TEXAS PARKS AND WILDLIFE DEPARTMENT	
Request: To support the existing and future uses of the popular TPWD-managed equestrian trail, TPWD requests that the land uses within the TPWD-managed Greenbelt Corridor also include the following: 1) From 455 south to the pipeline (depicted as a red line on the enclosed figures) classify the east side of the river, where the equestrian trail is, as HDR for equestrian use and a potential new trailhead, and 2) From the pipeline south, classify the equestrian trail and a buffer on both sides of the equestrian trail as HDR. Recommendation: The description of ESA-12 should indicate the extent to which equestrian use is allowed and identify allowances for new or reconfigured unimproved equestrian trails. However, TPWD's request for HDR above, to accommodate the equestrian trail, is preferred for TPWD's Greenbelt equestrian trail.	Concur in part. Equestrian use within ESA-12 will be more fully described in Chapter 5, Section 5.3.5 and Section 5.5 where ESA-12 is described. The existing equestrian trail alignment will be identified on map LE20MP-OR-GC and a separate map will be prepared to show the entire Greenbelt Corridor. The land classification of the equestrian trail will be changed to an HDR classification and will include a strip of land approximately 30 feet wide (15 feet either side of the centerline of the existing trail). This will allow most of ESA-12 to remain under the ESA land classification. A potential new trailhead could be located in the parcel of land adjacent to Wildcat Road. This parcel is classified as Multiple Resource Management Land - Low Density Recreation which would allow for the construction of a passive use trailhead. The potential trailhead location will be described in Chapter 6 of the

COMMENT	USACE RESPONSE
	Master Plan in Section 6.5 where all trails at Lewisville Lake are described.
Recommendation: TPWD recommends that the Master Plan more fully address equestrian use, equestrian trails, and the land uses in which equestrian use is allowed.	Concur.
The Map LE20MP-OR-428-ACC shows two trails exiting the FM 428 access area, one on each side of the river. However, Map LE20MP-OR-GC only shows one trail to represent the improved multiuse trail and omits the unimproved equestrian trail. Recommendation: TPWD recommends the Master Plan consistently identify the improved multiuse trail as well as the unimproved equestrian trail.	Concur in the recommended map corrections.
Map LE20MP-OL-02, showing the land managing entities, indicates that the Greenbelt Corridor above US 380 is managed by the City of Denton with a linear portion through that area managed by TPWD. Map LE20MP-OL-02 only represents TPWD's management of the improved multiuse trail and omits TPWD management of the trailhead parks and the unimproved equestrian trail. The area leased and managed by TPWD is misrepresented in Map LE20MP-OL-02. Recommendation: TPWD recommends updating LE20MP-OL-02 to correctly represent TPWD management within the Greenbelt Corridor, including TPWD-managed trailhead parks and the unimproved equestrian trail. Enclosed are two figures depicting TPWD's lease area as the thin yellow polygon area. Please coordinate with State Parks staff to correctly represent TPWD managed property in the Master Plan.	Concur in the recommended map corrections.
Table 2.24 Summary of Recreation Facilities tabulates two equestrian trails. Figure 2.12 identifies equestrian trails at Greenbelt Access 380 and YMCA of	Concur in part. Table 2.24 will be edited to reflect that additional equestrian trails exist. Figure 2.12 correctly lists the trails in Pilot Knoll and Sycamore Bend as

COMMENT	USACE RESPONSE
<p>Dallas. Section 6.5 identifies equestrian trails at Pilot Knoll Park, Sycamore Bend Park, and the Greenbelt Corridor. Recommendation: TPWD recommends consistency between Table 2.24, Figure 2.12, and Section 6.5, regarding the number, length, and location of equestrian trails.</p>	<p>multipurpose trails that are used by hikers and equestrian users. Section 6.5 will be edited to better describe the extent of equestrian trails on Lewisville Lake.</p>
<p>Readers must jump back and forth between the detailed park maps to identify whether other land classifications exist within designated parks. Recommendation: To improve readability, TPWD recommends that the recreational maps hatch mark the areas within the parks that are classified other than HDR. For example, LE20MP-OR-CB-02 for Copperas Branch Park should indicate ESA-18 for the Wichita Forest. It appears that Pilot Knoll includes ESA-17 and that Hickory Creek and Point Vista include ESA-15.</p>	<p>Concur. The ESA land classification will be shown on the park plates.</p>
<p>Because the design details regarding future development of parks at Lewisville Lake are not presented in the Master Plan, future development actions would be assessed by USACE on a project-by-project basis to ensure that environmental impacts have been evaluated and that the proposed development follows the policies for environmental stewardship and sustainability at the lake. Recommendation: Because there are large areas of undeveloped land and sensitive resources within HDR sites that are not given an ESA or MRML land classification, TPWD recommends that future development within HDR areas include an assessment of environmental impacts on a project-specific basis to be coordinated for TPWD review. TPWD recommends that future developments utilize limited-footprint designs that avoid, minimize, or mitigate impacts to sensitive resources. Sensitive environmental resources may include, but are not limited to, stream and riparian</p>	<p>The future development of HDR areas is conceptually presented in the revised Master Plan in Chapter 5. When and if development does occur, the development would be addressed in a separate Environmental Assessment pursuant to the National Environmental Policy Act (NEPA) with full agency and public coordination. Minor changes/additions in park areas, such as lengthening parking spurs or replacing an outdated restroom, may qualify as Categorical Exclusions as defined in Engineer Regulation 200-2-2 and may not require additional coordination pursuant to NEPA. USACE management objectives in Chapter 3 of the revised Master Plan would require USACE to give high priority to the protection of sensitive environmental resources. Fully implementing NEPA requirements will ensure that these objectives are met.</p>

COMMENT	USACE RESPONSE
<p>corridors, species rich grasslands, deciduous and mixed forest, wetlands, vegetated shoreline buffers with a broad width to protect the lake from runoff erosion, cultural resources, and aesthetic shorelines. TPWD encourages the USACE and park operators to incorporate natural habitat areas into the park plans.</p>	
<p>Sky glow as a result of light pollution can have negative impacts on wildlife and ecosystems by disrupting natural day and night cycles inherent in managing behaviors such as migration, reproduction, nourishment, sleep, and protection from predators. Recommendation: As protection measures for migrant and resident birds, as well as other wildlife, and to meet the objective for green design, TPWD recommends that future developments utilize the minimum amount of night-time lighting needed for safety and security. TPWD recommends minimizing the Project's contribution toward skyglow by focusing light downward, with full cutoff luminaires to avoid light emitting above the horizontal, and to use dark-sky friendly lighting that is on only when needed, down-shielded, as bright as needed, and minimizes blue light emissions. TPWD recommends retrofitting existing lighting where feasible. Appropriate lighting technologies and beneficial management practices (BMPs) can be found at the International Dark-Sky Association website.</p>	<p>Concur in the use of dark sky best management practices.</p>
<p>Recommendation: TPWD recommends that future developments retain forest corridors to accommodate passive use trails and to accommodate wildlife travelling along the shoreline or through parklands.</p>	<p>Concur in the maintenance of wildlife travel corridors that may also accommodate passive use trails.</p>
<p>Recommendation: TPWD recommends that future developments incorporate native landscaping that is drought tolerant and provides floral resources for pollinators.</p>	<p>Concur. The Natural Resources Management Objectives in Chapter 3 of the revised Master Plan specifically lists creation and protection of native habitats and specifically mentions pollinator habitat.</p>

COMMENT	USACE RESPONSE
<p>Recommendation: TPWD recommends that future developments consider the potential impacts that structure height and lighting practices may have on viewsheds from the lake. TPWD recommends avoiding or minimizing the removal of shoreline vegetation that provides a visual screen between development and lake users and protects the shoreline from erosion.</p>	<p>Concur. The Natural Resources Management Objectives in Chapter 3 of the revised Master Plan specifically states "Minimize activities that disturb the scenic beauty and aesthetics of the lake."</p>
<p>Map LE20MP-OC-09 shows an area located south of FM 428 and east of the Greenbelt Trail as ESA-12 land classification. Within this area of ESA-12, hay bales appear in aerial imagery indicating the area is hayed. Also, the description of ESA-12 on page 5-19 of the Master Plan does not indicate grasslands as a cover type within ESA-12.</p> <p>Recommendation: If cutting areas for hay in ESA-12 is a land management practice to reduce woody encroachment on diverse grassland habitat, then TPWD recommends the description of ESA-12 should indicate a grassland cover type with haying as a management practice for this grassland area. Otherwise, MRML–WM or MRML-Vegetation Management may be a more appropriate classification for hayed sites.</p>	<p>Concur. The description of ESA-12 will include management of several grassland areas to reduce wildfire fuel loads, encourage native wildflowers, and reduce the potential for invasive species such as Japanese privet and feral hogs. Some grassland areas in ESA-12 can support thick stands of giant ragweed which, although native, can become the dominant vegetation in the absence of management.</p>
<p>A few of the recreational map names begin with LE18MP, whereas most other maps begin with LE20MP.</p>	<p>Map names will be changed to begin with LE20MP.</p>
<p>Arrowhead Park Maps LE20MP-OR-OA-01 and 02 do not depict the entire Oakland Park area or the park limits to the north and east.</p>	<p>Park limits are shown on the two Arrowhead Park plates, however the boundary line is not shown on plate OA-01 and will be included.</p>
<p>The map inset on Greenbelt Corridor LE20MP-OR-428-ACC does not show the location being represented.</p>	<p>The map inset will be included on the plate mentioned.</p>
<p>Page 6-1 mentions best management practices to be applied for future use of "seven corridors described above", though there is no discussion regarding seven</p>	<p>The phrase "seven corridors described above" will be changed to "38 corridors described above."</p>

COMMENT	USACE RESPONSE
corridors. There are 38 corridors mentioned, as well as existing easements not designated as corridors.	
Map LE20MP-OR-HI-02 is missing aerial imagery.	Concur. Referenced map will be corrected.
Master Plan Table 2.8, EA Table 3-5, and Appendix C TPWD Rare Species Listing contain outdated information regarding state-listed threatened and endangered species. Please note that the TPWD online application identifying rare, threatened, and endangered species by county (RTEST) has undergone a significant update to reflect changes to the state-listed threatened and endangered species lists, effective March 30, 2020, as published in the Texas Register (45 TexReg 2188). Recommendation: TPWD recommends that Master Plan reflect the most recent changes to the state-listed threatened and endangered species lists, effective March 30, 2020, and reference the most recent RTEST list for Denton County.	Concur. The species list will be updated.
The surface water areas around the old Lake Dallas Dam appear to be classified as open recreation. The areas around old Lake Dallas Dam are utilized heavily by anglers that fish the cut areas, and it gets fairly crowded by boaters. It could result in dangerous and disruptive situations if boaters are able to pass through the narrow cuts on plane. Recommendation: TPWD recommends no-wake surface water use classification for the area buffering the old Lake Dallas Dam.	Concur. A No-Wake zone will be established from the northern "cut" to the north end of the old Lake Dallas Dam, as well as the water surface at the southern "cut". These two No-Wake zones will encourage safe boating through the "cuts" and will enhance bank fishing in those areas. The concrete spillway of the old dam will be shown as a Restricted Area.
COMMENTS FROM CITY OF OAK POINT	
Expand Oak Point Boat Ramp Park: Investigate leasing (or licensing) from the USACE more than the current one-acre area to include the entire approximate 6.5 acres. This would accomplish several benefits for the site: A. Increase the site's safe boat launching level from 525.5' to	USACE concurs that the Oak Point Boat Ramp Park lacks proper design and the single lane ramp makes simultaneous launching and loading impossible. USACE will work with Oak Point on a plan that will take into account the boating capacity of Lewisville Lake. The

COMMENT	USACE RESPONSE
<p>530' or 532' by extending current ramp, or better, relocate both ramp and passenger loading dock to the southeast side where there is much less wind/wave exposure making the facility much safer for public use and also less susceptible to storm damage to the dock. A new ramp could also be widened to a 2-lane ramp for simultaneous launchings/loadings if appropriate.</p> <p>B. Increase the available area for parking as well as an increasing area for public picnic and fishing facilities.</p>	<p>results of the 2019 Recreational Boating Survey will be analyzed to determine what changes are feasible at the Oak Point Boat Ramp.</p>
<p>Adjust Hunting Boundaries: The hunting area established 50+ years ago reaches all the way down the west Oak Point shoreline from Cantrell Slough to the small slough adjacent to the Eagles Landing park. Hunting is already prohibited in Cantrell Slough, and we would ask that the three smaller sloughs—the one by the boat ramp and the two smaller ones adjacent to Eagles Landing—also be designated no hunting. Better yet would be redrawing the hunting line for the entire area to north of Oak Point. These areas are now heavily populated and the 600 yard “set back” for hunters is often ignored or misinterpreted, leading to gunfire very close to homes causing alarm for residents and disrupting the peace, often in early morning hours.</p>	<p>USACE reviews public hunting rules and boundaries for each lake each year to take into account changes in rules promulgated by Texas Parks & Wildlife Department (TPWD) and public safety issues associated with development of residential areas. This ever-changing program cannot be fully addressed in the Master Plan revision which envisions a 25-year planning horizon. Through the years, the allowable hunting areas on Lewisville Lake have been steadily reduced in the face of expanded residential development around the lake and permits issued to hunters are limited to 500. In addition, each permitted hunter must show evidence of having completed a TPWD certified hunter safety course. The comments concerning possible further reductions in allowable hunting areas will be considered by USACE as the public hunting program is once again reviewed.</p>
<p>No Wake Zones in Oak Point Sloughs: These same sloughs, particularly the one by the boat ramp, are frequently explored by water craft at high speeds, both destructive to the delicate shoreline and dangerous to hand powered craft that frequently use the slough and can be hidden around blind corners.</p>	<p>Conflicts between powered vessels and paddle craft do occur at Lewisville Lake, but no complaints have been received regarding the coves and sloughs mentioned in the comment. Nonetheless, public participation in the use of paddle craft is increasing and there is interest from several surrounding communities at Lewisville Lake for "no</p>

COMMENT	USACE RESPONSE
	<p>wake" coves where paddle craft can be operated without concern for high speed boats. Designating "no-wake" coves entails a significant commitment to maintain regulatory buoys and placement of bouys must be supported by TPWD and other law enforcement staff. USACE is willing to discuss no-wake designations for certain coves with the understanding that USACE cannot unilaterally accept responsibility for placement and maintenance of the required buoys and the placement of said buoys must be supported by law enforcement entities that enforce laws on the water surface.</p>
<p>Establish and Manage Nature Trails in Oak Point ESAs: Oak Point is adjacent to or contains three Environmentally Sensitive Ares (ESAs)—#8, Wildridge, #10 Nix & Jefferson Sloughs, and #11 Old Lake Dallas Area (Cantrell Slough). Each is important for wildlife habitat and have potential for enjoyment by hikers and nature enthusiasts. The city would like to partner with the USACE in establishing foot trails where reasonable, and removal of invasive plants like Chinese privet and Johnson grass. When made accessible, they should be promoted to DISD, LEISD and other groups as educational opportunities for such things as animal/bird census and other projects like bird houses, game cameras, monarch butterfly gardens, etc. Adjacent property owners should be made aware by local authorities as well as the USACE of the importance of these areas and to minimize habitat destruction. Particularly destructive is illegal mowing along shorelines, which are important wildlife corridors. Mowing also destroys tree regeneration. All forms of hunting should be prohibited in these areas, other than destructive and invasive species removal.</p>	<p>USACE concurs that the ESAs mentioned are good locations for passive use trails, invasive species management and environmental education. To that end, USACE would consider a lease of the areas in question to the City of Oak Point similar to the lease USACE currently has with the City of Denton for the Clear Creek Natural Heritage Area. A cooperative effort between the City of Oak Point, Denton ISD and Little Elm ISD could provide significant benefits to area citizens and the natural habitat on USACE lands.</p>

COMMENT	USACE RESPONSE
<p>Create a method or system for reporting boaters who violate community standards related to noise or profanity. A simple system of tracking certain TX numbers and boat descriptions along with details like time and date of violation.</p>	<p>USACE will continue working with area law enforcement officials to curtail offensive noise and language coming from boaters. Citizen reports of such activity are very helpful and should be made to USACE and/or area law enforcement.</p>
<p>Create an interactive online system utilizing GPS technology to identify water hazards for boaters. For instance, at the south end of Eagles Landing rocks extend out some 150' from a point just under the surface at conservation level of 522'. And just off shore of Shady Shores are 4 concrete piers with razor sharp metal parts attached to the top that are just below the surface at about 520'. Many boats have been seriously damaged colliding with both of these areas, and serious injury could result. At the least, the USACE should place warning buoys in these areas.</p>	<p>USACE is open to a collaborative effort to mark obvious hazards. This topic may best be addressed through a water-safety summit that would bring numerous players together to decide the best course of action. A similar effort took place years ago resulting in a gridded map of Lewisville Lake listing navigation hazards known to exist within each grid. The grid map was published (perhaps by the US Coast Guard Auxiliary) and provided to boaters at ramps. The grids could be referenced when reporting hazards or accidents. With GPS technology, an online map is a good idea.</p>
COMMENTS FROM UPPER TRINITY REGIONAL WATER DISTRICT	
<p>It appears that three sections of UTRWD easements for water or wastewater pipelines that cross U.S. Army Corps of Engineers (USACE) property are not included in the Utility Corridors map. Those pipeline easements and crossings are described below (see actual comment). We ask that USACE include these easement sections in the revised Master Plan and other related USACE documents. 1. Hickory Creek Arm (USACE Map No. LE20MP-OU-02); 2. Little Elm Creek Arm (USACE Map No. LE20MP-OU-06); 3. LELLA (USACE Map No. LE20MP-OU-09)</p>	<p>USACE is aware of the three described easements issued to UTRWD. These easements were intentionally not designated as utility corridors because they do not provide for complete crossings of USACE lands. With the exception of the easement in the Hickory Creek Arm, the described easements only provide relatively short sections of USACE land that lead to a facility operated by UTRWD. The short segment in the Hickory Creek Arm was not designated as a corridor because other designated utility corridors exist in the area that do provide complete crossings of the Hickory Creek Arm. If designated as a utility corridor, the corridor would be available to all public</p>

COMMENT	USACE RESPONSE
	<p>utilities, but existing easements that are not designated corridors may continue to be used by the respective grantees for the intended purpose of the easement.</p>
<p>Concerning the Narrow Shoreline Variance Areas described on pages 119-120, 134 and 164 of the revised Master Plan, we support USACE's requirement for adjacent property owners to apply for a permit to mow in these areas. However, UTRWD encourages USACE to continue to maintain the current allowed mowing practices as stated on page 120, first paragraph: "... adjacent landowners may apply for a permit to mow a meandering path to the shoreline, and may apply for a permit to mow a narrow strip along the USACE boundary line as a precaution against wildfire." Not allowing landowners to mow the entire Narrow Shoreline Variance Area will help to protect water quality and reduce shoreline erosion by maintaining a vegetated buffer between the private properties and the lake water. UTRWD recognizes the need to balance overgrowth and wildfire concerns with a good view of the lake, but would not want lakeside residents to be able to mow and remove vegetation in a manner that will negatively impact the lake.</p>	<p>The Narrow Shoreline Variance Areas (NSVA) were established in 2005 during a comprehensive review of allowable vegetation modification activities at Lewisville and Grapevine Lakes. The designation of the NSVA (nineteen shoreline segments), as well the entire review process was addressed in a Programmatic Environmental Assessment with a Finding of No Significant Impact (FONSI) signed on 25 May 2005. Adjacent landowners who live next to NSVAs may apply for a written permit to modify the existing vegetation and to mow to the shoreline. With the exception of adjacent landowners living next to designated parks, almost all adjacent landowners may mow vegetation and trim woody vegetation along a 50-foot wide strip of USACE land adjacent to the property boundary. This degree of mowing is permissible as a deterrent to wildfire. The decision to establish the NSVA resulted in an increase of 158 acres of potential area that can be mowed. This is a negligible increase considering the total USACE acreage above the conservation pool of 26,195 acres. While undisturbed wooded areas and other vegetation are very effective water quality buffer zones, the 2005 PEA noted that mowed grass buffers as narrow as 30 feet can remove as much as 79% of phosphorous and 79% of Nitrogen. Most NSVAs are wider than 30 feet. USACE also prohibits the use of pesticides and herbicides by adjacent landowners on USACE land. This prohibition further protects water quality.</p>

COMMENT	USACE RESPONSE
COMMENTS FROM THE CITY OF FRISCO	
<p>Page 5-17 ESA 3 - Stewart Creek. "As of the date of this Plan a lease has not yet been executed between USACE and the City of Frisco to enable the City to maintain the environmental restoration project that was cost-shared between USACE and Frisco in the Stewart Creek and Hackberry Creek drainages."</p> <p>COMMENT: The City of Frisco has accepted management of the 1135 Project for both Stewart Creek and Hackberry Creek. Please contact FWCOE for verification.</p>	<p>USACE records indicate that a lease has not been executed for the property in question but USACE will coordinate with the City of Frisco to prepare and execute a lease.</p>
COMMENTS FROM CITY OF HIGHLAND VILLAGE	
<p>Page 102 For Copperas Branch Park, the MP Needed Facilities section lists 30 camping sites and RV dump stations, 95% of the park is in the flood plain; adding campsites would not be feasible.</p>	<p>Noted. Edits will be made in Chapter 5 to note that campsites and an RV dump station are not feasible within Copperas Branch Park.</p>
<p>Page 102 Can you add that the City of Highland Village is currently undergoing a master planning process for Copperas Branch Park and that it is expected to be adopted in 2020?</p>	<p>Noted. Applicable sections in Chapter 5 will be edited to reflect the City's park master plan process.</p>
<p>Page 153 CORPS response to CORPS land adjacent to Doubletree, Copperas Branch Lake area – this land “is” reclassified now.</p>	<p>Noted.</p>
COMMENTS FROM MONTSERRAT RETREAT HOUSE	
<p>Montserrat would ask the Corp to consider in its planning what steps can be done to help better mitigate the noise from the Toll Bridge. Montserrat also shares in the public concern for noise coming from boaters playing loud music especially as they near the grounds of Montserrat. It could be helpful to establish maximum noise levels especially as boaters near existing inhabited facilities to control noise pollution.</p>	<p>Construction of the Lewisville Lake Toll Bridge was completed by the North Texas Toll Authority on August 1, 2009. Environmental studies focused on the bridge date back to 1993 when construction of the bridge was initially being considered by Denton County. These studies and additional environmental analyses were included in the USACE 1999 Programmatic Environmental Assessment (PEA) which</p>

COMMENT	USACE RESPONSE
	<p>assessed over 300 individual actions affecting USACE lands at Lewisville Lake at the time. The PEA included a noise analysis which used Federal Highway Administration criteria to determine if traffic from the bridge would create a noise impact that would require noise abatement measures. It was determined that no noise impact would occur, and no noise abatement measures were needed.</p>
<p>Another concern that has impacted the residing priests at Montserrat is the use of airboats equipped with excessively bright lights in the evening. One boat in particular take people out at night spearfishing and will go along the shoreline late into the evening. Such activities diminish the peacefulness of the shoreline around Montserrat.</p>	<p>The use of bright lights along the shoreline may be a topic that could be addressed with Texas Parks & Wildlife Department through their annual rule making process wherein the agency promulgates "means and methods" for the taking of game animals. USACE has no rule preventing the use of lights on the water surface.</p>
<p>In February 2016, Montserrat protested the Bureau of Land Management's proposed Oil and Gas Lease Sale [NM-201604-044] (attached) which threatened Lewisville Lake with potential pollution (air, water, etc.). Montserrat supports the Corps desire to protect the air quality of the area. Given Montserrat's service to an oftentimes older population (60+ years old) and desiring to allow them to enjoy the beauty and fresh air, Montserrat would continue to oppose similar proposals to use the lake for the purpose of gas/oil leases.</p>	<p>Noted.</p>
<p>Another area of concern is the possibility of using Corridor #21 (a utility corridor) as a potential trail. Montserrat asks the Corp to preserve this as only a utility corridor (p125). As such, Montserrat does not support the building of trails north of Willow Grove park that would encroach upon the shoreline near Montserrat's property.</p>	<p>There are currently no plans to place a trail north of Willow Grove Park in the vicinity of the Montserrat facility or Utility Corridor #21. If a passive use trail is proposed for the area, it would be addressed as a separate action open to public and agency comment.</p>

COMMENT	USACE RESPONSE
<p>Story for Green Source DFW, readers want to clear up Elm Fork and open Greenbelt Corridor. It has been closed since 2017. Does the Master Plan mention clearing up the creek, opening the trails and the dead trees?</p>	<p>USACE is aware of the damage to the Greenbelt Corridor caused by a flood event prior to 2017. TPWD operates the Greenbelt and is continuing efforts to repair the damage and open the trails. A log jam on the Elm Fork of the Trinity downstream from Highway 380 has also been a point of discussion between USACE and other stakeholders. The log jam does not interfere with overall operation of Lewisville Lake and does not directly impact the Greenbelt Corridor.</p>
GENERAL PUBLIC COMMENTS	
<p>I have resided at the end of Garza Lane in unincorporated Denton County, which is at the north end of the old Lake Dallas dam, for eight years. The end of our street is a public access site on Lewisville Lake. I have been told by Denton County officials that this site was opened to the public when the Lewisville Lake Toll Bridge was built "because they had to provide a public access site when they built the bridge". Until as recently as this weekend, there was no signage at the entrance to the old dam at all. One small sign measuring smaller than a sheet of 8.5x11" paper was posted decreeing "No Fires" in English only. This site is being severely abused by those accessing the site. You need only review the records of the Denton County Sheriff and the Little Elm Fire Department to see the astronomical number of violations committed here on a weekly basis. Despite the presence of trash receptacles, which are emptied weekly by Denton County Roads & Bridges, I pick up the most disgusting waste on a weekly basis, as you can see in the photos. When I spoke with a Denton County official, I was dismayed to hear him constantly refer to this area as a "park". If</p>	<p>USACE is aware of the littering and illicit activity where Garza Lane dead-ends at the USACE property line. USACE considers this area to be an access point and has granted an easement to Denton County to maintain the area. As noted in the comment, Denton County endeavors to provide trash removal and a degree of law enforcement. This area is important as a public access point for fishermen who walk out onto the old Lake Dallas Dam and there is no plan to close the area to public access. As noted in comments below, the town of Lakewood Village has expressed interest in managing the area as a park but has not presented a formal plan for doing so. USACE will continue working with Lakewood Village on this concept and will also meet with Denton County to determine if additional law enforcement is possible. The USACE land at the end of Garza Lane is currently classified as Wildlife Management, but a change to High Density Recreation could be considered to allow establishment of a small park..</p>

COMMENT	USACE RESPONSE
<p>this public access site is indeed a park, then we need restroom facilities, increased trash receptacles, hours of operation, large and clear signage in English and Spanish, and oversight of its usage. The residents of Garza Lane and its intersecting streets would like to formally request a change in the status of the old Lake Dallas dam. It should be closed and no longer open to the public, or officially made a park, with fees and restrictions applying.</p>	
<p>I was pleased to find the following verbiage (section 5.5):“Passive public use such as natural surface trails, bank fishing, and nature study are appropriate for these areas.” Two questions I hope can be clarified in the report to avoid future ambiguity: Would graded, crushed granite trails as appropriate for recreational cycling (not mountain biking) be classified as natural surface trails? Should this master plan mention cooperation with the NCTCOG 2045 Veloweb? Two corridors: ESA-13: A long planned Veloweb route skirts the shore from the greenbelt trail to the outflow of Pecan Creek. The City of Denton has recently acquired bond funding and expressed interest in developing a crushed stone trail all the way from the Pecan Creek outflow to downtown Denton. ESA-16: A Veloweb route is shown connecting a future Hickory Creek trail route via the KCS railroad right of way into Hickory Creek. The planning process might benefit from flexibility to have a trail traverse ESA-16. See the Denton County Veloweb map here: https://www.nctcog.org/nctcg/media/Transportation/DocsMaps/Plan/Bike/DntnCntyBikeway_0818.png</p>	<p>USACE considers a crushed granite trail to be an improved trail, not a natural surface trail. Construction of a crushed granite trail would involve, clearing, grading, and routine maintenance, resulting in possible negative impacts to wildlife habitat in ESA 13 and 16. Any future proposal to construct such a trail in the referenced ESAs would require an environmental assessment and possibly a master plan supplement. USACE is not opposed to considering placement of an improved hike and bike trail through ESAs, but such a proposal would require full public and agency coordination. USACE will describe the long-planned Veloweb in Chapter 6 of the Master Plan revision.</p>
<p>It's too bad we don't have a nice single-track trail of our own like many other lakes around DFW have. It would be great if you would consider MTB trail development.</p>	<p>There are currently no plans for a mountain bike trail on USACE land at Lewisville Lake. Many other trails including pedestrian, bicycle and equestrian trails are being managed by</p>

COMMENT	USACE RESPONSE
	<p>various park and recreation lessees in almost every sector of Lewisville Lake. These trails are described in Chapter 6 of the revised Master Plan. Other comments received on the draft Master Plan indicate interest in establishing more passive use trails in areas where trails do not exist, but there has been no interest in establishing a mountain bike trail. Mountain biking is an active sport that would be appropriate as an amenity in areas classified as High Density Recreation (HDR). USACE would consider placement of a mountain bike trail in these areas if a park and recreation lessee is interested.</p>
<p>Feedback on the water surface in the Highland Village Pilot Knoll area. The shoreline is identified as high density recreation but little area identified as no wake. There are so many high-speed boats moving through that area with water skiers or fisherman and it is dangerous for kayakers and stand up paddle boarding. Also, the water in the designated swimming area gets really roughed up from the boats. Is there any way to expand the no wake area for safety purposes? We use the lake regularly for non-motorized activities and would greatly appreciate this change in the plan. Most boaters do not yield to the non-motorized boaters and it creates a dangerous situation.</p>	<p>Pilot Knoll Park is leased to and operated by the City of Highland Village. Expanding or establishing no-wake areas at the lake requires a significant investment in regulatory buoys and enforcement. USACE will work with any park and recreation lessee who proposes to establish or expand no-wake areas, but USACE has no plans to unilaterally establish such restrictions.</p>
<p>Any thought given to reduce noise levels on the lake? The same boaters play music really loud, sometimes at 6:00 or 7:00 am when they get started and it disturbs the peace for those that are enjoying the nature, the campers and residences. The boat motors can also be very loud when they are travelling at high speeds.</p>	<p>Loud noise from boats and offensive language from boaters is a common complaint and is a violation falling within the broad range of disturbing the peace. While USACE rangers can take action to remove individuals from the project, such action normally requires assist or direct action by local law enforcement. Citizen reporting of such violations is extremely helpful in curtailing the activity. Contact the USACE office for phone numbers that can be used to report violations.</p>

COMMENT	USACE RESPONSE
<p>I vote for mountain biking trails. I'd like to put in my 2 cents for looking into building real trails that are enjoyed by the mountain biking community. (It is a large community in DFW) Lewisville lake is large, yet severely lacking in any real bike trails. I live right here in The Colony 1 mile from the Lake and I drive all the way to Grapevine, Lavon, Ray Roberts, and Joe Pool lakes because there is no single-track trail here. The shoreline trail is not utilized by bikers despite the great views because, plainly it's just no fun, because the "trail" is the size of a fire road and is not engaging to ride on at all. The East side of the lake has plenty of potential. I think Hidden Cove Park and the region about would be a great wooded place to have a single-track trail. Trail stewards within the DORBA (Dallas Off Road Biking Association) community have made magnificent trail systems throughout DFW which are well maintained and enjoyed by thousands. Erwin Park in McKinney, Northshore in Flower Mound, and Rowlett Creek Preserve are great examples of what can be done to have and maintain a trail on clay soil.</p>	<p>See the USACE response above to a similar comment. We are aware of the good work that the DORBA organization performs and are especially pleased with the work DORBA does on the Northshore Trail at Grapevine Lake. The suggestion to establish a Mountain Biking Trail in Hidden Cove Park has merit but would require an expression of interest from The Colony and their sublessee who operates Hidden Cove Park.</p>
<p>In the new Lewisville Lake Master Plan Revision, has there been any thought to allowing new permits to be issued for boat docks? This seems like a good revenue source for the Corp and as a homeowner would greatly make the Lake more usable. There are other USACE lakes that allow structures to be permitted.</p>	<p>Management of private docks and vegetation modification activities is carried out by USACE in accordance with the Shoreline Management Plan (SMP) for Lewisville Lake. Since publication of the SMP in 1976, new private docks have not been permitted at Lewisville Lake. There is currently no scheduled date to revise the Lewisville Lake SMP. Refer to Chapter 6 for a brief discussion of the SMP.</p>
<p>I have a small pond that overflows into the Timbercreek. The overflow is washing out. I need someone to recommend what can be done. I understood that the core of engineers may have helped to initiate the plans for the pond. Can you recommend</p>	<p>Noted. If the small pond is not located on USACE land, USACE can take no action to suggest solutions to the overflow problem. The United States Department of Agriculture, Natural Resources Conservation Service, may have staff that can suggest solutions.</p>

COMMENT	USACE RESPONSE
someone I could consult about solutions for this situation?	
What are the changes, in normal language, planned for areas 1 and 2 of Lake Lewisville?	This comment does not specify where "areas 1 and 2" are located so a response to this comment is not possible.
Are there any plans to dredge out inlet areas?	USACE currently has no plans to dredge any areas on Lewisville Lake.
<p>In our opinion the proposed Master Plan does not adequately address erosion and shoreline issues in certain parts of the lake. Shoreline erosion is occurring in the Highland Shores area of Highland Village at potentially a faster rate than the lake as a whole due to the wake impact of high density recreational boating, particularly when combined with flooding conditions. This area contains millions/tens of millions of dollars of private property which is adjacent to Corps Property. It appears private property is being or could be impacted by what is happening on Corps Property. And what will happen over the next 25 years? How important is shoreline erosion, particularly in higher residential combined with higher recreational areas (and then combined with flooding)? Is recreation a higher priority than shoreline erosion and it's potential impact on private property? If the current conditions persist, then do property owners have the ability to get help from the Corps/Federal Government to protect their property from erosion which is coming out form Corp property (such as the installation of riprap)? Do property owners have the ability to get temporary help from the Corps when flooding conditions are at or above a certain level (such as temporary no wake zones). We think maintaining the integrity of the shoreline should be a priority now, and over the next 25 years.</p>	<p>When shoreline erosion causes, or is about to cause, the conservation pool (at elevation 522.0 NGVD) to inundate private land, USACE will permit private landowners to place erosion protection structures on USACE land to prevent their property from being inundated. Erosion control structures include rip-rap covered slopes, gabion walls, or when no other alternative exists, construction of retaining walls. USACE has authorized several of these privately constructed erosion control structures at Lewisville Lake. If the private landowner desires that USACE solve the problem, USACE will select the most economical method. In most cases this means that USACE will purchase additional land to allow the erosion to continue. This procedure has also been done at Lewisville Lake. Only in rare cases will the economic analysis of a given situation indicate that USACE will construct an erosion control structure. Landowners who choose to construct their own erosion control structure must submit plans to USACE. If approved, USACE will issue a Real Estate License for the work to be done. There is no fee for the license.</p>

COMMENT	USACE RESPONSE
Keep the land use regulations at present levels.	More information is needed to respond to this comment. Information was requested but not furnished.
Keep the hunting permits at present levels. Allow feral hogs to be taken by shotgun. Allow deer hunting with archery tackle only.	As noted in other comments and responses, the public hunting program is reviewed annually for possible changes. The recommended changes will be considered in future hunting program reviews.
I am an avid equestrian and ride the trails around Lake Lewisville. Please consider the many other trail riders and hikers in your updated plan. I propose the Master Plan maintain, improve and possibly expand the equestrian and hiking trails on Lake Lewisville. The Elm Fork trail needs upgrade at the low water crossing. As of now it's impassable when the creek has much water. It's such a wonderful hike to Sycamore Bend Park from Old Alton Bridge, we really need to improve it. Also, please continue to limit the trails to hikers and equestrians only.	The draft revised Master Plan includes a management objective in Chapter 3 to work cooperatively with all lessees to meet recreational needs including all types of trails. The Pilot Knoll trail is restricted to pedestrian and equestrian use and the Greenbelt Corridor trails feature separate trails for hiking/biking and for equestrian use. Several lessees including Highland Village, Hickory Creek, Lake Dallas, Little Elm and The Colony all have plans that would expand trail access for hikers and bikers. USACE will continue to work with lessees and volunteer groups to make repairs to the Elm Fork Trail that runs through portions of Corinth and Hickory Creek. See Chapter 6 for a full discussion on Trails.
As part of The Tribute site plan there is an area designated for Commercial/Recreation area along the south side of the Wynnwood Park peninsula. Is this area owned by USACE and included in the 2020 Master Plan revision?	After checking the area in question, USACE determined that the "Commercial/Recreation" area shown on the Tribute site plan is not Federal land.
In revising the Lewisville Lake Master Plan, flood mitigation must be a top priority. Policies should be enacted to release water sooner rather than wait for the lake's capacity to exceed a safe level. Although the lake should stay as close to full, if the lake's level is at or above 100% and there is high degree of precipitation in the forecast, the Army Corps of Engineers	The Master Plan does not address the management of water levels for the water supply or flood risk reduction missions of Lewisville Lake. The management of water levels for these primary missions is described in the USACE Water Control Manual for Lewisville Lake. Management of land and the water surface for environmental

COMMENT	USACE RESPONSE
<p>should release water at least 48 hours prior to the precipitation event to help ease flooding. Waiting until after the lake's capacity hits a certain point is causing flooding not only to the parks and recreation areas around the lake, but unsafe conditions downstream for businesses and homeowners. More can be done to help with flooding at Lake Lewisville.</p>	<p>stewardship and recreational purposes must be carried out within the constraints imposed by the water control plan for the lake. Refer to Chapter 7 for a comment by the City of the Colony suggesting that USACE endeavor to develop a plan for management of the water surface when the lake level reaches an elevation of 533.0 - 534.0 NGVD. The Colony's comment mentioned the problems caused by boating during the flood events of 2015. The plan envisioned by The Colony would address the fact that boats on the water surface during high lake levels can result in waves that can damage private property. This plan envisioned by The Colony has merit but will require lengthy coordination with all stakeholders. Regardless of public use issues occurring during high lake levels, USACE will continue operating the lake in accordance with the Water Control Manual. The release or retention of flood waters requires decisions that take into account many other lake and river conditions on a regional basis, not just the issues occurring at Lewisville Lake.</p>

Copies of letters received from governmental entities are included in the EA. Upon incorporation of public comment into the draft Master Plan, EA and FONSI, final versions were prepared and signed by the District Engineer for implementation. The final version is posted on the District website.

CHAPTER 8 - SUMMARY OF RECOMMENDATIONS

8.1 SUMMARY OVERVIEW

The preparation of the Lewisville Lake Master Plan followed the new 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 new 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 rigorous public involvement throughout the process, and consideration of regional recreation and natural resource management priorities identified by other federal, state, and municipal authorities. The study team endeavored to follow this guidance to prepare a master plan that will provide for enhanced recreational opportunities for the public, improve environmental quality, and foster a management philosophy that promotes partnerships and the success of each stakeholder involved in the management of the lands and surface waters of Lewisville Lake. Factors considered in the Plan were identified through public involvement and review of statewide planning documents including TPWD's 2018 and 2012 TORP (synonymous with SCORP) and the TCAP – Texas Blackland Prairies Ecoregion and the Cross Timbers and Prairies Ecoregion. Also reviewed was the NCTCOG Vision 2050 report, and the parks master plans for several cities operating parks on USACE lands. This Master Plan will ensure the long-term sustainability of the outdoor recreation and environmental stewardship programs administered by USACE and a broad array of partners at Lewisville 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.
- Following the initial public meetings in May 2017 and the virtual public involvement process in May/June 2020, numerous comments were received and analyzed by the planning team (See Chapter 7 for a complete listing of comments and the USACE response). Those comments, as well information in the TORP, TCAP and the North Texas Vision 2050 report by NCTCOG described in Section 8.1, was used by the planning team to prepare a final Master Plan for Lewisville 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 (2005) land classifications to the current 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 Change from Prior Land Classification to New Land Classification¹

Prior Land Classifications (2004)	Acres	New Land Classifications	Acres
Project Operations	1,170	Project Operations	1,083
Recreation	8,935 ²	High Density Recreation	4,559 ³
Fish and Wildlife Management	6,738		
		Separable Recreation Lands ⁴	1,110
Environmentally Sensitive Areas (as an overlay on certain Fish & Wildlife and Recreation lands) The Fish and Wildlife portion totaled 6,738 acres.	7,292	Environmentally Sensitive Areas	11,188
		Multiple Resource Management - Low Density Recreation	542
		Multiple Resource Management – Wildlife Management	3,268
Permanent pool	28,980	Permanent pool	27,175 ⁵
Flowage Easement	5,213	Flowage Easement	8,237
Conservation Easement	500	Conservation Easement	475

***Note:** ¹The new land classification acreage figures were measured using GIS technology and may vary from prior, similar classifications, and from official land acquisition records. Also, with the exception of the Project Operations classification, there is no direct relationship between the prior land classifications and the new land classifications.

²The 8,935 acre number was copied from the 2004 MP supplement. Although not stated in the 2004 supplement, it is assumed that this number included the cumulative acreage of recreation-related lands identified in the 1985 MP.

³The 4,559 acres figure includes 1,110 acres of Separable Recreation Lands acquired for the Ray Roberts Lake State Park – Greenbelt Corridor.

⁴Separable Recreation Lands is not a land classification but is required by USACE regulations to be described in project Master Plans. Separable Recreation Lands are those lands acquired only for the purpose of recreation and are otherwise not required for the successful operation of Lewisville Lake for the primary missions of flood risk management and water conservation. The acreage of Separable Recreation Lands is included in the acreage totals for High Density Recreation lands. The 1,110 acres of Separable Recreation Lands existed in 2004 but were not identified as such in the 2004 Master Plan Supplement.

⁵As measured during the 2007 Sedimentation Survey conducted by TWDB.

Table 8.2

Land Classification	Description	Rationale
Project Operations (PO)	The Project Operations classification was reduced by 87 acres.	The small reduction in Project Operations lands is primarily the result of the GIS measurement differential from 2004 to 2020. The 2020 classification included all Project Operations lands shown in 2004 plus two small tracts totaling 10 acres and some additional acreage located along the uncontrolled spillway discharge channel up to Fish Hatchery Road.
High Density Recreation (HDR)	The HDR lands measured in 2020 included all areas that were in the 2004 “Recreation” classification. The 2020 HDR lands total 4,559 acres. The acreage of “Recreation” lands recorded in the 2004 MP supplement was 8,935 acres. The reason for this large figure was not fully explained in the 2004 MP supplement but may have included all recreation-related lands that were included in the 1985 MP. After careful measurement for this MP, there is 4,559 acres included in the HDR classification. The only acreage removed from HDR status from 2004 to 2020 was approximately 75 acres in Hickory Creek Park and 10 acres of the area leased to the	The HDR areas that date back to 2004, minus the two exceptions noted in the column to the left, are needed for current and planned recreational development. It is noteworthy that there are many undeveloped acres within current HDR areas that have the potential to meet future recreation needs. Many of these undeveloped acres are located in Cottonwood Park, Sycamore Bend Park, East Hill Park, Doe Branch Park, and Hidden Cove Park.

Land Classification	Description	Rationale
	University of North Texas. Both areas were changed to ESA status.	
Environmentally Sensitive Areas (ESA)	Approximately 11,188 acres have been classified as ESA areas. Approximately 7,292 acres in the 2004 MP supplement were designated as an ESA overlay on another primary classification. The ESA overlay afforded the same protection as the 2020 ESA classifications, but national guidance now requires areas classified as ESA to be a stand-alone classification. Most of the acreage added to the ESA classification were formerly classified as Fish and Wildlife Management Area.	The 2004 ESA classification overlays did not include important east-side riparian areas, including two areas where an environmental restoration project on Hackberry Creek and Stewart Creek tributaries has been completed. Other areas added as ESA in this 2020 Plan include select portions of Hickory Creek Park, as well as an area that includes Nix and Jefferson Sloughs and the Rocky Point ESA near the north end of the old Lake Dallas Dam.
MRML – Low Density Recreation (LDR)	Approximately 542 acres were reclassified from a 2004 Fish and Wildlife Management classification to a MRML-LDR classification.	In 2005, USACE published a Programmatic Environmental Assessment (PEA) focused on vegetation modification activities undertaken by adjacent landowners. This PEA led to the designation of 19 Narrow Shoreline Variance Areas where USACE ownership is approximately 50 feet wide or less. Landowners adjacent to the NSVA areas may apply for a written permit to mow USACE land to the water's edge. Each of the 19 NSVA areas has been reclassified from a Fish &

Land Classification	Description	Rationale
		Wildlife Management classification to a MRML-LDR classification.
MRML – Wildlife Management (WM)	The 2004 MP Supplement classified approximately 6,738 acres as Fish & Wildlife Management areas. This 2020 MP classifies 3,268 acres as MRML-WM.	The lands formerly classified as Fish & Wildlife Management area, were reclassified to the ESA classification to recognize the superior environmental quality of the areas. The ESA areas will be protected and managed to provide significant benefits to fish and wildlife
Water Surface Restricted	Approximately 82 acres of water surface has been classified as Restricted water surface where boats are not allowed.	Areas included in the 82 acres are comparatively small parcels that surround water intake structures, the USACE gate control tower, the approach to the uncontrolled spillway, and designated swimming beaches
Water Surface Designated No Wake	Approximately 1079 acres of water surface has been classified as Designated No Wake area where vessels are not allowed to create a wake when underway.	Areas included in this water surface classification include areas surrounding boat ramps, marina areas, and two coves selected to meet the need of paddle craft. No wake areas are also established near the “cuts” in the Old Lake Dallas Dam.

Note: The land classification changes described in this table are the result of changes to 44 individual parcels of land ranging from a few acres to several hundred acres. Acreages were measured using GIS technology. The acreage numbers provided are approximate.

CHAPTER 9 - BIBLIOGRAPHY

Cordell & Green, National Survey on Recreation and the Environment, Texas Reports 1994-95, 2000-01 and 2006-09, 2009

City of The Colony, Texas. 2020. <https://www.thecolonytx.gov>

City of Copper Canyon, Texas. 2020. <https://www.coppercanyon-tx.org>

City of Denton, Texas. 2020. <https://www.cityofdenton.com>

City of Hickory Creek, Texas. 2020. <https://www.hickorycreek-tx.gov>

City of Highland Village, Texas. 2020. <https://www.highlandvillage.org>

City of Lake Dallas, Texas. 2020. <https://www.lakedallas.com>

City of Lewisville, Texas. 2020. <https://www.cityoflewisville.com>

City of Little Elm, Texas. 2020. <https://www.littleelm.org>

Cross Timbers Equestrian Trails Association. 2020. <https://www.cteta.org>

Environmental Protection Agency (EPA). 2016. <https://www.epa.gov>

EPA National Ambient Air Quality Standards (NAAQS). 2016.
<https://www.epa.gov/criteria-air-pollutants/naaqs-table>

Google Maps. 2016

Google Earth. 2018

Lewisville Lake Environmental Learning Area. 2020. <https://llela.org>

National Vegetation Classification System. 2016. EP 1130-2-540. Level 1 inventory

National Oceanic and Atmospheric Administration (NOAA). 2016. US Climate Data; National Centers for Environmental Information. , <http://www.weather.gov.fwdann/>

NCTCOG. 2018. Air Quality Website: <https://www.nctcog.org/trans/air>

NCTCOG. 2018. Metropolitan Transportation Plan – Mobility 2040.
<https://www.nctcog.org/trans/mtp/2040/>

NCTCOG. 2010. North Texas 2050 <http://www.visionnorthtexas.org/main.html>

Texas Commission on Environmental Quality (TCEQ). 2016.

https://www.tceq.texas.gov/agency/air_main.html

Texas Department of State Health Services. October 2006. Fish and Shellfish Consumption Advisory.

<https://dshscpd.maps.arcgis.com/apps/View/index.html?appid=2a02cfc25e1d49a880385fd5c561f201>

Texas Railroad Commission. 2016. GIS Data.

<http://www.gisp.rrc.texas.gov/GISViewer2/>

Texas State Historical Association. 2016

The University of Texas at San Antonio. 2016. Texas State Data Center, 2040 Projections

TPWD. 2012. Texas Outdoor Recreation Plan. 2012 Statewide Comprehensive Outdoor Recreation Plan (TORP/SCORP). TPWD, State Parks Division.

https://tpwd.texas.gov/business/grants/pwd_rp_p4000_1673_TORP.pdf

TPWD. 2012. Texas Conservation Action Plan 2012 – 2016: Statewide/Multi-region Handbook.

https://tpwd.texas.gov/huntwild/wild/wildlife_diversity/nongame/tcap/

TPWD. 2020. <https://www.tpwd.texas.gov>

TWDB. 2012. Texas State Water Plan: Water for Texas. Texas Water Development Board, Austin, Texas. <http://www.twdb.texas.gov/>

TXDOT. 2018. <https://www.txdot.gov/inside-txdot/projects/project-tracker.html>

USACE. 1976. Lewisville Lake Lakeshore Management Plan.

USACE. 1985. Design Memorandum No. 1C – Master Plan (revised) Supplement No. 1. 2004

USACE. 1994. Feature Design Memorandum No. 44. Greenbelt Corridor

USACE. 1998. Water-Related Recreation Use Study, Lewisville Lake, Texas

USACE. 2000. Environmental Assessment. Water Related Recreation Development

USACE. 2005. Programmatic Environmental Assessment. Allowable Adjacent Landowner Activities Incorporating Ecosystem Management Practices on Federal Lands at Lewisville and Grapevine Lakes, Texas.

USACE. 2013. ER 1130-2-550, Project Operations, Recreation Operations and Maintenance Guidance and Procedures. HQ, USACE.
<https://www.publications.usace.army.mil/>

USACE. 2013. EP 1130-2-550, Project Operations, Recreation Operations and Maintenance Guidance and Procedures. HQ, USACE.
<https://www.publications.usace.army.mil/>

USACE. 2016. OMBIL Environmental Stewardship Module. USACE, Fort Worth District, Texas.

USACE. 2016. OMBIL Recreation Module. USACE, Fort Worth District, Texas.

USACE. 2016. Value to the Nation – Recreation Fast Facts:
<http://corpsresults.us/recreation/recfastfacts.cfm>

USACE. 2018. Lewisville Dam and Lake Water Control Manual – Appendix D of Master Reservoir Regulation Manual.

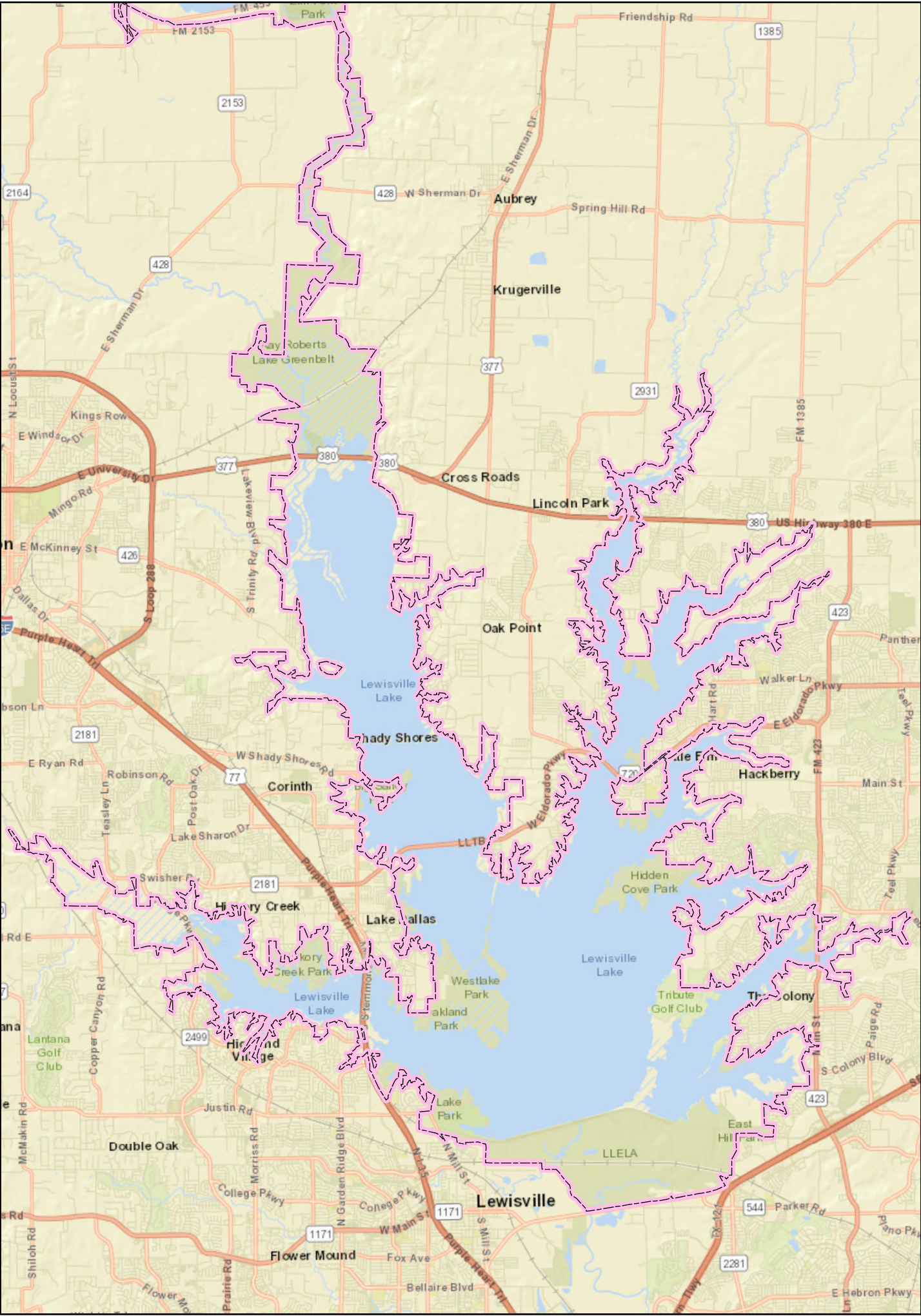
US Bureau of the Census. 2016. American Fact Finder Website.
https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml

USFWS. 2016. Classification of Wetlands and Deepwater Habitats of the United States <https://www.fws.gov/wetlands/>

USFWS. 2020. Information for Planning and Conservation (IPaC) website:
<https://ecos.fws.gov/ipac/>

USGS. 2018. <https://txpub.usgs.gov/dss/texasgeology/>,

Appendix A - Maps



INDEX TO MASTER PLAN MAPS

LAND CLASSIFICATION MAPS

MAP NO.	TITLE
LE20MP-OC-INDEX PLUS	LAND CLASSIFICATION-INDEX PLUS
LE20MP-OC-01 THROUGH LE20MP-OC-17	LAND CLASSIFICATION (SHEET 01) THROUGH LAND CLASSIFICATION (SHEET 17)

DEPTH CONTOUR MAPS

MAP NO.	TITLE
LE20MP-OD-INDEX PLUS	DEPTH CONTOUR- INDEX PLUS
LE20MP-OD-01 THROUGH LE20MP-OD-07	DEPTH CONTOUR (SHEET 01) THROUGH DEPTH CONTOUR (SHEET 07)

LAND MANAGING ENTITY MAPS

MAP NO.	TITLE
LE20MP-OL-INDEX PLUS	LAND MANAGING ENTITY- INDEX PLUS
LE20MP-OL-01 THROUGH LE20MP-OL-04	LAND MANAGING ENTITY (SHEET 01) THROUGH LAND MANAGING ENTITY (SHEET 04)

PARKS AND ACCESS AREA MAPS

MAP NO.	TITLE
LE20MP-OR-INDEX PLUS	RECREATION-INDEX PLUS
LE20MP-OR-01 THROUGH LE20MP-OR-66	RECREATION (SHEET 01) THROUGH RECREATION (SHEET 66)


UTILITY CORRIDOR MAPS

MAP NO.	TITLE
LE20MP-OU-INDEX PLUS	UTILITY CORRIDOR- INDEX PLUS
LE20MP-OU-01 THROUGH LE20MP-OU-09	UTILITY CORRIDOR (SHEET 01) THROUGH UTILITY CORRIDOR (SHEET 09)



 FEE BOUNDARY

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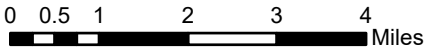

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TRINITY RIVER, TEXAS

LEWISVILLE LAKE

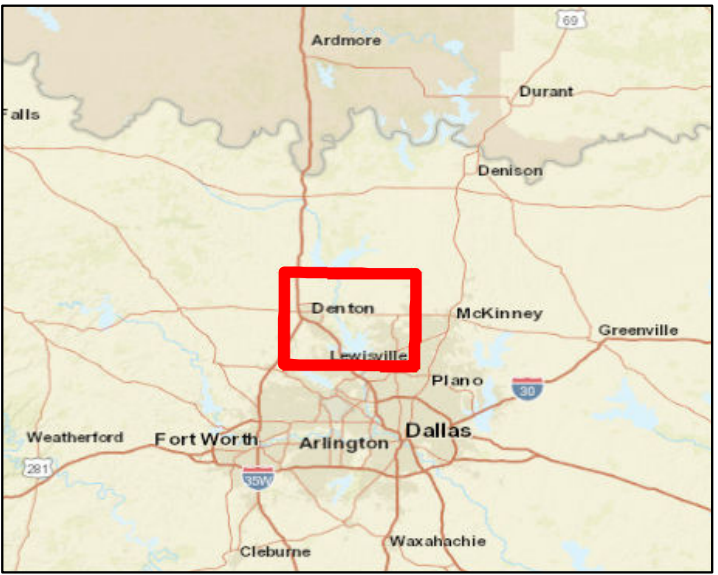
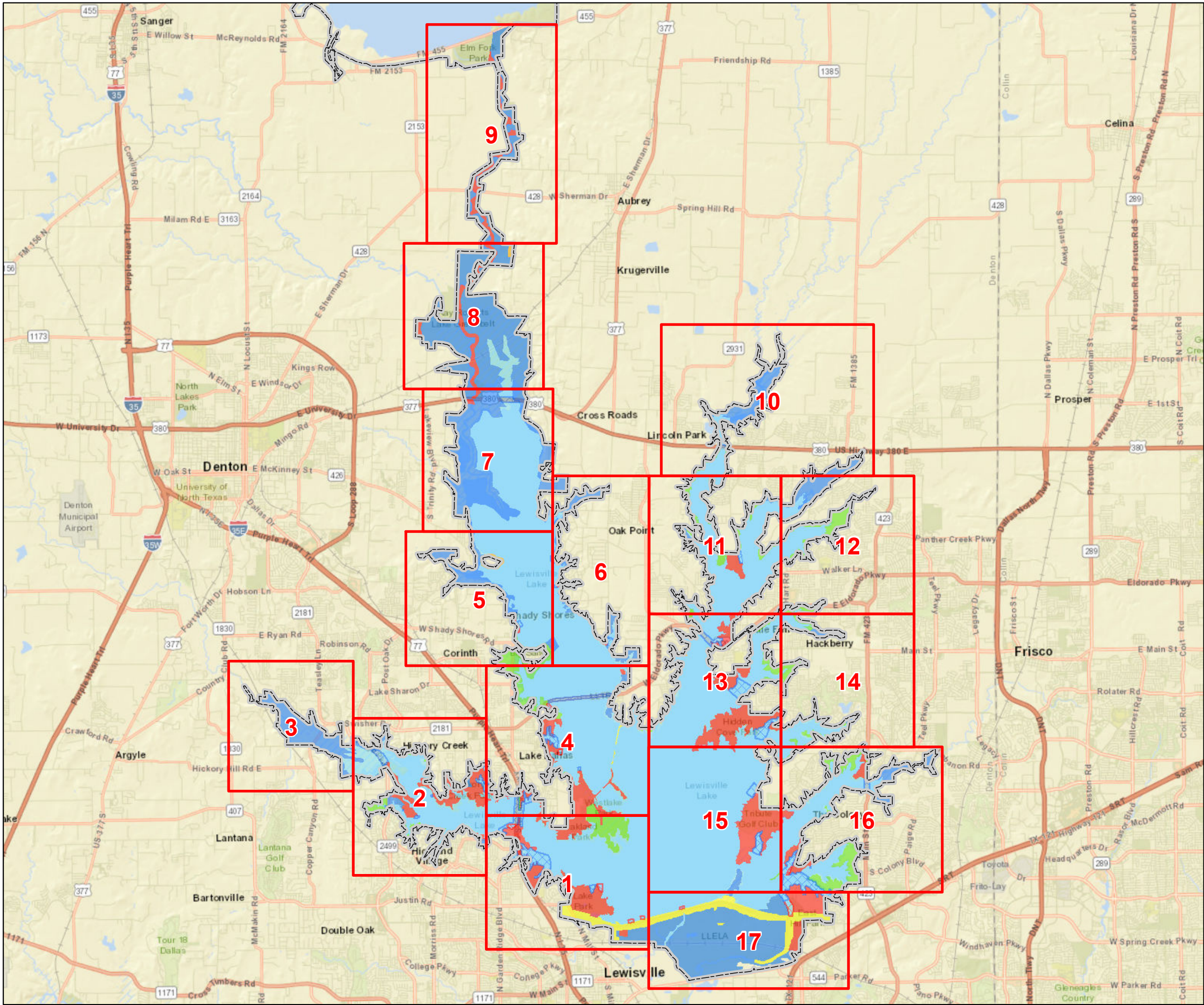
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




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





 FEE BOUNDARY

LAND CLASSIFICATION

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

WATER SURFACE

-  OPEN RECREATION
-  NO WAKE
-  RESTRICTED



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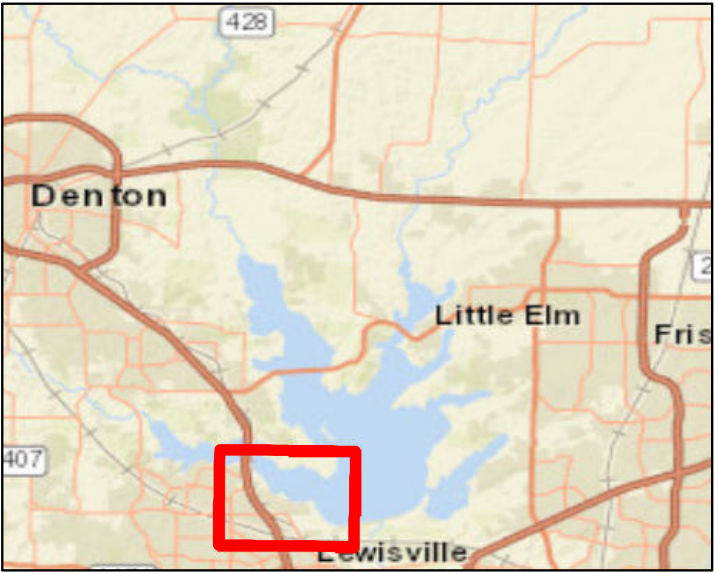
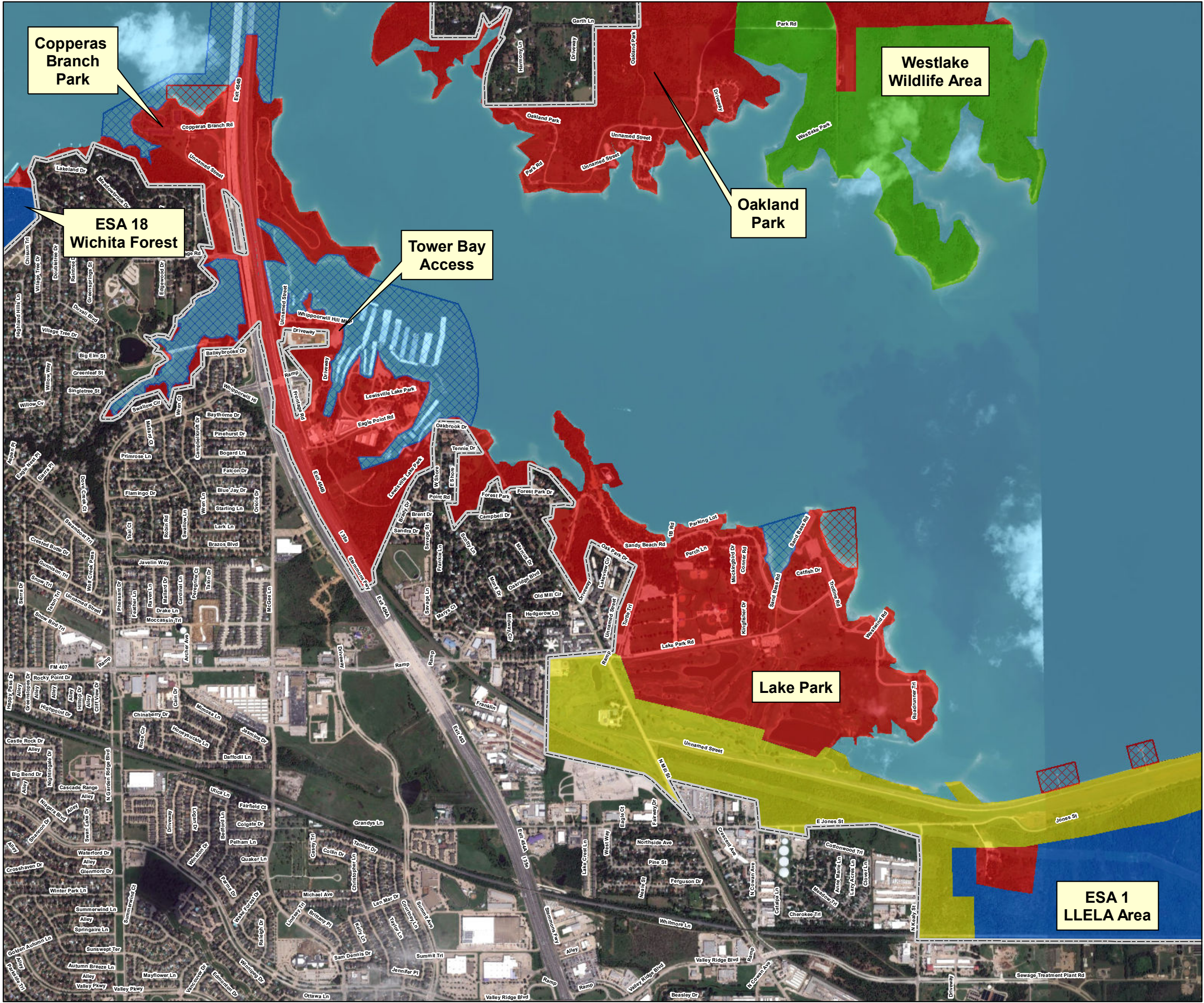
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




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





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LAND CLASSIFICATION

-  ENVIRONMENTALLY SENSITIVE AREA
-  HIGH DENSITY RECREATION
-  LOW DENSITY RECREATION
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WATER SURFACE

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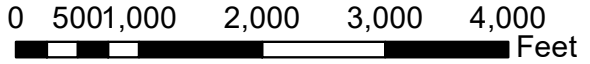

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TRINITY RIVER, TEXAS

LEWISVILLE LAKE

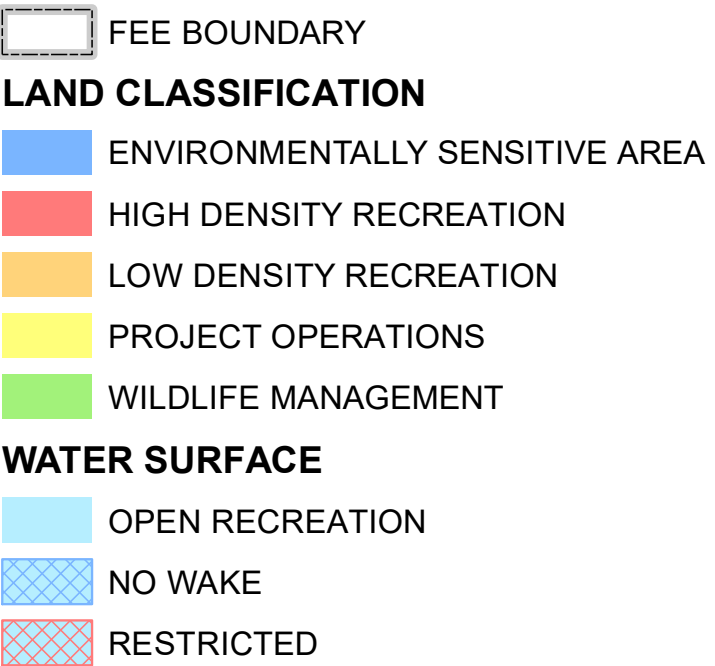
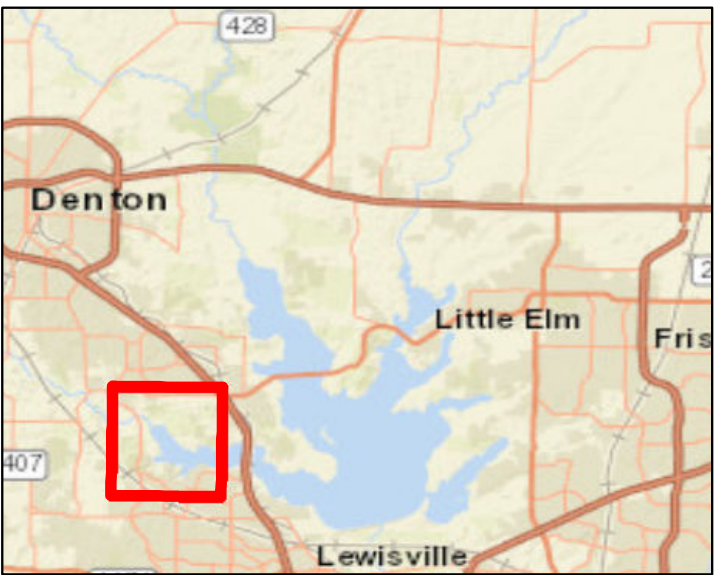
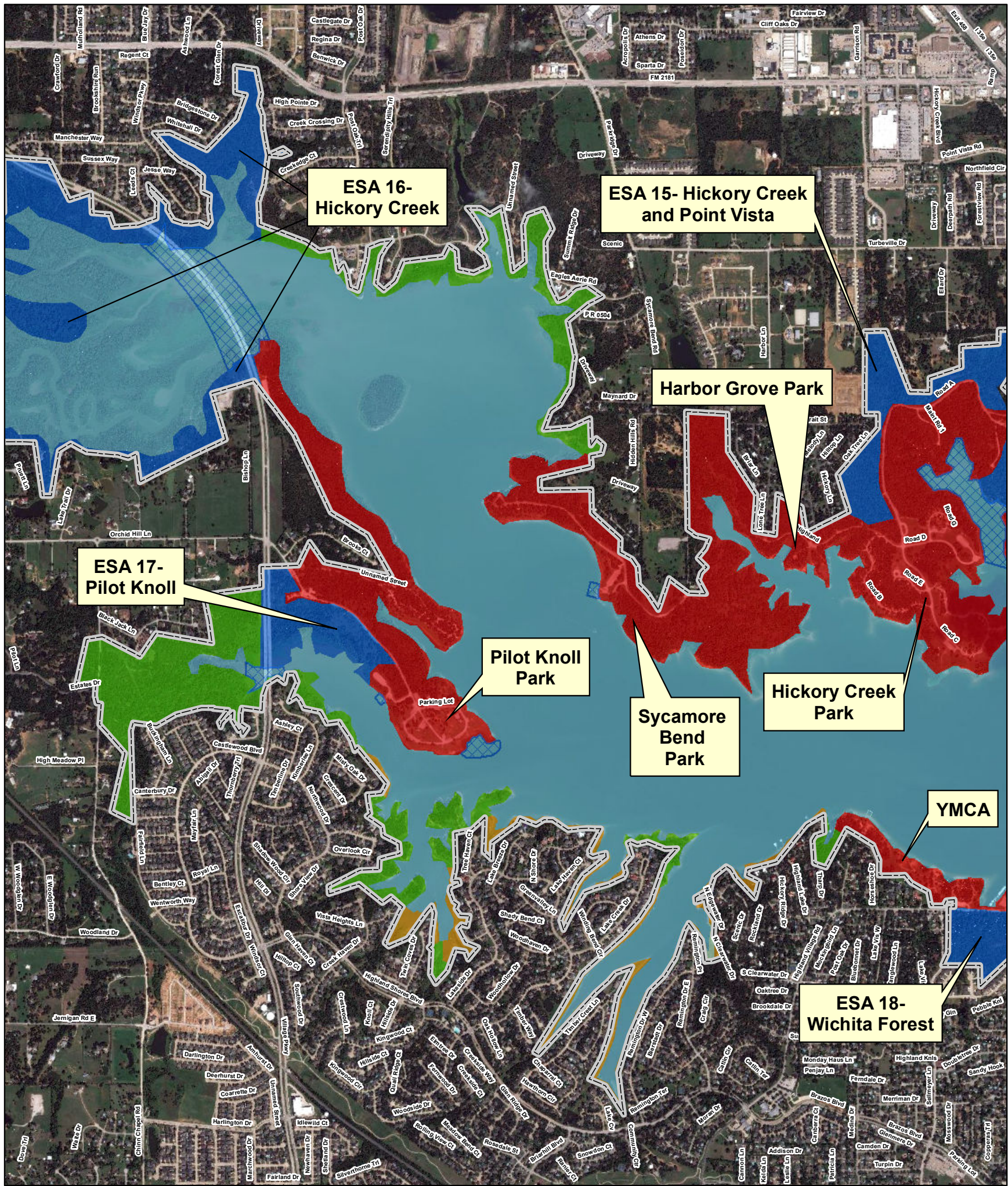
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LAND CLASSIFICATION- SHEET 01



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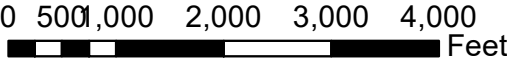

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LEWISVILLE LAKE

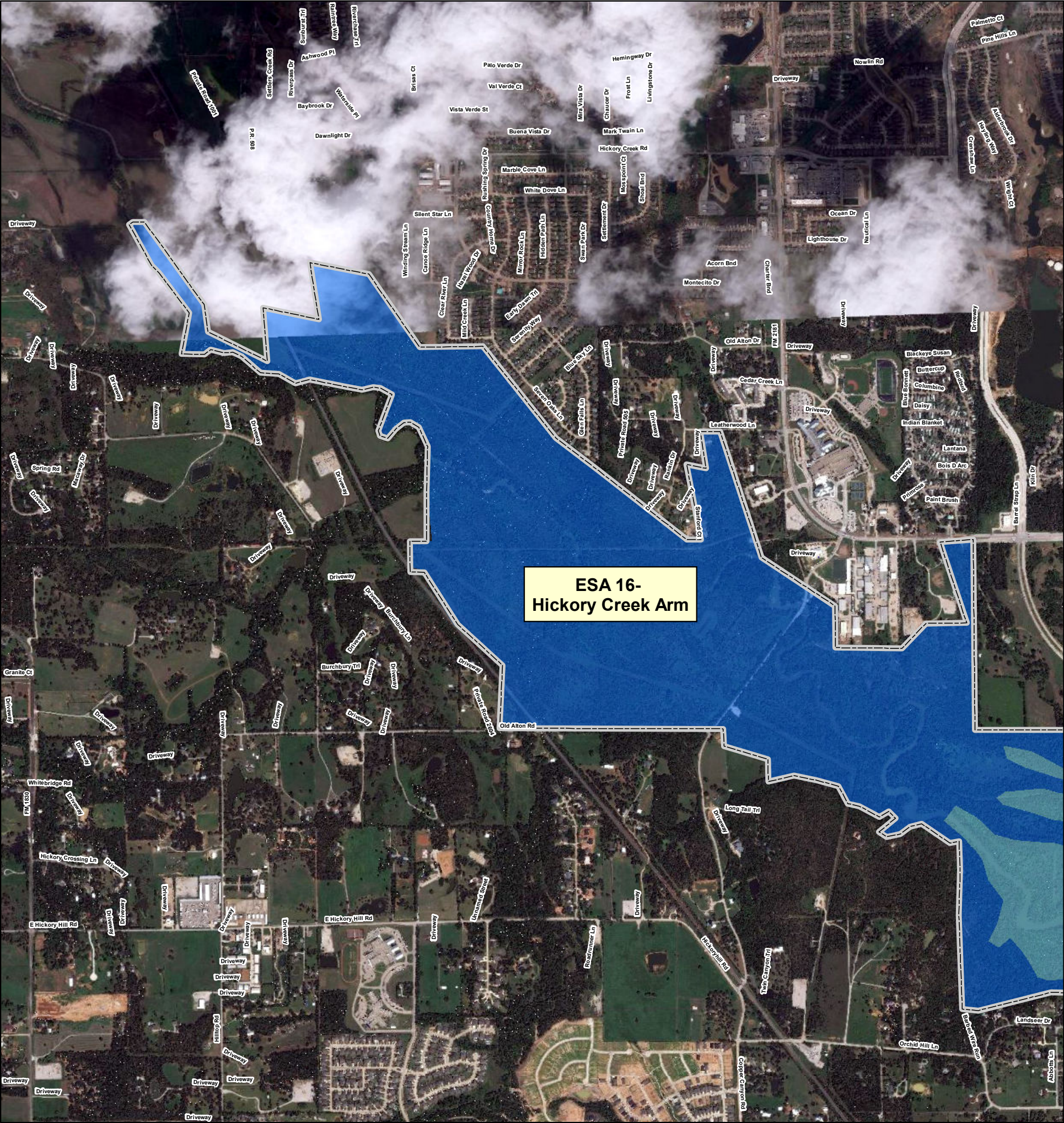
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LAND CLASSIFICATION- SHEET 02








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





 FEE BOUNDARY

LAND CLASSIFICATION

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

WATER SURFACE

-  OPEN RECREATION
-  NO WAKE
-  RESTRICTED



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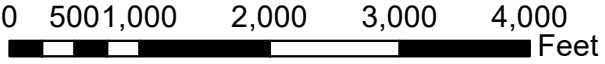

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TRINITY RIVER, TEXAS

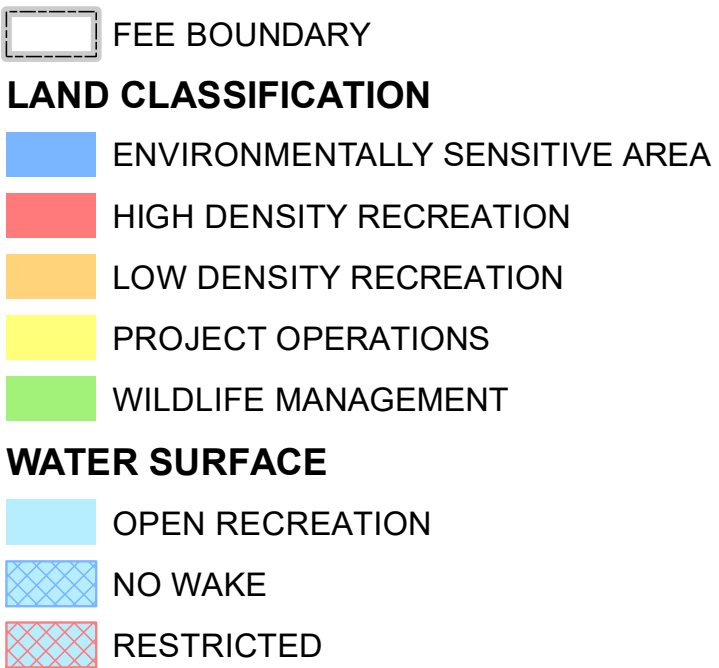
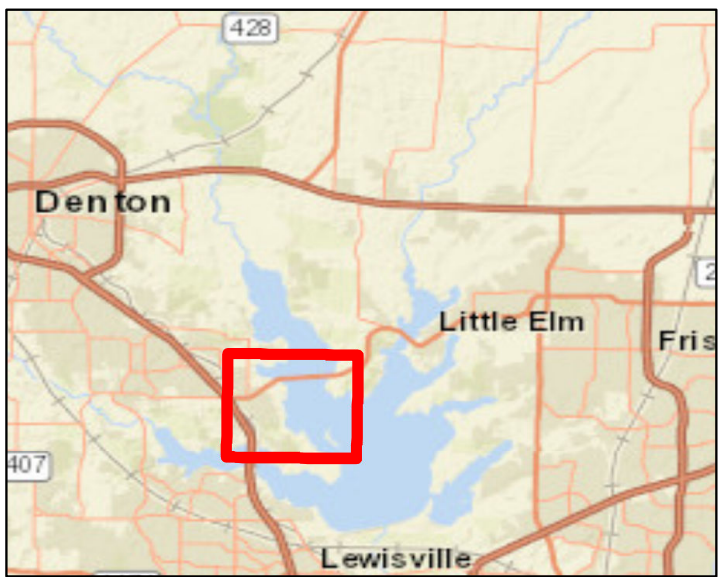
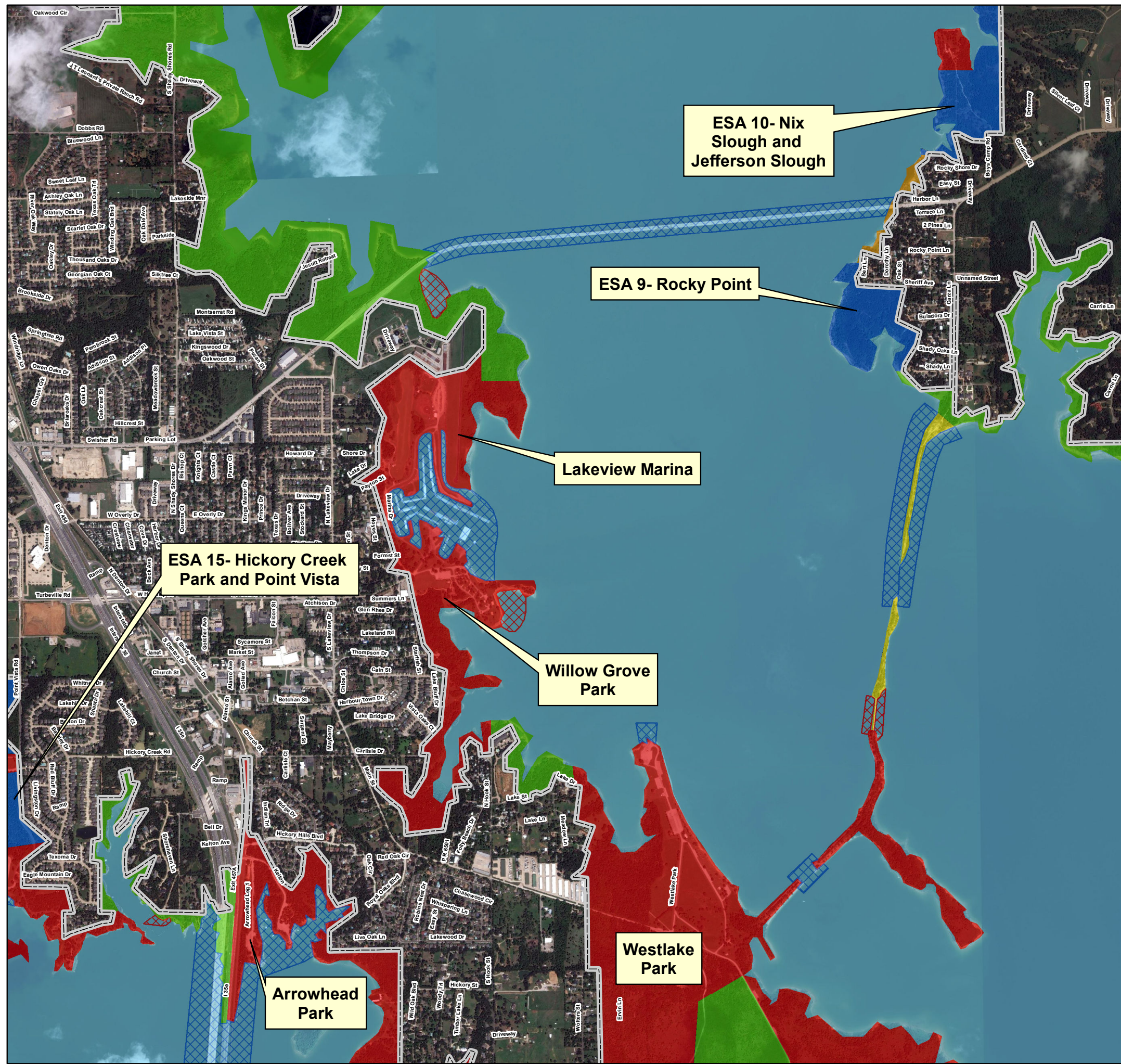
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LAND CLASSIFICATION- SHEET 03



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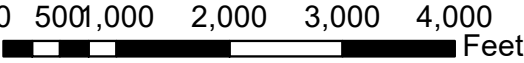

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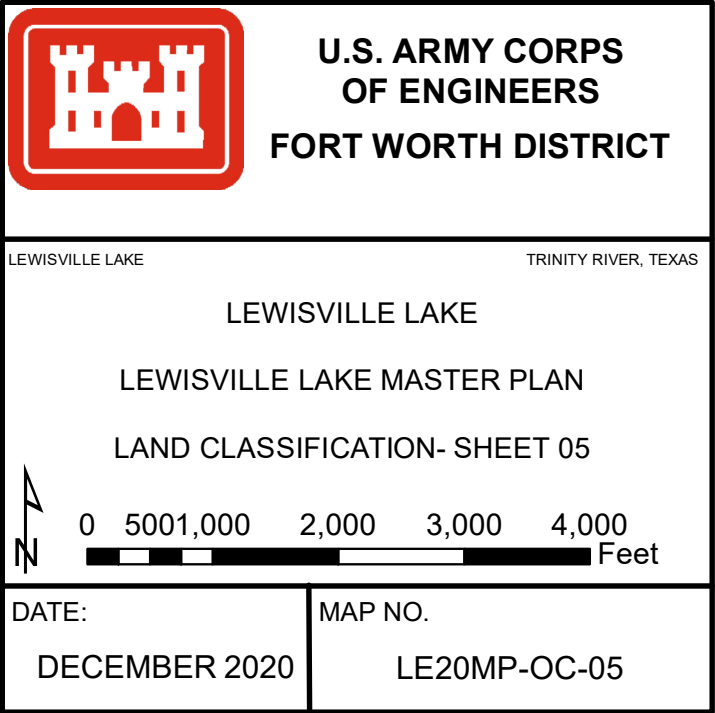
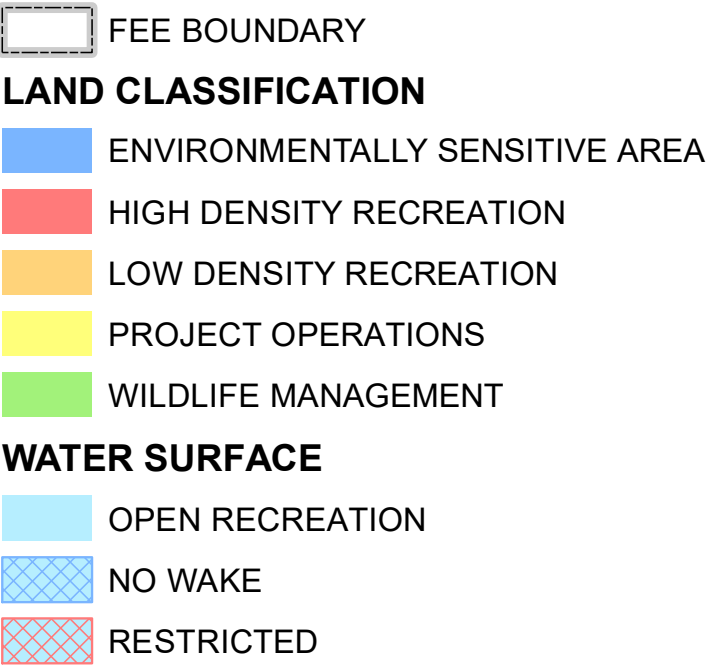
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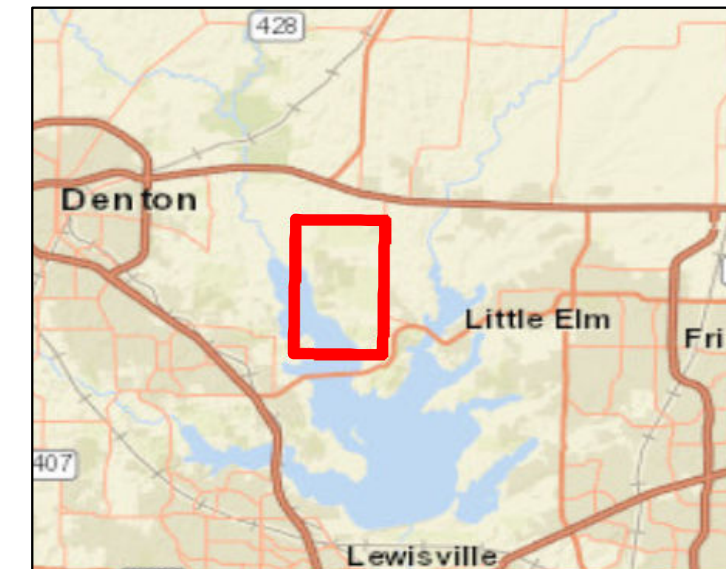
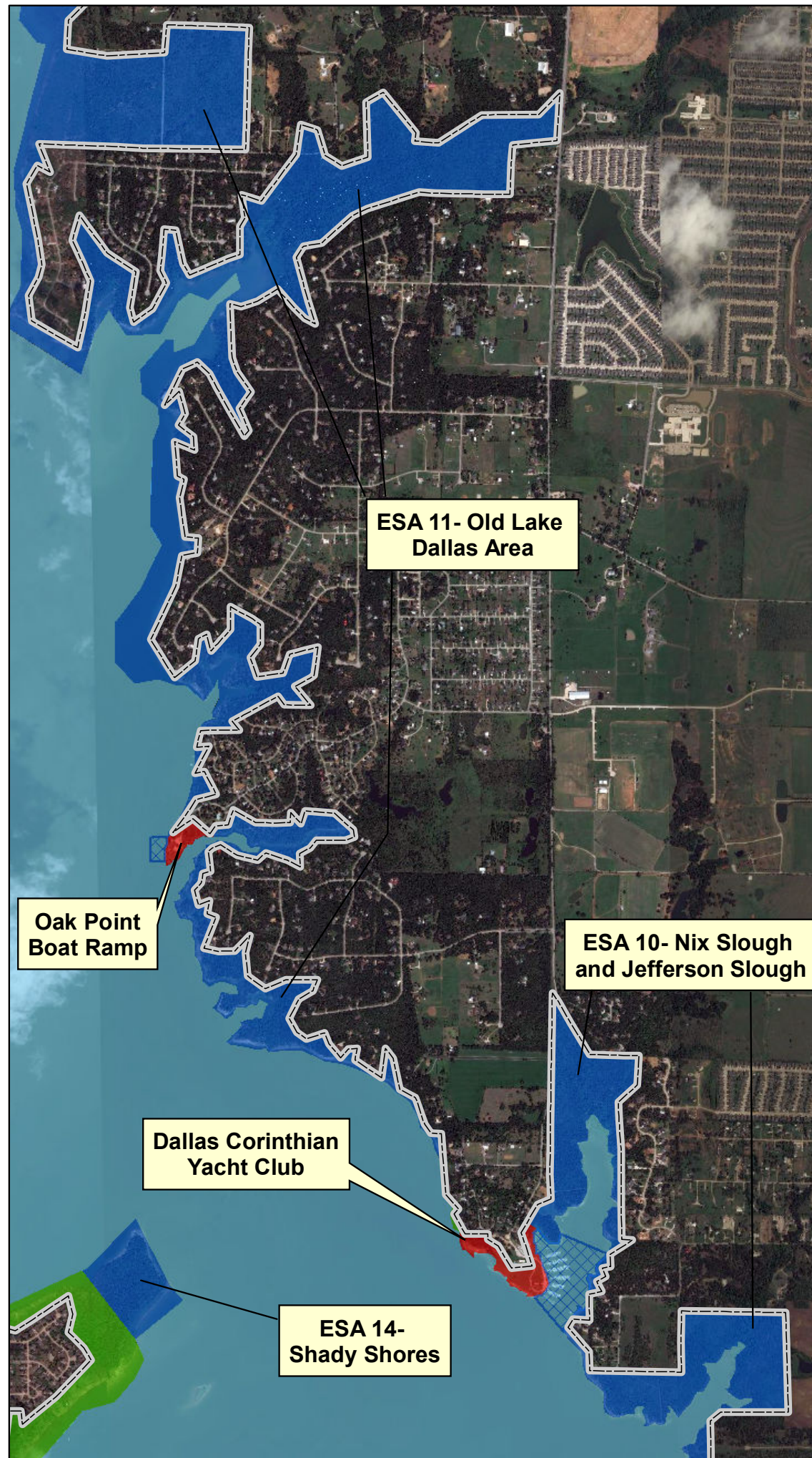
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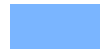




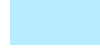


LAND CLASSIFICATION- SHEET 04




DATE:	MAP NO.
DECEMBER 2020	LE20MP-OC-04





-  FEE BOUNDARY
- LAND CLASSIFICATION**
-  ENVIRONMENTALLY SENSITIVE AREA
 -  HIGH DENSITY RECREATION
 -  LOW DENSITY RECREATION
 -  PROJECT OPERATIONS
 -  WILDLIFE MANAGEMENT
- WATER SURFACE**
-  OPEN RECREATION
 -  NO WAKE
 -  RESTRICTED



**U.S. ARMY CORPS
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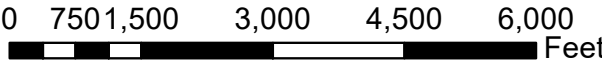

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

LAND CLASSIFICATION- SHEET 06



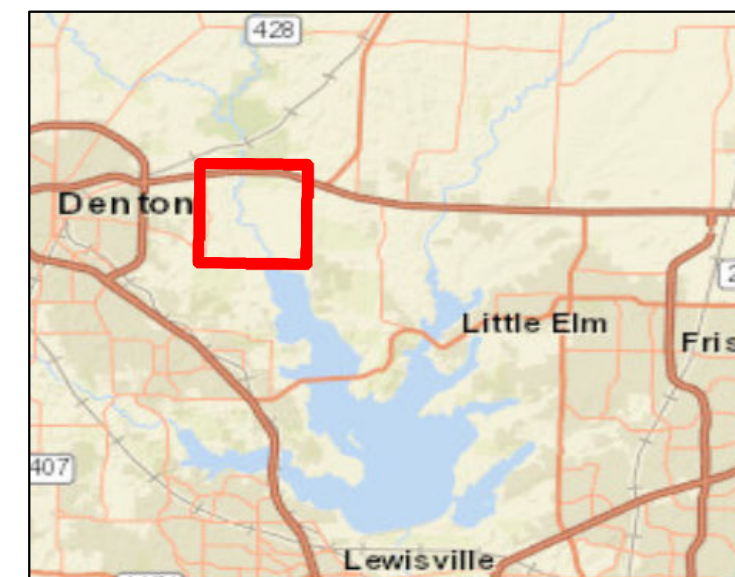
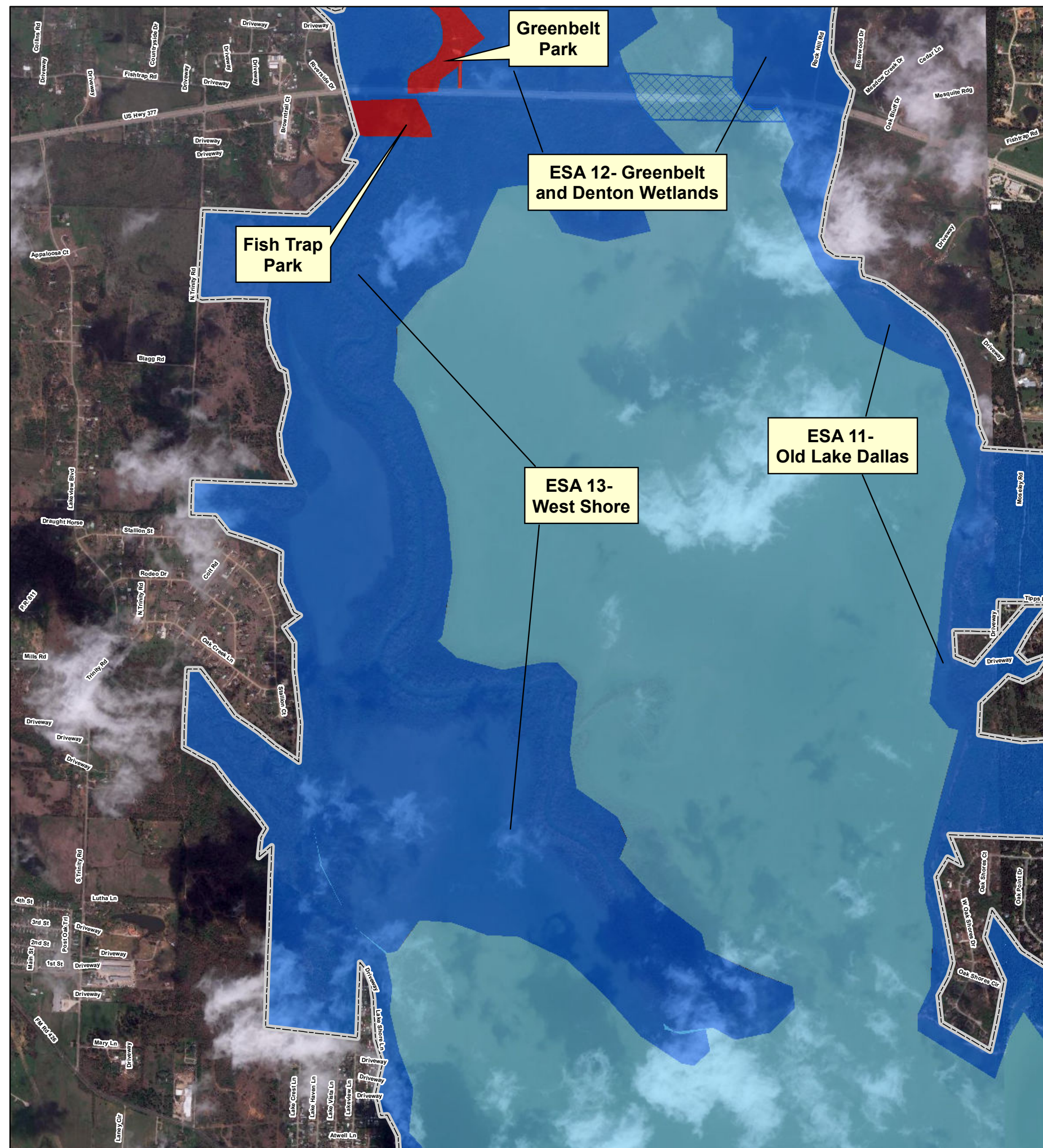
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DATE:

DECEMBER 2020

MAP NO.

LE20MP-OC-06



FEE BOUNDARY

LAND CLASSIFICATION



ENVIRONMENTALLY SENSITIVE AREA



HIGH DENSITY RECREATION

LOW DENSITY RECREATION

PROJECT OPERATIONS

WILDLIFE MANAGEMENT

WATER SURFACE

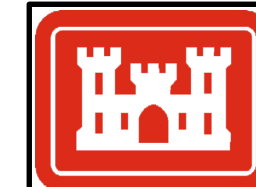
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NO WAKE



 RESTRICTED



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FORT WORTH DISTRICT**

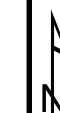
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TRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

LAND CLASSIFICATION- SHEET 07



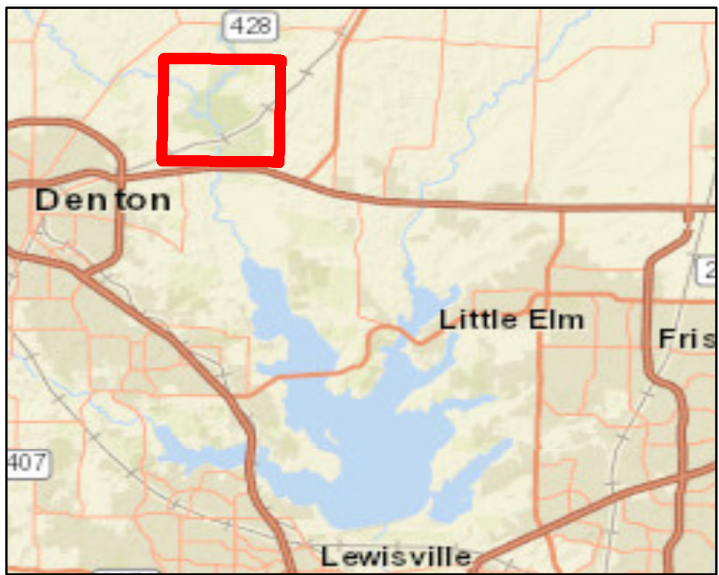
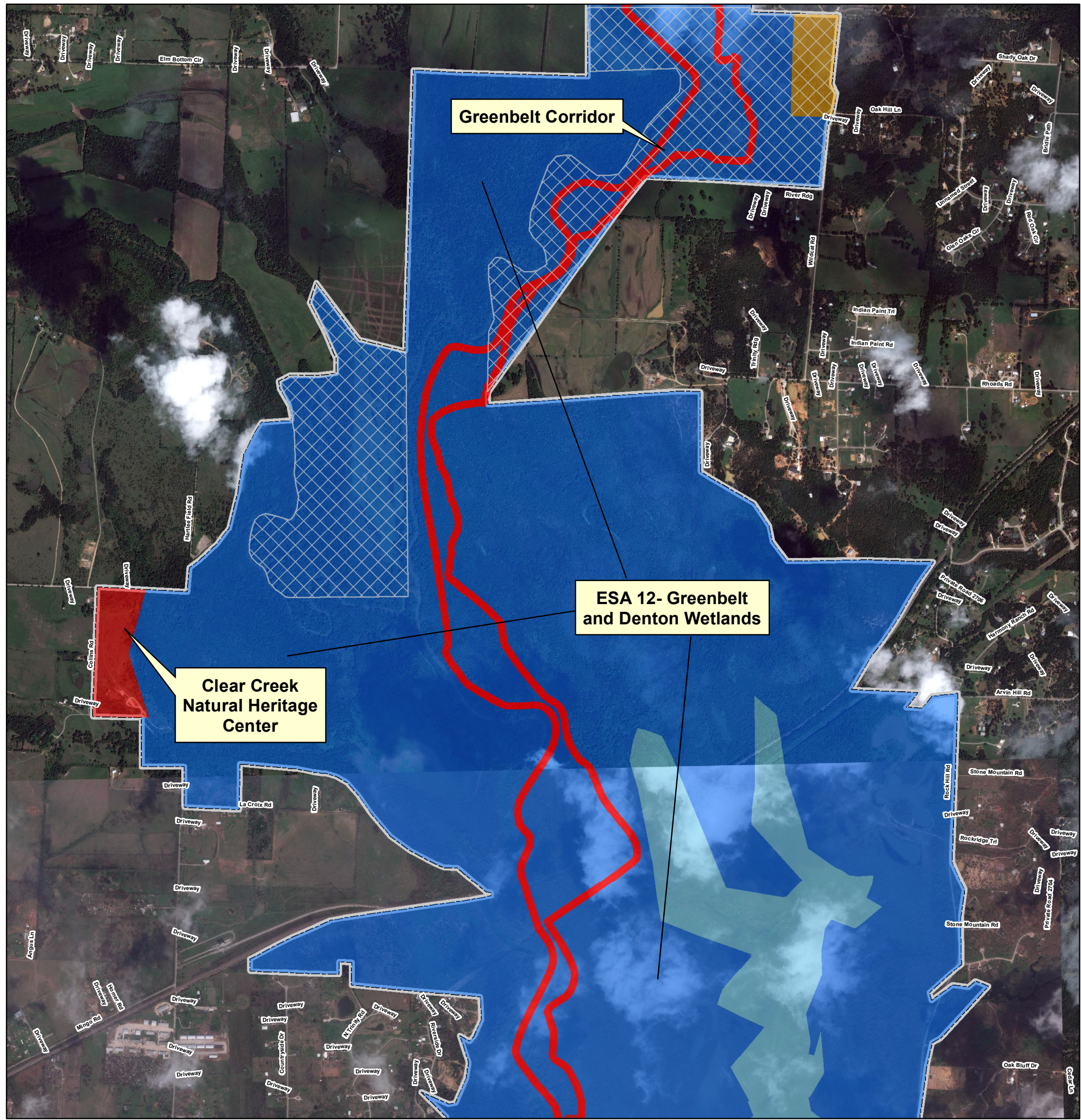
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DATE:


DECEMBER 2020

MAP NO.

LE20MP-OC-07



-  FEE BOUNDARY
- LAND CLASSIFICATION**
-  ENVIRONMENTALLY SENSITIVE AREA
 -  HIGH DENSITY RECREATION
 -  LOW DENSITY RECREATION
 -  PROJECT OPERATIONS
 -  WILDLIFE MANAGEMENT
 -  SEPARABLE RECREATION LANDS
- WATER SURFACE**
-  OPEN RECREATION
 -  NO WAKE
 -  RESTRICTED



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

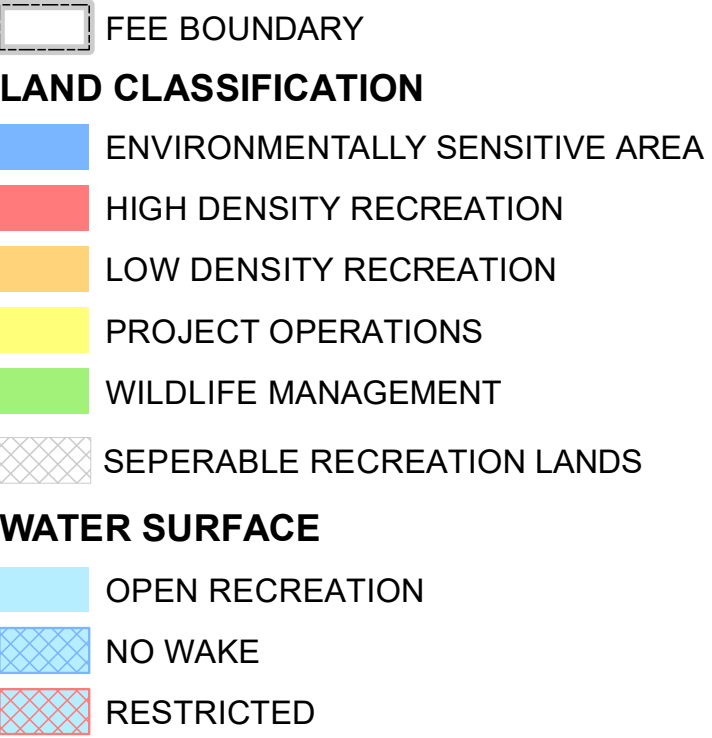
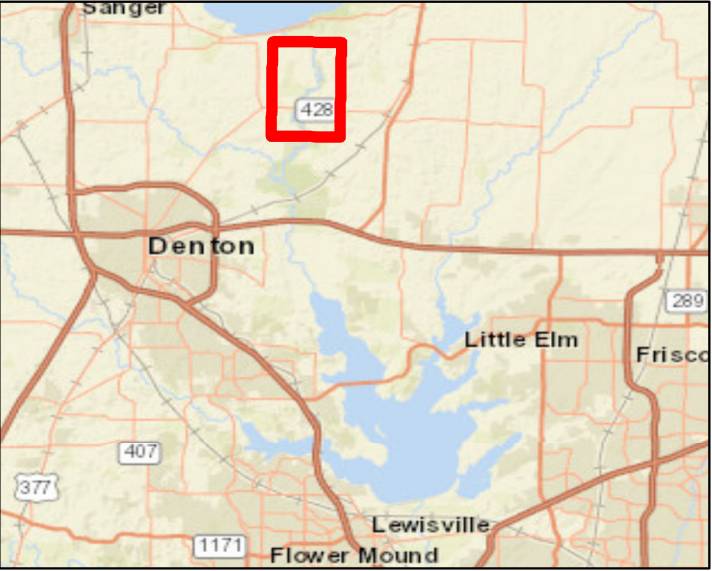
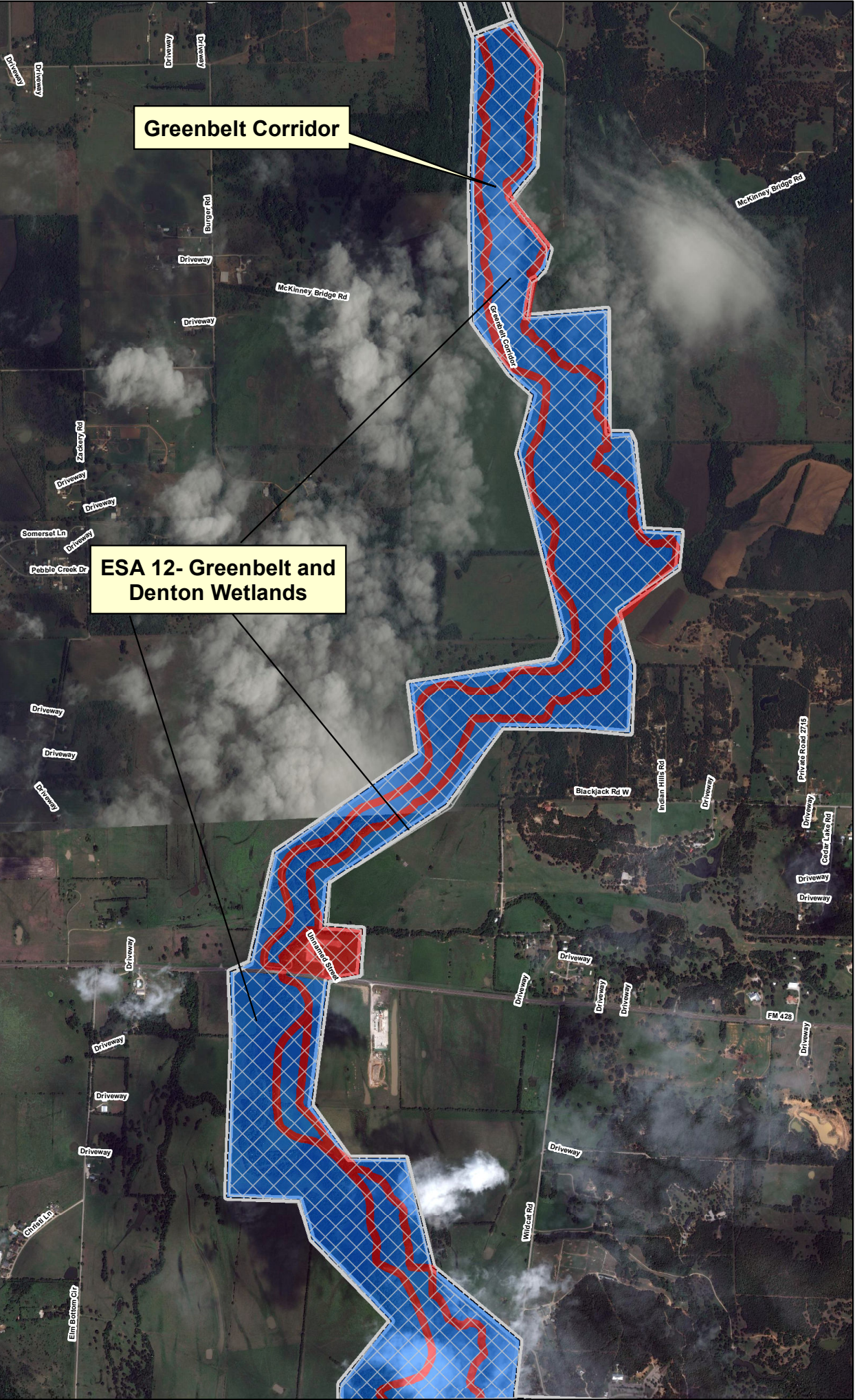
LEWISVILLE LAKE MASTER PLAN


LAND CLASSIFICATION- SHEET 08

0 500 1,000 2,000 3,000 4,000 Feet

DATE: DECEMBER 2020

MAP NO. LE20MP-OC-08





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

FORT WORTH DISTRICT

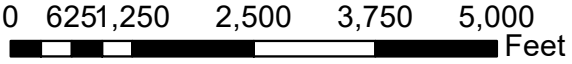

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

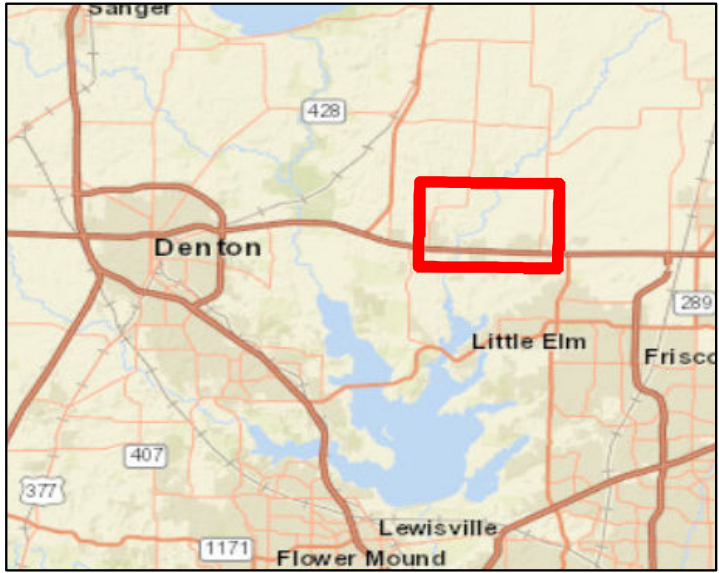
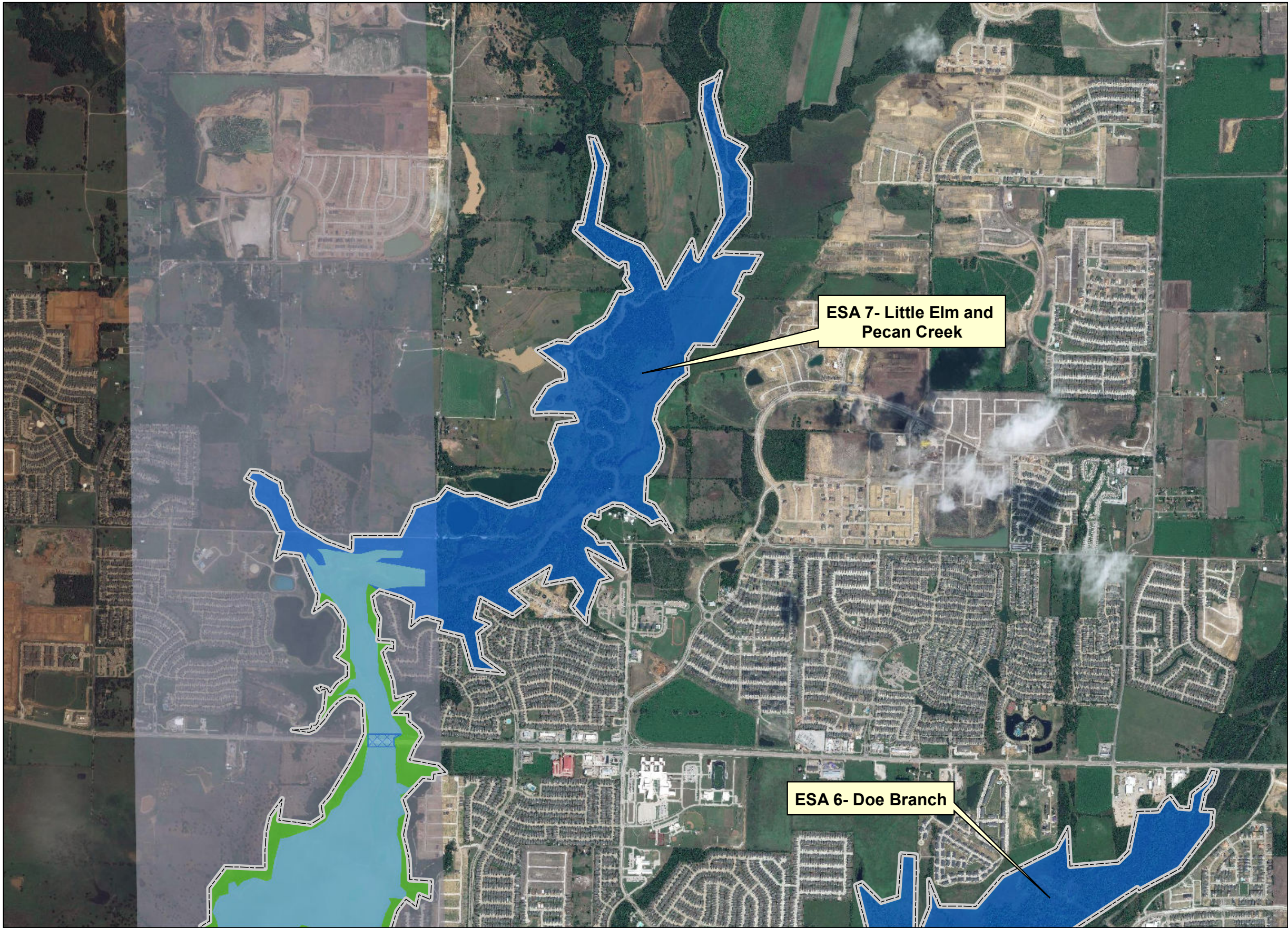
LEWISVILLE LAKE


LEWISVILLE LAKE MASTER PLAN

LAND CLASSIFICATION- SHEET 09








DATE:	MAP NO.
DECEMBER 2020	LE20MP-OC-09






 FEE BOUNDARY

LAND CLASSIFICATION

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

WATER SURFACE

-  OPEN RECREATION
-  NO WAKE
-  RESTRICTED



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**


LEWISVILLE LAKE

TRINITY RIVER, TEXAS

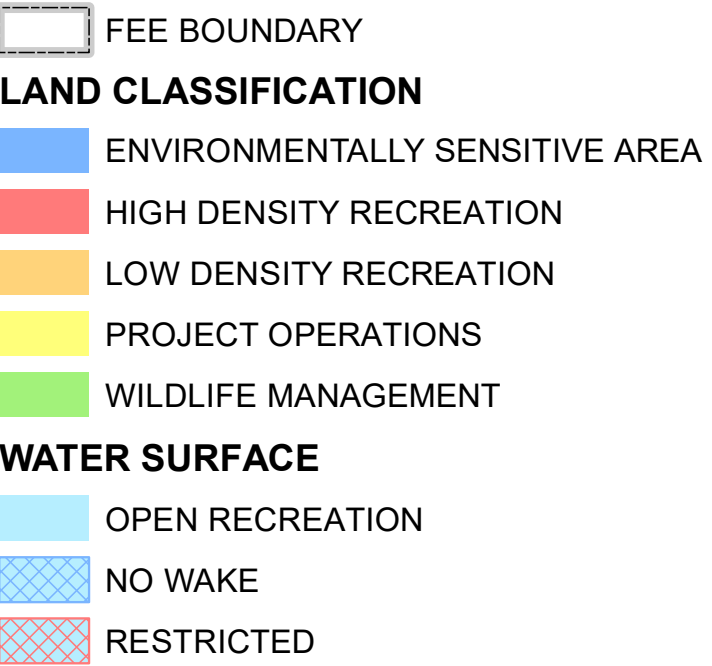
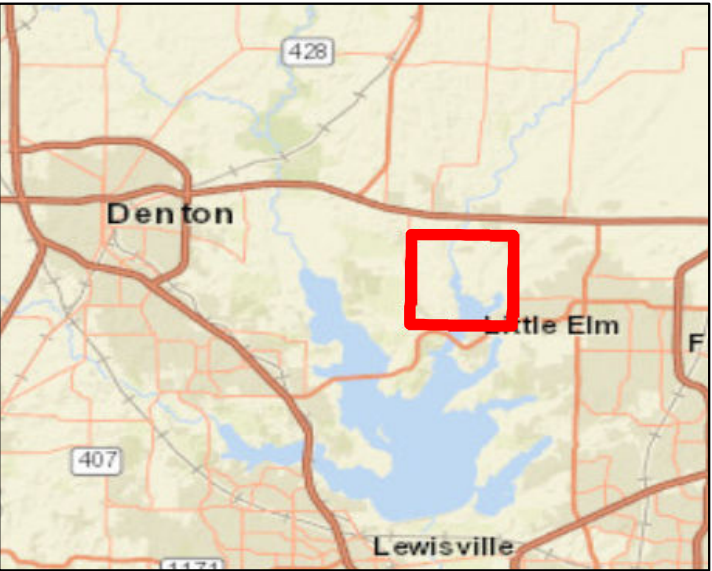
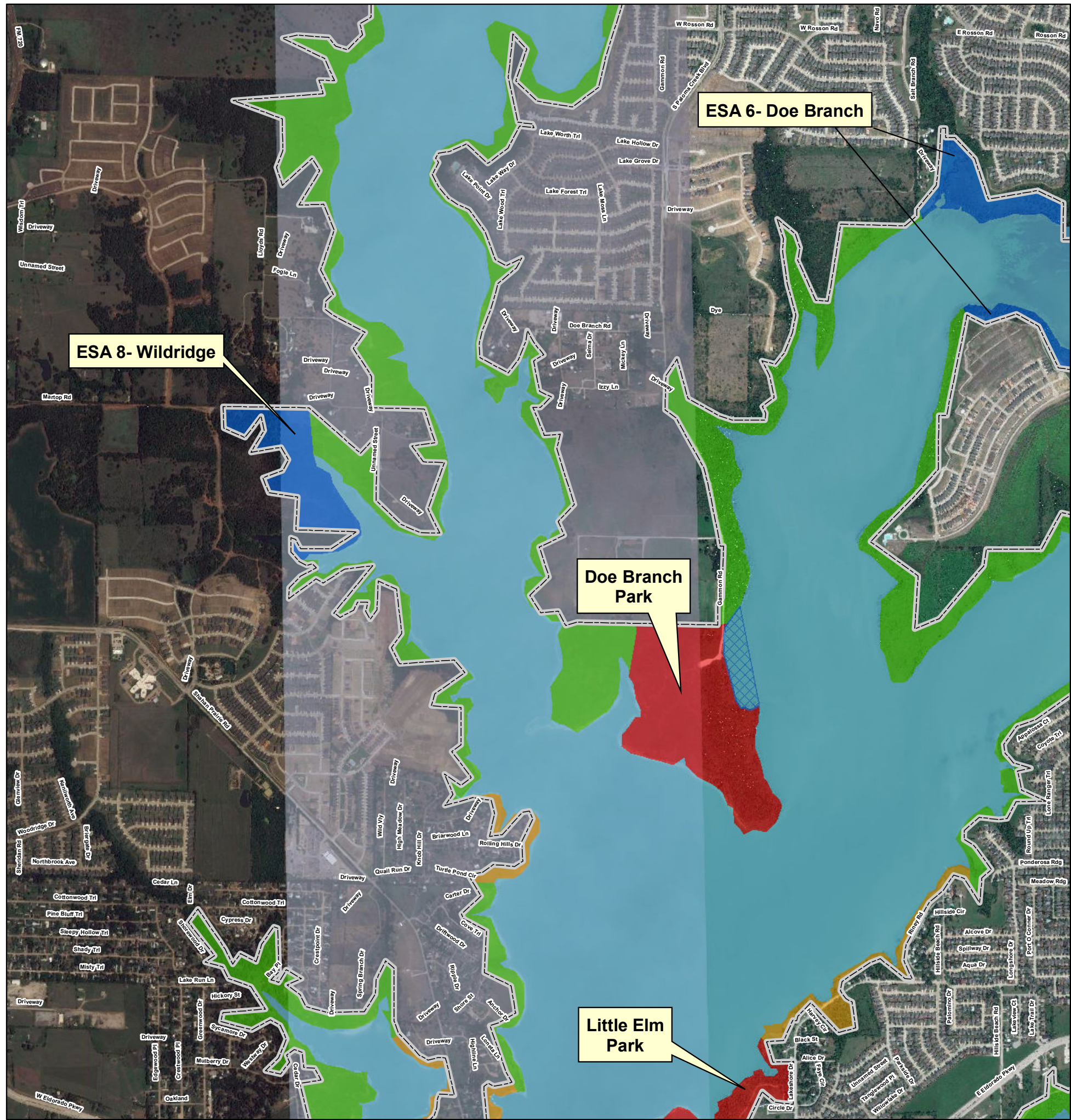
LEWISVILLE LAKE


LEWISVILLE LAKE MASTER PLAN

LAND CLASSIFICATION- SHEET 10



DATE: DECEMBER 2020	MAP NO. LE20MP-OC-10
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**U.S. ARMY CORPS
OF ENGINEERS**

FORT WORTH DISTRICT

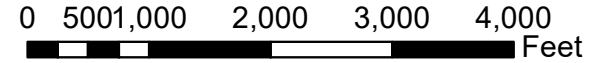

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

LAND CLASSIFICATION- SHEET 11



DATE:	MAP NO.
DECEMBER 2020	LE20MP-OC-11



FEE BOUNDARY

LAND CLASSIFICATION

ENVIRONMENTALLY SENSITIVE AREA

HIGH DENSITY RECREATION

LOW DENSITY RECREATION

PROJECT OPERATIONS

WILDLIFE MANAGEMENT

WATER SURFACE

OPEN RECREATION

NO WAKE

RESTRICTED

**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

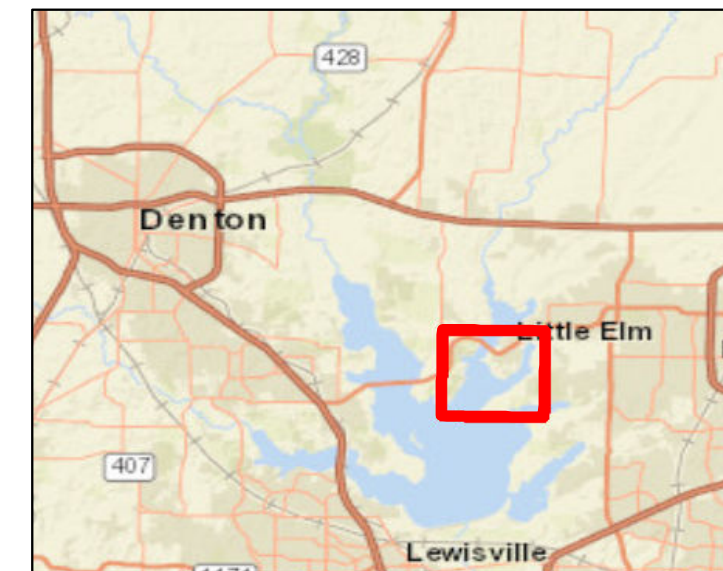
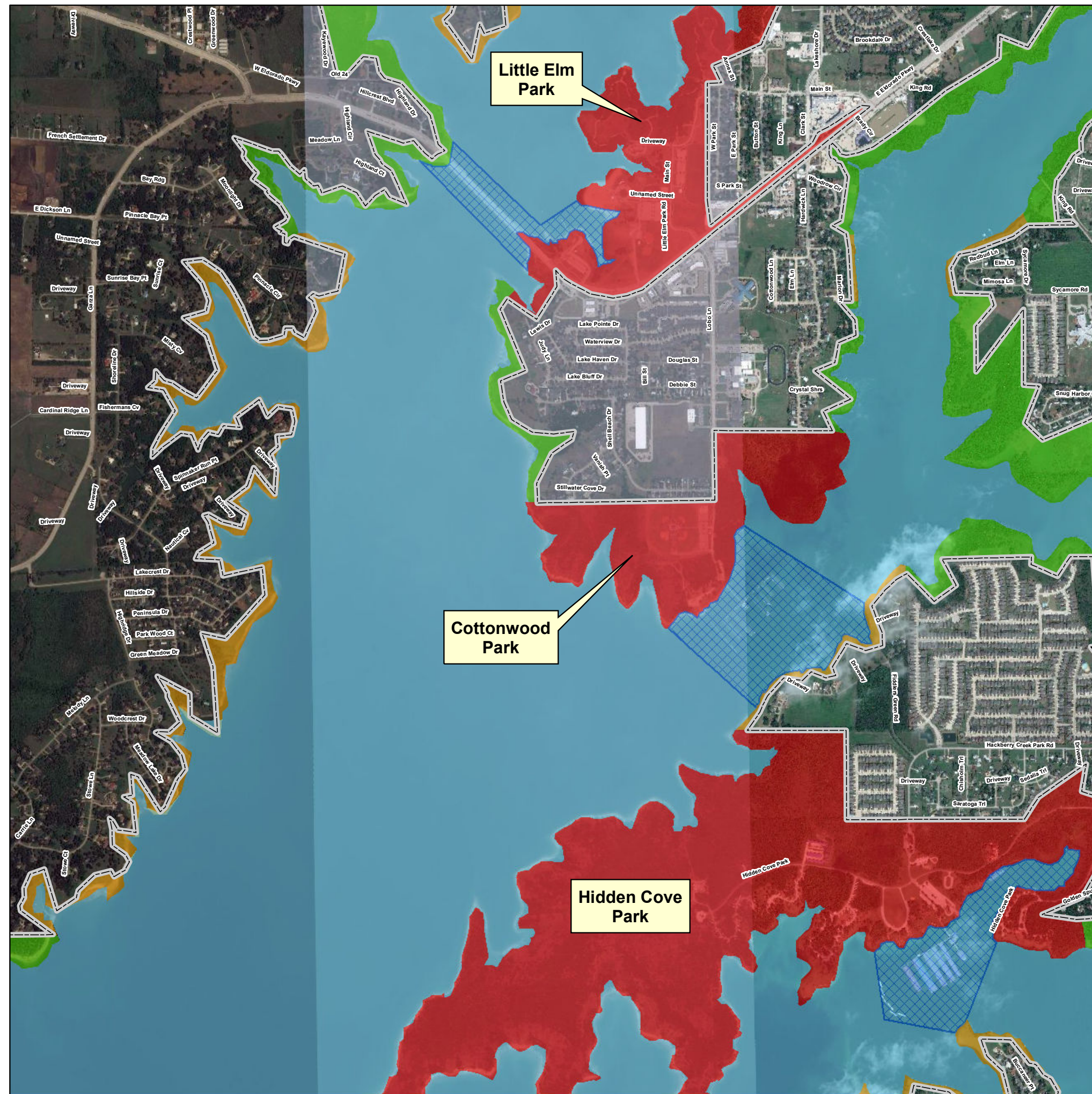
LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

LAND CLASSIFICATION- SHEET 12

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OC-12

 FEE BOUNDARY

LAND CLASSIFICATION

 ENVIRONMENTALLY SENSITIVE AREA

 HIGH DENSITY RECREATION

LOW DENSITY RECREATION

PROJECT OPERATIONS

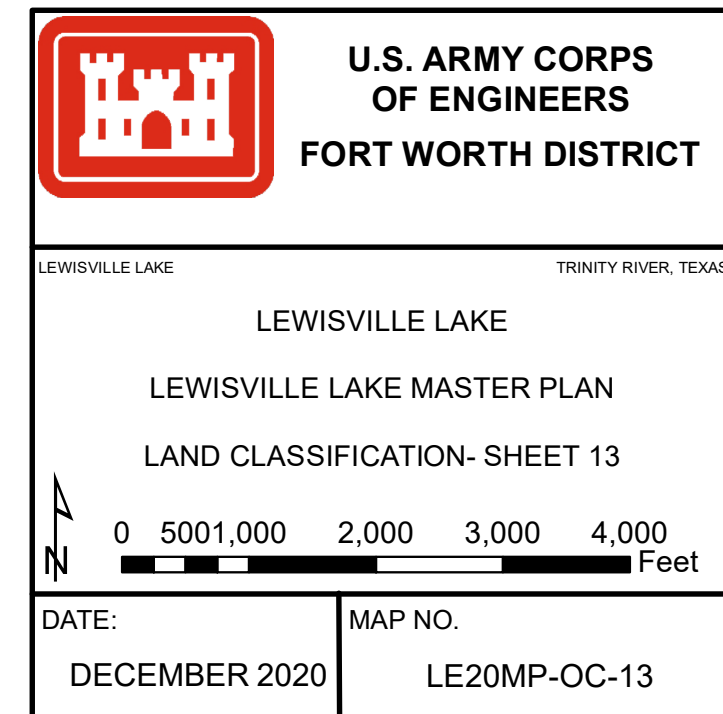
WILDLIFE MANAGEMENT

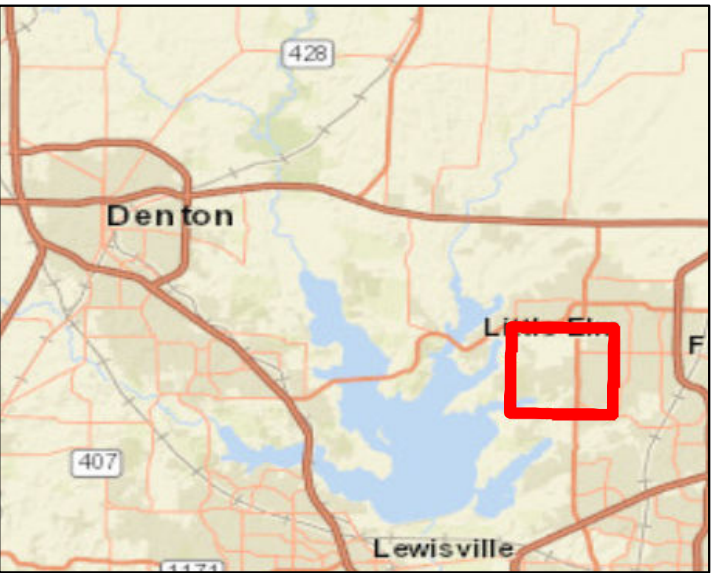
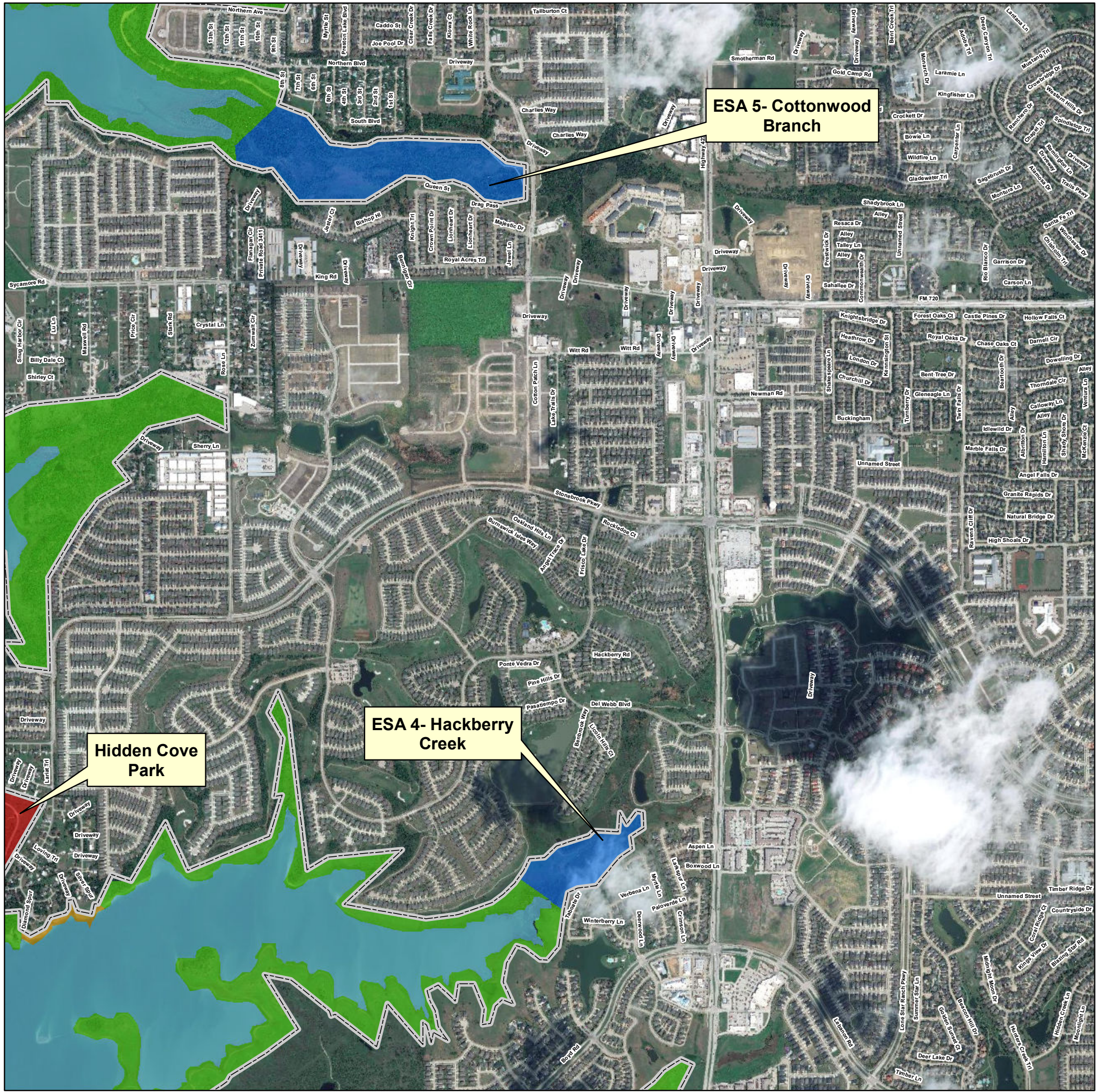
WATER SURFACE


 OPEN RECREATION

 NO WAKE






 RESTRICTED









 FEE BOUNDARY

LAND CLASSIFICATION

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

WATER SURFACE

-  OPEN RECREATION
-  NO WAKE
-  RESTRICTED



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

FORT WORTH DISTRICT

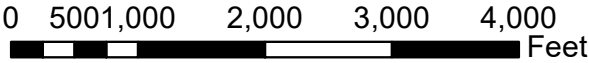

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

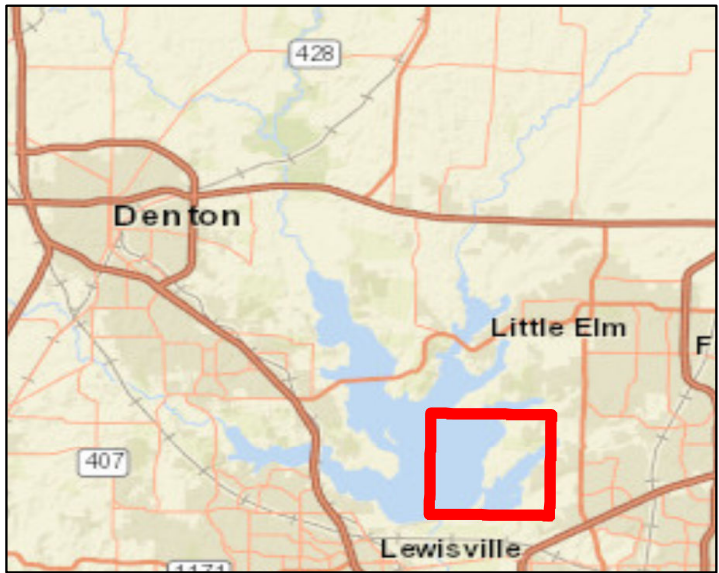
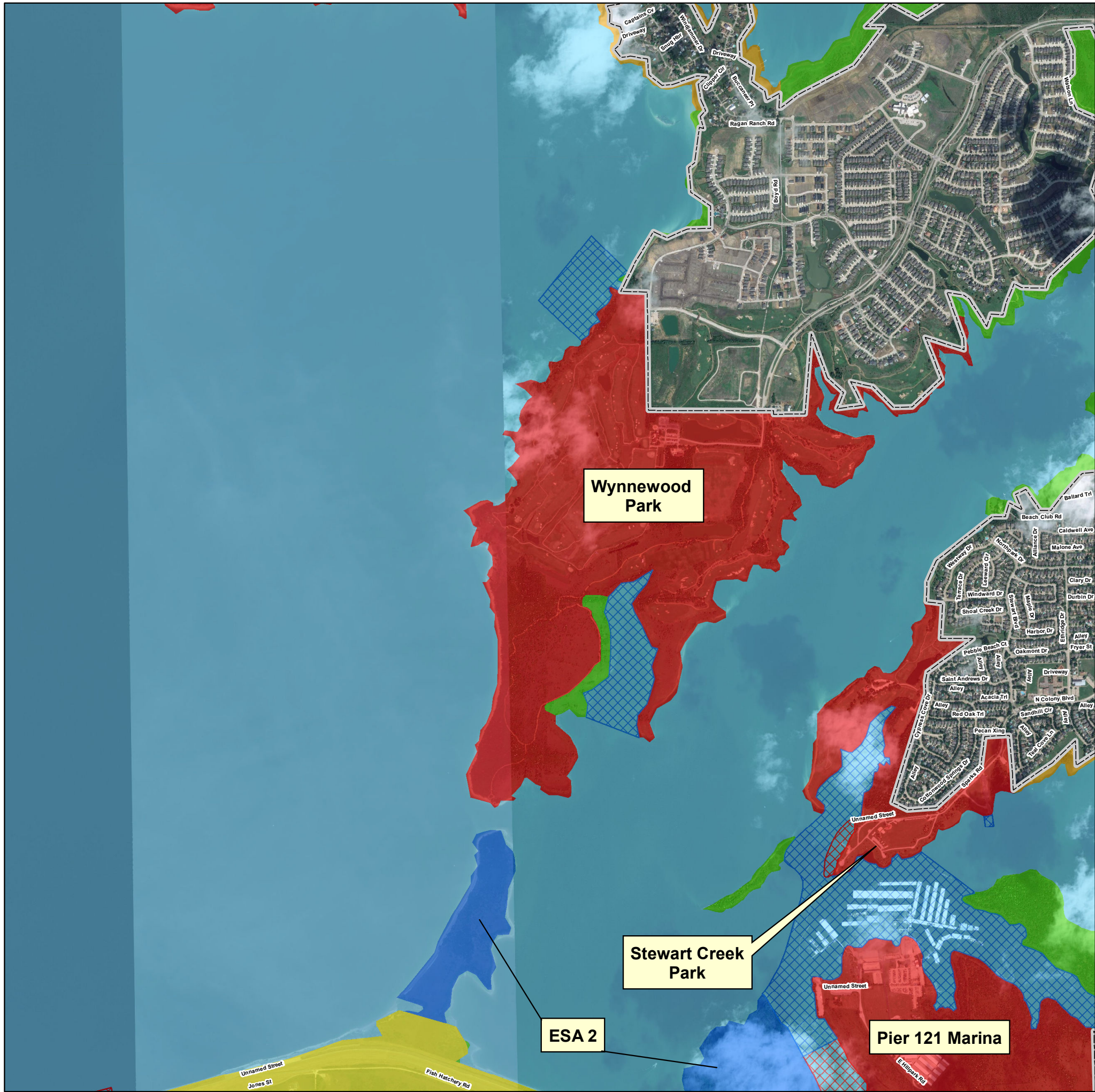
LEWISVILLE LAKE










LEWISVILLE LAKE MASTER PLAN


LAND CLASSIFICATION- SHEET 14



DATE:	MAP NO.
DECEMBER 2020	LE20MP-OC-14



-  FEE BOUNDARY
- LAND CLASSIFICATION**
-  ENVIRONMENTALLY SENSITIVE AREA
 -  HIGH DENSITY RECREATION
 -  LOW DENSITY RECREATION
 -  PROJECT OPERATIONS
 -  WILDLIFE MANAGEMENT
- WATER SURFACE**
-  OPEN RECREATION
 -  NO WAKE
 -  RESTRICTED



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

FORT WORTH DISTRICT


LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

LAND CLASSIFICATION- SHEET 15

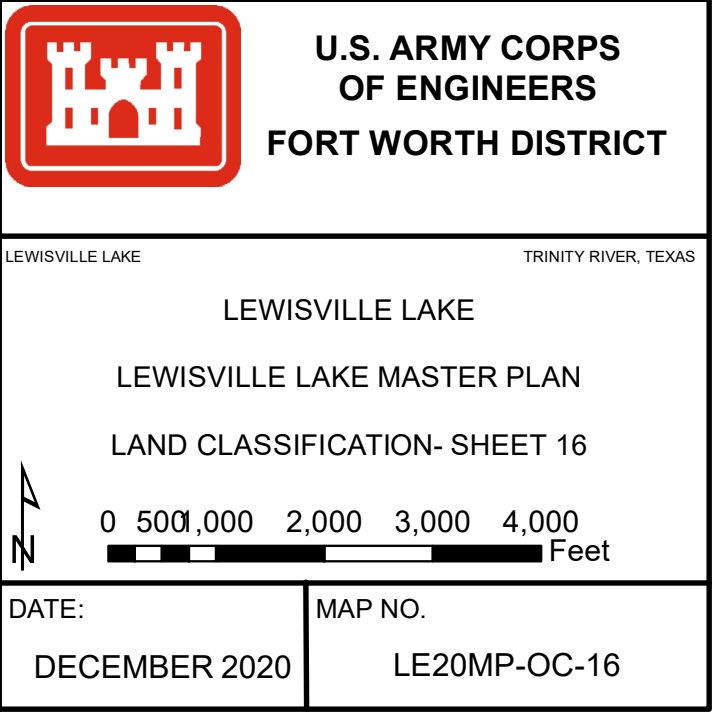
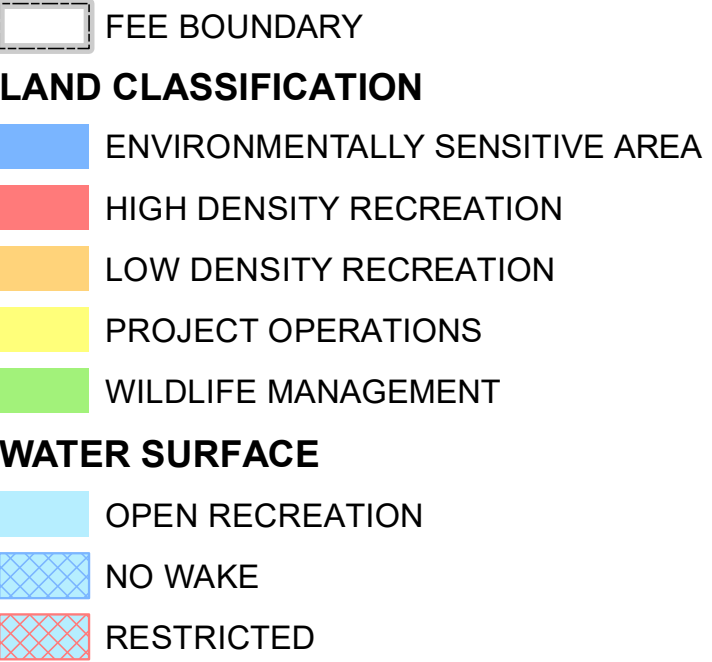
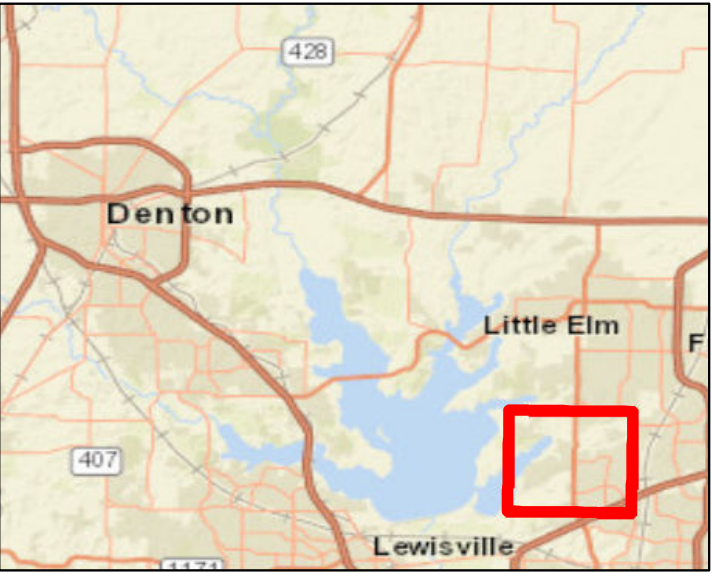
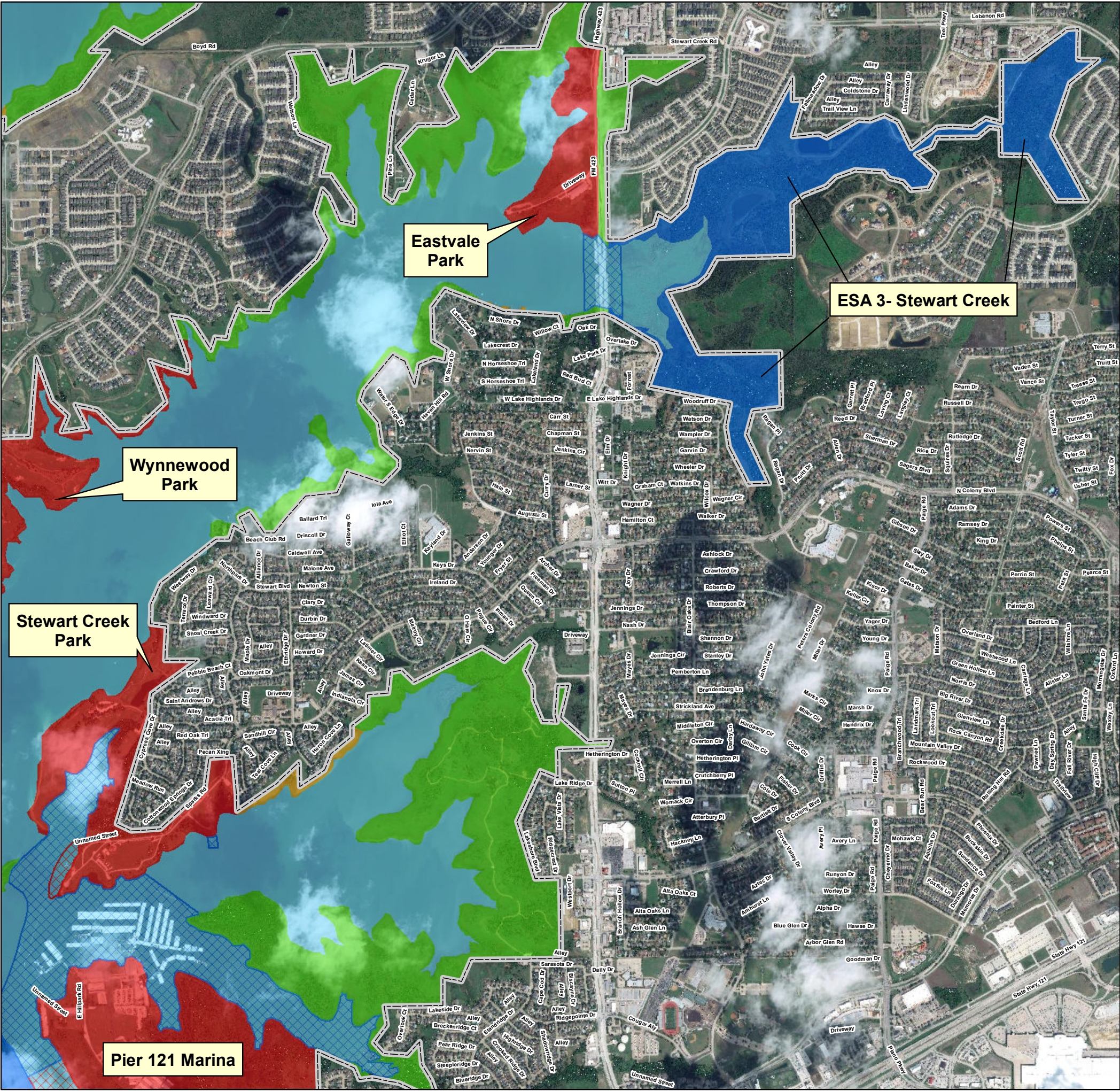


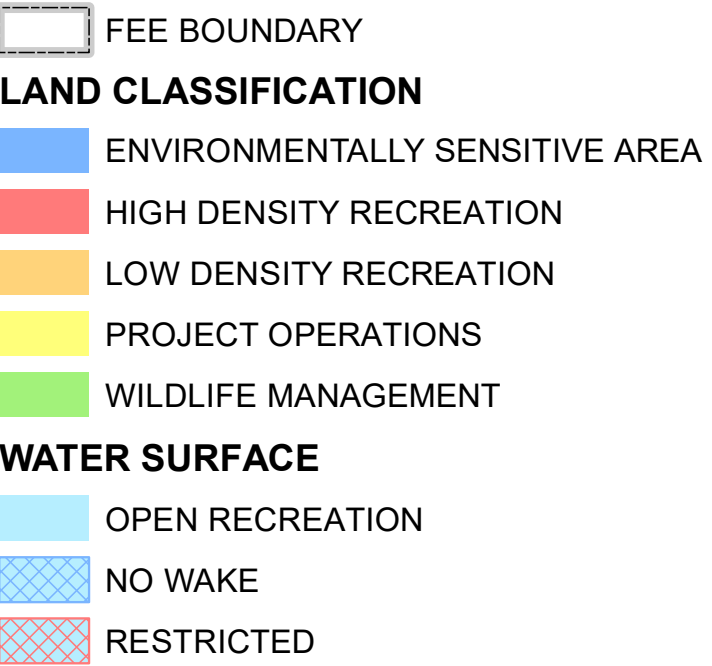
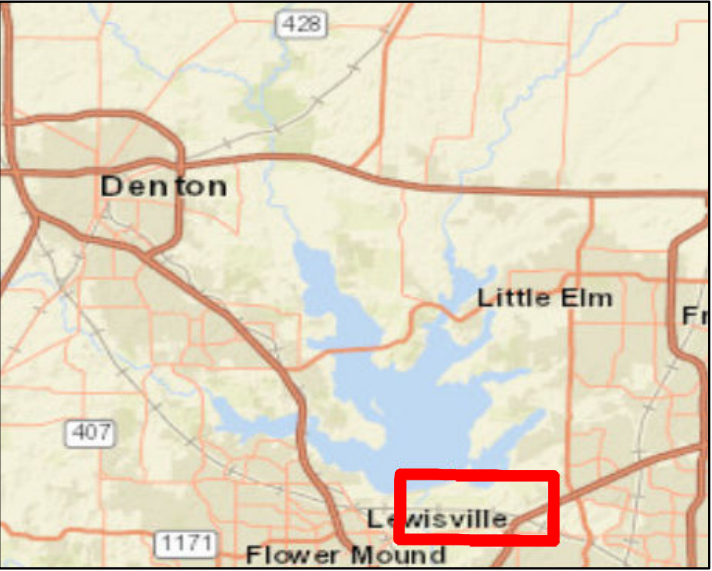
06251,2502,5003,7505,000


Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OC-15







**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

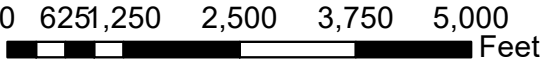
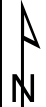
LEWISVILLE LAKE

TRINITY RIVER, TEXAS

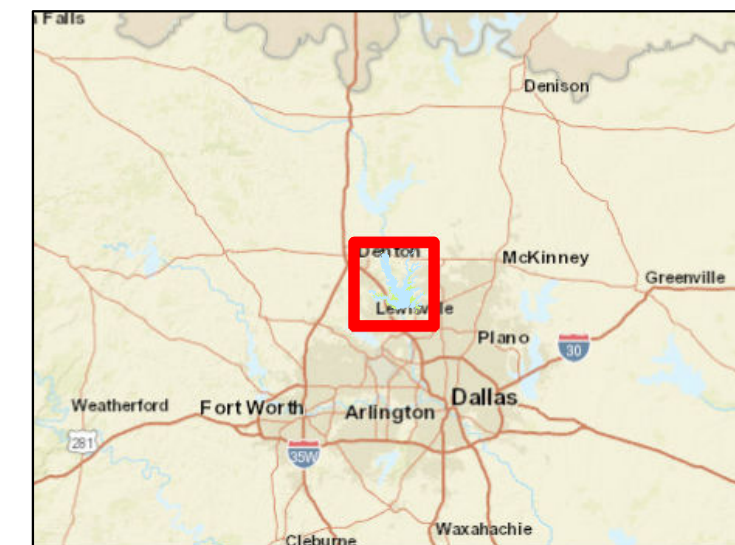
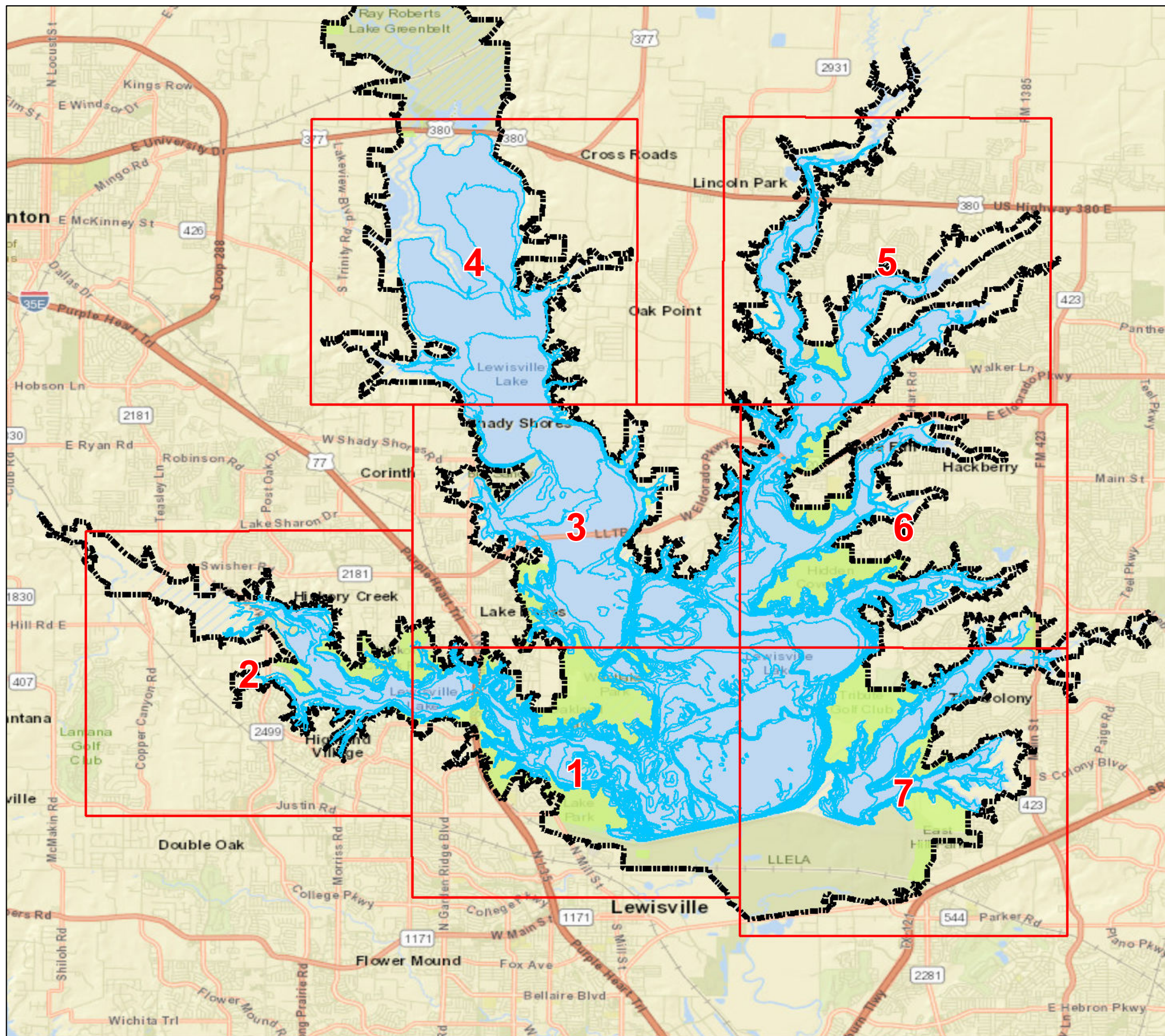
LEWISVILLE LAKE


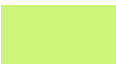

LEWISVILLE LAKE MASTER PLAN

LAND CLASSIFICATION- SHEET 17

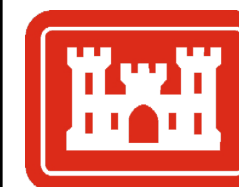


DATE:	MAP NO.
DECEMBER 2020	LE20MP-OC-17



-  FEE BOUNDARY
-  RECREATION AREA
-  DEPTH CONTOUR GRID

The contours and water depths depicted on this map are an approximation based on a fixed water surface elevation of 522.0 NGVD, and are provided only for illustrative purposes. Actual water depths may vary greatly.



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LEWISVILLE LAKE TRINITY RIVER, TEXAS

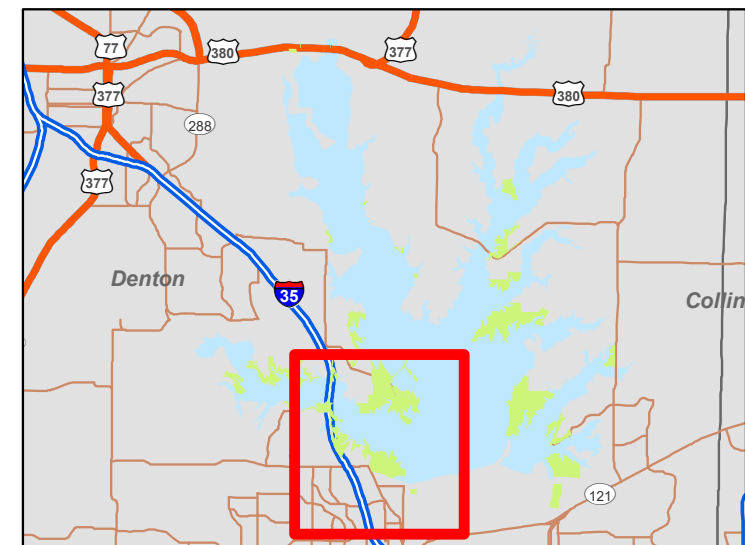
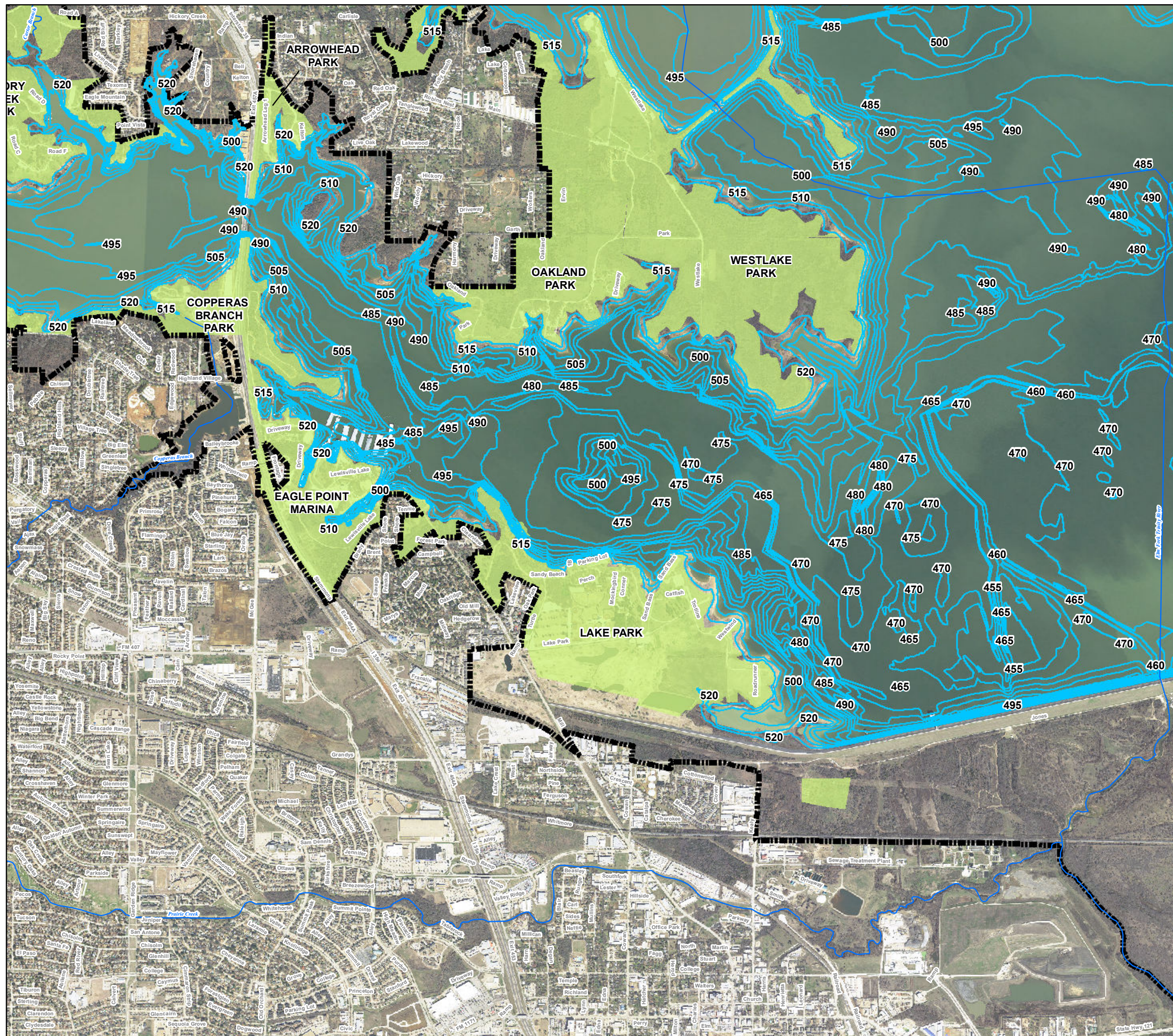
LEWISVILLE LAKE
LEWISVILLE LAKE MASTER PLAN
DEPTH CONTOUR (INDEX SHEET)






0 0.75 1.5 3
Miles

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OD-INDEX



-  FEE BOUNDARY
-  RECREATION AREA
-  DEPTH CONTOUR

The contours and water depths depicted on this map are an approximation based on a fixed water surface elevation of 522.0 NGVD, and are provided only for illustrative purposes. Actual water depths may vary greatly.



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LEWISVILLE LAKE TRINITY RIVER, TEXAS

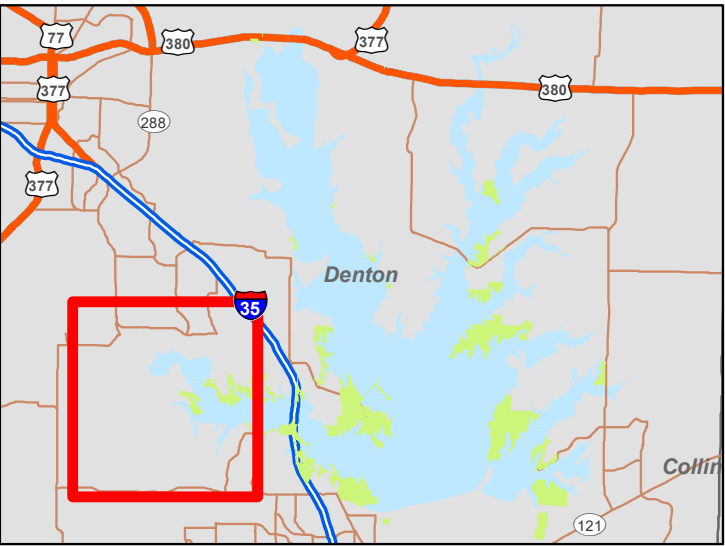
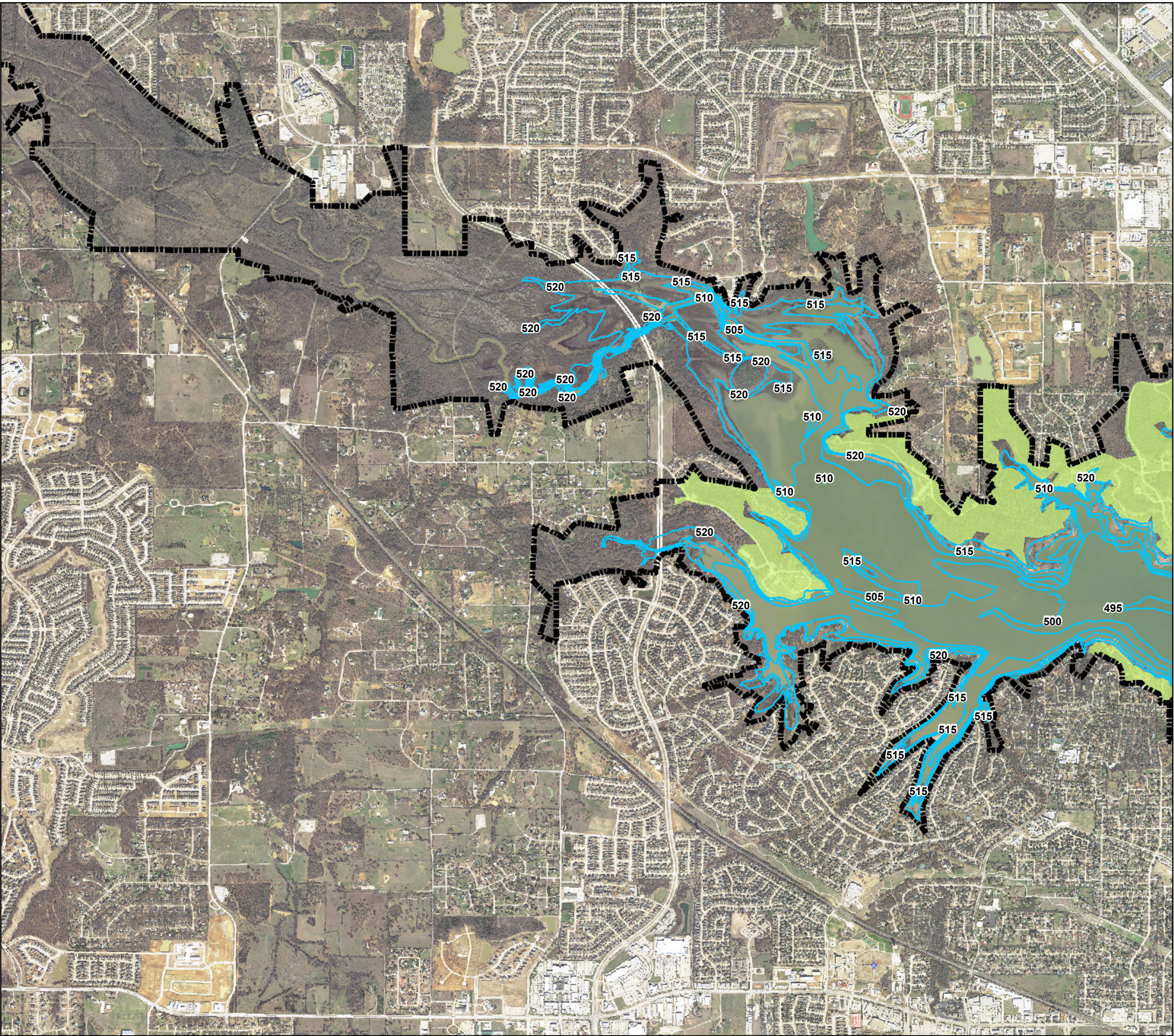
LEWISVILLE LAKE
LEWISVILLE LAKE MASTER PLAN
DEPTH CONTOUR INDEX (SHEET 1)



0 1,250 2,500 5,000
Feet


DATE:
DECEMBER 2020

MAP NO.
LE20MP-OD-01



- FEE BOUNDARY
- RECREATION AREA
- DEPTH CONTOUR

The contours and water depths depicted on this map are an approximation based on a fixed water surface elevation of 522.0 NGVD, and are provided only for illustrative purposes. Actual water depths may vary greatly.




**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

LEWISVILLE LAKETRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

DEPTH CONTOUR INDEX (SHEET 2)

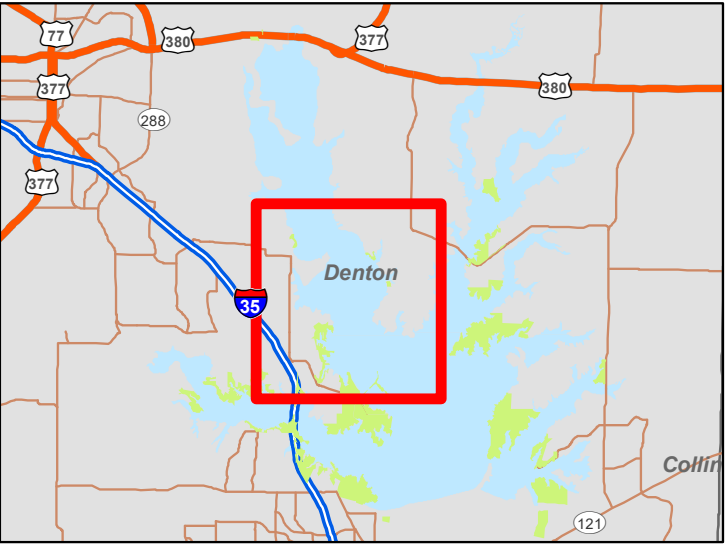
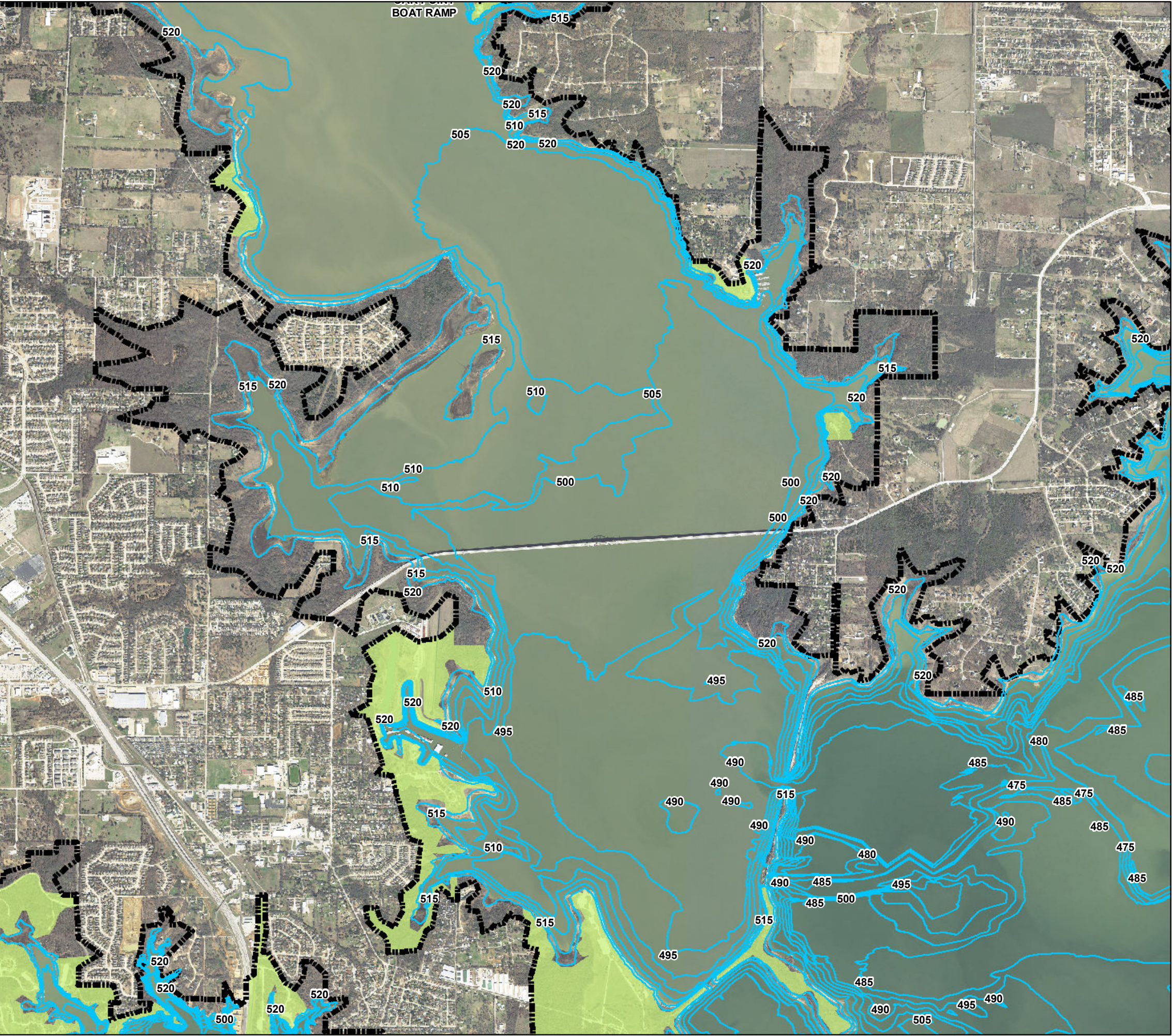





01,2502,5005,000

Feet


DATE:
DECEMBER 2020

MAP NO.
LE20MP-OD-02



-  FEE BOUNDARY
-  RECREATION AREA
-  DEPTH CONTOUR

The contours and water depths depicted on this map are an approximation based on a fixed water surface elevation of 522.0 NGVD, and are provided only for illustrative purposes. Actual water depths may vary greatly.



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

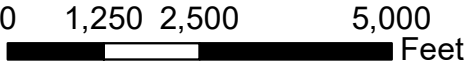

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

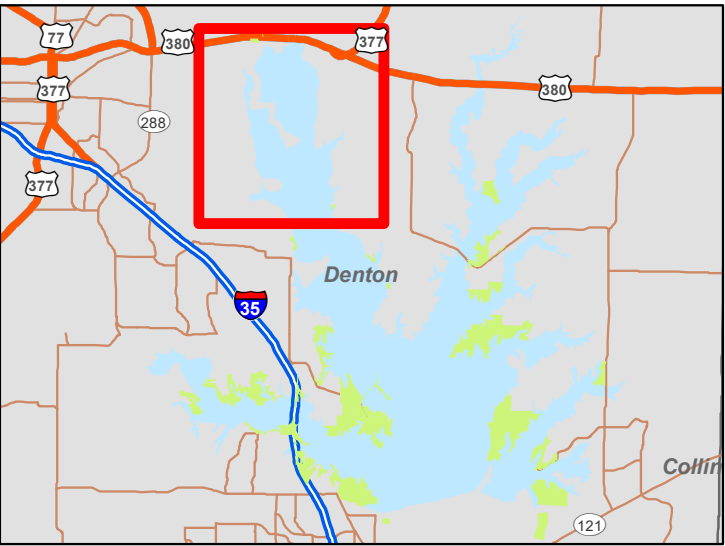
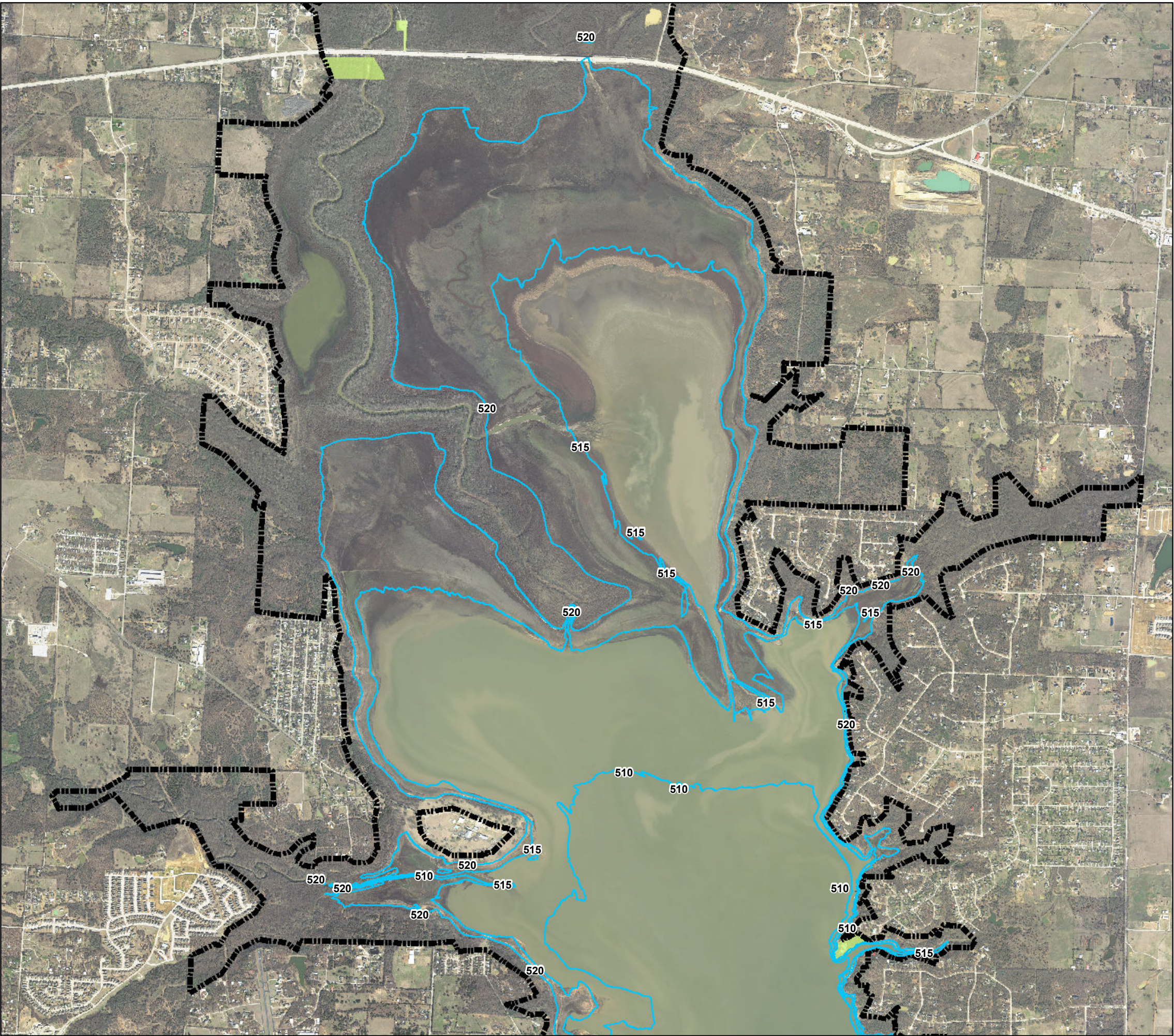
LEWISVILLE LAKE MASTER PLAN




DEPTH CONTOUR INDEX (SHEET 03)




DATE:
DECEMBER 2020

MAP NO.
LE20MP-OD-03



-  FEE BOUNDARY
-  RECREATION AREA
-  DEPTH CONTOUR

The contours and water depths depicted on this map are an approximation based on a fixed water surface elevation of 522.0 NGVD, and are provided only for illustrative purposes. Actual water depths may vary greatly.




**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

LEWISVILLE LAKETRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

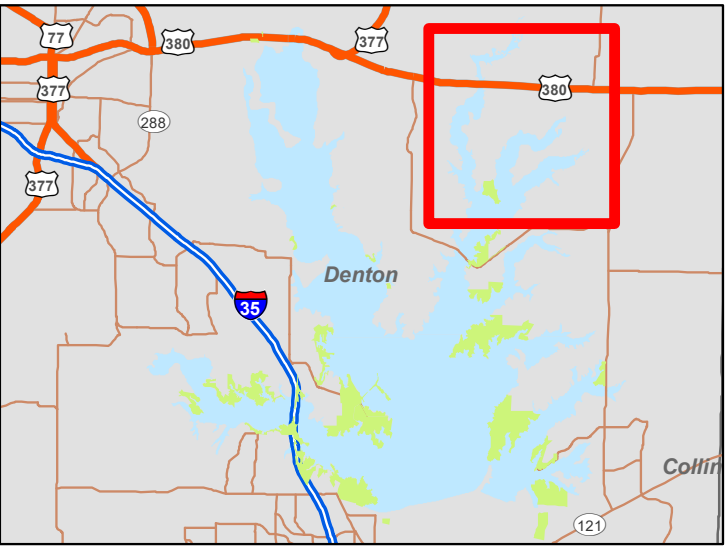
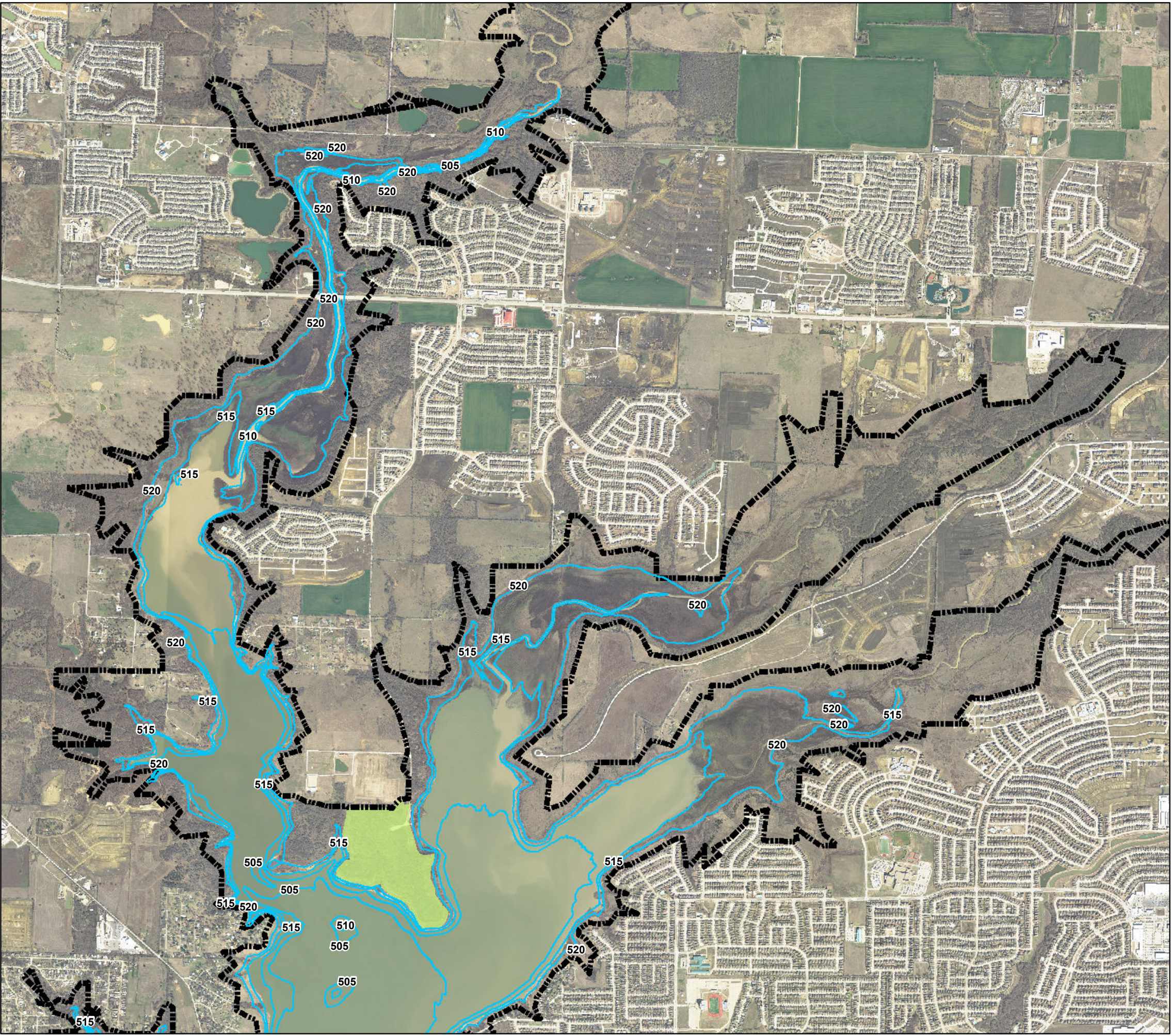
DEPTH CONTOUR INDEX (SHEET 4)






01,2502,5005,000
Feet


DATE:
DECEMBER 2020

MAP NO.
LE20MP-OD-04



-  FEE BOUNDARY
-  RECREATION AREA
-  DEPTH CONTOUR

The contours and water depths depicted on this map are an approximation based on a fixed water surface elevation of 522.0 NGVD, and are provided only for illustrative purposes. Actual water depths may vary greatly.




**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

LEWISVILLE LAKETRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

DEPTH CONTOUR INDEX (SHEET 05)

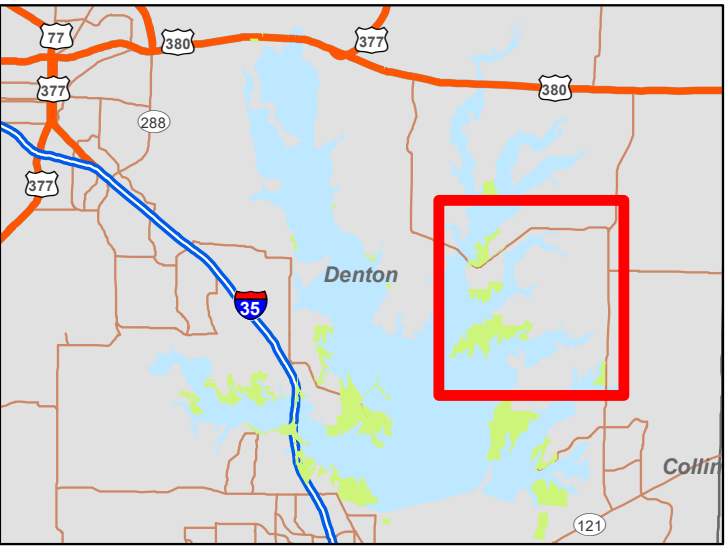
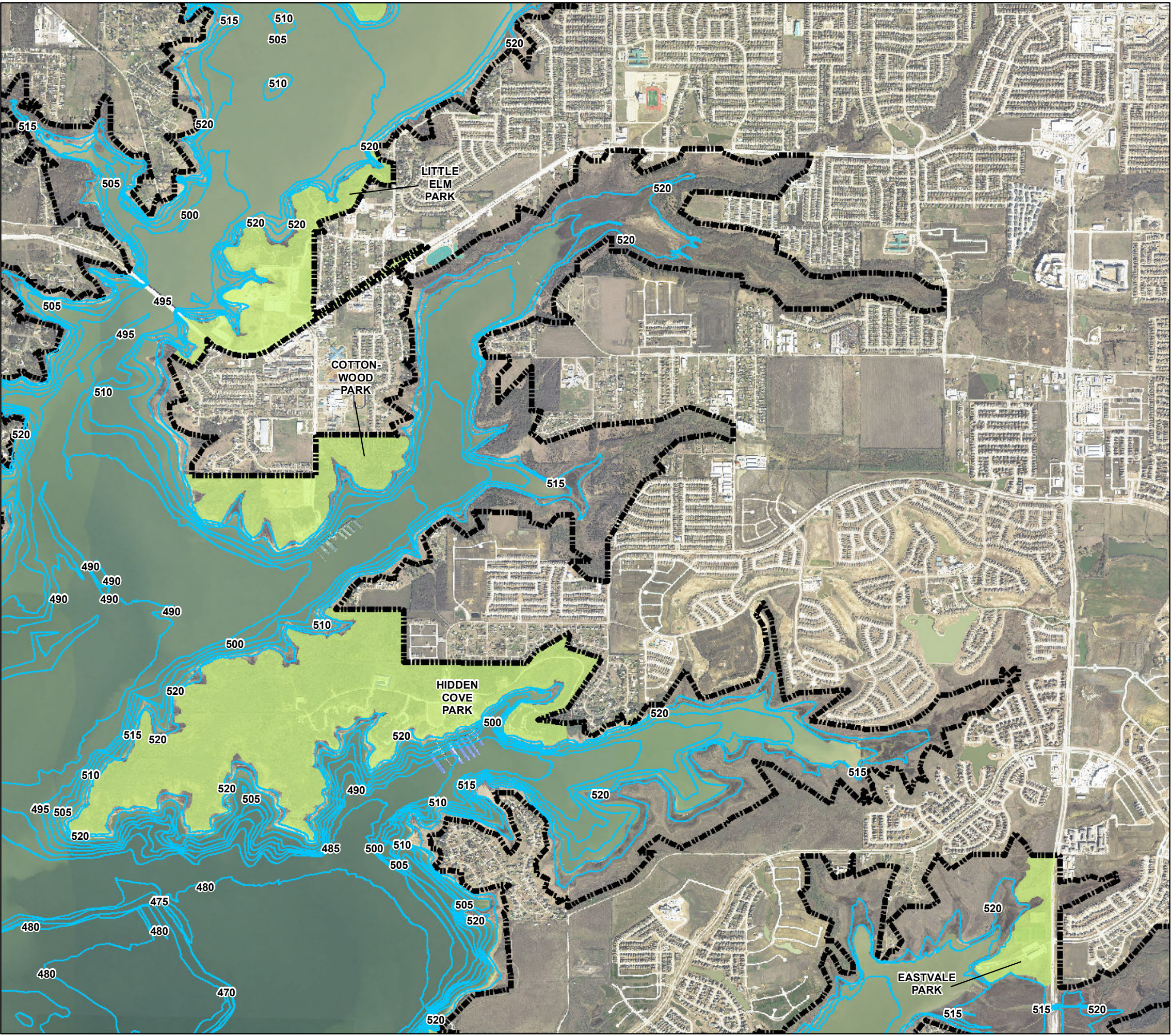





01,2502,5005,000

Feet


DATE:
DECEMBER 2020

MAP NO.
LE20MP-OD-05



-  FEE BOUNDARY
-  RECREATION AREA
-  DEPTH CONTOUR

The contours and water depths depicted on this map are an approximation based on a fixed water surface elevation of 522.0 NGVD, and are provided only for illustrative purposes. Actual water depths may vary greatly.



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

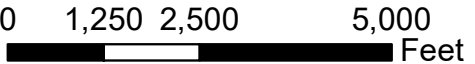

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

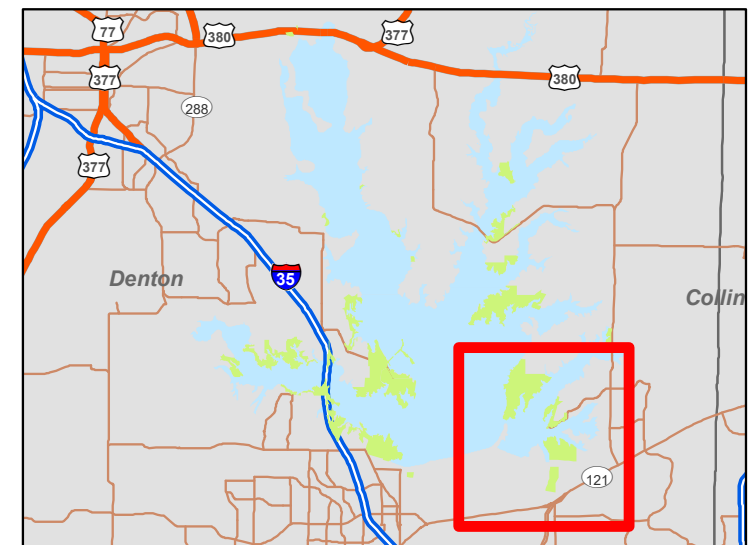
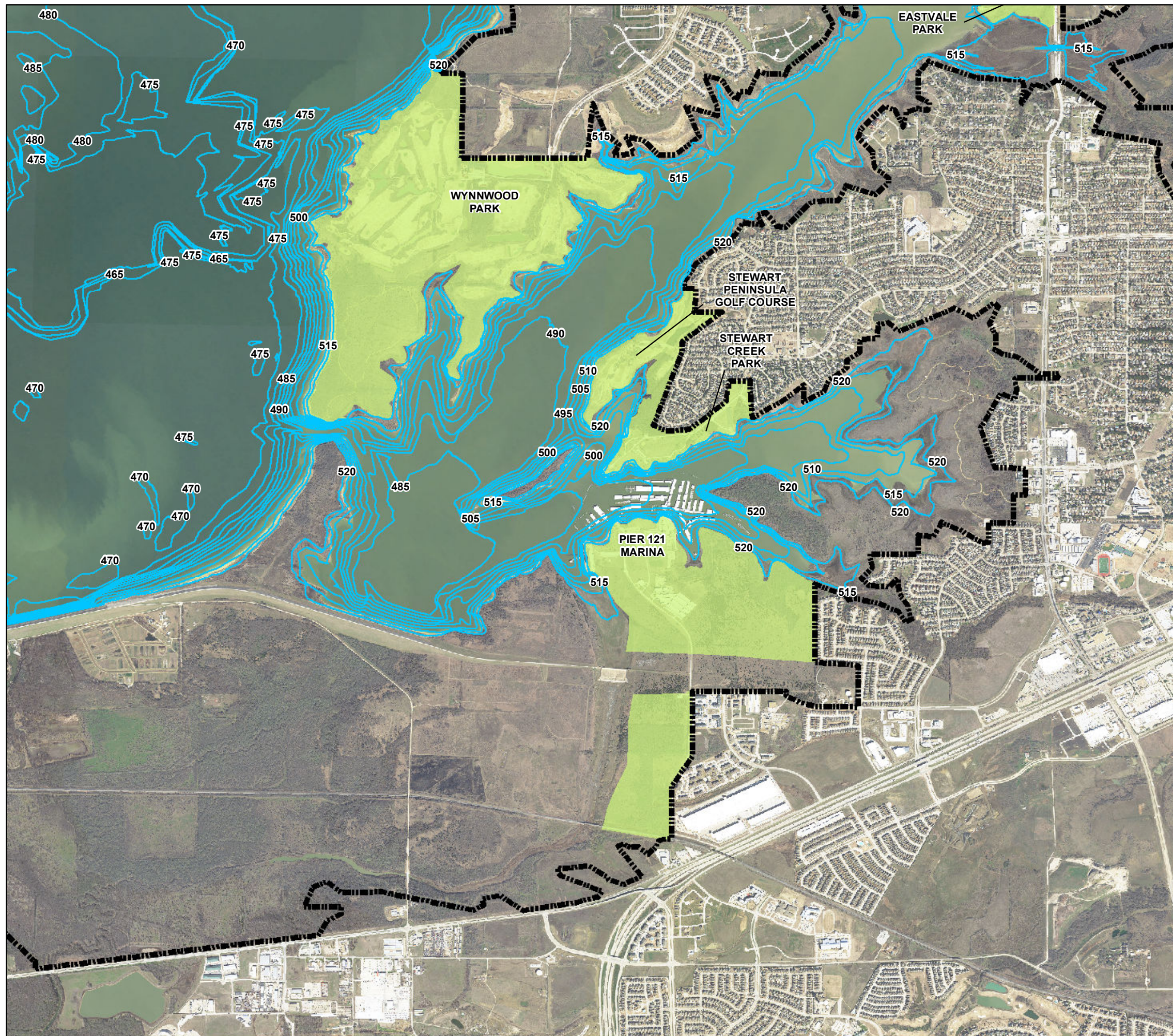
LEWISVILLE LAKE MASTER PLAN




DEPTH CONTOUR INDEX (SHEET 06)



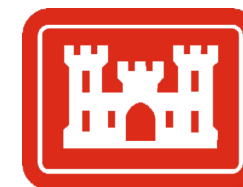
DATE:
DECEMBER 2020

MAP NO.
LE20MP-OD-06



-  FEE BOUNDARY
-  RECREATION AREA
-  DEPTH CONTOUR

The contours and water depths depicted on this map are an approximation based on a fixed water surface elevation of 522.0 NGVD, and are provided only for illustrative purposes. Actual water depths may vary greatly.



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LEWISVILLE LAKE TRINITY RIVER, TEXAS

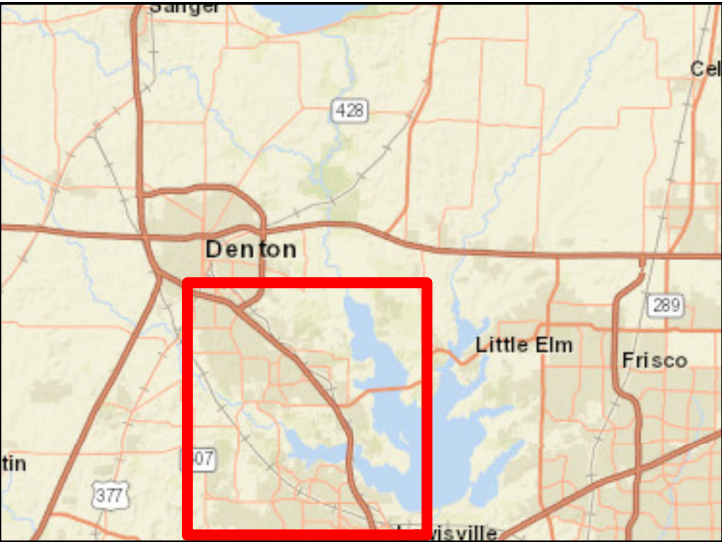
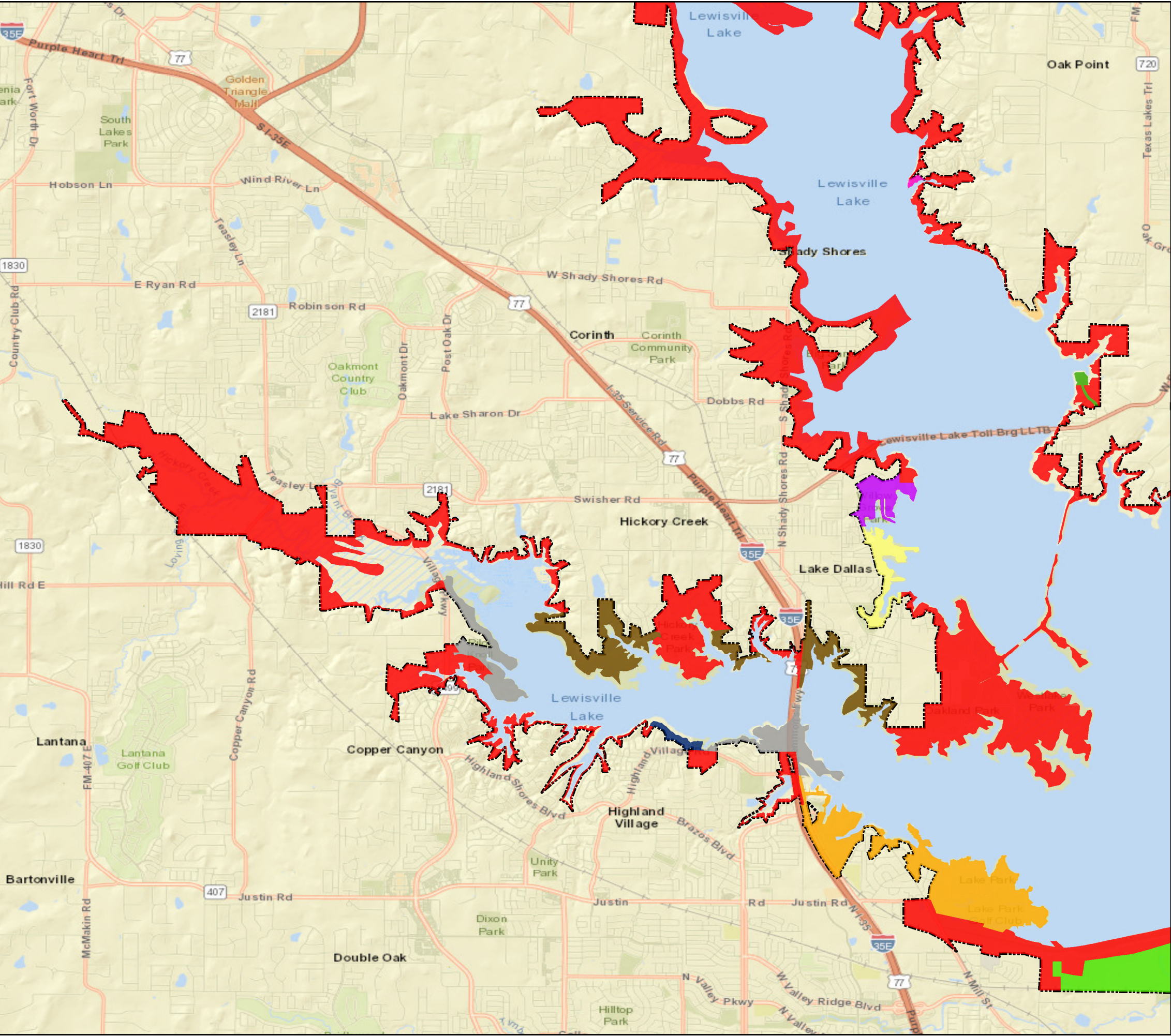
LEWISVILLE LAKE
LEWISVILLE LAKE MASTER PLAN
DEPTH CONTOUR INDEX (SHEET 07)





















0 1,250 2,500 5,000
Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OD-07



-  PROJECT BOUNDARY
- MANAGING ENTITY**
-  USACE
 -  SAFE HARBOR MARINAS
 -  CITY OF DENTON
 -  CITY OF HICKORY CREEK
 -  CITY OF HIGHLAND VILLAGE
 -  CITY OF LAKE DALLAS
 -  CITY OF LEWISVILLE
 -  CITY OF LITTLE ELM
 -  CITY OF OAK POINT
 -  CITY OF THE COLONY
 -  DALLAS CORINTHIAN YACHT CLUB
 -  LAKEVIEW MARINA
 -  LEWISVILLE LAKE ENVIRONMENTAL LEARNING AREA
 -  TEXAS PARKS AND WILDLIFE
 -  UNIVERSITY OF NORTH TEXAS
 -  YMCA



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

FORT WORTH DISTRICT



LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

LAND MANAGING ENTITIES (SHEET 01)

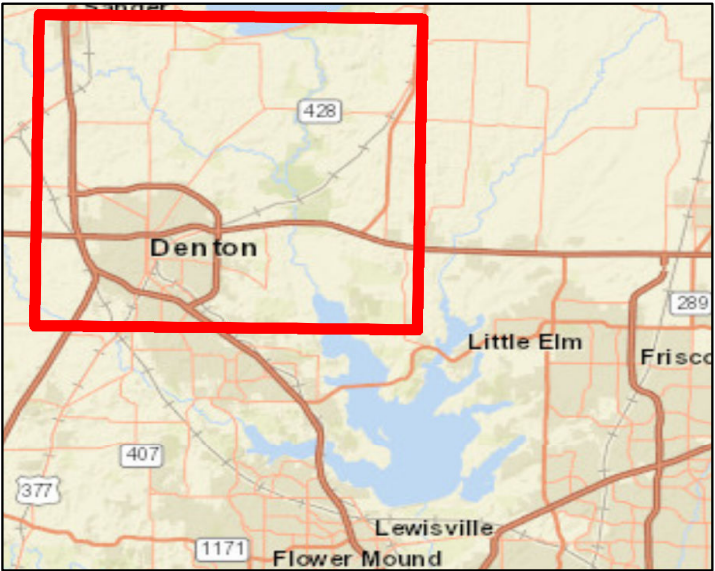
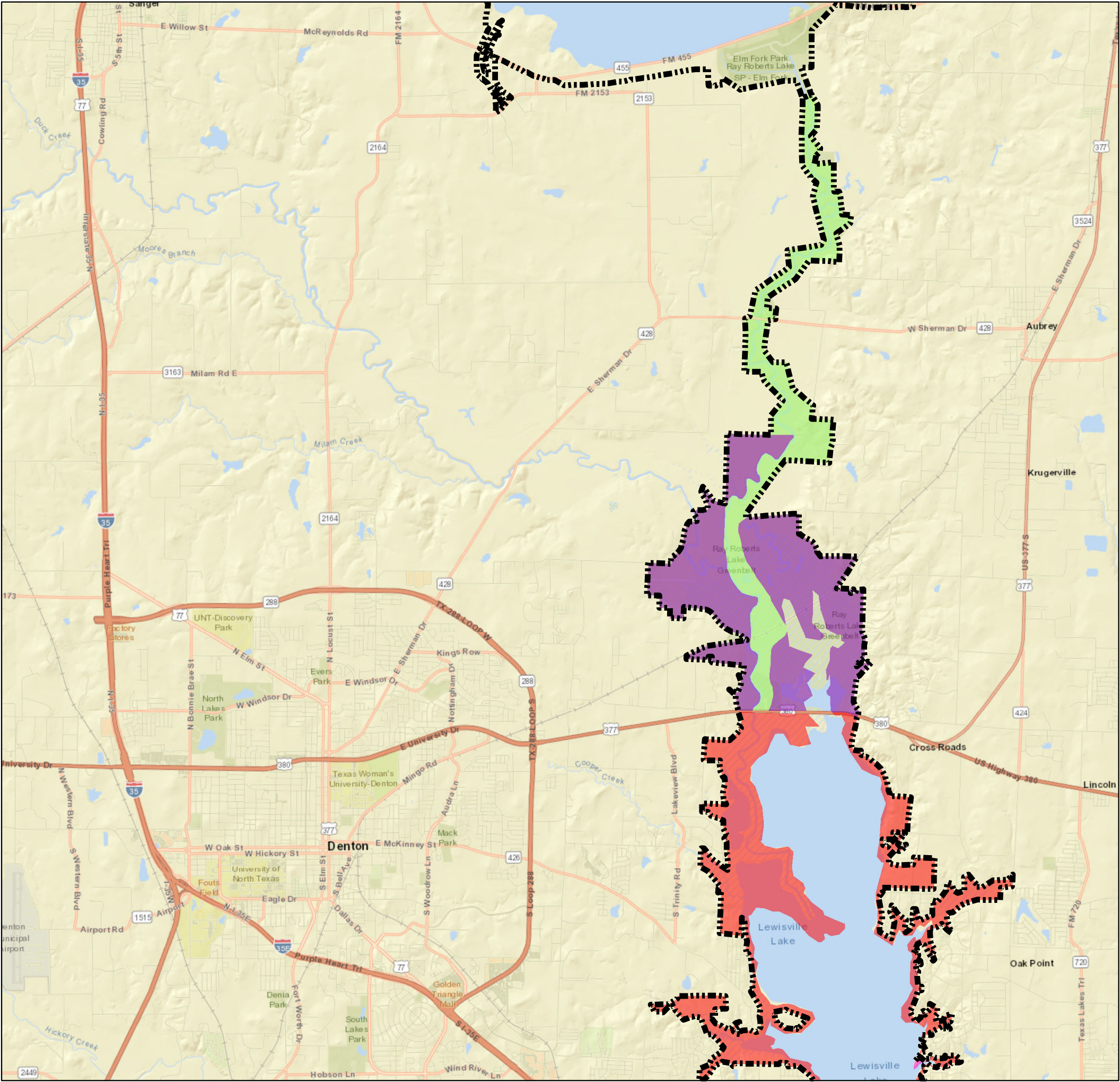


DATE:

DECEMBER 2020

MAP NO.

LE20MP-OL-01



- PROJECT BOUNDARY**
- MANAGING ENTITY**
- USACE
 - SAFE HARBOR MARINAS
 - CITY OF DENTON
 - CITY OF HICKORY CREEK
 - CITY OF HIGHLAND VILLAGE
 - CITY OF LAKE DALLAS
 - CITY OF LEWISVILLE
 - CITY OF LITTLE ELM
 - CITY OF OAK POINT
 - CITY OF THE COLONY
 - DALLAS CORINTHIAN YACHT CLUB
 - LAKEVIEW MARINA
 - LEWISVILLE LAKE ENVIRONMENTAL LEARNING AREA
 - TEXAS PARKS AND WILDLIFE
 - YMCA



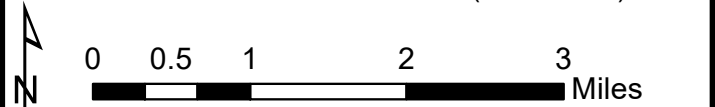
**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LEWISVILLE LAKE TRINITY RIVER, TEXAS

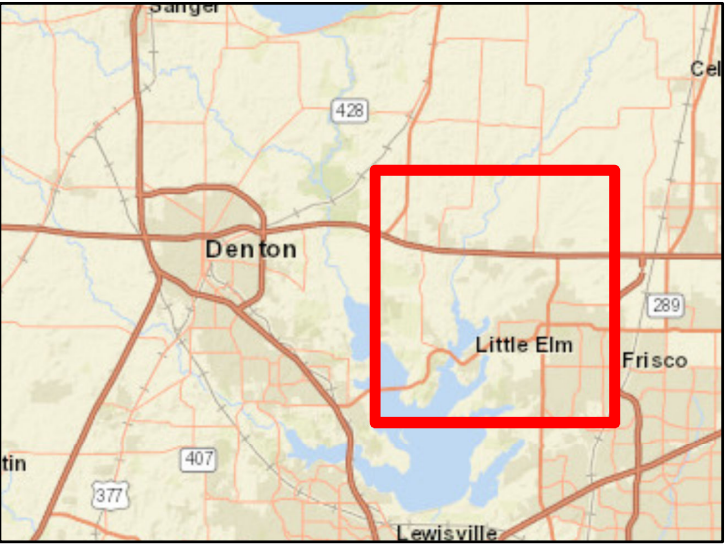
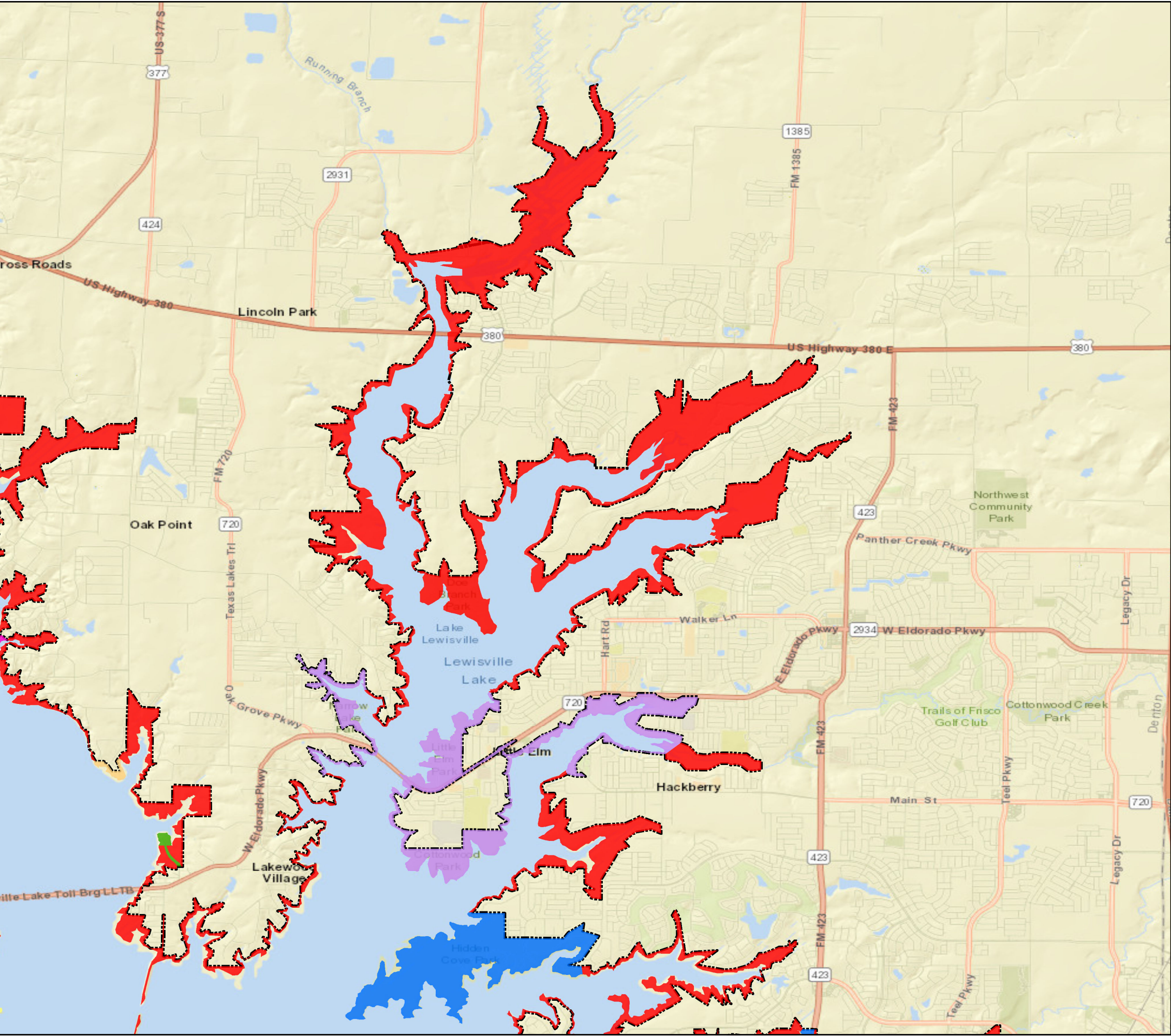
LEWISVILLE LAKE


















LEWISVILLE LAKE MASTER PLAN


LAND MANAGING ENTITIES (SHEET 02)



DATE: DECEMBER 2020	MAP NO. LE20MP-OL-02
------------------------	-------------------------



-  PROJECT BOUNDARY
- MANAGING ENTITY**
-  USACE
 -  SAFE HARBOR MARINAS
 -  CITY OF DENTON
 -  CITY OF HICKORY CREEK
 -  CITY OF HIGHLAND VILLAGE
 -  CITY OF LAKE DALLAS
 -  CITY OF LEWISVILLE
 -  CITY OF LITTLE ELM
 -  CITY OF OAK POINT
 -  CITY OF THE COLONY
 -  DALLAS CORINTHIAN YACHT CLUB
 -  LAKEVIEW MARINA
 -  LEWISVILLE LAKE ENVIRONMENTAL LEARNING AREA
 -  TEXAS PARKS AND WILDLIFE
 -  UNIVERSITY OF NORTH TEXAS
 -  YMCA



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

FORT WORTH DISTRICT



LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

LAND MANAGING ENTITIES (SHEET 03)

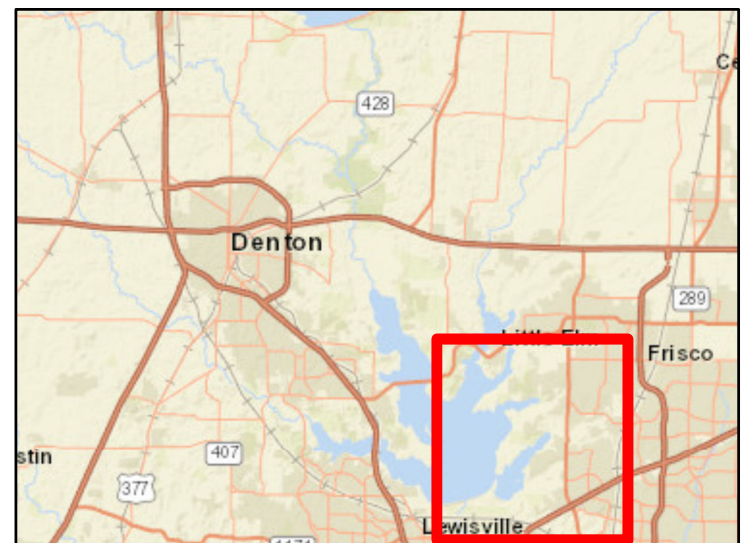
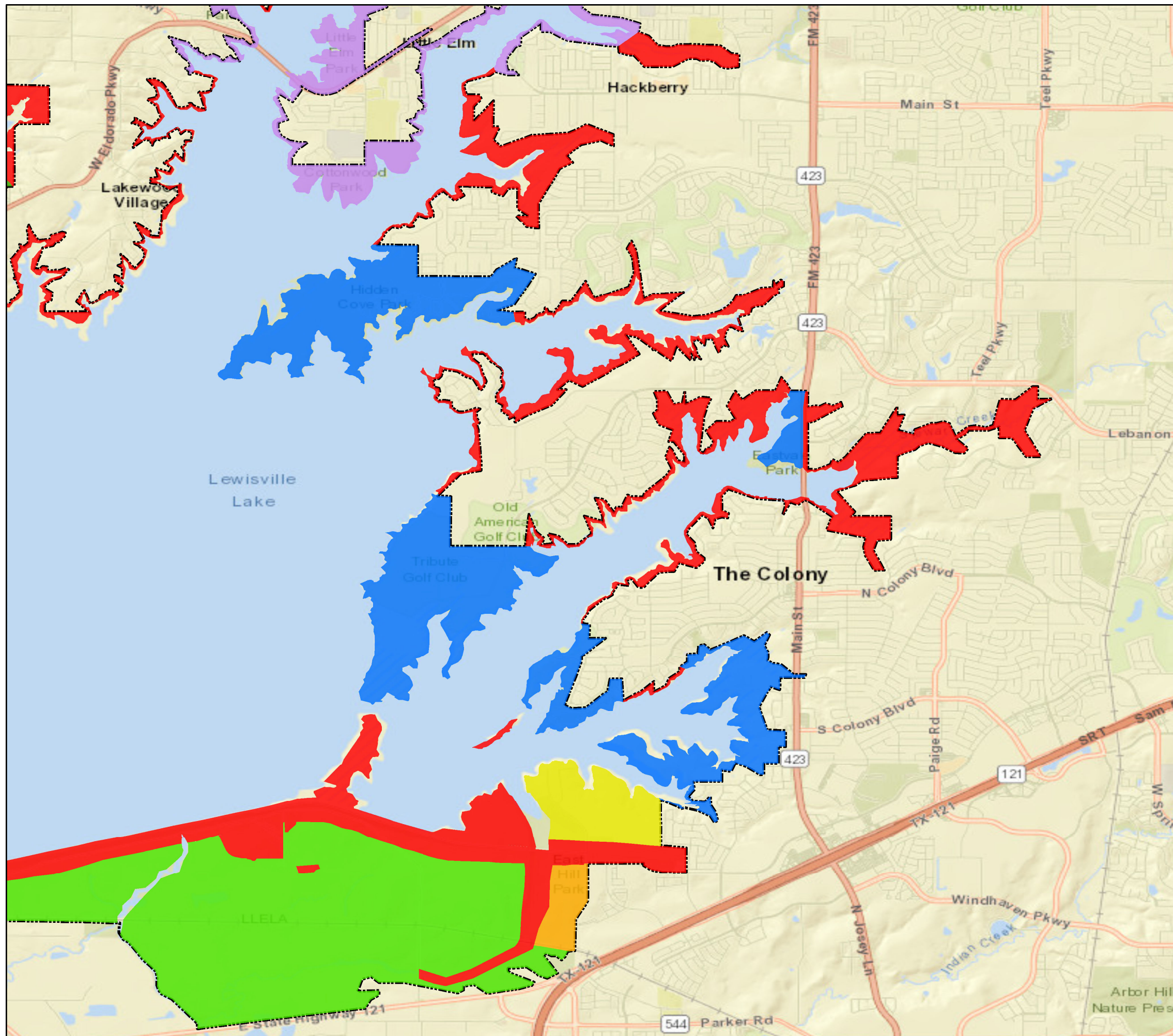


DATE:

DECEMBER 2020

MAP NO.

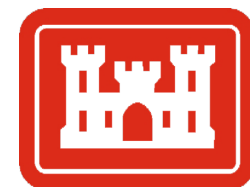
LE20MP-OL-03



 PROJECT BOUNDARY

MANAGING ENTITY

-  USACE
-  SAFE HARBOR MARINAS
-  CITY OF DENTON
-  CITY OF HICKORY CREEK
-  CITY OF HIGHLAND VILLAGE
-  CITY OF LAKE DALLAS
-  CITY OF LEWISVILLE
-  CITY OF LITTLE ELM
-  CITY OF OAK POINT
-  CITY OF THE COLONY
-  DALLAS CORINTHIAN YACHT CLUB
-  LAKEVIEW MARINA
-  LEWISVILLE LAKE ENVIRONMENTAL LEARNING AREA
-  TEXAS PARKS AND WILDLIFE
-  UNIVERSITY OF NORTH TEXAS
-  YMCA



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LEWISVILLE LAKE TRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

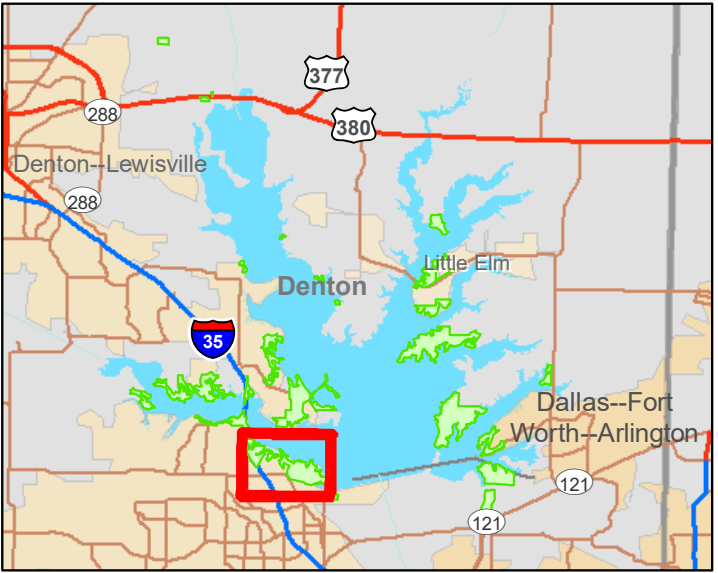
LAND MANAGING ENTITIES (SHEET 04)



0 0.5 1 2 Miles

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OL-04



FACILITY TOTALS	
ITEM	EXISTING
PICNIC SITE	14
RV CAMPSITES	66
BOAT RAMP	4
COURTESY DOCK	4
RESTROOM	1
MARINA	1
FISHING DOCK	1
FUEL STATION	1
GATEHOUSE	1
PLAYGROUND	1
ATHLETIC AREA	18



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LEWISVILLE LAKE TRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

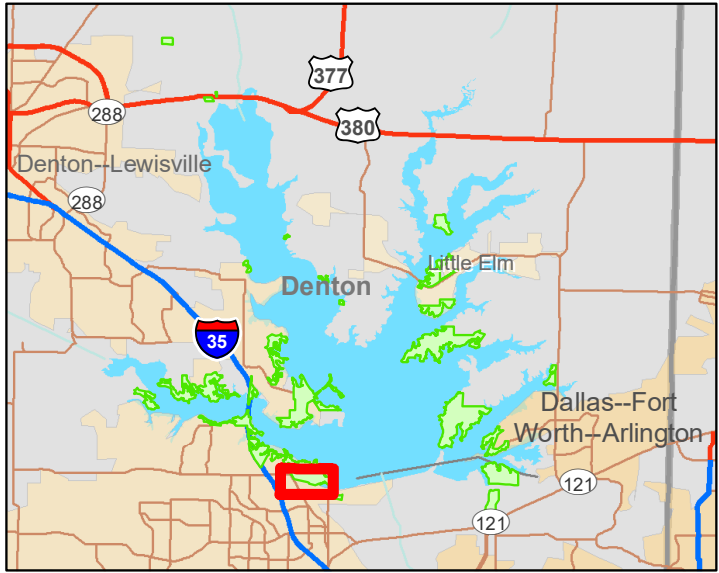
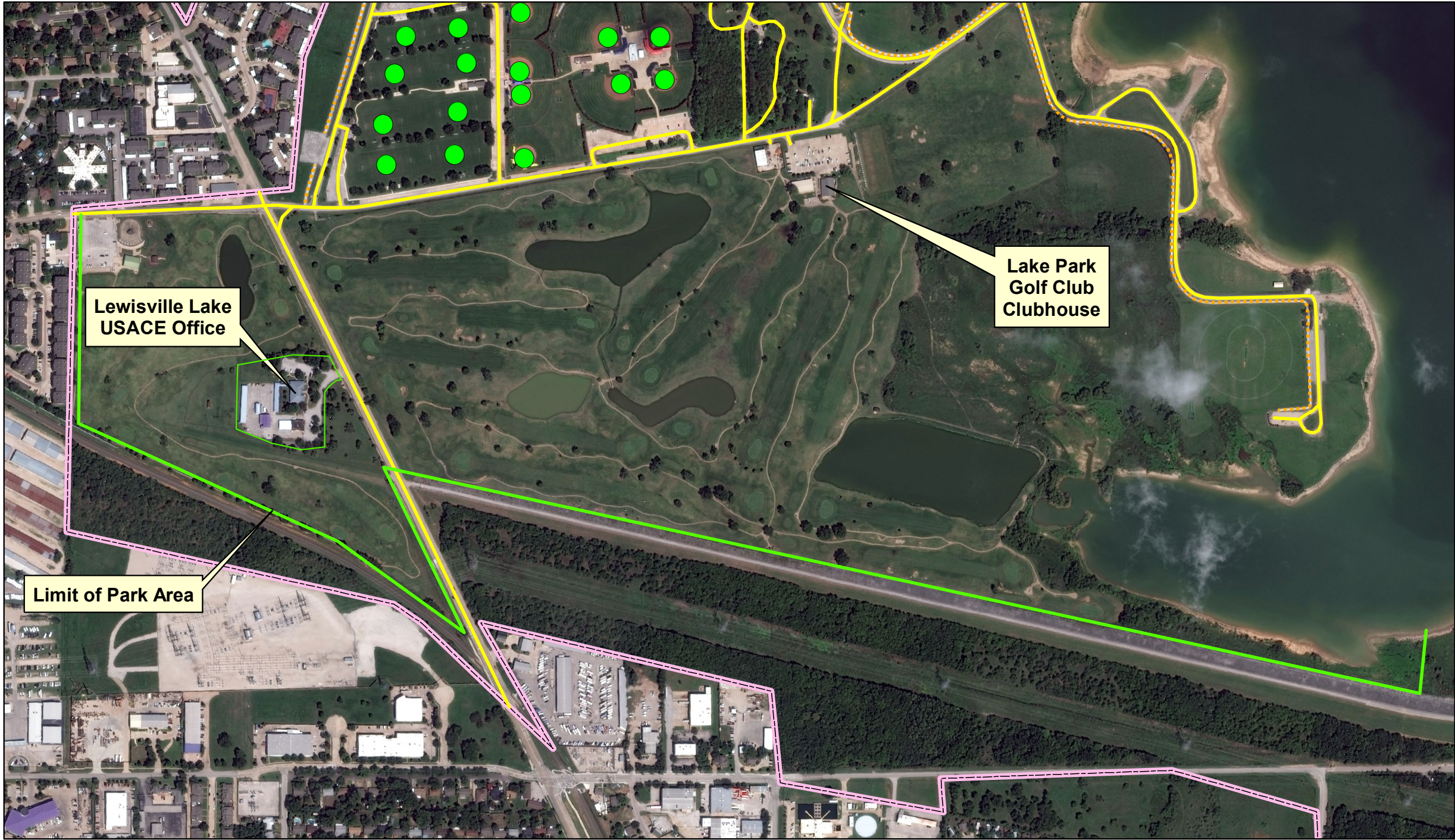
RECREATIONAL MAP-
(LEWISVILLE LAKE PARK-
LEASED TO CITY OF LEWISVILLE)



0 300 600 1,200 1,800 2,400
Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-LP-INDEX



- FEE BOUNDARY
- RECREATION TRAIL
- LIMIT OF PARK AREA
- ATHLETIC AREA



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LEWISVILLE LAKE TRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

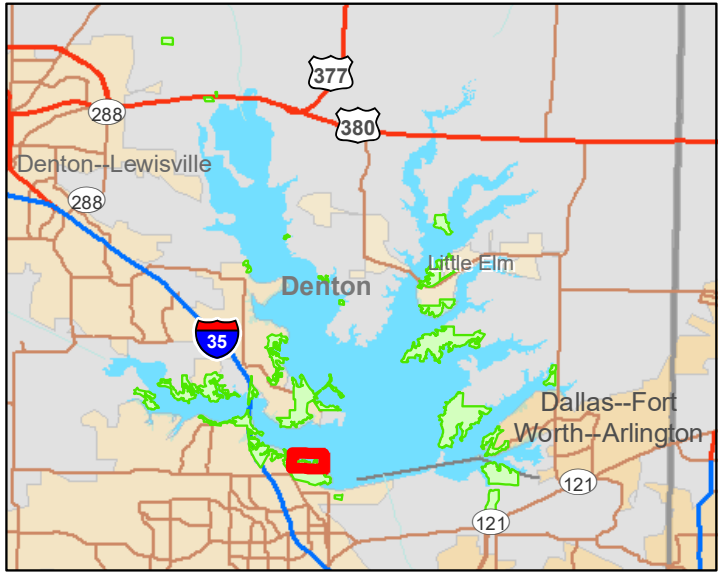
RECREATIONAL MAP-
(LEWISVILLE LAKE PARK-
LEASED TO CITY OF LEWISVILLE)



0 175 350 700 1,050 1,400 Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-LP-01



- FEE BOUNDARY
- RECREATION TRAIL
- PICNIC SITE
- BOAT RAMP
- COURTESY DOCK
- RESTROOM
- PLAYGROUND
- ATHLETIC AREA



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LEWISVILLE LAKE TRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

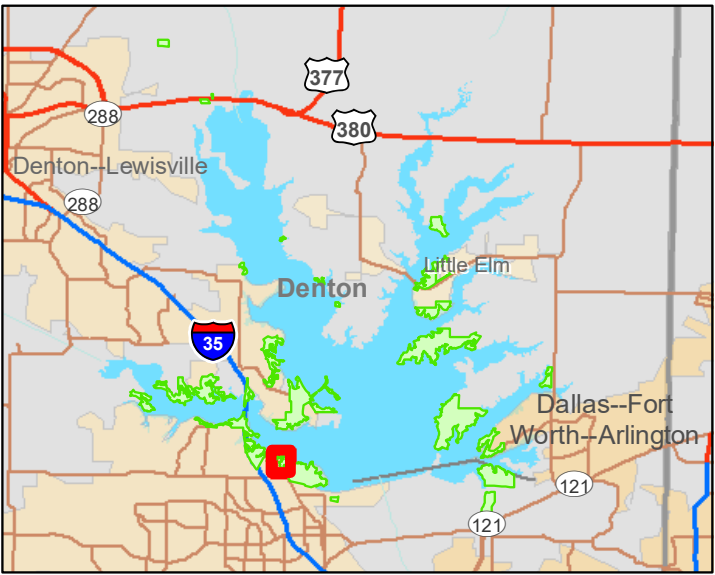
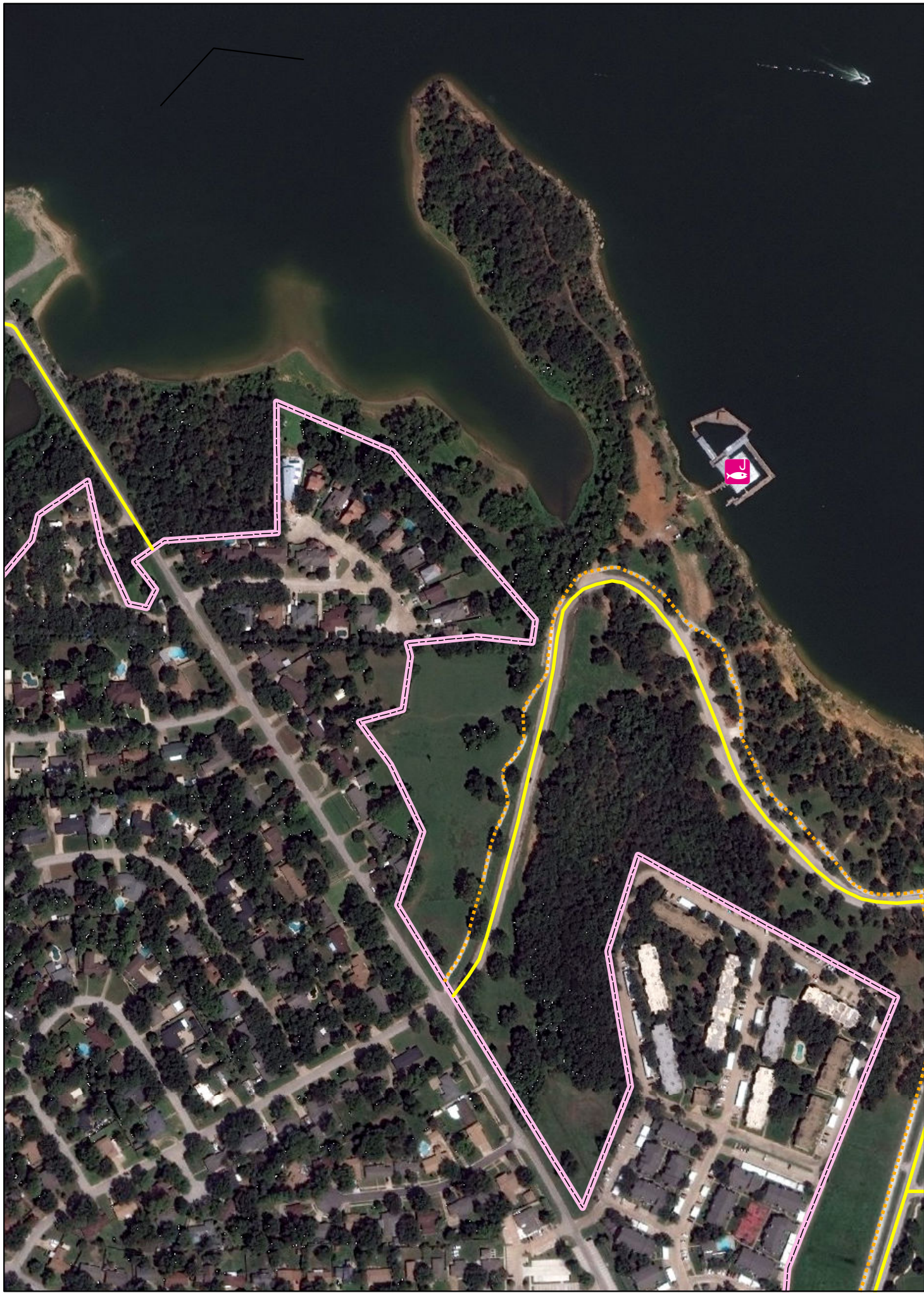
RECREATIONAL MAP-
(LEWISVILLE LAKE PARK-
LEASED TO CITY OF LEWISVILLE)







0 100 200 400 600 800 Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-LP-02



-  FEE BOUNDARY
-  RECREATION TRAIL
-  FISHING DOCK



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

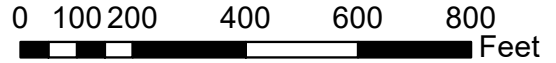

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

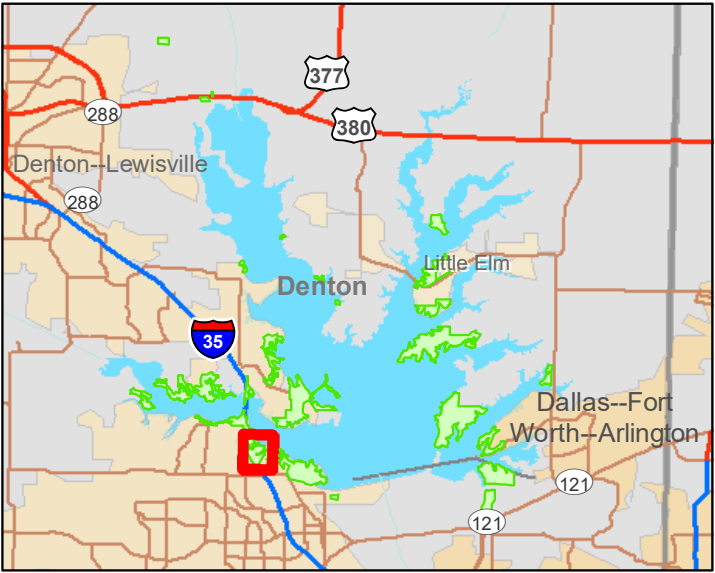
LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(LEWISVILLE LAKE PARK-
LEASED TO CITY OF LEWISVILLE)




DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-LP-03



- FEE BOUNDARY
- RECREATION TRAIL
- LIMIT OF PARK AREA
- BOAT RAMP
- COURTESY DOCK
- MARINA
- FUEL STATION



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

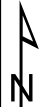
LEWISVILLE LAKE

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(LEWISVILLE LAKE PARK-
LEASED TO CITY OF LEWISVILLE)

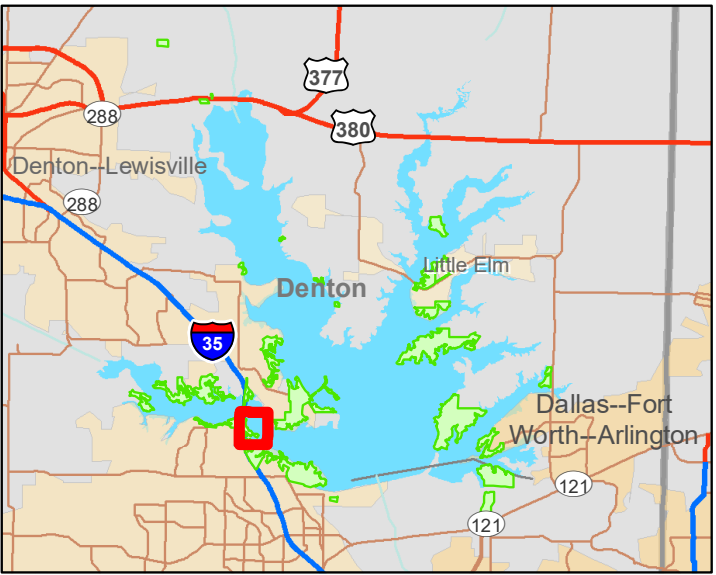


0 175 350 700 1,050 1,400






Feet


DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-LP-04



FACILITY TOTALS	
ITEM	EXISTING
BOAT RAMP	1
COURTESY DOCK	1
RESTROOM	1

-  FEE BOUNDARY
-  RECREATION TRAIL
-  BOAT RAMP
-  COURTESY DOCK
-  RESTROOM



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT


LEWISVILLE LAKE

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(TOWER BAY ACCESS AREA-
LEASED TO CITY OF LEWISVILLE)

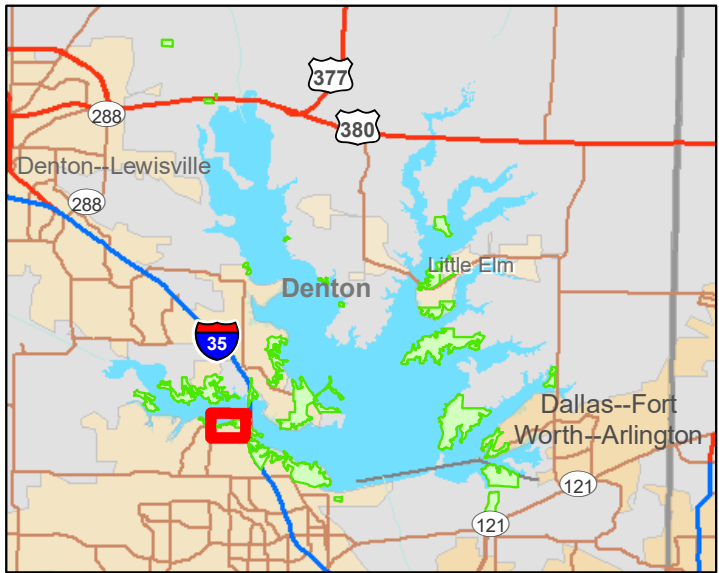
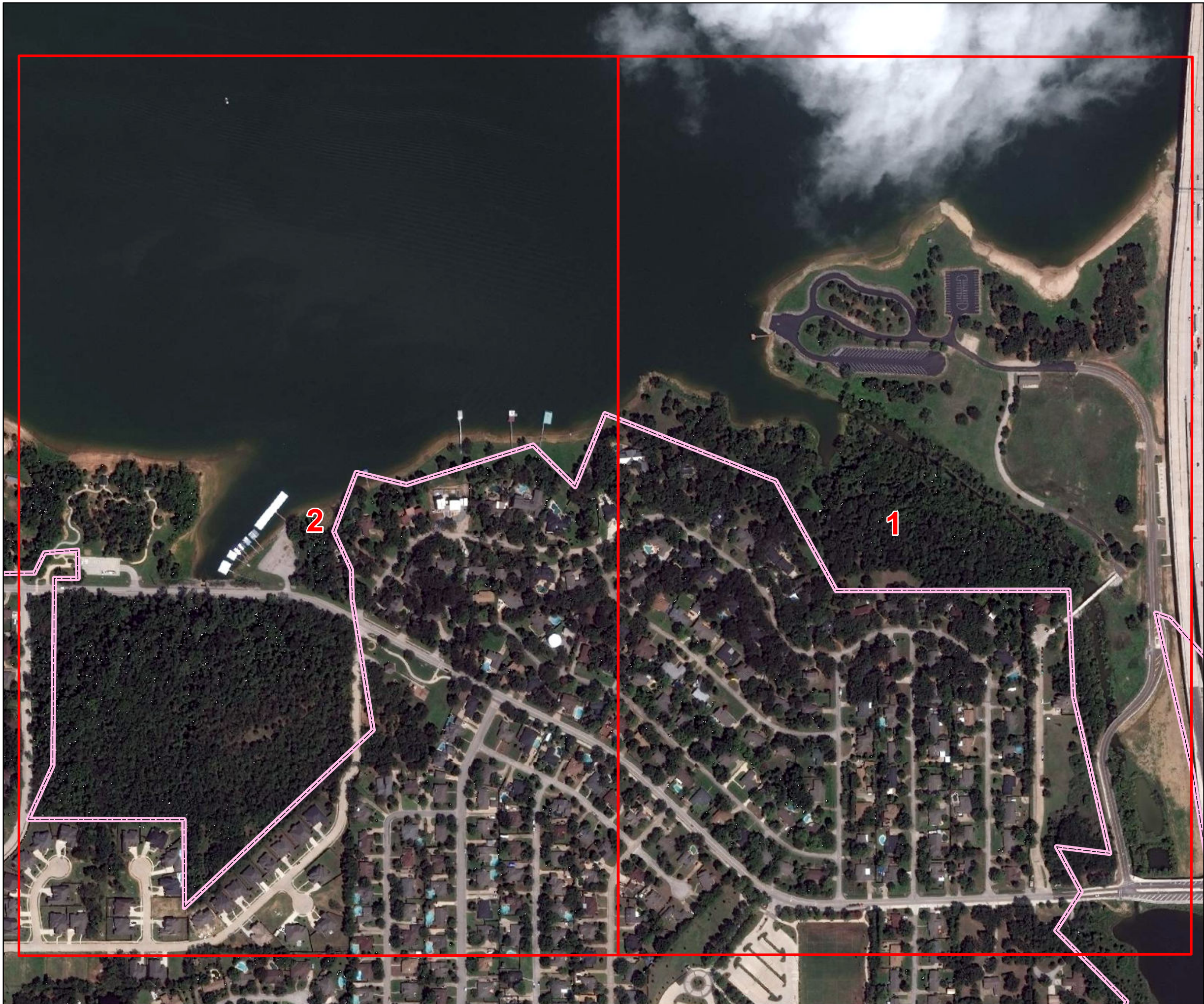


0 175 350 700 1,050 1,400

Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-TB



FACILITY TOTALS	
ITEM	EXISTING
PICNIC SITE	17
GROUP PICNIC SHELTER	2
BOAT RAMP	1
COURTESY DOCK	1
RESTROOM	2
GATEHOUSE	1
SWIM AREA	1



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LEWISVILLE LAKE LEWISVILLE LAKE TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN

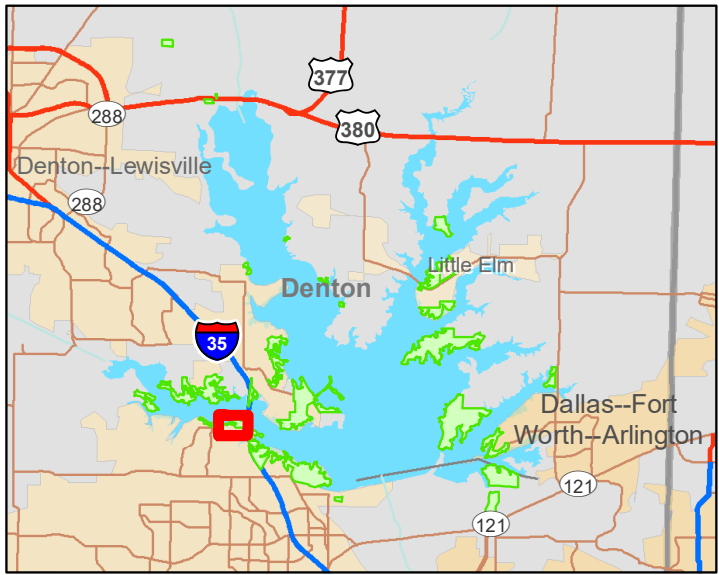
RECREATIONAL MAP
(COPPERAS BRANCH PARK-
LEASED TO CITY OF HIGHLAND VILLAGE)




0 125 250 500 750 1,000 Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-CB-INDEX



- FEE BOUNDARY
- LIMIT TO PARK AREA
- PICNIC SITE
- BOAT RAMP
- COURTESY DOCK
- RESTROOM
- GATEHOUSE
- SWIM AREA
- LE ESA



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

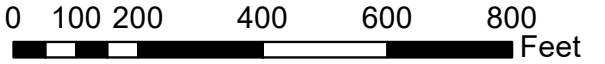

LEWISVILLE LAKE

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

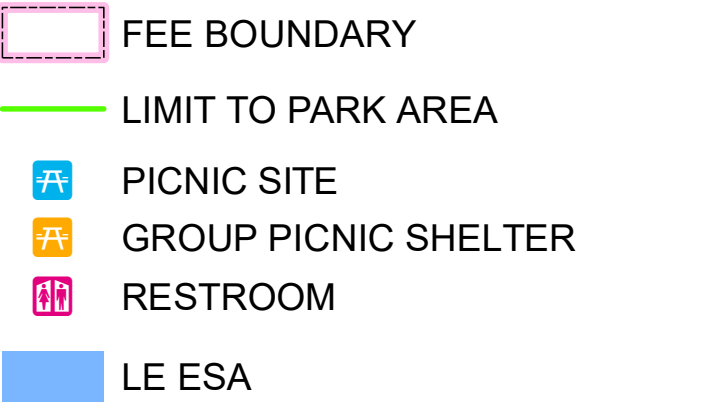
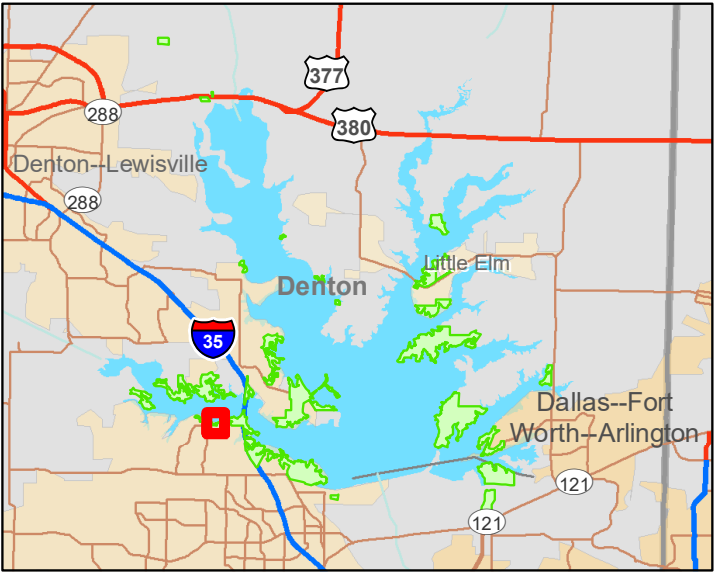
LEWISVILLE LAKE MASTER PLAN


RECREATIONAL MAP
(COPPERAS BRANCH PARK-
LEASED TO CITY OF HIGHLAND VILLAGE)



DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-CB-01





U.S. ARMY CORPS
OF ENGINEERS

FORT WORTH DISTRICT


LEWISVILLE LAKE

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN

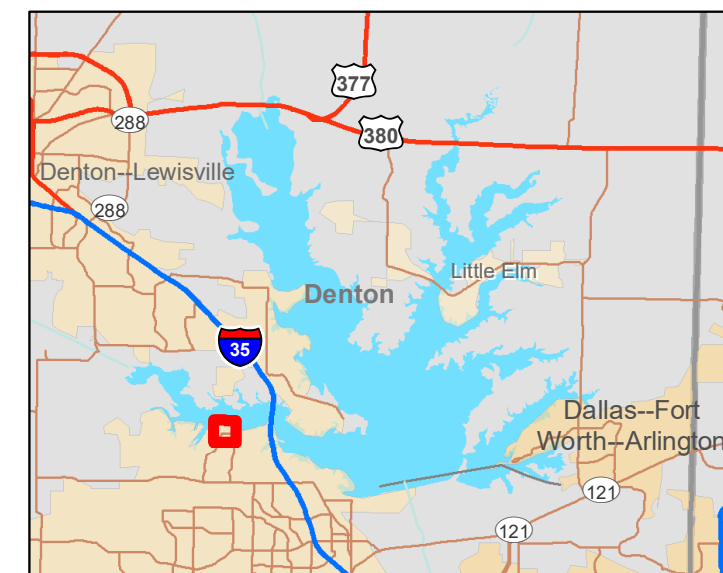
RECREATIONAL MAP
(COPPERAS BRANCH PARK-
LEASED TO CITY OF HIGHLAND VILLAGE)








0 105 210 420 630 840 Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-CB-02



-  FEE BOUNDARY
-  LIMIT OF PARK AREA
-  RECREATION TRAIL
-  LE ESA



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LEWISVILLE LAKE

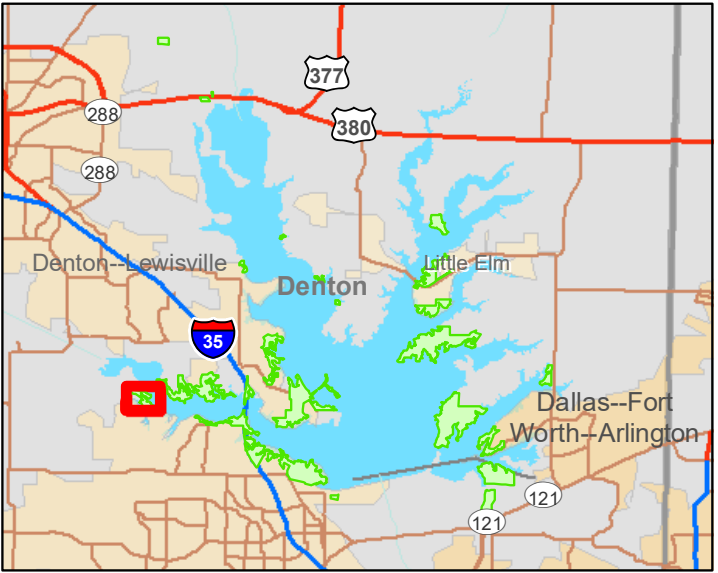
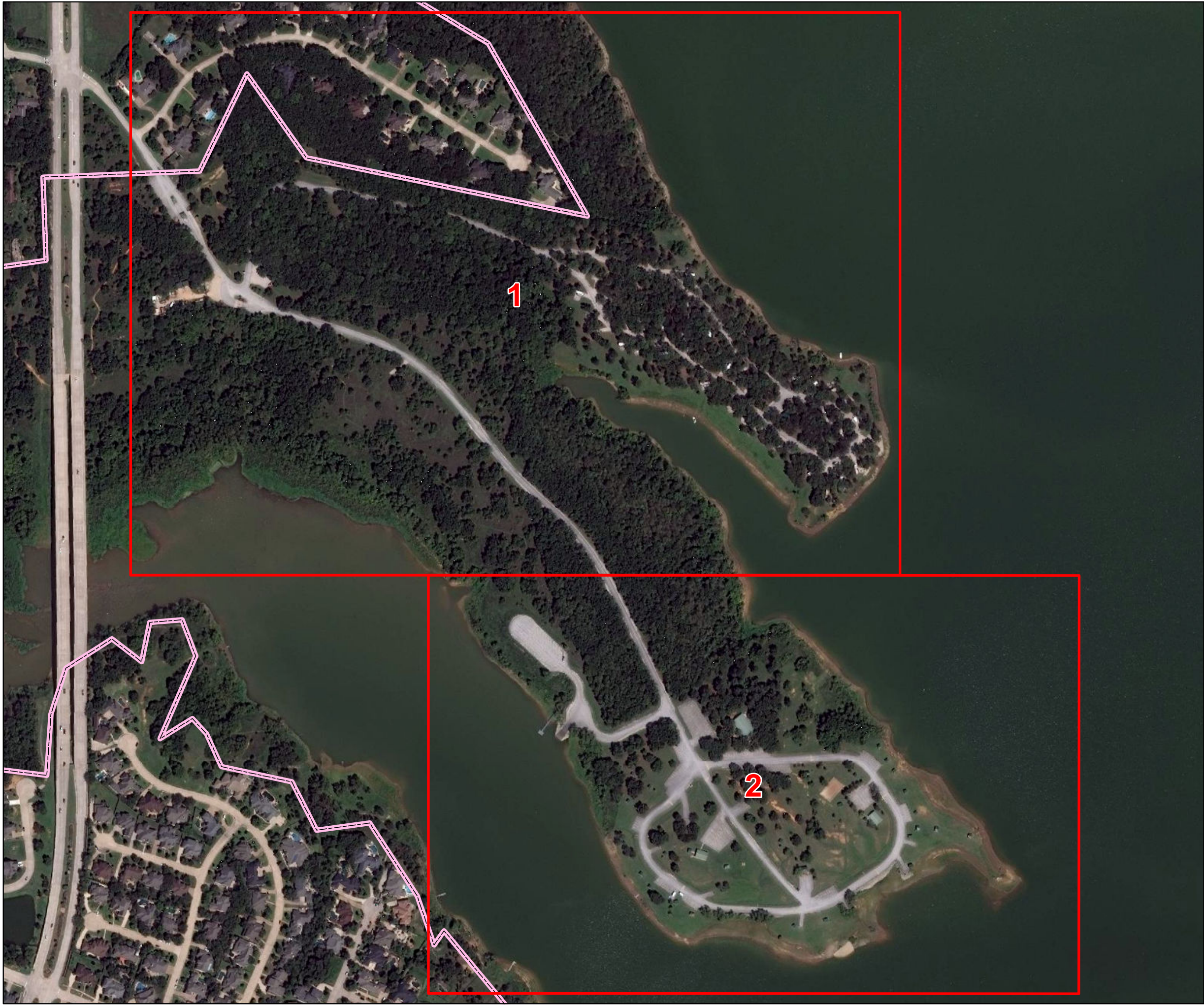
LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP
(YMCA- DIRECT LEASE FROM USACE)

0 100 200 400 600 800 Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-YMCA



FACILITY TOTALS	
ITEM	EXISTING
PICNIC SITE	27
GROUP PICNIC SHELTER	3
RV CAMPSITE	64
DUMP STATION	1
BOAT RAMP	1
COURTESY DOCK	1
RESTROOM	1
GATEHOUSE	1
PLAYGROUND	1
ATHLETIC AREA	1

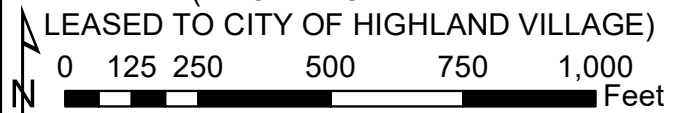


U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT

LEWISVILLE LAKE LEWISVILLE LAKE TRINITY RIVER, TEXAS

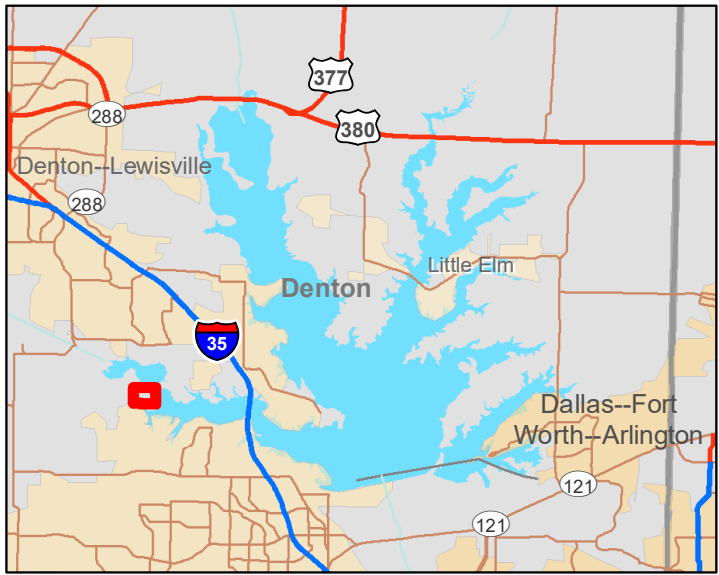
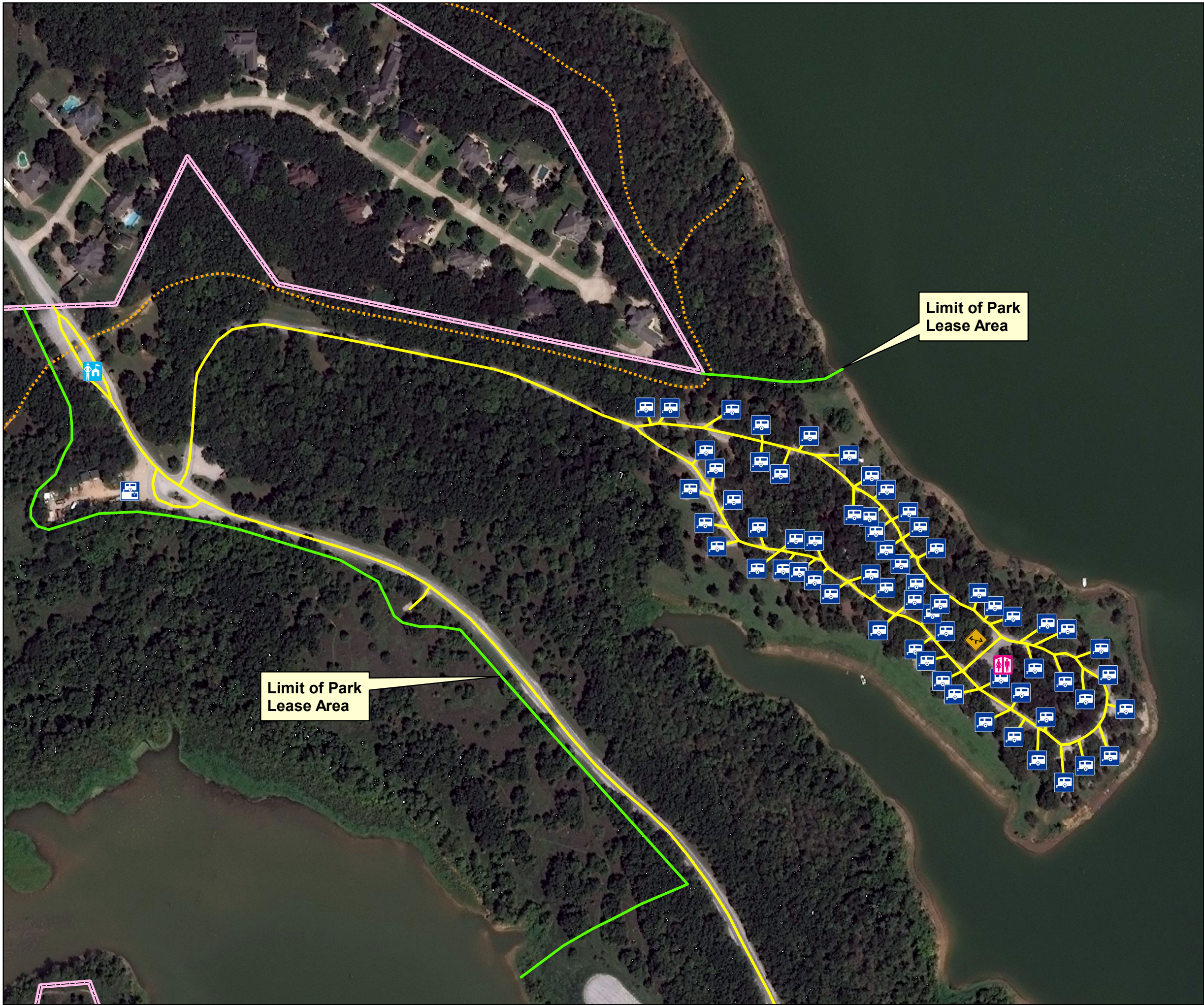
LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(PILOT KNOLL PARK-
LEASED TO CITY OF HIGHLAND VILLAGE)



DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-PK-INDEX



- FEE BOUNDARY
- RECREATION TRAIL
- LIMIT OF PARK AREA
- RV CAMPSITE
- DUMP STATION
- RESTROOM
- GATEHOUSE
- PLAYGROUND

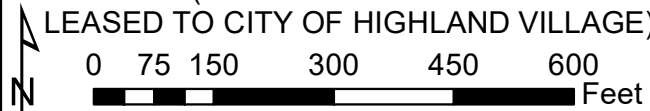


**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LEWISVILLE LAKE LEWISVILLE LAKE TRINITY RIVER, TEXAS

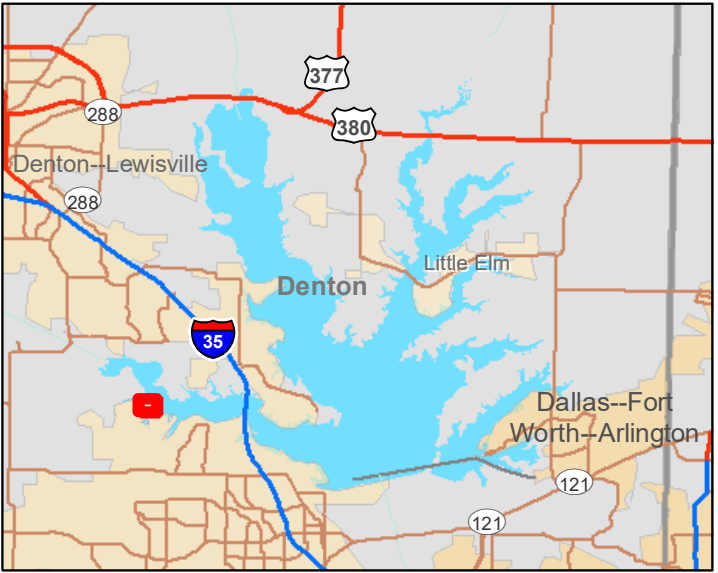
LEWISVILLE LAKE MASTER PLAN







RECREATIONAL MAP-
(PILOT KNOLL PARK-
LEASED TO CITY OF HIGHLAND VILLAGE)




DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-PK-01



-  FEE BOUNDARY
-  PICNIC SITE
-  GROUP PICNIC SHELTER
-  BOAT RAMP
-  COURTESY DOCK
-  ATHLETICA AREA



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT


LEWISVILLE LAKE

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN

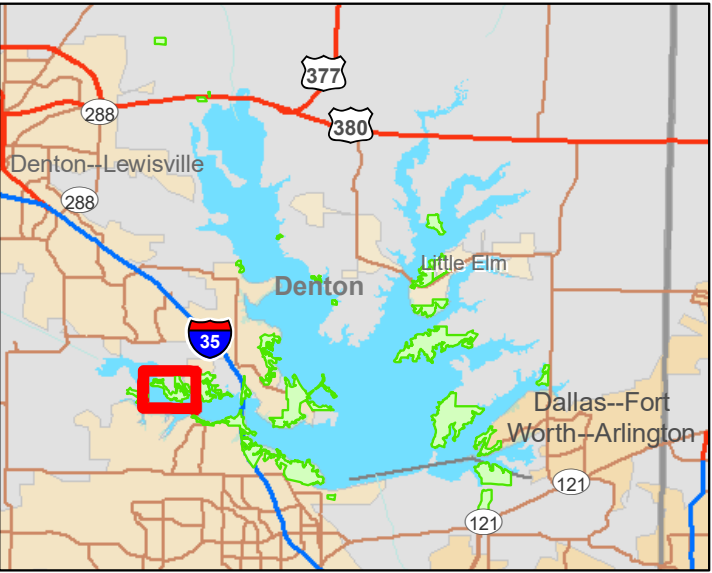
RECREATIONAL MAP-
(PILOT KNOLL PARK-
LEASED TO CITY OF HIGHLAND VILLAGE)



0 62.5 125 250 375 500 Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-PK-02



FACILITY TOTALS	
ITEM	EXISTING
PICNIC SITE	9
GROUP PICNIC SHELTER	1
RESTROOM	2
PRIMITIVE CAMPSITE	14
BOAT RAMP	1
COURTESY DOCK	1
PAY STATION	1



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LEWISVILLE LAKE

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(SYCAMORE BEND PARK-
LEASED TO CITY OF HICKORY CREEK)

N

0

187.5375

750

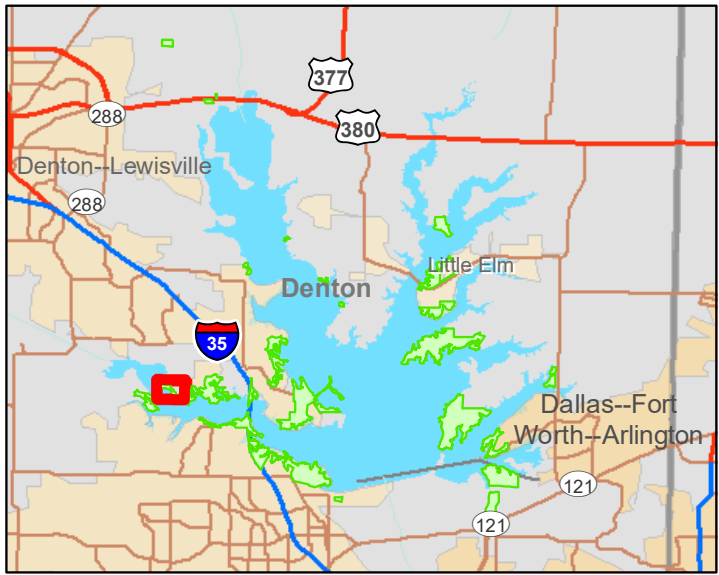
1,125

1,500

Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-SB-INDEX



- FEE BOUNDARY
- LIMIT OF PARK AREA
- PICNIC SITE
- GROUP PICNIC SHELTER
- PRIMITIVE CAMPSITE
- BOAT RAMP
- COURTESY DOCK
- RESTROOM
- PLAYGROUND
- PAY STATION

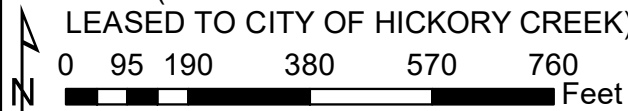


**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

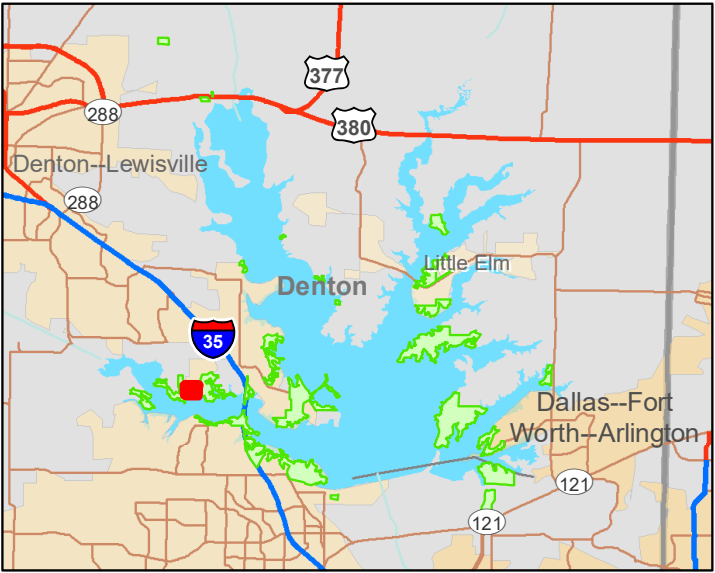
LEWISVILLE LAKE LEWISVILLE LAKE TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN

**RECREATIONAL MAP-
(SYCAMORE BEND PARK-
LEASED TO CITY OF HICKORY CREEK)**




DATE:	MAP NO.
DECEMBER 2020	LE20MP-OR-SB-01



FACILITY TOTALS	
ITEM	EXISTING
PICNIC SITE	12
RESTROOM	1
PLAYGROUND	1

- FEE BOUNDARY
- RECREATION TRAIL
- LIMIT TO PARK AREA
- PICNIC SITE
- RESTROOM
- PLAYGROUND



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT


LEWISVILLE LAKE

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN

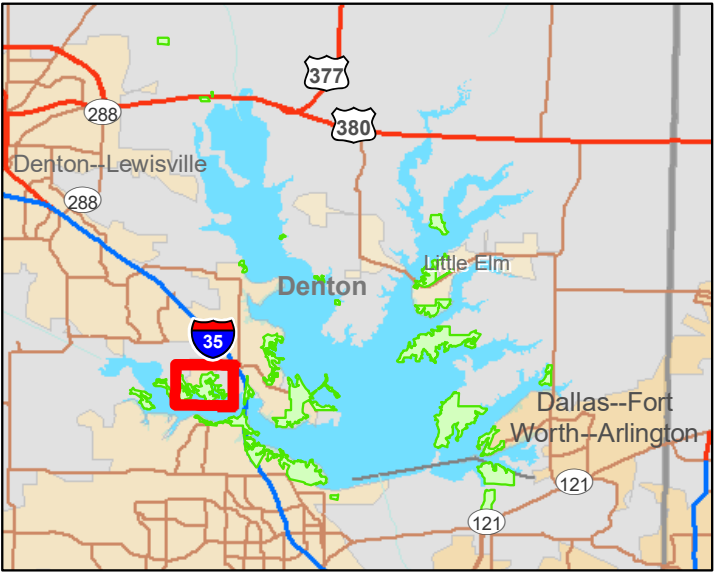
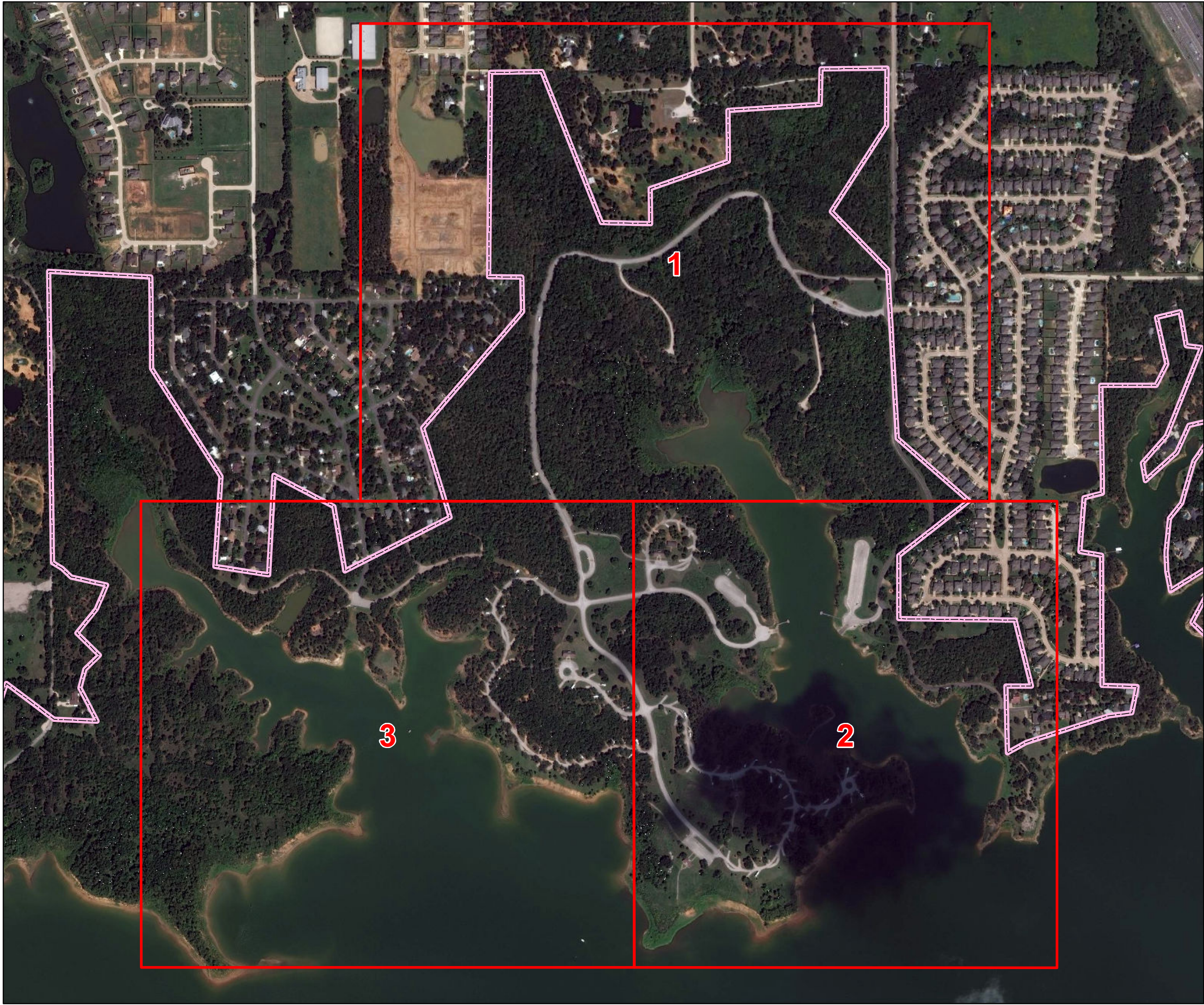
RECREATIONAL MAP-
(HARBOR LANE PARK-
LEASED TO CITY OF HICKORY CREEK)




0 50 100 200 300 400 Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-HL



FACILITY TOTALS	
ITEM	EXISTING
PICNIC SITE	14
GROUP PICNIC SHELTER	1
RV CAMPSITE	119
DUMP STATION	1
PRIMITIVE CAMPSITE	10
RESTROOM	7
BOAT RAMP	2
COURTESY DOCK	2
GATEHOUSE	1
PLAYGROUND	2

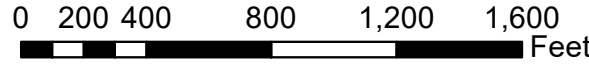
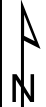


**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

LEWISVILLE LAKE LEWISVILLE LAKE TRINITY RIVER, TEXAS

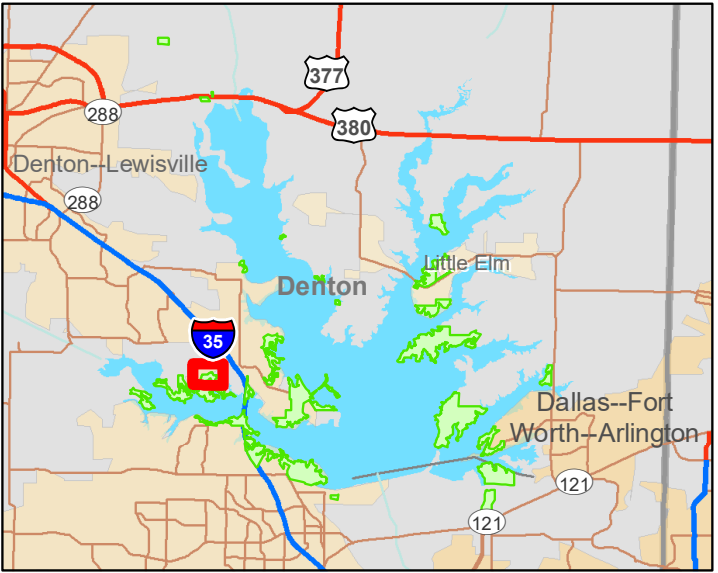
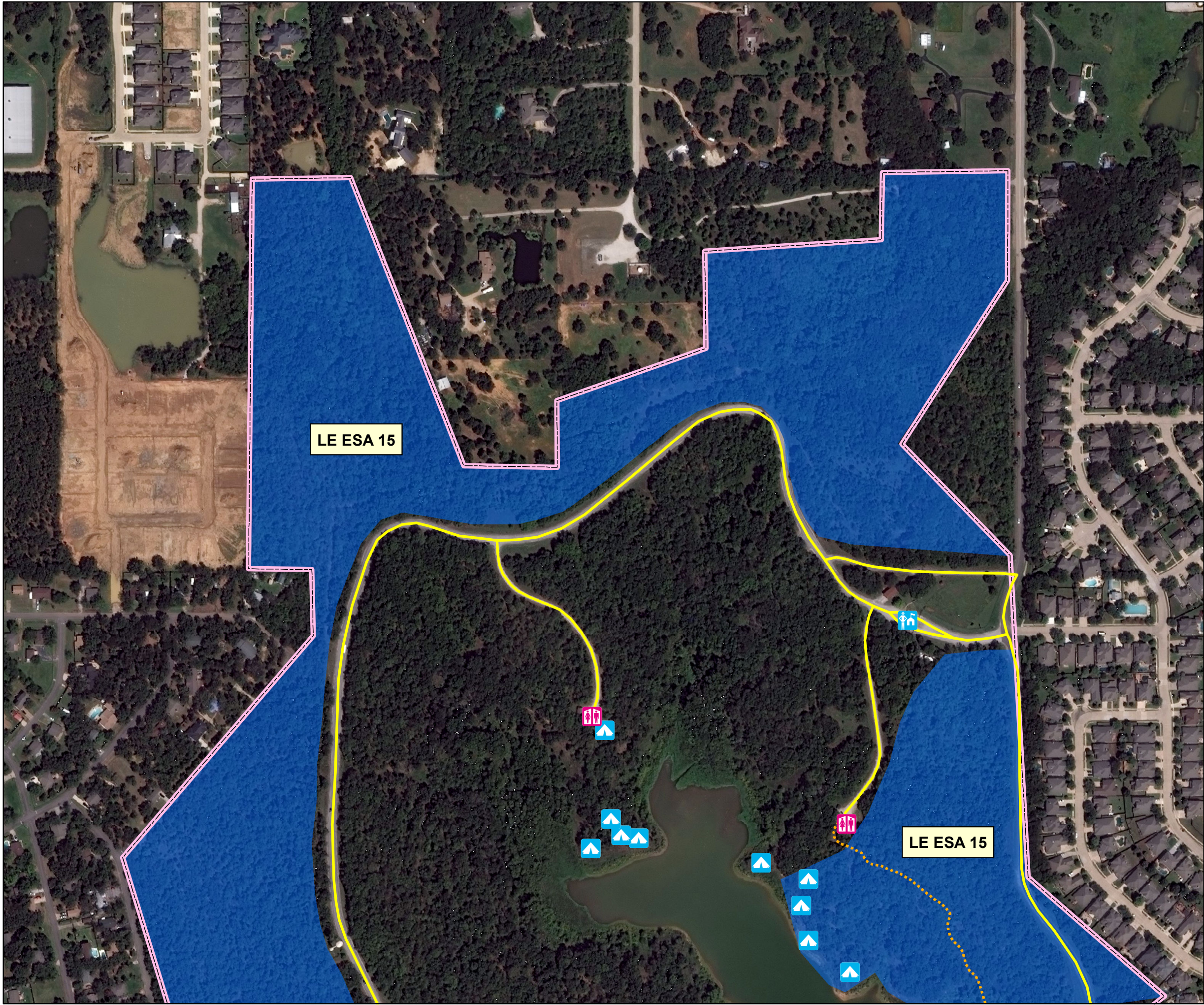
LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(HICKORY CREEK PARK- USAGE;
POINT VISTA PARK AND BOAT RAMP
AND HARBOR GROVE PARK- LEASED
TO CITY OF HICKORY CREEK)




DATE: MAP NO.

DECEMBER 2020 LE18MP-OR-HC-INDEX



-  FEE BOUNDARY
-  RECREATION TRAIL
-  PRIMITIVE CAMPSITE
-  RESTROOM
-  GATEHOUSE
-  LE ESA



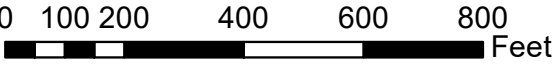

**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

LEWISVILLE LAKETRINITY RIVER, TEXAS

LEWISVILLE LAKE

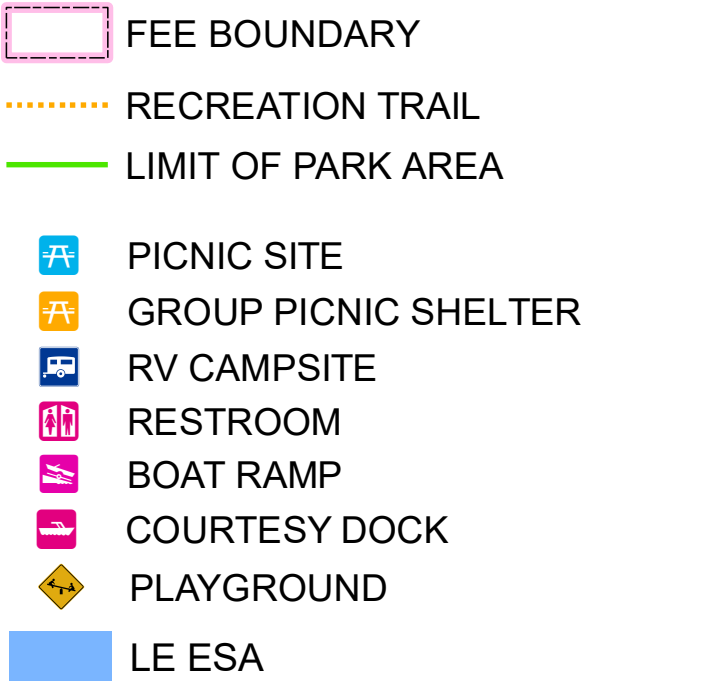
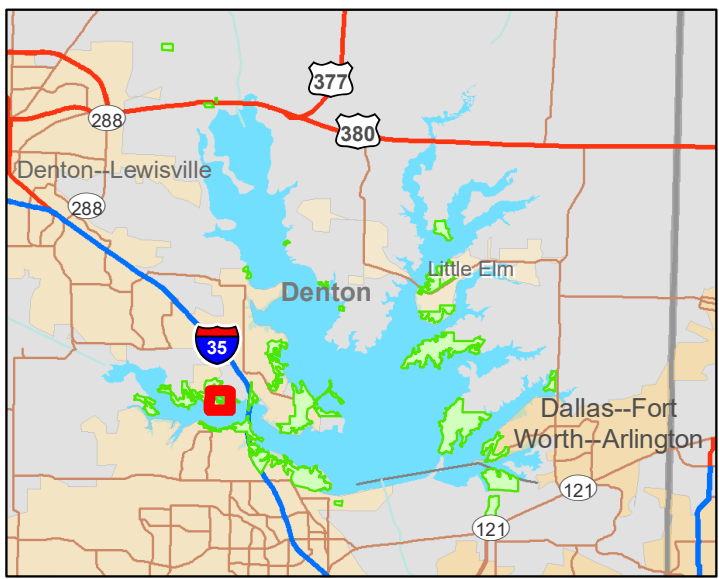
LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(HICKORY CREEK PARK- USACE)



DATE:
DECEMBER 2020

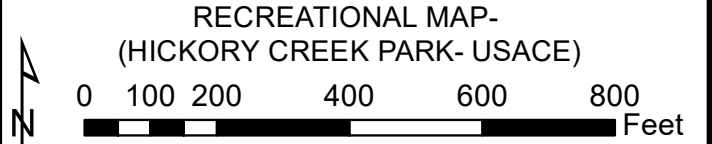
MAP NO.
LE20MP-OR-HC-01



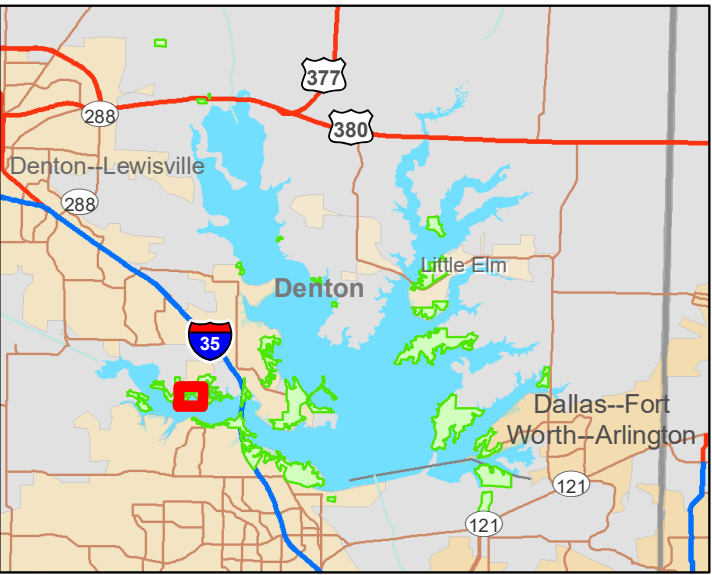
**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LEWISVILLE LAKE TRINITY RIVER, TEXAS


LEWISVILLE LAKE
LEWISVILLE LAKE MASTER PLAN



DATE: DECEMBER 2020	MAP NO. LE20MP-OR-HC-02
------------------------	----------------------------



- FEE BOUNDARY
- RECREATION TRAIL
- LIMIT OF PARK AREA
- PICNIC SITE
- RV CAMPSITE
- RESTROOM
- PLAYGROUND
- LE ESA



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

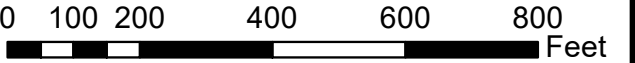

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

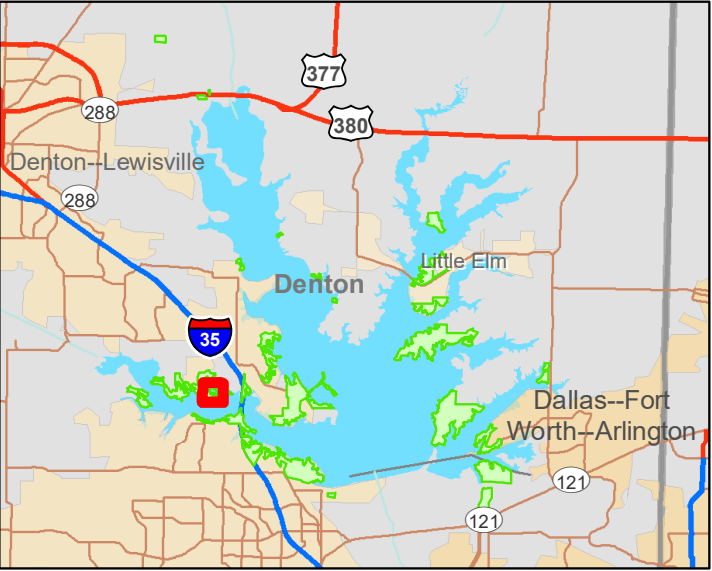
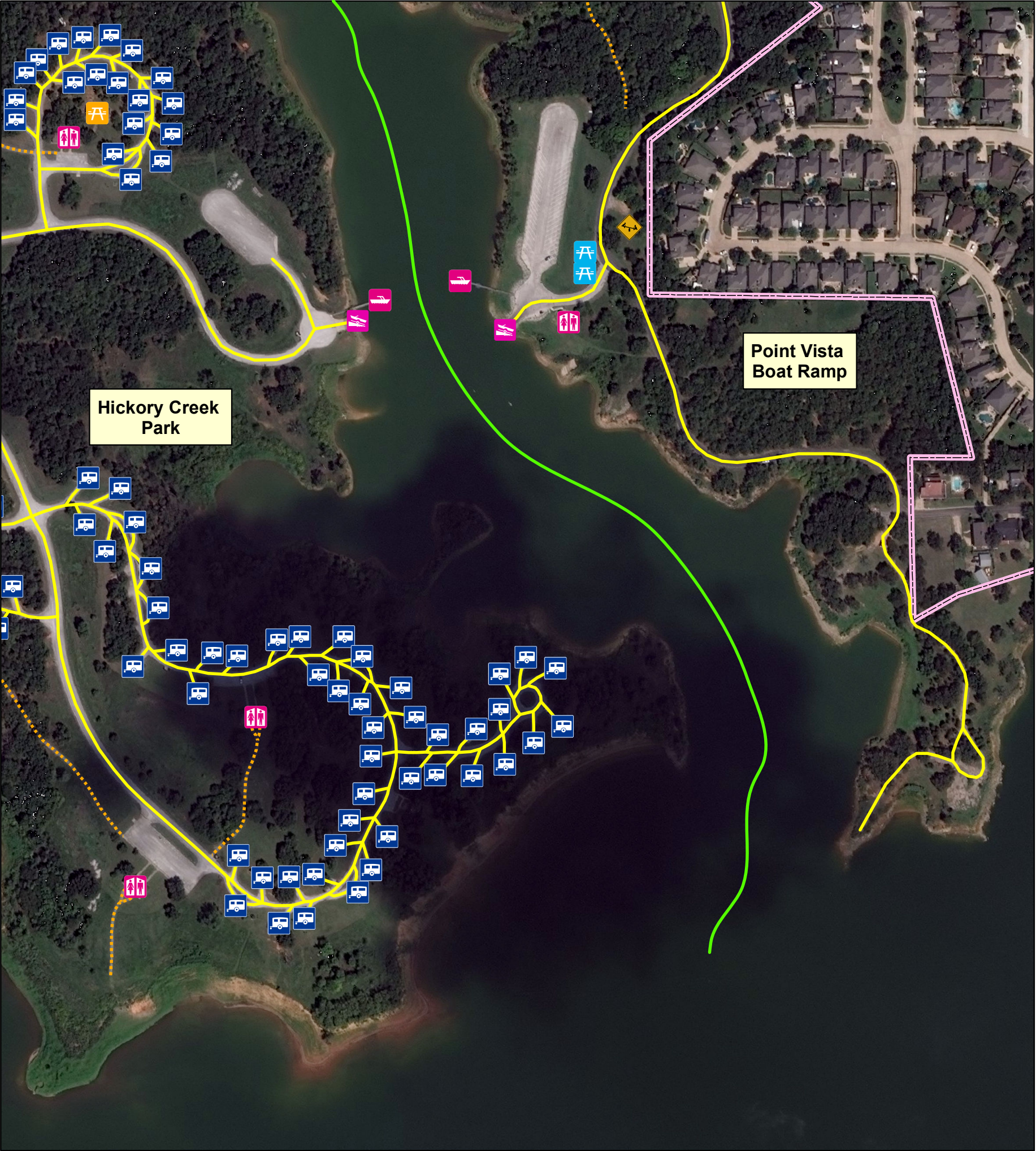
LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(HICKORY CREEK PARK- USACE)




DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-HC-03



FACILITY TOTALS	
ITEM	EXISTING
PICNIC SITE	2
BOAT RAMP	1
COURTESY DOCK	1
RESTROOM	1
PLAYGROUND	1

- FEE BOUNDARY
- RECREATION TRAIL
- LIMIT OF PARK AREA
- PICNIC SITE
- GROUP PICNIC SHELTER
- RV CAMPSITE
- RESTROOM
- BOAT RAMP
- COURTESY DOCK
- PLAYGROUND



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT


LEWISVILLE LAKE

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(POINT VISTA BOAT RAMP
AND ACCESS AREA- LEASED
TO CITY OF HICKORY CREEK)

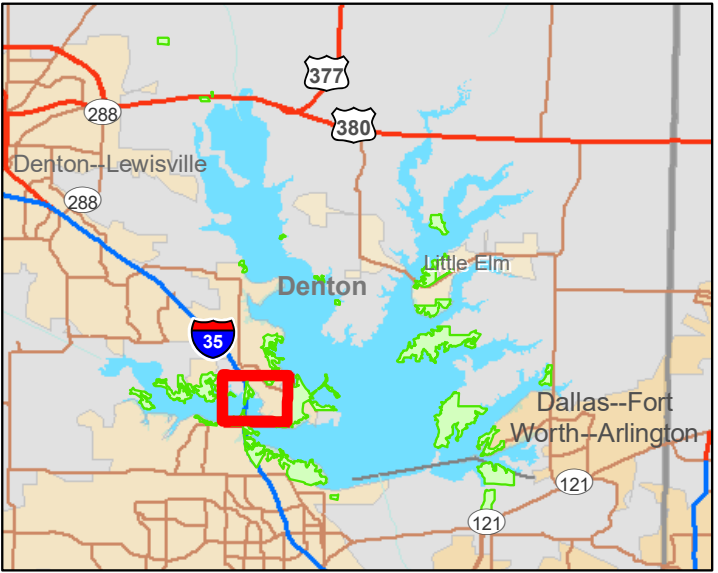
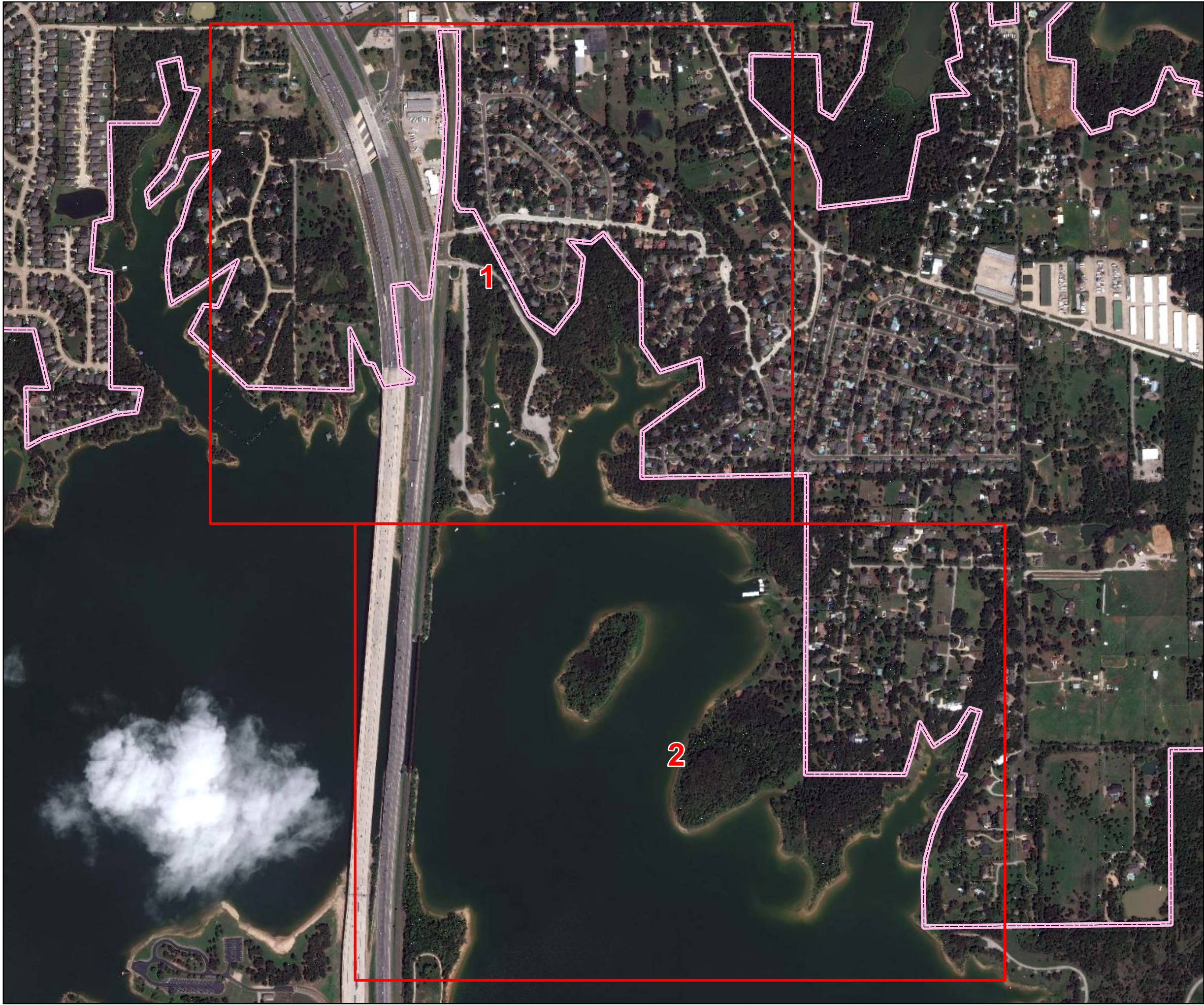


0100200400600800


Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-PV-01



FACILITY TOTALS	
ITEM	EXISTING
PICNIC SITE	10
GROUP PICNIC SHELTER	1
BOAT RAMP	2
COURTESY DOCK	2
RESTROOM	2
PLAYGROUND	1
PAY STATION	1

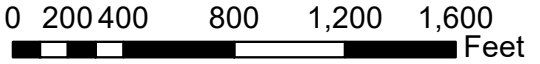
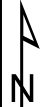


**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

LEWISVILLE LAKE LEWISVILLE LAKE TRINITY RIVER, TEXAS

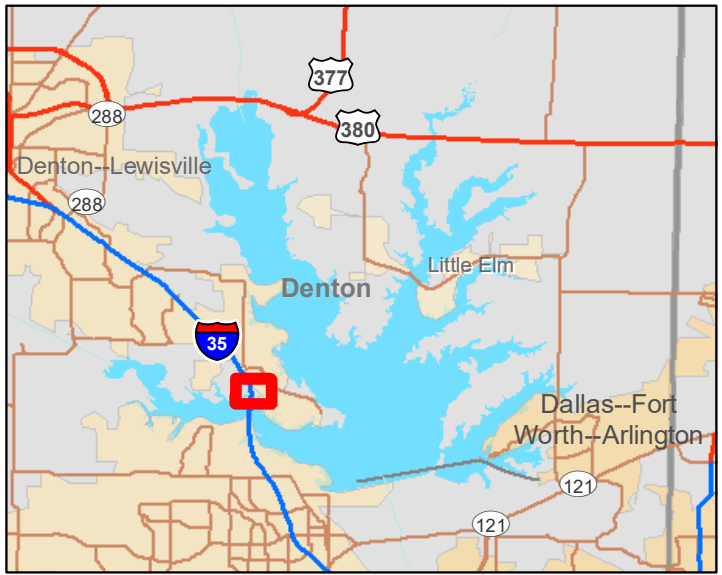
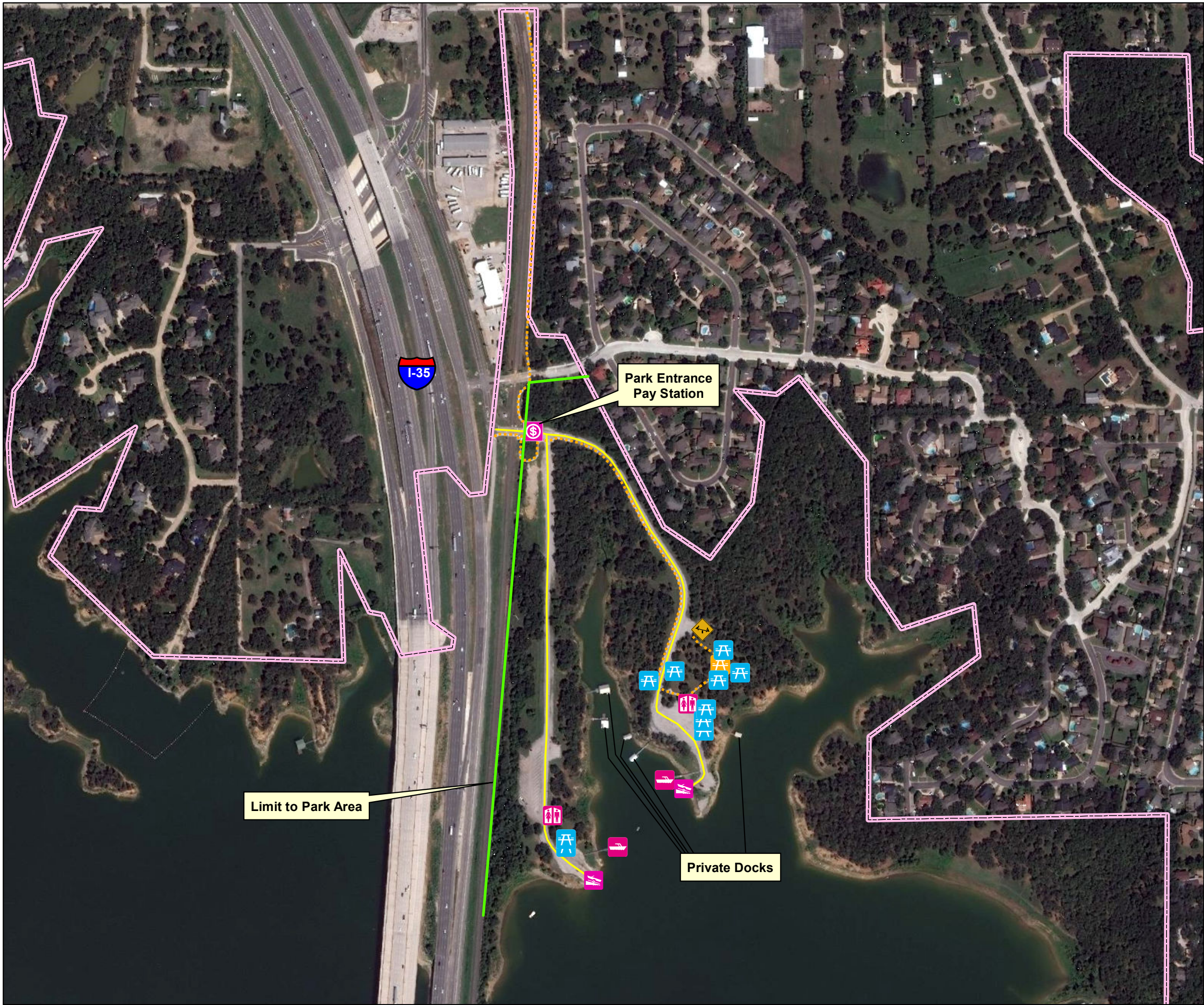
LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP
(ARROWHEAD PARK-
LEASED TO CITY OF HICKORY CREEK))



DATE: MAP NO.

DECEMBER 2020 LE20MP-OR-AH-INDEX



- FEE BOUNDARY
- RECREATION TRAIL
- LIMIT TO PARK AREA
- PICNIC SITE
- GROUP PICNIC SHELTER
- BOAT RAMP
- COURTESY DOCK
- RESTROOM
- PLAYGROUND
- PAY STATION



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

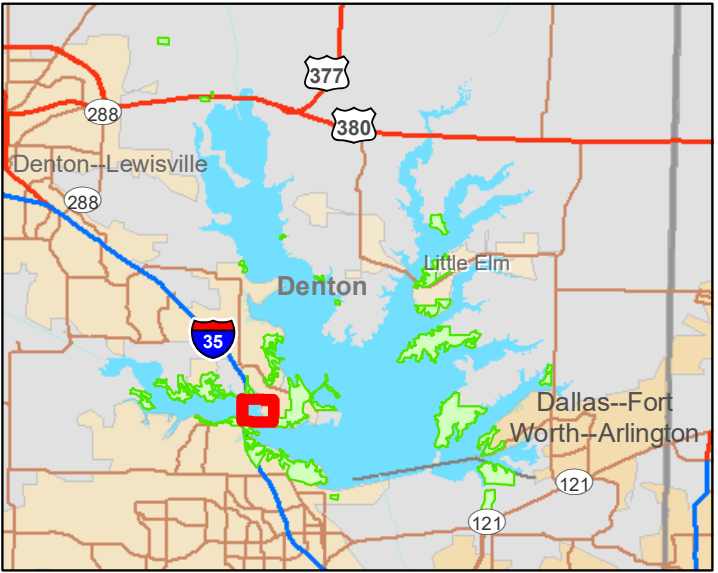
LEWISVILLE LAKE LEWISVILLE LAKE TRINITY RIVER, TEXAS




LEWISVILLE LAKE MASTER PLAN


RECREATIONAL MAP (ARROWHEAD PARK-
LEASED TO THE CITY OF HICKORY CREEK)



DATE:	MAP NO.
DECEMBER 2020	LE20MP-OR-AH-01



-  FEE BOUNDARY
-  RECREATION TRAIL
-  LIMIT TO PARK AREA



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT


LEWISVILLE LAKE

LEWISVILLE LAKE

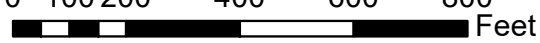
TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP
(ARROWHEAD PARK-
LEASED TO CITY OF HICKORY CREEK))

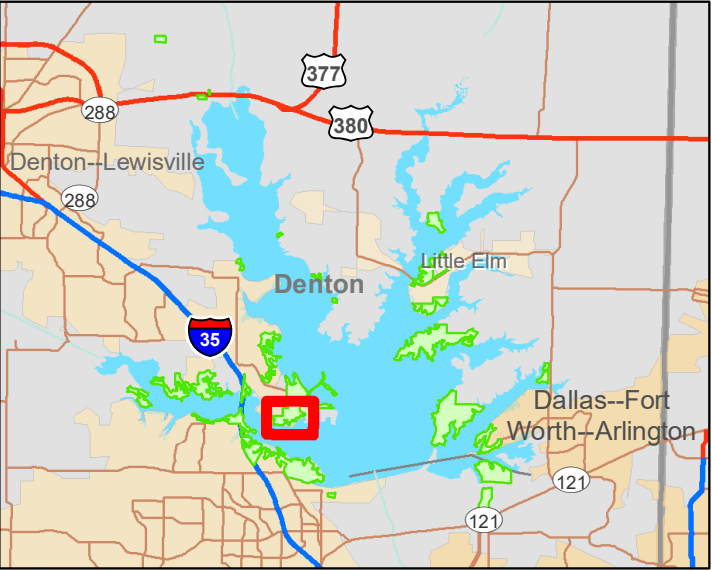
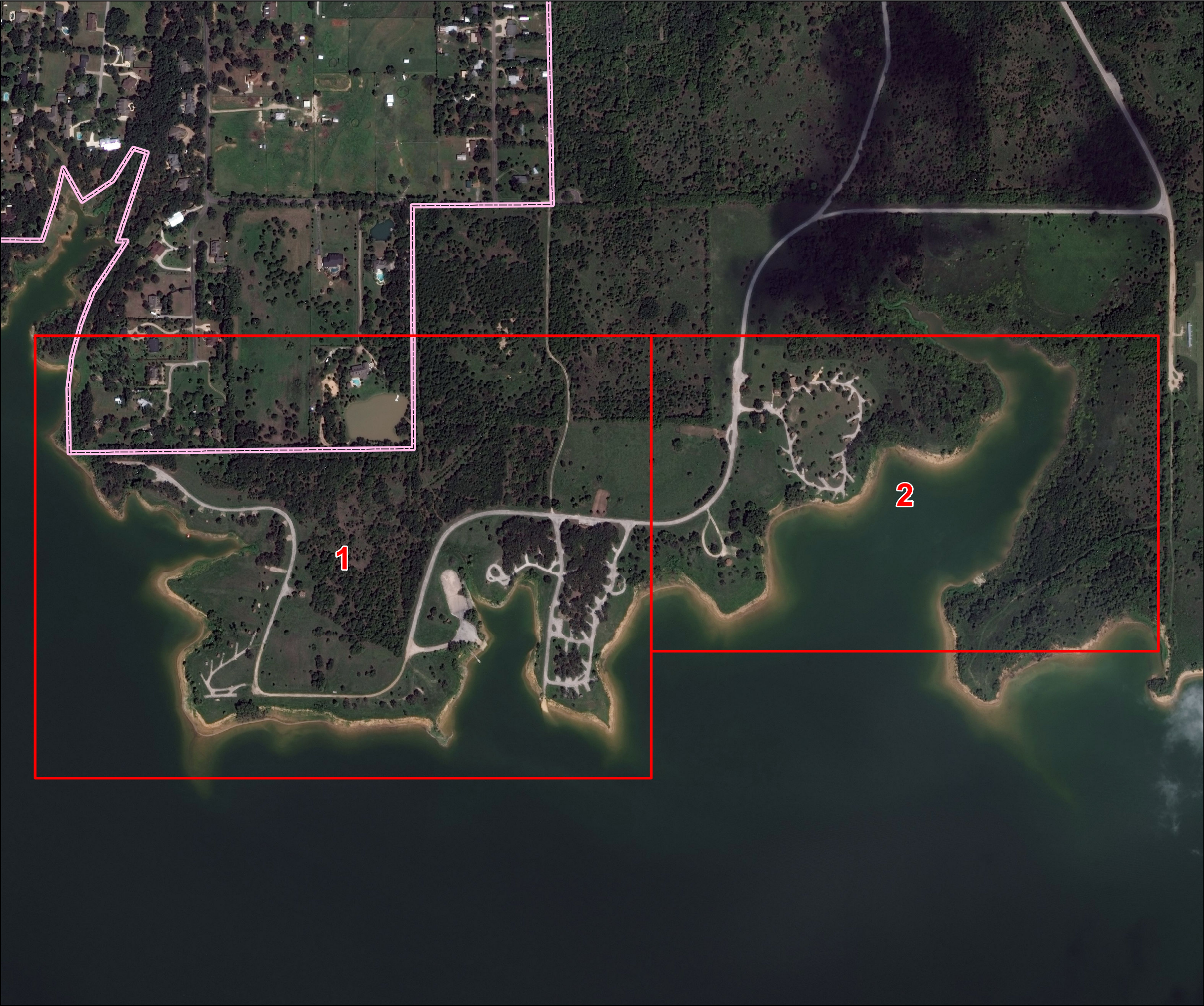


0 100 200 400 600 800 Feet










DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-AH-02



FACILITY TOTALS	
ITEM	EXISTING
PICNIC SITE	84
GROUP PICNIC SHELTER	3
RESTROOM	3
BOAT RAMP	2
COURTESY DOCK	1

-  FEE BOUNDARY
-  PICNIC SITE
-  GROUP PICNIC SHELTER
-  RESTROOM
-  BOAT RAMP
-  COURTESY DOCK



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

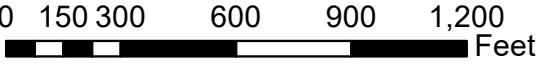

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

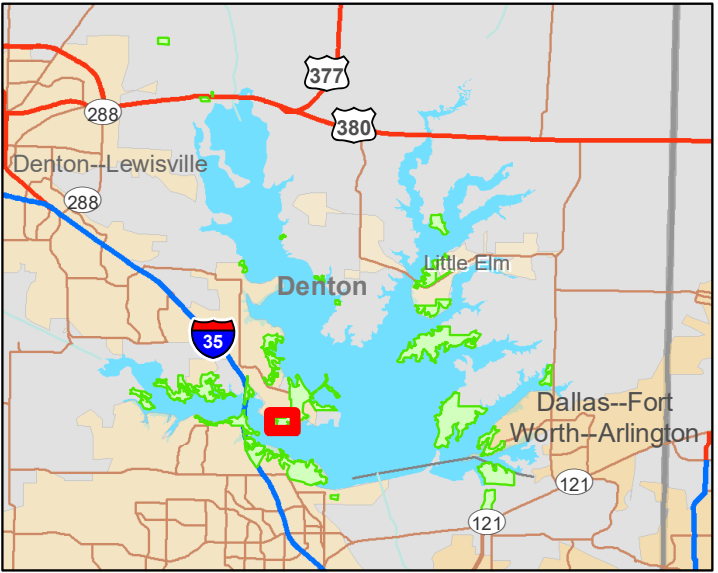
LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(OAKLAND PARK- USACE)




DATE:
DECEMBER 2020

MAP NO.
LE18MP-OR-OA-INDEX



- FEE BOUNDARY
- RECREATION TRAIL
- LIMIT OF PARK AREA
- PICNIC SITE
- GROUP PICNIC SHELTER
- RESTROOM
- BOAT RAMP
- COURTESY DOCK



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

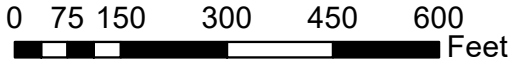

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

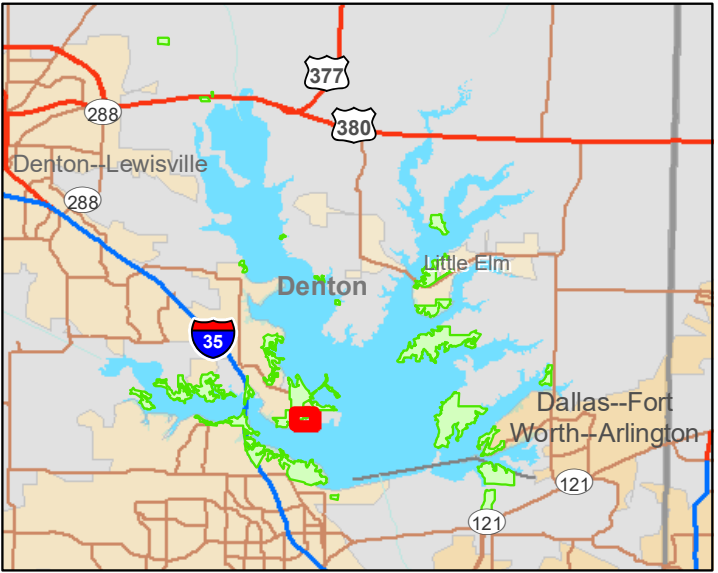
LEWISVILLE LAKE






LEWISVILLE LAKE MASTER PLAN


RECREATIONAL MAP-
(OAKLAND PARK- USACE)



DATE:	MAP NO.
DECEMBER2020	LE20MP-OR-OA-01



-  FEE BOUNDARY
-  RECREATION TRAIL
-  PICNIC SITE
-  GROUP PICNIC SHELTER
-  RESTROOM



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

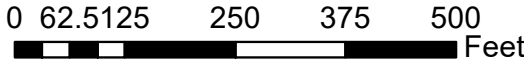
LEWISVILLE LAKE

TRINITY RIVER, TEXAS

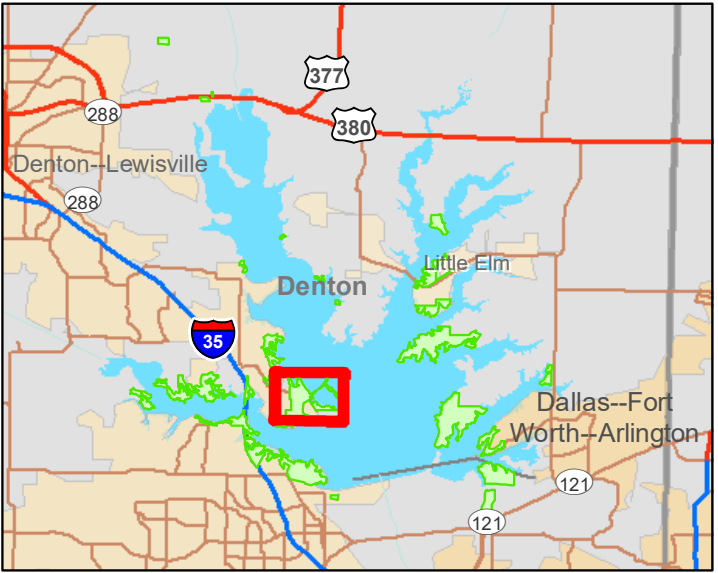
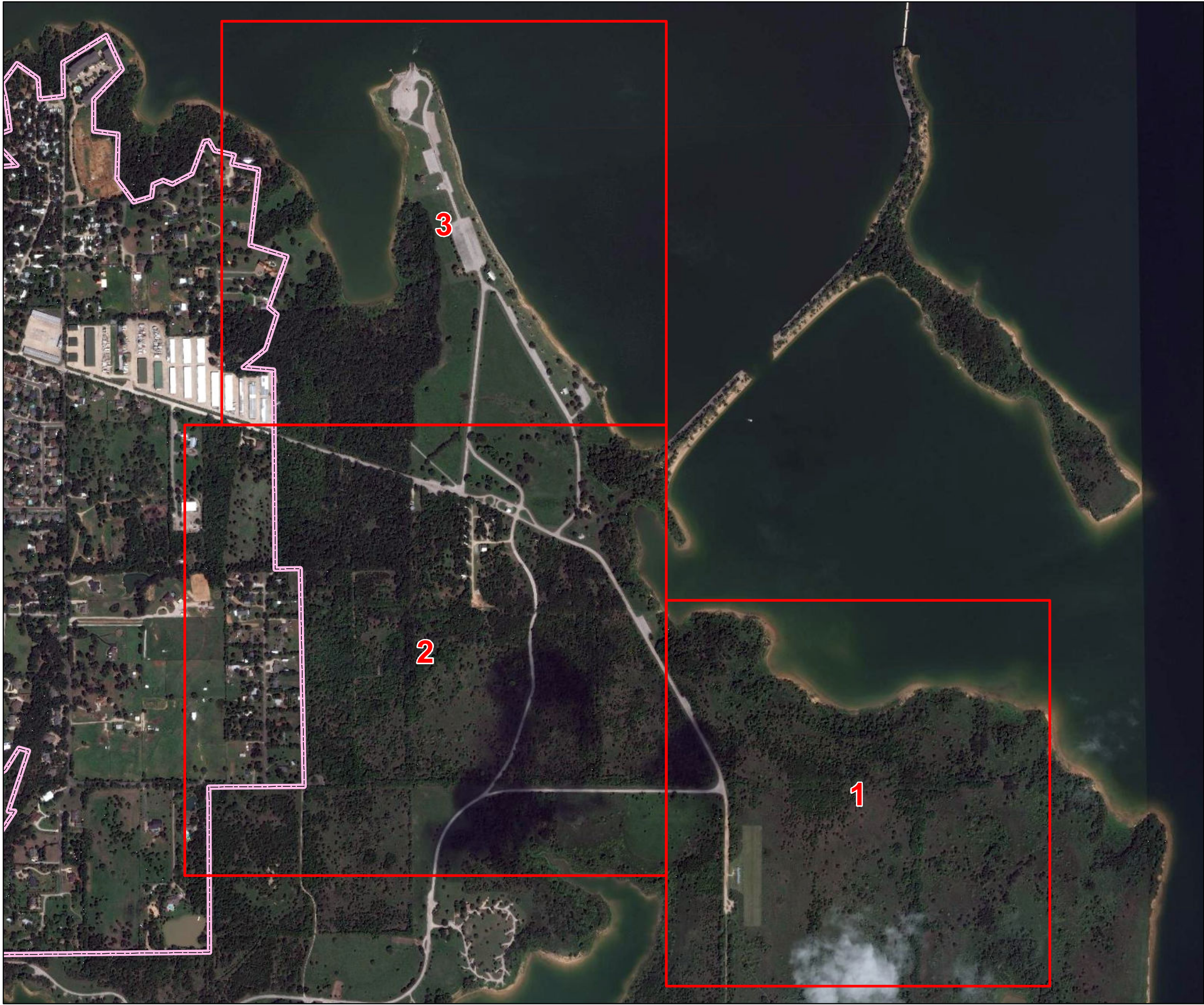
LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN


RECREATIONAL MAP-
(OAKLAND PARK- USACE)



DATE:	MAP NO.
DECEMBER 2020	LE20MP-OR-OA-02



FACILITY TOTALS	
ITEM	EXISTING
PICNIC SITE	31
GROUP PICNIC SHELTER	3
RESTROOM	1
BOAT RAMP	1
COURTESY DOCK	1
GATEHOUSE	1



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

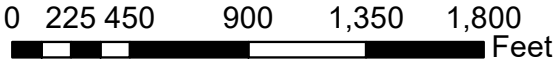

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

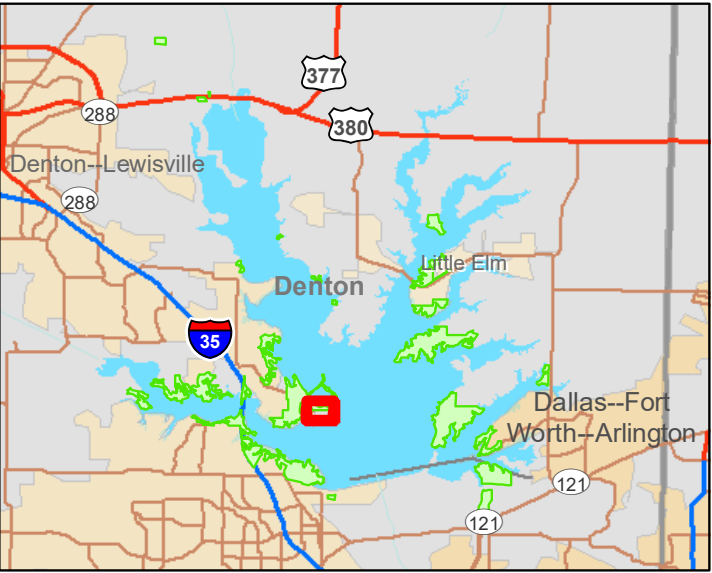
LEWISVILLE LAKE MASTER PLAN



RECREATIONAL MAP-
(WESTLAKE PARK- USACE)




DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-WL-INDEX



-  FEE BOUNDARY
-  LIMIT TO PARK AREA



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

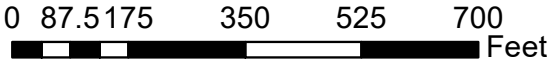

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

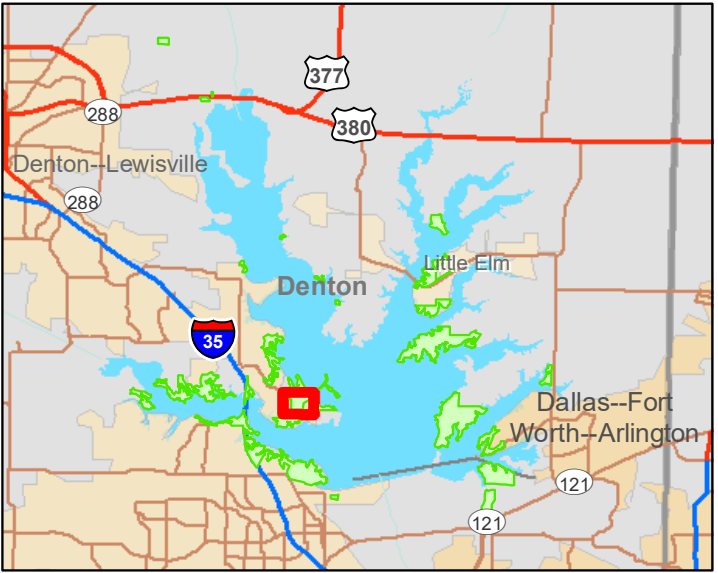
LEWISVILLE LAKE MASTER PLAN




RECREATIONAL MAP-
(OAKLAND PARK- USACE)




DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-WL-01



-  FEE BOUNDARY
-  RECREATION TRAIL
-  GATEHOUSE



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

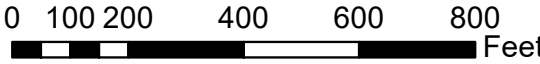

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

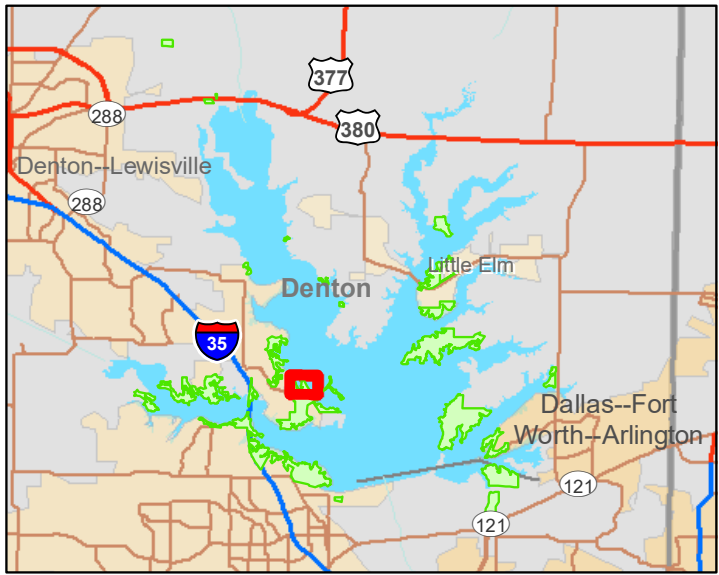
LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(OAKLAND PARK- USACE)



DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-WL-02



- FEE BOUNDARY
- LIMIT OF PARK AREA
- PICNIC SITE
- GROUP PICNIC SHELTER
- RESTROOM
- BOAT RAMP
- COURTESY DOCK



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

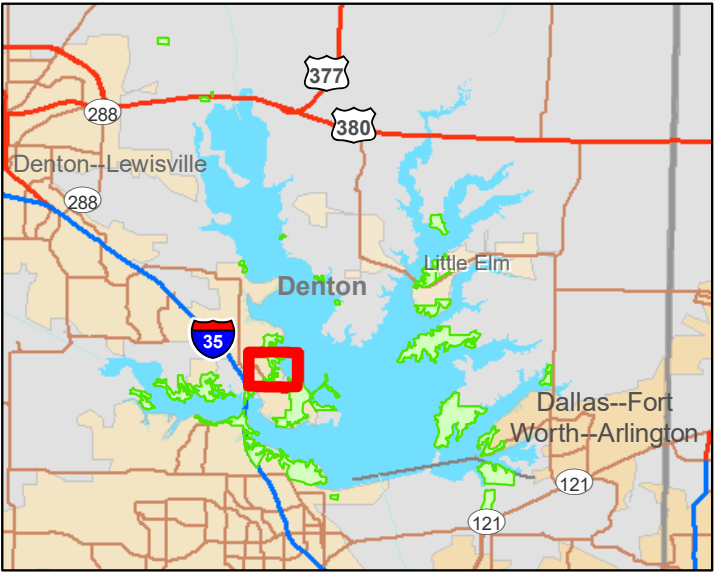
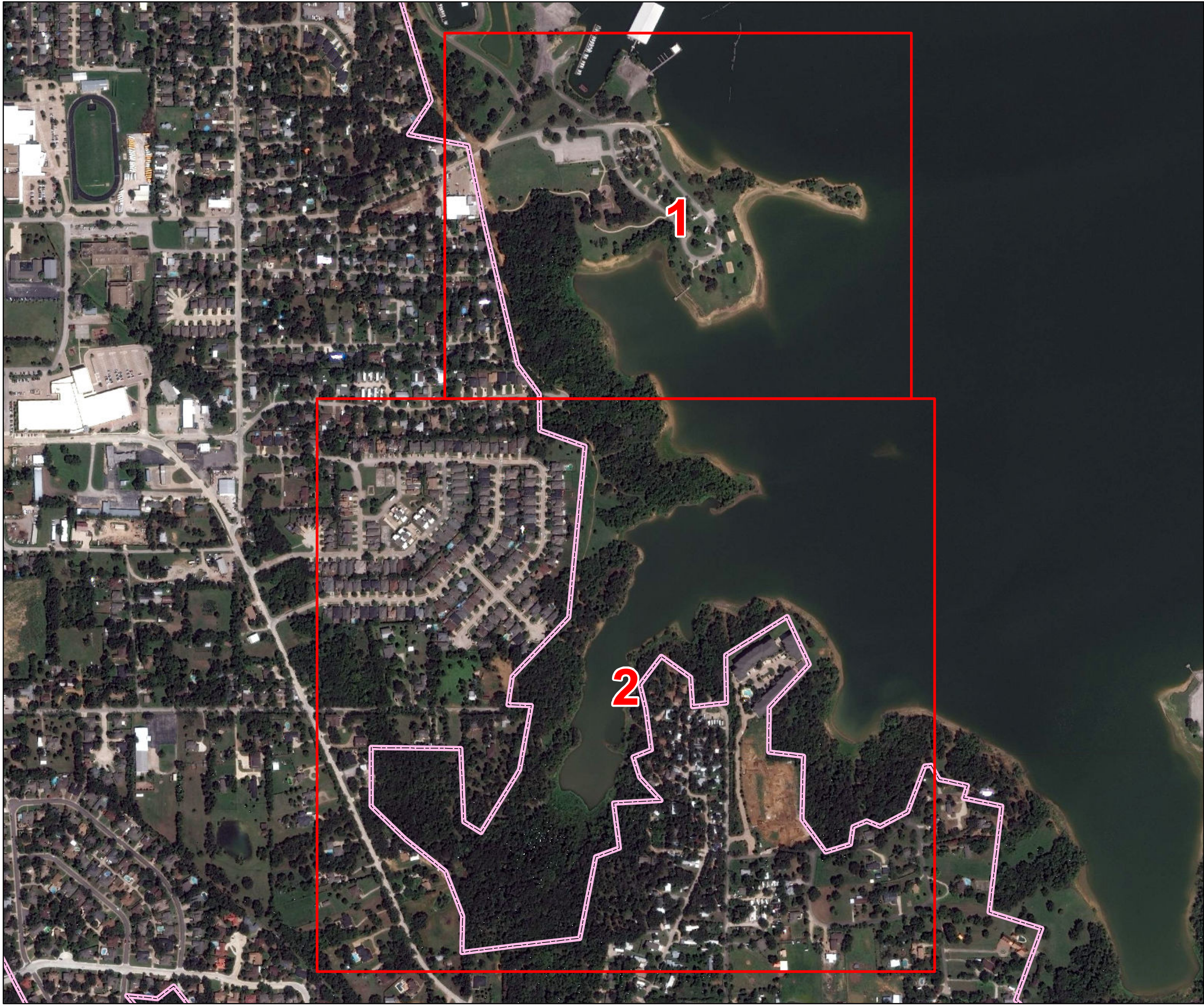
LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(WESTLAKE PARK- USACE)

0 100 200 400 600 800 Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-WL-03



FACILITY TOTALS	
ITEM	EXISTING
PICNIC SITE	5
GROUP PICNIC SHELTER	1
RV CAMPSITE	14
RESTROOM	1
BOAT RAMP	1
COURTESY DOCK	2
FISHING DOCK	1
PLAYGROUND	2
ATHLETIC AREA	3



U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT

LEWISVILLE LAKE LEWISVILLE LAKE TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN

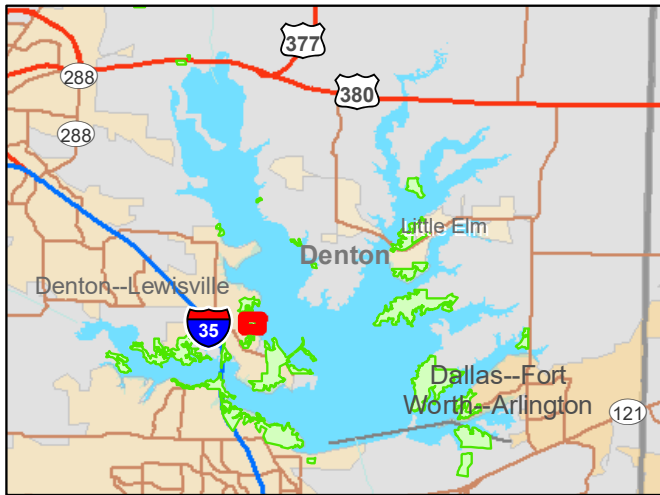
RECREATIONAL MAP-
(WILLOW GROVE PARK-
LEASED TO CITY OF LAKE DALLAS)



0 175 350 700 1,050 1,400 Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-WG-INDEX



- FEE BOUNDARY
- RECREATION TRAIL
- LIMIT OF PARK AREA
- PICNIC SITE
- GROUP PICNIC SHELTER
- RV CAMPSITE
- RESTROOM
- BOAT RAMP
- COURTESY DOCK
- FISHING DOCK
- PLAYGROUND
- ATHLETIC AREA

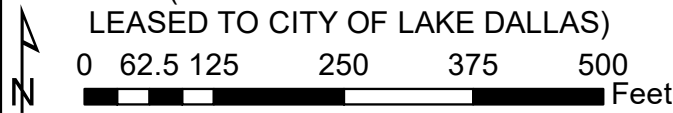


**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

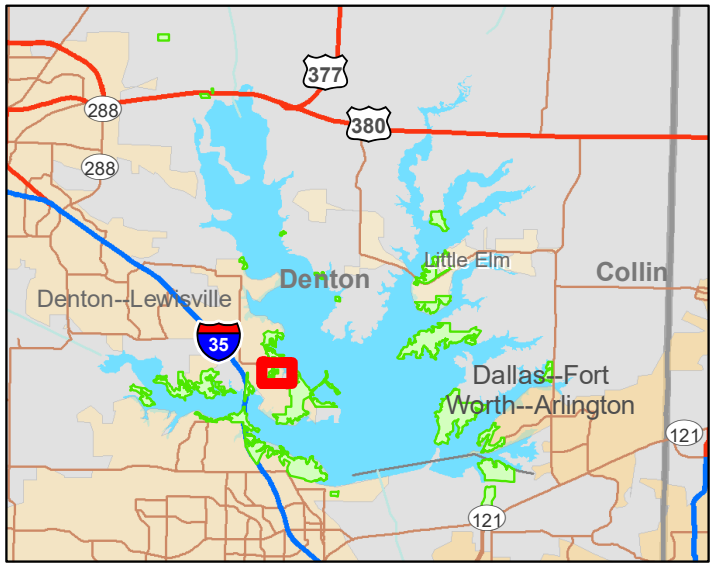
LEWISVILLE LAKE LEWISVILLE LAKE TRINITY RIVER, TEXAS




LEWISVILLE LAKE MASTER PLAN

**RECREATIONAL MAP-
(WILLOW GROVE PARK-
LEASED TO CITY OF LAKE DALLAS)**



DATE:	MAP NO.
DECEMBER 2020	LE20MP-OR-WG-01



-  FEE BOUNDARY
-  RECREATION TRAIL
-  LIMIT OF PARK AREA

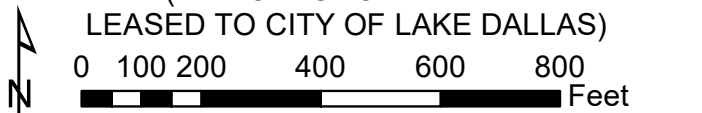


**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

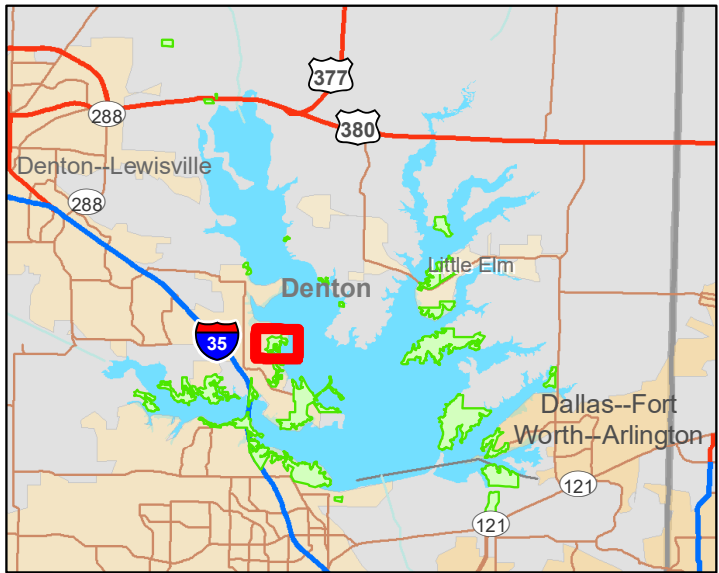
LEWISVILLE LAKE TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN





**RECREATIONAL MAP-
(WILLOW GROVE PARK-
LEASED TO CITY OF LAKE DALLAS)**



DATE: DECEMBER 2020	MAP NO. LE20MP-OR-WG-02
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FACILITY TOTALS	
ITEM	EXISTING
BOAT RAMP	1
MARINA	1

-  FEE BOUNDARY
-  RECREATION TRAIL
-  BOAT RAMP
-  MARINA



U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT

LEWISVILLE LAKE TRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

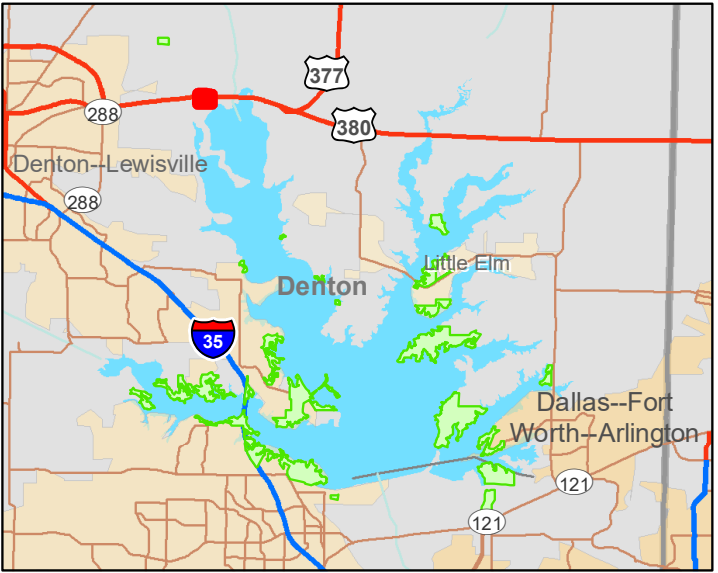
RECREATIONAL MAP-
(LAKEVIEW MARINA-
LEASED FROM USACE)








0 125250 500 750 1,000
Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-LM



-  FEE BOUNDARY
-  RECREATION TRAIL
-  LIMIT OF PARK AREA
-  LE ESA



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT


LEWISVILLE LAKE

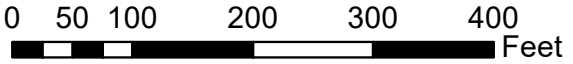
LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(FISH TRAP PARK-
CLOSED INDEFINITELY)

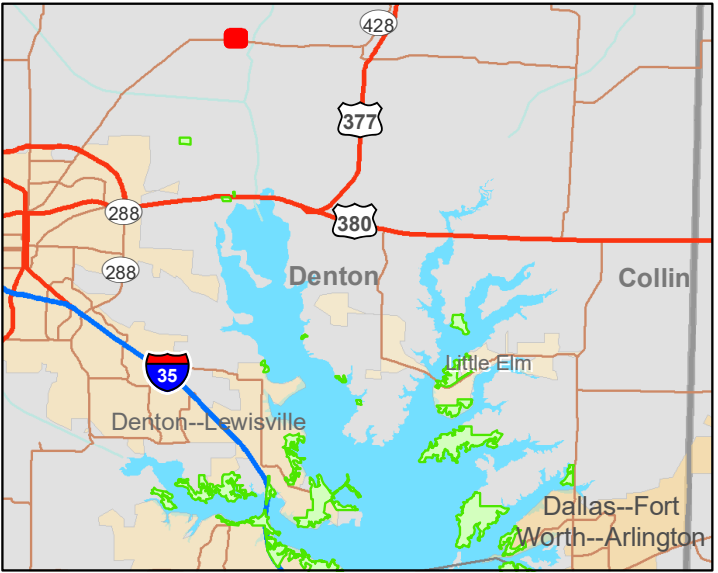




0 50 100 200 300 400 Feet


DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-FT



FACILITY TOTALS	
ITEM	EXISTING
PICNIC SITE	11
RESTROOM	1

- FEE BOUNDARY
- Greenbelt Equestrian Trail
- Greenbelt Hard Surface Trail
- PICNIC SITE
- RESTROOM
- LE ESA

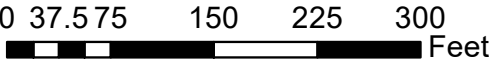



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

LEWISVILLE LAKE LEWISVILLE LAKE TRINITY RIVER, TEXAS

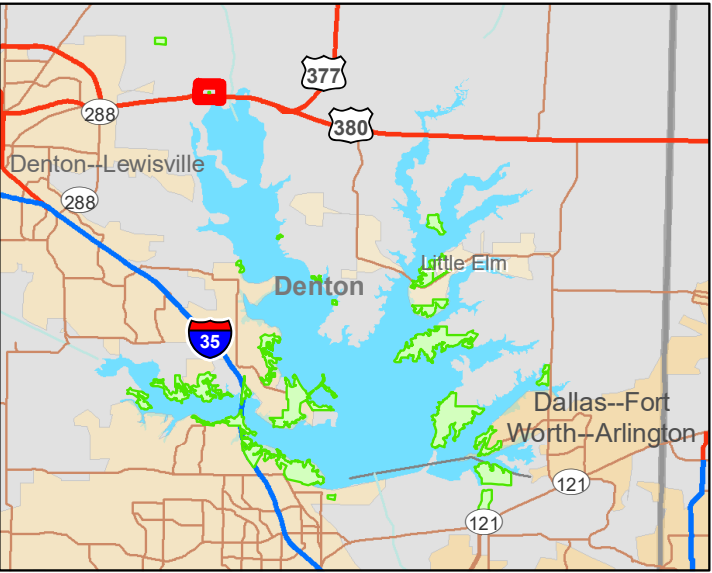
LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(GREENBELT CORRIDOR PARK
HIGHWAY 428 ACCESS- LEASED TO
CITY OF DENTON AND DALLAS AND
OPERATED BY TEXAS
PARKS AND WILDLIFE DEPARTMENT)




DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-428



FACILITY TOTALS	
ITEM	EXISTING
PICNIC SITE	7
RESTROOM	1

- FEE BOUNDARY
- Greenbelt Equestrian Trail
- Greenbelt Hard Surface Trail
- PICNIC SITE
- RESTROOM
- LE ESA

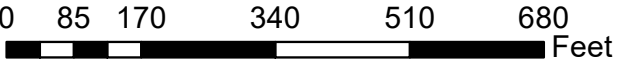



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

LEWISVILLE LAKE LEWISVILLE LAKE TRINITY RIVER, TEXAS

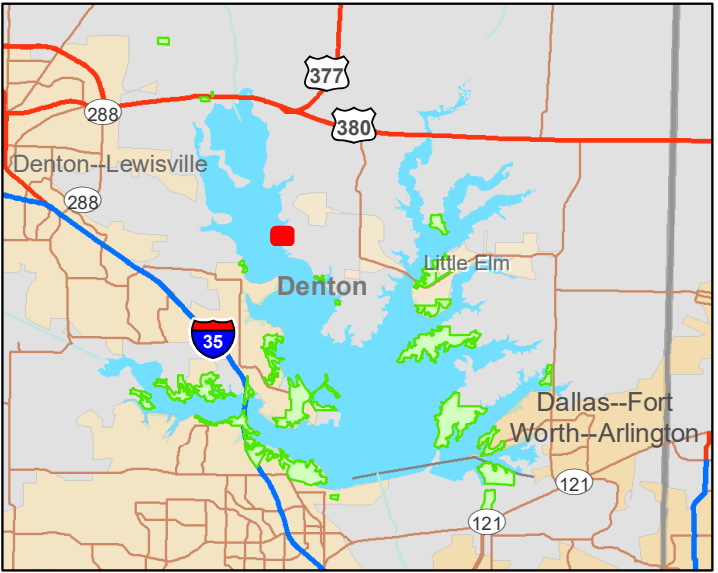
LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(GREENBELT CORRIDOR PARK-
HIGHWAY 380 ACCESS-
LEASED TO CITY OF DENTON AND DALLAS
AND OPERATED BY TEXAS
PARKS AND WILDLIFE DEPARTMENT)




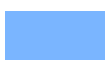



DATE: MAP NO.

DECEMBER 2020 LE20MP-OR-380



FACILITY TOTALS	
ITEM	EXISTING
BOAT RAMP	1

-  FEE BOUNDARY
-  LIMIT OF PARK AREA
-  BOAT RAMP
-  LE ESA



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT


LEWISVILLE LAKE

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN

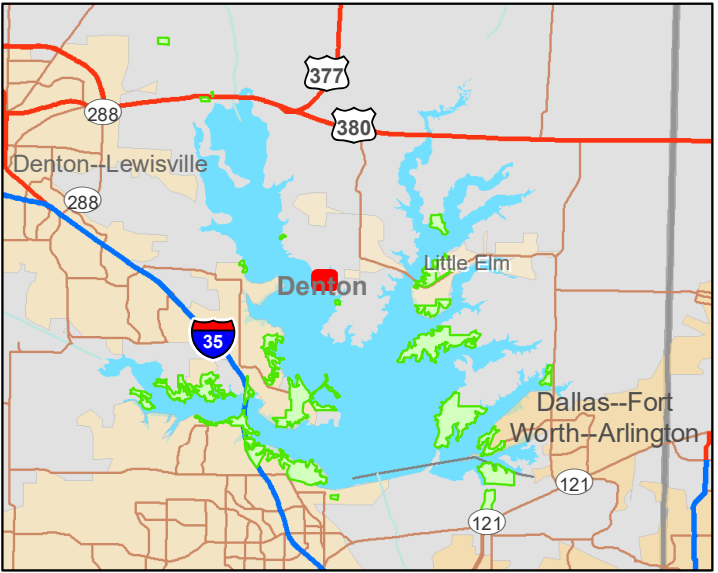
RECREATIONAL MAP-
(OAK POINT BOAT RAMP-
LEASED TO CITY OF OAK POINT)



0 50 100 200 300 400 Feet


DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-OP



FACILITY TOTALS	
ITEM	EXISTING
BOAT RAMP	1
MARINA	1

- FEE BOUNDARY
- BOAT RAMP
- MARINA
- LE ESA



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

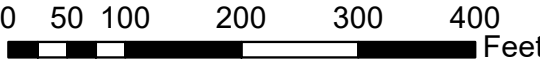

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

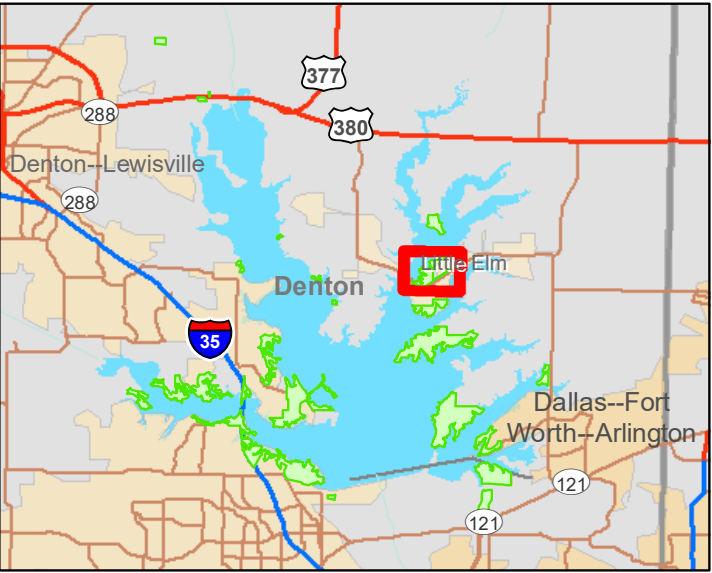
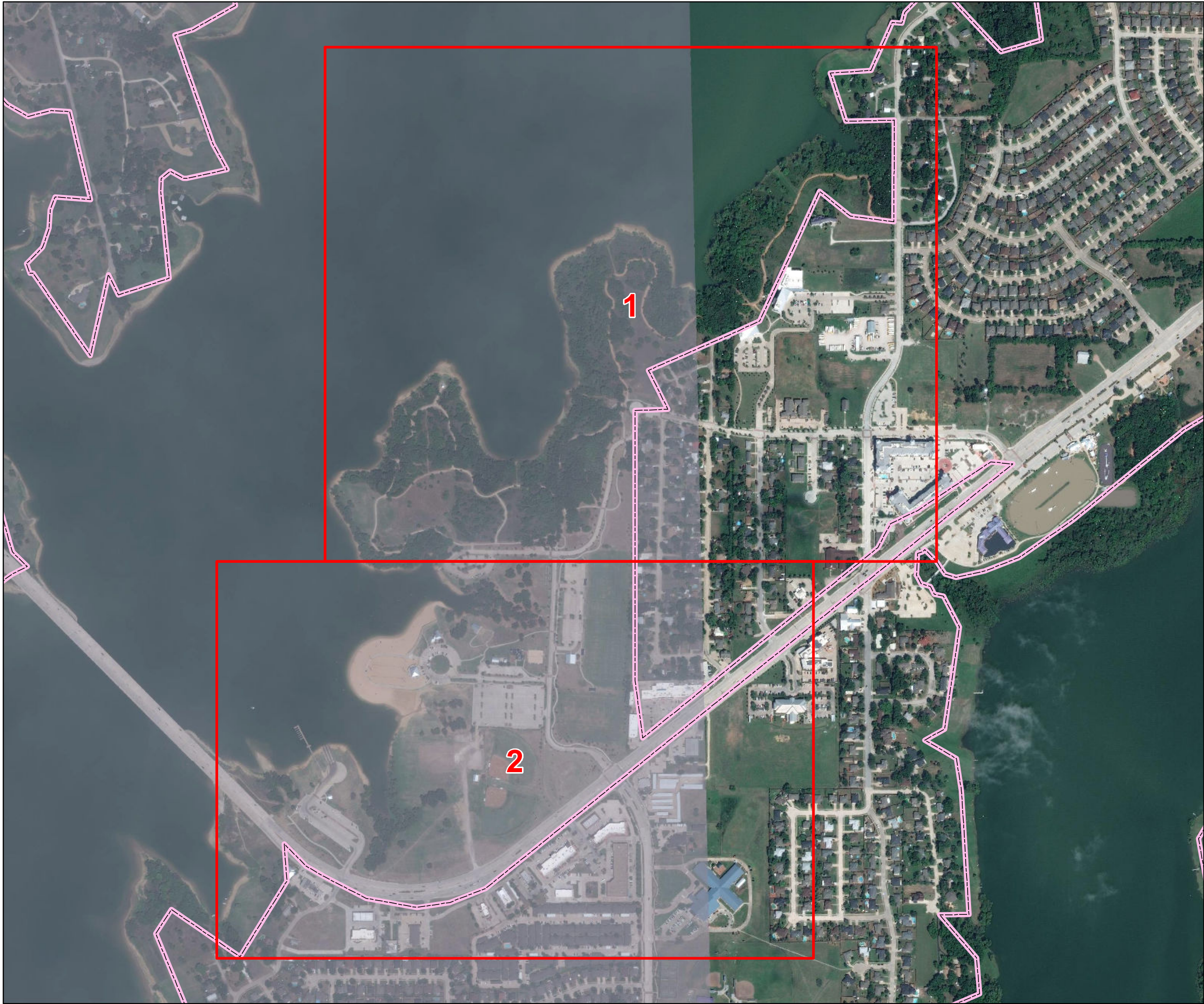
LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(LEASE AREA-
DALLAS CORINTHIAN YACHT CLUB)




DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-DC



FACILITY TOTALS	
ITEM	EXISTING
PICNIC SITE	4
GROUP PICNIC SHELTER	3
RESTROOM	4
BOAT RAMP	1
COURTESY DOCK	1
PLAYGROUND	1
ATHLETIC AREA	19



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

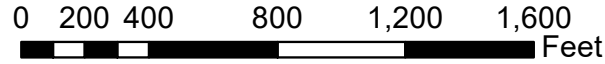

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

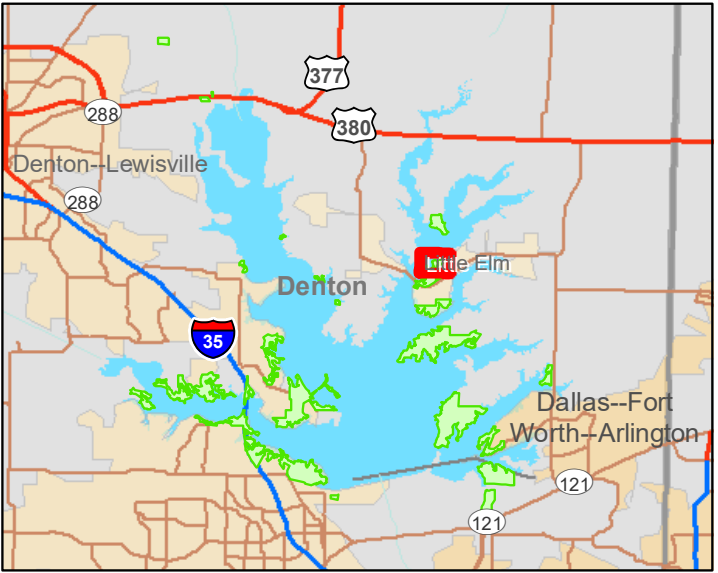
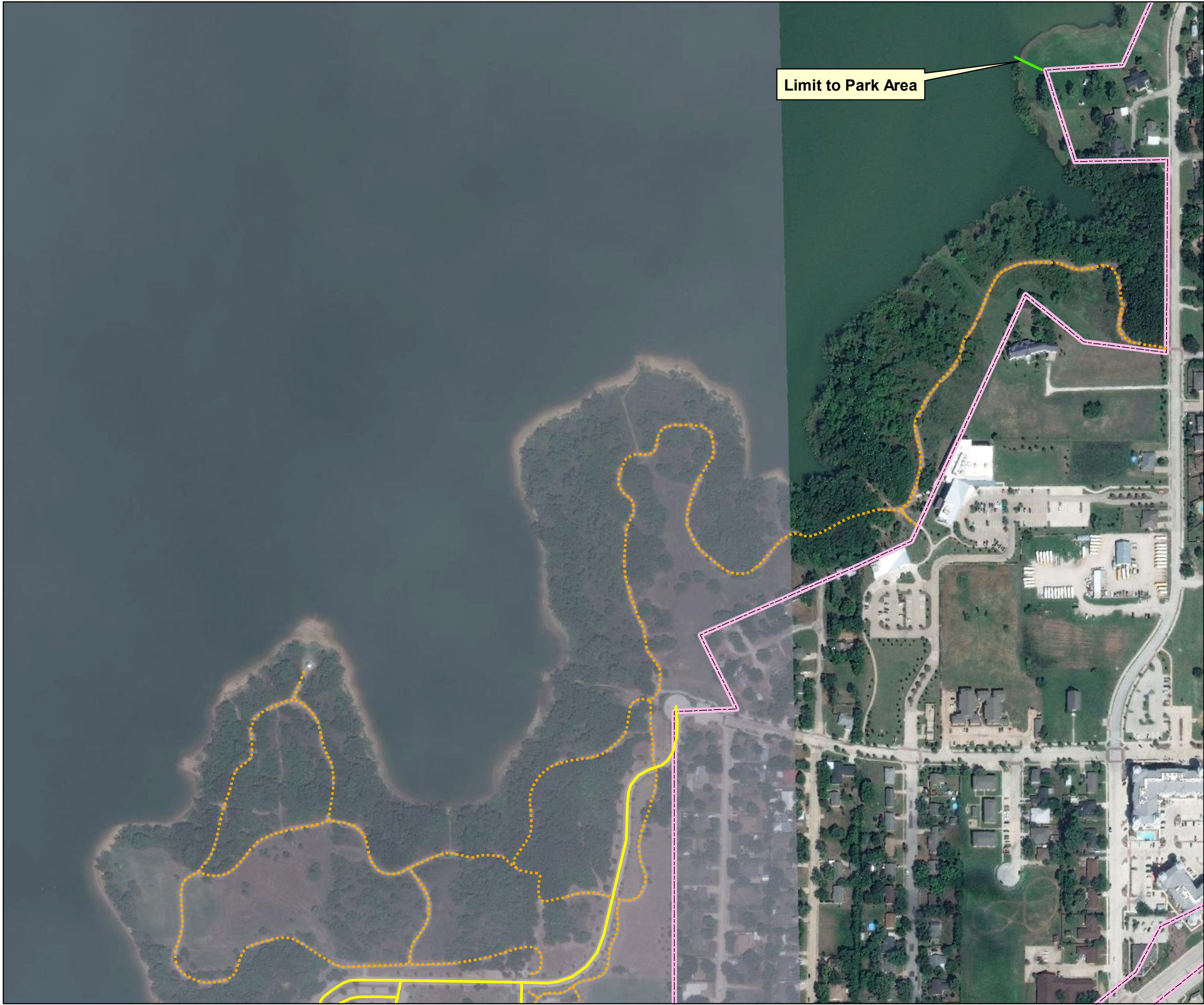
LEWISVILLE LAKE MASTER PLAN




RECREATIONAL MAP-
(LITTLE ELM PARK-
LEASED TO CITY OF LITTLE ELM)




DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-LI-INDEX



-  FEE BOUNDARY
-  RECREATION TRAIL
-  LIMIT OF PARK AREA



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT


LEWISVILLE LAKE

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(LITTLE ELM PARK-
LEASED TO CITY OF LITTLE ELM)

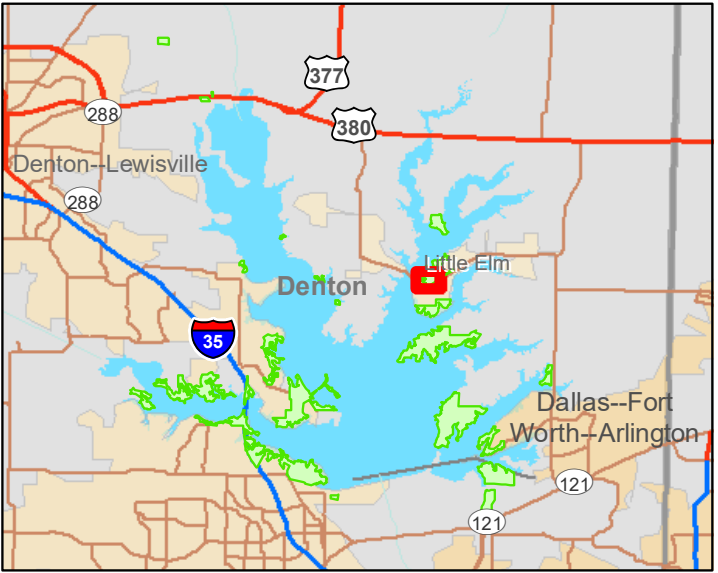


0 100 200 400 600 800


Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-LI-01



- FEE BOUNDARY
- RECREATION TRAIL
- LIMIT OF PARK AREA
- PICNIC SITE
- GROUP PICNIC SHELTER
- RESTROOM
- BOAT RAMP
- COURTESY DOCK
- PLAYGROUND
- ATHLETIC AREA



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT


LEWISVILLE LAKE

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(LITTLE ELM PARK-
LEASED TO CITY OF LITTLE ELM)

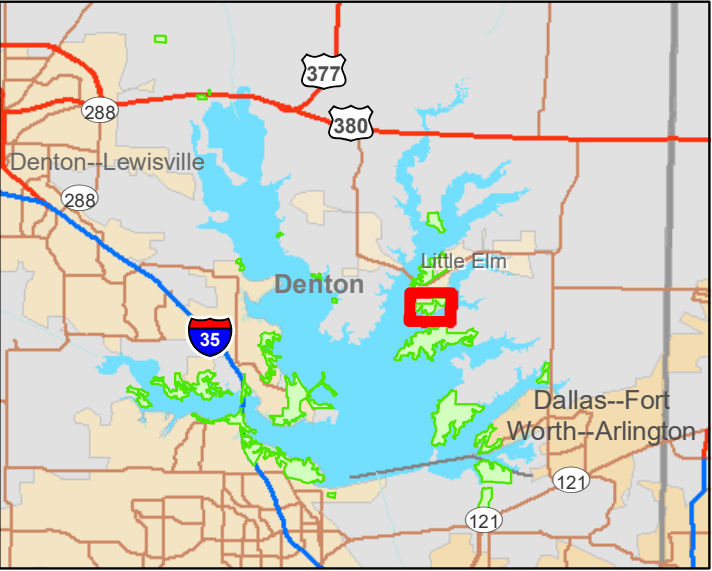
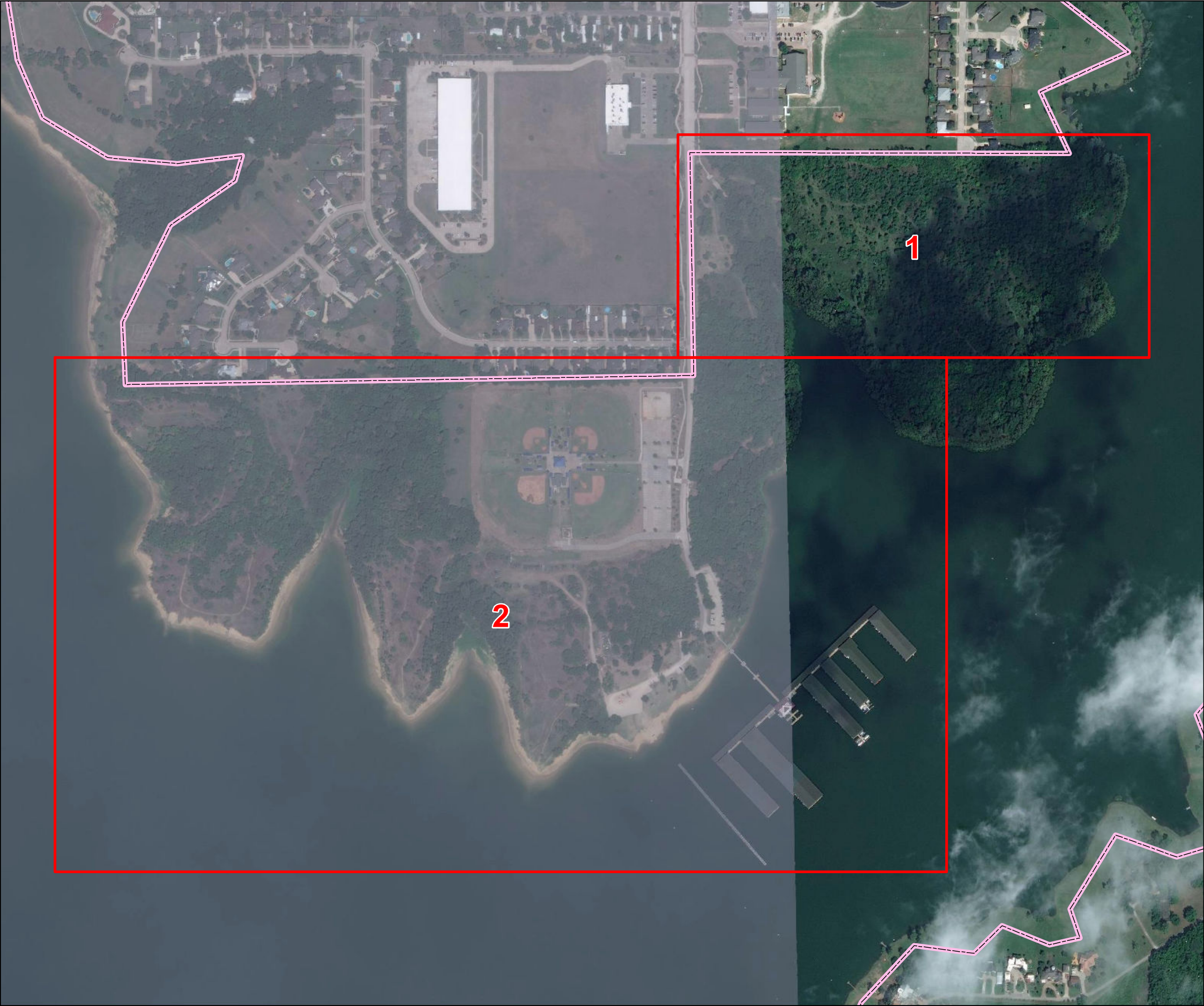


0 75 150 300 450 600


Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-LI-02



FACILITY TOTALS	
ITEM	EXISTING
PICNIC SITE	8
GROUP PICNIC SHELTER	1
RESTROOM	2
MARINA	1
ATHLETIC AREA	4



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT


LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

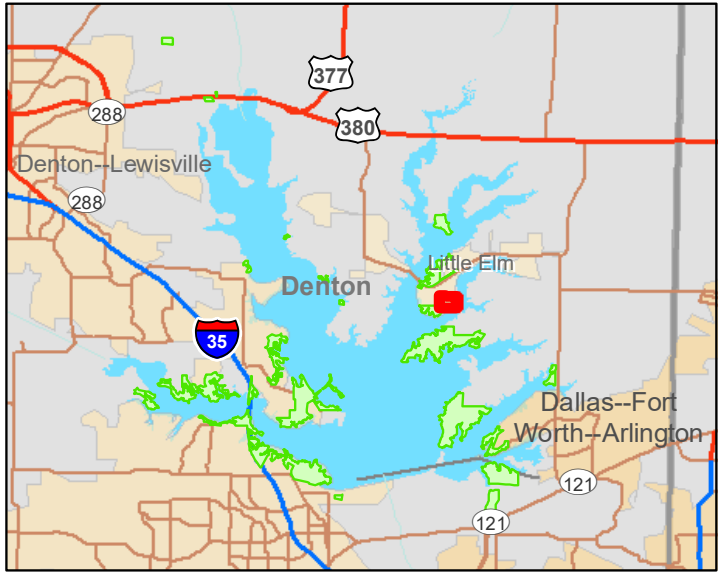
RECREATIONAL MAP-
(COTTONWOOD PARK-
LEASED TO CITY OF LITTLE ELM)

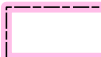



0 125 250 500 750 1,000 Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-CW-INDEX



-  FEE BOUNDARY
-  RECREATION TRAIL



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LEWISVILLE LAKE TRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

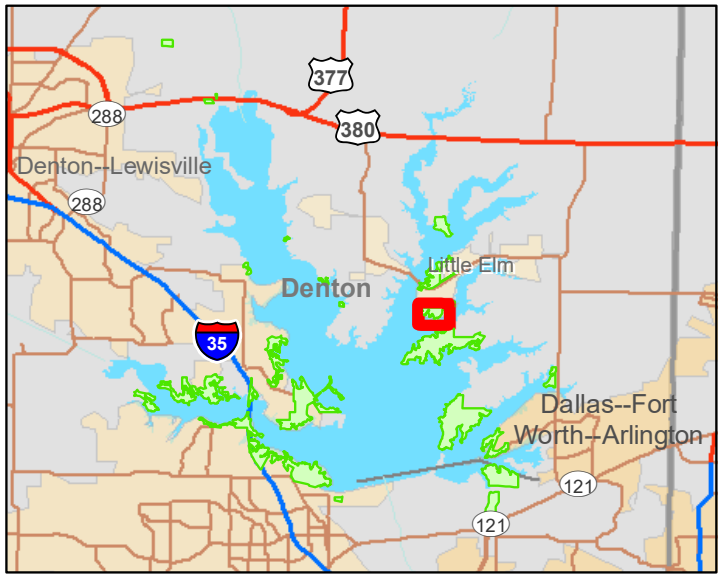
RECREATIONAL MAP-
(COTTONWOOD PARK-
LEASED TO CITY OF LITTLE ELM)



0 50 100 200 300 400
Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-CW-01



- FEE BOUNDARY
- RECREATION TRAIL
- PICNIC SITE
- GROUP PICNIC SHELTER
- RESTROOM
- MARINA
- ATHLETIC AREA



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LEWISVILLE LAKE TRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

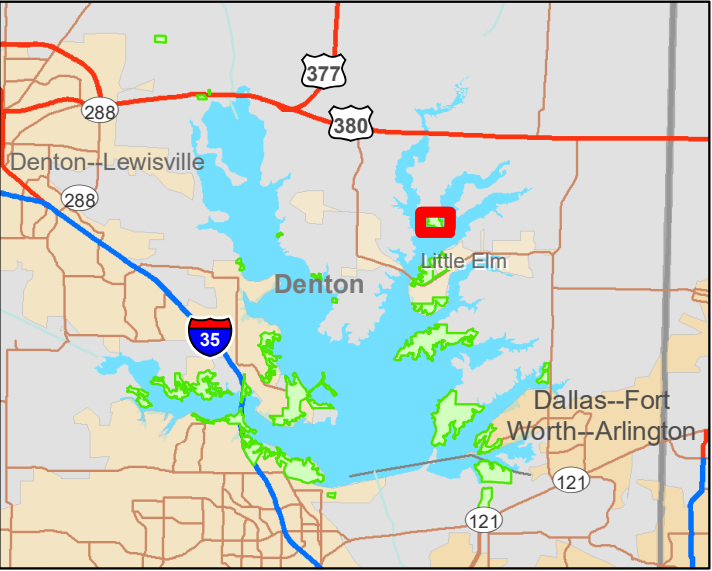
RECREATIONAL MAP-
(COTTONWOOD PARK-
LEASED TO CITY OF LITTLE ELM)






0 100 200 400 600 800 Feet


DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-CW-02



FACILITY TOTALS	
ITEM	EXISTING
BOAT RAMP	1

-  FEE BOUNDARY
-  LIMIT OF PARK AREA
-  BOAT RAMP



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

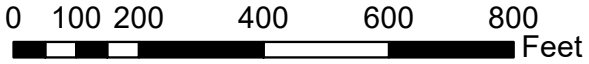

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

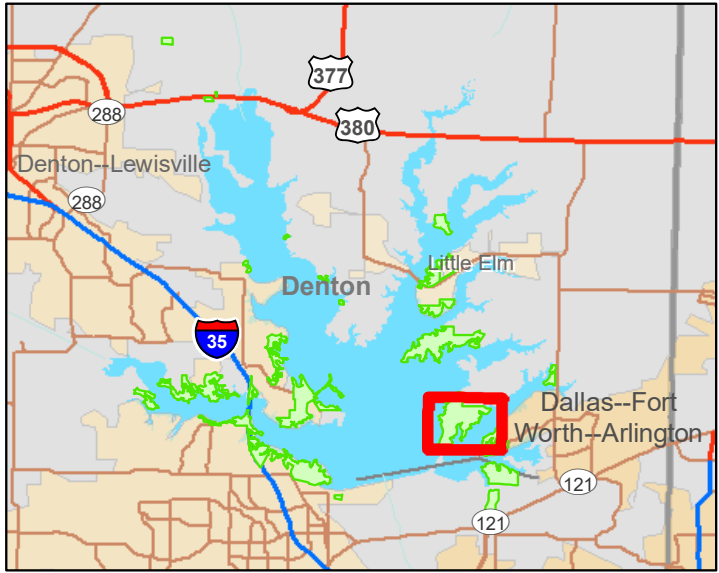
LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(DOE BRANCH PARK- USACE)



DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-DB



FACILITY TOTALS	
ITEM	EXISTING
GOLF COURSE	2

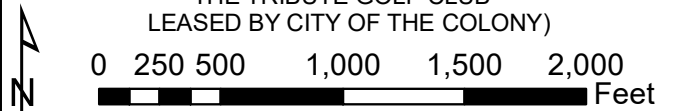


**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

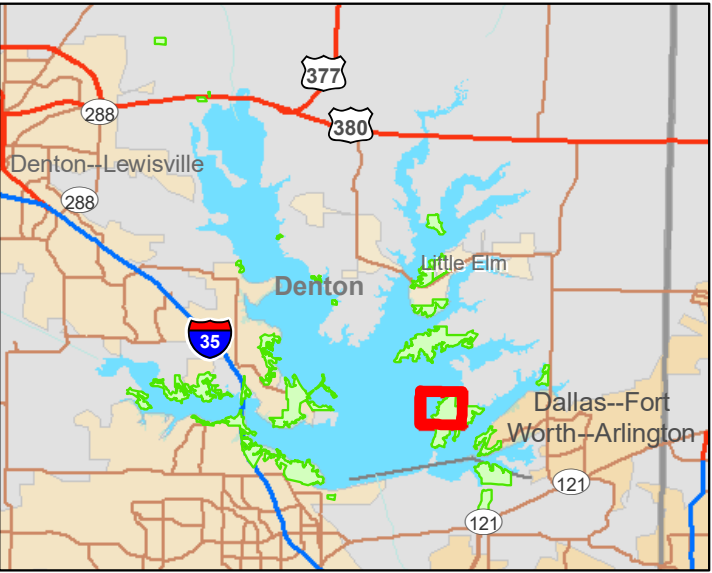
LEWISVILLE LAKE LEWISVILLE LAKE TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(WYNNEWOOD PARK-
OLD AMERICAN GOLF CLUB AND
THE TRIBUTE GOLF CLUB-
LEASED BY CITY OF THE COLONY)



DATE: DECEMBER2020	MAP NO. LE20MP-OR-WW-INDEX
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- FEE BOUNDARY
- RECREATION TRAIL
- LIMIT OF PARK AREA
- ATHLETIC AREA



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

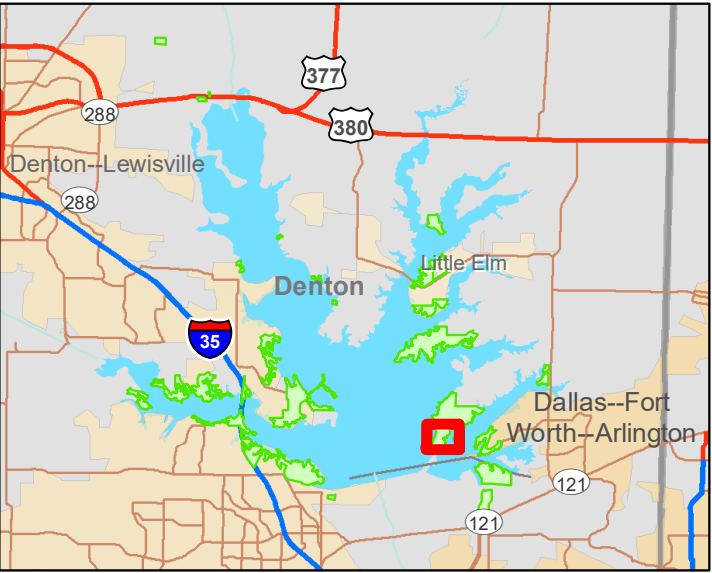
RECREATIONAL MAP-
(WYNNEWOOD PARK-
THE TRIBUTE GOLF CLUB-
LEASED BY CITY OF THE COLONY)






0 175 350 700 1,050 1,400

Feet

DATE:	MAP NO.
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-  FEE BOUNDARY
-  RECREATION TRAIL



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT


LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(WYNNEWOOD PARK-
THE TRIBUTE GOLF CLUB-
LEASED BY CITY OF THE COLONY)

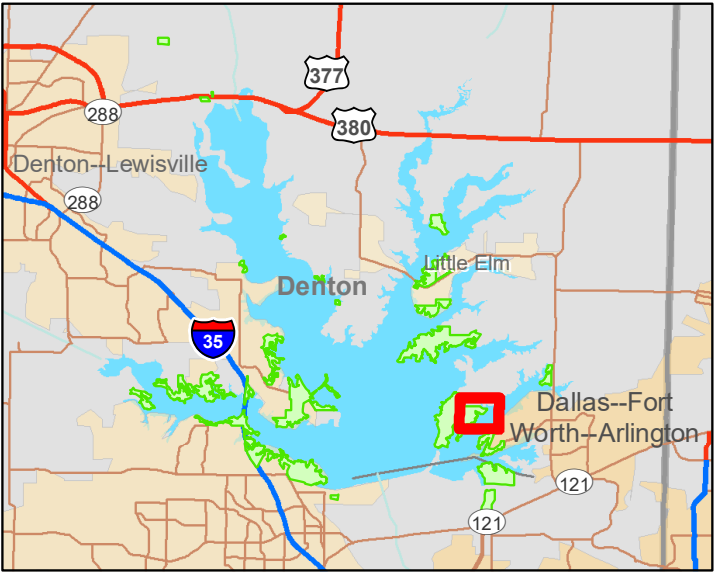





01252505007501,000


Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-WW-02



-  FEE BOUNDARY
-  RECREATION TRAIL
-  ATHLETIC AREA




**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

LEWISVILLE LAKE

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(WYNNEWOOD PARK-
THE TRIBUTE GOLF CLUB-
LEASED BY CITY OF THE COLONY)

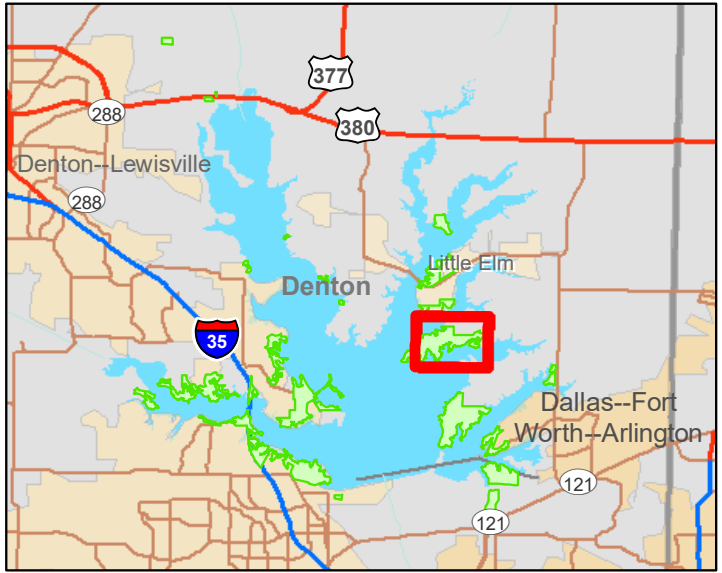


0 150 300 600 900 1,200

Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-WW-03



FACILITY TOTALS	
ITEM	EXISTING
PICNIC SITE	58
GROUP PICNIC SHELTER	4
RV CAMPSITE	112
PERMANENT CAMPSITE	13
DUMP STATION	1
RESTROOM	3
BOAT RAMP	1
COURTESY DOCK	1
MARINA	1
GATEHOUSE	1
PLAYGROUND	1
ATHLETIC AREA	1

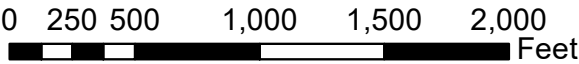


U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT

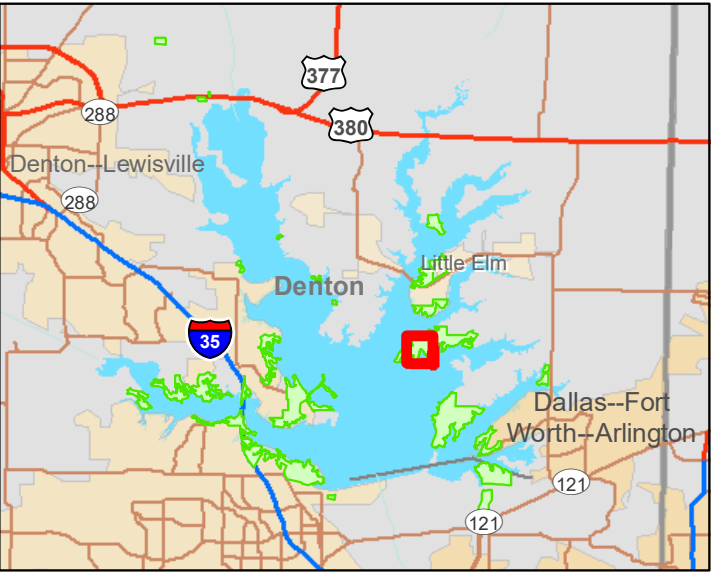
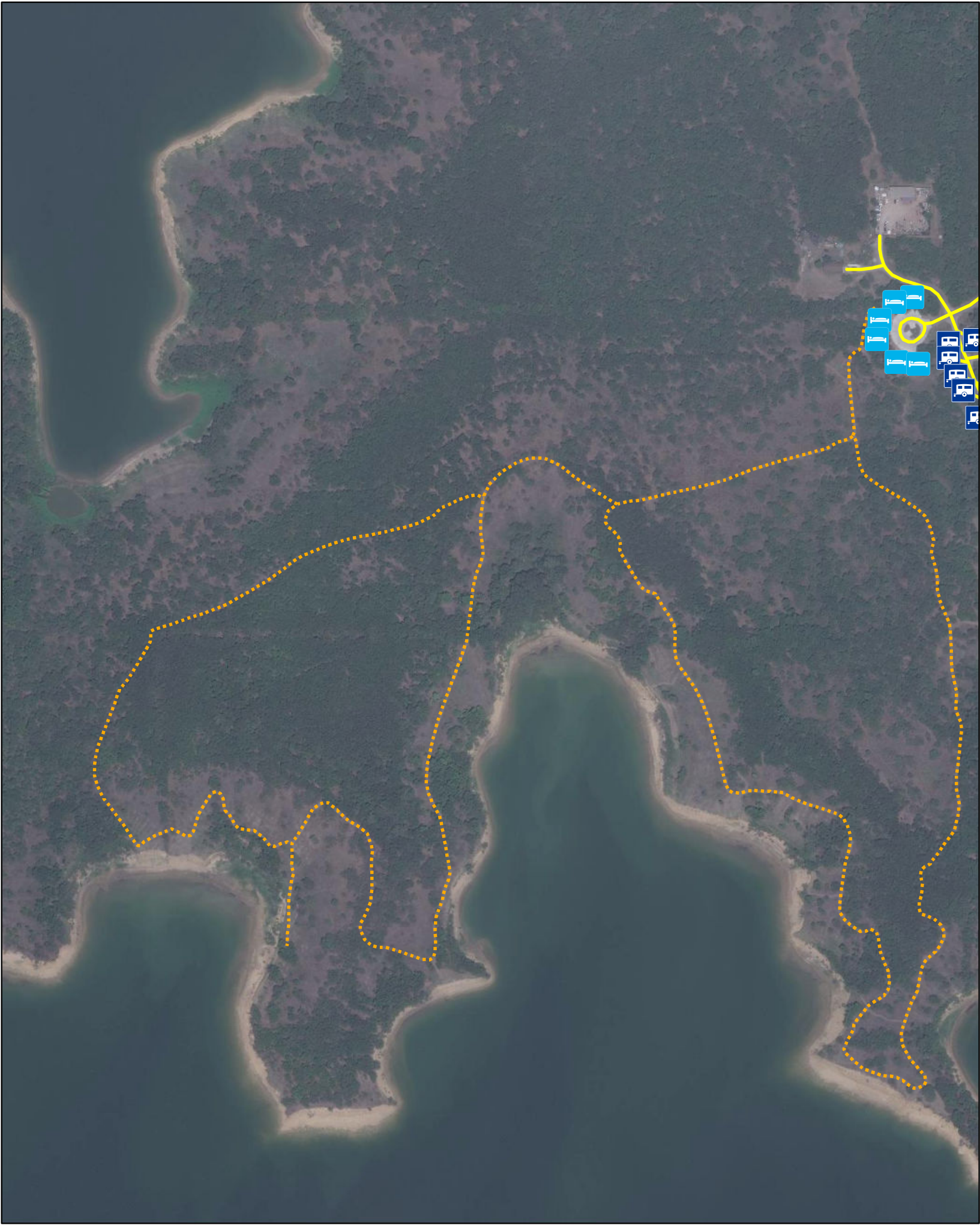
LEWISVILLE LAKE LEWISVILLE LAKE TRINITY RIVER, TEXAS





LEWISVILLE LAKE MASTER PLAN


RECREATIONAL MAP-
(HIDDEN COVE PARK-
LEASED TO CITY OF THE COLONY)



DATE:	MAP NO.
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-  FEE BOUNDARY
-  RECREATION TRAIL
-  RV CAMPSITE
-  PERMANENT CAMPSITE



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

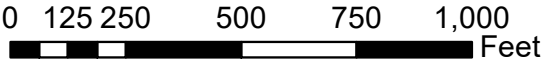

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

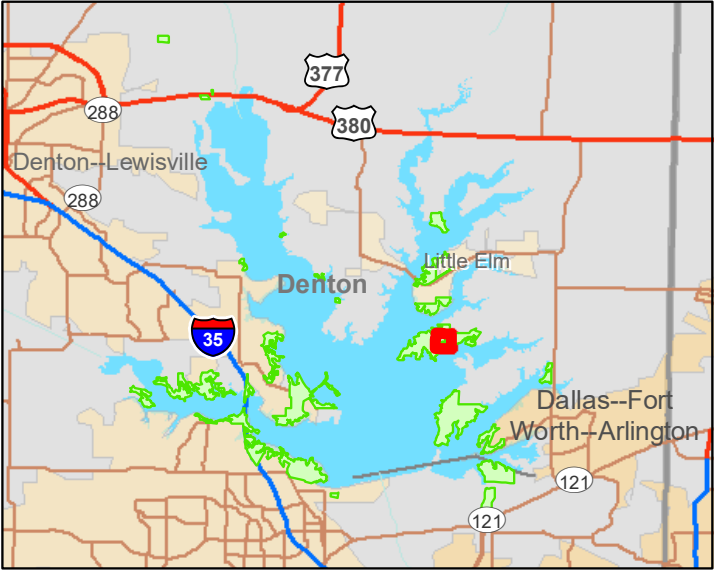
LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(HIDDEN COVE PARK-
LEASED TO CITY OF THE COLONY)




DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-HCV-01



- FEE BOUNDARY
- RECREATION TRAIL
- GROUP PICNIC SHELTER
- RV CAMPSITE
- PERMANENT CAMPSITE
- RESTROOM



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT


LEWISVILLE LAKE

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(HIDDEN COVE PARK-
LEASED TO CITY OF THE COLONY)

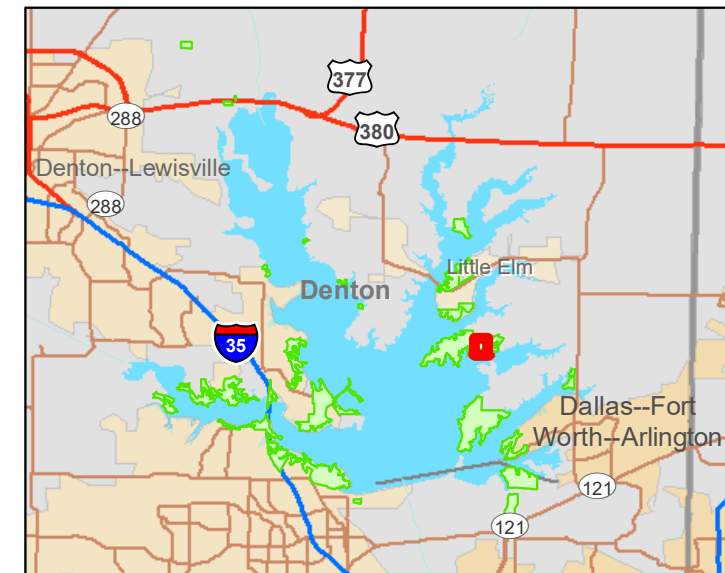
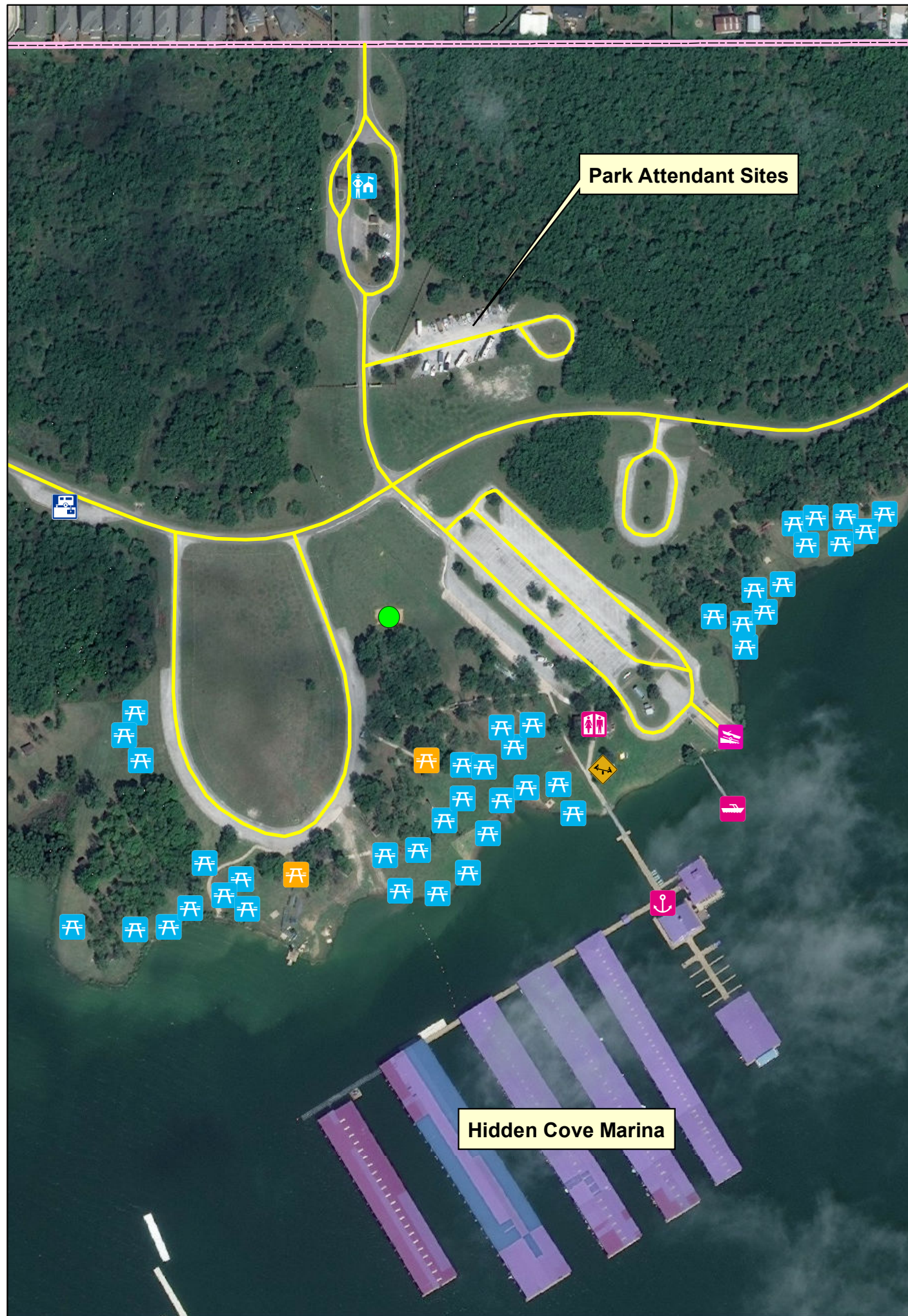


075150300450600


Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-HCV-02



- FEE BOUNDARY
- RECREATION TRAIL
- PICNIC SITE
- GROUP PICNIC SHELTER
- DUMP STATION
- RESTROOM
- BOAT RAMP
- COURTESY DOCK
- MARINA
- GATEHOUSE
- PLAYGROUND
- ATHLETIC AREA



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

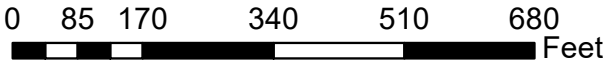

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

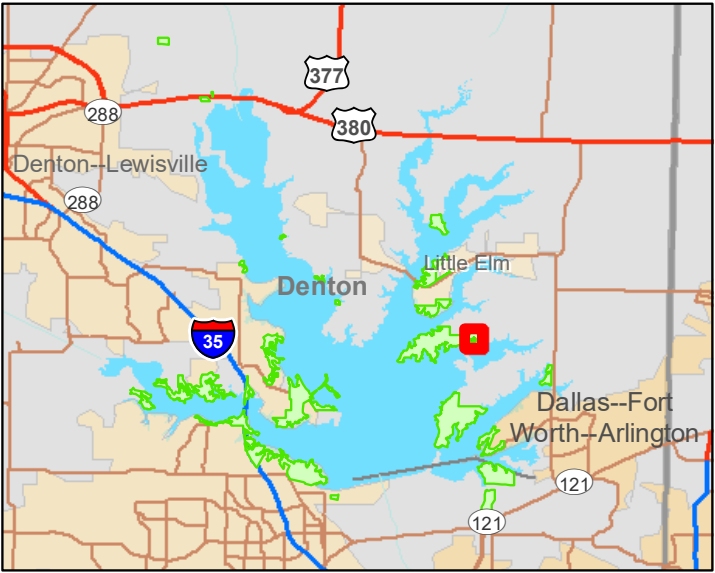
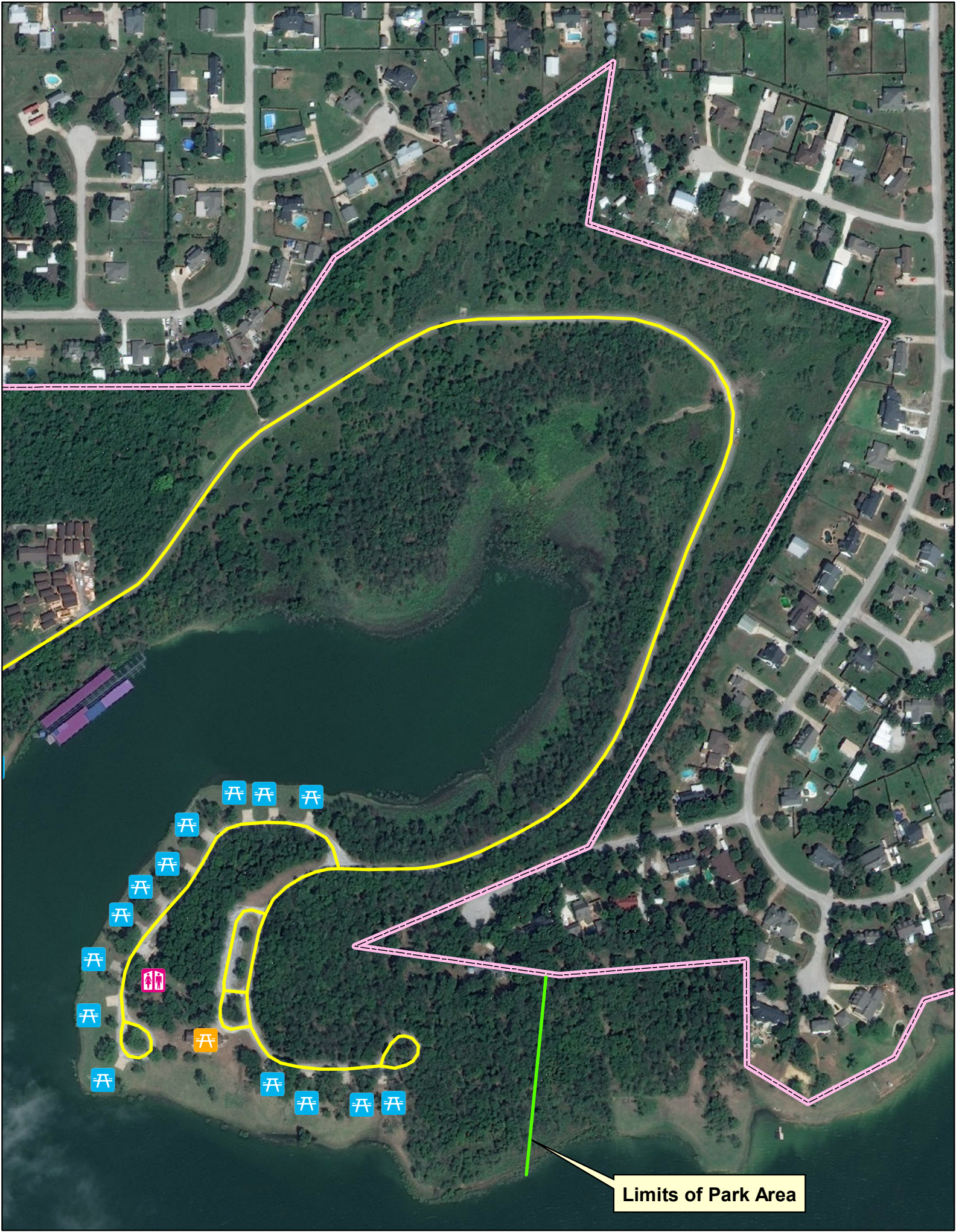
LEWISVILLE LAKE MASTER PLAN







RECREATIONAL MAP-
(HIDDEN COVE PARK-
LEASED TO CITY OF THE COLONY)




DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-HCV-03



-  FEE BOUNDARY
-  RECREATION TRAIL
-  LIMIT OF PARK AREA
-  PICNIC SITE
-  GROUP PICNIC SHELTER
-  RESTROOM



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT


LEWISVILLE LAKE

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(HIDDEN COVE PARK-
LEASED TO CITY OF THE COLONY)

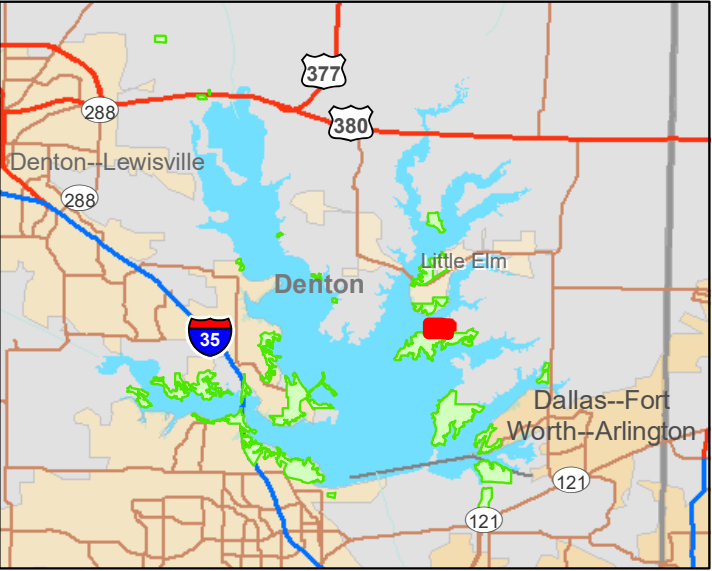




0 100 200 400 600 800


Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-HCV-04



-  FEE BOUNDARY
-  LIMIT OF PARK AREA



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT


LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

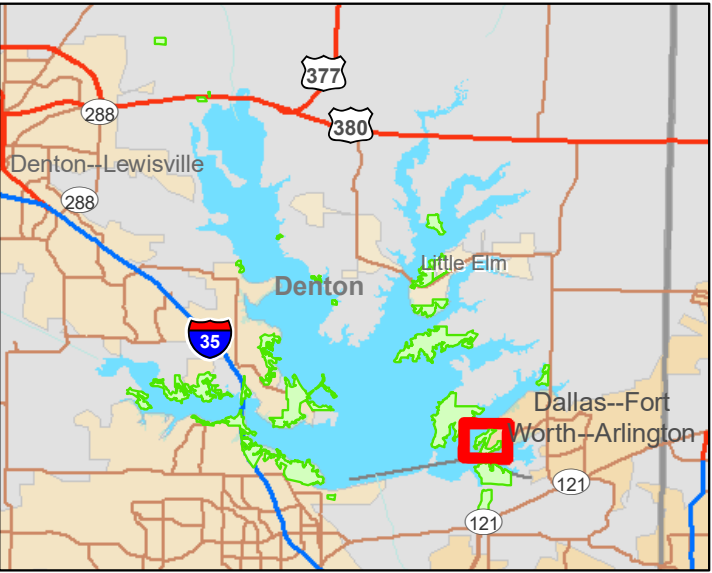
LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(HIDDEN COVE PARK-
LEASED TO CITY OF THE COLONY)




075150300450600Feet

DATE:	MAP NO.
DECEMBER 2020	LE20MP-OR-HCV-05



FACILITY TOTALS	
ITEM	EXISTING
PICNIC SITE	22
GROUP PICNIC SHELTER	1
RESTROOM	1
BOAT RAMP	1
COURTESY DOCK	1
SWIM AREA	1
FISHING DOCK	1
GATEHOUSE	1
PLAYGROUND	1
ATHLETIC AREA	3



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

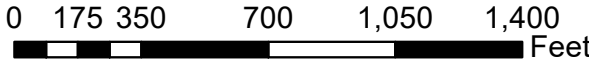
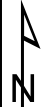
LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

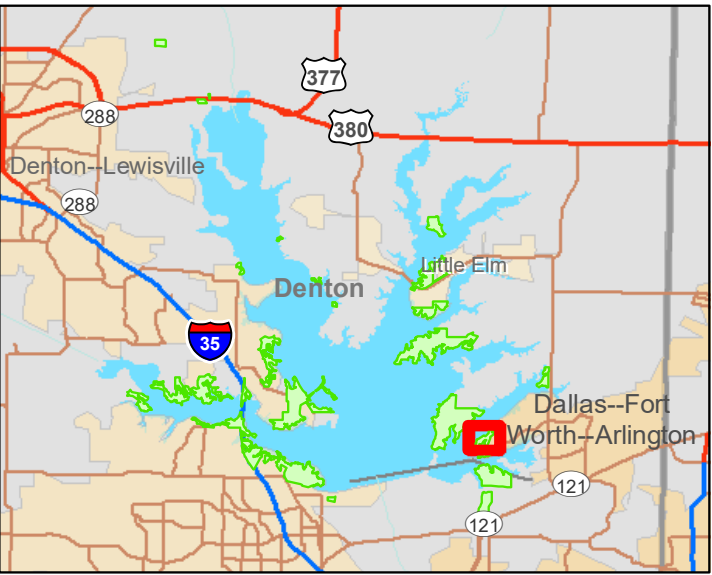
LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(STEWART CREEK PARK-
LEASED BY CITY OF THE COLONY)




DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-SC-INDEX



- FEE BOUNDARY
- RECREATION TRAIL
- LIMIT OF PARK AREA



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT


LEWISVILLE LAKE

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN

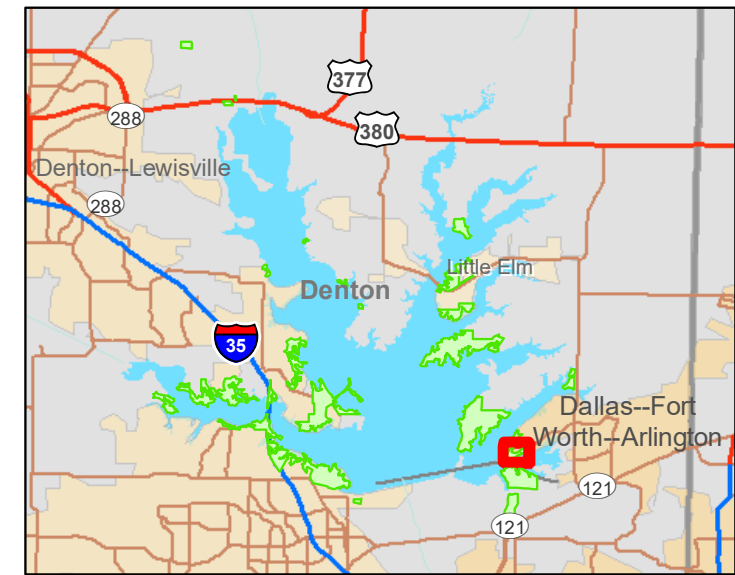
RECREATIONAL MAP-
(STEWART PENINSULA GOLF COURSE-
LEASED BY CITY OF THE COLONY)




0 125 250 500 750 1,000
Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-SC-01



- FEE BOUNDARY
- RECREATION TRAIL
- LIMIT OF PARK AREA
- PICNIC SITE
- GROUP PICNIC SHELTER
- RESTROOM
- BOAT RAMP
- COURTESY DOCK
- FISHING DOCK
- SWIM AREA
- PLAYGROUND
- ATHLETIC AREA



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT


LEWISVILLE LAKE

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(STEWART CREEK PARK-
LEASED BY CITY OF THE COLONY)

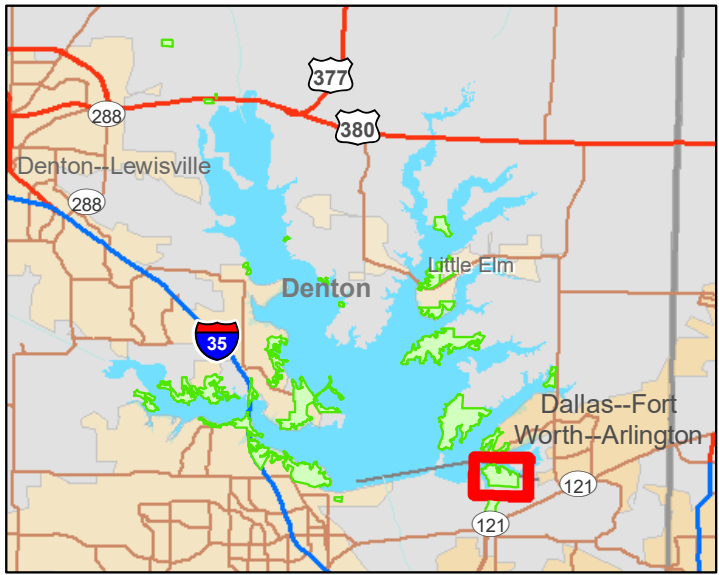


0 100 200 400 600 800

Feet

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-SC-02



FACILITY TOTALS	
ITEM	EXISTING
PICNIC SITE	33
GROUP PICNIC SHELTER	1
RESTROOM	1
BOAT RAMP	3
MARINA	1
GATEHOUSE	1
PLAYGROUND	1



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LEWISVILLE LAKE

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

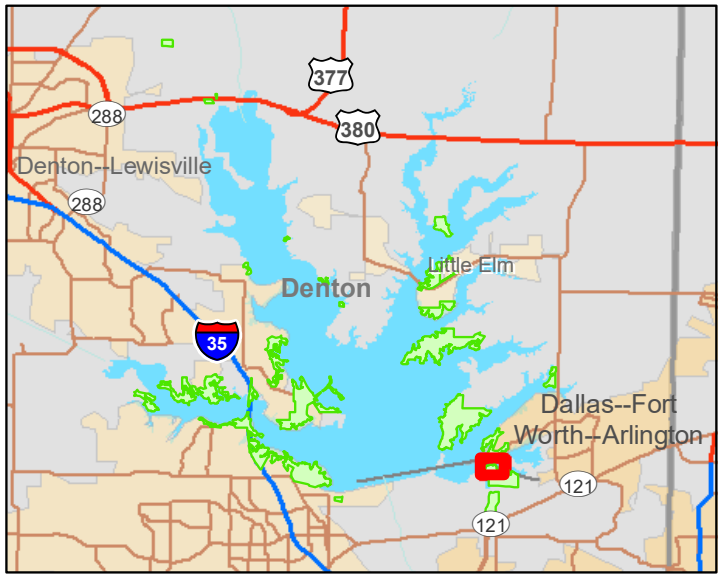
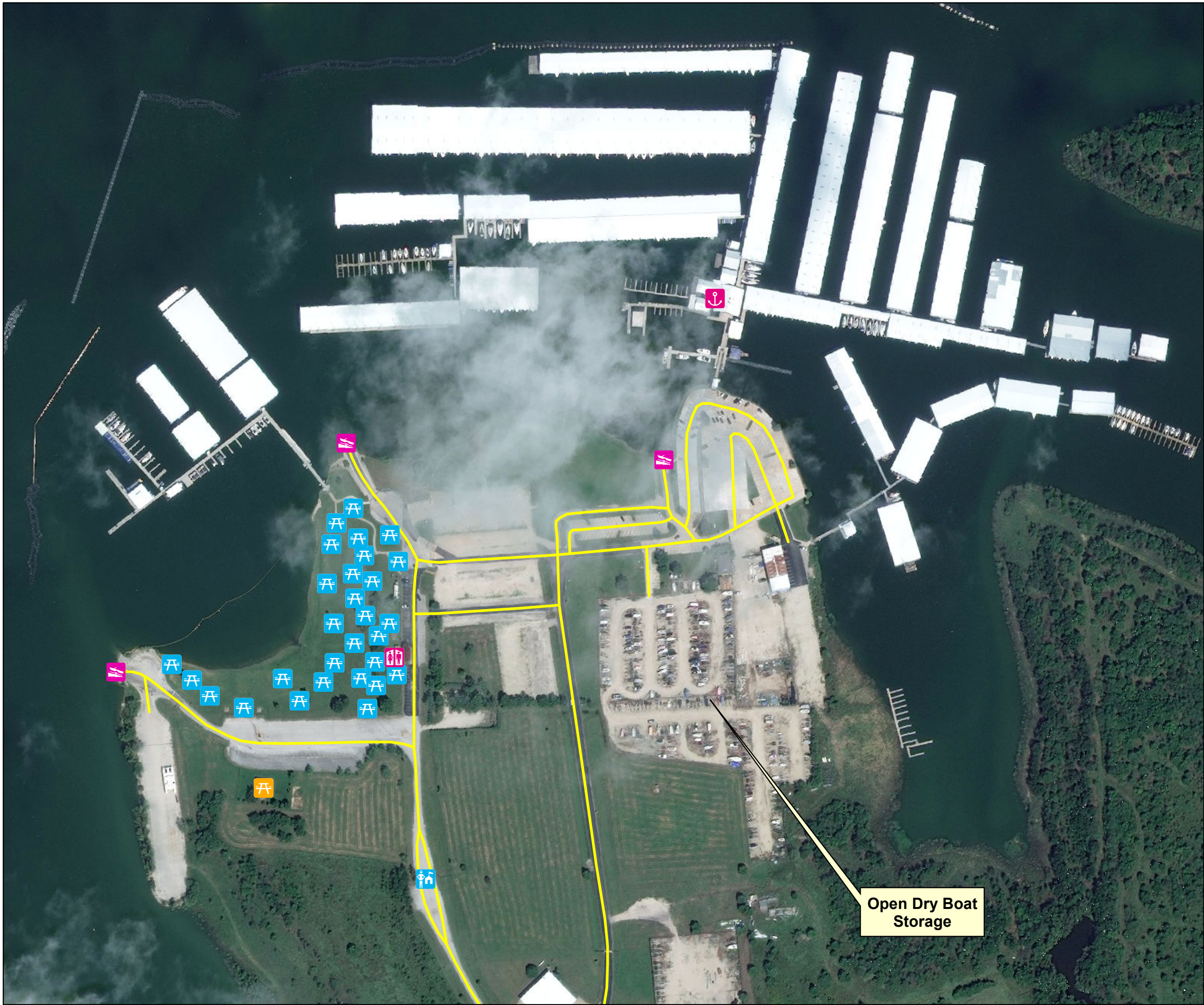
LEWISVILLE LAKE MASTER PLAN

RECREATIONAL MAP-
(EAST HILL PARK AND
PIER 121 MARINA LEASE)



DATE:
DECEMBER 2020

MAP NO.
LE20MP-OR-P121-INDEX



- FEE BOUNDARY
- RECREATION TRAIL
- PICNIC SITE
- GROUP PICNIC SHELTER
- BOAT RAMP
- RESTROOM
- MARINA
- GATEHOUSE



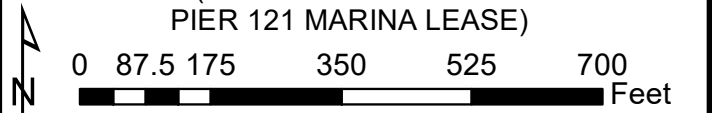
**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LEWISVILLE LAKE TRINITY RIVER, TEXAS

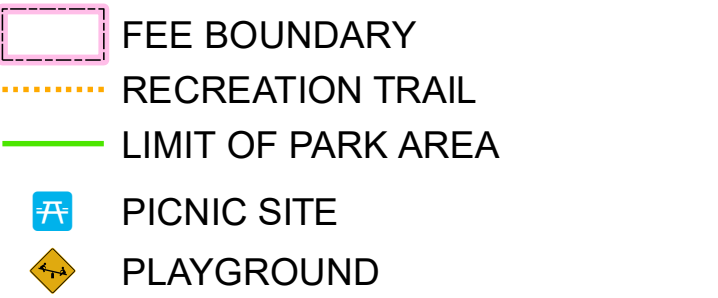
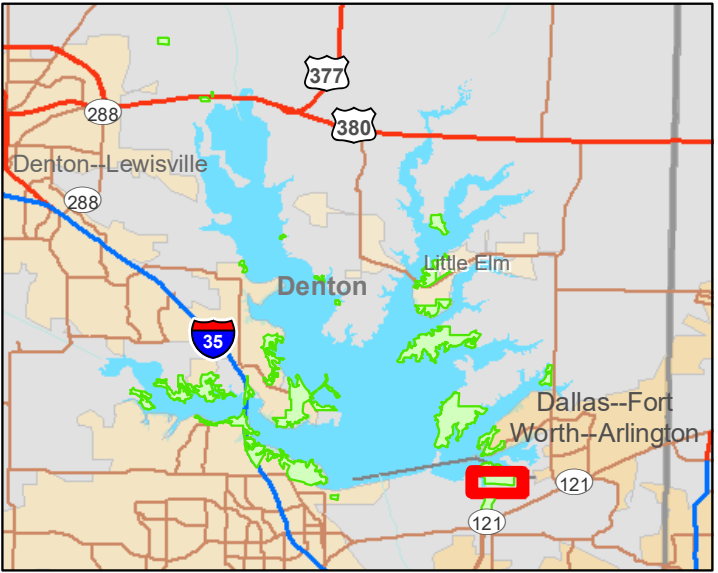
LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN


RECREATIONAL MAP-
(EAST HILL PARK AND
PIER 121 MARINA LEASE)



DATE:	MAP NO.
DECEMBER 2020	LE20MP-OR-P121-01



Area leased to City of Lewisville for Water Storage Tanks and small Community Playground



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT


LEWISVILLE LAKE

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE MASTER PLAN

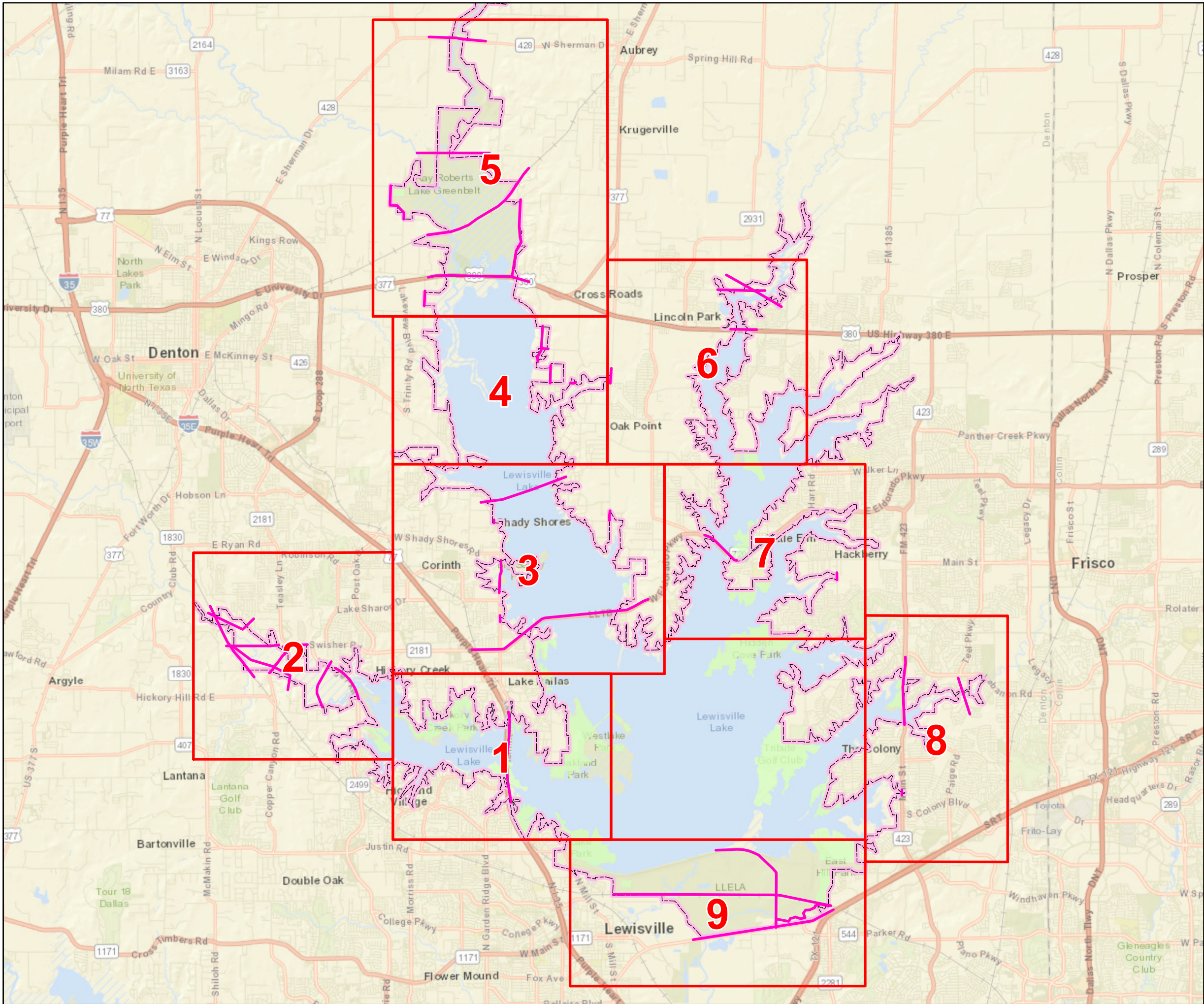
RECREATIONAL MAP-
(EAST HILL PARK AND
PIER 121 MARINA LEASE)



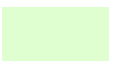




0 187.5375 750 1,125 1,500 Feet

DATE:
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MAP NO.
LE20MP-OR-P121-02



-  FEE BOUNDARY
-  UTILITY CORRIDOR
-  RECREATION AREA
-  UTILITY GRID



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT


LEWISVILLE LAKE

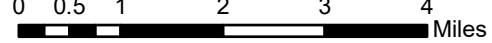
TRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

UTILITY CORRIDOR MAP- INDEX

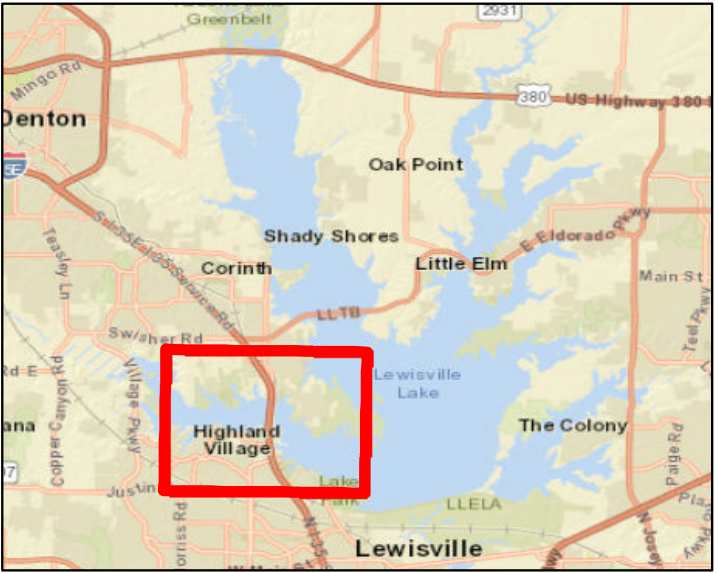
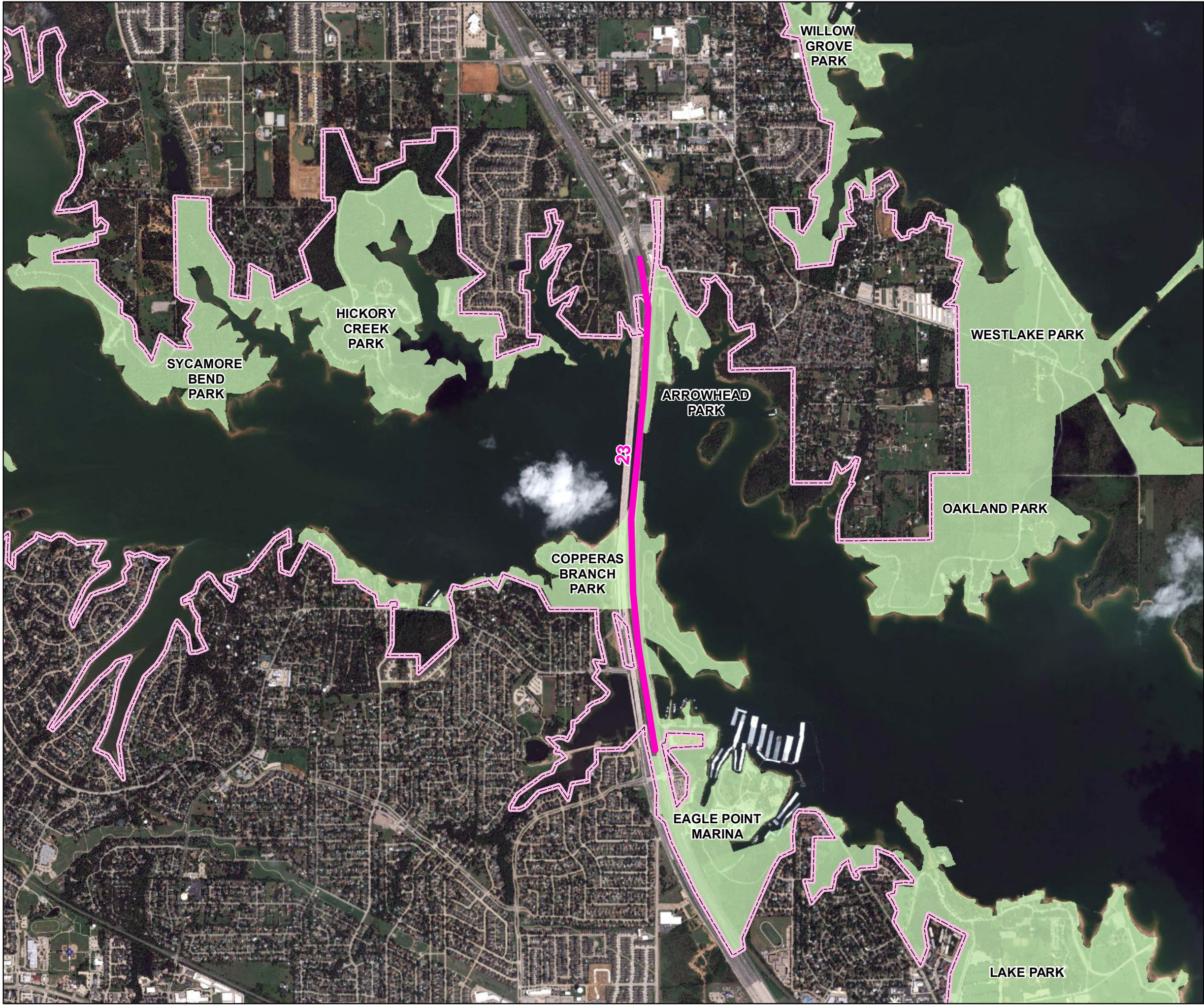




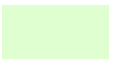



0 0.5 1 2 3 4 Miles

DATE:
DECEMBER 2020

MAP NO.
LE20MP-OU-INDEX



-  FEE BOUNDARY
-  UTILITY CORRIDOR
-  RECREATION AREA



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT


LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

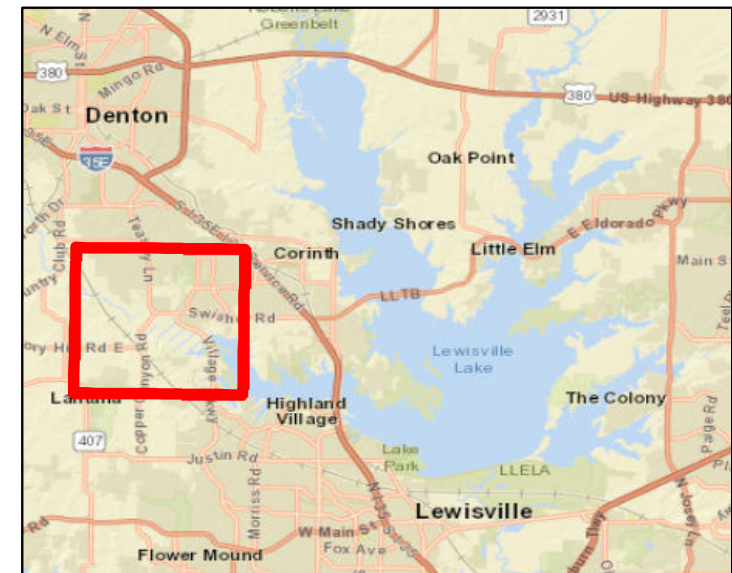
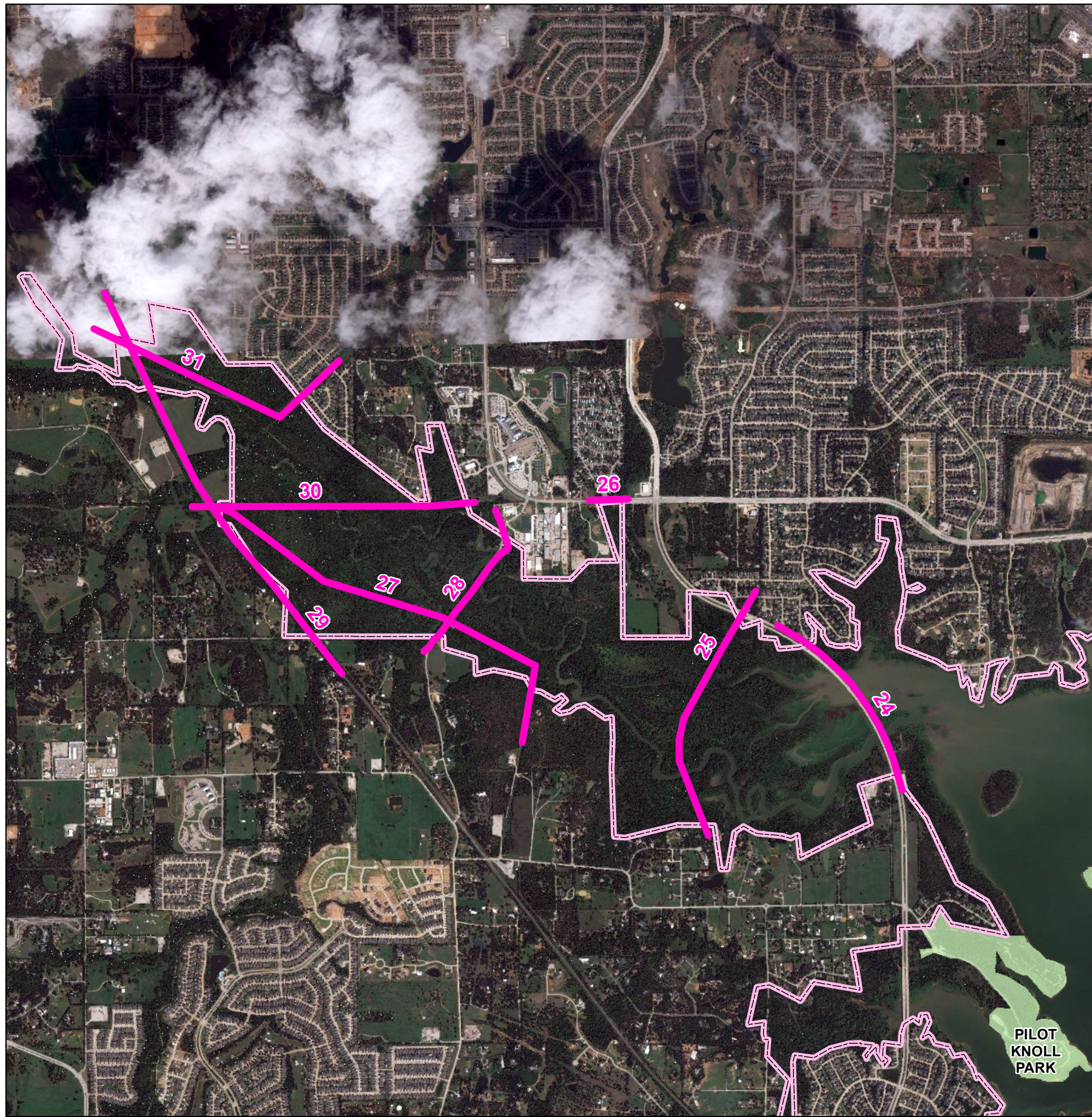
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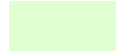



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-  FEE BOUNDARY
-  UTILITY CORRIDOR
-  RECREATION AREA



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

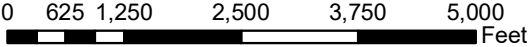

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TRINITY RIVER, TEXAS

LEWISVILLE LAKE

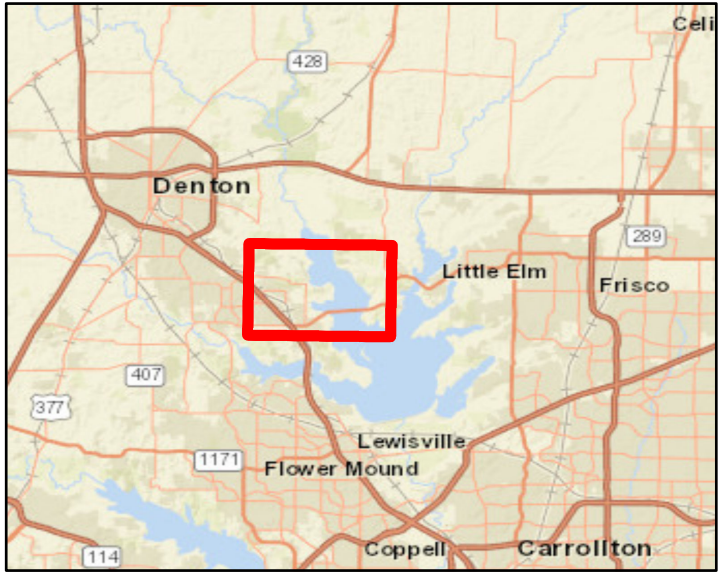
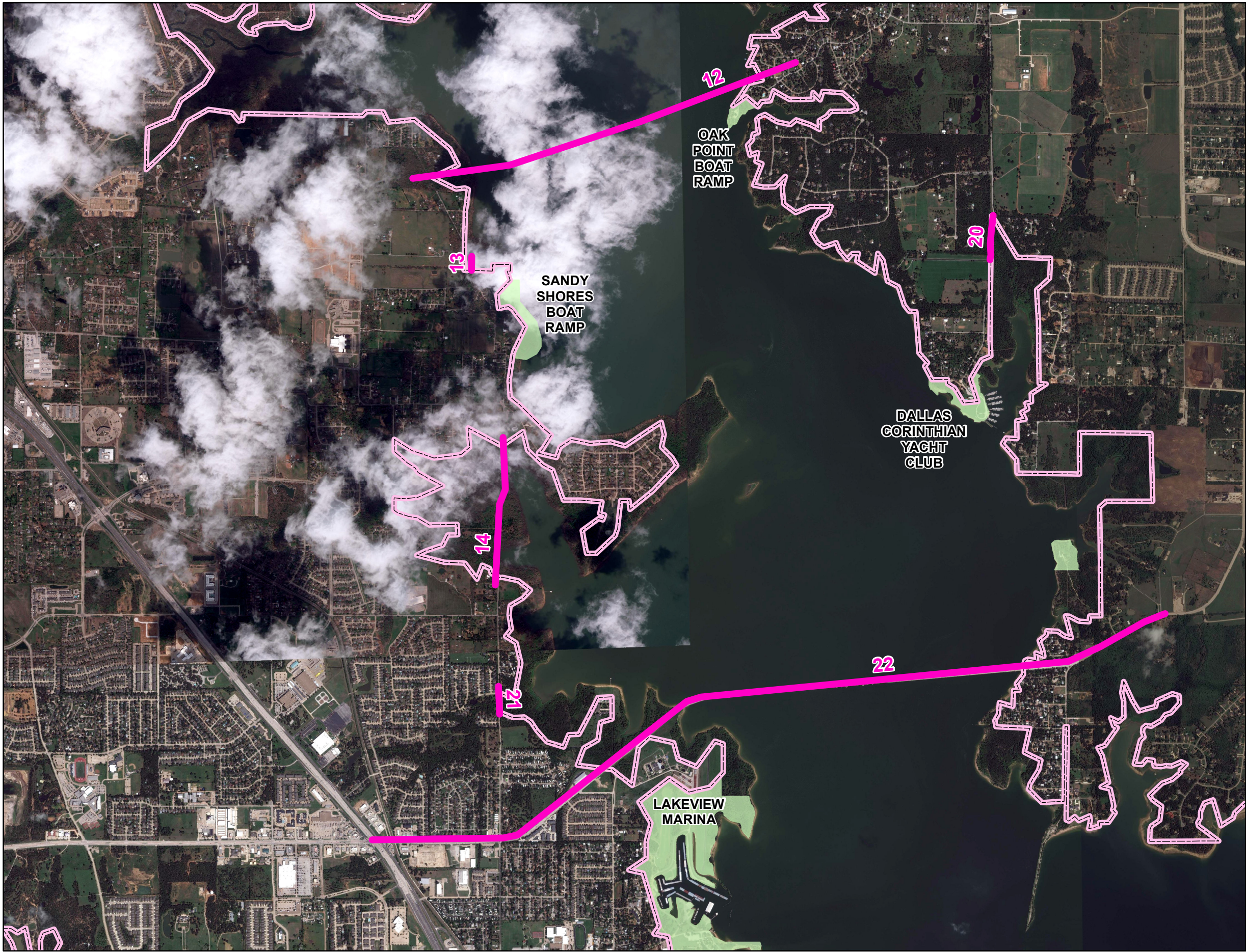
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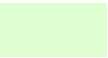
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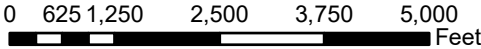
-  FEE BOUNDARY
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-  RECREATION AREA



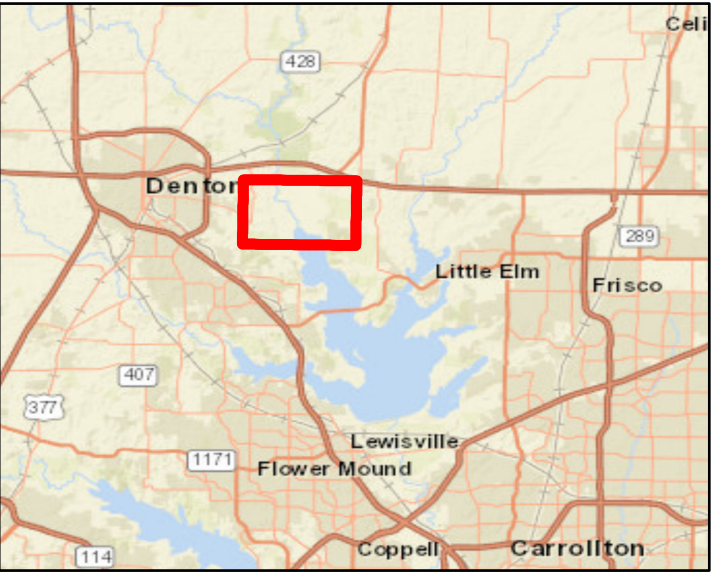
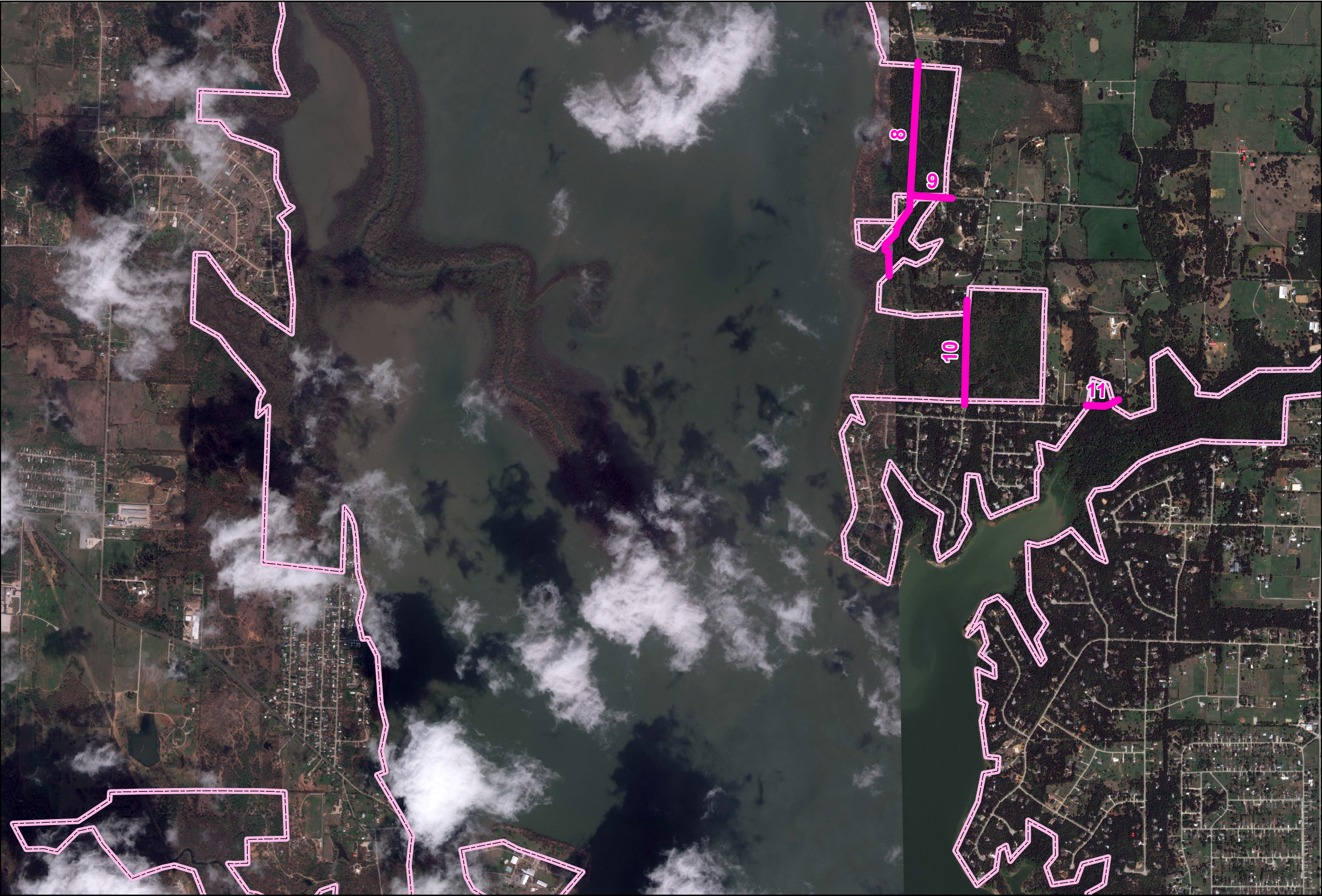
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FORT WORTH DISTRICT**



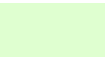
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LEWISVILLE LAKE
LEWISVILLE LAKE MASTER PLAN
UTILITY CORRIDOR MAP- PLATE 03



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-  FEE BOUNDARY
-  UTILITY CORRIDOR
-  RECREATION AREA



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FORT WORTH DISTRICT


LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

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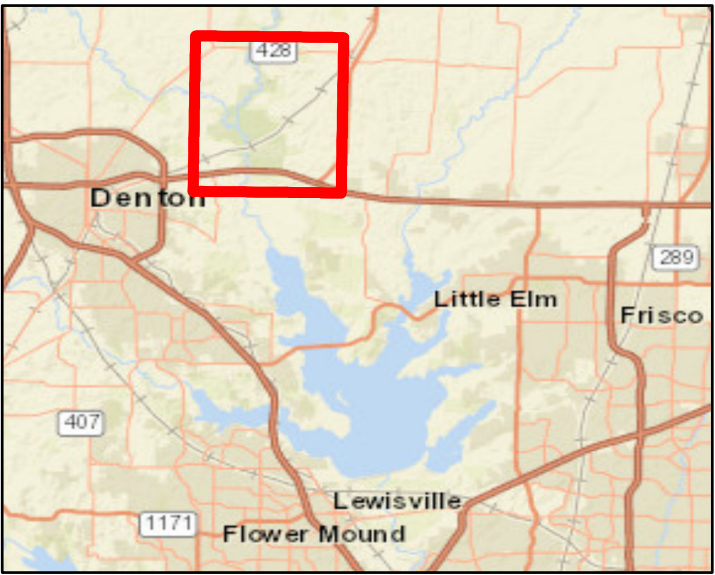
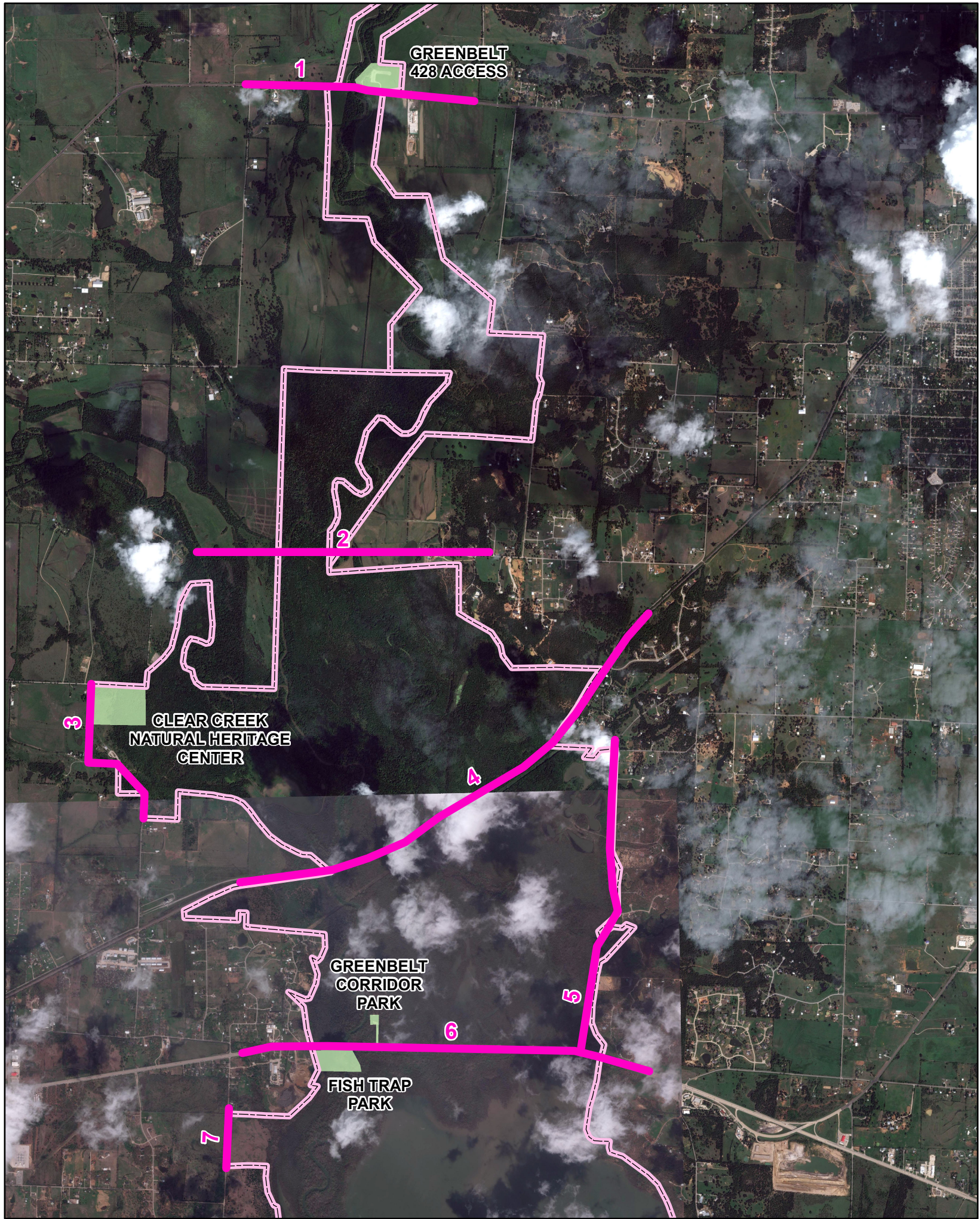
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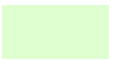



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-  UTILITY CORRIDOR
-  RECREATION AREA



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LEWISVILLE LAKE

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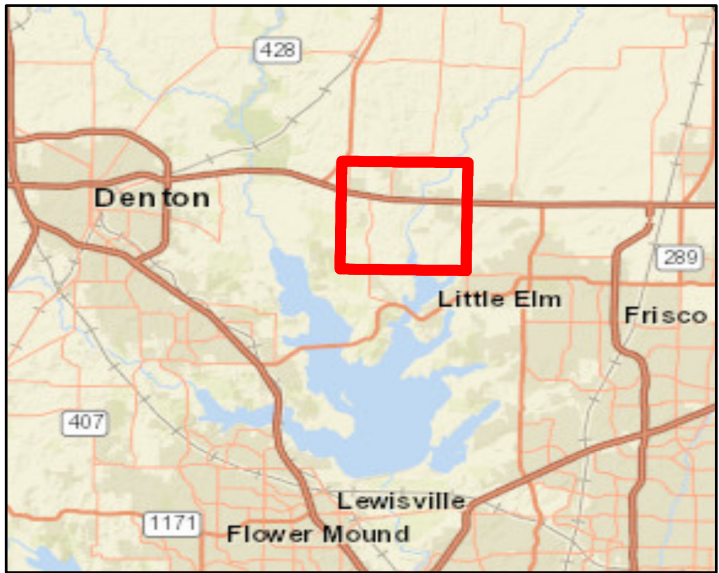
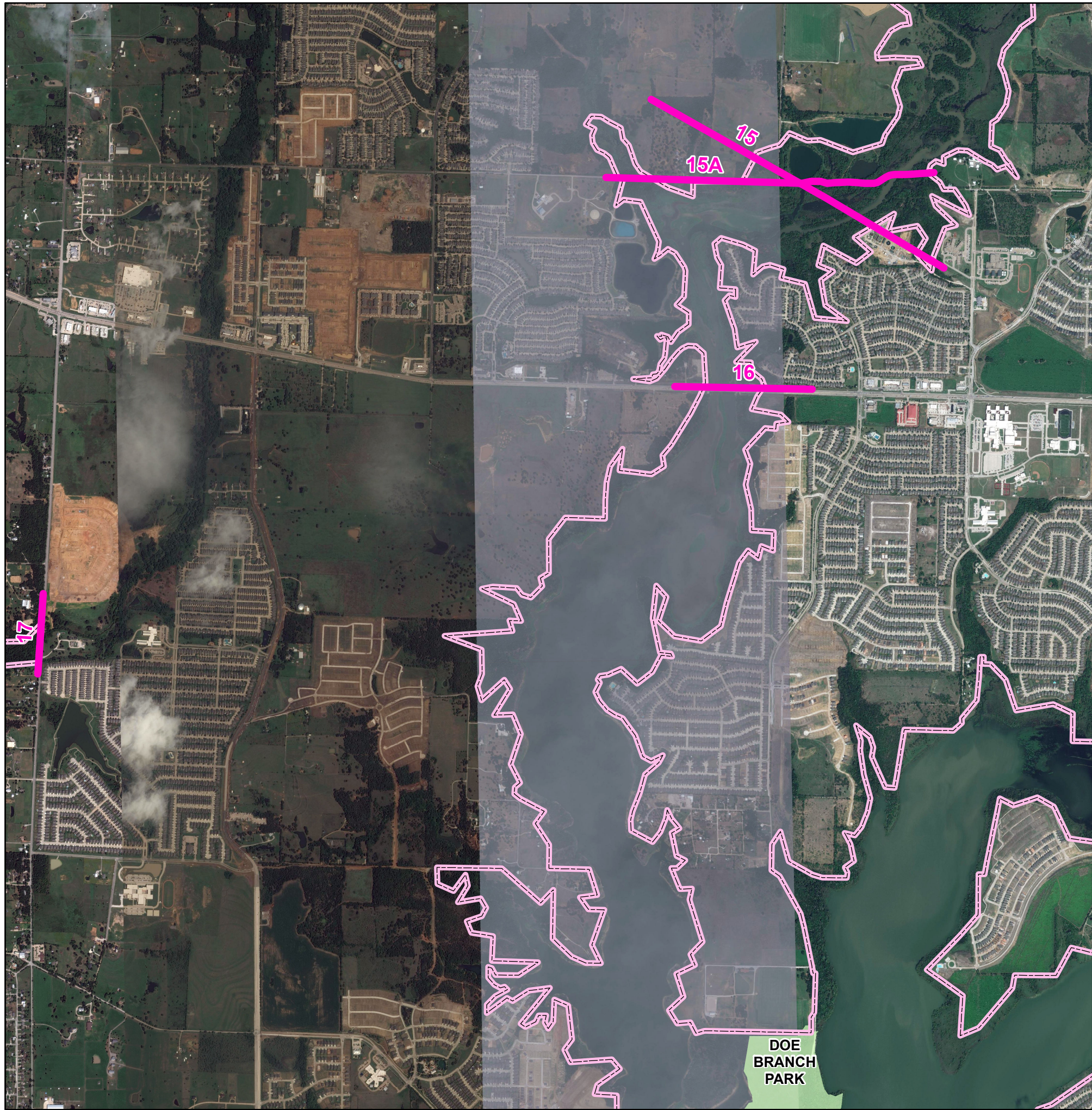
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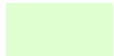


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-  FEE BOUNDARY
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-  RECREATION AREA



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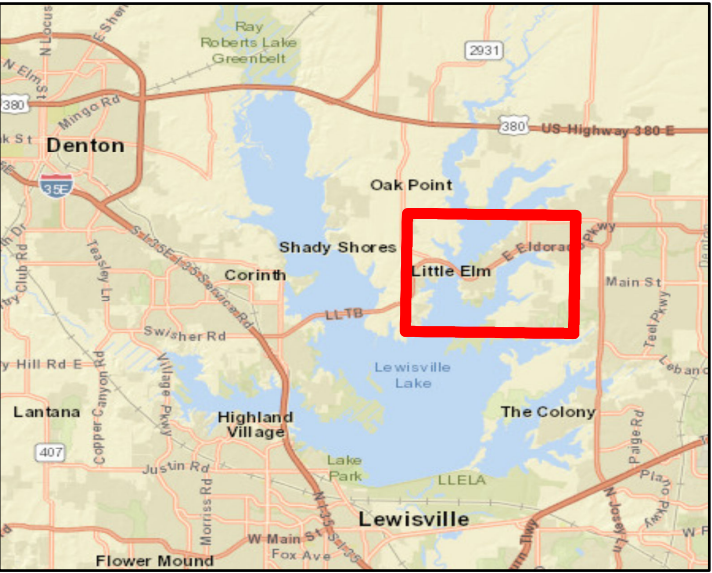
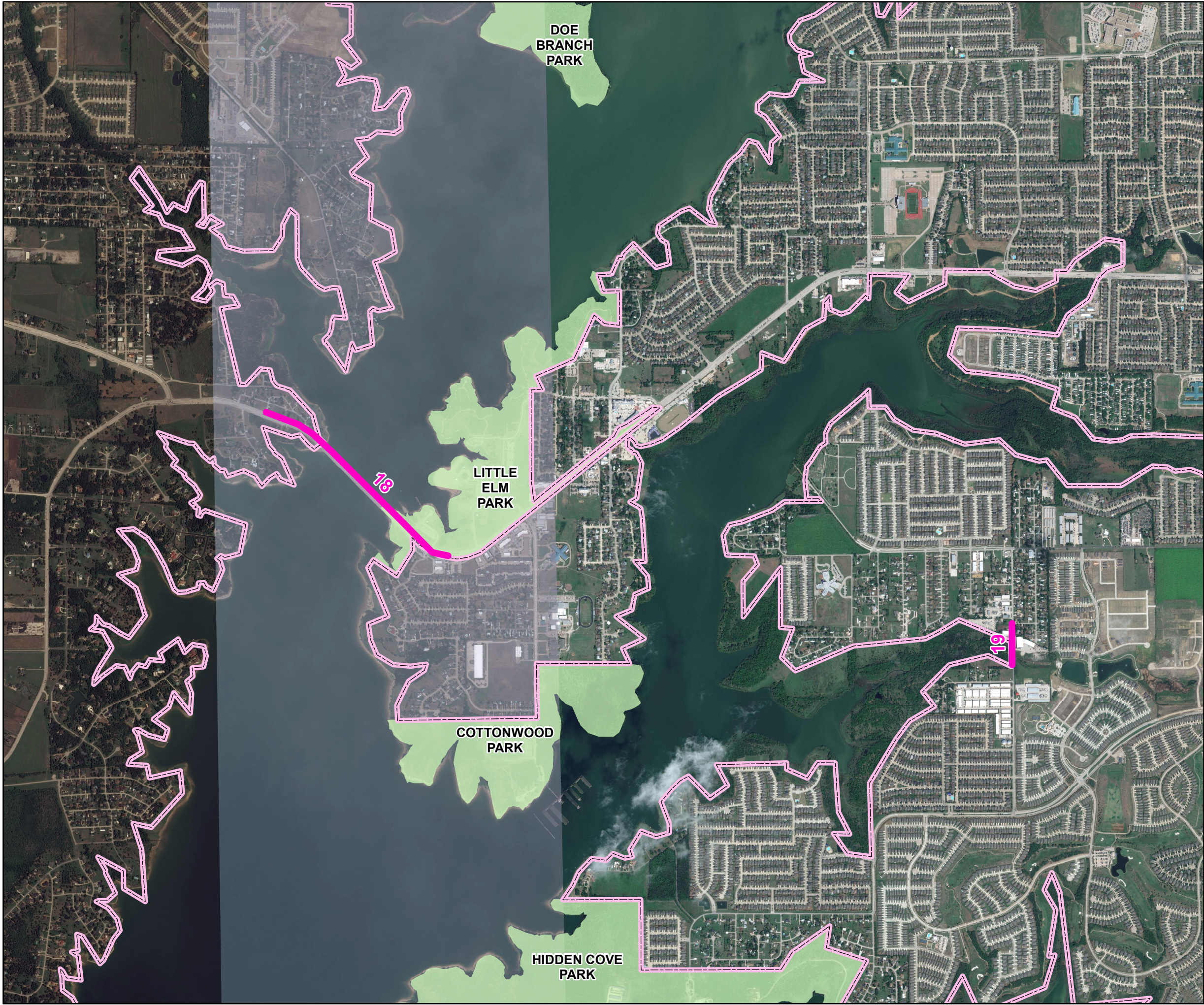
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LEWISVILLE LAKE MASTER PLAN
UTILITY CORRIDOR MAP- PLATE 06



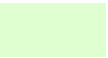



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-  FEE BOUNDARY
-  UTILITY CORRIDOR
-  RECREATION AREA



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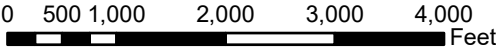

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

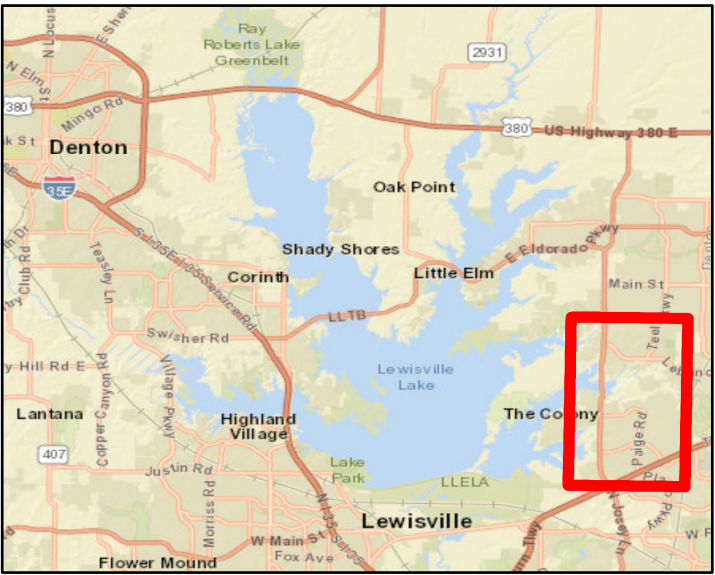
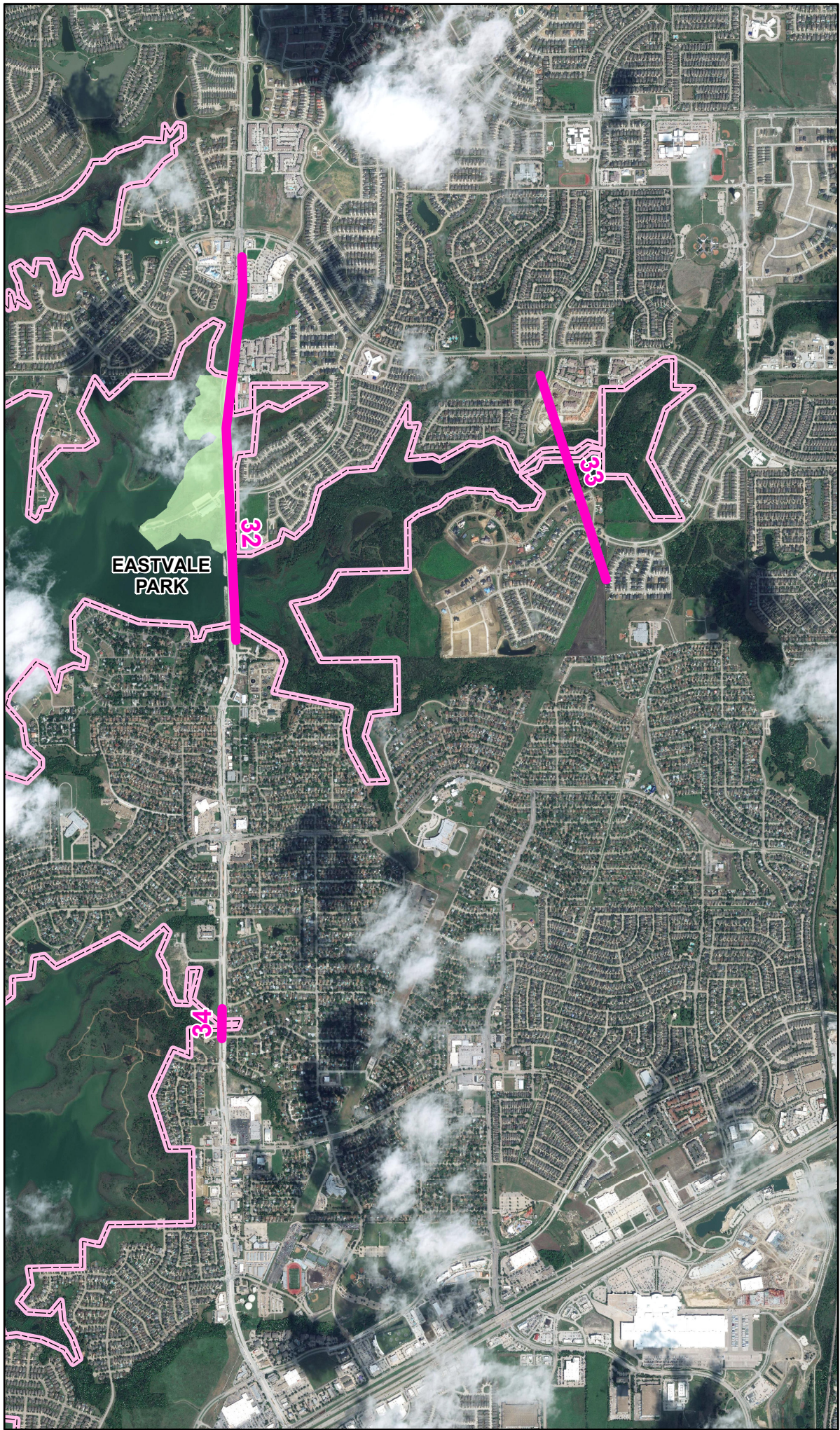
LEWISVILLE LAKE MASTER PLAN



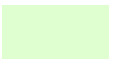
UTILITY CORRIDOR MAP- PLATE 07




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-  FEE BOUNDARY
-  UTILITY CORRIDOR
-  RECREATION AREA



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

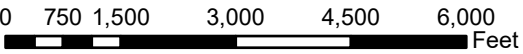

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TRINITY RIVER, TEXAS

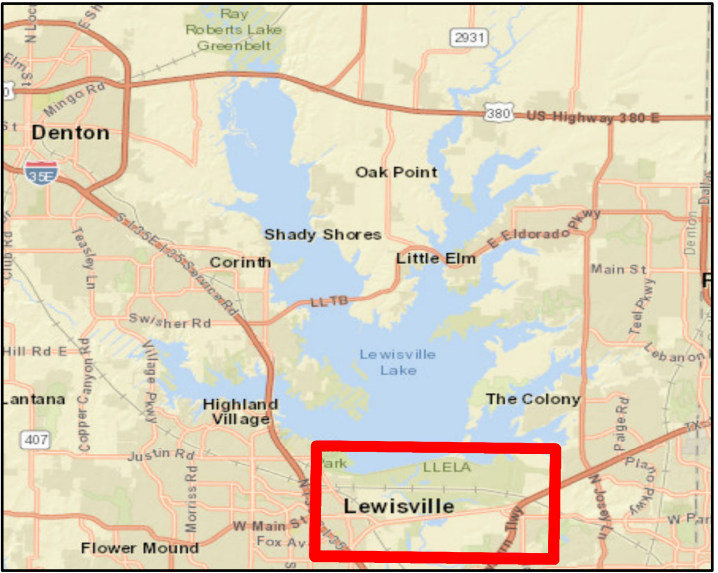
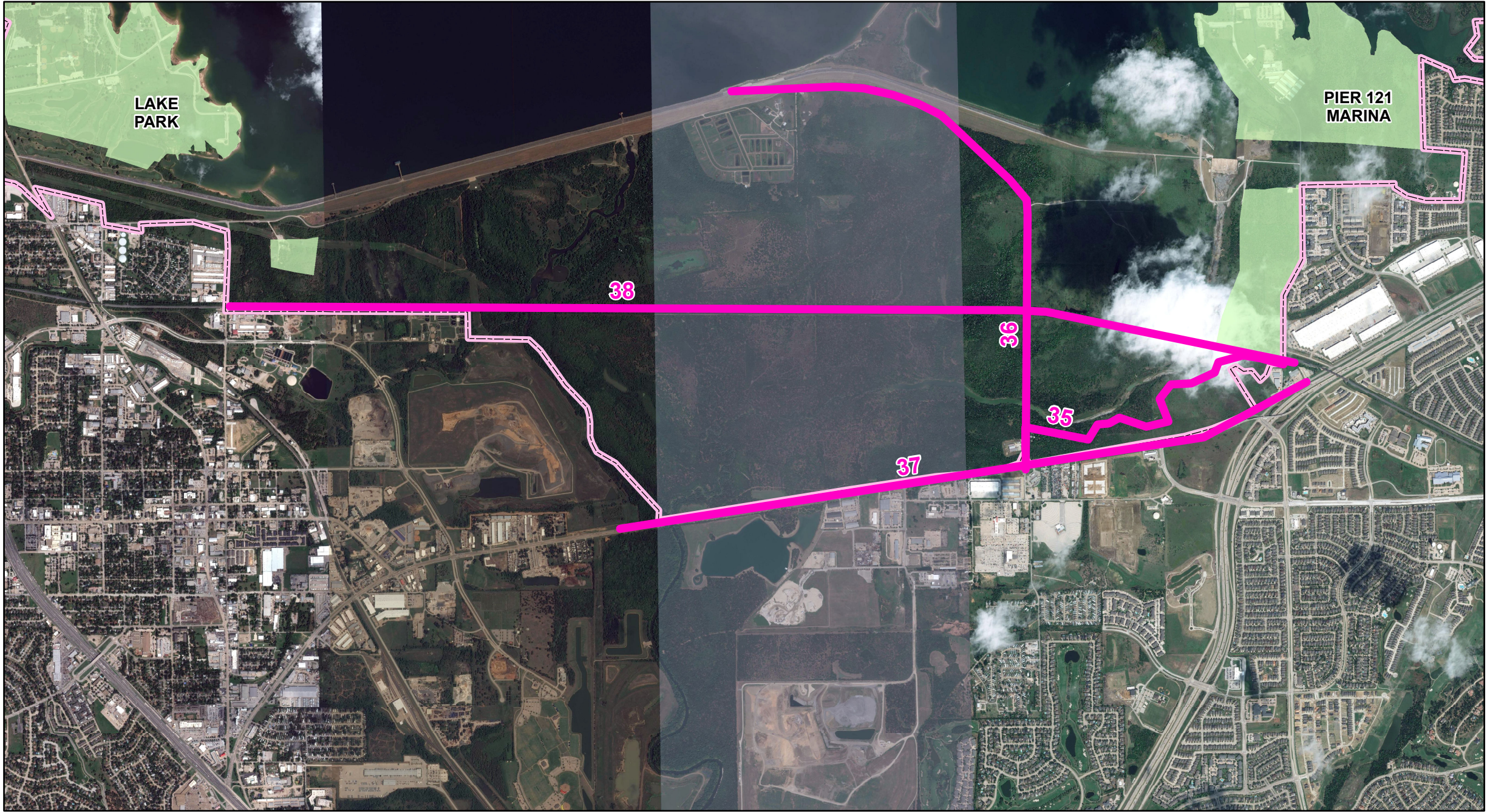
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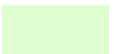
LEWISVILLE LAKE MASTER PLAN


UTILITY CORRIDOR MAP- PLATE 08



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-  FEE BOUNDARY
-  UTILITY CORRIDOR
-  RECREATION AREA



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FORT WORTH DISTRICT

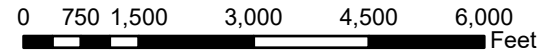

LEWISVILLE LAKE

TRINITY RIVER, TEXAS

LEWISVILLE LAKE

LEWISVILLE LAKE MASTER PLAN

UTILITY CORRIDOR MAP- PLATE 09



DATE:
DECEMBER 2020

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LE20MP-OU-09

Appendix B – Environmental Assessment

**FINDING OF NO SIGNIFICANT IMPACT
ENVIRONMENTAL ASSESSMENT FOR THE
LEWISVILLE LAKE 2020 MASTER PLAN
ELM FORK OF THE TRINITY RIVER
DENTON COUNTY, TX**

Engineering Regulation (ER) 1130-2-550 Change 07, dated January 2013 and Engineering Pamphlet (EP) 1130-2-550 Change 05, dated 30 January 2013, require Master Plans for most the U.S. Army Corps of Engineers water resources development projects having a federally owned land base. The revision of the 1985 Lewisville Lake Master Plan, as supplemented in 2004 was conducted pursuant to this ER and EP, and it is necessary to bring it up to date to reflect current ecological, socio-demographic, and outdoor recreation trends that are affecting the lake, as well as those anticipated to occur within the planning period of 2020 to 2045.

In accordance with the National Environmental Policy Act of 1969, as amended, including guidelines in 33 Code of Federal Regulations (CFR), Part 230, the U.S. Army Corps of Engineers (USACE), Fort Worth District and the Regional Planning and Environmental Center (RPEC) have conducted an environmental analysis on the Lewisville Lake 2020 Master Plan. The final Master Plan addresses the need for an updated comprehensive land management document for Lewisville Lake in Denton County, Texas. The final recommendation is contained in the Lewisville Lake 2020 Master Plan dated December 2020.

This Final Environmental Assessment (EA) for the Lewisville Lake 2020 Master Plan evaluated various alternatives that would revise the 1985 Lewisville Lake Masterplan, as supplemented in 2004 to meet current policy.

The revision of the 1985 Lewisville Lake Master Plan (hereafter Plan or Master Plan) is a framework built collaboratively to serve as a guide toward appropriate stewardship of USACE administered resources at Lewisville Lake over the next 25 years.

In addition to a "no action" plan, one alternative that fully met the project purpose was evaluated (recommended plan). Section 2.0 of the Lewisville Lake 2020 Master Plan EA discusses alternative formulation and selection. Within Section 2, tables 2-1, 2-2, and 2-3 provide a summary of the changes to the land classifications. The recommended 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 publication of the 1985 Master Plan and the supplement added in 2004. 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 Recommended 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 checked="" type="checkbox"/>	<input type="checkbox"/>	<input 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 were analyzed and incorporated into the recommended plan. The recommended plan does not entail ground-disturbing activities. Future ground-disturbing activities on USACE property would be subject to all necessary environmental evaluations and compliance regulations.

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

Public review of the draft Master Plan, Environmental Assessment, and FONSI was completed on June 22, 2020. All comments submitted during the public review period were responded to in the final Master Plan and Environmental Assessment.

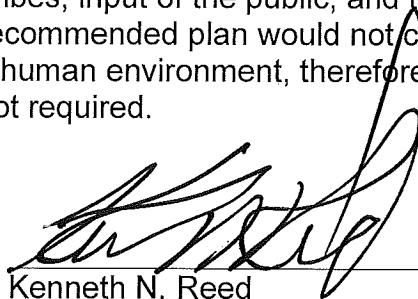
Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, USACE determined that the recommended plan will have no effect on federally listed species or their designated critical habitat.

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, USACE determined that the recommended plan has no effect on historic properties.

All applicable environmental laws have been 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 recommended plan would not cause significant adverse impacts on the quality of the human environment, therefore, preparation of an Environmental Impact Statement is not required.

A handwritten signature in black ink, appearing to read 'Ken Reed', is written over a horizontal line.

Kenneth N. Reed
Colonel, U.S. Army
District Commander

FINAL

Environmental Assessment for the Lewisville Lake 2020 Master Plan

Elm Fork of the Trinity River
Denton County, Texas



December 2020



**US Army Corps
of Engineers** ®
Fort Worth District

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ENVIRONMENTAL ASSESSMENT ORGANIZATION

This Environmental Assessment (EA) evaluates the potential environmental and socioeconomic impacts of the implementation of the 2020 Lewisville Lake Master Plan. This EA facilitates the decision making process regarding the Proposed Action and alternatives.

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

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FINAL ENVIRONMENTAL ASSESSMENT

Lewisville Lake 2020 Master Plan

Lewisville Lake Denton County, Texas

SECTION 1: INTRODUCTION

This Environmental Assessment (EA) has been prepared by the United States Army Corps of Engineers (USACE) to evaluate the implementation of the Lewisville Lake 2020 Master Plan (MP). A master plan is a programmatic document that is subject to evaluation under the National Environmental Policy Act (NEPA) of 1969, (Public Law [PL] 91-190). This EA is an assessment of potential impacts that could result with the implementation of either the No Action or Proposed Action alternative and has been prepared in accordance with 33 Code of Federal Regulations (CFR) Part 230 and the Council on Environmental Quality (CEQ) Regulations (40 CFR §§1500-1508), as reflected in the USACE Engineering Regulation, ER 200-2-2.

A master plan is a strategic land use management plan that provides direction for the orderly development, administration, maintenance, preservation, enhancement, and management of all natural, cultural and recreational resources of a USACE water resource project. The USACE water resource project includes all government-owned lands in and around a USACE-managed lake or reservoir. A master plan identifies conceptual types and levels of activities, but does not include designs, project sites, or estimated costs. It is a vital tool for responsible stewardship and sustainability of the project's natural and cultural resources, as well as the provision of outdoor recreation facilities and opportunities on federal lands for the benefit of present and future generations. All actions carried out by USACE, other agencies, and individuals granted leases to USACE lands must be consistent with the Master Plan. Therefore, the Master Plan must be kept current in order to provide effective guidance in USACE decision-making.

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

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

The current Lewisville Lake MP was approved in 1985, supplemented in 2004, and has not been updated since. The current Lewisville Lake Master Plan is 35 years old and does not reflect ecological, socio-political, and socio-demographic changes that are

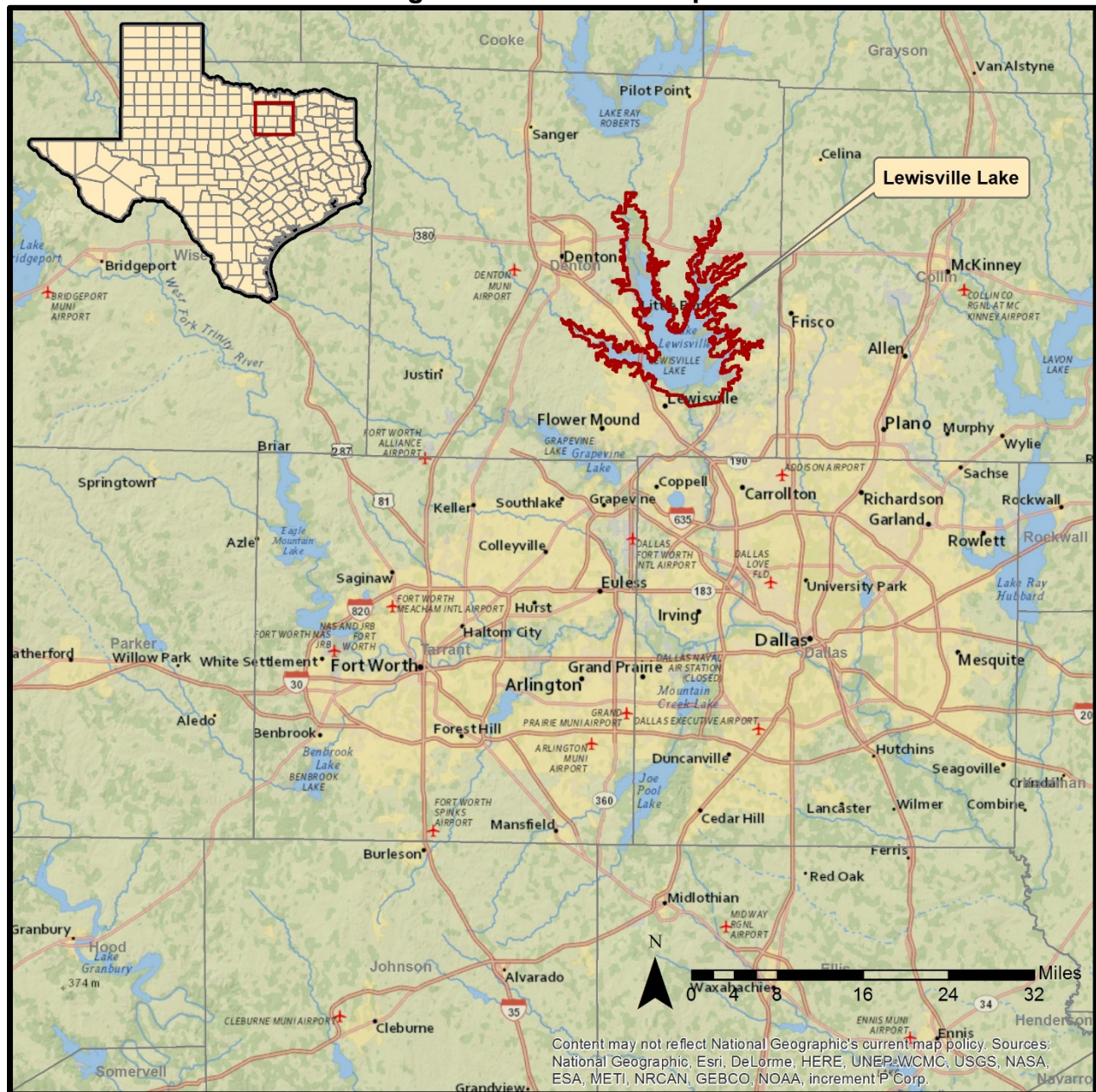
currently impacting Lewisville Lake, as well as those changes anticipated to occur through 2045. Changes in outdoor recreation trends, regional land use, population, current legislative requirements, and USACE management policy have indicated the need to revise the plan. Additionally, increasing fragmentation of wildlife habitat, national policies related to climate change and growing demand for recreational access and protection of natural resources are all factors affecting Lewisville Lake and lake's region in general. Furthermore, the 1985 MP resources goals, policies, ecological principles, best management practices, cooperative directives, are no longer up to date with current USACE standards and various other environmental laws and regulations. In response to these continually evolving trends, the USACE determined that a full revision of the 1985 Lewisville Lake MP is needed.

1.1 DESCRIPTION OF LEWISVILLE LAKE

Lewisville Dam is located at river mile 30.0 on the Elm Fork of the Trinity River, a tributary of the Trinity River in the Trinity River Basin. Lewisville Lake is located 2.4 miles northeast of Lewisville and 22 miles northwest of Dallas in Denton County, Texas (see Figure 1-1). The total drainage area above Lewisville Dam is 1,660 square miles. Construction on Lewisville Dam began on November 28, 1948, with deliberate impoundment beginning on November 1, 1954. The project was completed in August of 1955.

The City of Dallas constructed the original lake, Lake Dallas, in the 1920s. The Garza Dam on the Elm Fork of the Trinity River was completed in 1927 and water storage began in 1928. However, because the water storage capacity of the original Lake Dallas was reduced significantly by siltation, the USACE began construction of Lewisville Dam in 1948. The original Congressional authority for the construction of Lewisville Lake is contained in the River and Harbors Act approved on March 2, 1945 (PL 14, 79th Congress, 1st Session). This Act was modified by PL 84-329 in 1955 to change the name of the dam from Garza-Little Elm to Lewisville. The original Lewisville Lake was authorized for flood control and water conservation purposes, with other associated purposes that include fish and wildlife management, recreation, and hydroelectric power generation.

Figure 1-1. Location Map



Congressional authority for the modification of Lewisville Lake, including the construction of Ray Roberts Lake (formerly Aubrey Lake), is contained in the River and Harbor Act of 1965 (PL 89-298) in accordance with the total plan of improvement for the Trinity River as presented in House Document 276 (89th Congress, 1st Session). The authorized development plan included flood control storage in Ray Roberts to permit reallocation of an equivalent amount of storage in the existing downstream Lewisville Lake from flood control to water supply. The authorized plan provided for raising the conservation pool level in Lewisville Lake from 515.0 National Geodetic Vertical Datum of 1929 (NGVD29) to elevation 522.0 NGVD29 to increase its water supply yield. The reduced flood control capacity in Lewisville Lake is provided in upstream Ray Roberts

Lake in the same frequency of protection at Ray Roberts Lake for the area below Lewisville Lake. Consequently, the flood protection level for the area was not reduced.

1.2 PURPOSE OF AND NEED FOR THE ACTION

The purpose of the Proposed Action is to ensure that the management of the land, water, and recreational resources on Lewisville Lake are in compliance with current applicable environmental laws and regulations. The Proposed Action is needed because both the human and regulatory environments have substantially changed since 1985, and even since the 2004 Supplement, which has resulted in the current MP being inconsistent with USACE goals and the public needs. The Proposed Action is also needed to establish transparent management of the lake project in a manner that addresses the both the public demands for access to the lake while maintaining the mission of the USACE project.

1.3 SCOPE OF THE ACTION

This EA was prepared to evaluate existing conditions and potential impacts of proposed alternatives associated with implementation of the 2020 MP. The alternative considerations were formulated with special attention given to new land classifications, new resource management objectives, and a conceptual resource plan for each land classification category. Effective and early NEPA integration with the master planning process can significantly increase the usefulness of the 2020 MP to the decision maker.

SECTION 2: DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 MASTER PLAN DEVELOPMENT

USACE guidance for master plan development recommends the establishment of resource goals and objectives for purposes of development, conservation, and management of natural, cultural, and man-made resources at a project. Goals describe the desired end state of overall management efforts, whereas resource objectives are specific task-oriented actions necessary to achieve the overall 2020 MP goals. Goals and objectives are guidelines for obtaining maximum public benefits while minimizing adverse impacts on the environment and are developed in accordance with 1) authorized project purposes; 2) applicable laws and regulations; 3) resource capabilities and suitabilities; 4) regional needs; 5) other governmental plans and programs; and 6) expressed public desires.

In the course of preparing the Lewisville Lake 2020 MP, USACE identified five management goals. These goals are discussed in detail in the Lewisville Lake 2020 MP, at Chapter 3, *Resource Goals and Objectives*.

The goals for the Lewisville Lake 2020 MP include the following:

- Goal A: Provide the best management practices (BMPs) to respond to regional needs, resource capabilities and capacities, and expressed public interests consistent with authorized project purposes.
- Goal B: Protect and manage project natural and cultural resources through sustainable environmental stewardship programs.

- Goal C: Provide public outdoor recreation opportunities that support project purposes and public interests while sustaining project natural resources.
- Goal D: Recognize the unique qualities, characteristics, and potentials of the project.
- Goal E: Provide consistency and compatibility with natural objectives and other state and regional goals and programs.

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

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

The Lewisville Lake 2020 Master Plan has identified objectives to meet each of these goals, and organized them by topic: recreation; natural resources; visitor information, education, and outreach; general management; and cultural resources. Specific resource objectives to accomplish these goals can be found in Chapter 3, *Resource Objectives*, of the Lewisville Lake 2020 MP.

It is also worth noting that just as the regulatory, social, and natural resources environments have changed since 1985, so too has the analytical environment. In many cases, current spatial analysis result in revisions of areas under consideration. The Lewisville Lake 2020 MP aims to update these values as determined accurate via current technologies. For example, while the lake surface area stated in 1985 was 29,980 acres, current GIS analysis has calculated the area to be 27,175 acres.

While dam operations and water management are major elements of the USACE management at Lewisville Lake, neither of these elements are addressed in the Lewisville Lake 2020 MP, and thus will not be discussed further in this EA. Water management, which includes flood control management and dam operations, is

established in the Trinity River Basin Master Reservoir Regulation Manual and the Lewisville Lake Water Control Manual.

2.2 ALTERNATIVE 1: NO ACTION

Under the No Action Alternative, the USACE would not implement the 2020 MP. Instead the USACE would continue to manage Lewisville Lake's natural resources as set forth in the 1985 MP. The 1985 MP would continue to provide the only source of comprehensive management guidelines and philosophy. However, the 1985 MP is out of date and does not reflect the current ecological, socio-political, or socio-demographic conditions of Lewisville Lake or those that are anticipated to occur through 2045.

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

2.3 ALTERNATIVE 2: PROPOSED ACTION

Under the Proposed Action, the USACE proposes to adopt and implement the Lewisville Lake 2020 MP, which guides and articulates USACE responsibilities pursuant to federal laws to preserve, conserve, restore, maintain, manage, and develop land, water, and associated resources. The 2020 MP would replace the 1985 MP, and 2004 Supplement MP, and provide an up-to-date management plan that follows current federal laws and regulations, while also being reflective of public input and recreational preferences. The Lewisville Lake 2020 MP aims to sustain Lewisville Lake's natural resources and provide recreational experiences for the next 25 years. The Proposed Action would meet regional goals associated with good stewardship of land, water, and recreational resources; address identified recreational trends; and allow for continued use and development of project lands without violating national policies or public laws.

The Lewisville Lake 2020 MP would classify all federal land at Lewisville Lake above conservation pool elevation 522.0 NGVD29 into management categories. These management categories would define appropriate uses of federal property to ensure the protection of natural resources and environmental stewardship while also allowing maximum public enjoyment of the lake's resources.

The new land classification categories are defined as follows:

- Project Operations (PO): Lands required for the dam, spillway, switchyard, levees, dikes, offices, maintenance facilities, and other areas used solely for the operation of Lewisville Lake.
- High Density Recreation (HDR): Lands developed for the intensive recreational activities for the visiting public including day use and campgrounds. These areas could also be for commercial concessions and quasi-public development.
- Environmentally Sensitive Areas (ESA): Areas where scientific, ecological, cultural, or aesthetic features have been identified.
- Multiple Resource Management Lands (MRML): Allows for the designation of a predominate use with the understanding that other compatible uses may also occur on these lands.

- MRML Low Density Recreation (LDR): Lands with minimal development or infrastructure that support passive recreational use (primitive camping, fishing, hunting, trails, wildlife viewing, etc.).
- MRML Wildlife Management (WM): Lands designated for stewardship of fish and wildlife resources.
- Surface Water (SW): Applies to surface water zones.
 - Restricted (R): Water areas restricted for Lewisville Lake operations, safety, and security.
 - Designated No-Wake (NW): Water areas to protect environmentally sensitive shoreline areas and recreational water access areas from disturbance and areas to protect public safety.
 - Open Recreation (OR): Water areas available for year-round or seasonal water-based recreational use.

Table 2-1 shows the new classifications changes and acres contained in each classification; Table 2-2 shows the water surface classifications, and Table 2-3 provides the rationale for the new reclassification. Please refer to pages 2-19 in the Lewisville Lake 2020 MP Appendix A for the maps with the new land classifications.

Table 2-1. Land Use Acreage Changes

Prior (2004) Land Classifications	Acres	New Land Classifications	Acres
Operation and Maintenance	1,170	Project Operations	1,083
Recreation	8,935	High Density Recreation	4,559
		Separable Recreation Lands	1,110 ³
Environmentally Sensitive Areas	7,292 ¹	Environmentally Sensitive Areas	11,188
Fish and Wildlife Management	6,738 ²	Multiple Resource Management – Low Density Recreation	542
		Multiple Resource Management – Wildlife Management	3,268
Conservation Pool 522.0 NGVD29	28,980	Conservation Pool 522.0 NGVD29	27,175 ⁵
Flowage Easement	5,746 ⁴	Flowage Easement	8,712

1. The majority of these acres were also included in the acres shown for Fish and Wildlife Management

2. A majority of these acres were also classified as ESA.

3. Separable Recreation Lands is not a land classification but is required by USACE regulations to be described in project Master Plans. Separable Recreation Lands are those lands acquired only for the purpose of recreation and are otherwise not required for the successful operation of Lewisville Lake for the primary missions of flood risk management and water conservation. The acreage of Separable Recreation Lands is included in the acreage totals for High Density Recreation lands. The 1,110 acres of Separable Recreation Lands existed in 2004 but were not identified as such in the 2004 Master Plan Supplement.

4. This figure was incorrectly stated in the 2004 Master Plan Supplement. The correct number of 8,712 acres is shown under the column for New Land Classifications.

5. This acreage was the result of a 2007 volumetric survey of Lewisville Lake conducted cooperatively by USACE and the Texas Water Development Board. Throughout this Plan, this figure is used as the conservation pool elevation.

**Table 2-2. New Lewisville Lake
Surface Water Classifications**

Proposed Classification	Acreage
Water Surface: Restricted	82
Water Surface: Designated No-Wake	1,079
Water Surface: Open Recreation	25,475
Total (Conservation Pool)	26,636

Note: Acreages were measured using GIS technology and may vary from the official land acquisition records. Acreage varies depending on changes in lake levels, sedimentation and shoreline erosion.

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

Table 2-3. Rationale for the New Classifications

Land Classification	Description	Rationale
Project Operations (PO)	The Project Operations classification was reduced by 87 acres.	The small reduction in Project Operations lands is primarily the result of the GIS measurement differential from 2004 to 2020. The 2020 classification included all Project Operations lands shown in 2004 plus two small tracts totaling 10 acres and some additional acreage located along the uncontrolled spillway discharge channel up to Fish Hatchery Road.
High Density Recreation (HDR)	The HDR lands measured in 2020 included all areas that were in the 2004 “Recreation” classification. The 2020 HDR lands total 4,559 acres. The acreage of “Recreation” lands recorded in the 2004 MP supplement was 8,935 acres. The reason for this large figure was not fully explained in the 2004 MP supplement but may have included all recreation-related lands that were included in the 1985 MP. After careful measurement for this MP, there is 4,559 acres included in the HDR classification. The only acreage removed from HDR status from 2004 to 2020 was approximately 75 acres in Hickory Creek Park and 10 acres of the area leased to the University of North Texas.	The HDR areas that date back to 2004, minus the two exceptions noted in the column to the left, are needed for current and planned recreational development. It is noteworthy that there are many undeveloped acres within current HDR areas that have the potential to meet future recreation needs. Many of these undeveloped acres are located in Cottonwood Park, Sycamore Bend Park, East Hill Park, Doe Branch Park, and Hidden Cove Park.

Land Classification	Description	Rationale
	Both areas were changed to ESA status.	
Environmentally Sensitive Areas (ESA)	Approximately 11,188 acres have been classified as ESA areas. Approximately 7,292 acres in the 2004 MP supplement were designated as an ESA overlay on another primary classification. The ESA overlay afforded the same protection as the 2020 ESA classifications, but national guidance now requires areas classified as ESA to be a stand-alone classification. Most of the acreage added to the ESA classification were formerly classified as Fish and Wildlife Management Area.	The 2004 ESA classification overlays did not include important east-side riparian areas, including two areas where an environmental restoration project on Hackberry Creek and Stewart Creek tributaries has been completed. Other areas added as ESA in this 2020 Plan include select portions of Hickory Creek Park, as well as an area that includes Nix and Jefferson Sloughs and the Rocky Point ESA near the north end of the old Lake Dallas Dam.
MRML – Low Density Recreation (LDR)	Approximately 542 acres were reclassified from a 2004 Fish and Wildlife Management classification to a MRML-LDR classification.	In 2005, USACE published a Programmatic Environmental Assessment (PEA) focused on vegetation modification activities undertaken by adjacent landowners. This PEA led to the designation of 19 Narrow Shoreline Variance Areas where USACE ownership is approximately 50 feet wide or less. Landowners adjacent to the NSVA areas may apply for a written permit to mow USACE land to the water's edge. Each of the 19 NSVA areas has been reclassified from a Fish & Wildlife Management

Land Classification	Description	Rationale
		classification to a MRML-LDR classification.
MRML – Wildlife Management (WM)	The 2004 MP Supplement classified approximately 6,738 acres as Fish & Wildlife Management areas. This 2020 MP classifies 3,268 acres as MRML-WM.	The lands formerly classified as Fish & Wildlife Management area, were reclassified to the ESA classification to recognize the superior environmental quality of the areas. The ESA areas will be protected and managed to provide significant benefits to fish and wildlife
Water Surface Restricted	Approximately 82 acres of water surface has been classified as Restricted water surface where boats are not allowed.	Areas included in the 82 acres are comparatively small parcels that surround water intake structures, the USACE gate control tower, the approach to the uncontrolled spillway, and designated swimming beaches
Water Surface Designated No Wake	Approximately 1079 acres of water surface has been classified as Designated No Wake area where vessels are not allowed to create a wake when underway.	Areas included in this water surface classification include areas surrounding boat ramps, marina areas, and two coves selected to meet the need of paddle craft. No wake areas are also established near the “cuts” in the Old Lake Dallas Dam.

Note: The land classification changes described in this table are the result of changes to 44 individual parcels of land ranging from a few acres to several hundred acres. Acreages were measured using GIS technology. The acreage numbers provided are approximate.

SECTION 3: AFFECTED ENVIRONMENT AND CONSEQUENCES

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

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

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

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

The Lewisville Lake 2020 MP thoroughly details both the project setting and the intended end state of the resources with the implementation of the MP. Unless otherwise noted, the following discussion summarizes the current conditions and proposed action impacts as described in the Lewisville Lake 2020 MP. The citation for each resource is included here, to assist in rapidly identifying more detailed information.

3.1 LAND USE

Lewisville Dam and Lake are a multi-purpose project used for flood control, water supply, hydropower, fish and wildlife, and recreation. The project is a unit of the Trinity River Basin System, which consists of eight USACE lakes and various channel improvements and levees operated to provide flood protection along the Trinity River. Lewisville Dam and Lake operates in conjunction with Ray Roberts Dam and Lake on the Elm Fork of the Trinity River to provide flood risk management for the lower Elm Fork Trinity River and the main stem Trinity River through Dallas and downstream. The total project area at Lewisville Lake encompasses 47,137 acres including the Lewisville Lake Environmental Learning Area (LLELA) to the south and the Greenbelt to the north. Of this total area, 46,001 acres were acquired in fee simple title by USACE, while a total of 8,712 acres were acquired for a perpetual Flowage Easement. When the pool elevation is at the normal or conservation pool elevation of 522.0 NGVD29, the lake has a surface area of 27,175 acres based on a 2007 volumetric survey. The lands acquired for the Greenbelt consist of 475 acres of conservation easement to protect the natural integrity of the area as well as 1,136 acres as fee simple title.

Table 3-1 describes the current land use classification in the Project Area. While the existing plan also categorizes land use for surface water, the management is done flexibly according to current drawdown measures. Surface water management areas include swimming, outlet and intake structures, low speed boating areas, uncleared areas, boat channel, shallow areas, low pool hazards, and the City of Denton Water Intake Cove.

Table 3-1. 2004 Land Use Classifications

Land Use Classification	Acreage	Description
Recreation	8,935	Facilities provided to accommodate visitors in concentrated numbers as required to make a whole recreation unit. Management practices leading to habitat improvement for the benefit of wildlife are encouraged. No hunting or agricultural uses are permitted.
Fish and Wildlife Management	6,738	Designated habitat for fish and wildlife. Vehicles are not allowed. Lands are generally available for selected low-density recreation activities such as hiking, hunting, fishing, nature study, nature photography, wildlife observation, and other related activities. Includes the ESA overlay and Common Utility Corridors ¹ .
Project Operations	1,170	Lands designated to provide for safe, efficient operation of the project for those authorized purposes other than recreation and fish and wildlife. This includes the land on which project operational structures are located.

Note: 1. Common Utility Corridors are defined as areas where utilities could be or have been placed. These corridors were designed to be as unobtrusive as possible on surrounding habitat and to follow existing roads or utility easements where possible.

Refer to Chapter 6, *Land Use Allocation Plan*, of the 2004 MP Supplement for further details concerning what these land classifications entails.

3.1.1 Alternative 1: No Action

Under the No Action Alternative, USACE will not implement the Lewisville Lake 2020 MP, and thus the land use management will not be updated to current needs and demands. The operation and maintenance of USACE lands at Lewisville Lake will continue as outlined in the existing MP to the extent that current and future laws and regulations will permit. Management will continue to lag behind the current and future recreational needs and public preferences. As the regulatory environment continues to change, management at Lewisville Lake will diverge from the plan. This divergence will create a patchwork of management requirements that will be inefficient for Lewisville Lake staff to implement. The management will also increasingly lack transparency to the public, or alternately create more of a burden to staff to communicate how the lake management differs from that in the management plan. Implementation of the No Action Alternative will have moderate, adverse, short and long term impacts on land use within and on USACE Lewisville Lake project lands due to conflicting guidance and management of USACE lands.

3.1.2 Alternative 2: Proposed Action

The objectives for revising the Lewisville Lake MP were to describe current and foreseeable land uses, taking into account expressed public opinion, regional trends, and USACE policies that have evolved to meet day-to-day operational needs. The reclassifications in the Lewisville Lake 2020 MP were developed to help fulfill regional goals associated with good stewardship of land and water resources that will allow for continued use and development of project lands.

The land previously designated as Project Operations will be wholly reclassified as Project Operations, with minimal functional change to land use management.

While ESA is technically a new management classification, the bulk of the revised 11,188 acres of ESA land is from the previous Fish and Wildlife Management (FWM) land under the 2004 MP's ESA overlay. Therefore, the revised management for most of this land will also be consistent with current management. The revised ESA was developed based on a combination of quantitative habitat evaluation, presence of cultural resources, and public input. Additional descriptions of each ESA is available in Section 5.5 of the 2020 MP. The revised ESA does include 3,896 acres that was not previously within the ESA overlay. The majority of new acreage for revised ESA land is from the 2,704-acre LLELA that is classified as FWM under the 2004 MP. This designation is based on input from LLELA management which results in long term, beneficial impacts on land use within USACE Lewisville Lake MP fee use lands as natural areas would be protected for continued conservation and outdoor recreation.

One of the most substantial changes to the land use terminology concerns the recreation categories. The 2004 land class of Recreation, would be replaced with two different classes, HDR and MRM-LDR. This revision still focuses the management on recreational uses, but will also allow USACE to manage lands with more granularity, with development concentrated in high-density designated spaces, like the revised

4,559 acres designated for HDR. These lands generally include established parks for camping and fishing. The 542 acres revised under MLM-LDR to be reclassified from FWM, still preserving the majority of the Lewisville Lake area as an open space oasis in the DFW Metroplex while affording low impact outdoor recreation opportunities.

On the waters of Lewisville Lake, the 2020 MP will add established surface water use categories in addition to the current ad hoc management of the lake. The formal establishment of 82 acres of restricted, 1,079 acres of no wake, and 25,475 acres of open recreation to the water surface, respectively, will allow for delineated, and safer management of the lake's waters when the lake is at conservation pool. These classifications will help to improve safety of those recreating on and around Lewisville Lake. This will be done by restricting boat access and speeds around certain parts of the lake, as well as establishing areas that boating can occur in. The Lewisville Lake office will still maintain the authority to make ad hoc adjustments as needed by lake level, which will prevent the new classifications from being overly rigid or even ineffectual in various lake level conditions.

The removal of the four Common Utility Corridors to thirty-eight corridors with none being added as explained in Section 6.1 and in Table 6.2 of the Lewisville Lake 2020 master plan will have negligible positive short and long term impacts on land use within Lewisville Lake. The positive impacts comes removing the land class designation from Common Utility Corridor to that of the surrounding land classification. Their removal will not increase the usage of nearby corridors.

The majority of the land use classifications revised in the Lewisville Lake 2020 MP will maintain the functional management that is currently occurring. While the terminology updates appear substantial, they have been proposed after considerable public input, and seek to maintain the values the public holds highest at Lewisville Lake. Additionally, the land reclassifications provide a balance between public use, both intensive and passive, and natural resources conservation. Therefore, the implementation of the Proposed Action will have minor, long term beneficial impacts to land use as the revised land classes and utility corridors further refine areas for appropriate activities.

3.2 WATER RESOURCES

Neither the existing nor the Lewisville Lake 2020 MP address groundwater, water quality, water level management, or water conservation, and therefore these aspects of water resources are being considered qualitatively in this EA primarily for the potential for indirect effects of the Lewisville Lake 2020 MP. This level of analysis also frames the discussion of the affected environment as being limited to information needed to provide the context of the potential impact.

Surface Water

The headwaters of the Elm Fork of the Trinity River begin in eastern Montague County in North Central Texas and flow 110 miles south and southeast through Cooke, Denton, and Dallas counties to its confluence with the West Fork of the Trinity River in the City of Dallas. Lewisville Lake is a roughly 29,000-acre reservoir created by the

U.S. Army Corps of Engineers by impounding the waters of the Elm Fork of the Trinity River, plus the waters of Stewart, Panther, Cottonwood, Doe Branch, Little Elm, Pecan, and Hickory Creeks.

The Elm Fork watershed is comprised of parts of Montague, Cooke, Grayson, Collin, Wise, Tarrant, Denton, and Dallas counties. It is about 80 miles long and has maximum width of 60 miles. The watershed contains a total area of 2,577 square miles, of which 1,660 square miles drain into Lewisville Lake and 968 square miles are downstream of Ray Roberts Dam (TWDB 2007).

Lewisville Lake, as it is today, is the result of impounding two separate lakes. Lake Dallas was the original lake which was built in 1929 by the City of Dallas for flood control and the area's main water source. In order to meet water demands of a growing community, the U.S. Army Corps of Engineers began construction of a new dam in 1948, which was completed in 1955. The two lakes were formed into one by breaching the Lake Dallas dam, and the new reservoir was named Lewisville Lake.

Lewisville Lake reaches a depth of 67 feet at normal conservation pool elevation of 522.0 NGVD29 with water levels fluctuating from four to eight feet annually in normal years. Lewisville Lake has an average depth of 25 feet and contains numerous shallow areas with exposed and submerged trunks which add to the danger for boats and other recreational watercraft. Although the lake water is generally murky, water quality is good.

Per the 2007 Volumetric and Sedimentation Survey conducted by the Texas Water Development Board (TWDB), Lewisville Lake has a total reservoir capacity of 598,902 acre-feet (ac-ft) and encompasses 27,175 acres at the conservation pool elevation. In addition, Lewisville Lake has approximately 250 miles of shoreline surrounded by roughly 9,000 acres of project lands.

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.

The designated uses for Lewisville Lake are flood control, water supply, aquatic habitat, and contact recreation. According to the 2020 TCEQ report, Lewisville Lake nor any waters directly within USACE fee owned properties were listed as impaired except for the Clear Creek portion of the Greenbelt connection between Lewisville and Ray Roberts Lake. Clear Creek TSWQS impairment is for bacteria in the water.

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

(DHS 2019). As of December 2019, no fish consumption advisories have been issued for Lewisville Lake or the Trinity River within the Lewisville Lake Federal Fee Boundary by the Texas Department of State Health Services Texas DSHS (2019).

Hydrology

The Elm Fork of the Trinity River sub-watershed is subject to three general types of flood-producing rainfall events: thunderstorms, frontal rainfall, and tropical cyclones. The topography, soils, and typical rainfall patterns of the watershed lead to rapid and sharp crested flood hydrographs. Floods occur frequently and can occur at any time of year. Generally, the highest 24-hour and monthly precipitation periods have occurred during major thunderstorm events. However, there are some instances where heavy precipitation results from localized thunderstorms or rain events. The principal tributaries contributing to the Elm Fork of the Trinity River are the right bank tributaries, Denton Creek, Hickory Creek, and Clear Creek, and the left bank tributaries, Isle Du Bois Creek and Little Elm Creek. With the exception of Denton Creek, all of these principal tributaries are located upstream of Lewisville Lake.

The Lewisville Dam and Lake Project is an integral part of the USACE plan for flood control and water conservation in the Trinity River Basin. The plan presently consists of eight major USACE flood control projects, known as Benbrook Dam, Bardwell Dam, Grapevine Dam, Lewisville Dam, Lavon Dam, Lewisville Dam, Navarro Mills Dam, and Ray Roberts Dam. The eight USACE dam projects in the Trinity River system control approximately 1,591,300 acre-feet (ac-ft) of flood control area. Lewisville Lake controls 1,658 square miles of drainage area. Specifically, Lewisville Lake has a conservation pool capable of storing 27,175 ac-ft between elevation 522.0 and 481.0 NGVD29. Once the water elevation reaches 532.0 NGVD29 and fills an additional 11,993 ac-ft of storage space, water overtops the spillway and is uncontrollably released downstream. The pool of record occurred on May 31, 2015 with an elevation of 536.94 NGVD29.

Groundwater

Deep below Lewisville Lake lies the Trinity and Woodbine aquifers. The Trinity Aquifer extends across much of the central and northeastern portion of Texas and 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.

The Woodbine is a minor aquifer located in northeast Texas. The aquifer overlies the Trinity Aquifer and consists of sandstone interbedded with shale and clay that form three distinct water-bearing zones. The Woodbine Aquifer reaches 600 feet in thickness in subsurface areas, with an aquifer that serves as a water supply resource to the region. Historically, abundant springs and seeps were documented along with artesian pressures as early as the late 1800s by the first drillers to penetrate the Eagle Ford Shale and encounter the Woodbine. Wells drilled throughout the region were free flowing at hundreds of gallons per minute (gpm) for many years until increased

groundwater withdrawal reduced artesian conditions. After the construction of multiple surface water reservoirs, and increased surface water supply options, the reduced use of groundwater has resulted in a partial return of higher water levels and artesian pressures in the Woodbine. The Woodbine is confined to semi-confined beneath the Eagle Ford Shale.

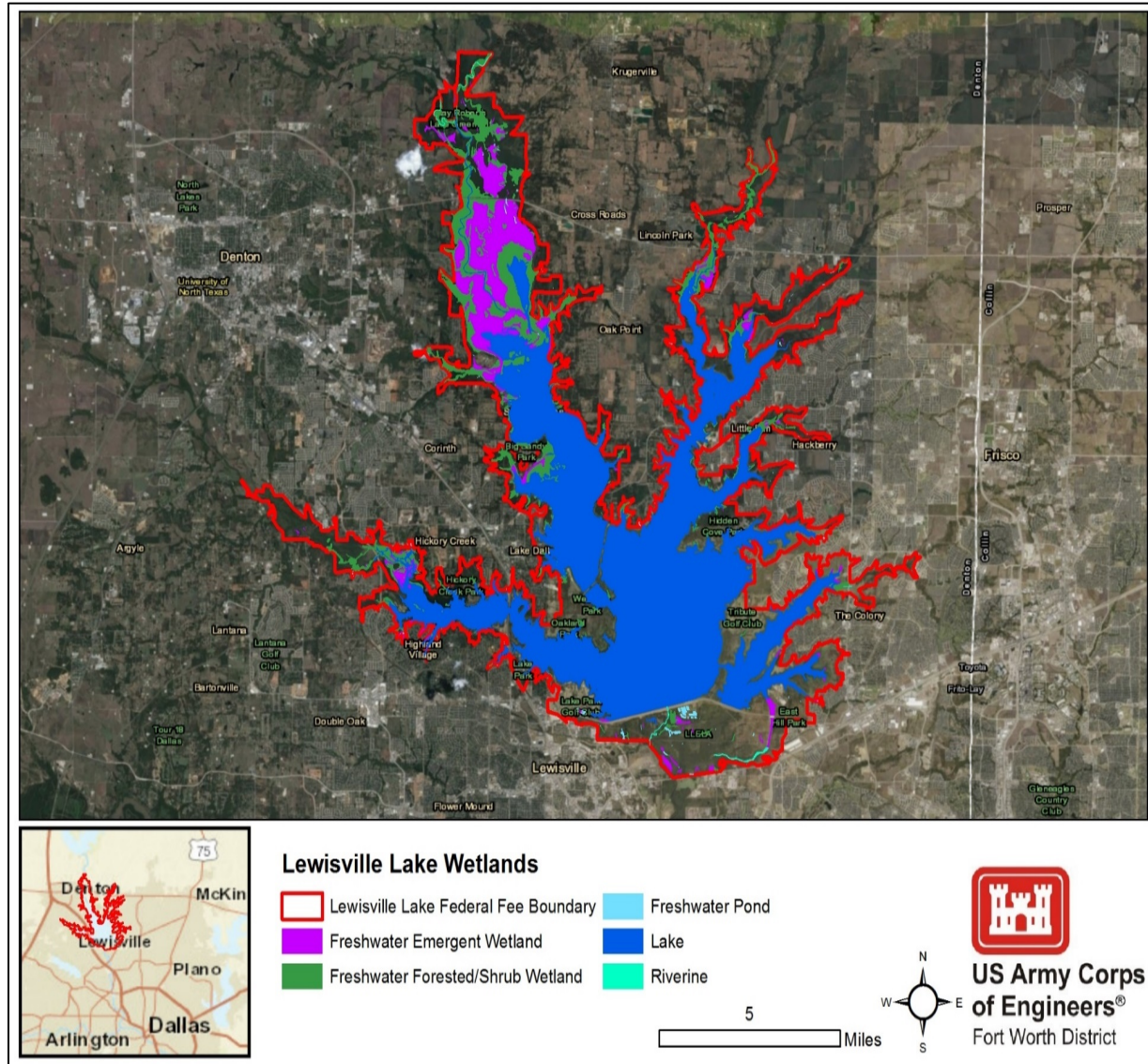
Wetlands

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 2018). Within the Lewisville Lake project lands, wetlands generally occur near the rivers and flatter areas in the northwestern arm of the lake. Table 3-2 lists the acreages of various types of wetlands present at Lewisville Lake and Figure 3-1 displays the distribution of wetland types found within Lewisville Lake project lands.

Table 3-2. Wetlands within Lewisville Lake Project Lands

Wetland Type	Total Acres
Freshwater Emergent Wetland	2,834.9
Freshwater Forested/Shrub Wetland	4,278.8
Freshwater Pond	121.8
Lake	19,823.8
Riverine	1,220.1
Total	28,279.4

Figure 3-1. Distribution of Wetland Types within Lewisville Lake Project Lands



3.2.1 Alternative 1: No Action

There will be no impacts on water resources as a result of implementing the No Action Alternative, since there will be no change to the existing Master Plan. There are no known water resource related problems that the 1985 MP and 2004 Supplement are helping to increase nor maintain.

3.2.2 Alternative 2: Proposed Action

The reclassifications and resource management objectives required for implementing the Lewisville Lake 2020 MP the Proposed Action will allow land management and land uses to be adjusted for current and reasonable foreseeable future changes in water resources. For example, the increase of 3,895 acres to ESA lands would help stabilize soils through the promotion of native habitat. In turn, the

habitat would help buffer and filter storm runoff before making its way into the lake. Minor, beneficial impacts to water quality may be realized during storm events as the natural areas may help to reduce erosion and subsequent water turbidity. The establishment of a total 11,188 acres of ESA lands and 3,268 acres of MRML-WM lands that will result in more upland areas and wetlands being protected from erosion and sedimentation. Resource objectives makes it mandatory that all decision making processes take into consideration their impacts to Lewisville Lake watershed, lake water supply, and water quality.

Additionally, 1,079 acres of surface waters are to be classified as Designated No Wake. These areas are near shorelines where wave action can increase erosion. This revised Designated No Wake classification would be expected to help prevent further erosion and water turbidity.

Therefore implementation of the Lewisville Lake 2020 MP will have negligible positive short and long term impacts on water resources within and on USACE project lands.

3.3 CLIMATE, CLIMATE CHANGE, AND GREENHOUSE GASES

Lewisville 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 prevailing winds over the watershed are from the south during the spring, summer, and fall months, while northerly winds prevail during the winter months. The mean annual temperature in the nearby city of Denton is about 65 degrees Fahrenheit. January, the coldest month, has an average minimum daily temperature of about 33 degrees (U.S Climate Data, 2019). August, the warmest month, has an average maximum daily temperature of about 96 degrees. The average length of the growing season is 277 days (NOAA, 2020).

The normal annual precipitation is 38 inches with precipitation levels being higher in the late-spring, early-summer months, peaking in May-June and lowest in December-January and July-August (U.S Climate Data, 2019). Because of the preponderance of tropical maritime air, heavy showers of short duration may occur at any time during the year.

The relative humidity typically ranges from 0% to 83% over the course of a year. The air is driest around the end of November-February timeframe and is most humid between June-July. The average annual evaporation rate at nearby Grapevine Lake, as calculated using the measured pan evaporation multiplied by the monthly pan coefficient, is about 83 inches with the lowest evaporations rates occurring during the winter and greatest evaporation occurring during the summer (USACE 2018).

Climate Change and Greenhouse Gases

Federal agencies are required to consider Green House Gas (GHG) emissions and climate change in environmental assessments in accordance with NEPA. On August 1, 2016, the CEQ issued final guidance on the consideration of GHG emissions and climate change in NEPA reviews; however, Executive Order (EO) 13783 directed the

CEQ to rescind that guidance. At the same time, case law in the Ninth Circuit Court still requires climate change analysis: “The impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct” (Center for Biological Diversity vs. the National Highway Traffic Safety Administration, 538 F.3d 1172, 1217 (9th Cir., 2008)). Consistent with case law, an analysis of climate change impacts was conducted for this EA.

EO 13834, as well as the President’s Climate Action Plan (CAP) set forth requirements to be met by federal agencies. These requirements range from preparing general preparedness plans to meeting specific goals to conserve energy and reduce GHG emissions. The USACE has prepared an Adaptation Plan in response to the EOs and CAP. The Adaptation Plan includes the following USACE policy statement:

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

The USACE manages project lands and recreational programs to advance broad climate change resilience and carbon sequestration, as set forth in EO 13834 and related USACE policy.

Predicted Climate Change

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). Lewisville Lake is 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 have 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 rainfall, extreme heat events have also been increasing. Most of the increases of heat wave severity in the U.S. are likely due to human activity, with a detectable human influence in recent heat waves in the southern Great Plains (USGCRP, 2014). In particular, in 2011, the State of Texas experienced a heat wave and drought. The growing season and summer were both the hottest and driest on record. Extreme heat events in Texas have also been occurring substantially more frequently.

This trend of rising temperatures and more frequent extreme events such as heat waves, drought, and heavy rainfall is predicted 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.

3.3.1 Alternative 1: No Action

The continual implementation of the 1985 MP will not result in any change in management of Lewisville Lake project land nor anything that will currently and in the future contribute to climate, climate change, and greenhouse gases. Implementation of the 1985 MP and 2004 Supplement will have no impact (beneficial or adverse) on existing or future climate conditions. Current policy EO 13834 and 13783, and related USACE policy requires project lands and recreational programs be managed in a way that advances broad national climate change mitigation goals including, but not limited to, climate change resilience and carbon sequestration. These policies will continue to be implemented under the No Action Alternative.

3.3.2 Alternative 2: Proposed Action

The Lewisville Lake 2020 MP does not recommend any activities that will result in a change (beneficial or adverse) in GHG emissions; therefore adoption and implementation of the Lewisville Lake 2020 MP will have no impact on the existing climate of the study area nor will it exacerbate future climate conditions. Management under the 2020 MP will also follow current policy to meet climate change goals as described for the No Action Alternative. Ground disturbing activities that arise from guidance from this document will go through the NEPA and design process prior to implementation. It is during that time, that impacts to the climate will be analyzed for those ground disturbing activities.

3.4 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 and concentrations of various air contaminants including primary and secondary standards for six criteria pollutants: Ozone (O₃), Carbon Monoxide (CO), Sulfur Dioxide (SO₂), Nitrogen Oxide (NO), particulate matter (PM₁₀ and PM_{2.5}), and Lead (Pb). If 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.

Lewisville Lake is located within the Metropolitan Dallas-Fort Worth Air Quality Control Region (AQCR). The DFW AQCR is in attainment for all criteria air pollutants, except for O₃. 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 is August 3, 2021.

3.4.1 Alternative 1: No Action

The continual implementation of the 1985 MP will not result in any changes to current and reasonably foreseeable future air quality in the region. No new increase in vehicular traffic, mass permanent vegetation removal, or the building of mass industrial facilities occur. The No Action Alternative will remain compliant with the Clean Air Act because the MP includes only guidelines and does not incorporate actions which produce criteria pollutants as explained in the previous sentence.

3.4.2 Alternative 2: Proposed Action

As with the No Action Alternative, the 2020 MP will not result in any change to current and reasonably foreseeable air quality in the region. The Proposed Action does not propose any actions (i.e. ground disturbing activities) that directly or indirectly produce criteria pollutants (i.e. total emissions is 0); therefore, this action is compliant with the Clean Air Act and State Implementation Plan and is not subject to a conformity determination. Negligible air quality benefits may be realized through the revised classification of 11,188 acres of ESA and 3,268 acres of MRML-WM. These areas contain natural vegetation communities that filter and sequester air pollutants.

3.5 TOPOGRAPHY, GEOLOGY, AND SOILS

Topography

Topography describes the physical characteristics of the lands such as slope, elevation, and general surface features. Lewisville Lake and its tributaries are located in the Blackland Prairie, East Cross Timbers, Grand Prairie, and West Cross Timbers subdivisions of the Gulf Coastal Plain physiographic province. The topography throughout the basin is predominantly gently rolling. Basin topography varies from level or gently rolling in the lower reaches to broken prairie in the north and northwestern reaches. Some rough land occurs along the streams in the lower reaches.

The Elm Fork of the Trinity River drops from an elevation of about 1,210 feet NGVD29 at its source to 435 feet NGVD29 at the Lewisville Dam site. The average slope of the stream bed is 7.5 feet per mile, and the average slope downstream of Lewisville dam is 1.6 feet per mile.

Geology

The Upper Trinity River Basin is situated within the West Gulf Coastal Plain section of the Coastal Plain physiographic province. The physiography of the area is primarily controlled by surficial geologic material. The regional geology of the Upper Trinity River Basin reflects the various depositional phases and environments that took place during three periods of pre-historical geologic times. The oldest layers, exposed in the northwestern reaches of the basin consist of marine and near shore sand, shale, and limestone layers (bedrock). Younger layers, consisting of near shore sand and marine shale and limestone are exposed at the surface over most of the Upper basin. The younger sediments, which dip gently toward the east and southeast, were deposited unconformably (i.e., missing a layer or layers of the entire regional geologic sequence) over the northwest-dipping older layers after a period of lifting and erosion. The sediments in the Lewisville Lake area are youngest, a result of the processes of weathering and erosion of the older rocks during more recent times. These sediments,

composed of unconsolidated sand, gravel, silt, and clay, make up the alluvial deposits (water-laid) of the Trinity River floodplain and its major tributaries (Ulery et al. 1993).

Primary Formations

Primary bedrock formations occurring at the dam site are the Eagle Ford and Woodbine groups. The bedrock layers in the reservoir area dip southeastward at a gradient of 50 to 60 feet per mile. This is greater than the slope of the land surface, and results in the encounter of progressively younger beds when proceeding in a southeastward direction. Historically, the Eagle Ford group was not subdivided into various member formations at the dam site. For previous project purposes, the Eagle Ford was originally considered a single entity. However, based on more recent mapping in the region of north central Texas, the Eagle Ford Shale is divided into three ascending units: the Tarrant, the Britton, and the Arcadia Park formations. At the dam site, the Woodbine formation has been segregated into the upper Lewisville beds and the lower Dexter Sands. No major structural faulting or folding is known at the dam site or in the reservoir area.

Soils

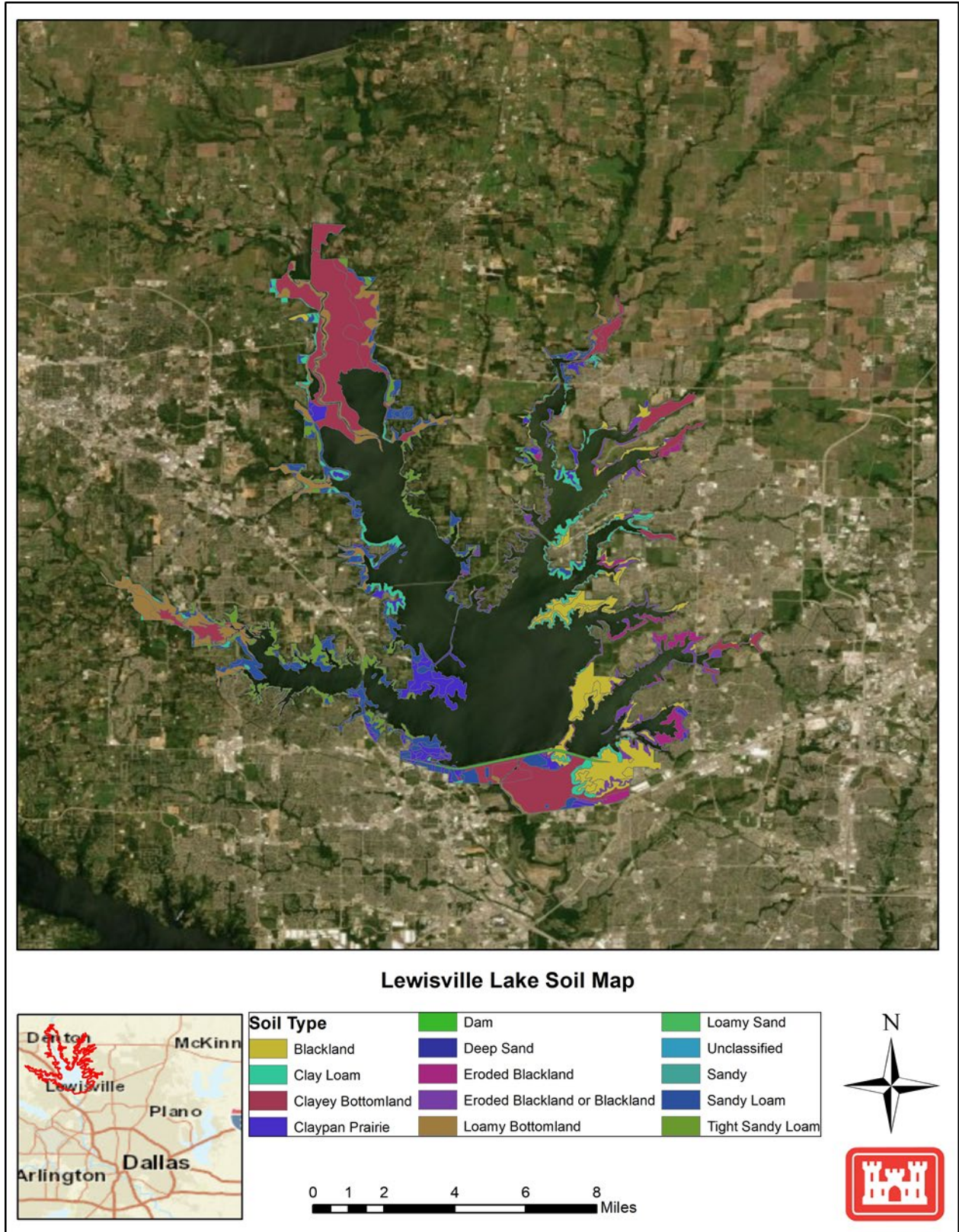
Many different soils occur in the Lewisville Lake vicinity. Residual soils east of the Elm Fork overlaying the Eagle Ford formation are predominately clay soils. Soils west of the Elm Fork overlying the Woodbine formation are somewhat sandy. The sandy soils are fairly shallow and overlie clay-based subsoil with a deep profile to bedrock.

The Natural Resource Conservation Service (NRCS) Web Soil Survey (2018) reports that there are twelve different types of soils that contribute to the diversity and abundance of terrestrial and aquatic vegetation on Lewisville Lake project lands. Table 3-3 shows the acreage associated with each soil type and Figure 3-2 shows the location of each soil type.

Table 3-3. Total acres of each Soil Type Found within Lewisville Lake Project Lands

Soil Type	Number of Acres
<u>Blackland</u>	2,747.03
<u>Clay Loam</u>	1,648.61
<u>Clayey Bottomland</u>	6,116.75
<u>Claypan Prairie</u>	1,672.02
<u>Deep Sand</u>	12.2
<u>Eroded Blackland</u>	761.53
<u>Eroded Blackland or Blackland</u>	1,170.05
<u>Loamy Bottomland</u>	2,185.54
<u>Loamy Sand</u>	56.22
<u>Sandy</u>	0.61
<u>Sandy Loam</u>	2,820.57
<u>Tight Sandy Loam</u>	1,489.66
<u>Total</u>	20,680.79

Figure 3-2. Location of Various Soil Types Found within Lewisville Lake Project Lands



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 Lewisville Lake and Dam in November 1948.

3.5.1 Alternative 1: No Action

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

3.5.2 Alternative 2: Proposed Action

The Lewisville Lake 2020 MP takes into consideration of the various topographical, geological, and soils aspects of USACE Lewisville Lake project lands. The reduction of Project Operations land (from 1,170 acres to 1,083 acres) and Recreation land (8,935 acres to 4,559 acres) and the increase of ESA (from 7,292 acres to 11,188 acres) lands will help to increase the long term preservation and stabilization of the soils within USACE Lewisville Lake project lands. In addition, resource objectives make it mandatory that erosion control and sedimentation issues are being monitored and alternatives be developed and implemented to resolve those issues. The removal of the 4 Common Utility Corridors with none being added will not have any impact on topography, and geology. However, the continued and future use of the remaining utility corridors will condense disturbances associated with utility operations to limited areas, further reducing soil exposure to erosive wind and water forces. The establishment of ESA and MRML-WM land classes as well as the implementation of resource objectives discussed in Chapter 3 of the 2020 MP, the proposed action would have minor, positive, long-term impacts on soil conservation.

3.6 NATURAL RESOURCES

Operational civil works projects administered by USACE are required, with few exceptions, to prepare an inventory of natural resources. The basic inventory required is referred to within USACE regulations (ER and EP 1130-2-540) as a Level One Inventory. This inventory includes the following: vegetation in accordance with the National Vegetation Classification System through the sub-class level; assessment of the potential presence of special status species including but not limited to federal and state listed endangered and threatened species, migratory species, and birds of conservation concern listed by the USFWS; land (soils) capability classes in accordance

with NRCS soil surveys; and wetlands in accordance with the USFWS Classification of Wetlands and Deepwater Habitats of the United States, which were previously discussed in Section 3.2. In addition to the data from the Level One Inventories, a Habitat Assessment was conducted on October 16-20, 2017 at Lewisville Lake by an interagency team of biologists, foresters, and USACE park rangers using the TPWD's Wildlife Habitat Appraisal Procedure (WHAP) to help inform land classification proposals for the 2020 MP. A total of 84 data collection sites were selected using aerial photography and knowledge of the Lewisville Lake staff. The four major habitat types that were selected and assessed were Upland Forest, Marsh, Riparian/Bottomland Hardwood Forest, and Grassland. The WHAP assessment report is included as Appendix C of the 2020 MP. Additional details and results of the WHAP surveys can be found in Section 5.5 of the 2020 MP.

The WHAP assessment revealed that the two most abundant habitat types surveyed were upland forests and riparian/BHF. However, the two habitat types that scored on average the highest were marshes and grassland habitats. Four areas were identified to as having a concentration of high scoring habitats. These areas include the lands below the lake dam, Hickory Creek branch, Little Elm Fork branch, and the Elm Fork of the Trinity River branch.

Large scale conservation management efforts have been in progress at Lewisville Lake. Several of these sites were surveyed within Lewisville Lake Environmental Learning Area (LLELA) and Lewisville Aquatic Ecosystem Research Facility (LAERF) as part of this effort. Overall, seven riparian/BHF sites, ten upland forest sites, and two grassland sites received scores over 0.70, exhibiting medium to high quality habitat. Eight of these points are located below the lake dam and largely represent the conservation and restoration efforts completed to date and are likely to increase in habitat value as restoration efforts continue.

The Texas Conservation Action Plan (TCAP) 2012 and the accompanying Texas Blackland Prairies Ecoregion Handbook (Handbook), published by TPWD in August 2012, were used in the preparation of the 2020 MP. The TCAP and Handbook were invaluable in identifying Species of Greatest Conservation Need (SGCN), rare plant communities, regional conservation issues, and a suite of conservation actions needed to reduce negative effects on SGCN and rare plant communities.

Vegetation

Lewisville Lake is located within the Texas Blackland Prairies and Cross Timbers ecological regions. The Texas Blackland Prairies is a distinct ecoregion located in central Texas. The largest section of the ecoregion is mostly south to north trending, starting at San Antonio and nearly reaching the Oklahoma border north and northeast of Dallas. The other part of the Texas Blackland Prairies trends southwest to northeast, starting southeast of San Antonio. This smaller, more southeastern located part of the ecoregion is commonly called the Fayette Prairie. The entire Texas Blackland Prairies ecoregion covers roughly 19,500 square miles (see Figure 3-3.).

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 Lewisville Lake is located, include both the Eastern Cross Timbers and Fort Worth Prairie vegetative sub-regions of the Cross Timbers ecoregion.

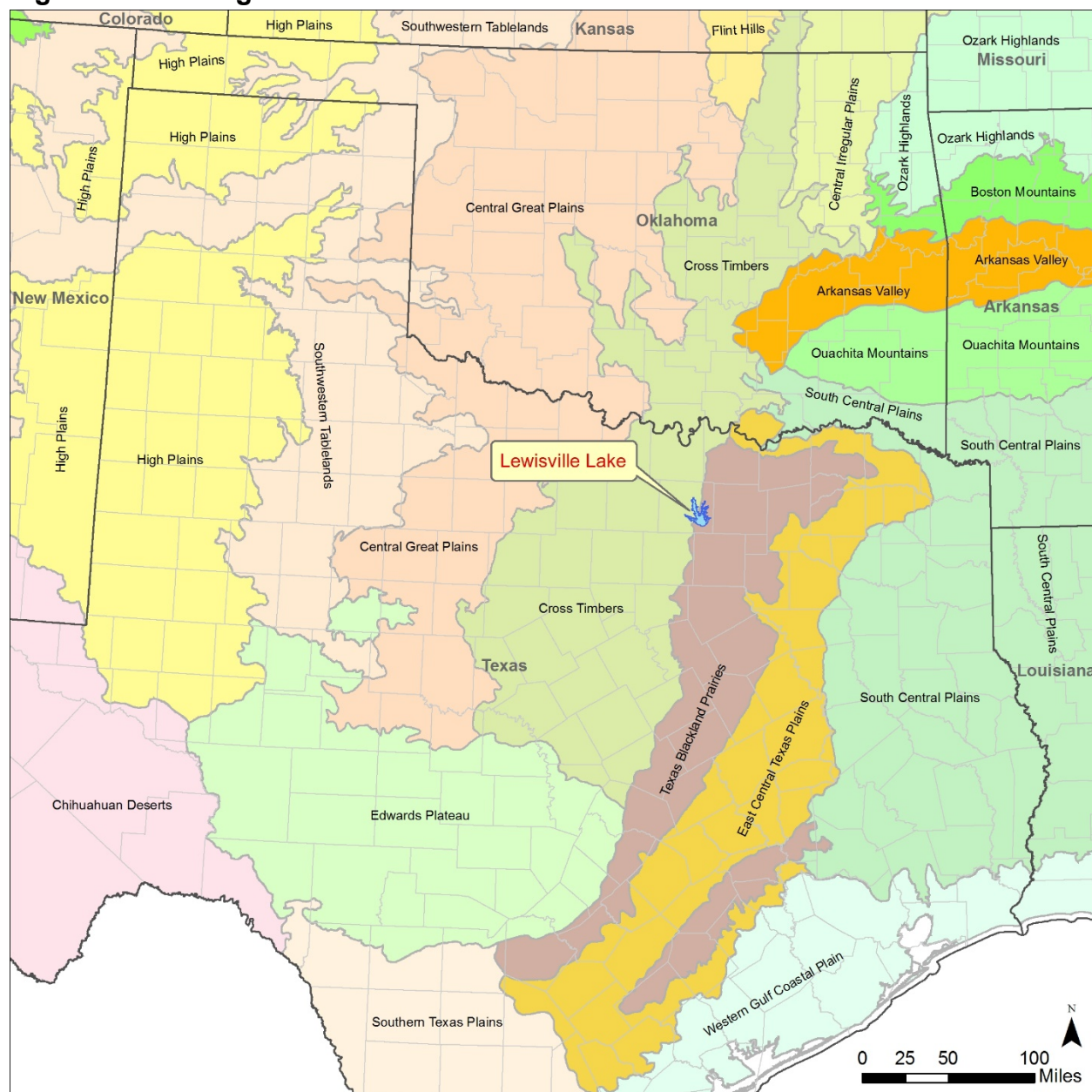
Texas Blackland Prairies

The land cover of the Texas Blackland Prairies at the beginning of the 19th century was predominately tallgrass prairie, with forest found primarily along stream courses and some uplands. The common grass and forb species include little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardi*), yellow Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), eastern gamagrass (*Tripsacum dactyloides*), tall dropseed (*Sporobolus compositus*), asters (*Aster spp.*), prairie bluet (*Stenaria nigricans*), prairie clovers (*Dalea spp.*), and coneflowers (*Echinacea spp.*). Bottomland hardwoods forest are not as prevalent, but where they occur common species include 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*), sweetgum (*Liquidambar styraciflua*), sugar hackberry (*Celtis laevigata*), and eastern cottonwood (*Populus deltoides*). 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.

Cross Timbers

Vegetation on the landscape of the Cross Timbers has undergone significant changes over the past 150 years. Early travelers through north Texas coined the name "Cross Timbers" by their repeated crossings of these timbered areas that proved to be a barrier to their travel on the open prairies to the east and west.

Figure 3-3. Ecoregions of Texas



Although habitat for wildlife is present throughout the ecological region as a whole, populations vary considerably within sub-regions. The diversity and configuration of the plant communities on the landscape influence wildlife populations. Other factors include fragmentation of once continuous habitat into smaller land holdings; 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.

Eastern Cross Timbers

In north central Texas, the Eastern Cross Timbers vegetative sub-region is a narrow strip of timbered country extending from eastern Cooke and western Grayson counties, south to near Waco, where it merges with the riverine forests of the Brazos River.

Fort Worth Prairie

The Fort Worth Prairie portion of the Cross Timbers extends as a continuous body of open grasslands, roughly 10 to 30 miles wide, from near the Red River in the north, south about 110 miles to where it ends in the wooded area along the Brazos River near the Johnson-Hill County line.

The Cross Timbers ecoregion, with its woody overstory consisting of primarily post oak (*Quercus stellata*) and blackjack oak (*Quercus marilandica*), owe its existence to the presence of sandy, slightly acidic soils. These soils allow more efficient water infiltration, permit easier penetration of tree roots, and provide more moisture to plants that do the heavier clay soils typically present in the Blackland Prairies ecoregion. In addition to the characteristic oaks, other woody species commonly found in the Cross Timbers today include hackberry (*Celtis spp.*), cedar elm, pecan, several juniper species, and mesquite. Common grass species include hairy grama (*Bouteloua hirsuta*), side-oats grama (*Bouteloua curtipendula*), tall dropseed (*Sporobolus compositus*), switchgrass (*Panicum virgatum*), Canada wild-rye (*Elymus canadensis*), and Texas winter grass (*Nassella leucotrica*) (Dyksterhuis 1948, Correl & Johnson 1970, Diggs, et al. 1999).

Fisheries and Wildlife Resources

Lewisville 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*), blue catfish (*Ictalurus furcatus*), white crappie (*Pomoxis annularis*), spotted bass (*Micropterus punctulatus*), hybrid striped bass, and white bass (*Morone chrysops*). Other less prominent species include carp, blue gill, longear sunfish (*Lepomis megalotis*), gizzard (*Dorosoma cepedianum*) and threadfin shad (*Dorosoma petenense*). Several species have been stocked periodically since 1966 with bass and catfish being the most popular. There is significant fishing pressure at the lake, since it is located within one of the most populated urban metro areas in the United States.

Many of the undeveloped open spaces provide habitat for wildlife including coyotes (*Canis latrans*), bobcats (*Lynx rufus*), eastern cottontail rabbit (*Sylvilagus floridanus*), fox squirrel (*Sciurus niger*), nine-banded armadillo (*Dasypus novemcinctus*), striped skunks (*Mephitis mephitis*), raccoons (*Procyon lotor*), white-tailed deer (*Odocoileus virginianus*), and Virginia opossum (*Didelphis virginiana*). The area also provides habitat for a diverse range of birds and acts as a stopover for migratory birds. Common bird species include many species of waterfowl (ducks), and various raptors, shore birds, and song birds. As for reptiles, there are several species of turtles, lizards, and snakes that are common to the area. Since Lewisville Lake is surrounded by the DFW

Metroplex, the wildlife management and ESA lands on Lewisville Lake have great benefit to vegetative and wildlife resources of the region as to threatened and endangered species. Piping Plover (*Charadrius melodus*) and Red Knott (*Calidris canutus*) are not an uncommon occurrence within the lake, where they use it as a stopover in their migrations.

3.6.1 Alternative 1: No Action

The No Action Alternative for Lewisville Lake does not involve any activities that will directly and immediately contribute to changes in existing conditions. Therefore, no immediate or short-term minor, moderate, or major; or beneficial or adverse impacts on natural resources will occur. However, maintaining existing land classifications will not recognize the need to protect important habitats such as prairies, wetlands, or scenic areas, which could lead to long-term moderate or major negative impacts on natural resources as a result of implementing the No Action Alternative

3.6.2 Alternative 2: Proposed Action

The implementation of the reclassifications of land management classes, improvement of resource management objectives, and the overall improvement of the Lewisville Lake 2020 MP will allow natural resources within USACE Lewisville federal project lands to be better managed and accounted for. The better management will be from implementing the knowledge gained from the Wildlife Habitat Appraisal Procedure (WHAP) survey done for Lewisville Lake, which helps to establish the high quality and unique areas. The implementation of revised land reclassifications will allow project lands to continue and further support the USFWS and the TPWD missions associated with wildlife conservation and implementation of operational practices that will protect and enhance wildlife and fishery populations and habitat. The new resource objectives also allows for natural resources to be managed with consideration of how they will be impacted from the retention of flood waters. The addition of 3,626 acres of ESA and 3,268 of MRML-WM lands, especially in prime ecological areas helps to protect natural resources from various types of adverse impacts such as habitat fragmentation. Which is what the removal of the 4 Common Utility Corridors with none added as described in section 6.1 of the Lewisville Lake 2020 MP will help to do and as well as increase the acreage of habitat. In addition, all new utilities will be built along existing right-of-ways and existing Common Utility Corridors. Therefore, under the Proposed Action, there will be short- and long-term major, beneficial impacts on natural resources as a result of implementing the 2020 MP.

3.7 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 on, and recovery efforts for, these species; and (4) consultation with other federal agencies concerning measures to avoid harm to listed species.

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

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

The USFWS's Information for Planning and Consultation (IPaC) database (2020) lists the threatened and endangered species and trust resources that may occur within the Lewisville Lake project lands (see USFWS Official Species List and the Trust Resources Report in Appendix C of the 2020 MP). There are two federally-listed species and no candidate species that have the potential to utilize Lewisville Lake project lands. A list of these species is presented in Table 3-4. No Critical Habitat has been designated within or near Lewisville 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 MP as well as a list of Species of Greatest Conservation Need (SGCN) for the Cross Timbers and Texas Blackland Prairie Ecoregions.

Table 3-4. Federally Listed Endangered and Threatened Species with Potential to Occur within Lewisville Lake Project Lands

Common Name	Scientific Name	Federal Status	Occurrence
Least Tern	<i>Sterna antillarum</i>	Endangered	Seasonally Common
Whooping Crane	<i>Grus Americana</i>	Endangered	Rare

Source: USFWS 2020

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. Although fairly rare, both of these species have been observed at Lewisville Lake during their migration seasons.

Least tern preferred habitat mostly consists of open waters, rivers, lakes, estuaries, marshes, and swamps. Typically nesting occurs on sandy to gravelly substrates including shorelines and sandbars or other areas that are near open water. Nests are usually above the high water line and close to vegetation (USFWS 2017). Depending on lake levels, it may nest along the shorelines or on exposed sandbars at Lewisville Lake. Because of the availability of desirable habitat and recent unofficial sightings, the specie occurrence on Lewisville Lake project lands is considered uncommon.

Whooping crane habitat consists of marshes, shallow lakes, lagoons, salt flats, grain and stubble fields, and barrier islands (AOU 1983, Matthews and Moseley 1990). Because of the sporadic unofficial sightings, the occurrences of Whooping Cranes within the boundaries of Lewisville Lake is considered rare (NatureServe 2016).

Texas Parks and Wildlife Department's (TPWD 2020) Annotated County Lists of Rare Species database record the threatened and endangered species that may occur on Lewisville project lands. Table 3-5 lists these species including their scientific name and status with TPWD.

Table 3-5: TPWD List of Threatened and Endangered Species That May Occur within Lewisville Lake Project Lands

Common Name	Scientific Name	State Status
Birds		
White-Faced Ibis	<i>Plegadis chihi</i>	Threatened
Black Rail	<i>Laterallus jamaicensis</i>	Threatened
Whooping Crane	<i>Grus americana</i>	Endangered
Piping Plover	<i>Charadrius melodus</i>	Threatened
Rufa Red Knot	<i>Calidris canutus rufa</i>	Threatened
Interior Least Tern	<i>Sternula antillarum athalassos</i>	Endangered
Reptiles		
Texas Horned Lizard	<i>Phrynosoma cornutum</i>	Threatened
Mollusks		
Sandbank Pocketbook	<i>Lampsilis satura</i>	Threatened
Louisiana Pigtoe	<i>Pleurobema riddellii</i>	Threatened
Texas Heelsplitter	<i>Potamilus amphichaenus</i>	Threatened

Source: TPWD 2020

Texas Natural Diversity Database

The Texas Natural Diversity Database (TXNDD), administered by TPWD, manages and disseminates information on the occurrence of rare species, native plant communities, and animal aggregations in Texas to help guide project planning efforts. An official request via email was made on December 16, 2019 requesting this information for the following USGS quadrangles that encompass Lewisville Lake project lands: Little Elm, Lewisville East, Lewisville West, Denton East, and Green Valley. USACE received the requested information from TXNDD on August 4, 2020. The next four paragraphs would summarize the information received.

Within the Lewisville 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 garter snake (*Thamnophis sirtalis annectens*) and Texas heelsplitter (*Potamilus amphichaenus*) (TXNDD 2020).

In late 1977 and 1978, Texas heelsplitter shells were detected at ten locations within Lewisville Lake project lands and living Texas heelsplitter were detected in Lewisville Lake. In 1999, Texas heelsplitter was detected again, with living individuals at one site (TXNDD 2020). The ideal habitat for the Texas heelsplitter is of flowing water with mud or sand in small to medium rivers. It may also be found in reservoirs (NatureServe 2017A) and (Howells et al., 1996).

In 2006 a Texas garter snake was positively identified in the former Lake Dallas area of Lewisville Lake (TXNDD 2020). After further investigation in NatureServe (2017B) about the preferred habitat of the species, it was found that it prefers wet, moist soils in grassy and or bushy terrain areas near rivers and streams. Because of this information, the occurrence of Texas Garter Snake occurring within Lewisville Lake project lands is considered to be common.

The TXNDD reports and the data collected from the WHAP survey confirms that pockets Mollisol Blackland Prairie mixed plant community can be found on the project lands at Lewisville Lake; thus, the occurrence of this community on project lands is considered common.

3.7.1 Alternative 1: No Action

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

3.7.2 Alternative 2: Proposed Action

The implementation of the Lewisville Lake 2020 MP will allow for better cooperative management plans with the USFWS and TPWD that will help to preserve, enhance, and protect vegetation and wildlife habitat resources that are essential to various endangered and threatened species that may be found within USACE Lewisville federal project lands. To further management opportunities and beneficially impact habitat diversity, the reclassifications in the Lewisville Lake 2020 MP include 10,918 acres as ESAs. Under this reclassification, several land parcels previously classified as Fish and Wildlife Management lands were converted to ESAs in order to recognize those areas having the highest ecological value and to ensure they are given the highest order of protection among possible land classifications. In combination with the revised 1,079 acres of Designated No Wake Zones, the federally protected shorebirds that occur at Lewisville Lake would be expected to benefit from reduced wake induced erosion. The conversion of these lands was supported by recommendations from the USFWS, TPWD, and the surrounding cities. Resource objectives makes it mandatory that threatened and endangered species are managed by various ecosystem management principles. In addition, all new utilities will be built along existing right-of-ways and existing Common Utility Corridors. This will help to reduce future loss of natural resources that could potentially occur from placement of utility lines on project lands.

Then the removal of the 4 Common Utility Corridors with none being added as described in section 6.1 of the Lewisville Lake 2020 MP will help to increase the acreage of threatened and endangered species habitat and reduce their fragmentation. Any future activities that could potentially result in impacts on federally listed species will be coordinated with USFWS through Section 7 of the Endangered Species Act. Under the Proposed Action, the impacts to federally threatened and endangered species would be long-term, minor, and entirely beneficial. As a result, USACE has determined the Lewisville Lake 2020 MP revisions will have no effect on federally threatened or endangered species that occur at Lewisville Lake.

3.8 INVASIVE SPECIES

Invasive species are any kind of living organism which, if uncontrolled, causes harm to the environment, economy, or human health. Invasive species generally grow and reproduce quickly and spread aggressively. Non-native, or exotic, species have been introduced, either intentionally or unintentionally, and can out-compete native species for resources or otherwise alter the ecosystem. Native invasive species are those species that spread aggressively due to an alteration in the ecosystem, such as lack of fire or the removal of a predator from the food chain. Table 3-6 lists invasive and exotic species that are known to occur within Lewisville Lake project lands.

Table 3-6. Invasive Species Found within Lewisville Lake Project Lands

Common Name	Scientific Name	Native/Non-native	Prevalence
Mammals			
Feral Hog	<i>Sus scrofa</i>	Non-native	Moderate
Nutria	<i>Myocastor coypus</i>	Non-native	Moderate
Mollusks			
Zebra Mussel	<i>Dreissena polymorpha</i>	Non-native	Minor
Insects			
Africanized Honeybee	<i>Apis spec</i>	Non-native	Major
Red Imported Fire Ant	<i>Solenopsis invicta</i>	Non-native	Moderate
Plants			
Purple Loosestrife	<i>Lythrum salicaria</i>	Native	Minor
Chinaberry Tree	<i>Melia azedarach</i>	Non-native	Minor
Chinese Privet	<i>Ligustrum sinense</i>	Non-native	Minor
Chinese Tallow Tree	<i>Triadica sebifera</i>	Non-native	Minor
Hydrilla	<i>Hydrilla verticillate</i>	Non-native	Minor
Johnsongrass	<i>Sorghum halepense</i>	Non-native	Minor
King Ranch Bluestem	<i>Bothriochloa ischaemum</i> <i>var. songarcia</i>	Non-native	Minor

Source: USACE Operations and Maintenance Business Information Link (OMBIL) 2018

In 2015, 1,655 acres were treated for invasive species. Of that total, 55 acres were treated for 4 terrestrial animals and 1,600 acres for 10 terrestrial plants. In 2016 and 2017 the number of acres treated, and the number of plants and animals remained the

same. For two years 105 acres were treated - 100 acres was treated for 5 terrestrial plants and 5 acres was treated for 2 terrestrial animals (USACE 2018).

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 and Lewisville Lake’s close proximity to other non-infested lakes. Although native, cowbirds (*Molothrus ater*) have become problematic due to their expanding range associated with agriculture and human development. The close proximity to urban landscaping has led to many common landscape plants becoming aggressive colonizers and become invasive at Lewisville Lake.

03.8.1 Alternative 1: No Action

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

3.8.2 Alternative 2: Proposed Action

The implementation of the reclassifications of land management classes, improvement of resource management objectives, and the overall improvement of the Lewisville Lake 2020 MP will allow invasive species within USACE Lewisville federal project lands to be better managed and accounted for. The better management will be from implementing the knowledge gained from the Wildlife Habitat Appraisal Procedure (WHAP) survey done for Lewisville Lake, which helps to identify high value and unique areas that may need further protection from invasive species so as to protect their value and uniqueness that invasive species may destroy or degrade. The addition of 3,626 acres of ESA and 3,268 acres of MRML-WM lands, especially in prime ecological areas helps to protect natural resources from various types of adverse impacts such as habitat fragmentation which increases the spread of invasive species and these areas also receive more invasive species management efforts. There are also resource objectives that call for the monitoring and reporting of invasive species as well as the control of them. The removal of the 4 Common Utility Corridors as well as no new corridors added, will help to further reduce the spread of invasive species by removing avenues of entry whereby invasive species can be introduced and spread. Therefore, under the Proposed Action, there will be short- and long-term minor, beneficial impacts on invasive species as a result of implementing the 2020 MP.

3.9 CULTURAL, HISTORICAL, AND ARCHAEOLOGICAL RESOURCES

Cultural History Sequence

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 Lewisville 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. 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 Lewisville 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 Lewisville 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 Lewisville 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.

Historic

Local tradition holds that Native Americans of the Wichita and Caddo Nations inhabited the Lewisville 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 Lewisville 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 Lewisville Lake include the archeological remains of house sites and farmsteads dating from the late 19th century through the mid 20th century, although a few sites dating to the earlier Peters Colony occupation have been recorded.

Previous Investigations

The initial archeological investigations at Lewisville Lake were conducted between 1948 and 1950 by the River Basin Surveys. During that period, 27 sites were recorded, and three sites (41DN5, 41DN6, 41DN12) were tested. Plans to enlarge the lake led to additional survey in 1986 and 1987 by the University of North Texas (UNT), followed by test excavations at 23 prehistoric and 16 historic sites. In 1988, UNT performed data recovery excavations at five prehistoric (41DN20, 41DN26, 41DN27, 41DN372, 41DN381) and three historic (41DN401, 41DN404, 41DN429) sites. Limited survey work since then has added to the number of known archeological sites.

Recorded Cultural Resources

Currently, 161 archeological sites have been recorded at Lewisville Lake. One of these archeological sites (Cranston Pottery Kiln - 41DN16) and the historic Old Alton Bridge are listed on the National Register of Historic Places (NRHP). Of the remaining 160 archeological sites, ten have been determined eligible for NRHP and 136 have been determined ineligible. Fourteen of the recorded sites have not yet been evaluated for NRHP eligibility.

Cultural Resources Management at Lewisville Lake

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 Lewisville Lake. Completion of a full inventory of cultural resources at Lewisville 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, would require cultural resource surveys to locate and evaluate historic and prehistoric resources. Resources determined eligible for the NRHP must be protected from proposed project impacts, or the impacts must be mitigated. All future cultural resource investigations at Lewisville 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.

3.9.1 Alternative 1: No Action

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

3.9.2 Alternative 2: Proposed Action

The implementation of the 2020 MP land management reclassifications classes, improvement of resource management objectives, and the overall improvement of the Lewisville Lake 2020 MP will allow cultural, historical, and archaeological resources within USACE Lewisville federal project lands to be better managed and accounted for. Based on previous surveys at Lewisville Lake, the required reclassifications, existing utility corridors, resource objectives, and resource plan will not change current cultural resource management plans or alter areas where these resources exist. All future activities will be coordinated with the State Historic Preservation Officer and federally recognized Tribes to ensure compliance with Section 106 of the NHPA, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act. Therefore, no significant adverse impacts on cultural, historical, or archaeological resources will occur as a result of implementing the 2020 MP. Beneficial impacts may occur as a result of the 2020 MP as lands classified as PO, ESA, or MRML-WM would generally protect any historic properties within those lands against ground disturbing activities.

3.10 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

Located totally within Denton County, the primary zone of interest (ZOI) for socioeconomic analysis of Lewisville Lake is defined as those counties that surround the lake, which are Denton, Dallas, Tarrant, and Collin counties, in North Central Texas. The population, education level, employment rates, income, and household characteristics of the area are discussed in detail in Section 2.4 of the 2020 MP and are incorporated herein by reference (USACE, 2020).

Environmental Justice

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

EO 12898 does not provide guidelines as to how to determine concentrations of minority or low-income populations. However, analysis of demographic data on race and ethnicity and poverty provides information on minority and low-income populations that could be affected by the proposed actions. The U.S. Census American Community Survey provides the most recent estimates available for race, ethnicity, and poverty. Minority populations are those persons who identify themselves as Black, Hispanic, Asian American, American Indian/Alaskan Native, Pacific Islander, or Other. Poverty status is used to define low-income. Poverty is defined as the number of people with income below poverty level, which, according to the U.S. Census Bureau, was \$24,588 for a family of four in 2017. A potential disproportionate impact may occur when the minority in the study area exceeds 50 percent or when the percent minority and/or low-income in the study area are meaningfully greater than those in the region.

Protection of Children

EO 13045 requires each federal agency “to identify and assess environmental health risks and safety risks that may disproportionately affect children” and “ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.” This EO was prompted by the recognition that children, still undergoing physiological growth and development, are more sensitive to adverse environmental health and safety risks than adults. The potential for impacts on the health and safety of children is greater where projects are located near residential areas. Per Table 3-7, the U.S. Census estimates show that persons under 18 years of age living in poverty range from 28.3 percent of the population in Dallas County, 23.9 percent in the State of Texas, 20.7 percent in Tarrant County, and 10.0 percent each in Denton and Collin counties (U.S. Census Bureau 2016).

Dallas, Tarrant, and Collin counties all have a larger minority population percentage than the State of Texas, while Denton County is less. In Tarrant, the percentage of the population living in poverty and the percentage of children under the age of 18 living in poverty is less than both the State of Texas and Dallas County. Both these percentages are substantially lower in Denton, and Collin counties.

Table 3-7. Minority/Poverty Percentages for State of Texas and Counties in ZOI

	Minority Population (Percent)	All Ages in Poverty (Percent)	Under 18 in Poverty (Percent)
Texas	23.0	16.7	23.9
Dallas County	37.1	18.6	28.3
Tarrant County	27.6	14.4	20.7
Denton County	20.5	08.7	10.0
Collin County	25.3	07.1	10.0

Zone of Interest Average Total	27.6	12.2	16.1
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Sources: 2016 U.S. Census Bureau Statistics

3.10.1 Alternative 1: No Action

The continual implementation of the 1985 MP will result in the existing beneficial socioeconomic impacts to continue, as visitors will continue to come to the lake from surrounding areas. In addition to camping, many visitors purchase goods such as groceries, fuel, and camping supplies locally, eat in local restaurants, stay in local hotels and resorts, play golf at local golf courses, and shop in local retail establishments. These activities will continue to bring revenues to local companies, provide jobs for local residents, and generate local and state tax revenues. There will be no disproportionately high or adverse impacts on minority or low-income populations or children with the implementation of the No Action Alternative.

3.10.2 Alternative 2: Proposed Action

The implementation 2020 MP the land reclassifications, resources objectives, and resource plan reflect changes in land management and land uses that have occurred since 1985 and 2004. Lewisville Lake offers a variety of recreational opportunities for visitors. It is beneficial to the local economy through direct and indirect job creation and local spending by visitors. Beneficial impacts will be similar to the No Action Alternative. There will be no adverse impacts on economy in the area and no disproportionately high or adverse impacts on minority or low-income populations or children as a result of the Proposed Action.

3.11 RECREATION

Because six of the eight reservoirs in the Upper Trinity River system are located within the DFW Metroplex, the majority of the visitors to Lewisville Lake come from within a 30-mile radius, thus from Denton, Dallas, Tarrant, and Collin counties. These visitors are a diverse group of people with a wide variety of interests. Examples of visitors include campers who utilize the USACE- and city operated campgrounds around the reservoir; adjacent residents; recreational boaters, anglers who fish for recreation or participate in fishing tournaments; marina customers who utilize the marina on the reservoir; and day users who picnic, hike, bike, swim, and bird watch. Recreational facilities, activities, and needs are discussed in detail in Section 2.5 of the 2020 MP.

The USACE operates two recreation areas around Lewisville Lake, an additional seventeen areas are operated by local cities, and two by community organizations. For further information on these facilities refer to Section 2.5, *Recreation Facilities, Activities, and Needs*, of the Lewisville Lake 2020 MP. The recreation areas are leased to non-federal partners referred to as grantees. Each grantee is responsible for the operation and maintenance of their leased area; USACE does not provide direct maintenance within any of the leased locations, but it may occasionally lend support where appropriate. The USACE reviews requests and ensures compliance with applicable laws and regulations for proposed activities in all leased High Density Recreation areas.

3.11.1 Alternative 1: No Action

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

3.11.2 Alternative 2: Proposed Action

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

Lewisville Lake is beneficial to the local visitors and also offers a variety of free recreation opportunities. Even though the amount of acreage available for High Density Recreation will decrease (8,935 acres to 4,559 acres) as well as the creation of 542 acres for MRML-Low Density Recreation (MRML-LDR) with implementation of the 2020 Master Plan, these land reclassifications reflect changes in land management and land uses that have occurred since 1985 and 2004 at Lewisville Lake as well as errors made in consolidating land classifications at the time. The classification of MRML-LDR lands took into consideration areas where USACE ownership ranges from less than 50 feet wide to approximately 100 feet wide as a part of the Narrow Shoreline Variance Areas (NSVA) program, this designation allows adjacent landowners to apply for a written permit to mow USACE land to the water's edge. The reclassification of these lands will have no effect on current or projected public use. Nor will the reclassification of 2,704 – acres from FWM to ESA for the Lewisville Lake Environmental Learning Area (LLELA). Passive recreational activities would still be allowed as they are now and within LLELA like hiking, fishing, kayaking, running and other passive recreational activities. A small area within LLELA is revised as HDR for future development of a nature center or similar facility. The resource objectives make it mandatory that all decisions made in regard to the lake take into consideration their impacts to recreation and monitored should adjustments be needed. Therefore, under the Proposed Action, there would be no adverse, short- or long-term impacts on recreation as numerous recreation opportunities would remain around Lewisville Lake to accommodate various outdoor based recreation activities.

3.12 AESTHETIC RESOURCES

Lewisville Lake and surrounding federal lands offer public, open space value and scenic vistas that are unique to the region. This is especially true in the Lewisville Lake Environmental Area (LLELA) and the Greenbelt. Natural Resources Management objectives will continue to minimize activities which will disturb the scenic beauty and aesthetics of the lake.

3.12.1 ALTERNATIVE 1: No Action

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

3.12.2 ALTERNATIVE 2: Proposed Action

Lewisville Lake currently plays a pivotal role in availability of parks and open space in Denton County and the greater Dallas-Fort Worth Metroplex. The amount of acreage classified for Recreation (8,935) would reduce from to 4,559 acres for High Density Recreation and 542 acres for MRML-Low Density Recreation with implementation of the 2020 Master Plan. These land reclassifications reflect changes in land management and land uses that have occurred since 1985 and 2004 at Lewisville Lake as well as errors made in consolidating land classifications at the time. The conversion of these lands would have no effect on current or projected public use or visual aesthetics as views from natural and recreation areas would remain in place. Furthermore, the increase in the acreage of land classified as ESAs by 3,626 acres and the 3,268 acres of MRML – Wildlife Management will protect lands that are aesthetically pleasing and available for passive recreation activity Lewisville Lake and limit future development. All new utilities will be built along existing right of ways and existing Common Utility Corridors to limit aesthetics impacts to natural landscapes. Additionally, revised resource objectives places an emphases on increasing public education on recreation, nature, cultural resources, and ecology resources at Lewisville Lake. Therefore, under the Proposed Action, there would be no short- and long-term minor, adverse impacts to aesthetic resources as a result of implementing the 2020 MP.

3.13 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

This section describes existing conditions within the Lewisville Lake area with regard to potential environmental contamination and the sources of releases to the environment. Contaminants could enter the Lewisville Lake environment via air or water pathways. The highways and roads, marinas, and private residences in the vicinity of the lake could also provide sources of contaminants. There are 4 marinas at Lewisville Lake that provide boat fueling service. These fuel docks are regulated by the USCG with regard to spill containment and cleanup requirements. There have been no major releases of boating fuel to the lake in the past 5 years (USACE 2020). There are also numerous public campgrounds and recreation areas/parks around the lake that could contribute small amounts of hazardous materials and waste to the watershed. Illegal trash dumping on project lands by individuals and businesses is a persistent problem. USACE and area law enforcement officials work cooperatively to apprehend those responsible for illegal trash dumping.

Golf courses and numerous private residences and commercial facilities also surround the lake shores, and fertilizer and pesticide/herbicide use at those locations could contribute minor amounts of hazardous materials to the lake. Public trash and garbage pickup and disposal is provided for all properties around Lewisville Lake by commercial solid waste removal contractors (USACE 2020).

3.13.1 Alternative 1: No Action

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

3.13.2 Alternative 2: Proposed Action

The implementation of the Lewisville lake 2020 MP will allow for the management of hazardous and solid waste to be managed along with various other resource management goals, which will then allow for a directed and unified approach to managing them. The land reclassifications required to revise the Master Plan will be compatible with Lewisville Lake hazardous and toxic waste and solid waste management practices. Therefore there will be short- and long-term, negligible, beneficial impacts on hazardous, toxic, radioactive, or solid wastes as a result of implementing the 2020 MP.

3.14 HEALTH AND SAFETY

As mentioned earlier in this document, Lewisville Lake's authorized purposes include hydropower, flood risk management, water conservation, and recreation. Compatible uses incorporated in project operation management plans include conservation and fish and wildlife habitat management components. The USACE, with some assistance from the TPWD and USFWS, has established public outreach programs to educate the public on water safety and conservation of natural resources. In addition to the water safety outreach programs, the project has established recreation management practices in place to protect the public. These include safe boating and swimming regulations, safe hunting regulations, and speed limit and pedestrian signs for park roads. Lewisville Lake also has solid waste management plans in place for camping and day use areas. Lewisville Lake has personnel in place to enforce these policies, rules, and regulations during normal park hours.

3.14.1 Alternative 1: No Action

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

3.14.2 Alternative 2: Proposed Action

The implementation of the Lewisville Lake 2020 MP would result in the classification of Restricted Surface Water (82 acres) and Designated No-Wake areas (1,079 acres). These classifications maintain and, in some cases,, improve boating, non-motorized recreation, and swimming safety near the Lewisville Lake Dam, water intake structures, and key recreational water access areas such as boat ramps and designated swimming areas.

The project would continue to have reporting guidelines in place should water quality become a threat to public health. Existing regulations and safety programs throughout the Lewisville Lake project area would continue to be enforced to ensure public safety. The resource objectives make it mandatory that various factors that impacts human safety at the lake are monitored and that actions are taken to address, eliminate or reduce those factors. Additionally, the objectives place an emphasis on educating the public on water safety and on flood risk management efforts at Lewisville Lake. Therefore, under the Proposed Action, there will be short- and long-term minor, beneficial impacts on health and safety as a result of implementing the 2020 MP.

3.16 SUMMARY OF CONSEQUENCES AND BENEFITS

Table 3.8 provides a tabular summary of the consequences and benefits for the No Action and Proposed Action alternatives for each of the 15 assessed resource categories.

Table 3-8. Summary of Consequences and Benefits

Resource	Change Resulting from Lewisville Lake 2020 Master Plan	Environmental Consequences		Benefits Summary
		No Action Alternative	Proposed Action	
Land Use	No effect on private lands. Emphasis is on protection of wildlife and environmental values on USACE land and maintaining current level of developed recreation facilities.	Fails to recognize recreation trends and regional natural resource priorities.	Recognizes recreation trends and regional natural resource priorities identified by TPWD, and public comments.	Land classification changes and new resource objectives fully recognize passive use recreation trends and regional environmental values such as protection of Cross Timbers forests.
Water Resources Including: Surface Water, Groundwater, Wetlands, and Water Quality	Small change to recognize value of wetlands.	Fails to recognize the water quality benefits of good land stewardship and need to protect wetlands.	Promotes restoration and protection of wetlands and good land stewardship.	Specific resource objective promotes restoration and protection of wetlands.
Climate, Climate Change, and Greenhouse Gases	Minor change to recognize need for sustainable, energy efficient design.	Fails to promote sustainable, energy efficient design.	Promotes land management practices and design standards that promote sustainability.	Specific resource objectives promote national climate change mitigation goal. LEED standards for green design, construction, and operation activities would be employed to the extent practicable.
Air Quality	No change	No effect	No effect	No added benefit
Topography, Geology, Soils, and Prime Farmland	Minor change to place emphasis on good stewardship of land and water resources.	Fails to specifically recognize known and potential soil erosion problems.	Encourages good stewardship that would reduce existing and potential erosion.	Specific resource objectives call for stopping erosion from overuse and land disturbing activities.
Natural Resources	Moderate benefits through land reclassification and resource objectives.	Fails to recognize ESAs, and regional priorities calling for protection of wildlife habitat.	Gives full recognition of sensitive resources and regional trends and priorities related to natural resources.	Reclassification of lands included 11,188 acres of ESA and an increase in lands emphasizing wildlife management.

Resource	Change Resulting from Lewisville Lake 2020 Master Plan	Environmental Consequences		Benefits Summary
		No Action Alternative	Proposed Action	
Threatened and Endangered Species	Minor change to recognize both federal and state-listed species.	Fails to recognize current federal and state-listed species.	Fully recognizes federal and state-listed species as well as SGCN listed by TPWD and Rare species listed by TPWD.	The master plan sets forth the most recent listing of federal and state-listed species.
Invasive Species	Minor change to recognize several recent and potentially aggressive invasive species.	Fails to recognize current invasive species and associated problems.	Fully recognizes current species and the need to be vigilant as new species may occur.	Specific resource objectives specify that invasive species shall be monitored and controlled as needed.
Cultural Resources	Minor change to recognize current status of cultural resources.	Included cursory information about cultural resources that is inadequate for future management and protection.	Recognizes the presence of cultural resources and places emphasis on protection and management.	Reclassification of lands included 11,188 acres of ESA and specific resource objectives were included for protection of cultural resources.
Socioeconomics and Environmental Justice	No change	No effect	No effect	No added benefit
Recreation	Moderate benefits to outdoor recreation programs.	Fails to recognize current outdoor recreation trends.	Fully recognizes current outdoor recreation trends and places special emphasis on trails.	Specific management objectives focused on outdoor recreation opportunities and trends are included.
Aesthetic Resources	Minor benefits through land reclassification and resource objectives.	Fails to minimize activities that disturb the scenic beauty and aesthetics of the lake.	Promotes activities that limit disturbance to the scenic beauty and aesthetics of the lake.	No added benefit Specific management objectives to minimize activities that disturb the scenic beauty and aesthetics of the lake.

Resource	Change Resulting from Lewisville Lake 2020 Master Plan	Environmental Consequences		Benefits Summary
		No Action Alternative	Proposed Action	
Hazardous, Toxic, and Radioactive Wastes	Minor to moderate benefits to HTRW issues by limiting HDR usage on ESA and WM areas.	Fails to recognize current HTRW problems associated with incompatible recreation use on WM areas.	Fully recognizes compatible use activities and limits those recreational activities that would be detrimental to the designated land use classifications.	Specific management objectives focused on outdoor recreation opportunities and trends that are compatible with the designated land used classifications and limits those that are not.
Health and Safety	Minor change to promote public safety awareness.	Fails to emphasize public safety programs.	Recognizes the need for public safety programs.	Includes specific management objectives to increase water safety outreach efforts. Also, classifies 82 acres of water surface as restricted and 1,082 acres of designated no-wake for public safety purposes.

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SECTION 4: CUMULATIVE IMPACTS

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

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

4.1 PAST IMPACTS WITHIN THE ZONE OF INTEREST

Lewisville Lake was originally authorized by the Flood Control Acts of 1941 and late in 1944. Construction of the Lewisville Lake Dam began on November 28, 1948 and was completed in August 1955. Deliberate impoundment began on November 1, 1954. The total project area at Lewisville Lake encompasses 47,137 acres, including the 27,175 (based on 2007 Volumetric Survey) acres of surface water at normal pool elevation of 522.0 NGVD29. The entire 46,001 acres were acquired in fee simple title by USACE with perpetual Flowage Easements on an additional 8,712 acres up to elevation 537.0 NGVD29. Since the building of Lewisville Dam, the area around Lewisville Lake has seen great transformation, from mostly an agrarian area with ranch homes in abundance to now being fully urbanized with a few tall apartment complexes dotting the region.

Within Lewisville Lake there has been 3 projects that have modified the structures and operations Lewisville Lake for the purpose of improving the environment in the public interest. These projects are governed by Section 1135 of the 1986 Water Resources Development Act, as amended and are summarized below.

- Stewart Creek. This 268-acre parcel of land is located on the east side of the lake and includes the headwaters of Stewart Creek located on USACE fee property. The area consists of a riparian corridor and is adjacent to residential development upstream. Protection and potential restoration of the area are a priority maintaining the area as a visual and esthetic buffer are important for this area. The area is managed by USACE. The project involved construction of shallow marsh areas and restoration of riparian hardwoods. The restoration work involved construction of several wetland cells and the planting of old agricultural

fields with several species of bottomland hardwood trees. Frisco envisions maintaining natural surface trails and wildlife observation facilities on the leased premises when a lease is promulgated.

- Hackberry Creek. This 25-acre area is located on the headwaters of Hackberry Creek where it enters Lewisville Lake on the west side of FM 423. This location was included in the Frisco Section 1135 Environmental Restoration Project. The work along Hackberry Creek consisted of construction of shallow wetland cells that were planted with beneficial aquatic plants.
- Greenbelt Corridor and City of Denton Wetland Complex. This area of 3,124 acres north of HWY 380 encompasses periodically flooded areas of the Elm Fork of the Trinity River. It includes mature bottomland hardwoods, mature riparian corridor, and constructed shallow water wetlands managed by the City of Denton. TPWD manages the narrow portion of this area known as the Greenbelt Corridor.

Lewisville Lake was initially built to provide a stable supply of water and for flood control. The flood damages prevented in the Elm Fork Trinity River basin by Lewisville Dam and Lake during fiscal year 2015 were estimated to be \$3,616,516,200. The cumulative damages prevented since the completion of the project in 1955 through 2015 are \$35,276,767,800, and the average is \$578 million per year. Lewisville Lake has a spillway that once waters reaches to the top it will uncontrollably spill over into the downstream area. Homes and businesses downstream may be flooded by this water as well as from the cumulated water from other creeks, rivers, and lakes. However, homes and businesses that do not cross the flowage easements are not as likely to be flooded around Lewisville Lake.

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

Future management of the 5,746 acres of Flowage Easement Lands at Lewisville Lake includes routine inspection of these areas to ensure that the Government's rights specified in the easement deeds are protected. In almost all cases, the Government acquired the right to prevent placement of fill material or habitable structures on the easement area. Placement of any structure that may interfere with the USACE flood risk management and water conservation missions may also be prohibited.

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 2040 plan was used as a reference document for this Master Plan. Items recommended for implementation in the Mobility 2040 plan that are of significance to the area surrounding Lewisville Lake include the following:

- Construct new road for I-35E, a regionally important arterial roadway, with a to be determined date (TBD)
- Repair FM 423, a regionally important arterial roadway, with a TBD date

- Repair FM 720, a minor arterial roadway, with a TBD date
- Construct new road for US 380, a regionally important arterial roadway, with a TBD date

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.

Ongoing and future construction activities on Lewisville Lake Dam and associated structures includes embankment modifications such as seepage collection systems and earthen berms. Additional modifications to the concrete river outlet structure is also occurring.

Due to safety concerns, there will be no LLELA visitor access within the construction site east of the river in 2020. This will include fishermen using the east bank access and hiker use of the Bittern Marsh Trail. The City of Lewisville staff will continue maintenance of the Bittern Marsh Trail throughout construction, but it will not be available to visitors. All other LLELA hiking trails will remain open for the majority of the dam modification construction, and most programs and activities will continue with minor modifications.

Embankment work on the dam is scheduled for completion in February 2021, barring weather delays. The second and third contracts are for work on the auxiliary spillway at the far-east end of the dam, and for restoration of borrow areas associated with the first two contracts. Both of these projects are expected to be completed in early 2027.

4.3 ANALYSIS OF CUMULATIVE IMPACTS

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

4.3.1 Land Use

A major impact would occur if any action is inconsistent with adopted land use plans or if an action would substantially alter those resources required for, supporting, or benefiting the current use. Land use around Lewisville Lake has experienced little

change since it is almost all urbanized. Under the No Action Alternative, land use would not change. Although the Proposed Action would result in the reclassification of project lands, the reclassifications were developed to help fulfill regional goals associated with good stewardship of land resources that would allow for continued use of project lands.

Section 6.1 of the 2020 Master Plan also identifies the location of existing Common Utility Corridors as well as those to be removed (4 in total). The purpose of utility corridors is to condense the footprint and associate impacts of any future roads and utilities crossings on USACE lands. The removal is not anticipated to have cumulative impacts on land use in the region. Therefore, cumulative impacts on land use within the area surrounding Lewisville Lake, when combined with past and proposed actions in the region, are anticipated to be negligible.

4.3.2 Water Resources

A major impact would occur if any action is inconsistent with adopted surface water classifications or water use plans, or if an action would substantially alter those resources required for, supporting, or benefiting the current use. Lewisville Lake was developed for flood risk management, water conservation, hydropower, fish and wildlife, and recreation purposes. The reclassifications and resource objectives required to revise the Lewisville Lake MP are compatible with water use plans and surface water classification; further, they were developed to help fulfill regional goals associated with good stewardship of water resources that would allow for continued use of water resources associated with Lewisville Lake. Therefore, cumulative impacts on water resources within the area surrounding Lewisville Lake, when combined with past and proposed actions in the region, are anticipated to be negligible.

4.3.3 Climate, Climate Change and GHG

Under the Proposed Action, Lewisville Lake project management plans and monitoring programs would reflect the changes in land classifications and resource objectives. In the event that GHG emission issues become significant enough to impact the current operations at Lewisville Lake, the 2020 Master Plan and all associated documents would be reviewed and revised as necessary. Therefore, implementation of the 2020 Master Plan, when combined with other existing and proposed projects in the region, would result in negligible cumulative impacts on climate, climate change, and GHG.

4.3.4 Air Quality

There are a few major highway and roadway projects that are scheduled near the zone of interest for Lewisville Lake; therefore, increasing the amount of new emissions that could potentially affect air quality within the region. The Proposed Action would not adversely impact air quality within the area. Vehicle traffic along park and area roadways and routine daily activities in nearby communities contribute to current and future emission sources; however, the impacts associated with the reclassification of lands would be negligible. Seasonal prescribed burning could occur on Lewisville Lake and would have minor, short-term, adverse impacts on air quality; however, these seasonal burns would be scheduled to limit air quality impacts in accordance with local and state regulations. Implementation of the 2020 Master Plan, when combined with

other existing and proposed projects in the region, could result in negligible cumulative impacts on air quality.

4.3.5 Topography, Geology, and Soils

A major impact would occur if the action exacerbates or promotes long-term erosion, if the soils are inappropriate for the proposed construction and would create a risk to life or property, or if there would be a substantial reduction in agricultural production or loss of Prime Farmland soils. Cumulative impacts on topography, geology, and soils within the area surrounding Lewisville Lake, when combined with past and proposed actions in the region, are anticipated to be negligible.

4.3.6 Natural Resources

By implementing the 2020 MP, the required reclassifications, resource objectives, and resource plan would allow land management and land uses to be compatible with the goals of good stewardship of natural resources. The Proposed Action would allow project lands to continue supporting USFWS, TPWD, and LLELA missions associated with wildlife conservation and implementation of operational practices that would protect and enhance wildlife and fishery populations and habitat. In addition, the Proposed Action would be compatible with conservation principles and measures to protect migratory birds as mandated by EO 13186. Long-term, beneficial impacts on natural resources could occur as a result of implementing the reclassifications outlined in the 2020 MP. Therefore, implementation of the 2020 MP, when combined with other existing and proposed projects in the region, would result in minor to moderate beneficial cumulative impacts on natural resources in the Lewisville Lake area.

4.3.7 Threatened and Endangered Species

Under the Proposed Action, the USACE would continue cooperative management plans with USFWS, TPWD, and LLELA to preserve, enhance, and protect wildlife habitat resources. To further management opportunities and beneficially impact habitat diversity, the reclassifications, resources objectives, and resource plan in the Lewisville Lake 2020 MP include 11,188 acres as ESAs and 3,268 acres as MRML- Wildlife Management Lands. Therefore, implementation of the 2020 MP, when combined with other existing and proposed projects in the region, would result in minor to moderate beneficial, cumulative impacts for threatened and endangered species as the natural areas at the lake provide some of the last, large patches of natural habitat in the region.

4.3.8 Invasive Species

The Proposed Action would have beneficial impacts on native species as a result of programs such as the Lewisville Lake hunting program, which encourages hunters to harvest feral hogs during legal seasons. Lewisville Lake currently also implements the Lewisville Lake Invasive Species Management program and would continue to do so regardless of the Proposed Action. Therefore, implementation of the 2020 Master Plan, when combined with other existing and proposed projects in the region, would not result in adverse cumulative impacts on native species as a result of invasive species control efforts. Beneficial cumulative impacts would occur on native species through implementation of the 2020 Master Plan and other programs within the region supported by agencies such as TPWD and USFWS.

4.3.9 Cultural, Historical, and Archaeological Resources

The Proposed Action would not affect cultural resources or historic properties, as the master plan revision does not involve any ground disturbing activities. However, ESA and MRML-WM lands provide additional protection against ground disturbances. Additionally, the existing utility corridors would restrict any future pipelines, roads, or other infrastructure to already disturbed areas, further limiting impacts on cultural resources. Therefore, this action, when combined with other existing and proposed projects in the region, would not result in adverse cumulative impacts on cultural resources or historic properties.

4.3.10 Socioeconomics and Environmental Justice

The Proposed Action would not result in the displacement of persons (minority, low-income, children, or otherwise) as a result of implementing the reclassifications, resources objectives, and resource plan in the Lewisville Lake 2020 MP. Therefore, the effects of the Proposed Action on environmental justice and the protection of children, when combined with other ongoing and proposed projects in the Lewisville Lake area, would have no cumulative effect.

4.3.11 Recreation

Lewisville Lake provides regionally significant outdoor recreation benefits including a variety of free recreation opportunities. Even though the amount of acreage available for High Density Recreation and Low Density Recreation will decrease as a result of implementing the reclassifications, resources objectives, and resource plan in the Lewisville Lake 2020 MP, these changes reflect changes in land management and historic recreation use patterns that have occurred since 1985 at Lewisville Lake as well as errors made in consolidating land classifications at the time. The conversion of these lands would have no effect on current or projected public use. Therefore, the Proposed Action, when combined with other existing and proposed projects in the region, would result in negligible to minor beneficial cumulative impacts on area recreational resources as Lewisville Lake would continue to provide large outdoors spaces for recreation activities.

4.3.12 Aesthetic Resources

No adverse impacts on aesthetic resources would occur as a result of implementing the reclassifications and resources objectives in the Lewisville Lake 2020 MP. The Proposed Action, especially the classification of ESAs, in conjunction with other projects in the region, would result in minor beneficial cumulative impacts on the aesthetic resources in the Lewisville Lake area as these areas would receive increased protection in a region experiencing substantial urban development.

4.3.13 Hazardous, Toxic, and Radioactive Waste

No hazardous, toxic, and radioactive waste concerns would be expected with implementation of the 2020 Master Plan; therefore, when combined with other ongoing and proposed projects in the Lewisville Lake area, there would be no cumulative effects on hazardous materials and solid waste.

4.3.14 Health and Safety

No health or safety risks would be created by the Proposed Action. The effects of implementing the 2020 Master Plan, when combined with other ongoing and proposed projects in the Lewisville Lake area, would have no cumulative effect. Existing water safety rules and law enforcement would continue into the future.

SECTION 5: COMPLIANCE WITH ENVIRONMENTAL LAWS

This EA has been prepared to satisfy the requirements of all applicable environmental laws and regulations, and has been prepared in accordance with the CEQ's implementing regulations for NEPA, 40 CFR Parts 1500 – 1508, and the USACE ER 200-2-2, *Environmental Quality: Procedures for Implementing NEPA*. The revision of the Lewisville Lake 2020 MP is consistent with the USACE's Environmental Operating Principles. The following is a list of applicable environmental laws and regulations that were considered in the planning of this project and the status of compliance with each:

Fish and Wildlife Coordination Act of 1958, as amended – The USACE initiated public involvement and agency scoping activities to solicit input on the Lewisville Lake 2020 MP revision process, as well as identify reclassification proposals, and identify significant issues related to the Proposed Action. Information provided by USFWS and TPWD on fish and wildlife resources has been utilized in the development of the 2020 MP.

Endangered Species Act of 1973, as amended – Current lists of threatened or endangered species were compiled for the Lewisville Lake 2020 MP. There would be no adverse impacts on threatened or endangered species resulting from the implementation of the Lewisville Lake 2020 MP. However, beneficial impacts, such as habitat protection, could occur as a result of the implementation of the Lewisville Lake 2020 MP. The analysis for this was done in section 3.7 of the EA.

Executive Order 13186 (Migratory Bird Habitat Protection) – Sections 3a and 3e of EO 13186 direct federal agencies to evaluate the impacts of their actions on migratory birds, with emphasis on species of concern, and inform the USFWS of potential negative impacts on migratory birds. The Lewisville Lake 2020 MP would not result in adverse impacts on migratory birds or their habitat. Beneficial impacts could occur through protection of habitat as a result of the Lewisville Lake 2020 MP. The analysis for this was done in section 3.6 of the EA.

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

CWA of 1977 – The Proposed Action is in compliance with all state and federal CWA regulations and requirements and is regularly monitored by the USACE and TCEQ for water quality. A state water quality certification pursuant to Section 401 of the CWA is not required for the Lewisville Lake 2020 MP. There would be no change in the existing

management of the reservoir that would impact water quality. The analysis for this was done in section 3.2 of the EA.

National Historic Preservation Act (NHPA) of 1966, as amended – Compliance with the NHPA of 1966, as amended, requires identification of all properties in the project area listed in, or eligible for listing in, the NRHP. All previous surveys and site salvages were coordinated with the Texas State Historic Preservation Officer. Known sites are mapped and avoided by maintenance activities. Areas that have not undergone cultural resources surveys or evaluations would need to do so prior to any earthmoving or other potentially impacting activities. The analysis for this was done in section 3.9 of the EA.

Clean Air Act of 1977 – The USEPA established nationwide air quality standards to protect public health and welfare. Existing operation and management of the reservoir is compliant with the Clean Air Act and would not change with the Lewisville Lake 2020 MP. The analysis for this was done in section 3.4 of the EA.

Farmland Protection Policy Act (FPPA) of 1980 and 1995 – The FPPA's purpose is to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses. There are Prime Farmland and farmland of state importance on Lewisville Lake project lands, but these would not be significantly impacted. The analysis for this was done in section 3.5 of the EA.

Executive Order 11990, as amended, Protection of Wetlands – EO 11990 requires federal agencies to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in executing federal projects. The Proposed Action complies with EO 11990. The analysis for this was done in section 3.2 of the EA.

Executive Order 11988, as amended, Floodplain Management – This EO directs federal agencies to evaluate the potential impacts of proposed actions in floodplains. The operation and management of the existing project complies with EO 11988. The analysis for this was done in section 3.2 of the EA.

Executive Order 13751, Invasive Species – This EO directs executive departments and agencies to take steps to prevent the introduction and spread of invasive species, and to support efforts to eradicate and control invasive species that are established. The Proposed Action complies with EO 13751. The analysis for this was done in section 3.8 of the EA.

CEQ Memorandum dated August 11, 1980, Prime or Unique Farmlands – Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses. The Proposed Action would not impact Prime Farmland present on Lewisville Lake project lands. The analysis for this was done in section 3.5 of the EA.

Executive Order 12898, Environmental Justice – This EO directs federal agencies to achieve environmental justice to the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review. Agencies are required to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.

The implementation of the Lewisville Lake 2020 MP would not result in a disproportionate adverse impact on minority or low-income population groups. The analysis for this was done in section 3.10 of the EA.

SECTION 6: IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES

NEPA requires that federal agencies identify “any irreversible and irretrievable commitments of resources which would be involved in the Proposed Action should it be implemented” (42 U.S.C. § 4332). An irreversible commitment of resources occurs when the primary or secondary impacts of an action result in the loss of future options for a resource. Usually, this is when the action affects the use of a nonrenewable resource or it affects a renewable resource that takes a long time to renew. The impacts for this project from the reclassification of land would not be considered an irreversible commitment because subsequent MP revisions could result in some lands being reclassified to a prior, similar land classification. An irretrievable commitment of resources is typically associated with the loss of productivity or use of a natural resource (e.g., loss of production or harvest). No irreversible or irretrievable impacts on federally protected species or their habitat is anticipated from implementing the Lewisville Lake 2020 MP.

SECTION 7: PUBLIC AND AGENCY COORDINATION

In accordance with 40 CFR §§1501.7, 1503, and 1506.6, the USACE initiated public involvement and agency scoping activities to solicit input on the 2020 Master Plan revision process, as well as identify reclassification proposals, and identify significant issues related to the Proposed Action. The USACE began its public involvement process with a public scoping meeting to provide an avenue for public and agency stakeholders to ask questions and provide comments. Public scoping meetings were respectively held on 2 and 4 July 2017 at the Armed Forces Reserve Center, 1860 Summit Avenue, Lewisville Texas and at 400 Lobo Lane, Little Elm, Texas. The USACE, Fort Worth District, placed advertisements on the USACE webpage, social media, and print publications prior to the public scoping meeting.

Because of the COVID-19 virus pandemic and concerns over public safety, the draft release for public comment and information meeting to present the draft of 2020 Master Plan was cancelled and replaced with an online video and other information resources that summarizes the Master Plan and posted on the Fort Worth District website. Public comments on the draft 2020 MP and EA were accepted until June 22, 2020.

As with the first public meeting, USACE, Fort Worth District, placed advertisements on the USACE webpage, social media, and print publications. Attachment A includes, public notices, and news releases, and media coverage of the project. The EA was coordinated with agencies having legislative and administrative responsibilities for environmental protection. A copy of the correspondence from the agencies that provided comments and planning assistance for preparation of the EA is also included in Attachment A. Please refer to Section 7.2 of the 2020 Master Plan for a summary of comments received at the public meetings.

SECTION 8: REFERENCES

- Council on Environmental Quality (CEQ). 2005. Executive Office of the President. *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act.*
- CEQ, 2015. Executive Office of the President. *Revised Draft Guidance for Greenhouse Gas Emissions and Climate Change Impacts.*
- NOAA, National Weather Service Forecast Office. 2020. First/Last Occurrence. Min Temp. Summary for DALLAS FAA AP, TX from 2000 to 2020. Retrieved from <https://w2.weather.gov/climate/xmacis.php?wfo=fwd>
- Natural Resources Conservation Service (NRCS). 2018. Custom Soil Resource Report for Denton County, Texas. Retrieved from <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>
- TCEQ. 2020A. Dallas-Fort Worth: Current Attainment Status. Available on the internet at: <https://www.tceq.texas.gov/airquality/sip/dfw/dfw-status>
- TCEQ. 2020B. 2020 Texas Integrated Report - Texas 303(d) List. Available on the internet at: https://www.tceq.texas.gov/assets/public/waterquality/swqm/assess/16txir/2016_303d.pdf
- Texas Department of State Health Services (DSHS). 2019. Fish Consumption Advisory Viewer <https://dshscpd.maps.arcgis.com/apps/View/index.html?appid=2a02cfc25e1d49a880385fd5c561f201>
- Texas Department of Transportation (TXDOT). 2016. Planned Projects for 2016. Internet URL: <http://ftp.dot.state.tx.us/pub/txdot-info/tpp/rider14j/planned-projects.pdf>
- Texas Natural Diversity Database (TXNDD). 2020. Element Occurrence data export. Wildlife Diversity Program of Texas Parks & Wildlife Department. 4 Aug 2020.
- Texas Parks and Wildlife Department (TPWD). 2012. Texas Outdoor Recreation Plan. 2012 Statewide Comprehensive Outdoor Recreation Plan (TORP/SCORP). TPWD, State Parks Division. https://tpwd.texas.gov/business/grants/pwd_rp_p4000_1673_TORP.pdf
- TPWD. 2012. Texas Conservation Action Plan 2012 – 2016: Statewide/Multi-region Handbook. https://tpwd.texas.gov/huntwild/wild/wildlife_diversity/nongame/tcap/

- TPWD. 2018. Landscape Ecology Program: Ecological Mapping Systems
<https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/>
- TPWD. 2020. Rare, Threatened, and Endangered Species of Texas. Denton County.
 Created on October 22,2020. <https://tpwd.texas.gov/gis/rtest/>
- USACE. 1988. *Engineering Regulation*
200-2-2, Procedures for Implementing NEPA. Washington, DC.
- USACE. 2018. Lewisville Dam and Lake Water Control Manual.
- USACE. 2020. Lewisville Lake 2020 Master Plan.
- U.S. Bureau of Labor Statistics. 2015a. Local Area Unemployment Statistics. Labor
 Force Data by County, 2014 Annual Averages. Internet URL:
<http://www.bls.gov/lau/>
- U.S. Bureau of Labor Statistics. 2015b. Local Area Unemployment Statistics,
 Unemployment Rates for States. Internet URL:
<http://www.bls.gov/lau/lastrk14.htm>
- U.S. Census Bureau. 2000. 2000 Decennial Census. Accessed through
<http://factfinder2.census.gov/>
- U.S. Census Bureau. 2014. Projections of the Population and Components of Change
 for the United States: 2015 to 2060. Internet URL:
<https://www.census.gov/population/projections/data/>
- U.S. Census Bureau. 2015a. American Community Survey, 5-Year Estimates, 2010-
 2014. DP05: ACS Demographic and Housing Estimates. Accessed through
<http://factfinder2.census.gov/>
- U.S. Census Bureau. 2015b. American Community Survey, 5-Year Estimates, 2010-
 2014. S1501: Educational Attainment. Accessed through
<http://factfinder2.census.gov/>
- U.S. Census Bureau. 2015c. American Community Survey, 5-Year Estimates, 2010-
 2014. DP03: Selected Economic Characteristics. Accessed through
<http://factfinder2.census.gov/>
- U.S. Census Bureau. 2015d. State and County QuickFacts. Internet URL:
<http://quickfacts.census.gov/qfd/index.html>
- U.S Climate Data. 2019. Climate Denton – Texas. Available on the internet at
<https://www.usclimatedata.com/climate/denton/texas/united-states/ustx1505>
- U.S. Environmental Protection Agency (USEPA). 2016. 2014 Greenhouse Gas
 Emissions from Large Facilities. All Facilities, Collin County, Texas. Internet
 URL:
<http://ghgdata.epa.gov/ghgp/main.do#/facility/?q=Find%20a%20Facility%20or%20Location&st=TX&fc=48085&bs=&et=&fid=&sf=11001000&lowE=0&highE=23000000&g1=1&g2=1&g3=1&g4=1&g5=1&g6=0&g7=1&g8=1&g9=1&g10=1&s1=1&>

s2=1&s3=1&s4=1&s5=1&s6=1&s7=1&s8=1&s9=1&s10=1&s201=1&s202=1&s203=1&s204=1&s301=1&s302=1&s303=1&s304=1&s305=1&s306=1&s307=1&s401=1&s402=1&s403=1&s404=1&s405=1&s601=1&s602=1&s701=1&s702=1&s703=1&s704=1&s705=1&s706=1&s707=1&s708=1&s709=1&s710=1&s711=1&s801=1&s802=1&s803=1&s804=1&s805=1&s806=1&s807=1&s808=1&s809=1&s810=1&s901=1&s902=1&s903=1&s904=1&s905=1&s906=1&s907=1&s908=1&s909=1&si=&ss=&so=0&ds=E&yr=2014&tr=current&cyr=2014&rs=ALL.

US Fish & Wildlife Service (USFWS). 2017. Interior Least Tern Fact Sheet.
<https://www.fws.gov/midwest/Endangered/birds/leasttern/IntLeastTernFactSheet.html>

USWS. 2018B. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. <http://www.fws.gov/wetlands/>

USFWS. 2020. IPAC: Information, Planning, and Consultation System, Environmental Conservation Online System. Official Species List. Event Code: 02ETAR00-2021-E-00352; Consultation Code: 02ETAR00-2018-SLI-0485
Created on December 28, 2020. <https://ecos.fws.gov>.

U.S. Geological Survey (USGS). 2014. Texas 2014 Seismic Hazard Map, available online at: earthquake.usgs.gov/earthquakes/states/texas/hazards.php

SECTION 9: ACRONYMS/ABBREVIATIONS

%	Percent
°	Degrees
BMP	Best Management Practice
BP	Before Present
CAP	Climate Action Plan
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CO ₂ e	CO ₂ -equivalent
CWA	Clean Water Act
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EP	Engineer Pamphlet
ER	Engineer Regulation
ERS	Environmental Radiation Surveillance
ESA	Environmentally Sensitive Area
F	Fahrenheit
FAA	Federal Aviation Administration
FONSI	Finding of No Significant Impact
GHG	Greenhouse Gas
LLELA	Lewisville Lake Environmental Learning Area
MRML	Multiple Resource Management Lands
msl	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO	Nitrogen Oxide
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRRS	National Recreation Reservation Service
O ₃	Ozone
OAQPS	Office of Air Quality Planning and Standards
Pb	Lead
PCB	Polychlorinated Biphenyls
PCPI	Per Capita Personal Incomes
PM _{2.5}	Particulate Matter Less than 2.5 Microns
PM ₁₀	Particulate Matter Less than 10 Microns
ROD	Record of Decision
RPEC	Regional Planning and Environmental Center
SGCN	Species of Greatest Conservation Need
SO ₂	Sulfur Dioxide

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

SECTION 10: LIST OF PREPARERS

Marcia Hackett – Environmental Resources Planner, Regional Planning and Environmental Center: 21 years of USACE experience.

Brandon Wadlington - Biologist, Regional Planning and Environmental Center; 5 years of USACE experience.

Paul E. Roberts-Biologist, Regional Planning and Environmental Center; 5 years of USACE experience.

ATTACHMENT A: NEPA COORDINATION AND PUBLIC SCOPING



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

April 22, 2020

Notice of Availability

**Lewisville Lake Master Plan Revision, Lewisville Lake, Trinity River Basin,
Denton County, Texas**

The Fort Worth District, U.S. Army Corps of Engineers (USACE), hereby informs the public of the availability of the draft revised Lewisville Lake Master Plan. The draft revised master plan, an explanation of the revision process, and instructions for public participation in the revision are available at the following website: <https://www.swf.usace.army.mil/About/Lakes-and-Recreation-Information/Master-Plan-Updates/>. The website provides a brief presentation describing the revision process, a copy of the current 1985 master plan as well as a 2004 master plan supplement that includes a map of the current land use classifications. A comment form and instructions for submitting comments to USACE can be found at the website. The public involvement process will be conducted online in lieu of face-to-face workshops until the COVID-19 virus pandemic subsides. All members of the public are encouraged to submit written comments and suggestions before 22 June 2020.

Key topics to be addressed in the revised master plan include revised land classifications, new natural, cultural and recreational resource management objectives, recreation facility needs, and special topics such as utility corridors and trail opportunities. Revision of the master plan will not address in detail the technical operational aspects of the reservoir related to the water supply or flood risk management missions of the project, nor does the master plan address in detail the Shoreline Management Plan that sets forth policy and rules governing private activities such as boat docks or vegetation modification.

The master plan is a vital tool produced and used by USACE to guide the responsible stewardship of USACE-administered lands and resources for the benefit of present and future generations. Public participation is critical to the successful revision of the master plan and is strongly encouraged.

Questions on the proposed revision can be emailed to Lewisville-MP@usace.army.mil, or mailed to Don Wiese: Project Manager, CESWF-PEC-TM, U.S. Army Corps of Engineers, Regional Planning and Environmental Center, Fort Worth District, P.O. Box 17300, Fort Worth, TX 76102-0300.

Sincerely,

MCGUIRE.AMAND
A.M.1399923332

Digitally signed by
MCGUIRE.AMAND.A.M.139992333
Date: 2020.04.21 15:23:14 -05'00'

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

Home > Community > Corps to host public meetings for the Lewisville Lake Master Plan revision

Community

Corps to host public meetings for the Lewisville Lake Master Plan revision

by Submitted Reports - April 11, 2017 727 0

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An access road leads down the upstream side of the Lewisville Lake dam from just east of the flood gates. (Photo by Christina Ulah)

U.S. Army Corps of Engineers representatives will host public meetings on May 2 and May 4 to provide information and receive public input on an initiative to revise the Master Plan for Lewisville Lake.

The meetings will be identical and held at two separate locations for public convenience. The May 2 meeting will be held at the Armed Forces Reserve Center, 1860 Summit Avenue. The May 4 meeting will be at the Lakeside Middle School auditorium, 400 Lobo Lane. Both meetings will have a formal presentation beginning at 6 p.m., followed by an open house forum for individual one-on-one discussion with Corps representatives. The public can view maps, ask questions and provide comments about the project. Comment forms and instructions for making comments will be provided at the meeting. The formal presentation to be used at the meetings will be available shortly before the meeting on the USACE website.

The current Master Plan for Lewisville Lake was completed in June 1985 to address the land management needs stemming from the permanent increase in the normal or conservation pool elevation from 515 feet above mean sea level to 522 feet. A major supplement to the Master Plan was completed in May 2004 to address needed land classification changes and establish utility corridors. The Master Plan is in need of revision to address changes in regional land use, population, outdoor recreation trends and national USACE management policy. Key topics to be addressed in the revised Master Plan include revised land classifications, revised natural and recreational resource management objectives, utility corridors, recreation facility needs and special topics such as invasive species management. Public participation is critical to the successful revision of the Master Plan.

Questions pertaining to the proposed revision can be addressed to Donald Wiese at 817-886-1568 or donald.n.wiese@usace.army.mil.

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Little Elm News Flash

Posted on: June 1, 2017

Army Corps of Engineers set meeting on lake master plan

LITTLE ELM (April 24, 2017) Based on the close relationship Little Elm residents enjoy with Lewisville Lake, the US Army Corps of Engineers (USACE) has scheduled a public meeting in Town to share information and to gather comments in anticipation of revising the lake's master plan.

Representatives of the Fort Worth District of USACE will host the meeting on Thursday, May 4 in the auditorium of Lakeside Middle School, 400 Lobo Lane, starting at 6 p.m. The meeting will open with a presentation by USACE, followed by opportunities for attendees to ask questions, review maps and provide comments.

Residents will be asked to comment on the section of the master plan that addresses recreational, natural and cultural aspects of the lake and the lake's immediate surroundings that fall under USACE administration.

The Little Elm meeting follows an identical meeting in Lewisville on May 2. At both meetings, comment forms as well as instructions on how to submit comments following the meetings will be provided. The presentation to be used at the two meetings will be available on the USACE.

Among the topics that will not be addressed by the presentation and for which public comments are not sought are the technical operation of the lake and its maintenance; the lake's water supply; flood risk management; the Shoreline Management Plan; private docks; and vegetation modification of public land by adjacent landowners.

The current master plan is over 30 years old, and requires updating because of changes in regional land use, population, outdoor recreation trends and national USACE management policy changes. Plan revisions will address land classifications, new natural and recreational management objectives, utility corridors, recreation facility needs and invasive species management.

Questions on the process can be addressed to Donald Wiese at Donald.n.wiese@usace.army.mil or by calling 817-886-1568.

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US Army Corps of Engineers
BUILDING STRONG®

Corps to host public meetings for the Lewisville Lake Master Plan revision

Posted 4/6/2017

Release no. 17-007

Contact

Edward Rivera 817-886-1313

edward.rivera@usace.army.mil

819 Taylor Street, Fort Worth, Texas 76102

FORT WORTH, Texas – Fort Worth District, U.S. Army Corps of Engineers representatives will host public meetings on May 2 and May 4 to provide information and receive public input on an initiative to revise the Master Plan for Lewisville Lake.

The meetings will be identical and are being held at two separate locations for public convenience.

The May 2 meeting will be held at the Armed Forces Reserve Center, 1860 Summit Avenue, Lewisville, Texas. The May 4 meeting will be at the Lakeside Middle School auditorium, 400 Lobo Lane, Little Elm, Texas. Both meetings will have a formal presentation beginning at 6 p.m., followed by an open house forum for individual one-on-one discussion with Corps representatives. The public can view maps, ask questions and provide comments about the project. Comment forms and instructions for making comments will be provided at the meeting. The formal presentation to be used at the meetings will be available shortly before the meeting on the USACE website at:

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

A Master Plan is defined by the Corps as the strategic land use management document that guides the comprehensive management and development of all recreational, natural, and cultural resources throughout the life of the water resource development project. In general, it defines “how” the resources will be managed for public use and resource conservation. Revision of the Master Plan will not address in detail the technical operational aspects of the reservoir related to the water supply or flood risk management missions of the project, nor will it address the Shoreline Management Plan which governs private docks and vegetation modification of public land by adjacent landowners. The Master Plan study area will include Lewisville Lake proper and all adjacent recreational and natural resources properties under Corps administration.

The current Master Plan for Lewisville Lake was completed in June 1985 to address the land management needs stemming from the permanent increase in the normal or conservation pool elevation from 515.0 feet above mean sea level to 522.0 feet. A major supplement to the Master Plan was completed in May 2004 to address needed land classification changes and establish utility corridors. The Master Plan is in need of revision to address changes in regional land use, population, outdoor recreation trends and national USACE management policy. Key topics to be addressed in the

revised Master Plan include revised land classifications, revised natural and recreational resource management objectives, utility corridors, recreation facility needs and special topics such as invasive species management. Public participation is critical to the successful revision of the Master Plan. Questions pertaining to the proposed revision can be addressed to: Donald Wiese, CESWF-PEC-TP, U.S. Army Corps of Engineers, Fort Worth District, P.O. Box 17300, Fort Worth, TX 76102-0300, Phone: (817) 886-1568 or email: donald.n.wiese@usace.army.mil.

-30-

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

APPENDIX C – Wildlife Documents

IPaC Report

TPWD -SGCN List

TPWD Rare Species Listing

WHAP Report

Last login December 28, 2021 06:21 AM MST

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

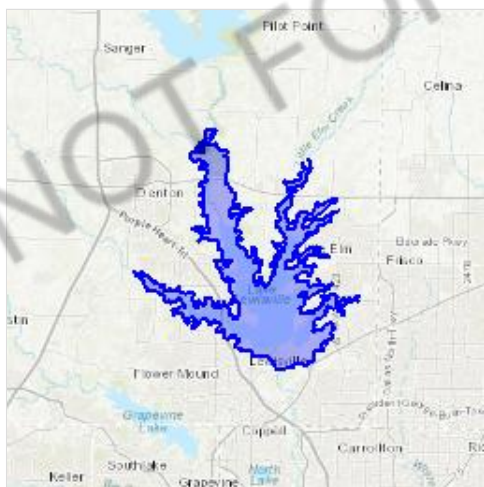
Project information

NAME

Lewisville Lake Masterplan Revision

LOCATION

Denton County, Texas



DESCRIPTION

The Lewisville Master Plan (Denton County, Texas) is the long-term strategic land use management document that guides the comprehensive management and development of all the project's recreational, natural, and cultural resources within the federal fee boundary. Under the guidance of ER-1130-2-550 Change 7, the Plan guides the efficient and cost-effective development, management, and use of project lands. It is a dynamic tool that provides for the responsible stewardship and sustainability of the project's resources for the benefit of present and future

generations. The Plan works in tandem with the Operational Management Plan (OMP), which is the implementation tool for the resource objectives and development needs identified in the Master Plan. The Master Plan guides and articulates the USACE responsibilities pursuant to federal laws. Efforts are under way to revise the current Lake Master Plan. The Master Plan revision will update land classifications, plan for the modernization of existing parks, and inform the management of wildlife and other resource lands within USACE managed property at Lewisville Lake for the next 25 years

Local office

Arlington Ecological Services Field Office

☎ (817) 277-1100

📠 (817) 277-1129

2005 Ne Green Oaks Blvd

Suite 140

Arlington, TX 76006-6247

<http://www.fws.gov/southwest/es/arlingontexas/>

<http://www.fws.gov/southwest/es/EndangeredSpecies/lists/>

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species¹ and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries²).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information.
2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Birds

NAME	STATUS
------	--------

Least Tern *Sterna antillarum*

Endangered

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/8505>

Piping Plover *Charadrius melodus*

Threatened

This species only needs to be considered if the following condition applies:

- Wind Energy Projects

There is **final** critical habitat for this species. Your location is outside the critical habitat.

<https://ecos.fws.gov/ecp/species/6039>

Red Knot *Calidris canutus rufa*

Threatened

This species only needs to be considered if the following condition applies:

- Wind Energy Projects

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/1864>

Whooping Crane *Grus americana*

Endangered

There is **final** critical habitat for this species. Your location is outside the critical habitat.

<https://ecos.fws.gov/ecp/species/758>

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

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

NAME

BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)

American Golden-plover *Pluvialis dominica*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds elsewhere

Bald Eagle *Haliaeetus leucocephalus*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

<https://ecos.fws.gov/ecp/species/1626>

Breeds Sep 1 to Jul 31

Buff-breasted Sandpiper *Calidris subruficollis*

Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/9488>

Harris's Sparrow *Zonotrichia querula*

Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Henslow's Sparrow *Ammodramus henslowii*

Breeds May 1 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/3941>

Lesser Yellowlegs *Tringa flavipes*

Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/9679>

Marbled Godwit *Limosa fedoa*

Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/9481>

Red-headed Woodpecker *Melanerpes erythrocephalus*

Breeds May 10 to Sep 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Semipalmated Sandpiper *Calidris pusilla*

Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Sprague's Pipit *Anthus spragueii*

Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/8964>

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

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

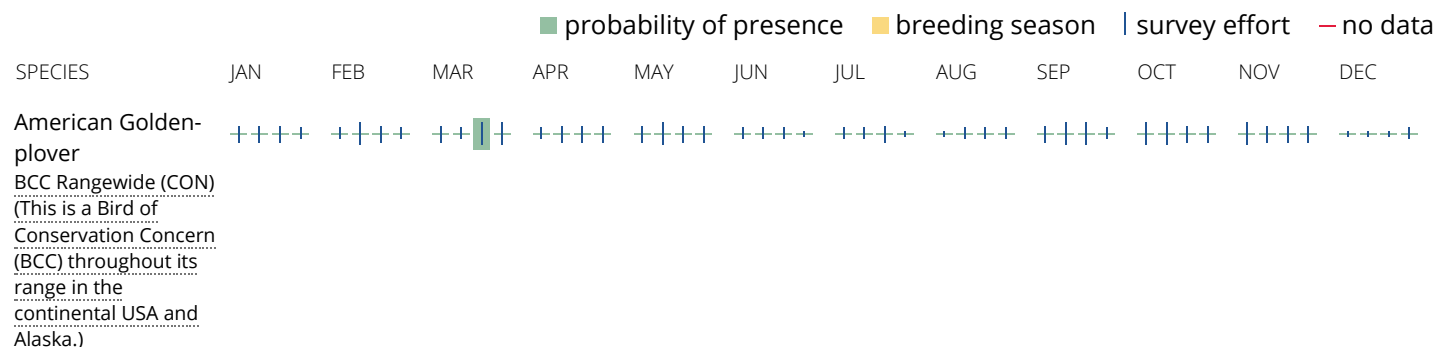
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

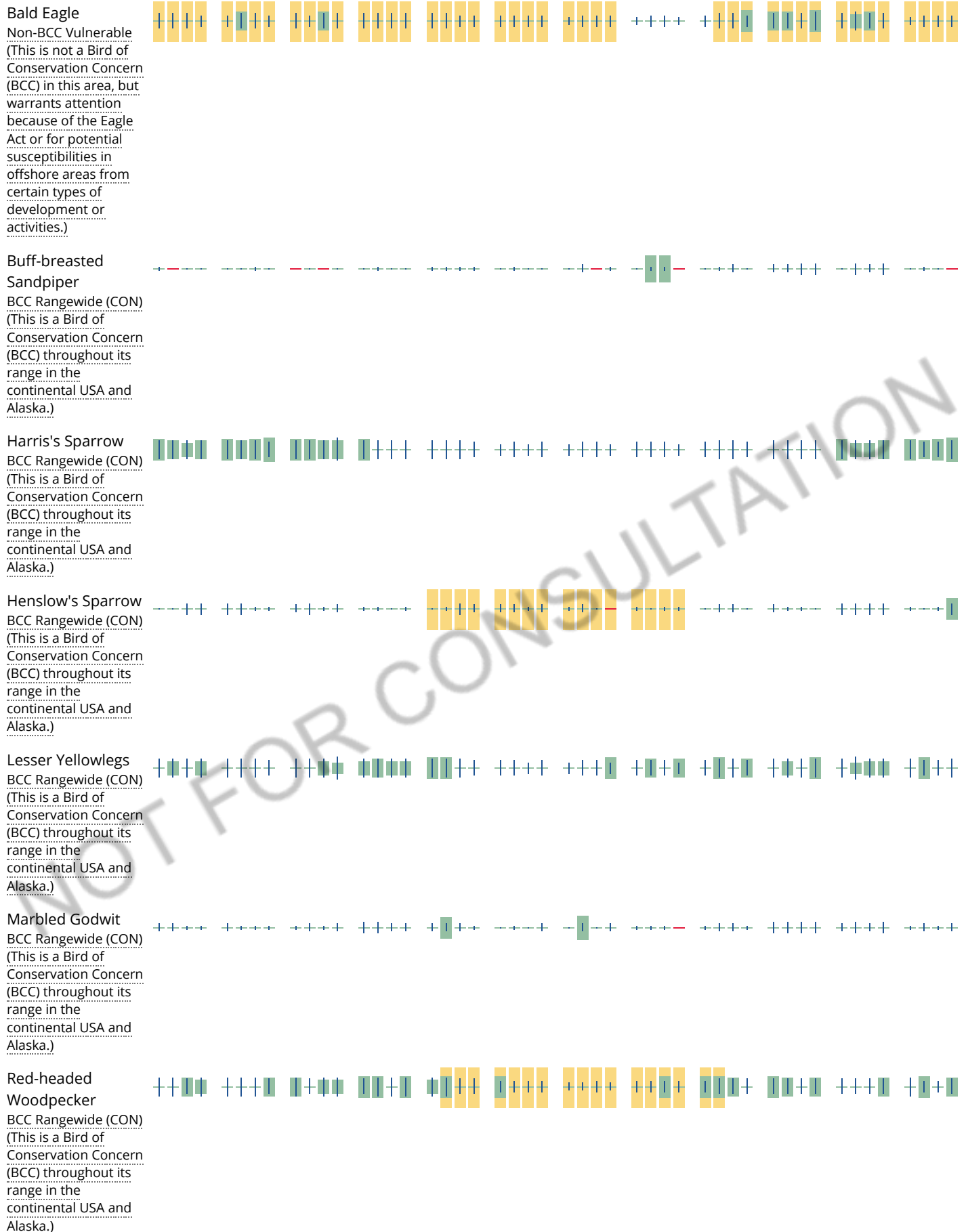
No Data (—)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Semipalmated Sandpiper	++++	++++	++++	++	++	++++	++++	++++	++	++	++++	++++	++++
BCC Rangewide (CON)													
(This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)													
Sprague's Pipit	++++	++++	++++	++++	++++	++++	++++	++++	++++	++++	++	++	++++
BCC Rangewide (CON)													
(This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)													

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) and/or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [AKN Phenology Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential

impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

Wildlife refuges and fish hatcheries

REFUGE AND FISH HATCHERY INFORMATION IS NOT AVAILABLE AT THIS TIME

Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the [NWI map](#) to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION



United States Department of the Interior



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Phone: (817) 277-1100 Fax: (817) 277-1129

<http://www.fws.gov/southwest/es/arlingtontexas/>

<http://www.fws.gov/southwest/es/EndangeredSpecies/lists/>

In Reply Refer To:

December 28, 2020

Consultation Code: 02ETAR00-2018-SLI-0485

Event Code: 02ETAR00-2021-E-01709

Project Name: Lewisville Lake Masterplan Revision

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

To Whom It May Concern:

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

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

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

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

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

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

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

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

guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

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

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

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

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Arlington Ecological Services Field Office

2005 Ne Green Oaks Blvd

Suite 140

Arlington, TX 76006-6247

(817) 277-1100

Project Summary

Consultation Code: 02ETAR00-2018-SLI-0485

Event Code: 02ETAR00-2021-E-01709

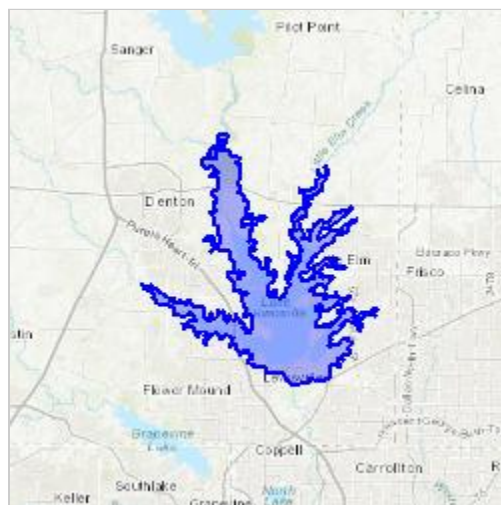
Project Name: Lewisville Lake Masterplan Revision

Project Type: LAND - MANAGEMENT PLANS

Project Description: The Lewisville Master Plan (Denton County, Texas) is the long-term strategic land use management document that guides the comprehensive management and development of all the project's recreational, natural, and cultural resources within the federal fee boundary. Under the guidance of ER-1130-2-550 Change 7, the Plan guides the efficient and cost-effective development, management, and use of project lands. It is a dynamic tool that provides for the responsible stewardship and sustainability of the project's resources for the benefit of present and future generations. The Plan works in tandem with the Operational Management Plan (OMP), which is the implementation tool for the resource objectives and development needs identified in the Master Plan. The Master Plan guides and articulates the USACE responsibilities pursuant to federal laws. Efforts are under way to revise the current Lake Master Plan. The Master Plan revision will update land classifications, plan for the modernization of existing parks, and inform the management of wildlife and other resource lands within USACE managed property at Lewisville Lake for the next 25 years

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/33.16630645600003N97.01489065428797W>



Counties: Denton, TX

Endangered Species Act Species

There is a total of 4 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 2 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.
-

Birds

NAME	STATUS
Least Tern <i>Sterna antillarum</i> Population: interior pop. No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8505	Endangered
Piping Plover <i>Charadrius melodus</i> Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is final critical habitat for this species. Your location is outside the critical habitat. This species only needs to be considered under the following conditions: <ul style="list-style-type: none">▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red Knot <i>Calidris canutus rufa</i> No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: <ul style="list-style-type: none">▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened
Whooping Crane <i>Grus americana</i> Population: Wherever found, except where listed as an experimental population There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/758	Endangered

Critical habitats

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

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

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

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

CROSS TIMBERS SPECIES OF GREATEST CONSERVATION NEED								
Scientific Name	Common Name	Status		Abundance Ranking		General Habitat Type(s) in Texas	Other Notes	Endemic in Texas
		Federal	State	Global	State	These are VERY broad habitat types as a starting place State of the practice resources are listed in each taxa line for more detailed information W.B. Davis and D.J. Schmidly. 1997 and 1994. Mammals of Texas (online and in print). Texas Tech University (1997) and Texas Parks and Wildlife Department (1994). http://www.nsrll.ttu.edu/tmot1/Default.htm (accessed 2011)		
MAMMALS								
<i>Conepatus leuconotus</i>	Hog-nosed skunk			G5	S4	Shrubland, Savanna/Open Woodland, Barren/Sparse Vegetation,		N
<i>Dipodomys elator</i>	Texas kangaroo rat		T	G1G2	S2	Shrubland, Agricultural	status in review	Y
<i>Lutra canadensis</i>	River otter			G5	S4	Riparian	Appendix II, CITES	N
<i>Mustela frenata</i>	Long-tailed weasel			G5	S5	Forest, Woodland, Desert Scrub, Shrubland, Savanna/Open Woodland	Statewide	N
<i>Myotis velifer</i>	Cave myotis			G5	S4	Caves/Karst,		N
<i>Neovison vison</i>	Mink			G5	S4	Riparian, Riverine, Lacustrine, Freshwater Wetland		N
<i>Puma concolor</i>	Mountain lion			G5	S2	Forest, Woodland, Desert Scrub, Shrubland, Savanna/Open Woodland, Riparian	Statewide	N
<i>Spilogale putorius</i>	Eastern spotted skunk			G4T	S4	Savanna/Open Woodland, Grassland		N
<i>Sylvilagus aquaticus</i>	Swamp rabbit			G5	S5	Riparian, Freshwater Wetland		N
<i>Tadarida brasiliensis</i>	Brazilian free-tailed bat			G5	S5	Cave/Karst, Artificial Refugia	Statewide	N
<i>Taxidea taxus</i>	American badger			G5	S5	Grassland, Desert scrub, Woodland, Savanna/Open Woodland, Forest		N
BIRDS						The Birds of North America Online (A. Poole, Ed.). 2005 (with current updates by species). Retrieved from The Birds of North America Online database: http://bna.birds.cornell.edu/BNA/ (accessed 2011). Supported by information from the Cornell Lab of Ornithology and the American Ornithologists' Union (http://www.aou.org/).		BIRDS ONLY: instead of endemism, these numbers are for taxonomic sorting
<i>Anas acuta</i>	Northern Pintail			G5	S3B,S5N	Lacustrine, freshwater wetland, saltwater wetland, coastal, marine	Winter	2
<i>Colinus virginianus</i>	Northern Bobwhite			G5	S4B	Grassland, Shrubland, Savanna/Open Woodland	deleted for CHIH	4
<i>Tympanuchus cupido</i>	Greater Prairie-Chicken (Interior)			G4	S1B	Grassland	Year-round	6
<i>Meleagris gallopavo</i>	Wild Turkey			G5	S5B	Shrubland, Savanna/Open Woodland, Forest, Riparian, Agricultural	Year-round, added <i>merriami</i> for CHIH	8
<i>Egretta thula</i>	Snowy Egret			G5	S5B	Riparian, Riverine, Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary, Coastal, Cultural Aquatic	Breeding	12
<i>Egretta caerulea</i>	Little Blue Heron			G5	S5B	Riparian, Riverine, Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary, Coastal, Cultural Aquatic	Breeding	13
<i>Butorides virescens</i>	Green Heron			G5	S5B	Riparian, Riverine, Lacustrine, Freshwater Wetland, Cultural Aquatic	Breeding	16
<i>Ictinia mississippiensis</i>	Mississippi Kite			G5	S4B	Woodland, Forest, Riparian, Developed:Urban/Suburban/Rural	Breeding	20
<i>Haliaeetus leucocephalus</i>	Bald Eagle			G5	S3B,S3N	Riparian, Lacustrine, Freshwater Wetland, Saltwater Wetland	Year-round, added CRTB	22
<i>Circus cyaneus</i>	Northern Harrier			G5	S2B,S3N	Grassland, Shrubland	Year-round	23
<i>Buteo lineatus</i>	Red-shouldered Hawk			G5	S4B	Woodland, Forest, Riparian, Freshwater Wetland	Year-round	26
<i>Buteo swainsoni</i>	Swainson's Hawk			G5	S4B	Desert Scrub, Grassland, Shrubland	Breeding	28
<i>Pluvialis dominica</i>	American Golden-Plover			G5	S3	Grassland, Freshwater Wetland, Agricultural	Migrant	39
<i>Sternula antillarum</i>	Least Tern	LE*	E*	G4	S3B	Riverine, Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary, Coastal, Marine, Developed: Industrial	Year-round; subspecies <i>athalassos</i>	54
<i>Athene cunicularia</i>	Burrowing Owl			G4	S3B	Desert Scrub, Grassland, Shrubland, Agricultural, Developed	Year-round	63
<i>Asio flammeus</i>	Short-eared Owl			G5	S4N	Grassland, Shrubland, Agricultural	Winter	65
<i>Caprimulgus carolinensis</i>	Chuck-will's-widow			G5	S3S4B	Woodland, Forest, Riparian	Breeding	66
<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker			G5	S3B	Savanna/Open Woodland, Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Year-round	67
<i>Tyrannus forficatus</i>	Scissor-tailed Flycatcher			G5	S3B	Desert Scrub, Grassland, Shrubland, Agricultural, Developed	Breeding	71
<i>Lanius ludovicianus</i>	Loggerhead Shrike			G4	S4B	Desert Scrub, Grassland, Shrubland, Savanna/Open Woodland, Agricultural, Developed	Year-round	73
<i>Vireo bellii</i>	Bell's Vireo			G5	S3B	Desert scrub, Shrubland, Riparian	Breeding	74
<i>Vireo atricapilla</i>	Black-capped Vireo	LE	E	G3	S2B	Shrubland	Breeding	75
<i>Poecile carolinensis</i>	Carolina Chickadee			G5	S5B	Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Year-round	76
<i>Anthus spragueii</i>	Sprague's Pipit	C		G4	S3N	Barren/Sparse Vegetation, Grassland, Shrubland, Agricultural	Winter	80
<i>Dendroica chrysoparia</i> *	Golden-cheeked Warbler	LE	E	G2	S2B	Woodland	Breeding; *taxonomic change likely to <i>Setophaga chrysoparia</i>	83
<i>Aimophila cassinii</i>	Cassin's Sparrow			G5	S4B	Grassland, Shrubland	Breeding	92
<i>Aimophila ruficeps</i>	Rufous-crowned Sparrow			G5	S4B	Grassland	Year-round	95
<i>Spizella pusilla</i>	Field Sparrow			G5	S5B	Grassland, Shrubland, Savanna/Open Woodland	Year-round	96
<i>Ammodramus savannarum</i>	Grasshopper Sparrow			G5	S3B	Grassland, Agricultural	Year-round	97
<i>Chondestes grammacus</i>	Lark Sparrow			G5	S4B	Grassland, Shrubland, Savanna/Open Woodland	Year-round	98
<i>Ammodramus leconteii</i>	Le Conte's Sparrow					Grassland	Winter	101
<i>Zonotrichia querula</i>	Harris's Sparrow			G5	S4	Shrubland, Agricultural	Winter	103
<i>Calcarius mccownii</i>	McCown's Longspur			G4	S4	Grassland, Agricultural	Winter, TBPR (northern), ECPL (northern)	104
<i>Piranga rubra</i>	Summer Tanager			G5	S5B	Savanna/Open Woodland, Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Breeding	106
<i>Passerina ciris</i>	Painted Bunting			G5	S4B	Shrubland, Agricultural	Breeding	107
<i>Spiza americana</i>	Dickcissel			G5	S4B	Grassland, Agricultural	Breeding	108
<i>Sturnella magna</i>	Eastern Meadowlark			G5	S5B	Grassland, Shrubland, Savanna/Open Woodland	Year-round; subspecies <i>lilliana</i> added for CHIH	109
<i>Icterus spurius</i>	Orchard Oriole			G5	S4B	Shrubland, Savanna/Open Woodland, Woodland, Riparian	Breeding	111
REPTILES AND AMPHIBIANS						J.E. Werler and J.R. Dixon. 2000. Texas Snakes: Identification, Distribution, and Natural History. University of Texas Press, Austin. 519 pgs. J.R. Dixon. 1987. Amphibians and Reptiles of Texas. Texas A&M University Press, College Station. 434 pp.		
<i>Anaxyrus (Bufo) woodhousii</i>	Woodhouse's toad			G5	SU	woodland, forest, freshwater wetland		N
<i>Apalone mutica</i>	smooth softshell turtle					riparian, riverine, lacustrine, freshwater wetland	added	N
<i>Cheylydra serpentina</i>	Common snapping turtle					riparina, riverine	added	N

Scientific Name	Common Name	Status		Abundance Ranking		General Habitat Type(s) in Texas	Other Notes	Endemic in Texas
		Federal	State	Global	State	These are VERY broad habitat types as a starting place		
						State of the practice resources are listed in each taxa line for more detailed information		
<i>Crotalus atrox</i>	Western diamondback rattlesnake				S4	barren/sparse vegetation, desert scrub, grassland, shrubland, savanna, woodland, caves/karst		N
<i>Crotalus horridus</i>	Timber (Canebrake) Rattlesnake		T	G4	S4	woodland, forest, riparian		N
<i>Eurycea chisolmensis</i>	Salado Springs salamander	C		G1	S1	freshwater wetland (springs)		Y
<i>Eurycea naufragia</i>	Georgetown Salamander	C		G1	S1	caves and karst, freshwater wetland (springs)		Y
<i>Graptemys versa</i>	Texas map turtle			G4	SU	riparian, riverine		Y
<i>Heterodon nasicus</i>	Western hognosed snake					desert scrub, grassland, shrubland	added	N
<i>Macrochelys temminckii</i>	alligator snapping turtle		T	G3G4	S3	riparian, riverine, cultural aquatic	added	N
<i>Nerodia harteri</i>	Brazos Water Snake		T		S1	riparian, riverine, cultural aquatic		Y
<i>Phrynosoma cornutum</i>	Texas horned lizard		T	G4G5	S4	desert scrub, grassland, savanna		N
<i>Pseudacris streckeri</i>	Strecker's Chorus Frog			G5	S3	grassland, savanna, woodland, riparian, cultural aquatic, freshwater wetland		N
<i>Sistrurus catenatus</i>	massasauga					grassland, barren/sparse vegetation, shrubland, coastal,	added	N
<i>Terrapene ornata</i>	Ornate box turtle			G5	S3	grassland, barren/sparse vegetation, deset scrub, savanna, woodland		N
<i>Thamnophis sirtalis annectans</i>	Texas Garter Snake (Eastern Texas/New Mexico)			G5	S2	riparian, around lacustrine and cultural aquatic sites		Y
<i>Trachemys scripta</i>	Red-eared slider					riparian, riverine, lacustrine, freshwater wetland, cultural aquatic	added	N
FRESHWATER FISHES						C. Thomas, T.H. Bonner and B.G. Whiteside. 2007. Freshwater Fishes of Texas: A Field Guide. Sponsored by The River Systems Institute at Texas State University, published by Texas A&M University Press. <i>Editor's Note: All freshwater fishes life history information in this table was sourced directly from the online version; citations are embedded in the online version at http://www.bio.txstate.edu/~tbonner/txfishes/</i>	Range in Texas, as known	
<i>Anguilla rostrata</i>	American eel			G4	S5	streams and reservoirs in drainages connected to marine environments	mouth upstream to and including the Kiamichi River), Sabine Lake (including minor	N
<i>Cycleptus elongatus</i>	Blue sucker		T	G3G4	S3	large, deep rivers, and deeper zones of lakes	(including minor coastal drainages west to Galveston Bay), Galveston Bay (including	N
<i>Hiodon alosoides</i>	Goldeye					large lakes; backwaters	Red River	N
<i>Ictalurus lupus</i>	Headwater catfish			G3	S2	clear streams and rivers with moderate gradients, deep spring runs	Guadalupe, and Colorado basins, but appears to be extirpated from these systems	N
<i>Macryhbopsis storeriana</i>	Silver chub					common over silt or mud, turbid water with very soft sand/silt substrate	other populations of this species, which range through the Mississippi River Basin to	N
<i>Micropterus treculii</i>	Guadalupe bass			G3	S3	small lentic environments; commonly taken in flowing water	of the Brazos, Colorado, Guadalupe, and San Antonio basins; species also found outside	Y
<i>Notropis bairdi</i>	Red River shiner					streambeds with widely fluctuating flows subject to high summer temperatures, high rates of evaporation,	Red River, from the mouth upstream to and including the Kiamichi River	N
<i>Notropis oxyrhynchus</i>	Sharpnose shiner	C		G3	S3	Moderate current velocities and depths, sand bottom	captured into the Red River drainage; introduced in Colorado River drainage	Y
<i>Notropis potteri</i>	Chub shiner		T	G4	S3	turbid, flowing water with silt or sand substrate; tolerant of high salinities	Brazos River, Colorado River, San Jacinto River, Trinity Rivers, and Galveston Bay	N
<i>Polyodon spathula</i>	Paddlefish		T	G4	S3	sized rivers, sluggish pools, backwaters, bayous, and oxbows with abundant zooplankton; large reservoirs if	eastward; currently only Red River, from the mouth upstream to and including the	N
INVERTEBRATES						www.bugguide.net – good tool for identification and taxonomic information. www.texasento.net – compilation of information on insects in Texas www.odonatacentral.org – resource for identification and distribution of damselflies and dragonflies www.butterfliesandmoths.org – resource for identification and distribution of Lepidoptera www.texasmussels.wordpress.com – resource for information on freshwater mussels in Texas Howells, R. G., R. W. Neck and H. D. Murray. 1996. Freshwater Mussels of Texas. Texas Parks and Wildlife Press, Austin		<i>Editor's Note: Most karst invertebrates are likely endemic</i>
<i>Amblycorypha uhleri</i>	A katydid			G2G3*	S2?*	Savanna/Open Woodland	Terrestrial - Insects - Grasshoppers	
<i>Arethaea ambulator</i>	A katydid			G2G3*	S2?*	Savanna/Open Woodland	Terrestrial - Insects - Grasshoppers	
<i>Bombus pensylvanicus</i>	American bumblebee			GU	SU*	Grassland, Savanna/Open Woodland	Terrestrial - Insect - Bee/Wasp/Ant	
<i>Pleurobema riddellii</i>	Louisiana pigtoe		T	G1G2	S1	Riverine	Aquatic - Freshwater - Mollusks; new state rank and threatened state status	
<i>Pogonomyrmex comanche</i>	Comanche harvester ant			G2G3*	S2*	Barren/Sparse Vegetation	Terrestrial - Insect - Bee/Wasp/Ant; ecoregions added	
<i>Potamilus amphichaenus</i>	Texas heelsplitter		T	G1G2	S1	Riverine	Aquatic - Freshwater - Mollusks; new state rank and threatened state status	
<i>Quadrula aurea</i>	Golden orb		T	G1	S2*	Riverine	Aquatic - Freshwater - Mollusks; new state rank and threatened state status	Y
<i>Quadrula houstonensis</i>	Smooth pimpleback		T	G2	S1S2*	Riverine	Aquatic - Freshwater - Mollusks; new state rank and threatened state status	Y
<i>Quadrula mitchelli</i>	False Spike		T	GH	SH	Riverine	Aquatic - Freshwater - Mollusks; new state rank and threatened state status	
<i>Taeniopteryx starki</i>	Texas willowfly			G1	S1	Riparian, Riverine	Aquatic - Insects - Stoneflies	
<i>Truncilla macrodon</i>	Texas fawnsfoot		T	G2Q	S1*	Riverine	Aquatic - Freshwater - Mollusks; new state rank and threatened state status	Y
PLANTS						J.M. Poole, W.R. Carr, D.M. Price and J.R. Singhurst. 2007. Rare Plants of Texas. Texas A&M University Press, College Station. D.S. Correll and M.C Johnston. 1979. Manual of the Vascular Plants of Texas. The University of Texas at Dallas, Richardson. M.C. Johnston. 1990. The Vascular Plants of Texas: A List Up-dating the Manual of the Vascular Plants of Texas, 2nd Edition. Marshall C. Johnston, Austin. F.W. Gould. 1975. The Grasses of Texas. Texas A & M University Press, College Station. S.D. Jones, J.K. Wipff, and P.M. Montgomery. 1997. Vascular Plants of Texas: A Comprehensive Checklist including Synonymy; Bibliography, and Index. University of Texas Press, Austin. R.A. Vines. 2004. Trees, Shrubs and Woody Vines of the Southwest. Blackburn Press.		
<i>Agalinis auriculata</i>	earleaf false foxglove			G3	SH	Savanna/Open Woodland; Grrassland	Terrestrial	N
<i>Agalinis densiflora</i>	Osage Plains false foxglove			G3	S2	Savanna/Open Woodland - Outcrops	Terrestrial	N
<i>Argythamnia aphoroides</i>	Hill Country wild-mercury			G2G3	S2S3	Savanna/Open Woodland	Terrestrial	Y
<i>Carex edwardsiana</i>	canyon sedge			G3G4S3S4	S3S4	Woodland (slopes above Riparian)	Wetland	Y
<i>Carex shinnerei</i>	Shinner's sedge			G3?	S2	Grassland	Wetland	N
<i>Clematis texensis</i>	scarlet leather-flower			G3G4	S3S4	Woodland	Terrestrial	Y
<i>Croton alabamensis</i> var. <i>texensis</i>	Texabama croton			G3T2	S2	Woodland	Terrestrial	Y
<i>Cuscuta exaltata</i>	tree dodder			G3	S3	Woodland	Terrestrial	N
<i>Dalea reverchonii</i>	Comanche Peak prairie-clover			G2	S2	Savanna/Open Woodland; Grassland	Terrestrial	Y

Scientific Name	Common Name	Status		Abundance Ranking		General Habitat Type(s) in Texas		Other Notes	Endemic in Texas
		Federal	State	Global	State	These are VERY broad habitat types as a starting place			
						State of the practice resources are listed in each taxa line for more detailed information			
<i>Echinacea atrorubens</i>	Topeka purple-coneflower			G3	S3	Savanna/Open Woodland	Terrestrial		N
<i>Festuca versuta</i>	Texas fescue			G3	S3	Woodland	Terrestrial		N
<i>Gaura triangulata</i>	prairie butterfly-weed			G3G4	S3	Grassland	Terrestrial		N
<i>Hexalectris nitida</i>	Glass Mountains coral-root			G3	S3	Woodland	Terrestrial		N
<i>Ipomoea shumardiana</i>	Shumard's morning glory			G2G3	S1	Savanna/Open Woodland	Terrestrial		N
<i>Liatris glandulosa</i>	glandular gay-feather			G3	S3	Savanna/Open Woodland	Terrestrial		Y
<i>Oenothera coryi</i>	Cory's Evening-primrose			G3	S3	Savanna/Open Woodland	Terrestrial		Y
<i>Pediomelum cyphocalyx</i>	turnip-root scurfpea			G3G4	S3S4	Grassland	Terrestrial		Y
<i>Pediomelum reverchonii</i>	Reverchon's curfpea			G3	S3	Grassland	Terrestrial		N
<i>Physaria engelmannii</i>	Engelmann's bladderpod			G3	S3	Savanna/Open Woodland	Terrestrial		Y
<i>Prunus minutiflora</i>	Texas almond			G3G4	S3S4	Savanna/Open Woodland	Terrestrial		N
<i>Schoenoplectus hallii</i>	Hall's baby bulrush			G2G3	S1	Freshwater Wetland (ponds)	Wetland		N
<i>Senecio quaylei</i>	Quayle's butterweed			G1Q	S1	Savanna/Open Woodland	Terrestrial		Y
<i>Styrax platanifolius</i> subsp. <i>platanifolius</i>	sycamore-leaf snowbell			G3T3	S3	Woodland	Terrestrial		Y
<i>Valerianella stenocarpa</i>	bigflower cornsalad			G3	S3	Savanna/Open Woodland	Terrestrial		Y
<i>Yucca necopina</i>	Glen Rose yucca			G1G2	S1S2	Savanna/Open Woodland	Terrestrial		Y

Last Update: 8/25/2020

DENTON COUNTY

AMPHIBIANS

Strecker's chorus frog *Pseudacris streckeri*

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

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

Woodhouse's toad *Anaxyrus woodhousii*

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

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

BIRDS

bald eagle *Haliaeetus leucocephalus*

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

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

Black Rail *Laterallus jamaicensis*

Salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous years dead grasses; nest usually hidden in marsh grass or at base of Salicornia

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

Franklin's gull *Leucophaeus pipixcan*

This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night.

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

interior least tern *Sternula antillarum athalassos*

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

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

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DENTON COUNTY

BIRDS

mountain plover *Charadrius montanus*

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

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

piping plover *Charadrius melodus*

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

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

Rufa Red Knot *Calidris canutus rufa*

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

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

western burrowing owl *Athene cunicularia hypugaea*

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

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

white-faced ibis *Plegadis chihi*

Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.

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

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DENTON COUNTY

BIRDS

whooping crane *Grus americana*

Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties.

Federal Status: LE	State Status: E	SGCN: Y
Endemic: N	Global Rank: G1	State Rank: S1N

INSECTS

American bumblebee *Bombus pensylvanicus*

Habitat description is not available at this time.

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

No accepted common name *Arethaea ambulator*

Habitat description is not available at this time.

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

MAMMALS

American badger *Taxidea taxus*

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

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

big brown bat *Eptesicus fuscus*

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

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

big free-tailed bat *Nyctinomops macrotis*

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

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

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DENTON COUNTY

MAMMALS

black-tailed prairie dog *Cynomys ludovicianus*

Dry, flat, short grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle; live in large family groups

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

eastern red bat *Lasiurus borealis*

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

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

eastern spotted skunk *Spilogale putorius*

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

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

hoary bat *Lasiurus cinereus*

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

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

long-tailed weasel *Mustela frenata*

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

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

Mexican free-tailed bat *Tadarida brasiliensis*

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

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

mink *Neovison vison*

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

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

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DENTON COUNTY

MAMMALS

mountain lion *Puma concolor*

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

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

plains spotted skunk *Spilogale putorius interrupta*

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

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

southern short-tailed shrew *Blarina carolinensis*

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

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

swamp rabbit *Sylvilagus aquaticus*

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

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

thirteen-lined ground squirrel *Ictidomys tridecemlineatus*

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

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

tricolored bat *Perimyotis subflavus*

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

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G2G3	State Rank: S3S4

western hog-nosed skunk *Conepatus leuconotus*

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

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

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DENTON COUNTY

MAMMALS

woodland vole

Microtus pinetorum

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

Federal Status:

State Status:

SGCN: Y

Endemic: N

Global Rank: G5

State Rank: S3

MOLLUSKS

Louisiana Pigtoe

Pleurobema riddellii

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

Federal Status:

State Status: T

SGCN: Y

Endemic: N

Global Rank: G1G2

State Rank: S1

Sandbank Pocketbook

Lampsilis satura

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

Federal Status:

State Status: T

SGCN: Y

Endemic:

Global Rank: G2?

State Rank: S1

Texas Heelsplitter

Potamilus amphichaenus

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

Federal Status:

State Status: T

SGCN: Y

Endemic: N

Global Rank: G1G3

State Rank: S1

REPTILES

common garter snake

Thamnophis sirtalis

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

Federal Status:

State Status:

SGCN: N

Endemic:

Global Rank: G5

State Rank: S2

eastern box turtle

Terrapene carolina

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

Federal Status:

State Status:

SGCN: Y

Endemic: N

Global Rank: G5

State Rank: S3

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DENTON COUNTY

REPTILES

slender glass lizard

Ophisaurus attenuatus

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

Federal Status:

State Status:

SGCN: Y

Endemic: N

Global Rank: G5

State Rank: S3

smooth softshell

Apalone mutica

Aquatic: Large rivers and streams; in some areas also found in lakes and impoundments (Ernst and Barbour 1972). Usually in water with sandy or mud bottom and few aquatic plants. Often basks on sand bars and mudflats at edge of water. Eggs are laid in nests dug in high open sandbars and banks close to water, usually within 90 m of water (Fitch and Plummer 1975).

Federal Status:

State Status:

SGCN: Y

Endemic: N

Global Rank: G5

State Rank: S3

Texas garter snake

Thamnophis sirtalis annectens

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

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G5T4

State Rank: S1

Texas horned lizard

Phrynosoma cornutum

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

Federal Status:

State Status: T

SGCN: Y

Endemic: N

Global Rank: G4G5

State Rank: S3

timber (canebrake) rattlesnake

Crotalus horridus

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

Federal Status:

State Status:

SGCN: Y

Endemic: N

Global Rank: G4

State Rank: S4

western box turtle

Terrapene ornata

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

Federal Status:

State Status:

SGCN: Y

Endemic: N

Global Rank: G5

State Rank: S3

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DENTON COUNTY

REPTILES

western rattlesnake *Crotalus viridis*

Terrestrial: Dry desert and prairie grasslands, shrub desert rocky hillsides; edges of arid and semi-arid river breaks.

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

PLANTS

Glen Rose yucca *Yucca necopina*

Grasslands on sandy soils and limestone outcrops; flowering April-June

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G1G2	State Rank: S3

Topeka purple-coneflower *Echinacea atrorubens*

Occurring mostly in tallgrass prairie of the southern Great Plains, in blackland prairies but also in a variety of other sites like limestone hillsides; Perennial; Flowering Jan-June; Fruiting Jan-May

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

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WILDLIFE HABITAT APPRAISAL PROCEDURE (WHAP) SUMMARY REPORT
LEWISVILLE LAKE MASTER PLAN
DENTON COUNTY, TEXAS



**US Army Corps
of Engineers®**
Fort Worth District

January 2018

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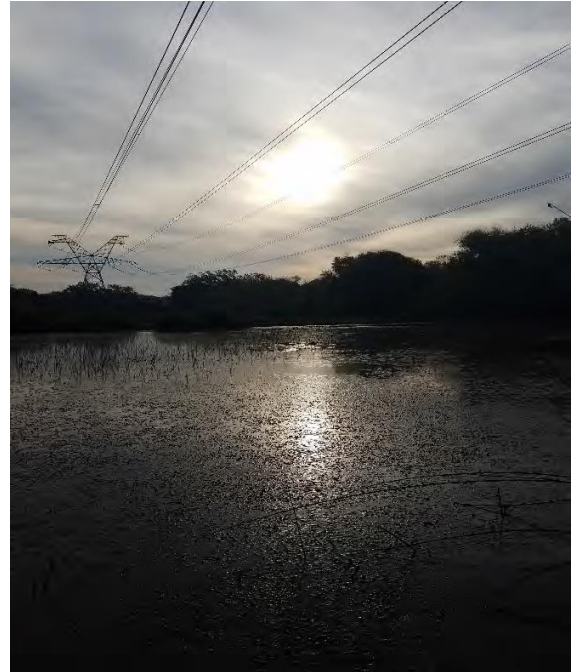
Introduction

Habitat assessments were conducted at Lewisville on October 16-20, 2017 using Texas Parks and Wildlife Department's (TPWD) Wildlife Habitat Appraisal Procedure ([WHAP] TPWD 1995). WHAP survey point locations were haphazardly preselected based on aerial imagery from existing Geographical Information Systems (GIS) data. A total of 84 WHAP points were surveyed, 11 others were skipped for various reasons, and all are within U.S. Army Corps of Engineers (USACE) fee boundary (Figures 1A through 1J).

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

Study Area

USACE fee owned property at Lewisville Lake, approximately 45,944 acres, is located within the Dallas-Fort Worth metroplex in north central Texas. More specifically, the lake sits primarily between the cities of Denton and Frisco, Texas within the Texas Blackland Prairie and Cross Timbers ecoregions. Among numerous small creeks and tributaries, the Elm Fork of the Trinity River is the major contributing stream to Lewisville Lake. Downstream of the Lewisville Lake dam, Elm Fork meanders down to the confluence with the West Fork of the Trinity River.



Methodology

An interagency team of biologists, foresters, and USACE park rangers conducted the habitat surveys on October 16-20, 2017. TPWD's WHAP protocol was used to analyze and describe existing habitats.

The WHAP requires evaluating representative sites of each cover type present within an area of interest. For this project, a search area of 0.1 acre (circle with radius of 37.2 feet) was used at each WHAP site to compile a list of plant species occurring at each site and to complete the Biological Components Field Evaluation Form (https://tpwd.texas.gov/publications/pwdpubs/media/pwd_rp_w7000_0145.pdf). Field data collected on the form at each WHAP site included the following components:

1. Site Potential
2. Temporal Development of Existing Successional Stage
3. Uniqueness and Relative Abundance
4. Vegetation Species Diversity
5. Vertical Vegetation Stratification
6. Additional Structural Diversity
7. Condition of Existing Vegetation

At each site, a 1/10th acre plot was evaluated and points were assigned to all applicable components based on field conditions. A habitat quality score, where values range from 0.0 (low quality) to 1.0 (high quality), was then calculated for each site by adding together all points and multiplying by 0.01. Habitat quality was then determined for all sites within the same habitat type.

Photographs were taken at each site and are included as Attachment B.

The TPWD developed the WHAP to allow a qualitative, holistic evaluation of wildlife habitat for particular tracts of land statewide without imposing significant time requirements in regard to field work and compilation of data (TPWD 1995). The WHAP was not designed to evaluate habitat quality in relation to specific wildlife species.

The WHAP is based on the following assumptions:

1. Vegetation structure including species composition and physiognomy is itself sufficient to define the habitat suitability for wildlife;
2. A positive relationship exists between vegetation diversity and wildlife species diversity;

- 3. Vegetation composition and primary productivity directly influence population densities of wildlife species.

As designed, the WHAP is intended to be used for the following applications:

- 1. Evaluating impacts upon wildlife populations from specific development project alternatives.
- 2. Establishing baseline data prior to anticipated or proposed changes in habitat conditions for specific areas.
- 3. Comparing tracts of land that are candidates for land acquisition or mitigation.
- 4. Evaluating general habitat quality and wildlife management potential for tracts of land over large geographical areas, including wildlife planning units.

The WHAP protocol can be used to assess a wide range of habitats, however it was originally developed to assess and develop mitigation requirements for loss of bottomland hardwoods and other aquatic habitats. Scores can screw higher for these habitats based on how the scoring is allotted to each WHAP habitat component. Upland forest and grassland habitat types cannot reach a score indicative of high quality habitat although they may exhibit high quality features. Subsequently, high quality upland habitat may not be identified or can be overlooked.

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

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

These two components alone regularly exclude grassland habitat from receiving 0.26 points on the WHAP scale. In order to identify the maximum score each habitat type can receive, USACE environmental staff scored each criteria given ideal conditions for riparian/bottomland hardwood forest (BHF), upland forest (includes all non-riparian/BHF forests), grassland, swamp, and marsh habitats. The maximum values scores, shown in Table 1, were then used to normalize scores for habitats that are prevented from reaching the maximum WHAP score primarily due to arbitrary low scores in the two WHAP components described above. Normalizing habitat scores will identify high quality habitat that would otherwise not be detected.



Table 1. Maximum Total Score per Habitat Type

Cover Type	Component Number								Maximum Total Score
	1	2	3	4	5	6	7	7B	
Swamp	20	20	20	20	5	5	5	5	1.00
Marsh	25	20	20	20	NA	5	10	NA	1.00
Riparian/BHF	25	20	20	15	5	5	5	5	1.00
Upland Forest	12	20	20	15	5	5	5	5	0.87
Grassland	12	12	20	6	3	5	5	5	0.68

Swamp, marsh, and riparian/BHF habitats can all achieve the maximum score, therefore, no normalization of scores were made for these habitat types. Upland forests and grasslands,

however, can only reach within 0.13 and 0.32 points of the maximum WHAP score, even in ideal conditions.

To evaluate all habitat types on an even scoring basis, upland forest and grassland scores were normalized by dividing their original scores by the maximum possible score for their respective habitat types. For example, if a grassland site received an initial score of 0.42, it would be divided by the maximum total points a grassland site can receive, 0.68. The normalized total score used for further analysis for the grassland site would be 0.61.

This adjustment allows habitat type scores to be analyzed and compared to their corresponding habitat type maximum total score. Rather than, for instance, a grassland being evaluated on a bottomland hardwood scoring scale.

All WHAP scores analyzed and discussed from here forward reflect the normalized total scores. As mentioned above, swamp, marsh, and riparian/BHF habitats were not normalized as they can already achieve maximum scores. Grassland scores were normalized by dividing initial scores by 0.68, while all upland forest scores were normalized by dividing the initial score by 0.87.

Habitat

Using TPWD’s Texas Ecological Mapping Systems (<https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/>), Lewisville Lake lies within the Texas Blackland Prairie and Cross Timbers ecoregions. The most common habitat types include grassland, marsh, riparian/BHF, and upland forest (Elliot, 2014). Table 2 displays all habitats surveyed and the number of points surveyed within each respective habitat type.

Table 2. Survey Points per Habitat Type	
Habitat Type	Points Surveyed
Grassland	12
Marsh	3
Riparian/BHF	28
Upland Forest	41
Total Points Surveyed	84

Elliot (2014) provided general habitat type descriptions and associated vegetation communities for the Ecological Systems Classification and Mapping Project in support of the Comprehensive Wildlife Conservation Strategy for the Texas Parks and Wildlife Department. These descriptions were meant to be broad and depict typical vegetative assemblages across vast areas as the observable vegetation communities can vary based on local conditions.

Historically, tallgrass prairies consisting of little bluestem, big bluestem, yellow Indiangrass, tall dropseed, eastern gamagrass and many forbs, such as asters, clovers, and black-eyed susan dominated the region. Before nearly all of the prairie was developed, bison and pronghorn, greater prairie chickens, and even ocelot utilized this area. Only an estimated 5,000 widely scattered acres in small tracts remain of the original 12 million acres of the region, or less than one-tenth of one percent of remaining prairie. Riparian hardwoods, primarily bur oak, Shumard oak, sugar hackberry, elm, ash, eastern cottonwood, and pecan, meander this prairie. The headwaters of several east Texas rivers begin in the Blackland Prairie region. In addition, the Trinity, Brazos and Colorado Rivers, and many tributaries of nearly every major system feeding the Gulf of Mexico, originate in or cross the Blackland Prairies (TPWD, 2012).



Early settlers found the Cross Timbers’ woodlands thick and impenetrable. Dominated by post and blackjack oak, these woodlands were often cleared for farming. The remaining woodland tracts can contain trees reaching 200-500 years old. Today juniper and yaupon are a more abundant component of the Cross Timbers, pockets of prairie are spread throughout agriculture, oil and gas, and urban use areas (TPWD, 2012). The ecoregion is characterized by moderate but sporadic rainfall. Typical vegetation that can be found in the Cross Timbers include: Post Oak (*Quercus stellate*), Blackjack Oak (*Quercus marilandica*), Black Hickory (*Carya texana*), Bitternut Hickory (*Carya cordiformis*), Dwarf Chinkapin Oak (*Quercus prinoides*), Cedar Elm

(*Ulmus crassifolia*), Oak (*Quercus*) spp, Little Bluestem (*Schizachyrium scoparium*), Sumac (*Rhus*) spp, Eastern Red Cedar (*Juniperus virginiana*), Ashe Juniper (*Juniperus ashei*) and Honey Mesquite (*Prosopis glandulosa*).



Figure 2 displays the distribution of habitat types within the USACE boundary at Lewisville Lake. For analysis purposes, habitat types were pooled into one of four categories: grassland, marsh, riparian/BHF, and upland forest.

Results and Discussion

The total habitat score for each point surveyed is a representation of multiple habitat attributes including vegetative diversity and structure, site soil potential, successional stage, and uniqueness of that habitat across the landscape. Data analysis highlights are discussed below, while detailed data for each point surveyed can be found in Attachment A: Lewisville WHAP Summary Results of this report.

Upland forest (N = 41) and riparian/BHF (N = 28) were the most abundant habitat types surveyed. Upland forest scores ranged from 0.89 to 0.43 while riparian/BHF scores fell between 0.81 and 0.45 (Table 3). The lower minimum scores, especially for these normally drier upland habitats, may be partly due to long-term flooding that occurred at Lewisville Lake in recent years, thus leading to reduced plant diversity. Flooding at lower elevations in the flood pool of Lewisville Lake almost certainly led to mortality of the typically upland species of herbaceous plant growth. This certainly affected survey metrics within the inundated areas. Long-term flooding of Federal lands is a routine occurrence at typical Corps lakes having a primary mission of flood risk reduction.

The average, maximum, and minimum total score observed for each habitat type surveyed is shown in Table 3.

Table 3. Average, Maximum, and Minimum Total Scores per Habitat Type			
Habitat Type	Average Total Score	Maximum Total Score	Minimum Total Score
Grassland	0.66	1.00	0.47
Marsh	0.77	0.98	0.41
Riparian/BHF	0.63	0.81	0.45
Upland Forest	0.61	0.89	0.43

Figures 3A through 3J show the range of total scores for all points surveyed (N = 84) as well as the 11 additional points that were skipped due to inaccessibility or multiple points occurring in the same area. Skipped points show a total score of 0 in figures 3A through 3J but were not included in the analyses. Overall marsh and grassland habitats exhibited the highest average total score (0.70 and 0.66), as these habitats generally exhibited more herbaceous vegetative species and structural diversity. On average, all habitat types, including riparian/BHF and upland forest, displayed at least medium quality habitat.

The grassland site receiving a score of 1.00 is likely to transition to upland forest in the near future. The surrounding forest will continue to encroach into the grassland area as supported by the diversity of young woody species detected within the site.

Also noteworthy, considerable conservation and education efforts are ongoing at Lewisville Lake, especially within Lewisville Lake Environmental Learning Area (LLELA) in addition to environmental research being conducted at the Lewisville Aquatic Ecosystem Research Facility (LAERF). Both of these areas are located on USACE owned property below the lake dam. Habitat scores in this area are expected to climb as native plant diversity increases due to LLELA and LAERF efforts. Native prairie and forest habitat in the region has largely been altered or lost due to different land uses. As development increases around Lewisville Lake these areas are likely to become more unique, and highly valuable for wildlife.

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

Table 4. Average Site Potential, Successional Stage, and Uniqueness and Relative Abundance Scores per Habitat Type			
Habitat Type	\bar{x} Site Potential	\bar{x} Successional Stage	\bar{x} Uniqueness and Relative Abundance
Grassland	14.67	5.92	8.33
Marsh	23.33	NA	15.00
Riparian/BHF	17.11	12.29	12.14
Upland Forest	16.02	10.29	10.24

Site potential allocates more points based on soil substrates characteristics and hydrologic connectivity that can support hydrophytic habitats, such as marshes, swamps, and bottomland hardwood forests that are often considered to be higher quality, more diverse habitat. This allows areas to score higher even though a recent disturbance, such as fire or flood, may have removed most of the vegetation. Areas scoring high in site potential but low in other metrics can be targeted for management efforts as these areas’ vegetation community response should be favorable, thus increasing habitat value.

Successional stage refers to the age of the vegetative community. Older, mature forests, as do climax prairies, score higher than younger pole stands or disturbed grasslands as they provide more diverse forage, cover, and niche habitats. These scores are expected to increase across the board except in areas around the lake that may not have the soil types to support hydrophytic vegetation and are flooded frequently enough to limit upland forest or grassland growth and development.

Uniqueness and Relative Abundance takes into consideration the rarity of a habitat or vegetative community and its abundance in the region. Ongoing urban expansion has significantly influenced the region’s remaining habitat composition. Few large, contiguous patches of habitat remain within the DFW metroplex. Lewisville Lake and the surrounding terrestrial habitat represents one of these remaining patches that have become less abundant across the region. As urban development continues, the remaining habitat at Lewisville Lake will likely increase in overall wildlife value and uniqueness.

Riparian forests are typically found in highly productive soils and consist of vegetation communities that persist and even thrive when exposed to frequent or extended periods of flooding. As such, these areas exhibited the highest average site potential, successional stage, and uniqueness and relative abundance scores among all habitat types surveyed.

As noted earlier, large scale conservation management efforts have been in progress at Lewisville Lake. Several of these sites were surveyed within LLELA and LAERF as part of this effort. Overall, seven riparian/BHF sites (0, 1, 11, 62, 64, 67, 85), ten upland forest sites (3, 24, 26, 49, 50, 52, 65, 66, 79, 92), and two grassland sites (20, 38) received scores over 0.70, exhibiting medium to high quality habitat. Eight of these points are located below the lake dam and largely represent the conservation and restoration efforts completed to date and are likely to increase in habitat value as restoration efforts continue.



Five points (48, 45, 13, 6, and 9) surveyed received scores over 0.80 indicating very high quality habitat. Points 13 (riparian/BHF), 6 (Marsh), and 9 (riparian/BHF), which were below the lake dam, all scored over 0.90 representing near pristine habitat. These areas support marsh, riparian/BHF, upland forest and grassland habitats featuring high tree and grass species diversity as well as a variety of niche habitats. In addition, these five points all received the high scores for site potential, successional stage, and uniqueness and relative abundance criteria. Figure 4 highlights the WHAP points scoring over 0.70 by habitat type.

In summary, high quality habitat appears to occur in patches around Lewisville Lake. Considering the WHAP analysis, expected urban development, and spatial distribution of higher scoring points, four areas were identified as having contiguous high quality habitat in relation to the remaining lands administered by USACE at Lewisville Lake. These areas include the lands

below the lake dam, Hickory Creek branch, Little Elm Fork branch, and the Elm Fork of the Trinity River branch.

Recommendations

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



Current conservation and restoration management practices at Lewisville Lake include prairie restoration using thinning and prescribed fire, and chemical treatment for the improvement of upland and riparian habitats with an overall goal of increasing native species diversity and maintaining overall health. Overall, habitat management has shown to be effective in maintaining medium- to high-quality wildlife habitat on USACE lands at Lewisville Lake.

Based on the results of the WHAP survey efforts, areas to consider for Wildlife Management or Environmentally Sensitive Areas land classifications include contiguous tracts of land having medium or greater WHAP survey scores. The planning team for the Lewisville Lake Master Plan revision will take into account the WHAP scores when making land classification decisions.

References

Elliott, Lee F., David D. Diamond, C. Diane True, Clayton F. Blodgett, Dyan Pursell, Duane German, and Amie Treuer-Kuehn. 2014. Ecological Mapping Systems of Texas: Summary Report. Texas Parks & Wildlife Department, Austin, Texas.

Texas Parks and Wildlife Department (TPWD). 2012. Texas Conservation Action Plan 2012-2016: Texas Blackland Prairies Handbook. Editor, Wendy Connally, Texas Conservation Action Plan Coordinator. Austin, Texas.

Texas Parks and Wildlife Department (TPWD). 1995. Wildlife Habitat Appraisal Procedure (WHAP). Last revised January 12, 1995.

Lewisville Lake WHAP Summary Result Figures

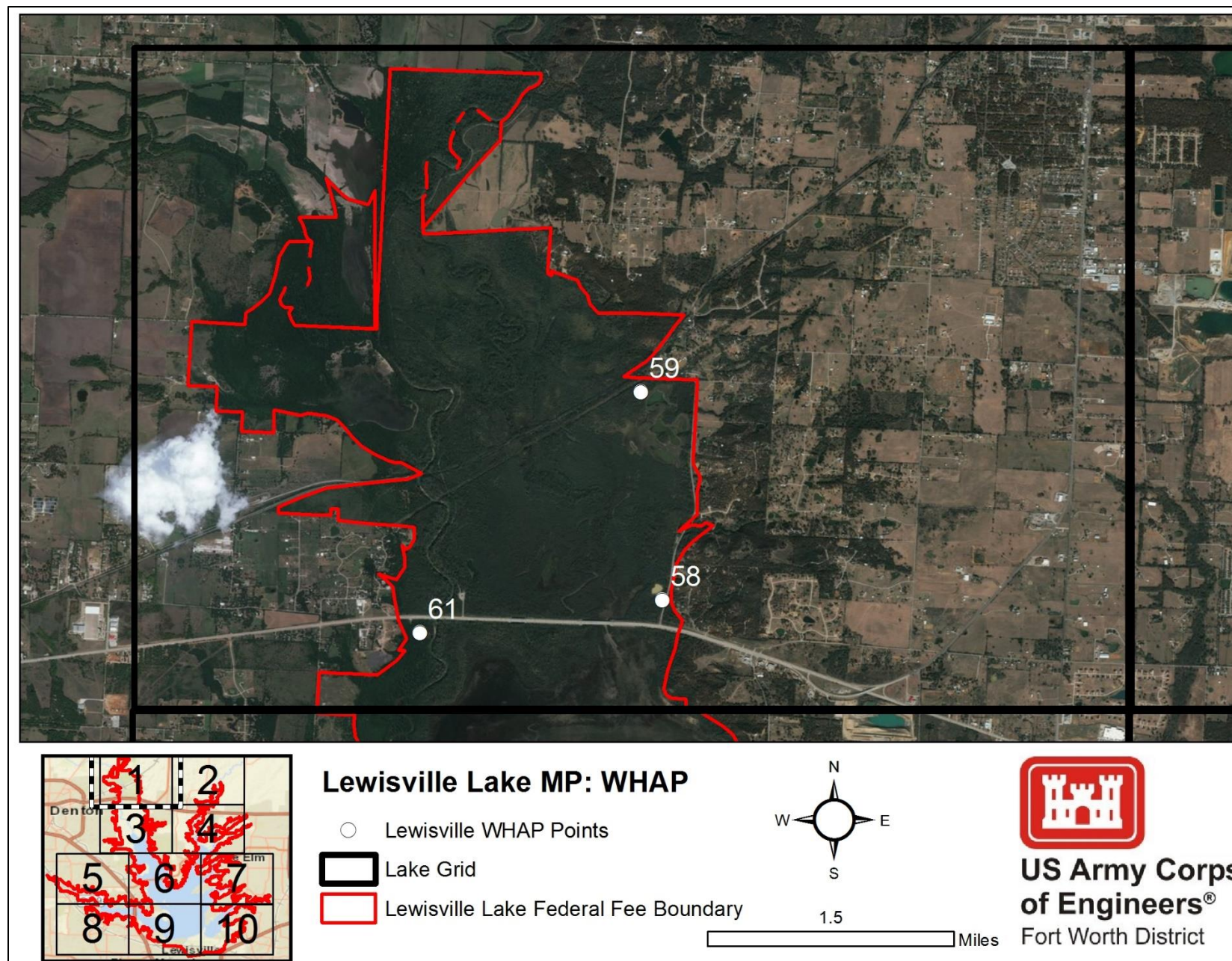


Figure 1A. Distribution of WHAP Points within the fee owned boundary at Lewisville Lake.

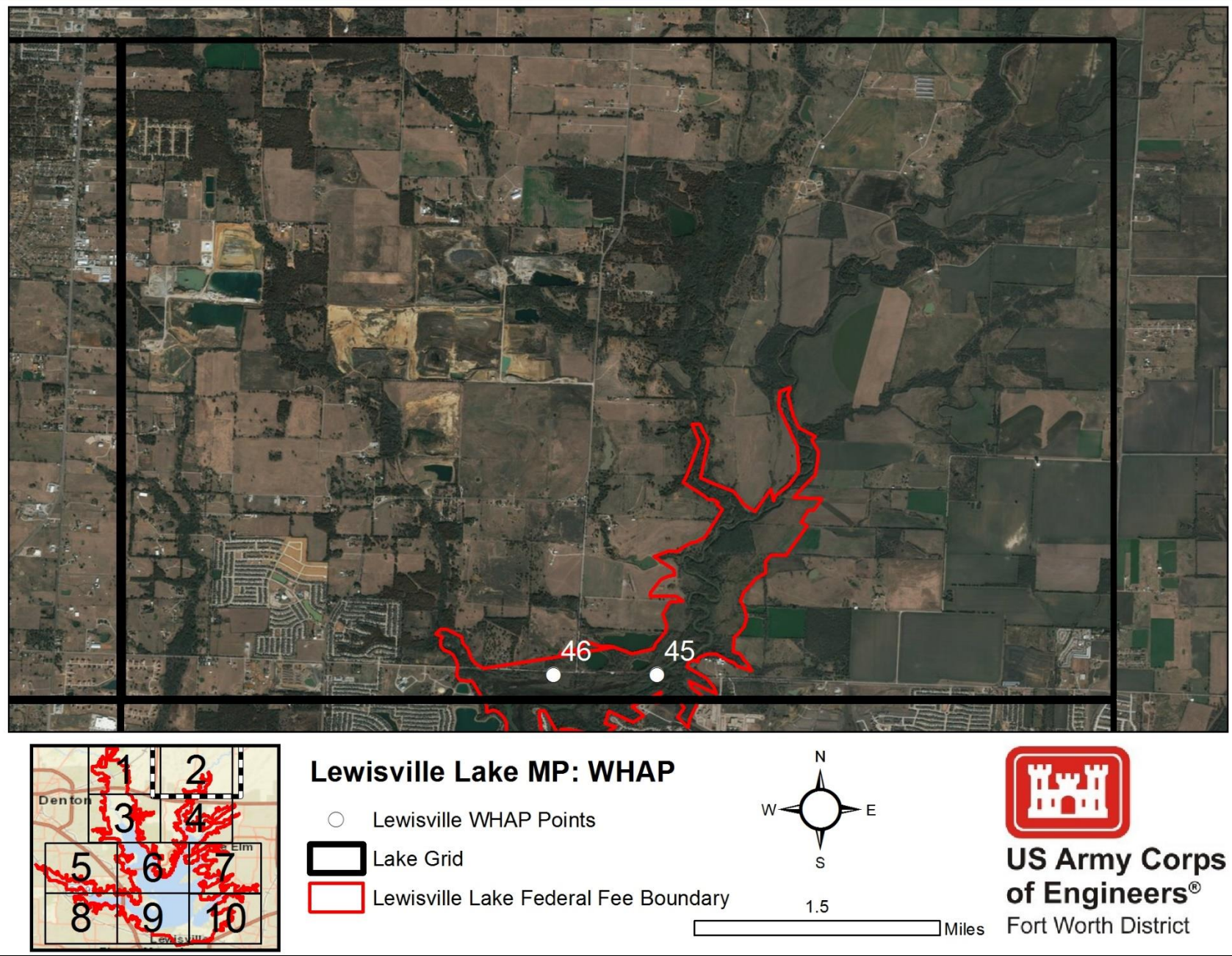


Figure 1B. Distribution of WHAP Points within the fee owned boundary at Lewisville Lake.

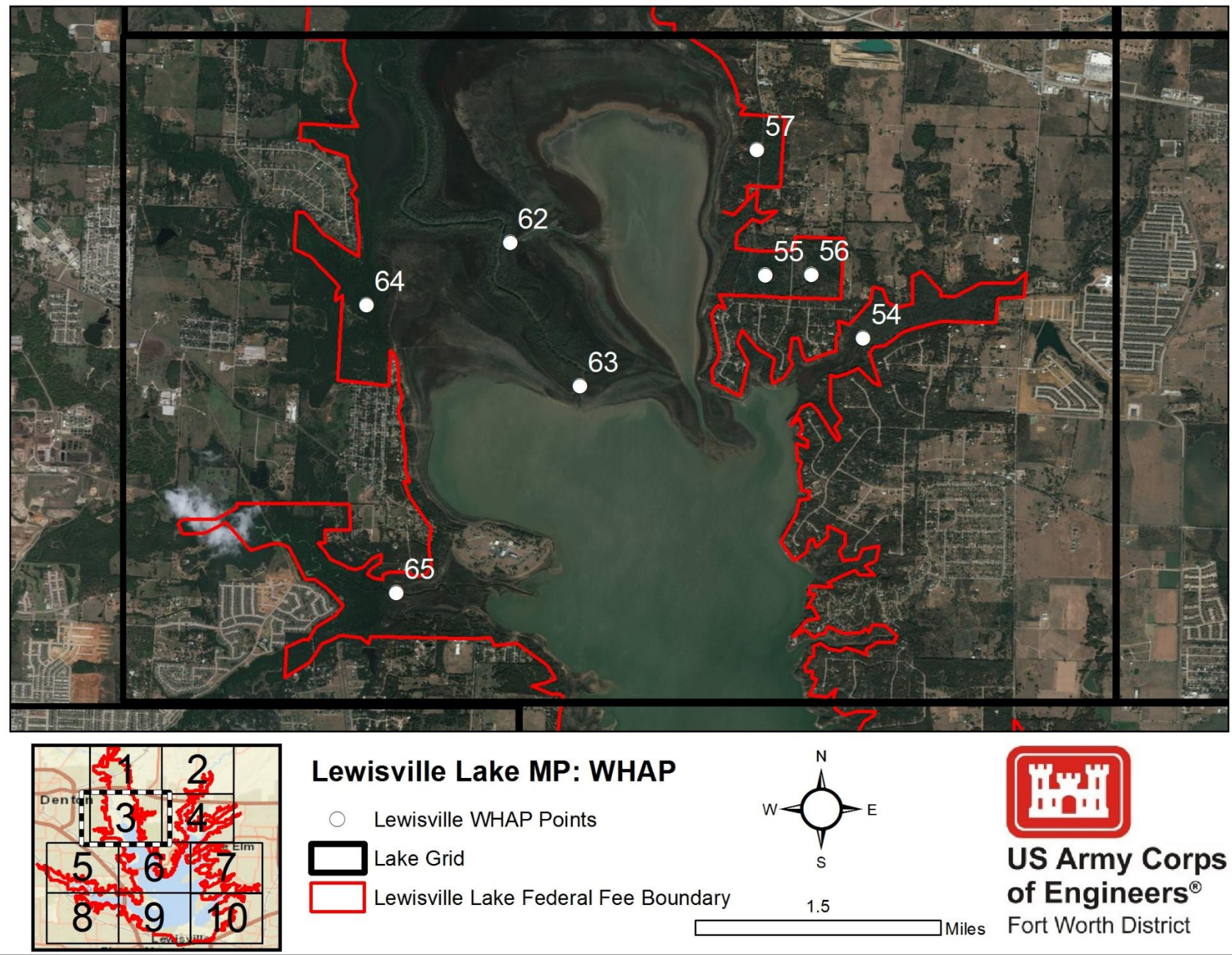


Figure 1C. Distribution of WHAP Points within the fee owned boundary at Lewisville Lake.

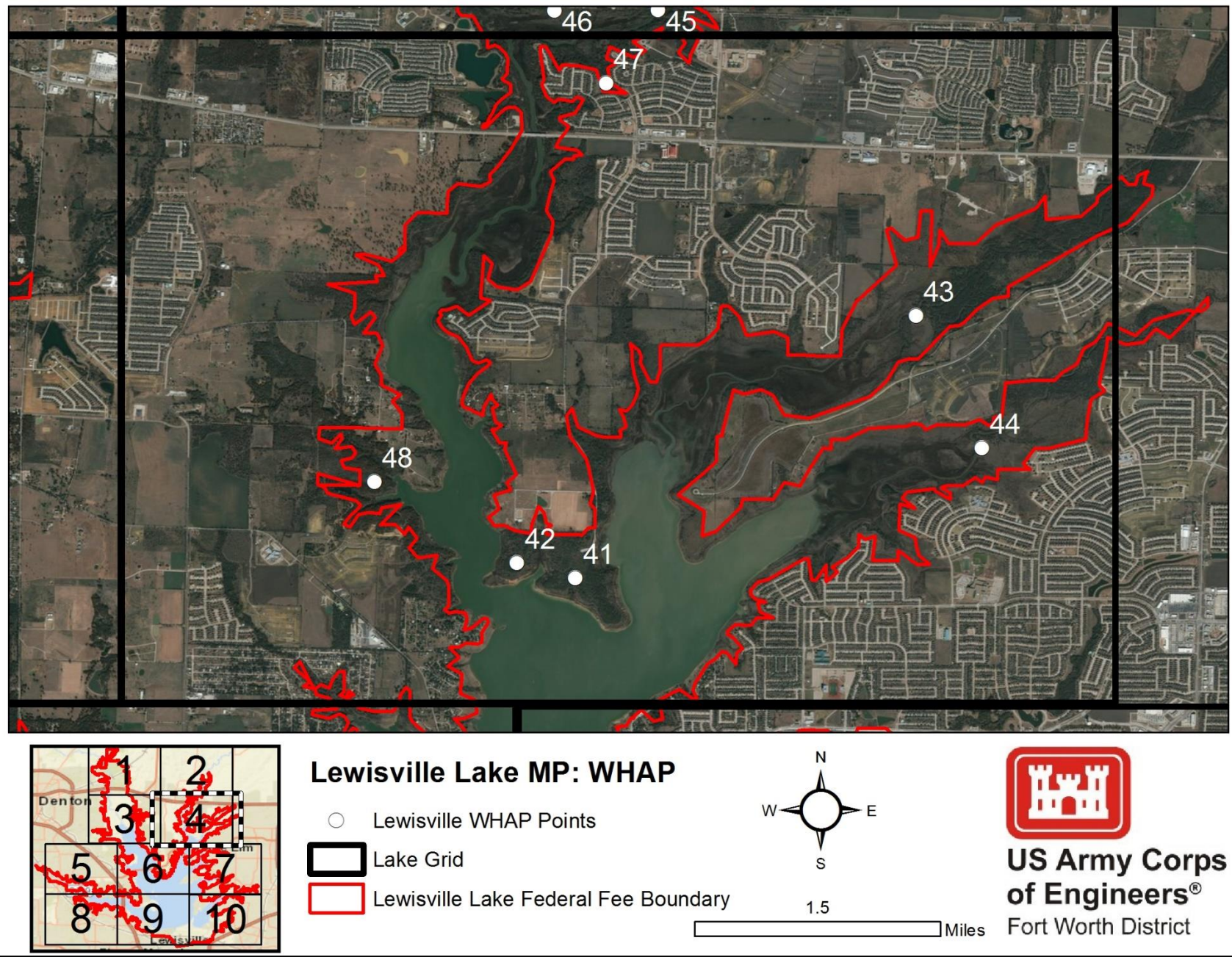


Figure 1D. Distribution of WHAP Points within the fee owned boundary at Lewisville Lake.

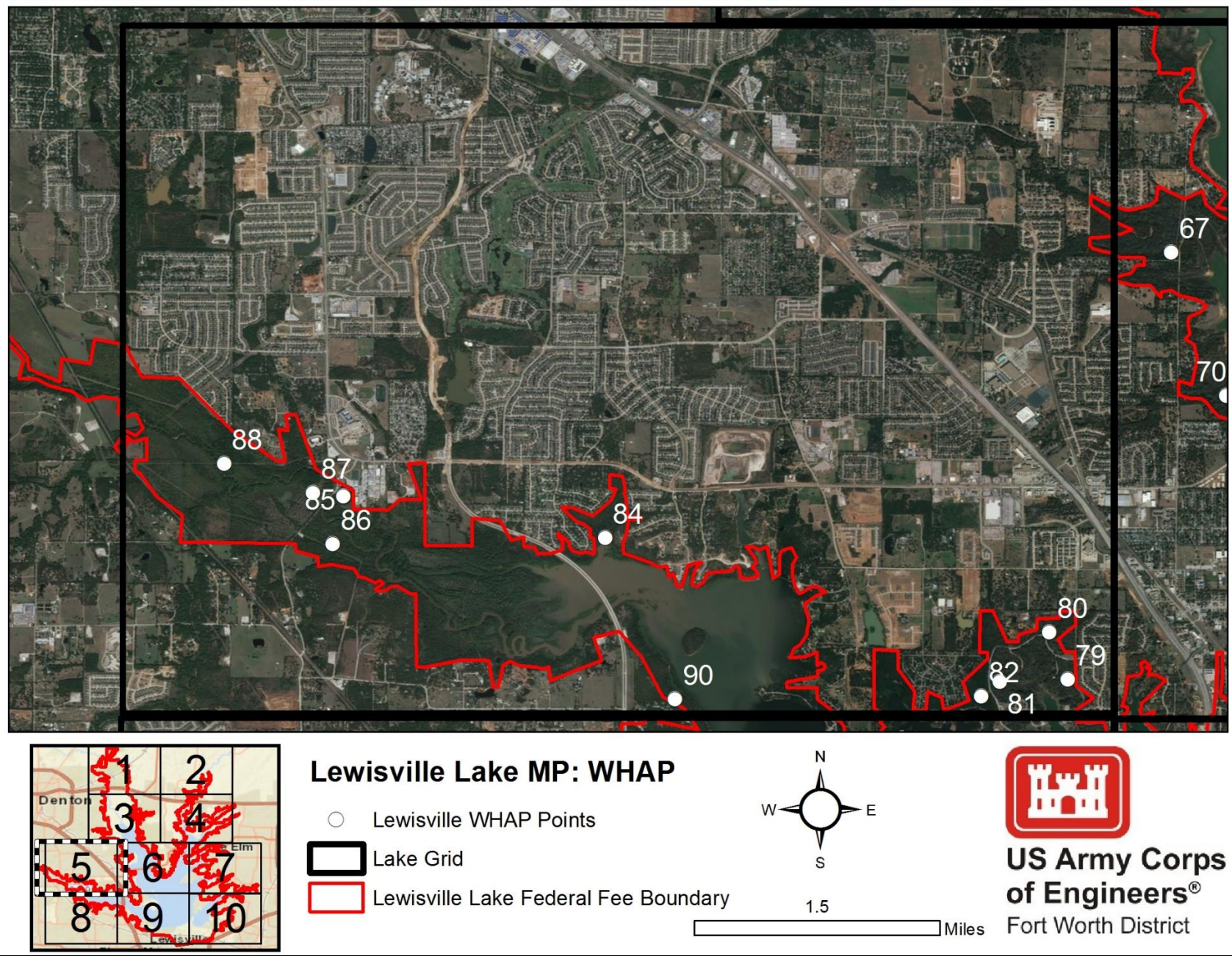


Figure 1E. Distribution of WHAP Points within the fee owned boundary at Lewisville Lake.

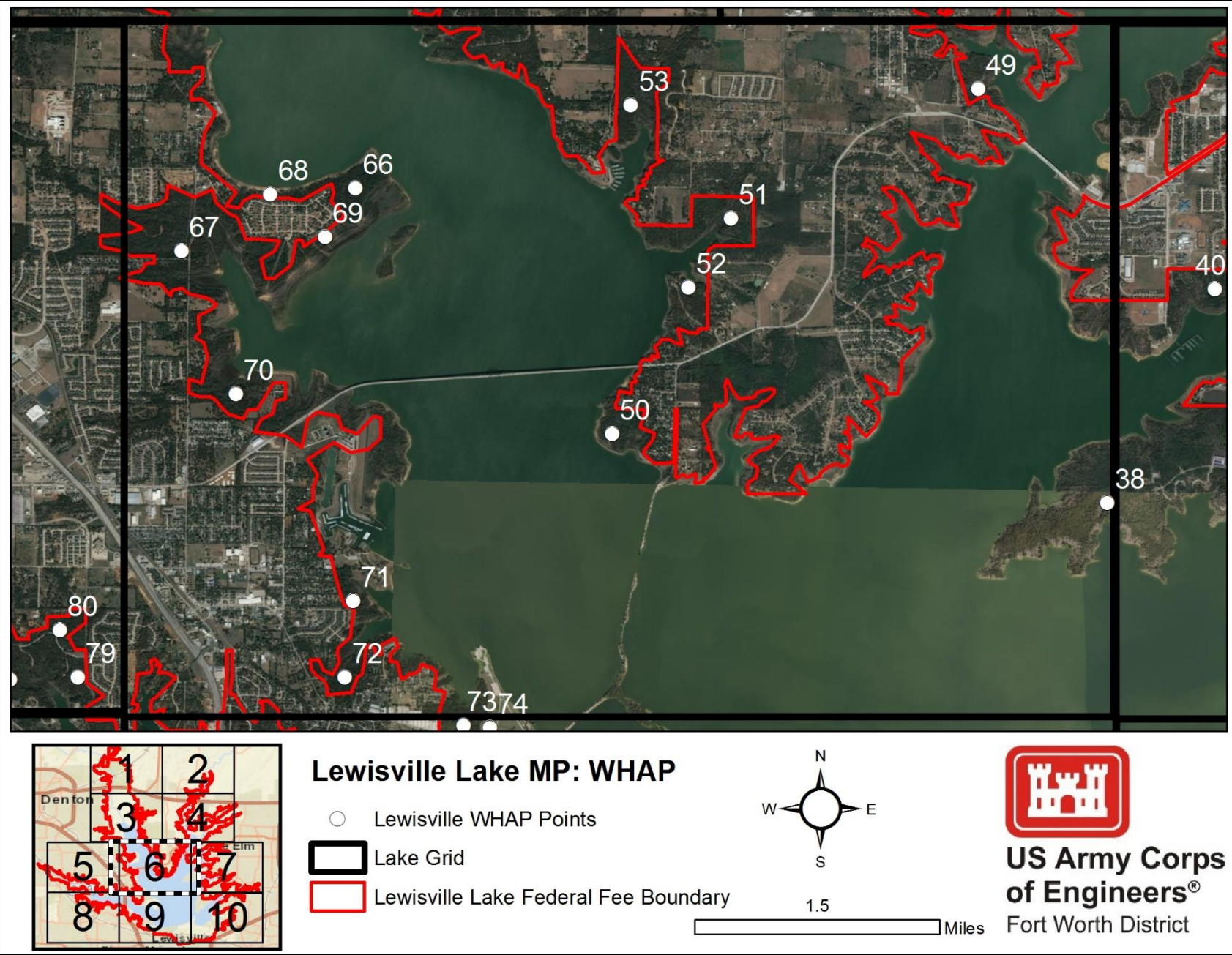


Figure 1F. Distribution of WHAP Points within the fee owned boundary at Lewisville Lake.

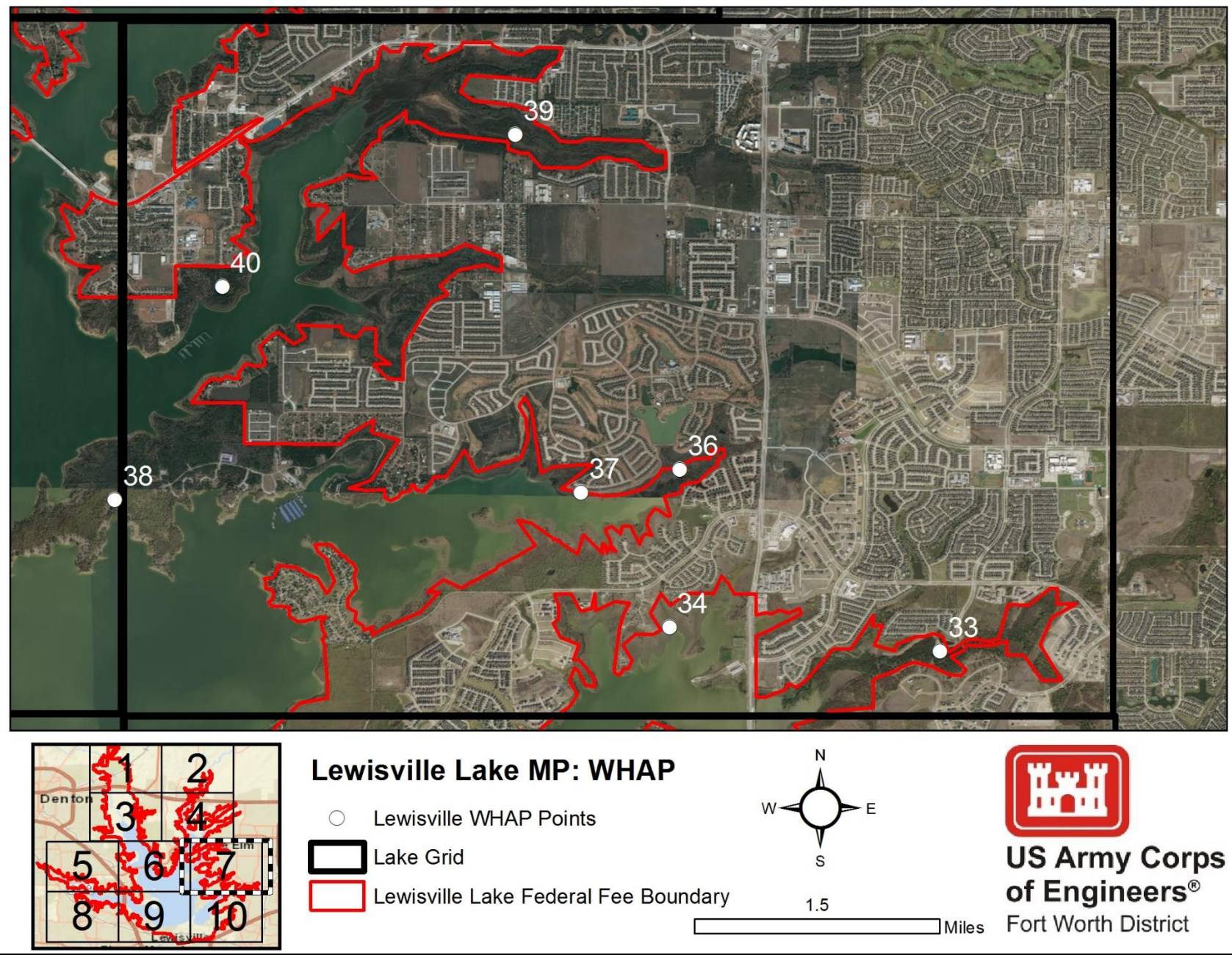


Figure 1G. Distribution of WHAP Points within the fee owned boundary at Lewisville Lake.

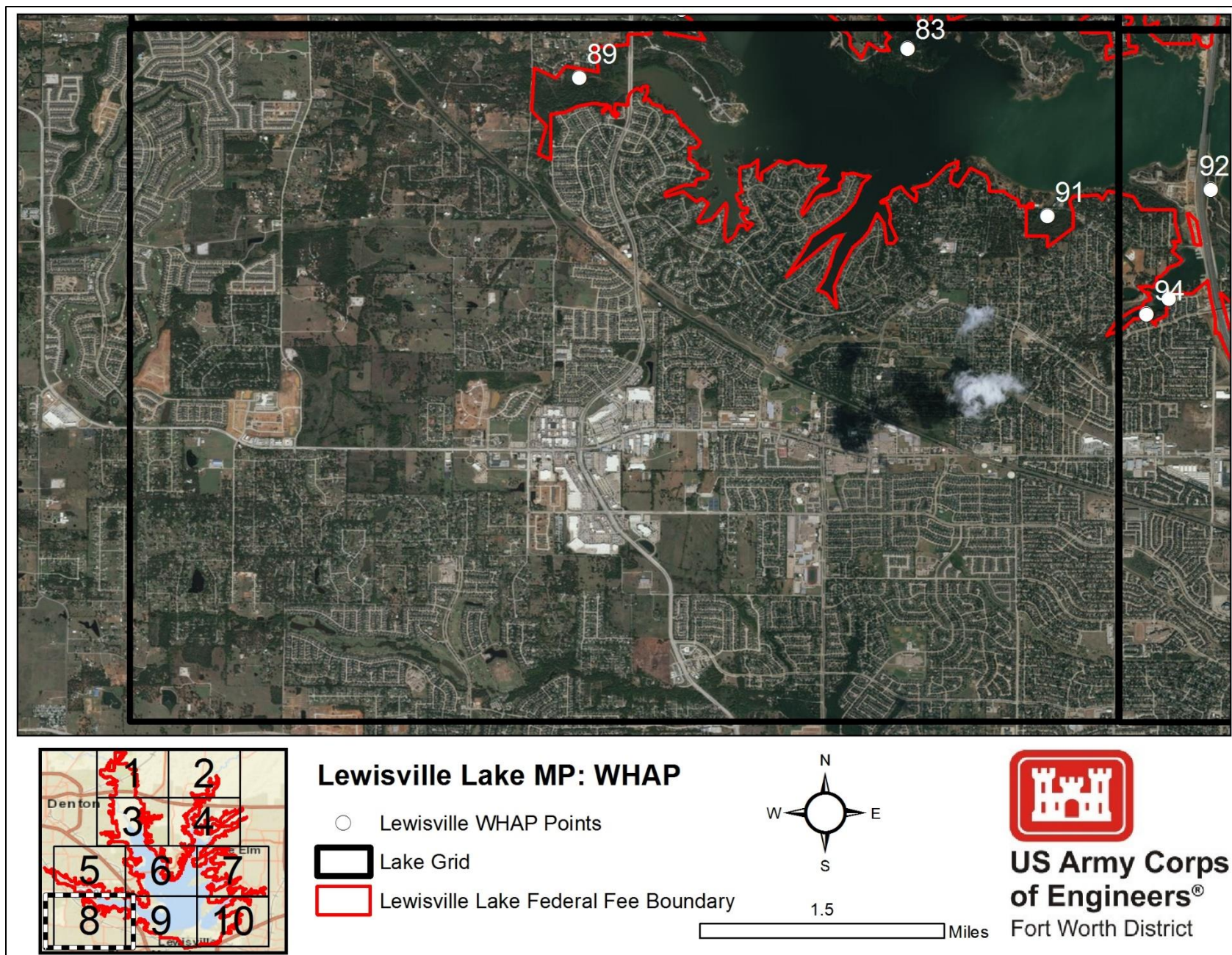


Figure 1H. Distribution of WHAP Points within the fee owned boundary at Lewisville Lake.

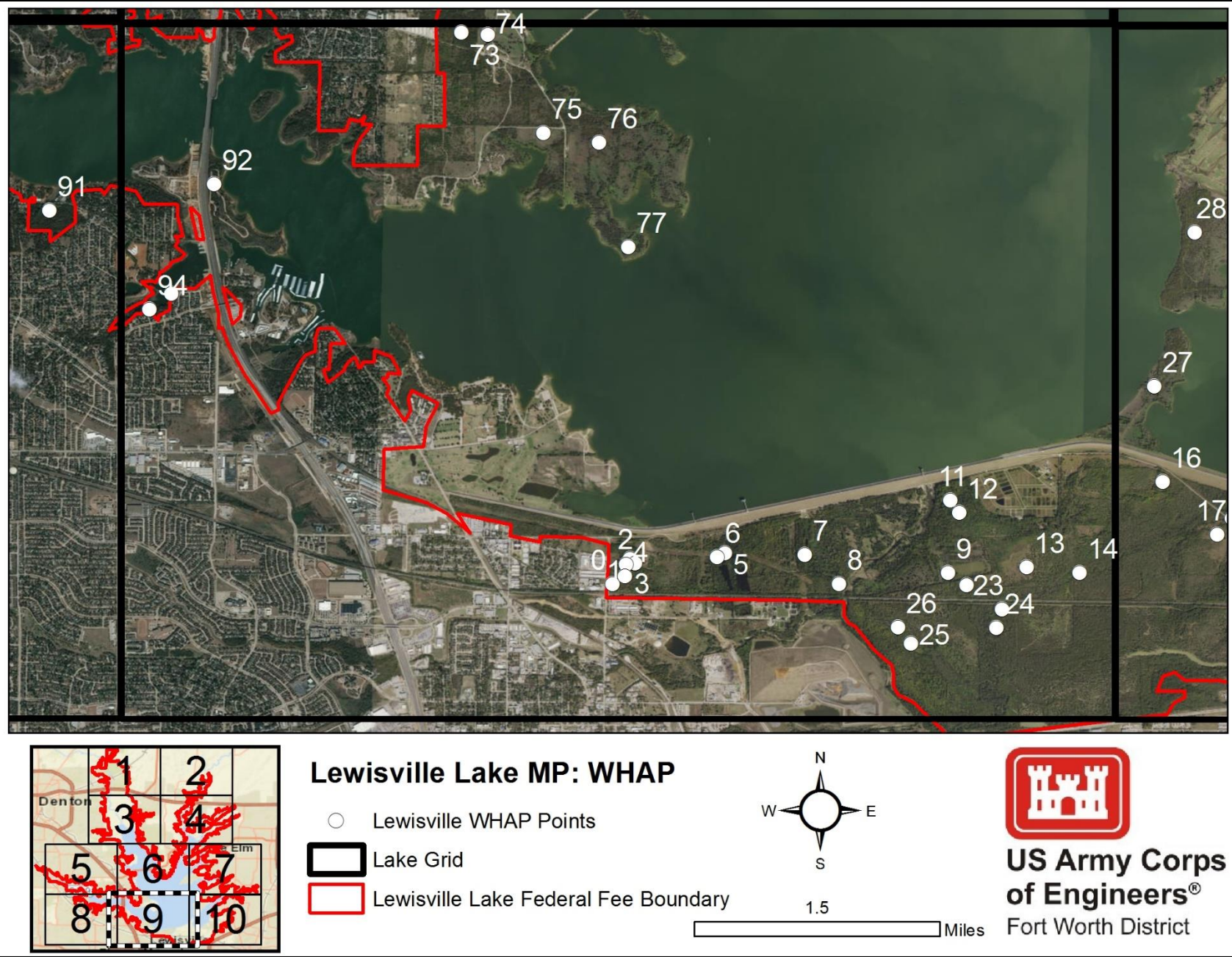


Figure 11. Distribution of WHAP Points within the fee owned boundary at Lewisville Lake.

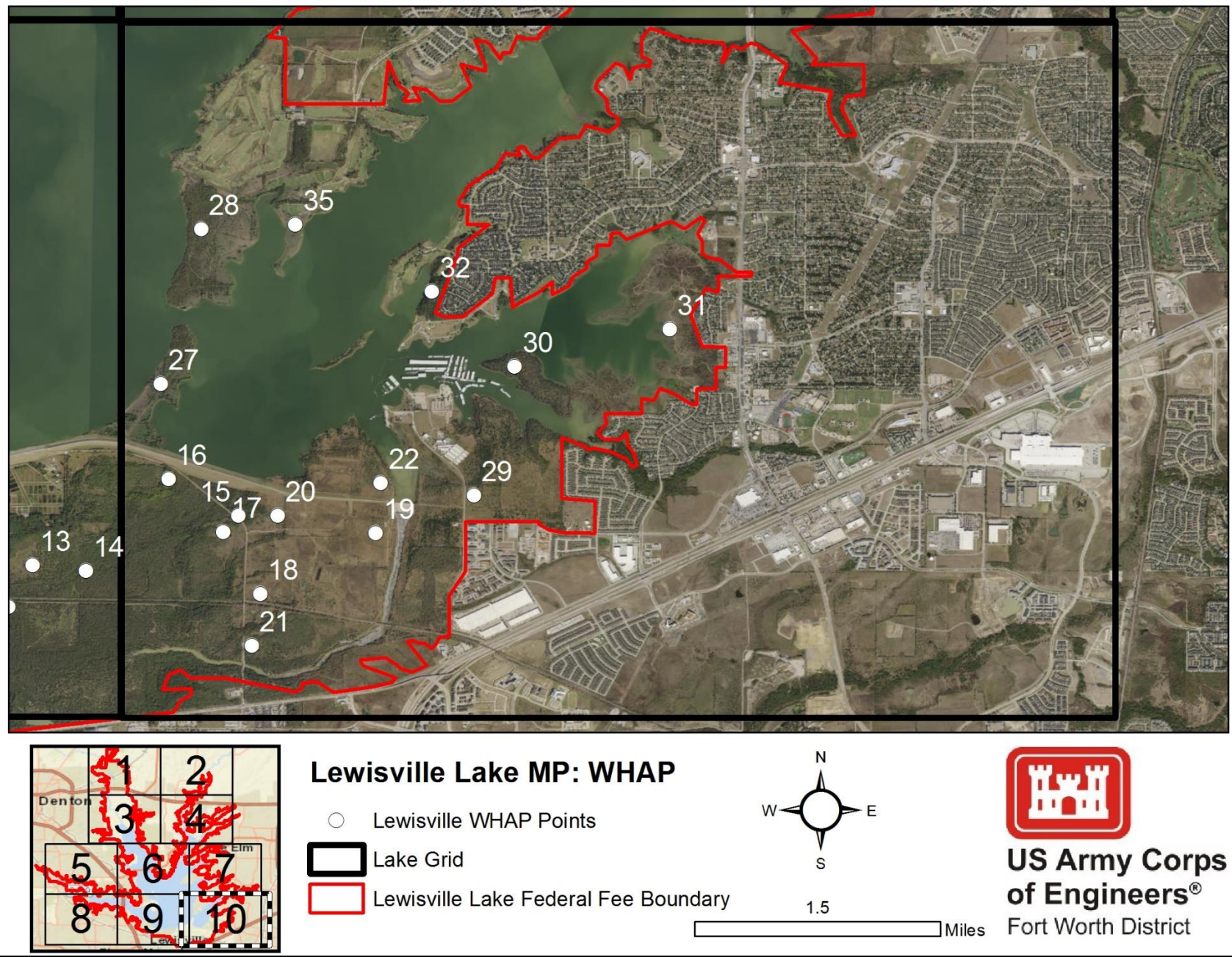


Figure 1J. Distribution of WHAP Points within the fee owned boundary at Lewisville Lake.

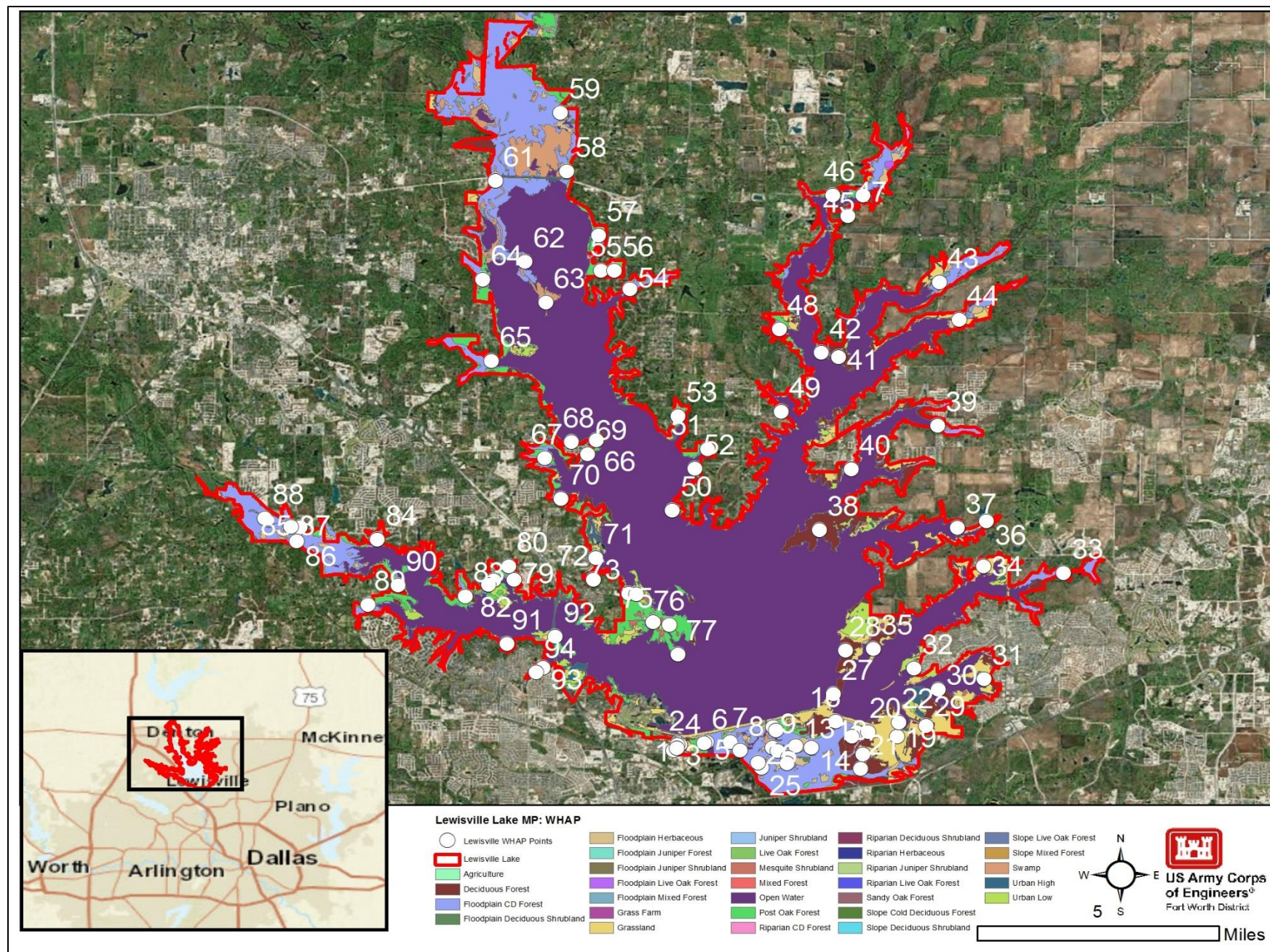


Figure 2. Distribution of Habitat Types within the fee owned boundary at Lewisville Lake.

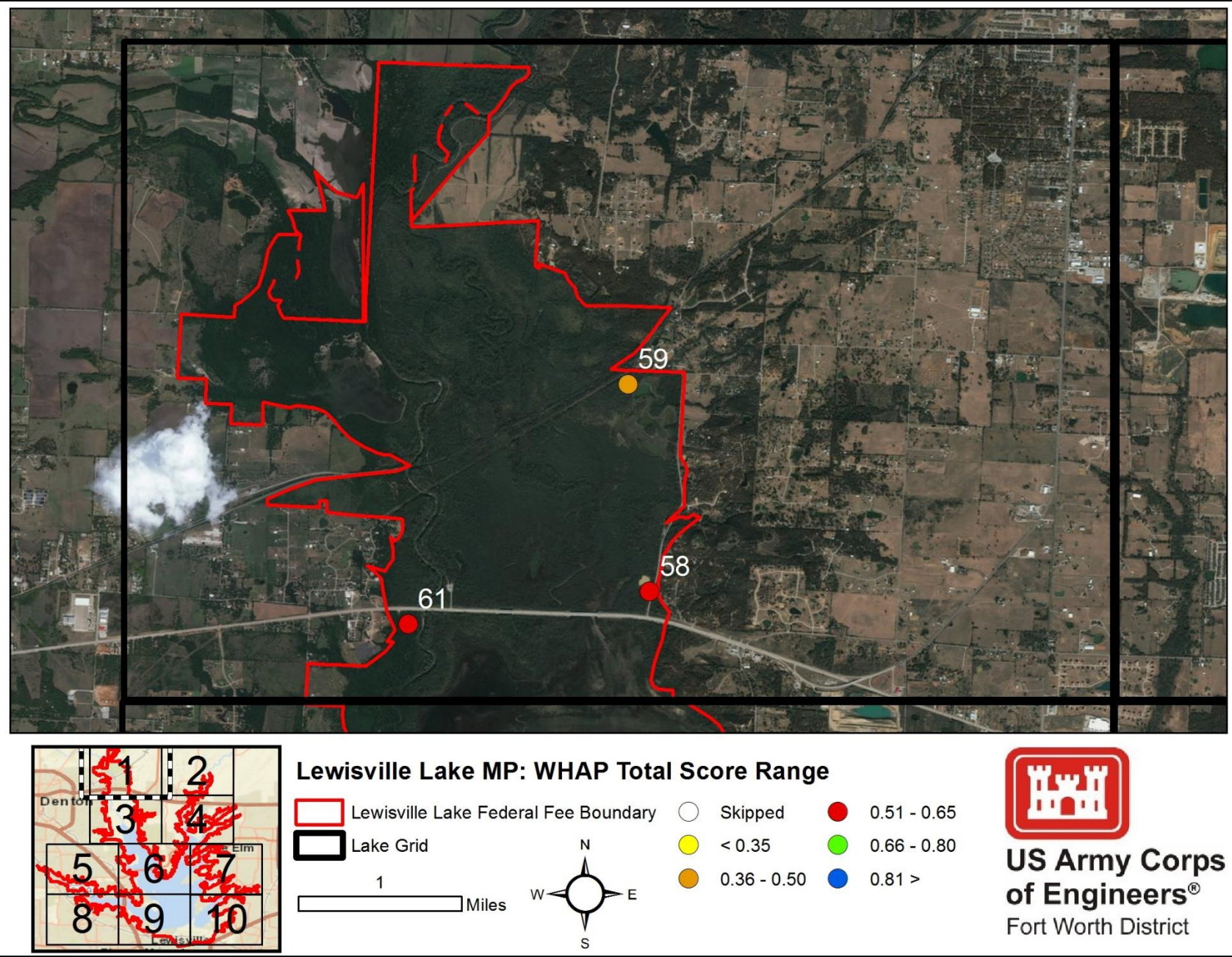


Figure 3A. Total Score Range for All Points Surveyed.

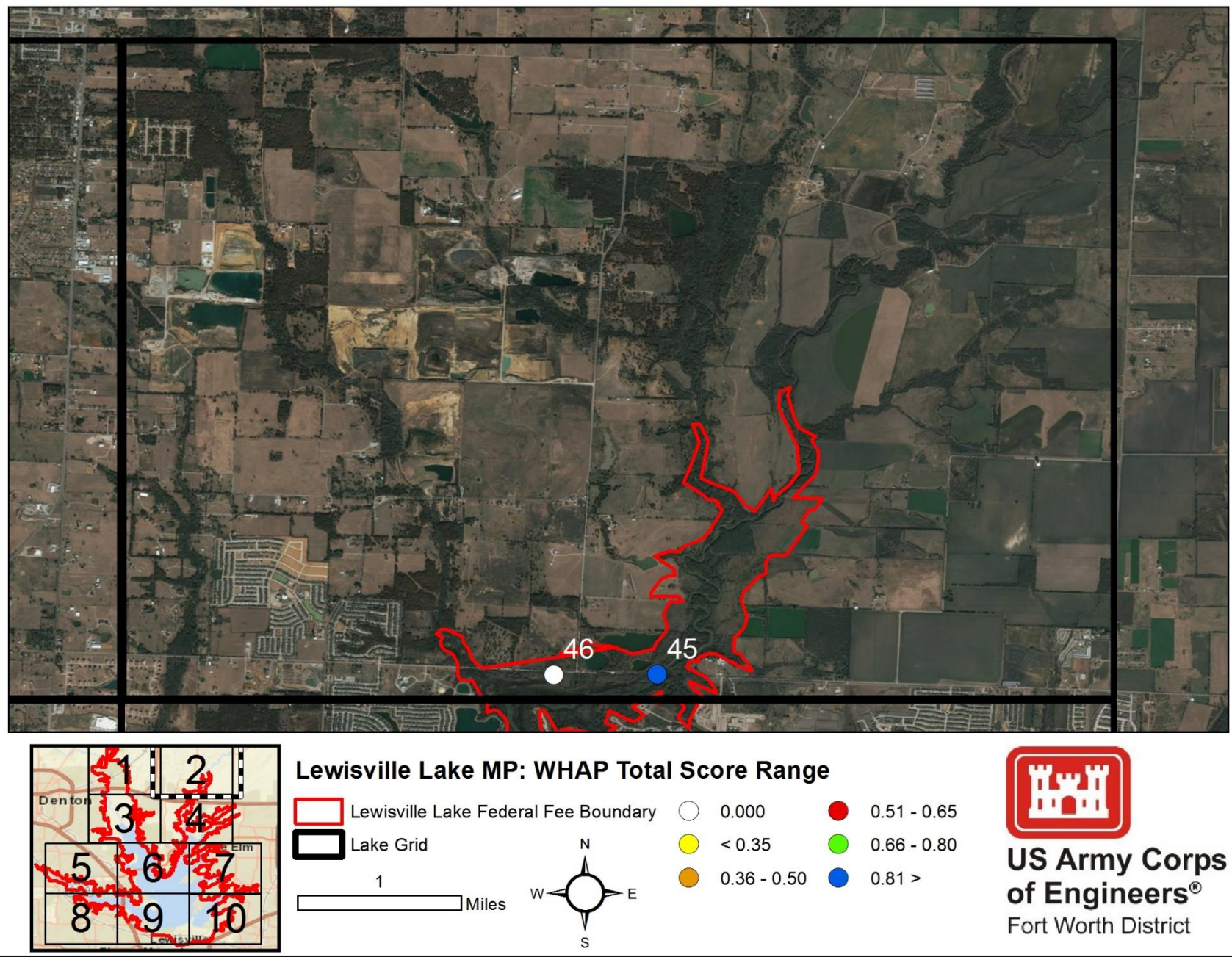


Figure 3B. Total Score Range for All Points Surveyed.

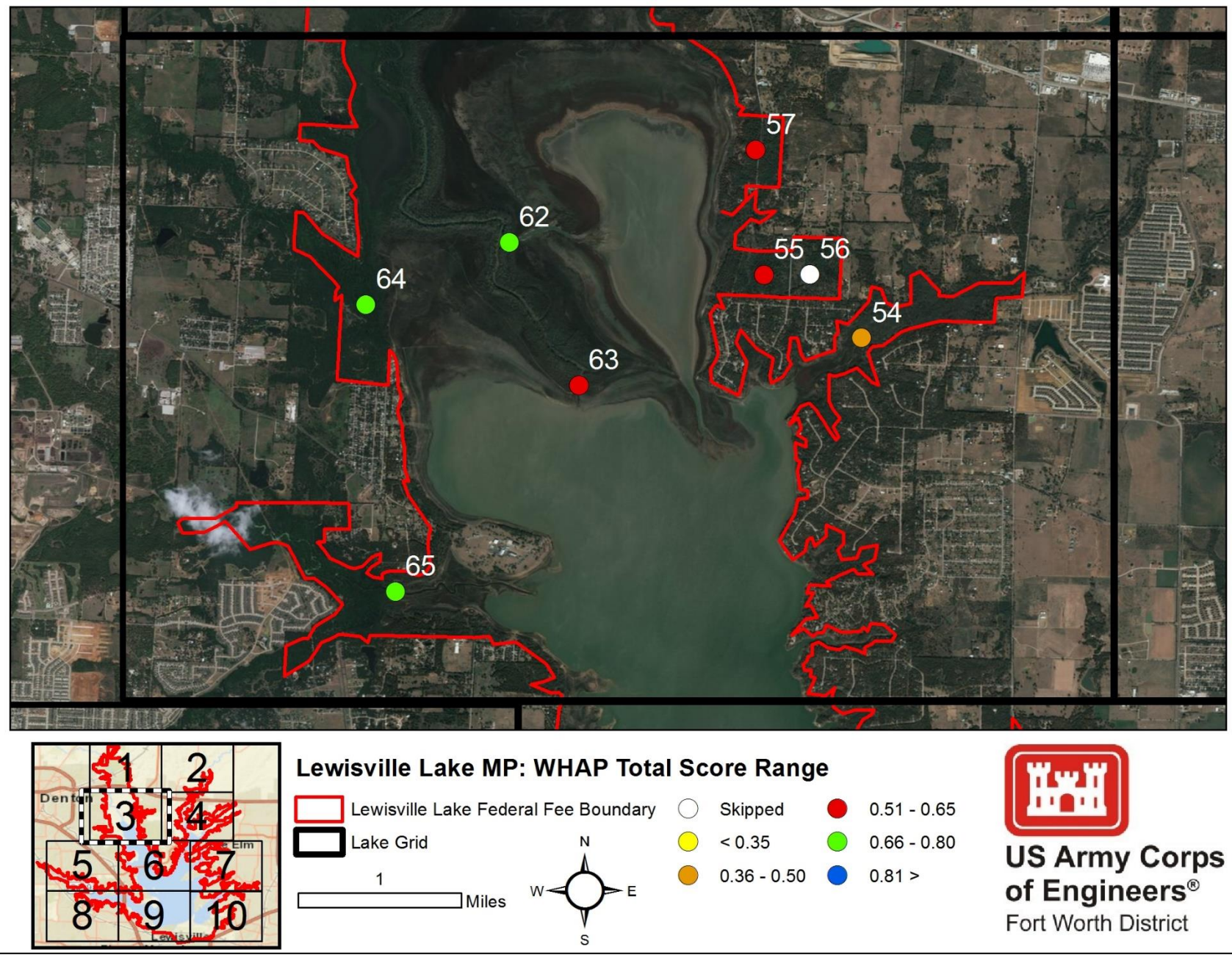


Figure 3C. Total Score Range for All Points Surveyed.

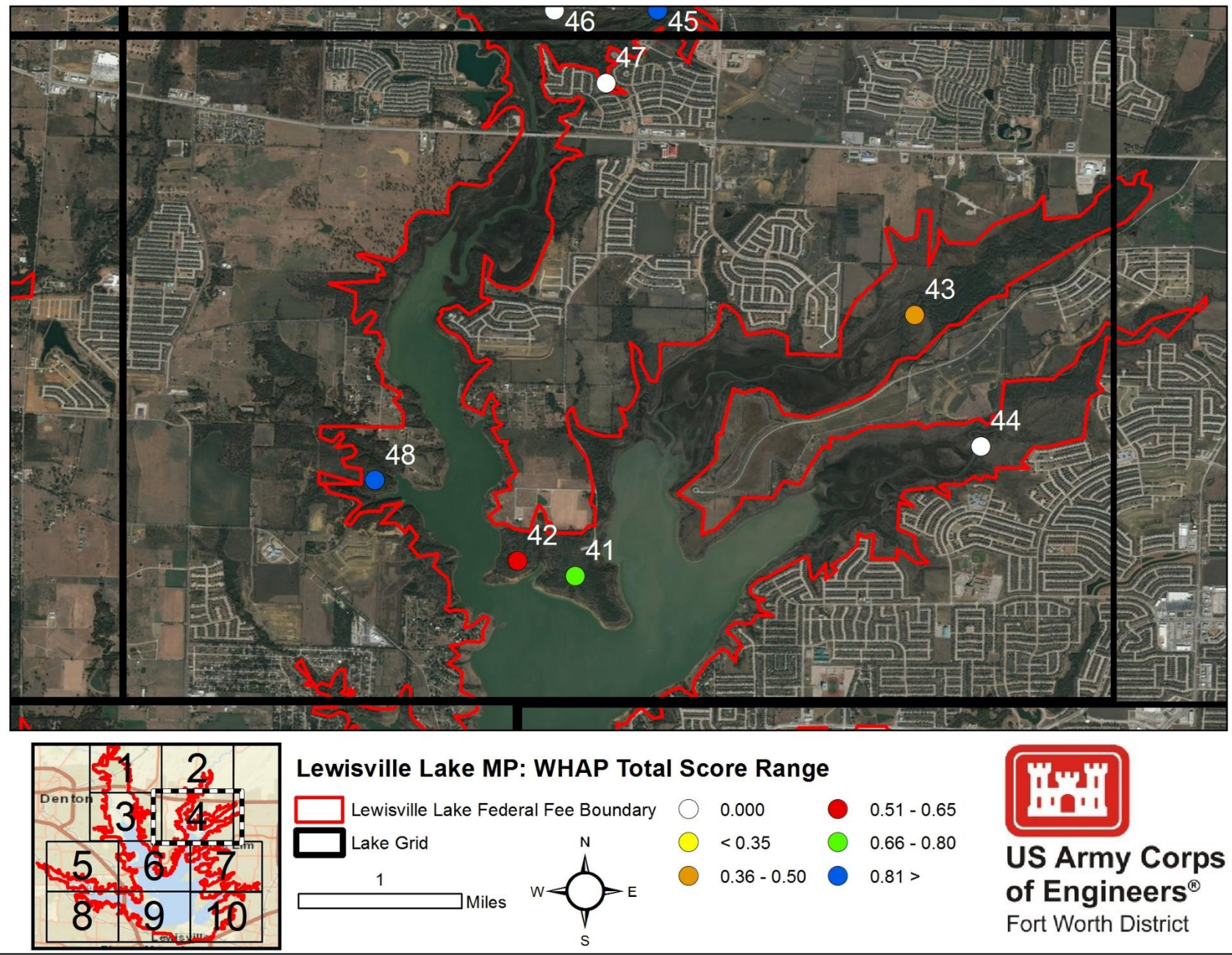


Figure 3D. Total Score Range for All Points Surveyed.

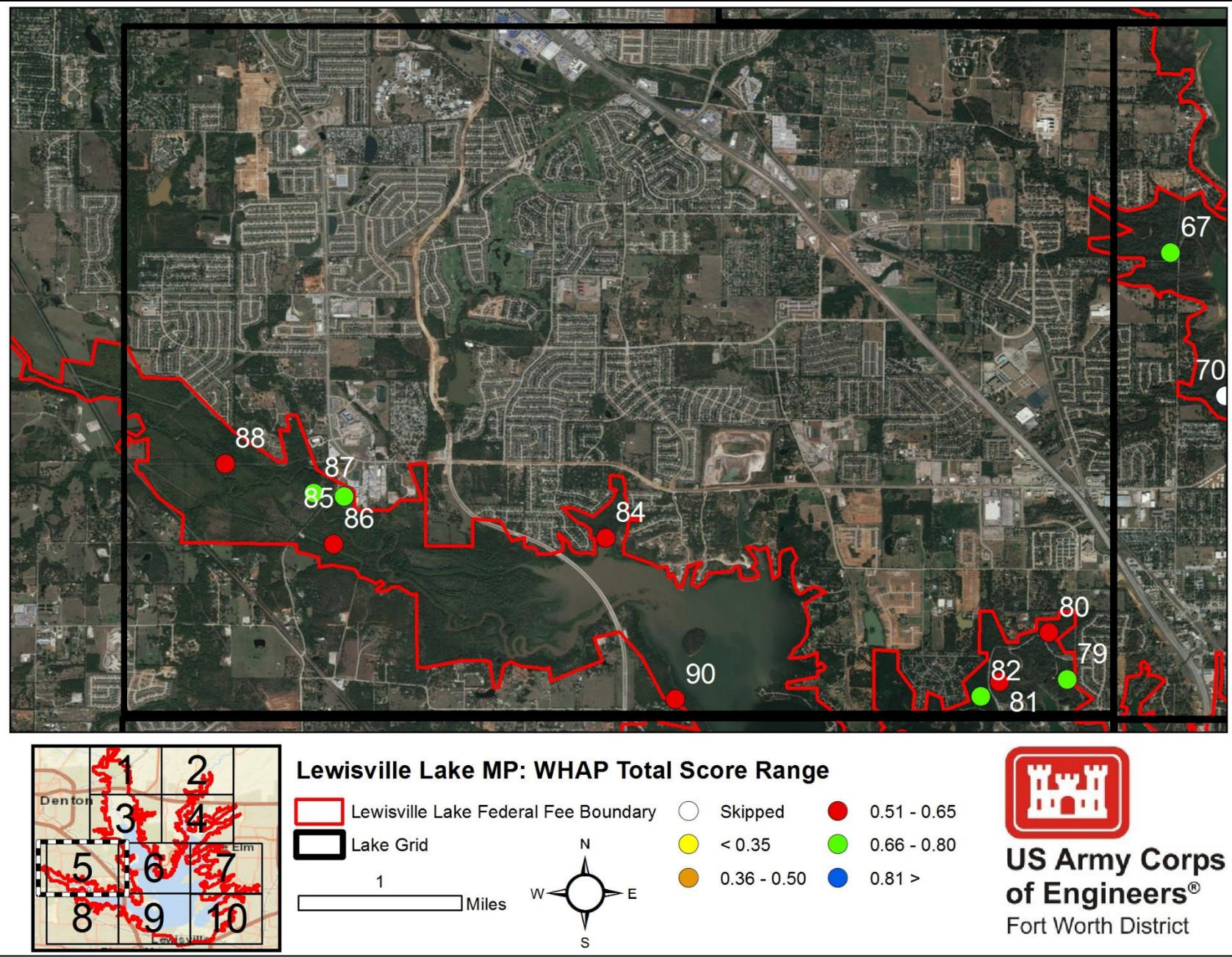


Figure 3E. Total Score Range for All Points Surveyed.

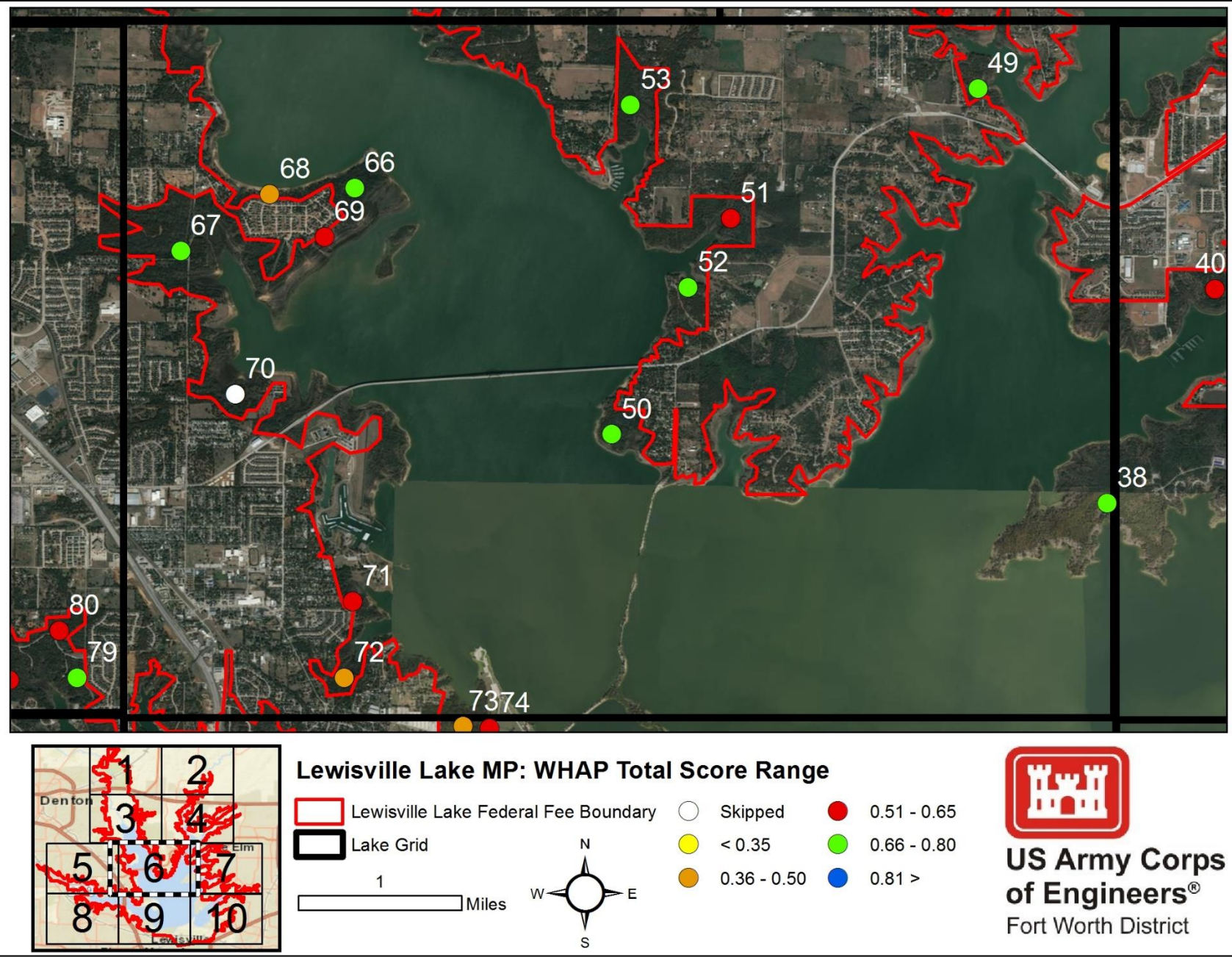


Figure 3F. Total Score Range for All Points Surveyed.

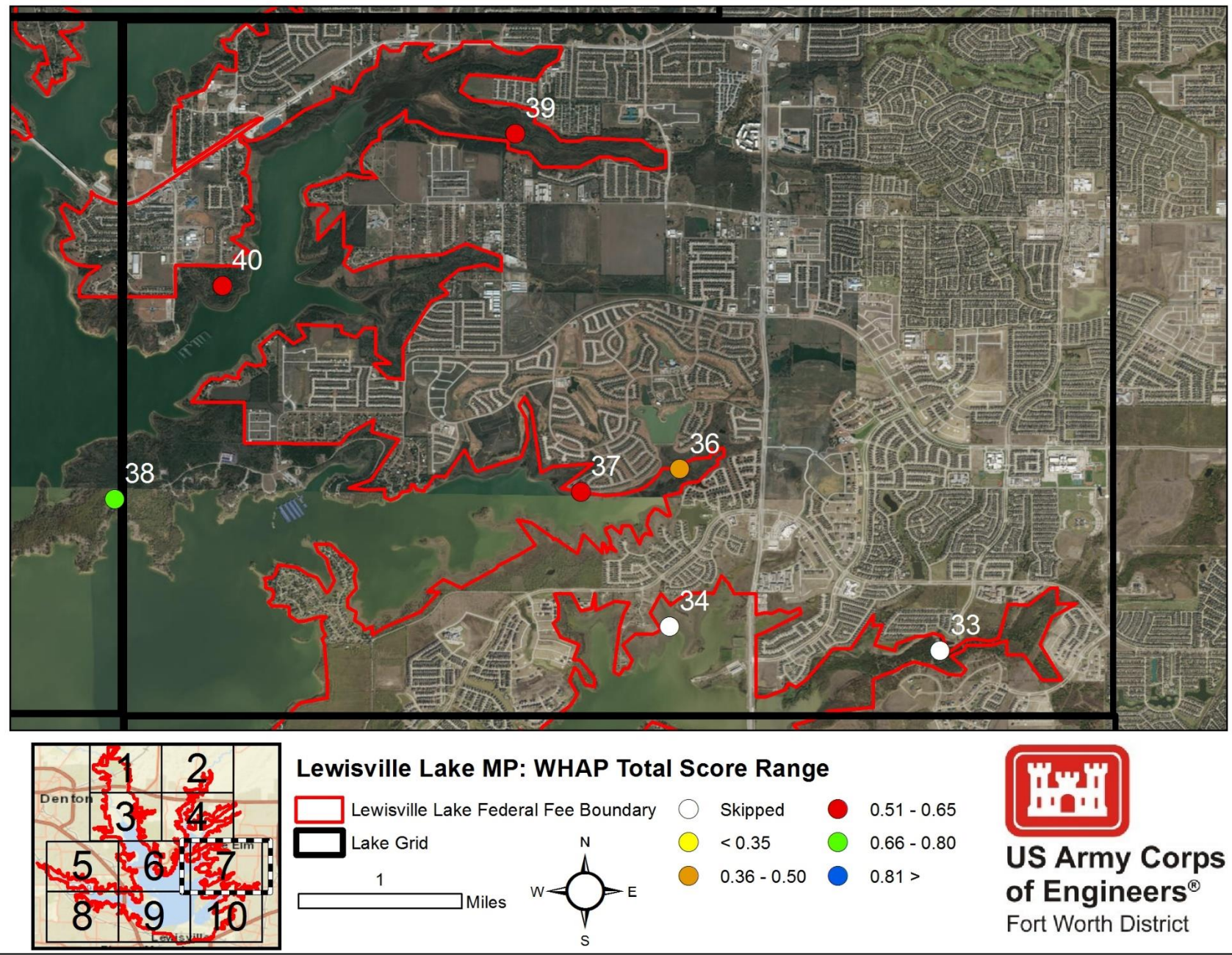


Figure 3G. Total Score Range for All Points Surveyed.

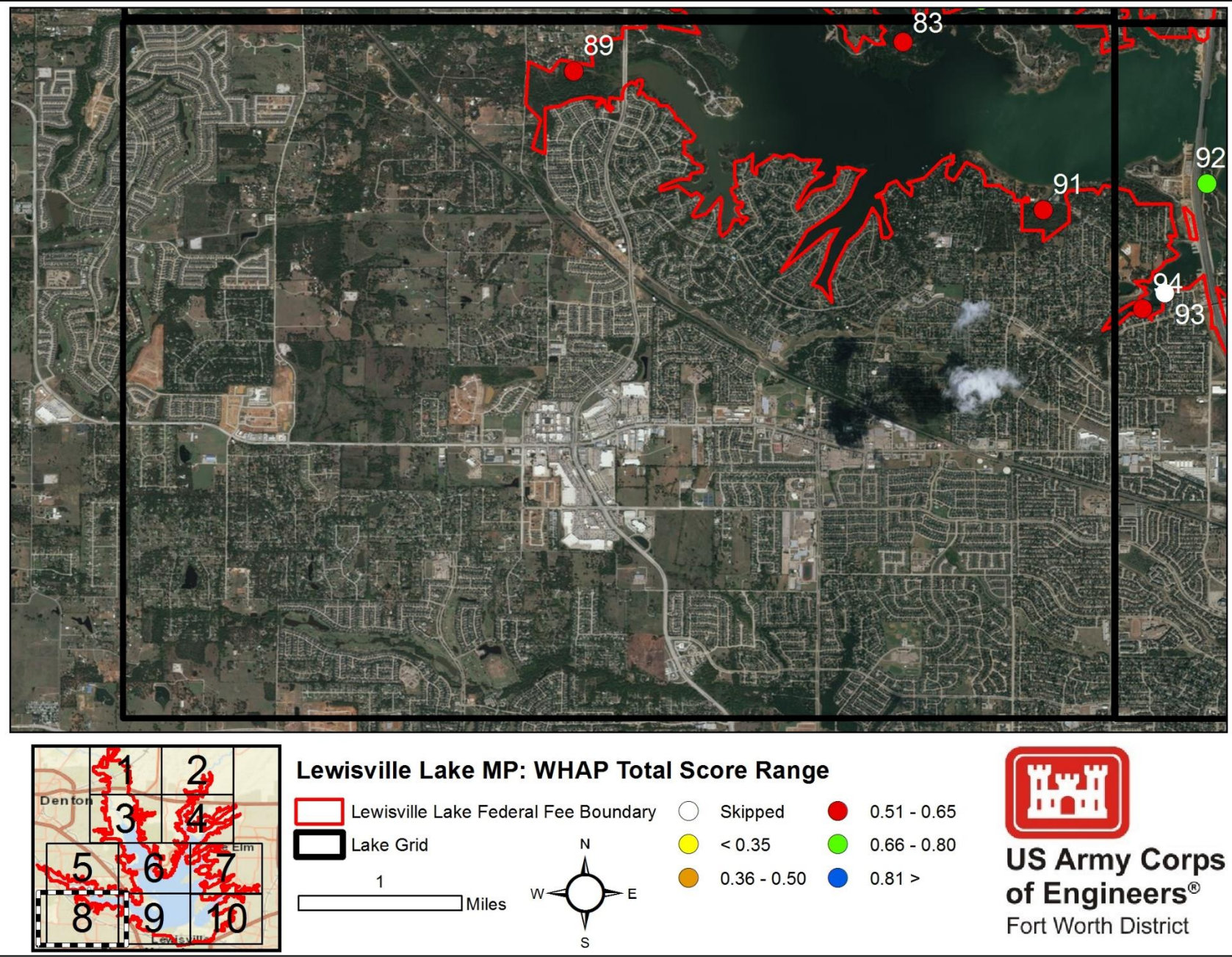


Figure 3H. Total Score Range for All Points Surveyed.

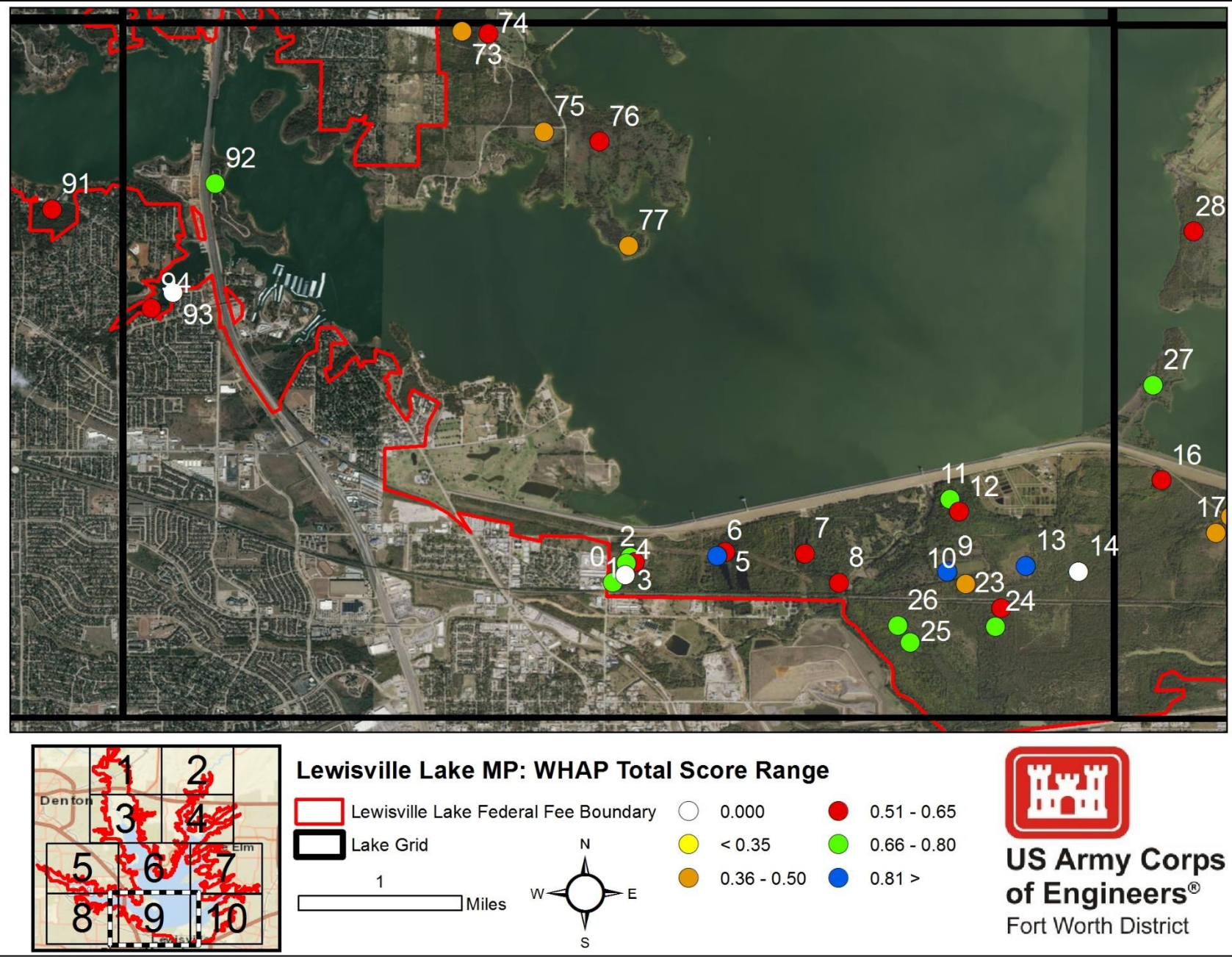


Figure 3I. Total Score Range for All Points Surveyed.

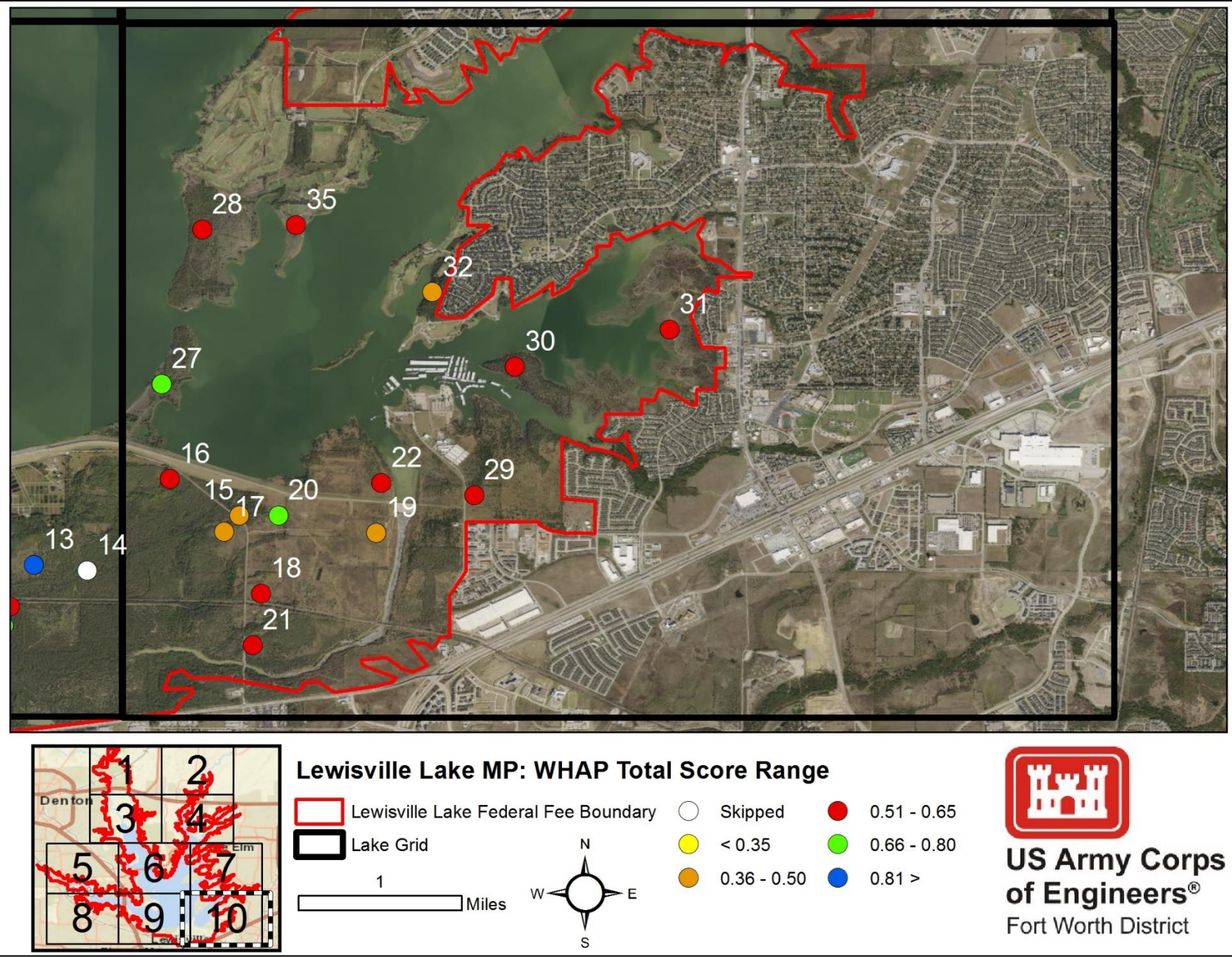


Figure 3J. Total Score Range for All Points Surveyed.

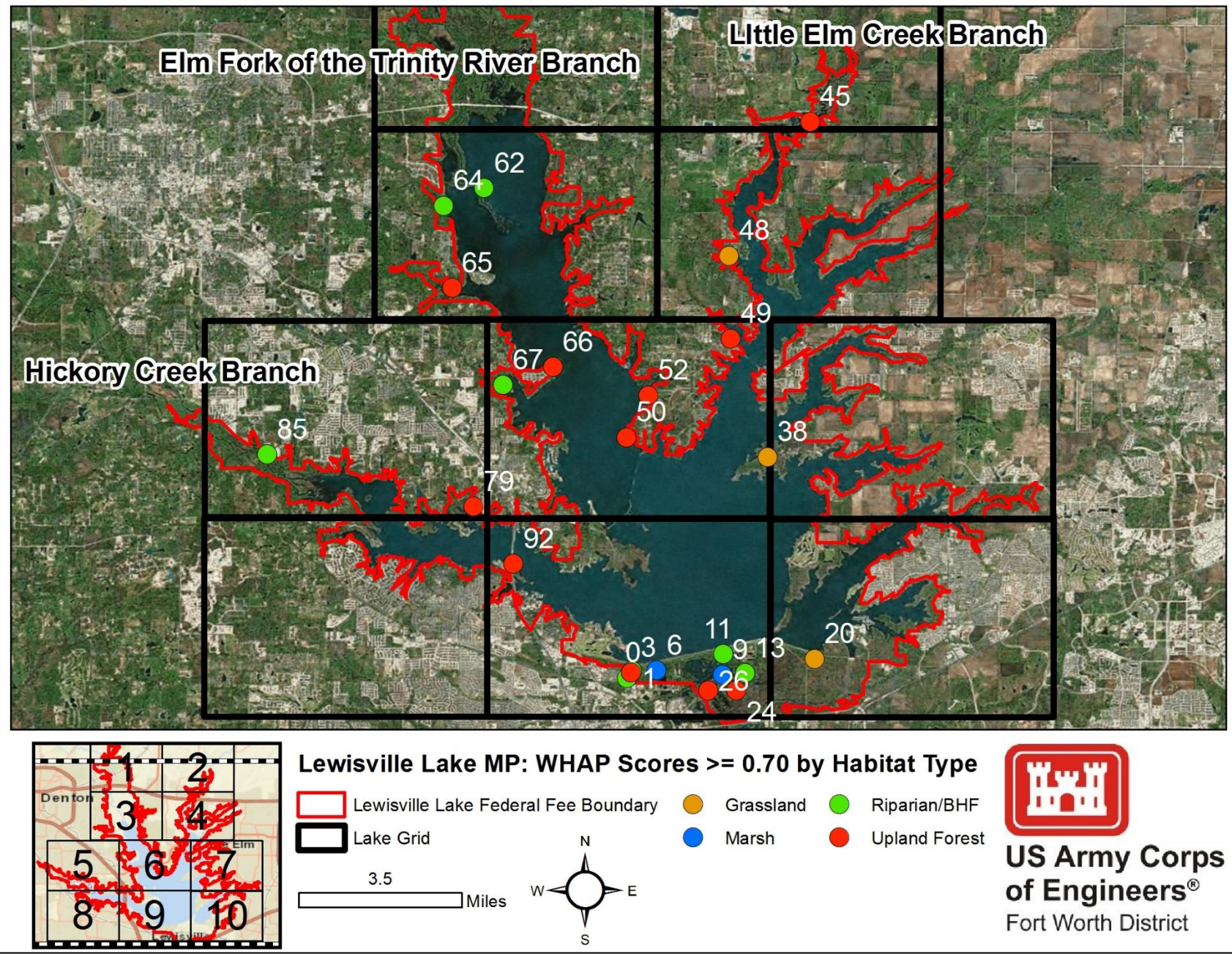


Figure 4. Distribution of WHAP Scores > 0.70 by Habitat Type.

Attachment A: Lewisville Lake WHAP Results Summary

Point Number	Habitat Group	Normalized Total Score	Berry Drupe	Legume Pod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Remarks
0	Riparian/BHF	0.71	Hackberry, Poison Ivy, Greenbrier, Yaupon, Gum Bumelia, Coralberry, Snailseed, Osage Orange, Plum, Japanese Honeysuckle, Pear Tree, Dewberry	1 unknown, Mesquite	Water Oak, Shumard Oak, Post Oak, Willow Oak	Pecan	White Ash, Cedar Elm	Juniper	none	Prickly Pear	Carex species, Wildrye, Sumpweed, 3 unknown forb, Golden Aster, Johnson Grass, Little Bluestem, Scribner Panicum, Western Ragweed, Snow on the Prairie	none
1	Riparian/BHF	0.70	Greenbrier, Virginia Creeper, Muscadine, Poison Ivy, Hackberry	none	Post Oak, Shumard Oak	Hickory	American Elm, Cedar Elm	Juniper	none	none	Carex, Inland Sea Oats	none
2	Riparian/BHF	0.55	Greenbrier, Poison Ivy, Privet	Redbud	Post Oak, Shumard Oak	none	Cedar Elm, Ash	Juniper	none	none	Carex	none
3	Upland Forest	0.74	Greenbrier, Poison Ivy, Virginia Creeper, Mustang Grape, Mulberry, Muscadine, Carolina Snailseed, Mulberry	none	Shumard Oak, Post Oak	Hickory	American Elm	Juniper	none	none	Inland Sea Oats, Carex	none
4	Skipped	Skipped	NA	NA	NA	NA	NA	NA	NA	NA	NA	none
5	Upland Forest	0.63	Poison Ivy, Peppervine, Greenbrier, Muscadine, Privet, Carolina Snailseed, Smilax	none	none	Hickory	none	none	none	Willow	none	none
6	Marsh	0.91	none	none	none	none	none	none	none	Willow	Duckweed, Smartweed, Algae, Cattail, Sedge	none
7	Riparian/BHF	0.61	1 unknown, Greenbrier, Poison Ivy, Snailseed, Hackberry	none	Shumard Oak, Bur Oak	none	Cedar Elm, Box Eldar, Ash	none	none	none	Carex species, Wildrye	none
8	Riparian/BHF	0.64	Greenbrier, Hackberry, Virginia Creeper, Poison Ivy, Peppervine	none	Shumard Oak, Bur Oak	Hickory	Cedar Elm, American Elm	none	none	Buttonbush, Willow	Boneset, Sumpweed, Bahiagrass, Water Hyacinth, Carex Species, Wildrye	none
9	Marsh	0.98	1 unknown, Peppervine	none	none	none	none	none	none	Willow, buttonbush	Bulrush, 1 unknown emergent, Illinois Pondweed Hydrilla, Lotus, Juncus, Cattail, Buttonbush, Morning Glory, Duck Potatoe, Pond Rush, Duckweed, Nut Sedge, Smartweed, Pickelweed, Water hemp	none
10	Riparian/BHF	0.47	Balloon Vine, Dewberry, Virginia Creeper, Poison Ivy, Hackberry	none	none	none	Ash, Cedar Elm	none	none	none	Sumpweed, Milkweed, White Aster, Love Grass, 1 unknown, Carex, Yellow Aster, Sedge, Boneset, Texas Aster, Snow on the Prairie, Aeromatic Aster	none
11	Riparian/BHF	0.79	Virginia Creeper, Peppervine, Privet, Hackberry, Mustang Grape, Poison Ivy, Muscadine, GreenBrier	none	Shumard Oak, Bur Oak	Pecan	Box Eldar, American Elm, Cedar Elm	Sycamore	none	none	Wildrye, Carex, White Aster, Sumpweed, Ragweed	Old Growth Sycamore, Pecan, Bur Oak
12	Riparian/BHF	0.64	American Beautyberry, Poison Ivy, Rattan Ivy, Hackberry, Privet, Greenbrier, Virginia Creeper, Mustang Grape, Muscadine, Mustang Grape	none	Shumard Oak, Bur Oak	Pecan, Hickory	Cedar Elm, American Elm, Box Eldar	none	none	Cottonwood	Wildrye, Inland Sea Oats, Carex species	100 yr old Bur Oak nearby

Point Number	Habitat Group	Normalized Total Score	Berry Drupe	Legume Pod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Remarks
13	Riparian/BHF	0.81	Chinese Privet, Hackberry, Ratton Vine, Holly, Snailseed, Virginia Creeper, Dogwood, Greenbrier, Gum Bumelia, Soap Berry, Rusty Hawthorn	Redbud	Shumard Oak, Red Oak	Pecan	Cedar Elm, Green Ash, American Elm	none	none	none	Carex species, Wildrye, White Aster, Beggars Lice	none
14	Skipped	Skipped	NA	NA	NA	NA	NA	NA	NA	NA	NA	none
15	Upland Forest	0.46	Virginia Creeper, Poison Ivy	Mesquite	none	none	Winged Elm	none	none	Osage Orange	Bunch Grass, Johnson Grass, Giant Ragweed	none
16	Upland Forest	0.58	Privet, Smilax	Mesquite	none	none	Cedar Elm, Winged Elm	none	none	Osage Orange	Carex species, 2 species of Panicum, Wildrye	none
17	Upland Forest	0.46	none	Mesquite	none	Ironwood	Winged Elm	none	none	none	Sunflower, Bushy Bluestem, Johnson Grass, Side Oats Grama, Purple Aster, False Boneset, Thistle, Wildrye, Bluestem, White Aster	none
18	Grassland	0.63	none	Mesquite	none	none	Winged Elm	none	none	none	Silver Bluestem, Scribner's Panicum, Lovegrass, Golden Rod, Western Ragweed, Johnson Grass, White Aster, Max. Sunflower	Moved to opposite side of road
19	Grassland	0.47	none	Mesquite	none	none	none	none	none	Prickly Pear	Goldenrod, Western Ragweed, Bunchgrass, Johnson Grass, 1 unknown	Recently burned
20	Grassland	0.71	none	Mesquite	none	none	none	none	none	Osage Orange	Goldenrod, Sacaton, Snow on the Prairie, Sunflower, Silver Bluestem, White Aster, Johnson Grass, Western Ragweed, Lovegrass, Dropseed	none
21	Upland Forest	0.62	Flameleaf Sumac, Virginia Creeper, Carolina Snailseed, Sumac, Poison Ivy, Hackberry, Greenbrier, Dewberry, Muscadine	none	Shumard Oak	none	Cedar Elm, Box Elder	Juniper	none	none	Carex, Lovegrass, 2 species of Panicum, Yellow Aster, White Aster	none
22	Grassland	0.59	Gum Bumelia, Hackberry, Plum	Mesquite	none	none	none	none	none	none	Fennel, Goldenrod, Silver Bluestem, Max. Sunflower, sunflower, Snow on the Prairie, Giant Ragweed, KRB, Sumpweed, Johnson Grass, Broomweed, Western Ragweed, Foxtail, 4 unknown, Aster, Doveweed	none
23	Riparian/BHF	0.62	Hackberry, Gum Bumelia, Greenbrier, Poison Ivy	none	none	none	Cedar Elm	none	none	Black Willow	Wildrye, Beggars Lice, Sumpweed, Echiochorus spp, Cyperus , Japenese Brome, Chickweed, Western Ragweed, Aster species, Frog Fruit, Carex species, Pondweed	none
24	Upland Forest	0.79	Rusty Hawthorn, Gum Bumelia, Poison Ivy, Greenbrier, honey suckle Snailseed, Muscadine, Smilax, Soapberry	Mesquite	none	none	Cedar Elm, Winged Elm, Green Ash	none	none	Osage Orange	White Aster, 3 unknown, Mimosa, Giant Ragweed, Wildrye, Fennel, Sorel, Sedge, Purple Aster, Sumpweed, Beggars Lice, Sunflower, False Boneset	none
25	Riparian/BHF	0.67	Greenbrier, Hackberry, Gum Bumelia, Poison Ivy, Carolina Snailseed, Decidious Holly	Honey Locust	Shumard Oak	none	Green Ash, Cedar Elm	Juniper	none	Buttonbush, Osage Orange	Carex species, Wildrye, Boneset, Nut Sedge, Smartweed, unknown forb	none
26	Upland Forest	0.71	Poison Ivy, Greenbrier, Snailseed, Toothache Tree, Western Soapberry, Hackberry, Chinese Privet, Chinaberry, Mustang Grape	none	none	none	Cedar Elm	none	none	none	Boneset, Wildrye, Blue Mist Flower, Smartweed, Aster, unknown forb, Inland Sea Oats	none

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Point Number	Habitat Group	Normalized Total Score	Berry Drupe	Legume Pod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Remarks
45	Upland Forest	0.89	Hackberry, Poison Ivy, Greenbrier, Coralberry, Carolina Snailseed, Mustang Grape, Deciduous Holly	Honey Locust	Bur Oak	Pecan	Green Ash, Box Elder, Cedar Elm	none	none	Black Willow, Osage Orange	Cocklebur, Giant Ragweed, Passion Flower, Mare's Tail, Carex Species, Beggars Lice, Sumpweed, Saw Leaf Daisy, unknown forb	none
46	Skipped	Skipped	NA	NA	NA	NA	NA	NA	NA	NA	NA	none
47	Skipped	Skipped	NA	NA	NA	NA	NA	NA	NA	NA	NA	none
48	Grassland	1.00	Gum Bumelia, Carolina Snailseed,	none	none	Black Hickory	Cedar Elm, White Ash	Juniper	none	none	Scribner Panicum, Big Bluestem, Little Bluestem, Wildrye, Sideoats Grama, Croton Species, Broomweed, Milkweed, Inland Seaoats, Japanese Brome, Doveweed, Purpletop, Blackeyed Susan, Beggars Lice, 2 species of Aster, Tickseed, Balloon Vine , Foxtail	none
49	Upland Forest	0.74	Greenbrier, Hackberry, 2 kinds of Greenbrier, Carolina Snailseed, Dewberry	Honey Locust	Post Oak	none	Cedar Elm, American Elm	none	none	Osage Orange, Buttonbush	Mare's Tail, Beggars Lice, 2 unknown forbs, Carex species, Giant Ragweed, Scribner Panicum, Fleabane, Aster Species, Johnson Grass	none
50	Upland Forest	0.73	Chinese Privet, Wild Plum, Hackberry, Roughleaf Dogwood, Gum Bumelia, Greenbrier	none	Post Oak	none	Cedar Elm	Ash Juniper	none	Osage Orange	none	none
51	Upland Forest	0.64	Hackberry, Greenbrier, Gum Bumelia, Chinese Privet, Mulberry, 1 unknown vine, Poison Ivy, Coralberry	none	Post Oak, Shumard Oak	none	Cedar Elm, White Ash	Juniper	none	Opuntia species	Partridge Pea, Carex species, Purple Top, Wildrye, Scribner Panicum, Coralberry, unknown forb, Little Bluestem, gayfeather, Cyperus, 1 unknown	none
52	Upland Forest	0.71	Hackberry, Greenbrier, Chinese Privet, Poison Ivy, Coralberry, Gum Bumelia, Toothache Tree	none	Post Oak	none	Green Ash	Juniper	none	none	Partridge Pea	none
53	Upland Forest	0.68	Hackberry, Chinese Privet, American Holly, Greenbrier, Carolina Snailseed, Gum Bumelia, unknown species	Legume Spp, Redbud	Post Oak, Shumard Oak	none	Cedar Elm	Juniper	none	none	Inland Sea Oats, Boneset, Carex Species	none
54	Riparian/BHF	0.49	Yaupon, Greenbrier	none	none	none	none	none	none	Black Willow, Buttonbush	Smartweed, Sesbania x2, Barnyard Grass, unknown vine	none
55	Upland Forest	0.56	Privet, Greenbrier, Hackberry	Mesquite	Post Oak	none	Winged Elm	Juniper	none	none	Scribner's Panicum, Carex	none
56	Skipped	Skipped	NA	NA	NA	NA	NA	NA	NA	NA	NA	none
57	Upland Forest	0.52	Greenbrier, Virginia Creeper, Privet	none	Post Oak, Blackjack Oak	none	Cedar Elm, Prickly Ash	Juniper	none	Prickly Pear	Bunch Grass, Sedge, Western Ragweed, Fleabane, Scribner Panicum	none
58	Upland Forest	0.62	Carolina Snailseed, Greenbrier, Hackberry	Honey Locust	none	none	American Elm	none	none	Cottonwood, Osage Orange	none	none
59	Riparian/BHF	0.50	Hackberry	Locust	Shumard Oak	Pecan, Hickory	Winged Elm	none	none	none	Giant Ragweed, Carex species, Scribners Panicum	none
60	Riparian/BHF	0.63	Virginia Creeper, Dewberry, Mustang Grape, Hackberry, Mulberry, Carolina Snailseed	none	Willow Oak	none	American Elm	none	Sycamore	Cottonwood	Clover Weed, Giant Ragweed, Fleabane, Carex, Purple Flower unknown	none
61	Riparian/BHF	0.59	Poison Ivy, Greenbrier, Hackberry	none	Willow Oak	none	American Elm	none	none	Cottonwood	Carex, Ragweed, Wildrye	none
62	Riparian/BHF	0.72	Poison Ivy, Mulberry	none	none	none	Cedar Elm, Box Elder	none	Sycamore	Black Willow, Buttonbush, Cottonwood	Panicum, Aster, Carex Species, Smartweed, unknown vine, Boneset, Cyperus Species, Frog Fruit	none
63	Riparian/BHF	0.54	Yaupon	none	none	none	none	none	none	Black Willow, Buttonbush	none	none

Point Number	Habitat Group	Normalized Total Score	Berry Drupe	Legume Pod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Remarks
64	Riparian/BHF	0.72	Poison Ivy	Honey Locust	none	none	Green Ash, Cedar Elm	none	none	Buttonbush, Blackwillow, cottonwood	Unknown vine, Devil Weed, Plucker Species, Gourd Species, Smartweed, 2 Carex Species, Cyperus species, Sagittaria species, False Nettle, Lovegrass, Aster Species	none
65	Upland Forest	0.73	Rough Leaf Dogwood	none	none	none	none	none	none	Black Willow, Buttonbush	Aster Species, unknown vine, Smartweed, Switchgrass, Duckweed, Ironweed, Water Hemlock, Carex species, 2 unknown, Sesbania species, Juncas, Cattail, bushy bluestem, Cyperus	none
66	Upland Forest	0.73	Chinese Privet, Dewberry, Huckleberry, Coralberry, Chinaberry, Greenbrier, American Beautyberry, Poison Ivy, Rattton Vine	none	Post Oak	Pecan	Cedar Elm, American Elm, Green Ash	Juniper, Ashe Juniper	none	none	Peppervine	none
67	Riparian/BHF	0.70	Greenbrier, Summer Grape, Muscadine, Smilax, Hackberry	none	Shumard Oak	none	Box Elder, Cedar Elm, American Elm	none	none	none	Wildrye, Carex Species, Sumpweed, Ragweed, Inland Sea Oats, Squirreltail	none
68	Riparian/BHF	0.47	Snailseed, Greenbrier, Poison Ivy, Hackberry, Dewberry, Bradford Pear	none	Post Oak	none	Cedar Elm, Box Elder	Juniper	none	Cottonwood	Partidige Pea, Bermuda, Cyperus Species, Carex Species	none
69	Upland Forest	0.53	Snailseed, Dewberry, Bradford Pear, Greenbrier, Common Persimmon	none	Shumard Oak	Pecan	Cedar Elm	none	none	Cottonwood, Buttonbush	Scribner Panicum, Jungle Ricegrass, Aster Species, False Nettle, Western Ragweed, Cocklebur, Partridge Pea. Lovegrass, Giant Ragweed, unknown forb, Little Bluestem, Peppervine	none
70	Skipped	Skipped	NA	NA	NA	NA	NA	NA	NA	NA	NA	No access
71	Upland Forest	0.54	Greenbrier, Poison Ivy, Snailseed, Privet, Peppervine	Honey Locust	Post Oak	none	Ash	none	none	none	Boneset, Carex, Sumpweed, Ragweed	none
72	Upland Forest	0.45	Greenbrier, Poison Ivy, Privet	none	Post Oak	none	Cedar Elm, Winged Elm, Ash	Juniper	none	none	Carex, Scribner Panicum species, Ragweed, Boneset, Wildrye	none
73	Upland Forest	0.43	Greenbrier	none	Post Oak	none	Cedar Elm, Ash, Winged Elm	Juniper	none	none	Carex, Wildrye	none
74	Grassland	0.65	Smilax	Locust	none	none	Elm	none	Baccharis	none	Little Bluestem, Lovegrass, Johnson Grass, Squirreltail, Silver Bluestem, Panicum	none
75	Upland Forest	0.45	Greenbrier, Virginia Creeper, Muscadine	Locust	none	none	Cedar Elm	none	none	Buttonbush	Boneset, Carex Species, Fleabane, Scribner Panicum, Sumpweed	none
76	Grassland	0.60	Decidious Holly, Smilax, Virginia Creeper	none	none	none	none	none	none	none	Western Ragweed, Scribners Panicum, Boneset, Rattleweed, unknown plant	none
77	Upland Forest	0.48	Hackberry, Dewberry	none	none	none	none	none	none	Buttonbush	Sumpweed, Cyperus species, Prairie Vervain, Boneset, Balloon Vine, cool season grass, Dodder, Mare's Tail, Western Ragweed, unknown forb	none
78	Skipped	Skipped	NA	NA	NA	NA	NA	NA	NA	NA	NA	none
79	Upland Forest	0.73	Greenbrier, Poison Ivy, Persimmon, Dewberry	Honey Locust	Post Oak	none	Cedar Elm	none	none	Black Willow, Buttonbush	Ragweed, Boneset, Panicum Species	none

Point Number	Habitat Group	Normalized Total Score	Berry Drupe	Legume Pod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Remarks
80	Upland Forest	0.62	Greenbrier, Gum Bumelia, Privet, Poison Ivy	none	Post Oak	Winged Elm, Cedar Elm, Ash, American Elm	Juniper		none	none	Bunch Grass, Panicum, Boneset	none
81	Upland Forest	0.55	Privet, unknown vine	none	Post Oak, Blackjack Oak	none	Winged Elm, 2 species of Ash	Juniper	none	none	Panicum	none
82	Riparian/BHF	0.69	Mulberry, Pokeweed, Greenbrier, Privet, Hackberry,	none	none	Pecan	American Elm, Ash	none	none	none	Carex, Panicum, Boneset, Wildrye, Inland Sea Oats, Bamboo, Johnson Grass, 1 unknown	none
83	Upland Forest	0.58	Greenbrier, Summer Grape, Muscadine, Poison Ivy, Privet	none	Post Oak	none	American Elm, Ash	Juniper	none	none	Boneset, Carex Species	none
84	Riparian/BHF	0.65	Smilax species, Greenbrier, Poison Ivy, Yaupon	none	Post Oak	Pecan	Winged Elm, Cedar Elm	none	none	Buttonbush	Sumpweed, Mimosa, melon, 3 unknowns, Wildrye, Carex species, 2 Juncus species, Johnson Grass, Texas Sedge, Giant Ragweed	none
85	Riparian/BHF	0.78	Dewberry, Hackberry, Mulberry, Poison Ivy, Greenbrier	none	Oak Spp	Pecan	Elm, American Elm	none	none	Cocklebur	Ragweed, Wildrye, Carex, Bamboo	none
86	Riparian/BHF	0.65	Virginia Creeper, Poison Ivy, Greenbrier, Dewberry, Yaupon, Hackberry	none	Shumard Oak, Post Oak	Pecan	American Elm	none	Sycamore	none	Aster, Ragweed, Sedge Thistle, Wildrye, Mistletoe	none
87	Riparian/BHF	0.69	Greenbrier, Poison Ivy, Virginia Creeper, Hackberry, Summer Grape	none	Bur Oak	none	Elm	none	none	none	Bamboo, Ragweed, Wildrye, White Aster, Panicum Species	none
88	Riparian/BHF	0.64	Greenbrier, Dewberry, Poison Ivy, Hackberry, Mulberry	none	none	Pecan, Hickory	American Elm, Cedar Elm	none	Sycamore	none	Ragweed, Bamboo, Wildrye, Panicum Species, Carex Species	none
89	Upland Forest	0.55	Poison Ivy, Greenbrier, Muscadine, Mustang Grape, Flameleaf Sumac	none	Blackjack Oak, White Oak, Post Oak	Hickory	American Elm, Winged Elm	Juniper	none	none	Panicum species	none
90	Upland Forest	0.58	Greenbrier, Crossvine, Mustang Grape	none	Post Oak	none	American Elm, Winged Elm, Ash	Juniper	none	Prickly Pear	Panicum species, Ragweed, Carex species, 2 unknowns	none
91	Upland Forest	0.54	Poison Ivy, Persimon, Privet	Locust	Post Oak	none	Winged Elm, American Elm	none	none	none	none	none
92	Upland Forest	0.75	Poison Ivy, Virginia Creeper, Greenbrier, Mustang Grape, Hackberry	Mesquite	Post Oak, Blackjack Oak	none	Winged Elm, Ash	Juniper	none	Prickly Pear	Ragweed, Western Ragweed, Wildrye, Panicum, Sumpweed	none
93	Skipped	Skipped	NA	NA	NA	NA	NA	NA	NA	NA	NA	none
94	Riparian/BHF	0.64	Greenbrier, Peppervine, Privet, Virginia Creeper, Smilax, Holly, Tallow, Poison Ivy, Persimmon	Locust	Post Oak	none	Ash, Cedar Elm	none	none	none	Carex, Wildrye, Western Ragweed, Boneset, Sumpweed	none

Attachment B: Lewisville Lake WHAP Point Photographs

Lewisville Point #: 0

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 1

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 2

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 3

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 5

Facing North



Facing East



Facing West



Facing South

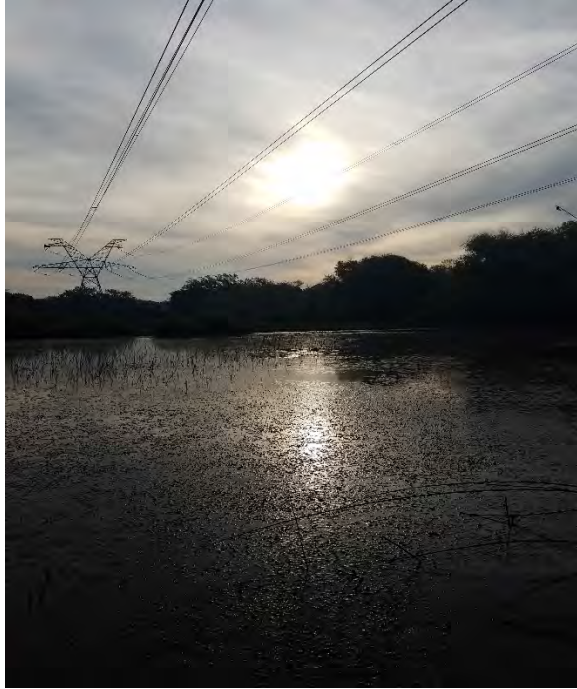


Lewisville Point #: 6

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 7

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 8

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 9

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 10

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 11

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 12

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 13

Facing North



Facing East



Facing West



Facing South

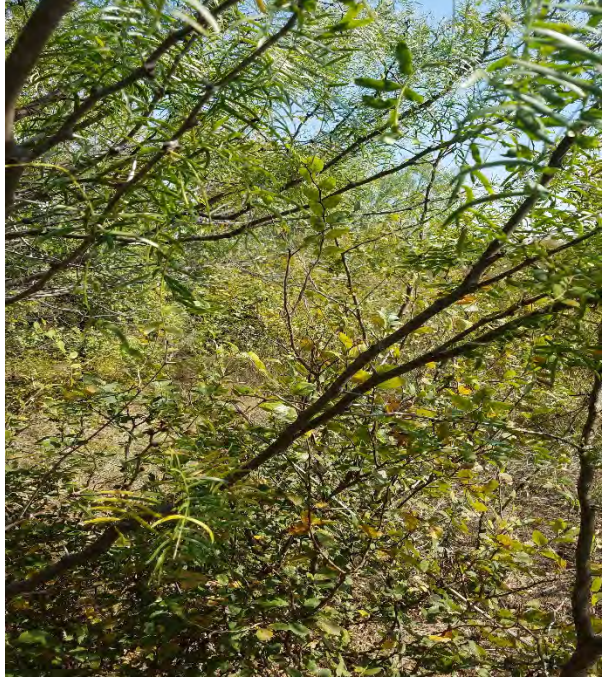


Lewisville Point #: 15

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 16

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 17

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 18

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 19

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 20

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 21

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 22

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 23

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 24

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 25

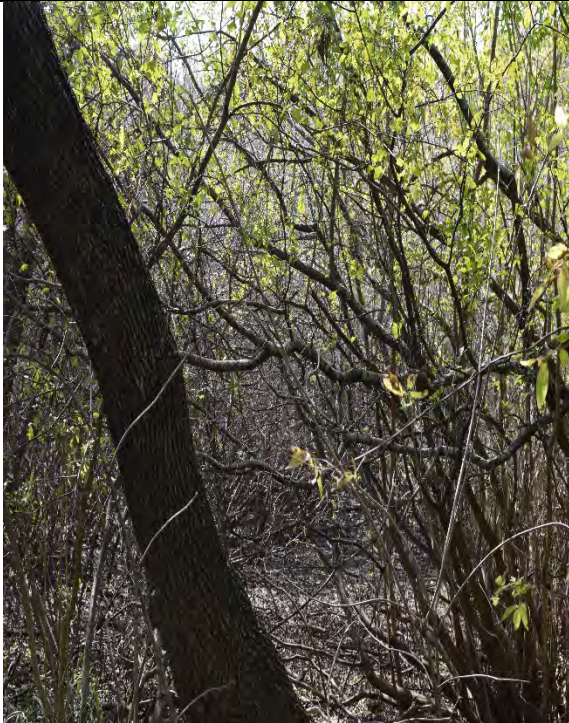
Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 27

Facing North



Facing East



Facing West



Facing South

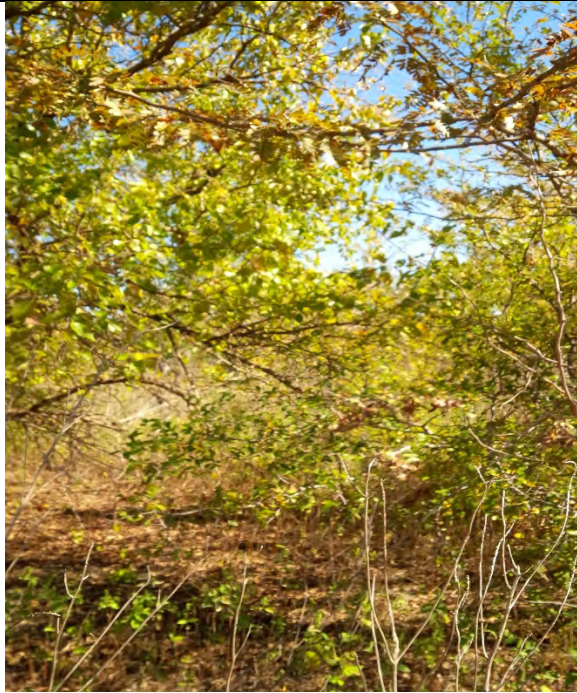


Lewisville Point #: 28

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 29

Facing North



Facing East



Facing West



Facing South

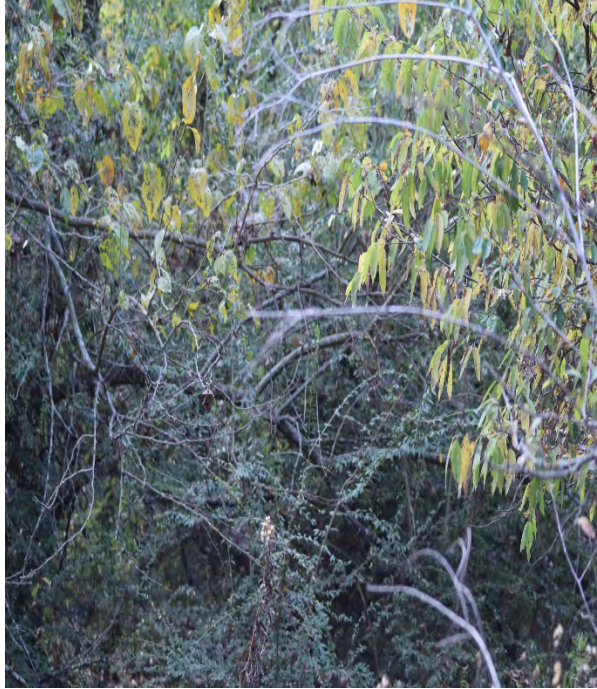


Lewisville Point #: 30

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 31

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 32

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 35

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 36

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 37

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 38

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 39

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 40

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 42

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 43

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 45

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 48

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 49

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 50

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 51

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 52

Facing North



Facing East



Facing West

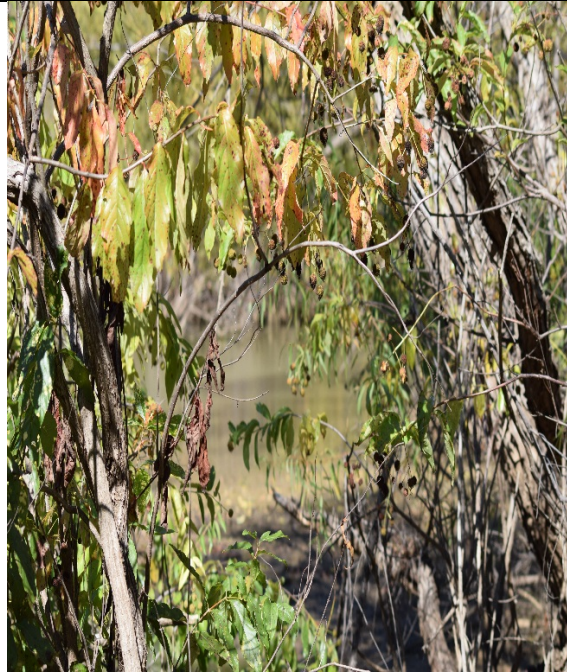


Facing South



Lewisville Point #: 53

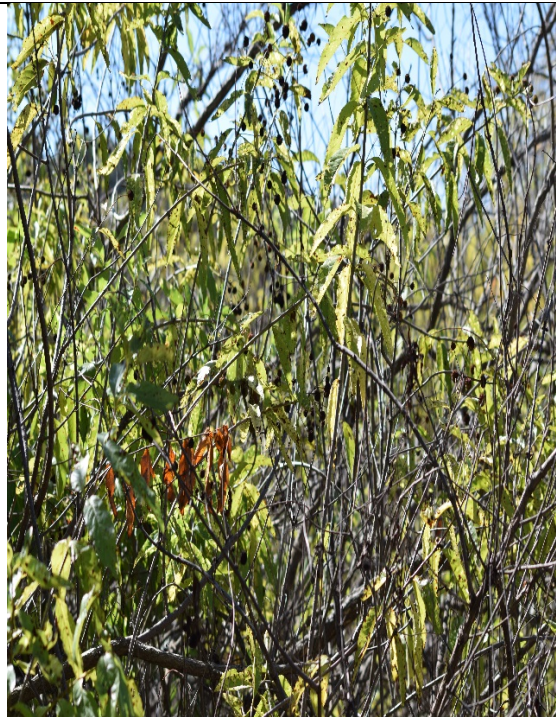
Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 55

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 57

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 58

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 59

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 61

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 62

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 64

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 65

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 66

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 67

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 68

Facing North



Facing East



Facing West



Facing South



Lewisville Point #: 69

Facing North



Facing East



Facing West



Facing South

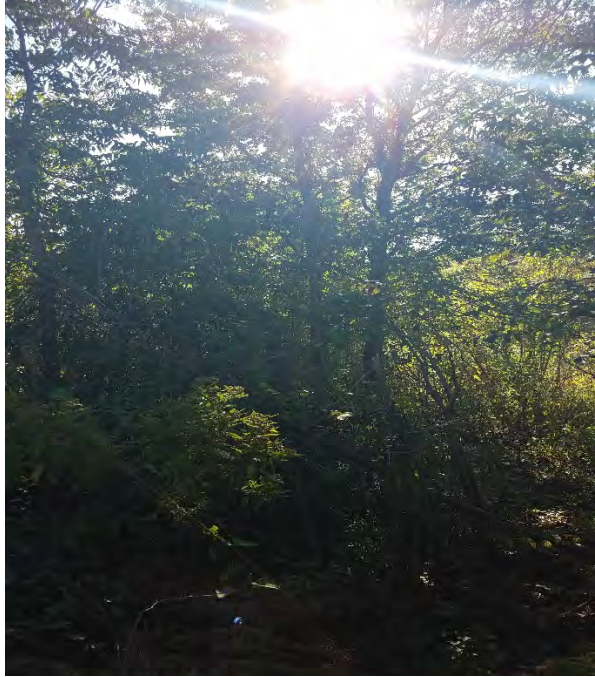


Lewisville Point #: 71

Facing North



Facing East



Facing West



Facing South



Lewisville Point #:72

Facing North



Facing East



Facing West



Facing South



Lewisville Point #:73

Facing North



Facing East



Facing West



Facing South



Lewisville Point #:74

Facing North



Facing East



Facing West



Facing South



Lewisville Point #:75

Facing North



Facing East



Facing West



Facing South



Lewisville Point #:76

Facing North



Facing East



Facing West



Facing South



Lewisville Point #:77

Facing North



Facing East



Facing West



Facing South



Lewisville Point #:79

Facing North



Facing East



Facing West

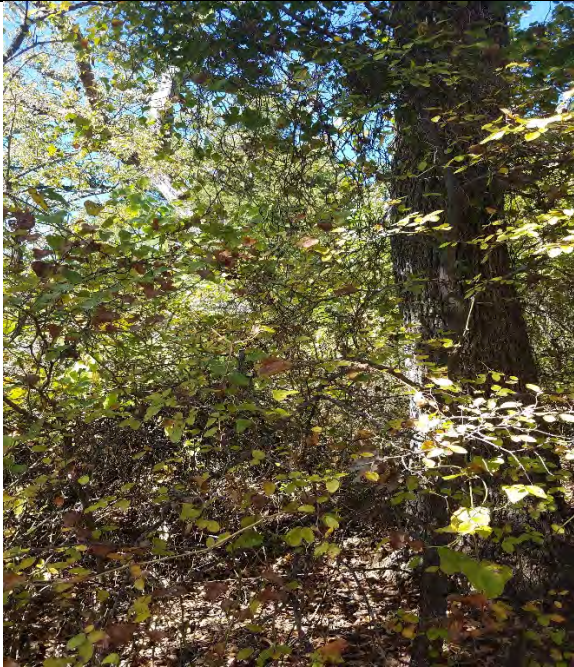


Facing South



Lewisville Point #:80

Facing North



Facing East



Facing West



Facing South



Lewisville Point #:81

Facing North



Facing East



Facing West



Facing South



Lewisville Point #:82

Facing North



Facing East



Facing West



Facing South



Lewisville Point #:83

Facing North



Facing East



Facing West



Facing South



Lewisville Point #:84

Facing North



Facing East



Facing West



Facing South



Lewisville Point #:85

Facing North



Facing East



Facing West



Facing South



Lewisville Point #:86

Facing North



Facing East



Facing West



Facing South

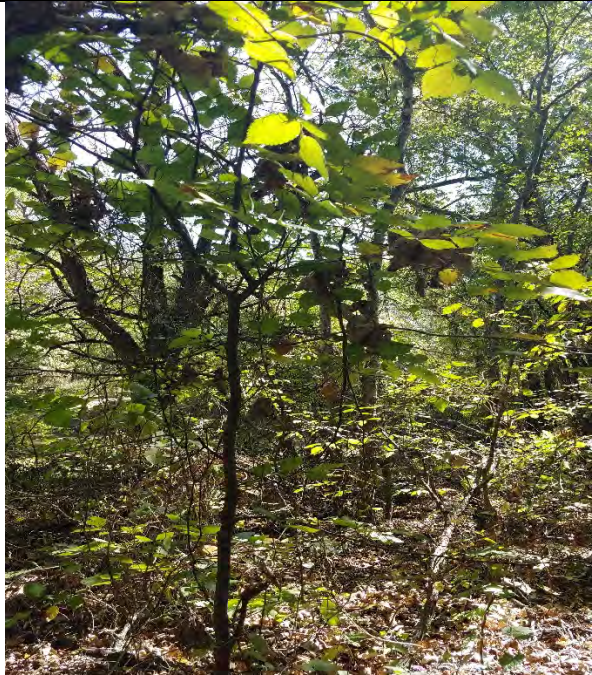


Lewisville Point #:87

Facing North



Facing East



Facing West



Facing South



Lewisville Point #:88

Facing North



Facing East



Facing West



Facing South



Lewisville Point #:89

Facing North



Facing East



Facing West



Facing South



Lewisville Point #:90

Facing North



Facing East



Facing West



Facing South



Lewisville Point #:91

Facing North



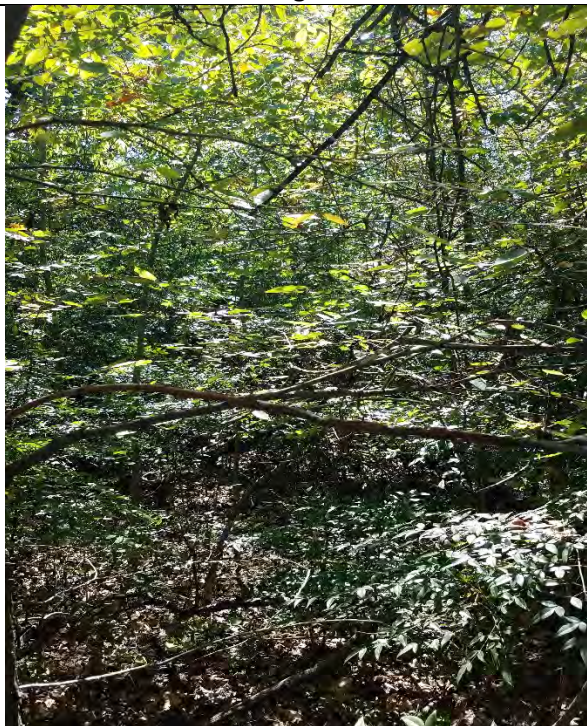
Facing East



Facing West



Facing South



Lewisville Point #:92

Facing North



Facing East



Facing West



Facing South



Lewisville Point #:94

Facing North



Facing East



Facing West



Facing South



APPENDIX D – PERTINENT PUBLIC LAWS

- House Document 74-308. Proposed the construction of the Caddoa Dam and Reservoir for flood control and irrigation purposes
- Public Law 74-738, Flood Control Act of 1936 as amended by the Public Law 75-761, Flood Control Act of 1938 – Authorized the construction of the Caddoa Dam and Reservoir for flood control and irrigation purposes.
- Public Law 76-667. Chapter 430, 3rd Session. Changed to name of the project to John Martin Reservoir Project in honor of John A Martin, the lake Congressman from Colorado.
- Public Law 78-534, Flood Control Act of 1944. Section 4 of the Act as last amended in 1962 by Section 207 of Public Law 87-874 authorizes USACE to construct, maintain, and operate public parks and recreational facilities in reservoir areas and to grant leases and licenses for lands, including facilities, preferably to Federal, State or local governmental agencies.
- Public Law 85-624, Fish and Wildlife Coordination Act 1958. – The FWCA as amended in 1965 sets down the general policy that fish and wildlife conservation shall receive equal consideration with other project purposes and be coordinated with other features of water resource development programs. Opportunities for improving fish and wildlife resources and adverse effects on these resources shall be examined along with other purposes which might be served by water resources development.
- Public Law 86-717, Forest Conservation Act. This Act provides for the protection of forest and other vegetative cover for reservoir areas under the jurisdiction of USACE.
- Public Law 89-298, Flood Control Act of 1965. Authorizes the Chief of Engineers to use and not to exceed 10,000 acre-feet of flood control storage space in the reservoir for the purpose of establishing and maintaining a permanent pool for fish and wildlife and recreations purposes at such times as storage space may be available for such permanent pool within the conservation pool as defined in Article III F, Arkansas River Compact (63 Stat. 145).
- Public Law 89-72, Federal Water Project Recreation Act of 1965. This Act requires that not less than one-half the separable costs of developing recreational facilities and all operation and maintenance costs at Federal reservoir projects shall be borne by a non-Federal public body. A HQUSACE/OMB implementation policy made these provisions applicable to projects completed prior to 1965.
- Public Law 91-190, National Environmental Policy Act of 1969. NEPA declared it a national policy to encourage productive and enjoyable harmony between man and his environment, and for other purposes. Specifically, it declared a “continuing policy of the Federal Government...to use all practicable means and measures...to foster and promote the general welfare, to create conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of

present and future generations of Americans.” Section 102 authorized and directed that, to the fullest extent possible, the policies, regulations, and public law of the United States shall be interpreted and administered in accordance with the policies of the Act. It is Section 102 that requires consideration of environmental impacts associated with Federal actions. Section 101 of NEPA requires the federal government to use all practicable means to create and maintain conditions under which man and nature can exist in productive harmony.

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

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
 - Assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
 - Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;
 - Preserve important historic, cultural, and natural aspects of our national heritage and maintain wherever possible an environment which supports diversity and variety of individual choice;
 - Achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities, and
 - Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.
- Public Law 89-665, National Historic Preservation Act of 1966 (NHPA). Establishes a national policy of preserving, restoring, and maintaining cultural resources. It requires Federal agencies to take into account the effect an action may have on sites that may be eligible for inclusion on the National Register of Historic Places.
 - Public Law 101-601, Native American Graves Protection and Repatriation Act. Requires Federal agencies to return Native American human remains and cultural items, including funerary objects and sacred objects, to their respective peoples.
 - Public Law 59-209, Antiquities Act of 1906. The first Federal law established to protect what are now known as "cultural resources" on public lands. It provides a permit procedure for investigating "antiquities" and consists of two parts: An act for the Preservation of American Antiquities and Uniform Rules and Regulations.
 - Public Law 74-292, Historic Sites Act of 1935. Declares it to be a national policy to preserve for (in contrast to protecting from) the public, historic (including prehistoric) sites, buildings, and objects of national significance. This act provides both authorization and a directive for the Secretary of the Interior, through the National Park Service, to assume a position of national leadership in the area of protecting, recovering, and interpreting national archeological historic resources. It also establishes an "Advisory Board on National Parks; Historic Sites, Buildings, and Monuments, a committee of eleven experts appointed by the Secretary to recommend policies to the Department of the Interior."

- Public Law 87-874, Rivers and Harbors Act of 1962. This act authorizes the construction, repair, and preservation of certain public works on rivers and harbors for navigation, flood control, and for other purposes.
- Public Law 88-578, Land and Water Conservation Fund Act of 1965. This act established a fund from which Congress can make appropriations for outdoor recreation. Section 2(2) makes entrance and user fees at reservoirs possible by deleting the words "without charge" from Section 4 of the 1944 Flood Control Act as amended.
- Public Law 89-272, Solid Waste Disposal Act, as amended by PL 94-580, dated October 21, 1976. This act authorized a research and development program with respect to solid waste disposal. It proposes (1) to initiate and accelerate a national research and development program for new and improved methods of proper and economic solid-waste disposal, including studies directed toward the conservation of national resources by reducing the amount of waste and unsalvageable materials and by recovery and utilization of potential resources in solid waste; and (2) to provide technical and financial assistance to State and local governments and interstate agencies in the planning, development, and conduct of solid-waste disposal program.
- Public Law 90-483, River and Harbor and Flood Control Act of 1968, Mitigation of Shore Damages. Section 210 restricted collection of entrance fee at USACE lakes and reservoirs to users of highly developed facilities requiring continuous presence of personnel.
- Public Law 91-611, River and Harbor and Flood Control Act of 1970. Section 234 provides that persons designated by the Chief of Engineers shall have authority to issue a citation for violations of regulations and rules of the Secretary of the Army, published in the Code of Federal Regulations.
- Public Law 92-463, Federal Advisory Committee Act. The Federal Advisory Committee Act became law in 1972 and is the legal foundation defining how federal advisory committees operate. The law has special emphasis on open meetings, chartering, public involvement, and reporting.
- Public Law 92-500, Federal Water Pollution Control Act Amendments of 1972. The Federal Water Pollution Control Act of 1948 (PL 845, 80th Congress), as amended in 1956, 1961, 1965 and 1970 (PL 91- 224), established the basic tenet of uniform State standards for water quality. Public Law 92-500 strongly affirms the Federal interest in this area. "The objective of this act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."
- Public Law 92-516, Federal Environmental Pesticide Control Act of 1972. This act completely revises the Federal Insecticide, Fungicide, and Rodenticide Act. It provides

APPENDIX E – FORT WORTH DISTRICT NOTICE TO SEAPLANE PILOTS

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

POLICY

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

DISTRICT-WIDE PROHIBITIONS AND RESTRICTIONS

1. Pilots are responsible for knowing the rules and regulations pertaining to aircraft as set forth in Title 36, Chapter III, Part 327.4 of the Code of Federal Regulations. Copies are available from any Corps of Engineers Lake Office.
2. Seaplanes may not be operated between sunset and sunrise. Where not specifically restricted or prohibited, recreational seaplane operations are allowed seven days a week.
3. Aircraft larger than 5,000 pounds gross weight are prohibited from landing without special permission from the District Engineer.
4. Commercial seaplane operations are prohibited unless authorized by the District Engineer. Commercial operations, if authorized, will be limited to the hours of 10 a.m. to 5 p.m., Monday through Friday, from November 1 to April 1.
5. Individual letter permits may be issued for seaplanes to operate in prohibited areas on a one-time-only basis.
6. The operation of a seaplane at Corps of Engineers lakes is at the risk of the plane's owner, operator, and passenger(s). All lakes in the Fort Worth District are operated as flood control reservoirs with widely fluctuating pool elevations. Pilots are encouraged to contact each lake project office for current pool elevation information. Addresses and phone numbers of each lake are listed in the attached Visitor's Guide. Information may also be obtained from the Corps of Engineers web site at www.swf.usace.army.mil
7. Where landings and takeoffs are not totally prohibited at a given lake, a minimum distance of 500 feet from shore or structures must be maintained during landing and takeoffs.
8. The attached information lists specific restrictions and prohibitions for each lake in the Fort Worth District.

SEAPLANE OPERATIONS ARE PROHIBITED ON THE FOLLOWING LAKES

Lake Georgetown
Grapevine Lake
Hords Creek Lake
O.C. Fisher Lake
B.A. Steinhagen Lake
Waco Lake

SPECIFIC RESTRICTIONS ON SEAPLANE OPERATION

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

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

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

APPENDIX F – ACRONYMS

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

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