LAKE TYLER

MASTER PLAN 2026

CITY OF TYLER

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WE WOULD LIKE TO THANK THE RESIDENTS WHO CALL LAKE TYLER AND LAKE TYLER EAST HOME, THE BUSINESSES THAT SUPPORT ITS VITALITY, AND ALL THOSE WHO WORK TO MAKE THE LAKES A PLACE FOR RECREATION, LASTING MEMORIES, AND CONNECTION TO NATURE.

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EXECUTIVE SUMMARY

PURPOSE AND BACKGROUND

The City of Tyler has partnered with Halff to update the 2011 Lake Tyler Master Plan and develop a new, forward-looking vision for both Lake Tyler and Lake Tyler East. This updated Master Plan will revisit previous recommendations and introduce new strategies to meet the City's evolving needs.

The purpose of the updated master plan is to provide the City with actionable recommendations to guide future development, support recreation, protect water quality, and establish clear policies for implementation. Key components of the plan include an environmental assessment, water resources assessment, recreation, tourism, and public safety assessment, stakeholder engagement, capital improvement planning, funding review, and recommendations.

Through a combination of technical assessments, modeling, research and on-the-ground observation, the findings were presented in a series of reports and shared with City leadership. This master plan document compiles the reports into a public-facing document that can be used as a reference for the City, Tyler residents, lake residents and lake users. The complete reports are available in the Appendix. This work will guide decisions on how to care for the lakes in ways that balance water quality, recreation, development, and environmental stewardship ensuring Lake Tyler and Lake Tyler East remain safe, accessible, and thriving well into the future.

GUIDING PRINCIPLES

Protect the water quality of Lake Tyler and Lake Tyler East.

Balance of lake benefits for both the citizens of Tyler and the residents and users of the lakes.

Enhance recreational opportunities for the citizens of Tyler and the residents and users of Lake Tyler and Lake Tyler East.

Identify long-term funding to support future investments in water quality protection and recreational enhancements for the lakes.

Strengthen relationships between the City of Tyler and Lake Tyler leaseholders.

About Lake Tyler and Lake Tyler East

Nestled in the heart of East Texas, Lake Tyler and Lake Tyler East are more than just reservoirs, they are vital sources of water, treasured community assets, and peaceful places where memories are made. Lake Tyler was created in 1949 by damming Prairie Creek, followed by the construction of Lake Tyler East in 1966 through the damming of Mud Creek. Together, these constructed reservoirs span 113 square miles, with inflows primarily dependent on rainfall runoff. The watershed is predominantly agricultural with undeveloped, forested areas, while residential development represents a significant portion of the surrounding land use.

The lakes serve multiple user groups whose needs must be considered in both planning and ongoing management, including City of Tyler residents who rely on the lakes for water supply, individuals who use the lakes for recreation, and shoreline residents, many of whom live outside the city limits.

Sedimentation remains a major concern for lake managers, contributing to reduced water storage capacity over time. Both lakes must also comply with all state regulations for water quality and permitted water use.

Recreational activity around the lakes has expanded since the last master plan, driven by the redevelopment of land into The Boulders at Lake Tyler and new management at the Lake Tyler Marina. Protecting water quality, managing sedimentation, accommodating recreational use, and balancing the needs of all users will require continued collaboration, long-term planning, and sustained investment.

Water Users

Residential Users

Recreational Users

KEY RECOMMENDATIONS

Environmental

- **Stormwater Management:** Establish standards to manage runoff from near-shore developments and reduce impacts from increased urbanization.
- **Buffer Zones:** Maintain vegetative buffers around lakes and streams to filter pollutants and prevent sedimentation.
- **Land Use Regulations:** Promote oil/gas lease regulations to balance development with watershed protection.
- **Agricultural Best Practices:** Promote conservation practices, buffer strips, wetlands, and precision farming to minimize agricultural runoff.
- **Pollution Control:** Strengthen regulations on stormwater discharge, encourage community clean-ups, enforce sanitary facility standards for boathouses, and conduct regular oil and gas inspections.
- **Habitat Management:** Control invasive species and manage aquatic vegetation.
- **Public Engagement:** Expand education efforts and build stakeholder partnerships to support conservation.
- **Monitoring and Research:** Implement regular water quality and biodiversity monitoring, including a formal Water Quality Monitoring Program, and assess climate impacts on the lake ecosystem.

Water Resources

- **Estblish a Routine Monitoring Progam:** Incorporate a 5-year review of land cover and development trends to track encroachment, impervious surface growth, and vegetation loss in order to prioritize high-risk zones for inspection.
- **Field Verification and Response:** Develop a protocol for field verification in areas showing notable change and identify where corrective action is needed.
- **Integrate Predictive Analysis into Planning Decisions:** Use hot spot and feature analysis to anticipate where development pressure is likely to occur and apply to permit applications, zoning changes or infrastructure plans.
- **Collaborate with City Planning:** Align land use policies with watershed protection priorities. Consider implementing low-impact design (LID) requirements.

Photo Credit: Adobe Stock Images

Recreation & Tourism

- **Strengthen Marketing and Visitor Engagement:** Coordinate marketing with Visit Tyler and tourism partners.
- **Formalize Stakeholder Engagement:** Engage with diverse stakeholders and host an annual summit for updates and public feedback.
- **Modernize Operations and Maintenance:** Adopt digital inspection and maintenance tools. Install QR-coded signs at recreation sites for visitor feedback and alerts.
- **Enhance Safety and Law Enforcement Presence:** Secure funding for regular lake patrols and formalize partnerships with the Smith County Sheriff's Office for enforcement and response coordination.
- **Diversify Revenue Streams:** Implement hybrid leases for commercial operators, increase dock permit fees, add a fuel sales fee, and explore parking/boat launch fees for non-residents.
- **Environmental Preservation and Sustainable Growth:** Maintain boathouse restrictions, assess and restore shoreline erosion, require strong water quality protections, and prioritize open space preservation in new developments.
- **Expand Trail Connectivity and Recreation Access:** Complete the Lake Tyler Loop and connect trails to the cities of Tyler and Whitehouse. Partner with local stakeholders to extend trail links and create new recreational access points.
- **Enhance Access and Recreation on City-Owned Undeveloped Property:** Develop low-impact trail networks for birdwatching and hiking on city-owned lands, connecting parks and neighborhoods. Collaborate with conservation groups and community partners to provide access and interpretive signage.

Implementation

The successful implementation of this master plan will require a phased and flexible approach, with funding opportunities, resource availability, and timing playing key roles in determining priorities. A complete list of recommendations, along with suggested short-term actions for the City's consideration, is provided in Chapter 3 pg. 105.

PLANNING PROCESS

TIMELINE

The Lake Tyler Master Plan took approximately 12 months to complete. Development of the Plan took place according to the process timeline shown below in Planning Process.

SUMMER 2024	Initial data gathering and research to document current environmental conditions, water resources, recreation areas, and tourism assets and to establishes an understanding of challenges and opportunities.
FALL 2024	Initial staff and stakeholder interviews were conducted to capture community priorities, while technical analysis continued for the environmental assessment, water resources, and recreational assessment.
WINTER/SPRING 2025	Technical assessments were refined to inform management strategies, infrastructure priorities, and operational needs. Preliminary funding considerations and implementation concepts were developed to guide the next phase.
SPRING/SUMMER 2025	Final recommendations and an implementation roadmap, combining technical analysis, stakeholder input, and strategic priorities to support the long-term success of the lakes, recreation system, and surrounding community.

KEY MASTER PLAN COMPONENTS

1 Natural Environment and Water Systems

An overview of key environmental factors and water resource conditions influencing the project area. It identifies existing environmental concerns and presents predictive modeling to assess future water resource conditions and potential impacts. Based on these findings, recommendations are provided to support resource protection, environmental stewardship, and sustainable water management strategies.

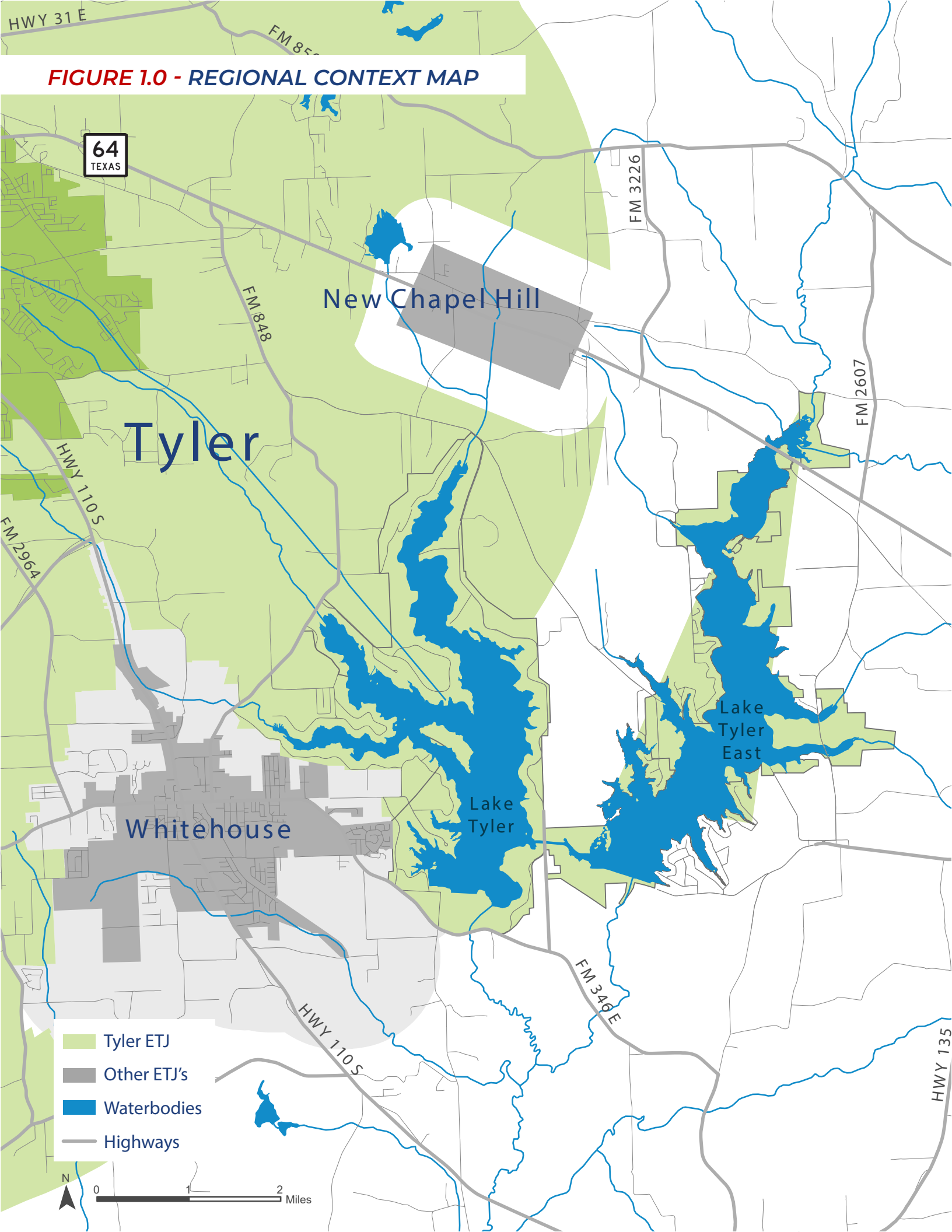
2 Recreation, Tourism and Community Priorities

This chapter highlights the role of recreation, tourism, and community priorities in shaping the lakes and surrounding areas. It provides an overview of regional context, supporting resources, and relevant studies, followed by a summary of existing recreational areas, park classifications, trails, and regulations. Stakeholder perspectives are included to align technical findings with community priorities.

3 Implementation Roadmap

Provides an Implementation Roadmap outlining key actions to support the long-term success of the lakes and recreation areas. It includes infrastructure planning priorities and identifies potential grant funding opportunities to advance recommended improvements.

FIGURE 1.0 - REGIONAL CONTEXT MAP



COMMUNITY ENGAGEMENT

STAKEHOLDER MEETINGS

Several stakeholder interviews were conducted to discuss key issues, challenges, and opportunities related to Lake Tyler and Lake Tyler East. Stakeholders included the lessees of The Boulders and the Lake Tyler Marina, as well as several key property owners. These conversations took place over several days.

Major Issues identified

- User fees
- Recreational improvements
- Communication and coordination
- Water and environmental quality (including lake dredging or sedimentation removal)

The Halff team also interviewed staff from the Tyler Water Utilities Department. This discussion provided valuable insight into the operations and management of the lakes and adjacent recreational areas. It highlighted challenges faced by staff and common concerns expressed by residents living around the lakes. Topics discussed included recent accomplishments, property and development prospects, lake protection efforts, law enforcement and safety, and funding needs.

It was also noted that recreation is not a core function of the Tyler Water Utilities Department. As a result, recreational opportunities at the lakes are not actively advertised or promoted, either by the utility or through the City of Tyler or the City's Parks and Recreation Department. Furthermore, there is currently no system to track recreational use, such as the number of boats or campers, so the total number of users at the lakes is unknown.

Despite this, the redevelopment of The Boulders has noticeably increased recreational activity and visibility at the lakes in recent years.

COMMUNITY MEETING

On October 8, 2025, a community meeting was held at The Boulders, inviting both City of Tyler residents and lake residents. More than 75 people attended. The meeting included a presentation of the draft master plan, followed by a short Q&A session. An open-house component allowed attendees to review boards summarizing the major components of the plan.Several written comments were received during the meeting.

Major Issues identified

- Lack of safety protocols on the lake
- No dedicated lake security
- User fee implementation
- Limiting wake board usage
- Lake health and water lake levels

Photos from the community meeting on October 8, 2025

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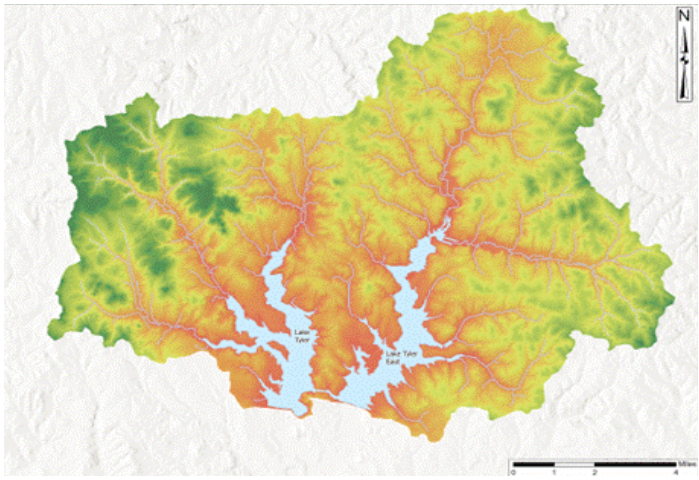
1 NATURAL ENVIRONMENT

ENVIRONMENTAL OVERVIEW

An environmental assessment/analysis was conducted to support the updated Lake Tyler Master Plan in compliance with applicable environmental laws and regulations to maintain water and/or land quality for future public use. The scope of work for the environmental assessment/analysis included the following tasks:

- Analyze and evaluate existing environmentally related recommendations from the 2011 Master Plan.
- Analyze current TCEQ surface water quality requirements as they apply to the lakes and incorporate new requirements into the updated Master Plan.
- Perform desktop review using aerial photographs and regulatory databases to identify potential point sources of bacteria and other chemicals of concern (COCs), including per and poly-fluoroalkyl substances (PFAS)
- Identify oil and gas well activities in proximity to the lakes that could impact lake water quality.
- Based upon the results of the desktop and oil/gas well reviews, develop conceptual visual inspection and water quality sampling program for the lakes.
- Collaborate and coordinate with authorities having jurisdiction (i.e. Texas Commission on Environmental Quality [TCEQ], Texas Parks and Wildlife Department [TPWD], Texas Water Development Board [TWDB], etc.) To align recommendations with current regulatory requirements.



GEOGRAPHIC AND ECOLOGICAL OVERVIEW

Location and Size

Lake Tyler and Lake Tyler East are located approximately 12 miles southeast of the City of Tyler, in southeastern Smith County, Texas. The City of Tyler owns both lakes, and the municipalities of Whitehouse, Arp, and New Chapel Hill neighbor the lakes to the west, east, and north, respectively. The Whitehouse Dam (TX00245) impounded Lake Tyler and the Mud Creek Dam (TX00244) formed Lake Tyler East. Channel Bay West and Channel Bay East connect the southern portions of both lakes, and the combined drainage area (watershed) of the lakes is approximately 113 square miles. Lake Tyler's drainage area is 45 square miles, and major tributaries include Prairie Creek, Gilley Creek, and Hill Creek. Lake Tyler East's drainage area is approximately 68 square miles, and its major tributaries include Mud Creek, Lowry Creek, Caney Creek, and Everett Branch. **Figure 1.1**, on the following pages, show both lakes on USGS Topographic Maps.

Surface Conditions

According to the USGS Topographic Maps "Troup West, Texas," "Troup East, Texas," "Bascom, Texas," and "Hope Pond, Texas," both lakes were situated in a relatively varied area with near shoreline elevations ranging between 370 and 400 feet above mean sea level (MSL).

Subsurface Conditions

Geology

According to the Geologic Atlas of Texas, Tyler Sheet (Bureau of Economic Geology, University of Texas at Austin), the Lakes are located on the Queen City Sand of the Claiborne Group. The Queen City Sand comprises Tertiary-aged deposits of fine to medium-grained quartz sand and clay.
According to the United States Department of Agriculture (USDA) Natural Resources Conservation Service Web Soil Survey, the soils surrounding the lakes area consist mostly of

- Briley loamy fine sand, 1 to 5 percent slopes, well-drained
- Libert loamy fine sand, 1 to 6 percent slopes, well-drained
- Bowie fine sandy loam, 1 to 5 percent slopes, well-drained

HYDROLOGY

Lake Tyler was constructed in 1949 by damming Prairie Creek, and Lake Tyler East was constructed in 1966 by damming Mud Creek to expand water storage capacity. The combined watershed area feeding these reservoirs spans approximately 113 square miles and primarily includes forested lands, pastures/agricultural land, and some urban development.

The lake receives inflows from rainfall runoff and the main tributaries i.e., Prairie Creek feeds Lake Tyler, while Mud Creek feeds the Lake Tyler East. Evaporation significantly influences water levels, especially during the summer. Both lakes are managed as a single system, and their water levels are actively monitored and regulated to ensure consistent supply. According to the volumetric survey by TWDB in 2013, at the conservation pool elevation of 375.38 feet above mean sea level, the lakes have a combined storage capacity of 77,284 acre-feet encompassing a surface area of 4,714 acres.

LAND USE

Land use within the watershed predominantly consists of agricultural and/or undeveloped land with native forested areas along the bottomlands of the creek/tributaries. Suburban and rural residential areas are a significant part of the watershed, particularly near the lake shorelines and along access routes.
Areas of extensive residential and commercial developments are observed within the watershed near the southeastern part of the City of Tyler, the northeastern portion of the City of Whitehouse, and frontage development along Highway 64. Agricultural activities include cattle grazing and crop farming such as small-scale production of grains, hay, and other staples. Public parks, boat ramps, and marinas are scattered throughout the watershed to support recreational activities like fishing, boating, and hiking. Limited industrial or commercial activities are present within the watershed. Existing developments are typically located near major roads or at a distance from the lakes to minimize their environmental impact.

SEDIMENTATION

In 2013, the TWDB conducted a volumetric and sedimentation survey of Lake Tyler and Lake Tyler East. The survey determined that the combined reservoir capacity of both lakes in 2013 was 77,284 acre-feet. In comparison, a 1997 TWDB estimate placed the capacity at 83,244 acre-feet. This indicates that Lake Tyler has been losing approximately 373 acre-feet of capacity per year due to sedimentation below the conservation pool elevation. The City of Tyler is currently conducting another sedimentation and volumetric survey and the results of this survey will provide the most recent sedimentation rate in the lake.

REVIEW OF PREVIOUS MASTER PLAN

In April 2011, the City of Tyler adopted the existing Lake Tyler Master Plan (MP) as a policy framework to guide efforts in protecting and preserving water quality, the environment, and the overall quality of life within the watershed. The 2011 Master Plan included several recommendations (Recommendations 10 through 19) aimed at safeguarding the lakes' water quality. The environmentally focused recommendations from the 2011 Master Plan are as follows:

- Preserve City-owned land in the headwater of tributaries.
- Expand the existing water quality sampling and field monitoring program for the lakes and tributaries.
- Revise inspection and monitoring policies in the rules and regulations regarding near-shore On-Site Sewer Facilities (OSSF).
- Revise inspection and monitoring policies in the rules and regulations regarding erosion and sediment control practices around the lakes.
- Evaluate development standards and guidelines that can be implemented throughout the watershed to protect the lakes' water quality from stormwater runoff.
- Continue to inspect oil and gas wells for leaks and develop a policy for future well development.
- Evaluate alternatives to maintain constant lake elevations by procuring make-up water sources.
- Evaluate pesticide chemicals used around the lakes and include inspection of pesticides in boathouse sewer system inspection.
- Continue to pursue aquatic vegetation management.
- Develop a timber management program for un-leased City-owned property around Lake Tyler to promote timber growth and minimize potential fire hazards.

TCEQ SURFACE WATER QUALITY STANDARDS

The Federal Water Pollution Control Act, or Federal Clean Water Act (CWA), §303 (33 United States Code [USC], §1313) requires all states to adopt water quality standards for surface water. The Texas Commission on Environmental Quality (TCEQ) developed the Texas Surface Water Quality Standards (TSWQS) under the authority of the CWA and the Texas Water Code, which are codified in Title 30, Chapter 307 of the Texas Administrative Code (TAC).

TSWQS establishes standards for the quality of streams, rivers, lakes, and bays throughout the state to maintain surface water quality, support public health and enjoyment, and

protect aquatic life. Water quality standards identify designated beneficial uses of a water body or a segment of the water body, and the water quality criteria necessary to protect those uses. Several water quality parameters, including dissolved oxygen, temperature, pH, dissolved minerals, toxic substances, and bacteria, are utilized to support those uses.The TCEQ may revise statewide TSWQS for site-specific uses when sufficient informationis available. The current TSWQS were adoptedon September 7, 2022. Revisions of the TSWQS occur approximately every three years, andit is anticipated the TCEQ will adopt the next TSWQS revision in 2026.

For water quality management and site-specific standards designation, the state's major surface waters are classified as segments, and segments are aggregated by basin. Lake Tyler and Lake Tyler East are classified as Segment 0613 and are located under the Neches River Basin. Geographically, Segment 0613 extends from Whitehouse Dam and Mud Creek Dam in Smith County up to the normal pool elevation of 375.38 feet (impounds Prairie Creek and Mud Creek). The designated Site ID for Lake Tyler is 10637 and for the Lake Tyler East is 10638.

Based on the type and frequency of use, TSWQS identifies four categories of recreational uses of any water body such as primary contact recreation, secondary contact recreation (1 or 2), and non-contact recreation. Activities such as swimming, water skiing, diving, and surfing are categorized as primary contact recreation (PCR), and activities such as fishing, canoeing, kayaking, rafting, and motor boating are examples of secondary contact recreation (SCR). SCR activities are the same for both classifications (1 or 2), however SCR 2 classification is used when these occur less frequently. A water body may be classified as non-contact recreation (NCR) if conditions exist in the water body that make it unsafe to engage in activities described as contact recreation. According to the public use of Lake Tyler and Lake Tyler East, these water bodies are classified as PCR 1.

Table 1 below lists the recommended site-specific water quality parameters that are determined for Segment 0613 by TSWQS.

Table 1 *- Texas Surface Water Quality Standards*

Neches River Basin Segment Names (Segment 0613)	Lake Tyler (Site ID-10637)	Lake Tyler East (Site ID-10638)
Domestic Water Supply Use	Public Water Supply (PS)	Public Water Supply (PS)
Chloride (Cl^{-1}) (mg/L)	50 (maximum annual average)	50 (maximum annual average)
Sulphate (SO_4^{-2}) (mg/L)	50 (maximum annual average)	50 (maximum annual average)
Total Dissolved Solid (TDS)	200 (maximum annual average)	200 (maximum annual average)
Chlorophyll a	13.38 (µg/l)	13.38 (µg/l)
Dissolved Oxygen (DO)	5.0 (minimum 24 hours means)	5.0 (minimum 24 hours means)
pH	6.5-9.0 (minimum-maximum)	6.5-9.0 (minimum-maximum)
Indicator Bacteria* (cfu/100 mL)	126 (geometric mean)	126 (geometric mean)
Temperature (degrees Fahrenheit)	93 (maximum)	93 (maximum)

** The indicator bacteria for Segment 0613 is E. coli.*

DATABASE REVIEW FOR POTENTIAL ENVIRONMENTAL CONCERNS

REVIEW OF AERIAL PHOTOGRAPHS

Historical aerial photographs depicting the development of the lake and vicinity areas were reviewed to evaluate prior land use. Aerial photographs were also helpful in determining whether conditions of apparent environmental concern existed on or near the property at the time they were taken. Historical aerial photographs from 1940, 1949, 1958, 1968, 1978, 1985, 1995, 2005, 2010, 2016, and 2022 were provided by Environmental Risk Information Services (ERIS). Copies of historical aerial photographs are presented in Appendix. Review of the historical aerial photographs revealed the uses of the properties surrounding the lakes since at least the 1940s has consisted of agricultural land, forested land, vacant land, and residential developments. The 1940 aerial photograph showed the area encompassing the lake and its surroundings primarily consisted of agricultural land and undeveloped native forests along the bottomlands of Prairie Creek and Mud Creek. Lake Tyler was visible by at least 1949, while Lake Tyler East was constructed by at least 1968. Sparse residential development and associated roadways began appearing along the Lake Tyler shoreline and east of the City of Tyler by 1958.

By 1985, extensive residential development and road networks were evident along the shoreline, as well as to the west and north of the lakes. According to the 2022 aerial photograph, extensive residential and/or commercial development appears to the west of Lake Tyler and the north along Highway 64. It also appeared that the majority of the shoreline of both lakes is occupied by piers and/or boathouses.

REVIEW OF FEDERAL AND STATE REGULATORY AGENCIES

Halff contracted ERIS to conduct a Federal and State environmental regulatory database search for the study area. ERIS obtained these databases directly from government sources. The databases are updated on approximately quarterly intervals. Halff reviewed the environmental databases provided by ERIS. A summary of the researched databases is shown in **Table 2** and **Figure 1.2**, located on the following pages, and show the potential point source contamination sites identified during the database review. The ERIS database is provided in the digital Appendix.

Table 2 *- Regulatory Review Summary*

Source cc17	Database	Description	No. Within Study Area
EPA	NPL	The National Priorities List (NPL) is a subset of the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) and identifies sites for priority cleanup under the Superfund Program.	0
EPA	Delisted NPL	This database includes sites from the United States Environmental Protection Agency's Final National Priorities List (NPL) where remedies have proven to be satisfactory or sites where the original analyses were inaccurate, and the site is no longer appropriate for inclusion on the NPL, and final publication in the Federal Register has occurred.	0
EPA	NPL	The National Priorities List (NPL) is a subset of the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) and identifies sites for priority cleanup under the Superfund Program.	0
EPA	Delisted NPL	This database includes sites from the United States Environmental Protection Agency's Final National Priorities List (NPL) where remedies have proven to be satisfactory or sites where the original analyses were inaccurate, and the site is no longer appropriate for inclusion on the NPL, and final publication in the Federal Register has occurred.	0
EPA	SEMS (CERCLIS)	The U.S. Environmental Protections Agency's (EPA) Office of Solid Waste and Emergency Response, Office of Superfund Remediation and Technology Innovation (OSRTI), has implemented The Superfund Enterprise Management System (SEMS), formerly known as CERCLIS (Comprehensive Environmental Response, Compensation and Liability Information System) to track and report on clean-up and enforcement activities taking place at Superfund sites. SEMS represents a joint development and ongoing collaboration between Superfund's Remedial, Removal, Federal Facilities, Enforcement and Emergency Response programs.	0
EPA	SEMSARCH (CERCLIS NFRAP)	The Superfund Enterprise Management System Archive listing (SEMS-ARCHIVE) has replaced the CERCLIS NFRAP reporting system in 2015. This listing reflects sites that have been assessed and no further remediation is planned and is of no further interest under the Superfund program.	0
EPA	RCRAC	The Corrective Action Report (CORRACTS) identifies hazardous waste handlers with the Resource Conservation and Recovery Act (RCRA) corrective action activity.	0
EPA	RCRAT	The Resource Conservation and Recovery Information System (RCRIS) includes selective information on facilities that treat, store, and/or dispose (TSD) of hazardous waste as defined by RCRA.	0
EPA	RCRIS Generator	The RCRIS database includes several classifications of hazardous waste generators. This also includes facilities which do not presently generate hazardous waste and are classified as a RCRA non-generator.	0
EPA	EC	This database includes site locations where Engineering and/or Institutional Controls (EC) have been identified as part of a selected remedy for the site as defined by United States Environmental Protection Agency official remedy decision documents. Engineering controls include caps, barriers, or other device engineering to prevent access, exposure, or continued migration of contamination.	0
EPA	FINDS/FRS	The Facility Index System/Facility Registry Service (FINDS/FRS) database serves as an inventory of all facilities registered with the EPA.	51
EPA	ERNS	The Emergency Response Notification System (ERNS) is compiled from reports of emergency responses to releases of hazardous substances, answered either by the EPA or by local emergency personnel who notified the EPA of the action.	4
EPA	TRI	The Toxic Release Inventory System (TRI) identifies facilities that release toxic chemicals to the air, water, and land in reportable quantities under SARA Title III Section 313.	0
EPA	BF	The Brownfields Site Assessment (BF) database contains sites that are being cleaned under EPA grant monies.	0
TCEQ	SF	The Superfund Registry (states' equivalent to CERCLIS) contains information pertaining to potentially hazardous sites that have been placed on the State Priority List.	0

Table 2 *- Regulatory Review Summary Cont.*

Source cc17	Database	Description	No. Within Study Area
TCEQ	AST/UST	The aboveground storage tank (AST) and underground storage tank (UST) databases serve to track the location and number of ASTs and USTs under TCEQ jurisdiction.	11
TCEQ	LPST	The Leaking Petroleum Storage Tank (LPST) database serves to track the locations and cleanup of leaking petroleum storage tanks in Texas.	4
TCEQ	Spills	The Spills database is compiled from reports of emergency responses to spills or discharges of hazardous materials, answered either by the TCEQ or by local emergency personnel who notified the TCEQ of the action.	3
TCEQ	DCR	The Dry Cleaners (DCR) database is a listing of dry-cleaning facilities registered with the TCEQ.	1
TCEQ	SIEC01	The Texas Risk Reduction Program (TRRP) requires the placement of institutional controls (e.g., deed notices or restrictive covenants) on affected property in different circumstances as part of completing a response action. In its simplest form, an institutional control (IC) is a legal document that is recorded in the county deed records. In certain circumstances, local zoning or ordinances can serve as an IC. This listing may also include locations where Engineering Controls are in effect, such as a cap, barrier, or other engineering device to prevent access, exposure, or continued migration of contamination.	0
TCEQ	VCP	The Voluntary Cleanup Program (VCP) identifies facilities, which have undertaken or completed on-site remediation activities.	0
TCEQ	BSA	The BSA database includes relevant information on contaminated Brownfields properties that are being cleaned.	0
TCEQ	IOP	The Innocent Owner/Operator Program (IOP) identifies facilities, which have become contaminated as a result of a release or migration of contaminants from a source or sources not located on the property, and the facility owner/operator did not cause or contribute to the source or sources of contamination.	0
TCEQ	CLI	The Closed Landfill Inventory (CLI) serves as an inventory of permitted as well as unauthorized landfills that have been closed and abandoned in Texas.	0
TCEQ	SWF/LF	The Municipal Solid Waste Facilities/Landfill Sites database serves to track solid waste disposal facilities or landfills, including active or inactive facilities and open dumps.	2
TCEQ	TX IHW	The Industrial and Hazardous Waste (IHW) Database contains summary reports by waste handlers, generators, and shippers in Texas.	0
TCEQ	IHWCA	The IHW Corrective Action Sites (IHWCA) database contains a list of cleanup sites contaminated from industrial and municipal hazardous and industrial nonhazardous wastes.	0
TCEQ	MSD	The Municipal Setting Designation (MSD) is an official state designation given to property within a municipality that certifies that designated groundwater at the property is not used as potable water and is prohibited from future sue as potable water because groundwater is contaminated in excess of the applicable potable-water protective concentration level.	0
TCEQ	TIER II	The TIER II Database contains annual hazardous chemical inventories for facilities which includes facility tracking information, as well as information on chemicals that meet or exceed specified reporting thresholds at any time during a calendar year.	213

A review of the regulatory database indicates that chlorine, gasoline, diesel, propane, and triethylene glycol are the most commonly handled chemicals of concern (COCs).

In addition to the above-listed databases, ERIS obtained the following additional environmental records from federal and state databases to supplement information regarding facilities that may use or store per- and poly-fluoroalkyl substances (PFAS) or PFAS-containing equipment/materials within the study area. PFAS are a group of synthetic chemicals widely used in industrial and consumer products due to their water, grease, and heat-resistant properties. PFAS are often referred to as "forever chemicals" because they persist in the environment and do not readily break down. PFAS can originate from multiple manufacturing and industrial processes such as:

- Manufacturing of fluoropolymer coatings (e.g., Teflon, waterproof fabrics, non-stick cookware).
- Electroplating and metal finishing industries using PFAS in mist suppressants.
- Firefighting Foams (AFFF - Aqueous Film-Forming Foam): Used in firefighting training and emergency response, especially at airports and military bases.
- Stain-resistant textiles and carpets (Scotchgard, Gore-Tex).
- Food packaging (fast-food wrappers, microwave popcorn bags).
- Waste Management and Landfills: Improper disposal of PFAS-containing products. Leachate from landfills contaminating groundwater.

The U.S. Environmental Protection Agency (EPA) has been developing enforceable standards for PFAS under the Safe Drinking Water Act and other regulations. In March 2023, the EPA proposed Maximum Contaminant Levels (MCLs) for six PFAS in drinking water. In addition, the TCEQ has developed Protective Concentration Levels (PCLs) for select PFAS in soil, sediment, groundwater, and ecological benchmarks for PFAS in surface water. A summary of the researched databases for potential facilities that may use or store PFAS that may use or store is shown in **Table 3**.

Table 3 *- Regulatory Review Summary For PFAS Database*

Source	Database	Description	No. Within Study Area
EPA	PFAS GHG	The U.S. Environmental Protection Agency's Greenhouse Gas Reporting Program (GHGRP) collects Greenhouse Gas (GHG) data from large-emitting facilities (25,000 metric tons of carbon dioxide equivalent (CO2e) per year), and suppliers of fossil fuels and industrial gases that result in GHG emissions when used. PFAS emissions data has been identified for facilities engaged in the following industrial processes: Aluminum Production (GHGRP Subpart F), HCFC-22 Production and HFC-23 Destruction (Subpart O), Electronics Manufacturing (Subpart I), Fluorinated Gas Production (Subpart L), Magnesium Production (Subpart T), Electrical Transmission and Distribution Equipment Use (Subpart DD), and Manufacture of Electric Transmission and Distribution Equipment (Subpart SS).	0
EPA	PFAS NPL	The EPA's National Priorities List (NPL) contains list of Superfund Sites with PFAS. Limitations: Detections of PFAS at NPL sites do not mean that people are at risk from PFAS, are exposed to PFAS, or that the site is the source of the PFAS.	0
EPA	PFAS FED SITES	List of Federal agency locations with known or suspected detections of PFAS, made available by the U.S. EPA in their PFAS Analytic Tools data. Data are gathered from several federal entities, such as the Federal Superfund program, the Department of Defense (DOD), the National Aeronautics and Space Administration, the Department of Transportation, and the Department of Energy.	0
North-Eastern University	PFAS SSEHRI	The PFAS Contamination Site Tracker database is compiled by the PFAS Project Lab, part of the Social Science Environmental Health Research Institute (SSEHRI). The database records qualitative and quantitative data from each known site of PFAS contamination, including a timeline of discovery, sources, levels, health impacts, community response, and government response.	0
EPA	ERNS PFAS	The ERNS is compiled from reports of emergency responses to releases of hazardous substances, answered either by the EPA or by local emergency personnel who notified the EPA of the action. This dataset contains NRC spill information from 1990 to the present that is restricted to records associated with PFAS and PFAS-containing materials.	0
EPA	PFAS NPDES	The National Pollutant Discharge Elimination System (NPDES) permitted facilities with required monitoring for PFAS Substances is made available via the U.S. EPA's PFAS Analytic Tools.	0
EPA	PFAS TRI	The TRI facilities at which the reported chemical is a PFAS.	0
EPA	PFAS WATER	A public repository of PFAS Environmental Media Sampling Data. A wide range of federal, state, tribal and local governments, academic and non-governmental organizations, and individuals submit project details and sampling results to this public repository.	0
EPA	PFAS TSCA	The U.S. EPA issued the Chemical Data Reporting (CDR) Rule under the Toxic Substances Control Act (TSCA) and requires chemical manufacturers and facilities that manufacture or import chemical substances to report data to EPA. This list is specific only to TSCA Manufacture and Import Facilities with reported PFAS substances.	0
EPA	PFAS E-MANI-FEST	PFAS Waste Transfers dataset is made available via the U.S. EPA's PFAS Analytic Tools.	0
EPA	PFAS IND	Dataset from various sources that show which industries may be handling PFAS.	0
TCEQ	PFAS	List of sites from the Central Registry and ARTS databases where PFAS containing materials may be of concern.	0

No facilities that use and/or store PFAS or use and/or store potential PFAS-containing equipment/materials were identified within the study area.

REVIEW OF OIL AND GAS ACTIVITY

As part of the environmental assessment/ analysis, Halff reviewed publicly available data from the Texas Railroad Commission (RRC) regarding oil and gas activity within the Lake Tyler and Lake Tyler East watersheds. According to the RRC's public GIS data viewer, these watersheds contain 151 plugged wells, 102 dry holes, 95 oil wells, 120 gas wells, 18 oil/gas wells, and 7 injection/disposal wells. An analysis of the surface locations of these wells shows that the majority of the oil and gas wells (approximately 90%) are situated within the Lake Tyler East watershed. Within this area, most oil and oil/ gas wells are concentrated in the northwestern region, while gas wells are primarily found in the southeastern region. **Figure 1.3**, on the following pages, shows the summary of the researched oil and gas activity within the Lake Tyler and Lake Tyler East watershed.

Topographic gradient and flow direction analysis using digital elevation model (DEM) data indicate that any significant release of chemicals and/or petroleum products from oil and gas activities would likely flow towards the northern and southeastern portions of Lake Tyler East, potentially reaching the lake water. The City has established regulations governing both existing and new oil and gas wells, and to mitigate risk, however these are only applicable for wells within the City limits.

Natural gas transmission pipelines currently exists under Lake Tyler East. The City of Tyler can prohibit or allow drilling through specific council approval under the existing Drilling and Mining Ordinances. Maintenance of the natural gas transmission pipelines falls under the Texas Railroad Commission.

ENVIRONMENTAL SUMMARY

Given the Lake Tyler and Lake Tyler East's significance for both economic and recreational activities, effective management is necessary to prevent water contamination, shoreline erosion, preserve storage capacity, and environmental degradation. The following key management challenges must be addressed to uphold water quality for human use, support recreational activities, and protect the rich biodiversity that depends on these lakes.

- **Sedimentation:** Urban development, agricultural activities, and land erosion can increase sediment load, reducing storage capacity over time. Based on the 1997 and 2013 volumetric and sedimentation data the inflowing sediments have reduced the lakes' effective storage capacity by 373 acre-feet per year.
- **Pollution Control:** Managing agricultural runoff, urban development impacts, and oil/gas activities near the lakes is crucial to maintaining water quality.
- **Nutrients:** Runoff from agricultural areas contributes nitrogen and phosphorus, which can lead to eutrophication.

Tackling these issues requires a collaborative effort that brings together local communities, regulatory agencies, lake users, and other stakeholders. By implementing proactive management strategies, such as pollution control measures, monitoring, and sustainable water use practices, the long-term health and viability of these lakes can be safeguarded for future generations.

Lake Tyler Marina

ENVIRONMENTAL RECOMMENDATIONS

Recommendations for the preservation of water quality at Lake Tyler and Lake Tyler East included the following:

Stormwater Management

- Increasing urbanization and impervious surfaces within the watershed heightens the importance of stormwater management to mitigate runoff and protect water quality.
- Develop standards for protecting stormwater runoff from near-shore developments.

Buffer Zones

- Maintain vegetation buffers around the lakes and streams helps filter pollutants and reduce sedimentation.

Land Use Regulations

- The City of Tyler to enforce zoning laws and ordinances to balance development needs with watershed protection.
- Existing regulations for both oil and gas well leases should be enforced to ensure compliance.

Agricultural Best Practices

- Encourage farmers to adopt conservation practices, such as cover cropping and nutrient management, is key to reducing agricultural runoff.

Nutrient Management

- Implement buffer strips and wetlands to filter agricultural runoff.
- Promote precision farming practices to reduce fertilizer use.

Pollution Control

- Enforce stricter regulations on stormwater discharge.
- Encourage community clean-up initiatives and recycling programs.
- Regulate boathouse sanitary facilities for compliance with rules and regulations.
- Regular inspections of oil and gas wells for leaks.

Habitat Management

- Monitor and control invasive species through mechanical and biological means.
- Pursue aquatic vegetation management.

Public Engagement

- Increase awareness through educational campaigns.
- Foster partnerships between stakeholders to support conservation efforts.

Monitoring and Research

- Conduct regular water quality and biodiversity assessments. A proposed Water Quality Monitoring Program is provided on the following page.
- Study the impacts of climate variability on the lake's ecosystem.

PROPOSED WATER QUALITY MONITORING PROGRAM

In accordance with Sections 305(b) and 303(d) of the Federal Clean Water Act (CWA), the TCEQ assesses water bodies across the state and identifies those that fail to meet the designated uses and criteria established in the Texas Surface Water Quality Standards (TSWQS). These standards and criteria are designed to protect the attainable uses of each water body. Ambient water quality monitoring sites are strategically placed in locations that are representative of major hydrologic sections of the water body, ensuring that the established criteria are met. For reservoir arms, monitoring sites should be positioned closer to the main body of the reservoir rather than in riverine tributary areas. The assessment must use a sample set that is temporally representative of conditions within the period of record. Optimally, sampling should be routinely scheduled over several years and at a minimum of two years, with approximately the same intervals of time between sampling events. This routine sampling plan results in monthly or quarterly sample data sets which are considered temporally representative of long-term conditions. Surface water sampling typically collected at a depth of 0.3 meters (m) from the water surface—are considered the most appropriate for consistency with water quality standards and are generally used for assessing the following: water temperature, chloride, sulfate, TDS, dissolved oxygen (DO), nutrients, chlorophyll a, and E. coli.

Considering the observed development, agricultural activities, and oil and gas operations in the vicinity of the lakes, there is a potential risk of contamination that could impact water quality.

A thorough review of available data from the database report identified various sources of contamination, reinforcing the need for a structured water quality monitoring program.

To support a comprehensive evaluation of lake water conditions, a total of nine sampling locations were selected based on factors such as proximity to potential pollution sources, hydrological dynamics, and existing land use patterns. These sample points are intended to provide a representative assessment of key water quality indicators, including nutrient levels, sedimentation, and potential pollutants. The monitoring program will serve as a qualitative tool to track water quality trends over time, helping to identify any emerging concerns and inform future management and conservation efforts. **Figure 1.4** depicts the proposed sample location points and their associated area which collect surface runoff for that sample point. **Table 4** below provides the sample location coordinates and potential chemicals of concern (COCs) that need to be tested as part of the water quality monitoring program.

Table 4 *- Water Quality Monitoring Stations*

Station No.	Latitude & Longitude	COCs
Station 1	32.237364°, -95.208115°	pH, dissolved oxygen (DO), chloride (Cl-), chlorophyll a, Sulphate (SO4-2), total dissolved solids (TDS), total petroleum hydrocarbon (TPH), and indicator bacteria (E. Coli).
Station 2	32.255035°, -95.198047°	
Station 3	32.212456°, -95.126923°	
Station 4	32.287898°, -95.106778°	
Station 5	32.280029°, -95.114275°	
Station 6	32.268274°, -95.132375°	
Station 7	32.255470°, -95.114739°	
Station 8	32.239207°, -95.104097°	
Station 9	32.277529°, -95.105539°	

FIGURE 1.1 - TOPOGRAPHIC MAP

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Topographic Map
Lake Tyler & Lake Tyler East
Tyler, Smith County, Texas

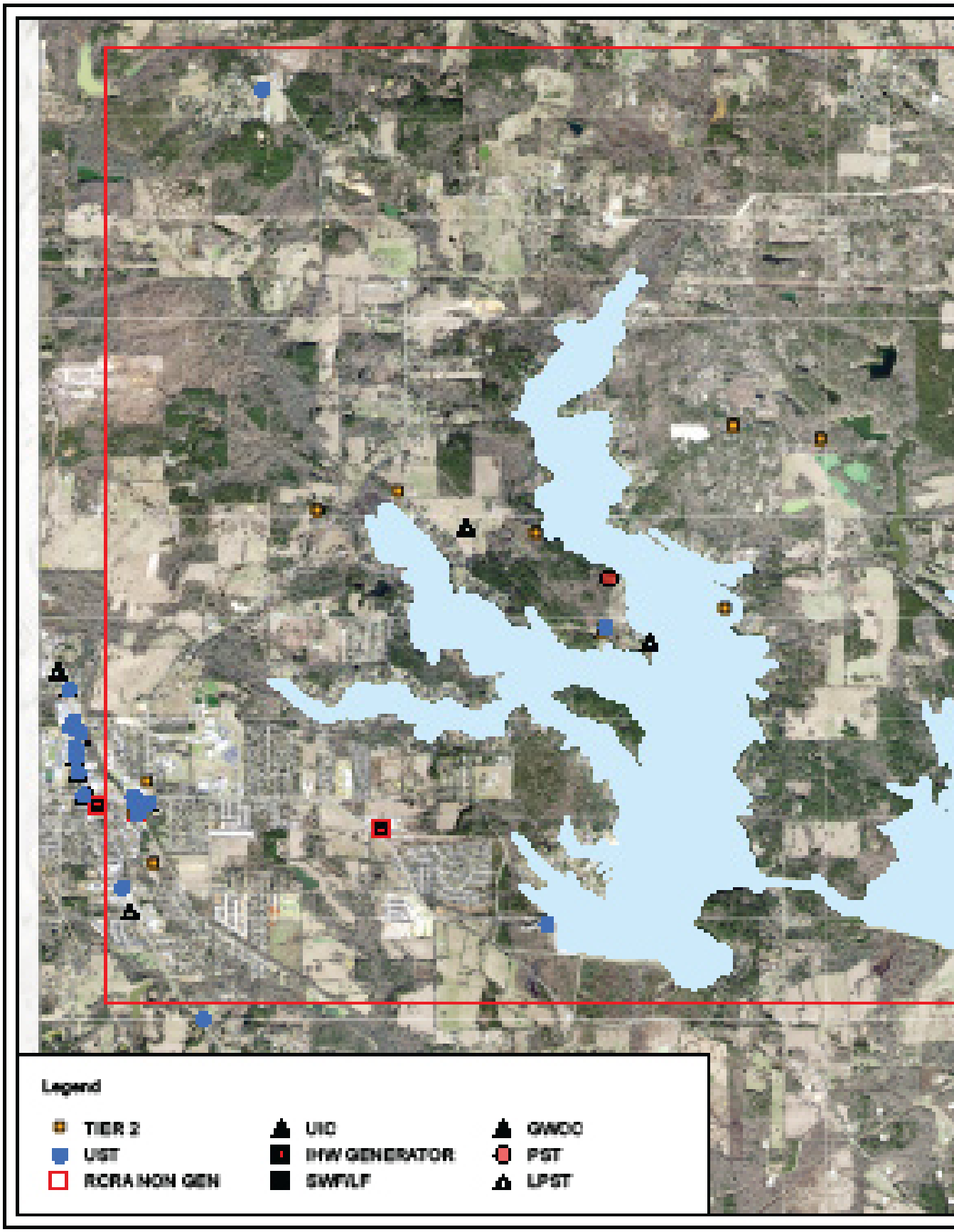
Project No.:	56964.001
Issued:	March 2025
Drawn By:	ZH
Checked By:	DM
Scale:	AS NOTED

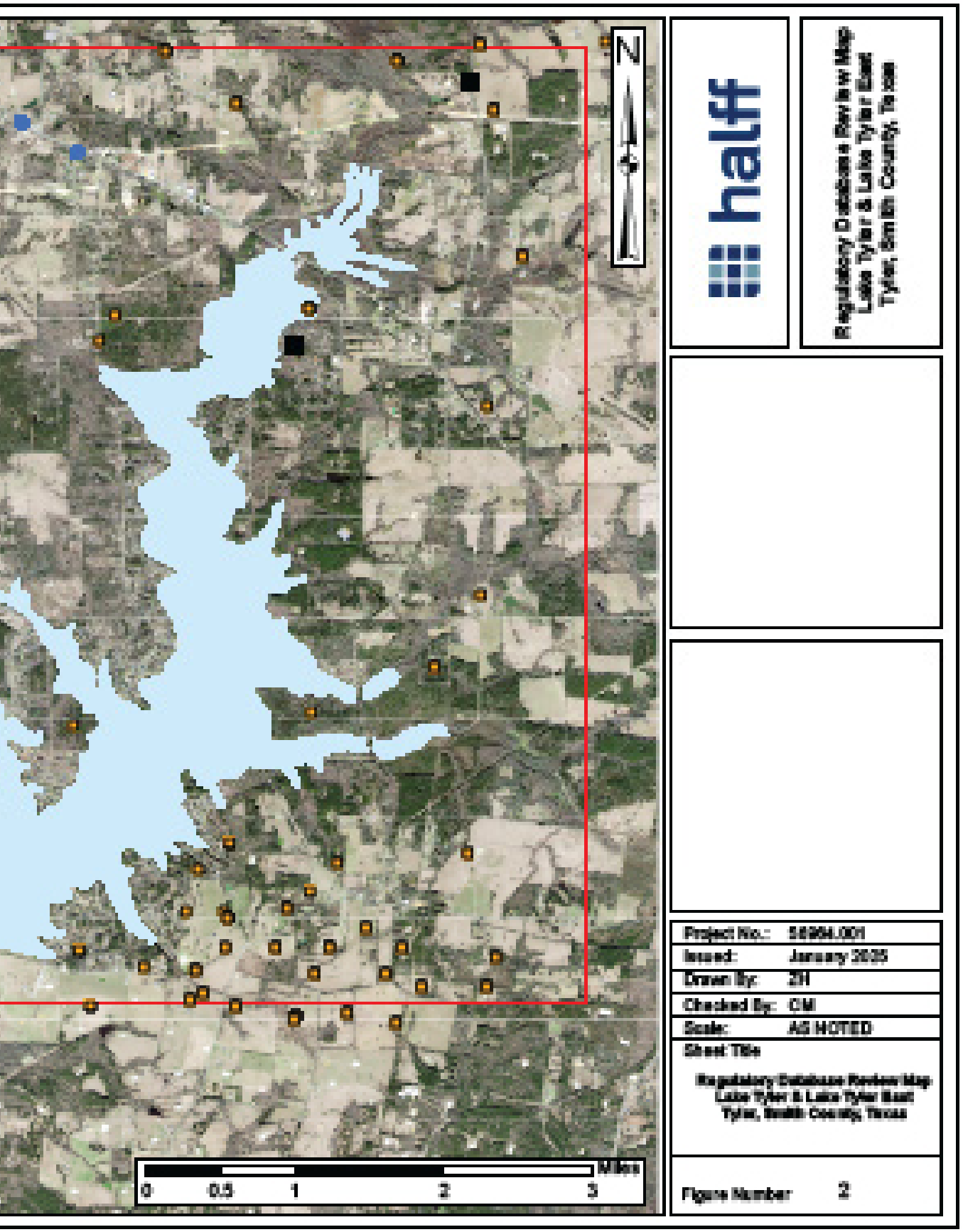
Sheet Title

Topographic Map
Lake Tyler & Lake Tyler East
Tyler, Smith County, Texas

Figure Number: 1

FIGURE 1.2 - REGULATORY DATABASE REVIEW MAP





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Regulatory Database Review Map
Lake Tyler & Lake Tyler East
Tyler, Smith County, Texas

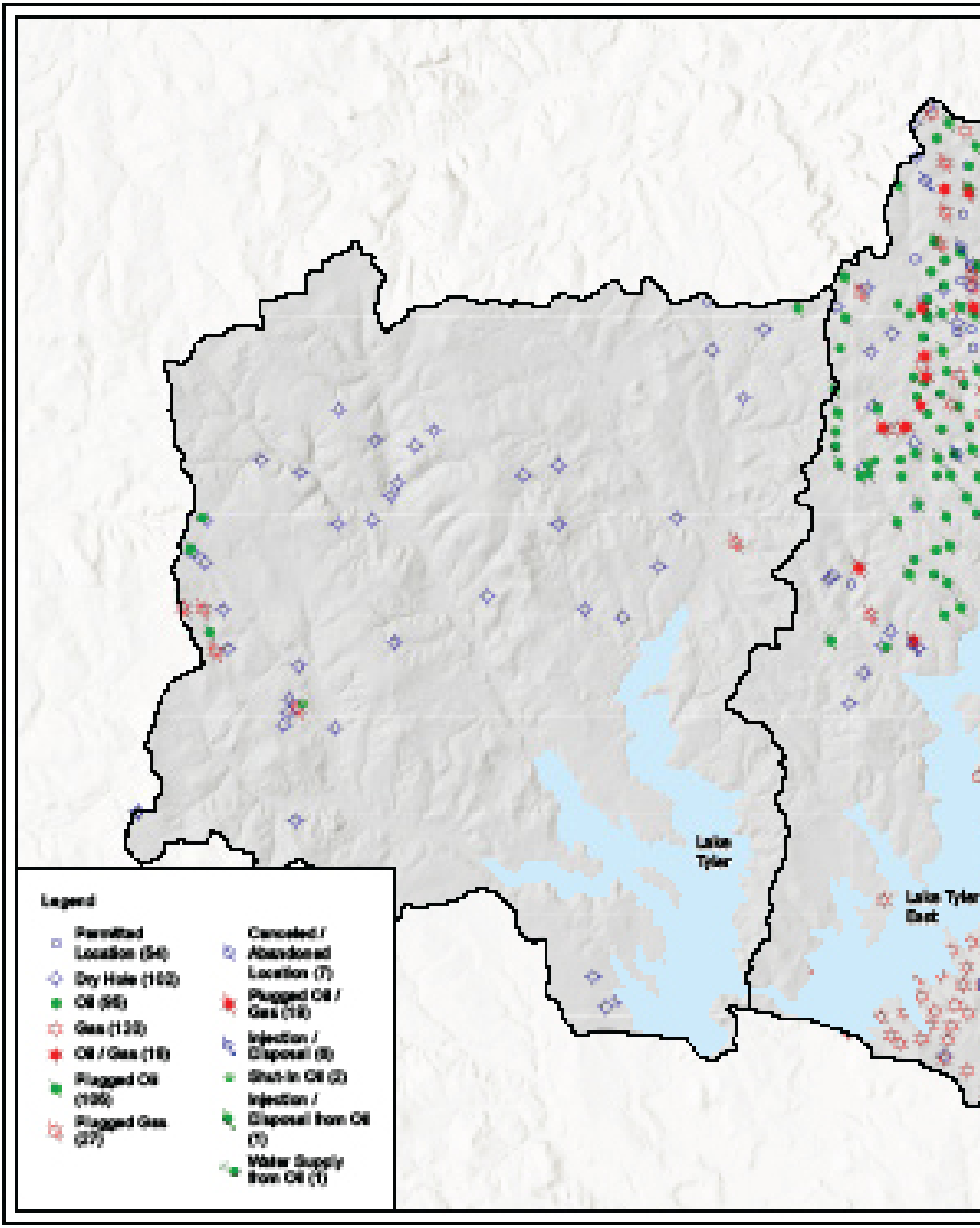
Project No.:	58964.001
Issued:	January 2025
Drawn By:	ZH
Checked By:	CM
Scale:	AS NOTED

Sheet Title

Regulatory Database Review Map
Lake Tyler & Lake Tyler East
Tyler, Smith County, Texas

Figure Number 2

FIGURE 1.3 - OIL AND GAS ACTIVITY MAP



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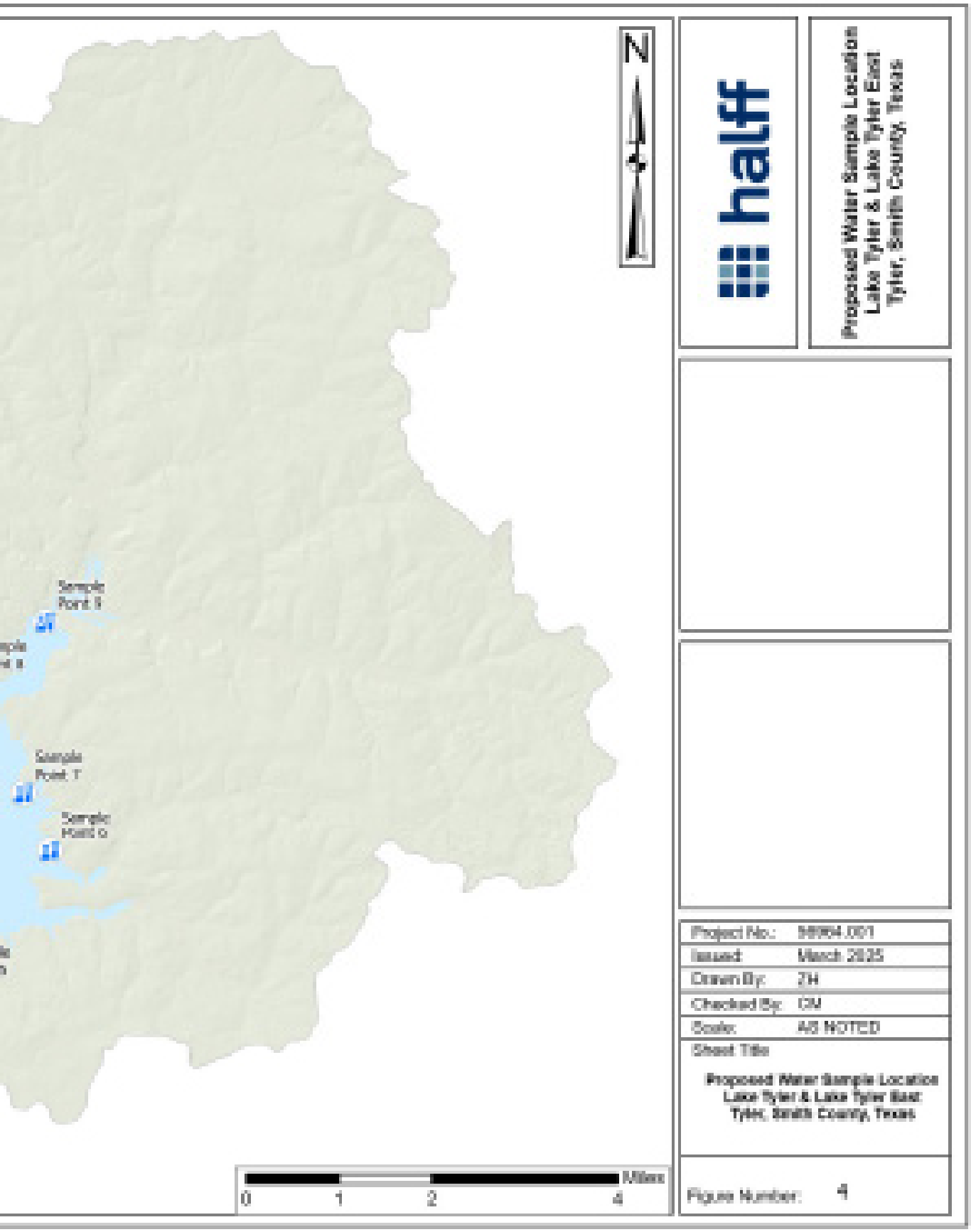
Oil and Gas Activity Map
Lake Tyler & Lake Tyler East
Tyler, Smith County, Texas
Project No.: 56964.001
Issued: January 2025
Drawn By: ZH
Checked By: CM
Scale: AS NOTED
Sheet Title
Oil and Gas Activity Map
Lake Tyler & Lake Tyler East
Tyler, Smith County, Texas
Figure Number: 3
0
1
2
4
Miles

FIGURE 1.4 - PROPOSED WATER SAMPLE LOCATION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halff
Proposed Water Sample Location
Lake Tyler & Lake Tyler East
Tyler, Smith County, Texas
Sample Point 8
Sample Point 7
Sample Point 6
Project No.: 98904.001
Issued: March 2025
Drawn By: ZH
Checked By: DM
Scale: AS NOTED
Sheet Title
Proposed Water Sample Location
Lake Tyler & Lake Tyler East
Tyler, Smith County, Texas
Figure Number: 4
0
1
2
4
Miles

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2

WATER SYSTEMS

WATER SYSTEMS OVERVIEW

As a part of the larger Master Plan for Lake Tyler and Lake Tyler East, this task seeks to assess current watershed conditions and provide recommendations for existing watershed or stormwater programs. Halff (Engineer) was the primary consultant for the project. The Engineer's project team utilized Light Detection and Ranging (LiDAR) data and current aerials to identify land-use changes near the reservoirs. Additionally, the Engineer leveraged the United States Geological Survey (USGS) National Agriculture Imagery Program (NAIP) to determine development trends and to contribute to the predictive analysis. Overall, the Engineer's project team performed a change detection analysis on imagery and the digital elevation model (DEM), ran a predictive analysis, and provided recommendations and conclusions for current plans for the HUC 12 watershed. All exhibits and tables are provided in the digital Appendix.

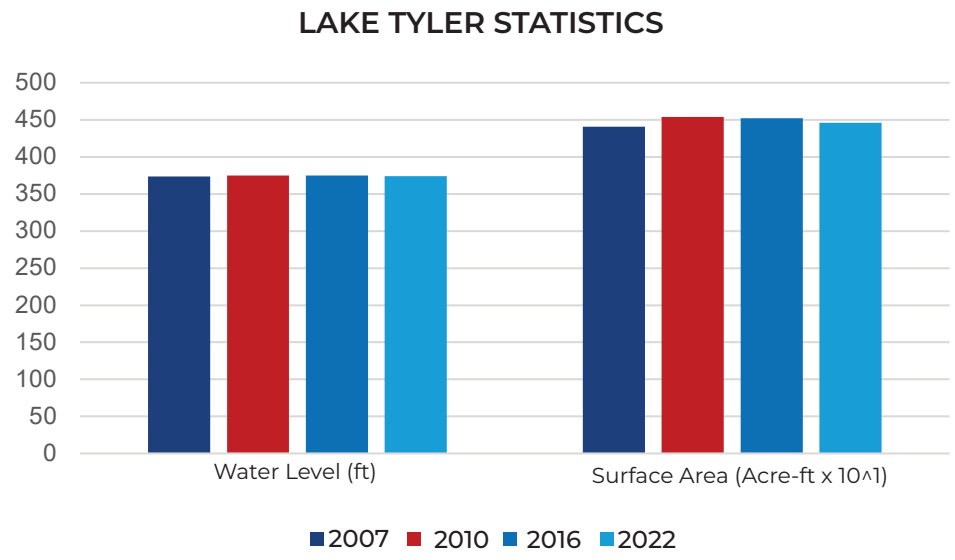
METHODS

Data Selection

For the data selection, the Engineer looked at Earth Explorer (https://earthexplorer.usgs.gov/) to find the NAIP and LiDAR data. The first criterion to select the proper data for the watershed analysis is the date acquired for the imagery. The Engineer collected the newest and oldest imagery data using the available datasets. These data selections provide the Engineer with the greatest span of time to work with, providing a more accurate picture of land-use development over time. The dates for the selected imagery data are 2010 and 2022, and the dates for the selected LiDAR data are 2007 and 2016. These selections provided the Engineer with the largest range of dates to accurately track land use changes near the reservoir. The images are provided in the Appendix.

To further justify the use of these datasets, the Engineer conducted research on the lake water levels and surface area. **Figure 2.1** compares the average water level and average

Figure 2.1 - *Summary Measurements of Lake Tyler*



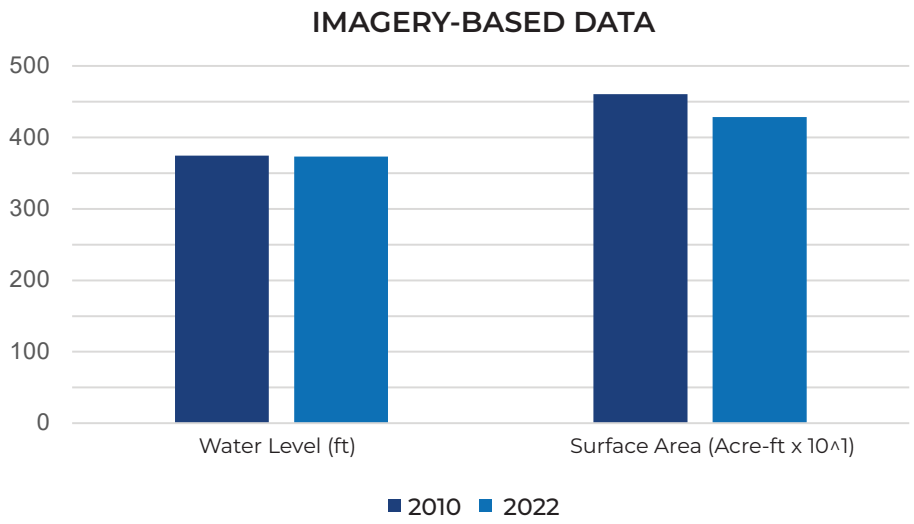
surface area for each of the four years studied. As shown in **Figure 2.1**, the water level and surface area of Lake Tyler remain relatively consistent overtime. As a result, changes in these environmental conditions does not significantly affect large land use variations over time.

Change Detection Analysis

To track changes in land use, the Engineer and their team followed the same workflow. The workflow consists of the following steps:

- **Image Classification:** The Engineer employed image classification tools in ArcGIS Pro to identify the various terrains located in the imagery data. These classifications include Water, Tree Canopy and Shrubs, Low Vegetation, Barren, Impervious Surfaces, and Impervious Roads. This tool directly influences the change detection step in the workflow. As a result, the Engineer refined the classification layers by manually reviewing the layer in comparison to the given images, correcting any false classifications.
- **Change Detection:** The Engineer used the Change Detection tool in ArcGIS pro to determine the changes between the raster datasets for both the imagery and DEM-based data. The Change Detection is converted into a polygon feature class to more accurately analyze the findings when the data is merged.
- **Filter of Results:** The Engineer applied queries to mitigate the noise from the change detection results. For both the imagery-based and the elevation-based data, a one-mile buffer was used to focus effort around the lakes. For the elevation-based data, a filter of less than or equal to 4 ft was used to reduce the noise associated with change detection results.
- **Results Assessment:** After these initial steps, the Engineer assessed the imagery-based data and elevation-based data separately. After highlighting the significant change locations using the imagery-based results and elevation-based results, the Engineer merged the respective change locations to establish and report on overlapping locations.

Figure 2.2 - *Comparison of Water Level and Surface Area (2010 and 2022)*



RESULTS

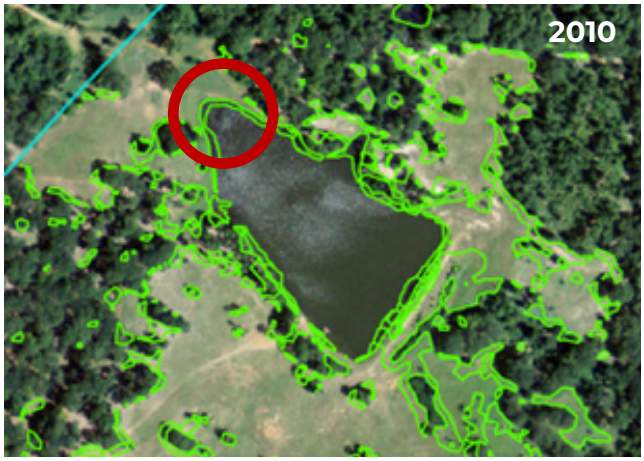
Imagery-Based Data

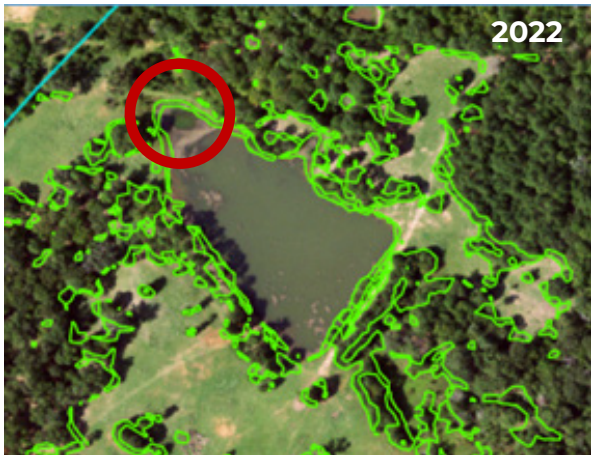
The Engineer analyzed the image-based results. These results focus on the visual changes in land-use within a one-mile radius around Lake Tyler and Lake Tyler East between the 2010 and 2022.

To accurately assess the change detection, the Engineer considered the water level and surface area variations. **Figure 2.2** compares the water level and surface area between the two time periods. Using this data, the Engineer calculated the percent difference between the two values. From 2010 to 2022, approximately 1% difference is reported for water level, and approximately 7% difference is reported for lake water surface area. These differences are primarily seen along the shorelines of lake and adjacent ponds,generally due to more sand and shore visible in 2022. However, these results do not significantly affect overall land cover changes.

Figure 2.3 - *Compares Imagery Changes from 2010 to 2022 for Pond Between Lakes*

Figure 2.4 - *Comparison of Visual Changes- Pond Northwest of Lakes (2010 to 2022)*





The Engineer identified several areas of significance after analyzing the image-based results. Those areas that overlapped with elevation-based results will be discussed in upcoming sections. However, a few areas stood out due to observable land cover changes where elevation changes were not seen. The following examples focus on land cover changes within a one-mile radius of the lakes.

Figure 2.3 shows a pond located in the center of the HUC 12 watershed between Lake Tyler and Lake Tyler East.

The Engineer notes land cover change from water to low vegetation, tree canopy and shrubs, and bare earth or barren surface. Additionally, change from low vegetation and tree canopy to water around the pond. Although there are no significant elevation changes in this area, the decrease in surface area of the pond, and the increase in shoreline around the pond suggest possible erosion.

Figure 2.4 presents another pond with significant land cover change, this one located northwest of Lake Tyler. The Engineer notes changes on the northwest shoreline of the pond, as indicated by the red circle.

On the northeast shoreline of the pond, the Engineer notes change from water to low vegetation, water to tree canopy and shrubs, and low vegetation to tree canopy and shrubs. In addition to these changes, the Engineer also observed small islands, or possibly algae, present throughout the pond. The additional shoreline area and island area could be due to water surface level fluctuations, or it could indicate erosion around the lake. Field verification will be required to verify these observations.

These examples were identified strictly through imagery-based land cover changes. However, the Engineer considers these a lower priority since they were not reinforced by findings in the elevation-based data.

Elevation Based Data

The Engineer analyzed the elevation-based results. A Digital Elevation Model (DEM) refers to a digital representation of terrain elevation. The Engineer evaluated DEM datasets for 2007 and 2016. **Figure 2.5** summarizes the yearly averages of the water levels and water surface areas for this period. The Engineer calculated the percent difference between the values. The water level differed by less than 1%, and the water surface area differed by 3%. These differences suggest that changes in these lake metrics do not significantly impact elevation changes over time.

Several areas of the watershed showed relatively large changes in elevation over the study period. The following examples haveno overlap with the imagery-based areas of interest, placing them in a lower, secondary priority for changes in the watershed.

Figure 2.6 shows elevation changes in an area with heavy tree cover to the north of Lake Tyler East. There are no visible elevation changes, as the land cover remains tree canopy. However, the average elevation change is 6 ft. This suggests that the terrain elevation in this area decreased by 6 ft between the two data source years.

Several creeks run through this portion of the watershed. The DEM change generally follows one of the creeks, and it indicates significant elevation change along the creek. Because of the potential for riparian erosion, this area should be field verified to confirm whether erosion is taking place. There are several examples of areas like this throughout the watershed. Although they are not high priority areas, they should be monitored for erosion activity.

Figure 2.5 - *Comparison of Water Level and Water Surface Area (2007 to 2016)*

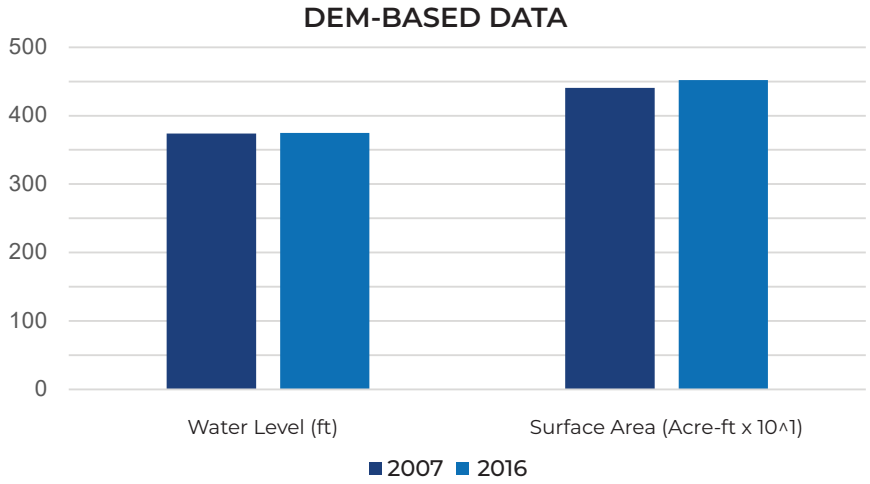
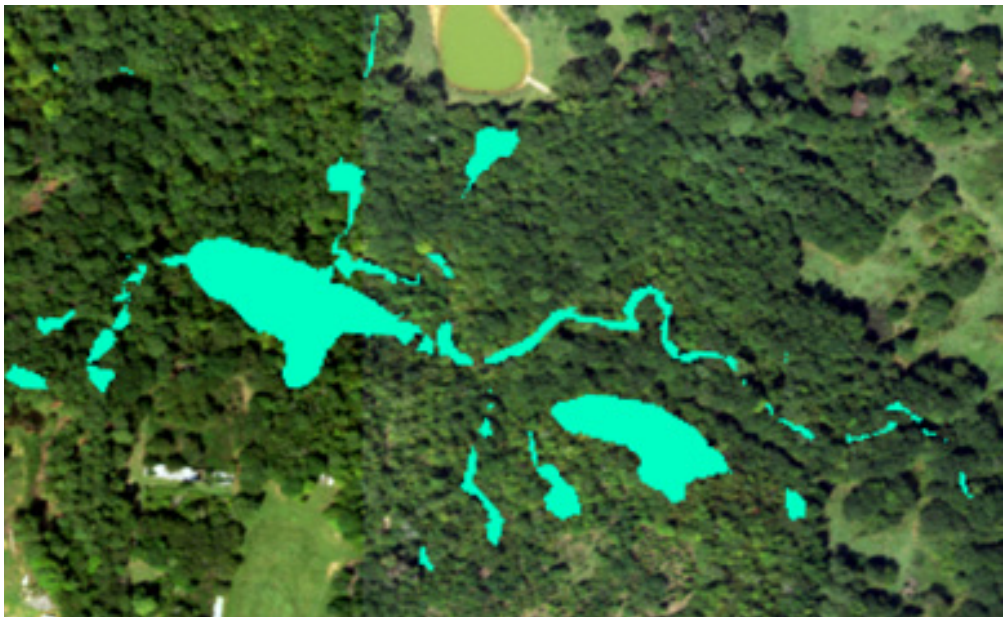


Figure 2.6 - *Elevation Changes (2007 to 2016) - Example 1*



INTERSECTED RESULTS

After independently analyzing the image-based and elevation-based datasets, the Engineer intersected the change results from the two sources to identify priority areas. These intersected results were split into land and shoreline classifications.

The Engineer ranked the intersected areas based on factors like mean elevation, max elevation, total surface area affected, nearness to impervious surfaces, and evidence of erosion. The Engineer considered these factors to determine the priority of the intersected change results areas.

Land

Land refers to land surface not in contact with Lake Tyler or Lake Tyler East but within a one-mile radius. **Table 5** lists the rankings for each identified area on land. The sites names match spatial bookmark labels in the GIS file.

The figures for each of the areas are listed in the Appendix. The following are the descriptions and observations for each high priority area.

Table 5- *High Priority Land Areas*

Rank	Name	Mean DEM (ft)	Max DEM (ft)	Total Surface Area
1	L_SE_LTE_DEM9.9	9.9	20.3	153,092.70
2	L_N_LT_DEM6.6	6.6	11.1	305,982.30
3	L_NE_LTE_DEM5.7	5.7	13.2	244,771.80
4	L_NE_LT_DEM5.8	5.8	9	235,503.90
5	L_NW_LT_DEM5.4	5.4	8.6	321,615.80
6	L_NE_LTE_DEM6.2	6.2	9.6	79,452.40
7	L_NW_LT_DEM4.8	4.8	5.7	92,084.70
8	L_NW_LTE_DEM4.7	4.7	7	18,274.10
9	L_NW_LTE_DEM4.2	4.2	4.4	87,054.30

- **Figure A-2: L_N_LT_DEM6.6 (Rank 2) –** Image-based change shows a tree canopy to barren land transition, impervious surfaces, low vegetation, and water. The Engineer observed the presence of new ponds. The elevation-based changes showed up around the ponds, suggesting erosion.

- **Figure A-3: L_NE_LTE_DEM5.7 (Rank 3) –** The image-based change showed transition from barren and low vegetation to tree canopy. This area is near impervious surfaces and residential areas. Elevation changes appear in this area with tree cover, and the area is not near a body of water.

- **Figure A-4: L_NE_LT_DEM5.8 (Rank 4) –** The imagery reports tree canopy to low vegetation change, barren land, and impervious surfaces. The image change area is along the west shoreline of Lake Tyler, but the elevation changes are found further inland. The elevation changes are found near new impervious surfaces such as roads and residential homes. Potential erosion is possible along the shoreline and near homes.

- **Figure A-5: L_NW_LT_DEM5.4 (Rank 5) -** The imagery shows transition from low vegetation and tree canopy to water and barren land, and a new pond was observed near residential areas. The elevation changes appeared in a tree-covered area along a creek feeding a pond, suggesting that erosion may be occurring along the creek bed.

- **Figure A-6: L_NE_LTE_DEM6.2 (Rank 6) –** The imagery shows impervious surface changing to low vegetation, and elevation changes intersect along the impervious surface. The impervious surface does not appear to be heavily used, and it is not close to water. Elevation changes may indicate land development rather than erosion.

- **Figure A-7: L_NW_LT_DEM4.8 (Rank 7) –** The imagery shows change from water to tree canopy and low vegetation. The Engineer observed a significant decrease in pond surface area over time, and the elevation changes were also observed along the pond. These changes suggest possible erosion.

- **Figure A-8: L_NW_LTE_DEM4.7 (Rank 8) –** The imagery changed from low vegetation and water to tree canopy. The Engineer observed a decrease in pond surface area, as well as an increase in algae. Elevation changes were observed in the center of the pond, indicating possible erosion.

- **Figure A-9: L_NW_LTE_DEM4.2 (Rank 9) –** The imagery changed from water to low vegetation and barren land to low vegetation, and a new pond was detected. The elevation analysis highlighted changes the tree line rather than near the new pond. The Engineer observed that erosion may be occurring around the pond.

Shoreline

Shoreline is defined as any surface in contact with Lake Tyler or Lake Tyler East. For the elevation-based results, the Engineer focused on the lake shorelines. The focus of the analysis highlighted any change in elevation greater than 3 to 5 feet of difference. With this focal area, the Engineer further investigated the shoreline results. **Table 6** ranks each area along the shoreline. The sites names match spatial bookmark labels in the GIS file.

Table 6 - *High Priority Shoreline Areas*

Rank	Name	Mean DEM (ft)	Max DEM (ft)	Total Surface Area
1	SL_E_LTE_DEM2.4	2.4	14.5	192,433.10
2	SL_W_LTE_DEM1.3	1.3	6.9	117,891.10
3	SL_E_LTE_DEM1.1	1.1	5.3	92,084.70
4	SL_E_LTE_DEM1.0	1	4.5	178,939.50
5	SL_W_LT_DEM0.8	0.8	5.1	92,614.90
6	SL_SE_LTE_DEM0.9	0.9	3	296,887.60
7	SL_W_LT_DEM0.6	0.6	2.3	343,713.00
8	SL_W_LTE_DEM0.5	0.5	1.9	38,091.80

The figures for each of the areas above are provided in the Appendix. The following are the descriptions and observations for each high priority area.

- **Figure A-10: SL_E_LTE_DEM2.4 (Rank 1)-** The image-based analysis detected water changed to low vegetation and barren land to low vegetation. The Engineer observed that the shoreline is becoming more visible over time, and the shape of the cove altered. The DEM-based analysis detected high elevation changes throughout this cove, suggesting possible erosion.
- **Figure A-11: SL_W_LTE_DEM1.3 (Rank 2)-** The imagery-based analysis detected low vegetation changed to tree canopy and impervious surfaces. The DEM-based analysis detected elevation change in the tree-covered area and along channel inlets. The Engineer observes shape changes along the shoreline where there are no impervious surfaces, suggesting possible erosion.
- **Figure A-12: SL_E_LTE_DEM1.1 (Rank 3)-** The imagery-based analysis detected water changed to low vegetation. Additionally, the Engineer observed an increase in algae. In the figure, the red circle indicates an area that changed from tree canopy and low vegetation to water. There is additional elevation change observed in this area, and land development changes suggest erosion caused by water movement into the lake.
- **Figure A-13: SL_E_LTE_DEM1.0 (Rank 4)-** The imagery-based analysis detected water changed to low vegetation and tree canopy to barren land. The Engineer observed several areas along the shoreline that appear to have inlets, and there is an overall increase in algae. The DEM-based analysis indicated elevation changes along

the shoreline and around the inlets. The red circle indicates an area that changed from tree canopy to barren. This could be due to erosion or land development.

- **Figure A-14: SL_W_LT_DEM0.8 (Rank 5)-** The imagery changed from tree canopy to low vegetation, barren land, and impervious surfaces. The Engineer observed more sand and shoreline throughout the area. The elevation-based analysis reports greatest elevation change around the southern-most point, indicating a likelihood of erosion.
- **Figure A-15: SL_SE_LTE_DEM0.9 (Rank 6)-** The imagery-based analysis detected tree canopy to impervious surfaces and low vegetation. The Engineer observed a change in shape of the shoreline and an increased surface area of the island. Additionally, there are sizable residential areas and an increase in algae over time. Elevation changes were observed along the shoreline and the island. Erosion may be occurring along the inlets near the areas with water movement/activity.
- **Figure A-16: SL_W_LT_DEM0.6 (Rank 7)-** The imagery showed change from tree canopy to low vegetation, barren land, and impervious surfaces. The Engineer observed these changes may be due to land development rather than erosion. However, elevation changes are present along the shoreline, and there is an increase in visible shoreline.
- **Figure A-17: SL_W_LTE_DEM0.5 (Rank 8)-** The imagery changed from tree canopy to low vegetation. Additionally, the Engineer observed more visible shoreline and a change in the shape of the cove. The elevation change analysis highlighted the inlet to the cove as areas with the greatest shoreline changes, indicating possible erosion.

PREDICTIVE ANALYSIS

Methods

The Engineer was tasked with establishing development trends and projecting potential future development within the Lake Tyler and Lake Tyler East watersheds. Four future development horizon years were selected - 2028, 2034, 2040, and 2046. The predictive analysis workflow for this project involved defining the area of interest, model selection, data development along with feature engineering, training model development and refinement, and predictive model development and application for future time horizons.

Areas of Interest

The HUC12 watersheds that contribute runoff to Lake Tyler and Lake Tyler East were used as the boundaries for the land cover predictive analysis. The Engineer applied a 10m x 10m grid to the study area. The grid contains a total of 2,767,627 cells and was used for data sampling and development before training the model.

Model Section

To project potential future development, the Engineer applied a supervised binary classification machine learning framework. The Engineer initially selected a multi-class model, however that model did not meet a minimum performance threshold of 70% or better true positive results. Although the multi-class model proved capable of predicting all seven land cover categories for known land cover data (2022), the model performance was relatively weak. As a simpler alternative with better predictive performance, a binary (2-class) model was tested and adopted. The Engineer justified the change in model type based on the significant performance improvement and more usable results produced by the binary model.

Data Development

The machine learning workflow began by leveraging the land cover GIS data that the Engineer generated from aerial imagery during the change detection analysis. The land cover data layers were re-classified to support the binary model, where only two categories are considered, Developed and Not Developed. The Developed category contains structures and buildings. The Not Developed category contains all other land cover categories - Water, Tree Canopy and Shrubs, Low Vegetation, Barren, and Impervious Roads.

Training Model

To develop and test the training model, the Engineer used the center point of each 10m x 10m cell to sample historical and existing land cover GIS datasets for the years 2010, 2016, and 2022. The grid sampling points were also used to develop model features (attributes) for a variety of physical, spatial, and demographic attributes. From the overall watershed, every 10th cell was uniformly selected for the training subset. To follow the best practice of a train-test split to evaluate the training model, the Engineer applied a 70/30 split of the training dataset. This means that 70% of the gridded watershed data was used for training, and the remaining 30% of the gridded data was used for testing. With a total of 2,767,627 cells in the watershed grid, the training dataset contained 276,767 cells, and of these 192,968 cells were used to train the model and 83,032 cells were used to test the model. Evaluation metrics for the training model are reported in the Results section of this memorandum.

Predictive Model

After training model evaluation and parameter refinement, the Engineer developed a predictive model using the same parameters as the final training model. To apply the predictive model, the Engineer used the same center points of the 10m x 10m grid to sample the existing land cover GIS datasets for the years 2016 and 2022. This information was used to train the predictive model to learn and apply the development trends during and prior to this period. The predictive model was applied forward in time to forecast future land development, using four consecutive timesteps of six years each. Below is a summary of the datasets used for model prediction:

- Training data: 2016 (known) and 2022 (known); predicted data: 2028;
- Training data: 2022 (known) and 2028 (predicted); predicted data: 2034;
- Training data: 2028 (predicted) and 2034 (predicted); predicted data: 2040; and
- Training data: 2034 (predicted) and 2040 (predicted); predicted data: 2046.

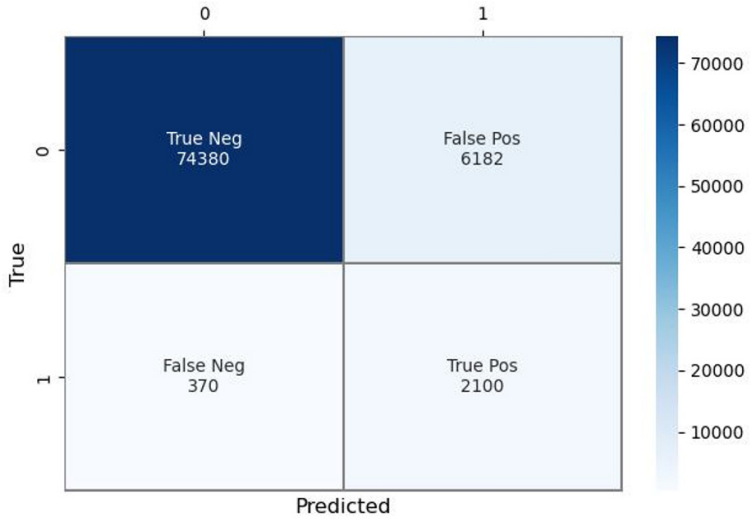
Results

The machine learning model results consist of:

- Training model results for an existing time horizon (2022);
- Predictive model results for future time horizons (2028, 2034, 2040, 2046); and
- Hotspot area results for future development predicted by the model.

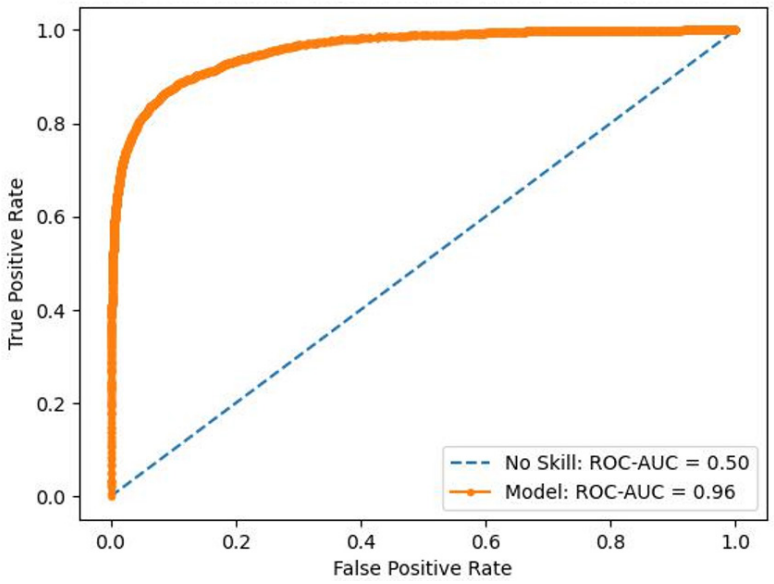
Training Model Results

Figure 2.7 - *Confusion Matrix- Training Model*



The confusion matrix in **Figure 2.7** gives a simple summary of the true and false results predicted for 30% of the training dataset (83,032 total cells). An ideal predictive model maximizes true results and minimizes false results. The Engineer considered the relative cost of false results and assumed false negative results as having the higher overall cost. Therefore, the model parameters were deliberately set to minimize false negatives, causing a resulting penalty to false positives. As shown, minimal false negatives (370) were achieved in the training model, but this increased the false positives (6182). Applied in a decision-support role for the City, the 2022 training model successfully predicts most of the areas that did in fact develop, and it misses only 370 of watershed grid cells. However, the same model overestimates areas that it predicted would develop. The model incorrectly predicted 6182 watershed cells would develop which did not.

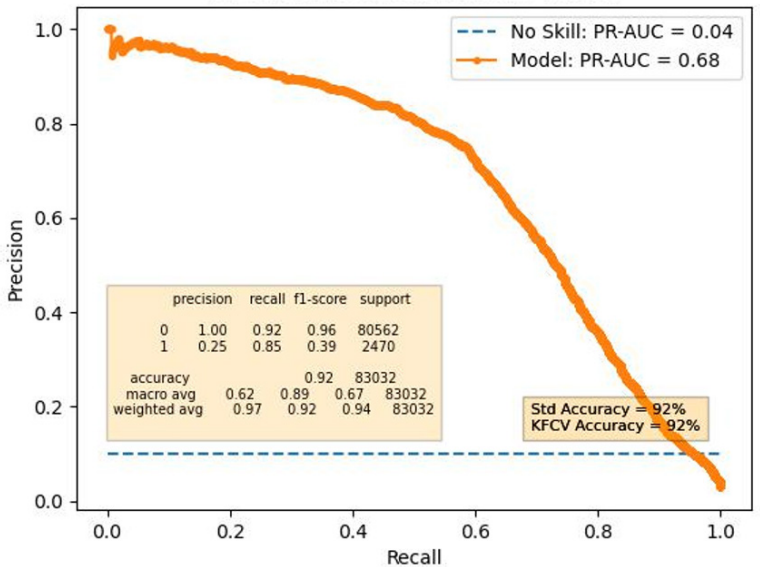
Figure 2.8 - *Receiver Operating Characteristics*



The receiver operating characteristics (ROC) area under the curve **(Figure 2.8)** is an important predictive model metric that compares the false positive rate versus the false negative rate. Using the same input information as the confusion matrix, the ROC quantifies model skill and makes a numeric comparison of the model skill versus against a no-skill model or in other words a random prediction. This metric essentially compares an uninformed, 50/50 probability guess about where and when future development will take place (blue dashed line), with the model's prediction of future development (orange solid line). An ideal predictive model reports an ROC value of 1.00, as it maximizes true positive results and minimizes false positive results. As shown, the predictive model reports strong results for this ROC (0.96). Applied in a decision-support role for the City, the 2022 training model successfully maximizes true positive results, representing areas that actually do develop, and it successfully minimizes the false positive results, or those areas predicted to develop that did not actually develop by 2022.

The precision-recall (PR) curve **(Figure 2.9)** summarizes the trade-off between true positive rate and the positive predictive value for a model using different probability thresholds. As an alternate and supplemental model metric to the ROC curve presented previously, the PR curve is better suited for so-called "imbalanced" datasets. These are datasets where the primary class of interest (developed land, per the scope of this analysis) is significantly outnumbered by the other class, leading to skewed data distribution. ROC curves can present an overly optimistic view of an algorithm's performance if there is a large skew in the class distribution. PR curves, often used in information retrieval, are cited as an alternative to ROC curves for tasks with a large skew in the class distribution. An ideal predictive model reports a PR value of 1.00. As shown, the Tyler predictive model reports acceptable results for PR (0.68). The Engineer also took into account a variety of additional, secondary model metrics to evaluate the Lake Tyler predictive model, including overall accuracy, the K-folds accuracy, and harmonic mean.

Figure 2.9 - *Precision-Recall*



The SHAP feature importance violin plot **(Figure 2.10)** is a visualization used to enhance machine learning interpretability to display the distribution of Shapley Additive Explanation (SHAP) values for each feature or attribute in a model. This type of visualization lends insight to how each feature influences the model's predictions across the dataset. The SHAP feature importance table (Table 3) summarizes the model features/attributes that are shown to be highly related to development trends in the Lake Tyler watershed.

Figure 2.10 - *SHAP Feature Importance*

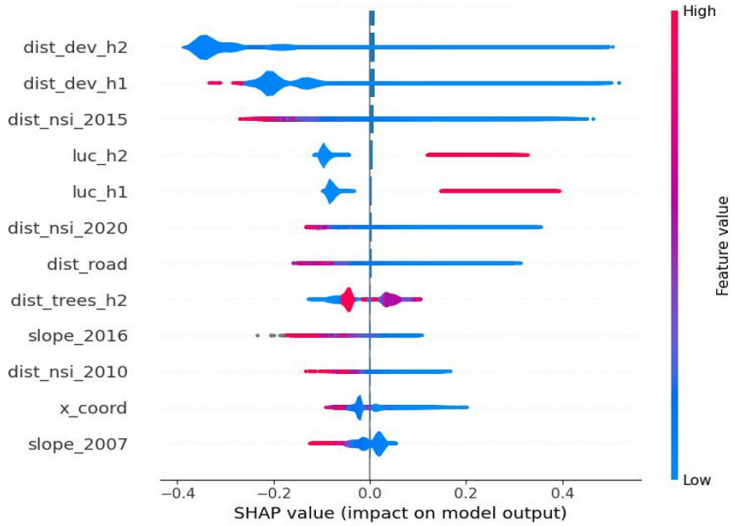


Table 7 - *SHAP Feature Importance - Tabular Summary*

Rank	Feature Description	Value	Rank	Feature Description	Value
1	Dist. to developed land (2016)	Min	8	Dist. to nearest tree (2016)	Max
2	Dist. to developed land (2010)	Min	9	Slope (2016)	Min
3	Dist. to structure, NSI data (2015)	Min	10	Dist. to structure, NSI data (2010)	Min
4	Land cover classification (2016)	Dev.	11	X-coordinate (NAD83 State Plane)	Min
5	Land cover classification (2010)	Dev.	12	Slope (2016)	Min
6	Dist. to structure, NSI data (2020)	Min			
7	Dist. to nearest road	Min			

Predictive Model Results

The Engineer prepared a predictive model based on the training model parameters. The predictive model was applied to forecast future development changes in the watershed for these future time horizons (2028, 2034, 2040, and 2046). As a baseline for comparison, the existing results for the most current time period (2022) are presented spatially in **Figure 2.11**. The predicted results for these future time horizons are presented spatially in **Figures 2.12, 2.13, 2.14, and 2.15.**

Figure 2.11 - *Existing Development (2022)*

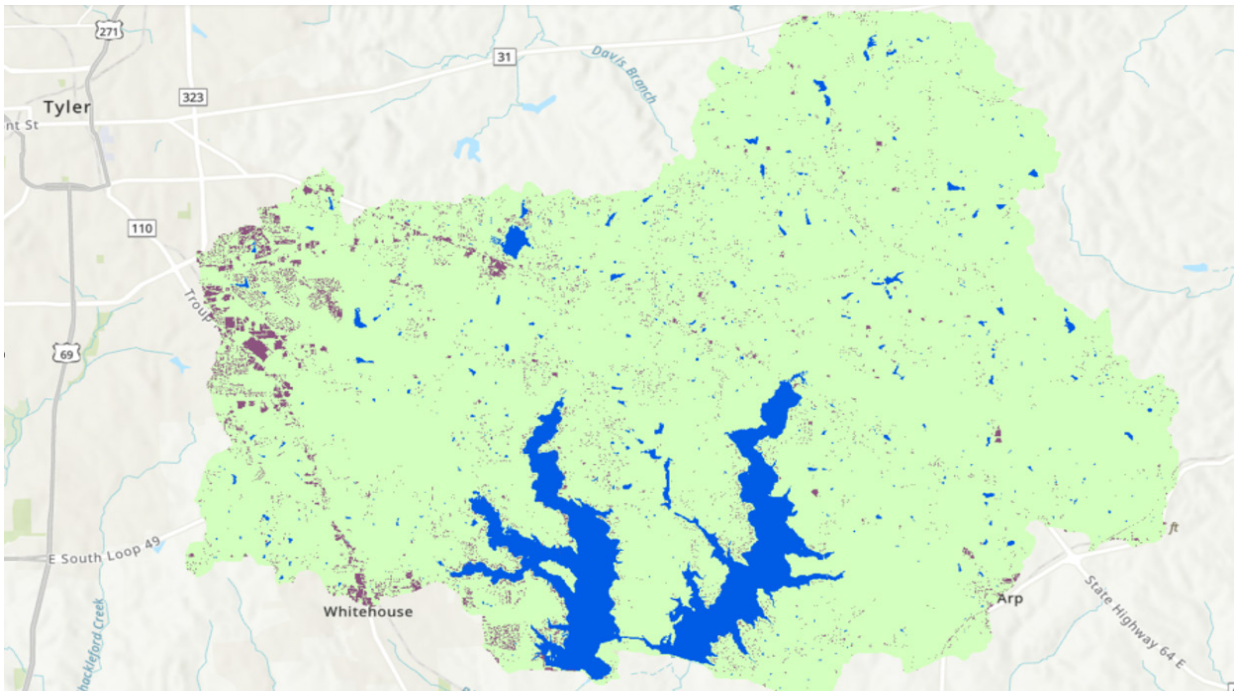


Figure 2.12 - *Predicted Development (2028)*

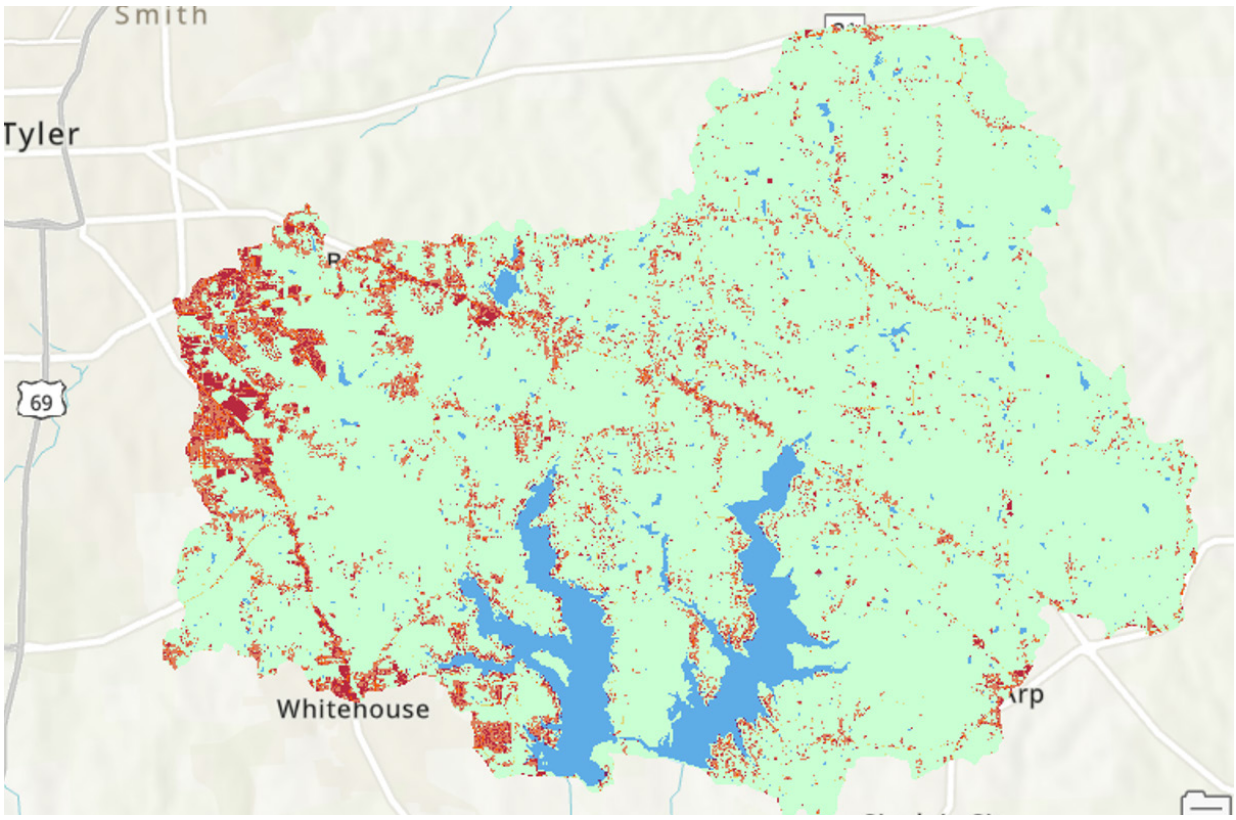


Figure 2.13 - *Predicted Development (2034)*

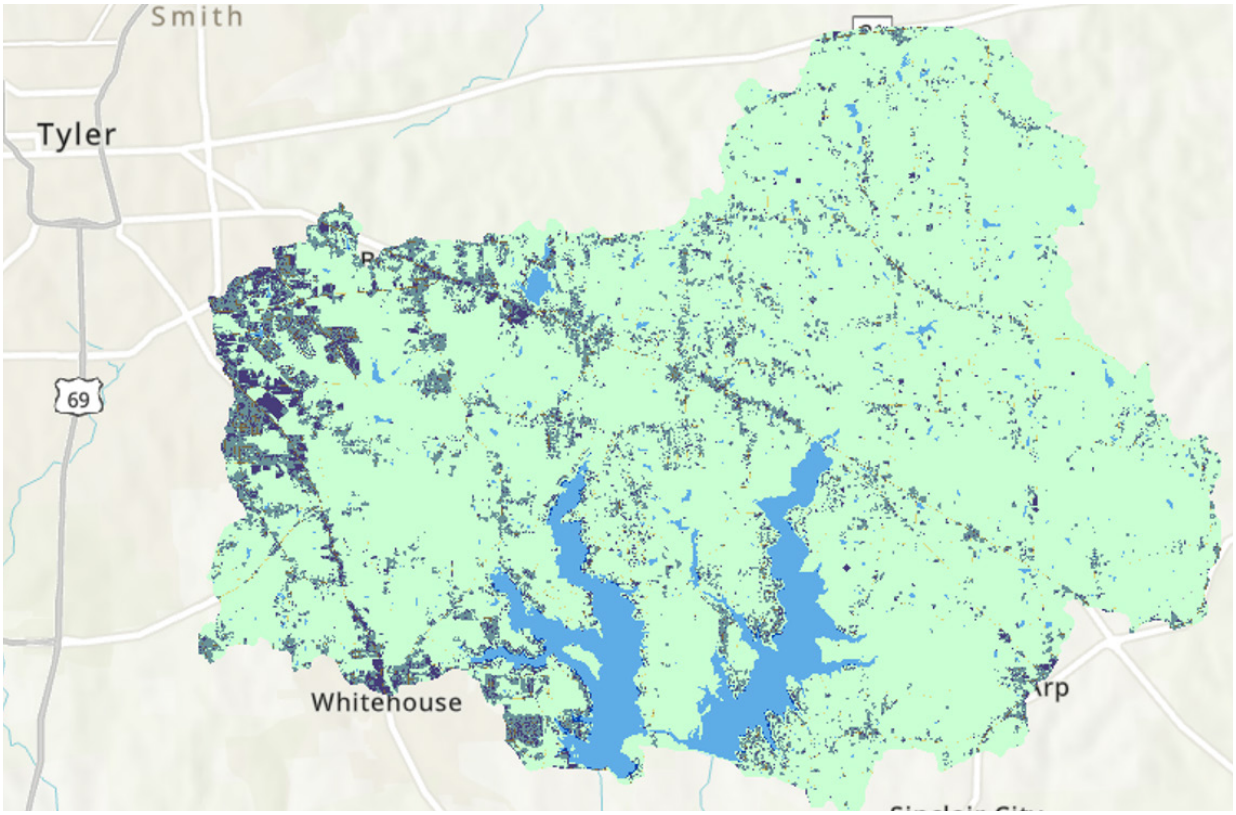


Figure 2.14 - *Predicted Development (2040)*

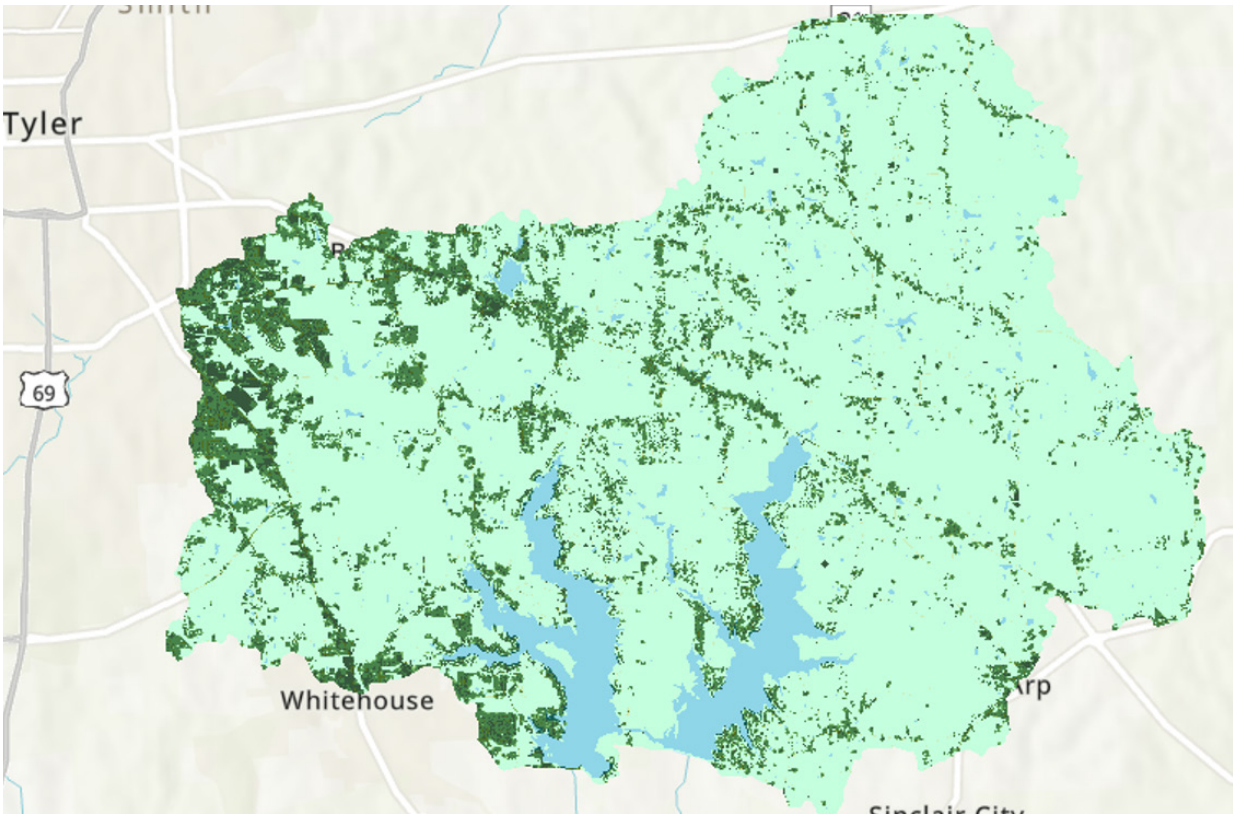
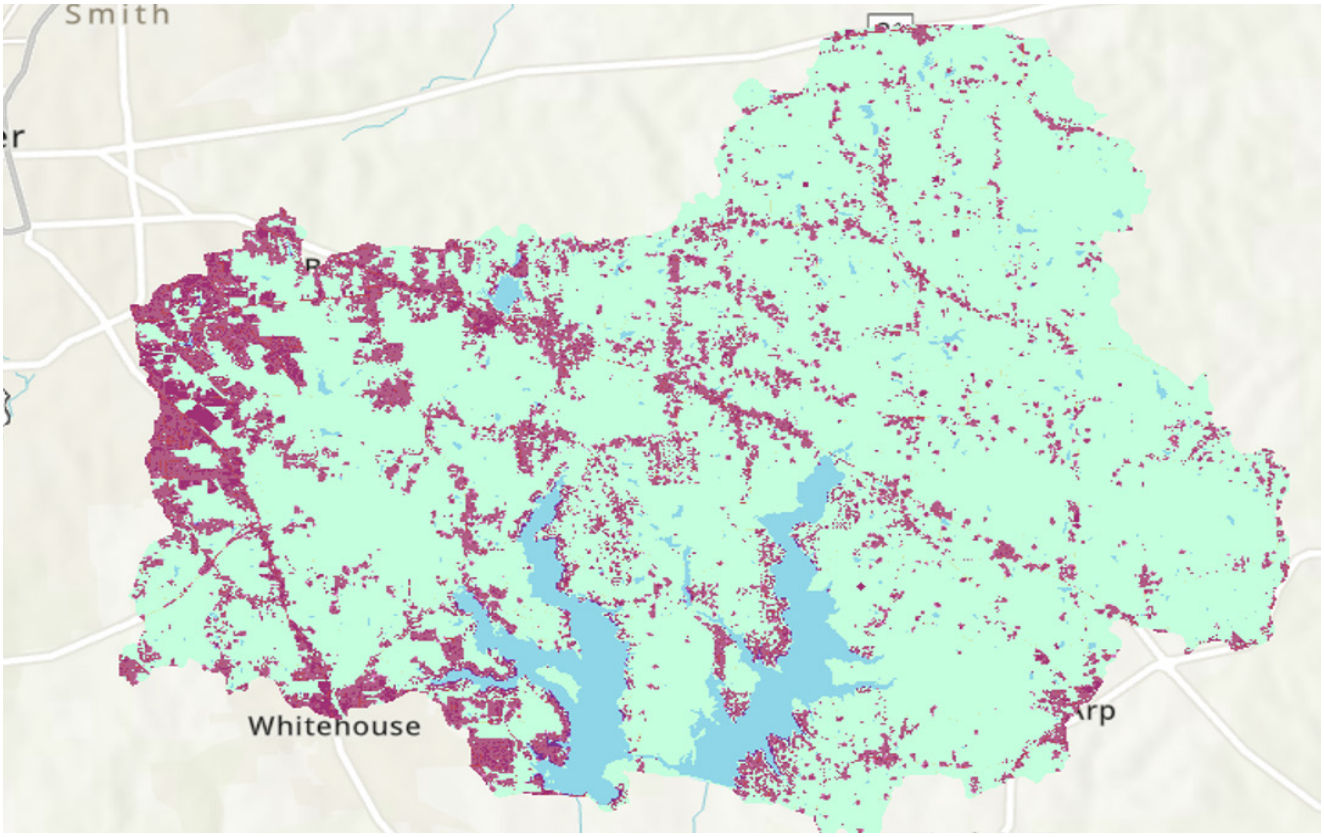


Figure 2.15 - *Predicted Development (2046)*



Hotspot Results

The Engineer used the predicted results to both quantify the forecasted future development and also to highlight hotspots based on the forecasted future development. A summary of the total area developed (number of 10m x 10m cells plus area) for each time horizon is reported (**Table 8**). The predictive model reports a 71% increase in total development area (in square km) between 2022 and 2028. The rate of predicted development then slows to between 21% and 9% for the subsequent time horizons leading up to 2046.

Table 8 - *Summary of Area Developed*

Time Horizon	Developed - Total Cells (n)	Developed - Area Total (sq. km)	Developed - Area Increase (sq. km)	Developed - Percent Increase
2022- Existing	82,560	8.3	-	-
2028- Predicted	286,618	28.7	20.4	71%
2034- Predicted	362,329	36.2	7.6	21%
2040- Predicted	437,567	43.8	7.5	17%
2046- Predicted	482,542	48.3	4.5	9%

The hotspot analysis, which compares the predicted land development from 2028 to 2046, was performed. The full watershed results are shown in **Figure 2.16,** and around the lakes is shown in **Figure 2.17**. Existing development cells are colored green, and statistically significant predicted development cells (similarity value <= 0.20) are shown in red.

Figure 2.16 - *Hot Spot Analysis - Predicted Land Development, Watershed (2028 to 2046)*

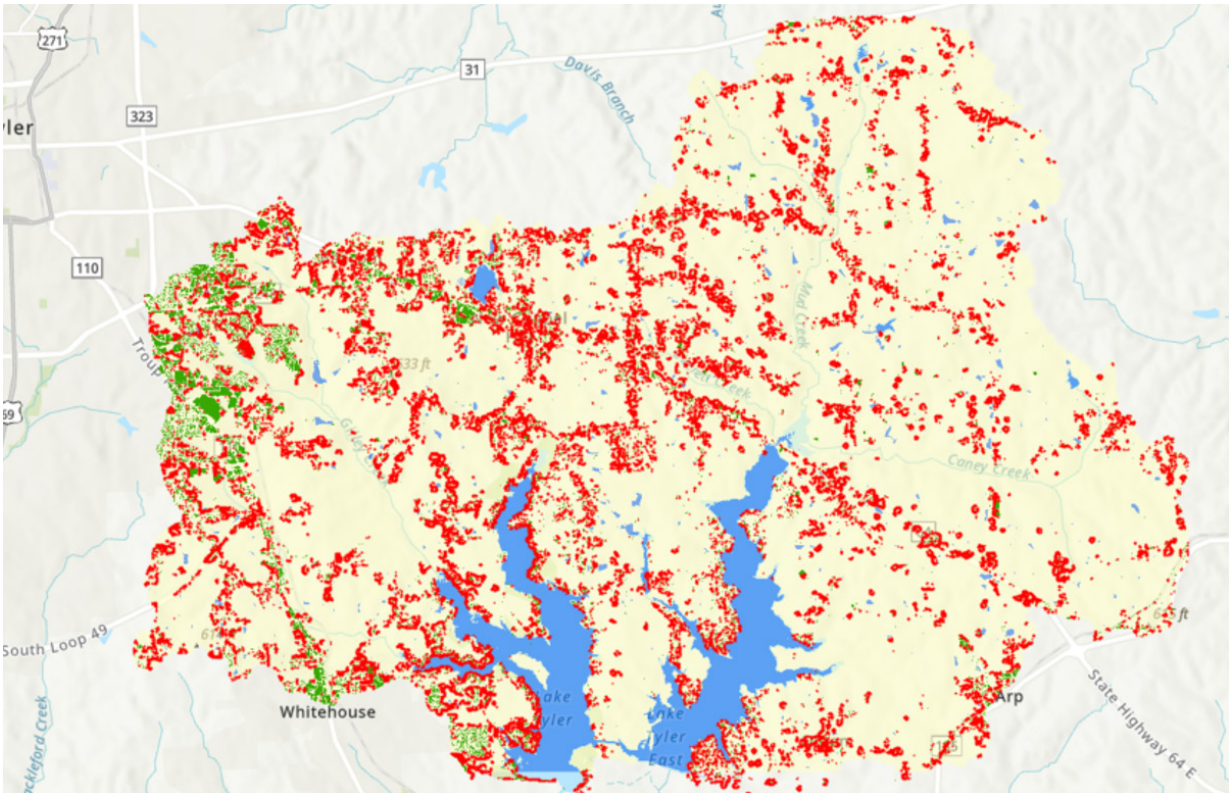


Figure 2.17 - *Hot Spot Analysis- Predicted Land Development, Lakes Inset (2028-2046)*

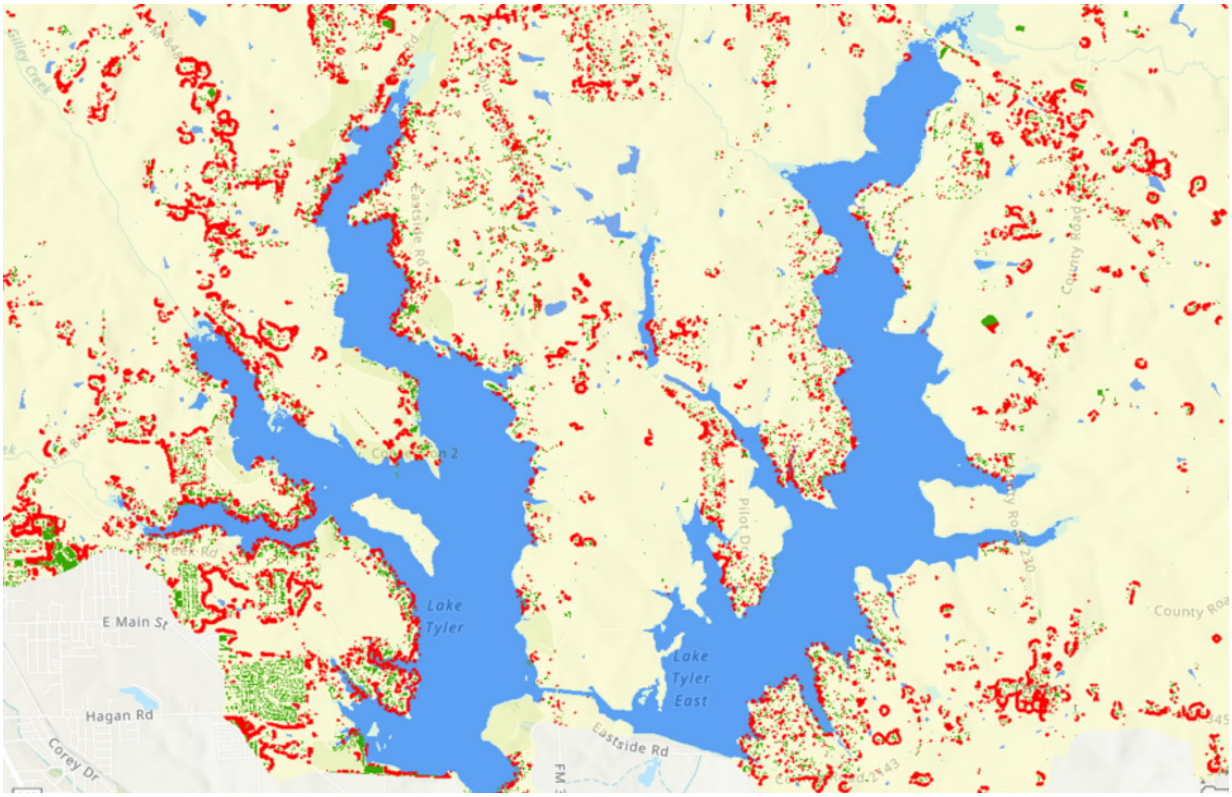


Figure 2.18 - *Existing Development, Lake Inset (2022)*

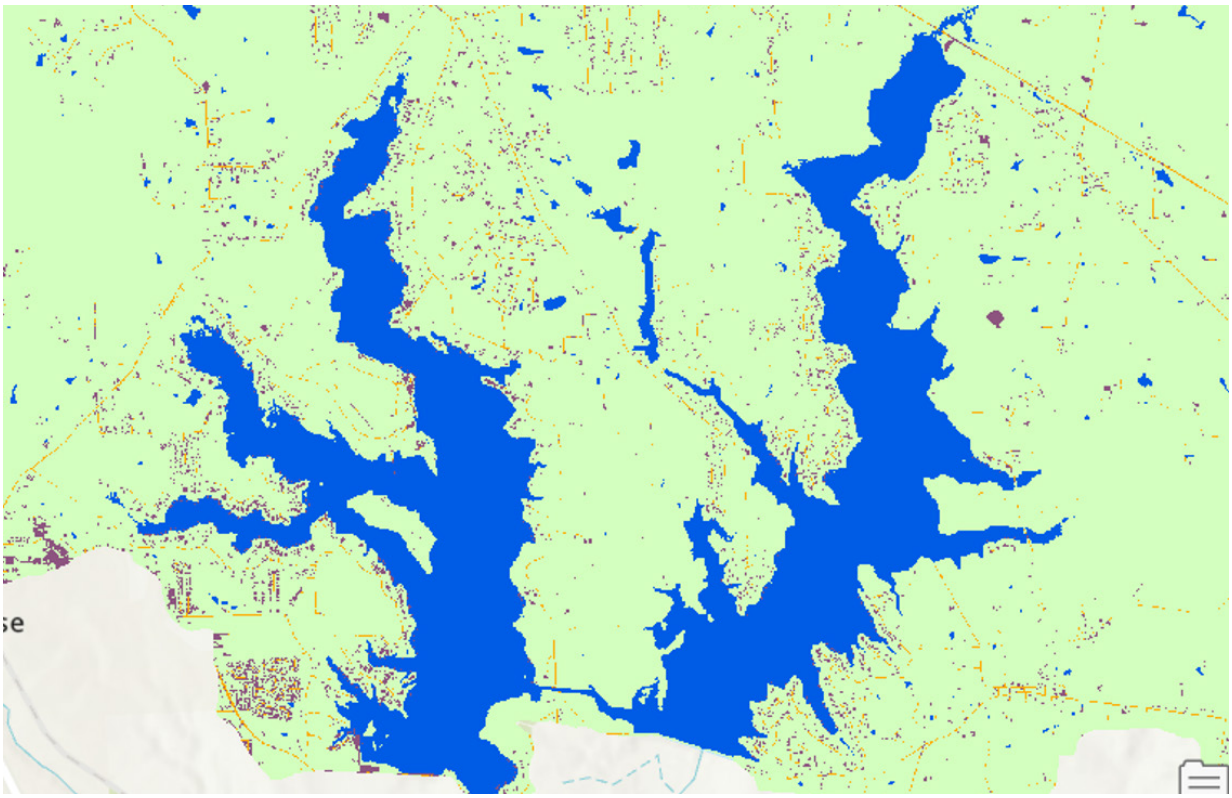


Figure 2.19 - *Predicted Development, Lake Inset (2028)*

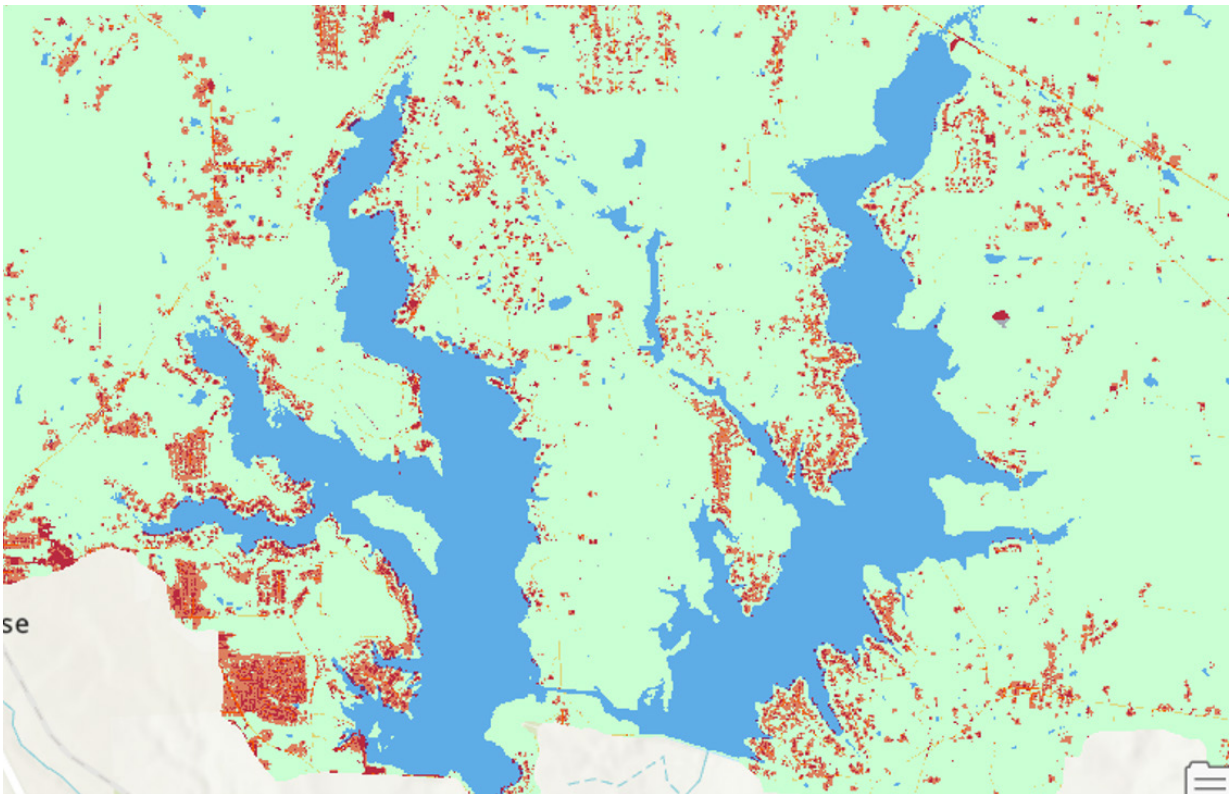


Figure 2.20 - *Predicted Development, Lake Inset (2034)*

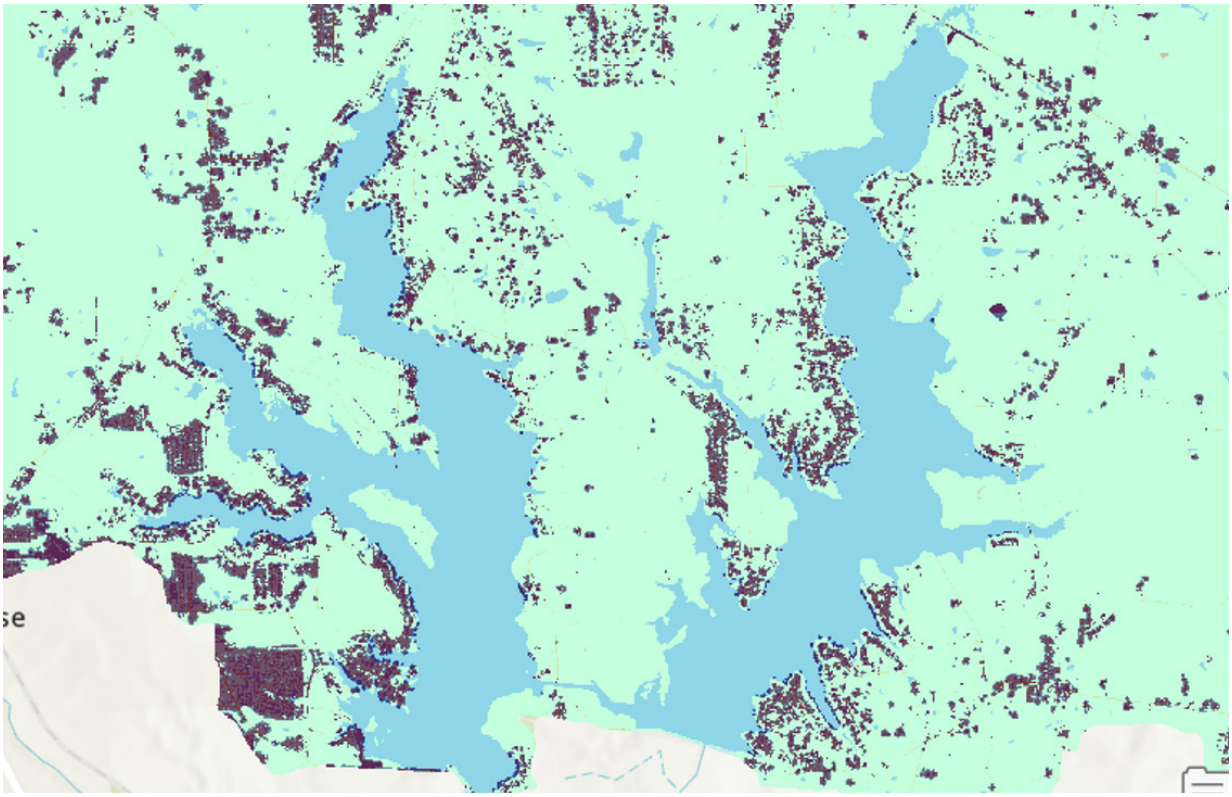


Figure 2.21 - *Predicted Development, lake Inset (2040)*

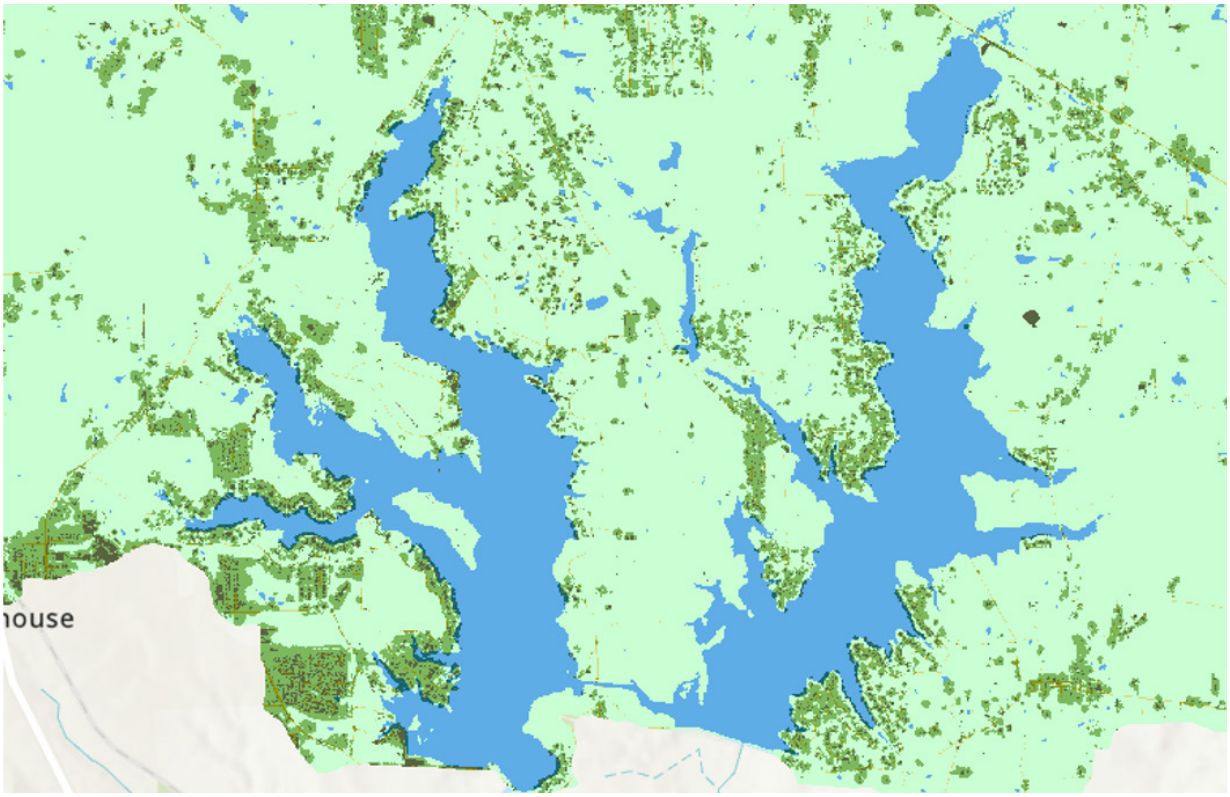
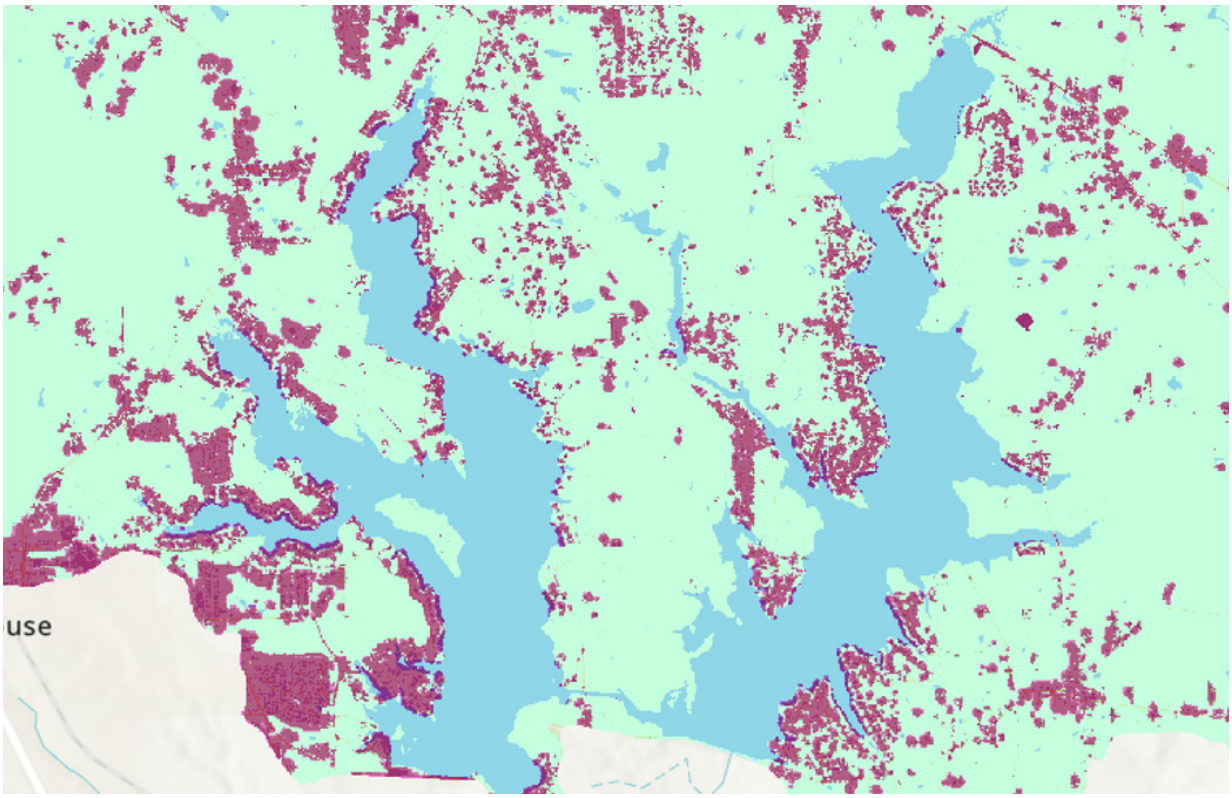


Figure 2.22 - *Predicted Development, lake Inset (2046)*



RECOMMENDATIONS

The Engineer provides the following recommendations based on the analyses and findings of this project task:

- **Change detection:** Using GIS software, review in greater detail the new land cover datasets that the Engineer generated from 2010, 2016, and 2022 ortho-imagery. These datasets serve as key references for the change detection analysis. Review the highlighted areas of observed change with a focus on those areas with observable changes in both the imagery and the DEM datasets. Perform field verification of these locations to gather additional data and determine which near-term corrective actions may be needed.
- **Predictive analysis:** Review the training model metrics (**Figures 2.7-2.9 and Table 7**) to understand how the initial model was developed and evaluated. **Figure 2.10** and **Table 7** are particularly interesting, where the Engineer presents a ranked list of the features/attributes found to be most-highly related to land development in the Lake Tyler watershed. Review the predictive model time horizon results (**Figures 2.11-2.15**). Pay special attention to the hotspot analysis, which highlights statistically significant predicted development areas around the watershed (**Figures 2.16 and 2.17**). Consider whether areas of the watershed predicted for significant development make sense from the perspective of City staff and residents. Going forward, the Engineer recommends a 5-year cycle to update and evaluate new development in the watershed to serve as verification and refinement of the predictive model results.

Lake Tyler shoreline
Photo Credit: Halff

SHORELINE ASSESSMENT

Lake Tyler is located in Neches River Basin, which consists of two connected reservoirs by a canal, Lake Tyler (West) and Lake Tyler East. The combined lake system drains an area of approximately 107 square miles, with each lake discharging into separate tributaries, Prairie Creek and Mud Creek, respectively. Halff was requested to provide a viable set of recommendations regarding the development opportunities and establishing policies for their implementation to update the 2011 Lake Tyler Master Plan.

Part of that request included creating an inventory of and performing a condition assessment of existing public assets along the shorelines of both Lake Tyler and Lake Tyler East. A shoreline assessment was performed intended to approximate potential erosion hotspots and potential threat to existing city infrastructure.

DESKTOP ANALYSIS

Over time, sediment accumulation and shoreline erosion have impacted both lakes. A desktop analysis was performed to identify and create an inventory of public infrastructure that would be utilized for in-the-field condition assessments. The analysis utilized ArcGIS, Smith County parcel data, and aerial imagery to create a database of public assets and infrastructure. Descriptions of the data sources and processes used in the desktop analysis are outlined below.

Aerial Imagery

The National Agriculture Imagery Program (NAIP) was used to identify public structures and sites around both lakes to be evaluated for potential erosion.

Smith County Parcel Data

Smith County parcel data and the Smith County Appraisal District webmap were used to determine which assets noted along the lake shorelines were public.

Public Assets

Using the NAIP imagery, public assets along the shorelines of both lakes were inventoried into a single GIS shapefile layer. These assets include public docks, boat ramps, recreational

parks, culverts, and bridges.
Erosion control structures were also identified for assessment of potential erosion impacts. These structures include concrete bag walls, rock rip rap, retaining walls, and concrete abutments.
In total, 15 public structures and/or sites were identified for field assessments. A field assessment form was created showing the locations requiring further in-field assessment with areas to document any physical characteristics as well as erosion impacts noted in the field.

FIELD ASSESSMENT

Field assessments were conducted via boat at each structure or site to verify on-site conditions and identify existing erosion impacts.
Any potential hazard and/or erosion was documented on the field assessment forms. Apart from the inventoried public assets, the City had also identified a few additional specific locations to be inspected. These areas were known to the City to have material loss and slope failures. Photos were taken at each site to document field conditions and used to inform the prioritizations and recommendations. The field assessment forms for all selected sites can be found in the appendix.

Site Identification and Ranking

Documented site conditions used to prioritize and rank each site include condition and material of existing structure, present erosion and type, and slope/vegetation conditions. Nine (9) public sites were identified to have visible erosion present. In general, the types of erosion noted included bank failure/sloughing and material loss behind hard structures. Following the completion of the condition assessments, Halff ranked multiple sites based on the severity of erosion noted and extent of damage to the site or structure. The sites were organized from most critical to least.

Site Recommendations

After ranking each site, each location or structure was evaluated for repair or replacement. Recommendations included slope repair and protection or the repair of segments of hard structures. No structure required full replacement. **Table 9** presents the list of prioritized sites and Halff's recommendation.

A brief one-page summary document for each site with observed shoreline erosion or instability was developed. Each document includes a location map, a summary of field observations, a photograph, Halff's recommendation for repair or replacement of the structure, and justification for repair or replacement. The summaries for each site can be found in the appendix.

Lake Tyler - Rank 1

Lake Tyler East- Rank 1

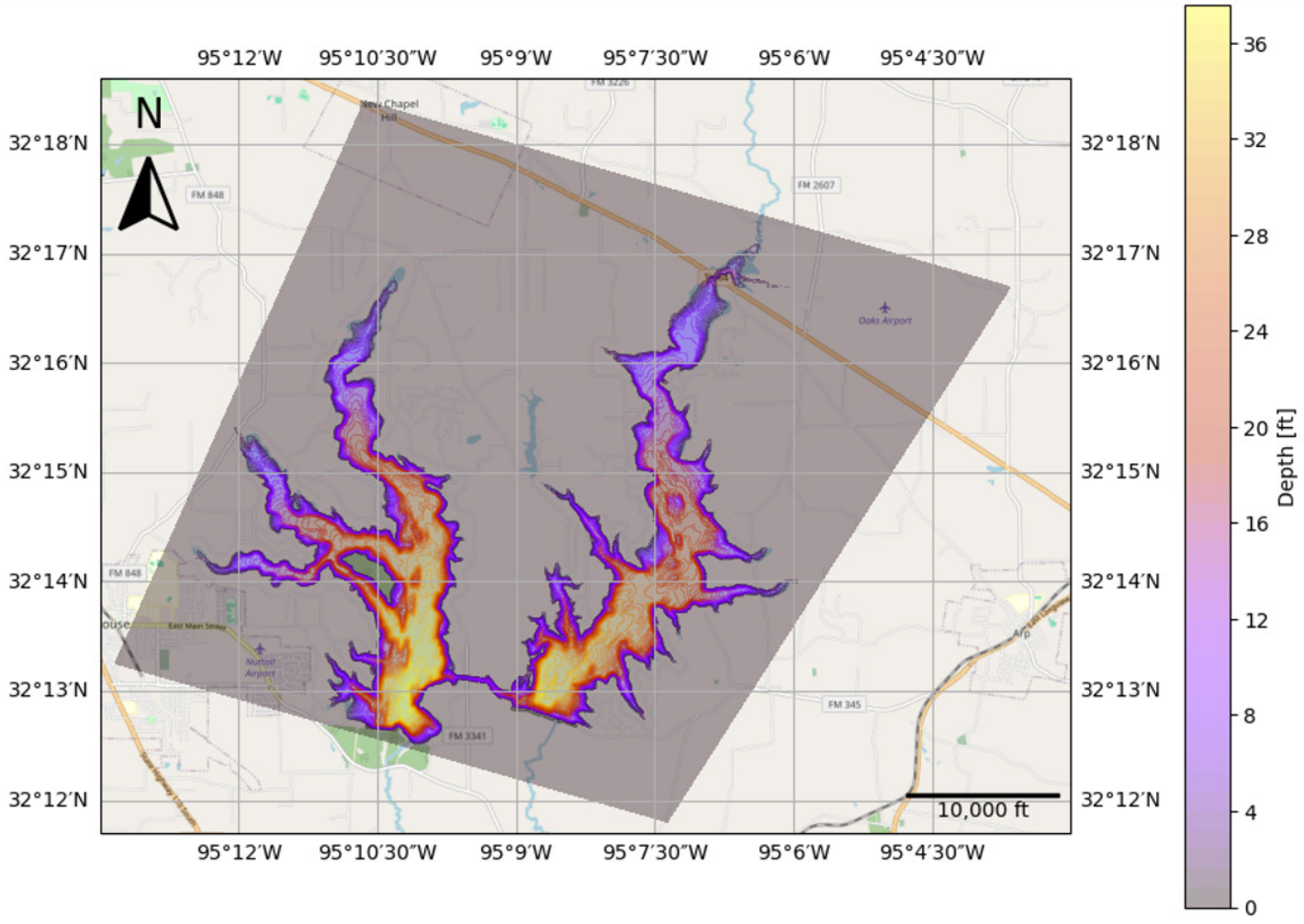
Table 9 *- Prioritized Sites*

Lake	Rank	Type	Location	Site Description	Repair/ Replace
Lake Tyler East	1	Boat Ramp	Old Omen East boat ramp at Lake Tyler East.	Bank cutting/sloughing and material loss resulting in approximately 6-foot vertical banks.	Repair
	2	Bridge Abutment	Lake Tyler and Lake Tyler East Connection	Material loss behind concrete rip-rap resulting in splitting at joints and visible cracking at multiple points along the channel.	Repair
	3	Boat Ramp	Lake Tyler East, boat ramp off of Old Omen Rd, in West Old Omen Park.	Minor bank cutting between both ramps.	Repair
	4	Bridge Abutment	Bridge on County Road 203 near Swinney Road Bay.	Minor bank cutting and minimal vegetation present adjacent to bridge abutment.	Repair
Lake Tyler	1	Retaining Wall	Along Concession Road near the Marina on Lake Tyler.	Material loss behind concrete bag wall at multiple locations along the bag wall.	Repair
	2	Dock, Marina Covered	Along Concession Road near the Marina on Lake Tyler.	Material loss behind sheet pile wall resulting in the collapse of an approximately 35 LF of wall.	Repair
	3	Boat Ramp, Dock	Along the Service Road for the Boulders on Lake Tyler.	Approximately 5'-6' bank cutting/ sloughing and material loss at the termination of the concrete bag wall.	Repair
	4	Retaining Wall	Along Concession Road near the Lake Tyler West Spillway.	Bank cutting at the termination of the concrete bag wall.	Repair
	5	Natural Bank	Hill Creek Park along Lake Tyler	Bank cutting/sloughing and material loss resulting in vertical banks ranging from 3-6 feet tall, tree roots are exposed.	Repair
	6	Natural Bank	Publicly owned property off of Eastside Road southwest of the Lake Tyler and Lake Tyler East connection channel.	Bank cutting/sloughing and material loss resulting in approximately 6-foot vertical banks, tree roots exposed.	Repair
	7	Natural Bank	Publicly owned property off of Eastside Road south of Douglas Cove and Eastside Park.	Bank cutting/sloughing and material loss resulting in vertical banks randing from 4-8 feet tall, tree roots are exposed.	Repair

SHORELINE EROSION RISK ANALYSIS

An analysis was performed to assess wave and shoreline erosion risks at Lake Tyler, as detailed in the Appendix. This summary provides an overview of the key findings and methodology. The analysis combined two complementary methodologies: the U.S. Department of Agriculture's Technical Release 56 (TR-56) empirical approach and the SWAN (Simulating Waves Nearshore) spectral wave model. The TR-56 method uses simplified analytical calculations of wave height, setup, and runup based on wind velocity, fetch, and slope geometry. The SWAN model offered a more detailed numerical simulation of wave propagation across the lake's bathymetry. The SWAN analysis domain encompassed both Lake Tyler and Lake Tyler East, with a spatial resolution of approximately 100 ft by 100 ft (**Figure 2.23**). Model inputs included detailed bathymetric data from a 2013 multi-frequency survey conducted by the Texas Water Development Board (TWDB).

Figure 2.23 - *SWAN Model Domain and Depths Assigned to the Computational Grid*



A total of ten model scenarios were developed by varying wind direction (0°, 90°, 130°, 180°, and 270°) and two representative lake elevations: conservation pool (375.38 ft), and high (377.80 ft). The 50-year recurrence wind speed of 67 mph was used as the design condition, driven from regional climatological iso-contours, as described in the Appendix.

The simulation results indicated that significant wave heights at the six designated public recreation areas ranged from approximately 2.1 to 2.6 feet, while the maximum value within the entire computational domain of the lake reached about 4.2 feet. The TR-56 analysis produced comparable results, confirming the consistency of both analytical and numerical approaches as summarized in **Table 10**.

Boat-generated waves, common on Lake Tyler due to extensive recreational activity, were not dynamically modeled in SWAN. In accordance with the TR-56 methodology, a conservative boat-generated wave height of 2 feet was applied at the target focus points where significant wave heights were less than 2 feet, to account for potential wake impacts. It is important to note that vessel wakes may contribute substantially to long-term shoreline erosion and should be addressed in future studies through dedicated modeling.

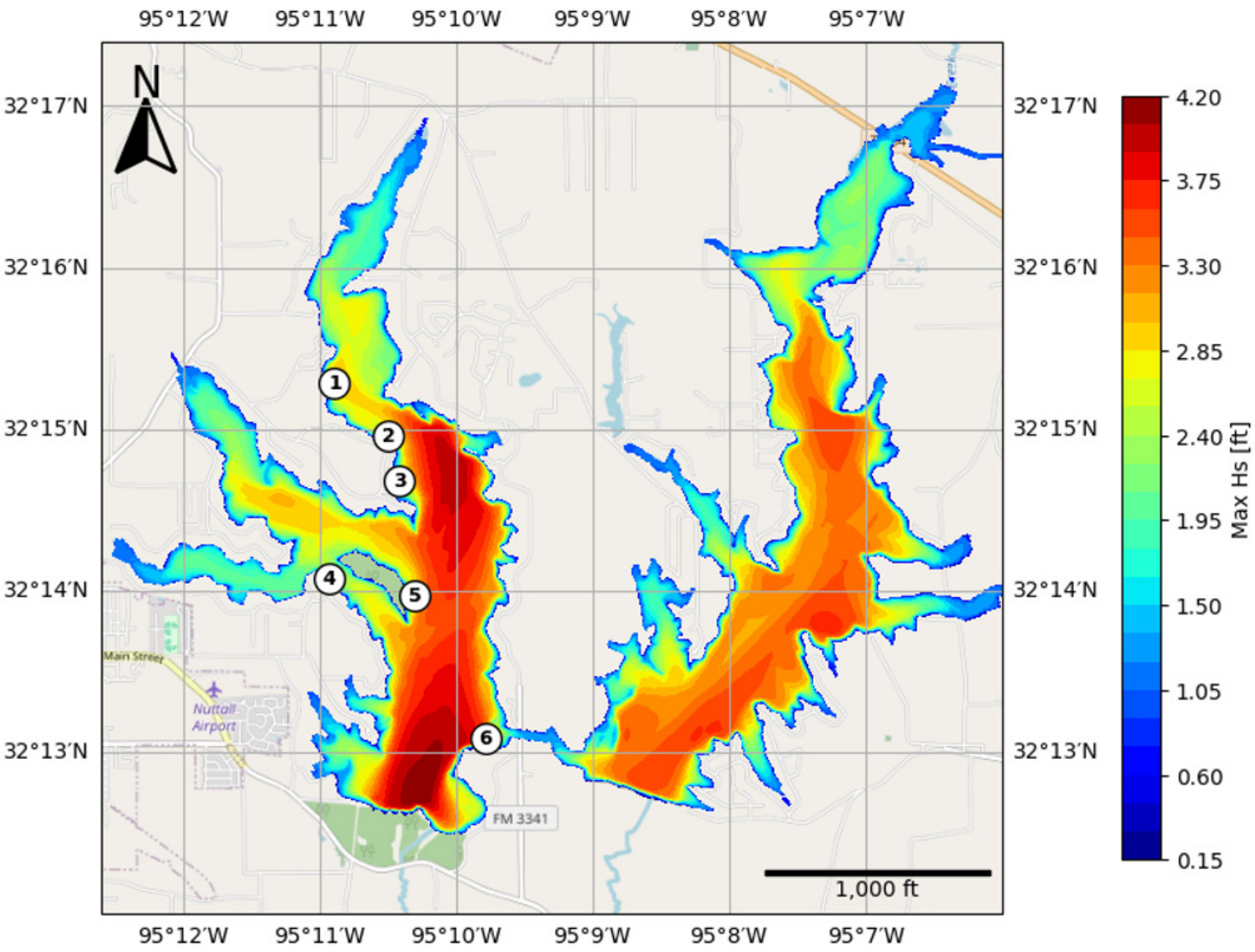
In conclusion, the wave analysis estimates that significant wave heights in the range of two to three feet acting on Lake Tyler's shorelines under design conditions. Further analysis including detailed study of boat wake effects, and utilizing updated bathymetric data for the final designs are recommended.

Table 10 - *High Priority Shoreline Areas*

Scenario	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6
1	2.038	2.193	1.338	1.971	1.837	0.682
2	2.296	2.188	1.844	1.845	1.916	0.262
3	2.421	2.144	1.841	1.917	1.941	0.201
4	1.938	1.767	1.706	1.392	1.968	0.219
5	0.919	1.503	0.773	1.275	0.982	0.528
6	2.155	2.408	1.483	2.222	2.06	2.546
7	2.435	2.316	2.074	2.049	2.061	1.188
8	2.596	2.334	2.113	2.12	2.125	0982
9	2.105	1.952	1.9	1.597	2.138	0.968
10	1.024	1.712	0.958	1.422	1.24	2.094
Max SWAN	2.60	2.11	2.11	2.22	2.14	2.55
TR-56	2.00	2.00	2.00	2.00	2.28	2.88

Figure 2.24 - *Map of the Six Designated Public Recreation Areas Around the Lake used in the Focused Wave Height Analysis*

Figure 2.25 - *Maximum Significant Wave Height Computed at Each Location Across All SWAN Simulations*



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3 RECREATION & TOURISM

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Photo Credit: Adobe Stock Images

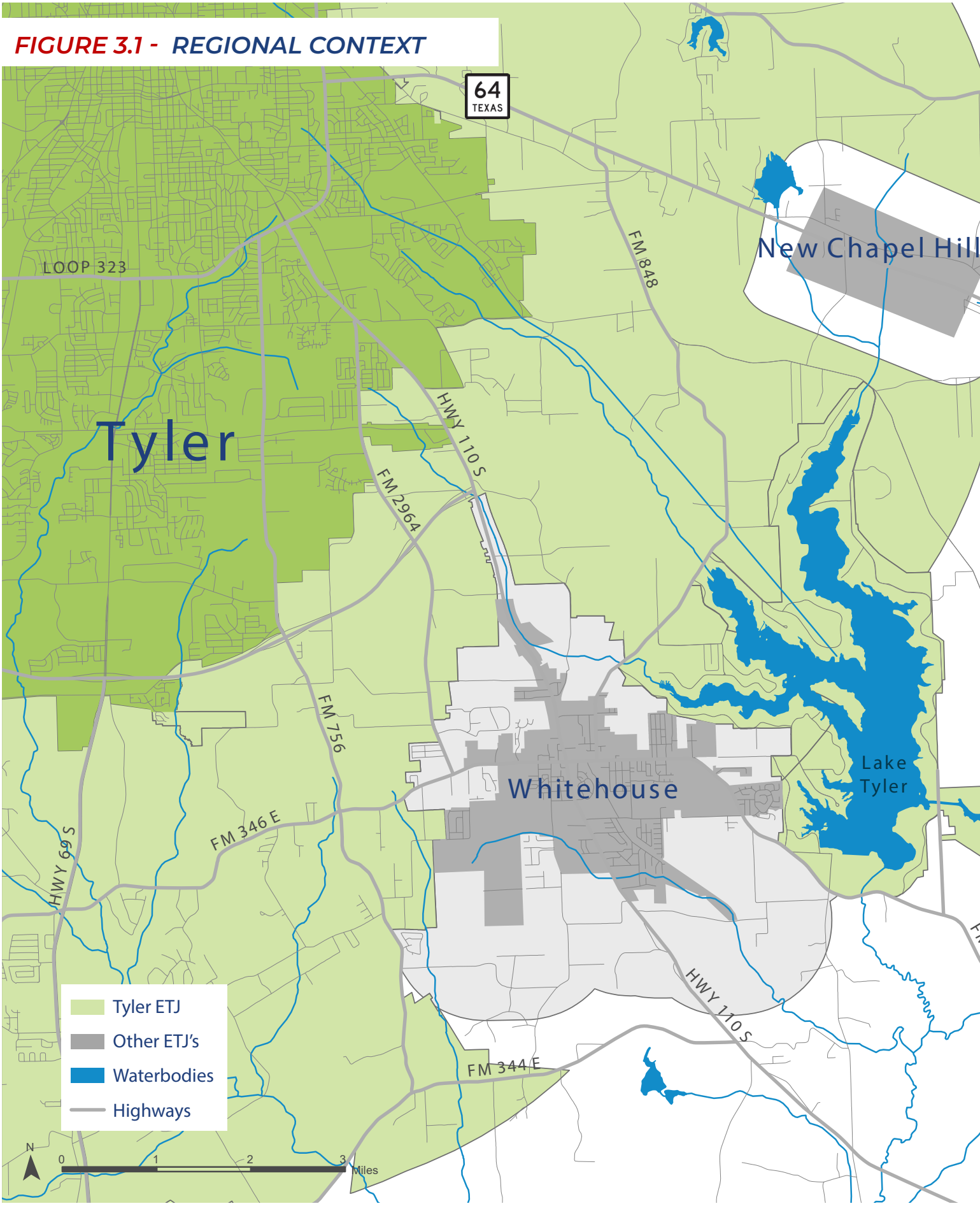
INTRODUCTION AND ASSESSMENT FRAMEWORK

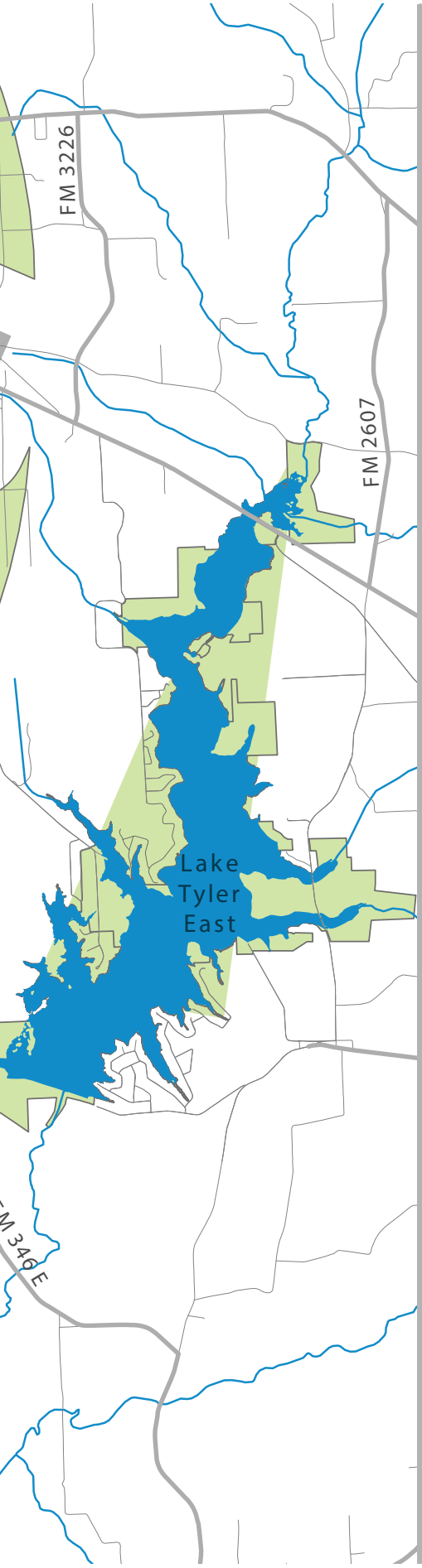
OVERVIEW

Lake Tyler and Lake Tyler East are critical resources providing drinking water, recreational opportunities, and supporting the region's growing population and tourism economy. Together, the lakes supply over 30 million gallons of water daily while offering popular amenities such as boating, fishing, camping, and waterfront living.

Over the past two decades, steady growth in Tyler, Whitehouse, and surrounding communities has increased demand for recreational access and strengthened the lakes' role in supporting regional tourism, which generates over $300 million annually. Despite improvements in signage, development management, and lease evaluations since the 2011 Lake Tyler Master Plan, challenges remain, including incomplete trail connections, outdated regulations, and the need for sustainable funding. This plan evaluates current conditions, benchmarks similar Texas reservoirs, and explores options for improving lease agreements, trail systems, and recreational oversight. In addition, this segment of the report assesses the park system of the lakes to identify challenges and areas of improvement, including gaps in connectivity, park infrastructure, maintenance practices, and public access. The plan also applies proven park system concepts, such as enhancing park typology, trail networks, expanding passive and active recreation opportunities, and strengthening community connections, to the unique recreational system at Lake Tyler and Lake Tyler East. By implementing updated policies, leveraging regional partnerships, and modernizing maintenance, the lakes will continue to provide lasting economic, recreational, and environmental benefits.

FIGURE 3.1 - REGIONAL CONTEXT





POPULATION GROWTH & REGIONAL CONTEXT

Over the past two decades, Smith County and its key cities have experienced steady growth, with projections indicating continued expansion through 2040. Alongside this population increase, regional lakes and tourism play a crucial role in the county's economy, attracting visitors and driving local business growth. Smith County's largest city, Tyler, has grown from 83,650 in 2000 to 105,995 in 2020, with a projected 119,364 by 2040. Nearby communities like Whitehouse have also expanded significantly, while Arp and Troup have experienced slower growth or slight decline. Overall, Smith County's population increased by 33.6% from 2000 to 2020, with an expected total of 281,009 residents by 2040.

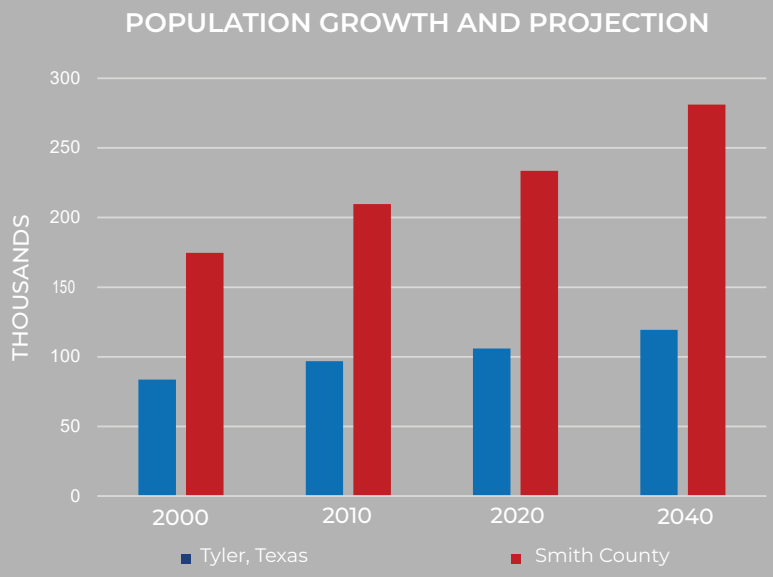


Figure 3.2 *- Population Growth and Projection*

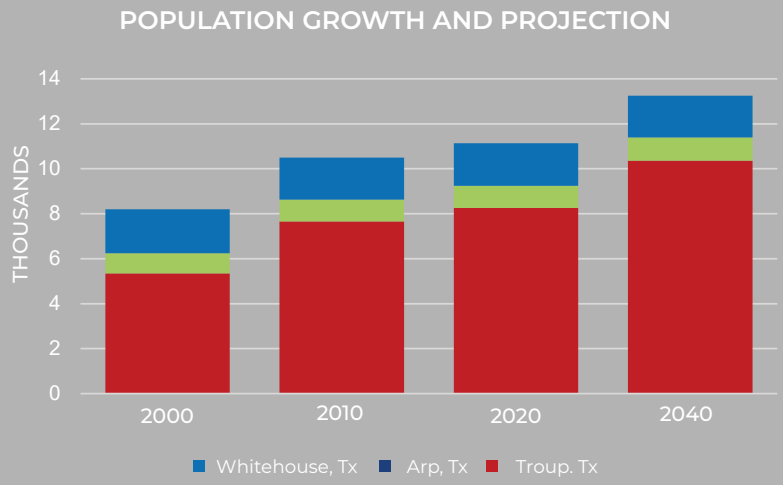


Figure 3.3 - *Population Growth and Projection*

TOURISM & ECONOMIC IMPACT

The Role of Regional Lakes in Growth and Tourism

Smith County is home to Lake Tyler and Lake Tyler East, two vital resources that provide drinking water, recreational opportunities, and scenic retreats for residents and visitors in East Texas. These lakes support a wide range of outdoor activities such as boating, fishing, and camping, while waterfront properties attract homeowners seeking a lakeside lifestyle. Visitors from across Texas contribute significantly to the local economy through recreational tourism, sustaining businesses that serve outdoor enthusiasts.

Fishing is especially popular, with local clubs organizing programs like Kid Fish and high school fishing competitions. Weekly fishing tournaments hosted by Lake Tyler Marina attract anglers from the region. Currently, the city does not impose regulations such as fees, formal registration, notification, or insurance requirements for these tournaments.

Boating is another favored activity, with areas like the Boulders on Lake Tyler serving as popular gathering spots for boaters. Camping opportunities, both public and private, are in high demand. Primitive and RV campsites are available on a first-come, first-served basis at locations like Hillside Camping and East Side #4. While these sites provide essentials such as tables, trash cans, and seasonal porta-potties, campers must bring their own water and manage graywater disposal.

Additionally, local churches and organizations frequently use lakeside areas for youth camps, retreats, and educational programs, fostering community engagement and outdoor experiences for children and families. Equestrian activities are prohibited near the lakes; however, Camp Tyler leases out pastures away from the water for other uses. Private venues such as the Petroleum Club also enhance the region's event landscape by hosting corporate events, weddings, and other special occasions, further establishing the lakes as destinations for both leisure and formal gatherings.

Tourism as an Economic Driver

Tourism is a major economic engine for Smith County, generating over $300 million annually in visitor spending and supporting more than 3,000 jobs in the hospitality and tourism sectors. It also contributes over $30 million in state and local tax revenues, which fund public services and infrastructure. Key factors drivers of this growth include:

- **Lodging, Dining & Shopping** – Hotels, bed & breakfasts, restaurants, and specialty retail stores thrive due to year-round visitors, particularly during major events.
- **Outdoor Recreation** – Lake Tyler and Lake Tyler East attract thousands of visitors for boating, fishing, and camping, benefiting local businesses such as marinas and outfitters.
- **Cultural & Heritage Tourism** – Attractions like the Caldwell Zoo, Tyler State Park, and the Tyler Rose Garden bring in tourists from across Texas and beyond.
- **Annual Festivals & Events** – Events such as the Texas Rose Festival and the Azalea & Spring Flower Trail continue to draw significant crowds, further boosting local business revenues.

As Smith County's population continues to grow, particularly in Tyler and Whitehouse, both residential development and tourism-related industries will be critical to the region's future. Troup and Arp are expected to see steady but slower growth. The lakes add value by enhancing residents' quality of life and driving visitor spending in outdoor recreation and hospitality.

With steady population growth, a thriving tourism industry, and the natural appeal of its lakes, Smith County is well-positioned for sustained economic prosperity in the years ahead.

RELEVANT STUDIES & BENCHMARKING

Relevant Studies

City of Tyler Comprehensive Plan (2007)

The 2007 Comprehensive Plan for Tyler includes a detailed section on parks and recreation, with specific references to Lake Tyler. The plan highlights the lake's significance as a recreational asset and outlines objectives to enhance its use and accessibility. Key points include:

- **Development of Recreational Facilities:** Proposals for new parks, trails, and amenities around Lake Tyler to boost recreational opportunities.
- **Environmental Protection:** Strategies to preserve the natural environment of the lake while accommodating increased public use.
- **Community Engagement:** Initiatives to involve the community and citizens of Tyler in the planning and development process to ensure that the recreational facilities meet public needs and preferences.

The plan underscores the dual role of Lake Tyler as both a natural resource and a recreational destination, aiming to foster sustainable use and enjoyment of the lake.

City of Tyler Parks and Recreation Master Plan (2011)

In the 2011 plan survey, nature trails ranked as #1 on the citizen survey and multi-purpose trails ranked #4. The City of Tyler needs to preserve natural open spaces for primitive recreation. Water features such as lakes and creeks ranked #10 on the citizens survey. Many of the references related to preserving land near and around Mud Creek, Black Forest Creek, Stone Leaf Creek, and their tributaries. It is stated that future recreational development should maintain valuable environmental assets such as water and natural open space. Its lakes may be an opportunity to help the City of Tyler Parks and Recreation access more water recreation and natural area passive recreation.

Lake Tyler Master Plan (2011)

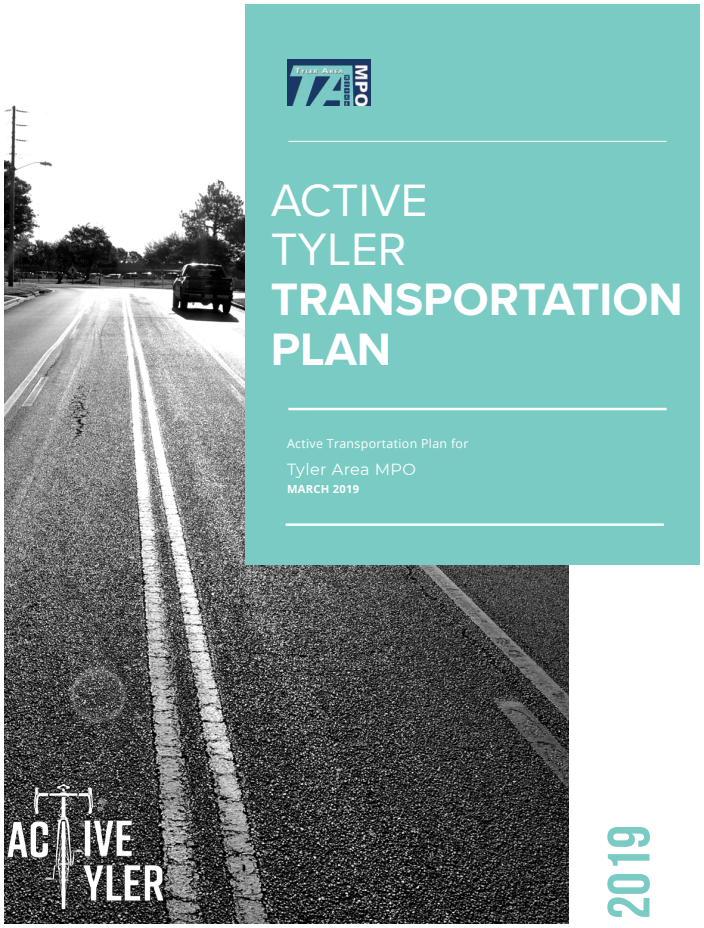
The Lake Tyler Master Plan 2011 document mentions several specific recreational activities aimed at enhancing the experience for residents and visitors. These activities include:

- **Boating and Fishing:** The plan emphasizes the importance of providing facilities and opportunities for boating and fishing, which are popular activities on Lake Tyler and Lake Tyler East.
- **Camping and Picnicking:** There are recommendations for developing and improving camping and picnicking areas to encourage more outdoor activities and family gatherings.
- **Hiking and Biking Trails:** The plan includes the development of hiking and biking trails around the lakes to promote physical activity and provide scenic routes for visitors.
- **Water Sports:** Activities such as swimming, kayaking, and paddle boarding are highlighted as key recreational opportunities to be supported and enhanced.
- **Wildlife Observation:** The plan also suggests creating designated areas for wildlife observation, allowing visitors to enjoy the natural beauty and biodiversity of the area.

Active Tyler Transportation Plan Tyler Area MPO (2019)

The Active Tyler Plan outlines several bike and trail connections to Lake Tyler and Lake Tyler East, enhancing regional access and recreational opportunities. Water Row at Lake Tyler is identified as a regional trail connection linking the lake to the Tyler city limits, while Regional Connection 529 extends this link as a rural trail route. Additionally, the plan highlights connections between Lake Tyler, Whitehouse, and surrounding areas, including Regional Connection 526, which follows Troup Highway (SH 110) from the Tyler city limits to Whitehouse, and Regional Connection 528, which continues from Whitehouse to Troup.

These planned routes suggest an effort to improve active transportation infrastructure, making Lake Tyler and Lake Tyler East more accessible for biking, walking, and recreation, while also strengthening connectivity between Tyler, Whitehouse, and the broader region.



City of Whitehouse Parks Master Plan (2024)

The parks master plan identifies the lakes as a connection to the City's Blackhawk Trail through a study of the bike-way and trail connections.

Table 11 - *Reservoir Benchmarking*

Source	Managed by	Activities Offered	Purpose	Fees	Open
Lake Tyler	City of Tyler Water Utility	Fishing, boating, camping, birding	Water supply	Launch fee/ fishing fee at the marina	Year round
Lake Tyler East	City of Tyler Water Utility	Fishing, boating, birding	Water supply	Launch fee/ fishing fee at the marina	Year round
Athens Lake	Athens Municipal Water Authority	Fishing, water sports	Water supply and recreation	Free	Year round
Wichita Reservoir	City of Wichita Falls	NA	Drinking water	NA	Year round
Alvarado Park Lake	City of Alvarado	Fishing, boating, water sports, swimming	Floodwater retention, municipal water storage, recreation	Free	Year round
Jacksonville Lake	Jacksonville Municipal Water Supply	Fishing, camping, swimming	Water supply	Free	Year round

Benchmarking

A broad review and comparison of other similarly-sized recreational reservoirs in Texas was conducted. These include: Athens Lake, Wichita Reservoir, Alvarado Park Lake, Lake Ray Hubbard, and Jacksonville Lake. A broad inventory was done for each as well as a review of any plans available.

Athens Lake:
Located outside Athens west of Tyler.

Wichita Reservoir:
Located in Wichita Falls just northwest of Fort Worth.

Alvarado Park Lake
Located south of Fort Worth.

Jacksonville Lake:
Located south of Tyler outside of Jacksonville.

Athens Lake- Lake Athens Marina and RV Park

Whichita Reservoir- Lakeside City, Texas

Level of Service (LOS)	Public Access	Surface Area (ac.)	Depth (ft)	Capacity (af)	Impound Year
High	Yes	2224	40	46,000	1949
Medium	Yes	2276	40	46,000	1966
Medium	Yes	1799	50	32,840	1962
Low	No, low water	1224	9.5	14,000	1901
Medium	Yes	437	20	4,700	1966
Medium	Yes	1,320	62	30,500	1957

Alvarado Park Lake- The RV Resort

Jacksonville Lake- Explore Jacksonville

Lake Ray Hubbard- Visit Garland

Choke Canyon Lake- Mark Bradshaw Fine Art America

EXISTING CONDITIONS

OVERVIEW

Lake Tyler Overview

Lake Tyler, constructed in 1949, spans approximately 2,400 acres, while Lake Tyler East, built in 1967, covers about 2,500 acres. The two lakes are connected by a channel and collectively store 83,600 acre-feet of water. They are impounded by Whitehouse Dam and Mud Creek Dam, draining a watershed of 107 square miles and supplying 34 million gallons of water daily.

Located 15 miles southeast of Tyler, the lakes lie within the extraterritorial jurisdiction (ETJ) of Tyler and Whitehouse in Smith County and are owned by the City of Tyler. In addition to serving as a critical water source, Lake Tyler provides recreational opportunities under strict sanitary controls, with six designated recreational areas maintained by the City.

The lake has a storage capacity of over 15 billion gallons (46,000 acre-feet) with an average depth of 17.6 feet.

Lake Tyler East Overview

Completed in 1967, Lake Tyler East spans approximately 2,500 acres with a watershed area of 62 square miles. Connected to Lake Tyler by a channel, the lakes together provide a combined safe yield of approximately 34 million gallons per day (mgd). Lake Tyler East shares similar recreational uses and is managed under the same regulations. Both lakes lie within the Angelina River watershed. Lake Tyler is located on Prairie Creek, a tributary of Mud Creek, while Lake Tyler East is on Mud Creek.

Boat docks at the Marina at Lake Tyler
Photo Credit: Halff

PARK CLASSIFICATIONS

Classifying parks and recreational areas helps guide future planning, resource allocation, and investment. A park classification system allows planners and park professionals to categorize parks and open spaces based on their size, purpose, and amenities. These classifications support informed decisions about park design, maintenance, and programming.

Regional

These parks are typically a minimum of 50 acres, and serve a larger area than the community. These parks typically feature similar amenities to that of a community park, however are much larger in size.

Community

Community parks provide an array of outdoor activities, and opportunities to engage in social and environmental opportunities. These parks are typically between 20-50 acres in size, and should serve two or more neighborhoods.

Neighborhood

Serve as the recreational and social focus of a specific neighborhood. These parks range from 5-10 acres, and have a service area of ¼ to ½ mile depending on density.

Special Use

Special use parks cover a broad range of parks and recreation facilities. They provide areas for specific activities to allow groups with common interests to interact.

Undeveloped/Natural Areas

Undeveloped or Natural Areas are parks or open spaces that remain largely in their natural state with minimal improvements. These spaces prioritize the preservation of native landscapes, wildlife habitats, and ecological features. While they may offer low-impact amenities such as nature trails, overlooks, or signage, their primary purpose is conservation, passive recreation, and providing opportunities for nature observation and environmental education.

CITY-OWNED AND MANAGED RECREATIONAL AREAS AND OPEN SPACE

Eastside Park

Neighborhood Park

Located on the eastern shore of Lake Tyler along East Side Road, this site primarily serves as a day-use facility that offers swimming and picnicking. Camping is allowed, however there are no designated campsites, and the area lacks a boat launch. Its elevated position on a point provides scenic lake views.

Lake Tyler Marina Resort (LTMR)

Community Park

Lake Tyler Marina Resort offers a boat launch, convenience store, camping spots, RV hookups, a full-service bar, fuel station, and fishing opportunities. Visitors can enjoy events throughout the year, such as car and boat shows, haunted hayrides for Halloween, and “Breakfast with Santa” for Christmas. The Lakeside Grill opened on Memorial Day weekend in 2021 and has since expanded with a second RV site, an upgraded gas pump system, and a renovated interior.

Langley Island Nature Preserve

Undeveloped/ Natural Area

Located near the center of Lake Tyler, Langley Island Nature Preserve is a 72-acre that serves as a dedicated habitat improvement area with restricted public access. The small island provides essential nesting habitat for birds and supports wildlife diversity on the lake. Recent enhancements, including nesting boxes and signage, were completed through a partnership between the City of Tyler, Audubon Texas, and local conservation groups. Public access is limited to protect the sensitive habitat.

Old Omen Road Ramp East

Special Use Park

This boat ramp is situated on the eastern shore of Lake Tyler East and features a single ramp with limited parking. It mainly serves residents of Troup and Arp. The site is located in a heavily wooded area, with restricted access to the lake. The ramp is open year-round and is free to use.

Old Omen Road Ramp West

Special Use Park

Positioned on the western side of Lake Tyler East, this boat ramp features four ramps, two piers, and parking for 20 vehicles. The site is open year-round with no usage fee. Adjacent to the parking area, there are approximately 1.5 acres of undeveloped-natural area.

Highway 64 Recreation Area

Neighborhood Park

Located at the northern end of Lake Tyler East along State Highway 64, the site is frequently used by fishermen and offers picnic areas and camping opportunities. The facility includes two boat ramps, a pier, and parking for roughly 60 vehicles. Its location along a major highway ensures easy access, and the open visibility of the site from the road provides an added sense of security. The site remains open year-round with no fee required for use.

Hill Creek Recreation Area

Community Park

Located on Slack Road is Hill Creek Recreation Area. The park space has several water recreation opportunities, picnic shelter, a public dock, and boat ramp as well as ample parking. This space is open year-round and with no fee required.

Old #2 - Chapman Recreation/ The Boulder's at Lake Tyler

Special Use Park

Chapman Park is located just east of the Lake Tyler Pump Station, located on Country Road 2127. The park features a wide single-lane concrete ramp and is open year-round with no fee required. It features shore access through public docks and ramps, as well as picnic tables, and parking. The Boulders offer a full-service lake and outdoor facility for daily activities, overnight stays, or multi-day getaways. Amenities include a bait shop, convenience store, fishing pier, and boardwalk. Guests can enjoy picnic and tent sites, with rates at $10 per day and $25 per night for camping. Daily rentals are available for kayaks, golf carts, and pontoon boats. Lodging options include cabins, glamping sites, RV sites, and RV rentals.

Photo Credit: Adobe Stock Images

PRIVATELY-MANAGED RECREATIONAL ACTIVITIES & ATTRACTIONS

Lake Tyler Petroleum Club

Special Use Park

Lake Tyler Petroleum Club is nestled on 35 acres. Families can enjoy a gathering place on Lake Tyler for picnics, protected lake swimming, cookouts, member only swimming pool, cabin rentals, private boat ramp and day use docks. Two event rental facilities are also available Lakeside and Harbor Landing, accommodating between 150 to 250 guests.


Photo Credit: Adobe Stock Images

Camp Tyler

Special Use Park

Camp Tyler is an outdoor learning center of 455 acres, with 105 acres leased from the city, and located on the west bank of Lake Tyler. Established in 1949, it provides educational, physical, and social experiences for East Texas youth. The facility offers summer camps and hands-on learning programs, where children can explore Texas pioneer life in the 1800s, discover Native American culture, learn to fish, and study local ecosystems, including birds, wildlife, and insects.

Photo Credit: Halff

Green Acres Baptist Church Retreat

Special Use Park

Green Acres Baptist Church Retreat is a host location for Green Acres Baptist Church and non-profit organizations, and doubles as an outdoor center that offers opportunities for retreats, events, and summer camps. This gated park includes lodging opportunities, picnic tables, pavilions, and fire pits. As well as recreational facilities such as boat dock and launch ramp, a disc golf course, archery, axe throwing, and plenty of parking for members. The boat ramp and dock are exclusive to members only though sunrise and sunset.

Photo Credit: Adobe Stock Images

Photo Credit: Halff

PRIVATELY-OWNED AND MANAGED RECREATIONAL AREAS AND OPEN SPACE

Table 12 - *City-Owned and Managed Recreational Areas*

					Active Facilities						
Recreational Areas, Boat Ramps & Marinas	**Location Address**	**Lake**	Acreage*	Undeveloped	Archery	Disc Golf	Axe Throwing	Concession Stand (#)	Recreation Center (#)	Playground (#)	
Lake Tyler Petroleum Club	15898 Eastside Rd	Lake Tyler	38								
Camp Tyler	15143 Camp Tyler Rd	Lake Tyler	118.6		x						
Green Acres Baptist Church Retreat	16163 N Peninsula Rd	Lake Tyler	16		x	x	x		x	x	

**City-owned and managed, all others are leased*

***Acreage based on GIS data*

****All piers are used for boaters*

	Water Recreation				Passive Facilities															Fishing Facilities				
	Lake Swimming	Canoe/Kayak	Paddleboarding	Swimming Pool (#)	Walking/Biking Trail (miles)	Table/Picnic Table (#)	BBQ Grill (x)	Restaurant	Lodging	Picnic Shelter/Pavilion (#)	Porta johns (Only in summer)	Shore access	Public Dock (#)	Public Boat Ramp (#)	Camping (#)	Parking (#)	Boat Rentals	RV Park	ADA Access	Fishing Pier** (#)	Cleaning Stations	Weigh Station	Live Bait	Boat Gas
		x	x	x		x			x			x												
	x	x	x		x	x			x	x		x			x	x				x				
		x	x		x	x			x	x	x	x				x								

CITY-OWNED AND MANAGED RECREATIONAL AREAS AND OPEN SPACE

Table 13 - *Privately Owned and Managed Recreational Areas*

					Active Facilities						
Recreational Areas, Boat Ramps & Marinas	**Location Address**	**Lake**	Acreage*	Check if Undeveloped (Yes/No)	Archery	Disc Golf	Axe Throwing	Concession Stand (#)	Recreation Center (#)	Playground (#)	
Eastside Recreation Area*	FM 3341 (East Dam Rd)	Lake Tyler									
Lake Tyler Marina Resort (Concession #1)	18183 Concession Road Whitehouse, TX 75791	Lake Tyler	350					x		x	
Langley Island*		Lake Tyler	72	x							
Old Omen Road Ramp, West*	CR 285 (Old Omen Rd)	Lake Tyler East	1.5								
Old Omen Road Ramp, East*	CR 285 (Old Omen Rd)	Lake Tyler East									
Highway 64 Ramp*	Texas 64 East	Lake Tyler East									
Hill Creek Recreation Area*	17145 Slack Road, Whitehouse, TX 75791	Lake Tyler									
Old #2/Chapman Recreation Area*/ Boulders at Lake Tyler	CR 2127	Lake Tyler									

**City-owned and managed, all others are leased*

***Acreage based on GIS data*

****All piers are used for boaters*

	Water Recreation				Passive Facilities																Fishing Facilities				
	Lake Swimming	Canoe/Kayak	Paddleboarding	Swimming Pool (#)	Walking/Biking Trail (miles)	Table/Picnic Table (#)	BBQ Grill (x)	Restaurant	Lodging	Picnic Shelter/Pavilion (#)	Porta johns (Only in summer)	Shore access	Public Dock (#)	Public Boat Ramp (#)	Camping (#)	Parking (#)	Boat Rentals	RV Park	ADA Access	Fishing Pier ** (#)	Cleaning Stations	Weigh Station	Live Bait	Boat Gas
		x	x			x					x	x			x	x								
	x			x		x	x	x		x	x	2	x	x	x	x			x	x	x	x		
		x	x			x					x	x	x	2	x	20								
		x	x									x		1		x								
		x	x			x					x	x	x	1	x	60								
	x	x	x			x				x		x	x	x	x	25								
		x	x			x					x	x	x	1	x	x							x	x

FIGURE 3.4 - EXISTING LAND USE

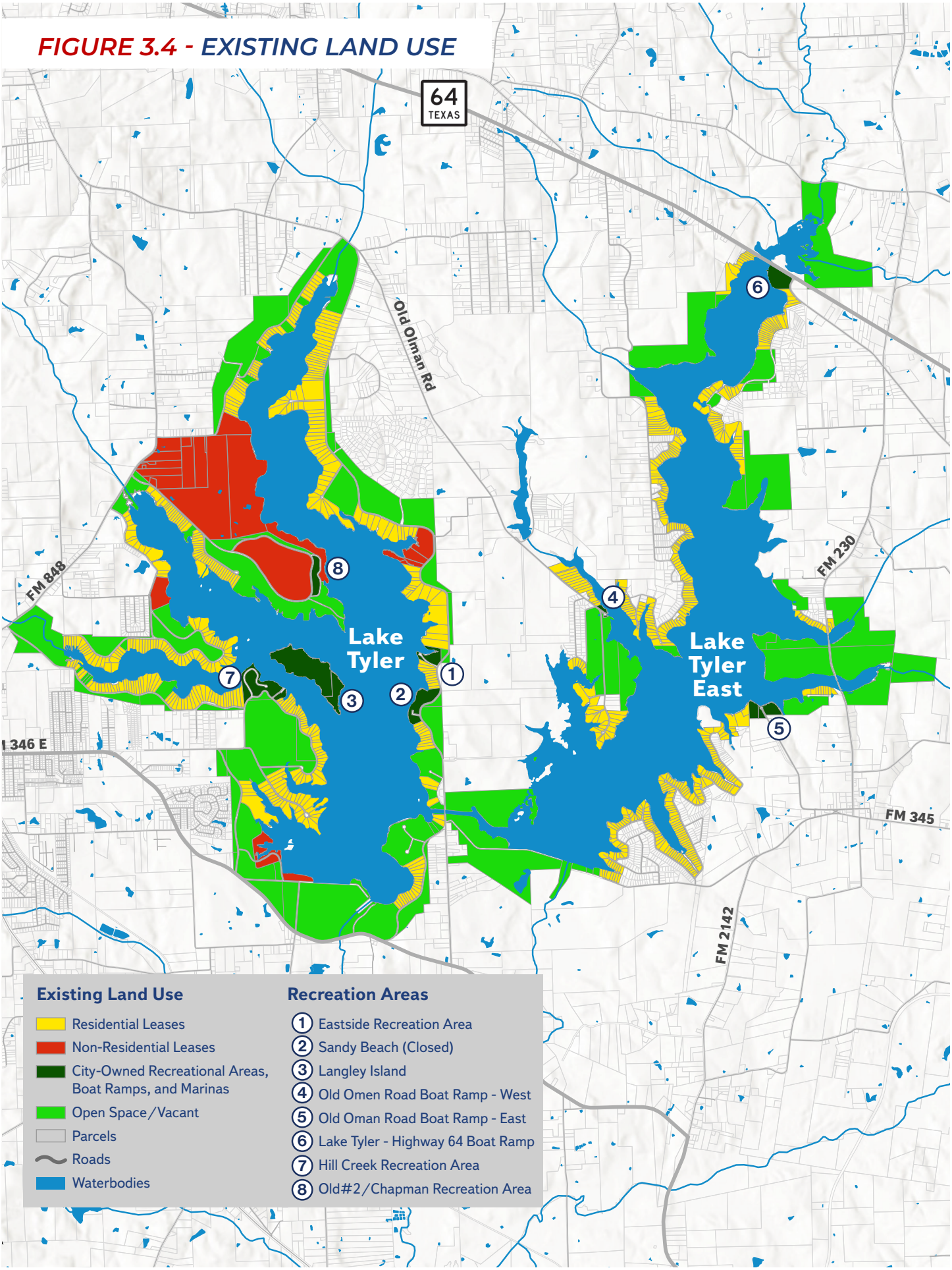


FIGURE 3.5 - NON-RESIDENTIAL LAND USE

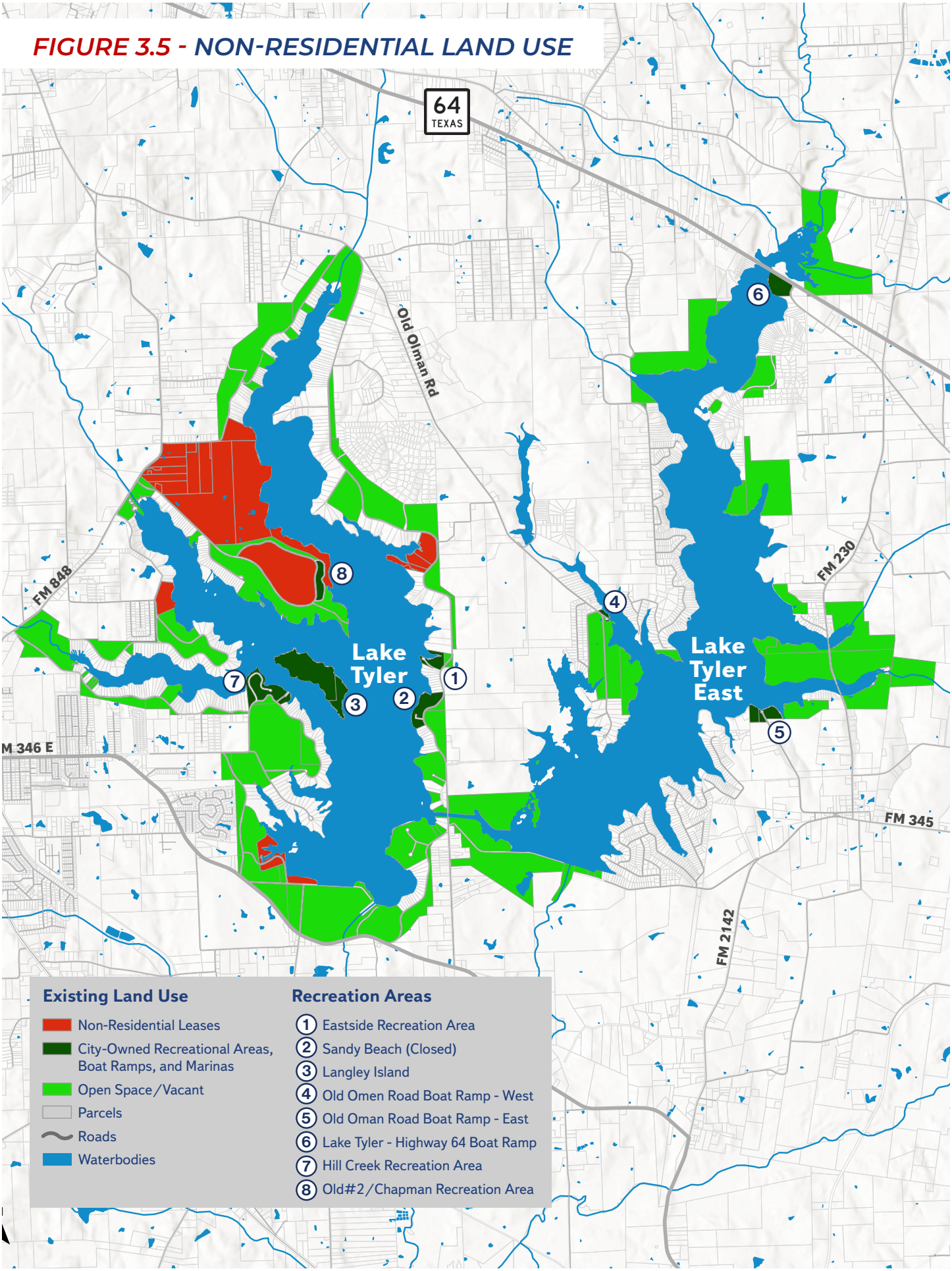


FIGURE 3.6 - LAKE TYLER BOAT RAMPS

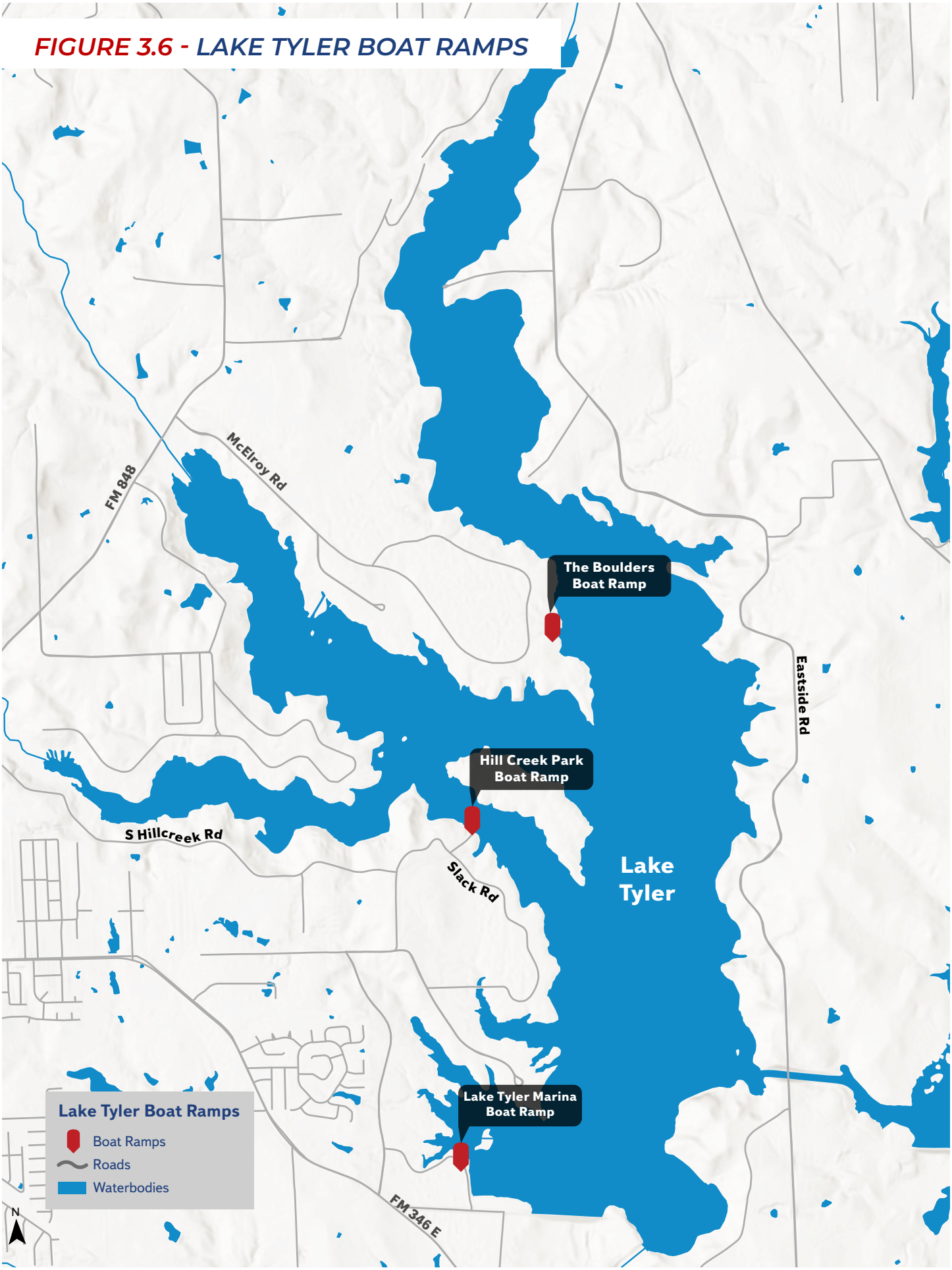
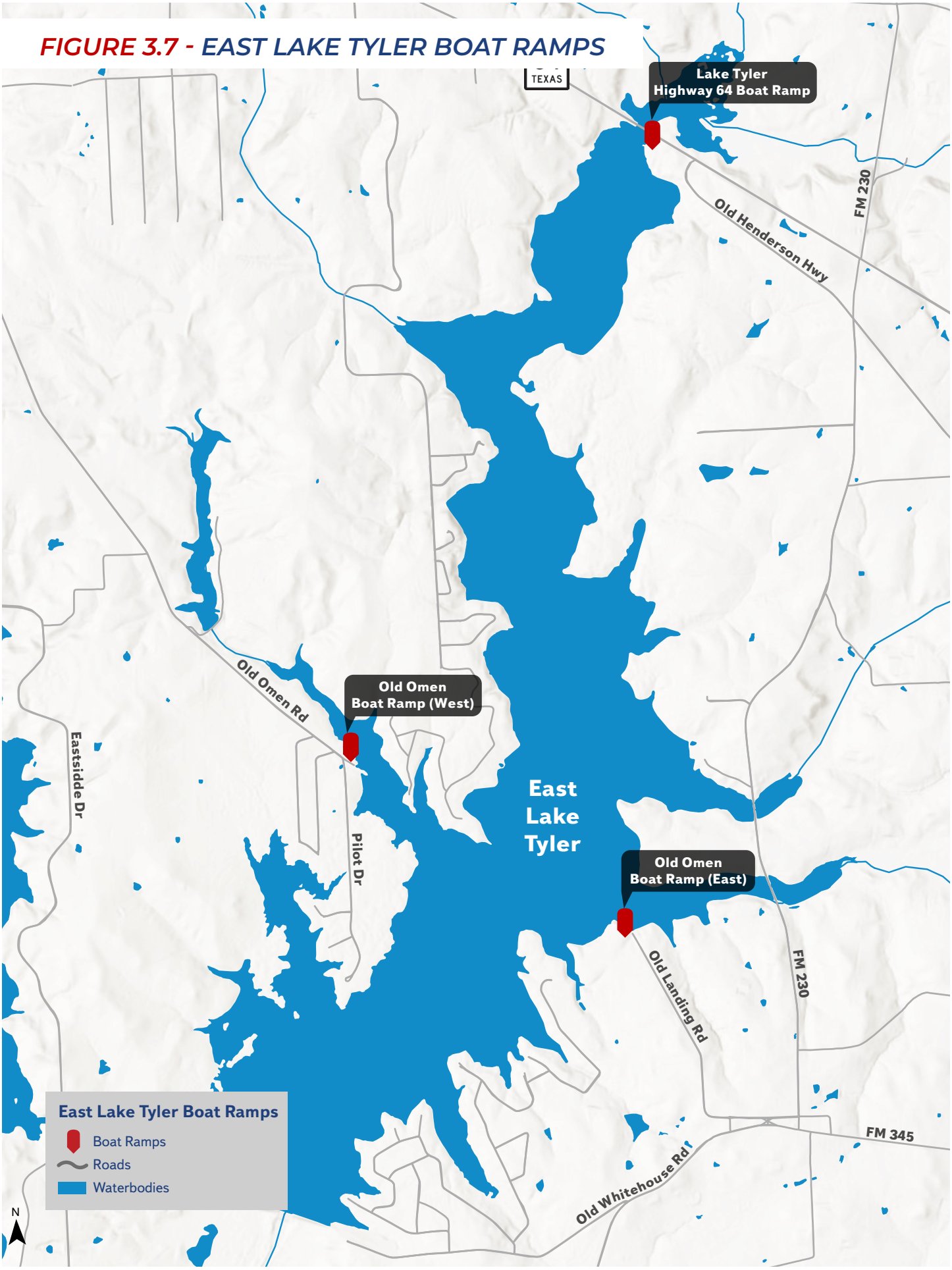


FIGURE 3.7 - EAST LAKE TYLER BOAT RAMPS



TRAIL ASSESSMENT

TRAIL CONNECTIVITY & PLANNING EFFORTS

Currently, there are no natural or multipurpose trails around the lakes. However, the existing open space and wooded areas often have ideal conditions and strong potential for future trails development. Both the City of Tyler and the City of Whitehouse have included plans that propose trail connections to the lakes.

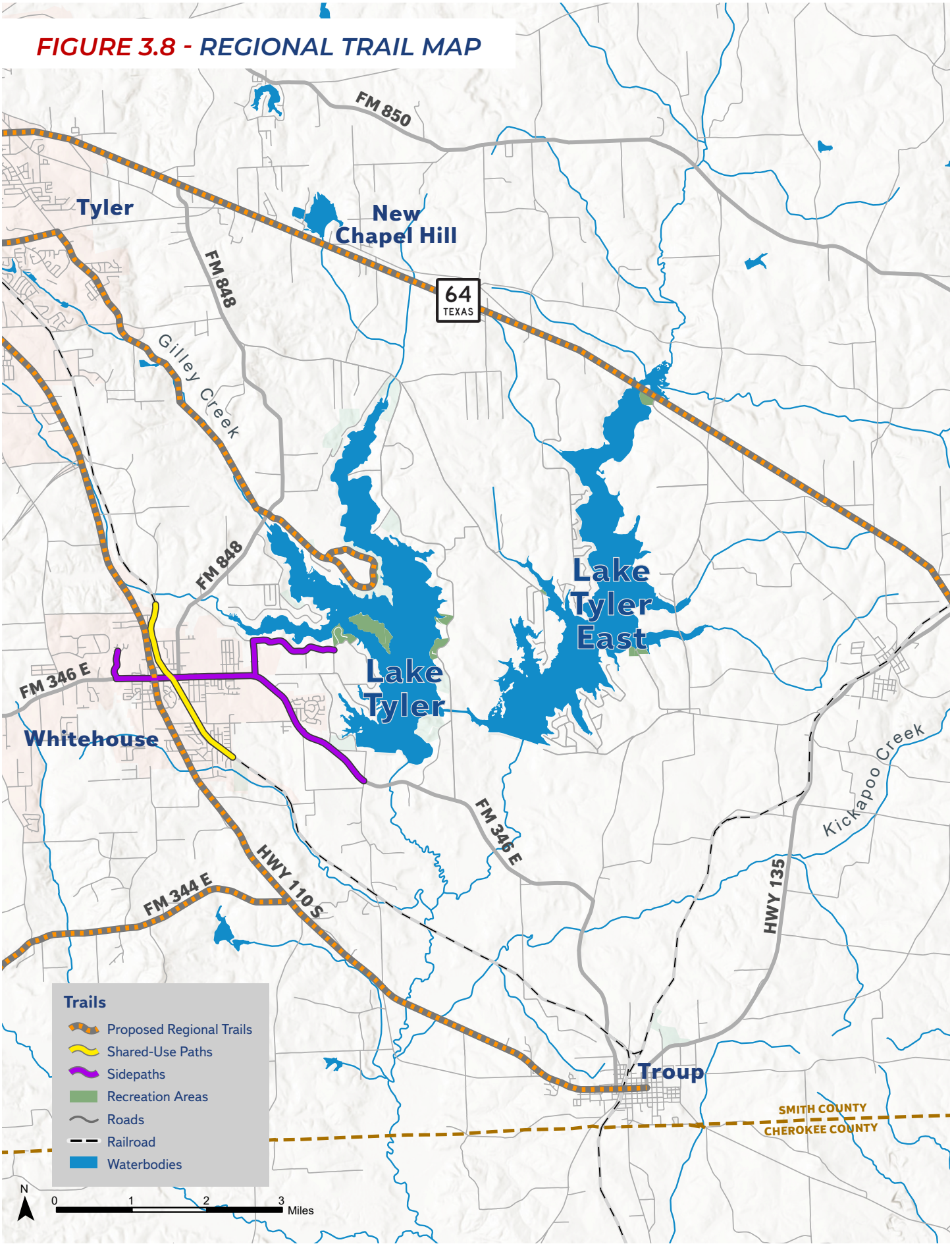
The 2011 Lake Tyler Master Plan identified low usage of the hiking and biking trails surrounding Lake Tyler and Lake Tyler East. The completion of the Lake Tyler Loop and improved connections to Whitehouse and Tyler's trail systems would encourage more non-motorized traffic, promoting outdoor recreation and use of alternative transportation options.

The Lake Tyler Master Plan outlines strategies to improve recreational opportunities for residents and visitors while balancing environmental conservation. Key recreational elements include:

- **Hiking and Biking Trails:** Development of interconnected trails around the lakes to provide scenic walking and cycling opportunities.
- **Boating and Fishing:** Expansion of facilities to support these popular activities.
- **Camping and Picnicking:** Designation of areas for family-friendly outdoor recreation.
- **Water Sports:** Support for activities such as kayaking, paddle boarding, and swimming.
- **Wildlife Observation:** Creation of designated viewing areas to promote ecological awareness.

Lake Tyler Marina shoreline opportunity for trail connection

FIGURE 3.8 - REGIONAL TRAIL MAP



The plan highlights the importance of maintaining trail infrastructure, including routine upkeep, signage, rest areas, and potential bike repair stations to ensure accessibility and safety for all users.

The City of Tyler 2007 Comprehensive Plan underscores Lake Tyler's role as a regional recreational asset. It emphasizes:

- New trail development to enhance public access.
- Environmental conservation to balance increased use with natural preservation.
- Community engagement to ensure recreational facilities align with public needs.

City of Tyler Parks and Recreation Master Plan (2011) emphasizes preserving natural spaces near waterways, such as Mud Creek and Black Forest Creek, and integrating lakes into the city's broader recreational framework. The public survey conducted for the plan ranked nature trails as the top recreational priority. Multi-use trails ranked fourth, highlighting strong community demand for expanded trail networks.

The City of Whitehouse Parks Master Plan references the potential trail connections to Lake Tyler. Existing Tyler Metropolitan Planning Organization studies identify trail corridors linking Lake Tyler to the City of Tyler. Future parkland acquisitions west of Highway 110 should incorporate trail connections to

Family cycling together near scenic trails offer low-cost, active outdoorrecreation and trail connectivity.

enhance accessibility and recreation.
The Active Tyler Plan outlines strategic trail and bike route connections to Lake Tyler and Lake Tyler East. Key planned connections include:

- **Water Row at Lake Tyler:** A regional trail linking Lake Tyler to the Tyler city limits.
- **Regional Connection 529:** A rural trail extending this link.
- **Regional Connection 526:** Following Troup Highway (SH 110), this route connects Tyler to Whitehouse.
- **Regional Connection 528:** Continuing from Whitehouse to Troup, improving regional trail accessibility.

Additionally, Green Acres Church has expressed interest in connecting to regional trails, reinforcing the demand for expanded non-motorized transportation options.

Regional Trail Discussions

The lakes plays a critical role in regional trail planning efforts, serving as a key connection point within a broader network of trails linking Tyler to surrounding communities. As regional discussions advance, stakeholders should consider:

- **Integrating Lake Tyler into a Regional Trail Network:** Strengthening connections with planned and existing trails to enhance accessibility and recreational opportunities.
- **Leveraging Lake Tyler's Role as a Recreational Hub:** Promoting the lake as a central destination for outdoor recreation, fostering economic and tourism benefits for the region.
- **Collaborating with Regional Partners:** Engaging with local governments, MPOs, and community organizations to align goals and secure funding for trail expansions.
- **Advocating for Trail Infrastructure Improvements:** Supporting enhancements such as wayfinding signage, rest areas, and maintenance programs to increase trail usability and safety.

By implementing these strategies, Lake Tyler and Lake Tyler East can become premier outdoor recreation destinations, fostering active transportation and environmental stewardship.

OWNERSHIP, REGULATION & LEASE MANAGEMENT

OWNERSHIP & REGULATIONS

The City of Tyler owns and manages Lake Tyler and Lake Tyler East, enforcing rules and maintaining the surrounding park areas. Any construction on City-owned (leased) property, including over-water structures and marginal lands at Lake Tyler East, requires a permit from the City of Tyler's Building Services Department. This includes submitting a construction application and complying with Chapter 19, Article VI of the City of Tyler Code of Ordinances.

At the time of adoption, lease transfers, including those to heirs, must be approved by the City, as outlined in the Code of Ordinances. All lease-related requests must be submitted in writing, with applicable fees: $150 per transfer, $100 mortgage consent or addendum, plus a $100 filing fee if managed by the City. There are 512 leases across both lakes, with four residential types, each with its own lease agreement and rate.

While the City of Tyler does not own the residential lots around Lake Tyler East, it maintains a 100-foot sanitary control easement and oversees water quality. The property owners' responsibilities are defined in the Smith County Court ruling, commonly referred to as "Exhibit B." In accordance with these regulations, property owners must register their properties with the City of Tyler.

Boathouse Regulations & Permitting

Although the City of Tyler manages lake home inspections, not boathouses, the city no longer permits the construction of boathouses with plumbing. This new ordinance was aimed to prevent potential environmental concerns and maintain water quality.

Lease Management & Recreation Oversight

Lake Tyler and Lake Tyler East play a vital role as recreational and economic assets for the region, supporting both local residents and visitors. Effective management of leases, funding, and stakeholder collaboration is critical to ensuring sustainable growth, ongoing maintenance, and equitable public access.

This section outlines best management practices (BMPs) for lease agreements, including considerations for fixed versus percentage-based structures and recommended review schedules to maintain

Table 14 - *Lease Management Best Practices*

Lease Type	Advantages	Disadvantages	Best Use Case
Fixed Lease (Annual Fee)	Predictable revenue	Does not scale with business success	Small-scale vendors or businesses with stable income
Percentage-Based Lease (Revenue Share)	Scales with business growth; Encourages partnership	Revenue fluctuations may impact lake budget	High-revenue businesses (e.g. marinas, event venues, fuel sales)
Hybrid (Base Fee + % Revenue)	Provides steady minimum income; Captures growth potential	More complex to negotiate	Large scale commercial properties & high traffic venues

consistency and fairness. Additionally, it proposes an annual gathering model to foster communication and engagement among leaseholders and stakeholders, ensuring a collaborative approach to lake management.

Lease Management Best Practices

When managing commercial leases (e.g., marinas, resorts, private docks), choosing the right lease model is critical.

Best Practice Recommendations for Lake Tyler:

- Use a Hybrid Lease for Major Businesses – Base Lease ($15,000) + 5% of gross revenue.
- Require Private Dock Permits – Annual $150-$200 per slip fee.
- Implement a Small Fuel Sales Fee – Example: $0.05 per gallon of marina fuel sales.
- Irrigation Pump Fees – Annual
- Annual Financial Reporting Requirement – All percentage-based leaseholders must submit financial reports annually for transparency. Audits can be conducted every 3 years.

Considerations for Change

- Convert major leases to hybrid model (Base fee + % of revenue).
- Increase private dock permit fees ($150-$200 per slip).
- Implement a small fuel sales fee ($0.05/gallon).

Stakeholder Communication & Collaboration

To improve communication, cooperation, and long-term lake planning, the plan recommends improving and enhancing communication to residents of Lake Tyler through various methods. Tyler Water Utilities may consider developing a web site or platform for stakeholder engagement. The platform would help assist in facilitating discussions on lease agreements, funding strategies, and maintenance priorities. This may be through direct email, online residents page, or a designated liaison.

By continuing to improve communication with Lake Tyler residents, the City will improve collaboration among leaseholders, local officials, and community members as well as foster support for sustainable lake management practices.

Table 15 - *Recommended Lease Review Schedule*

Leaseholder Type	Review Frequency	Best Use Case
Major Concessions (Marinas, Resorts, Petroleum Club)	Every 5 years	Long term stability but adaptable to market conditions
Private Dock Owners	Every 3 years	Ensures rates reflect lake usage & maintenance needs
Event Venue & Commercial Vendors	Every 3-5 years	Adapting pricing to inflation & demand

To enhance cooperation, transparency, and community engagement, an annual Lake Tyler public meeting can be considered. This event would provide a structured forum for key discussions, including:

- State of the Lake Report – Overview of recent improvements and upcoming projects.
- Leaseholder Discussions – Review of lease terms, expectations, and potential adjustments.
- Funding & Grant Opportunities – Exploration of available resources for lake maintenance and development.
- Public Feedback Forums – Can allow lake residents to have discussions with the City on lake management.

OPERATIONS, MAINTENANCE AND SAFETY

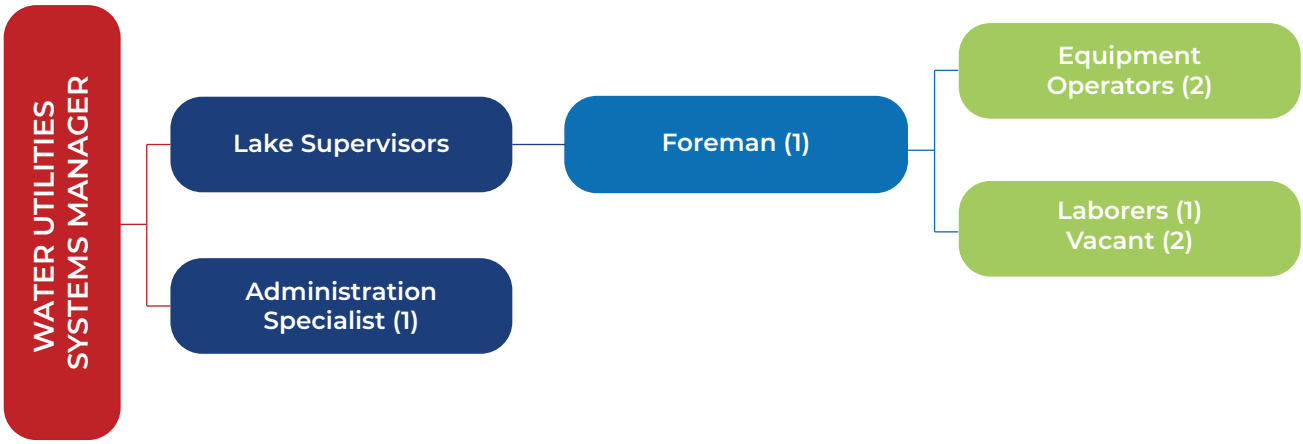
Ownership, Administration, and Maintenance Responsibilities

The Lake Tyler Division oversees the administration and management of the two lakes. This division is responsible for parks and grounds maintenance, road and drainage upkeep, and facility construction and maintenance. The operations team consists of seven staff members, with two positions currently vacant, **Figure 3.9**.

Lake Supervisor II serves as the primary point of contact for lessees, property owners, and the Smith County Sheriff's Office. The Lake Supervisor II manages a team of six, two are currently vacant, who are responsible for maintaining the recreation areas around the lakes, including the upkeep of boats and boat ramps. The City of Tyler manages streetscape improvements and lake supervision, ensuring public spaces remain accessible and well-maintained. Trash collection occurs every two weeks, with increased service before and after peak holiday seasons, particularly in May and June.

Additionally, the city maintains over 20 miles of public roads, five public boat ramps, and four public recreation areas. While two designated lake patrol officers exist, they are rarely on the water. In the past, lake supervisors also served as peace officers, but currently, no peace officers are assigned to the lake. Game wardens continue to enforce fishing and boating regulations to ensure compliance with state laws.

Figure 3.9 - *Organizational Chart*



Operations & Maintenance Processes

Lake Tyler and Lake Tyler East's operations and maintenance efforts are guided by established Standard Operating Procedures (SOPs) that ensure consistency and safety across various tasks. These procedures cover essential activities such as chainsaw operation, trash truck usage, backhoe operations, tractor operation with a brush hog attachment, and weed eater operation. By following these guidelines, maintenance teams can uphold safety standards and maintain the lake's facilities effectively. Weekly and month activities include trash collection occurs every two weeks, with increased service before and after peak holiday seasons, particularly in May and June.

Despite having structured SOPs, Lake Tyler currently relies on manual processes for executing and tracking maintenance activities. Paper-based checklists, verbal communication, and physical record-keeping remain the primary methods for documenting work, which presents several challenges. The lack of real-time monitoring may make it difficult to track compliance or delayed maintenance responses. Additionally, limited accessibility to historical records complicates inspections and audits, and there is no structured system for reporting incidents or equipment malfunctions.

To enhance efficiency and accountability, integrating digital tools into existing Best Management Practices (BMPs) could significantly improve operations. A digital system would streamline record-keeping, provide real-time maintenance tracking, automate alerts for necessary repairs, and centralize data for easy access. By modernizing maintenance processes while maintaining adherence to SOPs, management of that lake can improve operational reliability, enhance compliance oversight, and optimize resource utilization.

Safety & Law Enforcement

Public safety on Lake Tyler is a shared responsibility among several agencies. The City of Tyler provides police presence during high-activity days in the summer to ensure a safe environment for visitors. The Smith County Sheriff's Office also patrols the area but operates independently from the city, though they communicate with the city when necessary. While there are two boat patrol units assigned to the lake, they are not frequently deployed. Additionally, game wardens regulate fishing and boating activities to enforce wildlife and water safety laws.

MARKETING & COMMUNICATIONS

Currently, the City of Tyler does not actively promote Lake Tyler/Lake Tyler East's recreational opportunities. Visit Tyler, the city's tourism bureau, does not include the lake in its marketing efforts since it is not funded by the Hotel Occupancy Tax (HOT). As a result, there are no official brochures, pamphlets, or other printed materials available to inform visitors about the lake's amenities and activities.

While the city has installed some signage around the lake, independent programming and events are primarily driven by local businesses, such as The Boulders, and individual residents. These activities, however, are not coordinated with the

city, leading to fragmented outreach and inconsistent messaging. A more structured and collaborative marketing strategy could enhance public awareness and increase recreational use of the lake.

These special districts can serve as tools for the community to reinvest in a specific area where stakeholders want to maintain or enhance appeal of a commercial, residential, or recreational zone.

REVENUE

Over the past three fiscal years, Lake Tyler's total revenue has grown significantly, increasing from $96,505 in 2021-2022 to $147,973 in 2023-2024. This represents a 53.3% increase in overall revenue over the three-year period. At the writing of the 2025 Lake Tyler Master Plan there were 452 residential lots and 5 non-residential lots on Lake Tyler.

Key Revenue Sources & Trends

- Lake Tyler Lot Rental – The largest revenue source, growing steadily from $62,670 (2021-2022) to $71,389 (2023-2024).
- Lake Tyler Marina – The most dramatic increase, from $9,779 to $45,135, suggesting a surge in marina activity, possibly from boating popularity and tourism growth.
- Barge Concession – Revenue fluctuated but rebounded from $21,421 (2021-2022) to $28,779 (2023-2024), indicating a strong recovery.
- Lake Tyler East Registration – Remained stable, generating around $2,600 annually.

Key Takeaways

- Total revenue growth of 53.3% suggests rising recreational and tourism activity at Lake Tyler.
- Marina revenue increased over 4.5 times, indicating a boom in boating and waterfront tourism.
- Sustained demand for lot rentals shows Lake Tyler's appeal for long-term use

While the management of recreational areas may not be the primary focus of the Tyler Water Utilities, it is becoming an increasingly important consideration.

The lake serves as a significant draw for both the local community and the broader region, generating demand for improved facilities, maintenance, and oversight. As recreation use continues to grow, exploring new user fee structures, partnership models, or governance approaches could help support sustainable management. The following pages highlight examples of other lake communities and how they have addressed similar challenges.

Outdoor patio area at The Boulders

SPECIAL SERVICE DISTRICTS

Also known as Special Purpose Districts, Special Improvement Districts, or Public Improvement Districts (PID) is a defined geographic area where property owners agree to pay an additional tax on assessment to fund specific services or improvements that benefit the area.

Common uses are typically downtown revitalization, business corridors, tourism/recreation areas, lakefronts, and neighborhood improvements.

Examples of services include:

- Beautification
- Public safety
- Marketing/Promotion
- Infrastructure
- Maintenance of parks and trails

Case Study #1: Water-Oriented Recreation District (WORD) of Comal County

Established in 1987 and includes recreational activities along Canyon Lake and Guadalupe River. It has three main funding sources:

- 1% Sales Tax on local businesses
- Fees from commercial vendors (boat rentals, campsites)
- Hotel Occupancy Tax (HOT) from short-term rentals

Impacts: Generates $2 million+ per year for lake improvements, law enforcement, and recreation programs. In terms of Lake Tyler, a WORD could help fund improvements, such as boat ramps, fishing piers, and parks. Create sales tax revenue from businesses around the lake. Lastly, Hotel Occupancy Tax could apply to short-term rentals and resorts.

WORD volunteers planting trees
Source: WORD of Comal County

Picnic Tables at Canyon Lake
Source: WORD of Comal County

Case Study #2: Lubbock County Water Control & Improvement District #1

Established in 1925 to manage the water supply, flood control, and recreation at Buffalo Springs lake. Its funding sources include:

- Water supply contracts with cities & businesses
- User fees for recreational areas
- Bonds for infrastructure development

Impacts: Provides water management and recreational funding for lakes and parks in Lubbock County. In terms of Lake Tyler, a WCID could manage water quality while funding recreation area improvements. Could allow it to be structured under Smith County jurisdiction to maintain water recreation.

Sandy Beach at Buffalo Springs Lake
Source: BuffaloSpringsLake.net

Resident Information
Source: BuffaloSpringsLake.net

Table 16 - *Comparison Table of Water Districts*

	WORD (Water-Oriented Recreation District)	WCID (Water Control & Improvement District)
Purpose	Support recreation, tourism, and lake-related activities	Manages water supply, flood control, and infrastructure
Governing Law	Texas Local Government Code Chapter 324	Texas Water Code Chapter 51
Who Approves it?	Smith County Commissioners + voter approval if sales tax is included	Texas Commission on Environmental Quality (TCEQ) + local government approval
Funding Sources	Sales tax, hotel tax, users fees, grants	Property taxes, bonds, water usage fees, grants
Primary Uses	Park & boat ramp improvements, lake patrols, trails, tourism promotion	Flood control, water quality projects, infrastructure maintenance
Who Pays?	Businesses (via sales tax) tourists (via fees)	Property Owners (via taxes), water users
Best For	Enhancing recreation & economic development	Long-term management & conservation
Examples in Texas	WORD of Comal County (Canyon Lake, Guadalupe River)	Lubbock County Water Control and Improvement District

RECORD OF ACCOMPLISHMENTS

Initiatives and Actions from Previous Plans

Since the completion of the 2011 Lake Tyler Master Plan several recommendations have been realized. This includes:

- Updating and evaluation of lease agreements adjacent to the lakes
- Adding wayfinding or regulatory signage around the lakes
- Managing development and limiting residential developments
- Ensuring new development is compatible with the lake area
- Address issues at Fitz and Opals and the barge lots
- Secured new management for recreational areas at lake Tyler Marina and The Boulders

Initiatives and Actions Outstanding

There are several other recommendations that have not been completed or not fully realized. Most of the recommendations addressed water quality concerns, however the lakes are still working to establish methods for funding other recommendations from the plan. This includes:

- Annexation of land around the lake due to lake sewer services
- Develop and construct trail opportunities.
- Increasing and implementing user fees
- Increasing lease rates
- Update rules and regulations

Photo Credit Halff

Photo Credit Halff

Photo Credit Halff

RECREATION AREA ENHANCEMENT & DEVELOPMENT OPPORTUNITIES

PARK SIGNAGE & WAYFINDING

Park signage is one of the simplest and most cost-effective tools for improving the visitor experience at Lake Tyler and Lake Tyler East. Thoughtfully designed signage can unify the overall identity of the recreation system, communicate important information, and enhance both functionality and aesthetics.

TYPES OF SIGNAGE

Gateway and Entry Signage

Monument-style entry signs offer a welcoming first impression for park visitors. These signs can establish a sense of arrival and provide essential information about what guests can expect, including park hours, rules, and available amenities. Upgrading entry signage from standard government or TxDOT-style signs to a branded, consistent format will help create a more memorable and cohesive experience.

Internal and Wayfinding Signage

Interior park signage plays a vital role in guiding visitors and communicating park rules, safety regulations, operating hours, and policies. These signs should be strategically placed and easily legible. Helping reduce confusion and improve visitor safety.

Regulatory and Informational Signage

Existing signage at both lakes is largely regulatory in nature and is currently displayed in a fragmented and inconsistent manner. Consolidating and organizing these messages within a standardized signage framework will improve clarity and overall presentation.

OPPORTUNITIES FOR IMPROVEMENT

Brand Cohesion

Establishing a simple lake-specific brand standard will create a consistent look and feel across all recreation areas. This will elevate the visual identity of the parks and help foster a stronger sense of place.

Visibility and Attention

Updated signage can grab the attention of passing drivers, reinforcing the presence and appeal of the lakes as a recreational destination.

Improved Communication

Standardized signage formats allow for the clear communication of essential information, including contact numbers, safety reminders, and recreational guidance.

By implementing a coordinated signage strategy, Lake Tyler and Lake Tyler East can enhance navigation, promote safety, unify their identity, and ultimately offer a better experience for all park users.

EXISTING SIGNAGE

Many of the lake's recreation area entry signs are small, blends into its surroundings, and is easily overlooked by passing drivers. Its placement among multiple regulatory and informational signs creates visual clutter, making it difficult for visitors to quickly identify the entrance. The lack of clear, welcoming design elements further diminishes its visibility and fails to convey an inviting first impression for those arriving at the site.

NEW RECREATION AREA SIGNAGE

New entry signs, or monumentation, should be designed to stand out from surrounding regulatory signs, using bold, legible lettering, distinctive colors, and a clear graphic identity to alert drivers well in advance of the entrance. Incorporating a welcoming message and recognizable branding elements would create a positive first impression and set the tone for the visitor experience. The size and scale of the signage can be adapted to fit available budgets, while still achieving strong visibility. Establishing a standard entry signage design across all recreation areas would further enhance recognition, reinforce the system's brand, and help visitors feel confident they've arrived at their destination.

Figure 3.10 - *Enhanced Recreation Signage*

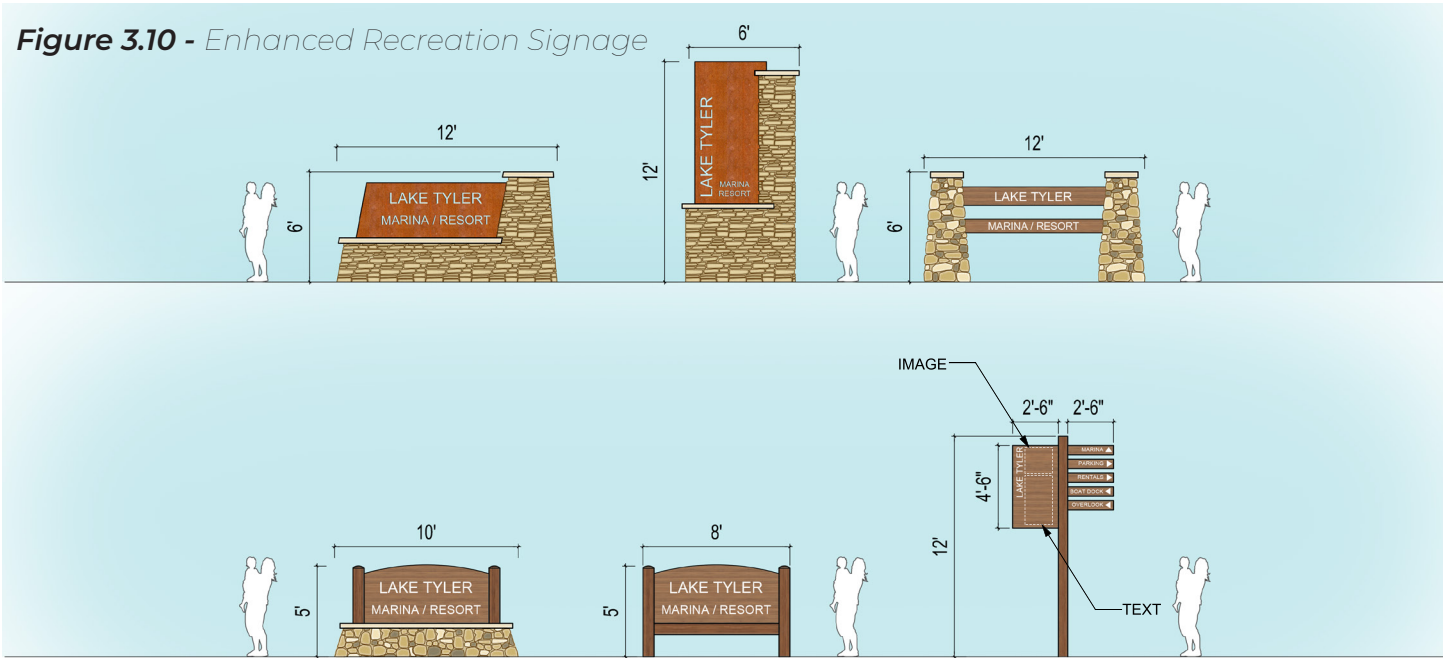


Photo Credit Halff

LAKE TYLER MARINA RESORT: PARK IMPROVEMENT CONCEPT

Background and Current Operations

Lake Tyler Marina Resort is a key recreation asset on Lake Tyler. The resort is operated by a private management team under a lease agreement with the City. Over the past six years, the current operators have made substantial improvements to the marina's facilities, helping revitalize its offerings and attract new visitors. Existing amenities include boat slip storage, a restaurant, RV, camping sites, and on-site parking. The resort serves as a hub of activity for both day users and overnight guests.

City-Owned Adjacent Property

At the entrance to the marina, the City owns and maintains a large parking area, and the adjacent dam access point. This area is not under the management of the resort lessee and has historically experienced issues with vandalism, under use, and unclear circulation. In 2012, the City developed preliminary conceptual designs for this area, focusing on enhancing access and functionality. Today, this area remains a recreational opportunity zone for the City to invest in infrastructure and recreational amenities that support and complement the marina's private operations while serving a broader public purpose.

Improvement Opportunity and Vision

The City envisions transforming the underutilized parking area and the adjacent beach frontage into a vibrant public recreation zone that enhances the resort's appeal, improves visitor circulation, and offers new park amenities.

Key improvement concepts may include:

- **Parking Lot Activation**
  Re-purposing a portion of the existing parking area into a flexible recreation and event space. This could include accommodations for food trucks, shaded seating areas, live music and performance space, a small playground, and an open lawn for passive recreation.
- **Beach Front Enhancements**
  Improving the shoreline just below the parking lot to create a more accessible beach zone. This would involve reshaping the edge for wading and swimming, adding picnic areas, and installing appropriate signage and safety features.

- **Circulation and Entrance Reconfiguration** Currently, marina patrons access the resort through a side entrance off Concession Road. With the proposed park improvements, this circulation pattern could lead to confusion or conflict between park users and marina traffic. A long-term improvement would be to relocate the marina's primary entrance to Highway 346 and Dickson Road streamlining access for both public park users and marina guests.

Together, these upgrades would improve the quality and safety of the resort's arrival experience, support public access to the lake, and create new spaces for the community programming, and spontaneous recreation.

Conceptual Designs

Building on the ideas developed in 2012, we created a conceptual map and then explored additional alternative concepts that may align with the City's intention to consider future low-cost, high-impact improvements. Please reference the Appendix to see the conceptual designs that reimagine this gateway area, offering a vision to guide future investments and foster an integrated public–private recreational node that enhances the identity and user experience of Lake Tyler Marina Resort.

Roadway to Lake Tyler
Photo Credit Halff

RECREATION & TOURISM RECOMMENDATIONS

SHORT

CONTINUE TO FOSTER STAKEHOLDER ENGAGEMENT

Continue to foster communications with Lake Tyler residents to be informed and educated on various updates related to the management, maintenance, regulatory changes, and to gather public feedback.

MODERNIZE OPERATIONS AND MAINTENANCE

Replace manual checklists with digital tools for inspections, automated work orders, real-time maintenance tracking, and incident reporting. Install QR-coded signs at recreational sites to enable instant visitor feedback and maintenance alerts.

ENVIRONMENTAL PRESERVATION AND SUSTAINABLE GROWTH

Continue prohibiting boathouses with plumbing and assess shoreline erosion areas for potential restoration efforts. Implement shoreline stabilization projects where needed. Require all new development to meet stringent water quality protections and prioritize preservation of natural open spaces.

MID

ENHANCE SAFETY AND LAW ENFORCEMENT PRESENCE

Secure funding for dedicated and regular lake patrols to improve visitor safety during peak seasons and enforce boating and fishing regulations. Formalize partnerships with the Smith County Sheriff's Office to clarify jurisdiction, response protocols, and expectations.

DIVERSIFY REVENUE STREAMS

Adopt hybrid lease models for major commercial operators consisting of a base fee and a percentage of gross revenue. Increase private dock permit fees to a range of one hundred fifty to two hundred dollars per slip. Implement a small fuel sales fee, such as five cents per gallon. Explore potential parking or boat launch fees for non-residents.

STRENGTHEN MARKETING AND VISITOR ENGAGEMENT

Develop an official marketing campaign in coordination with Visit Tyler and other tourism partners, even if indirect funding from hotel occupancy taxes is not currently available. This should include informational brochures, signage, a standalone website or webpage for Lake Tyler, and partnerships with local businesses and social media influencers. Collaborate with local event organizers such as The Boulders, Lake Tyler Marina, and the Petroleum Club to integrate city messaging and consistent branding for all lake-related events.

LONG

EXPAND TRAIL CONNECTIVITY AND RECREATION ACCESS

Prioritize completion of the Lake Tyler Loop and trail connections to Tyler and Whitehouse to support non-motorized access and promote outdoor recreation.

ENHANCE ACCESS AND RECREATION ON CITY-OWNED UNDEVELOPED PROPERTY

Increase opportunities for nature-based recreation, such as birdwatching and hiking, on city-owned undeveloped lands. Prioritize developing low-impact trail networks that connect to existing recreation areas to promote outdoor activity and environmental appreciation. Collaborate with local conservation groups, community organizations, and nearby landowners to design accessible entry points and interpretive signage that highlights natural features and wildlife habitat.

Photo Credit: Adobe Stock Images

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IMPLEMENTATION PLAN

4

Lake Tyler Pump Station
Photo Credit Halff

CAPITAL PROJECTS

The Implementation Chapter identifies potential capital projects based on the recommendations from the plan, such as major improvements needed to protect Lake Tyler and Lake Tyler East, enhance recreation access, and strengthen long-term lake management. The projects presented here were developed through a combination of technical shoreline analyses, field evaluations, community feedback, stakeholder interviews, and coordination with Tyler Water Utilities.

Additionally, this chapter identifies potential funding sources from state and federal grants and programs, explores opportunities to establish a dedicated foundation or partner non-profit organization to support future lake enhancement initiatives.

PROJECT CATEGORIES

To clearly communicate project intent and improvements are grouped by theme:

- Shoreline stabilization and erosion control (slope repair and riprap installation),
- Infrastructure repairs and replacements (dock repairs, culvert replacements, access roads),
- Recreation access and amenity enhancements (boat ramps, trails, public amenities) and,
- Water quality or environmental restoration projects (sediment removal, vegetation restoration)

PROJECT PRIORITIZATION AND COST FRAMEWORK

Each project is assigned a priority level based on urgency, safety, infrastructure risk, environmental benefit, and recreational value, and accompanied by a high-level cost range to support budgeting and decision-making.

PHASING AND IMPLEMENTATION STRATEGY

To guide implementation and align investments with available resources, projects are organized by timeframe. It also allows for the integration with existing maintenance or capital improvement programs.

- Short-term (1–3 years): Immediate, high-impact, visible improvements or foundational studies to inform future work.
- Mid-term (3–7 years): Projects requiring design, permitting, or coordination among partners.
- Long-term (7+ years): Major infrastructure, policy-driven, or capital-intensive undertakings.

This will help position the City to strategically deliver the highest-value improvements over time.

SUMMARY AND NEXT STEPS

Key takeaways on investment priorities. Suggested updates or monitoring intervals for project tracking and progress evaluation.

Table 17 - *Potential Projects*

Project Type	Project Description
Shoreline Erosion Control Program**	Hard armor solutions for wave action erosion.
Public Stewardship Facilities	Install trash collection sites, recycling points, and interpretive signage to encourage responsible lake use.
Temporary Restroom Replacement	Replace aging temporary facilities with permanent restrooms.
Recreation Area Signage Upgrade	Update, directional, safety, and interpretative signs across the lake, ramps and recreation areas.
Enhanced Law Enforcement Presence	Coordinate with Smith County and Texas Parks and Wildlife for patrols and safety monitoring.
Improve Parking Facilities	Enhance and reconfigure parking lots at recreational site to better accommodate visitors while controlling runoff and erosion.
Perimeter Natural Surface Trail	At the Marina at Lake Tyler construct trails near and around the lake to connect with roadways and local and regional trails.
Replace Restrooms at Concession #1	Upgrade permanent restroom facilities to connect to existing municipal sewer infrastructure.
Oil and Gas Site BMPs	Develop and enforce BMPs upgrades for existing operations within the watershed, including secondary containment and spill response.
Stormwater Infrastructure Upgrades	Retrofit priority outfalls and drainage including detention, filtration, or vegetated swales.
Agricultural Runoff Mitigation Pilot	Develop a cost-share program with local agricultural landowners to install buffer strips, retention ponds, and low-impact tillage systems.
Green Infrastructure Demonstration Sites	Construct rain gardens and pervious pavement systems in public recreation access areas around the lake.
Nutrient Monitoring Stations	Install automated monitoring buoys to track nitrogen, phosphorus, and chlorophyll-a levels in real time.
Septic System Upgrade Program	Provide assistance for grants or low-interest loans for the replacement of aging or failing septic systems within the lake watershed.
Sanitary Sewer Extension	Expand sewer infrastructure to support future development of high-use areas, specifically for the Boulders.
Master Plan Lake Tyler Marina	Develop final design and programming concepts from the produced conceptuals.

*High level cost ranges are not precise estimates and will vary by site, permitting and scope.
** The full table of the Shoreline Erosion Control Program can be found on the following page.

Responsible Party	Timing	Cost Range*
Tyler Water Utilities (lead); coordination with the City and TPWD	MID	$150,000-$500,000/mile
TWU lead; Neighborhood associations partners, conservation groups partners	MID	$50,000-$120,000/site
TWU (lead)	SHORT	$150,000-$350,000/each
TWU (lead)	SHORT	$25,000-$75,000 system wide
TWU (lead)	SHORT	$50,000-$100,000/year
TWU (lead)	MID	$200,000 – $600,000 per lot
City of Tyler Parks & Recreation lead; Tyler MPO Neighborhood Associations partners	LONG	$20,000-$50,000/mile
TWU (lead) coordination with leasees	MID	$250,000 – $400,000 each
TWU (lead) coordination Railroad Commission of Texas (RRC) and TCEQ oversight	SHORT	$100,000 – $250,000 per site
City of Tyler Engineering; TWU coordination	MID	$300,000 – $1 million per site
TWU and Smith County Ag Extension lead; local landowners partners	MID	$75,000 (startup)
TWU (lead) City of Tyler Parks & Recreation co-leads; community groups for stewardship and education	SHORT	$100,000 – $300,000 per site
TWU lead; TCEQ and USGS technical partners	SHORT	$75,000 – $200,000 per station
TWU (lead); leasee coordination; TWDB	MID	$200,000 – $500,000 per year
TWU (lead); City of Tyler Engineering, Development Services	LONG	$1.5 million – $3 million per mile
TWU	MID	$75,000-150,000

Table 18- *Capital Improvement Project List for Public Recreation Areas*

Site ID	Location Description	Length (ft)	$/Linear Foot	
#1	800 feet south of the Camp Tyler boat dock.	805	Rock Riprap	$1,000.00
			Sheet Pile	$800.00
#2	Near the Boulders at Lake Tyler adjacent to the Boulders at Lake Tyler Fishing Barge	195	Rock Riprap	$1,000.00
			Sheet Pile	$800.00
#3	North of the Boulders at Lake Tyler Boat Ramp adjacent to the RV parking.	730	Rock Riprap	$1,000.00
			Sheet Pile	$800.00
#4	Off of Country Road 2133 adjacent to Hill Creek Park.	670	Rock Riprap	$1,000.00
			Sheet Pile	$800.00
#5	Along the east bank of Langely Island.	595	Rock Riprap	$1,000.00
			-	-
#6	1,000 feet southwest of the Lake Tyler Yacht Club.	350	Rock Riprap	$1,000.00
			Sheet Pile	$800.00

*Construction cost includes 30% Contingency

1) Project cost includes: Probable construction cost, contingency (30%), design (20%), environmental & permitting (10%), and construction services (5%)

2) Rock rip rap assumptions:

- 2:1 slope
- Top and toe section keyed into banks
- 24- inch rock rip rap, 36-inches thick

3) Sheet pile wall assumptions:

- 8- foot vertical (4-foot buried, 4-foot exposed)

Construction Cost**		Overall Project Cost	
Alternative 1	$1,046,500.00	Alternative 1	$1,328,250.00
Alternative 2	$837,200.00	Alternative 2	$1,062,600.00
Alternaitve 1	$253,500.00	Alternative 1	$321,750.00
Alternative 2	$202,800.00	Alternative 2	$257,400.00
Alternative 1	$949,000.00	Alternative 1	$1,204,500.00
Alternative 2	$759,200.00	Alternative 2	$963,600.00
Alternative 1	$871,000.00	Alternative 1	$1,105,500.00
Alternative 2	$696,800.00	Alternative 2	$884,400.00
Alternative 1	$773,500.00	Alternative 1	$981,750.00
-	-	-	-
Alternative 1	$455,000.00	Alternative 1	$577,500.00
Alternative 2	$364,000.00	Alternative 2	$434,000.00

FEDERAL FUNDING SOURCES

DEPARTMENT OF AGRICULTURE

Emergency Watershed Protection Program

The Emergency Watershed Protection Program (EWPP) is designed to provide assistance to project sponsors and individuals in implementing emergency recovery measures to relieve imminent hazards to life and property caused by floods, fires, windstorms, and other natural occurrences. EWP is an emergency recovery program, initiated after a disaster is declared.
NRCS may bear up to 75 percent of the construction cost of emergency measures. The remaining 25 percent must come from local sources and can be in the form of cash or in-kind services. Funding is subject to Congressional approval. City and county governments, flood and water control districts, and soil and water conservation districts are the most common sponsors of EWP projects. Activities include providing financial and technical assistance to:

- Remove debris from stream channels, road culverts, and bridges;
- Reshape and protect eroded banks;
- Correct damaged drainage facilities;
- Establish cover on critically eroding lands;
- Repair levees and structures; and
- Repair conservation practices.

Website:
http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/ewpp/

State website:
https://www.nrcs.usda.gov/programs-initiatives/ewp-emergency-watershed-protection/texas/emergency-watershed-protection-texas

Timeframe:
Post-disaster

Contact:
Michael Robison, Texas Emergency Watershed Protection Program

Phone:
(254) 742-9901

Email:
michael.robison@usda.gov

Community Facilities Direct Loan & Grant Program

This program provides affordable funding to develop essential community facilities, including recreation and community centers, in rural areas. An essential community facility is defined as a facility that provides an essential service to the local community for the orderly development of the community in a primarily rural area, and does not include private, commercial, or business undertakings. Eligible areas include rural cities, villages, townships, or towns with no more than 20,000 residents. Funding types include low-interest loans, grants, or a combination of the two. Grants are awarded on a need-basis, based on community size and median household income.

Website:
http://www.rd.usda.gov/programs-services/community-facilities-direct-loan-grant-program/tx

Timeframe:
Ongoing

Contact:
Lillian Salerno, State Director

Phone:
(254) 742-9700

Email:
lillian.salerno@usda.gov

DEPARTMENT OF COMMERCE

Planning Program & Local Technical Assistance Program

Through its Planning and Local Technical Assistance programs, EDA assists eligible recipients in developing economic development plans and studies designed to build capacity and guide the economic prosperity and resiliency of an area or region. The Planning program helps support organizations, including District Organizations, Indian Tribes, and other eligible recipients, with Short Term and State Planning investments designed to guide the eventual creation and retention of high-quality jobs, particularly for the unemployed and underemployed in the Nation's most economically distressed regions. As part of this program, EDA supports Partnership Planning investments to facilitate the development, implementation, revision, or replacement of Comprehensive Economic Development Strategies (CEDS), which articulate and prioritize the strategic economic goals of recipients' respective regions.

Website:

https://www.eda.gov/funding/funding-opportunities

Timeframe:

Ongoing

Contact:

Jorge Ayala, Regional Director

Phone:

(512) 381-8144

Email:

jayala@eda.gov

Public Works and Economic Adjustment Assistance Program

EDA solicits applications from applicants in rural and urban areas to provide investments that support construction, non-construction, technical assistance, and revolving loan fund projects under EDA's Public Works and EAA programs. Grants and cooperative agreements made under these programs are designed to leverage existing regional assets and support public infrastructure projects that implement economic development strategies. Projects should support more than one private business entity. Examples include public road, sewer, or water infrastructure to support new or existing businesses.

Website:

https://www.eda.gov/funding/programs/economic-adjustment-assistance

Timeframe:

Ongoing

Contact:

Jorge Ayala, Regional Director

Phone:

(512) 381-8144

Email:

jayala@eda.gov

DEPARTMENT OF THE INTERIOR

Multi-state Conservation Grant Program

The MSCGP provides funding for wildlife and sport fish restoration projects identified as priority projects by the Association of Fish and Wildlife Agencies (AFWA). These high priority projects address problems affecting states on a regional or national basis. Project types that are generally selected for funding are: biological research/training, species population status, outreach, data collection regarding hunter/angler participation, hunter/aquatic education, economic value of fishing/hunting, and regional or multistate habitat needs assessments.
The AFWA and the Division of Wildlife Sport Fish Restoration Program (WSFR) work together to manage the MSCGP. The AFWA administers the grant application process, providing oversight, coordination, and guidance for the MSCGP while the WSFR awards and manages the grants.

Website:
https://www.fishwildlife.org/afwa-informs/multi-state-conservation-grants-program

Timeframe:
Proposals due annually on June 15

Contact:
Silvana Yaroschuk, MultiState Conservation Grant Program Manager

Phone:
Unknown

Email:
syaroschuk@fishwildlife.org

Challenge Cost Share Program

The Challenge Cost Share Program supports local projects that promote conservation and recreation, environmental stewardship, education, and engaging youth in the outdoors. Local project partners work with National Park Service (NPS) staff to achieve mutually beneficial outcomes. Applications are submitted by NPS staff in collaboration with project partners. This partnership challenge rewards those proposals that highlight long lasting benefits while developing new partnerships.
The program requires equal matching share. Cash, goods, or services from non-federal sources can be considered as a cost share.
The maximum Challenge Cost Share project support is $25,000. If selected our national partner, Outdoor Foundation, forms an agreement and provides project funds directly to the local partner. Applications are submitted by NPS staff in collaboration with project partners.

Website:
https://www.nps.gov/orgs/1837/index.htm#:~:text=The%20Conservation%20and%20Outdoor%20Recreation,Addressing%20the%20Climate%20Crisis

Timeframe:
Last due in January 2023

Contact:
Stephan Nofield

Phone:
(202) 208-6843

Email:
stephan_nofield@nsp.gov

Outdoor Recreation Legacy Partnership Program

The Outdoor Recreation Legacy Partnership Program (ORLP), a nationally competitive grant program funded through the Land and Water Conservation Fund (LWCF), offers grants specifically to help create and improve state and local parks and other outdoor recreation areas particularly in under-served communities. Applicants apply to the Texas Parks & Wildlife Department, who submit the grant to LWCF annually.

Website:
https://lwcfcoalition.org/orlp

Timeframe:
Annually, deadlines vary

Regional Contacts Website:
https://www.nps.gov/orgs/rtca/contactus.htm

Phone:
(402) 661-1588

Email:
cabbott@outdoorsamerica.org

Rivers, Trails, and Conservation Assistance

The RTCA program offers local groups staff assistance and consultations (no monetary award) for locally-led conservation projects. Projects may include developing trails and greenways or protecting rivers and open space. Regional RTCA offices provide application information and assistance.

Website:
https://www.nps.gov/orgs/rtca/apply.htm

Timeframe:
Current call due in March 2024

Regional Contacts Website:
https://www.nps.gov/orgs/rtca/contactus.htm

Phone:
(402) 661-1588

Email:
cabbott@outdoorsamerica.org

DEPARTEMENT OF TRANSPORTATION

Environmental Protection Agency (EPA)

Every year, EPA awards over $4 billion in funding for grants and other assistance agreements. From small non-profit organizations to large state governments, EPA works to help many visionary organizations achieve their environmental goals. The Infrastructure Investment and Jobs Act (IIJA) has infused EPA programs with additional funds through 2026. With countless success stories over the years, EPA grants remain a chief tool in the advancement of human health and the environment.

Website:
https://www.epa.gov/grants/specific-epa-grant-programs

Environmental Education Grants Program

The EPA Environmental grant program supports environmental education projects that enhance the public's awareness, knowledge, and skills to make informed and responsible decisions that affect environmental quality. The program provides financial support for projects that design, demonstrate, or disseminate environmental education practices, methods, or techniques. Each year, EPA's Office of Environmental Education releases a solicitation notice in the Federal Register that provides instructions for obtaining a grant. Educational agencies at the state, local and tribal level, state environmental agencies, college and universities, not-for-profit organizations, and noncommercial educational broadcasting entities are eligible to apply. Individuals are not eligible to apply. Although government agencies cannot apply directly, they are encouraged to work with other entities on developing and implementing environmental education programs.

Website:
https://www.epa.gov/education/environmental-education-ee-grants

Timeframe:
Current call due in November 2023

Contact:
Alexandra Olson, U.S. EPA Region 6

Phone:
(214) 665-2200

Email:
olson.alexandra@epa.gov

STATE FUNDING SOURCES

TEXAS PARKS AND WILDLIFE

Boating Acess Grant

The Boating Access Grant Program provides 75% matching fund grant assistance to construct new, or renovate existing, public boat ramps that provide public access to public waters for recreational boating. The State Boating Access Program receives funding from the Federal Aid in Sport Fish Restoration Act. Funds for the federal program are derived from the federal gasoline tax generated by sales of gasoline for recreational motorboats and a federal excise tax on the sales of fishing tackle and trolling motors. Fifteen percent of the state's annual apportionment from this federal program must be used to provide public recreational boating access.

Website:
http://tpwd.texas.gov/business/grants/recreation-grants/boating-access

Timeframe:
Annually, deadlines vary

Contact:
Matthew Fougerat, Program Manager

Phone:
(512) 389-8712

Email:
matthew.fougerat@tpwd.texas.gov

BOAT SEWAGE PUMPOUT GRANTS

Federal funds through the Clean Vessel Act of 1992 allow private marinas and local governments to receive grants to install boat sewage pumpout stations in Texas. Pumpout Grants can constitute up to 75% of all approved project costs. These grants provide funds for the construction and/or renovation, operation, and maintenance of pumpout and portable toilet dump stations.

Website:
http://tpwd.texas.gov/business/grants/recreation-grants/boat-sewage-pumpout

Timeframe:
Annually – December 31

Contact:
Matthew Fougerat, Program Manager

Phone:
(512) 389-8712

Email:
matthew.fougerat@tpwd.texas.gov

COMMUNITY OUTDOOR OUTREACH PROGRAM (CO-OP) GRANT

The Community Outdoor Outreach Program (CO-OP) grant provides funding to local governments and non-profit organizations for programming that introduces underserved populations to environmental and conservation programs as well as TPWD mission-oriented outdoor activities.
Grants are available to tax-exempt organizations and local governments introducing non-traditional constituents to TPWD related outdoor recreation, conservation, and environmental education programs. Eligible organizations can apply to use these funds for programming expenses such as equipment, leasing transportation, staff, liability insurance, food, program materials, etc.

Website:
http://tpwd.texas.gov/business/grants/recreation-grants/community-outdoor-outreach-program-co-op-grants

Timeframe:
Annually – November 1

Contact:
Carly Blankenship, CO-OP Program Manager

Phone:
(512) 389-8209
Email:

carly.blankenship@tpwd.texas.gov

HABITAT AND ANGLER ACCESS PROGRAM

The Habitat and Angler Access Program awards competitive grants to restore and enhance freshwater fish habitats and to improve or expand bank and shoreline-based angler access on public creeks, rivers, ponds, and lakes throughout the state. Projects can include fishing kayak launches and more. The Program enables cooperation between Texas Parks and Wildlife Department Inland Fisheries Division biologists and local partners to make fishing better for all Texans.

Website:
https://tpwd.texas.gov/landwater/water/habitats/habitat-angler-access-program/#:~:text=The%20Habitat%20and%20Angler%20Access,and%20lakes%20throughout%20the%20state

Timeframe:
Annually, deadlines vary

Contact:
Michael Homer Jr., Project Coordinator

Phone:
(325) 692-0921

Email:
fishgrants@twpd.texas.gov

LANDOWNER INCENTIVE PROGRAM

The Texas Landowner Incentive Program (LIP) is a competitive, incentive-based grant program supported by federal funds allocated to the state of Texas by the US Fish & Wildlife Service (USFWS), for conservation of rare species on private lands. Texas LIP is a cost share program providing technical assistance and funding to landowners at a maximum of 75% cost share. The LIP Partners Watershed Funding Series is designed to meet the needs of private, non-federal landowners wishing to enact good conservation practices on their lands. This allocation of LIP funding is made possible through a cooperative agreement with the USFWS Partners for Fish and Wildlife Program. All projects approved for funding are thereby subject to the terms and conditions of that Program.

Website:
https://tpwd.texas.gov/landwater/land/private/lip/#:~:text=The%20Texas%20Landowner%20Incentive%20Program,healthy%20terrestrial%20and%20aquatic%20ecosystems.

Timeframe:
Current call due February 5, 2024

Contact:
Arlene Kalmbach, Landowner Incentive Program Coordinator

Phone:
(512) 924-6987

Email:
arlene.kalmbach@tpwd.texas.gov

LOCAL PARKS GRANT

The Local Parks Grant Program consists of five individual programs that assist local units of government with the acquisition and/or development of public recreation areas and facilities throughout the State of Texas. The Program provides 50% matching grants on a reimbursement basis to eligible applicants. All grant-assisted sites must be dedicated as parkland in perpetuity, properly maintained and open to the public. Programs include:

- Urban Outdoor Recreation provides funding for populations over 500,000, up to $1.5 million.
- Non-Urban Outdoor Recreation provide funding for populations under 500,000, up to $750,000 in grant funding.
- Small Communities provide funding for populations under 20,000, up to $150,000.

- Urban Indoor Recreation provide funding for indoor recreation facilities for populations over 500,000, up to $1.5 million.*
- Non-Urban Indoor Recreation provides funding for indoor recreation facilities for populations under 500,000, up to $1 million.*

*The Indoor Recreation programs have not been funded for several years.

Eligible applicants include political subdivisions of the State of Texas legally responsible for providing public recreation services to their citizens. This includes cities, counties, river authorities, municipal utility districts, and other special districts.

Website:
http://tpwd.texas.gov/business/grants/recreation-grants/about-local-parks-grants

Timeframe:
Annually – August 1

Contact:
Dan Reece, Program Manager

Phone:
(512) 389-4656

Email:
dan.reece@tpwd.texas.gov

RECREATIONAL TRAILS GRANT

TPWD administers the National Recreational Trails Fund in Texas under the approval of the Federal Highway Administration (FHWA). This federally funded program receives its funding from a portion of federal gas taxes paid on fuel used in non-highway recreational vehicles. The grants can be up to 80% of project cost with a maximum of $300,000 for non-motorized trail grants and up to $600,000 for motorized trail grants. Funds can be used for the construction of new recreational trails, to improve existing trails, to develop trailheads or trailside facilities, and to acquire trail corridors.

Website:
http://tpwd.texas.gov/business/grants/recreation-grants/recreational-trails-grants

Timeframe:
Annually – February 1

Contact:
Trey Cooksey, Program Manager

Phone:
(512) 389-8743

Email:
trey.cooksey@tpwd.texas.gov

TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT)

TRANSPORTATION ALTERNATIVES SET-ASIDE PROGRAM

TxDOT administers Transportation Alternatives (TA) funds for locally sponsored bicycle and pedestrian infrastructure projects in communities less than 200,000. In large, urbanized areas with populations over 200,000, TA funds are distributed directly to Metropolitan Planning Organizations (MPO) to administer according to their needs. MPOs and TxDOT are responsible for selecting projects independent of one another. The TA program provides funding for construction of a variety of alternative transportation projects, including ADA/pedestrian infrastructure, on- and off-street bikeways, shared use paths, infrastructure for non-driver access to public transportation, and access for non-motorized roadway users, including safe routes to schools.

Website:
https://www.transportation.gov/grants/SS4A

Timeframe:
The FY24 Notice of Funding Opportunity is expected to open in Spring 2024

Contact:
Michelle Meaux, Austin District TA Coordinator at TxDOT

Phone:
(512) 832-7049

Email:
michelle.meaux@txdot.gov

TEXAS DEPARTMENT OF AGRICULTURE, RURAL COMMUNITY DEVELOPMENT BLOCK GRANT (CDBG) FUNDS

Community Development Block Grant (CDBG) Funds are available through the Texas Department of Agriculture for "nonentitlement" Texas communities. Nonentitlement communities are general purpose units of local government including cities and counties that are not participating or designated as eligible to participate in the entitlement portion of the federal Community Development Block Grant Program. Nonentitlement cities that are not participating in urban county programs through existing participation agreements are eligible applicants (unless the city's population is counted towards the urban county CDBG allocation).
Nonentitlement cities are located predominately in rural areas and are cities with populations less than 50,000 thousand persons; cities that are not designated as a central city of a metropolitan statistical area; and cites that are not participating in urban county programs. Nonentitlement counties are also predominately rural in nature and are counties that generally have fewer than 200,000 persons in the nonentitlement cities and unincorporated areas located in the county.
In general, Rural CDBG awards must support projects that benefit primarily low- to moderate-income residents.

- **Community Development Fund (2023-2024):** Deadline: Last due May 3, 2023, Max Award: $500,000. The Community Development Fund is the largest fund category in the TxCDBG Program. This fund is available through a competition in each of the 24 state planning regions. Although most funds are used for Public Facilities (water/wastewater infrastructure, street and drainage improvements and housing activities), there are numerous other activities for which these funds may be used.
- **Downtown Revitalization/Mainstreet Programs:** Last Application Deadline: Last due May 3, 2023, Max Award: $500,000. Provides grant funds for public infrastructure to eliminate deteriorated conditions and foster economic development in historic main street areas and rural downtown areas.
- **Planning and Capacity Building Fund**: Application Deadline: Last due May 3, 2023, Max Award: $75,000. An annual competitive grant program for local public facility and housing planning activities. Localities apply for financial assistance to prepare a "comprehensive plan" or any of its components.
- **Colonia Funds**: Funds available to eligible county applicants for projects in severely distressed unincorporated areas. The term "colonia" generally means an identifiable unincorporated community that is within 150 miles of the border between the United States and Mexico.
- **Colonia Planning Fund:** Application Deadline: By Invitation Max Award: $150,000. Assistance for the completion of planning activities to prepare colonia areas for water, sewer, and housing improvements.
- **Colonia Construction Fund:** Last Application Deadline: Last due May 3, 2023, Max Award: $1,000,000. Assistance to fund water and wastewater improvements, housing rehabilitation, and other improvements in colonia areas.

- **Colonia Economically Distressed Areas Program:** Application Deadline: As Needed Max Award: $1,000,000. Assistance to colonia areas to connect to a water and sewer system project funded by other state and federal funds.
- S**tate Urgent Need (SUN) Fund**: Application Deadline: As Needed Max Award: $500,000 ($1,000,000 for certain multi-jurisdiction awards). Assistance to communities impacted by state-declared disaster events that are not eligible for federal disaster assistance. Infrastructure repair, replacement, and improvement are eligible projects, with priority for drinking water systems and debris removal.

Website:
https://www.texasagriculture.gov/GrantsServices/RuralEconomicDevelopment/RuralCommunityDevelopmentBlockGrant(CDBG)/CDBGResources/Applications/CommunityDevelopmentFundApplicationGuide.aspx

Timeframe:
Last due in May 2023

Contact:
Suzanne Barnard, Director of CDBG Programs

Phone:
(512) 463-6612

Email:
Suzanne.barnard@TexasAgriculture.gov

TEXAS WATER DEVELOPMENT BOARD

The Texas Water Development Board (TWDB) offers a variety of cost-effective loan and grant programs that provide for the planning, acquisition, design, and construction of water related infrastructure and other water quality improvements.
Though mostly through loans, some loan-forgiveness and grants are available. Programs include:

- **Clean Water State Revolving Fund:** The Clean Water State Revolving Fund, authorized by the Clean Water Act, provides low-cost financial assistance for planning, acquisition, design, and construction of wastewater, reuse, and stormwater infrastructure.
- **Drinking Water State Revolving Fund:** The Drinking Water State Revolving Fund, authorized by the Safe Drinking Water Act, provides low-cost financial assistance for planning, acquisition, design, and construction of water infrastructure.
- **FEMA's Flood Mitigation Assistance:** The Flood Mitigation Assistance (FMA) grant program under the Federal Emergency Management Agency (FEMA), provides federal funding to help states and communities pay for cost effective ways to reduce or eliminate the long-term risk of flood damage to structures that are insured under the National Flood Insurance Program (NFIP). The Texas Water Development Board administers the FMA grant program for the State of Texas on behalf of FEMA.
- **Flood Infrastructure Fund**: Passed by the Legislature and approved by Texas voters through a constitutional amendment, the Flood Infrastructure Fund (FIF) program provides financial assistance in the form of loans and grants for flood control, flood mitigation, and drainage projects. The FIF has not been approved for a second round, but is expected to be approved in Spring of 2023. Projects must be listed on the State Flood Plan to be eligible.

Website:
https://www.twdb.texas.gov/financial/index.asp

Timeframe:
Deadlines vary by program

Contact:
Texas Water Development Board

Phone:
(512) 463-0991

Email:
Financial_Assistance@twdb.texas.gov

PRIVATE FUNDING SOURCES & FOUNDATIONS

Private funding and foundations may be a possible source for project funding. These sources are varied and plentiful, though it may require relationship-building and persistence. Possibilities include: local civic foundations, the Junior League, Jaycees, Kiwanis, Lions and local business and industry foundations.

Below are just a few of the thousands of private and foundation funding sources available. The Foundation Directory Online is a helpful resource to find more tailored funding ideas: https://fconline.foundationcenter.org/.

BNSF RAILWAY FOUNDATION

The BNSF Railway Foundation is dedicated to supporting the communities they serve and in which their employees live, work, and volunteer. Generally, the foundation will consider grant requests that clearly fall within one or more of the following categories (list not inclusive):

- Civic services including organizations which are concerned with the environment, as well as local community issues such as crime prevention, parks and recreation, diversity, and community development.
- Cultural organizations that include performing, visual, and fine arts, museums and other related activities that offer opportunities for underserved children to experience cultural learning events or preserve their cultural heritage.

Website:
http://www.bnsffoundation.org/

Timeframe:
Ongoing

Contact:
Manager, BNSF Railway Foundation

Email:
BNSFFoundation@bnsf.com

HOME DEPOT FOUNDATION, COMMUNITY IMPACT GRANT

Grants up to $5,000 are available to IRS-registered 501c designated organizations and tax-exempt public service agencies in the U.S. that are using the power of volunteers to improve the physical health of their community. Grants are given in the form of The Home Depot gift cards for the purchase of tools, materials, or services. The primary goal is to provide grants and volunteer opportunities to support the renovation, refurbishment, retrofitting, accessibility modifications, and/or weatherization of existing homes, centers, schools, and other similar facilities.

Website:
https://corporate.homedepot.com/grants/community-impact-grants

Timeframe:
Ongoing, last due July 2023

Contact:
THDF Board of Directors

Phone:
Unknown

Email:
THDF_VHG@homedepot.com

KEEP AMERICA BEAUTIFUL'S COMMUNITY GRANTS

The Community Grant Program is designed to support the Keep America Beautiful Affiliate network, other nonprofit organizations, and community groups to implement programs or projects designed to build clean, green, and beautiful places for all to thrive and enjoy. Keep America Beautiful is committed to fostering community diversity, unity, and environmental sustainability. Funding is available independently or collectively to:

- Promote public space recycling collection
- Build strong neighborhoods within and along Martin Luther King Jr. boulevards
- Beautification through tree planting,
- Prevent littering by addressing cigarette litter and collecting litter from the nation's waterways.

Website:
https://kab.org/beautification/community-grants/

Timeframe:
Ongoing

Contact:
Gabi Polo, Western Region KAB Representative

Phone:
(203) 659-3000

Email:
gpolo@kab.org

PEOPLE FOR BIKES COMMUNITY GRANT PROGRAM

The PeopleForBikes Community Grant Program supports bicycle infrastructure projects and targeted advocacy initiatives that make it easier and safer for people of all ages and abilities to ride bikes. PeopleForBikes accepts grant applications from non-profit organizations with a focus on bicycling, active transportation, or community development, from city or county agencies or departments, and from state or federal agencies working locally.

Website:
http://www.peopleforbikes.org/apply-now/

Timeframe:
1-2 Grant cycles per year; Deadlines vary

Contact:
Information

Phone:
(303) 449-4893

Email:
info@peopleforbikes.org

ROBERT WOOD JOHNSON FOUNDATION

The Robert Wood Johnson Foundation (RWJF) funds program and policy initiatives in four areas which are each critical to health equity—enabling everyone in our nation to live a healthier life:

- **Health Systems:** Catalyzing fundamental changes in health and health care systems to achieve measurably better outcomes for all.
- **Healthy Kids, Healthy Weight:** Enabling all children to attain their optimal physical, social, and emotional well-being, including growing up at a healthy weight.
- **Healthy Communities:** Creating the conditions that allow communities and their residents to reach their greatest health potential.
- **Health Leadership:** Engaging a diverse array of leaders in all sectors with the vision, experience, and drive to help build a Culture of Health.

In many cases, a competitive call for proposals is issued that defines the challenges to address, activities RWJF will support to achieve desired outcomes, and eligibility criteria. In addition,

funding is also provided through open calls for ideas and different types of challenges and prize competitions.

Website:
https://www.rwjf.org/en/grants/active-funding-opportunities.html?o=1&us=1

Timeframe:
Ongoing

Contact:
Lydia A. Ryba, Interim Director, Grants Management

Phone:
(877) 843-7953

Email:
lryba@rwjf.org

ROTARY, DISTRICT GRANTS

District grants fund small-scale, short-term activities that address needs of a community of a qualified Rotary district. Each district chooses which activities it will fund with these grants. You can use district grants to fund a variety of district and club projects and activities, including:

- Humanitarian projects, including service travel and disaster recovery efforts.
- Scholarships for any level, length of time, location, or area of study.
- Youth programs, including Rotary Youth Exchange, Rotary Youth Leadership Awards (RYLA), Rotaract, and Interact.
- Vocational training teams, which are groups of professionals who travel abroad either to teach local professionals about their field or to learn more about it themselves.

Website:
https://www.rotary.org/myrotary/en/take-action/apply-grants/district-grants

Timeframe:
Deadlines vary by program

Contact:
District Grants World Headquarters

Phone:
(866) 976-8279 (toll free)

Email:
To send a message, go to https://my.rotary.org/en/contact

WALMART STATE GIVING PROGRAM

The State Giving Program invests in all 50 states, Washington, D.C., and Puerto Rico. The Walmart Foundation has a State Advisory Council in each state, made up of Walmart associates representing local communities. Each Council helps identify local needs within its state, reviews all eligible grant applications and makes funding recommendations to the Walmart Foundation. Councils base recommendations on alignment with Foundation focus areas, state or community needs and program eligibility criteria.

Website:
https://walmart.org/how-we-give/grant-eligibility

Timeframe:
All states have two application cycles annually.

Contact:
https://walmart.org/contact-us

WALMART NATIONAL GIVING PROGRAM

The National Giving Program supports organizations working across one or more states to address social issues strongly aligned with our focus areas. This program often provide funds to organizations that have local affiliates around the country, and the majority of grants from this program include re-grants to implement programs in local communities.

Website:
https://www.alliedgrantwriters.com/the-walmart-foundations-national-giving-program/

Timeframe:
Ongoing

Contact:
Allied Grant Writers

Phone:
(800) 825-2314

Email:
Unknown

WELLS FARGO, COMMUNITY GIVING

Wells Fargo and the Wells Fargo Foundation provide monetary support, expertise, and volunteers to national and local nonprofit organizations and causes that align with our business priorities, values, business expertise, and geographies. Wells Fargo works with a wide range of nonprofits and community organizations to stabilize and strengthen low-to-moderate income neighborhoods, as well as address global social, economic, and environmental challenges. Wells Fargo focuses giving in the following areas:

- **Community Development:** Programs that help provide affordable housing for low- and moderate-income individuals; promote economic development by financing small businesses or small farms; provide job training for low- and moderate-income individuals; provide financial education and promote economic empowerment; help to revitalize low- and moderate-income communities.
- **Education:** Programs that promote academic achievement for low- and moderate-income students with a priority emphasis on K-12; provide training for teachers and administrators working with low- and moderate-income students; encourage school partnerships with parents and guardians, the local community, and the business community.
- **Human Services:** Social and human service organizations whose work chiefly benefits low- and moderate-income individuals.
- **Arts and Culture:** Projects and requests that work to enhance community diversity through access to cultural experiences for low- and moderate-income individuals, availability of a broad array of artistic opportunities and venues that reflect the community's diversity, and educational programs.
- **Civic Engagement:** Projects that enhance a community's quality of life through projects involving public policy, community beautification, civic leadership, citizen education, and cultural diversity.
- **Environment:** Including natural resources conservation, environmental education, and support the transition to a sustainable environment.

Website:
https://www.wellsfargo.com/about/corporate-responsibility/community-giving/

Timeframe:
Ongoing

Contact:
Wells Fargo Foundation

Email:
wffound@wellsfargo.com

ADDITIONAL TEXAS-BASED FOUNDATIONS

The following are foundations that may be potential sources for parks, playgrounds, trails, and recreation:

- Meadows Foundation, Inc.: https://www.mfi.org/
- The Moody Foundation: https://moodyf.org/application-process/

FRIENDS OF RESERVOIRS

Friends of Reservoirs (FOR) is a tax-deductible non-profit foundation established in 2010 as part of the National Fish Habitat Partnership and Reservoir Fisheries Habitat Partnership. Their goal is to promote the protection, restoration, and enhancement of habitat for fish and other aquatic species in reservoir systems. Friends of Reservoirs has grants that focus on supporting projects that:

- Protect, restore, or enhance fish habitat in reservoirs, including watersheds and tailwaters
- Foster partnerships and focus on long-term habitats

Through their Large Project Grants, Johnny Morris Fish Habitat Conservation Grant & U.S. Open Large Grant, Small Project Grant, and Mossback Habitat Product Grant.

LOCAL FOUNDATIONS & FRIENDS GROUPS

Parks foundations and friends groups can both play an important role in supporting public spaces, though they differ in structure and focus. Foundations are typically formal nonprofit organizations established to raise funds, support capital improvements, and create long-term partnerships for parks, trails, or lakes. Friends groups, on the other hand, are often grassroots, volunteer-driven efforts focused on stewardship, community involvement, and organizing activities like clean-ups or educational events. Together, these groups help enhance and sustain valued community resources by combining financial support with hands-on public engagement. Similar models have been successful across Texas, helping to bridge funding gaps, foster stewardship, and promote public engagement.

WHY ESTABLISH A FOUNDATION OR FRIENDS GROUP?

While Tyler Water Utilities provides essential management and core services for Lake Tyler and Lake Tyler East, additional resources are often needed to meet growing community expectations for maintenance, improvements, and recreational amenities. Establishing a Parks Foundation or Friends Group creates a structured way to generate supplemental support for these valued public assets.

BENEFITS OF A FOUNDATION OR FRIENDS GROUPS

- Targeted Fundraising: Secure private donations, sponsorships, and grants dedicated to enhancing Lake Tyler and Lake Tyler East

- Community Ownership: Provide residents, businesses, and stakeholders with a direct role in preserving and improving the lakes.
- Flexible Project Support: Fund initiatives and enhancements beyond the scope of existing municipal budgets
- Volunteer Engagement: Mobilize community members for events, shoreline clean-ups, habitat restoration, and educational activities

Lake Tyler and Lake Tyler East are more than just a water source--it is a recreational destination, environmental resource, and should be a point of community pride. As demand on the lakes continues to grow, so does the need for proactive maintenance, conservation efforts, and public education. A dedicated nonprofit or volunteer-driven group can play a critical role in sustaining the lakes' long-term health, beauty, and recreational value.

PROGRAM STRUCTURE

Foundations

A lake-focused foundation would serve as a dedicated, locally driven nonprofit organization focused on enhancing, protecting, and supporting the lakes and surrounding lake assets. This foundation provides a formal structure to raise funds, engage the community, and support projects that improve public spaces, promote environmental stewardship, and elevate recreational opportunities. Typically, a city can convene interested stakeholders to begin structuring the Foundation, including defining its mission, bylaws, board membership, and initial priority projects.

Friend Groups

Establishing a locally organized "Friends of Lake" or "Adopt-a-Lake" program provides a structured, community-based approach to support the ongoing care, protection, and enhancement of Lake Tyler and Lake Tyler East. A Friends Group can be structured as a nonprofit, advisory committee, or partnership with the City of Tyler Water Utilities. Local leadership keeps decision-making grounded in community priorities, while public-private collaboration enhances the lake's long-term sustainability. Participants benefit from building connections, protecting natural resources, and enhancing the quality of life for residents and visitors alike.

FOUNDATION SPOTLIGHT

Lake Houston Sports and Recreation Foundation

The Lake Houston Sports and Recreation Foundation is a 501(c)(3) nonprofit established by community members dedicated to preserving and enhancing the Lake Houston area. The Foundation works to raise public awareness of Lake Houston's value and supports projects that improve recreation, water quality, and habitat health.

Throughout the year, The Foundation hosts events that fund fish stocking efforts in partnership with Texas Parks and Wildlife, support native plant restoration through its aquatic plant nursery, and promote other lake improvement projects. These initiatives are advanced through outreach, including social media, traditional media, and community partnerships.

MODEL TAKEAWAY

Community-led nonprofit advancing lake health, habitat restoration, and recreation through events, partnerships, and public awareness efforts.

Lake Conroe Association

Created in 1977 the Lake Conroe Association (LCA) is a resident-led 501(c)3 nonprofit corporation. The LCA works to improve Lake Conroe for residents and businesses surrounding Lake Conroe including advocating for safe water levels, water conservation, resolving vegetation problems, and improving the overall quality of life around the lake. The LCA partners with agencies to manage aquatic vegetation, educate property owners, and raises funds to support lake health, water quality, and recreational access. The LCA serves as a key stakeholder and works closely with governmental partners such as the San Jacinto River Authority and Texas Parks and Wildlife Department to represent community interests on lake-related issues. The LCA hosts an annual General Meeting and Town Hall to update the community on key projects, lake conditions, recreational initiatives, and organizational activities.

Since its founding, the LCA has raised over $1 million in private donations, investing primarily in the stocking of White Amur (grass carp) for vegetation control and aquatic herbicide programs. Additional efforts include the removal of 450 stumps from the lake's main body and funding equipment for the Montgomery County Constable Search & Dive Team.

MODEL TAKEAWAY

Resident-led advocacy group focused on lake-specific issues, partnering with government entities.

Lake Houston Sports & Recreation Foundation

Lake Conroe Association