
PORT OF LIBERTY

VISION PLAN



LIBERTY COUNTY, TEXAS - 2025

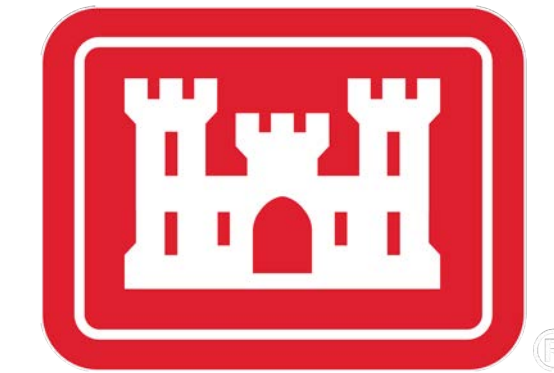


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ACKNOWLEDGMENTS

Planning Assistance to the States (PAS) Partners:

US Army Corps of Engineers (USACE)
 Trinity River Authority (TRA)



Stakeholders and Participants:

Port of Liberty Board of Commissioners
 Chambers-Liberty Counties Navigation District (CLCND)
 The Honorable John Hebert, Jr. - City of Liberty Mayor
 US Fish and Wildlife Service (USFWS)
 The Honorable Jay H. Knight - Liberty County Judge



LETTERS OF SUPPORT



February 25, 2025

RE: PORT OF LIBERTY

To Whom It May Concern,

The City of Liberty would like to offer a strong letter of support of the future plans to develop the Port of Liberty. The US Army Corps of Engineers (USACE) and the Trinity River Authority have worked in collaboration with the Port of Liberty Commissioners, the Chambers-Liberty Counties Navigation District, the City of Liberty, the US Fish and Wildlife Service and Liberty County to develop a long-range vision plan. The City of Liberty fully supports the vision plan that has been released.

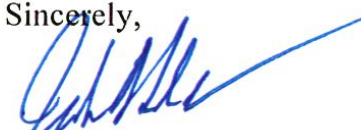
The Trinity River Authority of Texas is a conservation and reclamation district that provides water from reservoir facilities, water and wastewater treatment, along with recreation and reservoir facilities, within the nearly 18,000-square-mile Trinity River basin. The Authority also maintains a master plan for basin-wide development and serves as a conduit for tax-exempt financing for municipal projects and as a local sponsor for federal water projects.

The Port of Liberty is located in the city of Liberty, Texas approximately forty river miles from the Trinity Bay on the Gulf of Mexico. The Port previously serviced barges until 1992. The Port is strategically located between the Port of Houston and the Port of Beaumont.

Texas ports are responsible for over thirty percent of the Texas gross domestic product and are integral to Texas manufacturing and energy. However, Texas ports and manufacturing face an unprecedented competitive threat as ports in neighboring states are beating Texas in the race to improve their depth and infrastructure to meet the opportunities created by the new, deeper Panama Canal. Texas cannot afford to fall behind.

The Authority will act as the non-Federal primary sponsor for the feasibility study. The Authority will contribute necessary financial support, provide staff and consultant resources, and coordinate stakeholder and community understanding and engagement. The Authority expects potentially complex solutions will be identified through the feasibility study and is committed to thoroughly pursuing and implementing a long-term plan to re-open the Port of Liberty.

We sincerely hope that the vision of the group will be cultivated, and funding will be provided to explore the next steps of the project.

Sincerely,

John Hebert, Jr.
Mayor

1829 Sam Houston Street Liberty, Texas 77575 936-336-3684 Fax: 936-336-9846 www.cityofliberty.org



The City of Liberty
City Council
1829 Sam Houston
Liberty, TX 77575

Meeting: 2/25/2025 6:00 PM
Department: Administration
Category: Action Item

Resolution 2025-15

A RESOLUTION BY THE CITY COUNCIL OF THE CITY OF LIBERTY, TEXAS, A HOME RULE MUNICIPALITY EXISTING UNDER THE LAWS OF THE STATE OF TEXAS, AUTHORIZING THE MAYOR TO SIGN A LETTER OF SUPPORT FOR THE DEVELOPMENT OF THE PORT OF LIBERTY.

WHEREAS, the City of Liberty recognizes the significant economic and strategic benefits of developing the Port of Liberty and the importance of supporting efforts to enhance regional and state infrastructure; and

WHEREAS, the U.S. Army Corps of Engineers (USACE), the Trinity River Authority, the Port of Liberty Commissioners, the Chambers-Liberty Counties Navigation District, the City of Liberty, the U.S. Fish and Wildlife Service, and Liberty County have collaborated to develop a long-range vision plan for the Port of Liberty; and

WHEREAS, the Port of Liberty is strategically located approximately forty river miles from Trinity Bay on the Texas coast and previously serviced barges until 1992, offering a unique opportunity for economic revitalization and regional development; and

WHEREAS, Texas ports are responsible for over thirty percent of the state's gross domestic product and play an integral role in manufacturing and energy, making their improvement vital to maintaining economic competitiveness; and

WHEREAS, the Trinity River Authority will act as the non-federal primary sponsor for the feasibility study and will contribute necessary financial support, provide staff and consultant resources, and coordinate stakeholder and community engagement to explore long-term solutions for reopening the Port of Liberty; and

WHEREAS, the City of Liberty recognizes the importance of funding and support to advance the next steps in the feasibility study and implementation of the vision plan.


NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF LIBERTY, TEXAS:

SECTION 1. The City Council of the City of Liberty, Texas, hereby expresses its strong support for the development of the Port of Liberty and the collaborative efforts of the Trinity River Authority and other stakeholders.

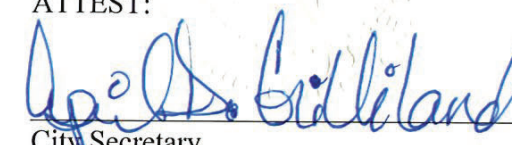
SECTION 2. The Mayor of the City of Liberty is hereby authorized to sign a letter of support in furtherance of the vision plan and feasibility study for the Port of Liberty.

SECTION 3. This Resolution shall take effect immediately upon passage.

PASSED AND APPROVED this 25th day of February 2025.



Mayor
City of Liberty, Texas

ATTEST:


City Secretary
City of Liberty, Texas

JAY KNIGHT
COUNTY JUDGE



1923 SAM HOUSTON
LIBERTY, TEXAS 77575

THE COUNTY OF LIBERTY
Est. 1836

March 12, 2025

RE: Port of Liberty – Liberty, Texas in Liberty County, Texas

To Whom It May Concern,

Please accept this letter as an acknowledgement of our great support for the plans to redevelop the Port of Liberty.

The Port of Liberty has been in existence for decades but fell into nonuse in the early 1990's when petroleum and agriculture related commerce declined in our area of Texas. We have recently seen a resurgence in the opportunities for economic development in Liberty County and the need to enhance and improve our ports in Houston and Beaumont. The Port of Liberty lies strategically between these two ports on the Trinity River, in Liberty, Texas, and just forty river miles from Trinity Bay on the Gulf of Mexico. As mentioned, it has been a proven port in the past and served barge traffic on the Trinity River for many years. We believe that the timing is right to explore the opportunities that our port has to offer.

The Trinity River Authority of Texas, along with the US Army Corps of Engineers, the Port of Liberty Commissioners, the Chambers-Liberty Counties Navigation District, the City of Liberty, the US Fish and Wildlife Service and the Liberty County Commissioners Court have worked together to develop a long-range vision plan. It is our understanding that the Trinity River Authority can and will act as the non-Federal primary sponsor for a feasibility study which will pursue and implement a long-term plan to re-open the Port of Liberty.

It is our sincere wish that the vision of the group may be explored, and funding will be provided to further along the next steps to bring this project to fruition.

Sincerely,

Jay H. Knight, Liberty County Judge



936/336-4665

jay.knight@co.liberty.tx.us

FAX: 936/336-4518

Trinity River Authority of Texas



General Office

March 10, 2025

Colonel Rhett A. Blackmon
District Commander, Galveston District
U.S. Army Corps of Engineers
2000 Fort Point Road
Galveston, TX 77550

Re: Support for the Port of Liberty Vision Plan

Dear Colonel Blackmon:

As a conservation and reclamation district with jurisdiction over the Trinity River, the Trinity River Authority of Texas (TRA) is very interested in addressing issues related to the inland and coastal waterway systems of the Trinity and specifically facilitating navigation, providing flood risk reduction and ecosystem restoration to the Port of Liberty.

TRA entered into a Planning Assistance to the States with the United States Army Corps of Engineers (USACE) in September 2023. The purpose of the project is to develop a Vision Plan that projects future growth and commerce for a potential Port in Liberty, TX taking into consideration the environmental, economic, and social aspects of the site and community. The Port of Liberty Vision Plan is a collaborative effort developed to illustrate the potential benefits and constraints of developing a barge port along the existing oxbow within the industrial area just south of the City of Liberty, Texas. The Vision Plan addresses future land use and strategic development over the next 5 to 20-year planning horizon.

TRA commends the work done by USACE on developing a Port of Liberty Vision Plan. The Vision Plan has the support of TRA's Board of Directors, local municipalities, elected officials, and businesses.

Sincerely,

J. KEVIN WARD
General Manager

JKW/cac

P.O. Box 60
Arlington, Texas 76004
Metro 817-467-4343
Tele Fax 817-417-036

**CHAMBERS-LIBERTY COUNTIES
NAVIGATION DISTRICT**

211 Miller Street
P.O. Box 518
Anahuac, Texas 77514



Phone: (409)267-3541
Fax: (409)267-4042
Website: www.clcnd.org

March 18, 2025

Colonel Rhett A. Blackmon
District Commander, Galveston District
U.S. Army Corps of Engineers
2000 Fort Point Road
Galveston, Texas 77550

Re: Port of Liberty Vision Plan

Dear Colonel Blackmon,

I am writing to express my support for the Port of Liberty Vision Plan. The Trinity River Authority of Texas (TRA) entered into a Planning Assistance to the States with the United States Army Corps of Engineers (USACE) as well as the Port of Liberty (POL), City of Liberty and Chambers-Liberty Counties Navigation District (CLCND) with the purpose of developing a Vision Plan that projects future growth and commerce for a potential Port in Liberty, Texas.

Chambers-Liberty Counties Navigation District and the City of Liberty have a Joint Operating Agreement governing the terms and conditions of their joint ownership, control and operation of the Port of Liberty. Chambers-Liberty Counties Navigation District expresses its strong support for the Port of Liberty development.

The Port of Liberty is located in the City of Liberty, Texas approximately forty-seven miles waterway from the Trinity Bay on the Gulf of Mexico. The Port of Liberty is strategically located between the Port of Houston and the Port of Beaumont.

As we look forward to the possibility of re-establishing the port facility, it will have a positive effect on the movement of goods, manufacturing, and agricultural industries in the lower Trinity basin.

I sincerely hope that the U.S. Army Corps of Engineers will give serious consideration to the Port of Liberty Vision Plan and funding will be provided to explore the next steps of the project.

Sincerely,

Claudia Sandoval
General Manager

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OVERVIEW

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INTRODUCTION AND PURPOSE

The purpose of the project is to develop a Vision Plan that projects future growth and commerce for a potential Port in Liberty, TX taking into consideration the environmental, economic, and social aspects of the site and community. The Port of Liberty Vision Plan is a collaborative effort developed to illustrate the potential benefits and constraints of developing a barge port along the existing oxbow within the industrial area just south of the City of Liberty, Texas. The Vision Plan addresses future land use and strategic development over the next 5 to 20-year planning horizon.

The Vision Plan focuses on capturing the potential for a multi-modal (water, rail, and road) port that supports shallow draft navigation barge traffic on the Trinity River up to the City of Liberty. The Vision Plan was developed in partnership with the US Army Corps of Engineers (USACE), the Trinity River Authority (TRA), and local stakeholders and the public. The Vision Plan is a companion document to a future feasibility study. This Plan is a living document

designed to be adaptable and periodically reviewed, incorporating new information and developments, refining market projections and opportunities, and evaluating and updating development and investment priorities.

The Port of Liberty Vision Plan effort is partially funded by the Planning Assistance to the States (PAS) program. This program provides planning level assistance from USACE to eligible non-federal partners in managing their water resources. This Vision Plan falls under the Comprehensive Plan guidelines for the PAS program, authorized by Section 22 of WRDA 1974. Projects in the PAS program are cost-shared with the study partner, meaning 50% is federally funded and 50% is non-federally funded, in this case by the Trinity River Authority. Funding is limited to U.S. territory, state, or tribe as per fiscal year, and no project can expend more than \$5M in federal funds for PAS planning efforts.



PROCESS

The Vision Plan was developed based on an interactive working relationship between the Port's senior management (Management Team), the Galveston District (SWG) and Regional Planning and Environmental Center (RPEC) Corps of Engineers (USACE) and necessitated rigorous involvement and input from key stakeholders, tenants, prospective customers, and the public.



Figure 1. Port of Liberty Public Meeting

The process in developing this Vision Plan is as follows:

- Review Available Documents and Data
- Strategic Assessment and Visioning Workshop
- Market Analysis
- Predict Alternative Cargo Demand Scenarios
- Facilities Evaluation & Capacity Assessment
- Rail, Highway, and Inland Waterway Access Evaluation
- Identify Development Alternatives
- Capital Program Development
- Plan Document Development

Previous planning documents:

- *Liberty County, Strategic Plan; 2016-2036*
- *Port of Liberty River Navigation Report; August 2017 – Freese and Nichols*
- *Trinity River & Tributaries Channel to Liberty Navigation Improvements Study; August 2017 – Report to Congress (WRRDA 7001)*
- *Liberty Local Protection Project; Sep 1990 - USACE*



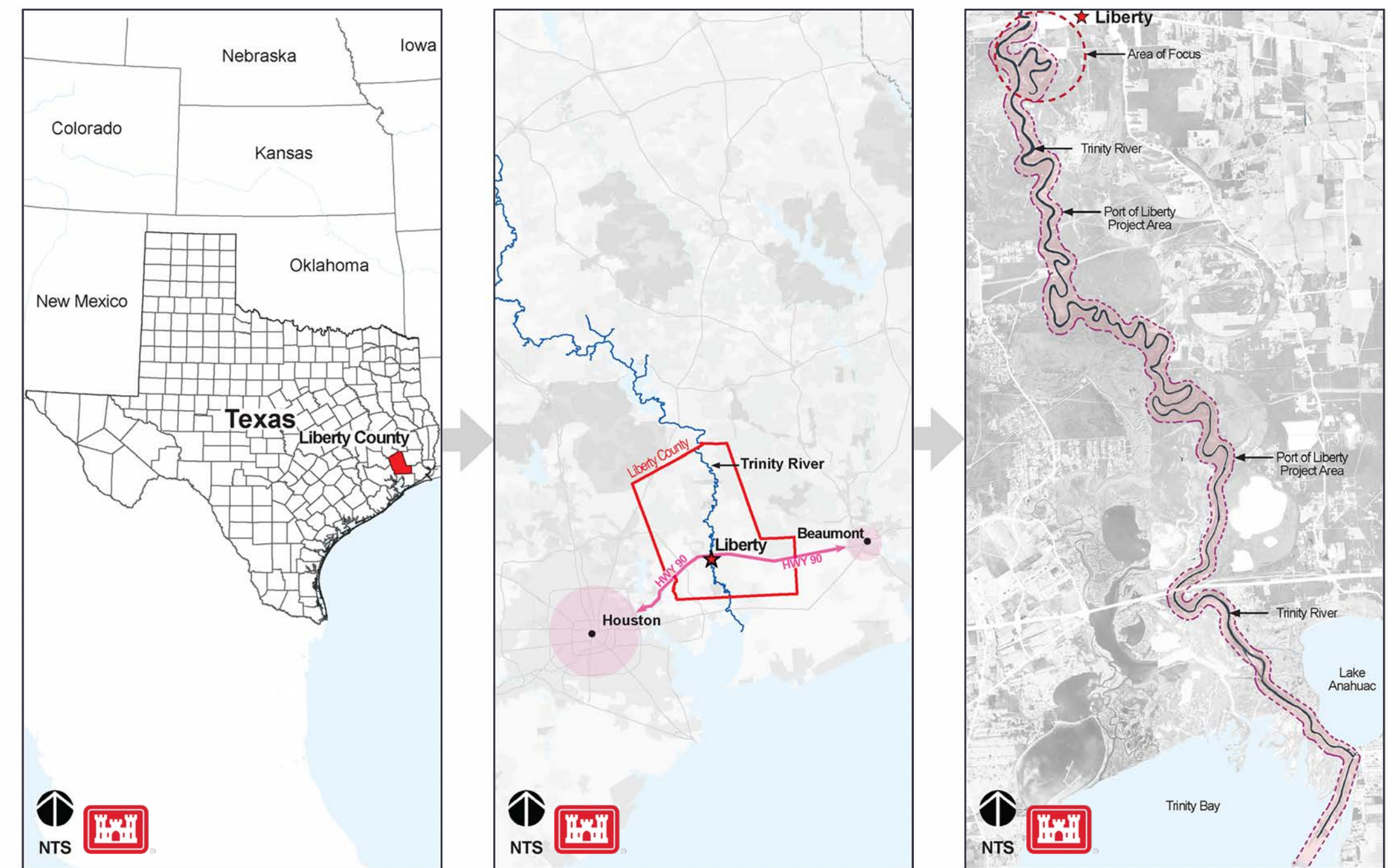
SETTING

Established in 1831, the city of Liberty is situated in southeastern Texas between Beaumont and Houston in Liberty County (Figure 2 and 3). The City has a population of approximately 8,600 people (2024 US Census) and consists of approximately 45.77 square miles.

The study area includes the area around the oxbow south of the city of Liberty and ties into the Trinity River, which flows into the mouth of the Trinity Bay. The resulting 41.4-mile-long channel along the Trinity River is referred to as the Channel to Liberty stretching from the mouth of the Trinity River north to the Port of Liberty and generally has a depth of 6 feet and a width of 100 feet. The Channel to Liberty is historically part of the Federally authorized three navigation channels of the Trinity River which includes the Channel to Smith Point, the Anahuac Channel and the Channel to Liberty (Figure 4).

USACE serves as the Federal agent responsible for channel planning and maintenance, with the Chambers-Liberty

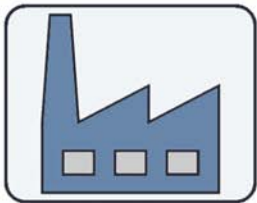
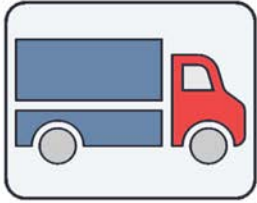
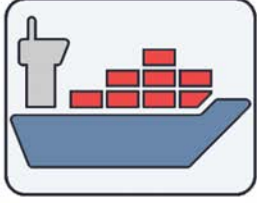

Counties Navigation District (CLCND) acting as USACE’s non-federal sponsor for maintenance of the three navigation channels. CLCND is equal partner with the City of Liberty in the ownership of the Port of Liberty.



Figures 2-4. Port of Liberty Contextual Maps



The area of influence extends from Liberty County to seven additional counties including San Jacinto, Polk, Tyler, Hardin, Jefferson, Chambers, and Harris. Although not listed as an active port by the state of Texas, the Port of Liberty resides in an active trade zone with 17 other seaports in the state of Texas. (Figure 5). Benefits of restoring a port at Liberty include the following:

- 
Benefit the agriculture, energy, and manufacturing of the eight-county region
- 
Reduce truck traffic on roads
- 
Address growing cargo needs
- 
Drive economic growth and future production

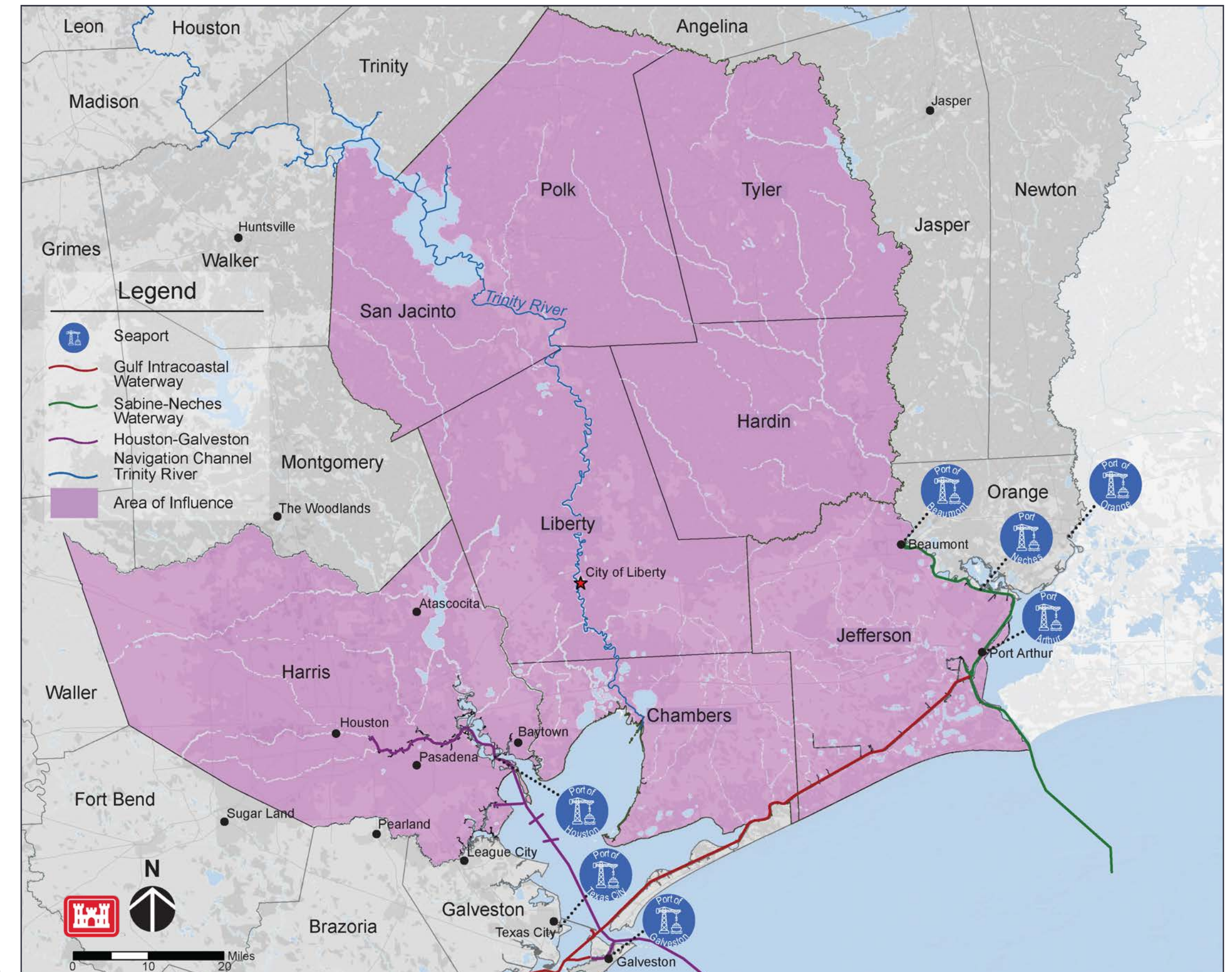


Figure 5. Setting Map Locating Deep-Water Ports

HISTORY

The founding of The City of Liberty dates to 1831 when a Mexican Land Commissioner, José Francisco Madero came to this Texas area to establish an office and validate land titles. Following the Texas Revolution, the residents changed the name of the town to Liberty in 1836. Congress authorized projects in 1878 that resulted in the dredging of the Channel to Liberty along the Trinity River to 5 feet deep and 100 feet wide . In 1922, Congress authorized a reexamination of the project improvements which increased the depth to 6 feet through snagging, dredging, and abandoning any existing dam or lock projects.

The Port of Liberty was fully operational from 1987-1992. It encountered multiple issues, such as a hurricane, drought, and an economic downturn, which together caused the Port to fail and close. In 2003, the Federal Notice of June 26, 2003 resulted in Congress deauthorizing any unconstructed Trinity River projects that provided improvements to the Channel to Liberty. In 2009, the Port of Liberty was deauthorized as a port by the State of Texas.

The navigation channel of the Trinity River and its tributaries above the city of Liberty was deauthorized by Congress in 2016. Per aerial photography, the remaining barge/dock in the oxbow south of Liberty at the deauthorized port was removed sometime between April 2023 and October 2024.



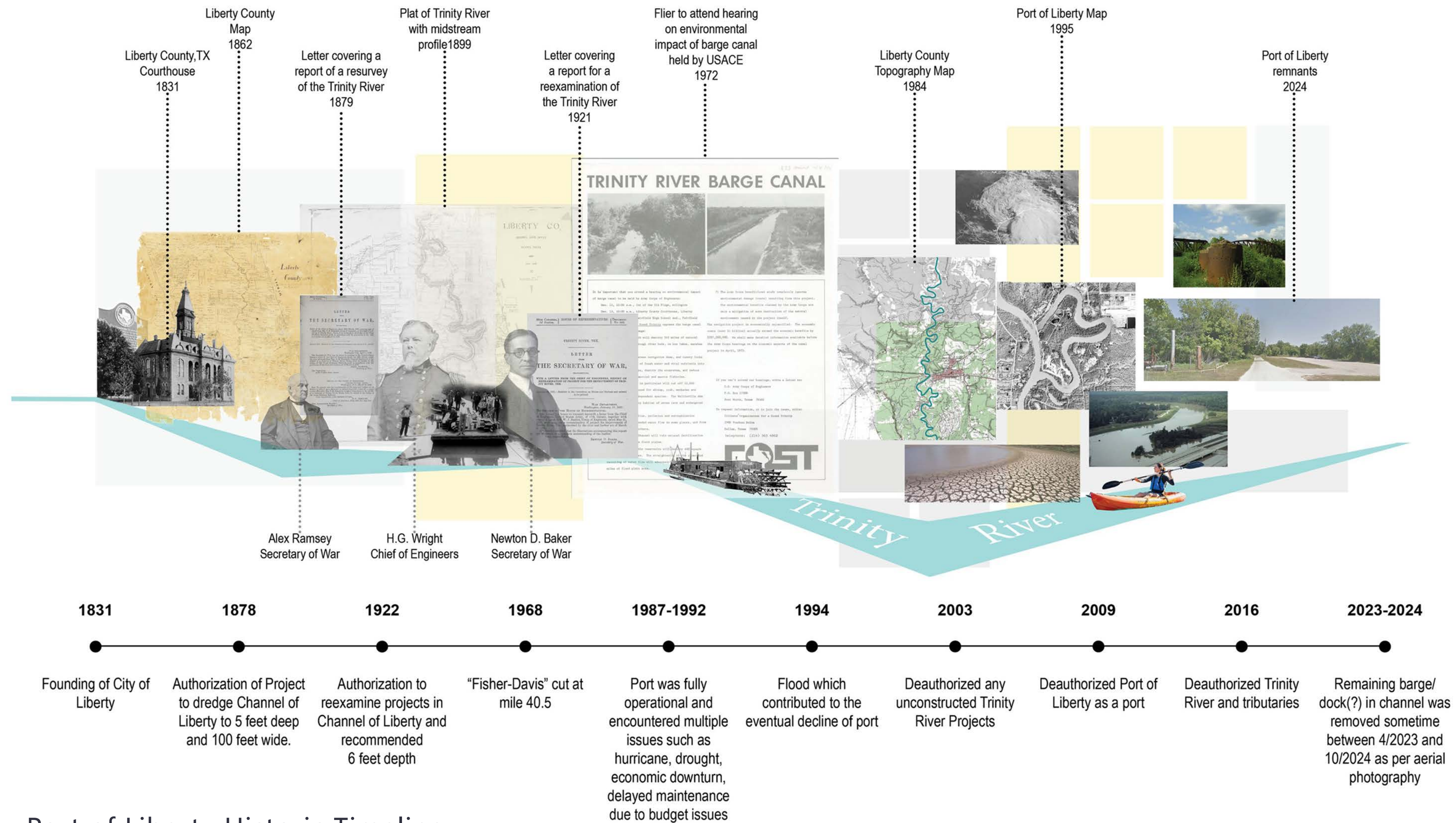


Figure 6. Port of Liberty Historic Timeline



DEMOGRAPHICS

The demographics of the study are illustrated on the following pages. The zone of interest (ZOI) for demographics includes the eight-counties of Chambers, Hardin, Harris, Jefferson, Liberty Polk, San Jacinto, and Tyler, which have grown in population from approximately 20.9 million people in 2020 to approximately 29.0 million people in 2022. This population is predominantly white (42%) or Hispanic (29%). Most of the populations in the ZOI is under the age of 40. Concerning education attainment, 12% of the ZOI population completed high school, 10% have some college but no degree, and another 10% have obtained a bachelors degree.

Leading industries in the ZOI include education, healthcare and social services (19%), professional, scientific, management, administrative, and waste management (13%), retail trade (10%), and manufacturing (9%). This region supports a diverse array of goods and services, creating jobs and improving economic resilience across many sectors. The following slides illustrate some of the demographic information based on the 2022 US Census data.

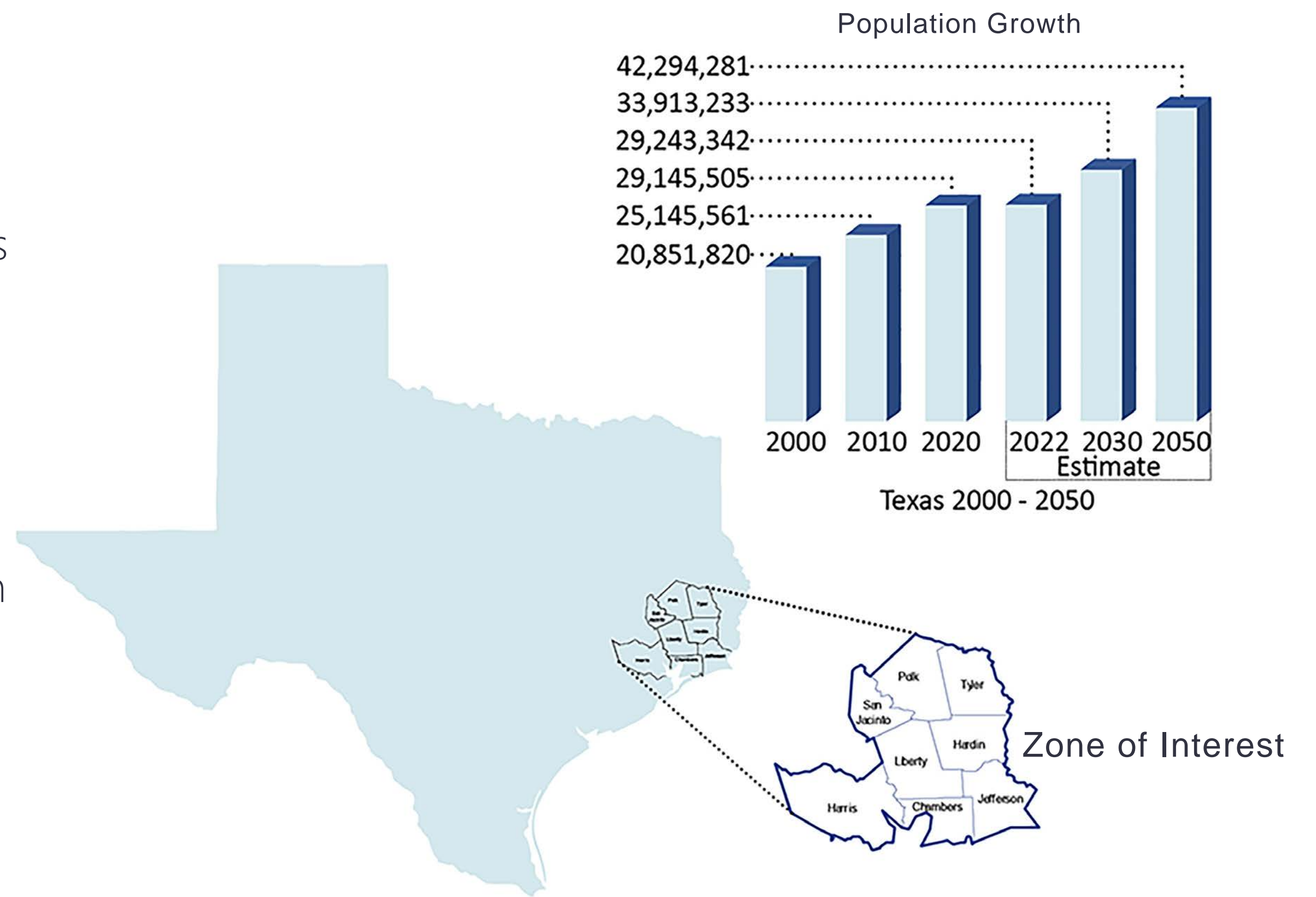


Figure 7. Texas Population Growth



POPULATION

Texas is the second most populous state in the US with 30 million residents, and accounts for 8.8% of the total US population, according to U.S. Census.

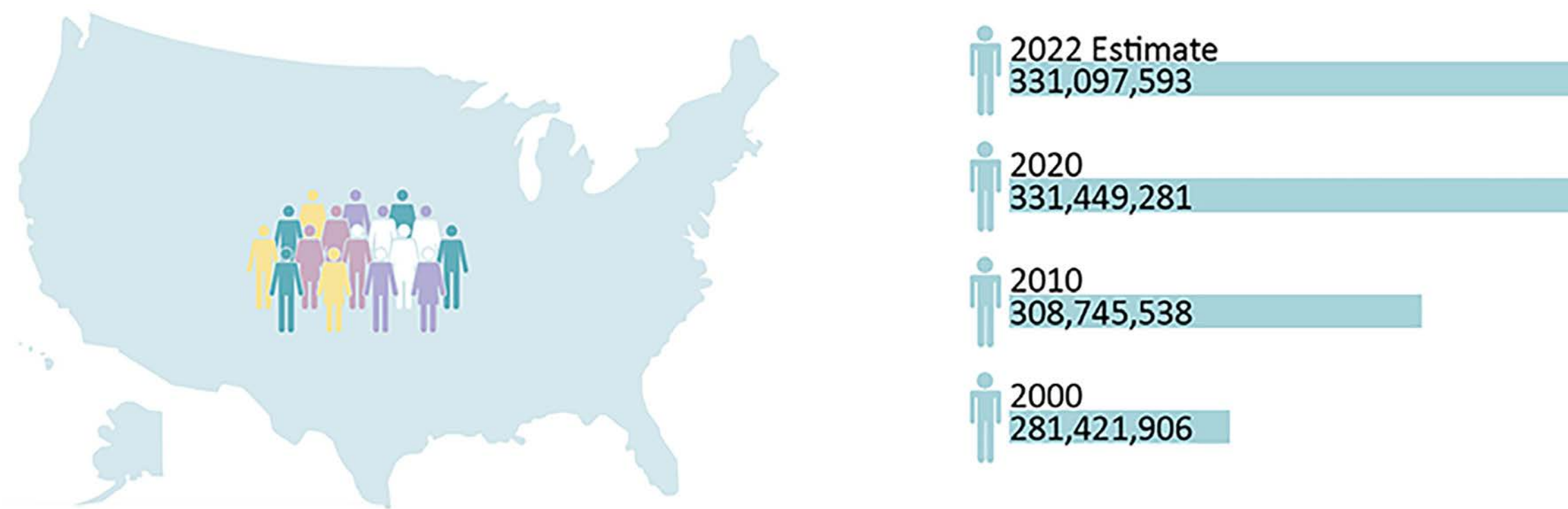


Figure 8. United States Population Growth

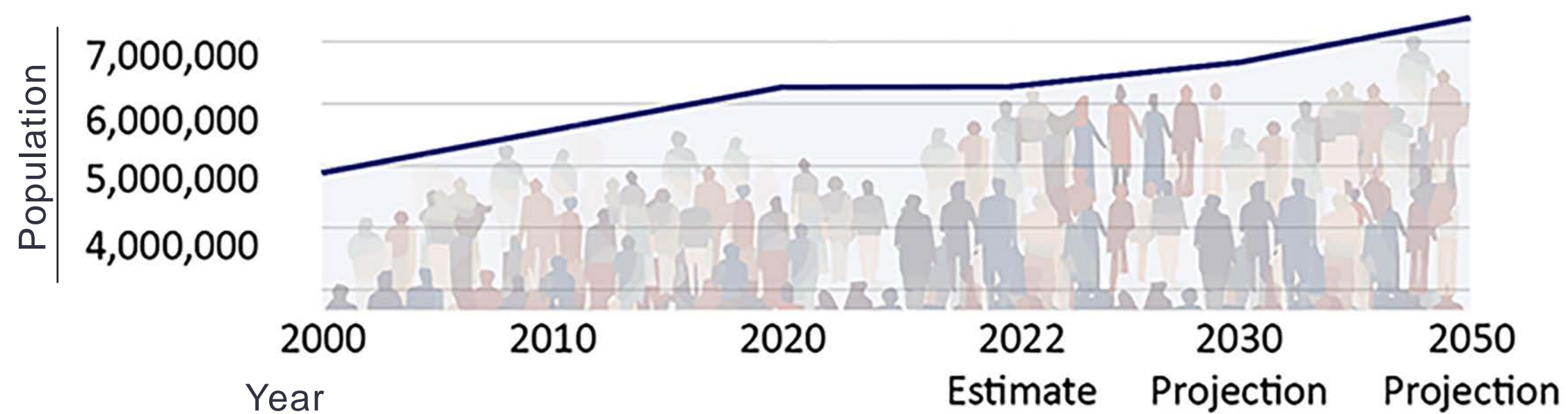


Figure 9. Zone of Interest Population Growth

Liberty County rests between Jefferson County (Beaumont, TX) and Harris County (Houston, TX) where more than 5.2 million people reside.

The population of Liberty is expected to increase 30% over the next 30 years, and neighboring counties are expected to exceed 6 million people.

Historically, the US has competitive advantages in the production of goods that use little labor, due to the higher cost of labor in the US compared to other countries' economies. The US exports goods in the categories of agriculture, capital goods, and energy (ACE).

Source: U.S. Census, American Community Survey, 2022 5-Year Estimates; Texas Water Development Board County Population Projections.

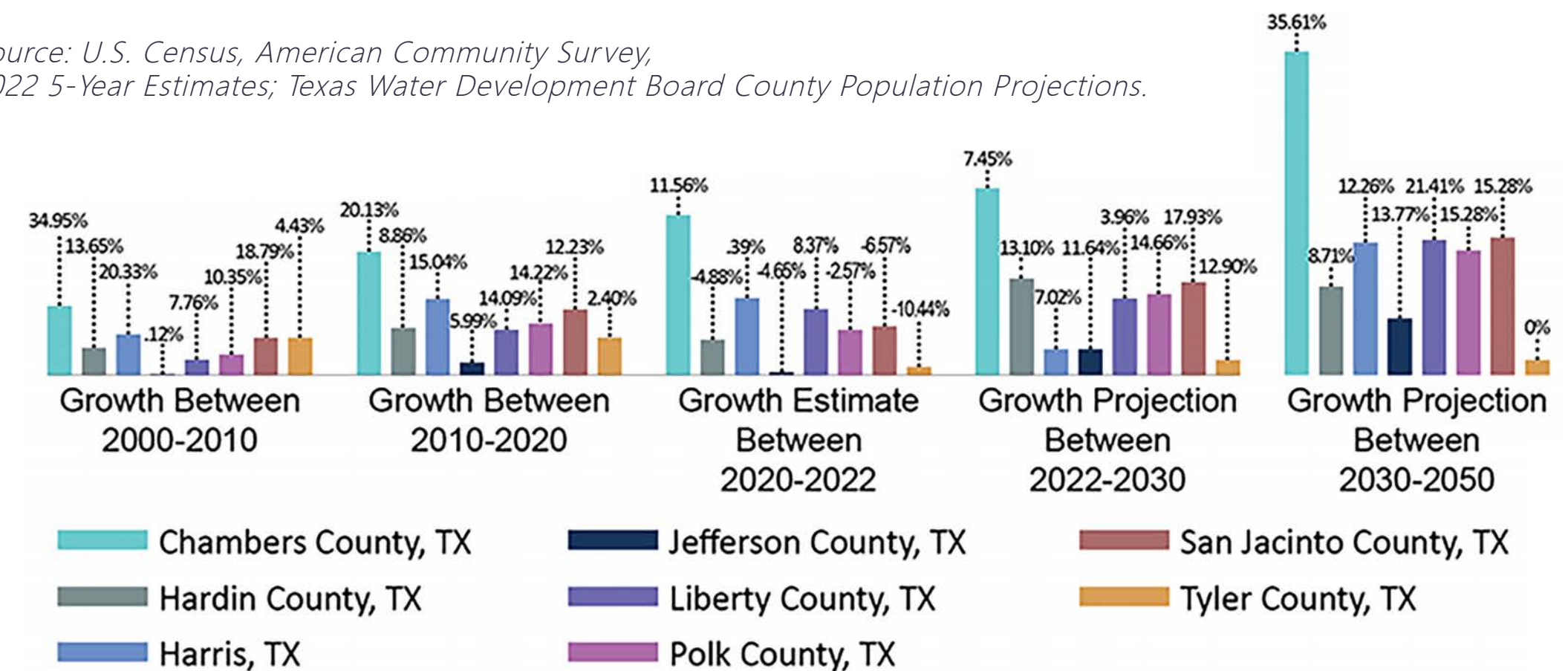


Figure 10. Zone of Interest: Population Growth by County



POPULATION BY GENDER

The gender distribution in the United States is slightly skewed, with females making up 50.41% of the population (166,987,295) and males comprising 49.59% (164,200,298). In Texas, the male population is marginally larger, with 50.01% males (14,624,638) compared to 49.99% females (14,618,704). Within the ZOI, the gender ratio is nearly even with 2,640,937 males and 2,635,482 females.

Among the eight counties in the ZOI, four have a higher male population, while three have a higher female population.

Tyler County has the largest male percentage, with 54.24% males (10,828) and 45.76% females (9,134). Hardin County has the highest percentage of females with 51.99% (28,849) compared to 49.01% males (27,727).

Harris County, representing the largest total population, has a nearly equal gender distribution, with females making up to 50.08% (2,366,762) and males 49.92% (2,359,415).

Figure 11. United States Population by Gender

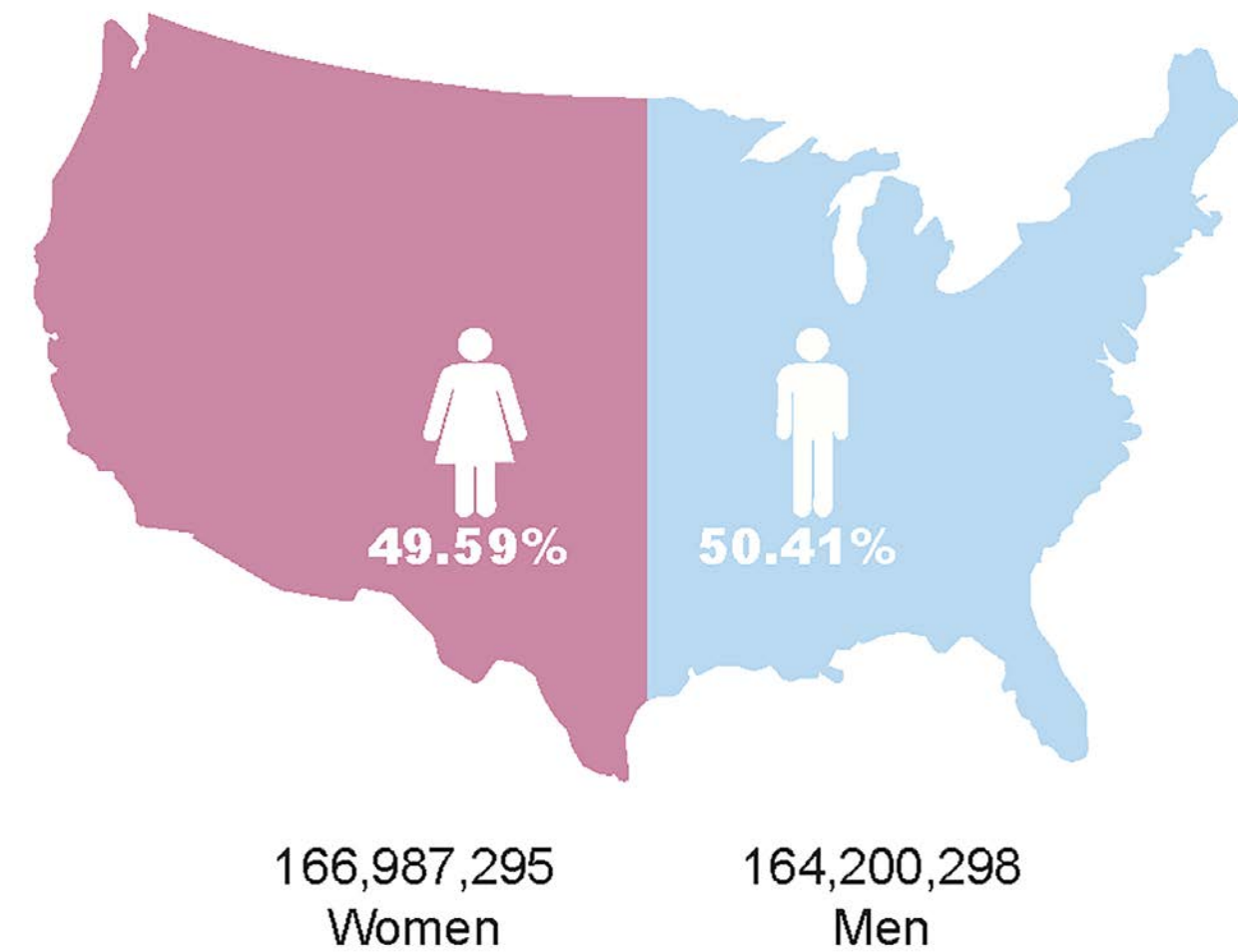


Figure 12. Texas Population by Gender

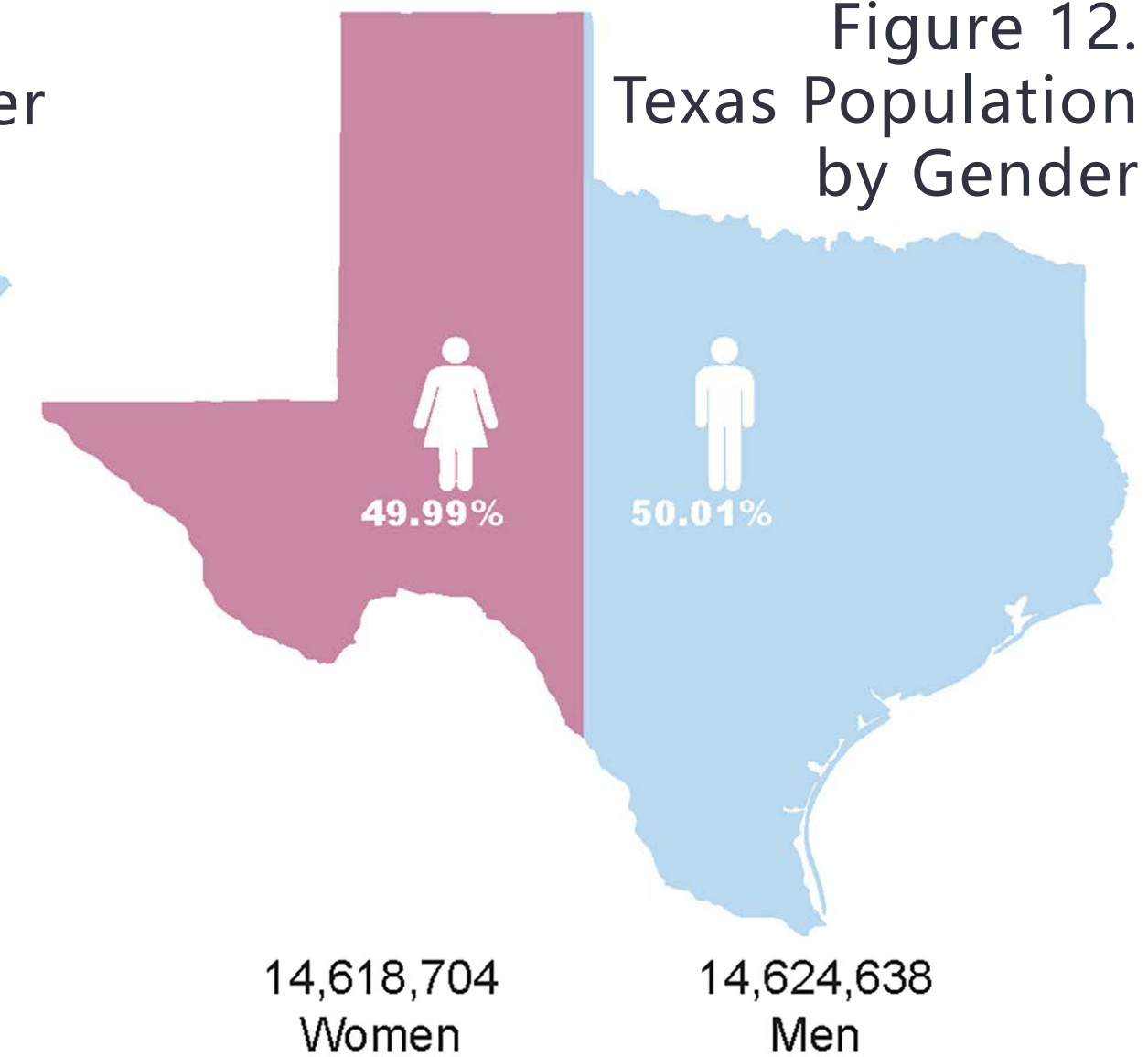


Figure 13. ZOI Gender Population by County

County	Male Population	Male Percentage	Female Percentage	Female Population
Tyler County	10,828	54.24%	45.76%	9,134
San Jacinto County	13,794	49.86%	50.14%	13,872
Polk County	27,262	53.95%	46.05%	23,274
Liberty County	46,504	49.72%	50.28%	47,019
Jefferson County	131,138	51.44%	48.56%	123,804
Harris County	2,359,415	49.92%	50.08%	2,366,762
Hardin County	27,727	49.01%	50.99%	28,849
Chambers County	24,269	51.60%	48.40%	22,768



POPULATION BY RACE ORIGIN

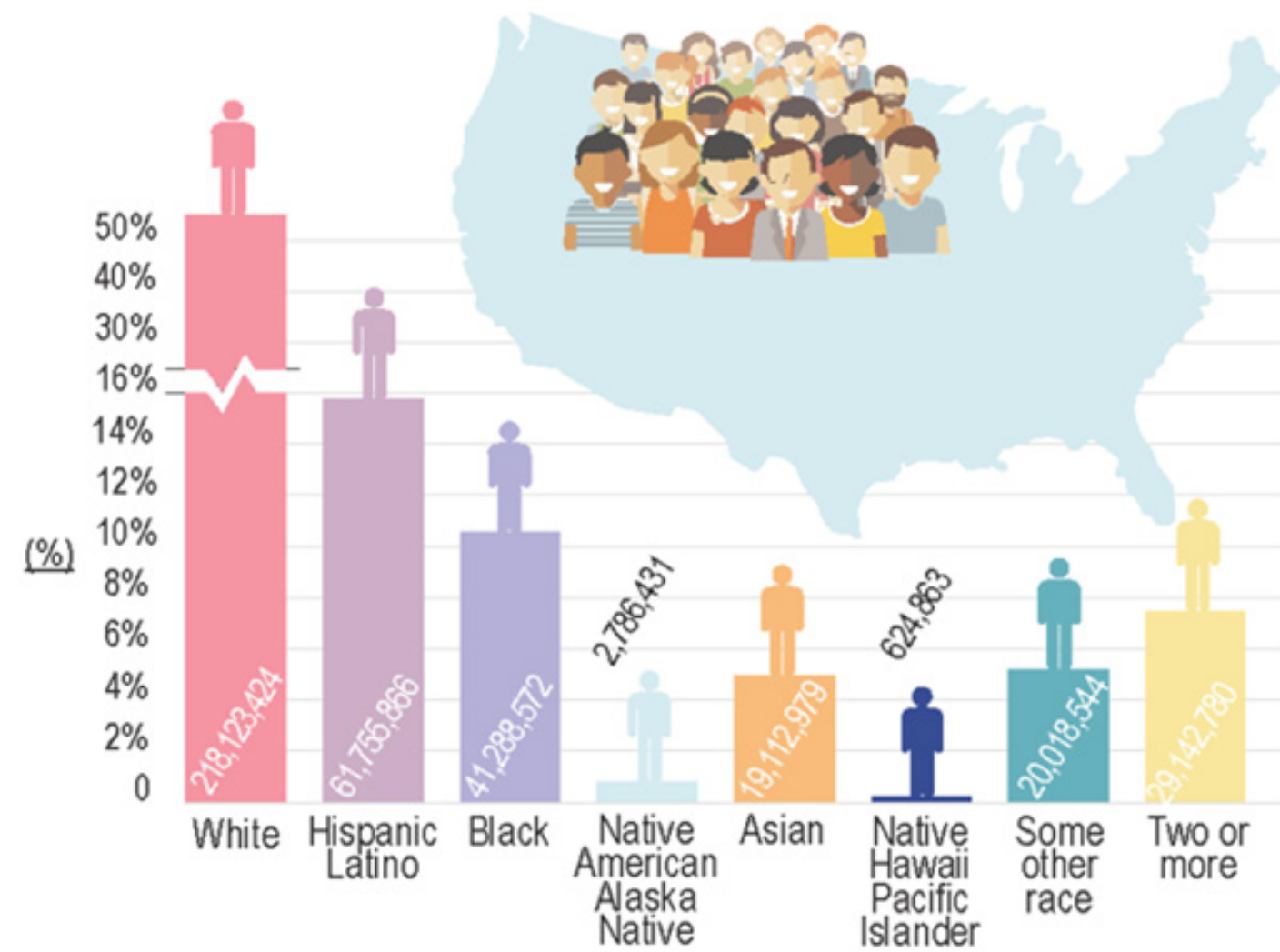


Figure 14. United States Population by Race Origin

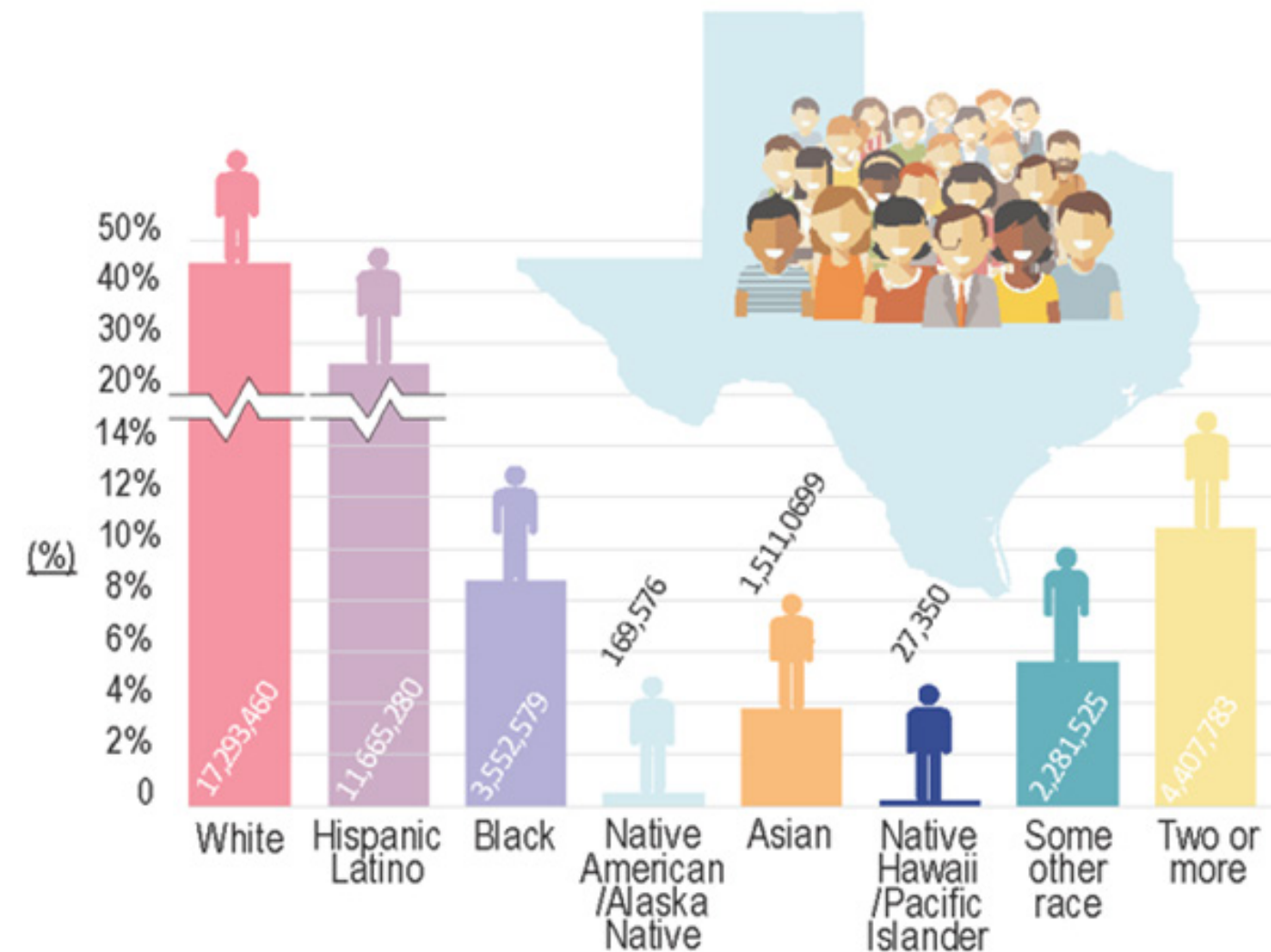


Figure 15. Texas Population by Race Origin

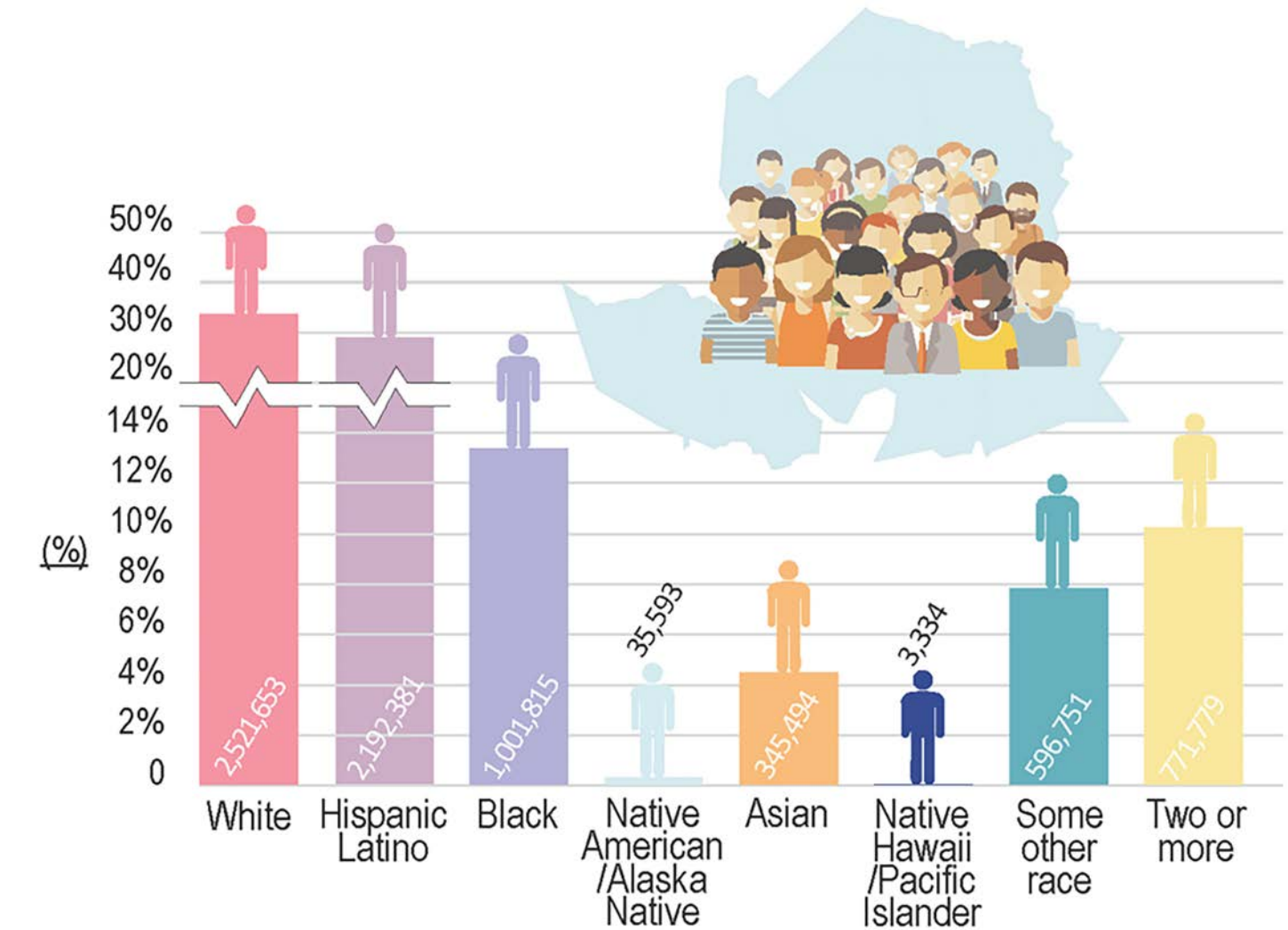


Figure 16. ZOI Population by Race Origin

POPULATION BY AGE

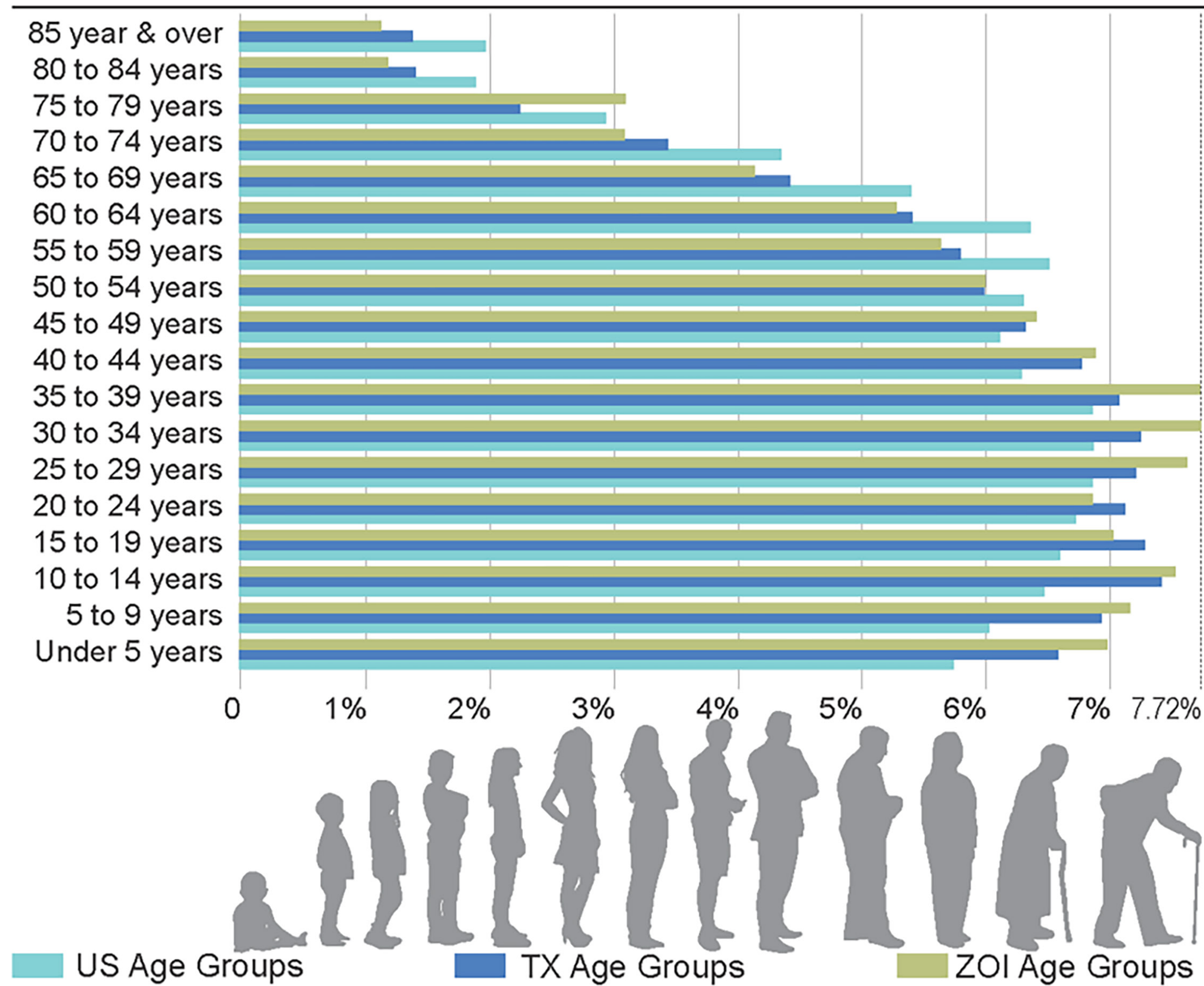


Figure 17.
US/Texas/ZOI
Population by Age



POPULATION BY EDUCATION (25 YEARS AND OVER)

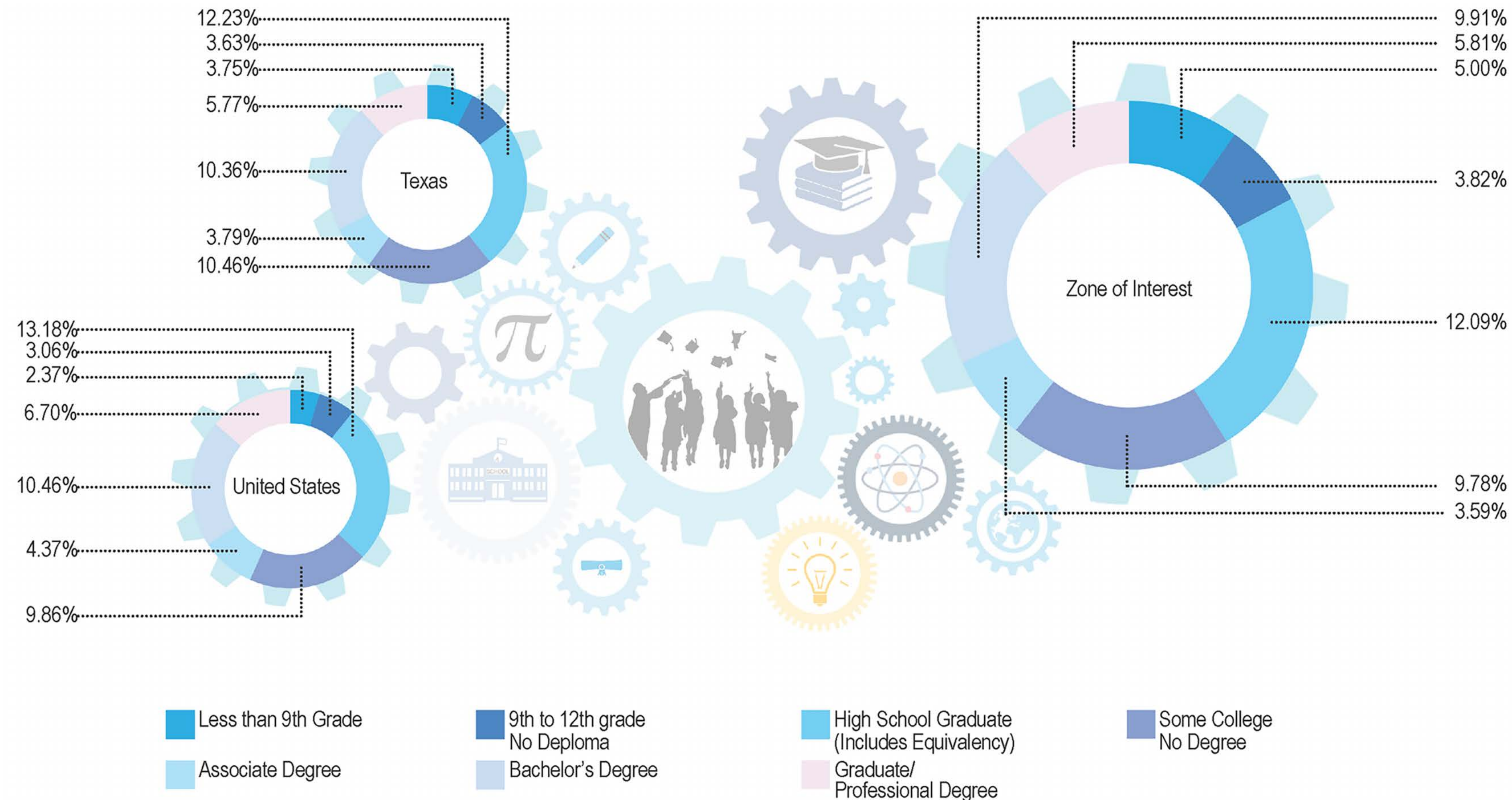


Figure 18. US/Texas/ZOI Population by Education



INDUSTRIES IN ZONE OF INTEREST

Manufacturing is the leading industry in Texas. Specifically, durable goods such as motor vehicles/parts, machinery, computer/electronics, and primary metals are strong performers.

Manufacturing of petroleum products and chemicals are already dominant in Texas and therefore are not as rapidly growing.

Figure 19. ZOI Industries



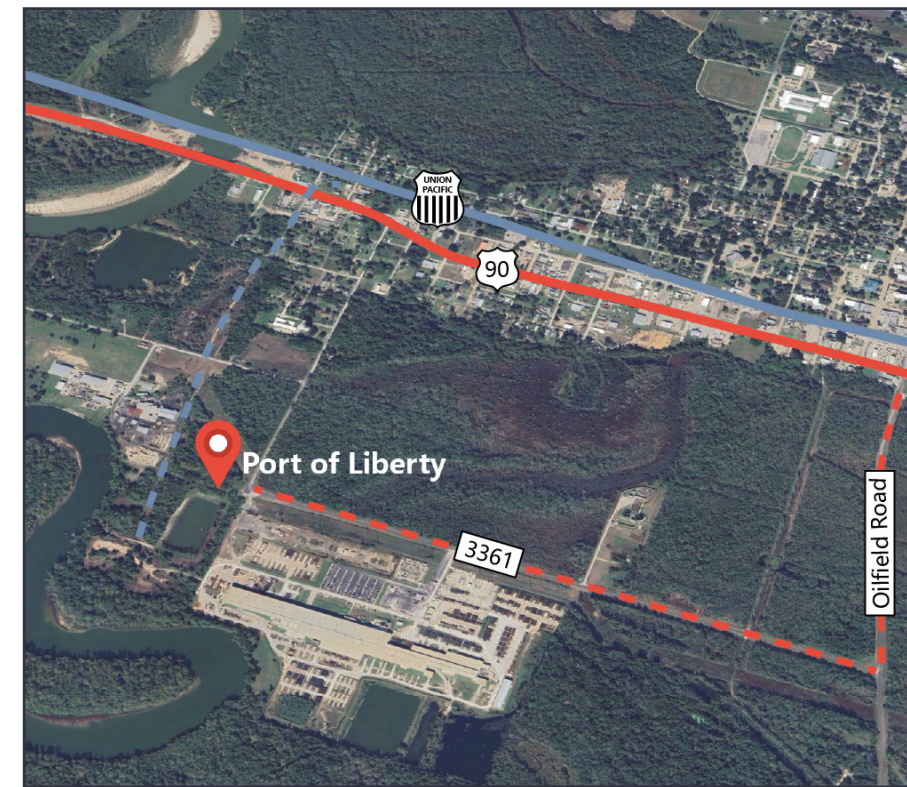
EXISTING PORT OPERATIONS

PORT STRUCTURES



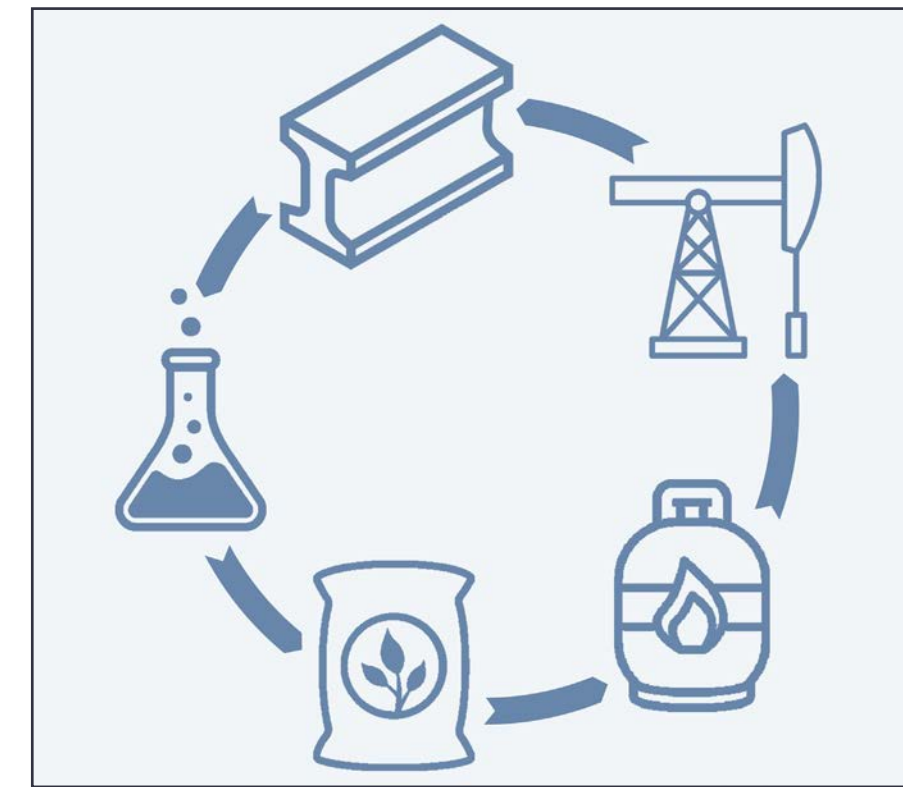
- The Port of Liberty is currently non-existent with no existing water port operations
- Reestablishment of the port will be required with the State of Texas
- Entire port will need to be constructed as no previous water-side structures either in the oxbow or on land can be reused

EXISTING INFRASTRUCTURE



- Existing infrastructure along channel is limited to the lock at the Wallisville Lake Project
- Direct road connections to the port site is from Farm to Market (FM) 3361 and Oilfield Road; regional connections are via US Hwy 90 in Liberty, Texas
- The connection to Union Pacific line in Liberty is non-existent as the rail spur was removed

INDUSTRIES



- Steel (Liberty Forge, Schlumberger, Mississippi Steel, PTC)
- Chemicals (Verdant)
- Fertilizer (CTL)
- Oil and gas (Exxon, Shell)
- Natural gas (Kinder Morgan)

PARTNERSHIPS



- The Chambers-Liberty County Navigation District (CLCND) acts as the Local Sponsor with the U.S. Army Corps of Engineers for maintenance of the channels
- The CLCND is an equal partner with the City of Liberty in the ownership of the Port of Liberty

PLANNING CONTEXT

The Water Resources Development Act (WRDA) addresses water infrastructure needs critical for the nation's economic competitiveness and domestic security. The Act is strictly an authorizing legislation, with funding authorized separately through annual appropriations budgetary process. WRDA relevant to the Port of Liberty Vision Plan includes:

- WRDA 1974 which provides USACE authority to assist in the development and conservation of water.
- WRDA 2018- 1151 involves operation and maintenance of navigation and hydroelectric facilities.
- WRDA 2022- 8102 includes emergency response to natural disasters, 8104 floodplain management services.



Figure 20. USACE Wallisville Lake Project



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PROJECT AREA

The Port of Liberty project area is strategically located between the Texas cities of Houston (approximately 50 miles to the west) and Beaumont (approximately 50 miles to the east). While this Vision Plan focuses on the immediate area of Liberty, Texas, the 25-, 50-, and 100-mile radius from the site (Figure 21) encompasses substantial population and market centers. The extended area includes a series of ports and waterways connecting commerce along the gulf coast from Texas to Louisiana, making it an

important component to the overall shipping, rail, and trucking commerce routes.

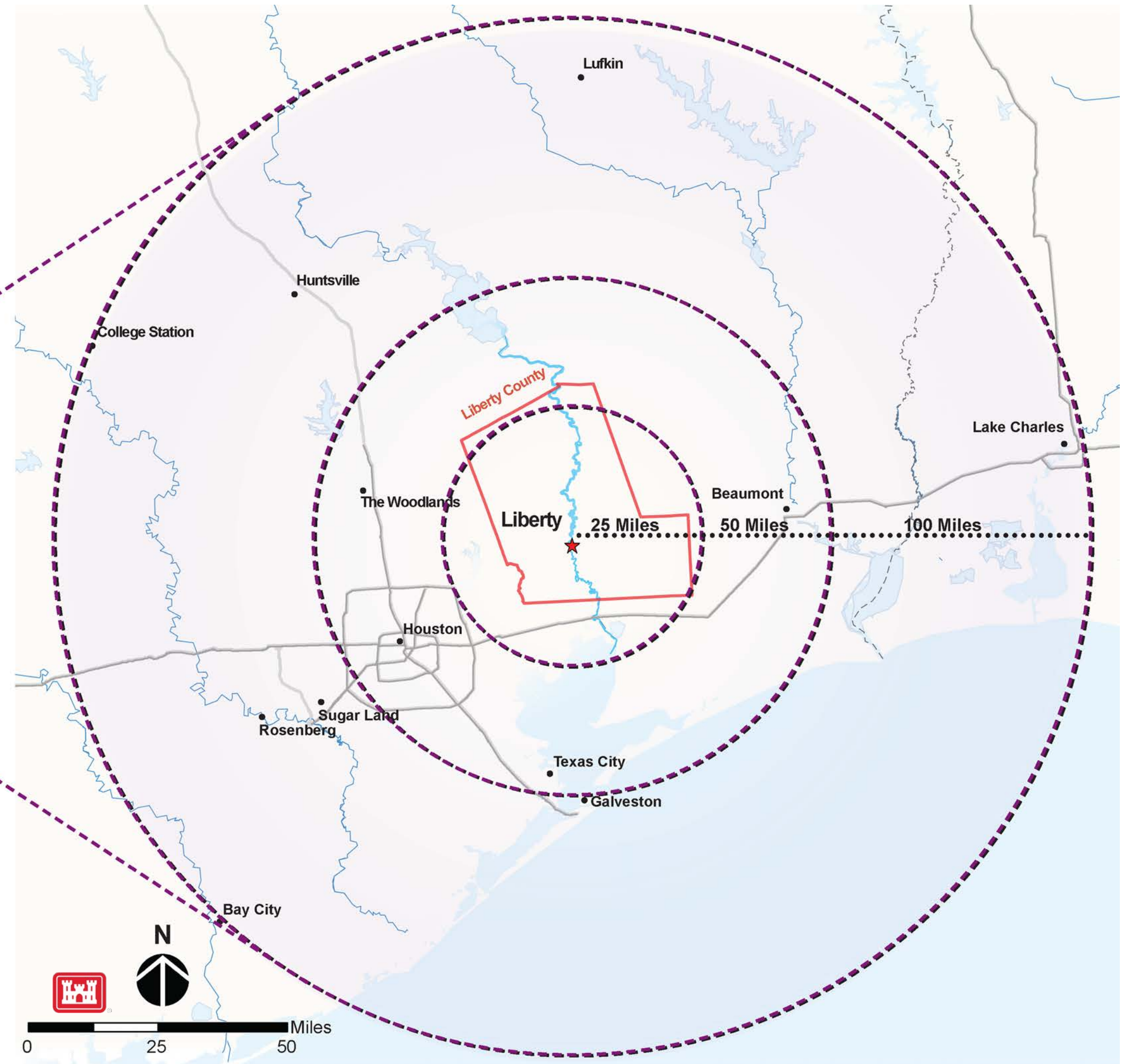
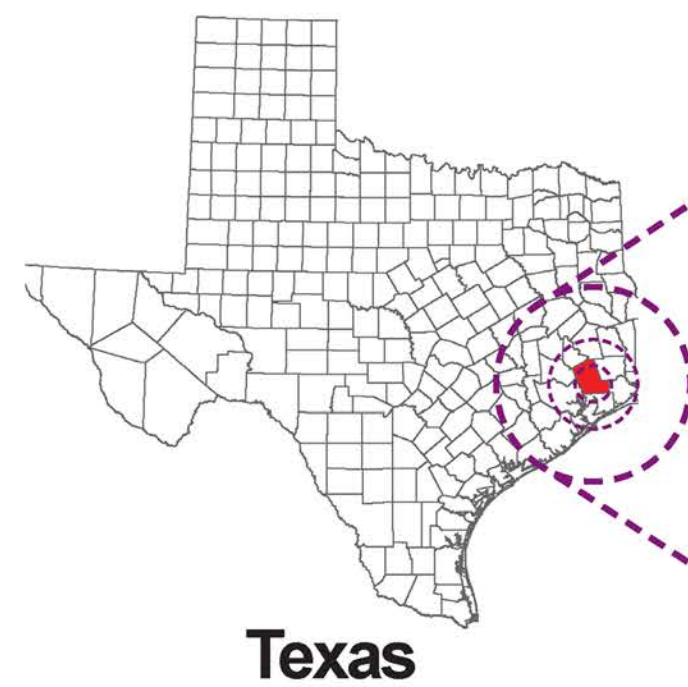


Figure 21. Project Area and Vicinity



LIBERTY RIVER CHANNEL

As a component of the shallow draft waterway that extends from Trinity Bay to Anahuac, Texas, the 41.4 miles of the Trinity River Channel twists and winds and is prone to siltation and erosion. This and the inconsistent flow of water within the Trinity River make for continued navigation challenges. Due to these issues, the channel must be dredged periodically to keep it operational.

Historically, 23 dredge material placement areas sites have been utilized for depositing dredged materials from the navigation projects. The primary cause of maintenance dredging is the result of flood-caused shoaling. Additional sources of shoal material is from upland erosion, riverbed and bank erosion, and sewer and drainage outfalls, and industrial and municipal discharges (Freese and Nichols, 2017.)

The current authorized depth of Channel to Liberty and Anahuac navigation channels is 6ft MLT with a bottom width of 100 ft. Typical dimensions are 9ft depth and 130 ft

minimum width for one-way traffic of a 50 ft tow width, or 190 ft minimum width for two-way traffic of 50 ft tow width. An optimum depth of the channel will need to be maintained all the time such that barge traffic is not stopped or suspended for periods of time or it will likely not be used by the industries in the region as it will be unreliable and costly to their operations to have to pivot from barges to another mode of transportation.



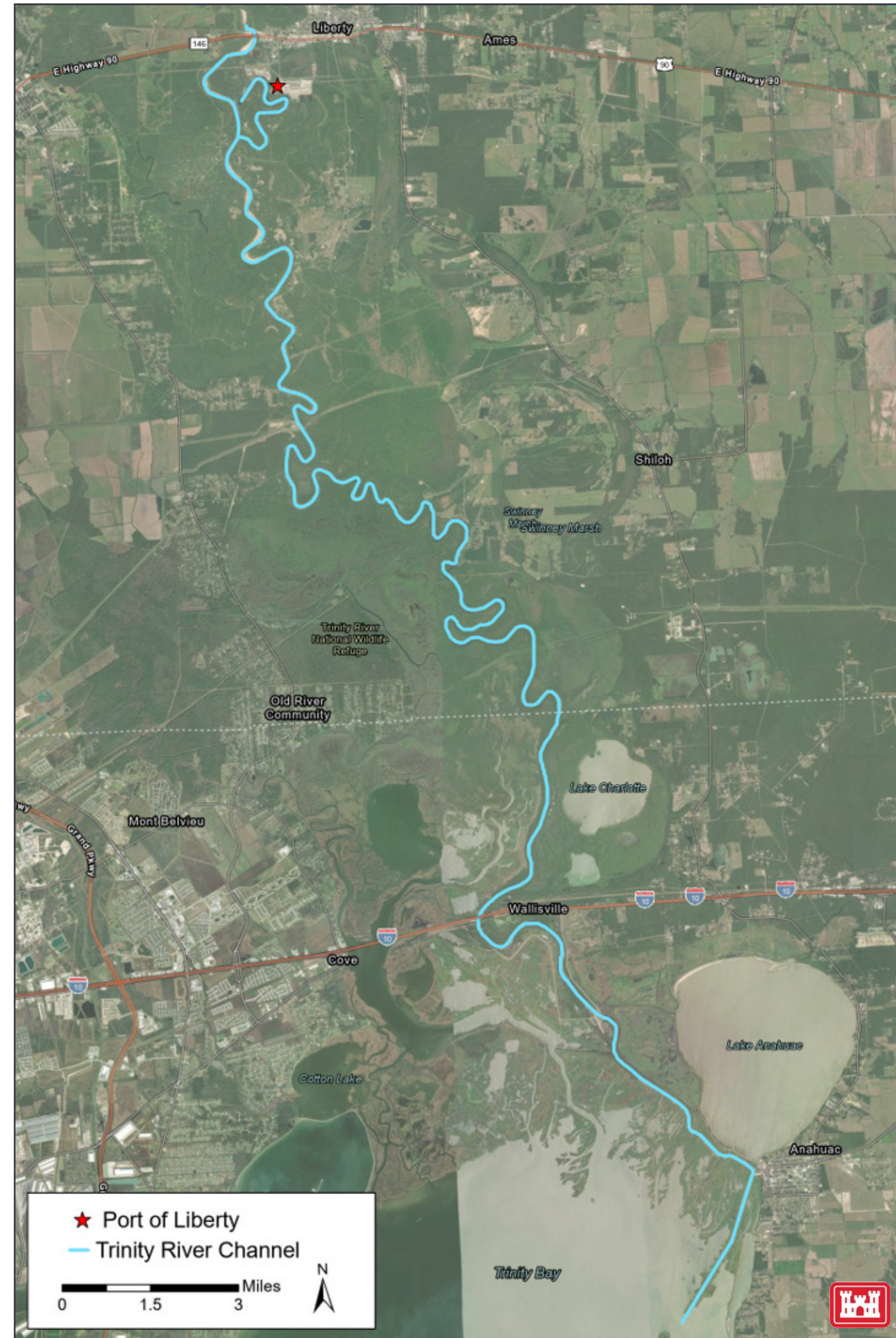


Figure 22.
Port of Liberty within
Trinity River Channel

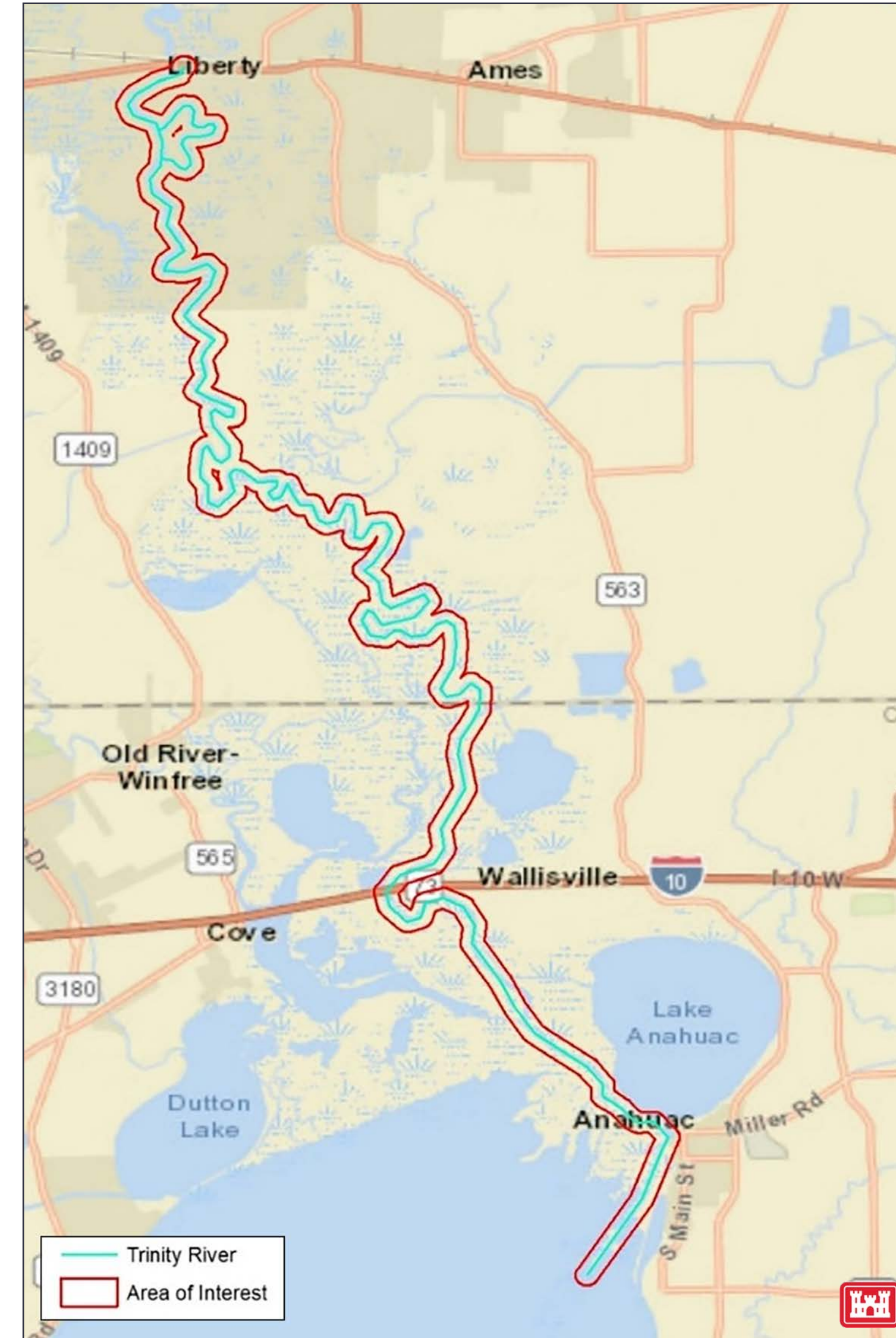


Figure 23.
Planning Assistance
to States Area of
Interest



ENVIRONMENTAL REVIEW

An environmental desktop review was conducted by USACE's Regional Planning and Environmental Center (RPEC) staff to identify regional environmental resources and concerns.

The review covers the following information:

- Sensitive and special status species
- Terrestrial and wetland habitat cover types
- Conservation and public-use areas
- Historical sites and previous studies
- Locations with hazardous, toxic, and radioactive waste (HTRW)

The area of interest (AOI) for the environmental review includes the following:

- 43 river miles of the Trinity River in Texas
- A 1,000 foot buffer on either side of the river
- Approximately 10,053 acres of land

The review provides a compilation of remote analyses describing the general existing conditions for the area of interest. The review looks at biologic resources, cultural resources, and hazardous, toxic, and radioactive waste.



BIOLOGICAL RESOURCES

ECOREGION CHARACTERISTICS

The environmental area of interest (AOI) lies within 4 different Level IV Ecoregions. Level IV Ecoregions are categories that identify an area based on its unique soil, climate, and vegetation characteristics. As can be seen below, the area is typically flat to gently sloping, prone to flooding and siltation. A description of the ecoregions and the area follows:

Floodplains and Low Terraces (majority of the AOI)

- Plants: Oaks, Sweetgum, Blackgum, Elm, Red Maple
- Habitats: Floodplains, Low terraces, Bottomland hardwood forests, Cropland, Pasture
- Features: Rivers, Floodplain forests, Holocene alluvial deposits

Flatwoods (small area near Hwy 90 and Trinity River)

- Plants: Longleaf pine, Sweetgum, White Oak
- Habitats: Upland pine communities, Flatwoods, Mesic slopes, Streams
- Features: Flat to gently sloping terrain, Poorly drained soils, Acidic soils, High fire frequency



Northern Humid Gulf Coastal Plains

- Plants: Little Bluestem, Yellow Indiangrass, Brownseed Paspalum
- Habitats: Grasslands, Oak mottes (maritime woodlands), Coastal prairies
- Features: Gently sloping coastal plain, Deltaic sands, silts, and clays, Fine-textured soils

Texas-Louisiana Coastal Marshes

- Plants: Cordgrass
- Habitats: Freshwater and saltwater coastal marshes, Estuaries, Tidal channels, Coastal bays
- Features: Rivers, Lakes, Bayous, Canals, Barrier islands (USGS, 2024)

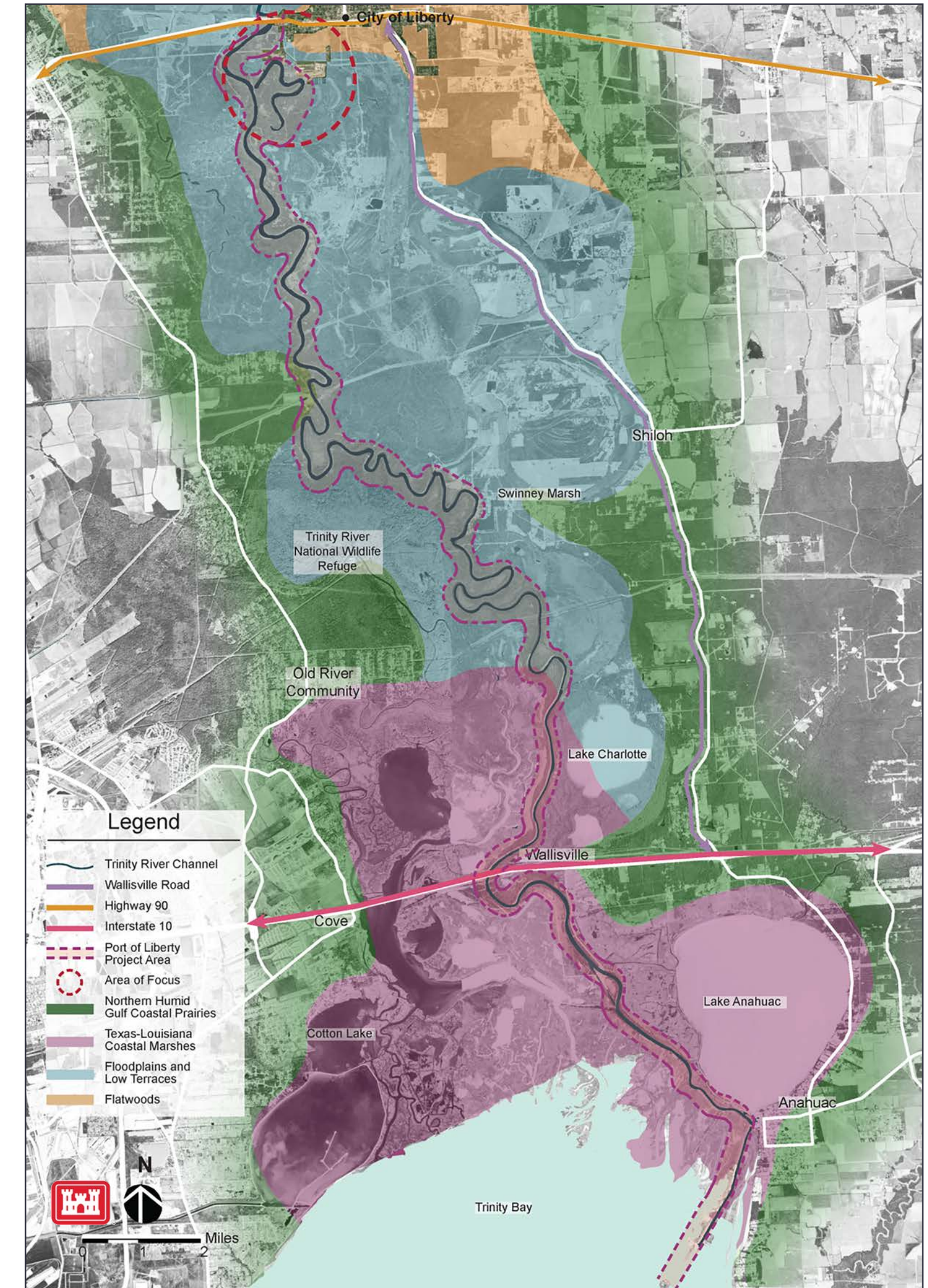


Figure 24.
Port of Liberty
Level IV Ecoregions

The northern portion of the AOI lies primarily within the Floodplains and Low Terraces Level IV Ecoregion (Figure 25). This area consists mostly of the Holocene alluvial floodplains and low terraces where there is a distinct vegetation change into bottomland oaks and gum forest. Water Oak (*Quercus nigra*), Willow Oak (*Quercus phellos*), Sweetgum (*Liquidambar styraciflua*), Blackgum (*Nyssa sylvatica*), Elm (*Ulmus*), Red Maple (*Acer rubrum*), Southern Red Oak (*Quercus falcate*), Swamp Chestnut Oak (*Quercus michauxii*), Southern Live Oak (*Quercus virginiana*), Loblolly Pine (*Pinus taeda*), Bald Cypress (*Taxodium distichum*), Pecan (*Carya illinoensis*) and Water Tupelo (*Nyssa aquatic*) are the trees that can be found in the area. Large portions of the floodplain forest have been removed, and land cover is now a mix of forest, cropland, and pasture.

A small portion of the AOI near the intersection of Highway 90 lies the Flatwoods Level IV Ecoregion. Another small portion of the AOI north of the Trinity River National Wildlife Refuge lies with the Northern Humid Gulf Coastal Plains Level IV Ecoregion.

The southern portion of the AOI, lies primarily within the Texas-Louisiana Coastal Marshes (TLCM) Level IV Ecoregion.

This region consists of freshwater and saltwater coastal marshes, lacks barrier islands and few bays, and it is wetter, more humid than other parts of Texas. Annual precipitation is 48 to 54 inches in Texas and up to 60 inches in Louisiana. There are many rivers, lakes, bayous, tidal channels, and canals. The streams and rivers that supply nutrients and sediments to this region are primarily from the humid pine belt. Extensive cordgrass marshes occur. The estuarine and marsh complex supports marine life, supplies wintering grounds for ducks and geese, and provides habitat for small mammals and American Alligators (*Alligator mississippiensis*). Brown Shrimp (*Farfantepenaeus aztecus*), the most commercially important marine species in Texas, is common along the whole coast, but in this northern coastal zone white shrimp are also commercially important. Eastern Oysters (*Crassostrea virginica*) and Blue Crabs (*Callinectes sapidus*) are also common and commercially important in the region. Sport fishery species such as Red Drum (*Sciaenops ocellatus*), Black Drum (*Pogonias cromis*), Southern Flounder (*Paralichthys lethostigma*), and Spotted Seatrout (*Cynoscion nebulosus*) occur throughout the coastal bays of this region (USGS, 2024).



The AOI consists of primarily temporarily flooded bottomland hardwood forests (3,917 acres). The next three most common habitat types in the area of interest were:

- Open water (1,938 acres)
- Seasonally flooded bottomland hardwood forest (982 acres)
- Fresh and intermediate tidal marsh (708 acres)
(TPWD, 2024)

This area supports a wide variety of wildlife and provides recreational and other resources to the larger geographical area.

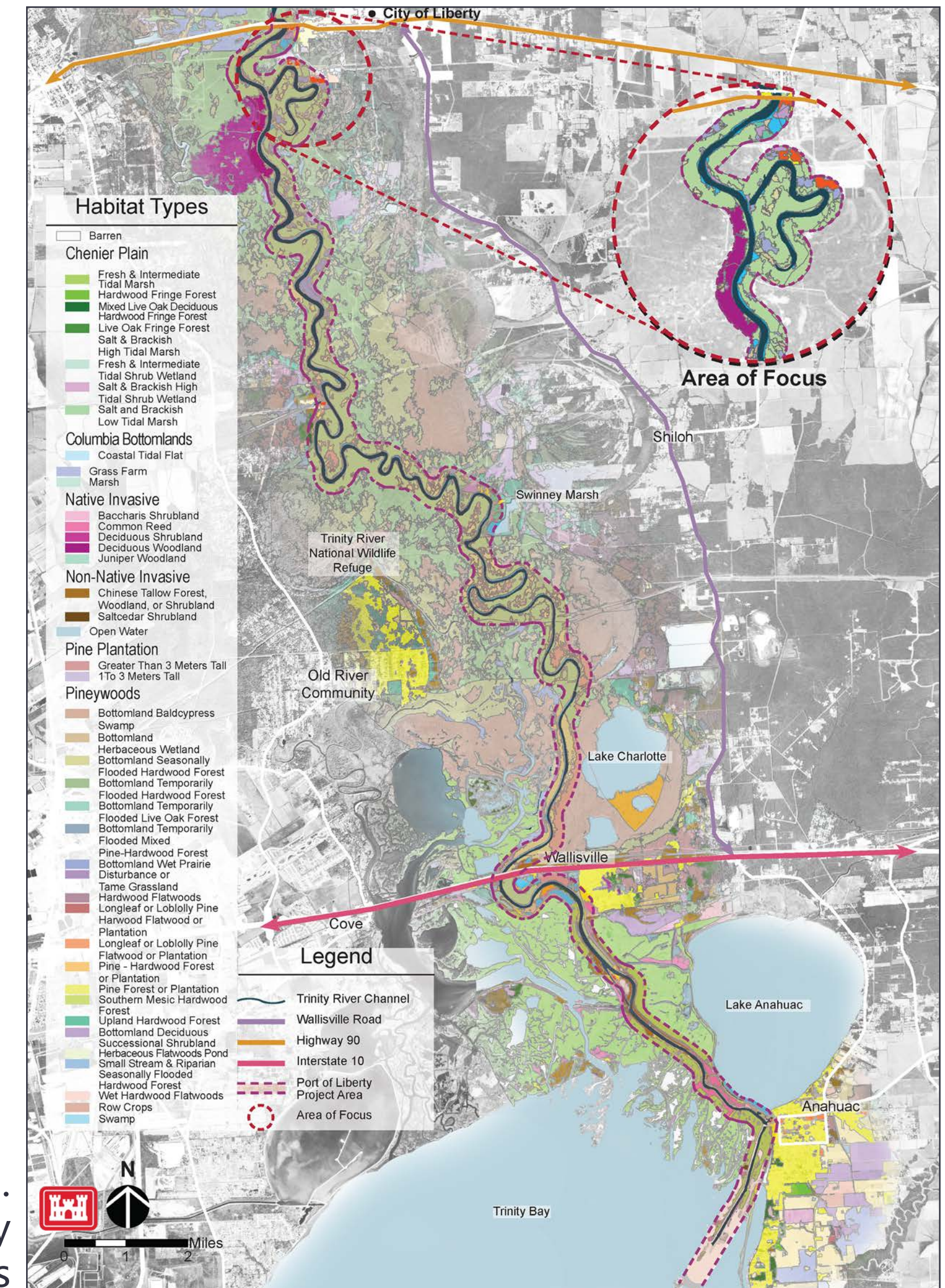


Figure 25. Port of Liberty Habitat Types

FISH SPECIES

The Trinity River is known to provide habitat for a variety of sportfish such as:

- Hybrid striped bass, Striped bass, White bass, Yellow bass
- Smallmouth buffalo, Black bullhead, Blue catfish
- White crappie, Alligator gar, Spotted gar (TPWD, 2024b)

Fish species in the Trinity River are vital because they contribute to the ecosystem’s balance by supporting the food web, maintaining water quality, and serving as indicators of environmental health. They are crucial for biodiversity, as their migration and spawning behaviors sustain other aquatic and terrestrial species. Additionally, fish hold cultural, recreational, and economic importance, supporting fishing industries and providing opportunities for local communities. Disrupting their habitats through dredging, pollution, or invasive species could destabilize the ecosystem, reduce biodiversity, and harm the river’s overall health and productivity.

Figure 26. Fish Species



Channel Catfish



Freshwater Drum



Largemouth Bass



Longnose Gar



WILDLIFE SPECIES

The Trinity River provides habitat for an abundance of wildlife species such as:

- **Mammals:** White-tailed deer, Virginia Opossum, Eastern Cottontail, Eastern Gray Squirrel
- **Reptiles:** American Alligator
- **Birds:** Anhinga, Northern Harrier, Little Blue Heron, Great Egret, Whooping Crane

Wildlife species on the Trinity River help maintain ecological balance, support biodiversity, and contribute to the health of the ecosystem. Wetlands and riparian zones provide shelter, breeding grounds, and food for many species, which in turn sustain other plants and animals in the food web. These species also play a role in water quality, flood control, and pollination, benefiting both the environment and human communities. Disruptions to their habitats from construction, pollution, or invasive species can destabilize the ecosystem, reduce biodiversity, and diminish the natural and cultural value of the Trinity River.

Figure 27. Wildlife Species



Virginia Opossum



American Alligator



Northern Harrier



Whooping Crane

THREATENED AND ENDANGERED SPECIES

Federally listed species that may occur in the area include:

- **Forested areas:** Tricolored Bat, Red-cockaded Woodpecker
- **Grasslands:** Monarch Butterfly
- **Wetlands:** Eastern Black Rail, Alligator Snapping Turtle, Whooping Crane
- **Bay areas:** Rufa Red Knot, Green Sea Turtle, Hawksbill Sea Turtle, Kemp's Ridley Sea Turtle, Leatherback Sea Turtle, Piping Plover, West Indian Manatee

Figure 28. Threatened and Endangered Species



Eastern Black Rail



Tricolored Bat



Green Sea Turtle



West Indian Manatee



WETLANDS

- Within the area of interest there is a total of 7,752 acres of wetlands (Figure 29).
- Seven wetland habitat types contribute to the diversity and abundance of fish, reptiles, amphibians, and migratory birds of the region.

WETLAND TYPE	TOTAL ACRES
Estuarine and Marine Deepwater	349
Estuarine and Marine Deepwater	511
Lake	179
Freshwater Pond	73
Freshwater Emergent Wetland	702
Freshwater Forested / Shrub Wetland	4,336
Freshwater Pond	79
Riverine	1,524

Table 1. Area of Interest Wetland Acreage

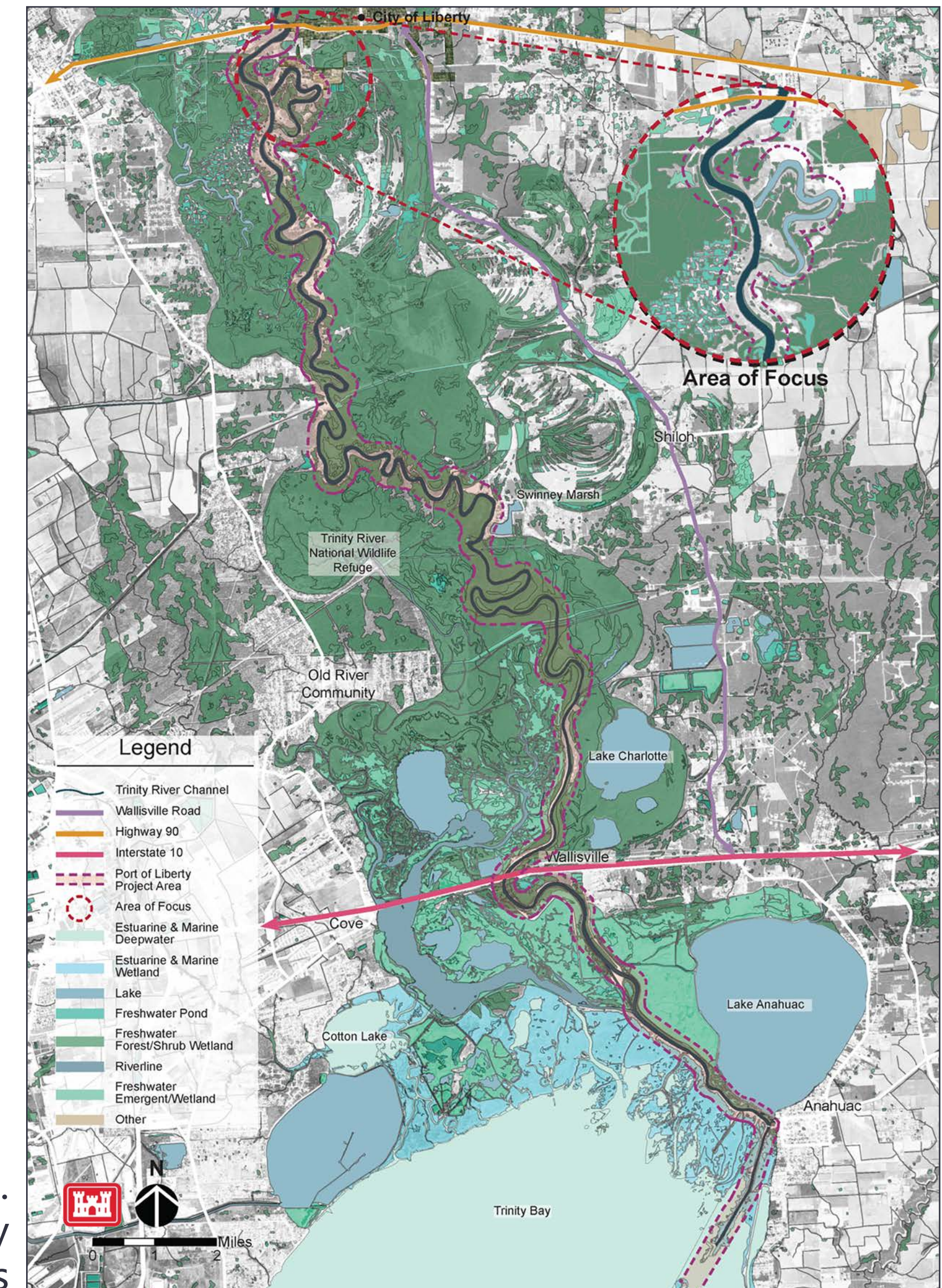


Figure 29. Port of Liberty Wetlands



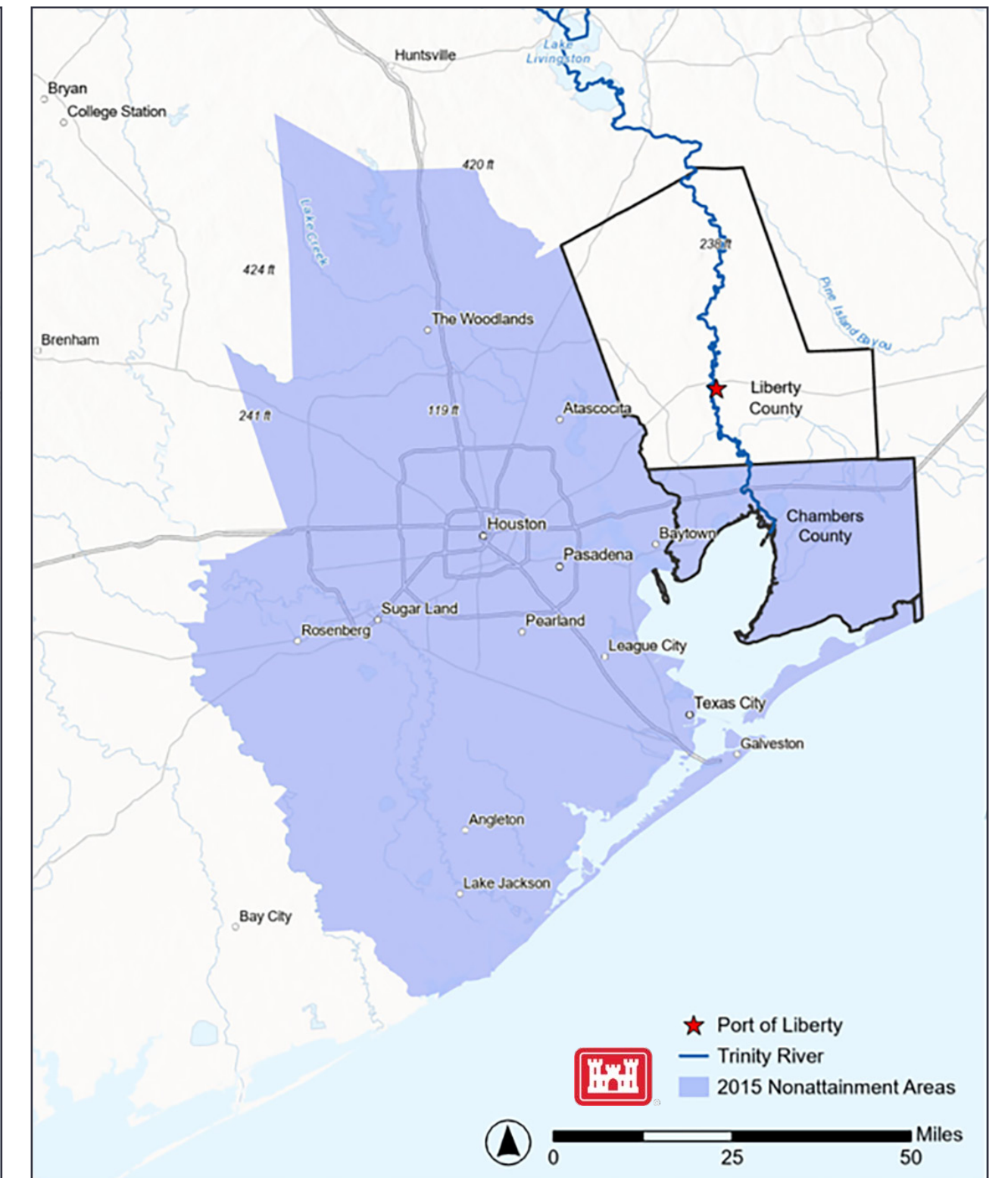
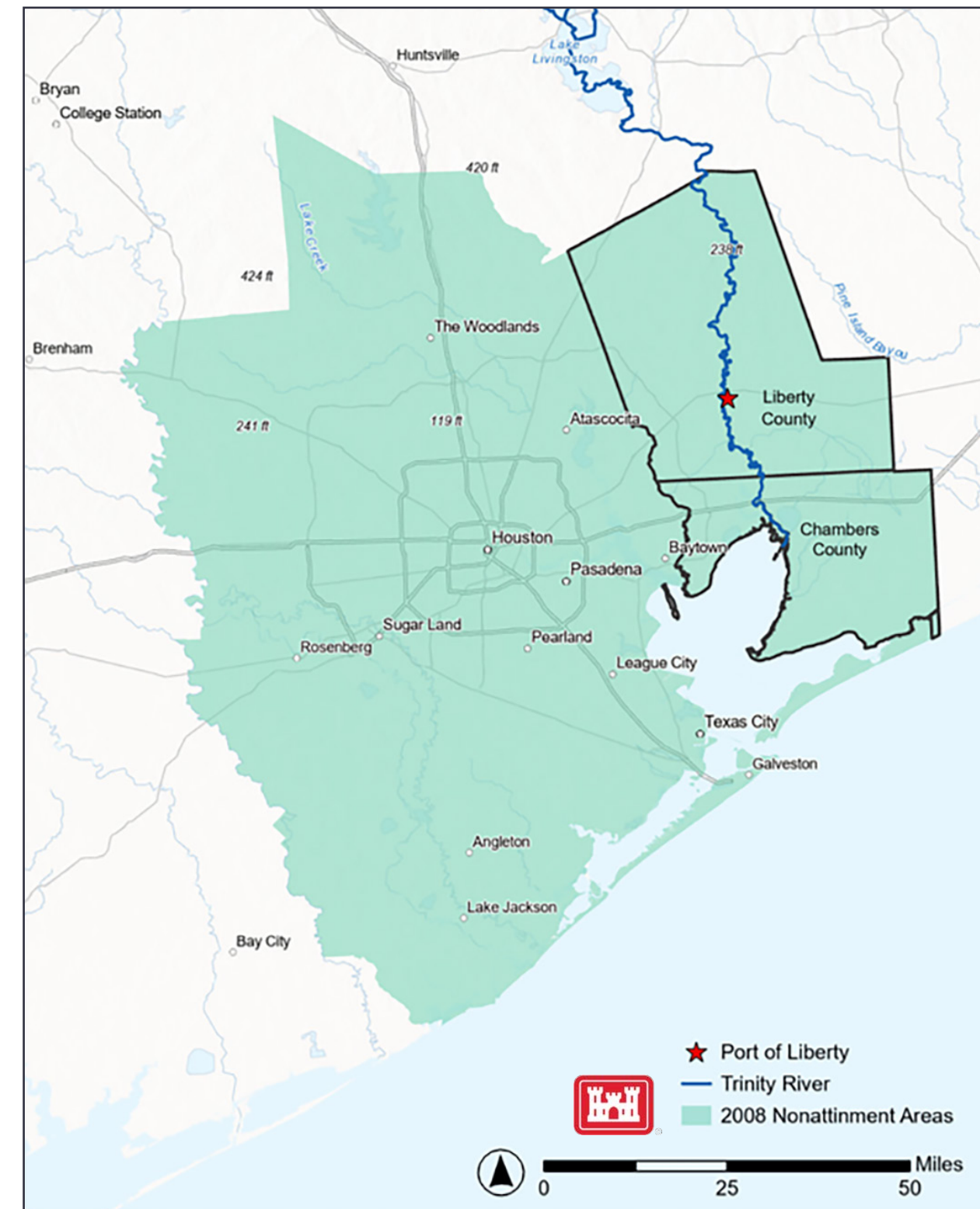
AIR QUALITY

Liberty and Chambers counties are in attainment with National Ambient Air Quality Standards (NAAQS) criteria pollutants (Figures 30 and 31):

- Carbon Monoxide (CO)
- Lead (Pb)
- Nitrogen Dioxide (NO₂)
- Particle Pollution (PM_{2.5}) and (PM₁₀)
- Sulfur Dioxide (SO₂)

However, both counties exceeded the NAAQS for the 8-Hour Ozone (O₃) 2008 standard. Both counties O₃ levels were classified as Severe-15 (between 0.113 - 0.119 ppm).

Only Chambers county exceeds the 2015 8-Hour Ozone standard with levels classified as Serious (between 0.093 - 0.104 ppm).



Figures 30 and 31.
Port of Liberty 8-Hour
Ozone Nonattainment Areas



WATER QUALITY

The Texas Commission of Environmental Quality publishes the Texas Integrated Report every 2 years, which includes the 303(d) Impaired Waterbodies List. In the report, both the Trinity River Below Lake Livingston (Segment ID 0802) and the Trinity Bay (Segment ID 2422) of the AOI were listed as impaired for Dioxin and PCBs in edible tissue of fish found in these areas (Figure 32). No other waterbody segment in the AOI were found to be impaired for any other water quality standard.

The 2024 report lists two waterbody segments in the AOI as Category 5, meaning:

- One designated use is not being supported or is threatened
- A Total Maximum Daily Load is needed

The impaired waterbody segments are:

- Trinity River Below Lake Livingston (Segment ID 0802)
- Trinity Bay (Segment ID 2422)

The impairment is due to:

- Dioxin in edible tissue of fish
- PCBs (Polychlorinated Biphenyls) in edible tissue of fish

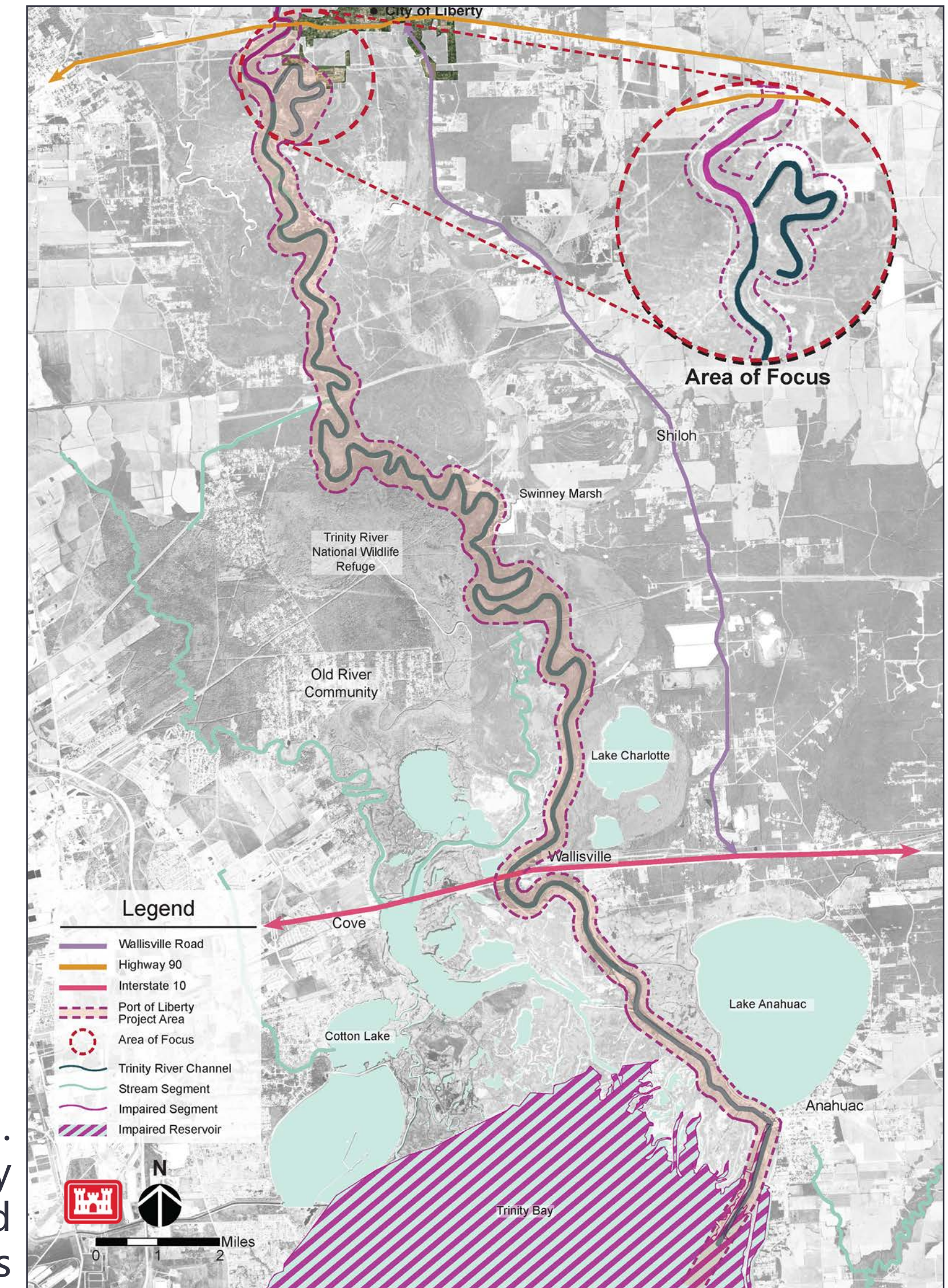


Figure 32. Port of Liberty Impaired Waterbodies

CULTURAL RESOURCES

USACE has reviewed the Texas Historical Commission ATLAS Database to better determine the existing conditions and potential risks of encountering cultural resources. Project design elements and implementation have not been finalized. As such, the area of potential effects (APE) for this research has been established based on a 1/3-mile distance from the centerline of the Trinity River, from State Highway Bridge #3 in Liberty, Texas, to the mouth of the Trinity River in Trinity Bay.

There are 11 eligible sites and 49 undetermined eligibility for National Register of Historic Places (NRHP) along with 9 historic steamboat shipwrecks on the Trinity River banks, the Wallisville Historic District, and State Highway Bridge #3.

Many of the sixty-one previously-recorded archaeology sites located within the study area have already been impacted by historic and modern infrastructure development, subsidence, and erosion. It is likely that dredging and/or channel modifications along the lower Trinity River and in Trinity Bay would have adverse impacts to potentially significant cultural resources.

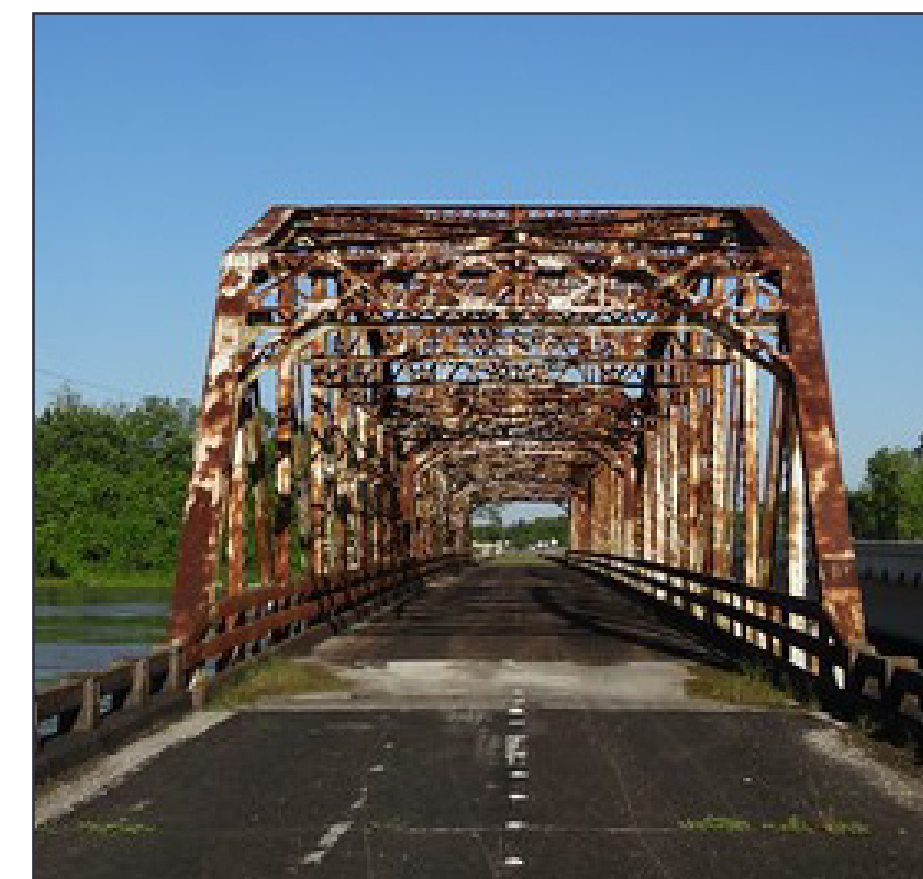
Figure 33. Cultural Resource Sites



National Register of Historic Places



Wallisville Heritage Park Museum



State Highway Bridge #3



Black Cloud Shipwreck



Table 2. Previously-recorded archaeology sites, historic districts, and NRHP-listed properties

SITE #/NRHP LISTING	ELIGIBILITY/LISTING STATUS	TIME PERIOD/COMMENTS
41CH240	Eligible, NRHP Listed	Historic
41CH239	Eligible, NRHP Listed	Historic
41CH238	Eligible, NRHP Listed	Historic
41CH237	Eligible, NRHP Listed	Historic
41CH243	Eligible, NRHP Listed	Historic
41CH57	Eligible, NRHP Listed	Multicomponent
41LB86 (Unknown Shipwreck)	Eligible, TX State Antiquities Landmark	Historic
41LB85 (J.D. Hinde Shipwreck)	Eligible, TX State Antiquities Landmark	Historic
41CH242	Ineligible	Historic
41CH65	Undetermined	Multicomponent
41CH66	Undetermined	Pre-contact
41CH68	Undetermined	Pre-contact
41CH311	Undetermined	Pre-contact
41CH316	Undetermined	Pre-contact
41CH329	Undetermined	Pre-contact
41CH130	Undetermined	Unknown
41CH125	Undetermined	Unknown
41CH383	Undetermined	Unknown
41CH271	Undetermined	Unknown
41CH131	Undetermined	Archaic
41CH319	Undetermined	Pre-contact, possible Archaic
41CH21	Undetermined	Unknown
41CH72	Undetermined	Unknown
41CH315	Undetermined	Unknown
41CH263	Undetermined	Unknown
41CH52	Undetermined	Unknown
41CH45	Undetermined	Multicomponent
41CH120	Undetermined	Unknown
41CH258	Undetermined	Unknown
41CH33	Undetermined	Unknown
41CH256	Undetermined	Unknown
41CH257	Undetermined	Unknown



Table 2. Continued

SITE #/NRHP LISTING	ELIGIBILITY/LISTING STATUS	TIME PERIOD/COMMENTS
41LB47	Undetermined	Historic
41CH16	Undetermined	Unknown
41CH17	Undetermined	Unknown
41CH49	Undetermined	Unknown
41CH48	Undetermined	Unknown
41CH384	Undetermined	Historic
41CH150	Undetermined	Unknown
41CH64	Undetermined	Unknown
41CH67	Undetermined	Unknown
41LB53	Undetermined	Multicomponent
41LB54	Undetermined	Multicomponent
Orcoquisac Archaeological District	Eligible, NRHP Listed	Multicomponent
Wallisville Historic District	Eligible, NRHP Listed	Historic (no standing structures, only foundations)
State HWY Bridge #3	Eligible, NRHP Listed	Historic
1818 French Site of Champ d'Asile	Undetermined	Historic
Unknown Shipwreck	Undetermined	Historic
Cleona Shipwreck	Undetermined	Historic
Orizaba Shipwreck	Undetermined	Historic
41LB47	Undetermined	Historic
41LB49	Undetermined	Historic
Governor Peace Shipwreck	Undetermined	Historic
Joseph BancPlain's Sloop Shipwreck	Undetermined	Historic
Dallas Shipwreck	Undetermined	Historic
Donna Jean Shipwreck	Undetermined	Historic
41CH413	Undetermined	Historic
41CH414	Undetermined	Historic
41CH415	Undetermined	Historic



PARKS AND OTHER PROTECTED AREAS

The Trinity River and Trinity Bay offer various outdoor recreation activities, such as boating, fishing, and wildlife viewing, and are surrounded by parks, public use areas, and conservation areas (Figure 34). The Trinity River National Wildlife Refuge, managed by the USFWS, protects a 30,000-acre mature bottomland hardwood forest ecosystem and is home to a diverse range of species, including Texas' largest maternal colony of Rafinesque's big-eared bat (*Corynorhinus rafinesquii*), a USFWS Species of Concern (USFWS, 2024c). The area is considered a critical conservation area, and the Liberty County Strategic Plan recommends developing regulations to ensure development is sensitive to conservation efforts and involves coordination with landowners, state, and federal authorities (Liberty County, 2016).

The Wallisville Lake Project, operated by the USACE, is a 20,000-acre project within the Port of Liberty AOI that was authorized for navigation, salinity control, water supply, fish and wildlife enhancement, and recreation (USACE, 2023).

The project includes specific recreational facilities, such as:

- The JJ Mayes Wildlife Trace
- Hugo Point Park
- Cedar Hill Park
- Trinity River Island Recreation Area
- Trinity River Waterbird Rookery

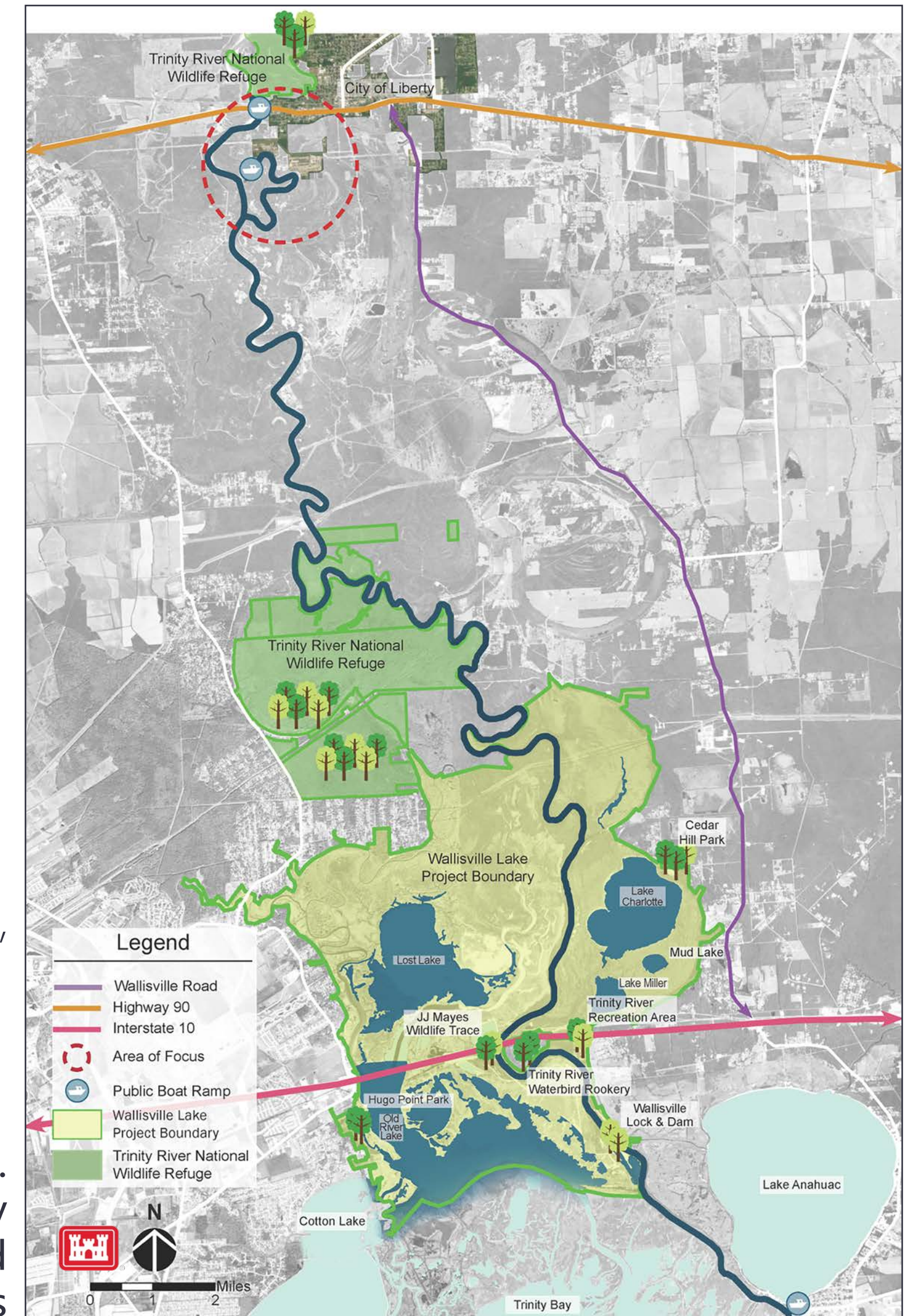


Figure 34.
Port of Liberty
Parks and
Protected Areas

HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

There are no recognized environmental conditions (RECs) of concern found in the project area (Figure 35). A Phase-I Environmental Site Assessment (ESA) was completed in October of 2017. However, due to the time lapsed, it is recommended that a new ESA be completed based on ASTM E1527-21 Phase-I Environmental Site Assessment (ESA) with a standard effective date of February 14, 2024, for the following reasons:

- The shelf life of Phase-I ESA is 180 days. This starts at the earliest component completed (i.e. interviews, lien search, review of environmental databases and regulatory files, site visit, etc.).
- Sediment Quality testing was not found in the report. It is highly recommended that USACE obtain recent quality sedimentation data before conducting dredging operations.



Figure 35.
Port of Liberty
HTRW

Note: The 2017 Phase-I Environmental Site Assessment (ESA) locations identified in the map were not designated as Recognized Environmental Conditions (RECs) of concern.



FLOODPLAIN

Floodplain designations, determined by the Federal Emergency Management Agency (FEMA), indicate the probability of flooding in an area within a specific timeframe. Flood mitigation will be required within the regulatory floodway and the 100-year floodplain during port restoration.

DESIGNATION	DESCRIPTION	FLOOD RISK
500-year Floodplain	Land with a 0.2% chance of flooding annually	Low
100-year Floodplain	Land with a 1% chance of flooding annually	Moderate
Regulatory Floodway	The river channel and adjacent areas reserved for base flood discharge without increasing water elevation significantly. This area functions as part of the waterway during a flood event and fills with flowing water.	High

Table 3. Floodplain Designation and Flood Risk

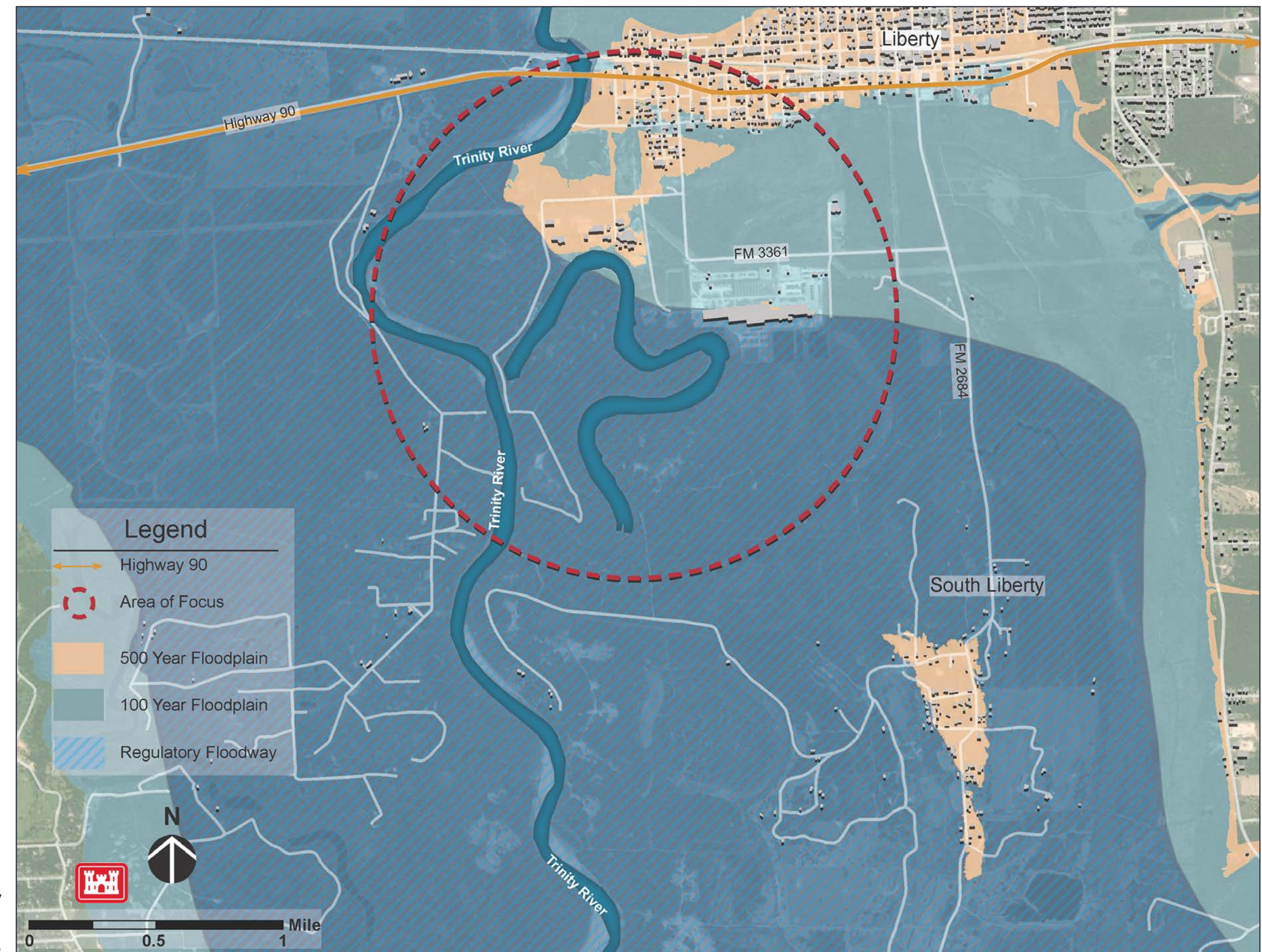


Figure 36. Port of Liberty FEMA Flood Hazard Areas

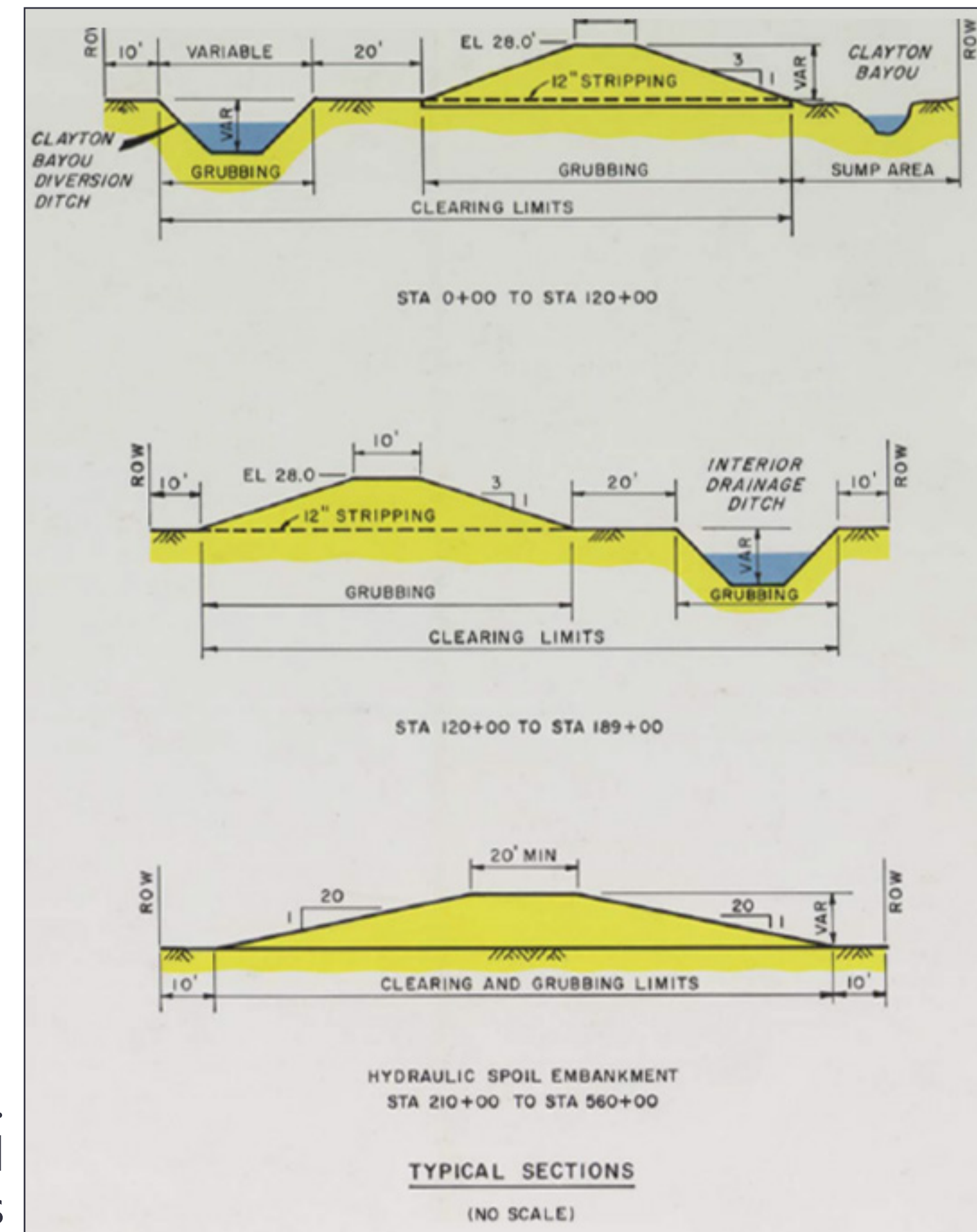
PAST LIBERTY FLOOD PROTECTION PLAN

A large portion of the City of Liberty is within the Trinity River floodway and is prone to flooding. In 1990, a study was completed by the USACE to address the flooding issues (see Figures 37 and 38). The project proposed:

“An earth levee, approximately 59,400 feet long, together with appurtenant drainage facilities which consist of permanent sump areas, gated gravity drains, and tow pumping stations having capacities of 40,000 and 150,000 gallons per minute, respectively. Approximately 31,400 linear feet of the levee are to be constructed by controlled placement of hydraulically dredged material obtained from the multiple purpose channel, and the balance of the levee is to be compacted fill obtained from designated borrow areas. The levee will protect about 8 square miles of flood plain which included about one-half of the City of Liberty.”

- Liberty Local Protection Project,
City of Liberty, Texas,
30 September 1990

Figure 37.
Liberty Past Flood
Protection Sections



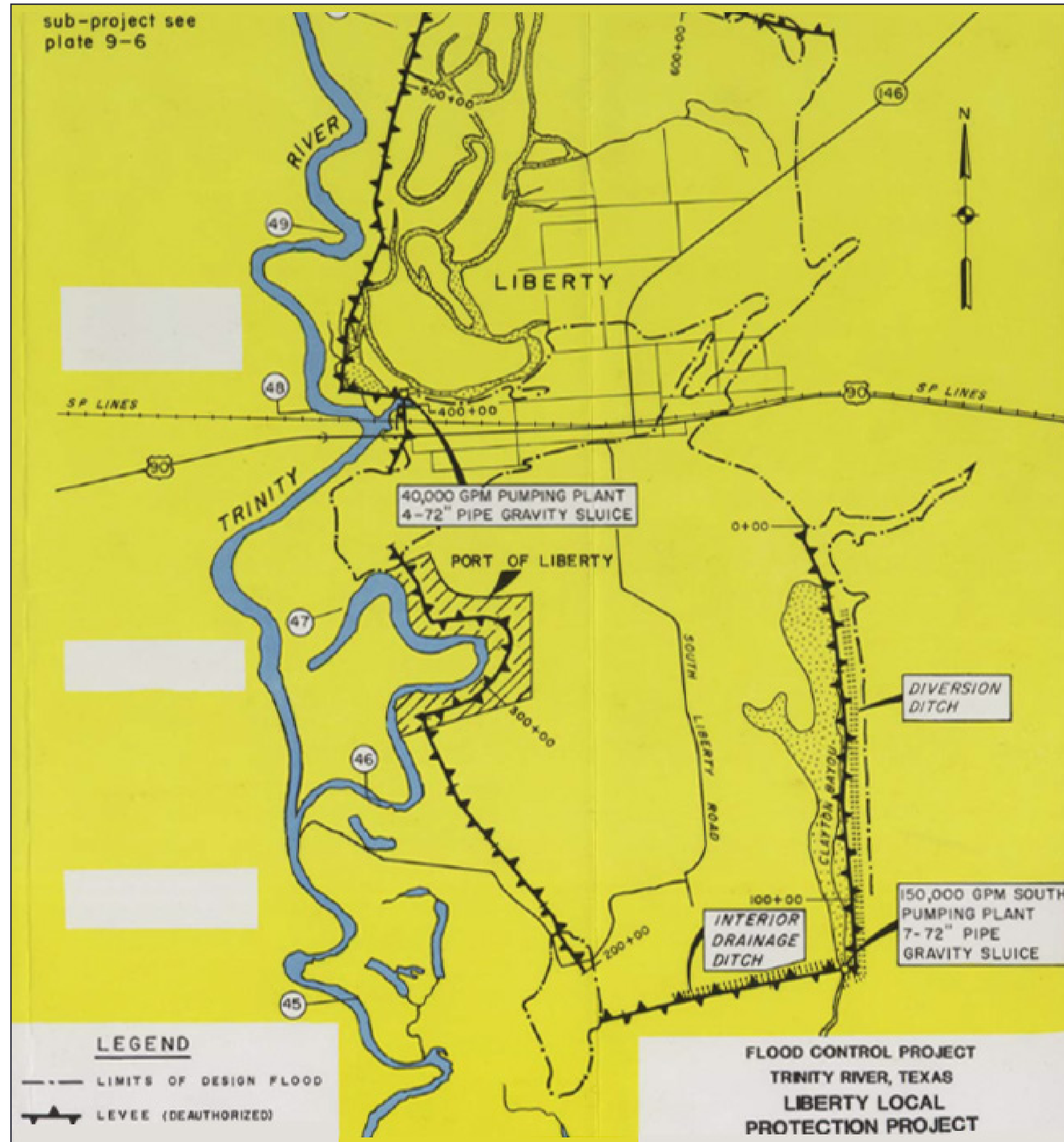


Figure 38. Liberty Past Flood Protection Plan

SEDIMENTATION

Sedimentation within the study area is a major concern. Failure to properly and consistently conduct maintenance dredging will negatively impact the navigability and operational viability of the Port of Liberty. As illustrated here in the tan-colored areas along the river, there are many segments along the Liberty River Channel where silt is laid down.

Due to the lack of consistent dredging, the south end of the oxbow at the city of Liberty is

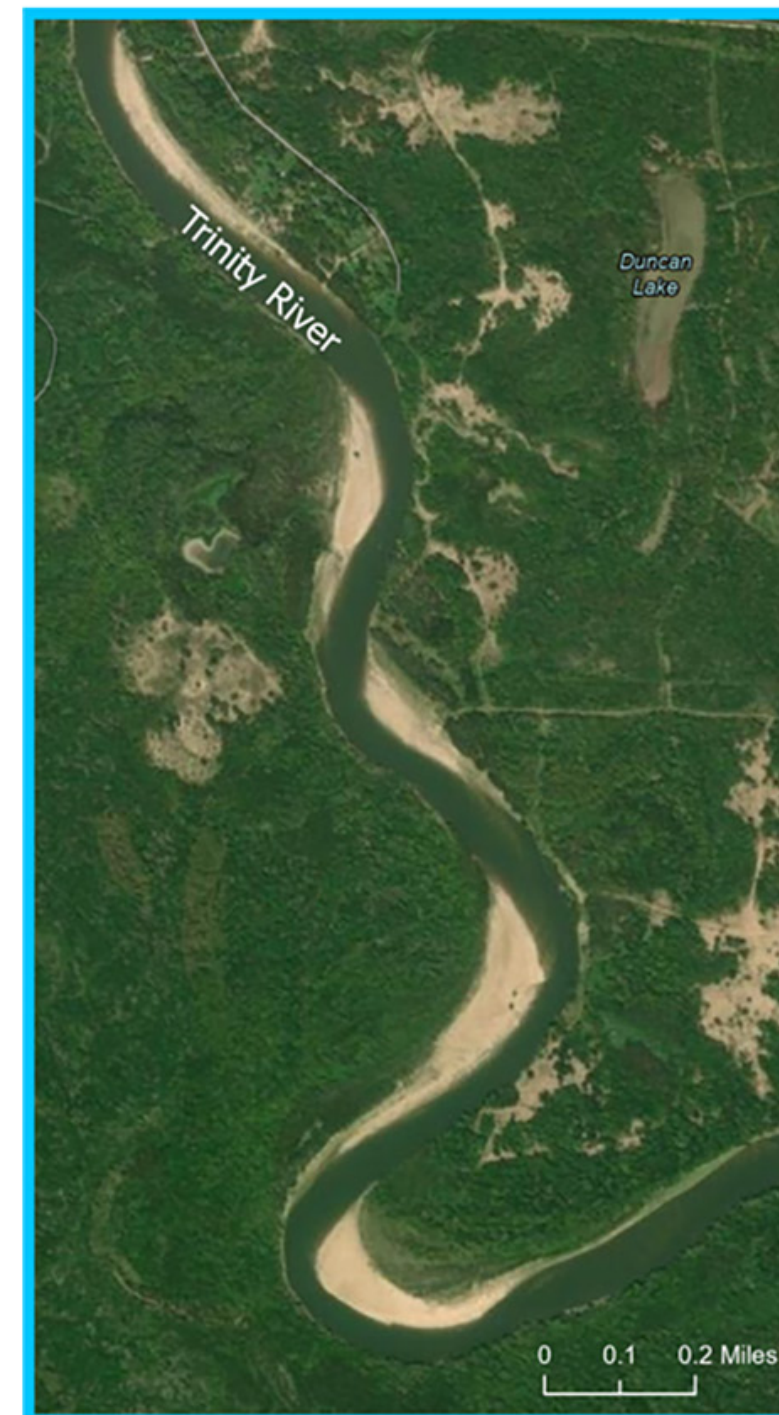
completely silted in. Strategies for economically dredging the area to include beneficial use of dredged material will need to be considered as part of the larger feasibility study for the Port of Liberty.



Trinity River channel narrowing caused by sedimentation near the northern end of the oxbow, along the west side of the Trinity River.



Narrow southern oxbow opening covered with vegetation.



Sedimentation along the Trinity River south of Liberty with channel narrowing

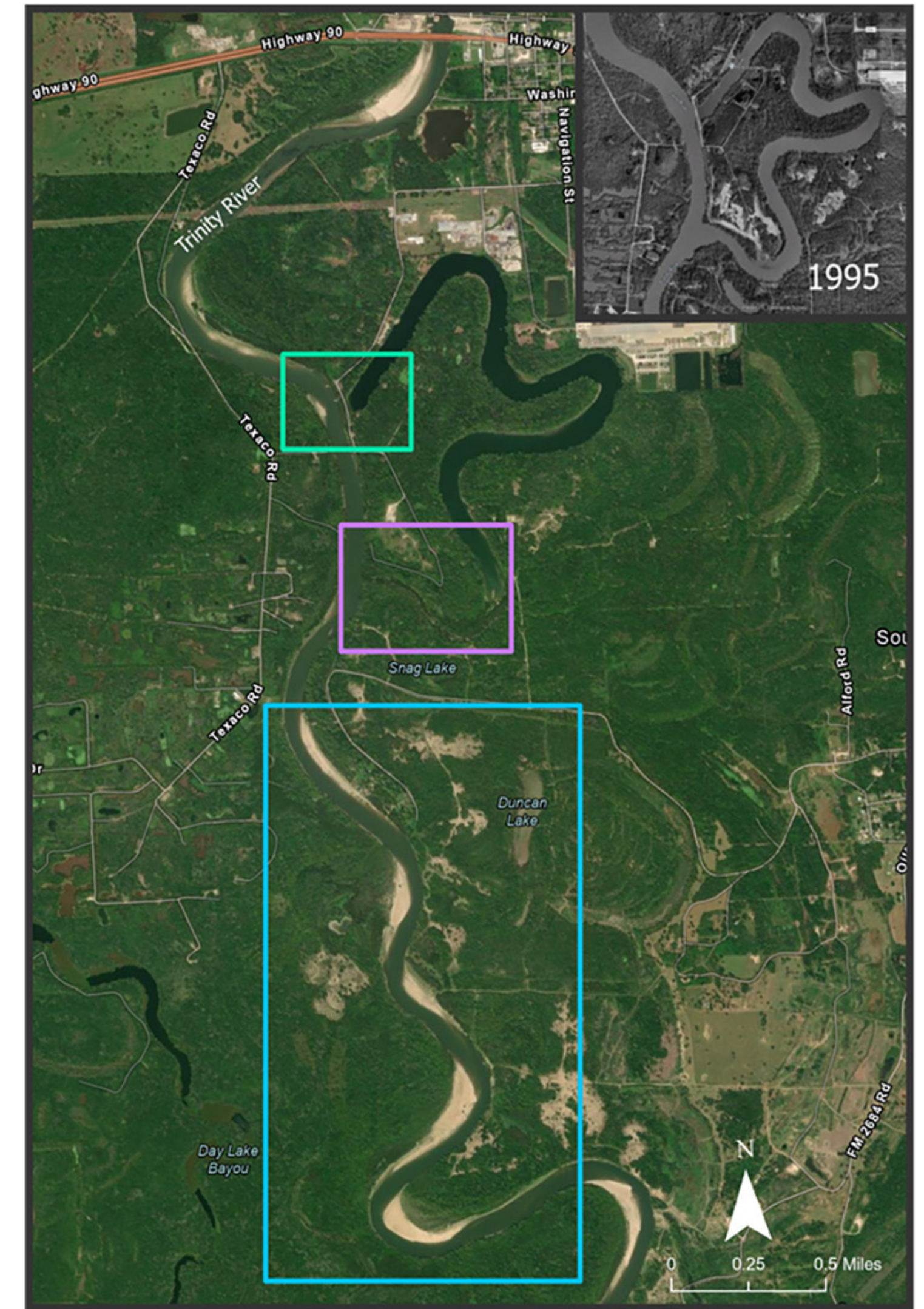


Figure 39. Port of Liberty Sedimentation



LAND OWNERSHIP

Figure 40 illustrates the governmental land ownership within the city of Liberty. This land has to potential to be used to support development of the proposed inland port.

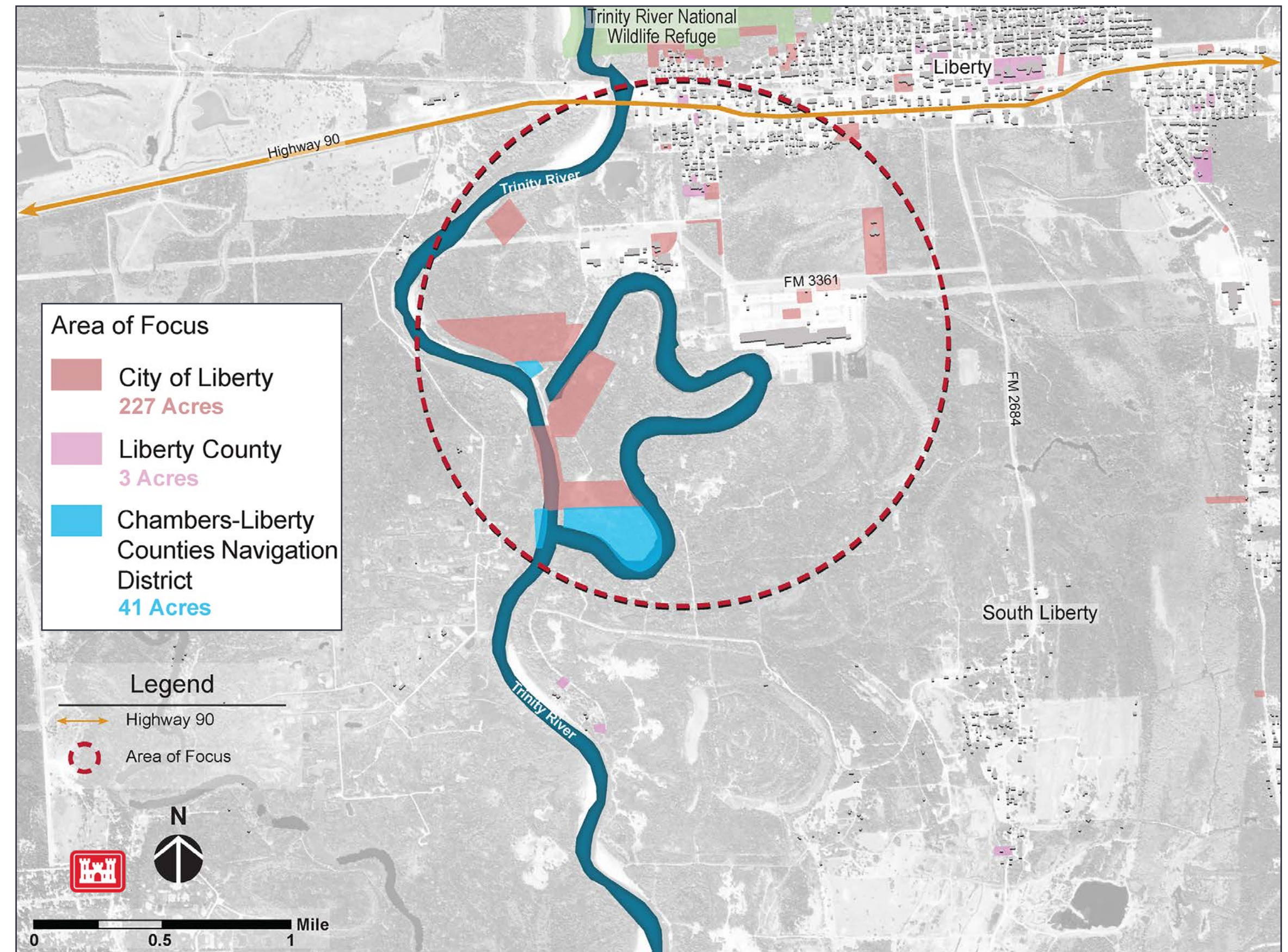


Figure 40.
Port of Liberty
Land Ownership

DEVELOPABLE AREAS

Developable areas are designated based on the constraints to building on the site. As can be seen, most of the area in Liberty and along the oxbow are in Developable Area 3, which is within the regulatory floodway.

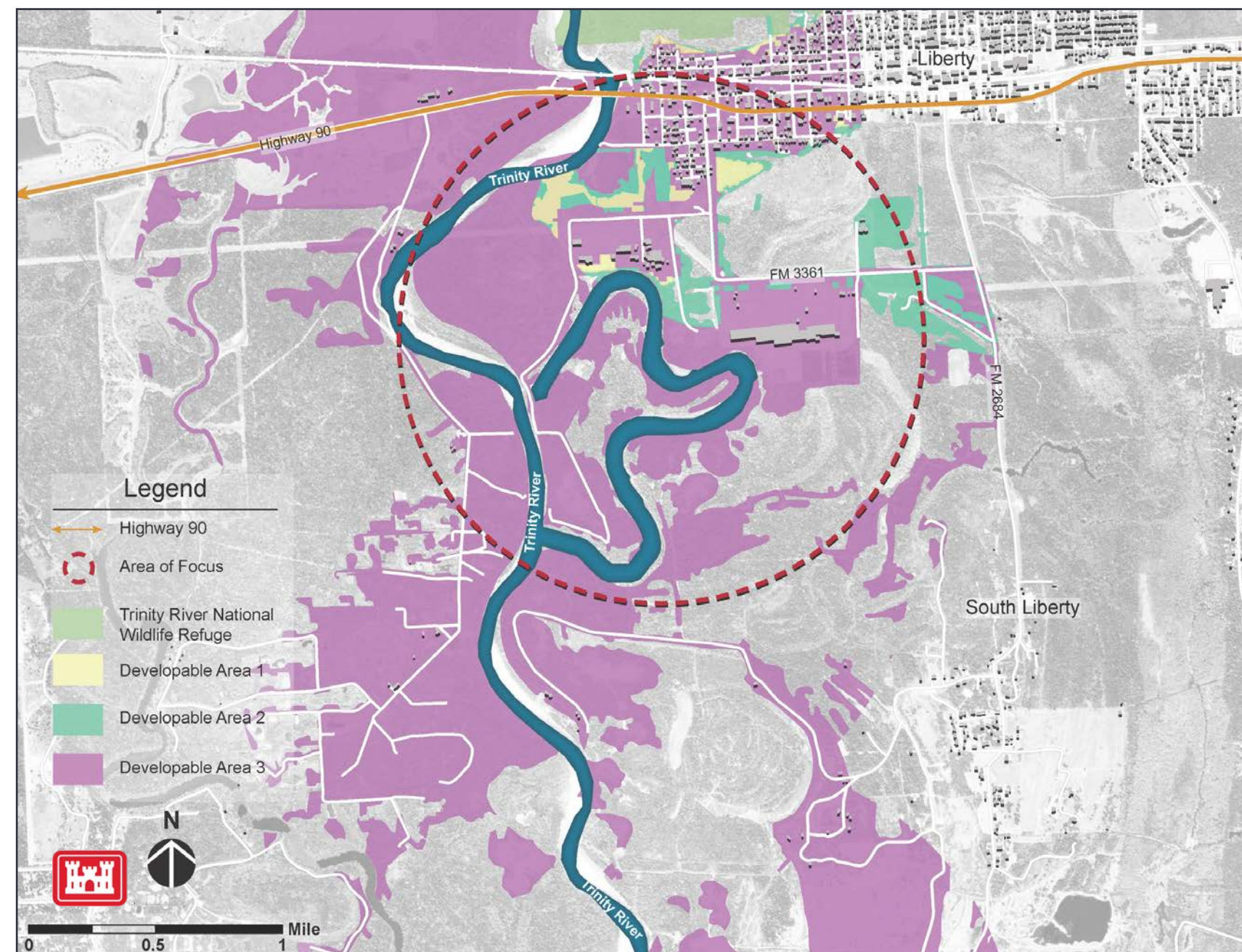


Figure 41. Port of Liberty Developable Area

Developable Area 1 -

- Minimal natural and manmade constraints
- Free of buildings, roads, and parking lots
- Can be developed immediately
- 500-year floodplain

Developable Area 2 -

- Some natural and manmade constraints
- May include existing horizontal infrastructure, such as roads and parking lots
- 100-year flood plain

Developable Area 3 -

- Additional constraints, such as existing buildings
- May be within the regulatory floodway

Areas protected by state and federal regulations have been excluded as potential development areas.



REGIONAL CONNECTIONS

Roads – US Highway (US) 90 passes through the City of Liberty and connects to Beaumont and Houston and provides connections to Interstate 10 (I-10). US 90 is 4 lanes to Houston and 2 lanes to Beaumont with plans to expand to 4 lanes. Hwy 90 is used as a bypass for I-10 traffic and negatively impacts traffic in Liberty and Dayton. Roads connecting directly to the port will need road improvements for future heavy truck traffic. State Highway 146 and Farm to Market (FM) 1409 connect US 90 to I-10 between Dayton and Mont Belvieu. FM 563 and SH 61 connect US 90 to I-10 between Liberty and Devers.

Water – The channel is approximately 30' deep by 200' wide in the Trinity River. Gulf Intercoastal Water Way (GIWW) traffic can access the Trinity River. The Trinity River only has one recreational boat ramp in poor condition near the port location with the nearest other recreational boat ramp is 40 miles away.

Rail – An abandoned rail spur crosses US Highway 90 down to the port site. Reconnecting the existing rail spur to the port will need to resolve several critical issues. Staging the rail is difficult as there is limited space, and the railroad is concerned with impeding on the main rail line traffic. The City of Liberty owns the rail crossings. Union Pacific owns the rail that passes through the City of Liberty, the holding yard of east side of Liberty, closer to Beaumont, and the large rail-port/holding yard in Dayton. Typically, 43 trains a day pass through City of Liberty, and staging the rail cars is not favorable as the space and time it takes to stage railcars impedes on main rail line traffic and road crossings in Liberty.



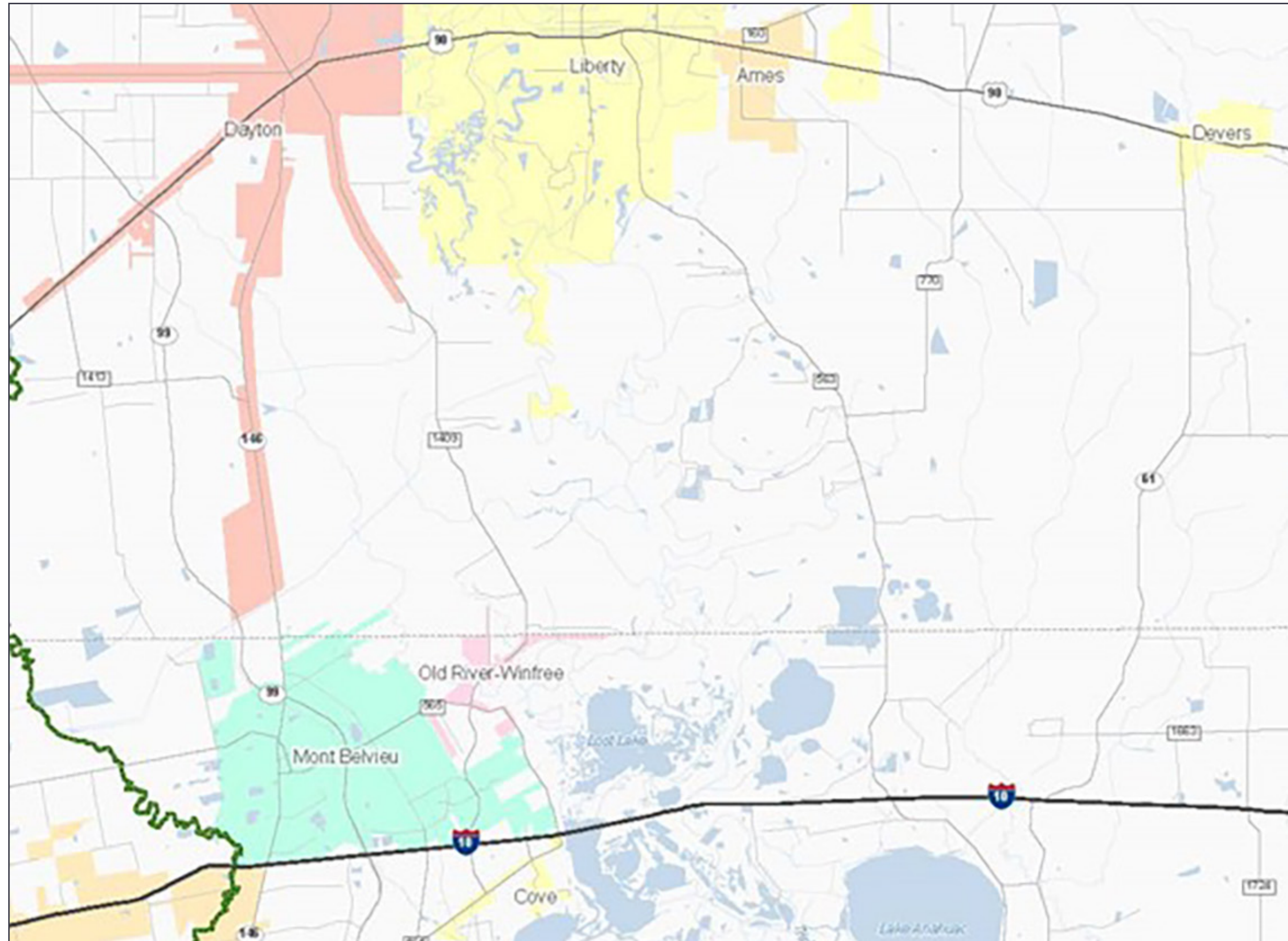


Figure 42. Road Connections (TXDoT Statewide Planning Map)



Pipelines – As with most of the area along the southeast Texas coast, Liberty County contains numerous pipelines for a wide variety of materials including crude oil, natural gas, and other high volatility liquids. The existing pipelines could potentially connect to the Port of Liberty site.

Port of Houston – The Houston Ship Channel complex and its more than 200 private and eight public terminals, collectively known as the Port of Houston, is the nation’s largest port for waterborne tonnage and an essential economic engine for the Houston region, the state of Texas, and the U.S.. Port Houston owns and operates the eight public facilities along the 52-mile Houston Ship Channel, including the area’s largest breakbulk facility and two of the most efficient container terminals in the nation.

Sabine-Neches Waterway – The Sabine-Neches Waterway is the second-longest inland waterway on the U.S. Gulf Coast and home to two U.S. strategic seaports – the Port of Beaumont and the Port of Port Arthur. The waterway is the No. 1 bulk liquid cargo and 3rd largest waterway by cargo volume in the nation. Operated by the Sabine-Neches Navigation District, it has operated in Jefferson County for over 100 years.

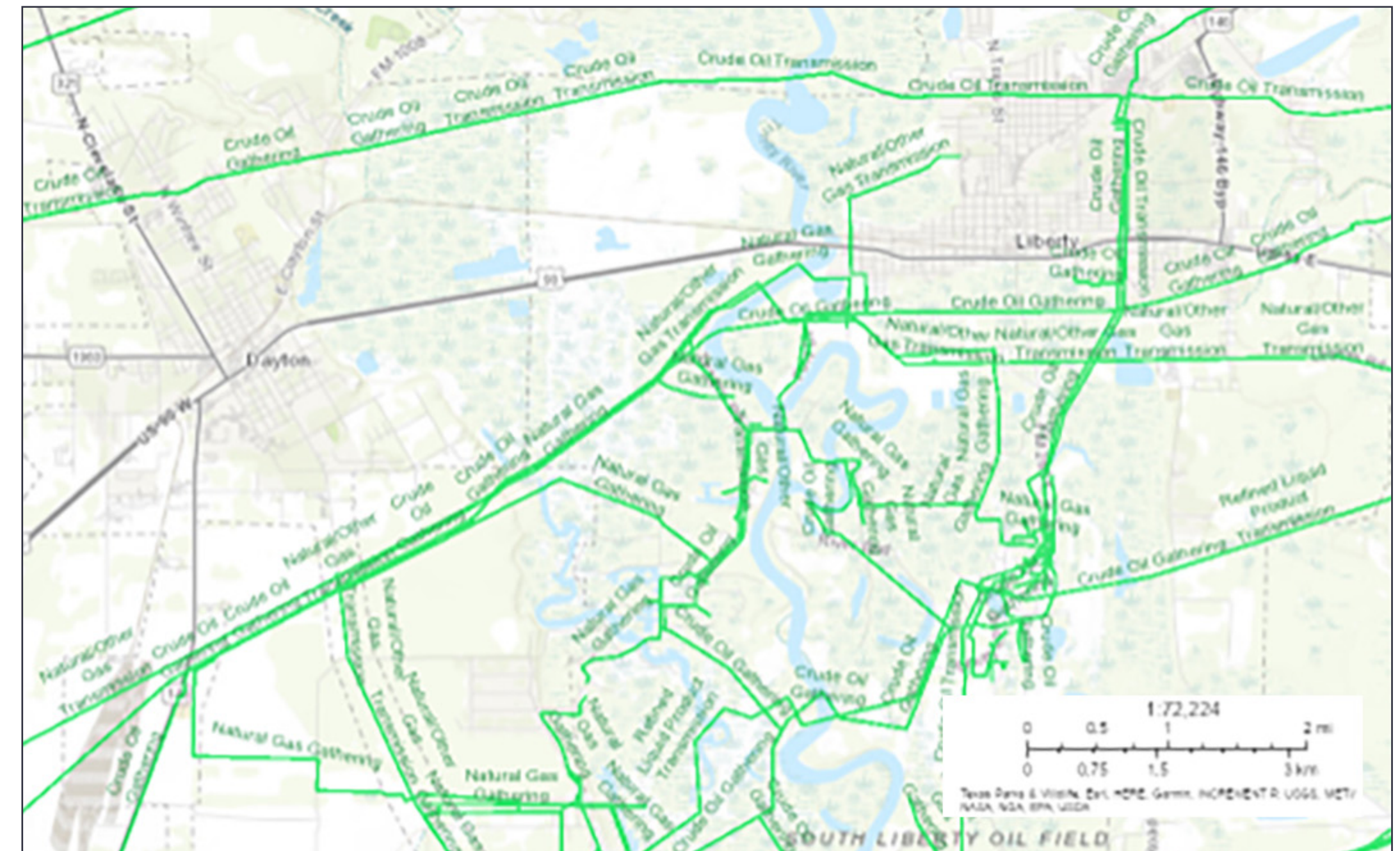


Figure 43. Map of Pipelines Near the Port of Liberty Site (Texas Railroad Commission)

WATER SUPPLY

Luce Bayou Interbasin Transfer Project (LBITP) – Owned and operated by the Coastal Water Authority (CWA), the LBITP transfers water from the Trinity River to Lake Houston and includes a pump station, pipelines, and an earthen canal. The LBITP is located downstream of the Port of Liberty immediately west of the Trinity River channel.

Lake Livingston – Owned and operated by the Trinity River Authority (TRA), Lake Livingston supplies water to four counties and the City of Houston. The lake is located upstream of the Port of Liberty of the Trinity River.

Chambers-Liberty Counties Navigation District (CLCND) – The district stretches from the northern boundary of Liberty County to the southern boundary of Chambers County and varies from five to ten miles in width following the Trinity River. It comprises 255,649 acres in Chambers County and 185,375 acres in Liberty County. The original purpose of the district was to provide navigation, as it was intended to be the first leg of a barge channel to Dallas. The channel to

Dallas never became a reality but the district now performs two major functions, navigation and raw water supply.

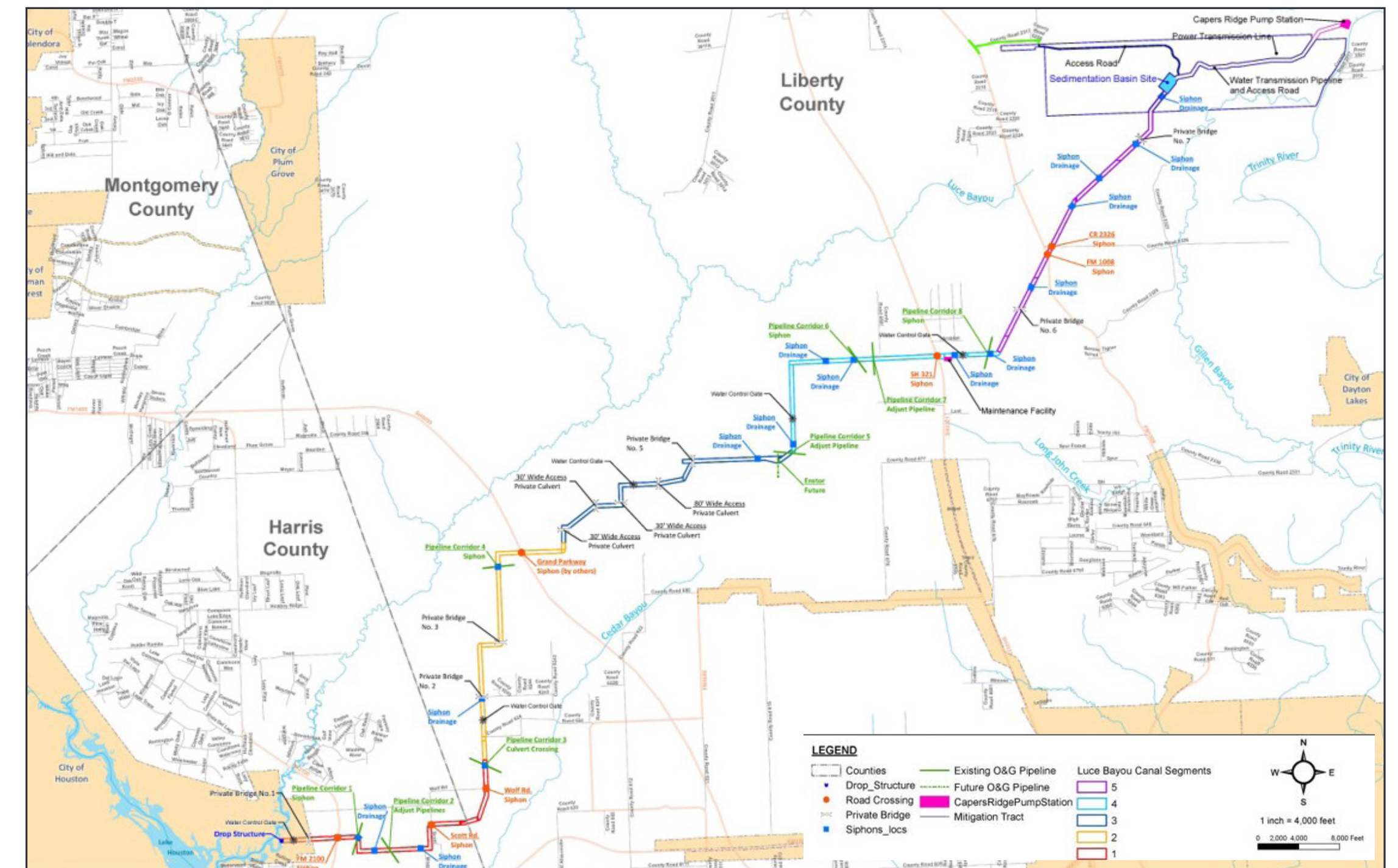


Figure 44. Luce Bayou Interbasin Transfer Project September 2016 (Coastal Water Authority)



SALT DOMES

A salt dome is a mound or column of salt that has intruded upward into overlying sediments. Salt domes can form in a sedimentary basin where a thick layer of salt, typically left over from a salty body of water millions of years ago, is covered by younger sediments of substantial thickness. (Miller 2021)

In many cases, salt domes reach thousands of feet above the salt layer from which they began growing. When this occurs, the domes can deform rock layers into traps that hold oil and natural gas. Because the salt is impermeable, the domes can serve as underground storage or for hazardous waste disposal. (Miller 2021)

Most salt domes in Texas are very large, ranging from a half-mile to more than 5 miles across. The parent rock units that serve as the source of salt can be several hundred to a few thousand feet thick and can be located more than a mile below the surface of the Earth. (Miller 2021)

Liberty County is home to three major salt domes, all on private land. (Figure 45) The highest point in otherwise flat Liberty County is actually the roof of a salt dome called Davis Hill. Near Dayton are the Esperson (discovered in 1928), North Dayton (1900) and South Dayton (early 1920s) salt domes. (Miller 2021)

The Dayton-area domes are well suited for liquefied natural gas storage and have attracted several energy companies that have built facilities nearby. Their combined business activity has brought millions of dollars annually in tax revenue to the region, making it a fast-growing zone for new residential construction and other businesses. The population of Dayton has doubled since 2000, which many attribute to the economic impact of the energy industry influx around the domes. (Miller 2021)



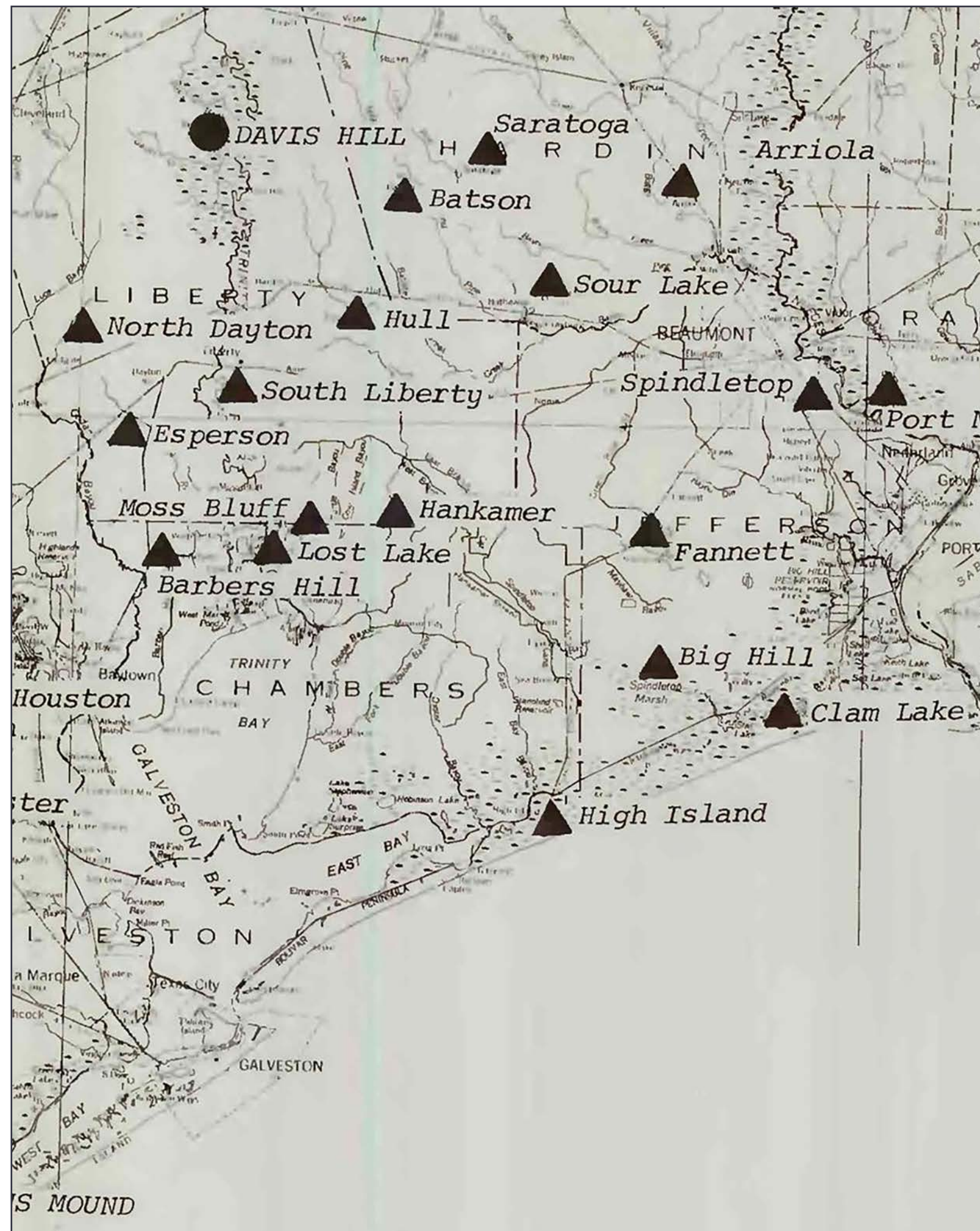


Figure 45. Partial Map of East Texas Salt Domes (USGS website)

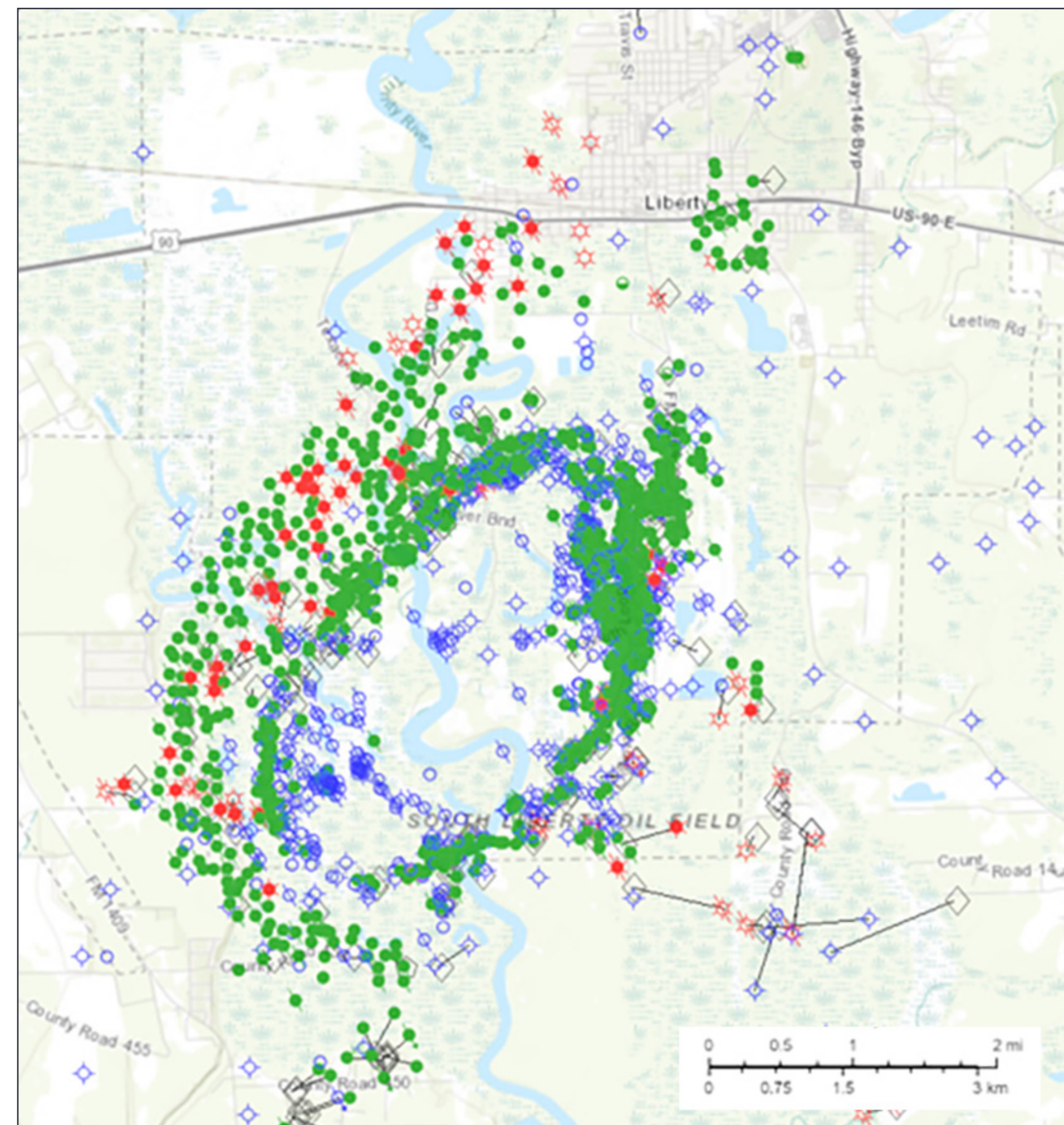


Figure 46. Map of Wells in South Liberty Oil Field (Railroad Commission of Texas website)



OIL AND GAS

The South Liberty Field is a piercement-type salt dome located on the Trinity River three miles south of the town of Liberty, Texas, and six miles east of the Esperson oil field. The productive area on the south flank of the dome was known as the South Dayton Field. The field is located on the flat, Gulf Coastal, southeastward dipping monocline with the surface elevation being 15 to 30 feet. The surface formation is the Beaumont clay of Pleistocene age. (Houston Geological Society 2007)

The South Liberty Dome was first indicated by sulphur springs, and gas and oil seeps in 1901 soon after the discovery of the Spindletop dome. A well was drilled in 1905 which found gypsum and sulphur in the caprock at a depth of 600 feet. Commercial oil production was found in 1925. The discovery of flank production is attributed to subsurface geology. (Houston Geological Society 2007)

In 1947, production from the field had declined to less than 500 barrels of oil per day, but subsequent discoveries and development have made the South Liberty Field a major producer of oil and gas. (Houston Geological Society 2007)



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PART 3

VISION, GOALS, AND OBJECTIVES

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PUBLIC AND STAKEHOLDER ENGAGEMENT

The U.S. Army Corps of Engineers and the Trinity River Authority hosted a public open house to request public comments toward the creation of a Vision Plan for the Port of Liberty. The Vision Plan will focus on the best and highest uses for lands related to the Port of Liberty that support economic development, environmental stewardship, and multi-modal transportation, including Trinity River navigation.

A public open house to learn about the project and contribute comments was held from 5:30 to 6:30 p.m. on March 20, 2024, at the Liberty County - A.J. "Jack" Hartel Building on 318 San Jacinto Street, Liberty, Texas 77575.

The public open provided attendees with information regarding the Port of Liberty Vision Plan content, development process, and general schedule. Attendees were able to view current maps and ask questions. A 30-day public comment period followed the open house from March 20, 2024, and ended April 19, 2024.

The following pages reflect the findings of the public engagement process.



STRENGTHS, WEAKNESSES, OPPORTUNITIES, AND THREATS (SWOT) ANALYSIS

The public and stakeholders were asked to provide their thoughts on the strength, weaknesses, opportunities and threats (SWOT) for the current conditions of buildings and infrastructure, environmental, and economics components at Liberty, Texas, where the port is being proposed. Each SWOT category is defined below:

STRENGTH = Assets to keep or replicate

WEAKNESS = Concerns that would hinder desired development

OPPORTUNITY = Opportunity to take advantage of

THREAT = Liabilities to fix or remove

The responses received from the stakeholders and public were consolidated and are summarized over the next few pages.



SWOT ANALYSIS

Building and Infrastructure



Strength



- Near multiple ports including Port of Gulf Sulfur, Port of Anahuac, Port of Houston, Port of Dayton, Port of Mont Belview
- Port Authority owns land and buildings
- Existing infrastructure of rail and electric substation
- Civilian boat ramp
- Keep Old Hwy 90 bridge for possible restoration

Weakness



- Major flooding which disrupt road systems and civilian access
- Debris could be washed down stream
- Construction on/near wetlands
- Impact on migratory birds and native animals
- UPRR bridge constriction causing erosion
- Streambank setback and erosion
- Low flows in river

Opportunity



- Ecotourism opportunities such as picnic area, kayaking, paddle-boarding
- Reconnecting to existing rail network
- Bulk dock facility may divert some barge traffic from Houston

Threat



- Cost of dredge and maintaining dredge going forward
- Widespread flooding results in limited areas for commercial or residential development
- Flood inundation of port facilities



SWOT ANALYSIS Environmental



Strength



- Increases access to river for resources and tourism industry
- Federal funding available for environmental restoration
- Ability to set aside certain areas for recreation
- Port provides better and safer access compared to flooded roads

Weakness



- Pollution and negative air quality
- Low flows in river
- Wetlands and ESAs
- Exacerbate erosion
- Impact on endangered species
- Improper dredge management could degrade habitat and contaminate water

Opportunity



- Maintain natural state
- Natural habitat for migrating animals and native animals
- Undisturbed wetlands could benefit wildlife
- Potentially lowering carbon emissions by reducing truck and rail traffic
- Beneficial use of dredge material could promote environmental restoration

Threat



- Poor lighting
- Riverbank erosion
- Need to finance the Port

SWOT ANALYSIS Economics



Strength



- Open Port of Liberty to Trinity River
- Connect Port of Anahuac to Trinity River
- Allow both facilities to help keep the River open
- Open cut to Liberty (pipe facility)
- Rail into Port – maybe from the east

Weakness



- Trinity River depth and navigation
- Monitoring Electric Company chemicals
- Length of time it takes to get approval to dredge

Opportunity



- Great opportunity not just for the Port of Liberty but also the Port of Anahuac
- Maintaining Trinity River dredge and Anahuac Channel
- Existing industrial businesses that need river access such as Dayton Rail Port
- Existing businesses in the Port such as Moss Bluff exports
- Growth in I-45 and I-69 corridors
- Grants or rail, docks, appurtenances
- Strategic location for economic growth
- Increase jobs availability • Tax base

Threat



- High cost
- Looking for funding
- Silting of river leading to cost uncertainty
- Railroad connection is large economic cost
- Lack of funding for infrastructure
- Opposition from other Texas Ports
- Lack of Port tenants



LIKES AND DISLIKES

As part of the public and stakeholder input process, participants were asked to list the things they liked or didn't like about Liberty and the potential for a port development. Key among the findings are an appreciation for the beauty of the natural environment and ideas for potential new products to include, and concerns over flooding and the constant need to dredge the oxbow.

The following pages summarize the findings.



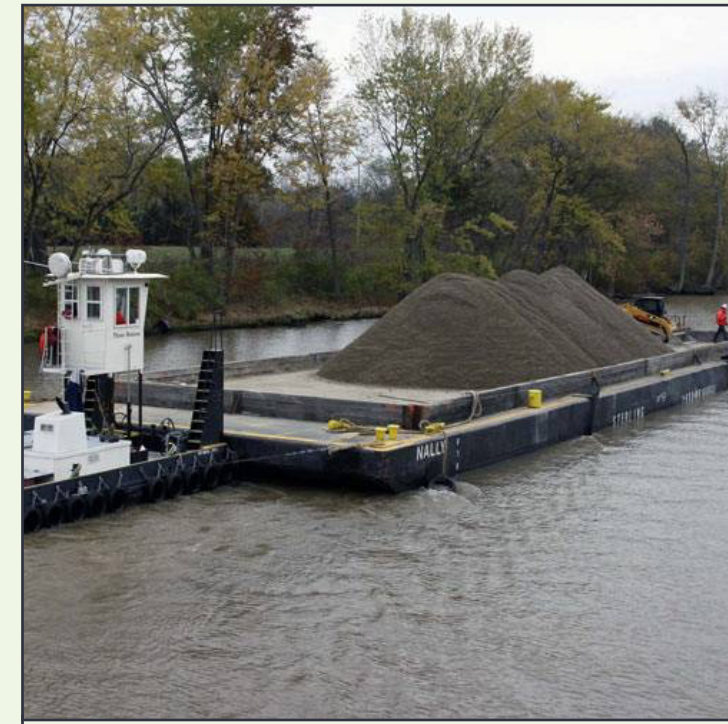
LIKES



Opening both sides of oxbow to stream flows can allow for a sustainable port with ecosystem restoration



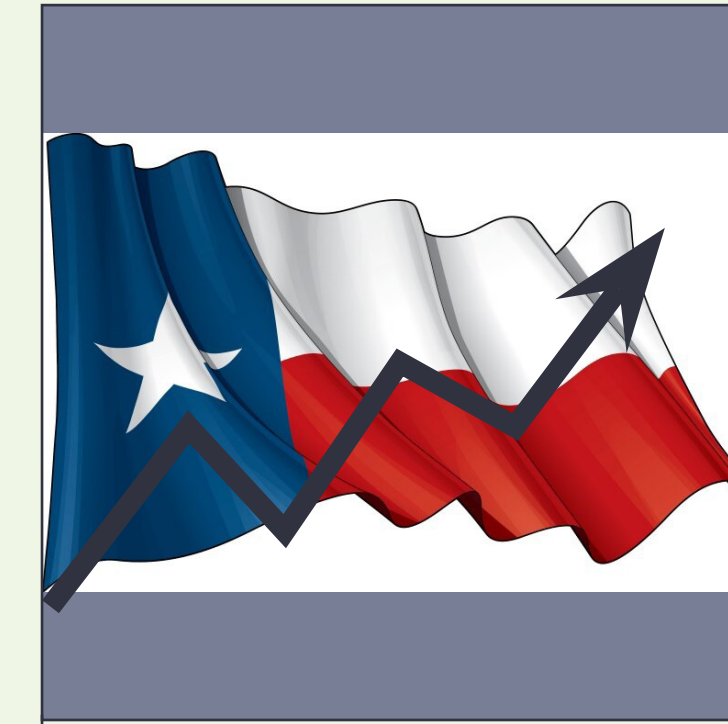
Regional Ecotourism



Reuse of dredge material and sand pits in northern part of Liberty County can be used for concrete, bottles, coastal reclamation



Export wood pellets



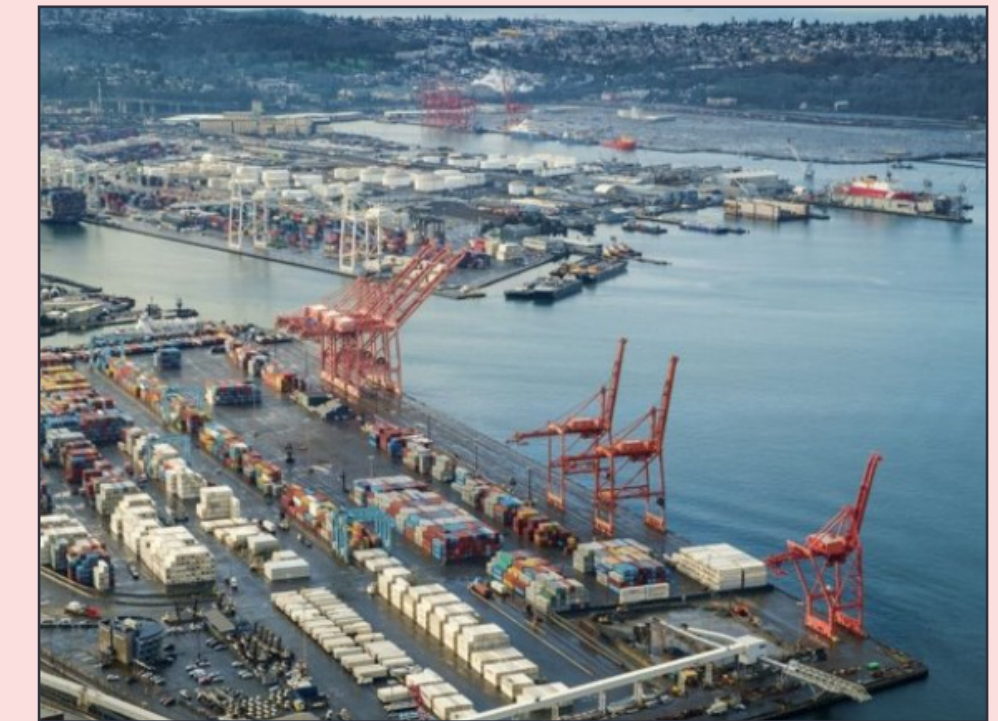
Economic driver



Shells for road base



DISLIKES



- Dredging without maintenance is a problem for keeping the port open
- Water flow will need to be consistent and available all the time (TRA has all the historical data on river flows)
- Next closest boat ramp is Interstate 10
- Railroad bridge alters the flow and sedimentation pattern upstream of the port
- Port is not listed as a port by the State of Texas, will require relisting
- Ecotourism in conflict with port activities
- Flooding a common occurrence, loading docks will need to be elevated
- Opening north end of oxbow removes land bridge and access to oil field, alternative access will need to be provided
- Configuration of the Trinity River is not ideal for efficient navigation as it is narrow and twisty in sections

VISION STATEMENT

The Vision Statement is an aspirational statement that sets the expectations for the future. This statement leads the goals, which sets the objectives to guide the implementation of the Port of Liberty. Based on public and stakeholder input, the following Vision Statement was developed for the Port of Liberty:

The Port of Liberty is a multi-modal transportation facility that supports barge, rail, and road networks for commerce, economic development, recreation, flood mitigation, and environmental preservation through collaboration with private, local, state, and federal stakeholders and partners.

The goals and objectives support this vision that were derived from public and stakeholder comment are found on the following page.



GOALS AND OBJECTIVES

1. ECONOMIC



- **Objective 1.1:** Open and Connected Port; barge, rail, truck
- **Objective 1.2:** Ecotourism and Recreation
- **Objective 1.3:** Connect to Anahuac Port

2. ENVIRONMENTAL QUALITY



- **Objective 2.1:** Maintain environmental areas
- **Objective 2.2:** Utilize sand from dredge material to rebuild Texas Coastline
- **Objective 2.3:** Protect public health through responsible industrial development.

3. FLOOD REDUCTION



- **Objective 3.1:** Devise strategies to reduce flooding in Port and Town of Liberty
- **Objective 3.2:** Ensure new roads and rail are out of the 100-year floodplain
- **Objective 3.3:** Create a development plan that moves buildings and infrastructure out of the floodplain

4. RETAIL/DEVELOP



- **Objective 4.1:** Partner with local industry to move goods via Trinity River
- **Objective 4.2:** Create a stakeholder /partner group that is a forum for new innovative ideas for the Port
- **Objective 4.3:** Pursue MARAD grant opportunities
- **Objective 4.4:** Partner with private and public recreational partners

LIBERTY COUNTY STRATEGIC PLAN ALIGNMENT

The Vision Statement Plan for the Port of Liberty aligns with the Liberty County Strategic Plan. Developed in 2016-2036 in partnership with the Texas Target Communities and the County of Liberty, the plan included Vision statement for the county, as well a Future Economic Development Map for the county (Figure 47). The Liberty County vision statement states:

“Liberty County supports high quality of life by nurturing a family-friendly, resilient, and equitable community, and welcomes sustainable growth while conserving natural assets.”

The Strategic Plan indicates a desire to expand industry, preserve the natural setting, improve traffic flow, and connect future industrial areas. A port in Liberty would support a variety of industries that could make the area attractive to potential business and provide environmental benefits due to restoring the oxbow.

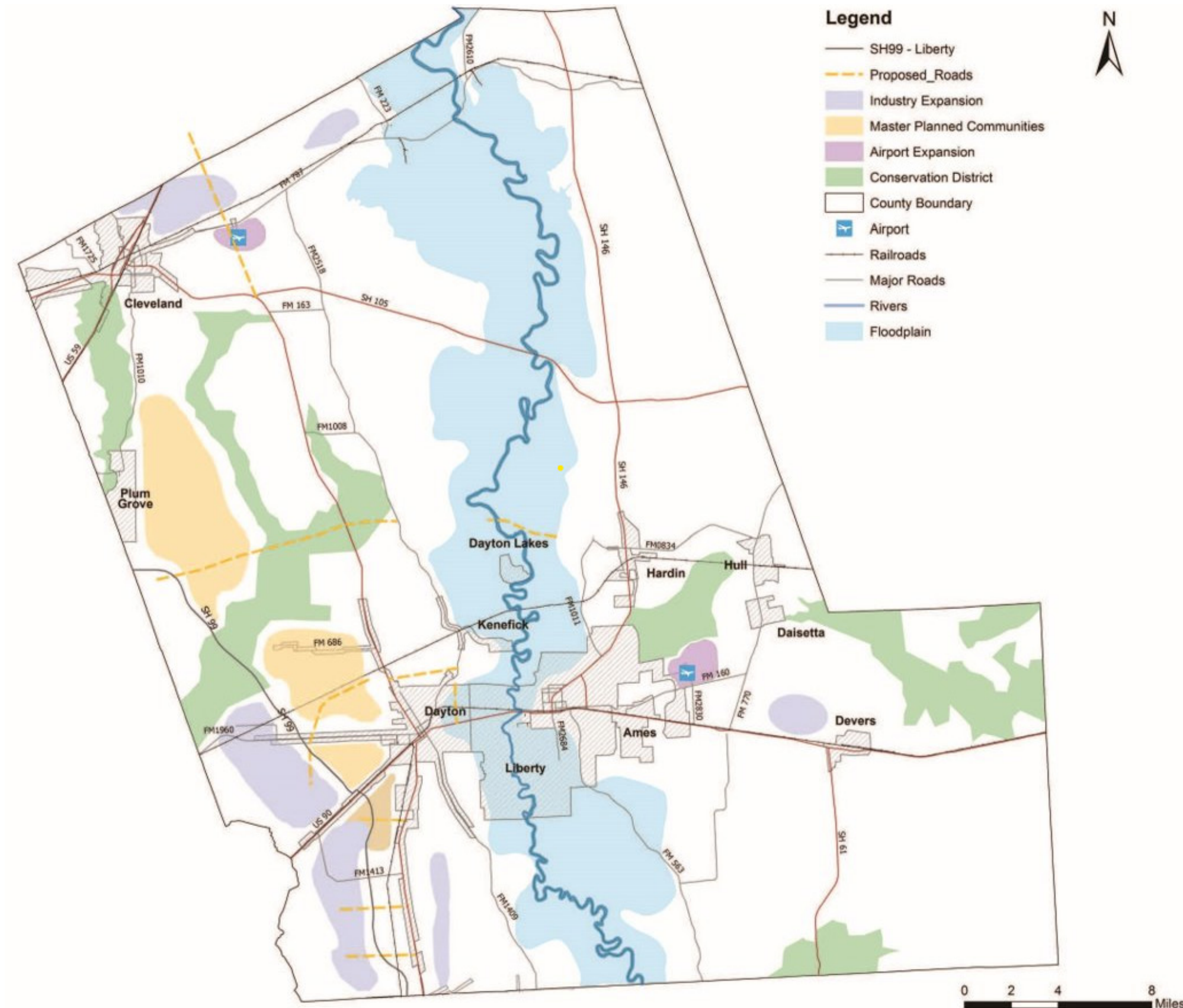


Figure 47. Liberty County Future Economic Development Map (Liberty County Strategic Plan)



PART 4

ANALYSIS OF ALTERNATIVES

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PROGRAM ELEMENTS

Program elements refers to the physical features that are essential to include in the vision of the port. This Vision Plan does not attempt to present a design of the Port of Liberty but focuses on the elements that will contribute to the success and sustainability of the port. Elements listed are basic features found at many inland ports that support barges. A phased implementation of the port is anticipated, and as the Port of Liberty matures and grows additional elements and products can be included to keep the port viable and responsive to market demand. Program elements discuss focus on their basic functions and general purpose.

DRY BULK CARGO TERMINAL

Terminal that is capable of loading, unloading, storing, and transporting dry bulk products. Cargo may be either loose, granular, free-flowing or solid but it is not shipped in package form. Products can include steel, lumber, scrap, grain, and sand. A dry bulk cargo terminal at the Port of Liberty will support the current manufacturing located near to the port.

LIQUID BULK PETROLEUM TERMINAL

Terminal that is capable of loading, unloading, storing, and transporting liquid bulk. Cargo is in liquid form and handled through pumps and piping. Products can include petroleum or other liquid chemicals. The terminal could potentially be connected to the numerous nearby pipelines.

STORAGE

Materials storage supports the port and is often associated directly at the terminal. Both inside and outside options for storage are needed depending on the materials transported. A separate storage area for materials storage located near the terminal facilities is a consideration.



CONNECTIONS (RAILROAD, ROAD, PIPELINE)

Port connections to other forms of transport is a critical element in a successful port. Connections to roadways are essential to move materials both to the port and away from the port to their destination. Roadways must be improved to handle heavy trucks and maintained to keep materials moving efficiently. Railroad connections are costly and difficult to implement but the Port of Liberty has an abandon railroad connection that will require detailed study to determine feasibility to reopen. Pipeline connections will support the liquid bulk petroleum transport of product with the use of trucks, barge, or rail.

DOCKS AND SLIPS

Docks and slips may be necessary to connect the barges to the port terminals. A dock is the designated area on a waterfront where a barge can securely moor and includes a flat platform for loading and unloading cargo. A slip is a specific, enclosed space within a barge dock designed for a single barge.

MATERIAL HANDLING EQUIPMENT

Within the port terminals a variety of material handling equipment is needed to load and offload material from the barges as well as transfer to or from trucks and rail. Equipment can include mobile cranes, winches, conveyors, and loaders.



Dry bulk terminal (Tulsa Ports website)



Neches River Barge Dock (Lanier Engineers website)

Figures 48-50.
Program Element Examples



Liquid bulk terminal (Manifold Times website)

ALTERNATIVE DEVELOPMENT PLANS

Following the on-site data collection, stakeholder discussions, and public meetings, the team continued to discuss these previous program elements in depth and provide alternatives that address the overall vision for the Port of Liberty.

ALTERNATIVE 1

Stakeholders collaborated to prepare three alternatives. Alternative 1, shown in Figure 51 proposes a port location that is sited on land that is currently owned by the Port Authority for the port. It will require some investment to make the site operational, and approval from the Port Authority who is involved as a stakeholders. The depth and width of the channel at this location is adequate for the current proposed uses. Additionally, there is no place for material storage and future growth of the port would be limited. The current recreation area along the oxbow will need to be relocated.

For Alternative 1, the northern end of the oxbow will be opened with dredging. The land bridge that currently is southwest of the site, where the oxbow will be opened, would need to be removed and a new access road over

the water or a ferry would need to be built for access to the island. This site is a short distance to the connection and access to the Trinity River. The Trinity River floodway connection, port site, and surrounding areas will require mitigation techniques to prevent flooding.

Regarding vehicular transportation, this port site location is a further distance from existing manufacturing facilities and main roadways into Liberty to the north including State Highway 146. Trucks using the port will have a further distance to travel to these major roadways. Some roads to and from the port are of low quality and will require improvements and repair due to increased vehicular traffic as port usage grows. There are currently no rail lines or rail connections to the site.



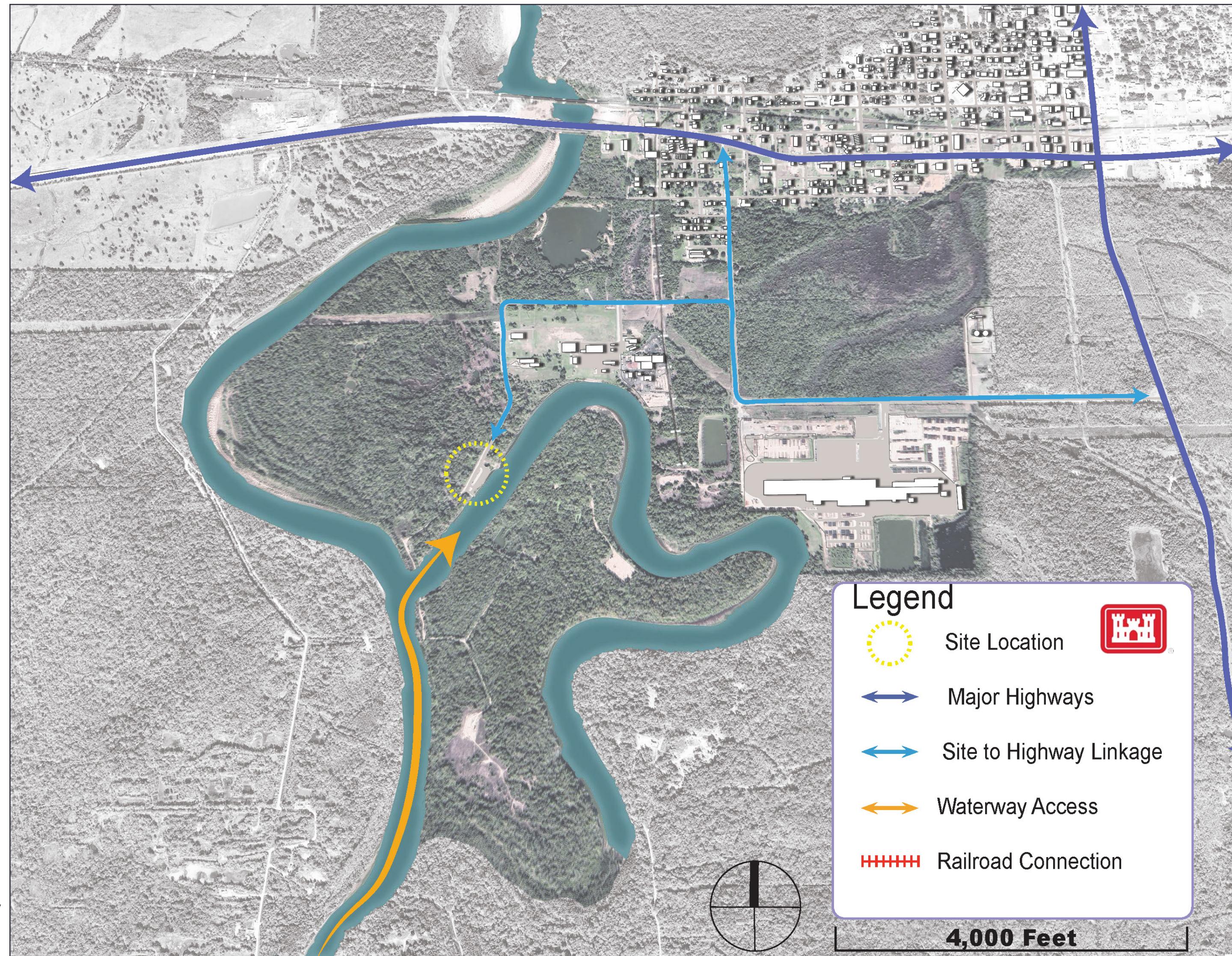


Figure 51.
Port of Liberty
Alternative 1 Site Plan





Figure 52.
Port of Liberty
Alternative 1,
View from the South





Figures 53-58. Port of Liberty Alternative 1, Views from the South, North, East, and West

The images and plans presented are conceptual renderings developed to convey the vision of the Port of Liberty. They are for illustrative purposes only and not intended to represent an approved outcome by the U.S. Army Corps of Engineers (USACE) or project stakeholders.



ALTERNATIVE 2

Alternative 2, shown in Figure 59 proposes a port location that is sited near the existing manufacturing facilities on the northeastern side of the oxbow. This location is currently vacant with much vegetation. It will require some investment to make the site operational, and purchase of the land from the existing property owner. Due to the site location and size, additional infrastructure investments for improvements will be needed. Additionally, future growth of the port to the east would be limited due to the existing manufacturing and industrial facilities adjacent to the site. The current recreation area along the oxbow will be retained.

For Alternative 2, the southern end of the oxbow will need to be opened with dredging. This keeps the land bridge at the northern end of the oxbow, allowing the access road to remain for connectivity to the island. This site is a longer distance for connection and access to the Trinity River. The Trinity River floodway connection, port site, and surrounding areas will require mitigation techniques to prevent flooding. This should also reduce maintenance dredging needed in the oxbow because there is no

hydraulic connection to the north except during flooding.

Regarding vehicular transportation, this port site location is near existing manufacturing facilities and the main roadways into Liberty to the north including State Highway 146. Trucks using the port will have a shorter distance to travel to these major roadways. Some roads to and from the port are of low quality and will require improvements and repair due to increased vehicular traffic as port usage grows. There are existing rail lines that need to be re-established near the site to allow for rail transport of material.



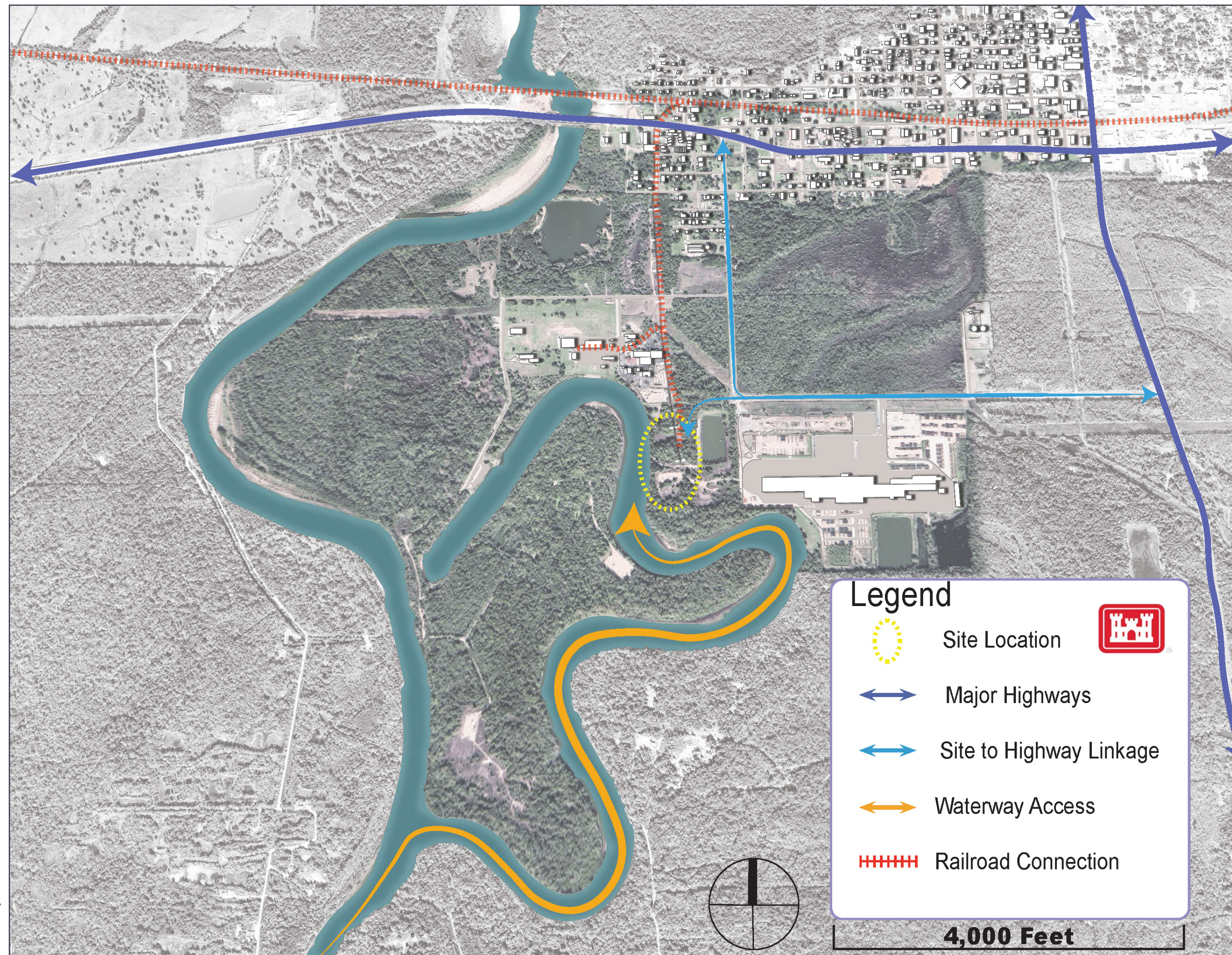


Figure 59.
Port of Liberty
Alternative 2 Site Plan





Figure 60.
Port of Liberty
Alternative 2,
View from the South





Figures 61-66. Port of Liberty Alternative 2, Views from the South, North, East, and West

The images and plans presented are conceptual renderings developed to convey the vision of the Port of Liberty. They are for illustrative purposes only and not intended to represent an approved outcome by the U.S. Army Corps of Engineers (USACE) or project stakeholders.



ALTERNATIVE 3

Alternative 3, shown in Figure 67 proposes a port location that creates a channel that is sited near the existing manufacturing facilities on the northeastern side of the oxbow. This location is currently vacant with much vegetation. It will require substantial investment to make the site operational, and purchase of the land from the existing property owner. Due to the site location and size, additional infrastructure investments for improvements will be needed. There is potential for growth and expansion to the west that could support port development efforts and material storage. Additionally, future expansion north of the port would be limited due to an existing utility easement and expansion to the east would be limited due to the manufacturing and industrial facilities adjacent to the site. The current recreation area along the oxbow will be retained.

For Alternative 3, the southern end of the oxbow will need to be opened with dredging. This keeps the land bridge at the northern end of the oxbow, allowing the access road to remain for connectivity to the island. This site is a longer distance for connection and access to the Trinity River.

The Trinity River floodway connection, port site, and surrounding areas will require flood mitigation techniques to prevent flooding. This site allows for expansion outside of the 100-year floodplain.

Regarding transportation, congestion on the main waterway is reduced and allows for loading and offloading to occur within the channel. This port site location is near existing manufacturing facilities and the main roadways into Liberty to the north including State Highway 146. Trucks using the port will have a shorter distance to travel to these major roadways. Some roads to and from the port are of low quality and will require improvements and repair due to increased vehicular traffic as port usage grows. There are existing rail lines that need to be re-established near the site to allow for rail transport of material.



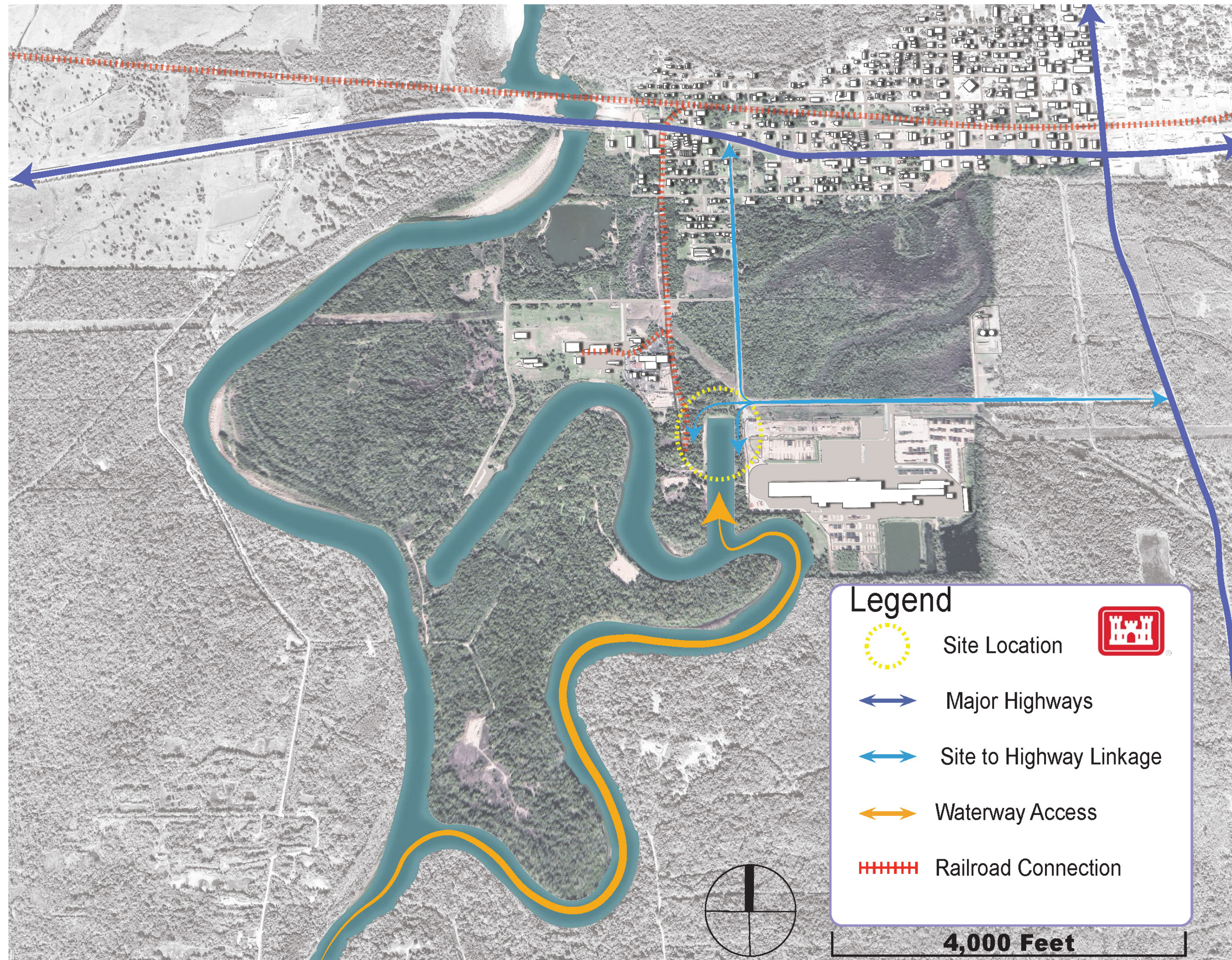


Figure 67.
Port of Liberty
Alternative 3 Site Plan



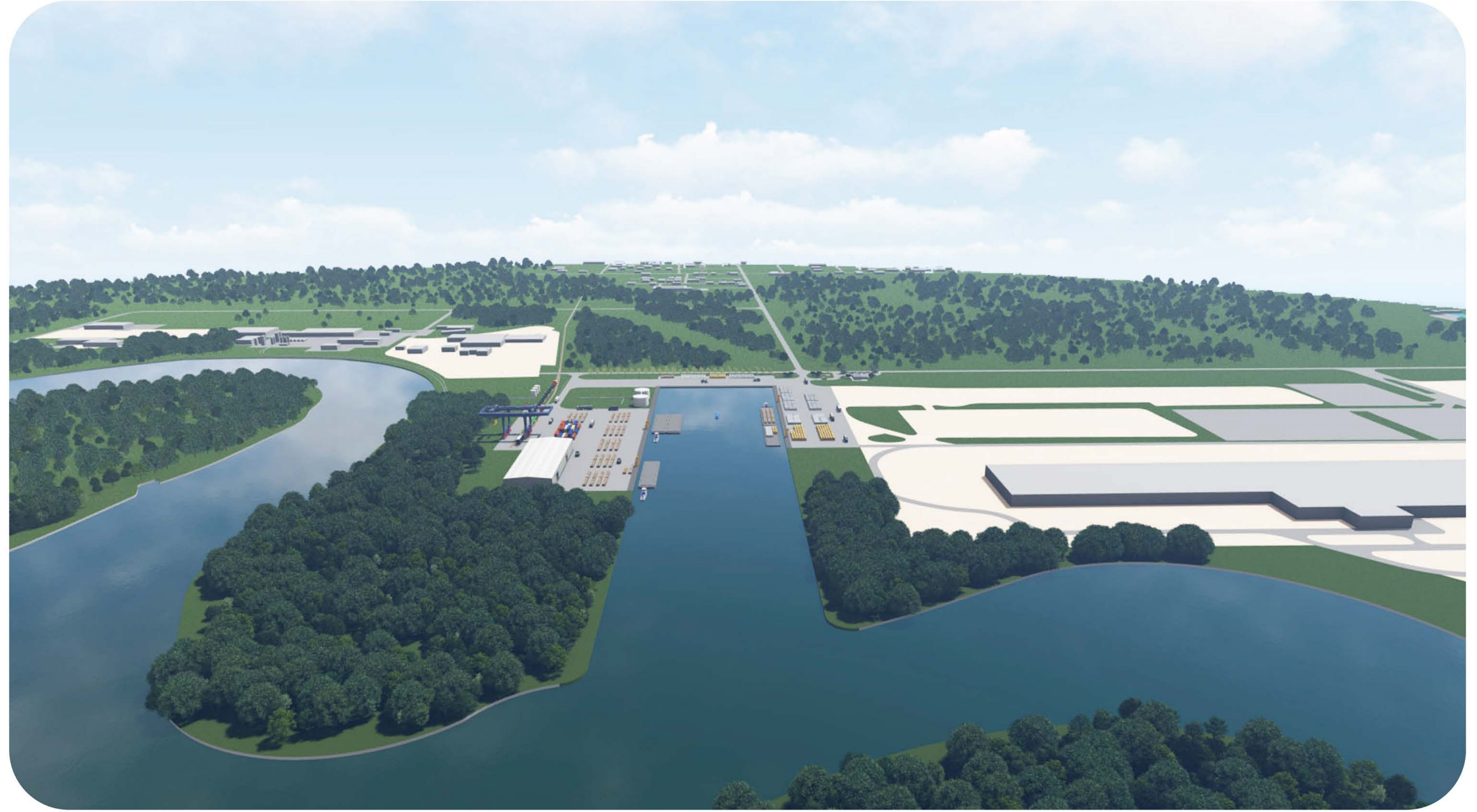


Figure 68.
Port of Liberty
Alternative 3,
View from the South





Figures 69-74. Port of Liberty Alternative 3, Views from the South, North, East, and West

The images and plans presented are conceptual renderings developed to convey the vision of the Port of Liberty. They are for illustrative purposes only and not intended to represent an approved outcome by the U.S. Army Corps of Engineers (USACE) or project stakeholders.



ALTERNATIVE EVALUATION

After the alternative plan development process, stakeholders evaluated Alternative 1, Alternative 2, and Alternative 3. The implementation of the program elements were considered during the evaluations. The program elements include dry bulk cargo terminal, liquid bulk petroleum terminal, storage of material, docks and slips, and material handling equipment, and transportation connections. Terminal capabilities, sustainability and resilience, connectivity, and future capacity were each compared and analyzed in each Alternative. To ensure each program element is included with adequate space for development and operations, phasing is considered for the Preferred Alternative. Two phases will be used for the Preferred Alternative.



PART 5
VISION PLAN

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PREFERRED ALTERNATIVE

PHASE 1

The Preferred Alternative will consist of two phases. Phase I, as shown in Figure 75, proposes the development of an initial port. This port will be located near the existing manufacturing facilities on the northwest side of the oxbow. The site is currently vacant and densely vegetated, requiring some investment to make it operational, including the purchase of land from the current property owner. Due to the site's location and size, additional infrastructure investments will also be necessary for improvements. The current recreational area along the oxbow will be preserved.

To facilitate access, the southern end of the oxbow will be opened through dredging. Mitigation measures will be required in the Trinity River floodway connection, the port site, and surrounding areas to prevent flooding. Although the south oxbow is farther from the Trinity River than the north side, this alignment avoids the removal of the bridge

that provides vehicular access to the island surrounded by the oxbow.

In terms of transportation, the port is conveniently located near existing manufacturing facilities and major roadways, including State Highway 90, which provides access to Liberty to the north. Trucks using the port will have a shorter travel distance to these primary routes. However, roads leading to and from the port will need improvements and repairs to accommodate increased vehicular traffic. Additionally, existing rail lines will need to be re-established, and efforts to address this will begin in Phase I. access to the Trinity River. The Trinity River floodway connection, port site, and surrounding areas will require flood mitigation techniques to prevent flooding. This site allows for expansion outside of the 100-year floodplain.



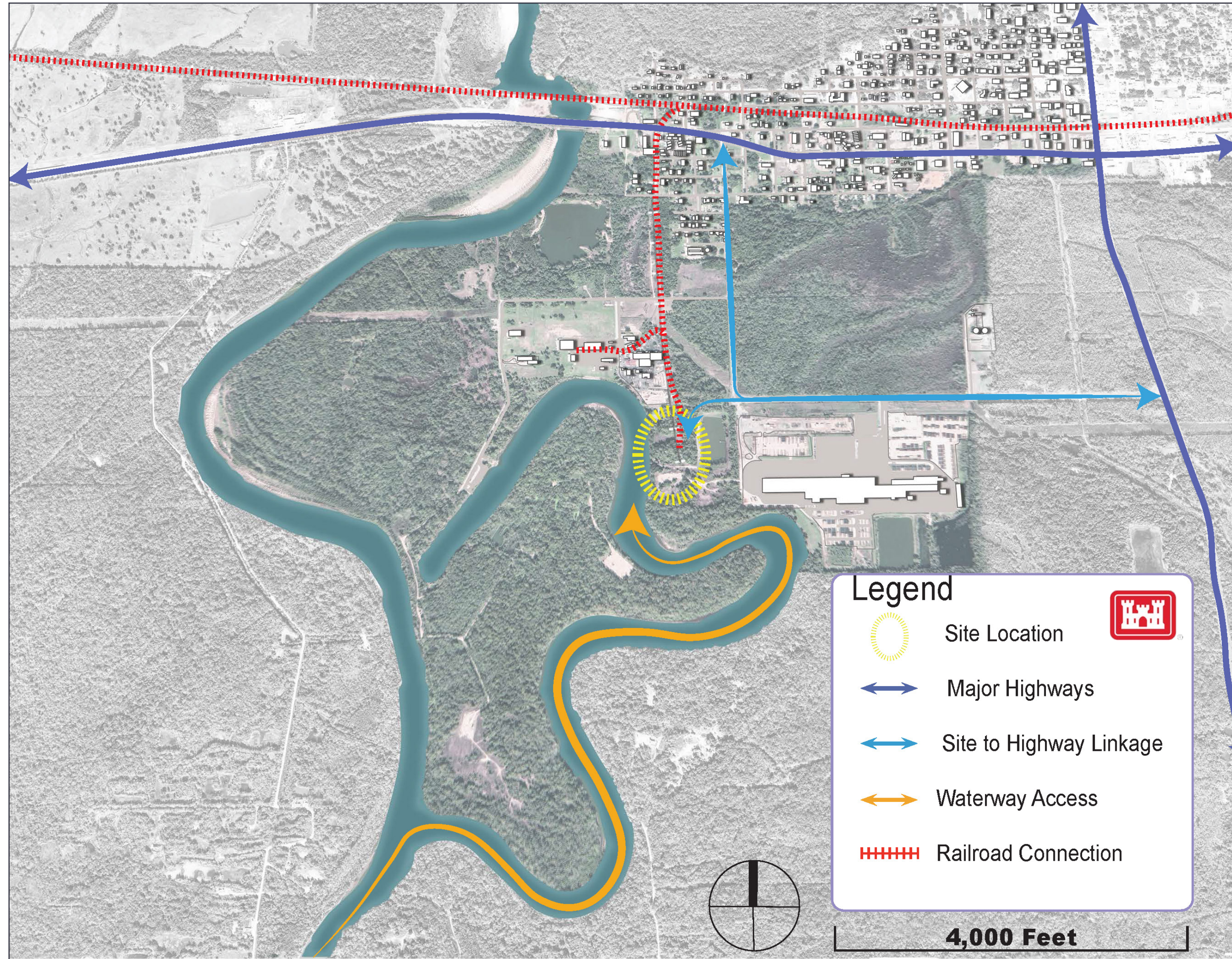


Figure 75.
Port of Liberty
Preferred Alternative
Site Plan - Phase I



PHASE 2

Phase II, as shown in Figure 76, proposes the creation of a channel to expand operations and the establishment of a turning basin to facilitate two-way traffic, enhancing capacity and providing a staging area that can also serve as a safe harbor during storms. This development will allow barge traffic, onloading, and offloading to occur within the channel, reducing congestion in the oxbow. New developments around the channel will support additional port facilities, warehousing, and storage. Road improvements and rail re-establishment will continue during this phase.

The proposed location for the channel is currently vacant and heavily vegetated. Significant investment will be required to make the site operational, including the purchase of land from the current property owner. Given the site's location and size, additional infrastructure upgrades will also be necessary. There is potential for growth and expansion to the west, which could support further port development and material storage.

The area to the north offers opportunities for future expansion outside of the 100-year floodplain. However, expansion north of the port would be limited due to an existing utility easement. While it is possible to expand by relocating the utilities, this would increase the cost of development. Additionally, expansion to the east would be constrained by the adjacent manufacturing and industrial facilities.



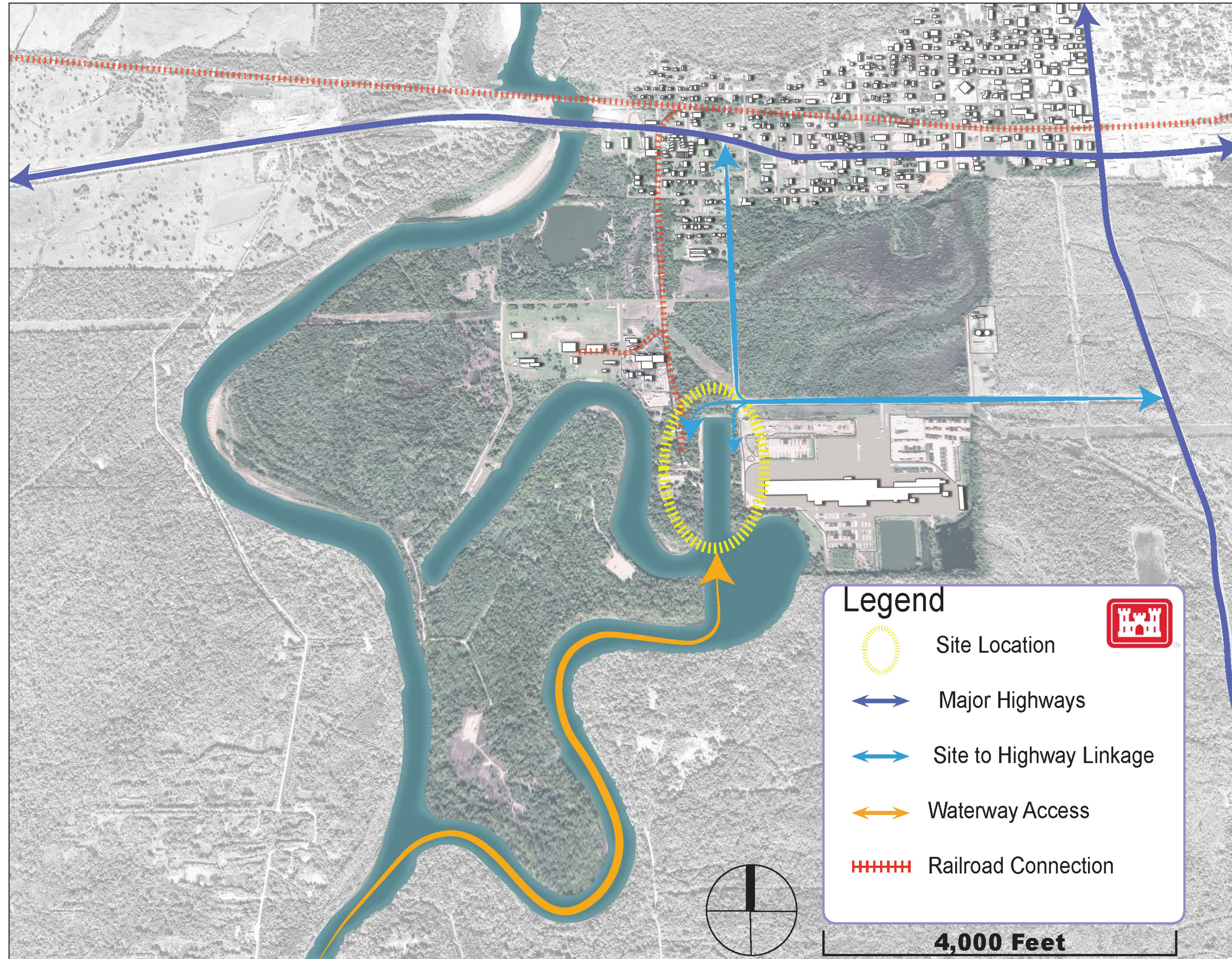


Figure 76.
Port of Liberty
Preferred Alternative
Site Plan - Phase II



PHASING PLAN

The development of the Port of Liberty will be carried out in two phases, each focused on addressing both initial capacity needs and long-term growth.

Phase I (Figure 77) will focus on establishing key infrastructure to support initial port operations. This phase includes the construction of a warehouse for storage, cranes, and staging areas for loading and unloading goods from barges. Additionally, bulk liquid storage tanks will be installed, with piping connecting directly to existing liquid goods facilities. A new rail connection will link the port to the existing rail line, facilitating goods transport via train. Finally, an administrative building will be built to manage port operations.

Phase II (Figure 78) will expand the port's capacity, extending eastward to wrap around the newly created channel. This phase will add a larger warehouse, expanded staging areas, and additional cranes to accommodate increased traffic. More bulk liquid storage tanks will be

included to handle both train and barge shipments. The north and east sides of the new channel will feature additional storage and staging areas to support the growth of the port and provide easy access for nearby manufacturers to the east. A new administrative building on the north side will further control port access and operations.

This phased approach ensures the Port of Liberty can efficiently meet both current and future demands while managing costs effectively.



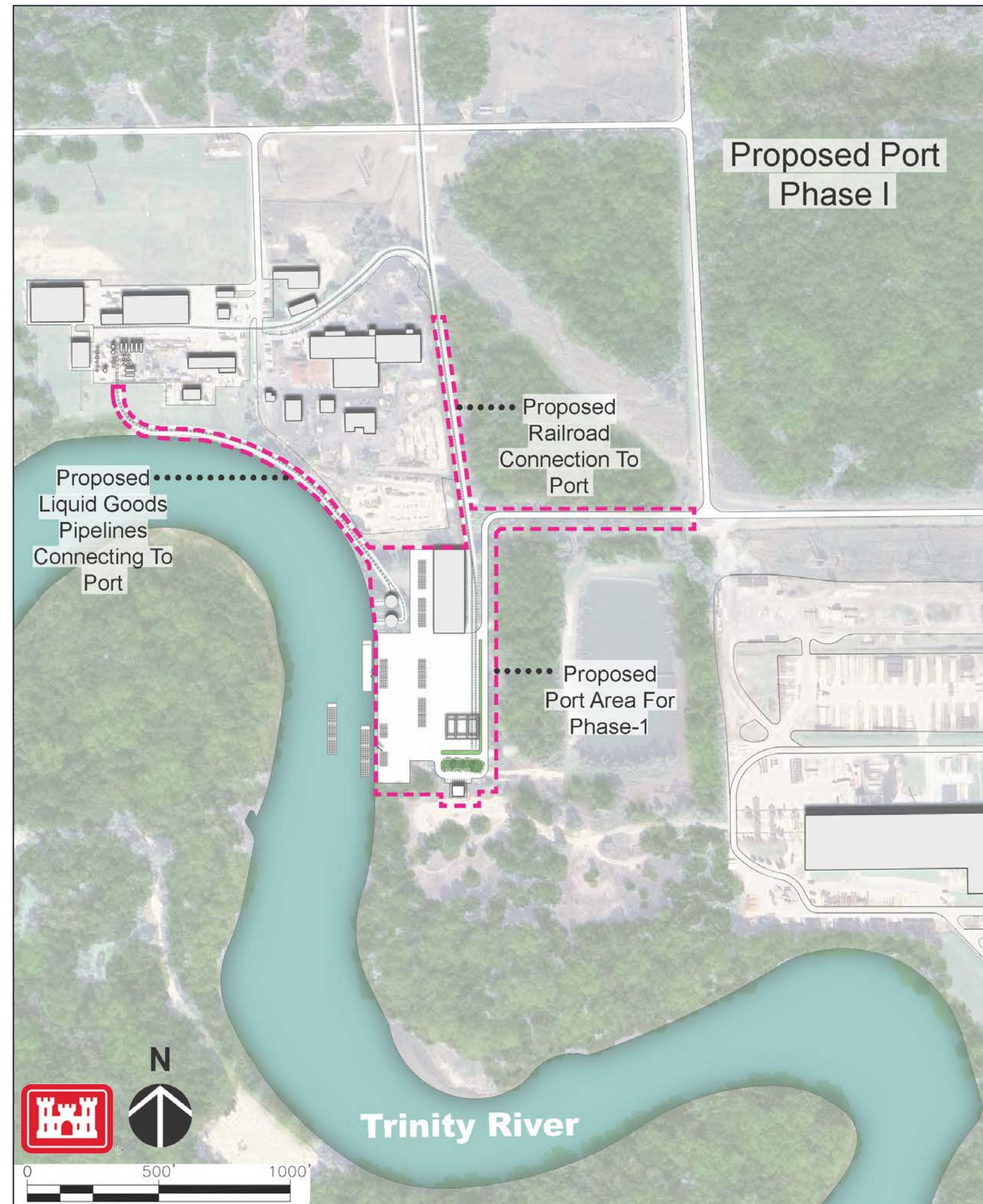


Figure 77.
Port of Liberty
Preferred Alternative
Site Plan - Phase II

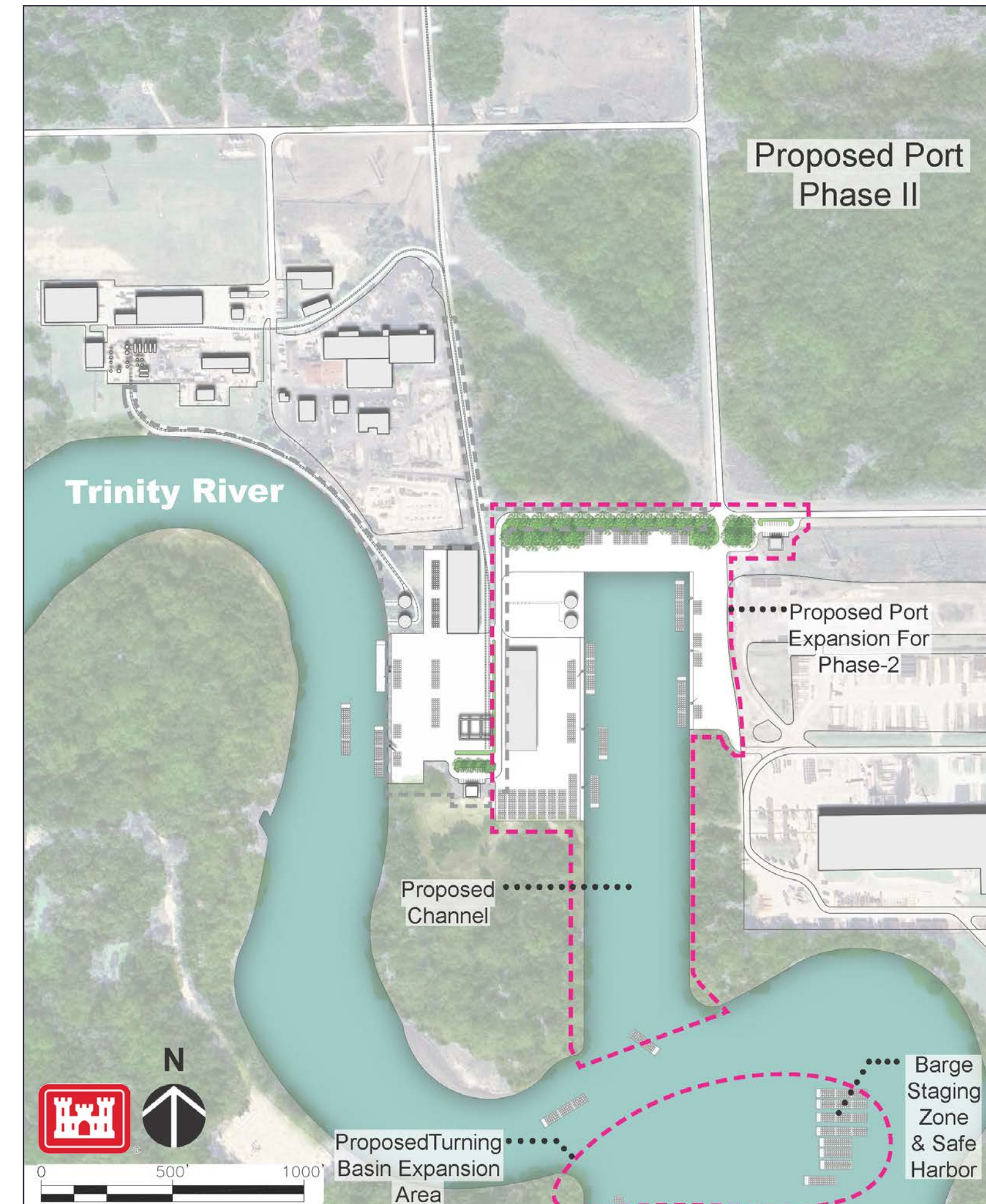


Figure 78.
Port of Liberty
Preferred Alternative
Site Plan - Phase II

ILLUSTRATIVE PLAN

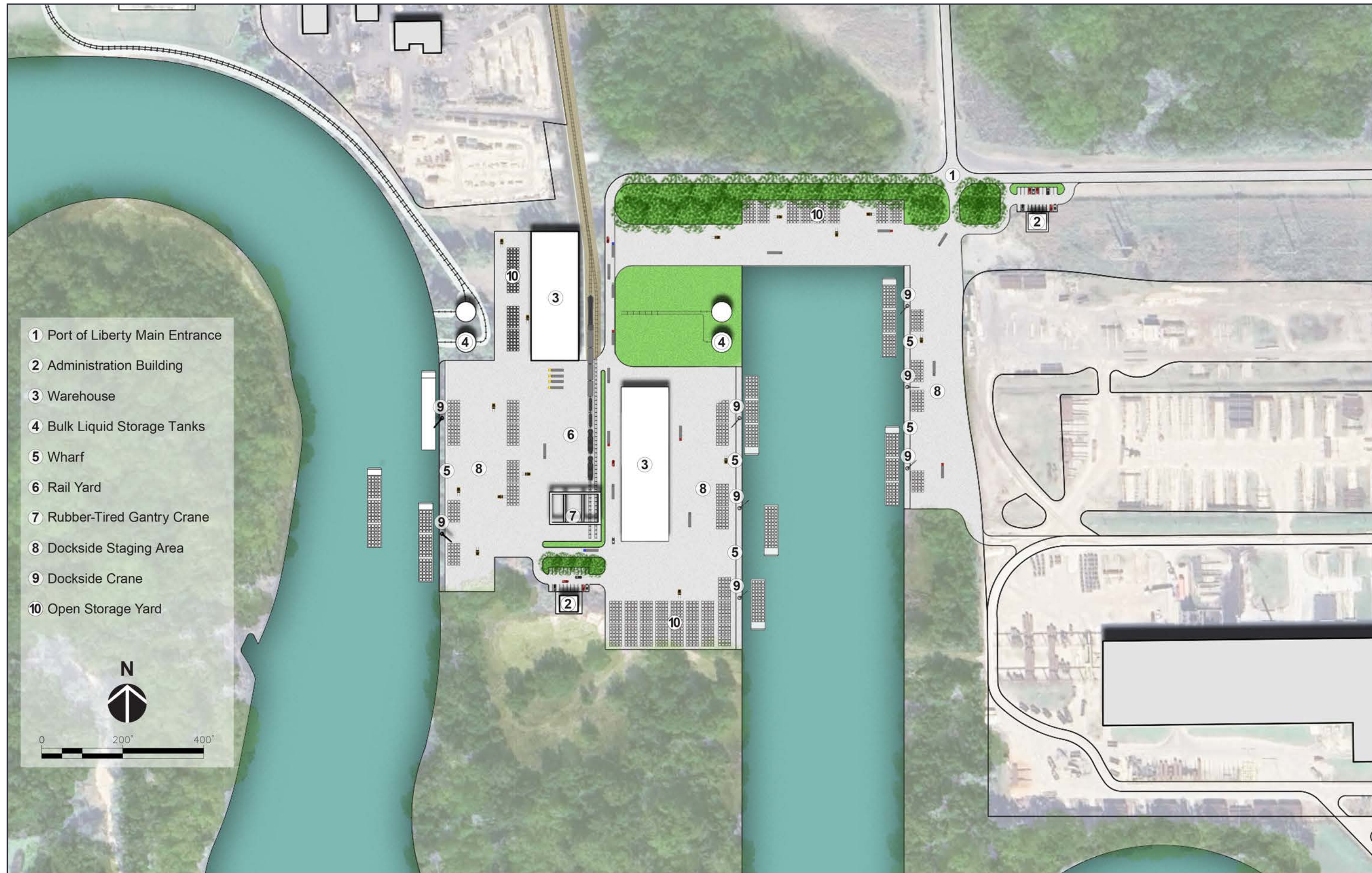


Figure 79.
Port of Liberty
Illustrative Plan



RECREATION AND CONSERVATION VISION

Publicly Accessible Waterfront

A vibrant and engaging riverfront with trails, boardwalks, and gathering spaces, ensuring year-round public access while preserving the natural habitat.

Nature-Integrated Boardwalk

A thoughtfully designed boardwalk along the river's edge that provides access to scenic views, fishing areas, and educational spaces while minimizing environmental impact.

Scenic Sand Beach & River Access

A small, natural sand beach area providing a peaceful spot for relaxation, wading, and family-friendly waterfront activities along the river.

Kayak & Water Recreation Hub

A designated launch area and rental facility offering opportunities for kayaking, paddle-boarding, and canoeing, encouraging active engagement with the river.

Fishing & Boating Access

A strategically located boat ramp providing easy access to the Trinity River for recreational boaters and anglers, supporting fishing and water based activities.

Trinity River Eco-Learning Experience

Interactive educational signage, bird blinds, and nature observation areas that highlight local ecology, conservation efforts, and the significance of the Trinity River ecosystem.

Preserved Native Habitat

A commitment to conserving and restoring native flora and fauna, integrating natural buffers and wildlife corridors to support biodiversity and ecological resilience.

Trail & Greenway Connectivity

A well-connected trail system that links the port area to existing city pathways enhancing walkability outdoor recreation, and community engagement with nature.



Figure 80.
Recreation and Conservation Vision

Publicly Accessible Waterfront

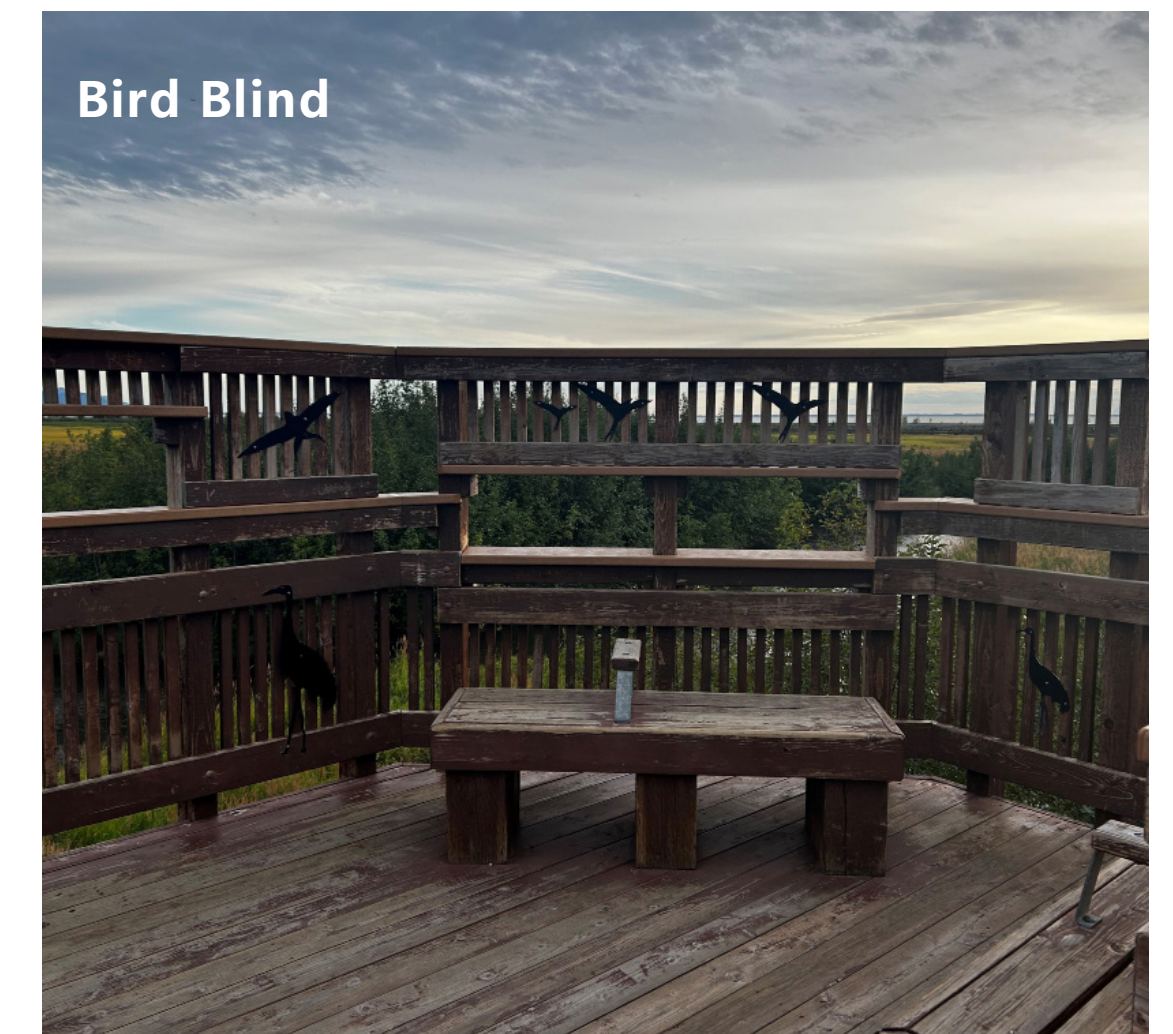
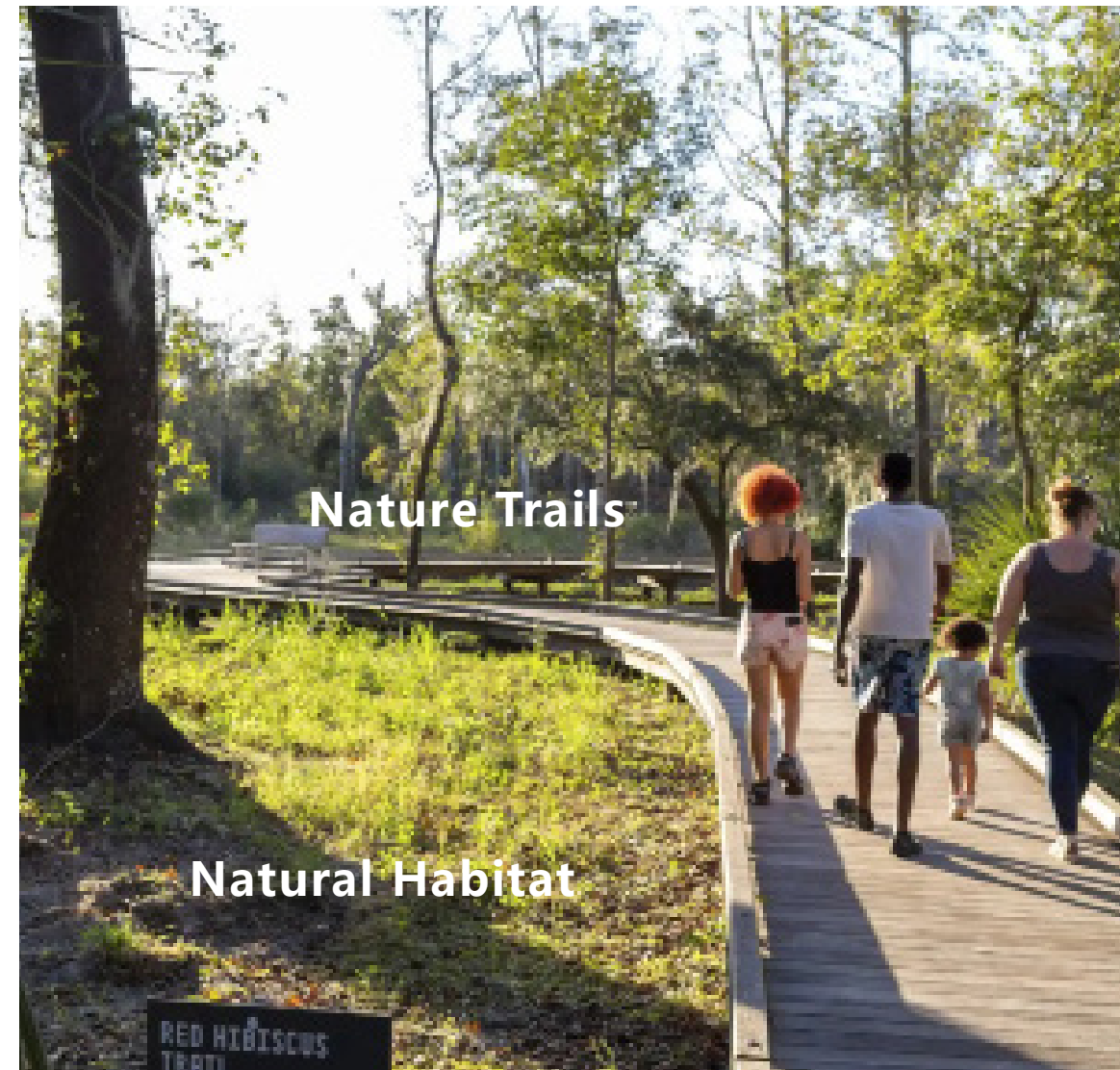


Figure 81. Recreation and Conservation Places and Activities



LAND USE

Figure 82 illustrates the existing and proposed land uses within the Area of Focus for the development of the Port of Liberty. The proposed land use includes cargo areas surrounding the proposed channel, as well as dredging sites located in the southern part of the Oxbow, along with the turning basin and port channel, necessary for barge navigation into the Port of Liberty.

LEGEND

- Area of Focus
- Existing Railroad
- Rail Lines Reconnected to Port

Land Use Category

- Existing Railroad
- Cargo
- Commercial
- Environmental
- Government and Historical
- Industrial
- Recreational
- Residential
- Vacant/ Undefined
- Dredge Sites

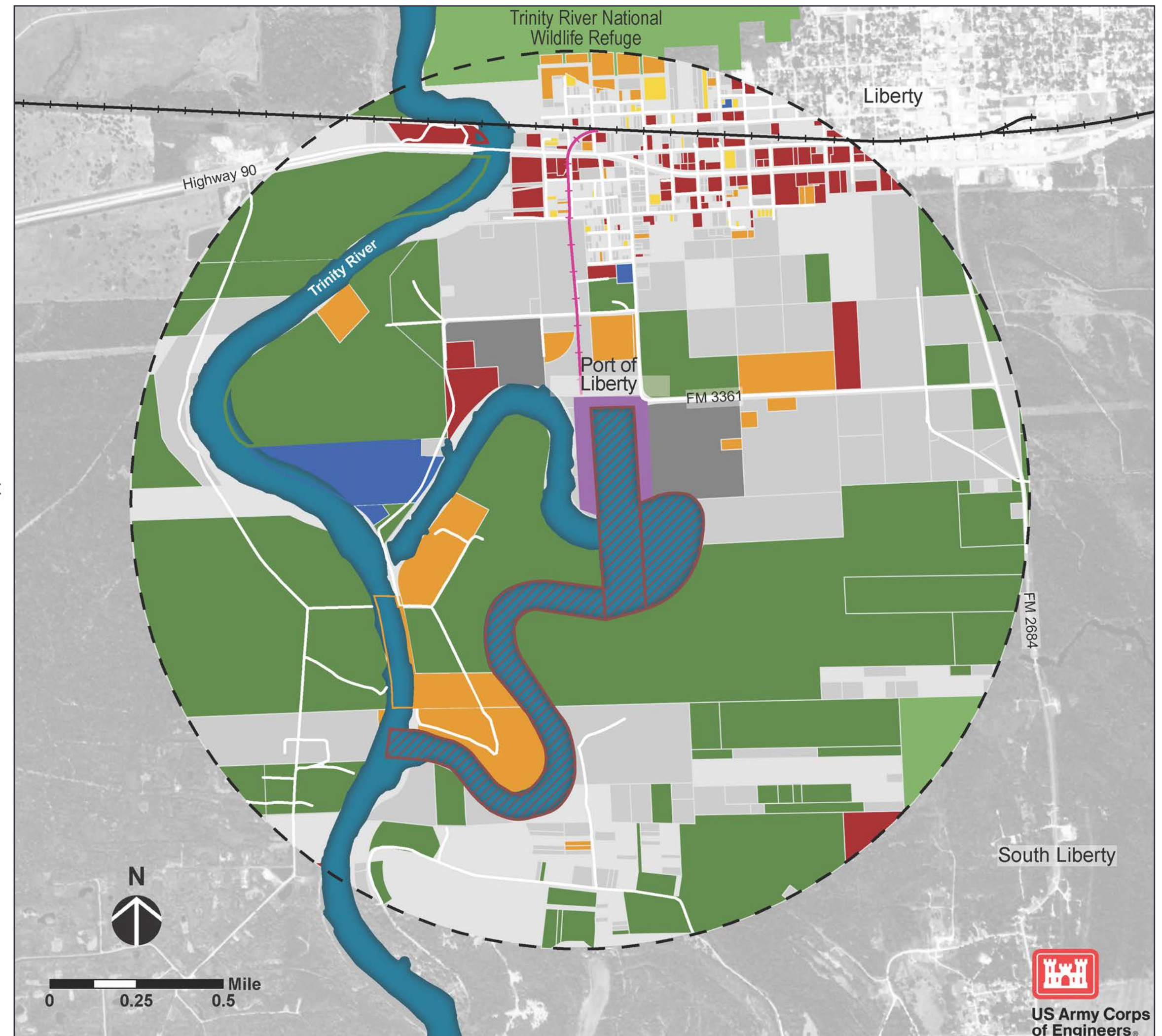
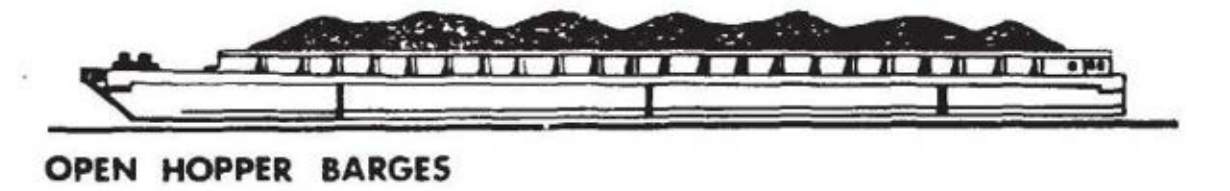


Figure 82.
Port of Liberty
Future Land Use

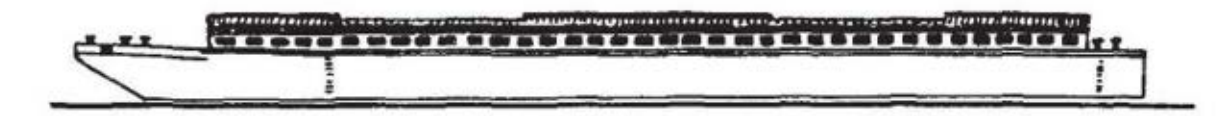




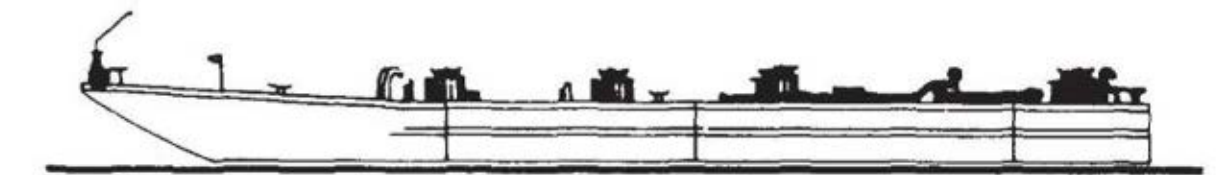
Figure 83. Navigation Channel and Historic Dredged Material Placement Areas



OPEN HOPPER BARGES



COVERED HOPPER BARGES



INTEGRATED CHEMICAL AND PETROLEUM BARGES



TOWBOATS

Figure 84. Predominant Barge and Tow Types (USACE 1980)



BARGE TOW REQUIREMENTS

BARGE TOW CONFIGURATIONS

Barge tow configurations consisting of a tow boat pushing one or more barges and are typical for transporting commodities along inland waterways. Table 4 displays the variation of characteristics and dimensions of the predominant barge and tow types.

Table 4. Predominant Barge and Tow Types, Characteristics, and Dimensions (USACE 1980)

Equipment Type	Length (ft)	Breadth (ft)	Draft (ft)	Capacity (tons)
Open Hopper Barges				
Standard	175	26	9	1,000
Jumbo	195	35	9	1,500
Super Jumbo	250-290	40-52	9	2,500-3,000
Covered Hopper Barges				
Standard	175	26	9	1,000
Jumbo	195	35	9	1,500
Chemical & Petroleum Barges	150-300	50-54	9	1,900-3,000
Towboats	65-160	24-50	5-9	-

BARGE TOW LIMITATIONS

Barge and tow design configurations are controlled by the dimensions of the Wallisville Navigation Lock Chamber and the alignment of the river. Historically, commodities were transported on the Trinity River and Tributaries Navigation System using tows consisting of one to two barges, similar to first three example configurations as shown on Figure 85.

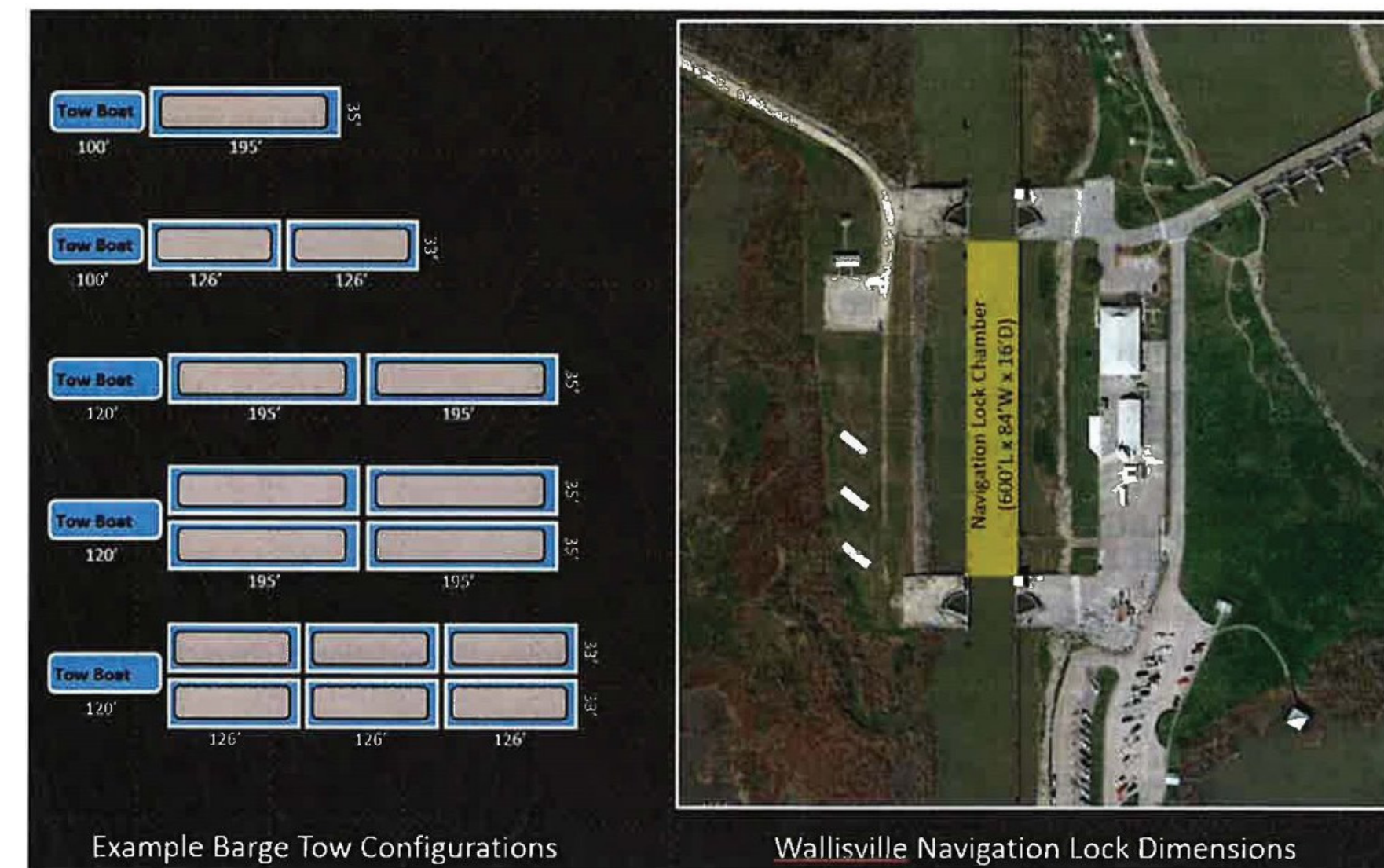


Figure 85. Example of Barge Tow Configuration (USACE 1980)

CHANNEL REQUIREMENTS

BARGE TOW CONFIGURATIONS

The Lower Trinity River in Texas flows 180 river kilometers from Livingston Dam in Livingston, Texas, to the Trinity River delta. The Channel to Liberty reach from Liberty, Texas, to Moss Bluff has historically required maintenance dredging in order to maintain the authorized channel depth of 6 ft Mean Low Tide (MLT) and a width of 100 ft. Large sand bars and channel bends dominate this section of the channel. The downstream section from Moss Bluff to Anahuac, Texas, is known to be self-maintaining and is comprised of very small point bars and has the deepest flows and lower rates of channel migration in comparison to the more northern reaches of the Lower Trinity River. (Freese and Nichols 2017)

Since the last maintenance dredging episode of the Channel to Liberty navigation channel, the Lower Trinity River has experienced meandering in some areas resulting in the need to reposition the channel centerline for future maintenance. For comparison purposes, Figure 86 displays an overlay of the new channel centerline to the historically maintained channel centerline. (Freese and Nichols 2017)

The Anahuac Channel alignment and channel centerline is expected to remain the same as the historic channel alignment and channel maintenance centerline. (Freese and Nichols 2017)

AUTHORIZED SIZE OF THE PROPOSED CHANNEL

The historic navigation features of the Trinity River and Tributaries project consist of the federally authorized shallow-draft three-channel navigation system to include the Channel to Liberty, Anahuac, and Channel to Smith Point channels. The Anahuac Channel extends 5.6 miles from Upper Trinity Bay to the Trinity River mouth. The Channel to Liberty proceeds 41.4 miles from the Trinity River mouth to the Port of Liberty. The Channel to Smith Point channel extends from the Houston Ship Channel along Trinity Bay's east shore to 1 mile south of Anahuac, Texas. (Freese and Nichols 2017)

Both the Channel to Liberty and Anahuac navigation channels are authorized to a depth of -6 feet (ft) MLT and a width of 100 ft, though they are not currently maintained. The Channel to Smith Point navigation channel is authorized at a depth of -9-ft MLT and is typically maintained at a width of 150 ft. (Freese and Nichols 2017)





Figure 86. Channel to Liberty Overlay Historic and New Channel Maintenance Centerline (USACE 2017)

ALIGNMENT

The general dimensions of the Channel to Liberty and the Anahuac Channel existing navigation channels is 6 ft deep MLT by 100 ft wide (USACE, 2012). Figures 86 and 87 depict the channel alignments maintained by USACE Galveston through the last recorded maintenance dredging episodes: 1994 for the Channel to Liberty navigation channel (from Stations 0+00 to 847+77.40), and 2011 for the Anahuac navigation channel (from Station 0+00 to the -6-ft daylight contour, approximately at Station 330+00). (Freese and Nichols 2017)



Figure 87. Channel to Liberty Existing Navigation Channel Maintenance Alignment (USACE 2017)

Figure 88. Anahuac Channel Existing Navigation Channel Maintenance Alignment (USACE 2017)



BATHYMETRY

Based on the bathymetric survey of the Channel to Liberty and the Anahuac Channel performed by Trinity River Authority (TRA) and the Texas Water Development Board (TWDB) in January 2017, coarse estimations of dredged material quantities were determined to reestablish a channel geometry with a depth of -6-ft Mean Lower Low Water (MLLW) and a width of 100 ft ("6 X 100") and an improved channel geometry of -9-ft MLLW and a

width of 130 ft ("9 X 130"). (Freese and Nichols 2017)

DREDGING

Future dredged material placement areas for sediments dredged from the Channel to Liberty and Anahuac navigation channels are anticipated to be similar to the placement areas used in the past. For the Channel to Liberty, the dredged material placement areas easements have expired, and therefore, the easements will need to be reacquired. Total initial and maintenance dredged material quantities for the two channel geometries are outlined in Table 5. (Freese and Nichols 2017)

Estimated Dredged Material Volumes (CY) (Channel to Liberty & Anhuac Navigation Channels)		
Dredging Period	Channel Geometry	
	"6 x 100"	"9 x 130"
Initial Dredging	1,487,477	3,730,900
20-Year Maintenance (Total)	7,000,000	14,700,000
50-Year Maintenance (Total)	17,000,000	35,700,000

Table 5. Estimate Dredged Material Volume (Freese and Nichols 2017)



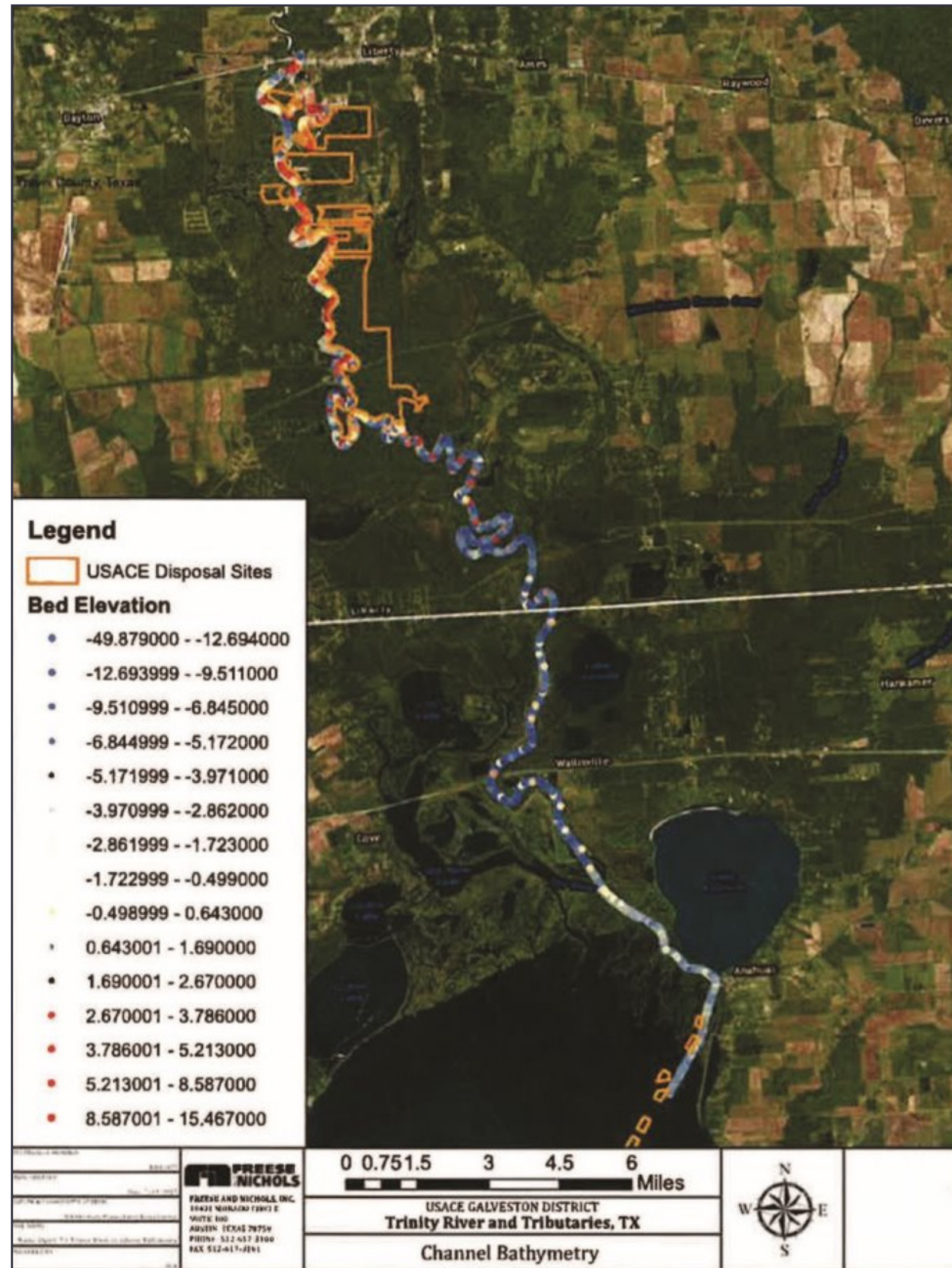


Figure 89. Channel to Liberty and Anahuac Channel Bathymetry (USACE 2017)

NAVIGATION CHANNEL GEOMETRY

Both the Channel to Liberty and the Anahuac Channel have historically been maintained to a depth of 6-ft MLT and a bottom width of 100-ft. Typically, an additional 1-ft overdepth is allowed to account for dredging equipment inaccuracies. Figure 90 demonstrates a typical channel geometry cross-section, with an overdepth allowance and side slopes of 3:1. (Freese and Nichols 2017)

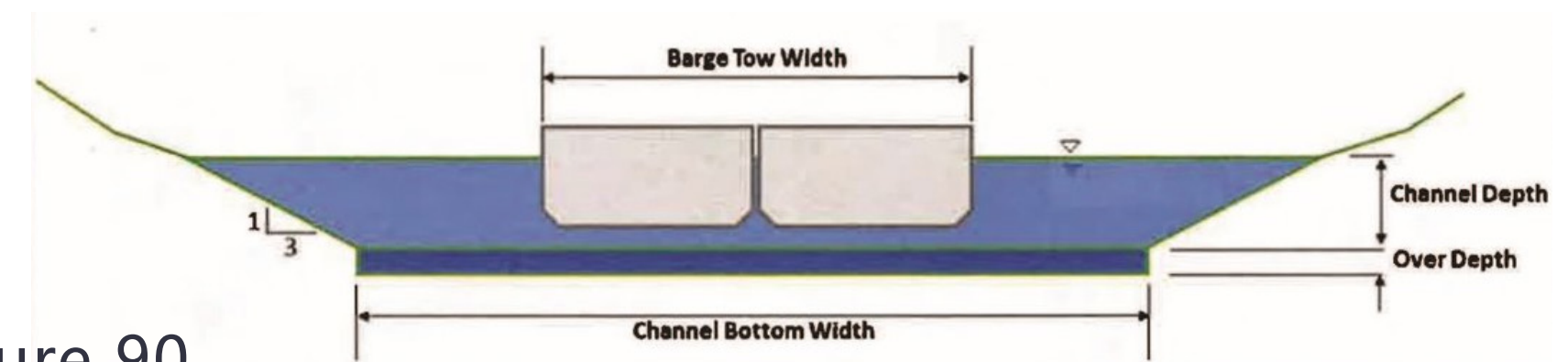


Figure 90. Typical Navigation Channel Geometry Cross-Section (Freese and Nichols 2017)

Shallow draft barges typically draft 9 ft. The existing Channel to Liberty and Anahuac Channel navigation channels are authorized to be maintained at -6-ft MLT, which will require barges to light-load to transit through the two waterways.

Additionally, the two navigation channels have generally been maintained to a width of 100 ft. In accordance with the USACE (1980), minimum channel width for a tow width of 50 ft for one-way traffic should be not less than 130 ft. Assessments of future improvements to channel geometries to achieve transportation cost savings should consider the guidance provided by USACE (1980) for minimum channels widths required for tows of various sizes as shown in Table 6, and in conjunction with the constraining width of the Wallisville navigation lock chamber, which is approximately 1,500 feet long and 84 feet wide.

Table 6. Recorded Minimum Channel Widths for Two Sizes (USACE 1980)

Channel Width (ft)		
Tow Width (ft)	Two-Way Traffic	One-Way Traffic
105	300	185
70	230	150
50	190	130*



PART 6

ECONOMIC ANALYSIS

INTRODUCTION	100
LOWER TRINITY RIVER BASIN ECONOMIC STUDY AREA	101
BENEFITS OF BARGES	102
WATERWAY COMMODITIES	103
STRATEGIC ADVANTAGE	104
MARKET DEMAND	116
NON-DIRECT ECONOMIC ADVANTAGES	120



INTRODUCTION

This section of the Vision Plan delves into the economic realities and potential of developing a port at Liberty, Texas. The Port of Liberty will support barge traffic within the oxbow, which has a large section that is currently silted in.

The economic analysis looks at the potential to support barge traffic and related industries, discusses the strategic advantages of the port, evaluates market demand, and suggests non-economic based benefits.



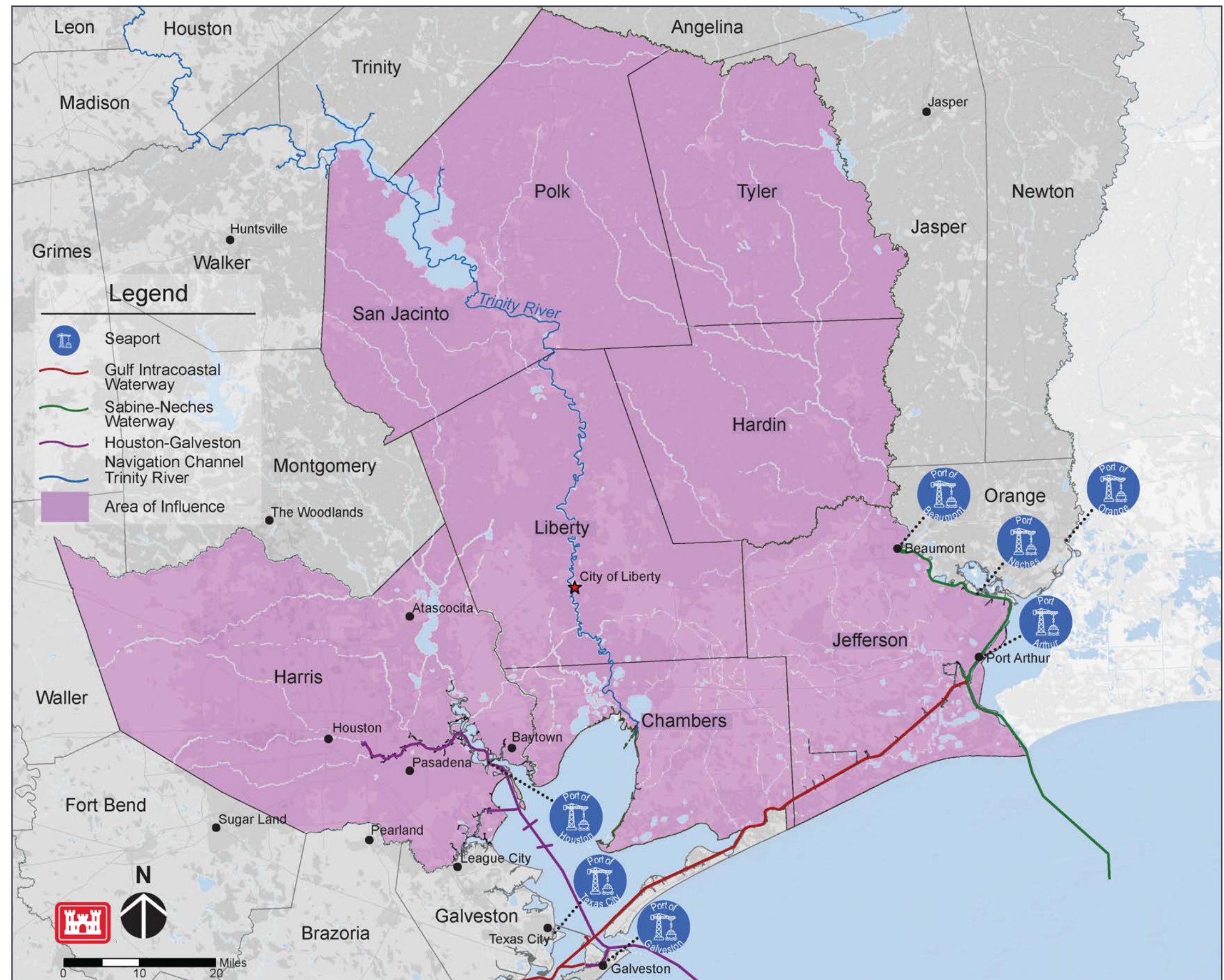
LOWER TRINITY RIVER BASIN ECONOMIC STUDY AREA

The economic study area for the Port of Liberty Vision Plan includes the counties of Chambers, Hardin, Harris, Jefferson, Liberty, Polk, San Jacinto, and Tyler. These counties are assumed to have the most direct impact on goods that could be transported through the Port of Liberty

The Port of Liberty located between the Port of Houston and Port of Beaumont and Port Arthur (Sabine-Neches Waterway). The Port of Houston is the largest port in the US in terms of tonnage, and the Sabine Neches Waterway is ranked the third largest waterway in the US in terms of tonnage in 2021.

Primary commodities traversing those channels include oil and gas products, chemicals, agricultural products, and materials and equipment servicing construction. Many of these goods are transferred by barge.

Figure 91.
Port of Liberty Vision
Plan Economic Study



BENEFITS OF BARGES

This Vision Plan proposes a multi-modal distribution center with a focus on barge traffic.

Barge traffic within navigable inland waterways provide a cost-effective, sustainable, and safe means for moving major bulk commodities such as grain, coal, and petroleum.

Inland navigation is a key element of State and local government economic development and national security.

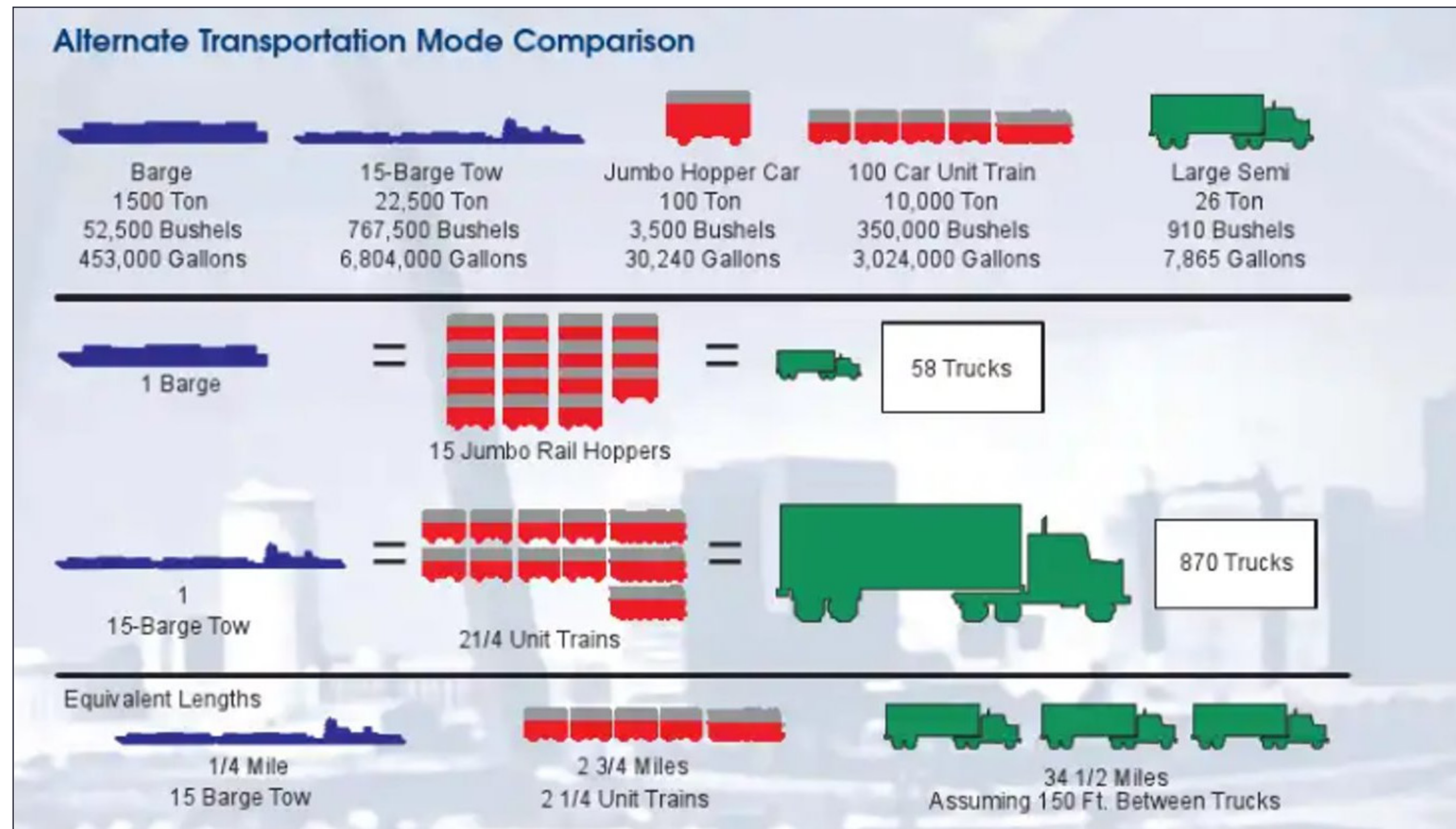


Figure 92. USACE Inland Waterway Navigation Value to the Nation (May, 2000)



WATERWAY COMMODITIES

The economic study area for the Port of Liberty Vision Plan includes the counties of Chambers, Hardin, Harris, Jefferson, Liberty, Polk, San Jacinto, and Tyler. These counties are assumed to have the most direct impact on goods that could be transported through the Port of Liberty.

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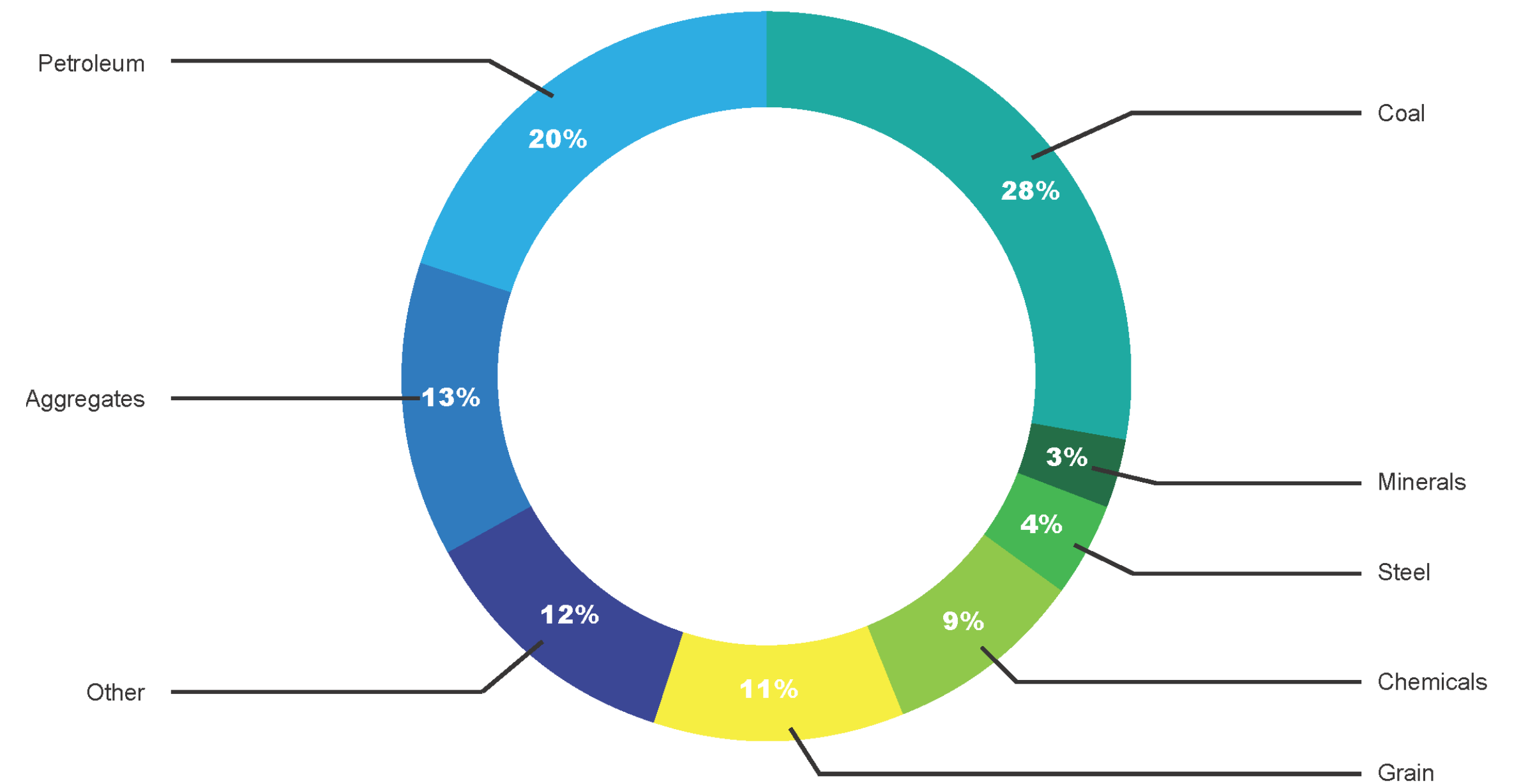


Figure 93. National Percentages for Inland Navigation

STRATEGIC ADVANTAGE

The Proposed Port of Liberty has several strategic advantages. These include its location, connection to other industrial centers, markets, rail, and roadways, as well as a host of diverse industries. The following pages contain a discussion and analysis of these advantages.

PORT OF LIBERTY STRATEGIC LOCATION

The Port of Liberty is strategically situated between two of the largest and busiest waterways in the U.S. Just approximately 40 miles by road from both the Port of Houston serviced by the Houston Ship Channel, and the Port of Beaumont serviced by the Sabine-Neches Waterway and interconnected by the GIWW. The Port of Liberty can provide services to complement those two waterways, and others, for the oil and gas industries.

Figure 94 includes many of the ports along the Texas Coast. With the Trinity River flowing into Galveston Bay, connecting with the Gulf Intracoastal Waterway, the Port of Liberty has many options for business partnerships.



Figure 94. Port of Liberty Strategic Location



PORT OF LIBERTY INFRASTRUCTURE CONNECTIONS

The City of Liberty’s infrastructure is ripe for development. Highway 90 passes through Liberty and besides Interstate 10, is the main thoroughfare connecting Houston to Beaumont. A Union Pacific railroad runs parallel to the highway and also connects the Houston and Beaumont ports. Additionally, Port of Liberty has access to the GIWW via the Trinity River and Galveston Bay for waterborne commerce. Numerous pipelines are also nearby. With sufficient open land for development, Port of Liberty is uniquely poised for growth. The table below shows the miles to nearby Port cities that export internationally and drive times.

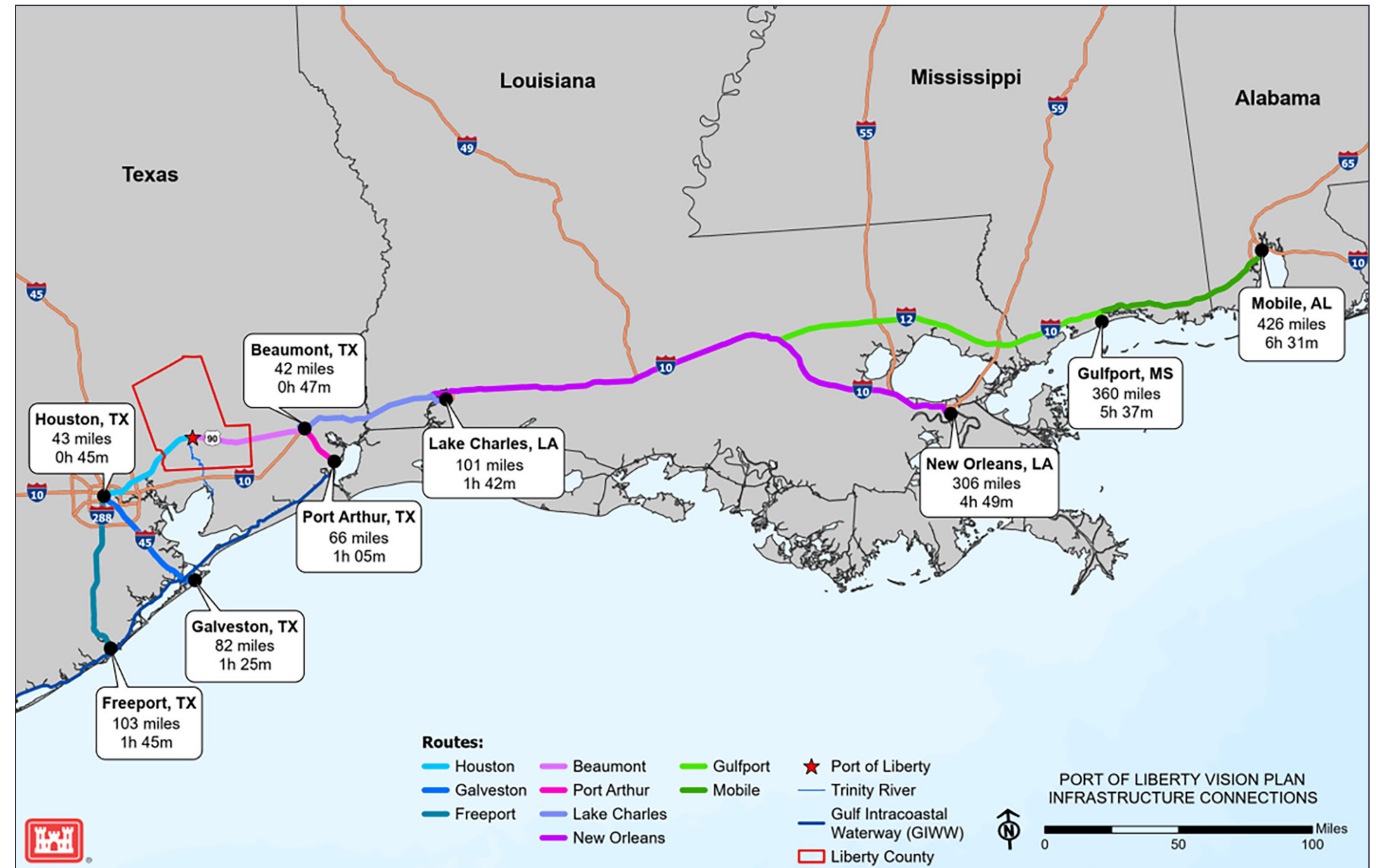


Figure 95. Port of Liberty Infrastructure Connections

MANUFACTURING IN THE STUDY AREA

Manufacturing in the study area consists mostly of fabricated metal products, chemicals, non-metallic mineral products and wood products. All of these, except for wood, provide support for the oil and gas sector.

The 2017 Port of Liberty Trinity River Navigation Report by Freese and Nichols identified the following companies and industries they service:

- Oil and gas supply (tubes, drilling fluids, etc): Boomerang, MI Swaco, InSteel, and Liberty Materials
- Chemicals: Huntsman
- Oil and natural gas storage (via underground salt domes): Kinder Morgan, Spectra Energy

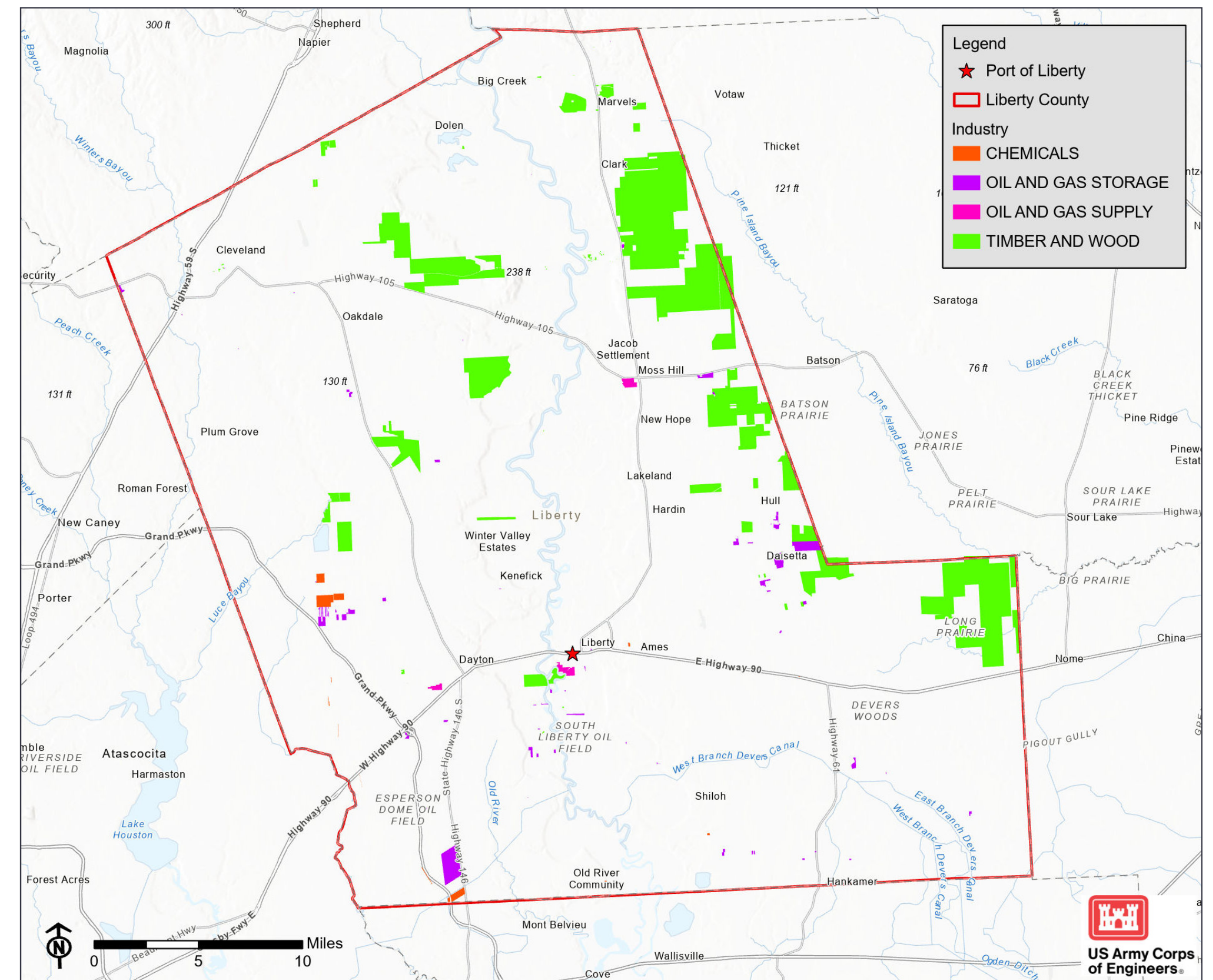


Figure 96. Port of Liberty Manufacturing in the Study Area



TIMBER AND WOOD INDUSTRY

The majority of the Trinity River basin is forested area. The timber and wood products industry is robust in eastern Texas, and companies such as Batson Lumber, located 20 miles from Liberty, produce mixed hardwood, solid oak lumber, and pine poles and posts. German Pellets Texas, LLC exports its biomass product. The basin supports high concentrations of forest residue and Primary Mill residues, which are the dominant feedstock into wood pellets. Wood pellet exports are increasing out of US Southeast and Gulf Coast ports.



Figure 97. Timber Industry in Liberty County
(Photo Source: Texas A&M Forest Service)

OIL AND GAS INDUSTRY

With a robust oil and gas industry in Texas, a port at Liberty could likely support this sector. Opportunities could include serving as a point of consolidation for pipe, fluids, and other goods that are produced locally and serve offshore platforms. Local salt domes have been converted into underground storage facilities, which provide opportunity for waterborne commerce at Liberty. A port at Liberty could also serve as a hub of construction and maintenance related equipment. During storms, Liberty could be a safe harbor for barges.



Figure 98. New Pipelines in Liberty County
(Photo Source – Bluebonnet News)



PORT OF HOUSTON

The Port of Houston is rapidly growing and thus is aggressively competing for space with the Houston metropolitan area as population continues to grow. With this competition, land prices are also climbing. Having access to another servicing port nearby would be beneficial both for the Port of Houston as well as Liberty. In 2024, the following was noted about the Port of Houston:

- Largest port in US for waterborne tonnage with 220 million short tons
- Largest port in US for foreign and domestic tonnage with 266 million short tons
- Largest port in Texas with 38% market share by tonnage
- Largest container port on the Gulf Coast with 73% market share in containers by total TEUs, and ranked 5th in the US
- Supports 1.54 million jobs throughout Texas and 3.37 million jobs nationwide (Martin Associates, 2022)
- Generates \$439 billion in statewide economic value and \$906 billion in nationwide economic value annually
- Houston Ship Channel contributes \$10.6 billion in state and local tax revenue and \$62.8 billion in national tax revenue annually (Port of Houston, 2024)



Figure 99. Port of Houston
(Photo Source – Texas State Historical Association)

THE SABINE-NECHES WATERWAY

The Sabine-Neches Waterway is a 79-mile, deep draft ship channel which is the lifeline of Southeast Texas, linking the countries energy and military transportation network. It includes the following:

- Third largest waterway by cargo volume in the U.S.
- Largest bulk liquid cargo waterway in the U.S.
- Largest refiner of jet fuel in the U.S.
- Largest refiner of military jet fuel in the U.S.
- Supplies 13% of the U.S. daily fuel consumption
- Largest LNG exporter in the U.S.
- Largest commercial military outload port in the U.S.
- Provides 55% of the strategic petroleum reserves in the U.S.
- Generates nationally \$106 billion in business activity, 288,000 jobs yielding \$18 billion in personal income, and \$3.4 billion in Federal taxes

Source: Sabine-Neches Navigation District, 2024

From the Port of Liberty via barge, access to the Sabine-Neches Waterway is not as convenient as Houston, but certainly feasible and cost effective for some products. To transport product by barge from the Port of Liberty, the vessel will travel down the Trinity River into Galveston Bay, east in the GIWW, and finally through the SNWW to either Port Arthur or Port of Beaumont. That total trip exceeds 150 navigation miles. By road, that same origin to destination trip is approximately 50 miles. Therefore, a more in-depth analysis would need to be completed during feasibility phase to assess cost effectiveness of barge versus truck or rail.

Additionally, within a 4-hour drive from Liberty resides more than 20 million people. If the Port of Liberty only services a very small fraction of either the Port of Houston or Port of Beaumont commerce, the Port of Liberty could potentially be a fully operational port with hundreds or possibly thousands of barges per year.



HOUSTON SHIP CHANNEL

Table 7 shows tonnage transported by barge at the SNWW, Houston Ship Channel, GIWW, and similar barge ports along the Texas coast that service the oil and gas industry.

Table 7. Annual Coastwise Tonnage (1000s) at Sabine-Neches Waterway and Houston (2021)

	Sabine Neches Waterway (Coastwise 2021)	Houston Ship Channel (Coastwise 2021)
Coal		
Petroleum and Petroleum Products	9,138	9,297
Chemicals	66	1,081
Crude Materials		
Primary Manufactured Goods	-	6
Agriculture	-	-
Manufactured Equipment, Machinery, and Products	-	-
Total Tons (x1000) (Includes Deep Draft)	173,267	290,005
Total Tons-Miles (x1000)	3,001,039	9,218,850
Total Trip-Ton-Miles (x1000)	25,838,378	16,482,848
Miles Per Ton	21	32
Tons Per Trip	24,1448	162,200
Total Annual Trips with Draft <18 Ft	48,058	118,573

Source: Waterborne Commerce, 2021



GULF INTERCOASTAL WATERWAY

The vast majority of tonnage is liquid petroleum products and chemicals. All of the tonnage at Liberty is presently categorized as crude materials, although the portfolio at the Port of Liberty will likely diversify with a fully operational port.

Table 8. Average Annual Tonnage (1000s) on the Gulf Intercoastal Waterway (2017-2021)

	Sabine River to Galveston	Galveston to Corpus Christi	Corpus Christi to Mexico Border
Coal	236	111	38
Petroleum and Petroleum Products	44,038	13,354	2,661
Chemicals	11,761	8,180	133
Crude Materials	3,179	1,593	113
Primary Manufactured Goods	1,855	252	72
Agriculture	399	176	131
Manufactured Equipment, Machinery, and Products	31	9	1
Total Tons (x1000)	61,861	23,677	3,149
Total Tons-Miles (x1000)	4,036,608	3,244,362	368,793
Total Trip-Ton-Miles (x1000)	26,968,362	9,251,125	1,324,957
Miles Per Ton	65	137	117
Tons Per Trip	9,259	8,304	876

Source: Waterborne Commerce, 2021



PORT TONNAGE COMPARISONS

Table 9 displays the average annual tonnage at similar barge ports range from 460,000 tons to almost 3,000,000 tons (excluding Greens Bayou since its tonnage includes deep-draft tonnage and not barges only). Therefore, at a cursory view, the Port of Liberty could reasonably expect at least 500,000 tons of throughput per year if no impediments occur in port development.

Table 9. Average Annual Tonnage (1000s) at Similar Barge Ports (2017-2021)

	Liberty	Cedar Bayou	Greens Bayou	Dickinson Bayou	Chocolate Bayou	Colorado River	Victoria	Harlingen
Coal	-	-	21	-	-	-	6	-
Petroleum and Petroleum Products	-	78	329	-	103	204	1,082	1,322
Chemicals	-	614	372	-	1,040	498	1,142	140
Crude Materials	4	5	70	458	-	-	716	-
Primary Manufactured Goods	-	626	90	0	-	0	-	-
Agriculture	-	71	0	-	-	30	2	132
Manufactured Equipment, Machinery, and Products	-	18	1	2	-	-	4	-
Total Tons (x1000)	4	1,410	6,179*	460	1,143	732	2,952	1,593
Total Tons-Miles (x1000)	265	8,730	505	7,318	10,278	11,393	N/A	N/A
Total Trip-Ton-Miles (x1000)	2,150	543,582	229,111	100,480	504,699	201,634	N/A	N/A
Miles Per Ton	61	6	0	16	9	16	N/A	N/A
Tons Per Trip	1	23	14	34	23	41	N/A	N/A
Acres		11,000	389				2,000	2,000
Barge Docks	1	2	6		3		2	5

Source: Waterborne Commerce, 2017-2021
 *Includes Deep-Draft Tonnage



GULF INTRACOASTAL WATERWAY

Table 10 shows the average annual trips by draft along the GIWW and at similar barge ports. A trip in the dataset is considered to be a one-way passage of a towboat and barges.

Note that a towboat may have more than one barge per trip. The GIWW is maintained at a depth of 12 feet, but certain conditions on some days allow barges to load heavier than 12 feet.

Table 10. Average Annual Trips by Draft on the GIWW (2017-2021)

	Sabine River to Galveston	Galveston to Corpus Christi	Corpus Christi to Mexico Border
Maintained Depth (Ft)	12	12	12
Draft (Ft)			
15	11		1
14	37	1	
13	32		
12	798	271	31
11	1,594	589	41
10	7,555	2,896	273
9	13,579	5,224	883
8	9,244	4,581	564
7	6,270	2,991	366
<6	19,961	12,375	1,023
Total Trips (Annual Average)	59,080	28,929	3,181

Source: Waterborne Commerce, 2017-2021



BARGE PORT TRIPS COMPARISON

Table 11 illustrates the average annual trips for similar barge ports along the Texas coast. Note that each port utilizes its full maintained depth. Dickinson only has a maintained depth of 7 feet and most of its tonnage includes crude materials, similar to Liberty presently. Crude materials, such as steel and pipe, does not require as much depth as other products such as liquid petroleum products or aggregate such as sand. Therefore, with its current portfolio, a depth of 7-8 feet for the Trinity River channel will probably suffice. However, as the port grows and its portfolio broadens, a deeper channel around 9-12 feet may be necessary.

Table 11. Average Annual Trips by Draft at Similar Barge Ports (2017-2021)

	Liberty	Cedar Bayou	Greens Bayou	Dickinson Bayou	Chocolate Bayou	Colorado River	Victoria	Harlingen
Maintained Depth (Ft)	N/A	11	12	7	11	8	N/A	9
Draft (Ft)								
15								
14			3		1			
13		14	2					
12		23	24		12	2	19	12
11		28	145		4	17	214	2
10		157	199	3	134	49	204	119
9		235	491	145	304	87	666	253
8		397	459	57	401	292	402	139
7		349	333	44	216	173	281	201
<6	3	1,316	1,002	186	777	779	1,661	399
Total Trips (Annual Average)	3	2,519	2,658	435	1,849	1,401	3,447	1,126

Source: Waterborne Commerce, 2017-2021



MARKET DEMAND

The potential for the Port of Liberty hinges on the market demand for products it supports. This market analysis illustrates the vast, diverse markets in the area and the benefits and constraints of supporting those markets.

POTENTIAL INDUSTRIES

Several potential example companies have been identified in this assessment, as well as past assessments by Freese and Nichols and Trinity River Authority, as potential users of a channel at Liberty.

- Note that this report does not endorse any particular company, but any example company mentioned represent possible types of product that channel users may reasonably transport.
- Boomerang Tube- makes Oil Country Tubular Goods (OCTG) and Line Pipe (LP). Capacity for 360,000 tons of Electric Resistance Weld (ERW) OCTG and LP annually. Imports are primarily from domestic mills consisting of hot rolled steel coils. Inbound and outbound traffic include truck and rail either direct or through a transload location near Liberty.
- Domino Sand Services- has a silica sand operation near Liberty. Capacity for 600,000 tons annually. Currently sand is trucked but could utilize rail to ship to Permian Basin and other fracturing mining locations, to include shipping by truck, rail, and barge.
- Baze Chemical- producer of chemicals with locations in Odessa, Palestine, and Liberty, TX, and New Iberia, LA. Potential barge volumes are unknown at this time and are dependent on market conditions.



Table 12. List of Potential Shippers and/or Users (TRA, 2017b)

Company	City	State	In/Out Bound	Product
Trinity Materials	Dallas	Texas	Out	Sand
Hannas Bend Aggregate	Liberty	Texas	Out	Sand
Liberty Ranch Sand Mine	The	Texas	Out	Sand
David Parker	Dayton	Texas	Out	Sand
Insteel Wire Production	Dayton	Texas	In/Out	Steel
Sumiden Wire Production Corp	Dayton	Texas	In/Out	Steel
Global Tubing	Dayton	Texas	In/Out	Steel
Hiller Carbon	Tampa	Florida	In/Out	Carbon
Huntsman Corporation	Dayton	Texas	In/Out	Chemical
CMC Railroad Inc	Dayton	Texas	In/Out	Trans Load
Boomerang Tube	Liberty	Texas	In/Out	Steel
Quickrete	Liberty	Texas	In	Sand
Liberty Forge	Liberty	Texas	In/Out	Steel
ARG	Raywood	Texas	Out	Agricultural
Baze Chemical	Liberty	Texas	In/Out	Chemical
Moss Bluff Gas Storage	Liberty	Texas	Out	Liquid Natural Gas

Ultimately, the companies that decide to utilize the channel will be dependent on its profitability margins. If transport by barge allows the company to increase its profit margin as compared to alternative modes of transportation, it is reasonable to assume a company will make an investment to pursue operations on the channel. This type of analysis is beyond the scope of this report.



A NAVIGABLE CHANNEL AND LOADING PATTERNS

The navigable portion of the Trinity River to Liberty, TX would be 41.4 miles for the Channel to Liberty, and 5.6 miles for the Anahuac Channel.

Tow costs greatly affect the profitability of companies and in turn the feasibility of a Port at Liberty. Tow costs are a function of tow size with respect to the number and size of barges. The greater the number of barges per tow, the lower the average total cost per barge. Another factor to tow cost is tow speed. The slower the tow speed, the higher the relative tow cost. The Channel to Liberty includes numerous curves which would in turn reduce tow speeds and most likely reduce the number of barges per tow. Loading patterns also affect tow costs. A barge that can load to full capacity experiences cheaper tow costs per ton than a barge light loading or utilizing smaller barges due to channel constraints.

While the GIWW is authorized at 12 feet MLLW, the Channel to Liberty and Anahuac is only authorized to 6 feet MLLW. Although parts of the river is naturally deeper in most areas, the lowest maintained depth serves as the constraint for navigation. At 6 feet depth, a typical 1,500 ton capacity

hopper barge would light load to about 1,000 tons. Light loading greatly affects company profitability and competitiveness in the market. A barge carrying 1,000 tons would cost 50 percent more than a barge carrying 1,500 tons. Each additional foot of depth allows for an additional 150 tons approximately. These figures are approximate and vary by commodity as well.

The tables below illustrate various barges and their characteristics.

Table 13. Predominant Barge and Tow Types, Characteristics, and Dimensions (USACE 1980)

Equipment Type	Length (ft)	Breadth (ft)	Draft (ft)	Capacity (tons)
Open Hopper Barges				
Standard	175	26	9	1,000
Jumbo	195	35	9	1,500
Super Jumbo	250-290	40-52	9	2,500-3,000
Covered Hopper Barges				
Standard	175	26	9	1,000
Jumbo	195	35	9	1,500
Chemical & Petroleum Barges	150-300	50-54	9	1,900-3,000
Towboats	65-160	24-50	5-9	



TOW AND BARGE CONFIGURATIONS

Figure 100 shows various tow and barge configurations. Since the Trinity River is meandering with sharp turns, the most likely configurations to use the channel would be a 100' tow boat and either 1 or 2 barges per tow with dimensions of 126' x 33' or 195' x 35' (the first 2 configurations in the figure to the right). The depth required is a minimum of 7' draft to fully load pipe, steel products, or other crude materials. A depth of 9-12' is required to fully load liquid products, aggregate such as sand, and other product that is heavier and more dense.

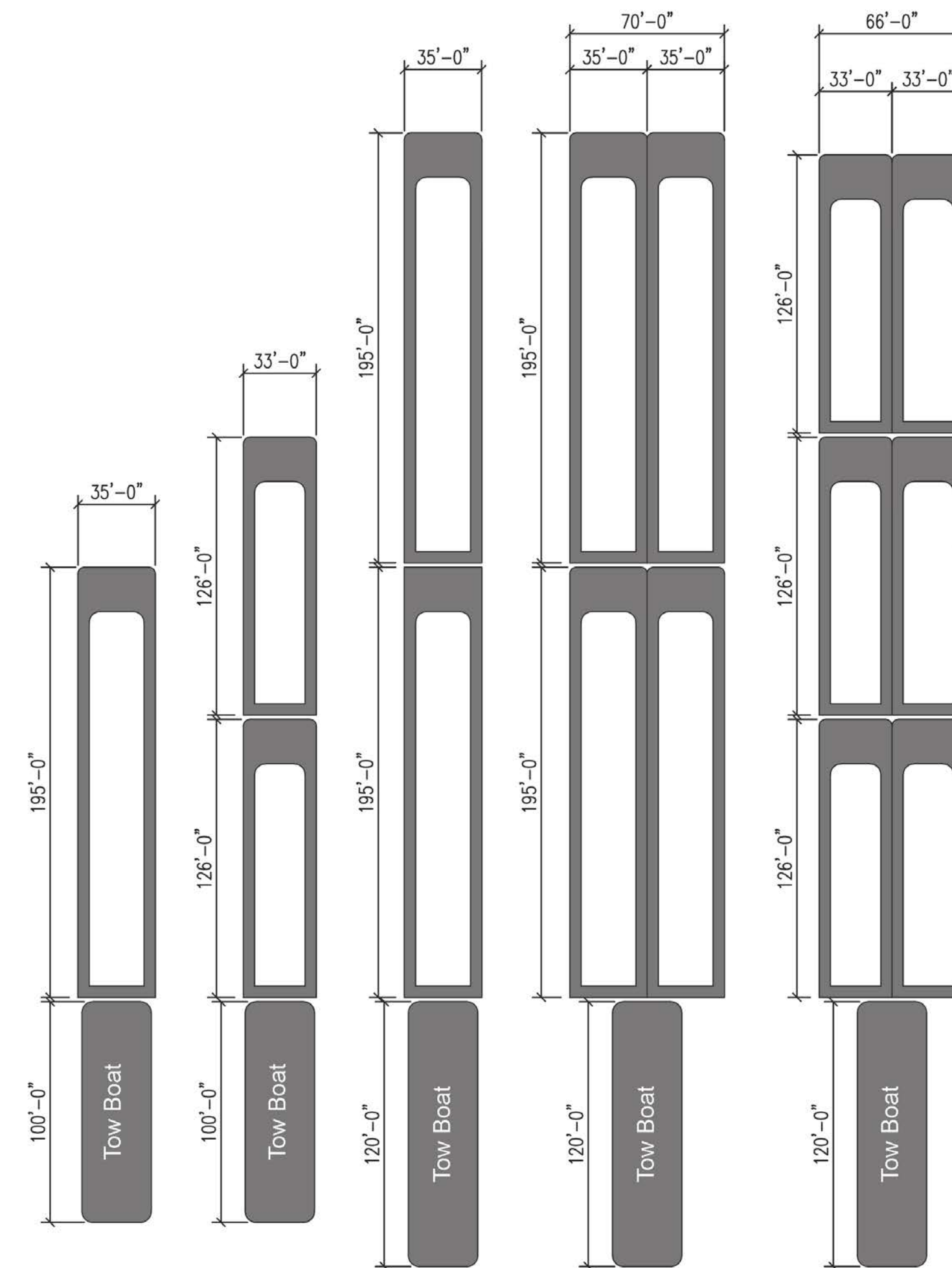


Figure 100. Barge Tow Configurations

NON-DIRECT ECONOMIC ADVANTAGES

Besides the direct advantage of the developing a port at Liberty, Texas, there are other critical indirect benefits.

- **Safety:** Navigation safety improves with better barge tow maneuverability
- **Lower carbon emissions:** Navigation has less emissions per unit than transport by truck and rail
- **Less congestion in Houston:** Less city congestion yields lower carbon emissions, higher safety, and overall better air quality
- **Ecosystem Restoration:** Beneficial use of dredged material may help restore the ecosystem



Figure 101. Rebuilding Coastline with Dredge Material
(Photo Source: USACE)



ADDITIONAL KEY CONSIDERATIONS

Inland ports are a very cost-effective way to distribute product throughout the country.

The main limitation on inland waterway shipping is that many rivers and canals have shallow waterways and may not be deep enough to accommodate large barges, restricting cargo rates.

Maintaining the waterways require consistent dredging of the waterway, and/or infrastructure designs to mitigate erosion and sedimentation.



Figure 102. Dredging Operations
(Source: USACE)

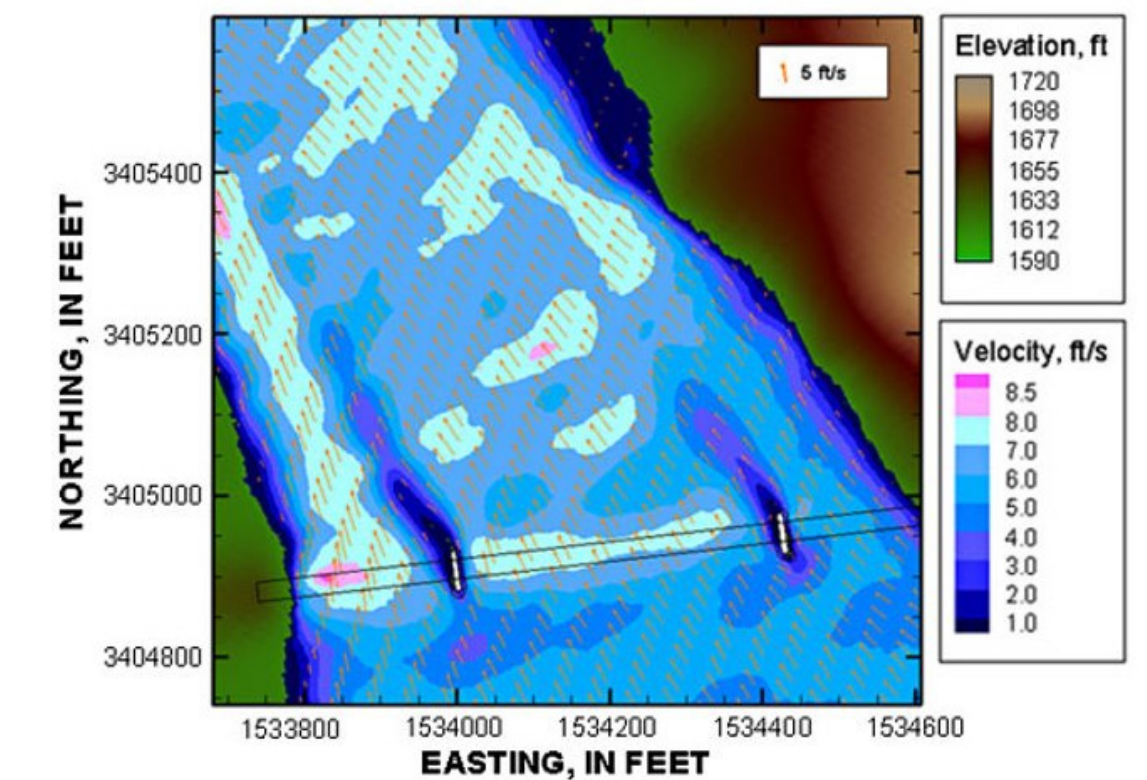
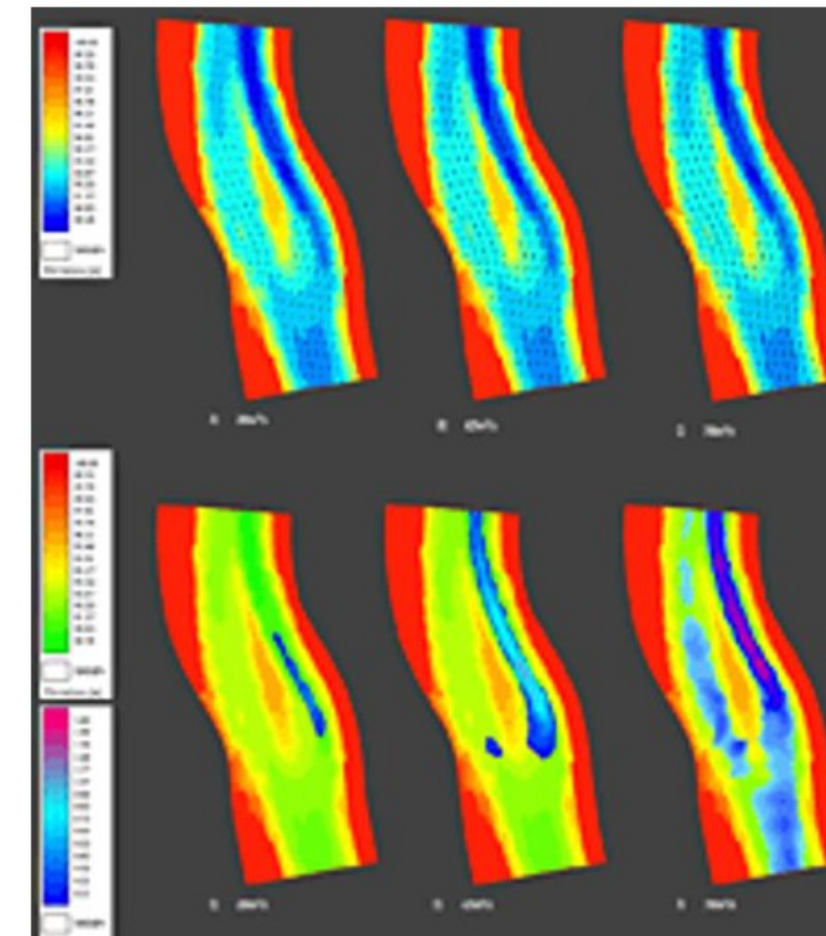
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PART 7

CONCLUSION AND NEXT STEPS

This Vision Plan demonstrates the potential benefits and needs of creating an inland port at Liberty, Texas connecting to Trinity Bay along the Trinity River. This Vision Plan proposes a three-phase approach that will open the south end of the oxbow and create a mid-sized port supporting bulk liquid and solid commodity barges. Due to its location between Houston and Beaumont, the port also has the capability of supporting emergency operations and provide safe harbor. Some of the potential benefits of creating a port at Liberty include the following:

- Improving navigation safety with better barge tow maneuverability
- Lower carbon emissions- Reduce truck and rail traffic
- Reduce congestion in Houston (Lower carbon emissions, safety, air quality)
- Provide Ecosystem Restoration through beneficial use of dredged material



Figures 103 and 104. Modeling Examples
(Source: USGS)



The analysis of the Vision Plan found the following conclusions:

- A channel of 9 ft depth will provide a more stable market at Liberty. A channel of 6 ft depth will limit what can be transported in the channel. Given the cost structure, there is a limited market for product transported at 6 ft depth.
- Given USACE policy and the costs of O&M, a port at Liberty approximately the size of Chocolate Bayou (5 trips per day) will need to be developed to justify the cost of O&M maintenance dredging. Transportation costs for a non-maintained channel that shoals to 6 ft depth will be approximately double the transportation costs of a maintained channel at 9 ft depth since each trip can only transport approximately half the tonnage. Therefore, the transportation cost savings (benefits) would be approximately equal to the FWP transportation costs listed above.

Finally, the realization of this Vision Plan will require additional studies and information to ensure optimum benefits and minimization obstacles and negative impacts.

- Modeling of water flows and sedimentation in channel and oxbow
- Ship simulations on navigability of channel and oxbow for barge traffic
- A feasibility study, as authorized in the 2022 WRDA

In conclusion, the Port of Liberty has the potential to be self-supporting and bring commerce, resilience, and environmental benefits to the region.



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