

# Gulf Intracoastal Waterway







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# Introduction

This report, the 19th in the series as required by the Transportation Code, is submitted by the Texas Department of Transportation (TxDOT) on behalf of the Texas Transportation Commission (commission) to the 83rd Texas Legislature, summarizing the state's sponsorship efforts to maintain the Gulf Intracoastal Waterway (GIWW) in Texas. The GIWW is an essential component of the state's and nation's transportation network and is an integral part of the governor's plans for moving Texas forward: "Improving transportation is essential to the safety of our families, a cleaner environment and the long-term health of our economy."<sup>1</sup>

The Gulf Intracoastal Waterway (GIWW) is a 1,100-mile-long shallow draft man-made protected waterway that connects ports along the Gulf of Mexico from St. Marks, Florida, to Brownsville, Texas (Figure 1). The Texas Department of Transportation (TxDOT) fulfills the non-federal sponsorship requirements for the waterway in Texas as described in Chapter 51 of the Transportation Code.

Cargo carried on the GIWW reduces congestion on the highway and rail systems,

decreasing maintenance costs and extending the life of these systems. In addition, water transportation is the most fuel-efficient mode of transportation and produces the smallest amount of air pollutants per ton of cargo carried.

The GIWW is the nation's third busiest inland waterway, with the Texas portion handling 63 percent of its traffic. In Texas, the GIWW is 406 miles long (Figure 2). In 2010, over 73 million short tons of cargo were moved on the Texas portion of the waterway. The majority of this cargo, 66.8 million short tons or 91 percent, is classified as petroleum- and chemical-related products. With the state's deep and shallow draft waterways, Texas ranked first in the nation for 2010 in total waterborne tonnage moved in the United States.<sup>3</sup>

The GIWW is designed to be 125 ft wide and 12 ft deep. Unfortunately, due to insufficient federal funding, these dimensions are not being maintained, resulting in costly inefficiencies and lost business opportunities for users of the GIWW.



Figure 1 – 1,100-mile GIWW.



Figure 2 – Texas GIWW.

# Benefits Assessment

The development of the GIWW requires the concerted efforts of federal, state and local interests. Planning associated with this project began over 107 years ago and continues today. One of the initial functions of the GIWW was to provide protected inland transportation of goods and troops during World War II. It has since evolved into a multipurpose waterway used by recreational and commercial interests. Recreational uses include fishing, skiing, sightseeing and traveling protected water transportation routes along the coast. Commercial uses include the movement of domestic and international cargo, harvesting fish and shellfish, and servicing the gulf and coastal oil and gas industry.

## Direct and Indirect Benefits

The GIWW provides important direct and indirect benefits to the state, such as:

- In 2010, 73.12 million short tons (1 short ton equals 2,000 pounds) of goods were moved on the Texas GIWW. This was accomplished by approximately 52,773 one-way barge movements.<sup>3</sup>
- In 2010, the GIWW enabled commercial fishermen to catch an estimated 14.0 million pounds of shrimp, oysters, crabs and finfish with a wholesale value of \$30.6 million from Texas bays and estuaries.<sup>4</sup>
- Barge transportation reduces congestion to the transportation system. The capacity of one dry cargo barge is equivalent to 15 railcars or 70 trucks. A typical tank barge is the equivalent of 46 railcars or 144 trucks.<sup>5</sup>
- Barge transportation is the most fuel-efficient mode of transportation. One gallon of fuel moves 1 ton of cargo 616 miles on the inland waterways, 478 miles on rail, and 150 miles on truck.<sup>5</sup>
- Barge transportation produces fewer air emissions than similar movements by truck or rail. For carbon dioxide (the principal component of greenhouse gases), barges produce 78 percent of what railroads produce and only 10 percent of what trucks produce for the same amount of work performed. For particulate matter, the percentages are 78 percent and 13 percent, respectively.<sup>5</sup>
- The movement of goods by barge is a safe mode of transportation. For the period 2001–2009, the spill rate for barges was 53 percent of the rate for railroads and 25 percent of the rate for trucks.<sup>5</sup>





## Operational Concerns

The waterway, in its current form, is over 60 years old. During the past 60 years, the size of individual barges and towboats, the width and length of barges lashed together and pushed as a unit (tows), and the volume of traffic have steadily increased. The base width of the navigable channel is 125 feet at a depth of 12 feet. Regulations restrict the width of tows to 55 feet, but oversize tow permits are routinely granted for tows as wide as 108 feet. When tows must pass each other, they must utilize the waters outside of the authorized channel. In some instances, one tow must hold on the bank of the channel to provide enough space for the other vessels to pass. Given the extensive use of the waterway by fishermen and recreational users, constant activity occurs outside the authorized channel. These factors have led towboat operators, shippers and transportation officials to believe that the 1949 dimensions of the GIWW and its associated structures do not adequately support the state of barge transportation today.

The Brazos River Floodgates and the Colorado River Locks are two lock-type structures on the waterway. The structures are over 60 years old and are only 75 feet wide. To move through the structures, vessel operators must park their tows, break the

barges apart, move them through the locks in smaller sets or individually, and then put them back together on the other side. This process, known as tripping, is inefficient and causes delays that cost the towing industry over \$2 million a year at each location, according to industry estimates.

In February 2009, the mouth of the San Bernard River was restored to its original location by dredging over 340,000 cubic yards of sediment from the sand spit that had formed across the mouth (Figure 3). The blockage caused waters of the San Bernard River to travel eastward through the Brazos River Floodgates, creating hazardous currents that jeopardized commercial navigation. Significant reductions in the velocity of water through the Brazos River Floodgates were evident immediately after the dredge restored the river's connection to the Gulf of Mexico. While the mouth of the San Bernard River is still unstable, moving westward about 6 feet per day, it is anticipated that currents will remain low through the Brazos River Floodgates for another three to five years. The U.S. Army Corps of Engineers Galveston District and the Texas Department of Transportation will monitor the performance of the project and develop appropriate actions as they become necessary.



**Figure 3 - San Bernard Dredging Project.**

Barge navigation is also hampered by a shortage of locations for mooring structures, which are a set of buoys outside the navigable channel to which a barge can be tied or moored. These structures are valuable throughout the waterway, especially during high wind and foggy conditions, and in areas where locks or heavy shoreline development dictate one-way traffic flow. Work is ongoing to evaluate existing locations and to determine needs for additional mooring structures.

The area in West Galveston Bay, where the GIWW passes beneath the dual Interstate Highway 45 bridges and the Galveston Island Railroad Bridge, has historically been a major problem. TxDOT finished replacing the dual Interstate Highway 45 bridges in November 2008, creating an opening of over 300 feet for barge traffic beneath the highway bridges. The adjacent Galveston Railroad Bridge, however, only had an opening with a width of 105 feet. In April 2009, U.S. Department of Homeland Security



**Figure 4 – Galveston Island Railroad Bridge.**

Secretary Janet Napolitano announced that the Galveston Bridge alteration project was included in the projects identified to receive funding from the American Recovery and Reinvestment Act. Because of this additional funding, the project to replace the railroad bridge with a wider span was completed in two years, rather than in the three plus years originally scheduled.

In February 2012, a new 382-foot-long, 1,580-ton vertical lift railroad bridge parallel to the Galveston Causeway was fitted into place (Figure 4). The old 105-foot drawbridge was subsequently removed to improve what has been called one of the trickiest places to navigate along the entire GIWW.

## Recent Activities

During the last biennium, TxDOT has participated in various activities to support the waterway. These include initiation of federal and state studies and research projects, and performance of maintenance dredging projects.

### Studies and Research

The Corps, under the authority of the Flood Control Act of 1970, has initiated various studies known as Section 216 studies. These studies look at specific water resource projects that may have changed because of physical or economic reasons. TxDOT acts as the non-federal sponsor for the studies involving the GIWW in Texas.

The Corps has divided the Texas portion of the GIWW into five separate Section 216 study areas. Figure 5 illustrates the Section 216 study reaches. These areas have been further divided into six studies that focus on complex or unique problems.

TxDOT no longer supports one of these projects, and the Corps has recommended its termination. One has been authorized for construction and is in the design phase. Of the remaining four, one is a reconnaissance study to see if there is a federal interest in the project, and three are in the feasibility study phase. For the five active projects, the total cost to complete the current phase is estimated at \$23.7 million, of which \$14.2 million in additional funding is needed. None of these projects were included in the president’s budget for fiscal year (FY) 2011, FY 2012 or FY 2013.

In addition to the federal Section 216 studies, TxDOT’s research program has initiated several marine transportation-related studies. This program, plus interagency agreements, allowed TxDOT to participate in studies that address various needs of the GIWW. Table 1 shows research studies funded by TxDOT that have been active during the past two years.

**Table 1 – TxDOT-Sponsored Research**

| PROGRAM                 | STUDY   | RESEARCHER(S)   |
|-------------------------|---|---|
| State Planning Research | Protecting Waterways from Encroachment (Completed)  | Texas A&M University at Galveston and Texas A&M Transportation Institute                          |
| State Planning Research | Selected 2012–2014 Trade Flows and Texas Gulf Ports: Panama Canal and South American Markets        | The University of Texas Center for Transportation Research and Texas A&M Transportation Institute |
| State Planning Research | An Analysis of the Value of Texas Seaports in an Environment of Increasing Global Trade (Completed) | The University of Texas Center for Transportation Research and Texas A&M Transportation Institute |
| State Planning Research | Selected 2012–2014 Trade Flows and Texas Gulf Ports: Panama Canal and South American Markets        | University of North Texas   |
| State Planning Research | Impacts on Texas Ports from the Panama Canal Expansion  | Texas A&M Transportation Institute  |
| State Planning Research | Synthesis of Port Related Freight Improvement Studies   | Texas A&M Transportation Institute  |



**Figure 5 – Section 216 Study Areas.**

TxDOT is also investigating and gathering data on the following topics:

- potential new development and savings on road congestion made possible by using the GIWW;
- the budget needed to maintain the GIWW at its authorized dimensions and make necessary upgrades;
- potential funding mechanisms, including public-private partnerships and user fees; and
- effective ways to involve the private sector and users of the GIWW in evaluating and selecting possible courses of action in the areas listed above.

These topics are being evaluated for inclusion in future TxDOT-sponsored research activities.

### **Maintenance Dredging Activities**

During FY 2011 and 2012, approximately \$43 million in federal funds was expended by the Corps in 100 percent federally contracted and funded projects to maintain the navigability of the Texas GIWW main stem. Approximately \$7.5 million was spent to operate and maintain the locks and floodgates. Approximately 9,000,000 cubic yards of sediment were dredged in seven different reaches of the GIWW. Figure 6 depicts the relative volumes that were removed and the location along the waterway.

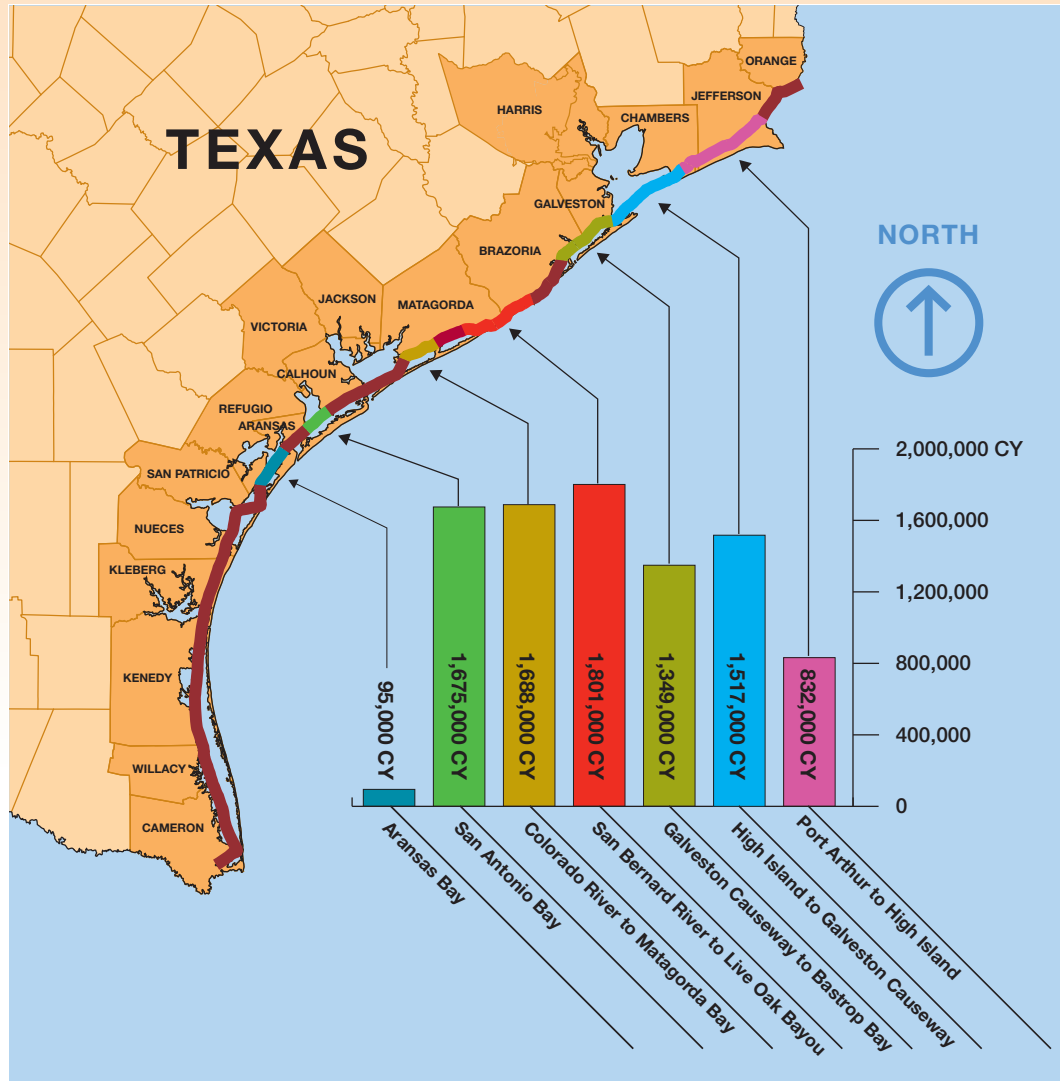


Figure 6 – FY 2011 and FY 2012 Dredging.

## Issues of Concern

There are funding, regulatory and management issues of legislative concern related to current and future operations of the GIWW.

The Corps has not received adequate operations and maintenance funding to maintain the waterway as designed. There has been a rapid escalation in dredging costs associated with the rise in the price of oil and the scarcity of equipment due to the increased activity necessitated by major storms. The Corps budget has not increased to offset this rise in dredging costs, and projects are being deferred or downsized. As a result, the Corps has not been able to maintain the entire waterway at its authorized depth. Commercial navigation is transporting smaller amounts of commodities per

vessel in response to a shallower waterway, resulting in higher transportation costs. It is estimated that for every ton left behind due to draft restrictions, there is an increase in transportation costs of at least \$0.035/ton mile.<sup>6</sup> With about 28 billion ton-miles traveled in the movement of commodities using the Texas GIWW in 2010, a 10 percent reduction in capacity equates to at least \$98 million in increased transportation costs. The age and inefficiencies of the Brazos River Floodgates and the Colorado River Locks only compound the problem. Continued degradation of the state's water transportation infrastructure and associated increases in transportation costs pose an economic threat to businesses that depend on water transportation, such as the chemical and petrochemical industries.



Figure 7 – Development along the GIWW.

Our state's rapidly growing population has spurred the development of private property along navigable waterways (Figure 7). The number of marinas, residential subdivisions, docks, piers and other shoreline developments has dramatically increased throughout the coastal regions of the state. As more projects are developed and navigation channels become more restricted and congested, safety issues arise. The benefits of the GIWW will be lost unless navigational impacts are considered and minimized in conjunction with future development. There is no clear, consistent method or process for regulating development along the waterway that poses a hazard to navigation or creates an unacceptable health or safety risk. As the pressure to develop new sites and recreational opportunities intensifies, the likelihood that the capacity of the waterway will be reduced and unnecessarily dangerous situations will be created will increase. A mechanism for balancing the uses of the waterway is needed.

TxDOT has discussed this issue with the councils of the Texas Coastal Management Program. They recommended addressing these concerns during the comment period for Corps of Engineers permit requests. The Corps of Engineers has agreed to evaluate navigational concerns, but its willingness to control shoreline development along navigable waterways has been limited. It is still unknown at this time how to appropriately balance shoreline development, public use and navigation interests.

In response to the Sunset Commission's 2010 review of the Coastal Coordination Council, Senate Bill 656 abolished the council on September 1, 2011, and transferred its functions and authority to the Texas General Land Office (GLO). The new relationship between TxDOT and GLO, as well as other agencies with input into the Coastal Management Program, is working well in support of TxDOT's role as the non-federal sponsor of the GIWW.



**Figure 8 – Freeport, Texas marsh land.**





Both the (Texas) House Committee on Transportation and the (Texas) Senate Committee on Transportation and Homeland Security have interim charges directing them to study the impact of expansion of the Panama Canal on the state's transportation infrastructure. To date, only the House committee has held a hearing. TxDOT formed a Panama Canal Stakeholders Working Group to examine the potential impacts of the canal expansion project on the state's transportation infrastructure. All of the evidence presented to date indicates that traffic on the GIWW will increase as a result of the expansion and various market shifts that are occurring.

Finally, TxDOT was designated as the non-federal sponsor of the GIWW in the 1975 Texas Coastal Waterway Act. In 1983, Texas and the federal government signed a Sponsorship Resolution detailing the non-federal sponsor's duties. One of the primary duties of the non-federal sponsor is the provision of lands, easements, rights of way, relocations, and necessary disposal

areas for maintenance and operation of the GIWW. As part of a 50-year GIWW dredged material management plan, there are over 200 designated disposal areas along the GIWW in Texas. These sites were established as the least-costly, environmentally acceptable, long-term dredged material placement areas for maintenance of the GIWW. Private interests have increasingly shown an interest in using these dedicated sites for their personal dredging projects. The Legislature has not authorized TxDOT to develop a program to allow private interests to use these dredged material disposal sites. There are numerous issues associated with state assistance to private parties that will need legislative direction before such a program can be developed. Several port authorities have established procedures for private interests to use their disposal areas, which usually consist of a charge per cubic yard. These charges are typically based on remaining capacity and maintenance expenses of the sites. (The Corps of Engineers may charge additional fees.)

In addition to these sites, there are numerous areas where the beneficial use of dredged material can occur. Projects such as the development of marshes or the placement of dredged material on eroding gulf beaches can be highly desirable to the state. Inconsistent federal and state environmental coordination, a lack of incentives, and the high cost of developing projects are hindrances to the development of beneficial use of dredged material projects.

Additionally, a number of these placement sites are reaching capacity. Without disposal capacity in these placement areas, dredging cannot take place. Maintenance activities such as dewatering and consolidation are necessary to maintain the ability to dredge.

To support the state's non-federal sponsorship of the GIWW in Texas and facilitate planning, maintenance, preservation, research and improvement of the waterway, the Texas Legislature should consider the following actions:

- providing the financial resources to acquire dredge material placement areas and develop beneficial use of dredged material projects;
- advocating for additional federal funding of the Corps of Engineers Operations and Maintenance budget for Texas, as well as funds to upgrade or replace the Brazos River Floodgates and the Colorado River Locks;
- investigating the feasibility of establishing a funding mechanism that would enable the state to compensate for insufficient federal funding and maintain the GIWW at its authorized dimensions;

- amending Transportation Code Chapter 51 to specifically authorize TxDOT to enter into contracts and/or grant funds to fulfill its responsibilities under this chapter;
- directing state agencies that review marine-transportation-related projects to develop environmental policies that promote marine transportation in an environmentally sound, cost-constrained manner;
- directing the Texas Coastal Management Program to place more emphasis on protecting navigation when reviewing permits for development along the GIWW; and
- directing the Texas Coastal Management Program to recognize the importance of dredged material placement areas and the need to develop policies to protect and preserve existing placement areas.

Waterborne transportation and the GIWW are important components of the state's transportation system. While the movement of goods by water is a safe, efficient, economical and environmentally friendly mode of transportation, over the years there has been little legislative and governmental effort to support, encourage and preserve water transportation. As a result, the state has lost many opportunities to take trucks off the road, reduce air emissions, reduce highway congestion, and use dredged material beneficially. These opportunities will continue to be lost unless the state acts to support and promote waterborne transportation.

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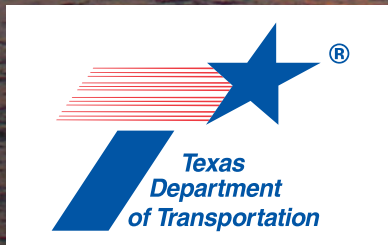
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<sup>4</sup>Texas Parks and Wildlife, Coastal Fisheries Division, Unpublished Data.

<sup>5</sup>Texas A&M Transportation Institute, Center for Ports and Waterways, A Modal Comparison of Domestic Freight Transportation Effects on the General Public: 2001–2009.

<sup>6</sup>Texas A&M Transportation Institute, Center for Ports and Waterways, C. J. Kruse Presentation, 2007 Gulf Intracoastal Canal Association Annual Meeting.



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