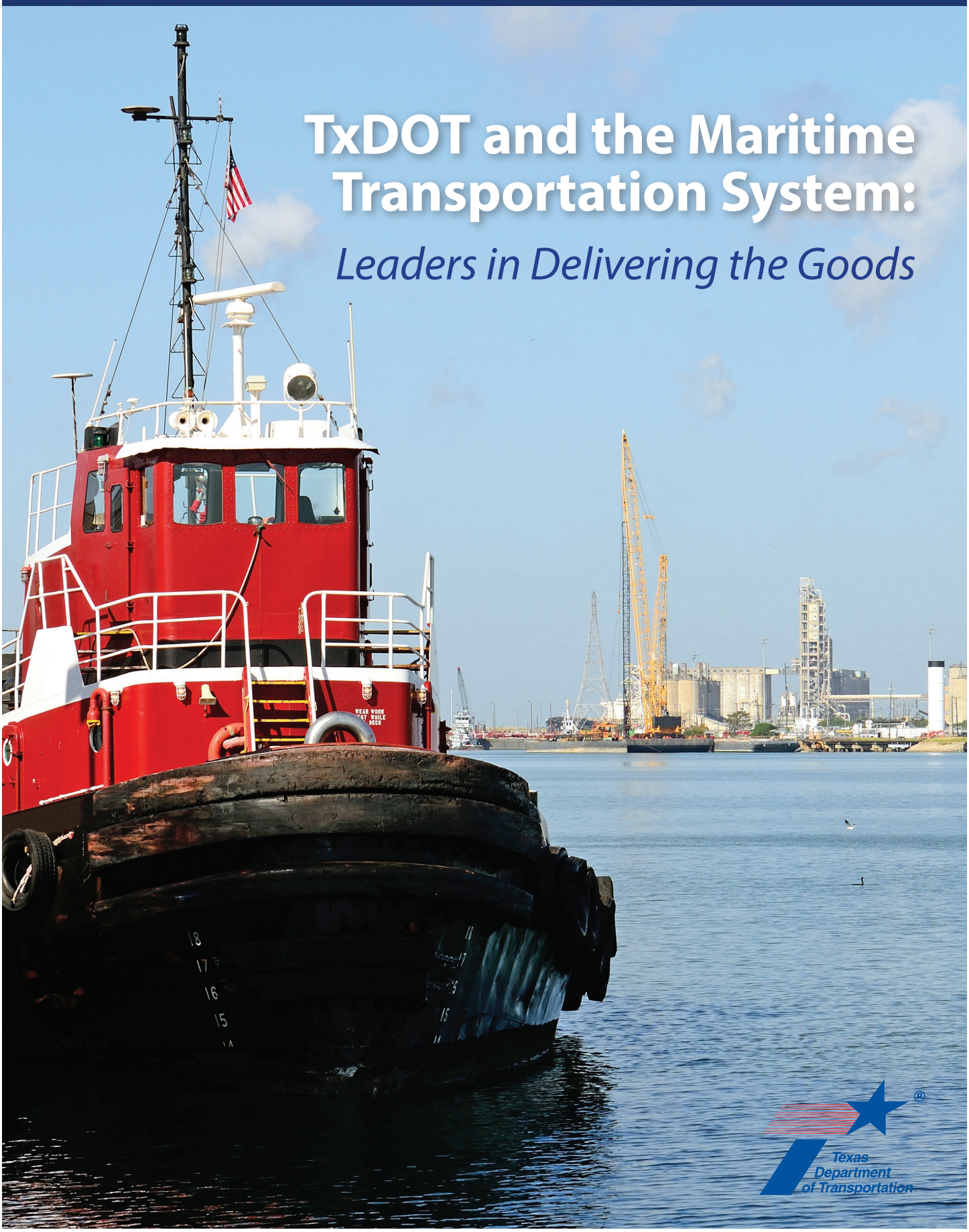
TEXAS DEPARTMENT OF TRANSPORTATION

# TxDOT and the Maritime Transportation System:

## *Leaders in Delivering the Goods*



Texas Department of Transportation

## COMPONENTS OF THE TEXAS MARITIME TRANSPORTATION SYSTEM


**Texas' maritime transportation system** consists of waterways, ports, and intermodal landside connectors. Together, the components of the marine transportation system facilitate the movement of goods and people over water. In Texas, there are 11 commercial ports served by channels with a draft of more than 30 feet (deep-draft ports), and five other ports that handle commercial cargoes with channel depths less than 30 feet (shallow-draft ports). The remaining shallow-draft ports are used for commercial fishing and recreational purposes and do not handle commercial cargoes. As reported in the Texas Ports Strategic Mission Plan - 85th Legislative Session, in 2015, the Lone Star State ranked second in the nation in total waterborne tonnage transported, with 563 million tons (or approximately 22 percent of the total U.S. maritime freight volume) on both deep- and shallow-draft waterways.

Texas' ports are connected by an extensive shallow-draft channel called the Gulf Intracoastal Waterway in Texas (GIWW-T), which serves as an integral component of the state's vast petrochemical and manufacturing supply chains.

For more detailed information on the Texas port system, see the Texas Ports Strategic Mission Plan, available on the TxDOT Maritime Division's website: www.txdot.gov/inside-txdot/division/maritime.html.

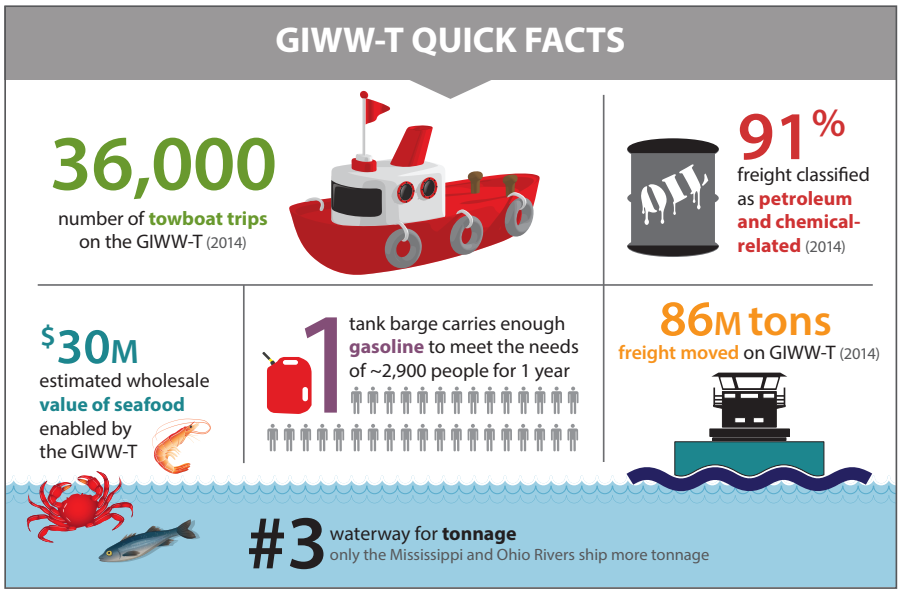
# TEXAS—A NATIONAL LEADER IN MARITIME TRADE

**Much of the state's import tonnage** is crude oil; it enters into the petroleum refining process and is rendered into gasoline, diesel, jet fuel, and other petroleum products sold domestically and internationally. Similarly, chemicals are also imported and used to produce more sophisticated chemicals or products, which are then exported. In short, Texas ports are critical to the state's economy and provide the necessary inputs for value-added products that are then exported to generate wealth for the state.

As the nation's leading export state, Texas ports handled over 28 percent of the nation's total export tonnage in 2015. Unlike many other parts of the nation, Texas' export and import trade volumes (by tonnage) were almost completely balanced during 2015.


Source: U.S. Army Corps of Engineers, Navigation Data Center

Texas leads the nation in the total volume of intrastate maritime cargo, handling 74.7 million tons of domestic cargo in 2015. Every ton of cargo handled on Texas' waterways reduces or eliminates the state's need to use its road, rail, or pipeline networks. As a result, Texas' coastwise maritime trade plays a key role in managing congestion and reduces the need to build new surface transportation infrastructure. Additionally, much of the cargo moved on water includes hazardous materials, and maritime vessels provide the safest mode for their movement.




The movement of intermodal containers is also an important component of Texas' maritime industry. During 2015, Texas ports handled more than 1.8 million twenty-foot equivalent unit (TEU) containers, or 71 percent of all loaded containers handled in the Gulf of Mexico. In total, approximately 80 percent of container traffic arriving at Texas ports remains within the state, indicating that the state's economy depends on the port system for efficient and cost-effective transportation of the products it imports and exports.

# EMERGING TRENDS AND ISSUES

**Texas' maritime industry** operates within an environment of robust demand and new opportunities. The state's strong population growth and expansions within key industrial sectors are sustaining this prosperity. The long anticipated completion of the Panama Canal's expansion project in June 2016 is also expected to create long-term, positive impacts for Texas ports and exporters.

Despite the slowdown in the state's oil and gas production in recent years, activities related to energy continue to keep Texas' ports and private marine terminals busy. For example, the Port of Beaumont handles large volumes of crude oil that is produced in Colorado and Wyoming and then blended with oil produced in Texas to optimize refinery production. There are also many private terminals receiving oil and gas for refining or processing that supply domestic demand and export their final products to countries in Latin America and around the world. Producers of natural gas plan to export their stock through a number of new liquefaction facilities being constructed or planned along the Texas Gulf Coast. Additionally, tens of billions of dollars in private investment are being made to build petrochemical plants along the Houston Ship Channel that will use the state's cheap and abundant natural gas to produce plastic resins for containerized exports.

**Crude Oil and Liquid Natural Gas (LNG) Exports:** With the legal barriers to exporting crude oil dropped in December 2015 and with new LNG export facilities coming on line, many producers are interested in selling their product internationally, where they can command higher prices. However, in the case of crude oil, reality has been more modest than earlier expectations. According to the U.S. Energy Information Agency, roughly 300,000 barrels of oil per day are exported from all U.S. Gulf Coast ports. This amount is equal to about one Panamax tanker movement every two days. Because the international price differential for LNG is higher than crude oil, LNG shipments are expected to contribute more significantly to vessel activity at Texas ports. Texas currently has two LNG export terminals under construction, located in Freeport and Corpus Christi. They are scheduled to commence operations in 2018 and 2021, respectively. Another facility in Sabine Pass has received approval from the

Federal Energy Regulatory Commission (FERC), but has not yet started construction. Several more LNG projects along the Texas coast have been proposed or are awaiting approval from FERC.

**Petrochemical Expansion:** Petrochemical producers are adding an unprecedented level of new capacity in Texas, as well as expanding existing facilities. According to the American Chemistry Council, U.S. petrochemical companies recently proposed 99 new major projects worth a total of $48.2 billion of new construction in Texas. These new plants are estimated to generate 15,800 direct jobs annually—not counting construction employment—once all facilities become operational. A number of these major projects are expected to come online during 2017 and 2018.

**Plastic Resin Exports:** The production of plastic resins has historically held an important role in Texas' petrochemical industry and its influence is expected to grow significantly in the near term. Plastic resins are made using naphtha, which is derived from crude oil during the refining process, or ethane, one of the compounds found in natural gas, with ethane being the more cost-effective of the two. Texas' increased production of natural gas from its shale plays, particularly the Eagle Ford shale play, is making it a highly competitive location for producing plastic resins. In addition to Texas' shale gas reserves providing a cheaper feedstock, they are also a source of cheap fuel needed to generate the significant amount of electricity required during the manufacturing process. Because of these cost advantages, global corporations plan to invest tens of billions of dollars for the expansion and construction of new plastic resin plants in Texas over the next decade. In the first 10 months of 2016, approximately 46 percent of all U.S. containerized plastic resin exports (153,000 TEUs) moved through Port Houston. With the new capacity coming online, an additional 500,000 TEUs of plastic resin exports annually could be generated during the next few years.

**Four of the eight largest ethylene complexes in the world are in Houston**

**Panama Canal Expansion:** The volume of cargoes handled at some Texas ports is expected to increase with the recently completed expansion of the Panama Canal. While most of the public narrative has focused on handling imported goods transiting the canal, exports will also be a major part of the picture. Products like LNG and liquefied petroleum gas (LPG) are expected to become major export commodities, and the number of transits to date is already exceeding forecasts. Prior to the expansion, the canal's dimensions could accommodate only 6 percent of the world's LNG fleet; it is now capable of accommodating 90 percent of the world's fleet.

**Growing Steel Industry:** Steel production is expanding in Texas and generating new, related industries, as a result of oil and gas exploration and production. A new $740 million steel mill was recently constructed by the Austrian company Voestalpine near Portland, just off the La Quinta Channel at the Port of Corpus Christi. The mill will specialize in producing hot briquetted iron used to make high quality steel. Next door, the Chinese firm TCPO has built and is expanding a pipe manufacturing facility to serve the oil and gas industry. Near Bay City, the Tenaris pipe mill is under construction at a cost of $1.8 billion.

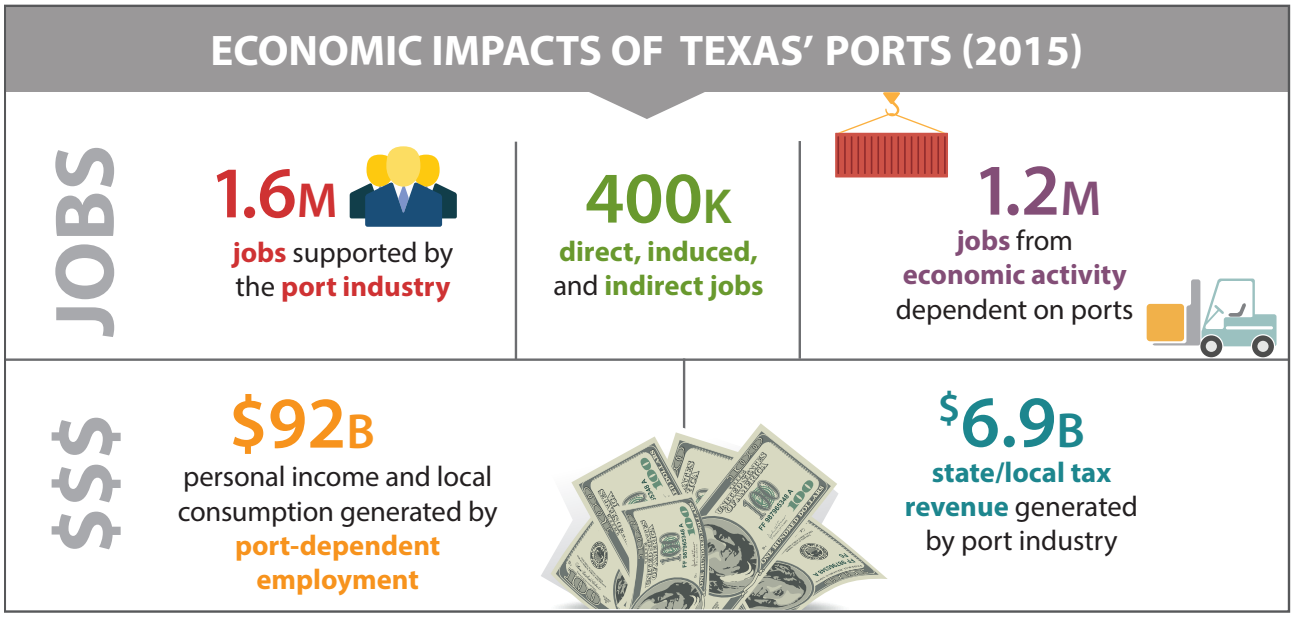
**Table 1. Select Major Petrochemical Plant Projects Expected to Begin Operations in 2017–2018**

| Company | Location | Activity | Estimated Cost | Anticipated Opening |
|---|---|---|---|---|
| Exxon Mobil Chemical | Baytown, Mount Belvieu | Ethylene and polyethylene | $6 billion | 2017 |
| Chevron Phillips | Baytown, Old Ocean | Ethylene and polyethylene | $6 billion | 2017 |
| Dow Chemical | Freeport | Ethylene, polyethylene, and propylene and plastics | $4 billion | 2017 |
| BASF and Yara | Freeport | Propylene and ammonia | $2 billion | 2018 |
| LyondellBasell | Channelview, La Porte, Corpus Christi | Ethylene | $1.3 billion (additional project pending) | 2017 (Channelview) |
| Formosa Plastics | Point Comfort | Olefin unit, PDH unit, LDPE resin plant | $3.0 billion | 2017 |
| Ingleside Ethylene LLC | Ingleside | Vinyl chloride monomer | $1.5 billion | 2017 |

http://www.houstonchronicle.com/business/energy/article/Natural-gas-is-cheap-too-so-Gulf-Coast-chemical-6483958.php; http://www.chemicals-technology.com/projects/ingleside-ethylenes-ethylene-cracker-plant-texas/

# THE ECONOMIC IMPACTS OF TEXAS' PORTS

**In 2015,** 1.6 million Texans were employed by businesses that depend upon Texas ports to operate or to remain competitive. Collectively, this employment generated $92 billion of personal income and local consumption and $6.9 billion of state and local taxes.




# CONCERNS AND NEEDS OF THE TEXAS MARINE TRANSPORTATION SYSTEM

## GIWW-T

**Brazos River Floodgates and Colorado River Locks:** Both the Floodgates and the Locks are very narrow by today's standards. The width at these two structures and the 45-degree angle alignment of the channel and floodgates at the Brazos River create navigational difficulties for tow operators on the GIWW-T. These operational inefficiencies cost industry over $12 million each year in delays and damages from striking the structures. The structures at both rivers are in need of replacement and/or reconfiguration. TxDOT is partnering with the Galveston District of the U.S. Army Corps of Engineers (USACE) to conduct a feasibility study for both locations. The study will determine solutions to improve safety and navigation efficiency on the GIWW-T at these two sites.

**Maintaining Depth:** Due to a lack of federal funding, many segments of the channel are not consistently maintained to their authorized dimensions of 12 feet deep and 125 feet wide. Although recent dredging projects along the GIWW-T have improved conditions at many locations along the waterway, there are still some areas where carriers have to load barges at less than their rated capacities—or "light load" them—to ensure that the barge does not scrape bottom or run aground during transit. In 2013, the effect of light loading barges increased the operating cost of carriers by roughly $58.7 million—an increase of nearly 15 percent in the cost of doing business compared to costs incurred when the channel is fully maintained.

**Mooring Facilities:** Barge navigation is hampered by a shortage of locations for mooring structures. These structures are sets of buoys outside the navigable channel to which a barge can be tied or moored temporarily when unable to proceed. These structures are valuable throughout the waterway, especially during high-wind and foggy conditions, and in areas where gate structures or heavy shoreline development dictate one-way traffic flow. To address this issue, the USACE has developed a tentative plan to install additional mooring facilities at existing mooring locations along the GIWW-T at Port Arthur, Port Bolivar, Pelican Island, the Brazos River Floodgates East, and the Brazos River Floodgates West. The USACE expects to complete the project in FY 2019.

## Ports

**Need for New Port Infrastructure:** Texas ports need to build new infrastructure to meet growing market demands and new developments in the shipping industry and to improve operational efficiencies. At the same time, they also need to replace aged docks, wharves, and cargo-handling facilities that are quickly reaching the end of their usable life.

**Landside Highway and Rail Infrastructure Projects:** Texas ports need new and improved landside roadway and rail infrastructure to address port access, port congestion, and local safety issues.

## Systemwide

**Lack of Federal Funding for Dredging:** Texas port channels and the GIWW-T suffer from insufficient federal funding for dredging, even though the source of funds and authorization process for each is different. Historically, Texas ports have

received less than 25 percent of what they contribute to the federal Harbor Maintenance Trust Fund, a fund for maintaining deep-water ship channels, each year. The average annual amount budgeted and funded for GIWW-T operations and maintenance has been approximately $28 million. This is about $34 million less than the average amount that the Galveston District of the USACE requires to perform maintenance of the GIWW-T at an effective and efficient level each year.

**Concerns about Deep-Draft Vessel and Shallow-Draft Vessel Interactions:** At various locations along the mid- to upper-Gulf coast, port officials and ship pilots have expressed concern about navigational risks of deep-draft vessels and barge tows interacting along the ship channels, as well as at the intersection of the GIWW-T and ship channels. In many cases, these navigational concerns are created by the lack of mooring locations for barges waiting to approach terminals. While they wait, many operators push their tows into the banks of channels for extended periods of time. Because these deep draft vessels and the barge tows often carry hazardous materials, any collision could create a serious threat to human safety and the natural environment. Key areas of concern are the San Jacinto Mud Flats along the Houston Ship Channel and the Freeport Ship Channel.

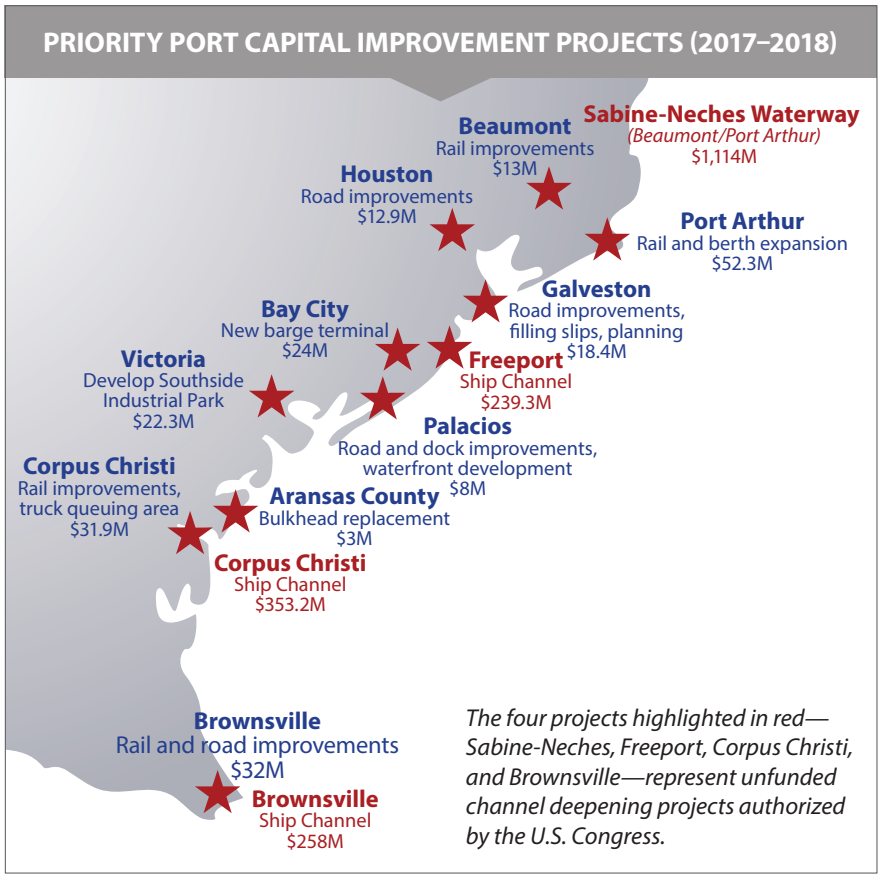
# FUTURE IMPROVEMENTS FOR THE TEXAS MARINE TRANSPORTATION SYSTEM

## Texas Ports 2017–2018 Capital Program

**The Texas Port Authority Advisory Committee** identified twenty high-priority improvement projects for the 2017–2018 period that would help promote regional economic development, improve port access, and enhance intermodal transportation opportunities. Collectively, these projects have an estimated cost of $217.2 million, with the ports pledging to contribute $85.4 million of that total. These projects encompass a variety of improvements, including rail and road upgrades, dock/bulkhead repairs, and site improvements. A complete discussion of these proposed improvements can be found within the Texas Ports 2017–2018 Capital Program on the TxDOT Maritime Division's website: http://www.txdot.gov/inside-txdot/division/maritime.html.

## Channel Deepening Projects

**There are five** channel deepening/widening projects under way in Texas. The Sabine-Neches Waterway, Corpus Christi, and Freeport projects were authorized or re-authorized in the Water Resources Reform and Development Act of 2014




*The four projects highlighted in red—Sabine-Neches, Freeport, Corpus Christi, and Brownsville—represent unfunded channel deepening projects authorized by the U.S. Congress.*

**Table 2. Status of Current Channel Deepening Projects in Texas**

| Channel | Current Depth | Expansion Project | Est. Cost ($ millions) | Status |
|---|---|---|---|---|
| Sabine-Neches Waterway (Ports of Beaumont and Port Arthur) | 40 | 48 | $1,114.0 | Authorized in WRRDA 2014, seeking funding |
| Brownsville Ship Channel (Port of Brownsville) | 42 | 52 | $258.0 | Authorized in WIIN 2016, seeking funding |
| Matagorda Ship Channel (Calhoun Port Authority) | 36 | 44 | -- | Feasibility Study and Environmental Impacts Assessment have been initiated |
| Corpus Christi Ship Channel (Port of Corpus Christi) | 45 | 52 | $353.2 | Reauthorized in WRRDA 2014, seeking funding. La Quinta extensions (41 ft. draft) completed in 2013 for $42 million |
| Freeport Ship Channel (Port Freeport) | 45 | 55 | $239.3 | Authorized in WRRDA 2014, seeking funding |

(WRRDA 2014). The Brownsville project was approved in the Water Infrastructure Improvements for the Nation Act (WIIN). A feasibility study and environmental impact assessment have been initiated for the Matagorda Ship Channel (Calhoun Port Authority) project. The total cost of the authorized projects exceeds $2.1 billion. The appropriations will be considered in separate legislation.

Channel improvement projects create significant and positive economic impacts on the port region, the State of Texas, and the United States as a whole. For example, on an ongoing basis, deepening the Sabine-Neches Waterway would lead to increased operations and export-related production. In turn, a 2013 study estimated the net benefits in a typical year to be $36.7 billion in gross product and an additional 115,653 permanent jobs in Texas ($57.3 billion in gross product and an additional 177,209 permanent jobs in the United States). The fiscal benefits associated with this increase in economic activity would also be significant for local governments, Texas, and the United States.

Despite the overall economic benefits of channel improvement projects, the State of Texas does not contribute directly to funding them. However, other competitor states do contribute to projects that support their ports.

## FUNDING NEW PORT INFRASTRUCTURE AND MAINTENANCE

**Historically,** Texas ports have been largely self-sufficient and have not received direct funding from the state for improving port infrastructure. Since 2010, Texas ports have invested more than $1.1 billion of their own funds on capital expenditures. During the 84th Texas legislative session, the Texas Legislature allocated $20 million to port-related projects via Rider 48—the first time the Legislature has funded such projects. The funds were set aside within the Texas Mobility Fund to improve public roads providing port access. Eight projects were selected to be funded via Rider 48.

Many of the ports competing with Texas receive state-funded subsidies to attract new tenants and have access to grants or low-interest loans for their capital improvement projects. Established by each state's legislature, these programs make revenue available through various mechanisms, such as the economic development funds, general revenue, tax incentives, or transportation programs. This revenue subsidizes channel deepening and widening projects, dockside infrastructure, warehouses, cruise terminals, security enhancements, and intermodal transportation projects to reduce congestion. Some states have appropriated funds for ship channel projects, apart from any ongoing programs. These subsidized port enhancements can make non-Texas ports more attractive to shippers and potential tenants, luring firms away from Texas.

**Table 3. Summary of Assistance Mechanisms for Selected Gulf and East Coast States**

| State | Program | Source of Funds |
|---|---|---|
| Alabama | Constitutional Amendment 666 and 796 | Oil and gas capital payments and state general obligation bonds |
| Florida | Florida Seaport Transportation and Economic Development Program | General revenues |
| | Strategic Port Investment Initiative | State Transportation Trust Fund |
| | Florida Ports Financing Commission | Revenue bonds |
| | Seaport Investment Program | State Transportation Trust Fund |
| | State Infrastructure Bank | Federal and state-matched funds, bond proceeds; general revenues |
| | Strategic Intermodal System Program | State Transportation Trust Fund |
| Louisiana | Port Construction and Development Priority Program | Appropriations to Transportation Trust Fund |
| | Capital Outlay Plan | State general obligation bonds |
| Massachusetts | Seaport Advisory Council | Environmental bond funds |
| | Rivers and Harbor Grant Program | General revenues |
| Mississippi | Port Revitalization Revolving Loan Program | State general obligation and limited obligation bonds |
| | Marine Transportation Capital Improvement Program Fund | General revenues |
| Pennsylvania | Direct appropriations | General revenues |
| | Pennsylvania Intermodal Cargo Growth Incentive Program | Multimodal Transportation Fund |
| Virginia | Commonwealth Port Fund | Transportation Trust Fund |

Three states that were surveyed had no port-related funding mechanisms—Georgia, North Carolina, and South Carolina.
Source: Reproduced from https://tti.tamu.edu/policy/finance/prc-report-survey-of-state-funding-practices-for-coastal-port-infrastructure/

## Texas Freight Mobility Plan

In January 2016, TxDOT released the Texas Freight Mobility Plan. It is the first comprehensive multimodal transportation plan that focuses on the needs of the state's freight industry and businesses. The plan identifies challenges, investment strategies, policies, and data needed to:

- enhance freight mobility;
- provide efficient, reliable and safe freight transportation; and
- improve the state's economic competitiveness.

It recognizes that Texas' waterways and ports are important economic engines for the state and the nation and play critical roles in the movement of freight. Appendix E of the plan provides a list of 130 important port and waterway projects with a total estimated cost of more than $3 billion. Approximately 56 percent of these projects are high priority, with an estimated cost of over $1.4 billion; 11 percent are medium-priority with a cost of over $1 billion; and 33 percent are low priority with a cost of over $500 million. The full plan can be accessed at http://movetexasfreight.com. The plan is currently being updated to align it with FAST Act requirements.

## Fixing America's Surface Transportation Act (FAST Act) Grant Program

**The FAST Act** established the Nationally Significant Freight and Highway Projects (NSFHP) program to provide federal financial assistance to projects of national or regional significance.

The act authorized the program at $4.5 billion for fiscal years (FY) 2016 through 2020. The grants from the NSFHP program are referred to as FASTLANE grants for projects that address critical freight issues facing our nation's highways and bridges.

The grants are awarded by USDOT on a competitive basis to projects of national or regional significance that meet statutory requirements, including port projects. To date, no funds have been awarded to a Texas entity, but TxDOT is working with the Texas port community to obtain grant funding from the program. In addition to the FASTLANE grants, the act allows states to obligate up to 10 percent of their total freight apportionment for intermodal or freight rail projects, which specifically includes ports.

## Marine Highway Designation – M-69 Designation

**In June 2016,** the Texas portion of the GIWW was designated as the Marine Highway 69 (M-69) Corridor. The M-69 connects commercial navigation channels, ports, and harbors within Texas. The marine highway designation makes projects that enhance service along the waterway eligible for federal funding, with the aim of increasing waterborne transportation and simultaneously improving mobility on I-69 and other highways along the Texas Gulf Coast by reducing truck traffic. Texas will still be a part of the larger M-10 designation to address overarching challenges along the entire GIWW.

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Texas Department of Transportation

**TXDOT'S MARITIME DIVISION**

**Charter:** The Maritime Division promotes the development and intermodal connectivity of Texas ports, waterways, and marine infrastructure and operations. It also serves as a resource to increase the use of the Gulf Intracoastal Waterway and promote waterborne transportation to maintain Texas' economic competitiveness.

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For more information and source reports, please visit http://www.txdot.gov/inside-txdot/division/maritime.html