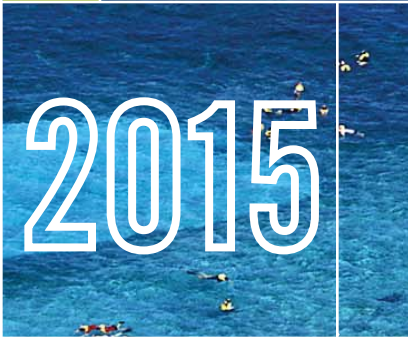
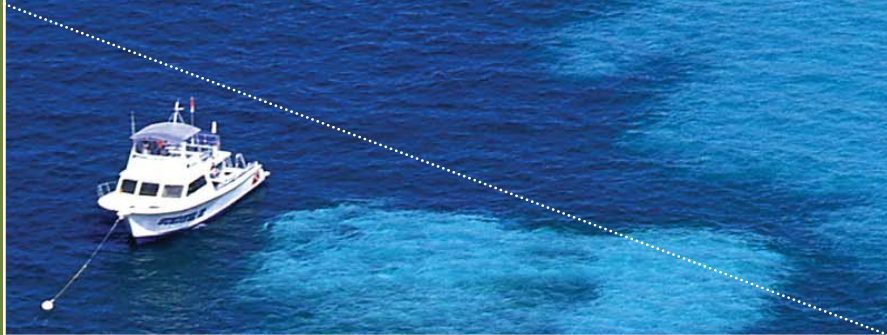


WATERWAYS

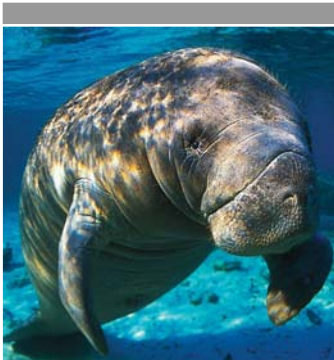


2015

# FLORIDA WATERWAYS SYSTEM PLAN



JULY | 2016







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# 1. INTRODUCTION

## 1.1 STATEMENT OF PURPOSE

This plan is an update to the Florida Waterway System Plan completed in 2008. It is the first time the Florida Department of Transportation (FDOT) has completed both the Florida Seaport System Plan and Waterways System Plan in the same five-year planning horizon, and in accordance with Section 311.14(1), Florida Statutes. These two plans, along with other modal plans under the Office of Freight Logistics and Passenger Operations (FLP) at FDOT, are being completed concurrently and will provide FDOT with a cohesive planning process for all the modal offices. Overall, this plan will further develop FDOT's role to coordinate resources, improve waterway activity awareness, establish joint waterway planning with partner agencies and organizations and evaluate potential funding opportunities. Highlights of this plan and the Seaport System Plan are combined into a single statewide Executive Summary illustrating the Seaport and Waterways vision, goals, conditions, challenges, trends, and future plans for the state of Florida.

## 1.2 PLAN OVERVIEW

This plan provides an analysis of the overall system, conditions, challenges, and trends facing Florida's waterways. The results of this analysis are then used to develop a plan for the waterways system to ensure the success of the transportation system as a whole in supporting the state's economic development goals. The plan is organized in the following five chapters:

1. Overview
2. Waterway System Details
3. Waterway Uses, Benefits & Trends
4. Key Issues
5. Summary and Recommendations

Florida is the only continental state largely surrounded by coastal seas and ocean. Florida's character, nature, and future are driven by and depend upon the waters that surround it. Its citizens and visitors are never more than 75 miles from saltwater, and Florida's economy is heavily dependent on its waterways and coastal ecosystems.

## 1.3 PAST WATERWAY PLANNING EFFORTS

### 1.3.1 2003 FLORIDA INTRACOASTAL AND INLAND WATERWAY PLAN

In 2003, the first FDOT Florida Intracoastal and Inland Waterway Plan was developed. This plan documented the importance of the navigable waterways and the intracoastal system to the state's commercial activities.

It also inventoried the operators and commodities that were currently using the system, identified primary commodities transported by the system, highlighted existing major impediments that restricted commercial use of the state's intracoastal and navigable waterways, documented key waterside connection points of the shallow draft network with the landside transportation system, and mapped the key features of Florida's intracoastal and inland waterway system.

### 1.3.2 2008 FLORIDA WATERWAY SYSTEM PLAN

A second FDOT Waterway System Plan was completed in 2008. This plan provided an update to the trends and conditions of the waterway system in Florida. It focused on the inventory and condition of the entire system providing an updated geographic representation of the waterway system as a part of Florida's Strategic Intermodal System. It also identified the current condition of transportation activities and how they impacted the potential use of the waterway system. Opportunities and challenges of the waterway system were identified with thought towards increasing the importance of waterway corridors within a multimodal transportation system.

## 1.4 CHAPTER ORGANIZATION

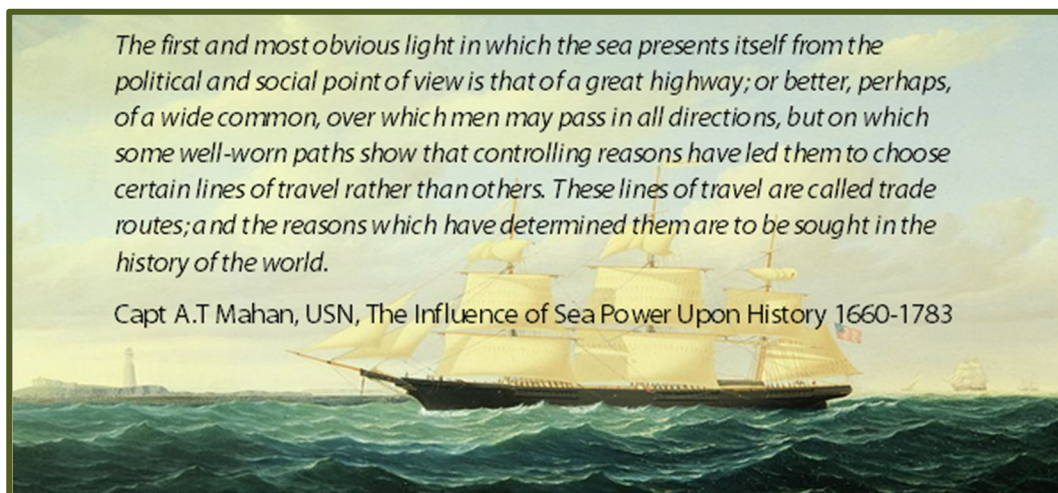
This introductory chapter will focus on the history of the statewide waterway system, diving into the three different Florida waterway systems: the Atlantic Intracoastal Waterway (AIWW), the Northern Gulf Intracoastal Waterway (NGIWW), and the Western Gulf Intracoastal Waterway (WGIWW). The events that formed the waterways, and their key dates, are explored in detail. Next, the different purposes that the waterways serve, and the activities that they are used for, will be discussed. These uses include trade and commerce, law enforcement and homeland security, recreation, and academic and scientific research. Finally, details about the waterway system features will be provided, such as water depth and the air draft restrictions, or height restrictions, of the bridges located on Florida's waterways.

## 1.5 HISTORY OF STATEWIDE WATERWAYS SYSTEM

The history of Florida cannot be told without mention of the importance of its coastline. Before European explorers arrived in the New World, Native Americans had been using the rivers, bays, and coasts for fishing, transportation, cultural activities, and commerce for over 10,000 years. Florida tribes traded shells and shark teeth to other tribes as far away as Illinois and Texas. Members of the Calusa tribe even travelled from South Florida to the Caribbean in canoes of up to 80 people.<sup>1</sup>

The arrival of European explorers was also made possible via Florida's waterways. In 1513, Juan Ponce de León landed near present-day Ponte Vedra Beach and then sailed southward along the coast ending in the Gulf of Mexico at Charlotte Harbor before returning to Puerto Rico. A later expedition led by Pánfilo de Narváez landed at Tampa Bay on April 15, 1528, with 300 men. They traveled northwestward through interior Florida, meeting heavy resistance from the Apalachee Indians. Eventually the resistance drove the expedition to retreat back to sea. Only four men survived this expedition after their rafts built for escape were blown out to sea, and some were captured by hostile natives. It is no accident that the first Spanish settlements, Pensacola in 1559, and St. Augustine in 1565, were located on bays and waterways with easy access to the sea.

<sup>1</sup> Allen Morris, *The Florida Handbook* (29th Edition), 2003.



Source: *The Ocean as a Transportation Highway - "Dashing Wave" clipper ship of Boston Light, William Bradford, 1855*

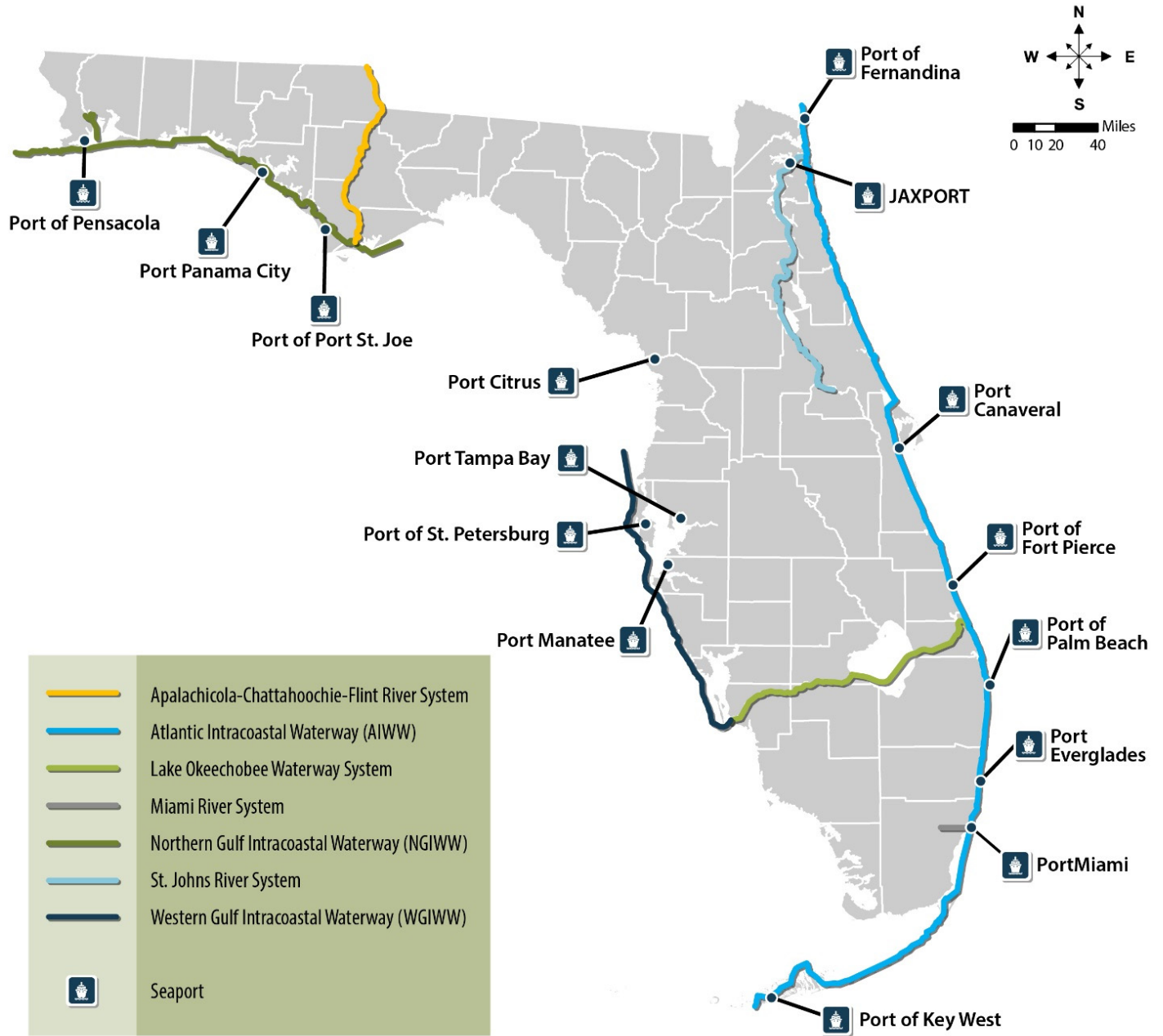
The last naval battle of the American Revolution was fought off the southern coast of Cape Canaveral on March 10, 1783. The St. Marks River played an important role in an attempted Union attack on Tallahassee during the Civil War. During World War II (WWII), German U-Boats patrolled the Atlantic and Gulf coasts of Florida, sinking over 24 ships. German spies even landed on Florida beaches.

Prior to and along with the railroads, the waterways and navigable river systems of the state were the primary means of transportation for settlers and land speculators. These waterways were early facilitators of the exploration and commercial development of Florida. These days, Florida's most iconic symbols include its beaches, lakes, rivers, and the intracoastal and inland waterways.

The evolution of major trade routes to and from Florida began between the First and Second World Wars. Many ship building facilities like the Panama City Shipbuilding Corporation were established and developed support vessels and military vessels for use in the war. Many of these installations, ports, piers, and docks were dismantled and later converted to public port terminals following the Second World War. Throughout the past three decades, Florida's public seaports have evolved into global hubs for trade, logistics, and passenger operations. These developments have made the Intracoastal waterways, major rivers, and port harbors and access channels essential transportation assets, necessary to support, sustain, and expand the economic significance of freight and passenger waterway movements.

Florida has three primary Intracoastal Waterway systems, including the Atlantic Intracoastal Waterway (AIWW), Northern Gulf Intracoastal Waterway (NGIWW), and the Western Gulf Intracoastal Waterway (WGIWW). The following sections will provide an historic description of each system. These waterways can be seen in Figure 1-1 on the next page.

Figure 1-1: Florida Waterway Systems



### 1.5.1 HISTORY OF THE ATLANTIC INTRACOASTAL WATERWAY (AIWW)

The Intracoastal Waterway on Florida's Atlantic Coast has a long history that began before the creation of the Florida Inland Navigation District (FIND) in 1927. The Florida Coast Line Canal and Transportation Company received Letters of Patent under the laws of Florida in 1881 to construct the Florida Coastline Canal. The original plan was to construct a canal connecting the Matanzas River and Banana River. The scope of the original project subsequently was extended by resolution to connect the St. Johns River at Pablo Creek through the Matanzas and Indian Rivers through Lake Worth with the waters of Biscayne Bay. The resolution also provided that the Canal should allow passage of vessels drawing three feet or less.

In 1889, the Florida Legislature declared that the waters of the Canal should be no less than 50 feet wide and 5 feet deep at Mean Low Water (MLW) along the Canal's entire length. In order to facilitate the Canal's expansion, the state granted over a million acres to the canal company. Work on the Canal expansion was completed in 1912. The total cost of the Canal was approximately \$3.5 million, with land sales generating approximately \$1.4 million for the company. The remaining \$2 million or so was provided by other sources within the company, including tolls charged for transiting the Canal. The completion of the Canal was a major milestone for water transportation in the state; however, this was not met without challenges as the company struggled to maintain the required five-foot depth.

During this time, growth and development along the East Coast of Florida continued to increase demand for adequate inland water transportation. Public bodies also continued to lobby the federal government to provide an inland waterway route.

In June of 1920, Congress passed the River and Harbor Act, which ordered a survey and study of two proposed Florida routes and the potential need for federal involvement in the development of the waterway. The two routes included a coastal route following much of the current alignment and a second alternative following the St. Johns River via Sanford and then to Titusville before following the coastal route south to Miami. After a more than six years of study, in 1926 the U.S. Army Chief of Engineers submitted a report to the Secretary of War, now known as the Secretary of the Army, summarizing the benefits of completing the waterway. The report recommended a waterway of 75 feet wide and 8 feet deep following the coastal route. The project was estimated to cost \$4.2 million with an annual maintenance cost of \$125,000.<sup>2</sup>

The project was recommended for approval contingent upon two conditions:

1. That local interests acquire the necessary rights-of-way, as well as the privately-owned Florida East Coast Canal, and transfer them free of cost to the United States government, and
2. That local interests furnish suitable areas for deposit of dredged material created during construction and maintenance of the waterway.

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<sup>2</sup> History of the Atlantic Intracoastal Waterway and Florida Inland Navigation District (FIND), 2016.

## 1.5.2 FLORIDA INLAND NAVIGATION DISTRICT (FIND)

In 1927, the Florida Legislature created the Florida Inland Navigation District (FIND) to meet the two conditions set forth by the federal government. The enabling legislation authorized the newly-created district to purchase the Coast Line Canal for no more than \$800,000, transfer it to the federal government, and issue bonds to purchase land for disposal of dredge material.<sup>3</sup>



### 1.5.2.1 Key Dates in FIND and the AIWW History

- 1927 – Florida Legislature passed Chapter 12026 creating FIND.
- 1931 – Florida Legislature amended Chapter 12026 for consistency with the federal River and Harbor Act of 1930 increasing the width of the waterway from 75 to 100 feet.
- 1935 – Florida Legislature passed Chapter 17020 authorizing FIND to expend funds publicizing completion of the waterway and its availability for use by watercraft.
- 1939 – Florida Legislature passed Chapter 19122 authorizing FIND to collect, compile, and furnish data, statistics, and other information to the federal government. This also allowed FIND to acquire and convey to the United States any lands, easements, rights-of-way, and spoil disposal areas for improvement of the waterway.
- 1941 – In Chapter 20430, the Florida Legislature expanded the authority of FIND to include the area between the St. Marys River and the St. Johns River, and to subsequently deepen that waterway to a depth of 12 feet and a width of 125 feet.
- 1965 – The project was completed from Jacksonville to Fort Pierce to the authorized depth of 12 feet and a width of 125 feet. From Fort Pierce to Miami, the project was fully widened to the authorized 125 feet, but only deepened to 10 feet.
- 1977 – The U.S. Army Corps of Engineers (USACE) conducted an economic feasibility study on the costs and benefits of deepening the Fort Pierce to Miami segment from 10 feet deep to 12 feet deep. The study determined the project was not cost-beneficial and further study on deepening the waterway would not be appropriate.
- 1985 – The Florida Legislature reviewed the functions of FIND and re-authorized the District until 1990. The Legislature also amended the law to create district “Assistance Programs” through which the districts can partner with state, regional and local governments on waterway improvement projects.
- 1986 – Pilot program began to study the inventory and needs of spoil disposal sites for a 50 year planning period. Study identified seven parcels for acquisition in Nassau and Duval counties.
- 1990 – The Florida Legislature re-authorized the inland navigation districts until 1995. The duties of the districts were expanded to include the installation of boat speed signage for manatee protection.
- 1995 – The Florida Legislature reviewed the functions of FIND and found that it should be re-authorized indefinitely. FIND was also designated as the local sponsor for the Okeechobee Waterway in Martin County.
- 2000 – Long-Range Dredge Material Management Studies were completed for all 12 FIND member counties.<sup>4</sup>

<sup>3</sup> Florida Inland Navigation District, [www.aicw.org](http://www.aicw.org).

<sup>4</sup> FIND Member Counties: Nassau, Duval, St. Johns, Flagler, Volusia, Brevard, Indian River, St. Lucie, Martin, Palm Beach, Broward, Miami-Dade.



### 1.5.3 HISTORY OF THE NORTHERN GULF INTRACOASTAL WATERWAY (NGIWW)

Interest in a water route on the Northern Gulf Coast predates Florida statehood by almost 20 years. On March 3, 1826, federal legislation was passed that authorized the survey of a canal route between the Atlantic Ocean and Gulf of Mexico. In 1829, Brigadier General Simon Bernard, a member of the Internal Improvement Board, finished the survey and presented its findings. One of the Generals' many survey findings concluded that with certain improvements, inland coastal navigation from what is now St. Marks, Florida to Lake Pontchartrain, Louisiana, could be "rendered secure, safe, and commodious." The proposed improvements set forth the first plan for constructing an inland waterway on the Gulf Coast; however, Congress appropriated no funds for any of the proposed projects.

#### **Barge on the Northern Gulf Intracoastal Waterway**



Source: "Florida Intracoastal Waterway." 30°19'02.29" N and 86°00'23.46" W. Google Earth. Aerial image date January 1, 2012.

In 1830, a follow-up survey was conducted by Engineer Captain William Chase on all the channels between Mobile and New Orleans. Two years later, a congressional act called for the surveying of two reaches of coastline for "practicability and cost of canals" between St. Andrews Bay and the river and bay of Chattahoochee and between Pensacola Bay and Bon Secour [Alabama]. A group of Army officers led by Lieutenant William G. Williams completed the survey in 1833, and proposed opening navigation between Mobile Bay and Pensacola Bay for vessels drawing 7.5 feet. The necessary projects were estimated to total \$3 million. No funding was appropriated by Congress for the proposal, and federal interest in the waterway disappeared for 42 years. In the years directly following the Civil War, the major focus was on developing the rail networks, and not much attention was on the waterways. The tide began to rise with Congress authorizing a comprehensive survey to study a proposed canal across Florida from the Gulf of Mexico to the Atlantic Ocean. This study was to include inland routes along the Gulf coasts of Florida, Alabama, and Louisiana to the Mississippi River. This route would link Savannah, Georgia, to the Mississippi River, connecting the two important trade markets.

This survey, however, met the same fate as previous attempts at improving the waterway and was never fully-funded. This would end any interest in developing an inland waterway along the Gulf coast for much of the remainder of the 19<sup>th</sup> century. It wasn't until the River and Harbors Appropriations Acts was passed in 1882 and 1884 that the federal government focused legislation and appropriations to improve waterways, citing an intention to promote competition among transportation modes.

The beginning of the 20<sup>th</sup> century brought a renewed interest in the development of inland waterways. In 1907, President Theodore Roosevelt charged the newly-created Inland Waterways Commission with conducting a broad study to consider rivers as "natural resources of the first rank", and reviewing all aspects of the waterways: navigation, flooding, protection of bottomlands, water purification and pollution, and construction of locks and dams. President Roosevelt transmitted the completed report to Congress on February 26, 1908. The underlying finding of the report was that all waterways in the country should be developed to serve the people as largely and in as many ways as possible.

Following the renewed interest in waterways, Congress passed the landmark River and Harbor Act on March 3, 1909. The act included the study of a continuous inland waterway between St. George Sound, Florida, and the Mississippi River in New Orleans, Louisiana. The River and Harbor Act of 1910 would be the first action to fund the long-proposed Northern Gulf Waterway by appropriating \$100,000 for improving the channel from Apalachicola to St. Andrews Bay, and an additional \$24,000 to improve the Santa Rosa Sound from Choctawhatchee Bay to Pensacola.

These first initial projects were followed by various improvements to the Northern Gulf Waterway in Florida. The initial focus was the need for access to a deepwater harbor for the booming commerce and trade coming down the Apalachicola River from farms and plantations along the 470-mile system of the Flint, Chattahoochee, Chipola, and Apalachicola Rivers. By 1908, this commerce had grown to a value of \$12 million. Port Panama City on St. Andrews Bay was selected as the deepwater port of choice and construction of an inland canal between Apalachicola and St. Andrews Bay was begun. The initial canal was 5 feet deep and 65 feet wide and was completed in 1915. In 1935, Congress authorized an expansion of the canal to a depth of 9 feet and a width of 100 feet with construction completed in 1937.

A second area of improvement was the Santa Rosa Sound between Choctawhatchee and Pensacola Bay. The 35 mile long sound provides a natural protected waterway to ship cattle, sheep, wool, cotton, lumber, and other agriculture cargo produced by local farms. An area of shoals in the eastern end of the sound called "The Narrows" limited navigation and the draft of vessels. In 1912, the narrows were dredged to a depth of 6 feet and within a year cargo increased by over 34,000 tons. The channel was enlarged again in 1937 to a depth of 9 feet and a width of 100 feet.

The third major area of improvement was an inland connection between West Bay and Choctawhatchee Bay. The project to dredge a 26 mile channel through part of the bays and the land between them was authorized in 1935. The project proved difficult, as the inland section was cut through a sandy soil with 40 feet of elevation at the highest point. One area became known as the "little Grand Canyon" due to its 50-foot sand walls. Sidewall cave-ins were especially problematic and required adaptation of dredging techniques by the engineers. With the opening of the West Bay to Choctawhatchee Bay reach in 1938, the long planned and awaited Gulf Intracoastal Waterway was complete. Vessels could now travel between Apalachicola and New Orleans via an uninterrupted protected waterway with a minimum depth of 9 feet and width of 100 feet. In 1943, a 9 feet deep by 75 feet wide canal completed by Gulf County from the Port of Port St. Joe to the Intracoastal Waterway was incorporated into the federal project and widened to 100 feet.

It would not take long after completion for the waterway to prove its value to the nation. The waterway was vitally important to the war effort during WWII. With German U-Boats patrolling the offshore shipping lanes and most ocean going tankers assigned to the Atlantic, barges transiting the Intracoastal Waterway became vital to moving fuel and supplies to bases and ports along the Gulf Coast. The waterway would exceed cargo projections used to justify its creation and see over 3 million tons of cargo transit in 1944.<sup>5</sup>

#### 1.5.4 HISTORY OF THE WESTERN GULF INTRACOASTAL WATERWAY (WGIWW)

The Western Gulf Intracoastal Waterway (WGIWW) traces its history to the end of the 19<sup>th</sup> century. Much like the Atlantic and Northern Gulf Intracoastal Waterways, it benefited from an increasing national interest in developing waterways for commercial use. In this part of the state, interest centered on improving waterways around and between Tampa and Sarasota Bay. The waterway would eventually grow to a 152 mile long, 9 feet deep and 100 feet wide channel from the mouth of the Caloosahatchee River to the mouth of the Anclote River. Throughout its history the WGIWW, as other important waterways, proved its value, especially during WWII. Shortly after, the West Coast Inland Navigation District (WCIND) was created to serve the local interests and represent the waterway.

#### 1.5.5 WEST COAST INLAND NAVIGATION DISTRICT (WCIND)



The West Coast Inland Navigation District (WCIND) was established by the Florida Legislature in 1947, to serve as the WGIWW local sponsor and complement the USACE.<sup>6</sup> The District is comprised of Manatee, Sarasota, Charlotte, and Lee counties and is now home to over 1 million

residents. The District began maintenance activities upon the waterway's completion in 1967. The District's responsibilities were then broadened in 1979, to include improving and maintaining public channels connecting to the WGIWW and any other waters that provide a significant contribution to waterway traffic or commerce. The District was also authorized to assist member counties in navigation projects, waterways research, erosion, and accretion studies and environmental restoration projects. The District's authorities were again expanded in 1989, to include the promotion of inlet management and the posting and maintenance of channel markers and manatee protection speed zone signs. The District has also implemented programs and informational campaigns encouraging boating safety and environmental stewardship.

<sup>5</sup> The Gulf Coast Intracoastal Waterway History is a summary of information obtained from, "History of the Gulf Intracoastal Waterway", Lynn M. Alperin, USACE, 1983.

<sup>6</sup> West Coast Inland Navigation District, <http://www.wcind.net>.

### 1.5.5.1 Key Dates in WCIND History<sup>7</sup>

- 1895 – As the first federal intracoastal navigation project in southwest Florida, Congress appropriated \$5,000 for dredging a 5 feet deep by 100 feet wide channel to run south from Tampa Bay to Sarasota Bay.
- 1896 – Modification of the initial Sarasota Bay project extended an improved channel 3 feet deep by 75 feet wide south to Casey’s Pass near Venice, FL.
- 1907 – Project extended further to Venice.
- 1917 – By this year, two-thirds of the 3,841 tons (brick, canned goods, groceries, cement, corn, feed, fertilizer, fish, flour, grain and hay, ice, lumber, refined oils, shingles, and miscellaneous merchandise) transported on this waterway moved between Sarasota and Tampa.
- 1919 – Congress provided for a relocated seven feet deep channel above Sarasota.
- 1939 – Board of Engineers for Rivers and Harbors recommended an intracoastal project, 9 feet deep by 100 feet wide, reaching from the Caloosahatchee River (Ft. Myers) north to the Anclote River (Tarpon Springs). WW II delayed funding until 1945.
- 1942 – National Defense Appropriation Act passed by Congress on October 26, 1942, funded the continuous dredging from Carrabelle, FL to Corpus Christi, TX.<sup>8</sup>
- 1945 – The project was completed to an authorized depth of 12 feet and width of 125 feet.<sup>9</sup>
- 1948 – Modifying legislation revised cost-sharing arrangements between the federal government and local interests; and authorized the study of an alternate route.
- 1959 – Terms of local compliance resolved, and a route was decided upon.
- 1960 – Dredging began on C-1 alternate route, a five-mile alternate passageway inland of the City of Venice, connecting Lemon Bay (extending south near Englewood) with the original route north of Venice to Sarasota.
- 1962 – Channel deepened (9 feet deep by 100 feet wide): the dredge began at “The Bulkhead” (lower Tampa Bay) and worked southward, completed improvements to Venice in 1965.
- 1964 – Channel improvement of Intracoastal Waterway began in Gasparilla Sound; dredge completed 9 feet deep by 100 feet wide channel through Lemon Bay to Red Lake by 1965.
- 1967 – Dredging is completed on the C-1 route between Red Lake (south Venice) and Roberts Bay (south Sarasota).

<sup>7</sup> Information obtained from, “A Historical Geography of Southwest Florida Waterways Volume One”, Gustavo Antonini, David Fann and Paul Roat, Florida Sea Grant, 1999.

<sup>8</sup> *Ibid.* 5, p. 1-9.

<sup>9</sup> *Ibid.* 5, p.1-9.

## 1.6 FLORIDA'S WATERWAY SYSTEM COMPONENTS

Florida's waterway system is made up of many different components serving distinct purposes and activities. This section explores those components and discusses the different uses of the waterways, such as trade and commerce, law enforcement and homeland security, recreation, and academic and scientific research, as well as provides details about the waterway system features, like water depth and air draft. These details help paint the current picture of Florida's waterways, and build off of the history presented in the sections above.

### 1.6.1 OVERVIEW OF CURRENT SYSTEM

As a state, Florida is second only to Alaska in length of coastline, with 1,350 miles of generalized coastline and 8,426 miles of detailed shoreline.<sup>10</sup> Florida is the only state with coastlines on both the Gulf of Mexico and Atlantic Ocean. In addition, Florida has 1,540 navigable miles of intracoastal and inland waterways, many of which are used for commercial and recreational activity. This coastline includes 6 major waterway systems and contains 2 intracoastal waterways, 13 large harbors, bays, or bayous, 12 inlets or passes, 4 canals, and 8 major rivers that all provide access and mobility for recreational and commercial users of the state's waterways.

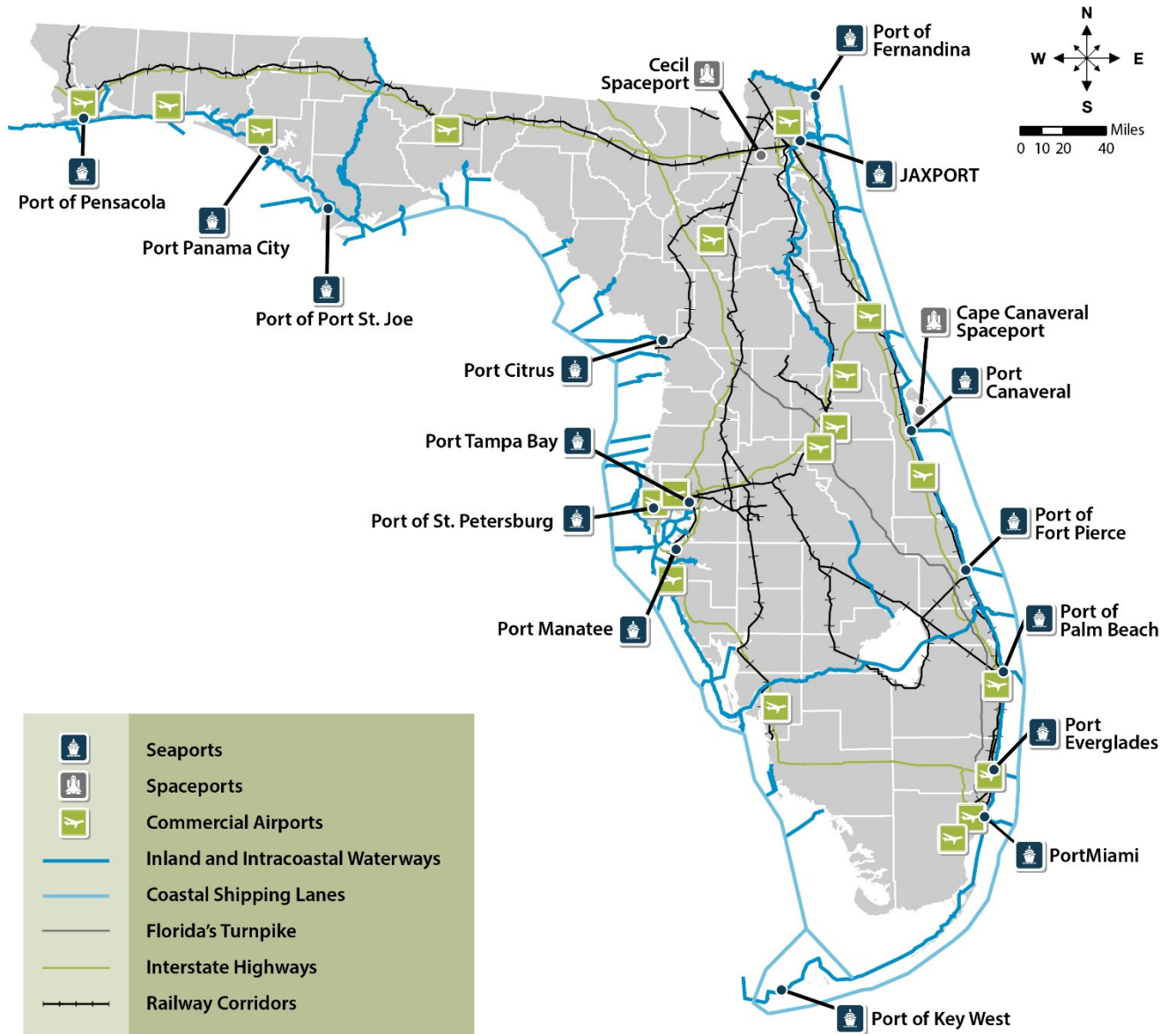
In addition, public access is provided in these areas by 930 saltwater boat ramps and 748 saltwater marinas.<sup>11</sup> Effective integration of the waterways into the state's overall transportation system is critical to meet the goals the state has set forth in policy and plans. This truly intermodal transportation system, shown in Figure 1-2, illustrates the intracoastal waterways, coastal shipping lanes, river waterways, the interstate highway system, commercial airports, designated space ports, major rail lines, and Florida's 15 public seaports. The map also provides an overview of how the collective transportation network is integrated with the waterway system and how it may offer alternatives to the increasingly congested rail and highway networks.

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<sup>10</sup> From The Florida Handbook 2009-2010 compiled by Allen and Joan Morris. "General" coastline is the measurement of the general outline of the seacoast. "Tidal" shoreline includes measurement of bays, sounds and other water bodies where these narrow to a width of three statute miles. "Tidal shoreline, detailed" takes bays, sounds and other bodies either to the head of tidewater or to a point where such waters narrow to 100 feet.

<sup>11</sup> Florida Department of Environmental Protection, Statewide Comprehensive Outdoor Recreation Plan, 2013.

**Figure 1-2: Florida's Waterway System and Intermodal Networks**



## 1.6.2 SYSTEM PURPOSE AND ACTIVITY

As detailed in the introduction, the waterway system in Florida has a long and varied history. Throughout time, the system's primary uses, purposes, and activities have remained constant, while other uses have changed. Constant uses and purposes of the waterway system include facilitating travel, economic activity, and fishing. From early Native Americans and settlers to the present day, the state's waterways have allowed people to travel, move goods and services to market, conduct trade, and harvest fish and shellfish. Some of the other uses of the waterway system have risen and fallen in significance as social, economic, and global conditions have changed. These include the importance of the waterways for national defense during WWII and during NASA's Space Shuttle Program, for shipping the shuttles' external fuel tanks to Kennedy Space Center and

### Autonomous Spaceport Drone Ship



Source: Space X Photo Collection, January 14, 2015

### 1.6.2.1 Trade and Commerce

Perhaps the most important of these purposes and activities is the movement of goods and trade. Two major developments of the early 19<sup>th</sup> century, steamboats and canals, enhanced the economic importance of inland waterways. Steam power allowed vessels to travel both up and down rivers, as well as travel longer distances along coastal waterways. During this time period, travel by road was expensive, slow, and very uncomfortable.

As a mode of transportation, waterways rely heavily on the landside modes to deliver goods and cargo to their final destination. Much of this interaction and transfer of cargo between modes occurs at riverports, seaports, and other waterfront mooring facilities. In order to complete the successful transit of goods along the waterway system and the efficient transfer to landside modes, the following types of facilities are important to provide safe and efficient waterway trade:

### NASA's Freedom Star



Source: NASA, 2015

recovering the jettisoned solid rocket boosters after liftoff, and more recent recoveries of Space X Falcon 9 first stage rockets via their autonomous spaceport drone ship. As Florida's population increased greatly after WWII, recreational boating began to grow in activity levels, eventually becoming a \$10.4 billion industry in 2013.<sup>12</sup> This Statewide Waterways System Plan discusses the facilitation of trade and commerce, national defense and law enforcement, recreational activities, and scientific research.

<sup>12</sup> Florida Fish and Wildlife Conservation Commission Fast Facts, 2014.

- Waterway Access to Ports:
  - Safe and unhindered approach channels maintained at authorized operating depths
  - Aids to navigation must be provided and maintained
  - Tugboat and barge operators to provide sufficient level of operations
  - Utilization of Pilots as regulated
- Vessel Service/Mooring Facilities:
  - Mooring bollards and dolphins
  - Berth capacity with load and dimensions to serve current vessel sizes
  - Mooring or fleeting areas for barges and anchorages for ocean going vessels
- Additional Services Include:
  - Cargo terminal facilities employ stevedores, cargo handlers, and heavy equipment operators to service cargo to and from vessels for storage or for transfer to other modes
  - Landside operations and transfer yards for parking trucks, trailers, rail cars, and equipment
  - Some facilities may also include ground transportation, restaurants, service stations, branch banks, fire station, and ministries like anchor houses to provide needed services to waterway operators and sailors
- Vessel Repair and Service:
  - Dry-dock facilities provide a necessary and sometimes required services for vessels
  - Vessels often break-down, need service, new parts, or upgrades
  - United States Coast Guard (USCG) provides vessel inspections, sometimes resulting in a need for repairs and other services such as cleaning

Several data sources exist to measure the levels of activity associated with trade and commerce. The U.S. Army Corps of Engineers (USACE) tracks and provides data on the amount of freight and levels of vessel traffic for inland and intracoastal waterways.

The Waterborne Commerce Statistics Center (WCSC) is the primary data source for the USACE data regarding commerce on the nation's waterways. Authorized under the River and Harbor Act of 1922, the WCSC collects, processes, and distributes data detailing vessel trips and tonnage of cargo. This data is published annually as the *Waterborne Commerce of the United States* publication.

The WCSC provides the following information on the source data:

- Waterborne traffic movements are reported to the USACE by all vessel operators of record. These reports are generally submitted on the basis of individual vessel movements completed.
- For movements of cargo, the point of loading and the point of unloading of each individual commodity must be delineated. In summarizing the domestic commerce, certain movements are excluded: cargo carried on general ferries; coal and petroleum products loaded from shore facilities directly into bunkers of vessels for fuel; and insignificant amounts of government materials (less than 100 tons) moved on government-owned equipment in support of USACE projects.
- Beginning with the calendar year 2000 publication, foreign waterborne import, export, and in-transit cargo statistics are derived primarily from data purchased from the Port Import Export Reporting Service (PIERS), a division of the Journal of Commerce, and supplemented by data furnished to the USACE by the U.S. Bureau of the Census and the U.S. Customs Service. Foreign cargo is matched to vessel moves to improve geographic specificity.



The WCSC data is a key data source used in this plan to provide an understanding of the commercial activity levels on Florida's waterways. The publication also provides key information on the physical properties of the waterways such as maximum authorized depth and segmentation.

Additional information and publications can be accessed at the following USACE web resource:

<http://www.navigationdatacenter.us/data/datawcus.htm>

In addition to tracking the economic activity on waterways, the USACE provides information on the waterfront facilities that are associated with and provide access to waterways.

The USACE Navigation Data Center maintains a database of port and waterway facilities. Called "Master Docks Plus", this database provides details of over 40,000 facilities located on the Great Lakes, coasts, and inland waterways. Data provided includes location (latitude/longitude, waterway, mile, and bank); operations (name, owner, operator, purpose, handling equipment, rates, and details of open-and-covered storage facilities); type and dimension of construction (length of berthing space for vessels and/or barges, depth, apron width, deck elevation, and details of rail-and-highway access); and utilities available (water, electricity, and fire protection).

*"The port facilities database contains a national inventory which delineates the Nation's principal coastal, Great Lakes and inland port and waterway terminal and transfer facilities. The information is used to analyze the use and improvement of existing terminals and the agencies; and port and waterway development authorities."<sup>13</sup>*

The database was used in developing this plan to identify waterfront facilities and their corresponding waterways. Additional information including the database described above can be accessed at the USACE web resource below:

<http://www.navigationdatacenter.us/ports/ports.htm>

### 1.6.2.2 Law Enforcement, Homeland Security, and Military

Florida's waterways have a long history of providing safe, secure, and strategic passage to and from harbors that serve one of the United States' primary purposes of national defense through military, homeland security, and law enforcement. As noted previously, German U-boats sunk over 24 ships off of Florida's Atlantic and Gulf Coasts during WWII. In February of 1942 alone, four merchant vessels were attacked within sight of Cape Canaveral. In response, USCG Commandant Vice Admiral Russell Weasch coordinated with yachting organizations in Florida to utilize small, armed boats as patrol craft. In recent decades, Florida's waterways provided opportunities for illegal drug trade, illegal immigration, and other national security risks to gain access to the United States. With many of these security risks and legal issues threatening the safety and security of citizens, federal and state governments have provided major resources to counteract those activities. The United States Military has two major branches, the Coast Guard and the Navy, that provide coastline, waterfront, and facility security. The Department of Homeland Security (DHS), which includes Customs and Border Patrol (CBP) and the Federal Emergency Management Agency (FEMA), provides waterway facilities with resources to inspect cargo and vessels, as well as resume trade in the case of manmade or natural disaster. At the state level, the Florida Fish and Wildlife Conservation Commission (FWC) patrols state waterways and enforces state and federal boating, fishing, and hunting laws.

<sup>13</sup> The U.S. Army Corps of Engineers Navigation Data Center Ports and Waterways Facilities Mission, 2014.

At the local law enforcement level, many cities and counties have marine officers and some ports have waterfront security departments, facilities, and equipment to patrol local waterways, rivers, and harbors.

### U.S. Coast Guard Small Boats near Fort Pierce Inlet



Source: U.S. Coast Guard, 2015

### UNITED STATES COAST GUARD (USCG)

The USCG's 7<sup>th</sup> District is headquartered in Miami and is responsible for Coast Guard activities in a 1.7 million square mile area. The District's area of responsibility extends from South Carolina to Florida, Puerto Rico, and the Caribbean. District units in Florida include 4 geographic Sector Commands, 2 Air Stations, 6 Aids to Navigation Teams, 13 Small Boat Stations, 1 Marine Safety Office, and 1 Marine Safety Detachment. The 8<sup>th</sup> USCG District includes Sector Mobile, Alabama, which has command over much of Florida's panhandle. Sector Mobile extends beyond Port of Port St. Joe to the East and Gulfport, Mississippi to the West. As a multi-mission maritime military and law enforcement agency, the Coast Guard is tasked with enforcing immigration law at sea, drug interdiction, protecting the U.S. Exclusive Economic Zone, enforcing domestic and international fisheries laws, enforcing safety and security at port and waterfront facilities, and maintaining the aids to navigation system. The Straits of Florida are the busiest waters for the Coast Guard in drug and migrant interdiction.

### U.S. NAVY

Florida is home to Naval Station Mayport, homeporting the Navy's 4<sup>th</sup> Fleet; Naval Air Station Pensacola, the primary flight training base for the Navy and Coast Guard; Naval Air Stations Jacksonville and Key West; Naval Support Activity Panama City with the Naval Diving Salvage and Training Center; and the Atlantic Undersea Test and Evaluation Center in West Palm Beach.

## U.S. MARINE CORPS

Florida is home to many Marine Corps bases and joint training facilities, including Camp Lejeune in Jacksonville. Also located in Jacksonville is one of the Marine Corps unique facilities at Blount Island Command on the St. Johns River, located on the east side of Blount Island adjacent to the JAXPORT Blount Island Terminal. This base is responsible for Maritime Prepositioning Ships (MPS) program which provides maintenance cycle operations and oversight of the MPS Program. Developed in the 1970's, the Marine Corps saw the benefit to having prepositioning equipment constantly ready for conflict to improve combat readiness. This facility supplies Marine Corps Expeditionary Units, which are made up 2,200 members and last for 30 days. These vessels are loaded with logistical support gear including tanks, portable landing craft, excavation equipment, helicopters, medical supplies, troop transport, ammunition, and thousands of other supplies. These vessels then depart on missions and are stationed throughout the globe for maximum mission readiness. Following the mission, they return to Blount Island for resupply, restarting the cycle. Each vessel completes these 36 month cycles in which all cargo is offloaded at the end, and every piece of equipment goes under strict inspection and gets cleaned, repaired, upgraded, and tested. The Blount Island Command has become an import link in the Marine Corps force logistical supply chain.

### USNS PFC Dewayne T. Williams Loading Cargo and Equipment



Source: FDOT, 2015

## U.S. DEPARTMENT OF DEFENSE (DOD)

Florida waters are also home to two important Department of Defense training ranges:

### A USAF C-130 Flies Over Destin



Source: U.S. Air Force, 2015

- Jacksonville Range Complex – Atlantic
  - Encompasses 150,000 square miles of air, surface and subsurface operational areas in Florida's near coastal waters. The range supports all services, and its lower sea state, climate, and proximity to the shore make it an ideal training area.
- Joint Gulf Range Complex – Gulf of Mexico
  - Encompasses 180,000 square miles of airspace over the Gulf of Mexico. An integral part of the DOD's Training Resource Strategy that allows for joint maritime, air and land training exercises.

## FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION (FWC)

The Florida Fish and Wildlife Conservation Commission (FWC) has research facilities, offices, field offices, and vessels located throughout the state. The FWC Division of Law Enforcement works to provide safe and enjoyable boating, fishing, and hunting for citizens of the state and its visitors through the effective and coordinated management of the waterway system. In addition, many Sheriff's Offices throughout the state have water patrol units with vessels moored at local marinas.

### A FWC Officer on Patrol



Source: FWC, 2015

### 1.6.2.3 Recreational Boating and Fishing

In addition to the obvious importance of Florida's waterways in providing for commercial vessels and cargo, they also provide significant economic benefits from recreational boating and fishing use.

While the commercial use of Florida's waterways touches all residents and visitors as consumers, it does so with a relatively few individuals using the waterway. In contrast, the recreational boating and fishing use of the waterways adds millions of users to the waterways.

**The economic impact of the boating industry is reported to contribute over \$18 billion and 220,000 jobs to Florida's Economy.<sup>14</sup>**

Waterways are used for a variety of recreational activities including cruising, swimming, fishing, wildlife viewing, sightseeing, and watersports such as skiing and wakeboarding. Smaller vessels are becoming increasingly popular as they provide economical access to the waterways. These include jet skis, canoes, and kayaks. The popularity of non-motorized vessels (canoes, paddle boards, and kayaks) also has risen dramatically in recent years.

This popularity can be attributed in part to low startup costs, the health benefits of rowing, a desire to experience nature in a more natural setting, and the smaller environmental footprint of human-powered watercraft. Also, new inventions and uses like kite-boarding, kayak fishing, and wake surfing have brought additional opportunities and enthusiasm to the waterfronts.

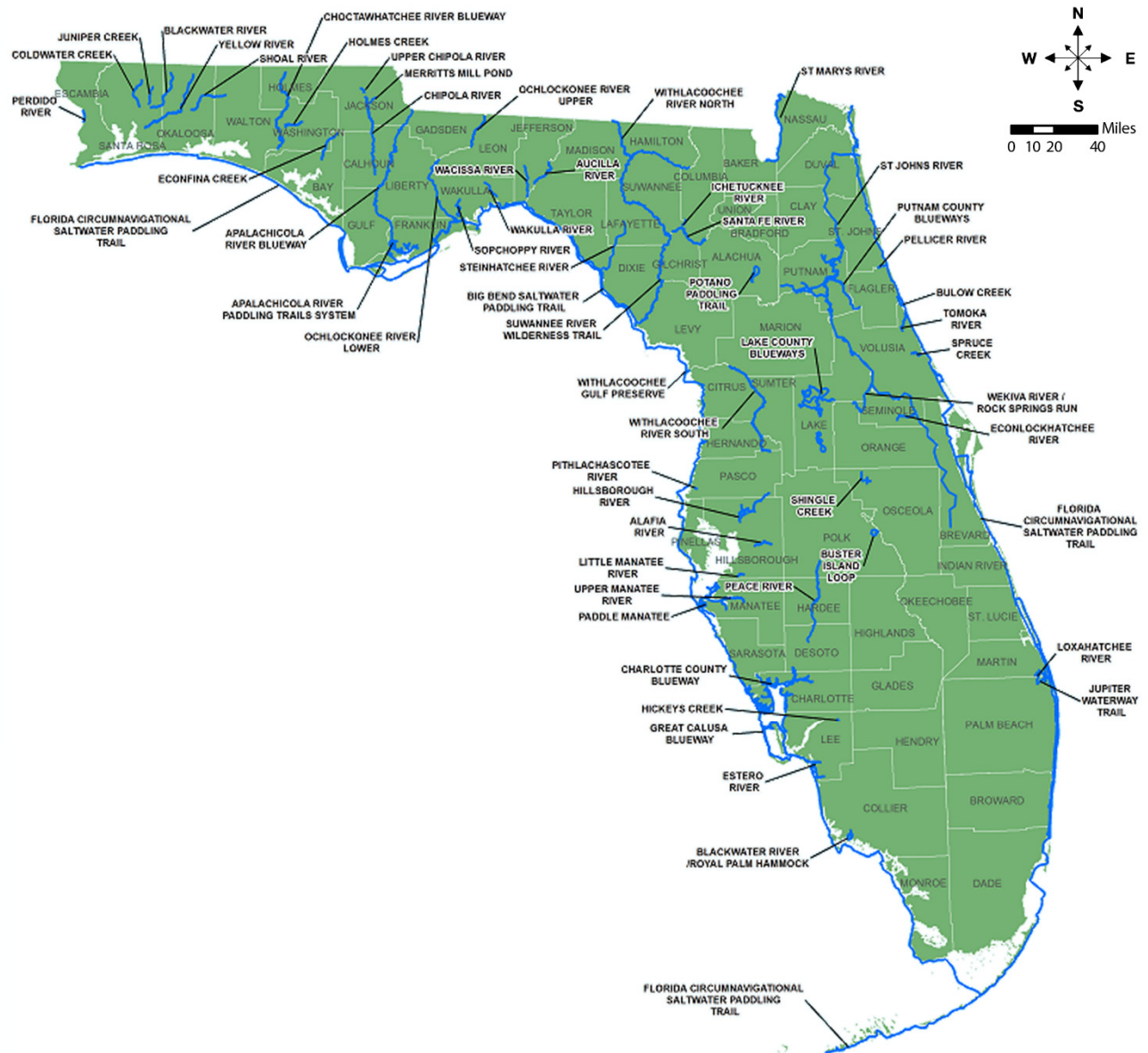
Waterways that are only used for recreational purposes are generally not dredged through projects sponsored by the USACE. However, organizations such as FIND aid local communities in obtaining funding for small dredging projects that help keep recreational waterways and inlets passable. Due to the recreational opportunities that these waterways provide, the local area receives economic benefits from tourists and local residents that are attracted to the area. These benefits come from businesses that are dependent on the waterway (marinas, and marine-related businesses) and the revenue from the increased purchases of goods and services by those that utilize the waterway. The economic benefits of recreational waterways are examined in greater detail in Chapter four of this plan.

<sup>14</sup> Florida Department of Economic Opportunity, 2015, <http://www.floridajobs.org/>.

**DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP)**

The Department of Environmental Protection (DEP) has research facilities and offices located throughout the state. DEP is home to the Florida Coastal Office, which is responsible for implementing the state's Coastal Zone Management Program (CZMA 1972). DEP also promotes waterway transportation through initiatives like the Florida Designated Paddling Trails program and grant opportunities that increase access to the state's waterways. These paddling trails can be seen in Figure 1-3, below.

**Figure 1-3: Florida's Designated Paddling Trails**



Source: Florida Department of Environmental Protection, 2015

### 1.6.2.4 Academic and Scientific Research

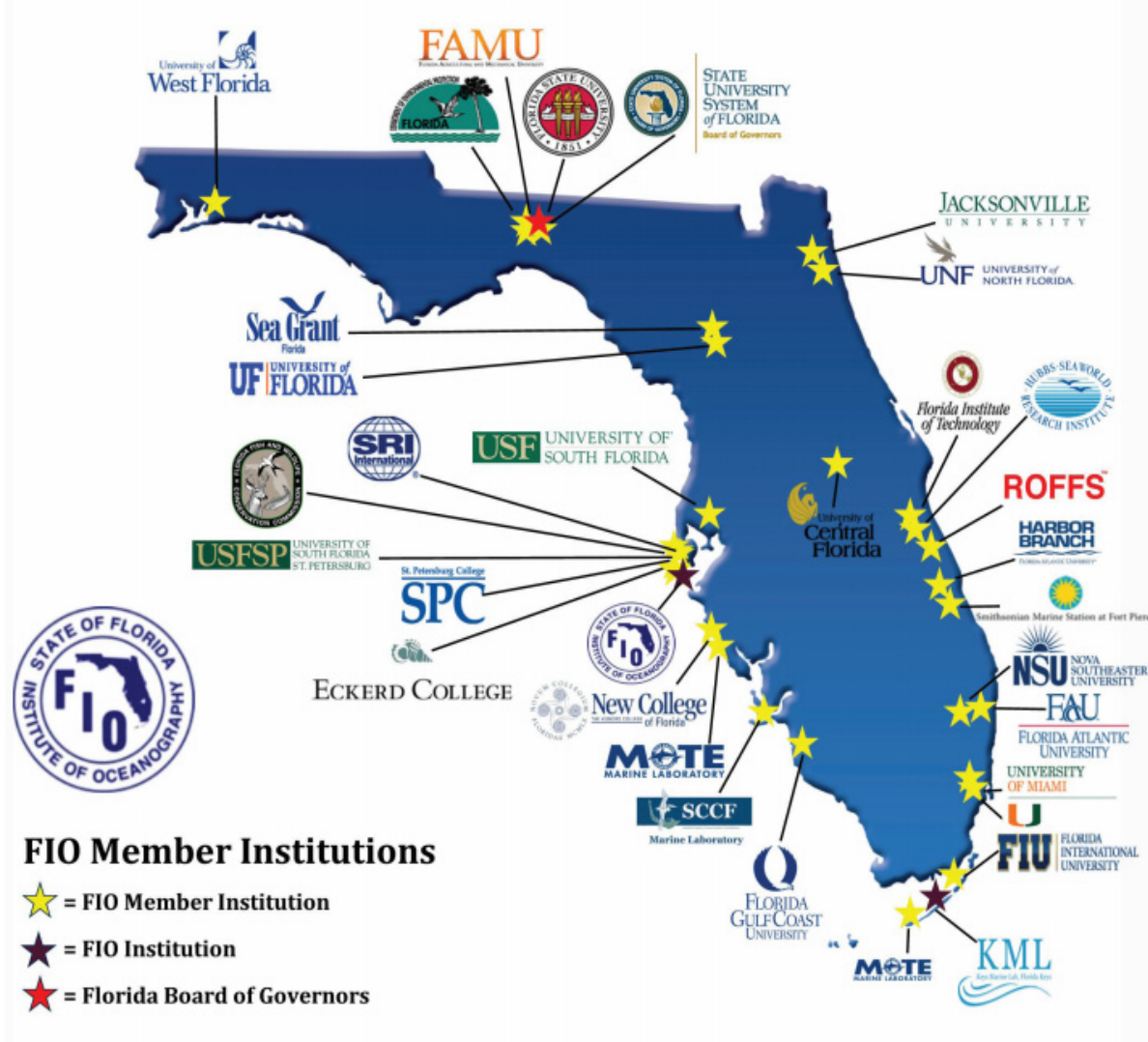
Florida waterways provide researchers access to the sea, and are themselves the subject of scientific research and academic training. Much of this research is conducted by members of the State of Florida Institute of Oceanography (FIO). FIO is a consortium of Florida's marine science research and educational institutions, and is part of the State University System. FIO's mission is to facilitate, promote, and support collaborative ocean-related research. Its members study environmental issues of importance to Florida, such as oil and dispersant impacts on the Gulf ecosystem, hurricanes, corals, and red tide. These member institutions are located throughout the state and include shore side research facilities as well as a fleet of research vessels. A list of these FIO member institutions can be found in Table 1-1, and their locations can be seen on the map in Figure 1-4.

**Table 1-1: State of Florida Institute of Oceanography Members**

<b>Full Members</b>	<a href="#">University of Florida</a>
<a href="#">Eckerd College</a>	<a href="#">University of Miami</a>
<a href="#">Florida Atlantic University</a>	<a href="#">University of Central Florida</a>
<a href="#">Florida Department of Environmental Protection</a>	<a href="#">University of North Florida</a>
<a href="#">Florida Agricultural and Mechanical University</a>	<a href="#">University of South Florida</a>
<a href="#">Florida Fish and Wildlife Conservation Commission</a>	<a href="#">University of West Florida</a>
<a href="#">Florida Gulf Coast University</a>	<b>Associate Members</b>
<a href="#">Florida Institute of Technology</a>	<a href="#">Clearwater Marine Aquarium</a>
<a href="#">Florida International University</a>	<a href="#">The Florida Aquarium</a>
<a href="#">Florida Sea Grant</a>	<a href="#">Hubbs-Seaworld Research Institute</a>
<a href="#">Florida State University</a>	<a href="#">Sanibel-Captiva Conservation Foundation</a>
<a href="#">Jacksonville University</a>	<a href="#">SRI International</a>
<a href="#">Mote Marine Laboratory</a>	<a href="#">St. Petersburg College</a>
<a href="#">New College of Florida</a>	<a href="#">University of South Florida St. Petersburg</a>
<a href="#">Nova Southeastern University</a>	<b>Affiliate Members</b>
<a href="#">Smithsonian Marine Station</a>	<a href="#">ROFFS Roffers Ocean Fishing Forecasting Service</a>

*Source: Florida Institute of Oceanography (members are hyperlinked to related websites)*

**Figure 1-4: Florida Institute of Oceanography Member Institutions**



Source: Florida Institute of Oceanography, 2015

It is difficult to estimate the impact of the research and economic activity of the marine research organizations in Florida. A recent effort was completed in 2008 by the National Ocean Economics Program. The “Florida’s Ocean and Coastal Economies Report” was commissioned by the Florida Oceans and Coastal Council and funded by the Florida Department of Environmental Protection. As part of the data collection, surveys were sent to all 55 of Florida’s marine and coastal research and education institutions seeking information regarding the programs, budgets, employment wages, number of students, and funding levels. Of those 55 marine institutes, 29 provided survey responses. The survey results revealed that the total amount spent on research was \$162 million with a total of 858 researchers.

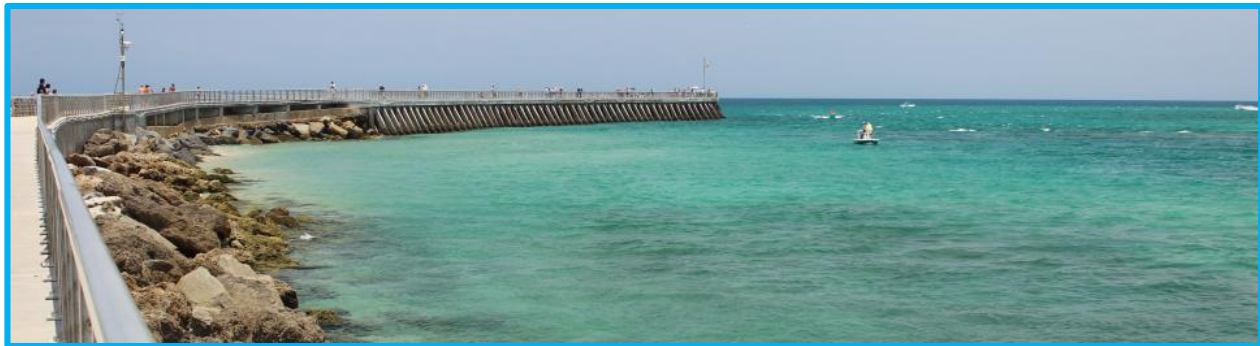
The institutional budgets totaled over \$272 million, paying over \$154 million in wages, with 2,925 employees and 2,234 students.<sup>15</sup>

<sup>15</sup> Judith Kildow, “Florida’s Ocean and Coastal Economies Report, Phase II”, 2008.

### 1.6.3 SYSTEM FEATURES

Waterways, ports, and waterfront facilities are primarily constrained by the quality of maritime access they can provide. Core components include access through the entire waterway system, including channels, turning basins, harbors, berth, bridge air drafts clearance, and bascule bridge schedule constraints. Other waterways system requirements include aids to navigation like channel markers, buoys, waterways signage. As waterways become more congested with both commercial and recreational activity, Global Positioning Systems (GPS) and Automated Identification Systems (AIS) may become more of a necessity, to make sure commercial and recreational vessels communicate with each other and with navigation infrastructure.

#### Sebastian Inlet Channel



*Source: floridastateparks.org, 2015*

#### 1.6.3.1 Water Depths

One of the biggest factors in determining the potential economic and commercial viability of a waterway is its depth at Mean Low Water (MLW) stage. According to the National Oceanic and Atmospheric Administration (NOAA), MLW is defined as the average of all the low water heights observed over the National Tidal Datum Epoch (presently 1983-2001). All waterway and channel depths are provided at MLW to provide the mariner with a worst case or shallowest scenario. The USACE divides waterways into two categories: shallow and deep draft. A shallow draft waterway is any waterway with a depth of 12 feet or less, these waterways are also considered to be those that primarily only carry domestic freight. A deep draft waterway is any waterway with a depth greater than 12 feet and is considered to carry both domestic and international freight. Table 1-2 shows the water depths for the shallow and deep draft waterways throughout Florida.



Table 1-2: Florida Shallow and Deep Draft Waterways

Shallow Draft Waterways	Authorized Depth at MLW
Apalachicola, Chattahoochee, and Flint Rivers	9
Atlantic Intracoastal Waterway, Fernandina to Ft. Pierce	12
Atlantic Intracoastal Waterway, Ft. Pierce to Miami	10
Atlantic Intracoastal Waterway, Miami to Key West	7
Canaveral Barge Canal	12
Cross Florida Barge Canal	12
Escambia River	10
Gulf County Canal	12
Gulf Intracoastal Waterway, Apalachee Bay to Panama City	12
Gulf Intracoastal Waterway, Caloosahatchee River to Anclote River	9
Gulf Intracoastal Waterway, Panama City to Pensacola Bay	12
Gulf Intracoastal Waterway, Pensacola Bay to Mobile, AL	12
LaGrange Bayou	12
New River	8
Okeechobee Waterway	8
Rice Creek	9
St. Johns River, Palatka to Sanford	12
St. Marks River	12
Watson Bayou	10
Deep Draft Waterways	Authorized Depth at MLW
Bayou Chico	15
Canaveral Harbor	44
Charlotte Harbor	32
Fernandina Harbor	40
Ft. Pierce Harbor	30
Jacksonville Harbor	42
Key West Harbor	18
Miami Harbor	50
Miami River	15
Palm Beach Harbor	33
Panama City Harbor	32
Pensacola Harbor	35
Port Everglades Harbor	45
Port Manatee (entrance channel)	40
St. Johns River, Jacksonville to Palatka	13
St. Joseph Bay	37
St. Petersburg Harbor	24
Tampa Harbor	42
Weedon Island	33

Source: US Army Corps of Engineers, 2015

The depth and width of a waterway are the primary factors allowing or prohibiting its use by the various vessel classes. Ships with larger capacity require deeper drafts since capacity is a function of weight and weight impacts displacement and buoyancy. In addition, as ships have grown larger and faster, the phenomenon of “Ship Squat” has become a larger issue. The squat effect is a hydrodynamic phenomenon caused by low pressure created when water accelerates faster under the hull of a ship in close proximity to the seabed, whereby lowering the water level surface and the vessel, and reducing the vertical clearance between vessels’ hull and the seabed. Because of this effect, a ship might need additional depth. Drafts of common commercial vessel types can be found in Table 1-3.

**Table 1-3: Drafts of Common Commercial Vessel Types**

Vessels	Depth, ft.
<b>Recreational Vessels, Shallow Draft Barges, Tugs, and Seaplanes</b>	6 to 12
<b>Cruise and General Cargo Vessels</b>	28 to 36
<b>General Cargo and Bulk Cargo Vessels</b>	36 to 41
<b>Panamax Bulk and Container</b>	39 to 41
<b>Post-Panamax Bulk and Container</b>	41 to 50

Note: Depths are based on MLW Statistics

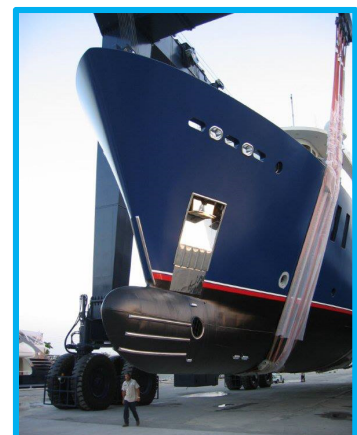
One strategy available to larger vessels whose draft requirements may exceed the depth of the waterway is to lighten their load or operate at less than full capacity. This strategy is not always economically efficient, as it negates the advantages of economies of scale and the primary reason for larger vessels. This increase in transportation cost may lead shippers to investigate or use other waterways or means of shipment. Shipping lines tend to make multiple port calls and in some cases call at the deepest ports-of-call with first and last loads, and at shallower draft ports between first and last call, to remain efficient.

The U.S. Department of Agriculture reports the following impacts when cargo vessels are not permitted to sail fully loaded:

- At a 9-foot draft, a barge has 1,500 short tons of capacity; for each foot of reduced draft, the barge loses about 200 short tons of capacity.
- When harbor channels are at less than authorized depths, S-Class container vessels lose 3,840 tons of cargo capacity per foot, Panamax bulk grain carriers lose 2,148 tons per foot, and Great Lakes ocean-bound vessels lose 1,389 tons per foot.

South Florida is also home to a large concentration of mega yachts and supporting industry. This industry includes a variety of repair and maintenance facilities all located on the waterfront and requiring access to navigable channels. The largest of these mega yachts can reach 300 feet in length and draft up to 13 feet. The Dania Canal in Broward County is home to a number of yacht repair and maintenance facilities.

### Mega Yacht Under Repair



Source: Derektor.com, 2015

In 2013, FIND completed a project dredging the Canal from 10 to 15 feet. This project was essential for the continued success and growth of the region's mega yacht service industry. Research has shown if the vessels are not able to safely navigate in an area, they will seek maintenance services elsewhere and very seldom return.

### 1.6.3.2 Air Draft

A second measure of draft important to pilots and vessel captains is air draft, or vessel air clearance. Air draft is the measure of how high a vessel is from water surface to highest point on the vessel. This is particularly important when crossing under infrastructure like bridges, power lines, and other overhead obstructions. At first thought, tall cruise ships and cargo vessels would seem like the most likely vessel types to be concerned with air draft. However, USCG statistics report that vessels under tow, like barges, have the highest occurrences of collisions with bridges where air draft was a factor.<sup>16</sup> These incidents result in loss of life, property damage, and inconvenience to communities dependent on bridges for travel. USCG investigations have found that the primary causal factor associated with these incidents is a lack of accurate air draft data for either the towing vessel or its tow, available to the ship's master or mate. These collisions often are caused by the cargo being carried instead of the barge or tow vessel itself. A good example of this type of collision is a construction barge used to transport or serve as a working base for cranes.

#### **Crane on Construction Barge Passes under SR 528 Bridge near Cape Canaveral**



*Source: FloridaToday.com, 2016*

It also is important to note that barges traverse up and down the entire Intracoastal Waterway. In many of the state's rural areas, bridges are older and are not designed to accommodate large vessels. There also are a number of private bridges throughout the state that limit air draft on certain areas of the Intracoastal.

<sup>16</sup> United States Coast Guard: Marine Safety Alert 09-14.

In contrast, larger cargo and cruise vessels typically limit their routes in and out of deepwater ports where area bridges are designed to accommodate larger vessels. They are typically under the control of Harbor Pilots. Several recent and current examples demonstrate the issues associated with air draft in Florida. The Miami River is a good example of an area operating with air draft restrictions. The Miami River is one of the most important inland rivers in the state in terms of freight and cargo shipping, with a number of shipping lines based on the river that service Caribbean ports. Most of these terminals are located approximately five miles upriver from the mouth of Biscayne Bay. During that 5 mile transit, the vessels must pass under 14 bridges. Due to the close confines of the river, vessels must be under tow with tug boat assistance while making this transit. While many of the bridges are drawbridges, the heavy amounts of traffic in downtown Miami limit the amount of time they can be raised to permit movement of vessel traffic. The Miami-Dade Metropolitan Planning Organization has initiated a feasibility study to replace the Brickell Avenue Bridge with a tunnel under the Miami River.

### **Cargo Vessels on the Miami River with Drawbridge in Background**



*Source: Thorn Grafton Photography, 2015*

A second area in the state where air draft is a concern is in Tampa Bay at the Sunshine Skyway Bridge. Cruise ships docking at Port Tampa Bay's Channelside terminals must travel under the Skyway Bridge to and from the Gulf of Mexico. Currently the largest cruise ships, along with most of the cruise ships on order, cannot transit under the Skyway Bridge because their air draft exceeds the bridge clearance of 181 feet. Several solutions have been reviewed, such as moving the cruise terminal to the Gulf of Mexico side of the bridge, raising the height of the bridge, or building a new bridge. Currently all of these options have not been further studied by local and regional stakeholders. Larger cruise vessels may not be the only vessel types impacted. With the Panama Canal expansion, larger Post Panamax container vessels may also be impacted by air draft restrictions at the Skyway Bridge, and in turn impact both Port Manatee's and Port Tampa Bay's future container business expansion. Currently, the Tampa Bay and Port Manatee shipping channels are too shallow for Super Post Panamax and Triple E class vessels, which are the only potential air draft restricted cargo vessels to transit under the Skyway Bridge. The USACE is performing a three year study to determine the feasibility of deepening the channel access to Port Manatee.<sup>17</sup>

<sup>17</sup> USACE Jacksonville District – Manatee Harbor, <http://www.saj.usace.army.mil/Missions/CivilWorks/Navigation/NavigationProjects/ManateeHarbor.aspx>.

### Carnival Sensation passes under Sunshine Skyway Bridge



Source: [tampabay.com](http://tampabay.com), 2016

A recent incident on the St. Johns River in downtown Jacksonville has also raised awareness of the importance of air draft. In 2013, a military sealift command vessel under tow struck the Matthews Bridge, damaging the main deck of the bridge. The bridge was closed for over a month while repairs were made, causing massive rerouting of traffic through downtown Jacksonville.

In addition to fixed height bridges, movable or drawbridges also affect navigation and the use of waterways. Since these bridges are raised or moved out of the way, air draft is not the primary concern for passing vessels. The primary factor affecting vessel traffic from movable bridges is their operational schedule. In urban areas, the operation of a movable bridge can greatly impact local traffic patterns. With this in mind, many bridges operate on a fixed schedule that mariners must be aware of or risk delays in transit.<sup>18</sup> A good example is the U.S. Highway 1 Fish Creek Drawbridge near Islamorada in the Florida Keys. This drawbridge was operating on a schedule of opening on every hour and every half hour. Due to complaints regarding traffic delays on U.S. 1, the Coast Guard is testing a temporary schedule of opening every hour on the hour from 8 a.m. to 4 p.m. Additionally, with the increase of passenger ridership on the state's rail system, along with the increased use of off port intermodal container transfer facility rail facilities, increased flexibility may be required by waterway users. In some cases, such as rural areas or times of day when traffic is lighter, vessels are able to hail movable bridge operators via VHF radio and request an opening.

The four most common types of movable bridges used in Florida are the drawbridge, bascule bridge, vertical-lift bridge, and swing bridge. Of these, the bascule bridge is the most common type of movable bridge in Florida. The most common non-movable bridge is the fixed bridge. Fixed bridges over the intracoastal waterways are required to have a minimum of 65 feet vertical clearance.

<sup>18</sup> Bridge operating schedules are defined in the Code of Federal Regulations (see [Title 33 CFR Part 117, Subpart B - Specific Requirements](#)).

In order to achieve this height and clearance, fixed bridges are required to be a specific length and may require large amounts of right of way. Bascule bridges, on the other hand, require less space due to the road deck raising vertically allowing vessels to pass.

Swing bridges rotate 180 degrees on a center pivot point allowing unobstructed air draft but limiting the width of vessels that may pass. As their name indicates, vertical-lift bridges raise directly vertical in place allowing vessels to pass underneath. The swing and vertical-lift bridges still in operation are mostly older, with some even being listed on the register of historical places. Due to maintenance and span limitations, they have mostly been replaced by more modern fixed bridge designs.

There are 118 bridges in Florida that cross the Atlantic and Gulf Intracoastal Waterways. These bridges all have the potential to impact the types of vessels able to use the waterways, the routes taken by these vessels, and the timing of when they transit certain locations. Table 1-4 details the type, number, and clearance information of the bridges located on intracoastal waterways throughout Florida.<sup>19</sup> There are a variety of data sources available for the mariner providing information on the location, characteristics, and operational schedules of bridges. These include navigational electronics such as radar and chart plotters, and paper copies of National Oceanic and Atmospheric Administration (NOAA) Navigational Charts and Coastal Pilots.

**Table 1-4: Bridges Spanning Florida Intracoastal Waterways**

		Bridge Type	Closed Clearance	Open Clearance	Number	
Waterways	NGIWW	Fixed Bridge	65 Feet	N/A	12	
		R/R Swing Bridge	11 Feet	Unlimited height; restricted width	1	
	WGIWW	Fixed Bridge	65 Feet to 180 Feet	N/A	6	
		Swing Bridge	9 Feet	Unlimited height; restricted width	2	
		Bascule Bridge	14 Feet to 30 Feet	Unlimited height	17	
	AIWW	Fixed Bridge	65 Feet	N/A	31	
		R/R Swing Bridge	5 Feet	Unlimited height; restricted width	1	
		Bascule Bridge	9 Feet to 55 Feet	Unlimited height	45	
		Vertical Lift	35 Feet	135 Feet	1	
		R/R Bascule Bridge	7 Feet to 22 Feet	Unlimited height	2	
	<b>Total Waterway Bridges</b>					<b>118</b>

Source: Blue Seas Boating and Yachting Resources, 2015

When thinking of navigational issues related to vessels, the first thought is to look down and check the water depth. These examples illustrate how, on inland waterways, it is critically important to look up as well.

<sup>19</sup> Blue Seas Boating and Yachting Resources, <http://www.offshoreblue.com>.

**Modern 65' Fixed Bridge over NGIWW near Perdido Key, FL**



Source: "Perdido Key Bridge." 30°18'44.27" N and 87°25'36.41" W. Google Street View. Image capture May 2011.

**Single Leaf Bascule Bridge in New Smyrna Beach, FL**



Source: Odebrechtusa.com, 2016

**Treasure Island Causeway Bascule Bridge near St. Petersburg, FL**



*Source: ecdriver.com, 2015*

**Main Street Vertical Lift Bridge Jacksonville, FL**



*Source: imgarcade.com, 2015*



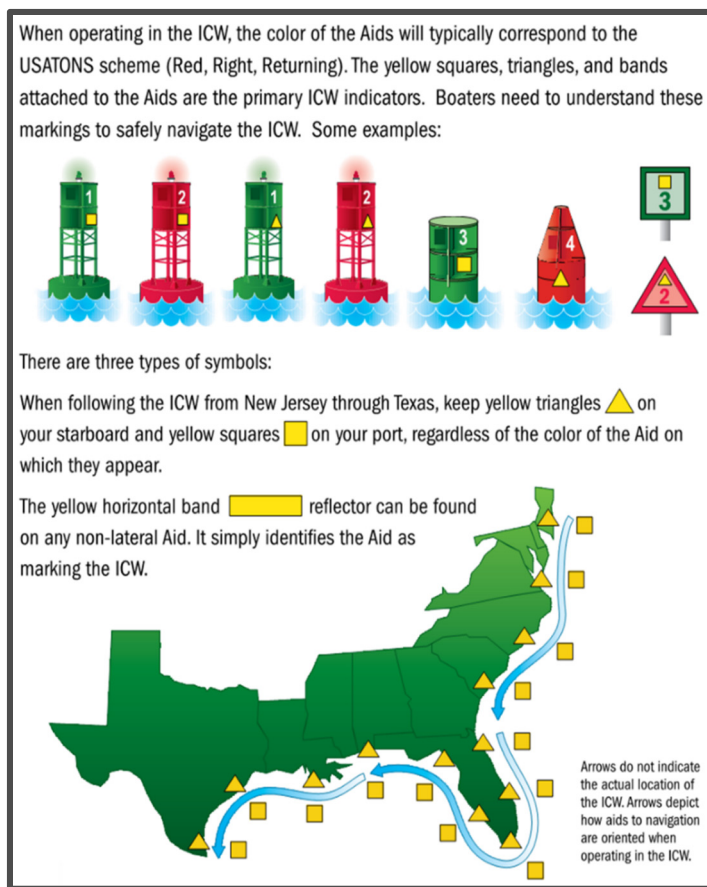
### 1.6.3.3 Other Navigational Hindrances and Navigational Aides

In addition to water depth and air draft, there are a variety of other factors that impact the usefulness of a waterway system. These include shoaling, which consists of sand bars and shallow areas that move based on currents and tides, derelict vessels which, when abandoned near channels, serve as navigational obstructions, and tides and currents which under certain circumstances make navigating inlets and passes difficult or dangerous for vessels.

The U.S. Aids to Navigation (ATON) System is maintained by the U.S. Coast Guard and consists of visual, audible and electronic signals designed to assist the mariner in navigation.

Aids to Navigation can provide a boater with the same type of information drivers get from street signs, stop signals, road barriers, detours, and traffic lights. These aids may be anything from lighthouses, to minor lights, day beacons, range lights, and sound signals, to lighted or unlighted buoys. Each has a purpose and helps in determining location, getting from one place to another, or staying out of danger. The goal of the U.S. Aids to Navigation System is to promote safe navigation on the waterway.<sup>20</sup>

**Figure 1-5: Elements of U.S. Aids to Navigation System**



Source: U.S. Coast Guard, 2015

A functioning and intact Aids to Navigation System is critical in order for inland waterways to function as systems for moving freight, commerce and recreational users. If channels are not properly marked, passenger and cargo vessels may run aground, jeopardizing the boater’s safety or commercial vessel cargo. This could potentially close the channel to traffic until the grounded vessel is removed.

Maintaining the ATON system requires a constant effort to verify navigational aids are located correctly, perform maintenance and are replaced when necessary. Some of these difficulties are magnified in areas where the Intracoastal channel is narrow and heavy barge traffic is present. The U.S. Coast Guard reports that several areas between Destin and Pensacola require frequent ATON verification as the barge traffic often collides with the navigational aids and drags them off station. Figure 1-5 better explains the colors and types of symbols needed to safely navigate the intracoastal waterway.

<sup>20</sup> U.S. Coast Guard - U.S. Aids to Navigation System Brochure, 2011.

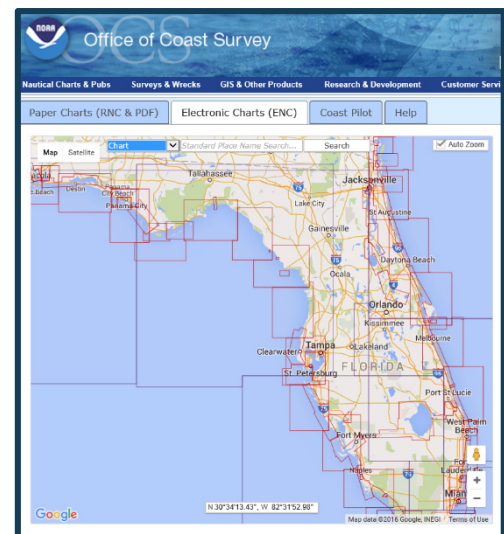
**Figure 1-6: State of Florida Navigational Markers**

Source: Florida Fish and Wildlife Conservation Commission, 2015

The FWC maintains a state system of navigational aids. Many of these are used to identify safety zones and other environmentally sensitive areas including manatee zones. These markers provide instructions to mariners on areas where they are required to operate at certain speeds or avoid altogether. Figure 1-6 shows an example of the navigational markers.

## NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

Additional aids to navigation are provided by the National Oceanic and Atmospheric Administration (NOAA), which includes physical measuring equipment fixed on channel markers, bridges, radar towers, and even satellites. Other tools that NOAA has developed and provides include navigational charts and additional services to ensure safe passage along coastal waterways. An electronic version of these navigational charts is provided by NOAA's Office of Coast Survey.<sup>21</sup> Additional useful information can be found on NOAA's National Ocean Service website.<sup>22</sup>



Source: NOAA, 2016

## 1.7 CONCLUSION

This introductory chapter provides a brief history of Florida's waterway system, a look into the three different intracoastal waterways, and an overview of the primary uses of the waterways system. These uses include trade and commerce, law enforcement and homeland security, recreation, and academic and scientific research. Along with those uses, a couple brief descriptions of some sister agencies and partners that help to manage, maintain, and oversee Florida's waterway system were provided. Finally, key attributes and limitations of the waterway system were discussed. Some of these attributes and limitations included the water depths and bridge air draft restrictions. A brief description of the aids to navigation was provided as well.

In subsequent chapters the Waterway System is described in greater detail, with maps of the various waterways throughout the state including intracoastal waterways, inland waterways, inlets and passes, canals and rivers, ports, harbors, and bayous. The national and state waterway trends and conditions are analyzed, key waterway planning issues are identified and a plan for the future of Florida's waterways is laid out.

<sup>21</sup> NOAA's Office of Coast Survey, <http://www.charts.noaa.gov/InteractiveCatalog/nrnc.shtml>.

<sup>22</sup> NOAA's National Ocean Service, <http://oceanservice.noaa.gov/facts/find-tides-currents.html>.



## 2. WATERWAY SYSTEM DETAILS

Chapter two provides more information on Florida’s waterway system as a whole, with a detailed description of individual waterway types, including the intracoastal waterways, ports, harbors, bayous, canals, rivers, inlets, and passes. Information related to associations and special districts of the various waterway systems, facility types, tonnage, and vessel trips is also presented. An overview of the states’ major waterways on the Gulf coast, Atlantic coast, as well as the states’ major rivers, is presented with detailed aerial maps provided to give a visual and spatial reference, and descriptions of attributes and key features are discussed.

### 2.1 FLORIDA’S WATERWAYS

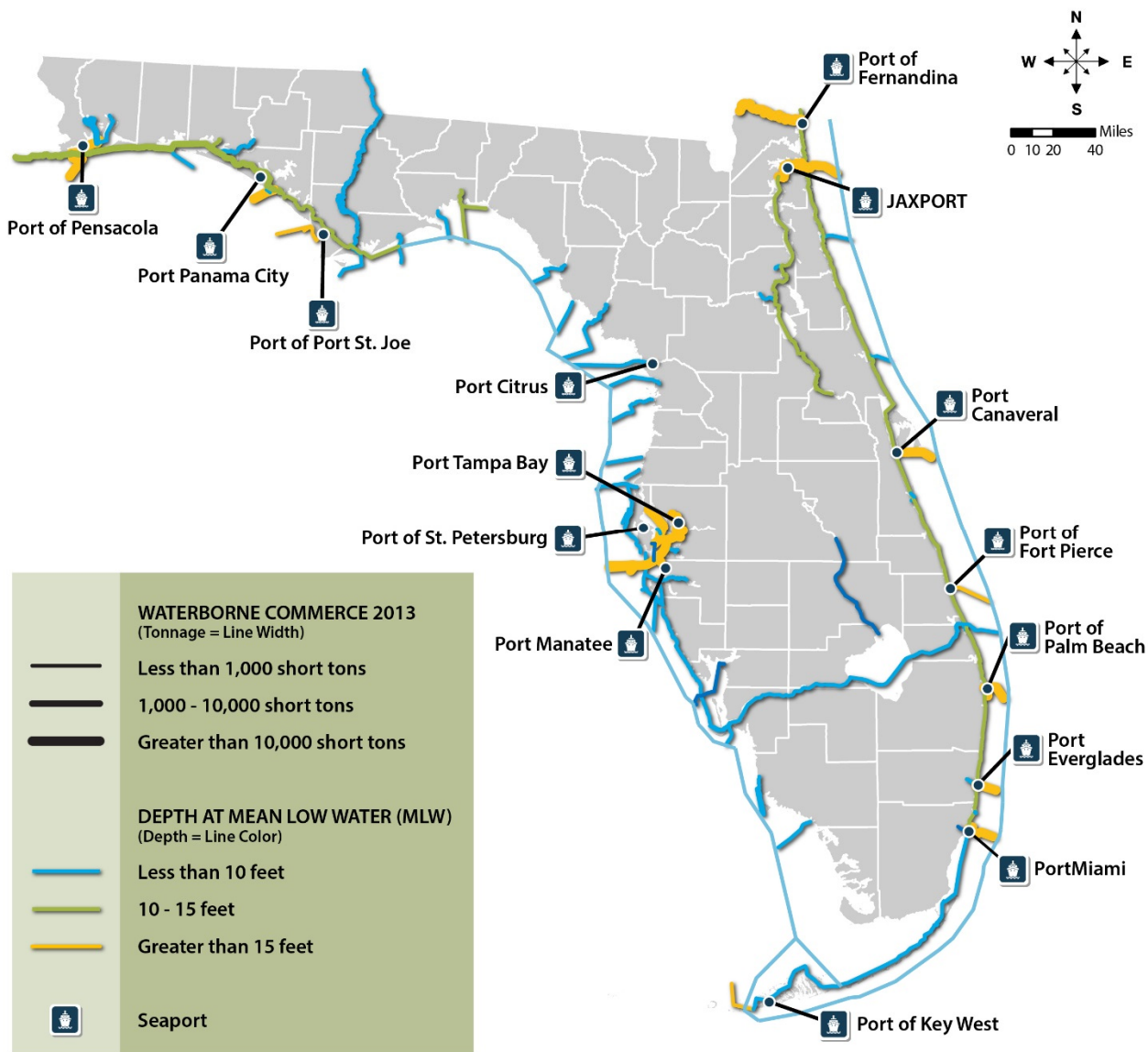
As mentioned previously, Florida enjoys an extensive coastline with waterways of varying size, depth, and levels of utilization. This system plan focuses on the waterways that have significant commercial or recreational activity levels. Waterways are organized in this plan by both geographical area and type. The waterway types identified in this plan include intracoastal waterways, harbors, bays, bayous, inlets, passes, canals, and rivers.

From 2003 to 2013, Florida consistently ranked third in overall waterborne tonnage when compared to the other Gulf and Southern Atlantic states. However, tonnage is not the only indicator to understand the full-range of commerce supported by Florida’s waterway system. While Florida’s coastal urban centers have large ports with high volumes of freight and passenger or cruise activity, these regions also have growing populations with diverse interests in recreational or other commercial uses of the waterway systems.<sup>1</sup>

Figure 2-1 is a statewide map of Florida’s waterway system categorized by waterway tonnage and depth. The tonnage data is the total 2013 Waterborne Commerce as reported by the United States Army Corps of Engineers (USACE) Waterborne Commerce Statistics Center (WCSC). The USACE GIS data shows waterway locations and depths depicted at Mean Low Water (MLW). The map strives to illustrate the annual level of cargo activity and the maximum draft of vessels utilizing each waterway segment. The locations of all of Florida’s 15 public seaports and major waterway systems including intracoastal, inland, and connector waterways are represented. Colors and line width are used to depict waterway depth and tonnage categories.

<sup>1</sup> Florida has 36 Metropolitan Statistical Areas (U.S. OMB, 2013).

Figure 2-1: 2013 Annual Tonnage and Depths of Florida's Waterways



Source: USACE Waterborne Commerce Statistics Center – 2003 to 2013 tonnage data

## 2.1.1 STRATEGIC INTERMODAL SYSTEM (SIS) WATERWAYS

Of particular importance to FDOT are the waterways designated as part of the State's Strategic Intermodal System (SIS). The SIS comprises Florida's statewide network of high priority transportation facilities, including the State's largest and most significant seaports, airports, spaceports, freight rail terminals, waterways, inter-regional rail and bus terminals, rail corridors, urban fixed-guide way transit corridors, and highways. SIS facilities are the primary means for moving people and freight between Florida's diverse regions, as well as between Florida and other states and nations, and as such, these facilities are designated as priorities for transportation and safety improvements.

### Intracoastal Waterway and Port Everglades

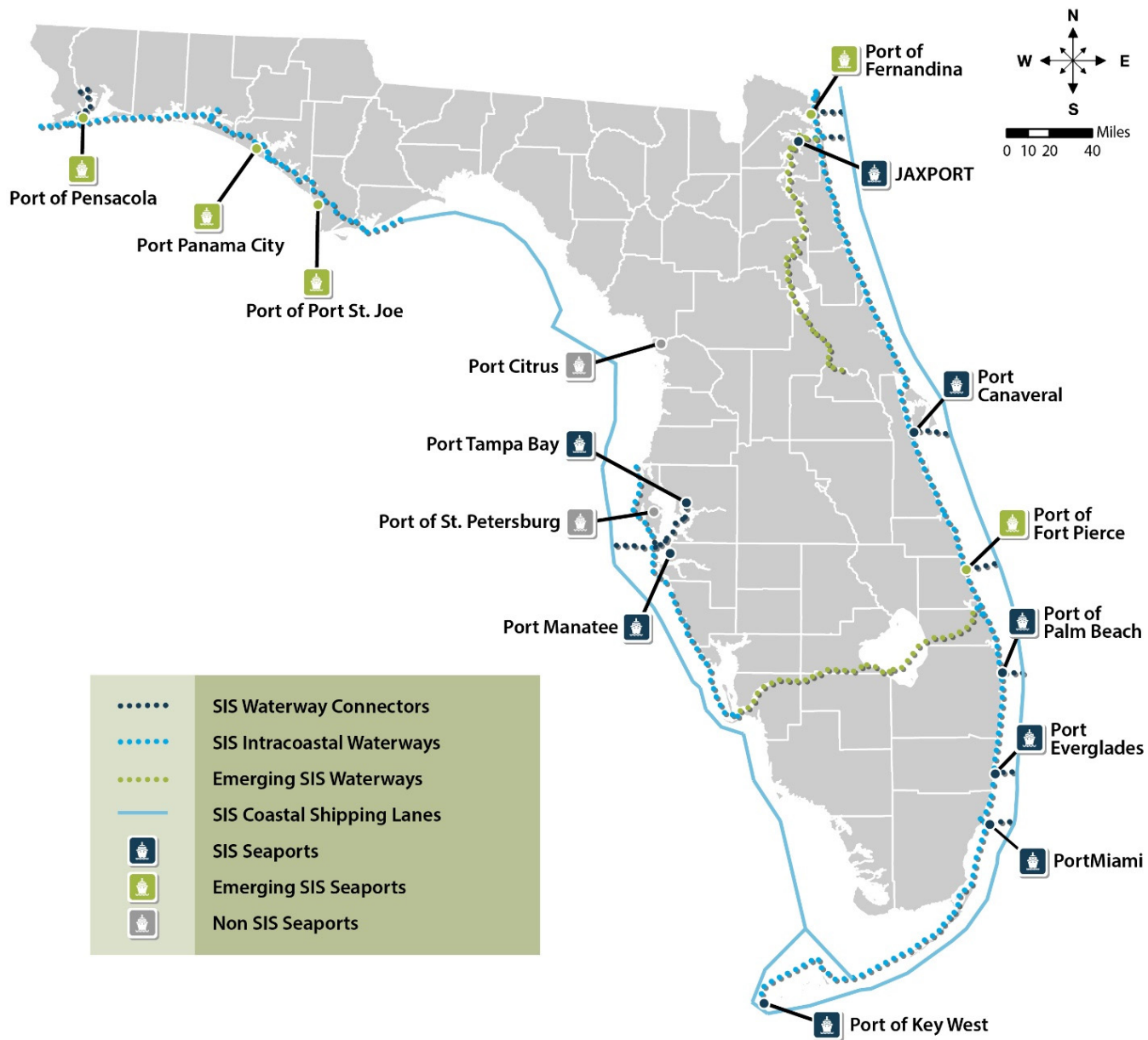


*Source: Florida Ports Council, 2015*

SIS Waterways are divided into four categories: coastal shipping lanes, intracoastal waterways, inland waterways and waterway connectors. Figure 2-2 is a statewide map that depicts Florida's SIS Waterways, including SIS Waterway Connectors, SIS Intracoastal Waterways, Emerging SIS Waterways, SIS Coastal Shipping Lanes, SIS Seaports, and Emerging SIS Seaports.

- Dark Blue Dots – SIS Ports and Harbors, along with designated connector waterways.
- Light Blue Dots – The SIS Intracoastal Waterway, along the national AIWW, extends from Port of Fernandina harbor and heads south to Key West.
- Lime Green Dots – The emerging SIS waterways, which include the St. Johns River Waterway and the Okeechobee Waterway System.
- Light Blue Line – SIS Coastal Shipping Lanes.
- Dark Blue Icon – SIS Ports.
- Lime Green Icon – Emerging SIS Ports.
- Grey Icon – Non-SIS ports.
- Solid Line – The intracoastal shipping lanes and depict the potential of domestic and international trade routes.

**Figure 2-2: SIS Waterways and Seaports**



Source: Florida Department of Transportation Strategic Intermodal System Program, September 2014

### 2.1.1.1 SIS Waterway Designation

In order to be designated as a SIS waterway or waterway connector, the waterway must meet certain designation criteria and thresholds based on quantitative measures of transportation and economic activity. For waterways, these thresholds include measures of freight tonnage, waterway depth and economic factors such as employment and areas of economic concern. The 2010 SIS Strategic Plan Implementation Guidance provides specific designation criteria for SIS Waterways. Table 2-1, below, describes the main criteria of waterways being designated as either a SIS Waterway or an Emerging SIS Waterway.<sup>2</sup>

**Table 2-1: SIS Waterway Designation Criteria**

SIS Component
<b><u>Coastal Shipping Lanes and Intra-coastal Waterways</u></b>
<ul style="list-style-type: none"> <li>• Designation intra-coastal waterways or coastal shipping lane handling international waterborne trade?</li> </ul>
<b><u>Inland Waterway: Deep Draft Size Criteria</u></b>
<i>(Must meet both of the following)</i>
<ul style="list-style-type: none"> <li>• Authorized depth of waterways <math>\geq</math> 12 feet</li> <li>• <math>&gt;0.25\%</math> of U.S. total annual waterway freight tonnage</li> </ul>
<b><u>Inland Waterway: Shallow Draft Size Criteria</u></b>
<i>(Must meet both of the following)</i>
<ul style="list-style-type: none"> <li>• Authorized depth of waterways <math>&lt;</math> 12 feet</li> <li>• <math>\geq 0.25\%</math> of U.S. total annual domestic waterway freight tonnage</li> </ul>
<b>Emerging SIS Component</b>
**Must meet either size or economic connectivity criteria**
<b><u>Inland Waterway: Deep Draft Size Criteria</u></b>
<i>(Must meet both of the following)</i>
<ul style="list-style-type: none"> <li>• Authorized depth of waterways <math>\geq</math> 12 feet</li> <li>• <math>&gt;0.05\%</math> of U.S. total annual waterway freight tonnage</li> </ul>
<b><u>Inland Waterway: Shallow Draft Size Criteria</u></b>
<i>(Must meet both of the following)</i>
<ul style="list-style-type: none"> <li>• Authorized depth of waterways <math>&lt;</math> 12 feet</li> <li>• <math>\geq 0.05\%</math> of U.S. total annual domestic waterway freight tonnage</li> </ul>
<b><u>Economic Connectivity Criteria</u></b>
<i>(Key Industry Employment; Must meet both of the following)</i>
<ul style="list-style-type: none"> <li>• <math>\geq 0.05\%</math> of U.S. total employment of industries dependent on waterborne transportation* (within 1 mile)</li> <li>• Located in a county or city with a designated Rural Area of Critical Economic Concern (RACEC) and <math>\geq 0.01\%</math> of U.S. total employment of industries dependent on waterborne transportation* (within 1 mile)</li> </ul>
<p>*Industries dependent on waterborne transportation include agricultural and forestry (NAICS 11); mining (NAICS 21); and trade and logistics (NAICS 42, 48, 49)</p> <p>Source: Table 2 Revised SIS and Emerging SIS Criteria's and Thresholds for Waterways, 2010 SIS Strategic Plan Implementation Guidance</p>

<sup>2</sup> 2010 SIS Strategic Plan Implementation Guidance, Chapter 11, Waterway Corridors SIS Designation Criteria, 2010.

### 2.1.1.2 SIS Waterway FDOT Project Funding

Designation as a SIS waterway has funding eligibility implications for proposed projects on these waterways. Florida Statute 339.08(l) authorizes FDOT to fund SIS projects from the State Transportation Trust Fund (STTF) and various other sources. However, in the context of transportation infrastructure, there are not enough resources to address all SIS funding needs. As a result, only certain types of projects (namely capacity projects) are eligible for SIS funding. SIS waterway capacity projects are divided into two categories: Waterway Corridor Projects and Waterway Connector Projects, as shown in Table 2-2. Certain SIS Waterway Corridor Projects are eligible for 100% state match and include marking or dredging of shipping channels or lanes. SIS Waterway Connector Projects for SIS waterways capacity projects include new connectors, locks, dredging, and widening.

**Table 2-2: SIS Waterway Corridor and Connector Project Eligibility**

<b>Waterway Corridors</b>		<b>Potential State Funding: 100%</b>
<b>SIS Project Categories</b>	<b>Projects Eligible for Funding</b>	<b>Projects Not Eligible for Funding</b>
<b>Capacity Projects</b>	Marking or dredging shipping channels in the immediate vicinity of SIS seaports; designation, identification, and improvement of shipping lanes within 12 miles of the Florida coast for purposes of avoiding hazards or unfavorable impacts of sea transport movements.	Projects beyond the territorial sea of the United States (12 miles from the coast).
<b>Waterway Connectors</b>		<b>Potential State Funding: 75%</b>
<b>SIS Project Categories</b>	<b>Projects Eligible for Funding</b>	<b>Projects Not Eligible for Funding</b>
<b>Capacity Projects</b>	New connectors; locks; dredging; widening	N/A

Notes: Encourage coordination with the U.S. Army Corps of Engineers to identify waterway commercial users, identify projects, coordinate planning and participate in project funding with Federal and State funds.

Source: FDOT System Planning Office

### 2.1.2 U.S. ARMY CORPS OF ENGINEERS (USACE) WATERWAYS

The USACE is the primary federal agency charged with overseeing the development and maintenance of inland and intracoastal waterways. Managing water resources is one of the five broad mission areas that the USACE is charged with completing. Under this mission, the USACE works to provide a safe, reliable, efficient, effective, and environmentally sustainable waterborne transportation system for the movement of commerce, national security needs, and recreation.

The USACE is responsible for the operation and maintenance of the waterways that make up the commercially active system. This system is known as the Inland Marine Transportation System (IMTS) and includes over 25,000 miles of navigable waters throughout the nation, as well as 12,000 miles of inland and intracoastal waterways. Table 2-3 provides a list of Florida's commercial waterways and their tonnage from 2007 to 2013.



**Table 2-3: Florida's Commercial Waterway Tonnage, 2007-2013 (Thousands of Short Tons)**

Waterway	2007	2008	2009	2010	2011	2012	2013
<b>Apalachicola, Chattahoochee, Flint River System</b>	0	0	0	0	0	2	0
<b>AIWW, Fernandina to Jacksonville</b>	184	263	142	205	167	227	130
<b>AIWW, Jacksonville to Miami</b>	459	75	55	80	12	1	2
<b>AIWW, Miami to Key West</b>	439	230	206	156	20	24	36
<b>Bayou Chico*</b>	242	269	51	47	32	75	154
<b>Canaveral Harbor</b>	3,470	2,431	2,301	2,510	3,462	3,164	3,337
<b>Charlotte Harbor</b>	134	0	22	0	0	2	6
<b>Cross Florida Barge Canal</b>	0	0	0	0	0	0	0
<b>Escambia River</b>	3,291	2,846	1,842	2,842	2,273	1,664	1,721
<b>Fernandina Harbor</b>	552	459	568	734	607	516	299
<b>Fort Pierce Harbor</b>	121	188	154	132	114	63	6
<b>Gulf County Canal</b>	0	0	0	312	0	0	0
<b>GIWW, Apalachee Bay to Panama City</b>	975	827	814	722	661	607	717
<b>GIWW, Caloosahatchee River to Anclote River</b>	1	3	28	0	0	15	1
<b>GIWW, Panama City to Pensacola Bay</b>	3,089	2,724	2,316	2,234	1,812	1,610	1,751
<b>GIWW, Pensacola Bay to Mobile, AL</b>	7,187	6,257	4,838	5,752	4,733	3,962	4,172
<b>Jacksonville Harbor</b>	21,207	21,050	17,691	19,122	16,831	15,439	16,473
<b>Key West Harbor</b>	8	1	16	49	60	39	0
<b>LaGrange Bayou</b>	352	312	249	254	249	219	262
<b>Miami Harbor</b>	7,479	6,826	6,772	6,960	7,178	6,994	7,125
<b>Miami River**</b>	463	317	335	390	417	392	369
<b>Okeechobee Waterway</b>	1	2	1	0	0	1	1
<b>Palm Beach Harbor</b>	3,117	2,377	2,342	2,374	1,813	2,065	2,130
<b>Panama City Harbor</b>	2,846	2,732	2,461	2,891	2,142	2,326	2,527
<b>Pensacola Harbor</b>	952	831	770	848	752	879	852
<b>Port Everglades Harbor</b>	24,216	21,652	20,059	20,233	20,956	21,105	21,703
<b>Port Manatee</b>	3,480	2,728	2,898	3,288	3,724	3,397	2,736
<b>Rice Creek</b>	100	56	43	41	39	3	0
<b>St. Johns River</b>	109	65	43	41	68	64	49
<b>St. Marks River</b>	109	88	76	80	62	72	53
<b>St. Petersburg Harbor</b>	27	13	15	9	2	4	1
<b>Tampa Harbor</b>	46,857	39,676	34,888	34,202	31,408	31,650	32,407
<b>Watson Bayou</b>	14	19	9	12	2	0	51
<b>Weedon Island</b>	937	631	0	0	0	0	0
<b>Florida Total</b>	<b>132,418</b>	<b>115,948</b>	<b>102,005</b>	<b>106,520</b>	<b>99,596</b>	<b>96,581</b>	<b>99,071</b>

Note: \*Bayou Chico volume are also included in Pensacola Harbor Totals

\*\*Miami River volume is also included in Miami Harbor Totals

Source: USACE Waterborne Commerce Statistics Center

The IMTS also contains a subset of waterways designated as the “fuel-taxed waterway system.” Users of these 11,000 miles of waterways pay a fuel tax of \$0.20 a gallon, which is deposited into the Inland Waterways Trust Fund (IWTF).<sup>3</sup> The IWTF is generally used to pay for up to half the cost of projects on fuel-taxed waterways. The fuel-taxed waterways system carries the bulk of freight moved on the nation’s waters. Florida is home to three waterways on the fuel-taxed system: the Gulf Intracoastal Waterway (GIWW) system, including two sub-sections, the Northern Gulf Intracoastal Waterway (NGIWW) and the Western Gulf Intracoastal Waterway (WGIWW); the Atlantic Intracoastal Waterway (AIWW) system; and the Apalachicola, Chattahoochee, and Flint Rivers (ACF) system.

For many years after its creation, the IWTF enjoyed a growing surplus beyond annual collections. However, in 2003, the Presidential Administration and Congress began dedicating increased amounts of revenue from the IWTF to modernize the IMTS as a whole. As a result, the expenditure of funds is currently limited to the amount of fuel tax revenues collected in the current year, which has led to a backlog of authorized projects awaiting construction.

The descriptions of federal fuel-taxed waterways are found below:

- Apalachicola, Chattahoochee, and Flint Rivers (ACF): Apalachicola River from mouth at Apalachicola Bay (intersection with the Gulf Intracoastal Waterway) river mile (RM) zero (0) to junction with Chattahoochee and Flint Rivers at RM 107.8. Chattahoochee River from junction with Apalachicola and Flint Rivers at RM zero (0) to Columbus, Georgia, at RM 155, and Flint River, from junction with Apalachicola and Chattahoochee Rivers at RM zero (0) to Bainbridge, Georgia, at RM 28.
- Atlantic Intracoastal Waterway (AIWW): Two inland waterway routes approximately paralleling the Atlantic coast between Norfolk, Virginia, and Miami, Florida, for 1,192 miles via both the Albemarle and Chesapeake Canal and Great Dismal Swamp Canal routes.
- Northern Gulf Intracoastal Waterway (NGIWW): Runs from St. Mark’s River, Florida, to Brownsville, Texas, for 1,134.5 miles.

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<sup>3</sup> Inland Waterways Trust Fund, [http://www.taxpayer.net/user\\_uploads/file/Transportation/Trust%20Funds/IWTF%20-%20TCS%20-%20FINAL%202012-01-18.pdf](http://www.taxpayer.net/user_uploads/file/Transportation/Trust%20Funds/IWTF%20-%20TCS%20-%20FINAL%202012-01-18.pdf).

## 2.2 GULF INTRACOASTAL WATERWAY

The Gulf Intracoastal Waterway (GIWW) is comprised of two sections. The northern section (NGIWW) stretches 1,300 miles from Brownsville, Texas, east to St. Marks, Florida. The western section (WGIWW) along Florida's western Gulf Coast stretches 152 miles from the Caloosahatchee River near Cape Coral, and ends north at the mouth of the Anclote River near Tarpon Springs.



As a whole, the GIWW is the third busiest waterway in the nation, transporting approximately 116 million tons or \$86 billion worth of commodities each year.

### 2.2.1 NORTHERN SECTION

The Florida portion of the Northern Gulf Intracoastal Waterway (NGIWW) is a SIS Waterway, with two active seaports and a variety of other marine transportation facilities. The Intracoastal Waterway is used to transport a significant amount of bulk cargo in the state, primarily in the form of barge traffic. The bays, bayous, rivers, inlets and passes also serve as vital connectors providing access from the seaports to the Intracoastal Waterway and offshore shipping lanes. Although there is no inland navigation district to serve the NGIWW, it carries a greater amount of cargo than the AIWW and WGIWW.

The NGIWW is home to many waterfront facilities. The USACE Master Docks Plus database lists 247 waterfront facilities and navigational points of interest. These have been categorized into six facility types based on descriptions provided in the Master Dock Plus database:

Facility Types	Quantity
Government	21
Port Tenant Facilities	11
Industrial/Commercial	79
Seafood Processing/Fishing Fleets	24
Navigation	93
Landings	19

Some of the facilities located along the NGIWW include the Ports of Pensacola, Panama City, and Port St. Joe; Naval Air Station Pensacola; Naval Activity Support Center Panama City; and Coast Guard Stations at Pensacola, Panama City, and Destin. In addition, there are a variety of industrial and commercial uses that are summarized by location in the sections to follow.

### 2.2.1.1 Gulf Intracoastal Canal Association

The northern section of the Gulf Intracoastal Waterway in Florida does not have a state-created navigation district as do the West Coast Inland and Atlantic Intracoastal Waterways. There are, however, various regional and national user groups organized to represent the waterway.

In its entirety, the Gulf Intracoastal Waterway extends along the Gulf Coast from Texas to Florida. The Gulf Intracoastal Canal Association (GICA) is a not-for-profit association that advocates on behalf of the users and industries dependent on the Gulf Intracoastal Waterway.<sup>4</sup> GICA's mission is to: "ensure the Gulf Intracoastal Waterway (GIWW) is maintained, operated and improved to provide the safest, most efficient, economical and environmentally-sound water transportation route in our nation, serving petrochemical facilities, refineries, farms, mines, ports, commercial fisheries, recreation and more."



The *Waterborne Commerce of the United States* reports, published by the USACE annually, provide counts of commercial vessel traffic by waterway. This information is helpful to understand the amount and type of commercial vessel traffic on the waterways. The NGIWW saw an overall decrease in commercial vessel traffic from 2007 to 2013. They did, however, also see a slight increase from 2012 to 2013, suggesting a potential rebound of economic activity along these waterways. The section between Pensacola and Mobile Bay remains the busiest and can attribute much of the section's activity to its proximity to offshore oil production and the Mississippi River waterway system. Table 2-4 describes the total annual waterborne commerce through the NGIWW as it compares to the statewide total.



Source: FWC, *Kayak Fishing in St. Marks River near St. Marks Light House*

<sup>4</sup> Gulf Intracoastal Canal Association, <http://www.gicaonline.com/Default.asp>.

**Table 2-4: Total Waterborne Commerce for the NGIWW, 2007-2013 (Thousands of Short Tons)**

Total Waterborne Commerce	2007	2008	2009	2010	2011	2012	2013
Florida Section of NGIWW	11,251	9,808	7,969	8,708	7,206	6,179	6,640
Florida Statewide Total	132,418	115,948	102,005	106,520	99,596	96,581	99,071
Annual Percent in Traffic Flow	8.50%	8.46%	7.81%	8.17%	7.23%	6.40%	6.70%

Source: USACE Waterway Commerce Statistics Center

The NGIWW is one of the nation's primary waterways for the movement of bulk commodities. From 2007 to 2013, the top commodities moved on Florida's portion of the waterway from Pensacola Bay to St. Marks included coal, petroleum, chemicals, crude oil, manufactured goods, farm and agricultural products, and manufactured equipment and machinery, as shown in Table 2-5 below.

**Table 2-5: Major Commodities for the NGIWW from Pensacola Bay to St. Marks, 2007-2013**

Major Commodities	2007	2008	2009	2010	2011	2012	2013
Coal, Lignite and Coal Coke	1,051,263	1,058,874	750,737	850,612	502,786	366,001	365,362
Petroleum and Petroleum Products	2,294,987	1,983,075	1,784,778	1,755,712	1,599,945	1,501,108	1,771,985
Chemicals and Related Products	146,254	160,642	129,886	147,192	170,780	144,470	127,248
Crude Materials, Inedible Except Fuels	257,889	171,111	306,358	34,274	24,627	25,250	24,522
Primary Manufactured Goods	179,811	77,327	65,237	89,414	98,826	68,876	144,761
Food and Farm Products	131,792	90,158	93,330	73,186	75,650	109,910	33,164
Manufactured Equipment, Machinery	2,020	9,306	0	5,462	124	1,589	1,106

Source: USACE Waterway Commerce Statistics Center

The primary sections of the NGIWW related to Florida's waterway system are shown in Table 2-6, which illustrates each sections annual vessel trips as reported by the USACE WCSC from 2007 to 2013. Since 2007, there has been a steady decline in vessel traffic recorded on the NGIWW with almost a 40% decline from 2007 to 2013. There was a slight spike in 2010 and 2011 for some sections.

**Table 2-6: Commercial Vessel Trips on NGIWW by Section, 2007-2013**

NGIWW Section	2007	2008	2009	2010	2011	2012	2013
St. Marks to Panama City	1,237	1,008	1,005	953	756	650	877
Panama City to Pensacola Bay	5,735	4,915	4,122	3,843	2,628	2,191	2,434
Pensacola Bay to Mobile Bay	11,322	9,859	8,231	11,821	9,214	7,347	7,652
<b>Overall Totals</b>	<b>18,294</b>	<b>15,782</b>	<b>13,358</b>	<b>16,617</b>	<b>12,598</b>	<b>10,188</b>	<b>10,963</b>

Source: USACE Waterborne Commerce Statistics Center

The NGIWW is maintained to a depth of 12 feet throughout its length. For most of its length, about 43% of the vessels that transit the NGIWW draft between 0 to 5 feet, about half of vessels draft between 6 to 9 feet, and the remaining 7% of vessels draft between 10 to 12 feet. Table 2-7 shows the percentage of vessel utilization by draft on each of Florida's sections of the NGIWW.

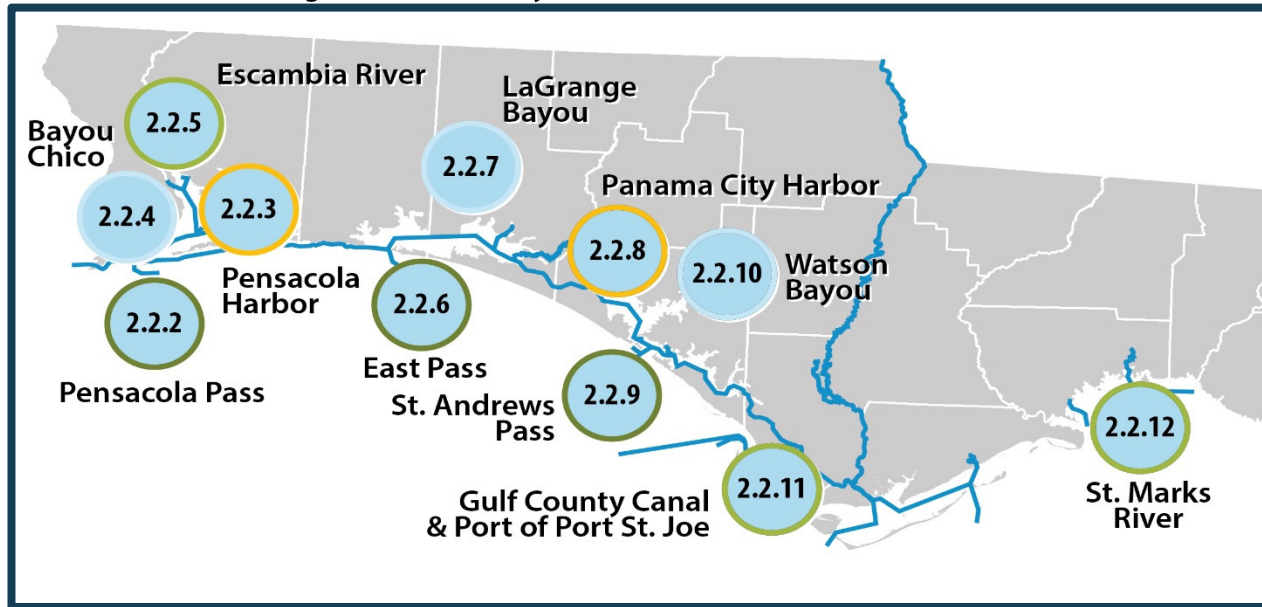
**Table 2-7: Percentage of Commercial Vessels by Draft on NGIWW Sections**

NGIWW Section	Vessel Draft			Maintained Depth
	0-5 ft.	6-9 ft.	10-12 ft.	
St. Marks to Panama City	49.0%	41.7%	9.2%	12 ft.
Panama City to Pensacola Bay	40.6%	51.9%	7.4%	12 ft.
Pensacola Bay to Mobile Bay	38.2%	57.8%	4.0%	12 ft.
<b>Average Across Sections</b>	<b>42.60%</b>	<b>50.47%</b>	<b>6.87%</b>	

Source: USACE Waterborne Commerce Statistics Center

The waterways of the Northern Florida Gulf Coast can be seen on Figure 2-3, below. Each circle on the map is explained in more detail in the subsequent pages. In some cases, notable facilities in each area are identified, including government facilities, ports, and navigational points of interest.

**Figure 2-3: Waterways of the Northern Florida Gulf Coast**



Legend:

- Ports and Harbors
- Inlets and Passes
- Canals and Rivers
- Bayous
- Waterways

### 2.2.2 PENSACOLA PASS

Pensacola Pass is the main entrance offering access to the open Gulf of Mexico for vessel traffic originating in Pensacola Bay and the surrounding area. The nearest open water access points are Orange Beach Pass, 14 miles to the west, and East Pass in Destin, approximately 50 miles to the east. The pass is maintained to a depth of 35 feet and is used heavily by recreational, commercial fishing, and commercial vessels leaving the Port of Pensacola.



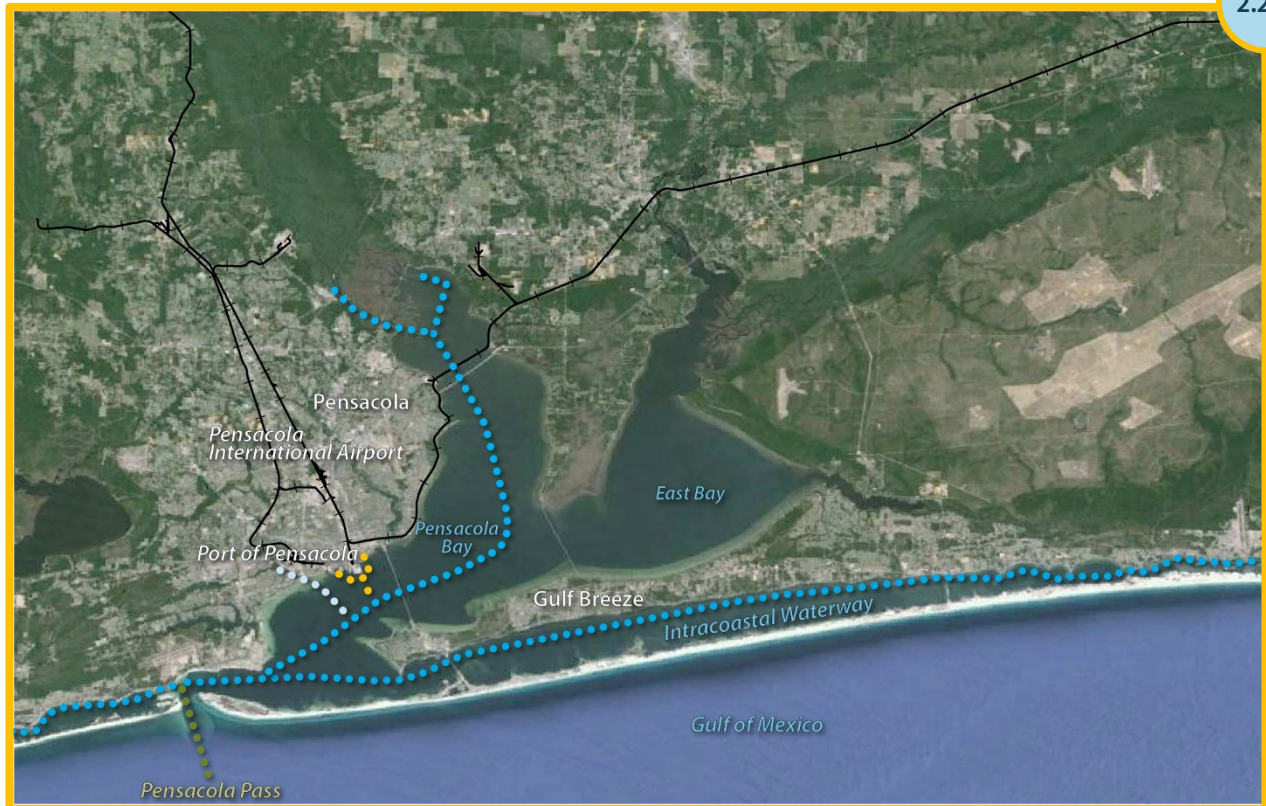
Legend:

- Intracoastal Waterways
- Inlets and Passes

### 2.2.3 PENSACOLA HARBOR

Pensacola Harbor is located in Escambia County. This harbor is accessed via the Pensacola Pass entrance to the southwest of the Port of Pensacola. The harbor has 17 miles of channel and an authorized depth of 35 feet. In 2013, 852,000 tons of cargo moved through the harbor, and the top commodities were petroleum and petroleum products.

2.2.3



**Legend:**

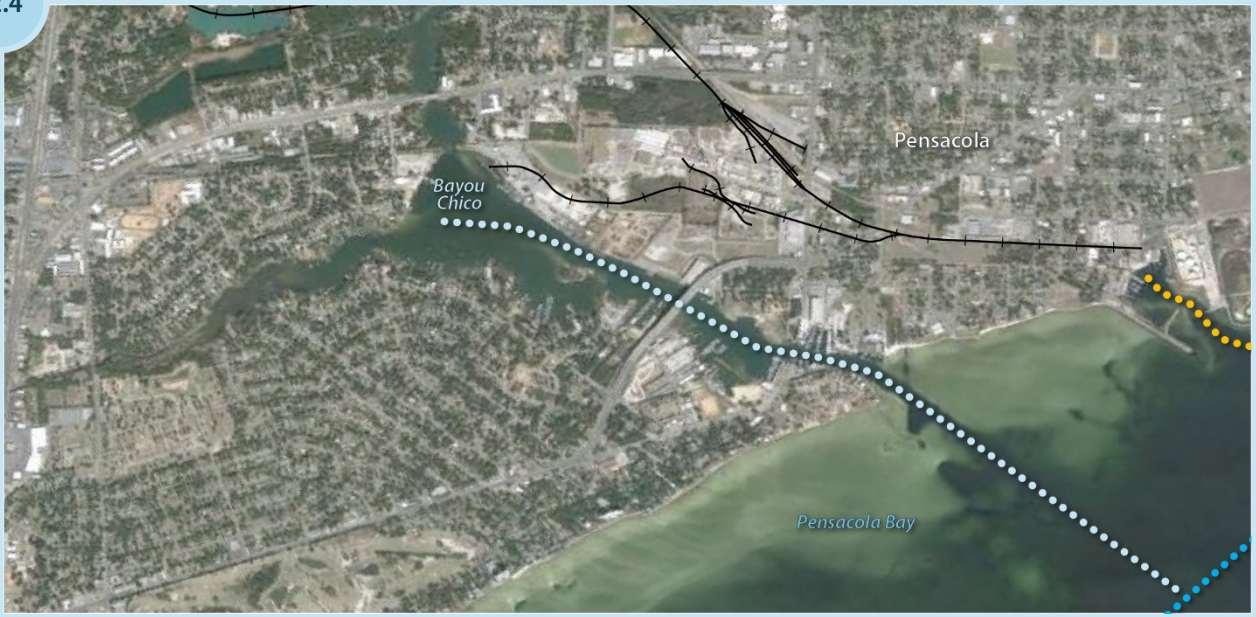
- Ports and Harbors
- Intracoastal Waterways
- Inlets and Passes
- Bayous
- +—+— Regional Railroads

<b>Government</b>	Pensacola Naval Air Station, USCG Station Pensacola, Pensacola Municipal Pier
<b>Ports</b>	Port of Pensacola
<b>Industrial/Commercial</b>	TransMontaigne Fuel Terminal, Gulf Sulphur, Chevron Fuel Terminal, Seville Harbor Marina, Palafox Pier and Yacht Harbor
<b>Seafood</b>	Joe Patti Seafood, Williams Seafood Co, American Seafood Co.
<b>Navigational Points of Interest</b>	Caucus Channel, Intracoastal WW Junction, Bayou Chico Junction

### 2.2.4 BAYOU CHICO

Bayou Chico is an industrialized waterway situated in southwestern Pensacola. It is 4 miles long and has an authorized depth of 15 feet. The bayou offers convenient access to shipping lanes from its location near the Gulf of Mexico and the GIWW. The bayou can handle sea-going barges and small cargo vessels. In 2013, it reported 154,000 tons of cargo through its waters. The top commodities were iron and steel scrap.

2.2.4



**Legend:**

- Ports and Harbors
- Intracoastal Waterways
- Bayous
- + + + Regional Railroads

<b>Industrial/Commercial</b>	Patti Shipyard, Pensacola Shipyard, Southern Recycling, Day Break Marina, Island Cove Marina, Pelicans Perch Marina and Boatyard, Harbor View Marine, Palm Harbor Marina, Bahia Mar Marina, Yacht Harbor Marina, Pensacola Kayak and Sail, Pensacola Yacht Club
<b>Navigational Points of Interest</b>	Bayou Chico Bridge, Pensacola Harbor Junction, Caucus Channel



### 2.2.5 ESCAMBIA RIVER

The Escambia River flows into the Pensacola Bay system and is part of a river system that includes the Conecuh River, located in Alabama. The portion of this river system in Florida is designated as the Escambia River Water Management Area under the management of the Northwest Florida Water Management District. The river is dredged only in Florida, which is the lower portion of the river close to the opening of Pensacola Bay. The portion of the river in Florida is 17 miles long and has an authorized depth of 10 feet. In 2013, it carried 1,721,000 tons of cargo, and the top commodity was coal. The river tonnage includes shipments through the Pensacola Harbor.

2.2.5



Legend:

- Intracoastal Waterways
- Canals and Rivers
- + + + Regional Railroads

**Industrial/Commercial**

Pensacola Chemical Complex, Gulf Power Steam Plant

**Navigational Points of Interest**

Pensacola Bay Junction, I-10 Bridge, U.S. HWY 90 Bridge

### 2.2.6 EAST PASS

East Pass in Destin, Florida, provides access to the Gulf of Mexico for all vessel traffic originating in Choctawhatchee Bay and the eastern portions of the Santa Rosa Sound. East Pass measures approximately one mile from the Destin Bridge to the Gulf. The next closest access to the Gulf is the Pensacola Pass 50 miles to the west, or St. Andrews Pass 50 miles to the east. There is a popular sand bar located on the inside of the pass called "Crab Island" which sees heavy recreational vessel traffic, especially in the summer months. The pass is maintained to a depth of 14.5 feet and is subject to shoaling and heavy swells during certain tide and wind conditions.



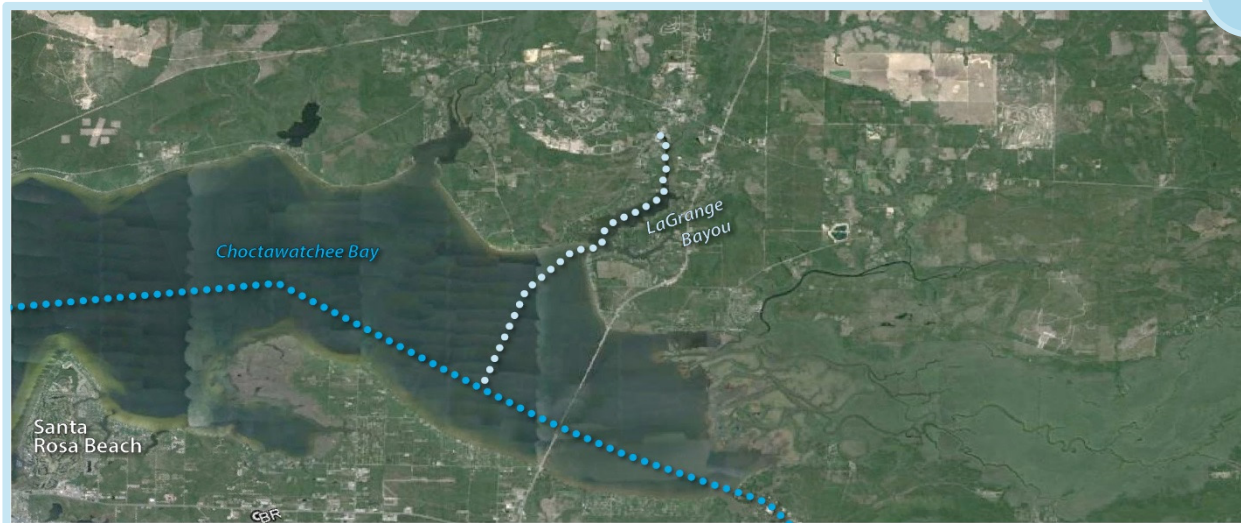
2.2.6

Legend:

- Intracoastal Waterways
- Inlets and Passes

### 2.2.7 LAGRANGE BAYOU

LaGrange Bayou is located near the Choctawhatchee Bay in Walton County. It connects the city of Freeport with the NGIWW. It is 7 miles long with an authorized depth of 12 feet. In 2013, it moved 262,319 tons of cargo, and petroleum and petroleum products were the top commodities.



2.2.7

Legend:

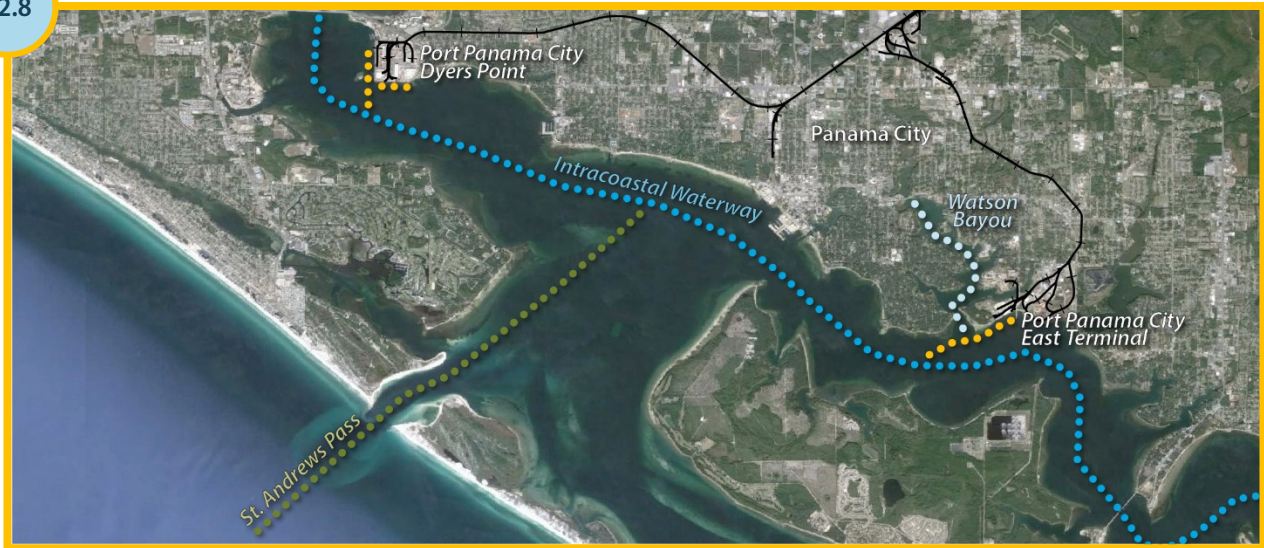
- Intracoastal Waterways
- Bayous

<b>Industrial/Commercial</b>	CEMEX Cement, Murphy Oil Terminal, Gulfstream Shipbuilding, G&S Custom Built Yachts
<b>Navigational Points of Interest</b>	Choctawhatchee Bay and Intracoastal WW Junction

### 2.2.8 PANAMA CITY HARBOR

Panama City Harbor is a deep draft harbor that is located along the NGIWW in Bay County. The harbor houses Port Panama City and is accessed through the St. Andrews Bay channel entrance connecting to the NGIWW. The harbor’s channel is 2 miles long and has an authorized depth of 32 feet. In 2013, 2,526,824 tons of cargo were reported moving across these waters, and the top tonnage commodities were petroleum and petroleum products.

2.2.8



**Legend:**

- Ports and Harbors
- Intracoastal Waterways
- Inlets and Passes
- Bayous
- +—+— Regional Railroads

<b>Government</b>	Panama City Marina
<b>Ports</b>	Port Panama City
<b>Industrial/Commercial</b>	Gulf Power Co. Steam Plant Dock, Bay Point Marina, Capt. Anderson’s Marina, Pirates Cove Marina, St. Andrews Marina, S. C. Rowe Diesel Terminal
<b>Seafood</b>	Tarpon Dock Seafood Market
<b>Navigational Points of Interest</b>	Junction with Grand Lagoon, Intracoastal WW Channel, St. Andrews Pass, Watson Bayou

### 2.2.9 ST. ANDREWS PASS

St. Andrews Pass at Panama City Beach provides access to the open Gulf of Mexico for all vessel traffic originating in St. Andrews Bay and the surrounding area of the Intracoastal Waterway. The entrance channel is 35 feet deep, between 300 - 450 feet wide, and 1.5 miles long. The closest access to the open Gulf is Destin's East Pass, 50 miles to the west, and the Gulf County Canal at Port St. Joe approximately 46 miles to the east.



2.2.9

### 2.2.10 WATSON BAYOU

Watson Bayou flows in to St. Andrews Bay in Bay County. The bayou is home to many boat slips and marinas due to its recognition as being one of the safest harbors in Northwest Florida. This bayou is 3 miles long and has an authorized depth of 10 feet. While this waterway has moved cargo in the past, there was no recorded tonnage for 2013.

Legend:

- Inlets and Passes



2.2.10

Legend:

- Port and Harbors
- Intracoastal Waterways
- Bayous
- +—+—+— Regional Railroads

<b>Government</b>	USACE Panama City Wharf
<b>Industrial/Commercial</b>	Bay Fabrication/Eastern Shipbuilding Wharf, H.G. Harders & Son Marine Yard, Gulf Terminal Corp, Whitaker Oil Co., Amerigas Terminal, Gulf Terminal Corp, Panama City Terminals, Bay Shipyard
<b>Seafood</b>	Brannon's Seafood Dock
<b>Navigational Points of Interest</b>	Junction with NGIWW, Watson Bayou and Panama City Harbor

### 2.2.11 GULF COUNTY CANAL

The Gulf County Canal connects the NGIWW shipping channel with St. Joseph Bay and the Gulf of Mexico in Gulf County. This canal is mainly used for commercial purposes, as there are limited opportunities for recreational activity. This is because the canal is centrally located near the local highway, rail, and the Port of Port St. Joe, and is home to a thriving commercial fishing community. The canal is 8 miles long and has an authorized depth of 12 feet. While this waterway has moved cargo in the past, there was no recorded tonnage for 2013.

2.2.11



**Legend:**

- Ports and Harbors
- Intracoastal Waterways
- Rivers and Canals
- +—+— Regional Railroads

<b>Ports</b>	Port of Port St. Joe
<b>Industrial/Commercial</b>	Captain's Cove Marina
<b>Seafood</b>	Raffield Fisheries, Wood's Fisheries
<b>Navigational Points of Interest</b>	St. Joe Bay Junction, Highlandview (U.S. 98) Bridge, Intracoastal WW Junction

### 2.2.12 ST. MARKS RIVER

The St. Marks River is located in the Big Bend region of Florida, and the portion maintained by the USACE is located in Wakulla County. It is a popular recreational river. This portion is 10 miles long and has an authorized depth of 12 feet and 125 feet wide. In 2013, it carried 53,000 tons of cargo and the top commodity was sodium hydroxide.



Legend:  
 ..... Canals and Rivers

<b>Government</b>	City of Tallahassee Purdham Power Generating Station
<b>Industrial/Commercial</b>	St. Marks Refinery, Warren Petroleum Terminal, Gulf Oil Terminal, Shields Marina
<b>Seafood</b>	St. Marks Seafood, Lynn Brothers Seafood
<b>Navigational Points of Interest</b>	Apalachee Bay Junction

### 2.2.13 WESTERN SECTION

The Western Gulf Intracoastal Waterway (WGIWW) is a Strategic Intermodal System (SIS) Waterway that is 151 miles long, beginning in the south at the mouth of the Caloosahatchee River near Cape Coral, and ending north at the mouth of the Anclote River near Tarpon Springs. While the WGIWW is not a major commercial cargo waterway when compared to the other intracoastal waterways, it is a very popular and busy waterway for recreational boating and fishing. The inlets located along the waterway are important for providing boaters with access to the open Gulf. The West Coast Inland Navigation District (WCIND), headquartered in Venice, serves as the local sponsor to the USACE for the Western Gulf Intracoastal Waterway.

The WGIWW is home to many waterfront facilities. The USACE Master Docks Plus database lists 228 waterfront facilities and navigational points of interest. These have been categorized into the same six facility types as the NGIWW:

<b>Facility Types</b>	<b>Quantity</b>
Government	11
Port Tenant Facilities	59
Industrial/Commercial	69
Seafood Processing/Fishing Fleets	6
Navigation	81
Landings	2

The WGIWW is home to the SIS Ports of Tampa Bay, Manatee, and St. Petersburg, as well as a variety of other marine transportation facilities. Some of the major facilities located along the WGIWW include the U.S. Coast Guard Sector St. Petersburg, with facilities in St. Petersburg and Tampa, and Stations St. Petersburg, Sand Key, and Fort Myers Beach. There is also an Aids to Navigation Team in St. Petersburg and a Marine Safety Detachment in Fort Myers. Tampa Bay is home to the cruise terminals at Port Tampa Bay, and MacDill AFB maintains a large security zone in the bay. In addition, there are numerous large recreational and commercial marinas. The famous Tarpon Springs sponge fleet and the fishermen in the Boca Grande Pass, known for tarpon fishing, also use and benefit from the WGIWW.

#### 2.2.13.1 West Coast Inland Navigation District (WCIND)

WCIND was created by the Florida Legislature in 1947, with the purpose of serving as a local sponsor to the inland waterways and providing assistance to other governments in developing waterway access and improvements. This is accomplished via projects that maintain and enhance public navigation channels and inlets, boating access facilities, waterfront parks, and piers. In 1979, WCIND's responsibilities were expanded and the District was given the authority to conduct projects in secondary and tertiary channels. WCIND also has the responsibility of ensuring the navigability of 14 inlets. Many of the dredging projects for inlets will use the sand removed as material for the adjacent beach re-nourishment. WCIND is comprised of four member counties: Lee, Charlotte, Sarasota, and Manatee, with a combined resident population of approximately 1.1 million people.

WCIND is funded through ad valorem taxes collected in the 4 member counties, and also through federal and state grant programs. In 2014, WCIND used these moneys to fund approximately \$6.3 million in projects. These projects included maintenance dredging, public information and boating education, and joint projects with local counties and municipalities. Notable recent and current dredging projects include Stump Pass, New Pass, and the Bimini Bay Inlet.

Other projects include K-9 training for local police and sheriff department marine units, Snake Island environmental restoration, improvements to kayak and boat launch facilities at Cherokee Park in Sarasota, and the USS Mohawk artificial reef off the coast of Fort Myers, providing recreational diving and fishing opportunities.

The primary statistics that show how the WGIWW relates to Florida's waterway system are shown in Table 2-8 through Table 2-11. As shown in Table 2-8, the availability of total waterborne commerce data for the section of the WGIWW from the Caloosahatchee River to the Anclote River was very sporadic, which could have been due to an issue with reporting the data or low utilization.

**Table 2-8: Total Waterborne Commerce for the WGIWW, 2007-2013 (Thousands of Short Tons)**

Total Waterborne Commerce	2007	2008	2009	2010	2011	2012	2013
Caloosahatchee River to Anclote River	1	3	28	n/a	0	15	1

Source: USACE Waterway Commerce Statistics Center

Table 2-9 illustrates the annual top commodities for the WGIWW from 2007 to 2013, excluding 2010 (data not available). In 2012 and 2013 the top commodities were primary manufactured goods and manufactured equipment and machinery.

**Table 2-9: Major Commodities for the WGIWW, 2007-2013 (Short Tons)**

	2007	2008	2009	2010	2011	2012	2013
Petroleum and Petroleum Products	0	0	27,262	n/a	0	0	0
Chemicals and Related Products	0	1,400	0	n/a	0	0	0
Crude Materials, Inedible Except Fuels	0	1,500	600	n/a	0	0	0
Primary Manufactured Goods	0	0	0	n/a	462	13,051	468
Manufactured Equipment, Machinery	500	0	0	n/a	0	1,586	738

Source: USACE Waterway Commerce Statistics Center

Table 2-10 illustrates the total annual vessel trips on the WGIWW section from the Caloosahatchee River to the Anclote River, as reported by the USACE Waterborne Commerce Statistics from 2007 to 2013. Since 2007, there has been a varying rate of vessel traffic recorded on this section of the WGIWW, with an average of 5,183 trips from 2007 to 2013.

**Table 2-10: Commercial Vessel Trips on WGIWW, 2007-2013**

WGIWW	2007	2008	2009	2010	2011	2012	2013
Caloosahatchee River to Anclote River	6,164	4,520	6,296	5,588	3,465	6,028	4,220

Source: USACE Waterborne Commerce Statistics Center

The percentage of vessels by draft on WGIWW sections from the Caloosahatchee River to the Anclote River, shown in Table 2-11, essentially tells the story that this section of waterway is primarily used by shallow draft vessels. Larger cargo vessels require deeper drafts and the high percentage of shallow draft vessels may be the reason tonnage and the number of vessel trips are down in recent years and may reflect a capacity problem related to depth and level of service.



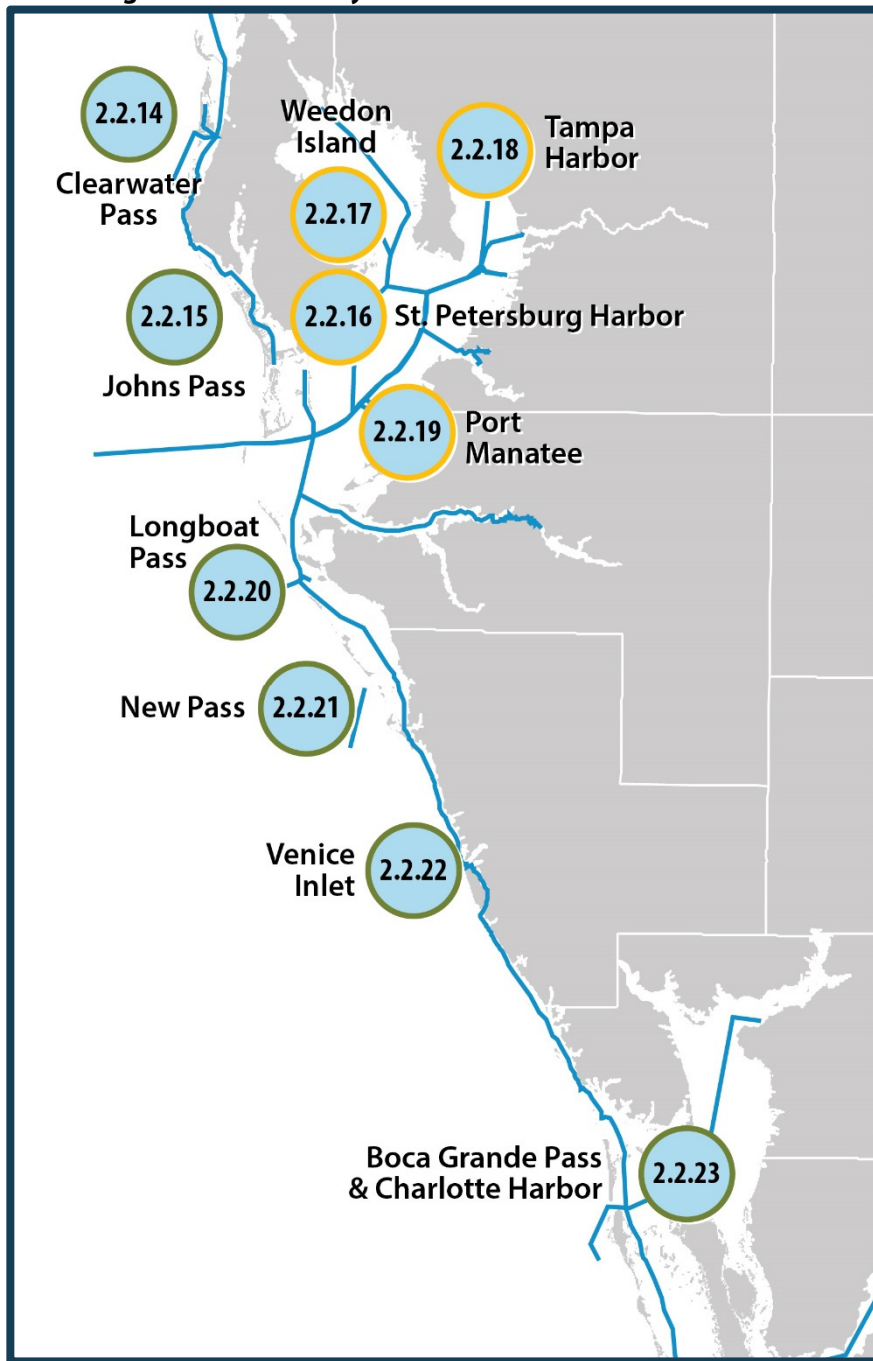
**Table 2-11: Percentage of Commercial Vessels by Draft on WGIWW Sections**

WGIWW	Vessel Draft			Maintained Depth
	0-5 ft.	6-9 ft.	10-12 ft.	
<b>Caloosahatchee River to Anclote River</b>	99.4%	0.6%	0.0%	9 ft.

*Source: USACE Waterborne Commerce Statistics Center*

The waterways of the Western Florida Gulf Coast can be seen on Figure 2-4, on the following page. Each circle on the map is explained in more detail in the subsequent pages. In some cases, notable facilities in each area are identified, including government facilities, ports, and navigational points of interest.

**Figure 2-4: Waterways of the Western Florida Gulf Coast**



Legend:

- Ports and Harbors
- Inlets and Passes
- Waterways

### 2.2.14 CLEARWATER PASS

Clearwater Pass is a naturally opened channel located in Pinellas County. The pass connects the WGIWW to the Gulf of Mexico. The pass is 5 miles long and has an authorized depth of 10 feet. This pass is used extensively by recreational boaters.



Legend:

- Intracoastal Waterways
- Inlets and Passes
- + + + Regional Railroads

### 2.2.15 JOHNS PASS

Johns Pass is a naturally opened pass created after a hurricane split Madeira Beach in 1848, and is located in Pinellas County. The pass connects the WGIWW to the Gulf of Mexico. It is 2 miles long and has an authorized depth of 13 feet.

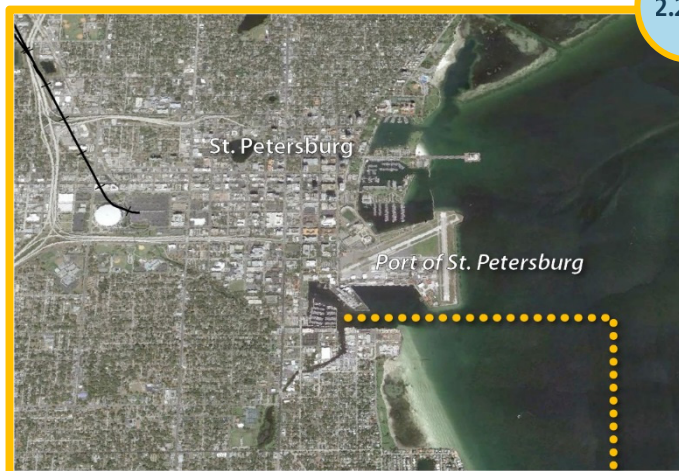


Legend:

- Intracoastal Waterways
- Inlets and Passes

## 2.2.16 ST. PETERSBURG HARBOR

St. Petersburg Harbor is a deep draft harbor located in Pinellas County. The harbor is situated on the peninsula between the Gulf of Mexico and Tampa Bay and is accessed via the entrance to Tampa Bay at the Gulf of Mexico. It is home to the Port of St. Petersburg. The harbor's channel is 9 miles long and has an authorized depth of 24 feet. In 2013, only 1,000 tons of cargo were reported as traversing the harbor, and the top commodity was distillate fuel oil.



### Legend:

- Ports and Harbors
- + + + + Regional Railroads

<b>Government</b>	USCG Sector St. Petersburg, University of South Florida Wharves, Florida Fish and Wildlife Conservation Commission Dock, St. Petersburg Pier
<b>Ports</b>	Port of St. Petersburg
<b>Industrial/Commercial</b>	Progress Energy Bayboro Station, St. Petersburg Yacht Station, Harborage Marina, Salt Creek Marina and Yacht Sales
<b>Seafood</b>	Pinellas Seafood
<b>Navigational Points of Interest</b>	Tampa Bay and Port of Tampa Junction, Lower Tampa Bay Junction

### 2.2.17 WEEDON ISLAND

Weedon Island has the largest estuarine preserve in Pinellas County. This area offers numerous recreational activities and provides a great deal of socioeconomic benefits to the region. Weedon Island is home to a Duke Energy power plant, an archaeological area, and Weedon Island Preserve Cultural and Natural History Center. This channel leading from the power plant to the Port Tampa Bay channel is 3 miles long and has an authorized depth of 33 feet. Prior to the power plant’s update and conversion to natural gas, the top commodity was residual fuel oil. There were no reported commercial shipments in 2013.

2.2.17



Legend:

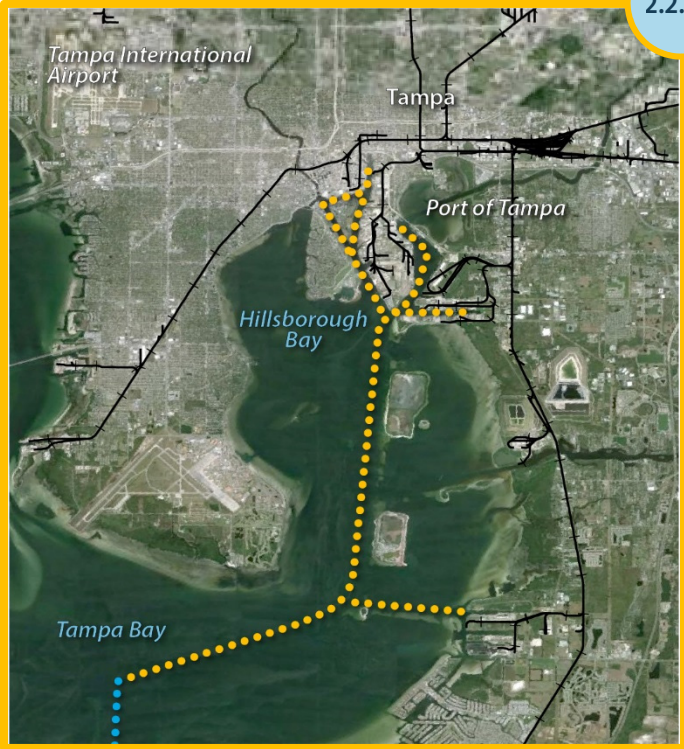
- Ports and Harbors
- Intracoastal Waterways
- +—+— Regional Railroads

<b>Industrial/Commercial</b>	Duke Energy Bartow Power Plant
------------------------------	--------------------------------

<b>Navigational Points of Interest</b>	Port Tampa Bay Channel Junction
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### 2.2.18 TAMPA HARBOR

Tampa Harbor is a deep draft harbor located in Hillsborough County. The harbor is home to Port Tampa Bay and has 87 miles of channels that service multiple terminals. The main channel has an authorized depth of 42 feet, and is accessed via the entrance to Tampa Bay at the Gulf of Mexico. The 2013 annual reported tonnage for this waterway was 32,407,000 short tons. The top foreign commodities were chemicals and related products, while the top domestic commodities were petroleum and petroleum products.



2.2.18

Legend:

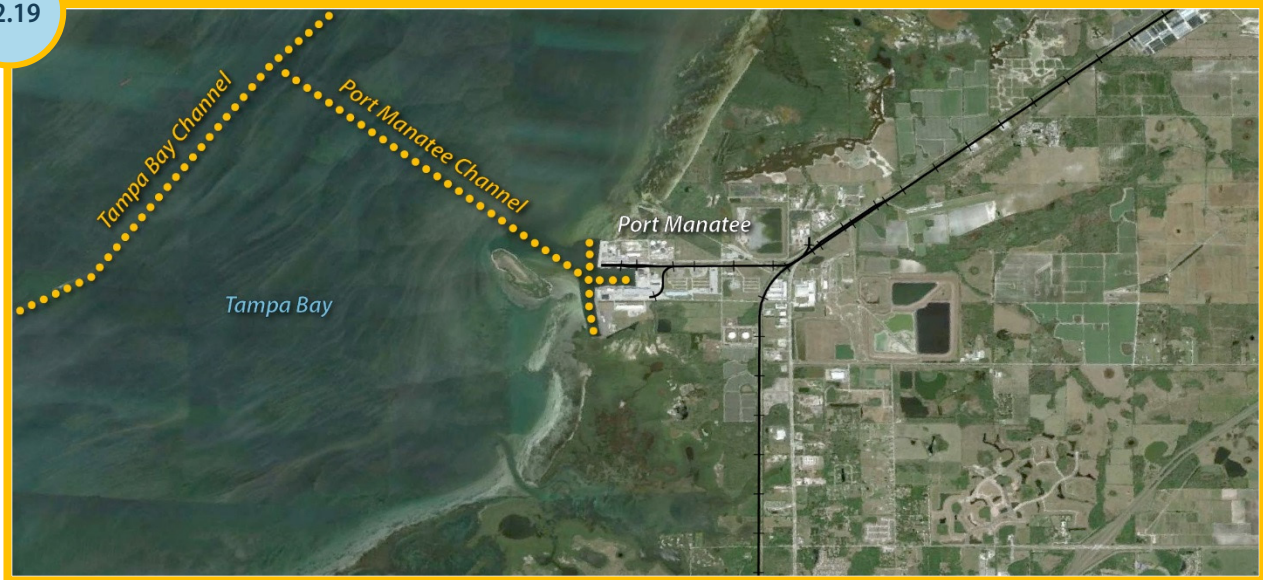
- Ports and Harbors
- Intracoastal Waterways
- +—+— Regional Railroad

<b>Government</b>	University of South Florida Wharves, Florida Fish and Wildlife Conservation Commission Dock
<b>Ports</b>	Port Tampa Bay
<b>Industrial/Commercial</b>	Misener Marine Construction Wharf, National Gypsum Company Wharf, TECO Big Bend Power Station, Mosaic Phosphate Plant, Davis Island Yacht Club, Duke Energy Bartow Plant
<b>Seafood</b>	Superior Seafood's, Versaggi Shrimp
<b>Navigational Points of Interest</b>	Little Manatee River Junction, Manatee River Junction, Weedon Island Channel Junction, Howard Franklin Bridge, W. Courtney Campbell Causeway, Gandy Bridge, Sunshine Skyway Bridge, Egmont Channel, Southwest Channel

### 2.2.19 PORT MANATEE CHANNEL

The Port Manatee entrance channel is located in northern Manatee County, and is 40 feet deep by 400 feet wide. Port Manatee is the closest U.S. seaport to the Panama Canal on both the Gulf of Mexico and the Atlantic coasts. The channel extends approximately three miles from the turning basin to its intersection with the Tampa Harbor main channel. In 2013, 2,735,813 tons of cargo were reported for Port Manatee, and the top commodities were chemicals and related products.

2.2.19



Legend:

- Ports and Harbors
- +—+— Regional Railroads

<b>Ports</b>	Port Manatee
<b>Industrial/Commercial</b>	Del Monte and Fresh Quest tropical fruits and vegetables, citrus juices and beverages; Port Manatee forestry products; TransMontaigne refined petroleum products; Vulcan and Martin Marietta phosphate fertilizers, phosphate products, non-ferrous metals, cement, heavy machinery and over-sized vehicles, construction and road building equipment, used vehicles; Air Products LNG heat exchangers and power generation units
<b>Navigational Points of Interest</b>	Manbirtee Key Bird Sanctuary, Port Tampa Bay entrance channel, Sunshine Skyway Bridge, Manatee River Junction, Egmont Channel

### 2.2.20 LONGBOAT PASS

Longboat Pass is located in Manatee County. It connects Sarasota Bay and the WGIWW to the Gulf of Mexico. The pass is 2 miles long and the authorized depth of the channel is 12 feet. Primarily recreational use, and provides access for Cortez commercial fishing fleet.

2.2.20



Legend:

- Intracoastal Waterways
- Inlets and Passes

### 2.2.21 NEW PASS

New Pass is located in Sarasota County and connects the WGIWW to the Gulf of Mexico. The pass is 3 miles long and the authorized depth is 10 feet. Primarily recreational use.

2.2.21



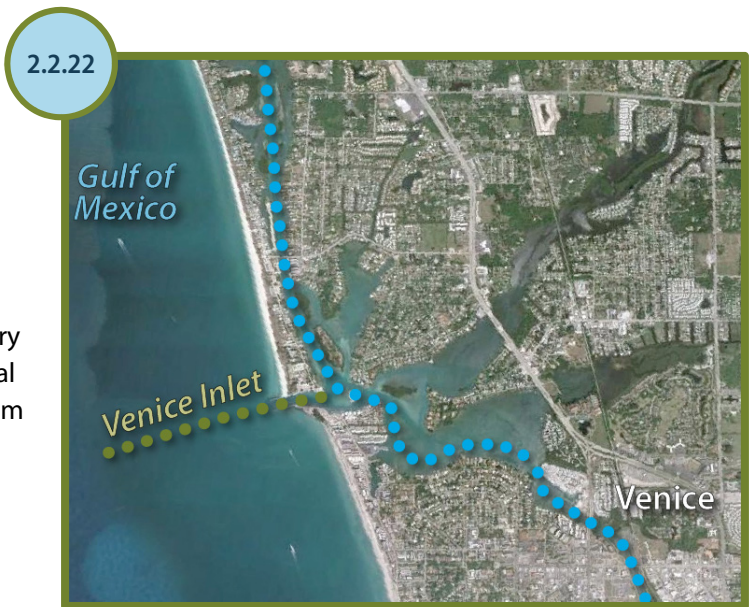
Legend:

- Intracoastal Waterways
- Inlets and Passes



### 2.2.22 VENICE INLET

Venice Inlet is a naturally opened inlet originally named Casey's Pass that separates Casey Key and Manasota Key from Venice Beach. The inlet is located in Sarasota County and connects Sarasota Bay and the WGIWW to the Gulf of Mexico. The inlet is 2 miles long and has an authorized depth of 17 feet. The inlet promotes a healthy, local estuary system by providing salt water inputs and tidal forces for mixing with freshwaters arriving from inland Florida by a series of watershed tributaries converging in the Venice area.



Legend:

- Intracoastal Waterways
- Inlets and Passes

### 2.2.23 CHARLOTTE HARBOR AND BOCA GRANDE PASS

Charlotte Harbor is a natural deep draft harbor located in Charlotte County. The harbor is the 17th largest estuary in the nation and the 2nd largest estuary in the state, with over 84% of the harbor preserved. This harbor does not have a working public port. Its channel is 24 miles long and has an authorized depth of 32 feet. In 2013, it reported 6,000 tons of cargo moving through its waters, and the top commodity was machinery. The harbor is a popular recreational boating and fishing destination and is home to many marinas. One location of note is Boca Grande Pass, which provides access to the open Gulf and has natural depths of up to 70 feet. The pass is famous for tarpon fishing, and on peak fishing days, hundreds of boats use the pass.

2.2.23



**Legend:**

- Intracoastal Waterways
- Inlets and Passes
- +—+— Regional Railroads

<b>Government</b>	Punta Gorda Municipal Pier, Laishley Park Municipal Marina
<b>Industrial/Commercial</b>	Gulf Oil Pier, Florida Power and Light Terminal, Bocilla Marina, Bokeelia Island Seaport and Fishing Pier, Fishermen’s Village Marina
<b>Seafood</b>	Charlotte Crab Co., Punta Gorda Fish Co.
<b>Navigational Points of Interest</b>	Boca Grande Pass, Boca Grande Lighthouse, I-75 Bridge, U.S. Hwy 41 Bridge, Caloosahatchee River Junction

## 2.3 ATLANTIC INTRACOASTAL WATERWAY



The Atlantic Intracoastal Waterway (AIWW) is a series of rivers, sounds, creeks, bays, harbors and manmade canals that stretch some 1,200 miles from Norfolk, Virginia to Key West, Florida. This Strategic Intermodal System (SIS) Waterway is 529 miles long in Florida, beginning at the Florida/Georgia state line and ending at Key West in the Florida Keys. Comprised of both natural and manmade canals, rivers, bays, and sounds, it provides a protected passage for the mariner transiting Florida's East Coast. The federal project depth for the AIWW provides for a minimum depth of 12 feet from the Georgia state line to Fort Pierce, Florida and then 10 feet from there to Miami, Florida. For those headed further south than Miami, the unofficial southern end of the AIWW ends in Key West. The Florida Keys have major reefs and are near the Straits of Florida. These areas off the coast of the main islands have a range of depths, starting in the high teens to well over one hundred feet deep. There are channels north of the Keys between the islands and mainland that

average between 14 to 16 feet deep. The Keys and surrounding reefs provide protection from weather and heavy seas for commercial and recreation vehicles transiting the waterway.

Along the AIWW waterway, there are eight public seaports, including Fernandina, JAXPORT, Port Canaveral, the Port of Fort Pierce, the Port of Palm Beach, Port Everglades, PortMiami, and the Port of Key West. The AIWW is both an important commercial and a recreational waterway, as the inlets located along the waterway are important for providing boaters with access to the Atlantic Ocean. The Florida Inland Navigation District (FIND), headquartered in Jupiter, serves as the local sponsor to the USACE for the AIWW.

The AIWW is home to many waterfront facilities. The USACE Master Docks Plus database lists 632 waterfront facilities and navigational points of interest. These have also been categorized into the same six facility types as the NGIWW and the WGIWW:

Facility Types	Quantity
Government	55
Port Tenant Facilities	91
Industrial/Commercial	250
Seafood Processing/Fishing Fleets	41
Navigation	192
Landings	3

Notable federal facilities located on the waterway include Naval Station Mayport, USCG Sector Jacksonville, USCG Sector Miami, and USCG Sector Key West with numerous small boat stations and aids to navigation teams. Additional facilities include large fuel terminals; energy plants; commercial fishing wharfs; recreational marinas; and yacht repair yards. Florida's section of the AIWW is characterized by seaport traffic with both cruise and cargo ports, and is also home to South Florida's mega-yacht industry.

### 2.3.1 FLORIDA INLAND NAVIGATION DISTRICT (FIND)

As the local sponsor for the Atlantic Intracoastal Waterway (AIWW), FIND is the state custodian and legislatively authorized public entity responsible for providing assistance to other governments in developing waterway access and improvements. In order to accomplish this mission, FIND collects ad valorem taxes from its 11 member counties. Its FY 2015/2016 budget shows \$22.4 million of revenue collected from these taxes. FIND plans expenditures of \$2.9 million for capital expenditures, \$1 million for waterway studies, \$14 million for waterways assistance projects, and \$1.9 million for cooperative assistance program projects. FIND will add \$9 million of operations funding to its existing \$31 million of on-going maintenance dredging projects in Indian River, St. Lucie, Palm Beach, and Miami-Dade Counties.

Table 2-12 shows the total waterborne commerce of Florida's AIWW compared to the state as a whole, from 2007 to 2013. Table 2-13 shows a description of the major commodities that are shipped along the AIWW annually from 2007 to 2013. Total vessel trips along Florida's section of the AIWW, depicted by year from 2007 to 2013, and by major AIWW section, are shown in Table 2-14. Table 2-15 shows the percentage of vessels that fall into different vessel draft categories on the AIWW sections, from 0-17 feet, as well as the maintained depth of the sections.

**Table 2-12: Total Waterborne Commerce for the AIWW, 2007-2013 (Thousands of Short Tons)**

Total Waterborne Commerce	2007	2008	2009	2010	2011	2012	2013
Florida Section of AIWW	1,082	569	403	441	199	252	168
Florida Statewide Total	132,418	115,948	102,005	106,520	99,596	96,581	99,071
Annual Percent in Traffic Flow	0.82%	0.49%	0.40%	0.41%	0.20%	0.26%	0.17%

Source: USACE Waterway Commerce Statistics Center

**Table 2-13: Major Commodities for the AIWW, 2007-2013 (Short tons)**

	2007	2008	2009	2010	2011	2012	2013
Petroleum and Petroleum Products	1,012,912	476,780	332,420	299,820	130,155	159,204	97,940
Chemicals and Related Products	64,873	81,375	63,045	108,309	66,142	88,428	65,880
Crude Materials, Inedible Except Fuels	0	2,882	600	14,485	51	0	60
Primary Manufactured Goods	1,515	1,617	1,115	1,905	674	1,188	512
Manufactured Equipment, Machinery	2,058	3,320	2,386	1,732	1,900	2,791	2,619

Source: USACE Waterway Commerce Statistics Center

**Table 2-14: Commercial Vessel Trips on AIWW by Section, 2007-2013**

AIWW Section	2007	2008	2009	2010	2011	2012	2013
Fernandina to St. Johns River	1,070	963	718	838	892	1,216	673
St. Johns River to Miami	1,657	386	475	361	522	210	312
Miami to Key West	535	277	290	217	28	68	284

Source: USACE Waterborne Commerce Statistics Center

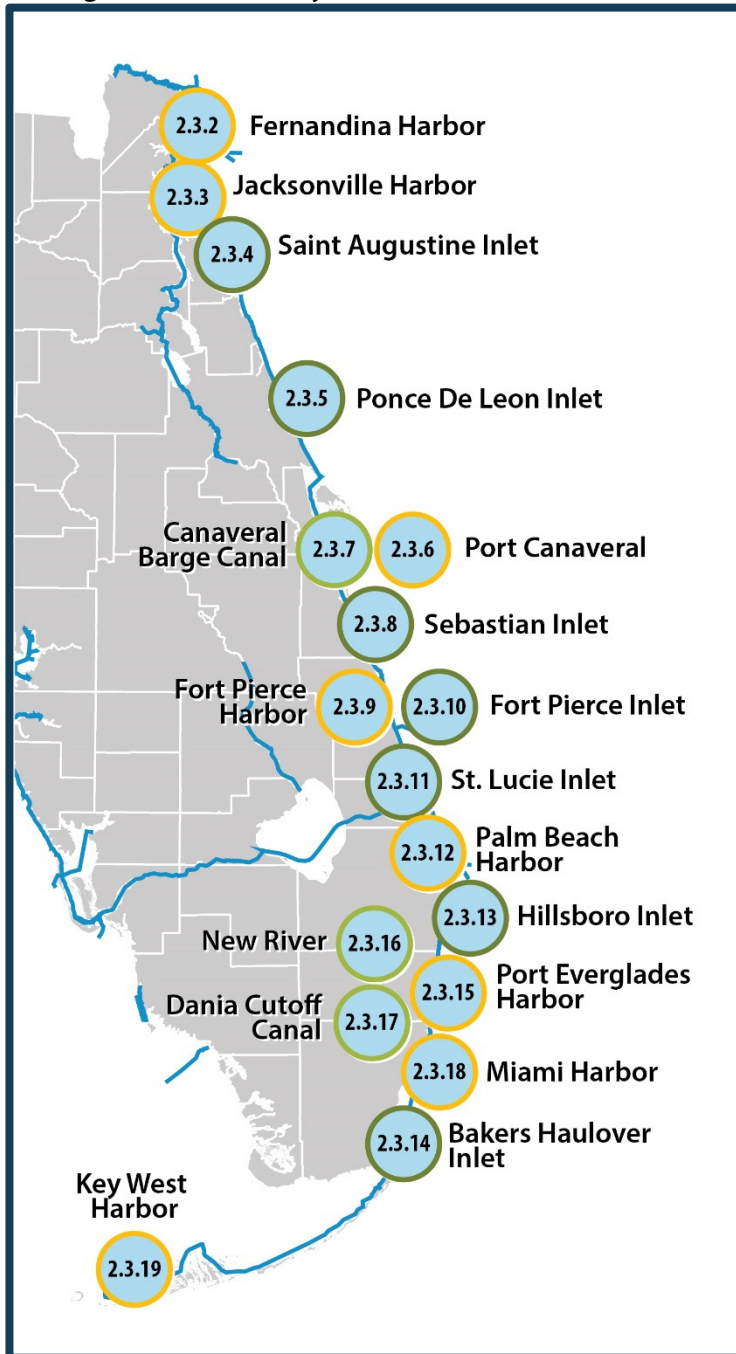
**Table 2-15: Percentage of Commercial Vessels by Draft on AIWW Sections**

AIWW Section	Vessel Draft					Maintained Depth
	0-5 ft.	6-9 ft.	10-12 ft.	13-14 ft.	15-17 ft.	
<b>Fernandina to St. Johns River</b>	24.7%	67.8%	5.6%	1.5%	0.4%	12 ft.
<b>St. Johns River to Miami</b>	26.6%	25.6%	46.2%	1.3%	0.3%	10-12 ft.
<b>Miami to Key West</b>	14.8%	84.9%	0.4%	0.0%	0.0%	7 ft.

*Source: USACE Waterborne Commerce Statistics Center*

The waterways of the Atlantic Florida Coast can be seen on Figure 2-5. Each circle on the map is explained in more detail in subsequent pages. In some cases, notable facilities in each area are identified, including government facilities, ports, and navigational points of interest.

**Figure 2-5: Waterways of the Atlantic Florida Coast**



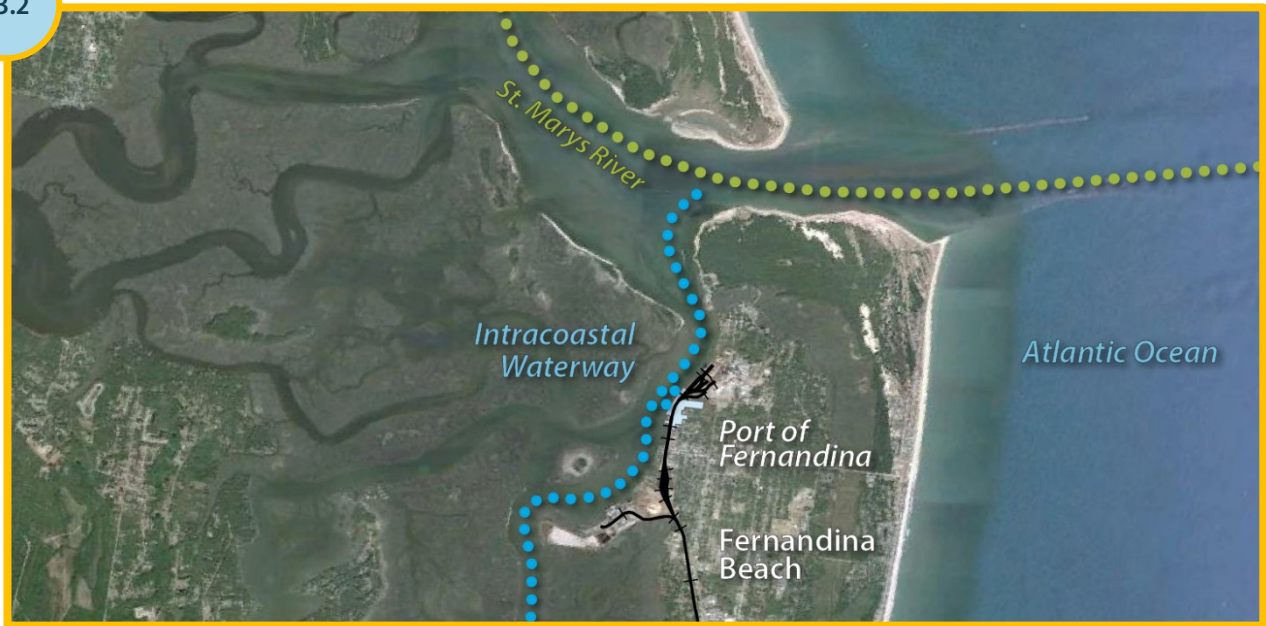
Legend:

- Ports and Harbors
- Inlets and Passes
- Canals and Rivers
- Waterways

### 2.3.2 FERNANDINA HARBOR

Fernandina Harbor is a natural deep draft harbor in Nassau County. The harbor is home to the Port of Fernandina. It is accessed via the entrance to the St. Marys River connecting to the AIWW. Its channel is 2 miles long and its authorized depth is 40 feet. In 2013, it reported 299,000 tons of cargo, and the top commodities were primary manufacturing goods (paper, iron and steel), mainly for foreign export.

2.3.2



**Legend:**

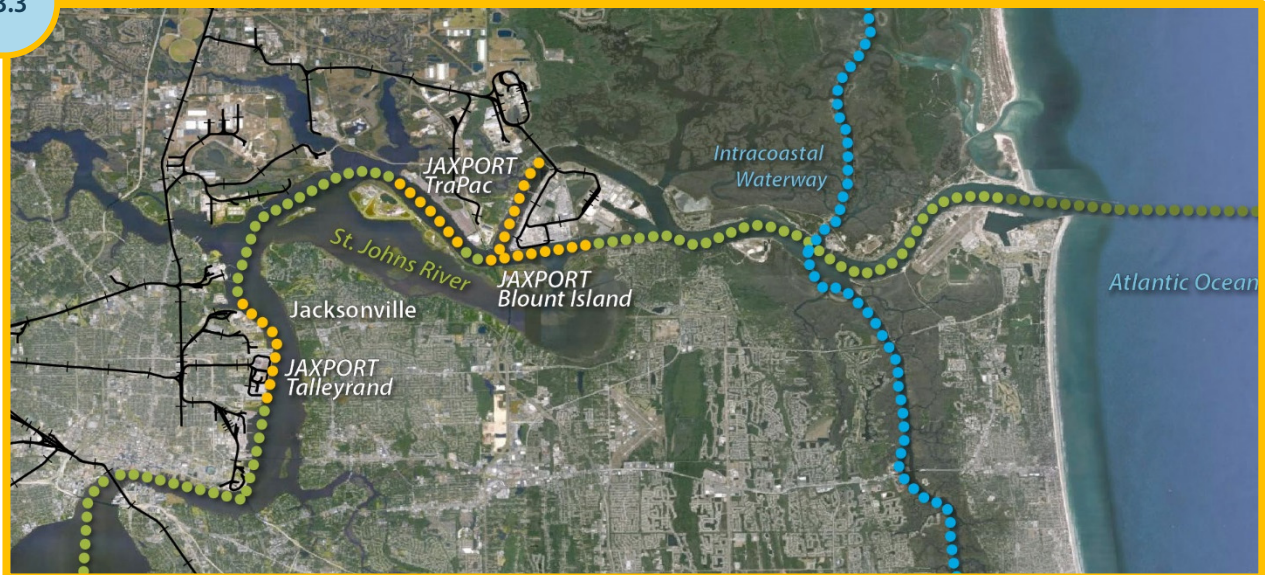
- Intracoastal Waterways
- Canals and Rivers
- +—+— Regional Railroads

<b>Ports</b>	Port of Fernandina
<b>Industrial/Commercial</b>	Rayonier Cellulose Plant, Rock-Tenn Plant, Kinder Morgan Nassau Terminals, Fernandina Harbor Marina
<b>Seafood</b>	Atlantic Seafood, Cook and Cook Seafood
<b>Navigational Points of Interest</b>	St. Marys Entrance Channel, Amelia and St. Marys River Junction, Lanceford Creek and Amelia River Junction

### 2.3.3 JACKSONVILLE HARBOR

Jacksonville Harbor is a natural deep draft harbor located in the heart of Duval County. It is home to Jaxport, which has 4 public seaport terminals and 20 privately-owned terminals, and is accessed from the Atlantic Ocean via the entrance to the St. Johns River. Its channel is 32 miles long and has an authorized depth of 42 feet. In 2013, 16,473,000 tons of cargo were reported as traversing the channel, and the top commodities were petroleum, limestone, and paper.

2.3.3



**Legend:**

- Ports and Harbors
- Intracoastal Waterways
- Canals and Rivers
- Inlets and Passes
- +—+—+ Regional Railroads

<b>Government</b>	U.S. Naval Station Mayport, USMC Support Facility Blount Island, USCG Sector Jacksonville, St. Johns River Ferry
<b>Ports</b>	Jaxport (Blount Island, Dames Point, Talleyrand, and Jaxport Cruise Terminals)
<b>Industrial/Commercial</b>	Morningstar Marina, BAE Systems, JEA Power Plant, Buckeye Fuel Terminal, BP Fuel Terminal, U.S. Gypsum, Colonial Oil Terminal, Keystone Bulk Terminal, TransMontaigne Fuel Terminal, River City Marina, Jacksonville Water Taxi, North Florida Shipyards, Victory Casino Cruises
<b>Seafood</b>	Safe Harbor Seafood, Singleton’s Seafood
<b>Navigational Points of Interest</b>	St. Johns River Channel Entrance, Mile Point, St. Johns River and Blount Island Channel Junction, Dames Point Bridge, Mathews Bridge, Hart Bridge, John T. Alsop Bridge, Acosta Bridge, Fuller Warren Bridge



### 2.3.4 ST. AUGUSTINE INLET

The St. Augustine Inlet was originally a natural inlet that was relocated to its current location in 1940. The inlet is located in St. Johns County and connects the Tolomata and Matanzas Rivers and the AIWW to the Atlantic Ocean. The inlet is the entrance channel to the historic St. Augustine Port Waterway and Beach District, which was created in 1930 to fulfill the requirements of a the USACE for a local sponsor for inlet dredge projects. It is 4 miles long and has an authorized depth of 16 feet.



Legend:

- Intracoastal Waterways
- Inlets and Passes
- + + + Regional Railroads

### 2.3.5 PONCE DE LEON INLET

The Ponce de Leon Inlet is located in Volusia County and connects the Indian River and the AIWW to the Atlantic Ocean. The pass is 4 miles long and has an authorized depth of 15 feet. The inlet is used primarily for recreational purposes, such as boating and fishing.



Legend:

- Intracoastal Waterways
- Inlets and Passes
- + + + Regional Railroads

### 2.3.6 CANAVERAL HARBOR

Canaveral Harbor is a man-made harbor located mid-way between Jacksonville and Miami on the Atlantic Coast. This harbor is home to Port Canaveral and is accessed via the Canaveral Harbor Channel. Its channel is 2 miles long and has an authorized depth of 44 feet. The harbor was initially created to provide a turning basin in the Banana River. The harbor contains the largest navigation lock in Florida, built to secure safe passage of vessels to the Canaveral Barge Canal (detailed on the next page). In 2013, the harbor reported 3,337,000 tons of cargo, and the top commodities were foreign petroleum imports.

2.3.6

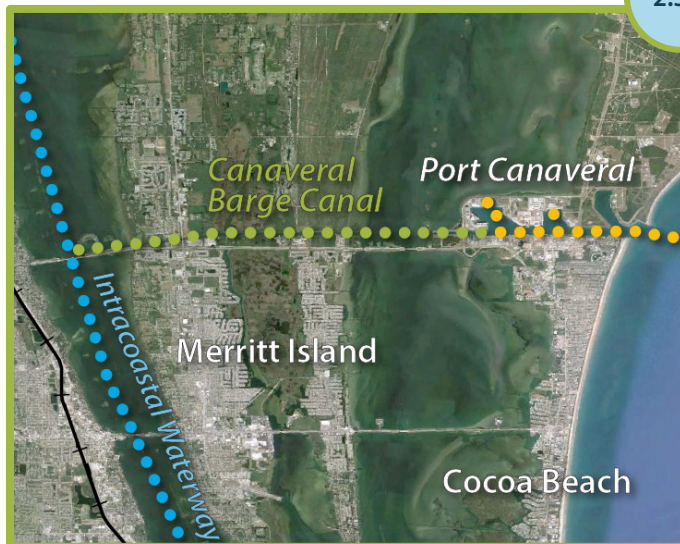


- Legend:
- Ports and Harbors
  - Canals and Rivers

<b>Government</b>	U.S. Navy Turning Basin, USCG Marine Safety Detachment and Station Port Canaveral
<b>Ports</b>	Port Canaveral
<b>Industrial/Commercial</b>	Disney Cruises, Norwegian Cruises, Carnival Cruises, Royal Caribbean Cruises, Ocean Club Marina, Port Canaveral Yacht Club, Cape Marina, Victory Casino Cruises
<b>Seafood</b>	Wild Ocean Market, Seafood Atlantic, Cape Canaveral Shrimp Co, Puck O'Neal Seafood Wharf
<b>Navigational Points of Interest</b>	Canaveral Lock, West Turning Basin, Middle Turning Basin, East Turning Basin, Canaveral Barge Canal, West Access Channel, Inner and Middle Reach Channels

### 2.3.7 CANAVERAL BARGE CANAL

The Canaveral Barge Canal is a man-made canal that connects the Indian River and the Banana River to the Atlantic Ocean. The canal also connects Canaveral Harbor with the AIWW. The canal has a lock managed by the USACE. It is used mostly for recreational purposes, however, barges use the canal to move fuel north to the Reliant and FPL power plants in Titusville from fuel tank farms at Port Canaveral. Port Canaveral is also investigating the possibility of using the canal to ship containers on barges to rail access in the community of Mims, in northern Brevard County. The canal is 8 miles long and has an authorized depth of 12 feet.



2.3.7

Legend:

- Ports and Harbors
- Intracoastal Waterways
- Canals and Rivers
- +—+— Regional Railroads

### 2.3.8 SEBASTIAN INLET

The Sebastian Inlet is located in southern Brevard County and connects the Indian River Lagoon and the AIWW to the Atlantic Ocean. It is 2 miles long and 8 feet deep. This inlet is known for its surfing and fishing activities.



2.3.8

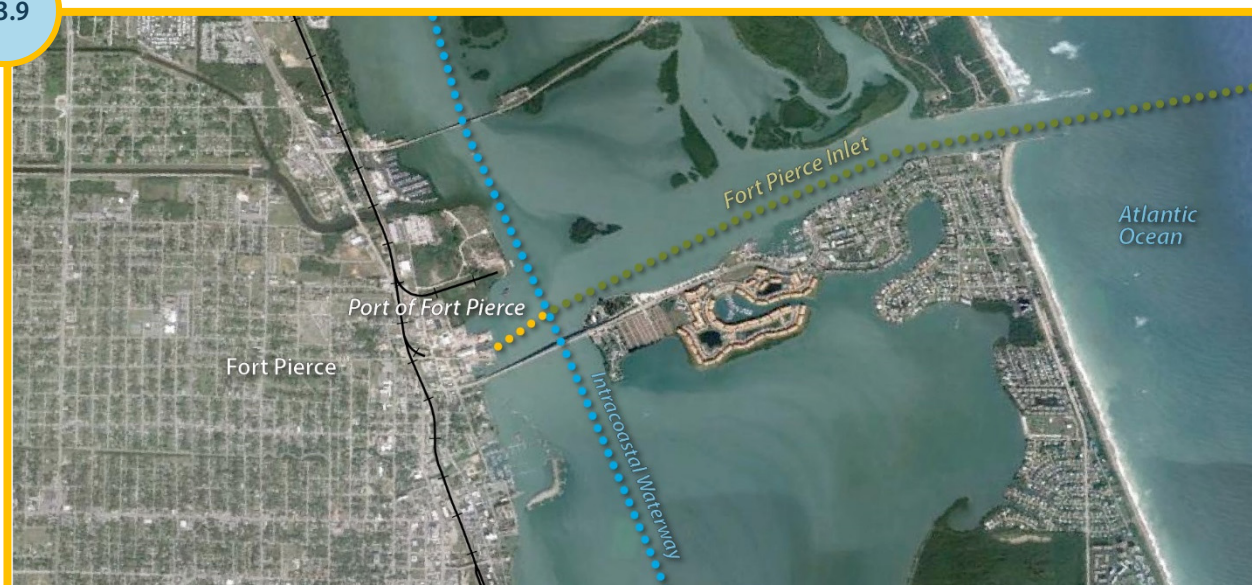
Legend:

- Intracoastal Waterways
- Inlets and Passes
- +—+— Regional Railroads

### 2.3.9 FORT PIERCE HARBOR

Fort Pierce Harbor is a man-made harbor, accessed via the Fort Pierce Inlet through the Indian River Lagoon. The harbor is located in St. Lucie County and houses the Port of Fort Pierce. Its channel is 1 mile long and has an authorized depth of 30 feet. In 2013, 6,000 tons of cargo were reported for this harbor, and the top commodities were sand, gravel, and other non-metal materials.

2.3.9



#### Legend:

- Ports and Harbors
- Intracoastal Waterways
- Inlets and Passes
- +—+—+ Regional Railroads

<b>Government</b>	USCG Station Fort Pierce, Fort Pierce City Marina
<b>Ports</b>	Port of Fort Pierce
<b>Industrial/Commercial</b>	Fort Pierce Inlet Marina, Pelican Yacht Club, Harbortown Marina, River Marina
<b>Seafood</b>	Inlet Fisheries, Day Boat Seafood
<b>Navigational Points of Interest</b>	Fort Pierce Inlet Inner and Entrance Range, AIWW Junction

### 2.3.10 FORT PIERCE INLET

The Fort Pierce Inlet is a man-made inlet located in St. Lucie County. The inlet connects the Indian River Lagoon and the AIWW to the Atlantic Ocean. It also provides access to the Fort Pierce Harbor. It is 3 miles long and has an authorized depth of 30 feet.

2.3.10



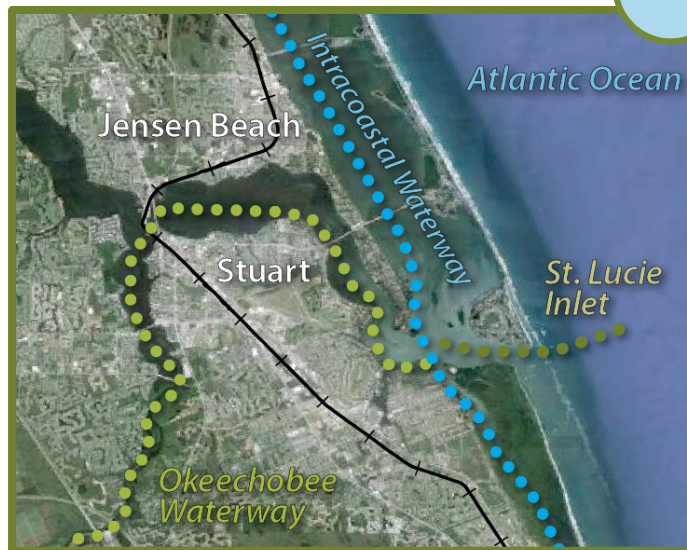
Legend:

- Ports and Harbors
- Intracoastal Waterways
- Inlets and Passes
- +—+— Regional Railroads

### 2.3.11 ST. LUCIE INLET

The St. Lucie Inlet is located in St. Lucie County and connects the Okeechobee Waterway and the AIWW to the Atlantic Ocean. This inlet is one of six that is linked to the Indian River Lagoon. The inlet is used for navigation, commercial, and recreational uses but also is essential for promoting estuarine health. The inlet is the core of the estuarine system that joins the Indian River Lagoon, the St. Lucie River, and the Hobe Sounds Narrow. It is 11 miles long and has an authorized depth of 6 feet.

2.3.11



Legend:

- Intracoastal Waterways
- Inlets and Passes
- Rivers and Canals
- +—+— Regional Railroads

### 2.3.12 PALM BEACH HARBOR

Palm Beach Harbor is a deep draft harbor located in Palm Beach County. The harbor is located 80 miles north of Miami and 135 miles south of Port Canaveral, and is accessed via the Lake Worth Inlet. The Port of Palm Beach is located within the harbor. Its channel is 7 miles long and has an authorized depth of 33 feet. In 2013, 2,130,000 tons of cargo were reported moving over these waters, and the top commodities were food and farm products, with approximately half as foreign exports.

2.3.12



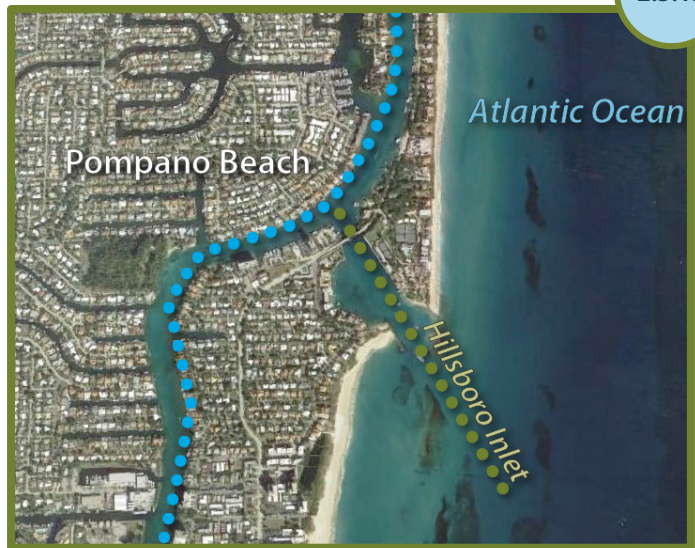
#### Legend:

- Ports and Harbors
- Intracoastal Waterways
- Inlets and Passes
- +—+— Regional Railroads

<b>Government</b>	USCG Station Lake Worth Inlet, Peanut Island Park
<b>Ports</b>	Port of Palm Beach
<b>Industrial/Commercial</b>	Peanut Island Water Taxi, Cracker Boy Boat Works, Riviera Beach Marina, Majestic Princess Cruises, Lockheed Martin, Cannonsport Marina, Sailfish Marina Resort, Sailfish Club of Florida
<b>Navigational Points of Interest</b>	Lake Worth Inlet, Entrance Channel, Inner Channel, Turning Basin, AIWW Junction

### 2.3.13 HILLSBORO INLET

The Hillsboro Inlet is a naturally opened channel located in Pompano Beach in Broward County. This channel connects the AIWW to the Atlantic Ocean. It is 1 mile long and has an authorized depth of 13 feet.



Legend:

- Intracoastal Waterway
- Inlets and Passes

### 2.3.14 BAKERS HAULOVER INLET

The Bakers Haulover Inlet is a man-made channel located in Miami-Dade County. It connects Biscayne Bay and the AIWW with the Atlantic Ocean. The inlet is used for recreational activities, primarily boating and sailing. The inlet is 1 mile long and has an authorized depth of 8 to 11 feet.



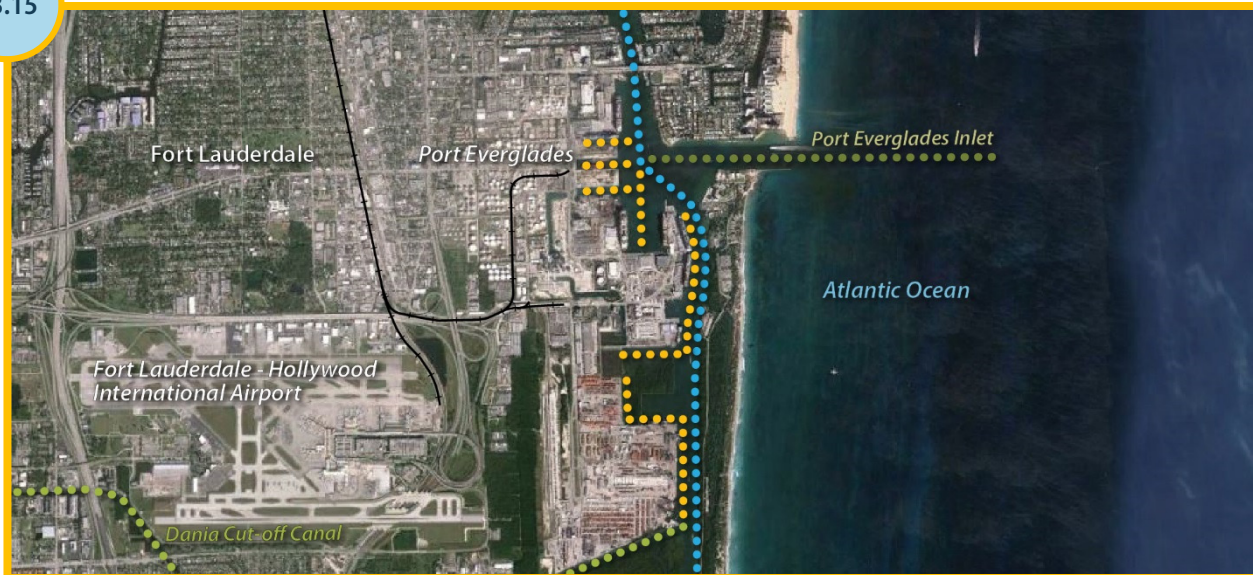
Legend:

- Intracoastal Waterways
- Inlets and Passes

### 2.3.15 PORT EVERGLADES HARBOR

Port Everglades Harbor is a man-made deep draft harbor located between Fort Lauderdale and Hollywood in Broward County, and is home to Port Everglades. It is accessed via the Port Everglades Inlet. The harbor has 3 miles of channel and has an authorized depth of 48 feet. In 2013, 21,703,000 tons of cargo were reported moving through the harbor, and the top commodities were domestic petroleum and petroleum products.

2.3.15



**Legend:**

- Ports and Harbors
- Intracoastal Waterways
- Inlets and Passes
- +—+— Regional Railroads

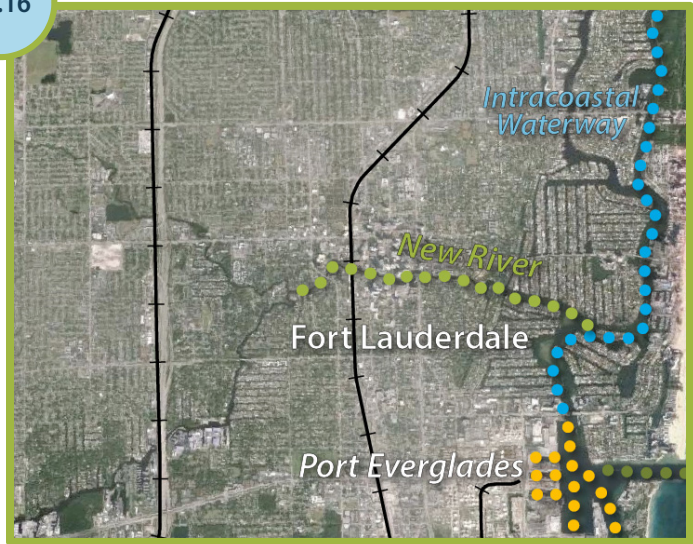
<b>Government/Institutional</b>	USCG Station Fort Lauderdale, Nova Southeastern University Oceanographic Center
<b>Ports</b>	Port Everglades
<b>Industrial/Commercial</b>	Sails Marina, Pier 66 Marina, Hilton Fort Lauderdale Marina
<b>Navigational Points of Interest</b>	17 <sup>th</sup> St Causeway Drawbridge, Dania Cut-off Canal and AIWW Junction, Turning Basin, Entrance Channel



### 2.3.16 NEW RIVER

The New River is part of a system of canals in Fort Lauderdale located in Broward County. Fort Lauderdale is a major yachting center where mega-yachts and other pleasure craft use the New River. It is six miles long and has an authorized depth of eight feet. The recorded tonnage for this canal is included as part of the tonnage reported for Port Everglades Harbor.

2.3.16



Legend:

- Ports and Harbors
  - Intracoastal Waterways
  - Inlets and Passes
- Canals and Rivers
  - +—+— Regional Railroads

### 2.3.17 DANIA CUT-OFF CANAL

The Dania Cut-Off Canal is located in Broward County, intersecting the South Fork of the New River. It connects Port Everglades to the AIWW. The Dania Cut-Off Canal is a working waterfront home to many marine companies, marinas, and small boat terminals. This canal is 3 miles long and was recently dredged in 2014 by FIND and USACE to 15 feet in depth. The recorded tonnage for this canal is included as part of the tonnage reported for Port Everglades Harbor.

2.3.17



Legend:

- Ports and Harbors
  - Intracoastal Waterways
  - Inlets and Passes
- Canals and Rivers
  - +—+— Regional Railroads

### 2.3.18 MIAMI HARBOR

Miami Harbor is a deep draft harbor on the east coast of Florida in the heart of the City of Miami. It is accessed via the Miami Harbor Inlet (also known as Government Cut) and is home to PortMiami. The harbor has 13 miles of channel and, after completing a major deepening project in 2015 to a new depth of 50 feet, it became the deepest port on the Atlantic coast south of Norfolk, Virginia. In 2013, the USACE reported 7,125,000 tons of cargo moving through these waters, and the top commodities for foreign trade both inbound and outbound were manufacturing equipment, machinery, and products.

2.3.18



**Legend:**

- Ports and Harbors
- Canals and Rivers
- Intracoastal Waterways
- +—+—+— Regional Railroads
- Inlets and Passes

<b>Government</b>	USCG Sector Miami, USCG Station Miami Beach, Miamarina
<b>Ports</b>	PortMiami
<b>Industrial/Commercial</b>	Fisher Island Ferry, Yacht Club at Portofino, Miami Beach Marina, Sunset Harbour Yacht Club, Sea Isle Marina, Miami Aqua Tours
<b>Navigational Points of Interest</b>	Main Ship Channel, Fisherman’s Channel, Government Cut, Bar Cut, Outer Bar Cut, Miami River Entrance, Intracoastal Waterway, Port Blvd Bridge, MacArthur Causeway, Venetian Causeway

### 2.3.19 KEY WEST HARBOR

Key West Harbor is a naturally deep draft harbor located in the southernmost part of the state in the Florida Keys. The harbor houses the Port of Key West and is mainly used for turning of large vessels especially cruise ships. It has 10 miles of channels and has an authorized depth of 18 feet. In 2013, there was no cargo reported, but it is currently the busiest port of call destination in the state of Florida for cruise vessel destinations. It is not currently a home port to any vessels.

2.3.19



**Legend:**

- Ports and Harbors
- Intracoastal Waterways
- Inlets and Passes

<b>Government</b>	USCG Sector Key West, U.S. Naval Air Station Key West
<b>Ports</b>	Port of Key West
<b>Industrial/Commercial</b>	Keys Energy Services Stock Island Generation Facility, Robbie’s Maritime Center, Stock Island Marina Village, Key West Harbour, Oceanside Marina, Sunset Marina, Conch Harbor Marina, Galleon Marina, A&B Marina
<b>Seafood</b>	Fishbusterz, Carlos Seafood of Key West, Stock Island Lobster Co., Fisherman’s Key Seafood
<b>Navigational Points of Interest</b>	AIWW Junction, Main Ship Channel, Garrison Bight Channel, Cow Key Channel, Boca Chica Channel, Northwest Channel, Southwest Channel, Hawk Channel

Florida’s river systems are a major part of the overall waterway systems throughout the state, and provide access for inland communities to reach the intracoastal waterways, lakes, bayous, bays, and eventually the Gulf of Mexico and the Atlantic Ocean. These river systems are described in the following sections and are shown on aerial maps to illustrate how they connect communities to other waterways.

### 2.4 ST. JOHNS RIVER SYSTEM

The St. Johns River starts in Indian River County and flows northward and out to Jacksonville Harbor. It is also one of the few rivers in the United States that flows north. The river has three main tributaries: Ockalawaha, Wekiva, and Econlockhatchee. The river is 142 miles long and has an authorized depth of 13 feet from Jacksonville to Palatka, and 12 feet from Palatka to Sanford. In 2013, it carried 5,000 tons of residual fuel oil.

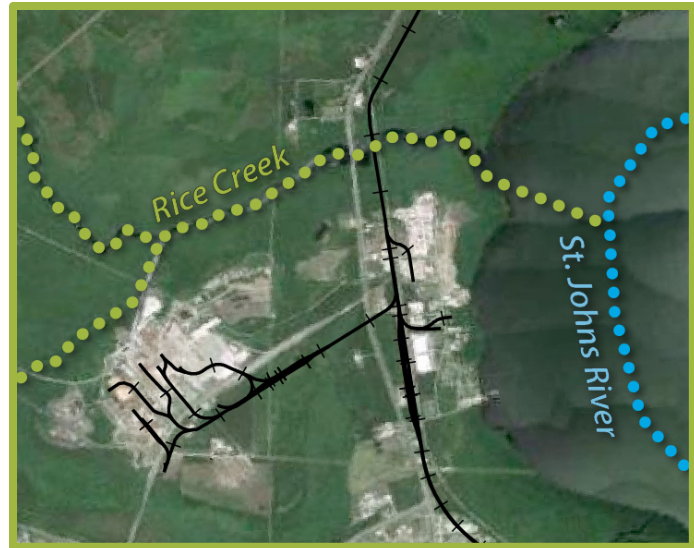


Legend:  
 ●●●●● Intracoastal Waterways  
 ●●●●● Canals and Rivers

<b>Government</b>	U.S. Naval Air Station Jacksonville, Palatka City Dock
<b>Ports</b>	Putnam County Barge Port
<b>Industrial/Commercial</b>	Epping Forrest Yacht Club, St. Johns Shipbuilding, Green Cove Springs Marina, Mobro Marine, Doctors Lake Marina, Whitney’s Marine, Rudder Club of Jacksonville, Duke Energy DeBary Plant, Fort Gates Ferry
<b>Navigational Points of Interest</b>	Jacksonville Harbor Junction, Buckman (I-295) Bridge, Ortega River Junction, Shands Bridge, U.S. 17 Bridge, Buffalo Bluff CSX RR Bridge, Lake George

## 2.5 RICE CREEK

Rice Creek is a tributary of the St. Johns River in Putnam County. The creek is formed from the confluence of Rice Creek Swamp, Palmetto Branch, Oldtown Branch, and Hickory Branch in a man-made channel that cuts through the swamp. The Rice Creek Wildlife Management Area is managed under the St. Johns River Water Management District and offers many recreational activities and opportunities. The creek is three miles long and has an authorized depth of nine feet. Residual oil fuel was reported as carried on the creek up until 2012. No cargo tonnage was reported for 2013.

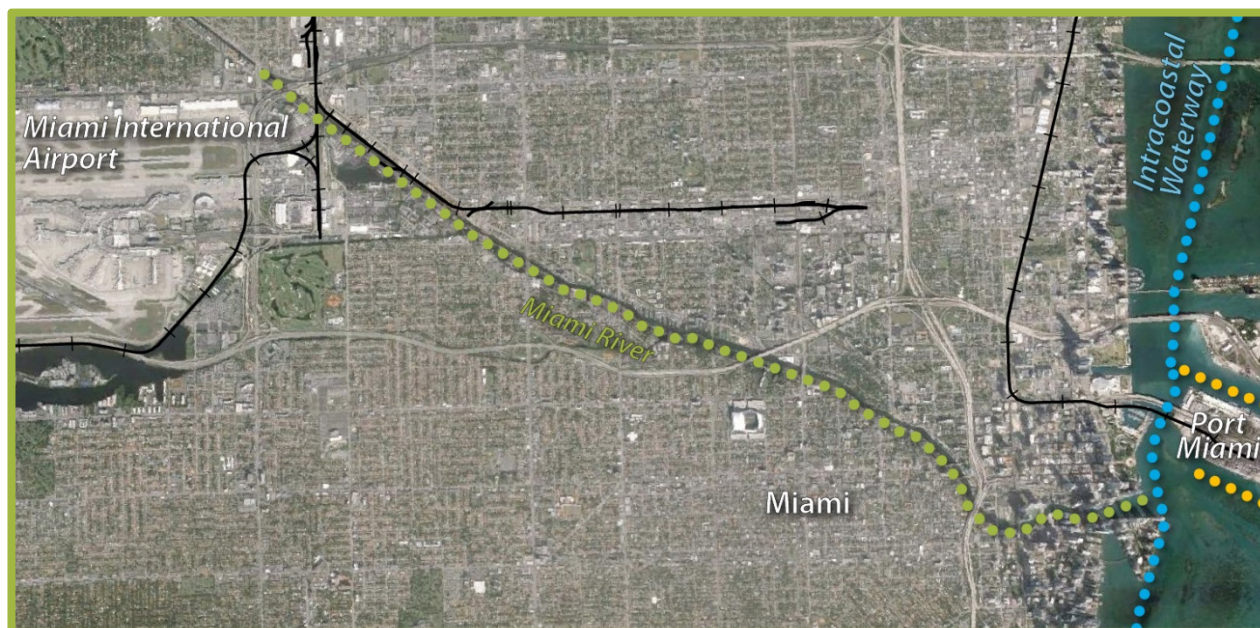


Legend:

- Intracoastal Waterways
- Canals and Rivers
- + + + Regional Railroads

## 2.6 MIAMI RIVER

The Miami River is a naturally formed river that has been manually deepened and widened for navigation and future commercial prospects. The river extends from the Miami International Airport to Biscayne Bay. The Miami River has 32 private terminals and is separated into 3 distinct zones: the Upper River, the Middle River, and the Lower River. The Upper River is typically known for its industrial business centers, primarily marine and shipping. Many of the shipping terminals are located here. The Middle River is known for its huge residential district, parks, and historic neighborhoods. The Lower River is where downtown Miami is located. The river is 5.5 miles long and has an authorized depth of 15 feet. In 2013, it carried 369,000 tons of cargo and the top commodities were foreign outbound manufacturing equipment, machinery, and products.



### Legend:

- Ports and Harbors
- Intracoastal Waterways
- Canals and Rivers
- +—+—+ Regional Railroad

### Government

Miami-Dade County Public Works Wharf, U.S. Customs Service Miami Wharf

### Industrial/Commercial

5<sup>th</sup> St Marina, Norseman Shipbuilding Corp, Anchor Marine, Merrill Stevens Yachts, Hurricane Cove Marina, Port of Miami River Terminal, Federal Metals, Miami Shipping Terminal, Antillean MaRine Shipping Corporation, Bimini Shipping, Laser Intl Freight, Miami Iron and Metal, Betty K Agencies

### Seafood

Garcia's Fish Market, Casablanca Fish Market, Miami River Lobster and Stone Crab

### Navigational Points of Interest

IWW and Miami Harbor Junction, SFWMD S-26 Pump Station, N.W. 27<sup>th</sup> Ave. Drawbridge, N.W. 22<sup>nd</sup> Ave. Drawbridge, N.W. 17<sup>th</sup> Ave. Drawbridge, Dolphin Expy Bridge, N.W. 12<sup>th</sup> Ave. Drawbridge, N. State Road 7 Drawbridge, W. Flagler St. Drawbridge, S.W. 1<sup>st</sup> St. Drawbridge, I-95 Bridge, S.W. 2<sup>nd</sup> Ave. Bridge, MDT Metrorail Bridge, S. Miami Ave. Drawbridge, Miami Metromover Bridge, Brickell Ave Drawbridge

## 2.7 APALACHICOLA, CHATTAHOOCHEE, AND FLINT RIVERS SYSTEM

The Apalachicola, Chattahoochee, and Flint Rivers make up a three river system that runs from Georgia through Florida to the Gulf of Mexico. The Apalachicola River is formed from the convergence of the Flint and Chattahoochee Rivers. The area is managed by the Northwest Florida Water Management District. The Apalachicola River flows nearly 128 miles long through Florida, and has an authorized depth of 9 feet. In 2012, it carried 2,000 tons of cargo, with no cargo reported for 2013.



**Legend:**

- Ports and Harbors
- Intracoastal Waterways
- Inlets and Passes
- Canals and Rivers
- +—+— Regional Railroads

<b>Government</b>	Jim Woodruff Dam
<b>Landings</b>	S.E. River St Landing, River Rd Park Landing, Bluff Rd Landing, Gaskin Park Landing, Ocheesee Landing, River Landing Chattahoochee
<b>Industrial/Commercial</b>	Scipio Creek Marina, Water Street Hotel and Marina, Gulf Power Generating Plant, Big Bend Gypsum Dock
<b>Seafood</b>	Leavin’s Seafood, Buddy Ward and Sons Seafood, Apalachicola Bay Seafood, Water Street Seafood, Ilso Seafood
<b>Navigational Points of Interest</b>	Jim Woodruff Dam Locks, JUNCTION Chattahoochee & Apalachicola Rivers, Apalachicola Bay & NGIWW Junction, U.S. 90 Bridge

## 2.8 OKEECHOBEE WATERWAY

The Okeechobee Waterway started off as a project meant to drain the Everglades in Central and South Florida for agriculture, farming, and settlement. The waterway is made up of the Caloosahatchee River to the west and the St. Lucie Canal to the east, connected by Lake Okeechobee. The USACE manages and operates five navigation locks and dams on this waterway. The waterway is 172 miles long and has an authorized depth of 8 feet. In 2013, there were 1,021 tons of cargo reported, and these tons were for the movement of machinery and primary manufactured goods. The amount of cargo on the Okeechobee Waterway was affected by lower water levels on the lake caused by recent years of drought. The lakes water levels have since returned to normal levels.



- Legend:
- Intracoastal Waterways
  - Canals and Rivers
  - +—+— Regional Railroad

<b>Government</b>	USCG Station Fort Myers Beach, City of Fort Myers Yacht Basin
<b>Landings</b>	Rosen Park Cape Coral, WP Franklin Recreation Area, Alva Boat Ramp, Hendry County Boat Ramp, Timer Powers Park
<b>Industrial/Commercial</b>	Legacy Harbor Marina, Fort Myers to Key West Ferry, Florida Power and Light Fort Myers Plant, Marintown Yacht Harbour, Port Labelle Marina, Glades Boat Storage, Indiantown Marina, River Forrest Yachting Center, American Custom Yachts, Martin County Marina, Sunset Bay Marina
<b>Seafood</b>	Trico Seafood Market, Shrimp Packers of South Florida, Gulf Shrimp Inc.
<b>Navigational Points of Interest</b>	Caloosahatchee River to Anclote River IWW Junction, Cape Coral Bridge, Midpoint Bridge, Caloosahatchee Bridge, U.S. 41 Bridge, Seminole Gulf Railway Bascule Bridge, I-75 Bridge, SR 31 Bridge, WP Franklin Lock and Dam, Broadway St. Bridge, Fort Denaud Swing Bridge, Ortona Lock, U.S. 27 Bridge, Moore Haven Lock and Dam, Port Mayaca Lock and Dam, Port Mayaca RR Bridge, CSX RR Bridge Indiantown, Big John Monahan Bridge, S.W. 96 <sup>th</sup> St. Bridge, St. Lucie Lock and Dam, Florida Turnpike Bridge, I-95 Bridge, Veterans Memorial Bridge, SR 714 Bridge, N.W. Dixie Hwy Bridge, N.W. Federal Hwy Bridge, Hwy A1A Bridge, AIWW Junction, St. Lucie Inlet



## 2.9 CROSS FLORIDA BARGE CANAL

The Cross Florida Barge Canal was a project that was meant to cross the state of Florida to connect the northern Atlantic and Gulf coasts with a barge canal. The project was planned to extend from the St. Johns River to the Gulf of Mexico through the Oklawaha and Withlacoochee River valleys. The entire project was not completed, but portions on both sides of the state were constructed. The 2 portions that were constructed comprise 98 miles and have an authorized depth of 8 to 12 feet. While this waterway has moved cargo in the past, there was no recorded tonnage for 2013.

### West Coast Section of Cross Florida Barge Canal



### East Section of Cross Florida Barge Canal



Legend:

- Canals and Rivers
- +—+— Regional Railroad

## 2.10 CONCLUSION

The Florida Waterway System is extensive, and serves many transportation purposes, both recreational and commercial. Florida's unique system was detailed throughout this chapter, describing the many types of waterways including the intracoastal waterways, the inlets and passes, canals and rivers, and public ports and harbors, and even some bayous. Details related to tonnages, types of products, and services were provided for each waterway, along with aerial maps illustrating significant waterway systems throughout the state.

Florida's residents and visitors enjoy the vast system of waterways, and benefit from the unique intermodal connections that are provided throughout the state. These residents and visitors have access to a wonderful system of rivers, canals, inlets, and passes that are interconnected, eventually leading to the Gulf of Mexico or the Atlantic Ocean. Many visitors to Florida come primarily to use one or more of these waterway systems, or to utilize the ports and harbors of the state to embark on a cruise or take a chartered fishing excursion. The following chapter will provide a deeper look into the specific transportation statistics related to overall waterway use, benefits and trends from a national perspective, compared with competitive states, and a look at statewide uses and trends related to recreation, security, and technology.



# 3. WATERWAY USES, BENEFITS & TRENDS

Chapter three includes information on national and state economic and freight trends, the benefits of waterborne freight transportation compared to other modes, and trends and conditions here in Florida, along with comparisons of those trends to competitive states, as well as commercial and recreational uses of the waterways, and safety and security concerns. These issues will be presented in detail throughout the following sections.

## 3.1 NATIONAL WATERWAY ACTIVITY AND TRENDS

There are a variety of local and global issues and trends affecting waterways on a national and state basis. Some of these trends determine the environment within which the marine transportation system operates. These include economic conditions, regulatory regimes, and international trade and laws. Many of the national and state issues center on efforts to fully develop the multimodal freight transportation system. Waterways are a valuable network whose surplus capacity has the potential to relieve congestion on other modes, such as highways.



*Source: St. Johns River and Dames Point Bridge, 2015*

### 3.1.1 UNITED STATES WATERBORNE FREIGHT TRENDS

The modern economy is more connected than ever. The global market never sleeps, with raw materials, consumer goods and money always on the move. This interdependence brings both opportunities and challenges, and the reality is that what happens in other parts of the world can greatly affect people across the United States and in Florida.

Our nation's 118.7 million households, 7.4 million business establishments, and 89 thousand governmental units are all part of this global economy dependent on freight.<sup>1</sup> The great majority of international freight arrives from overseas, via our waterways and seaports. In 2014, over 2.3 billion short tons of freight traveled through the waterways and ports of the United States. Foreign trade accounted for the majority of waterborne freight, at 60%, with domestic freight and intrastate cargo comprising the remaining 40%. Foreign trade tonnage increased from 2013 to 2014 by 24.8 million short tons, and domestic cargo had an impressive jump of over 45 million short tons during that same period of time. This trend can be seen in Table 3-1, below.

**Table 3-1: Total Annual U.S. Waterborne Tonnage (Thousands of Short Tons), 2007-2014**

Shipping/ Receiving	2007	2008	2009	2010	2011	2012	2013	2014
<b>Domestic</b>	1,021,520	956,334	857,085	893,461	887,930	884,876	891,152	936,963
<b>Foreign*</b>	1,542,452	1,520,760	1,353,667	1,440,938	1,479,554	1,421,894	1,383,626	1,408,476
<b>Intrastate</b>	315,327	283,193	257,600	271,799	277,131	288,507	288,781	296,861
<b>Total**</b>	<b>2,563,972</b>	<b>2,477,094</b>	<b>2,210,752</b>	<b>2,334,399</b>	<b>2,367,484</b>	<b>2,306,770</b>	<b>2,274,778</b>	<b>2,345,439</b>

Notes: \*Foreign Trade Total is Imports and Exports combined

\*\*Totals exclude duplication

Source: USACE Waterborne Commerce Statistics Center, 2015

The number of containers moving through U.S. ports is also an indicator of global economic activity and conditions. Gaining in popularity after World War II, containerized shipping has grown to carry about 60% of the value of goods shipped by sea.<sup>2</sup> Measured in twenty-foot equivalent units (TEUs), containers have become immensely popular due to the ability to efficiently transfer them across modes. They can be found on global shipping routes, short sea shipping lines, and increasingly on barges transiting inland waterways. After the low number of TEU movements seen in 2009 due to the global recession, the number of domestic and foreign loaded TEUs moving in and through U.S. waterways has steadily increased, reaching a total of over 34.5 million in 2013, which excludes empty container movements. However, 2014 saw a slight decrease to 33.5 million loaded TEUs. Table 3-2 provides the USACE annual container movements, both foreign and domestic, through U.S. Ports from 2007 to 2014.

#### Domestic Container on Barge Shipment



Source: MARAD, 2015

<sup>1</sup> U.S. DOT Bureau of Transportation Statistics, *Freight Facts and Figures 2013*.

<sup>2</sup> World Shipping Council, *History of Containerization*, 2016.

**Table 3-2: Total Loaded TEUs moved through U.S. Ports, 2007-2014**

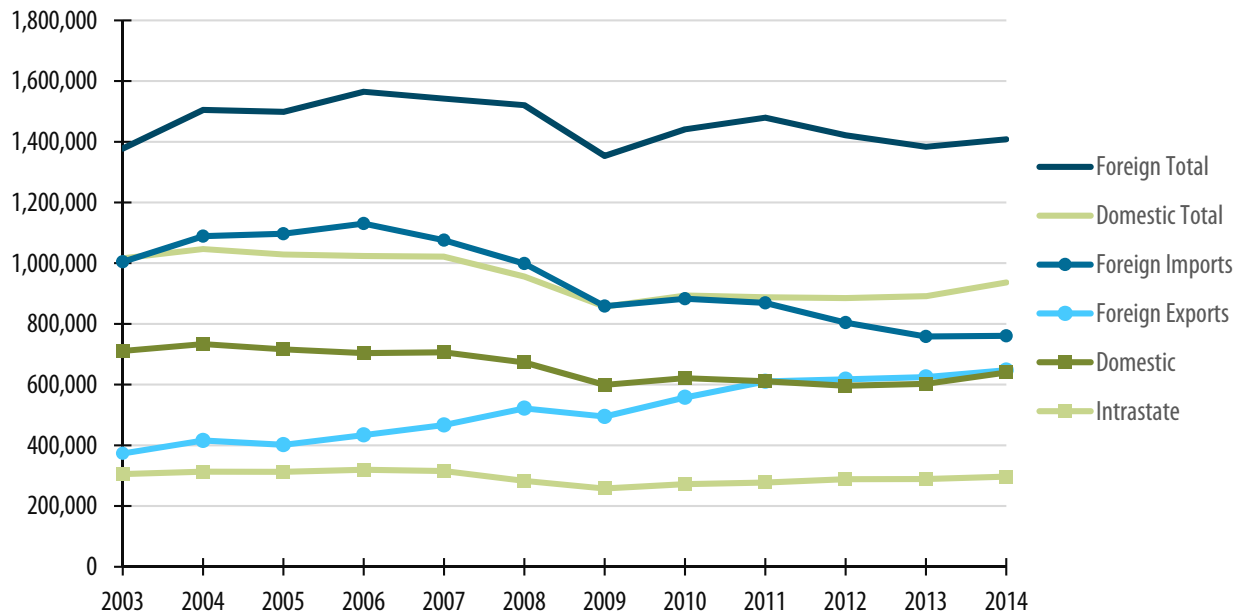
TEUs Moved	2007	2008	2009	2010	2011	2012	2013	2014
<b>Domestic</b>	5,280,225	4,918,635	4,418,570	4,684,631	4,791,855	5,012,507	5,628,300	5,290,674
<b>Foreign</b>	28,220,841	27,898,832	24,746,418	27,581,971	28,753,713	29,132,700	30,064,945	29,300,471
<b>Total</b>	<b>32,567,324</b>	<b>32,006,944</b>	<b>28,467,280</b>	<b>31,507,445</b>	<b>32,745,592</b>	<b>33,236,967</b>	<b>34,484,687</b>	<b>33,484,341</b>

Notes: Empty containers not included

Source: USACE Waterborne Commerce Statistics Center, 2015

An examination of the 12-year history in Figure 3-1 shows some positive news for domestic production. Domestic waterborne commerce and foreign exports have both shown an increase since 2009. In this same time period, intrastate trade has remained constant. Conversely, foreign imports have been decreasing since 2011. However, total foreign trade has been rising since 2013, largely because of an increase in exports.

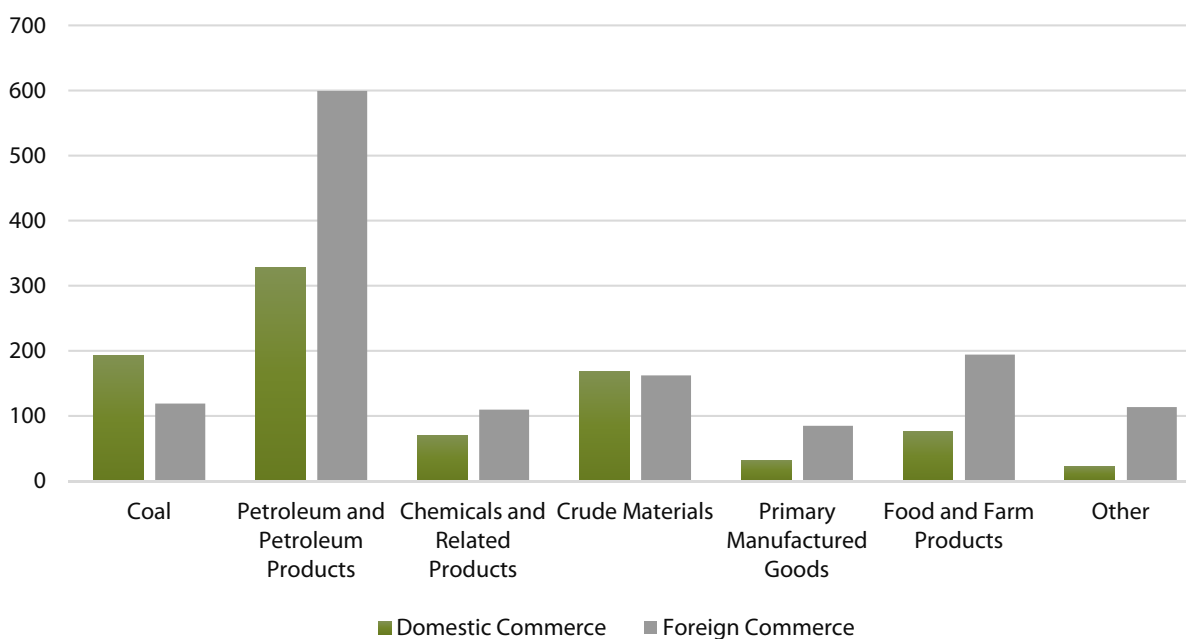
**Figure 3-1: Foreign and Domestic Waterborne Commerce (000 Short Tons), 2003 - 2014**



Source: USACE Waterborne Commerce Statistics Center, 2015

The latest available USACE Waterborne Commerce commodity flow data is from 2013. The top six commodity types are petroleum and petroleum products, crude materials, coal, food and farm products, chemicals and related products, and primary manufactured goods, in that order. Petroleum and petroleum products are by far the leading commodity for foreign commerce, with an almost 3 to 1 margin over the next commodity, food and farm products. Petroleum and petroleum products are also the largest domestic commodity, with coal coming in second, at not quite a 2 to 1 margin. Figure 3-2 illustrates the top combined foreign and domestic commodities by industry type.

**Figure 3-2: Total U.S. Major Foreign and Domestic Commodities by Type (Millions of Short Tons), 2013**

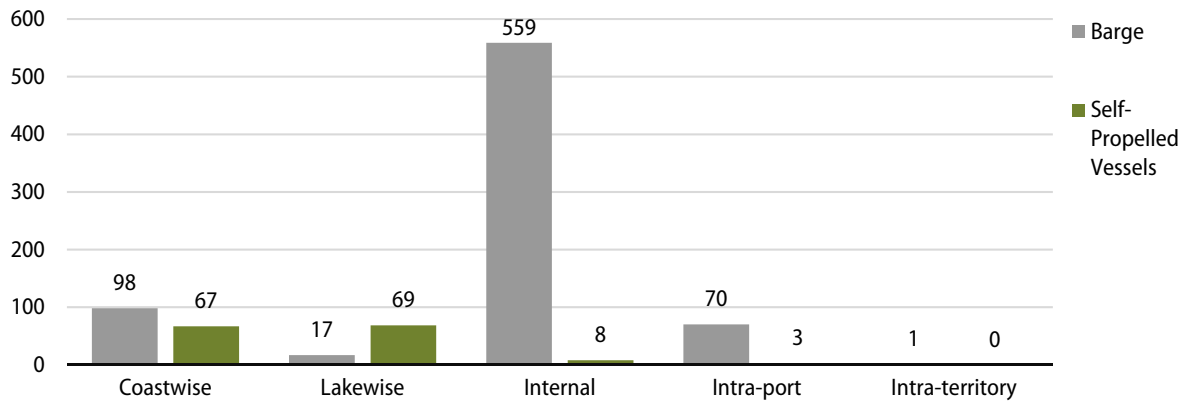


Source: USACE Waterborne Commerce Statistics Center, 2015

To understand domestic vessel traffic and maritime commerce, it is important to identify the type of vessel trip patterns and vessel type most commonly used. Vessel trip types are categorized by the USACE according to the origin, destination, and route taken of the vessel. The USACE Waterborne Commerce Statistics Center (WCSC) 2013 vessel trips and 2013 commodity flow data is the latest available information that contains both domestic and international movements. The five primary trip types used to measure domestic vessel traffic are:

- **COASTWISE:** Domestic traffic receiving carriage over an ocean or the Gulf of Mexico.
- **LAKELIKE:** Waterborne traffic between U.S. ports on the Great Lakes System.
- **INTERNAL:** Vessel movements taking place solely on inland waterways.
- **INTRA-PORT:** Movement of freight within the confines of a port.
- **INTRA-TERRITORY:** Traffic between ports in Puerto Rico and the U.S. Virgin Islands.

**Figure 3-3: Total U.S. Domestic Barges and Self-Propelled Vessels Traffic Type (Millions of Short Tons), 2013**



Source: USACE Waterborne Commerce Statistics Center, 2015

The majority (62%) of domestic tonnage is carried by barges completing internal trips, according to Figure 3-3. This is not surprising, as this category includes all the vessel traffic on inland river systems, such as the Mississippi. It also includes barge traffic on Florida's two intracoastal waterways. Barges also comprise a large portion of coastwise traffic, as well as the majority of intra-port movements. Examples of coastwise barge movement in Florida are the Crowley marine ocean-going barges, with service between Jacksonville and Puerto Rico. The great majority (92%) of national, self-propelled vessels operate in coastwise and lakewise traffic on the Great Lakes.

#### Bulk Barge Passing under the Skyway Bridge in Tampa Bay Florida



Source: American Waterway Operators, 2015

## 3.2 FLORIDA WATERWAY ACTIVITY AND TRENDS

Florida has emerged as a global hub for trade and tourism over the past two decades. As the state reviews trends related to waterways, it is important to also understand Florida's population, where people are locating in the state, and what the projected future growth looks like. Florida has a growing population, and in 2015 became the 3<sup>rd</sup> most populated state in the U.S., with 20,271,272 residents.<sup>3</sup> Florida is a national leader in tourism, and recently broke the 100 million visitor mark, with approximately 104,987,000 visitors to the state in 2015.<sup>4</sup> According to the U.S. Bureau of Economic Activity, Florida would rank as the 18<sup>th</sup> largest economy in the world if it was compared as a nation, and ranks higher than Switzerland and Saudi Arabia.



Source: Visit Florida; <https://flgov.smugmug.com>, 2015

**“...Florida has surpassed our tourism goal and welcomed an historic 105 million visitors to our state in 2015.” - Governor Rick Scott**

Florida's Gross Domestic Product (GDP) is around \$830 billion, putting Florida 4<sup>th</sup> in the United States. Florida is recognized as a world leader in a number of coastal industries. The movement of goods and passengers supports the cargo and cruise industries. The North American cruise industry has chosen Florida as the number one state in which to home port over the past several decades, which has made Florida the world leader for cruise passengers, with over 14 million revenue passenger embarkations and disembarkations in 2014.

### 3.2.1 REGIONAL COMPARISON OF COMMERCIAL WATERWAY UTILIZATION

As shown in Table 3-3, in 2014 Florida ranked 3<sup>rd</sup> in overall tonnage based on a state to state regional comparison of the states located on the Southeast Atlantic and Gulf of Mexico. This table illustrates the total annual short tons over an eight-year period from 2007 to 2014, for selected states. In 2014, almost 99 million short tons transited Florida's waterways, making up approximately 4.2% of the nation's total. Florida has been on a slight downward trend in tonnage during the period shown, but the numbers show a strong recovery in 2014. Texas and Louisiana have much larger volumes of bulk tonnage and have had large market growth over the most recent five-year period.

<sup>3</sup> U.S. Census Bureau, 2015, <http://quickfacts.census.gov/qfd/states/12000.html>.

<sup>4</sup> Visit Florida, Estimated Visitors, 2015, <http://www.visitfloridamediablog.com/home/florida-facts/research/>.



Trends that have kept Florida’s waterway utilization from returning to observed former higher rates include the recession in 2008 and slower growth in housing and building supplies, possibly due to the housing market crash and the reduction in hurricanes since 2005. The total waterborne commerce from 2007 – 2014, for selected states, can be seen in Table 3-3, below.

**Table 3-3: Total Waterborne Commerce by Selected States, 2009-2014 (Thousands of Short Tons)**

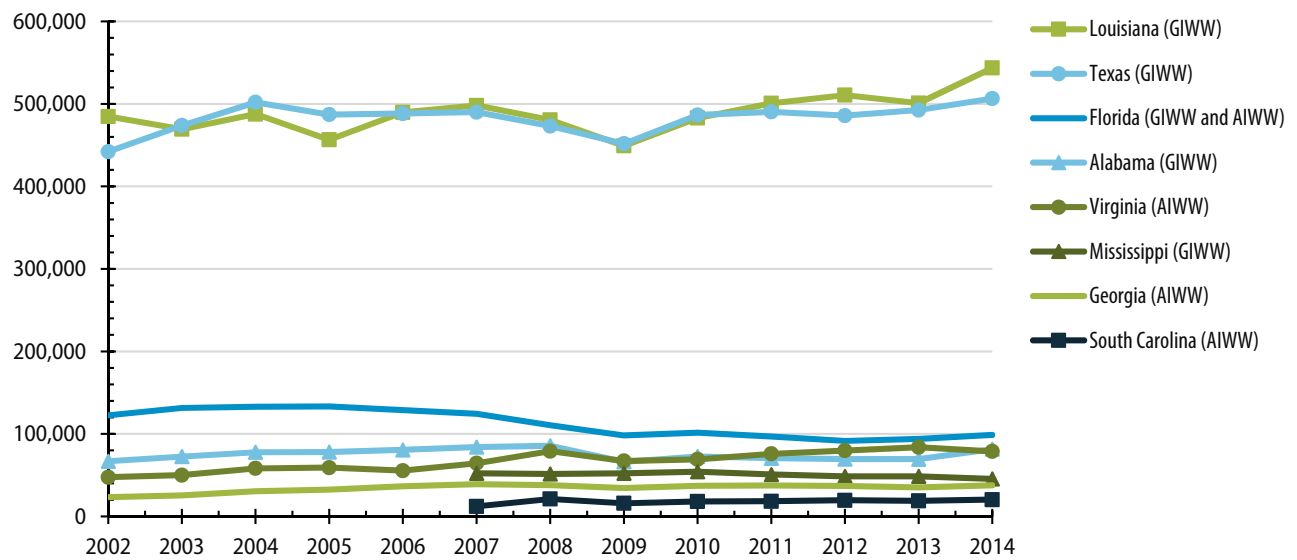
Regional States	2007	2008	2009	2010	2011	2012	2013	2014
<b>United States</b>	2,563,971	2,477,094	2,210,752	2,334,399	2,367,484	2,306,770	2,274,778	2,345,439
<b>Louisiana (GIWW)</b>	498,300	480,700	449,274	483,050	500,885	510,788	501,077	543,774
<b>Texas (GIWW)</b>	490,100	473,300	451,843	486,658	490,426	485,884	492,659	506,602
<b>Florida (GIWW and AIWW)</b>	124,400	110,500	98,091	101,455	96,769	91,501	93,925	98,747
<b>Virginia (AIWW)</b>	84,100	85,600	66,212	72,696	70,560	69,539	69,394	81,579
<b>Alabama (GIWW)</b>	64,500	79,100	67,162	69,095	75,945	79,821	83,834	78,777
<b>Mississippi (GIWW)</b>	52,200	51,500	52,229	54,210	50,763	48,592	48,582	45,487
<b>Georgia (AIWW)</b>	39,100	37,800	34,432	37,120	37,511	36,879	35,216	37,613
<b>South Carolina (AIWW)</b>	12,200	21,200	15,972	18,110	18,396	19,539	18,916	20,339

Note: States selected for regional comparison purposes from USACE Waterborne Commerce Statistics Center 2007 to 2014

Source: Waterborne Commerce Statistics Center, 2015

Figure 3-4 illustrates the growth trends that both Texas and Louisiana are experiencing. It appears that as it relates to bulk cargo tonnage, Florida has seen a much slower recovery period from the 2008 recession. The housing market crash in late 2006, along with a fortunate lack of hurricane activity since that same time, has stagnated the need for building materials in Florida, limiting tonnage growth. However, 2013 and 2014 show a return to positive growth.

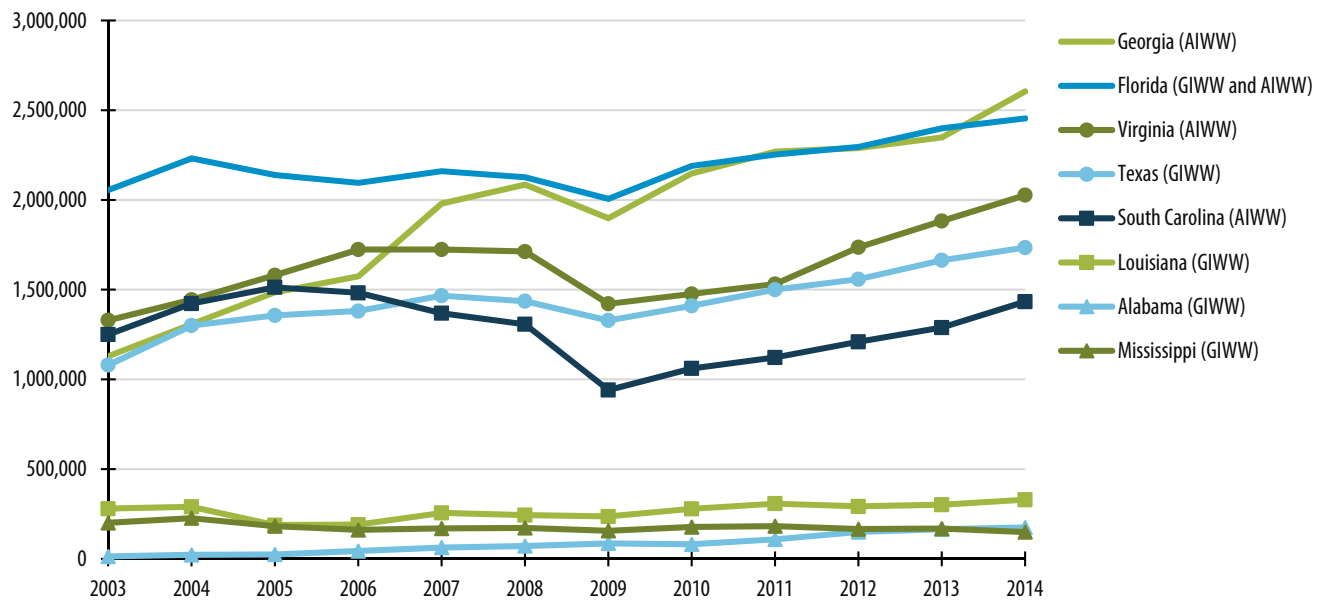
**Figure 3-4: Total Waterborne Commerce by Selected States, 2002-2014 (Thousands of Short Tons)**



Source: Waterborne Commerce Statistics Center, 2015

Total waterborne loaded container movements, shown in Figure 3-5 by selected state, show how Florida's ports have been emerging as global trade leaders in the Southeastern United States. Florida and Georgia show similar TEUs for the last six years, and both Florida and Georgia ports have experienced strong growth in container movements since the end of the 2008 recession. South Carolina and Texas are both trending up as well. In 2014, Virginia continued to climb in total statewide TEUs, breaking the 2 million TEU mark for the first time. Louisiana, Mississippi, and Alabama have all shown little to no growth in container movements over the past several years.

**Figure 3-5: Waterborne Loaded Container Movements by Selected States (TEUs), 2003-2014**



Source: Waterborne Commerce Statistics Center, 2015

In summary, based on the data shown in the figures and tables above, during the observation period Florida has 21% less tonnage in 2014 versus 2007, yet has seen a slight rebound in recent years since the recession in total waterborne tonnage movements. Florida has seen significant growth in container volumes and is keeping pace with other east coast states in terms of TEU movements. This data does not yet include the impact of many of the recent intermodal and seaport infrastructure projects, completed or currently underway, around the state. Several projects have just recently come online with many more that will be coming online in the next few years. Some examples of projects include the intermodal container transfer facilities (ICTFs) at PortMiami, Port Everglades, and JAXPORT, and major channel deepening/widening projects at those same ports as well as at Port Canaveral. Additionally, Port Panama City, Port Tampa Bay, and Port Manatee all have infrastructure improvements that, upon completion, are anticipated to encourage positive growth in both TEUs and tonnage. Terminal improvements and new crane purchases are also underway at several Florida ports.

To better understand Florida's waterborne activity, the following section offers a refined look at data that is Florida focused, and then drills down into the individual waterways and ports.

### 3.2.2 FLORIDA’S COMMERCIAL WATERBORNE ACTIVITY

One advantage of the USACE WCSC data and U.S. Census Bureau data is that these data sources offer the ability to review international trade trends over a long period of time. Annual tonnages by cargo type (containerized versus non-containerized) and foreign direction (import versus export) are tabulated in Tables 3-4, 3-5, and 3-6. Foreign trade volumes are shown for shipping (outbound) and receiving (inbound), domestic volumes, which are also shown in both columns but only get counted once in the total trade, and intrastate (throughput), which is tonnage that comes from out of state and is handled through a Florida port or vice versa.

- Total Tonnage – Tonnage through Florida ports fluctuated over the twelve-year period (2003-2014), but has remained relatively stable since the recession in 2008. Prior to the recession, tonnage increased 26.4% from 2003 to 2006 (from 46.1 million tons to 58.3 million tons, respectively). After peaking in 2006, total tonnage declined 24.4%, to 44.1 million in 2009. Since then, tonnage has held relatively constant.
- Cargo Type Tonnage – A majority of the decline between 2006 and 2009 was due to a 45.8% drop in non-containerized imports, from 39.9 million to 21.6 million, which further declined through 2012, to 19.6 million. In contrast to the non-containerized import decline, non-containerized exports have almost doubled since 2007, at 5.5 million, to 2008, at 10.7 million, and have remained relatively steady since. Containerized exports and imports have not changed as dramatically as non-containerized cargo since 2003.

**Table 3-4: Top Ten Waterborne Tonnage by State (Thousands of Short Tons), 2014**

Top Ten States	Totals*	Outbound		Inbound		Intrastate
		Domestic	Foreign	*Domestic	*Foreign	
<b>U.S. Total</b>	<b>2,345,439</b>	<b>640,102</b>	<b>647,600</b>	<b>640,102</b>	<b>760,876</b>	<b>296,861</b>
Louisiana	543,774	99,446	145,042	152,094	93,368	53,824
Texas	506,602	55,647	157,349	28,870	189,022	75,713
California	230,228	4,550	70,009	14,037	130,477	11,156
New Jersey	147,237	34,139	19,907	11,795	73,936	7,460
Washington	119,249	12,374	57,604	18,149	22,935	8,186
Illinois	106,517	79,202	5	18,665	2,074	6,571
Kentucky	101,110	50,822	0	24,735	0	25,552
<b>Florida</b>	<b>98,747</b>	<b>6,922</b>	<b>17,655</b>	<b>39,341</b>	<b>34,256</b>	<b>574</b>
Ohio	97,402	18,578	5,734	57,088	5,135	10,867
Alabama	81,579	12,028	18,518	16,460	18,308	16,264

Notes: \* Totals exclude duplication

Source: Waterborne Commerce Statistics Center, 2015

- TEUs – The USACE compiles TEU-related data indirectly from the U.S. Bureau of the Census and PIERS, as tabulated in Table 3-5. It includes domestic loaded and empty containers and foreign loaded only. These ports handle 90% of the 2.4 million statewide loaded containers.

**Table 3-5: TEUs by Florida Container Port, 2014 (not including foreign empty containers)**

Port	Grand Total Loaded	Domestic				Total	Foreign		
		Inbound		Outbound			Inbound	Outbound	Total
		Loaded	Empty	Loaded	Empty		Loaded	Loaded	
JAXPORT	768,463	84,327	26,065	359,941	83	470,416	172,968	151,227	324,195
Port Everglades	766,046	2,012	0	24,757	0	26,769	335,342	403,935	739,277
PortMiami	682,386	0	0	0	0	0	345,014	337,372	682,386
Port of Palm Beach	156,366	0	0	0	0	0	46,401	109,965	156,366
Port Tampa Bay	38,049	0	0	0	0	0	24,454	13,595	38,049
Port Panama City	27,400	0	0	0	0	0	16,310	11,090	27,400
Port Manatee	12,013	0	0	0	0	0	8,908	3,105	12,013
Port of Fernandina	4,564	0	0	0	0	0	664	3,900	4,564
<b>Total</b>	<b>2,455,287</b>	<b>86,339</b>	<b>26,065</b>	<b>384,698</b>	<b>83</b>	<b>497,185</b>	<b>950,061</b>	<b>1,034,189</b>	<b>1,984,250</b>

Domestic Source: U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center

Indirect Foreign Source: U.S. Bureau of the Census, U.S. Customs and Border Protection, and PIERS

Some Florida ports, especially Port Tampa Bay and Port Everglades, have high volumes of petroleum and related products that account for high total tonnage figures. Additionally, JAXPORT shows large tonnage volumes in major commodities like automobiles, paper, and steel. Florida has eight ports that have volumes at or in excess of 1 million tons. Table 3-6 shows the break-down of domestic and foreign trade volumes from the latest available Five-Year Florida Seaport Mission Plan, which is data reported directly from the individual Florida ports and can differ slightly from the USACE data.

**Table 3-6: Florida Ports Total Tons, by Port, by Direction, 2014**

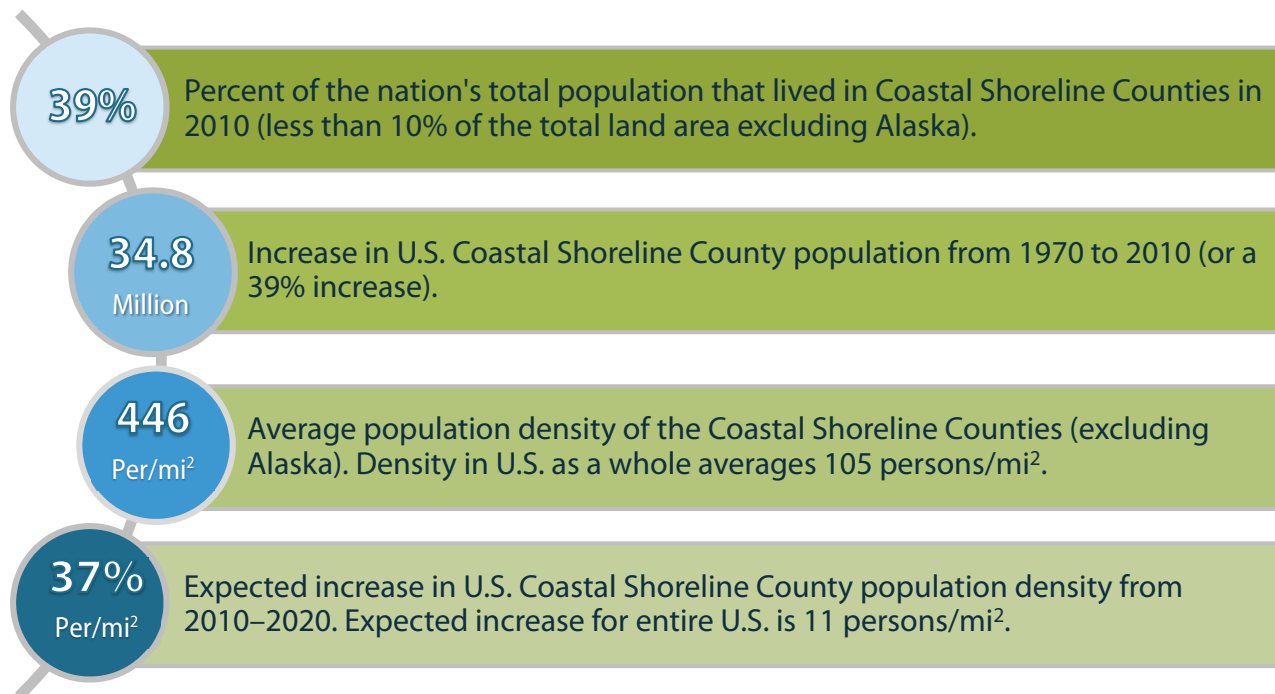
Port	Total	Domestic	Foreign	Imports	Exports
Port Tampa Bay	36,217,443	23,893,566	12,323,877	6,610,804	5,713,073
Port Everglades	23,985,882	11,310,820	12,675,062	9,333,693	3,341,369
JAXPORT	16,932,989	7,082,002	9,850,987	7,286,511	2,564,476
PortMiami	7,703,886	0	7,703,886	3,875,906	3,827,980
Port Manatee	6,403,414	2,300	6,401,114	5,851,543	549,571
Port Canaveral	3,362,282	593,361	2,768,921	2,699,028	69,893
Port of Palm Beach	2,150,804	496,040	1,654,764	352,021	1,302,743
Port Panama City	1,575,223	70,973	1,504,250	538,826	965,424
Port of Fernandina	228,262	0	228,262	4,965	223,297
Port of Pensacola	185,318	49,233	136,085	37,617	98,468
<b>Total</b>	<b>98,745,503</b>	<b>43,498,295</b>	<b>55,247,208</b>	<b>36,590,914</b>	<b>18,656,294</b>

Source: Individual Seaports, Five-Year Florida Seaport Mission Plan, 2015

### 3.2.3 U.S. COASTAL POPULATION TRENDS

For thousands of years, civilizations have developed near coastlines and waterways, providing access to food, commerce, security, and transportation. This trend continues today. According to the National Oceanic and Atmospheric Administration (NOAA), in 2010 over 123 million people in the United States, or 39% of the nation's total population, lived in coastal shoreline counties. This is significant, as these counties represent less than 10% of the land area in the U.S. (excluding Alaska). This centuries old trend presents challenges for coastal county and city planners, engineers, and managers related to overall waterway system utilization, including environmental ecosystems, safety awareness, hazard mitigation, and necessary infrastructure to meet the growing demand placed on the waterway system, as density increases along with utilization. Population in coastal shoreline counties increased by 34.8 million people from 1970 to 2010, a 39% increase, while the nation's entire population increased by 52% over the same time period. Even though population growth in coastal areas appears to have slowed in the past three decades, the population density averages 446 persons per square mile, more than four times that of the U.S. as a whole (105 persons per square mile). As shown in the Figure below, a 37% increase in the coastal populations of the U.S. over the period from 2010-2020 is predicted.

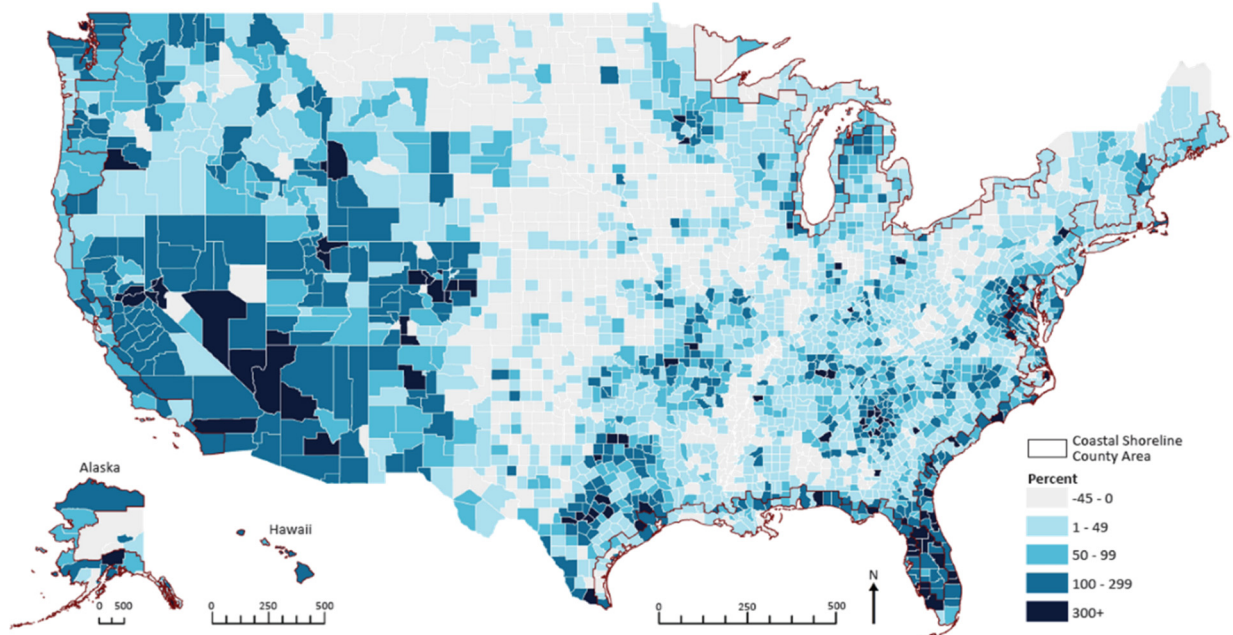
**Figure 3-6: U.S. Population Related to Coastal and Shoreline Counties**



Source: NOAA, 2012; U.S. Census Bureau, 2011; Woods & Poole, 2011

Figure 3-7 shows a map produced by NOAA in 2012, illustrating the percentage of growth in coastal populations in the United States over the past 40 years. As shown in the map, coastal shoreline counties throughout the country sustained growth rates between 100% and 299%, with some growing over 300% from 1970 to 2010.

**Figure 3-7: Percent of Population Growth in U.S. Coastal Shoreline Counties, 1970-2010**



Source: NOAA, 2012; U.S. Census Bureau, 2011; Crowell et al., 2010

Table 3-7 provides additional data describing rapid population growth, primarily in Florida, Texas, and California during the same 30-year period. Florida had a population growth of 165%, followed by Texas with 107%. That means that Florida, over the past 40 years, had the fastest growing coastal population in the country. In 2010, Florida was ranked third out of the states shown in Table 3-7 for overall state populations living within coastal or shoreline counties.

**Table 3-7: Coastal Shoreline Counties, Top Five State Comparison**

U.S. State or Territory	2010 Coastal Population	Rank	2010 Coastal Population Density (per/mi <sup>2</sup> )	Rank	1970-2010 Percent Historic Population Change	2010-2020 Percent Projected Population Change
California	25,520,252	1	716	10	62%	8%
New York	15,691,096	2	1,280	6	6%	5%
Florida	14,468,197	3	454	15	165%	16%
New Jersey	7,045,573	4	1,360	5	21%	4%
Texas	6,121,490	5	410	16	107%	16%

Source: NOAA, 2012; U.S. Census Bureau, 2011; Crowell et al., 2010

### 3.3 U.S. COMMERCIAL AND RECREATIONAL ACTIVITY AND TRENDS

The commercial and recreational fishing and boating industries of the United States are major economic sectors that depend on a functional waterway system to keep their industries afloat. In addition to the raw economic benefits, some of the more practical benefits include the many coastal industry jobs like seafood restaurants, grocery supply, and food packaging and shipping. These type of industries also provide surrounding communities with fresh seafood for sale and consumption. These waterways provide recreational sporting opportunities, of which millions of water hobbyists and sporting enthusiasts of all types take advantage. Florida's vast waterway system provides an abundance of options for citizens and visitors alike to enjoy their favorite water activities. Almost everyone in the United States is impacted in some way by commercial and industrial activities and trends on the waterways.

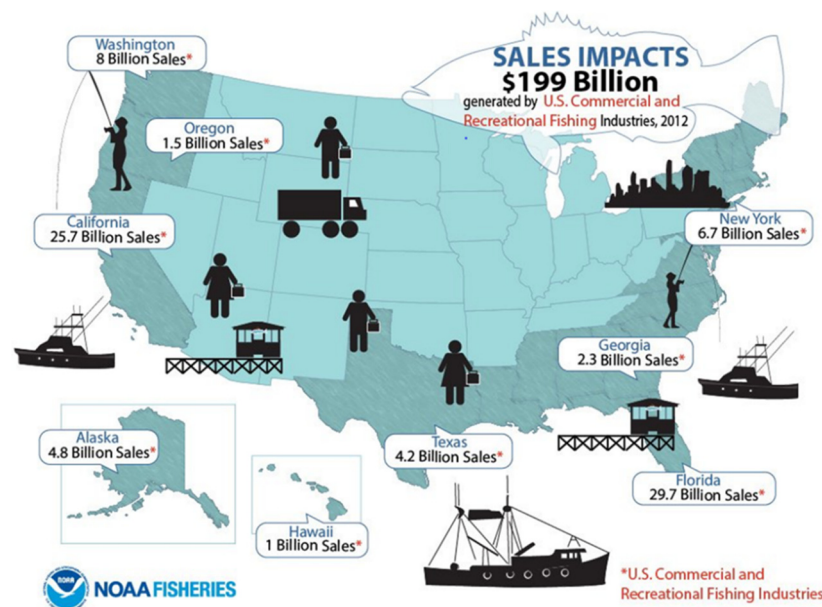


Source: Enterprise Florida Inc. and Florida Sports Foundation, 2015

#### 3.3.1 NATIONAL COMMERCIAL AND RECREATIONAL FISHING AND BOATING ACTIVITY AND TRENDS

NOAA's Office of Science and Technology of the National Marine Fisheries Service (NMFS) publishes an annual Fisheries Economics of the U.S. Report. The latest report, available for the year 2012, provides illustrative data regarding the economic impact of fishing. In 2012, the combined commercial and recreational fishing industries generated \$199 billion in sales. Florida was the highest single state, with \$29.7 billion generated in sales. Figure 3-8 shows the top states in sales.

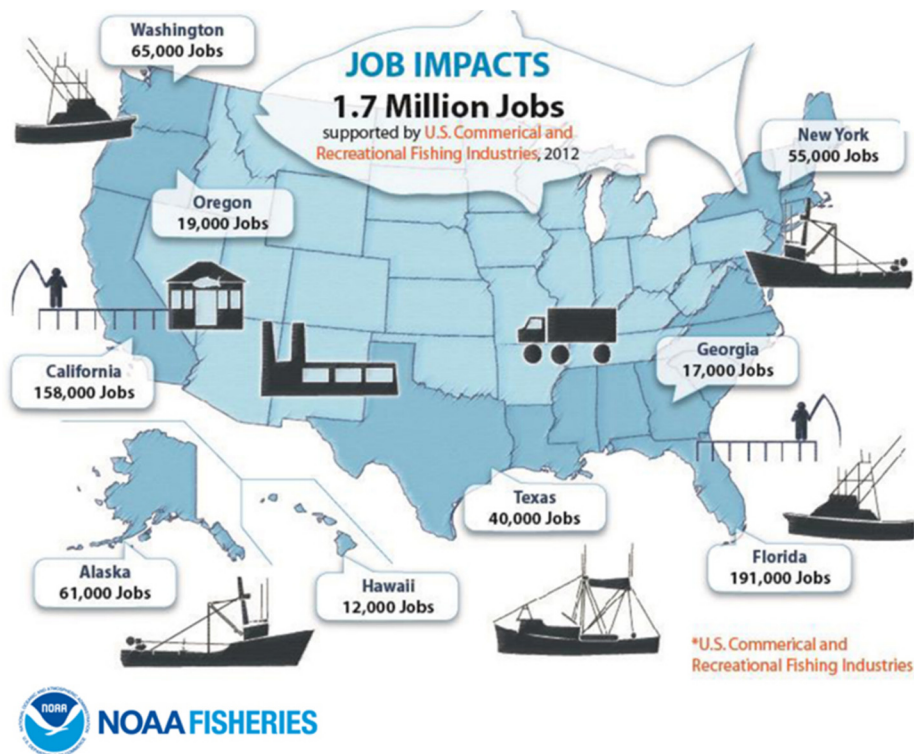
**Figure 3-8: Sales Impact of the Commercial and Recreational Fishing Industries, 2012**



Source: NOAA Fisheries Economics Program, 2012

The sales generated by the commercial and recreational fishing industries are directly related to jobs, as sales are the results of employment, and increased sales often lead to the creation of new jobs. Figure 3-9 illustrates that 2012 sales supported 1.7 million jobs nationwide and 191,000 jobs in Florida.

**Figure 3-9: Jobs Supported by Commercial and Recreational Fishing Industry**



Source: NOAA Fisheries Economics Program, 2012

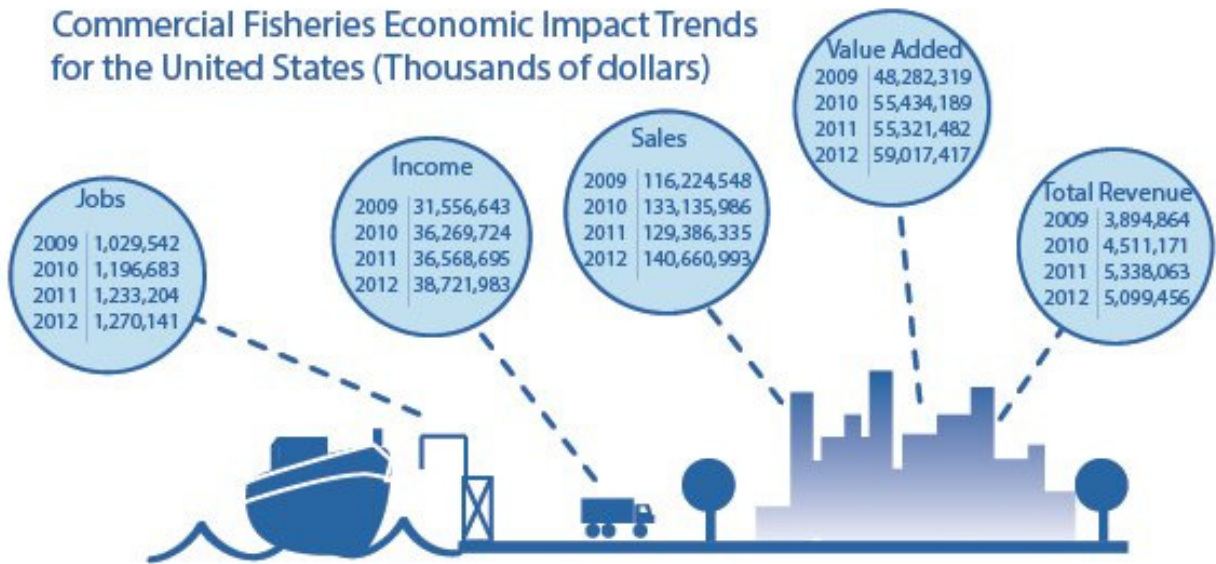


Source: FDOT, 2015

A four-year trend of positive growth for both commercial and recreational fishing from 2009-2012 is shown in Figure 3-10, which includes several economic categories. The categories reported include jobs, income, sales, value added, total recreational fishing trips, and total commercial revenue.



**Figure 3-10: Commercial and Recreational Fishing Trends, 2009-2012**



### Recreational Fisheries Economic Impact Trends for the United States (thousands of dollars and trips)



Source: NOAA Fisheries Economics Program, 2012

### 3.3.1.1 Recreational Boat Ownership and Use

Not all boats are used for fishing. Many boat owners enjoy sailing, watersports such as skiing and wake boarding, or simply use their boats to cruise and socialize. Statistics on total boat ownership and use help to capture all of these activities.

In 2012, the U.S. Coast Guard completed a National Recreational Boating Survey to gather information for the agency's National Recreational Boating Safety Program.<sup>5</sup> The survey was designed to gather information on recreational boating (vessels used for any purpose other than commercial) with the ultimate goal of improving safety. The results of the survey provided the following information:



Source: FDOT, 2015

- 22 million estimated boats in the U.S.
- 27% or 32 million of the estimated 118.1 million U.S. households had one member who boated in 2012
- 70% of people who said they boated in 2012 did so at least once in a powerboat
- 29% said they boated at least once in a canoe and over 32% boaters used a kayak
- Fishing was the 6<sup>th</sup> most popular boating activity
- Waterskiing, wakeboarding, and tubing were the 8<sup>th</sup> most popular activities in 2012

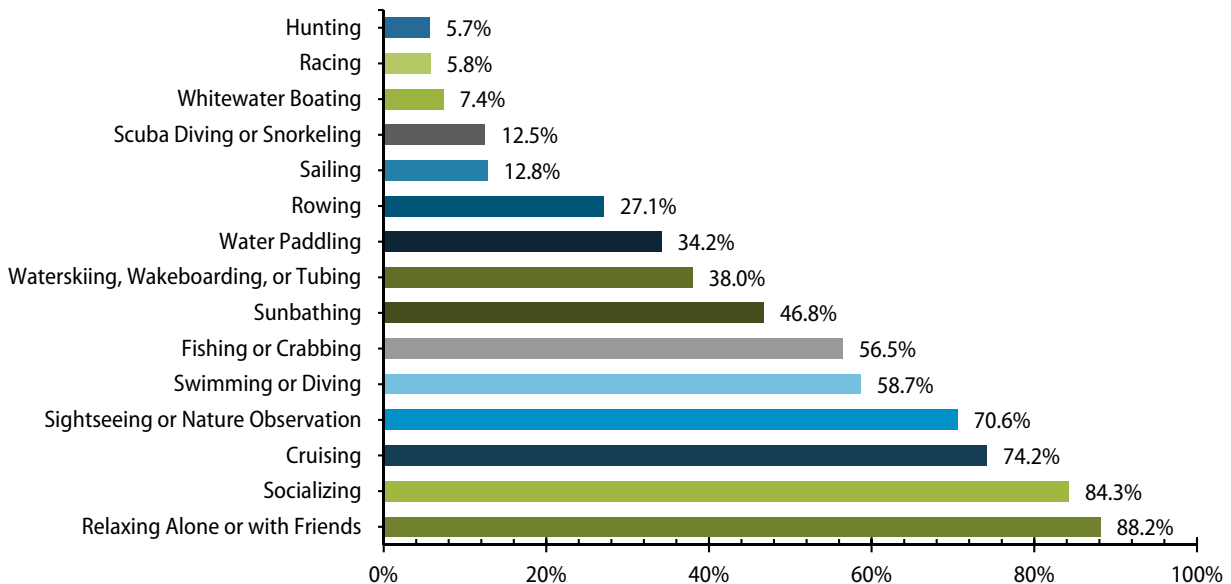


Source: Visit Pasco and Visit Florida, 2015

Persons aboard recreational boats participate in a wide variety of both active and passive recreational activities in boating. Relaxing alone or with friends was reported by 88.2% of boating participants, followed next by socializing (84.3%), cruising (74.2%), and sightseeing and/or nature observation (70.6%). Other popular activities included swimming or diving (58.7%), and fishing or crabbing (56.6%). Figure 3-12 provides the breakdown of activities as reported by the survey respondents.

<sup>5</sup> U.S. Coast Guard, National Recreational Boating Survey, 2012.

**Figure 3-11: Participation in Various Boating Activities**



Source: U.S. Coast Guard 2012 Recreational Boating Survey, 2015

Figure 3-11 shows that boaters in U.S. are involved in many different recreational activities on the waterways. Florida has emerged as the national leader in many of the activities mentioned above, primarily because of the population located near the coastal counties, but also because of the vast level of water related resources in the state. The following section will look more closely at Florida’s commercial and recreational boating activities, and the partnering state agencies that support the waterway system utilization.

### 3.3.2 FLORIDA COMMERCIAL AND RECREATIONAL FISHING AND BOATING ACTIVITY AND TRENDS



Source: FDOT, 2015

Florida is one of the leading states in the country when it comes to commercial and recreational uses of its waterways. As previously stated, Florida leads the nation in jobs that are supported by the commercial and recreational fishing industry, with over 191,000 jobs in 2012 alone. The Florida Fish and Wildlife Conservation Commission (FWC) provides statistics related to recreational boating, fishing, and hunting, and several of these FWC Fast Facts were used throughout this Section, to restate the significance of recreational waterways uses in Florida.

### 3.3.2.1 Continued Florida Growth in Recreational Use

Over the past ten years there has been an insurgence of new, trend setting recreational waterway activities. Some of these new types of activities include kite boarding, wakeboarding, wake surfing, paddle boarding, and a huge growth in kayaking and other paddle driven non-motorized watercraft. Since mainstream popularity and participation in these activities is a relatively new phenomenon, law enforcement agencies like FWC are facing the dilemma of finding ways to enforce vessel laws with non-registered vessels, as well as how to use current laws to better educate the public on safety and sharing of the waterways. Due to the exposed nature of those participating in paddle sports, participants are particularly vulnerable to injuries sustained from collisions with larger vessels.



Source: Visit Florida, 2015

Every vessel type has its own unique navigational challenges and limitations. In order to maintain a safe boating environment, it is important to understand the differences between vessel types, and how their operation impacts others on the waterway. A ship's configuration and cargo affect the vessel operator's line of sight from the ship's bridge. The blind spot ahead of the bow can be a few hundred feet – or a few thousand feet, in the case of deep draft container ships. Cranes, containers, and cargo canopies can create additional blind spots. Towboat and other vessel operators must exercise extreme caution when attempting to overtake a ship, taking care to avoid blind spots, watching for recreational boaters and to communicate intentions when necessary. Sharing Florida's waterways constantly brings about conflicts between commercial and recreational users. It is important for all users to operate their vessels or watercraft safely and with proper respect for others.

### 3.3.2.2 Adventures for Floridians with Disabilities



Source: The Florida Disabled Outdoors Association, 2015

Individuals with disabilities can locate accessible resources and programs for outdoor adventures in Florida through the Florida Disabled Outdoors Association.

This nonprofit organization uses Florida's natural resources to enrich the lives of other people through accessible, inclusive recreation for all. Through this program, mobility-impaired Floridians can experience outdoor opportunities, such as hunting programs, therapeutic recreation programs for people with brain and spinal cord injuries, and a Sports Ability annual event with multiple activities like water skiing, martial arts, and more.

### 3.3.2.3 Economic Benefits of Florida Waterways

Florida's waterways provide significant economic benefits through recreational boating and fishing. Fishing is an obvious strength in the state's ecotourism tool box due to its natural resources, many lakes and rivers, and long intracoastal waterways and coastline. The Florida Department of Economic Opportunity (DEO) reported that statewide recreational saltwater fishing is valued at over \$5 billion and creates over 50,000 jobs. The associated impacts of the boating industry contribute an additional \$18 billion, creating over 220,000 jobs. According to a 2011 survey compiled by Southwick Associates for the U.S. Fish and Wildlife Service, Florida has the largest number of saltwater anglers (2.4 million) in the U.S. Additional information is provided by FWC and can be found in Tables 3-8 and 3-9.

**Table 3-8: Annual Angler Registration Numbers in Florida**

NUMBER OF FLORIDA REGISTERED ANGLERS (AGE 16 OR OLDER)		
Freshwater	Residents	956,000
	Nonresidents	258,000
Saltwater	Residents	1,390,000
	Nonresidents	1,007,000
<b>Total</b>		<b>3,611,000</b>

**Table 3-9: Annual Economic Impact to Florida**

FLORIDA RECREATIONAL AND WILDLIFE INDUSTRIES		
Category	Economic Contribution	Jobs
Freshwater Fishing*	\$1.7 billion	14,000
Saltwater Fishing**	\$7.6 billion	109,300
Wildlife Viewing*	\$4.9 billion	44,600
Boating***	10.4 billion	82,800
<b>Total</b>	<b>24.6 billion</b>	<b>250,700</b>
FLORIDA SEAFOOD INDUSTRY**		
Category	Economic Contribution	Jobs
Commercial Harvesters	\$396 millions	6,028
Seafood Processors and Dealers	\$774 million	4,819
Importers	\$12.1 billion	44,018
Seafood Wholesalers and Distributors	\$1.2 billion	10,403
Retail	\$2.1 billion	16,873
<b>Total</b>	<b>\$16.6 billion</b>	<b>82,141</b>

Note: The economic impacts of the commercial fishing sector and seafood industry refer to the employment (full-time and part-time jobs) and output (sales by Florida businesses) generated by the commercial harvest sector and other major components of the U.S. seafood industry, including processors and dealers, wholesalers and distributors, grocers and restaurants.

Source: Annual Economic Impact:

\*Southwick Associates 2012 report, using USFWS 5-year survey, 2011.

\*\*National Marine Fisheries Service, 2014 report, using 2012 NOAA data.

\*\*\*National Marine Manufacturers Association, 2012 study, adjusted in 2013, using 2008 data.

When a Florida resident or out of state visitor goes fishing or hunting, purchases binoculars to view wildlife, visits a nature preserve, goes boating, or visits a seafood restaurant in Florida, they are contributing to the economic prosperity of the state. The economic impact of Florida's recreational saltwater fishing and boating activity expenditures is summarized below:

#### RECREATIONAL SALTWATER FISHING EXPENDITURES (2012 DATA):

- Participants 5,554,000 individuals
- Total Expenditures \$10.3 billion
- Trip-related (by fishing mode) \$1.1 billion
- For-hire \$304 million
- Private boat \$493 million
- Shore \$273 million
- Equipment-related \$9.3 billion
- Average per participant \$1,855

#### RECREATIONAL BOATING EXPENDITURES (2013 DATA):

- Total Expenditures \$10.3 billion<sup>6</sup>



Source: Visit Florida, 2015

<sup>6</sup> Florida Fish and Wildlife Commission, Economics of Fish & Wildlife Recreation in Florida, 2016.

## 3.4 WATERWAY TRANSPORTATION, TECHNOLOGY, SAFETY AND SECURITY

This section of Chapter 3 discusses waterways as a transportation system and reviews three aspects of waterway transportation. The first is waterway transportation technology, which will include clean fuels and autonomous vehicles. The second and third areas are safety and security.

### 3.4.1 WATERWAY TRANSPORTATION

The waterways are used for the purposes of transporting goods, services, and people every day on Florida's intracoastal waterways, rivers, locks and lakes. This system must be maintained at a high level of transportation mobility, which includes keeping the waterways clear of debris like derelict vessels, maintaining Aids to Navigation, developing new technology for safer, smarter transit, and being vigilant to keep the system safe and secure.

#### 3.4.1.1 U.S. Maritime Administration (MARAD) Marine Highways

The MARAD Marine Highway Program was created to help renew the United States' awareness and interest in the marine transportation system as an alternative to highways and roadway congestion. Commonly referred to as "Short Sea Shipping", Marine Highways move freight up and down a nation's coasts without crossing an ocean. The goal of the program is to expand America's Marine Highway services, and integrate them into the surface transportation system. The program works to achieve this goal by identifying and facilitating projects that serve domestic freight and passenger transportation needs. MARAD administers the program in support of the private sector, and state and local governments develop and operate Marine Highway services.

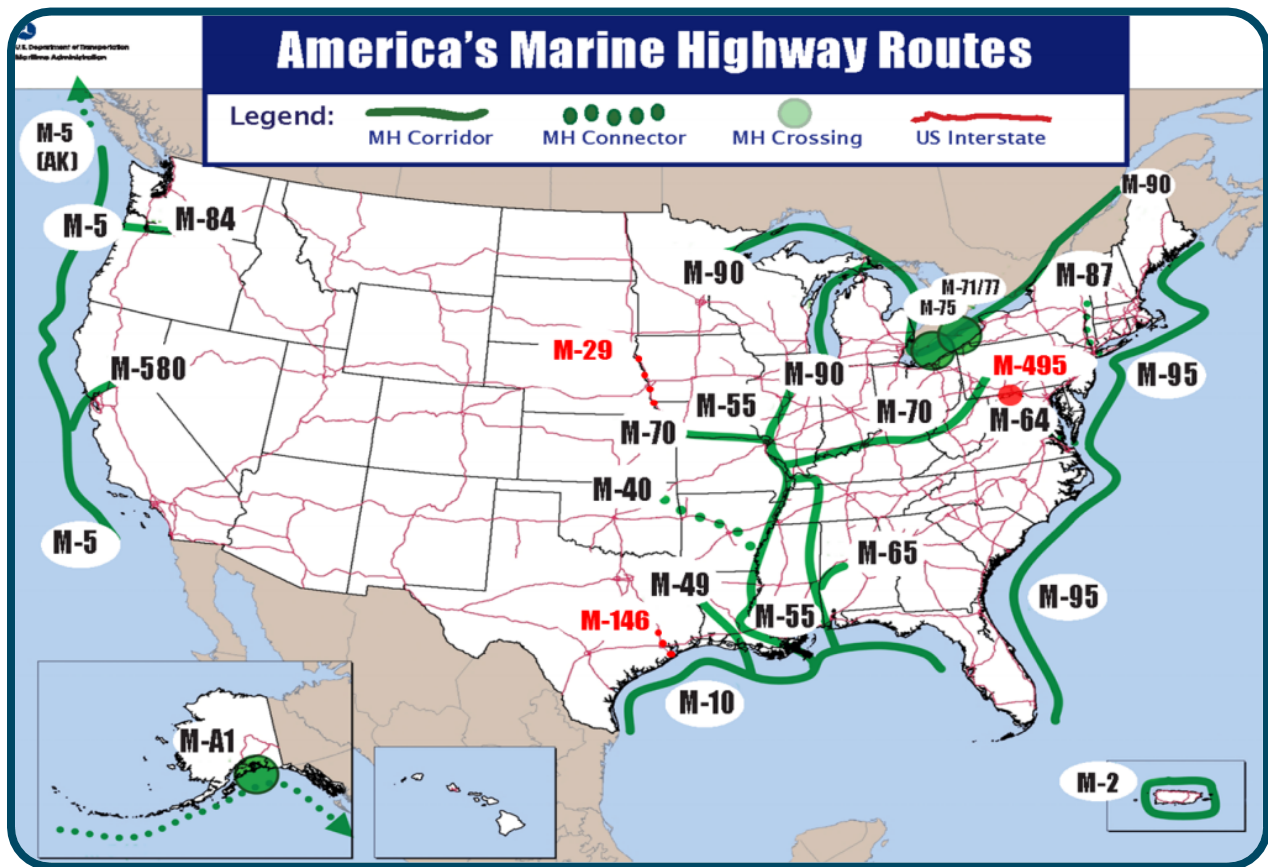
The Marine Highway Program was established by the Energy Independence and Security Act of 2007 to help reduce congestion on the nation's highways by designating corresponding Marine Highway Routes.<sup>7</sup> In 2012, the Coast Guard and Maritime Transportation Act of 2012 expanded the scope of the program to include efforts to generate public benefits by increasing the utilization, or efficiency, of domestic freight or passenger transportation on the Marine Highway Routes between U.S. ports.<sup>8</sup>

The Marine Highway System currently includes 22 Marine Highway routes that serve to relieve congestion from the surface transportation network, and to promote opportunities for short sea shipping. Marine Highway routes include three categories: corridors, connectors, and crossings. The 11 Marine Highway corridors are long, multi-state routes that parallel major national highways. The five Marine Highway connectors represent shorter routes that serve as feeders to the larger corridors, and the three Marine Highway crossings are short routes that transit harbors or waterways, and offer alternatives to much longer or less convenient land routes between points. The two Marine Highway routes of interest to Florida are the M-10 route, which parallels with Interstate I-10 along the north Florida Gulf Coast, and the M-95 route, traveling north to south along the Atlantic Coast parallel with Interstate I-95. A map of the Marine Highway routes can be found in Figure 3-12.

<sup>7</sup> USC Chapter 556 – Short Sea Transportation, 2012.

<sup>8</sup> H.R. 2838. Coast Guard and Maritime Transportation Act of 2012.

Figure 3-12: America's Marine Highways



Source: MARAD, 2015

MARAD periodically publishes a call for projects in order to receive applications for projects that would like consideration for funding and designation as a Marine Highway. The last two project application periods were in 2010 and 2014. For the 2010 submission period, MARAD received a total of 35 applications with eight of the projects receiving designation. MARAD identified two factors to be considered during project selection. These factors are: the potential of a project to offer public benefits and long-term sustainability without long-term federal support, and the inclusion of a benefit-cost analysis (BCA) of the project, as explained in the Marine Highways Program Final Rule.

In addition to the eight Marine Highway projects, the Secretary of U.S. DOT designated six Marine Highway initiatives. The services proposed in the initiatives were not developed to the level required to receive project designation, but the proposals demonstrated the potential for becoming a successful Marine Highway project in the future. Although they were not eligible to compete for Marine Highway grants, these Marine Highway initiatives received continuing support from the U.S. DOT, developing the concepts through conducting research, market analysis, and other efforts, to identify the opportunities they may present.

The 2014 application period was open until June 2016, with applications reviewed on a rolling basis every six months. Through the Marine Highway Program, and accompanying TIGER grants, federal investment in short sea shipping since 2009 has totaled over \$209 million. Additional information can be found at the MARAD Marine Highway Program website: <http://www.marad.dot.gov/ships-and-shipping/dot-maritime-administration-americas-marine-highway-program/>.



### 3.4.1.2 Waterways as a Modal Alternative

Each mode of freight transportation, truck, rail, air, and sea, have their own advantages. The decision of which mode to use is often based on considerations related to distance, the nature of the cargo, time, scheduling, and budget. For example, high value, light weight, and time sensitive cargo, such as flowers, are ideally moved by aviation, whereas heavy, non-time sensitive, bulk goods, such as coal and grain, are ideally carried by barges and bulk cargo ships. Distance travelled is also an important factor, with trucks dominating shorter freight trips due to the ability to adjust routes and deliver freight to virtually any location on the roadway network. Access, as a primary advantage of truck as a freight mode, is also the source of increasing challenges due to congestion on the roadway network in many areas across the country. The realization of these challenges has led to increased interest in inland waterways as a freight mode. The MARAD Marine Highway program, detailed previously, is a good example of this interest.

In 2012, the four modes (truck, rail, air, and sea) combined to move a daily average of 54 million tons of freight, valued at nearly \$48 billion. Trucks carry most of the tonnage and value of freight in the United States, while railroads and waterways carry significant volumes over long distances. Table 3-10 provides the breakdown of freight moved by mode in the U.S. for 2007, 2012 and projected for 2040.

**Table 3-10: Total National Freight Tons by Mode, 2007, 2012, 2040 (Millions of Tons)**

	2007				2012				2040 (Projected)			
	Total	Domestic	Exports*	Imports*	Total	Domestic	Exports*	Imports*	Total	Domestic	Exports*	Imports*
<b>Total</b>	18,879	16,851	655	1,372	19,662	17,523	901	1,238	28,520	23,095	2,632	2,794
<b>Truck</b>	12,778	12,587	95	97	13,182	12,973	118	92	18,786	18,083	368	335
<b>Rail</b>	1,900	1,745	61	93	2,018	1,855	82	82	2,770	2,182	388	201
<b>Water</b>	950	504	65	381	975	542	95	338	1,070	559	164	347
<b>Air, Air &amp; Truck**</b>	13	3	4	6	15	3	5	7	53	6	20	27
<b>Multimodal &amp; Mail***</b>	1,429	433	389	606	1,588	453	540	595	3,575	645	1,546	1,383
<b>Pipeline****</b>	1,493	1,314	4	175	1,546	1,421	13	112	1,740	1,257	17	467
<b>Other</b>	316	266	36	14	338	277	47	14	526	362	130	34

\*Data does not include imports and exports that pass through the United States from a foreign origin to a foreign destination by any mode  
 \*\* Includes truck moves to and from airports.  
 \*\*\*Multiple modes & mail includes U.S. Postal Service, courier shipments, and all intermodal combinations, except air and truck.  
 \*\*\*\*2007 total and domestic numbers for the multiple modes & mail and the pipeline categories were revised as a result of Freight Analysis Framework database improvements  
 Notes: Numbers may not add to totals due to rounding. The 2012 data are provision estimates that are based on selected modal and economic trend data. All truck, rail, water, and pipeline movements that involve more than one mode, including exports and imports that change mode at international gateways, are included in multiple modes & mail to avoid double counting. As a consequence, rail and water totals in this table are less than in other published sources.

Source: U.S. DOT Bureau of Transportation Statistics, "Freight Facts and Figures 2013", 2015

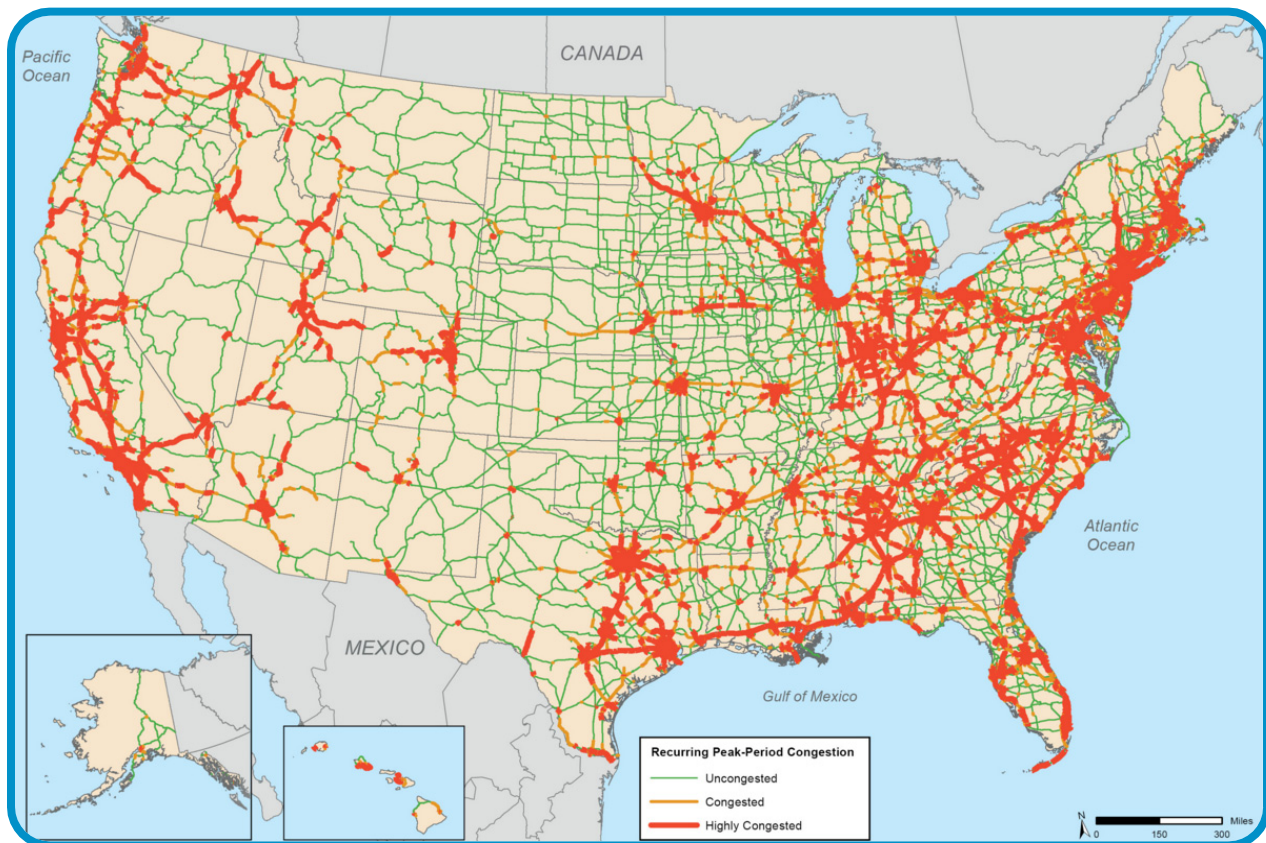
Table 3-10 shows an increase in tonnage of shipments for all of the freight modes between 2007 and 2012. Shipments moved by trucks and a combination of air and truck trips are projected to increase the greatest amount by 2040, at 43% and 253%, respectively. Tonnage of freight moved by rail is projected to increase by 37%, and freight moved by water is projected to increase the least, at 10%. The data shows that trucks are increasingly being relied upon for freight shipments on a surface network with projected growing congestion problems. This may provide opportunities for the Maritime Transportation System (MTS) to utilize its excess capacity to remove some demand off the nation’s highways.

### 3.4.1.3 Benefits of Waterborne Transportation

Roadway congestion is a growing issue that the U.S. and State DOTs are working to address. Congestion results when traffic demand approaches or exceeds the available capacity of the system. While this is a simple concept, it is not constant. Traffic demands vary significantly depending on the season of the year, the day of the week, and even the time of day. Also, the capacity can change because of weather, work zones, traffic incidents, or other non-recurring events.

Demand for highway travel by Americans continues to grow as population increases, particularly in metropolitan areas. Construction of new highway capacity to accommodate this growth in travel has not kept pace. Between 1980 and 1999, route miles of highways increased 1.5%, while vehicle miles of travel increased 76%. The Texas Transportation Institute estimates that, in 2011, congestion in 498 metropolitan areas caused urban Americans to travel an extra 5.5 billion hours and to purchase an extra 2.9 billion gallons of fuel for a congestion cost of \$121 billion.<sup>9</sup> The volume of freight movement alone is forecasted to nearly double by 2020. Congestion is largely thought of as a big city problem, but delays are becoming increasingly common in small cities, and some rural areas as well. Figure 3-13 is a map from the Federal Highway Office of Freight Management and Operations that shows areas projected to have peak period congestion in the year 2040.

**Figure 3-13: Peak-Period Congestion on the NHS, 2040**



Source: FHWA, Office of Freight Management and Operations, *Freight Analysis Framework*, 2015

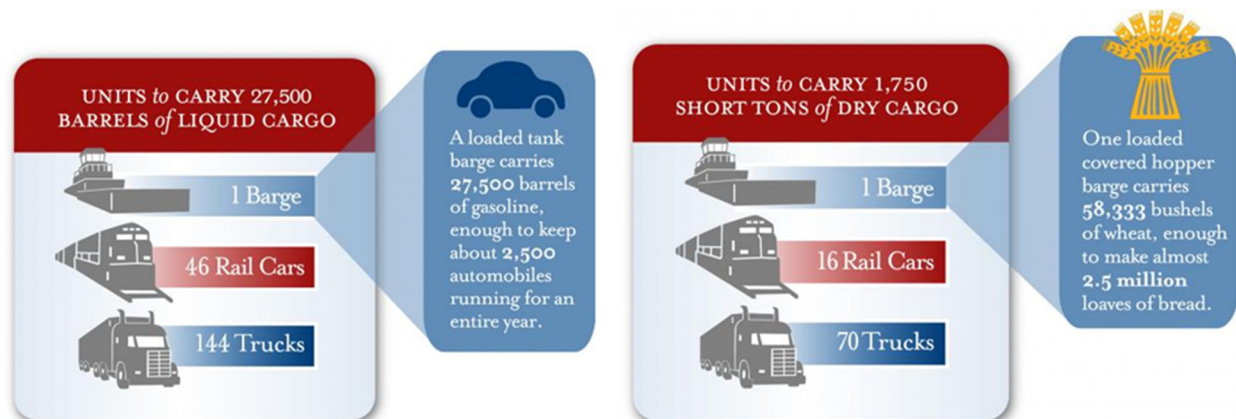
<sup>9</sup> Texas Transportation Institute, 2012 Urban Mobility Report.

The inland waterway system has the capacity and facilities necessary to serve as a reliever system for some of the surface freight traffic. The annual traffic on the inland waterway system, including the Gulf Intracoastal Waterway and the Ohio, Mississippi, and Columbia-Snake River systems, carries the equivalent of 51 million truck trips each year.<sup>10</sup> This total does not include any of the Marine Highways included in the MARAD Marine Highway program. The development of freight service on the M-10 Marine Highway along the northern Gulf Coast, and the M-95 Marine Highway along the Atlantic Coast, has the potential to greatly increase this total.

In addition to the available capacity of the inland waterway system, tug assisted barges and other self-propelled vessels are able to move larger, heavier loads much more efficiently than trucks or even rail. In 2012, the Texas Transportation Institute published, "A Modal Comparison of Domestic Freight Transportation Effects on the General Public".<sup>11</sup> This report provided a detailed comparison of the various freight modes including analysis on cargo capacity, congestion issues, emissions issues, energy efficiency, safety impacts, and infrastructure impacts. The report was completed with cooperation from the National Waterways Foundation. The infographics that follow were created using results of the study.

Figure 3-14 compares the number of barges, rail cars, and heavy trucks required to move an equivalent amount of liquid and bulk cargo. This graphic is particularly useful at showing the potential for waterborne commerce to help in reducing roadway congestion. A single barge is able to carry the same amount of cargo as 144 trucks of liquid cargo, and 70 trucks of dry cargo.

**Figure 3-14: Comparison of Modal Ability to Carry Equivalent Cargo**



Source: American Waterways Operators, 2015

Due in part to the simple fact that fewer engines are required to move the same amount of freight, waterborne freight also has the potential to produce less emissions than the other modes. This will only become more important in the future as additional efforts and regulations to reduce emissions are implemented. The U.S. Environmental Protection Agency (EPA) estimates that 27% of the nation's annual greenhouse gas emissions come from transport related activity.<sup>12</sup>

<sup>10</sup> National Waterways Foundation, *Waterways: Working for America* Brochure, 2012.

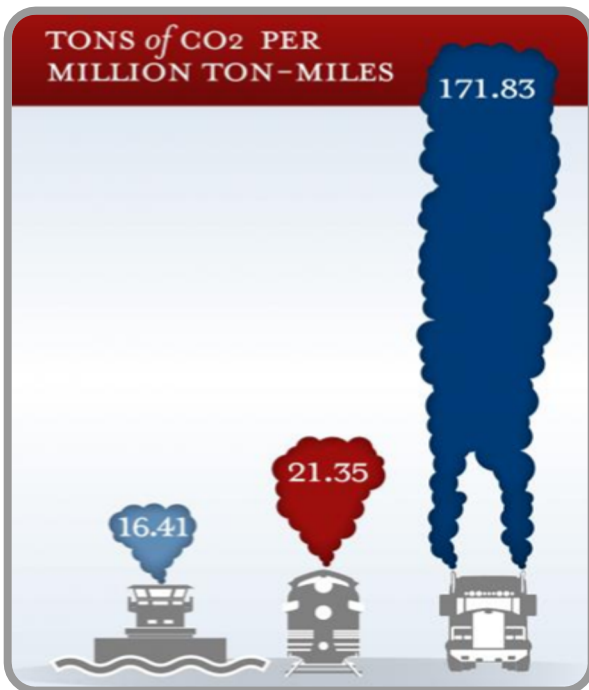
<sup>11</sup> Texas Transportation Institute, *A Modal Comparison of Domestic Freight Transportation Effects on the General Public 2001-2009*, Feb 2012

<sup>12</sup> Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2007*.

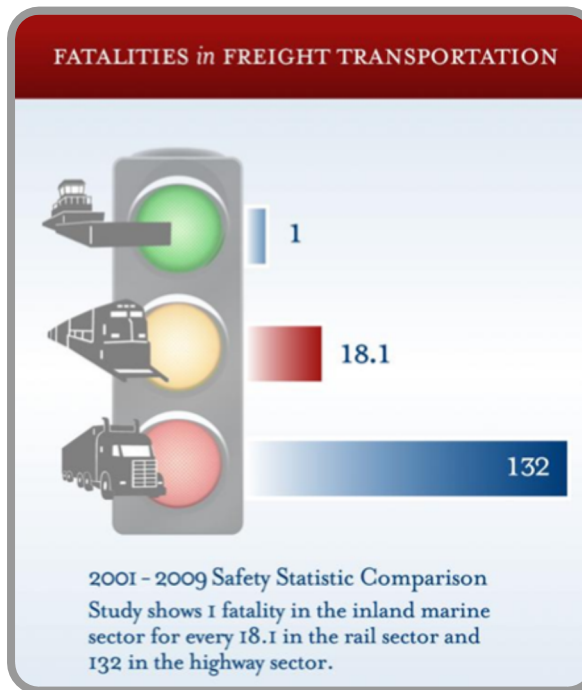
Figure 3-15 shows the number of tons of CO<sub>2</sub> (carbon dioxide) emitted by each mode during the shipment of a million ton miles. A ton mile is one ton of freight carried one mile, as a unit of traffic. Barges emit less CO<sub>2</sub> than rail, and significantly less CO<sub>2</sub> than trucks.

Barges and waterborne traffic also compare favorably to the other modes when safety is considered. Figure 3-16 shows that the inland marine sector had the lowest number of fatalities from 2001-2009.

**Figure 3-15**  
CO<sub>2</sub> Emissions by Mode



**Figure 3-16**  
Fatalities in Freight Transportation by Mode



### 3.4.2 TECHNOLOGICAL ADVANCEMENTS IN WATERBORNE FREIGHT

As with all sectors of the freight and transportation industry, technology is rapidly advancing and changing the nature of the waterborne freight industry. Some of the primary areas in which technology is advancing are discussed in greater detail within this section, and include automatic identification systems (AIS) and vessel tracking, alternative fuel technologies, smart waterway infrastructure, and autonomous marine vehicles.

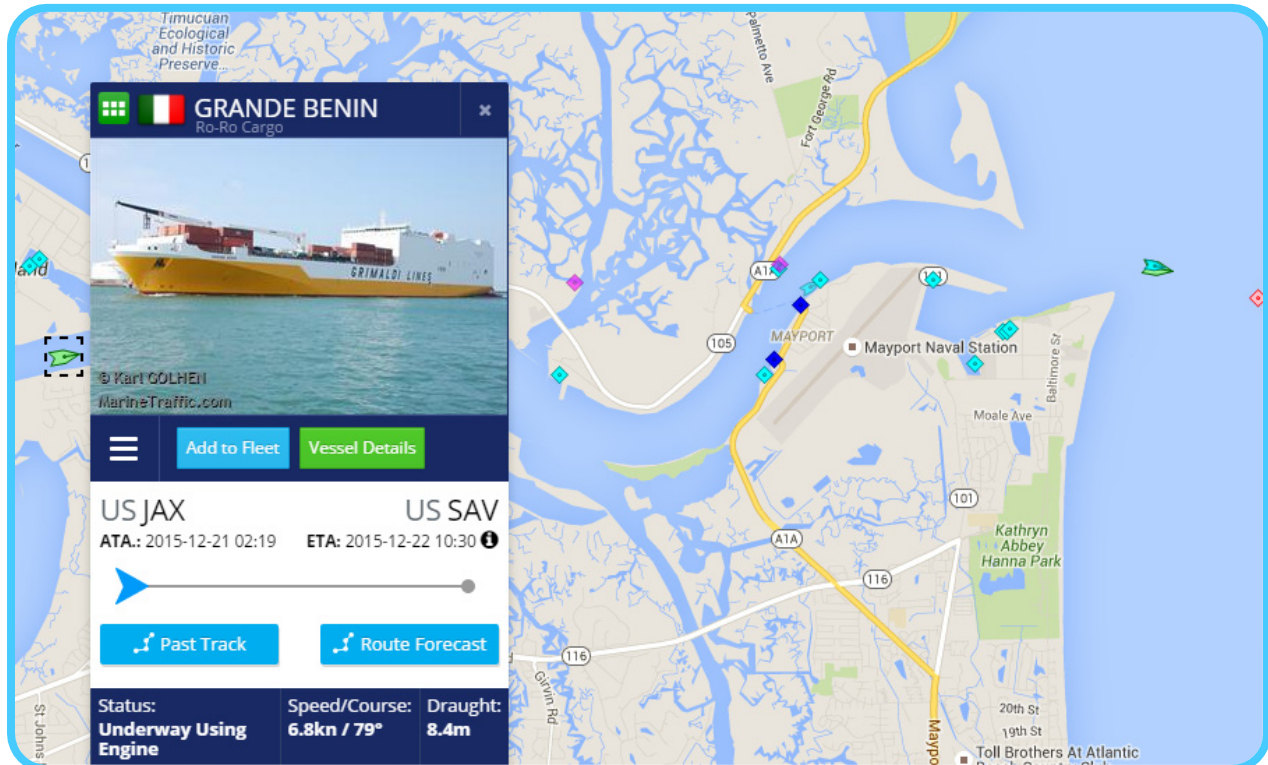
#### 3.4.2.1 Automatic Identification System (AIS)

The automatic identification system (AIS) is a maritime navigation safety communications system adopted by the International Maritime Organization (IMO) that provides vessel information, including the vessel's identity, type, position, course, speed, navigational status, and other safety-related information automatically to appropriately equipped shore stations, other ships, and aircraft; receives automatically such information from similarly fitted ships; monitors and tracks ships; and, exchanges data with shore-based facilities. The system is similar in function and purpose to the air traffic control systems used by control towers at airports.

AIS is used by the U.S. Coast Guard to monitor vessel traffic at the 12 Vessel Traffic Services (VTS) across the nation. VTS are staffed by the Coast Guard and local partner personnel at the busiest U.S. ports and harbors. The VTS provides active monitoring and navigational advice for vessels in particularly confined and busy waterways. VTS utilizes a wide range of techniques and capabilities aimed at preventing vessel collisions, rammings, and groundings in the harbor, harbor approach navigation, and inland waterway navigation. They are also designed to expedite ship movements, increase transportation system efficiency, and improve all-weather operating capability.

The first federal AIS requirements became effective in 2003, and were recently amended in January 2015, to expand the vessels required to have AIS equipment installed. The changes also require vessels falling under the regulation to install and utilize AIS in all waterways, whereas these vessels were previously only required to operate their AIS system when transiting waters covered by a VTS. Smaller recreational and commercial vessels remain exempt from the requirements.

### Screen Shot of Internet Based AIS System



Source: MarineTraffic.com, 2015

The Coast Guard is in the process of rulemaking to comply with Section 410 of the Coast Guard and Marine Transportation Act of 2004, which directs the Coast Guard to prescribe regulations requiring AIS equipped vessels operating in the navigable waters of the United States to be equipped with, and operate, an electronic chart system. The combination of AIS and electronic charts will allow the marine transportation system to realize the full safety and security benefits of this technology.

### 3.4.2.2 Alternative Fueled Vessels

In 2015, TOTE Maritime and General Dynamics NASSCO launched two 3,100 TEU Liquefied Natural Gas (LNG) powered containerships. These first of their kind ships will be used to service the trade route between Jacksonville, Florida and San Juan, Puerto Rico. The two vessels will refuel at a new LNG Terminal in Jacksonville.<sup>13</sup> In addition to Tote's new vessels, Crowley is in the process of constructing their first LNG-powered ConRo ships, which will service their Puerto Rico partners.<sup>14</sup>



Source: Tote Maritime, 2015

The use of LNG will reduce each vessel's emissions by 97%, helping to achieve compliance with enforcement of the North American Emission Control Area, the International Maritime Organization's (IMO) international air pollution control program.<sup>15</sup> The purpose of this program is to limit the amount of sulfur emissions from vessels, effectively prohibiting the use of bunker fuel within 200 miles of the United States. This law is anticipated to reduce emissions, but comes with a cost to shippers who have to convert vessels to costly cleaner burning fuels, replace current equipment with expensive LNG engines, or add emission scrubbers on to the vessels smoke stacks.

### 3.4.2.3 Autonomous Marine Vehicles

In the summer of 2015, FDOT provided a Florida Autonomous Vehicle (FAV) grant to develop the use of Unmanned Surface Vehicles (USVs) for bridge inspections. FDOT has approximately 11,450 state bridges, spanning rivers, canals, bays, and intracoastal waterways. Through the FAV grant, the College of Engineering and Computer Science at Florida Atlantic University (FAU) received \$187,000 to research and develop the use of unmanned marine vehicles for assistance in required inspections of these bridge

#### 2015 FAU and FDOT Bridge Inspection by USV



Source: Florida Atlantic University and FDOT, July 2015

structures. Unlike manned vessels operated by a human user, unmanned surface vehicles operate autonomously of human intervention and can operate for prolonged periods of time. FDOT currently inspects the 11,450 bridges at least once every other year. Bridge piling inspections at the waterline and underwater can be difficult at times, with tidal currents, waves, coastal winds, and other factors.

USVs are being increasingly used in applications that include ocean sampling, maritime search and rescue, hydrologic surveys, harbor surveillance, and defense. Other uses will become increasingly necessary and viable, like navigational aid inspections and waterway monitoring.

<sup>13</sup> Tote Marine, Marlin Class Vessel Specifications, 2014

<sup>14</sup> Crowley, Commitment Class, LNG-Powered, ConRo Vessels, 2015

<sup>15</sup> EPA Nonroad Engines and Vehicles. "Ocean Vessels and Large Ships", <https://www3.epa.gov/otaq/oceanvessels.htm>.

The primary goal of the FDOT project was to initiate research needed to develop capabilities for USV-based bridge inspections in the future. Particularly promising advances in research for bridge inspections include automatic path planning, which uses preprogrammed coordinates for assigned inspection, and real-time mission goals, which allow the inspection vessel to change its missions with remote supervisory control for on-the-fly updates and operational environment mapping.

### 3.4.3 SAFETY AND SECURITY

The same open oceans, waterways, and shipping channels that facilitate commerce and the global economy may also be used to bring danger or harm to the United States and its citizens. This challenge of balancing the efficient movement of vessels, and doing so in a regulated and safe manner is not new, nor is it likely to get easier in the near future. There are a variety of concerns and potential hazards related to water transportation. These include the safety and security of passenger vessels such as cruise ships; the safe movement of hazardous materials often shipped via intermodal containers on cargo ships; the potential for waterborne terrorist attacks; the security needs of sensitive waterfront facilities such as military bases; power generation plants and fuel terminals; and, the general safety of maritime industry and recreational boaters. There are a number of governmental and private organizations working to provide safety and security on the waterways.

Law Enforcement agencies at all levels are involved in, and routinely patrol, the nation's waterways. In Florida, the U.S. Coast Guard, U.S. Customs and Border Protection, National Marine Fisheries Service (NMFS), Florida Fish and Wildlife Conservation Commission (FWC), local Police Departments, and County Sheriff Departments all have presence on the waterways and waterfront facilities. In addition, ports have their own security personnel, whether direct port employees or on contract to enforce the provisions of the federal Maritime Transportation Security Act (MTSA) of 2002, as amended, as well as state and local laws.

The Coast Guard has been responsible for the security of the ports and waterways of the United States during times of war since the enactment of the Espionage Act of 1917. After World War II, the Magnuson Act of 1950 assigned the Coast Guard an ongoing mission to safeguard U.S. ports, harbors, vessels, and waterfront facilities from accidents, sabotage, or other subversive acts. Following the terrorist attacks of September 11, 2001, these authorities took on new importance. This includes denying terrorists the use of the U.S. maritime domain and the U.S. Marine Transportation System (MTS) to mount attacks on U.S. territory, population, or critical infrastructure. The MTSA was passed in 2002 as a response to the changed risk profile of the nation's ports, waterways, coastal areas, MTS, and Maritime Critical Infrastructure and Key Resources (CI/KR). Under this Act, Coast Guard Captains of Port Zones were designated as the Federal Maritime Security Coordinators (FMSC) and charged with overseeing the establishment of Area Maritime Security Committees (AMS Committees) and the corresponding Area Maritime Security Plans (AMS Plans). The Coast Guard thus became the lead agency for coordinating all maritime security planning and operations in our ports and waterways. These activities encompass all efforts to prevent or respond to attacks.

### 3.4.3.1 Area Maritime Security Committees (AMSC)

The AMS Committees were established to provide a link for contingency planning, development, review, and updates of AMS Plans, and to enhance communication between port stakeholders within federal, state, and local agencies, and maritime industry to address maritime security issues. There are currently 43 AMS Committees, and some larger Coast Guard Port Zones have more than one. Larger AMS Committees may further be divided into specialized sub-committees, such as committees assigned to address the Port Security Grant Program (PSG) or Transportation Worker Identification Card (TWIC) implementation.

An AMS Committee is composed of at least seven members who have an interest in the security of the area and who may be selected from various organizations and agencies. Additional partners and stakeholders may participate by invitation of the Captain of the Port Zone with AMS Committees, and appointed members serve individually for a term of no more than five years. These members must each have five or more years of experience related to maritime or port security operations. In most instances, the AMS Committees have a broad membership representing a community-wide or regional responsibility for maritime security. Members are appointed, and may be selected from several different agencies, including those listed below:

- Federal, Territorial, or Tribal government
- State government and political subdivisions
- Local public safety, crisis management and emergency response agencies
- Law enforcement and security organizations
- Maritime industry, including labor
- Port stakeholders affected by security practices and policies

The AMS Committee has a variety of responsibilities, but serves primarily to provide advice and assistance to the FMSCs in conducting training, assessing vulnerabilities, and mitigating risks in support of the Area Maritime Security Plan (AMS Plan). In addition to day-to-day security needs, AMS Committees are vital in planning and preparation for security during unique events, such as super bowls and national political conventions when held in waterfront locations. Specific duties of the AMS Committee include:

- Identifying critical port infrastructure and operations
- Identifying risks
- Determining mitigation strategies and implementation methods
- Developing and describing the process to continually evaluate overall port security
- Providing advice to, and assisting the Captain of the Port in, developing the AMS Plan

The AMS Committee also serves as a link for communicating threats and changes in Maritime Security (MARSEC) Levels, and disseminating appropriate security information to port stakeholders and waterway users. One of the primary roles of the AMS Committee is to advise the Facility Security Officer (FSO) on the continual development, review, and update of the AMS Plan. The AMS Plans are a vital effort to develop deterrence, protection, security responses, and recovery strategies and procedures for Transportation Security Incidents (TSI). In addition, they provide for other maritime security needs, and heighten the level of security in the ports and coastal waterways of the United States. AMS Plans are required to be consistent with the National Maritime Transportation Security Plan and the National Transportation Security Plan. AMS Plans are also required to be integrated with required individual local facility and vessel security plans, as well as the hazard mitigation and resumption of trade plans.



The detailed requirements of MTSA implementation are found in the Code of Federal Regulations (CFR). For additional information and security requirements, the following sections should be consulted:

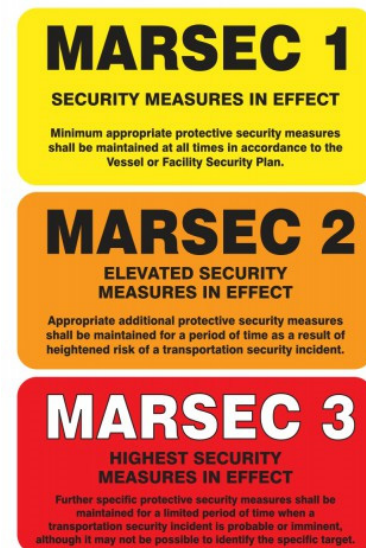
- 33 CFR 101 – Maritime Security General – has definitions, discusses alternatives and equivalencies, MARSEC levels & MARSEC Directives, and introduces TWIC.
- 33 CFR 103 – Area Maritime Security – is necessary to comply with ISPS Code – it contains all Area Maritime Security (AMS) information.
- 33 CFR 104 – Maritime Security Vessels – covers security requirements for vessels.
- 33 CFR 105 – Maritime Security Facilities – covers security requirements for facilities.
- 33 CFR 106 – Marine Security Outer Continental Shelf (OCS) Facilities – covers security requirements for offshore facilities.

### 3.4.3.2 U.S. Coast Guard Maritime Security Levels

The Coast Guard has a three-tiered system of Maritime Security (MARSEC) levels, consistent with the National Terrorism Advisory System (NTAS). MARSEC levels provide a means to easily communicate coordinated, pre-planned, and scalable responses to heightened levels of threat.

Levels are set to reflect the prevailing threat environment to the marine elements of the national transportation system, including ports, vessels, facilities, and critical assets and infrastructure located on, or adjacent to, waters subject to U.S. jurisdiction. The Commandant of the U.S. Coast Guard sets MARSEC levels in close alignment with threat conditions of the NTAS, but because of the unique nature of the maritime industry, MARSEC levels will not correlate precisely. MARSEC levels may be adjusted for a single port, region, or even nationwide, and are required to be posted at waterfront facilities and on vessels.

- MARSEC Level 1: minimum appropriate security measures shall be maintained at all times. MARSEC 1 generally applies when the Homeland Security Advisory System (HSAS) Threat Condition Green, Blue, or Yellow is in effect.
- MARSEC Level 2: appropriate additional protective security measures shall be maintained for a period of time as a result of heightened risk of a transportation security incident. MARSEC 2 generally corresponds to HSAS Threat Condition Orange.
- MARSEC Level 3: further specific protective security measures shall be maintained for a limited period of time when a transportation security incident is probable, imminent, or has occurred, although it may not be possible to identify the specific target. MARSEC 3 generally corresponds to HSAS Threat Condition Red.



Source: U.S. Coast Guard, 2015.

### 3.4.3.3 Port Security Grant Program

The Port Security Grant (PSG) Program is the Department of Homeland Security's (DHS) primary grant program to support maritime transportation infrastructure. The goal of the program is to strengthen the critical infrastructure in the United States against risks associated with potential terrorist attacks. Table 3-11 shows the 2015 PSG program awards in Florida.

**Table 3-11: 2015 PSG Program Awards in Florida**

Awardee	Area Maritime Security Committee (AMSC)	Amount Awarded
Florida Fish and Wildlife Conservation Commission (FWC)	Port Canaveral	\$173,241
Port Canaveral (Canaveral Port Authority)	Port Canaveral	\$675,675
Broward County Sheriff's Office	Port Everglades	\$131,376
City of Fort Lauderdale	Port Everglades	\$874,312
Florida Fish and Wildlife Conservation Commission (FWC)	Port Everglades	\$173,241
Port Everglades (Broward County Board of County Commissioners)	Port Everglades	\$1,265,887
St. Lucie County	Fort Pierce	\$325,633
City of Jacksonville / Jacksonville Sheriff's Office	Jacksonville	\$35,512
JAXPORT (Jacksonville Port Authority)	Jacksonville	\$1,050,000
Nassau County Board of County Commissioners	Jacksonville	\$27,755
St. Johns County Fire Rescue	Jacksonville	\$420,000
Tynda Holdings, LLC	Jacksonville	\$39,000
City of Key West Port	Key West	\$99,475
Florida Fish and Wildlife Conservation Commission (FWC)	Miami	\$173,241
Miami River Marine Group	Miami	\$57,324
PortMiami (Miami-Dade County)	Miami	\$153,938
Hillsborough County Sheriff's Office	Tampa Bay	\$57,500
Port Manatee (Manatee County Port Authority)	Tampa Bay	\$326,250
Port Tampa Bay	Tampa Bay	\$1,609,440
<b>Florida PSGP Total</b>		<b>\$8,268,800</b>

Source: U.S. Department of Homeland Security, Port Security Grant Program Fact Sheet, 2015

The vast majority of U.S. maritime critical infrastructure is owned and operated by state, local, and private sector maritime industry partners. PSGP funds are made available to these entities to improve port-wide maritime security risk management; enhance maritime domain awareness; support maritime security training and exercises; and, to maintain or reestablish maritime security mitigation protocols that support port recovery and resiliency capabilities. PSGP investments must address Coast Guard identified vulnerabilities in port security, and support the prevention, detection, response, and/or recovery from attacks involving improvised explosive devices (IED) and other non-conventional weapons.

Pursuant to the MTSA of 2002, as amended, DHS established a risk-based grant program to support maritime security risk management. Funding is directed towards the implementation of AMS Plans and Facility Security Plans (FSP) among port authorities, facility operators, and state and local government agencies that are required to provide port security services.

In administering the grant program, national, economic, energy, and strategic defense concerns based upon the most current risk assessments available shall be taken into account. By law, DHS must direct these funds to the nation's highest risk ports. Eligible entities within other port areas covered by an AMS Plan are also able to apply for PSGP funds. There was \$100 million available for funding in Fiscal Year 2015, with 19 Florida projects chosen for funding, for a total award of \$8.2 million.

### **3.5 CONCLUSION**

This chapter is important to better understand the waterway systems primary uses, benefits, and trends. International and domestic commerce was reviewed in the beginning of the chapter, with breakdowns provided of overall imports, exports, and domestic trade. Additionally, trends related to overall tonnages and container shipments by direction, along with major commodities shipped by water, were discussed. This section looked at the types of vessels used for waterborne shipments by type and cargo amount. A deeper look into specific Florida waterway activities and trends first provided a regional comparison of selected competitive states, followed by a focused analysis of Florida's trade by direction, and then broke down the analysis by individual public seaport. A demographic overview of coastal populations related to Florida's counties helped to show how rapidly the waterways are being effected by population growth. This population growth, coupled with the commercial and recreational activities, gave a solid understanding of alternative waterway activities that impact the overall system. Some impacts related to waterways are also effected by technology, stewardship, safety, and security, which are critical to future development of the waterways systems.

Chapter four will explore the national and state trends, and discuss the key issues identified by Florida's primary waterway stakeholders. These together will then later be used to develop Seaport and Waterway Office focus areas that align with the Goals and Objectives of the Florida Department of Transportation's long range planning process.





# 4. KEY ISSUES

Chapter four describes the issues and process used to identify key issues and hindrances faced by Florida’s waterways. These issues were identified through research and review of statewide issues from related plans and studies, stakeholder outreach efforts and waterway related research conducted through the plan development process. They include maintenance dredging and funding; bridge clearance and drawbridge schedules; regulations and permitting; waterway access; and, data and information.

## 4.1 STATEWIDE ISSUES FROM RELATED PLANS

The Florida Department of Transportation is unique among state DOTs, with an office directly representing both seaports and the state’s waterway system. The Seaport and Waterways Office facilitates state funding contributions toward waterways and seaports. FDOT Seaport and Waterways funds are primarily focused on Florida’s 15 public seaports and their associated waterways. This plan provides an opportunity for the state to consider the entire waterway system and determine if investments may be warranted to support the broader waterway system.

FDOT, with many partners, has produced multimodal plans over the past two decades. These plans have set in place the systematic structure for developing policy and procedures to improve Florida’s intermodal transportation system. A list of plans utilized during this plan update process include:

- Florida Transportation Plan (2010) and available updates (2015)
- Florida Strategic Intermodal System (SIS) Strategic Plan (2010) and available updates for the 2015 SIS Plan
- Florida Freight Mobility and Trade Plan (2014) both Policy and Investment Elements
- Trade and Logistics Study 1.0 (2010) and 2.0 (2013)
- Florida Seaport System Plan (2010)
- Florida Waterway System Plan (2008)
- Florida Waterway System Plan (2003)

In the process of identifying statewide issues related to the Florida waterway system, many of these plans were reviewed specifically to extract the waterway–system related issues. Primarily, the review process focused on several studies, including both elements of the Freight Mobility and Trade Plan (FMTP), Trade and Logistics Study 2.0, and the former Waterway System Plans.

The Florida FMTP identified a variety of key freight issues faced by Florida. These issues were identified during extensive collaborative outreach efforts consisting of regional stakeholder sessions, a freight leadership forum, and business forums.

Negative conditions identified in 2013/14 during FMTP outreach included:

- Workforce Education and Availability – identified as a need for secondary, post-secondary, and vocational education for freight and maritime related employment.
- Freight Flow Imbalances Across All Modes – addressed in the freight plan and other state plans to meet the challenges related to limited funding for many.
- Lessened Local Approach to Freight Emphasis – many metropolitan planning organizations and local planning authorities lack understanding or focus on freight related issues or needs.
- Congestion – this is an identified issue across many transportation plans and is an important freight related issue that impacts safety, efficiency and costs for freight companies.
- Funding Availability – ongoing issue across transportation modes specifically related to freight at seaports, intracoastal waterways, public access facilities and other waterway facilities.
- Lack of Specific Modal Availability in Every Region – intermodal connectivity provides cost saving and alternative methods to move goods to market both domestic and international.
- Federal Slowdown of Trade Due to Staffing – this freight issue was identified related to Customs and Border Protection and lack of federal funding to have enough agents and inspectors.

Anticipated future challenges identified in 2013/14 during FMTP outreach included:

- Planning for the “Last Mile” – this includes planning infrastructure that is considered a connector like roads, rail, and waterways that connect a corridor to a hub facility or terminal.
- Addressing Conflicting Goals – freight plan goals that conflict with other transportation initiatives.
- Climate Change – identified challenge to waterway systems related to sea-level rise and impacts.
- Education of Citizenry and Officials of Importance of Freight Planning – this refers to an approach to elevate freight initiatives for public, private and law makers by better understanding of impacts and needs.
- Congestion – this challenge is to address the issue of congestion with suggestions to better utilize ports and waterways.
- Funding – this was addressed in the FMTP and other state plans to meet the challenges related to limited funding for many waterway and seaport infrastructure projects like dredging and berth repairs.

In 2010, the Florida Chamber Foundation joined with FDOT in completing the Florida Trade and Logistics Study 1.0. This study was one of the early efforts to set the stage for increased freight planning in Florida. The study identified the following challenges faced by the state:

- Imbalance of Trade Flows – the Florida Chamber described the recent trade imbalance with imports vs. exports and the increase of imports vs. exporting of Florida manufactured goods and agriculture.
- Florida Container Cargo Using Out-of-State Seaports – over 300,000 thousand containers are currently using out of state ports that are destined to Florida.
- Florida’s Geographic Location Relative to National U.S. Distribution Patterns – shifting trade lanes, near shoring, and regulatory zones like ECA have a real positive impacts on trade for Florida.
- Limited Penetration of Asian and European Trade Lanes – this issue is related to infrastructure needs like deep dredge and container handling equipment.

- Transportation System Capacity – this impact is related to transportation infrastructure needs and from congestion from rapid population growth and commercial development.
- Limited Funding – is an issue that is on-going and identified specifically as a waterway issue in many reviewed plans.

The previous Florida Waterway System Plans, completed in 2003 and 2008, identified challenges that the state faced to meet the projected demand of waterborne commerce and passenger movement. These challenges included:

- Maintaining the Navigability of Waterways – this remains an on-going waterway issue and directly ties to other issues like lack of funding and regulatory and federal government slowdown.
- Lack of Funding – this is an ongoing issue that was identified in every major reviewed plan as an issue related to waterway infrastructure projects like dredging and infrastructure.
- Environmental Concerns – this issue is related to both the mitigation of natural resources and impacts from invasive species causing navigational hindrances
- Waterway Congestion – many of the key waterways like the AIWW are having major issues with too much traffic both recreational and commercial and the conflicts that occur.
- Implications of Federal Law such as the Jones Act – federal legislation can be restrictive to growth and many laws written decades ago need to be revised or removed to reduce issues.

The primary challenge identified in the prior Waterway System Plans was the navigability of major waterway channels. There are a variety of factors that can impede the navigability of a waterway, such as sediment build-up, shoaling, sand bars, strong currents, low tidal ranges, debris, derelict vessels, damage from natural disasters like hurricanes, and lack of funding for maintenance. The USACE has a backlog of maintenance dredging projects and lacks congressionally appropriated funds for many of these projects. Any phenomenon that impedes or limits a channel's depth or width can limit a waterways usefulness and economic viability. Invasive species can also limit a waterways usefulness, with plants such as hydrilla and water hyacinth able to completely choke off waterways, making them impassable. The cost to mitigate environmental impacts is a major impediment to maintaining or expanding waterway systems. Potential future challenges that directly impact navigation include increased traffic congestion at waterway choke points like narrow channels and passes, and air draft clearance on bridge structures.

Adequate funding is another challenge identified in the previous waterway plans. For waterway projects, the authority to complete a waterway improvement project and the funding appropriated to do so are separate, but related, items. The authority to complete projects is given to the USACE via the Water Resources Reform and Development Act (WRRDA), along with state and local water resource permits. The latest WRRDA, also known as H.R. 3080<sup>1</sup>, was signed into law on June 10, 2014. WRRDA is the congressional authorization for projects that have been studied and approved by the Chief of the Army Corps of Engineers (USACE). This legislation is the main vehicle for authorizing new water projects to be studied, planned, and developed by the USACE. Once studies and projects are authorized by a WRRDA, they still need to be funded through the annual congressional appropriations process, and funding is not guaranteed. This potential lack of funding serves to make the factors impeding the navigability of waterways more difficult to address.

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<sup>1</sup> H.R.3080 — 113th Congress (2013–2014) Public Law No: 113–121 (06/10/2014)

## 4.2 STAKEHOLDER OUTREACH

Stakeholder outreach was a key component in the effort to identify issues and constraints impacting the current utilization and future potential growth of Florida’s waterway system. To begin the outreach effort, a list of 17 waterway stakeholders was developed. The identified stakeholders were then invited to participate in the planning process via letter with an attached survey (Appendix C), requesting their industry, governmental, or related agency input on various aspects of the states waterway system. The surveys were followed up with phone interviews and in-person meetings. At the conclusion of the stakeholder outreach process, there were a total of eight in-person meetings held, with an additional six teleconference meetings conducted. In total, 12 survey responses were received, or about 70% of the initial request. Due to the large variety of stakeholders involved in the overall waterway system, the stakeholders were categorized according to their primary relationship to the waterway system. A more detailed description of the categories and participating stakeholders is presented in subsequent sections.

### 4.2.1 PARTICIPATING STAKEHOLDERS

For the purposes of organization, stakeholders of the plan were categorized into four main groups, based on their organizational type or primary interests. Categorizing stakeholders this way is helpful in understanding their organizational missions, priorities, resources, and needs. It also provides greater insight into the way they prioritize issues and trends facing the waterways. The four categories of stakeholders are described in the following sub-sections.

#### 4.2.1.1 Waterway Providers and Maintainers

This group of stakeholders primarily includes the governmental organizations charged with funding, providing access to, and maintaining the waterway system. This includes dredging projects on channels and inlets; maintaining the U.S. Aids to Navigation System; maintaining regulatory and safety messaging for state and local law enforcement including signage for speed and manatee zones; enforcing boating safety and operation laws; providing access facilities such as boat ramps and marinas; and, administering programs for public education. The stakeholders in this group are listed below:

- U.S. Army Corps of Engineers (USACE)
- Florida Inland Navigation District (FIND)
- West Coast Inland Navigation District (WCIND)
- United States Coast Guard (USCG)
- Florida Fish and Wildlife Conservation Commission (FWC)
- Local Governments



#### 4.2.1.2 Commercial Users

This group of stakeholders primarily represents the commercial and freight users of the waterways. The concerns of the commercial waterway stakeholders were centered on ensuring the waterway system is adequate for safe passage in and out of the intracoastal waterways, public and private harbors, seaports, and the channels. The harbor pilots are included, as they serve the larger vessels entering and leaving port. Seaports themselves are not included as they were separately interviewed for the Florida Seaport System Plan. The stakeholders in this group include the following:

- Miami River Marine Group (MRMG)
- Miami River Commission (MRC)
- Jacksonville Marine Transportation Exchange (JMTX)
- Gulf Intracoastal Canal Association (GICA)
- Florida Harbor Pilots Association (Pilots)

#### 4.2.1.3 Commercial Fisherman and Seafood Industry

These stakeholders include commercial fisherman and the waterfront seafood processing, wholesale, and retail establishments. Many of these are small family businesses, with many businesses owning both boats and seafood markets. The boats include larger shrimp and offshore vessels kept in the water and smaller oyster, mullet, and crab boats that are trailered and make use of boat ramps to enter and exit the waterway. The domestic commercial fishing and seafood industry faces several challenges, including regulations, foreign competition, and declining facilities due to coastal development in the state. The stakeholders in this group are listed below:

- Southeastern Fisheries Association (SFA)
- Gulf South Atlantic Fisheries Foundation (GSAFF)

#### 4.2.1.4 Recreational Users

This group is one of the largest and fastest growing groups of waterway users. The boats used by the recreational users include those trailered to boat ramps or kept at marinas. In addition, other users include transient boaters who sail mega-yachts that moor at a marina or an anchorage location around the state before cruising elsewhere. Primary concerns of this group include ensuring adequate public access to the waterways amid a growing population, consistency of regulations, and channel maintenance. The stakeholders in this group are listed below:

- Marine Industries Association of Florida (MIAF)
- Marine Industries Association of South Florida (MIASF)
- Florida Municipal Marina Association (Marinas)

## 4.3 ISSUES IDENTIFIED BY STAKEHOLDERS

As mentioned previously, stakeholder input was obtained through surveys, in-person meetings, teleconferences, and other communication. At the conclusion of these outreach efforts, the various issues and challenges identified by the stakeholders were organized into 12 main categories. Some of the categories were identified by stakeholders multiple times for separate reasons. These categories were then summarized into a matrix, shown below in Table 4–1, illustrating the issues and the stakeholders that identified them. The numbers in each block identify the number of comments or issues identified by each stakeholder.

**Table 4–1: Stakeholder Issues**

IDENTIFIED ISSUES	STAKEHOLDERS															Total	
	USACE	FIND	WCIND	USCG	FWC	Local Govt.	MRRMG	MRC	JMTX	GICA	Pilots	SFA	GSAFF	MIAF	MIASF		Marinas
<b>Waterway Dredging</b>	1	3	2	2	3	2	1	1	2	1	2	1	1	3	2	3	30
<b>Fixed Bridge Clearance/Drawbridge Schedules</b>	1	3			3		2		2	1				1	2	1	16
<b>Regulations/Permitting</b>	1	3	3		1		1		1			1		3	1		15
<b>Waterway Access</b>		3	1			1	1				1	1	1	1	1		11
<b>Availability of Data and Information</b>	2	1	1		1		2		1						1		9
<b>Waterway Funding</b>	2	2	1	1		1		1									8
<b>Increasing Vessel Traffic/Conflicts</b>	1	1	1		1	1				1				1		1	8
<b>Navigational Aids</b>			1	1	1	1				1							6
<b>Full Waterway Utilization</b>		2	1														3
<b>Derelict Vessels</b>					1											1	2
<b>Changing Technology LNG etc.</b>									1								1
<b>Anchoring and mooring areas</b>														1			1

Source: Stakeholder Outreach, summer and fall 2015

### 4.3.1 SUMMARY OF IDENTIFIED ISSUES

The top five issues identified by stakeholders were maintenance dredging, fixed bridge clearance and drawbridges, regulations and permitting, waterway access, and availability of current collaborative data and information resources. These issues are described in detail below. Other issues identified by stakeholders are also provided and briefly discussed at the end of this chapter.

#### 4.3.1.1 Waterway Dredging

Waterway dredging, including maintenance dredging and new dredge projects, was the principal issue raised by all stakeholders as vital to the success of Florida's waterways. This issue touches all of the stakeholders, no matter how they use the waterways. The issues identified with dredging include the dredging of federal navigation channels, inlets and passes, and off-channel dredging needs. Some hindering factors with maintenance and new project dredging activities include the availability of federal funds, local funding, permitting, and regulatory.

As with most infrastructure needs, one of the primary challenges mentioned is funding, or a lack thereof. When it comes to Florida's waterways, a large portion of dredging costs get deferred to the state, local sponsors like FIND, and member counties or local governments. Availability of federal funding for projects through two congressionally authorized trust funds are administered by USACE and require annual appropriations. These projects compete nationally with waterways like the Mississippi river and the Great Lakes, that both move large amounts of bulk tonnage and have many locks and large maintenance dredging requirements. The Harbor Maintenance Trust Fund (HMTF) and the Inland Waterways Trust Fund (IWTF) support cost-shared investments in federal navigation infrastructure for harbors and inland waterways, however, Florida's harbors and intracoastal waterways are widely considered donors since they typically do not receive as much federal funding as they contribute in taxes and fees. Maintenance funding for harbor-related maintenance activities is funded in large part from the HMTF. This trust fund receives revenues from taxes on waterborne commercial cargo imports, domestic cargo, and on cruise ship passengers at federally maintained ports. Similarly, roughly half of inland waterways construction appropriations are from the IWTF, which receives the proceeds of a fuel tax on barge fuel for vessels engaged in commercial transport on designated waterways.<sup>2</sup>

In order to start and complete new dredging projects, which include anything not previously authorized, the USACE needs to receive both project authorization and funding. Project authorization comes in the form of a Water Resources Development Act (WRDA) bill. WRDA is typically a biennial piece of legislation that is the main vehicle for authorizing projects to be studied, planned and developed by the USACE. Although intended to be biennial legislation, there have been several instances where past WRDA bills were not passed for up to 10 years. On June 10, 2014, the Water Resources Reform and Development Act (WRRDA) was passed and signed into law.<sup>3</sup> Section 7001 of WRRDA 2014 requires the USACE Secretary to publish in the Federal Register any requests for proposals for USACE project authorizations, studies and modifications to any existing projects, and must also produce an annual report to the Congress on future water resources development within that annual cycle.<sup>4</sup> On January 29, 2016, the USACE Secretary submitted the "2016 Report to Congress on Future Water Resources Development".<sup>5</sup> The House of Representatives Committee on Transportation and Infrastructure and the Senate Committee on Environment and Public Works will take into consideration the Annual Report as it prepares the next Water Resources Development Act.

<sup>2</sup> USACE, Water Resource Authorizations, Appropriations, and Activities, 2016

<sup>3</sup> Note: The Water Resources Development Act or WRDA is the historic name of USACE authorization bill. In 2014, policy issues were a major element of the Act, and the name was modified to reflect this component – Water Resources Reform and Development Act of 2014 (P.L. 113–121). Discussions and legislation introduced in 2016 reflect a return to the historic name of Act – WRDA.

<sup>4</sup> Water Resources Reform and Development Act of 2014 (P.L. 113–121)

<sup>5</sup> Report to Congress on Future Water Resources Development, 2016

### Dredging near Longboat Key, FL



Source: West Coast Inland Navigation District, 2015

Once a project is authorized by WRDA, a project must seek a federal appropriation. Funding for projects occurs through the annual USACE appropriations process; however, in recent years, Congress has not passed long-term funding bills or federal budgets. They have instead opted for short-term funding through continuing resolutions. The federal budget process and recent recession greatly impacted the ability of the USACE to program and complete dredging projects. In response to frustration from these federal delays, some ports and local waterway sponsors have begun authorized dredging projects without waiting on federal funding, instead using state and local money in anticipation of reimbursement of federal dollars in future appropriations.

However, as previously mentioned, Section 7001 of the WRRDA 2014 implemented new processes to try and mitigate for delays, and the USACE delivered its first such report to Congress in February of 2015, and again in January of 2016.

#### 4.3.1.2 Bridge Clearance and Drawbridge Schedules

The second issue most often mentioned was bridges, specifically the challenges they pose to vessel traffic. There were several types of issues associated with bridges, including the height of fixed bridges, the schedules of drawbridges, and construction and maintenance activities that block shipping channels.

Any time a bridge crosses a waterway, the height of the bridge or air draft underneath is of primary importance for vessels. The issue is of such importance that bridges crossing navigable waters of the U.S. must be approved by the local Coast Guard District Bridge Office. Most fixed bridges crossing the Intracoastal Waterway in Florida allow for an air draft of 65 feet; however, there are older bridges and private rail road bridges that are significantly lower. For a summary of the bridges spanning Florida's intracoastal waterways, (see table 1-4, page 1-28, Chapter 1.6.3.2). Many stakeholders noted how important it was to be aware of the heights of bridges.

The second set of issues relates to drawbridges and their opening schedule. The primary advantage of drawbridges is that when they are open they allow for an indefinite air draft; however, their primary drawback is that vessels can only pass when they are opened. The schedule for raising a bridge is dependent on the surface traffic on the roadways. In busy urban areas, drawbridges can cause severe roadway traffic congestion. All waterway users are impacted by these schedules, with both commercial and recreational stakeholders indicating it as an issue. Stakeholders identified that a streamline process is needed for adjusting drawbridge opening schedules of drawbridges on low volume, non-commercial waterways.

#### Venetian Causeway Bridge, Miami Beach, FL



Source: "Creative Commons Venetian Islands' Bridge" by Ines Hegedus-Garcia is licensed under CC BY 2.0

The third issue associated with bridges is the impact that construction and maintenance activities can have on the waterways. One stakeholder in the Northern Gulf Intracoastal Waterway noted concern about the construction plan for a new bridge over St. Andrews Bay that proposed closing the shipping channel for several months. The stakeholder, the Coast Guard, and the contractor for the project are developing an alternative plan for keeping the channel open during certain hours throughout the project.

#### 4.3.1.3 Regulations and Permitting

Another category of issues that received considerable mention was that of regulations and permitting. These issues are related to dredging, as most mentions of permitting were to explain the difficulties in getting dredging or other in-water projects approved and underway.

System providers and regulators involved in these permitting processes include the USACE, National Marine Fisheries Service (NMFS), Florida Department of Environmental Protection (FDEP), FWC, and local Navigation Districts and waterway partners. Many of the stakeholders interviewed mentioned environmental permitting as an issue that made it more difficult to deliver dredging projects in an efficient and timely manner, resulting in delays and increased costs. Most did mention that recent changes to FDEP's Environmental Resource Permit (ERP) to streamline the process have been a huge improvement and offered praise to that agency for being proactive with known issues.<sup>6</sup> Some additional suggestions included streamlining the process with national environmental groups, like Environmental Protection Agency (EPA) and NMFS, to speed up project delivery. The USACE has implemented a smart planning process, working with environmental review partner agencies earlier in the planning stages to speed up the overall permitting process.

#### St. Augustine Municipal Mooring Field



Source: Florida Fish and Wildlife Conservation Commission, 2015

The recreational boating industry identified regulations as a key issue for recreational boaters. There is concern that access is diminishing due to the creation of new speed, safety, and environmental zones. Some of these limit the boating public's use of certain areas, and increase congestion in unregulated areas. In some cases, the regulations relating to anchoring and mooring areas were also identified as problematic.

<sup>6</sup> Florida Department of Environmental Protection, Dredge and Fill Fact Sheet, 2015.

Many local governments have established their own regulations relating to municipal anchorages or mooring areas, and it is difficult for boaters cruising the coasts to keep track of the varying regulations. The recreational boating public identified the need for consistency with boating regulations across the state.

#### 4.3.1.4 Waterway Access

Almost all stakeholders indicated that access to the waterways is an issue of concern. As primary inland and intracoastal waterway advocates, the inland navigation districts have an expressed interest to provide the public unhindered access to those waterways. The districts have partnered with state and local governments on projects to make improvements at public boat ramps and other facilities. The stakeholders that were directly related to waterway recreation noted that the vast majority of boaters in Florida use boats by trailering to local boat ramps. The provision of these facilities has not kept pace with the population growth and demand of recent years. The commercial fishing and seafood industry also expressed concern over access to the waterways, but for a slightly different reason. Their primary concern was the shrinking amount of working waterfront in Florida, as development pressures continue along the state's coasts. Many areas that were once traditional working waterfronts, with seafood houses, piers, and docks, are being replaced by private residences and marinas. When commercial fishermen lose access in certain areas, they often have to travel farther to get to the fishing grounds and seafood processors, costing time and fuel in an industry in which it is increasingly difficult to be successful.

#### 4.3.1.5 Data and Information

The fifth most identified issue by stakeholders is the lack of, and need for, data and information regarding the usage and total economic impact of the waterways. One challenge with waterway planning that became apparent early in the update to this plan was the wide variety of stakeholders with varying priorities and areas of emphasis. Many of these stakeholders collect and maintain data related to their area of emphasis, but there is no single clearinghouse or comprehensive data set.

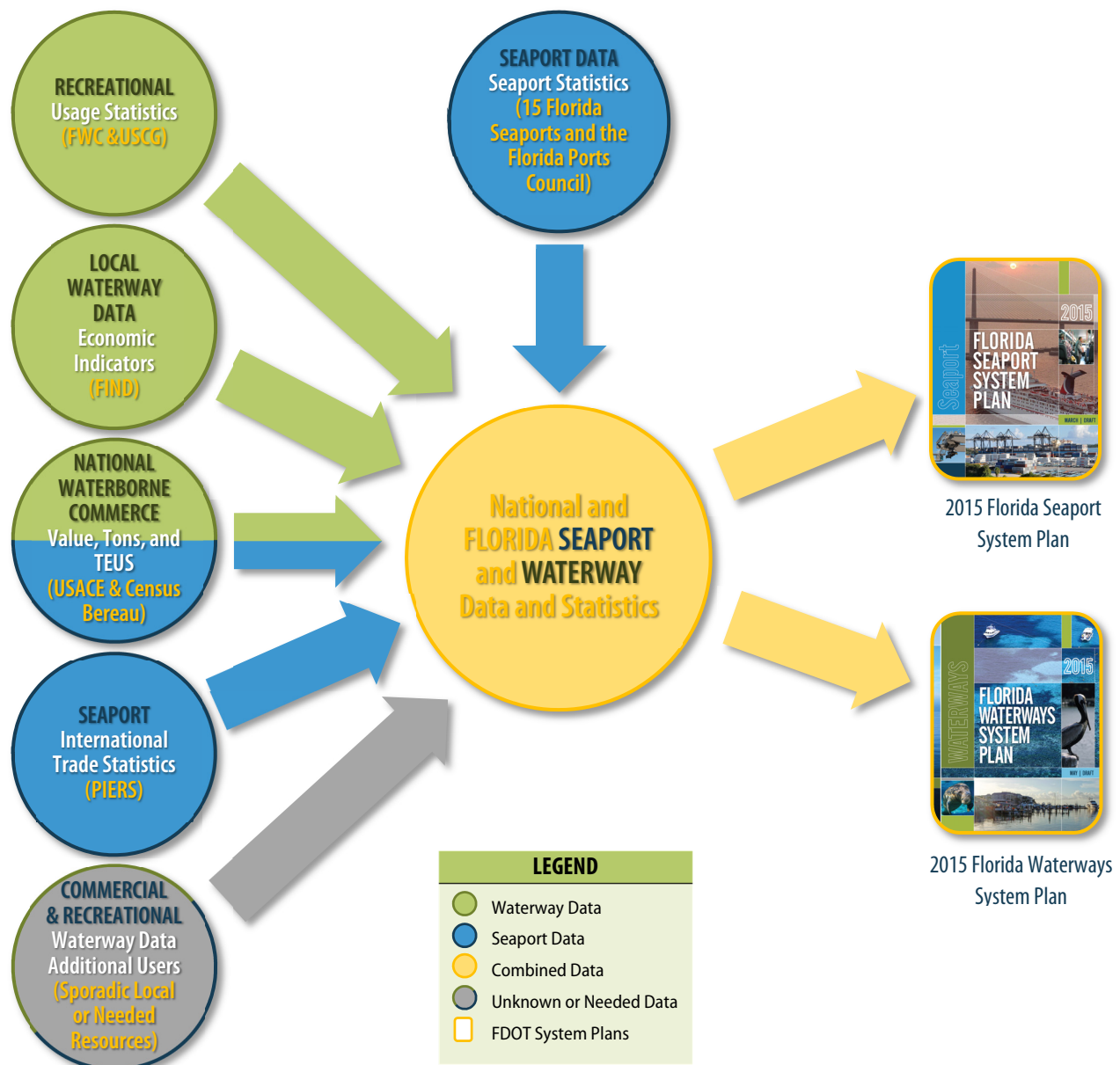
The premier data set related to freight economic activity on the waterways, The Waterborne Commerce of the United States, is maintained by the USACE Waterborne Commerce Statistics Center. The Center maintains a variety of databases all related to freight and commerce on the U.S. Waterway System. One shortcoming of these datasets is that they are not a complete representation of the total commerce occurring on the waterways, excluding noncommercial or non-freight economic activity, such as fishermen, recreational boating and yacht traffic. When the USACE conducts cost/benefit analysis on potential dredging projects, the criteria used focuses on freight and the impacts on commerce, failing to fully consider economic impacts created by other users.

Improving these or similar datasets to more fully capture the economic activity of all users would allow for more accurate cost/benefit analysis to be conducted and the state of Florida could gain insight from a detailed analysis of the private commercial, recreational and research initiatives that impact and create benefits from their use of the overall waterway system.

For example, FIND recently completed a study of the economic benefits associated with dredging the Dania Cut-Off Canal, used heavily by the mega yacht repair and maintenance industry. The study reported significant economic growth resulting from the project. Other stakeholders, such as the MIA SF, expressed concern that the true economic impact of recreational boating in Florida was not well understood or represented.

The resources used in this plan are illustrated in Figure 4–1, from recreational data sources, to local waterway data, national waterborne commerce, direct seaport data, and intermittent waterway user data. Although many of these resources provide solid data for analysis and uses in both the Seaport and Waterways Plan, some info related to private, commercial and industrial waterway users is dated or incomplete, and doesn't provide a complete picture of the waterway users and uses.

**Figure 4–1: National and Florida Waterway and Seaport Related Data Sources**



Source: FDOT, 2015

#### 4.3.1.6 Other Identified Issues

While not mentioned to the extent the top five issues were, the following seven issues were identified by stakeholders as important to waterways in Florida.

**WATERWAY FUNDING** – An issue closely related to the previous discussion on dredging, stakeholders identified this as a factor delaying dredging projects. Federal funding sources like the Harbor Maintenance Trust Fund and the Inland Waterways Trust Fund (IWTF) were both discussed as serious funding issues. Despite a large surplus in the trust fund, some of the busiest U.S. harbors are presently under-maintained. USACE estimated in a study presented to congress that 59 of the busiest ports have full access of their federally maintained channels less than 35% of the time. This is not only a funding issue, but a major cost to shippers having to carry less cargo with draft restrictions, or having time delays while waiting for higher tides so that they can enter ports.<sup>8</sup> State funding for SIS Corridors (i.e. waterways), Connectors (i.e. channels and harbors), and Hubs (i.e. facilities, terminals, and public seaports) was also discussed as an issue in areas like the Miami River, that until recently was ineligible for SIS funding as it was not a SIS waterway or a SIS designated seaport facility. Recently, the Miami River became eligible for funding, as it was designated as an Emerging SIS Waterway. Non-SIS hubs, terminals and industries on or adjacent to a SIS Waterway cannot typically receive funding outside the waterway corridor itself. This prevents funding of those facilities, harbors, and connecting channels, as they are not eligible SIS facilities. Larger facilities like ports are eligible because most public seaports in Florida are designated as SIS or as an Emerging SIS Hub and meet the SIS criteria mentioned in the previous chapter. However, private terminals, waterfront industries, or non-SIS seaports facilities benefit from improvement projects along a SIS designated waterways and could see additional benefit from a program to improve waterway connectors directly to those facilities.

Additionally, FWC mentioned a need for matching grants, as local governments often cannot regulate local waterway traffic without a study. These grants could provide the funding needed for boating traffic counts, and from there the local governments could get the data needed to put together these studies.

**SAFETY CONCERNS WITH INCREASING VESSEL TRAFFIC** – Increased vessel traffic and demand for waterway access is a concern for both commercial and recreational traffic. The rapid growth of non-motorized watercraft (kayaks, paddle boards, etc.) was also mentioned as a concern. While not large, these crafts increase congestion on the waterways and are often difficult to spot by larger vessels, presenting a safety issue.

**MAINTAINANCE OF NAVIGATIONAL AIDS** – Navigational Aids are the street signs of the waterways. They tell boaters where the channel is, identify special areas and zones, and provide other information necessary for safe transit and to help protect wildlife. The U.S. Coast Guard is the primary federal agency responsible for providing and maintaining the U.S. Aids to Navigation System. The Coast Guard reports that one of the issues they encounter on the Intracoastal Waterway is navigational aids getting moved off station. This can happen when the longer barges attempt to make turns on the system and strike the channel markers in the process.

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<sup>8</sup> Congressional Research Service, Harbor Maintenance Trust Fund Expenditures, 2011



This is also an issue for U.S. Fish and Wildlife Service and the FWC, who both manage and maintain NAVAIDS and boater information guides throughout Florida's waterways.

**UNUSED CAPACITY** – FIND and WCIND both identified the utilization of the waterways to their full potential as an area for exploration and growth. These two stakeholders mentioned potential alternative solutions to the growing transportation congestion in both passenger and freight on the highway transportation system, during both their phone and in-person interviews. These capacity constraints cause problems that the existing interstate and highway corridors cannot resolve with expansion alone and cannot sustain for safety and efficiency. They expressed support for the waterways systems as a modal alternative and mentioned that with better planning and coordination with local sponsors waterways could be effectively utilized as a reliever system to congested roadways. Chapter 3 has two sections that discuss some of the benefits to waterways transportation in, *Section 3.4.1.2 Waterways as a Modal Alternative and Section 3.4.1.3 Benefits of Waterborne Transportation*. In addition, both the SIS and MARAD Marine highways have designated waterway corridors that have the potential to fund projects for waterway development.

**REMOVAL OF DERELICT VESSELS** – Derelict vessels are vessels that are abandoned and left on the waterways. These vessels not only pose hazards to navigation, but can also pose hazards to the environment if there is any remaining fuel or oil on board. The FWC has a derelict vessel removal program, but currently there is limited funding available. This issue is particularly present in areas with larger recreational boating populations.

**CHANGING TECHNOLOGY** – Changing technology was mentioned as an issue of which the state should remain aware. The two new LNG powered container vessels entering service between Jacksonville and Puerto Rico were given as examples (see Chapter 3, Section 3.4.2.2).

**ANCHORING AND MOORING AREAS** – Anchoring and mooring areas were mentioned in conjunction with the need for consistent regulations across Florida. In some cases, mooring areas have not been received positively by residents living on the waterfront. Some residents believe mooring areas attract derelict vessels, and consider them as a negative rather than as a community amenity. Local regulations relating to issues like distance from shore and length of stay vary from place to place, causing confusion for transient boaters. The FWC established a pilot program in 2013 for Anchoring and Mooring with the primary goal of encouraging the establishment and use of public mooring fields. The intension of the FWC is to establish policies to promote public awareness and access to the waters of this state by enhancing navigational safety, protecting maritime infrastructure, the marine environment, and deterring abandoned or derelict vessels.<sup>9</sup>

### U.S. Coast Guard ATON Team at Work



Source: U.S. Coast Guard, 2015

<sup>9</sup> Florida Fish and Wildlife Commission, Anchoring and Mooring Pilot Program, 2016.

## 4.4 SUMMARY OF KEY ISSUES

In summary, the key issue areas identified from the comprehensive review of previous related study efforts, as well as from extensive stakeholder participation, were:

- Waterway Dredging and Funding – (Section 4.3.1.1) The need for adequate funding availability through federal, state, and local sources along with regular WRDA bill passage.
- Bridge Clearance and Drawbridge Schedules – (Section 4.3.1.2) Specific issues include challenges to vessel transit of waterways whether by schedules or height restrictions.
- Regulations and Permitting – (Section 4.3.1.3) Federal and state regulatory and environmental agencies/organizations require high cost mitigation and lengthy application and design processes.
- Waterway Access – (Section 4.3.1.4) Primary stakeholders expressed need for direct public access to the intracoastal and inland waterways with docks, piers, ramps, and mooring facilities.
- Data and Information – (Section 4.3.1.5) Availability of current and comprehensive data resources. Additional need for public outreach and education materials related to waterway systems.
- Other Issues Identified below – (Section 4.3.1.6):
  - Safety Concerns with Increasing Vessel Traffic/Conflicts – Personal recreational watercraft are having increased conflicts with commercial vessels expanding regulatory requirements.
  - Maintenance of Navigational Aids – Federal and state regulators have increased difficulties maintaining waterway Nav-Aids which often get push off station or destroyed by natural causes.
  - Unused Capacity – Local waterway sponsors FIND and WCIND are advocates for greater utilization of inland and intracoastal waterways to relieve landside transportation constraints.
  - Removal of Derelict Vessels – This was identified by state and local stakeholders as an issue to keep waterways safe and unrestricted from abandoned, lost or stolen vessels.
  - Changing Technology – Florida is leading the nation’s waterways with state of the art clean burning LNG fueled vessels like Sea Star Lines, Isla Bella and Crowley Maritime Corp., El Coquí at JAXPORT.
  - Anchoring and Mooring Areas – Many local waterway sponsors along with state regulatory authorities mentioned a need for better public access to inland and intracoastal waterways.
  - Statewide Waterway Resources Inventory and Economic Impact Assessment – Overall the waterway data for privately owned industrial, commercial, retail and recreational waterway users is not available on a statewide uniform basis.

## 4.5 CONCLUSION

This chapter focused on stakeholder responses and the key issues that were identified through the stakeholder outreach process. These key issues provide a foundation from which to consider initiatives to enhance the use, management, and capabilities of Florida’s waterway system.

Chapter five provides a summary of prior waterway planning efforts and recommend focus areas and initiatives for addressing waterway issues identified during this plan update. These focus areas relate directly to the Florida Transportation Plan, The Strategic Intermodal System Plan, and the Florida Freight Mobility and Trade Plan.

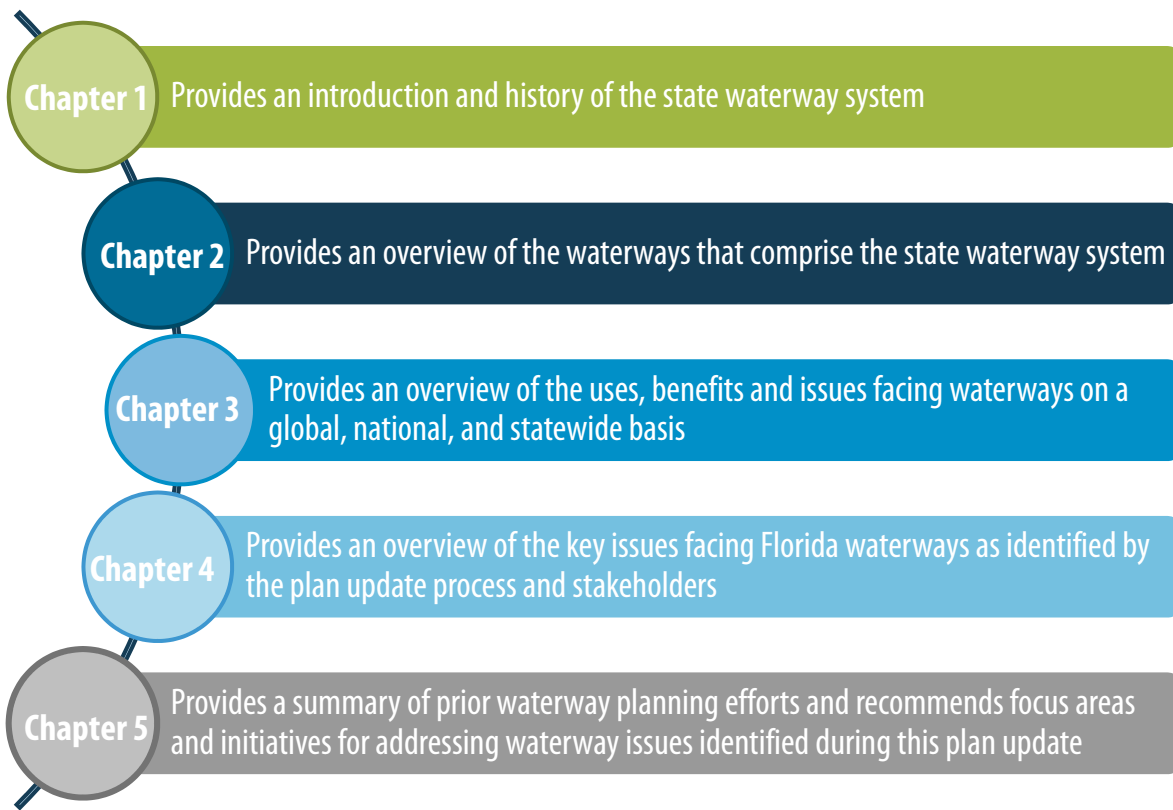


# 5. SUMMARY & RECOMMENDATIONS

Chapter five discusses the plan structure and summary, Florida Department of Transportation (FDOT) prior and current planning efforts as they pertain to waterways, and finally Seaport and Waterway Office focus areas and initiatives. These initiatives will provide guidance for monitoring and facilitating the maintenance and improvement of the Florida's waterway system over the next five years.

## 5.1 PLAN STRUCTURE & SUMMARY

The 2015 Florida Waterway System Plan serves as an update to the 2008 Waterways System Plan, and provides a current look at many pertinent topics. During the update process, seven years of data was reviewed with the purpose of realigning the plan to a five-year planning horizon. This system plan builds upon the previous plan, updates the data, and provides an up to date status of the issues that waterway stakeholders feel are important to the full utilization of the waterways as a commercial and recreational system.



The development of this plan relied heavily on research, data analysis, and stakeholder input to determine the current condition of Florida’s waterway systems and the critical key issues that are impacting waterway use. Stakeholders were instrumental in identifying the current conditions, challenges, and opportunities affecting the waterways. Many of the stakeholders, such as the U.S. Coast Guard, FWC, and commercial shippers, use the waterways on a daily basis and have detailed knowledge of their condition. The policies recommended in this chapter are based on these identified issues and conditions.

## 5.2 PRIOR & CURRENT PLANNING EFFORTS

This update builds upon and continues the efforts of the 2008 Waterway System Plan. It is also drafted to be consistent with FDOT’s latest planning efforts, which include the Florida Transportation Plan (FTP), FDOT’s highest level policy plan, providing the long-term vision and policy direction for FDOT as a whole; the Strategic Intermodal System (SIS) Policy Plan, which provides policy direction goals and objectives for the SIS on a statewide basis; and, the 2013/2014 Freight and Mobility and Trade Plan (FMTP), which provides policy and implementation direction to FDOT on matters related to the movement of freight. A summary of these plans as they pertain to Florida’s waterway system is provided in this section.

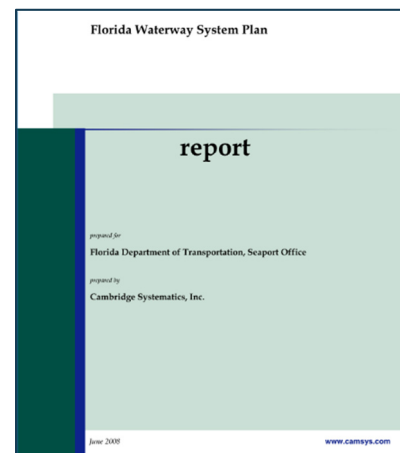
### 5.2.1 WATERWAY RELATED POLICIES IN EXISTING PLANS

#### 2008 WATERWAY SYSTEM PLAN

The 2008 Waterway System Plan surveyed the system, identified issues, and then proposed specific recommendations to address the identified issues. Many of the issues and recommendations identified in the 2008 plan are still applicable today, and are included in this update.

The 10 recommendations of the 2008 plan are provided below:

- Provide leadership and regularly update the plan
- Coordinate with seaport planning activities
- Partner with local waterway sponsors
- Reevaluate waterway corridors in the SIS Comprehensive update
- Maintain a database of Florida’s intracoastal and inland waterway system
- Quantify the economic impact of the waterway system
- Study impacts of using waterway corridors to relieve land side congestion
- Evaluate the feasibility of domestic cruising
- Understand the environmental impacts of waterway enhancements
- Evaluate the potential impacts of Short Sea Shipping



## FTP UPDATE

In 2015, FDOT is updating the FTP and the SIS Policy Plans concurrently. The FTP defines Florida's future transportation vision and identifies goals, objectives, and strategies to accomplish that vision. The FTP is the statewide long-range transportation plan for all of Florida, while the SIS Policy Plan identifies policies for planning and implementing Florida's SIS, the statewide high-priority network of transportation facilities critical to Florida's economic competitiveness. The FDOT Office of Policy Planning is responsible for overseeing the updates to both the FTP and SIS Policy Plans.<sup>1</sup>



The 2015 update to the 2060 FTP is comprised of three main elements: a Vision Element, a Policy Element, and an Implementation Element. The updated Vision Element (August 2015) provides a longer-term view of the major trends, uncertainties, opportunities, and desired outcomes shaping the future of Florida's transportation system over the next 50 years. A key purpose of the visioning effort is to guide the FTP update with consideration of the future Florida may face. To this end, FDOT developed five potential future alternatives for discussion and review. It is easy to think of many examples of how the potential futures may impact Florida's waterways.

## POTENTIAL FUTURES

- **Return to Historic Growth.** High growth in population, visitors, and the economy, with similar development patterns and industry mix as today.
- **Rural Rediscovery.** Focus on rural areas and small towns, including traditional industries such as agriculture and eco-tourism, as well as newer sectors.
- **Global Trade Hub.** Significant expansion in global trade, tourism, and investment.
- **Innovation Hub.** Emphasis on technology and innovation, particularly in urban centers.
- **Risks on the Horizon.** Florida's future is at risk due to slowing population growth, economic uncertainties, or extreme weather events and climate trends.

<sup>1</sup> Florida Transportation Plan/SIS Strategic Plan, <http://floridatransportationplan.com/>

The FTP Policy Element builds off of the direction provided by the Vision Element and input from the steering committee and public. It includes the goals and objectives necessary to guide FDOT towards the vision over the next 25 years. The draft Policy Element was completed in December 2015. The Policy Element contains seven long-range goals, with 30 long-range objectives.

The seven FTP goals are not ranked in priority order given their interrelatedness and equal role in creating Florida's transportation future. The goals are as follows:

- 1) **Safety and security** for residents, visitors, and businesses.
- 2) **Agile, resilient, and quality** transportation infrastructure.
- 3) **Efficient and reliable** mobility for people and freight.
- 4) **More transportation choices** for people and freight.
- 5) Transportation solutions that support Florida's global **economic competitiveness**.
- 6) Transportation solutions that support **quality places** to live, learn, work, and play.
- 7) Transportation solutions that enhance Florida's **environment and conserve energy**.

Each goal area addresses three main questions and provides the following related information:

- a) Why does it matter?

A brief narrative highlighting the importance of each goal.

- b) What do we want to achieve?

Four to five long-range objectives that support each goal, one to two indicators to watch to track progress toward each goal, and one to two examples of current initiatives related to each goal.

- c) How will we get there?

A set of ideas and approaches for accomplishing each goal, with opportunities to continue key emphasis areas, embrace innovation, collaborate with our partners, serve our customers, and improve data and processes.

The FTP goals are high level goals for the Florida transportation system as a whole. As the success in meeting these goals depends on all modes of transportation, waterways will play a large role in the success of FDOT. Each of the seven goals have emphasis areas related to waterborne transportation.

The final Element of the FTP is the Implementation Element, scheduled for completion in 2016. The Implementation Element is important as it provides specific direction and action items to be taken in order for FDOT to meet the goals and objectives provided in the Policy Element. The FDOT Seaport and Waterways Office will remain engaged in the FTP process to identify responsibilities resulting from completion of the Implementation Element.

## SIS POLICY PLAN UPDATE

In 2015, the SIS Policy Plan was updated to be consistent with the guidance provided by the FTP. The SIS Policy Plan provides direction specific to the SIS, in order to address changing trends and take advantage of future opportunities. The policies and objectives also serve as guidance for investment decisions over the five-year implementation period of the plan.

The SIS Policy Plan is based on three of the FTP goals that provide specific guidance to the SIS objectives. The three FTP and corresponding SIS Policy objectives are provided below:



- The FTP sets a goal of **efficient and reliable mobility** for people and freight. The corresponding SIS objective is to ensure the efficiency and reliability of **multimodal transportation connectivity** between Florida's economic regions and between Florida and other states and nations.
- The FTP sets a goal of **more transportation choices** for people and freight. The corresponding SIS objective is to expand transportation choices and **integrate modes for interregional trips**.
- The FTP sets a goal of transportation solutions that support Florida's global **economic competitiveness**. The corresponding SIS objective is to provide transportation systems to support **Florida as a global hub for trade, tourism, talent, innovation, business, and investment**.

These SIS objectives also form the basis for three new SIS areas of emphasis: **interregional connectivity**, **intermodal connectivity**, and **economic development**. In a similar format to the FTP Policy Element, for each FTP goal the SIS Policy Plan provides an objective, with a variety of approaches proposed for implementation.

Success in meeting the SIS Policy objectives will depend on all modes of transportation, and waterways will play a large role in the success of FDOT. Each of the three objectives have approaches related to water transportation.

The final part of the 2015/2016 FTP and SIS updates are revisions to SIS facility designation criteria and SIS project eligibility criteria. These criteria directly affect which waterways are part of the SIS, and the type of waterway improvement projects that are eligible for funding. Any proposed changes to SIS eligibility will need to demonstrate a direct contribution to advancing one or more of the SIS areas of emphasis.

## FLORIDA FREIGHT MOBILITY AND TRADE PLAN (FMTP)

Signed into law in 2012, Florida House Bill 599 directed FDOT to create a state Freight Mobility and Trade Plan (FMTP). The FMTP was developed and completed in two phases: the Policy Element and the Investment Element, each addressing specific needs, with their own purposes.

Adopted in June of 2013, the Policy Element is intended to:

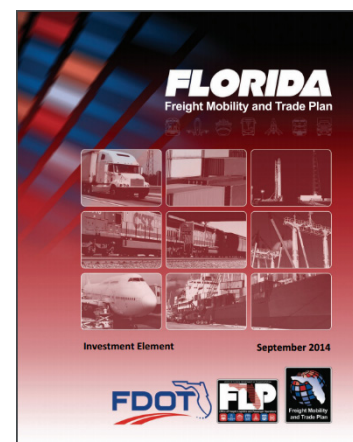
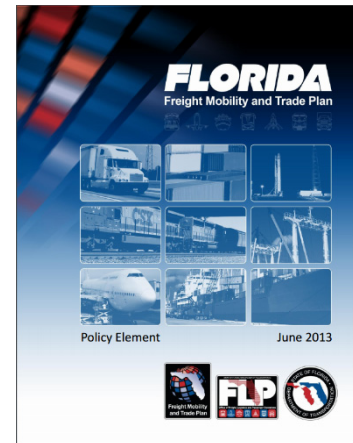
- Lay out the policy framework
- Identify responsibilities for implementation
- Meet all requirements of Florida House Bill 599 (2012)

Adopted in September of 2014, the Investment Element builds on the Policy Element and is specifically intended to:

- Identify freight needs
- Identify criteria for state investments in freight
- Prioritize freight investments across modes
- Meet requirements of federal MAP-21<sup>2</sup>

The overall goals for the creation of the plan are:

- Increasing the flow of domestic and international trade through the state's seaports and airports, including specific policies and investments that will recapture cargo currently shipped through seaports and airports located outside the state.
- Increasing the development of intermodal logistic centers in the state, including specific strategies, policies, and investments that capitalize on the state's empty backhaul trucking and rail market.
- Increasing the development of manufacturing industries in the state, including specific policies and investments in transportation facilities that will promote the successful development and expansion of manufacturing facilities.
- Increasing the implementation of compressed natural gas (CNG), liquefied natural gas (LNG), and propane energy policies that reduce transportation costs for businesses and residents located in the state.



<sup>2</sup> For more information on Map-21 requirements, please visit FHWA's website at: <http://www.fhwa.dot.gov/map21/>.



## 5.2.2 FOCUS AREAS

The culmination of the planning process described in this plan is the identification of focus areas and initiatives for the Seaport and Waterways Office to consider in monitoring and facilitating the maintenance and improvement of Florida's waterway system over the next five years. These focus areas and corresponding initiatives directly relate to FTP, SIS, and FMTP goals and objectives (as shown in Appendix A-1); and seek to address the topics and issues identified during the stakeholder outreach and research efforts completed to update the plan.

### **Facilitate maintenance of the current waterway network as a safe and reliable system for all users.**

- Coordinate with the USACE to ensure Florida projects are well positioned to receive funding.
- Participate in planning for the waterway network with seaports, connectors, and other intermodal hubs.
- Identify partnerships FDOT can participate in to advance safety on the states' waterways.

### **Encourage appropriate uses to increase utilization of the waterway system, and consider facilitating capacity improvements, if warranted.**

- Participate in the SIS planning process to ensure that SIS waterway planning criteria are appropriate.
- Explore potential funding sources, programs and partnerships to minimize bottlenecks, improve efficiency, and further develop capacity to meet user needs.
- Investigate the advantages of waterborne freight as an alternative or complement to other modes of freight transportation, including potential environmental benefits of waterborne freight movements.
- Participate in efforts to identify and resolve regulatory or permitting issues as they relate to the waterway system.

### **Explore the need and benefits of acquiring data to assist in better understanding the whole-range of commercial and recreational users and activities, and the non-freight economic impact of Florida's waterways.**

- Identify existing sources of data, and data gaps.
- Consider data acquisition needs.
- Explore creating an inventory of commercial and recreational waterway facility locations and types of commerce being conducted on the waterways.
- Investigate methods to better understand the true economic impact of activities occurring on the waterway network.

### 5.3 CONCLUSION

The focus areas developed for this plan were drafted to be consistent with, and implement, the goals and objectives of the FTP, SIS, and FMTP. Appendix A provides a 'crosswalk table' showing the relationship between related FTP, SIS, and FMTP guiding policies and their corresponding Waterways System Plan focus area initiatives.

The specific initiatives identified in this plan were developed in response to the issues and concerns identified from a review of the prior waterway plans, stakeholder outreach, and project research. The Seaport and Waterways Office will consider pursuing initiatives presented in this plan as we formulate FDOT's specific role with regard to each of Florida's inland, intracoastal and coastal waterways.

**Quartermasters on USS Boxer plot the ships course**



*Source: U.S. Navy, 2015.*



# LIST OF APPENDICES

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## APPENDIX A-1

### PLAN INTEGRATION CROSS WALK

#### FTP, FMTP, SIS and Seaport and Waterways Office Goals, Objectives, Focus and Strategies

##### Focus: Facilitate maintenance of the current waterway network as a safe and reliable system for all users.

Strategies (Seaport and Waterways Office)	FMTP Objectives	SIS Objectives	FTP Goal(s)
<ul style="list-style-type: none"> <li>Coordinate with the USACE to ensure Florida projects are well positioned to receive funding.</li> </ul>	1.1.2, 2.5, 5	1, 3	2, 3, 5
<ul style="list-style-type: none"> <li>Participate in planning for the waterway network with seaports, connectors, and other intermodal hubs.</li> </ul>	1.1.2, 1.1.3, 1.1.4	1, 2	1, 4, 3
<ul style="list-style-type: none"> <li>Identify partnerships the Department can participate in to advance safety on the states' waterways.</li> </ul>	2.6		1, 6

##### Focus: Encourage appropriate uses to increase utilization of the waterway system, and consider facilitating capacity improvements, if warranted.

Strategies (Seaport and Waterways Office)	FMTP Objectives	SIS Objectives	FTP Goal(s)
<ul style="list-style-type: none"> <li>Participate in the SIS planning process to ensure that SIS waterway planning criteria are appropriate.</li> </ul>	1.1.2, 2.5.3	1, 2, 3	2, 3, 4, 5
<ul style="list-style-type: none"> <li>Explore potential funding sources, programs and partnerships to minimize bottlenecks, improve efficiency, and further develop capacity to meet user needs.</li> </ul>	2.3, 2.5.1, 2.5.3	1, 2, 3	3, 5, 6
<ul style="list-style-type: none"> <li>Investigate the advantages of waterborne freight as an alternative or complement to other modes of freight transportation, including potential environmental benefits of waterborne freight movements.</li> </ul>	2.5.3	3	4, 7
<ul style="list-style-type: none"> <li>Participate in efforts to identify and resolve regulatory or permitting issues as they relate to the waterway system.</li> </ul>	1.6.1, 3.4, 6.2	1	2, 7

##### Focus: Explore the need and benefits of acquiring data to assist in better understanding the whole-range of commercial and recreational users and activities, and the non-freight economic impact of Florida's waterways.

Strategies (Seaport and Waterways Office)	FMTP Objectives	SIS Objectives	FTP Goal(s)
<ul style="list-style-type: none"> <li>Identify existing sources of data, and data gaps.</li> </ul>			1, 2, 3, 4, 5, 6, 7
<ul style="list-style-type: none"> <li>Consider data acquisition needs.</li> </ul>			1, 2, 3, 4, 5, 6, 7
<ul style="list-style-type: none"> <li>Explore creating an inventory of commercial and recreational waterway facility locations and types of commerce being conducted on the waterways.</li> </ul>	2.5.4, 7.1.4	2	3, 4, 7
<ul style="list-style-type: none"> <li>Investigate methods to better understand the true economic impact of activities occurring on the waterway network.</li> </ul>	7.3.4	3	3, 5

## APPENDIX A-2

### FDOT TRANSPORTATION PLANS, GOALS, AND OBJECTIVES

#### FDOT Transportation Plans Goals and Objectives

##### Florida Transportation Plan Goals:

- 1 Safety and Security for Residents, Visitors, and Businesses
- 2 Agile, Resilient, and Quality Infrastructure
- 3 Efficient and Reliable Mobility for People and Freight
- 4 More Transportation Choices for People and Freight
- 5 Transportation Solutions that Support Florida's Global Economic Competitiveness
- 6 Transportation Solutions that Support Quality Places to Live, Learn, Work, and Play
- 7 Transportation Solutions that Support Florida's Environment and Conserve Energy

##### Strategic Intermodal System Policy Plan Objectives:

- 1 **Interregional Connectivity:** Ensure the efficiency and reliability of multimodal transportation connectivity between Florida's economic regions and between Florida and other states and nations.
- 2 **Intermodal Connectivity:** Expand transportation choices and integrate modes for interregional trips.
- 3 **Economic Development:** Provide transportation systems to support Florida as a global hub for trade, tourism, talent, innovation, business, and investment.

##### Freight Mobility and Trade Plan Objectives and Strategies (Correlation to Waterways Focus):

- 1 Capitalize on the Freight Transportation Advantages of Florida Through Collaboration on Economic Development, Trade, and Logistics Programs
  - 1.1 Maximize the strategic advantage of Florida's transportation hubs for trade logistics
    - 1.1.2 Develop criteria for strategic port investments in tandem with private investments to respond to market needs nimbly and transparently
    - 1.1.3 Determine the operating characteristics of transportation hubs and improve the connecting distribution/transportation system (spokes) to match their particular logistic needs and opportunities
    - 1.1.4 Develop a comprehensive plan to support and facilitate international exports and interstate commerce
  - 1.6.1 Identify and address transportation issues and challenges for each of the targeted industries
- 2 Increase Operational Efficiency of Goods Movement
  - 2.3 Identify and implement freight movement efficiency enhancements
  - 2.5 Champion and support needed freight capacity expansions
    - 2.5.1 Identify and implement projects to eliminate freight bottlenecks
    - 2.5.3 Explore the appropriate role of marine highways or short-sea shipping
    - 2.5.4 Anticipate future freight facility needs
  - 2.6 Identify and implement safety and security enhancements
- 3 Minimize Costs in the Supply Chain
  - 3.4 Advocate for regulatory reform and federal inspection agencies staffing to reduce impediments to goods movement (e.g., weight limits)
- 4 Align Public and Private Efforts for Trade and Logistics
- 5 Raise Awareness and Support for Freight Movement Investments
- 6 Develop a Balanced Transportation Planning and Investment Model That Considers and Integrates All Forms of Transportation
  - 6.2 Coordinate across state agencies to ensure consistency of regulations that impact freight operations and mobility
- 7 Transform the FDOT's Organizational Culture to Include Consideration of Supply Chain and Freight Movement Issues
  - 7.1 Integrate modal perspectives with multimodal supply chain perspective
    - 7.1.4 Position and support emerging freight facilities: spaceports, marine highways, etc.(Modal Offices support)
  - 7.3 Prioritize freight projects across the modes
    - 7.3.4 Develop multimodal investment and decision tools

## APPENDIX B

### DEFINITIONS AND DESCRIPTIONS

**AIWW** – Atlantic Intracoastal Waterway

**Authorized depth at MLW** – The federally set depth of the waterway at mean low water.

**Barge** – A shallow draft vessel used to transport goods along the waterway, usually towed or pushed.

**Commercial Waterway** – A waterway that carries any amount of freight for the purpose of commerce.

**Deep Draft** – A waterway whose draft depth is greater than 12 feet deep.

**DEP** – Florida Department of Environmental Protection

**Domestic Cruising** – A cruise vessel that does not travel international waters for this leisure voyage.

**Draft** – Vertical distance between a ship's waterline and the lowest point of its keel.

**Dredging** – A method to scoop or suction material under the water to deepen or modify a waterway.

**FIND** – Florida Inland Navigation District, Florida sponsor for 12 member counties along the AIWW.

**FWC** – Florida Fish and Wildlife Conservation Commission

**Inland Waterway** – A waterway such as a river, canal, channel, or harbor.

**Intracoastal Waterway** – A not tidal waterway such as a bay, canal, or river that is connected so that vessels do not have to travel on the open sea.

**Invasive Aquatic Species** – Plants such as hydrilla, water hyacinth, and water lettuce that have adapted to living in, on, or next to water and grow either submerged or partially submerged in water.

**Jones Act** – A law enacted in 1920 that protects American shipping, provides for equally competitive domestic marine trade, and maintains the operation and viability of U.S. shipyards. Requires vessel engaged in domestic trade to be built, owned, and crewed by U.S. citizens.

**MARAD** – U.S. Maritime Administration

**Maritime Cabotage Task Force** – A task force dedicated to educating the public on the economic, national security, environmental, and safety benefits of the Jones Act.

**MLW** – Mean Low Water

**Navigable Waterway** – A body of water that capable of sustaining vessel traffic.

**NGIWW** – Northern Gulf Intracoastal Waterway

**NOAA** – National Oceanic and Atmospheric Administration

**Recreational Waterway** – A waterway used for leisure purposes such as boating, swimming, fishing, and sightseeing.

**Shallow Draft** – A waterway whose draft depth is less than or equal to 12 feet deep.

**Shoaling** – The deposition of sediments that cause a body of water to become shallower.

**Short Sea Shipping** – Primarily a sea route segment complementary to truck and rail transportation.

**Short Ton** – Unit of weight equal to 2,000 pounds.

**Tidal Current** – The flow of water caused by ebbing and flowing tides.

**Turning Basin** – An open area within a water body that allows a vessel to turn around.

**USACE** – U.S. Army Corps of Engineers

**USCG** – U.S. Coast Guard

**USFWS** – U.S. Fish and Wildlife Service

**USGAO** – U.S. Government Accountability Office

**USMC** – U.S. Marine Corps

**Water Surge** – A coastal rise in water caused by wind, tide, or wave actions.

**WCIND** – West Coast Inland Navigation District

**WCSC** – Waterborne Commerce Statistics Center

**WGIWW** – Western Gulf Intracoastal Waterway





# APPENDIX C

## SEAPORT AND WATERWAY SYSTEM PLAN QUESTIONNAIRE

### WATERWAY QUESTIONNAIRE:

Waterways Used: \_\_\_\_\_

Name of Respondent: \_\_\_\_\_ Position/Title: \_\_\_\_\_

Office Phone: \_\_\_\_\_ Mobile Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

### Waterway User Questions:

Please describe the role of your organization and members in using or managing Florida's waterways: \_\_\_\_\_

\_\_\_\_\_

What waterways in Florida are used most frequently by your members? \_\_\_\_\_

\_\_\_\_\_

What are the key factors impacting the success of these waterways? \_\_\_\_\_

\_\_\_\_\_

As part of this study, we are reviewing existing waterway programs and policies. Do you have any recommendations for changes to existing waterway programs or policies? \_\_\_\_\_

\_\_\_\_\_

### Waterway Network:

Describe the overall condition of the waterways used or managed by your members. Are there any operational or structural limitations (maintained depth, poor reliability, vessel constraints, navigation difficulties, shore side access, etc.)? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Are you aware of specific bottlenecks in the waterway system? Please identify any known specific locations as appropriate. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

How could the existing infrastructure physically be changed or operated differently to improve recreational and commercial use? \_\_\_\_\_

\_\_\_\_\_

What are the strengths of the region's waterway transportation infrastructure? \_\_\_\_\_

---

---

What are the weaknesses of the region's waterway transportation infrastructure? \_\_\_\_\_

---

---

What are the multi-modal (aviation, rail, roadways) connections available to waterways your members use or that you manage? \_\_\_\_\_

---

---

Please provide any examples you are aware of where connections between modes are well used and functioning successfully: \_\_\_\_\_

---

---

Please provide any examples you are aware of where connections between modes are not well used or functioning successfully: \_\_\_\_\_

---

---

For any areas listed in response to the previous question, what type of improvement or project would serve to remedy the situation? \_\_\_\_\_

---

---

**Waterway Economic Activity:**

If possible, please provide the major waterways used by your members or managed by your agency and also provide the major economic activity of the waterway (shipment of petroleum, recreational boating, shrimping, etc.).

	<u>Waterway</u>	<u>Major Activity</u>
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____

Are there any differences in the activities or economic potential among the various waterway types (Intracoastal Waterway, bays, rivers, etc.)? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

What are some limiting factors of the waterways that prohibit their full use (channel depth, bridge clearance, shore facilities, etc.)? If known, please provide examples below:

	<u>Waterway</u>	<u>Limiting Factor</u>
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____

What is the economic growth potential for the waterway(s) in your region? Please identify any opportunities or limitations (political, funding, or environmental) that could improve or impede economic growth. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

What effects, if any, do you anticipate to Florida waterways from the opening of the Panama Canal in early 2016? \_\_\_\_\_  
 \_\_\_\_\_

If one were established, what effects, if any, would you anticipate to Florida waterways from a ferry system to the Bahamas or Cuba? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**Other General Questions:**

Please identify any data/resources/studies you believe we should be collecting and reviewing as part of this study. \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Are there any other individuals that you believe we should invite to participate in the plan update? If so, please provide their contact information.

	<b><u>Name/Organization</u></b>	<b><u>Contact Info</u></b>
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____

What are your expectations for this study? What benefits can your organization/members derive from this study?

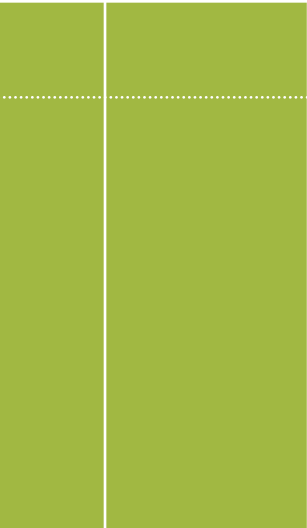
\_\_\_\_\_  
\_\_\_\_\_

If you have any additional comments or items you would like to discuss please provide them in the additional comments section.

**1. ADDITIONAL COMMENTS:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_





Prepared for:

