

Texas Department of Transportation's Gulf Intracoastal Waterway Capacity Study

GICA 112th Annual Seminar

July 28, 2017

Study Purpose

- Determine if current levels of vessel activity on the Texas segment of the GIWW are exceeding its operational capacity
- Analyze these questions using both quantitative and qualitative data sources
- Identify any new infrastructure or operational needs for the GIWW-T

Has the GIWW-T Reached Capacity?

Generally no, but there are bottlenecks that are creating issues

Some of the causes have been ongoing, while others are emerging

Identification of Capacity Constraints on the GIWW-T

Key Supply Side Constraints

- Channel depth along the GIWW-T's main channel and tributary channels
- Capacity and efficiency of its river locks and floodgates
- Navigability of bridges crossing the waterway
- Availability of permanent mooring sites
- Availability and usability of mooring and navigational buoys
- Structures that encroach into the GIWW-T setback

Navigability of the GIWW-T and Intersecting Channels

- In some locations, insufficient channel depth requires operators to “light load” barges, which reduces the capacity of the GIWW-T
 - For safety reasons, barges typically light load by 2 feet, even in segments of the GIWW that are maintained at the authorized depth
- Barges also light load when destinations on waterways outside of Texas are not at their authorized depth

Navigability of the GIWW-T and Intersecting Channels

- Conducted a detailed review of 485 hydrographic contour maps of the GIWW-T produced by USACE
- Locations with water depths of 10 ft. or less across the entire GIWW-T channel were found within the following segments
 - Freeport Harbor to Brazos River (MM 394 to MM 400)
 - Colorado River to Matagorda Bay (MM 442 to MM 459)
 - South Bird Island to Port Mansfield (MM 565 to MM 630)
- The busiest segment of the GIWW-T had 12 ft. of depth, although shoaling would require barge operators to maneuver the channel

Capacity and efficiency of the GIWW-T's locks and floodgates

- The Brazos River Floodgates and the Colorado River Locks are viewed as impediments to efficient barge tow movements on the GIWW-T
 - Queuing delays, need to “trip” multi-barge tows
 - Maintenance and weather closures compound the queuing delays
- TxDOT is currently assisting the USACE with studies to modernize the facilities that could include operational improvements, infrastructure improvements, or replacement

Navigability of the bridges crossing the waterway

- 13 bridges cross the GIWW-T
- TxDOT recently removed demolition debris from Galveston Rail Bridge, removing an existing navigation hazard
- FM 457 (aka Caney Creek) Swing Bridge is the process of being replaced
- Port Isabel Swing Bridge is privately-owned, but necessary to reach the Ports of Brownsville and Port Isabel

Number of permanent mooring sites

- Mooring needs along the GIWW-T are improving, but along intersecting ship channels mooring facilities are lacking
 - A key constraint on major ship channels is not insufficient channel capacity for moving vessels but handling the stationary vessels
- Houston Ship Channel has problems with barges pushing in around the San Jacinto Mud Flats
- Freeport Ship Channel has similar safety concerns and a much tighter geometry
- Other areas of concern include the Lydia Ann Cut and the Neches River



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Availability and usability of mooring and navigational buoys

- Barge tows regularly damaging or destroying USCG's Aids to Navigation System (ATON) buoys
- Similar problems with USACE mooring buoys
 - USACE-Galveston District is spending approximately \$2 million a year on repair and replacement
 - Insufficient mooring buoys sometimes leads to more than one barge tow tying up to a buoy, which reduces the clearance for passing tows

Encroachment of structures in or near the GIWW setback

- USACE developed setback rules to protect waters immediately surrounding GIWW-T
- A few grandfathered structures still exist in the setback – approximately 113 structures
- Many other structures are outside of the setback, but still very close to the GIWW

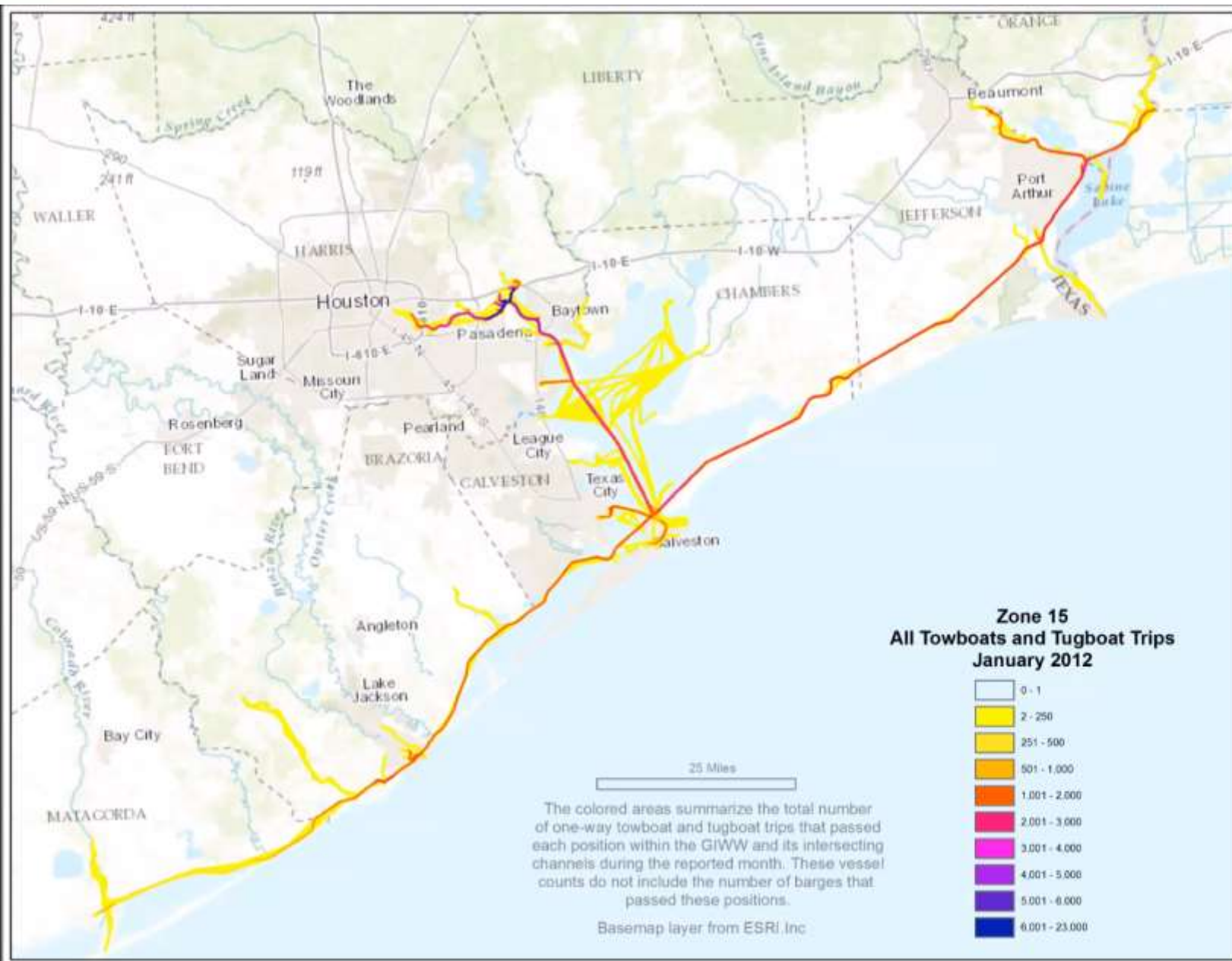


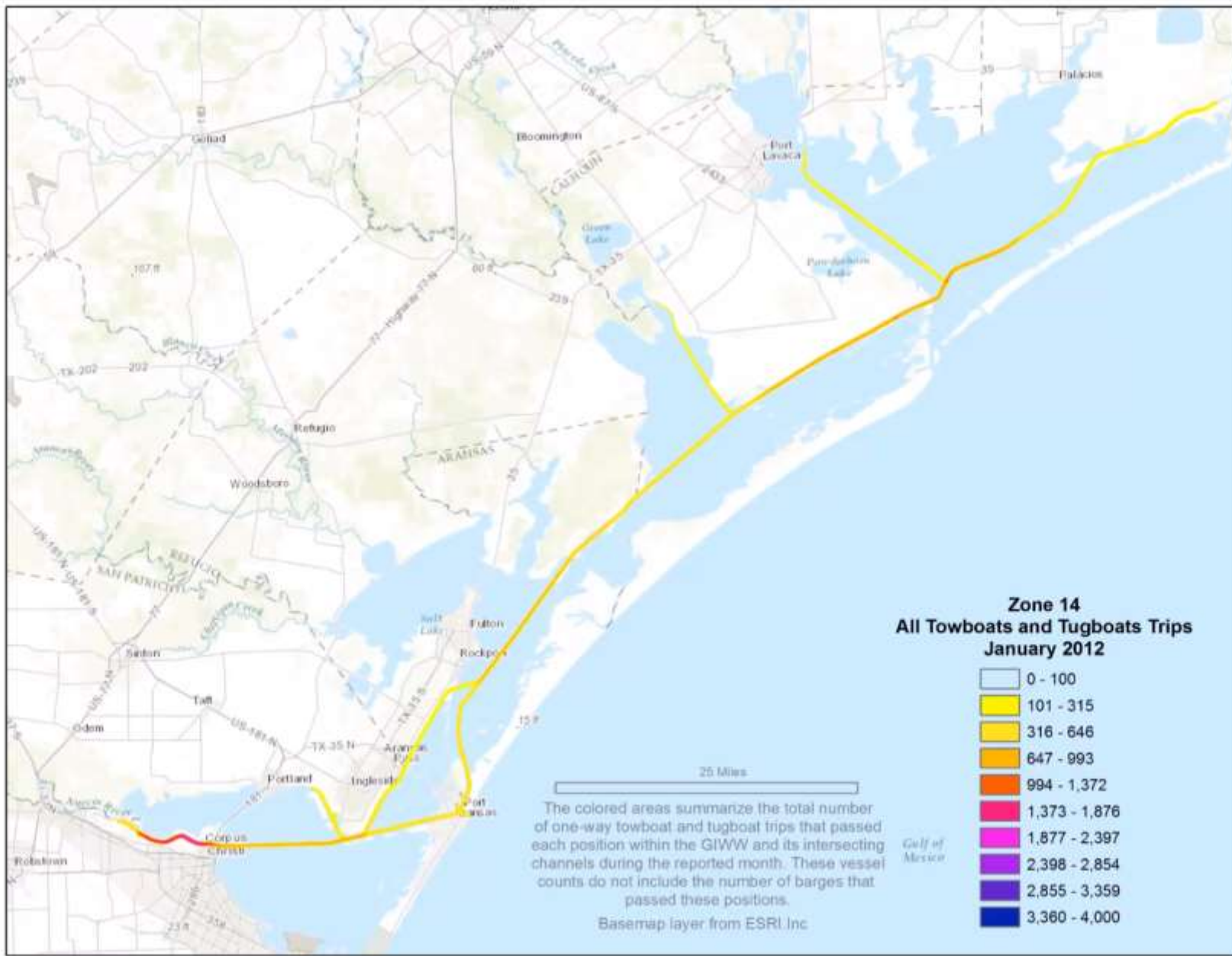


Identification of Capacity Constraints on the GIWW-T

Key Demand Side Constraints

- Vessel traffic and cargo tonnage on the GIWW-T have grown recently but have lagged overall economic growth in Texas
- However, barge tows are interacting more with deep draft vessels, which are increasing in volume
- Significant safety concerns about the interactions between ships and barges

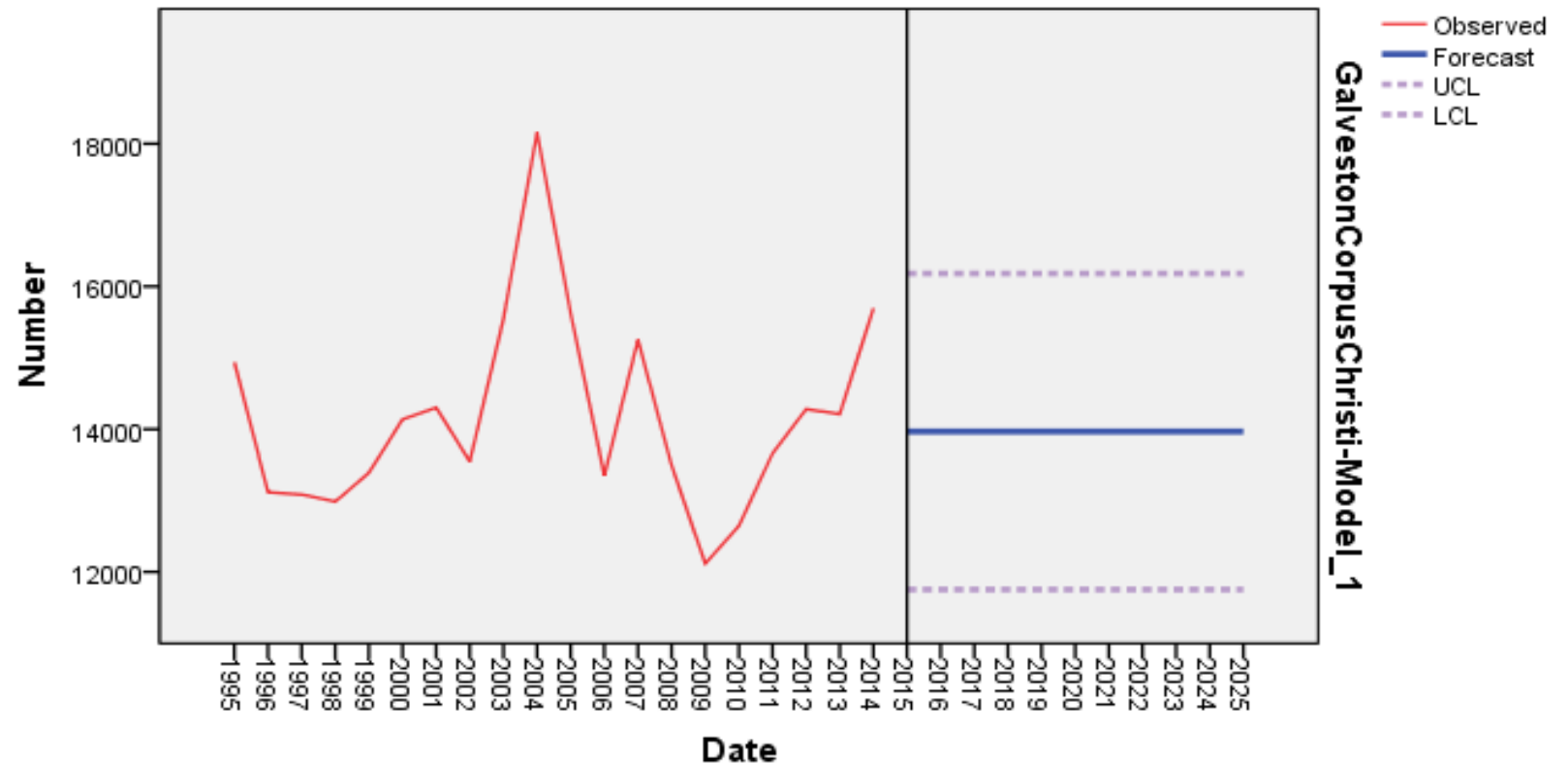




Projections of Future Towboat Traffic

- Model Type: ARIMA
- Ljung-Box Test:
 - Degrees of Freedom: 18
 - Significance: 0.227
 - Number of Outliers: 1
- Stationary R-Squared: 0.455

GIWW from the Corpus Christi Ship Channel to the Brownsville Ship Channel



Project Deliverables

- Main report, streamlined planning and policy document
- Four appendix reports on technical issues or large summaries of data
- Projected publishing date is September 2017

Topics for Future Work

- Use NAIS data to better understand vessel interactions at the intersection of the GIWW and ship channels
- Use NAIS data to better understand vessel dwelling activities, as well as purpose and trip destination
- Use NAIS data to develop estimates of trip travel times along the GIWW as a performance measure

QUESTIONS OR FEEDBACK?

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