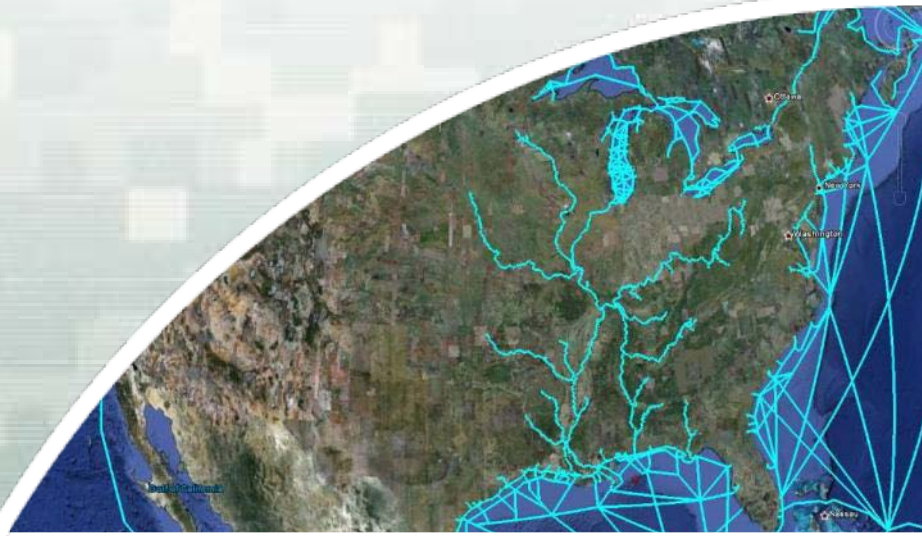
Channel Portfolio Tool (CPT) and Impacts of Draft Restrictions

Kenneth Ned Mitchell, PhD
U.S. Army Corps of Engineers
Engineer Research and Development Center
Coastal and Hydraulics Lab
Vicksburg, Miss.



Galveston District Dredging Meeting

October 24th, 2012

Channel Portfolio Tool (CPT)

https://cpt.usace.army.mil

CPT is a web-based decision-support tool which helps convey the importance of Corps dredging activity to the efficient movement of maritime commerce.

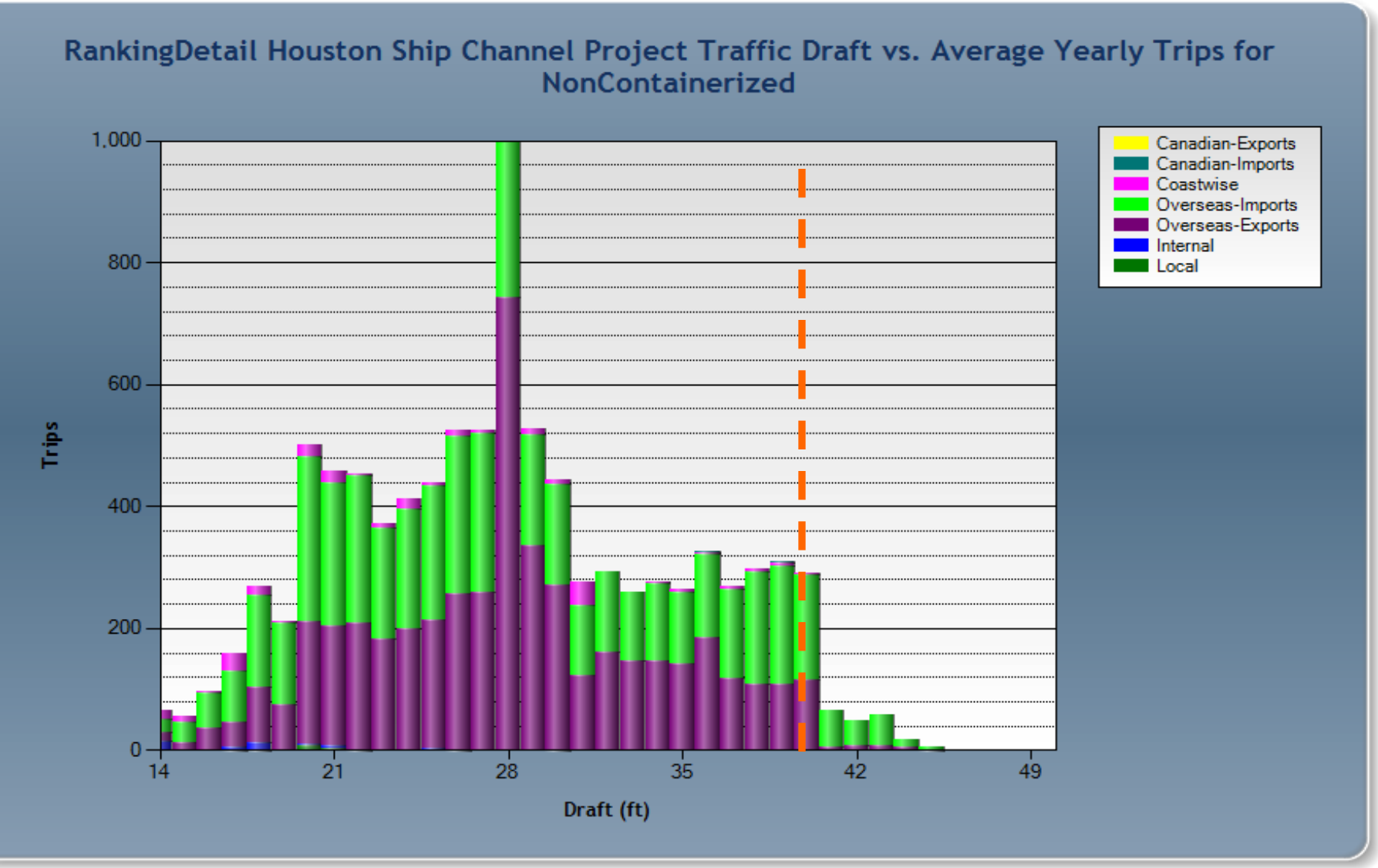
Waterborne Commerce Data

- The Corps' Waterborne Commerce Statistics Center (WCSC) collects and collates data from several sources concerning commercial use of US waterways.
  - Dock-level, origin-to-destination routing (Corps-use-only)
  - Includes tons, commodity types, vessel counts, drafts
  - Aggregated data already published at project level
  - Corps planning community uses WCSC data to support harbor deepening projects and inland studies

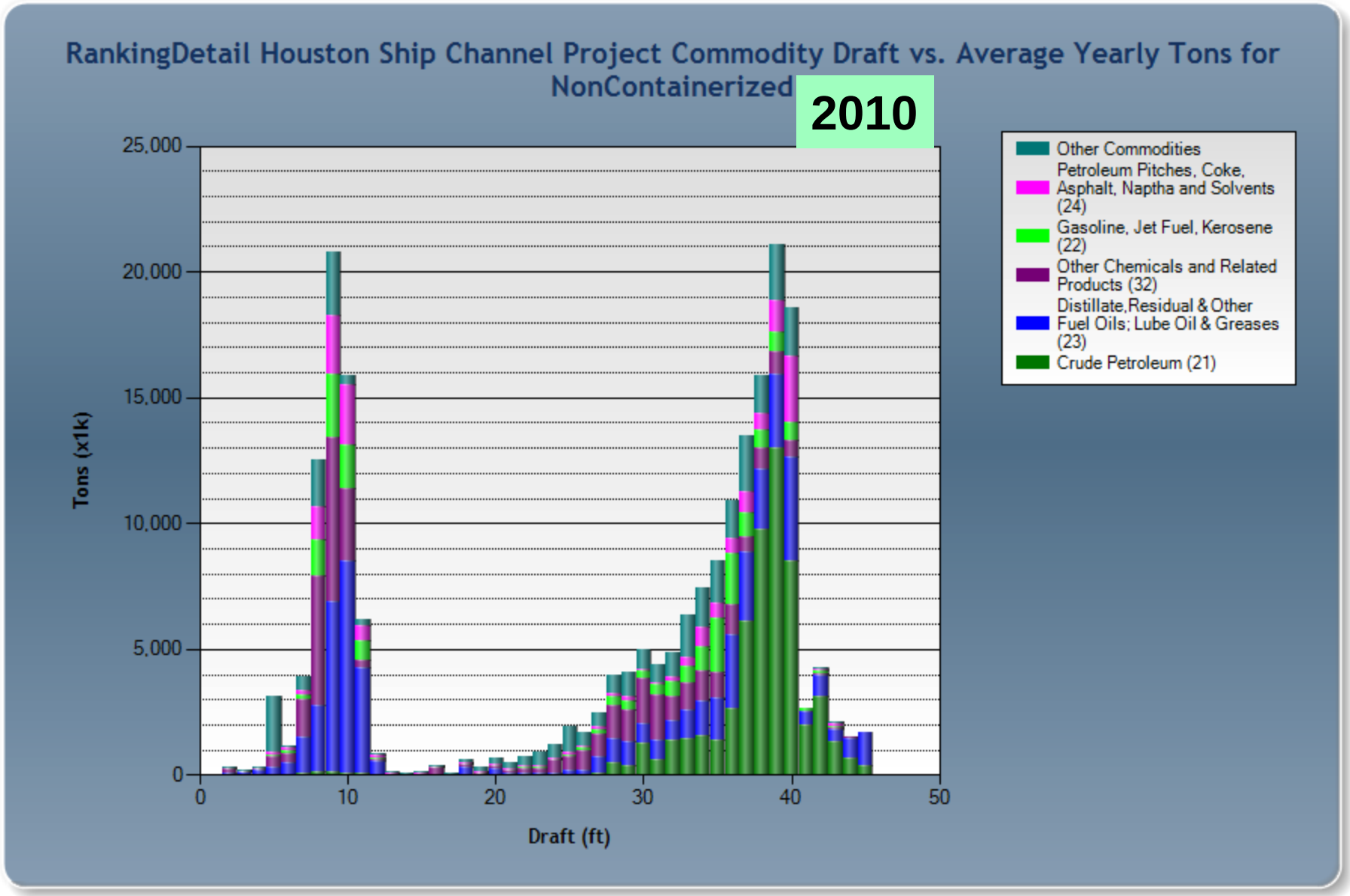
http://www.ndc.iwr.usace.army.mil/wcsc/wcsc.htm

- Corps Operations community has not consistently used this data beyond project-level tonnage and ton-mile metrics for O&M budget development.

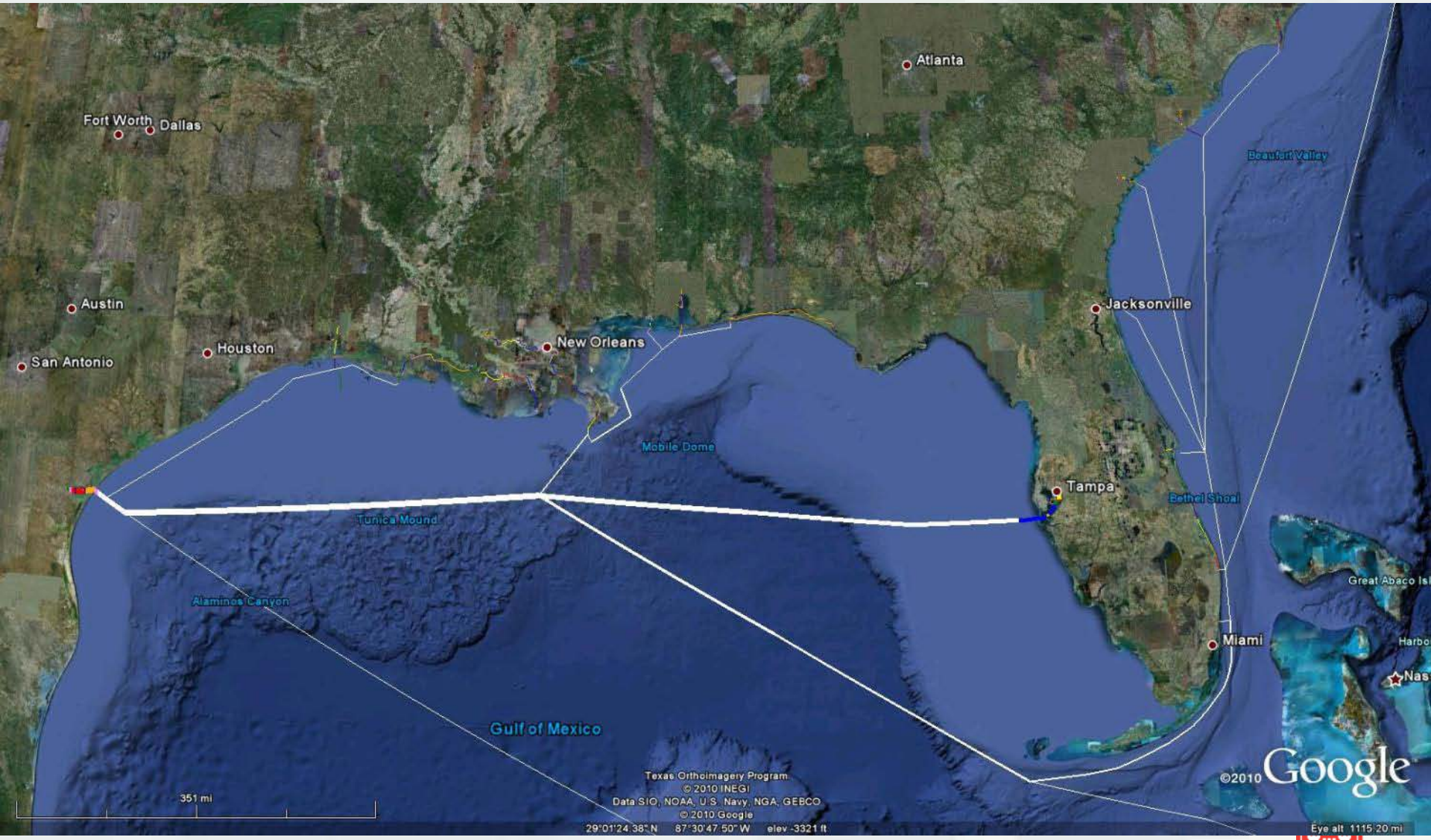
Focus on Shoal-vulnerable Cargo



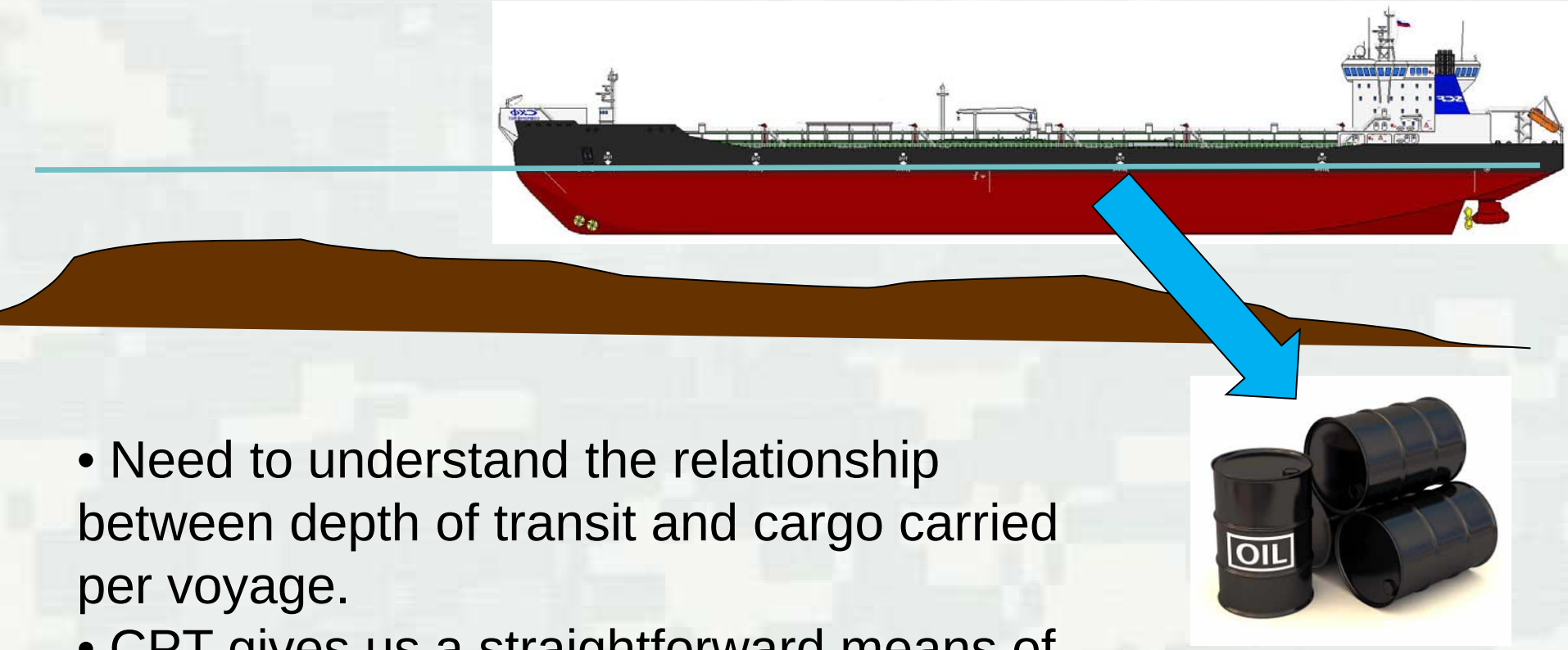
Focus on Shoal-vulnerable Cargo



Visualizing Commodity Flows

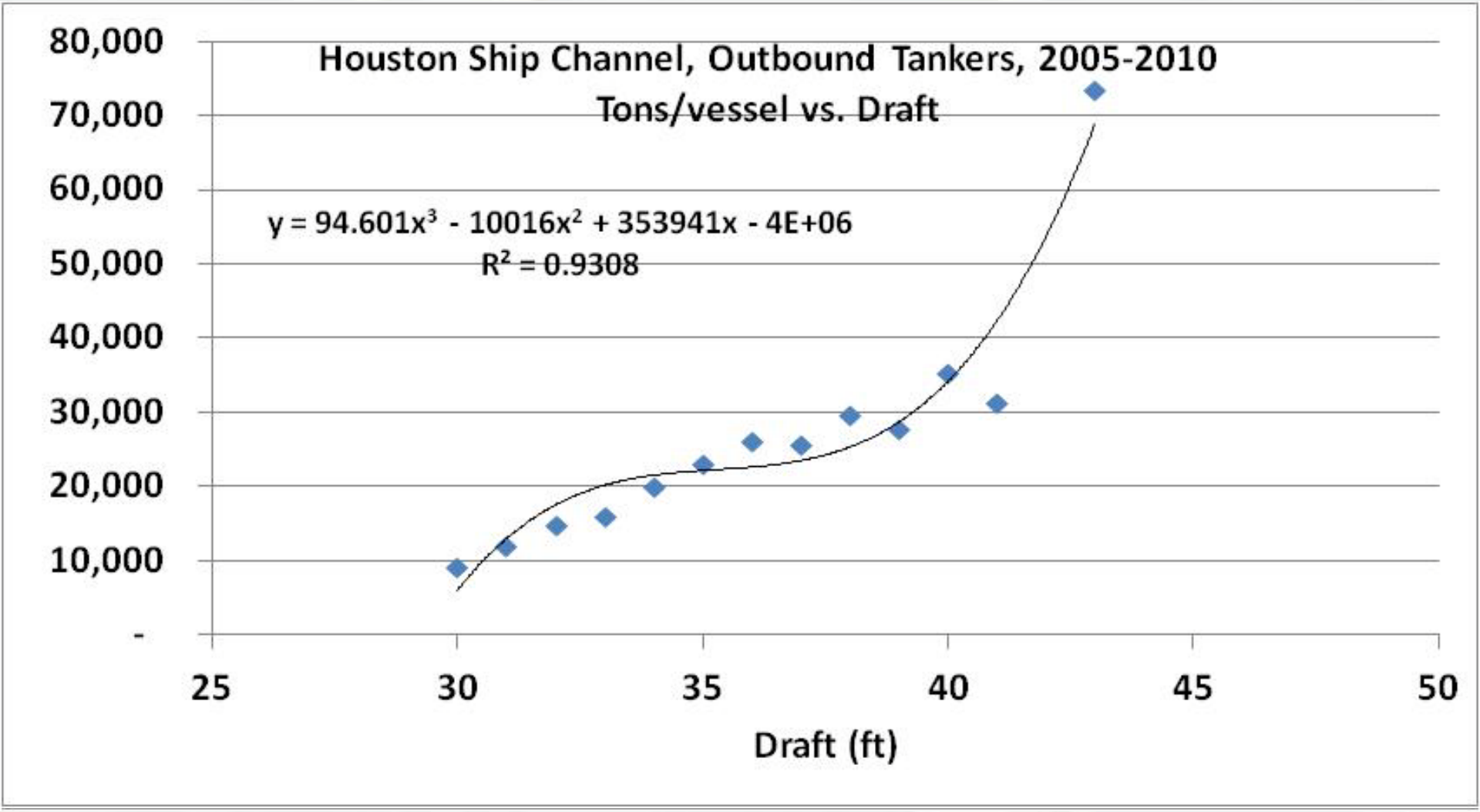


Need to Quantify Light-loaded Cargo

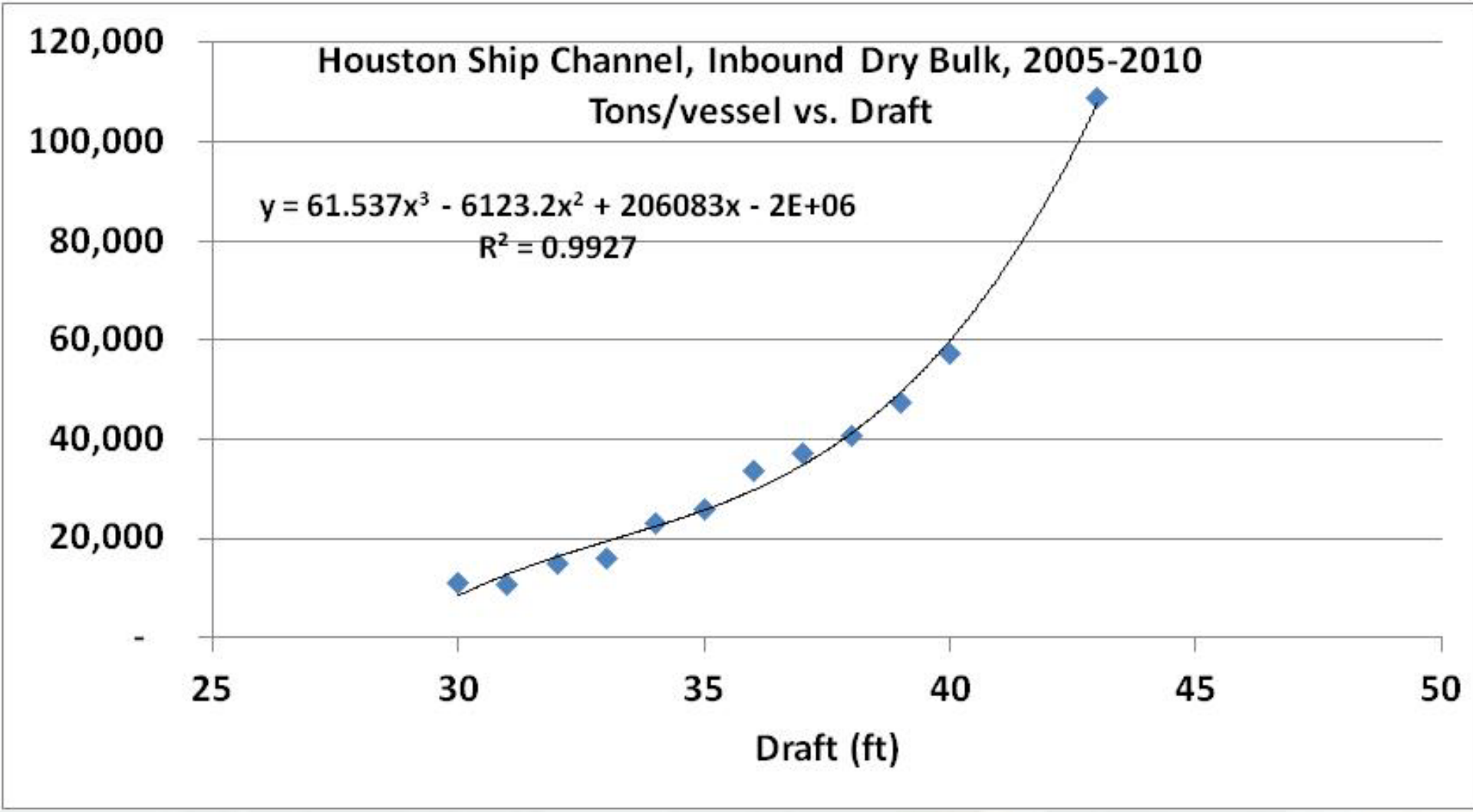


- Need to understand the relationship between depth of transit and cargo carried per voyage.
- CPT gives us a straightforward means of analyzing these relationships for scalable navigation systems.

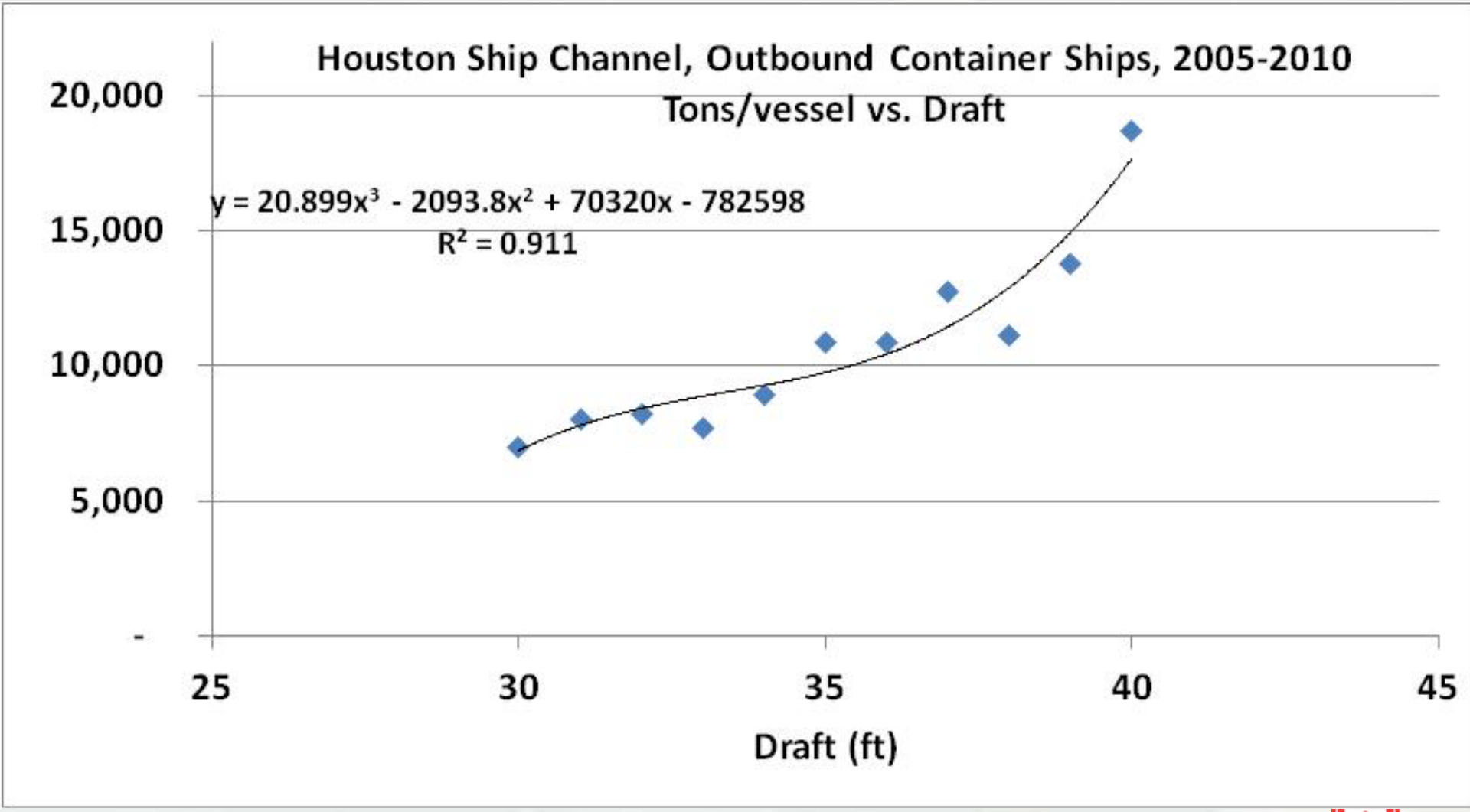
Tons/vessel across range of draft increments



Tons/vessel across range of draft increments



Tons/vessel across range of draft increments



HSC Comparison to National Averages

Vessel Type	Imports/ Exports	National Avg. Tons/ft/vessel	HSC Tons/ft/vessel
Tanker	Imports	6,858	6,706
Tanker	Exports	2,579	$283.8x^2 – 20032x + 353941$ [6,741 at 40 ft]
Dry Bulk	Imports	6,243	$184.6x^2 – 12246x + 206083$ [11,653 at 40 ft]
Dry Bulk	Exports	4,665	4,445
Container	Imports	$39.6x^2 - 2748x + 47720$ [5,049 at 42 ft.]	503.6
Container	Exports	$74.1x^2 - 5030x + 85382$ [2,273 at 42 ft.]	$62.7x^2 – 4188x + 70320$ [3,120 at 40 ft]

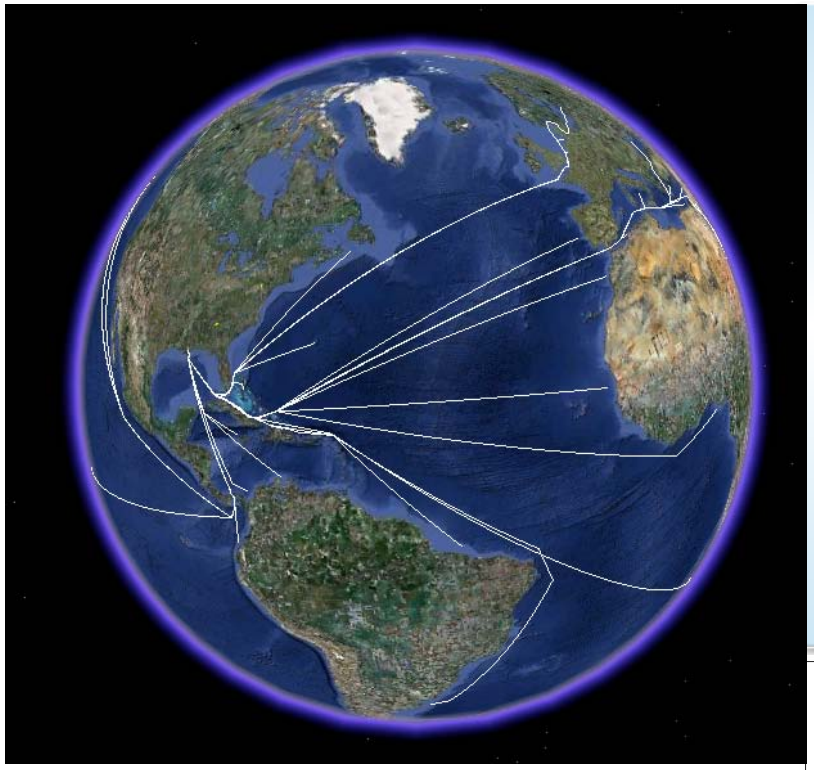
Houston Ship Channel
Average Yearly Disruptions, 3-ft Shoaling Scenario

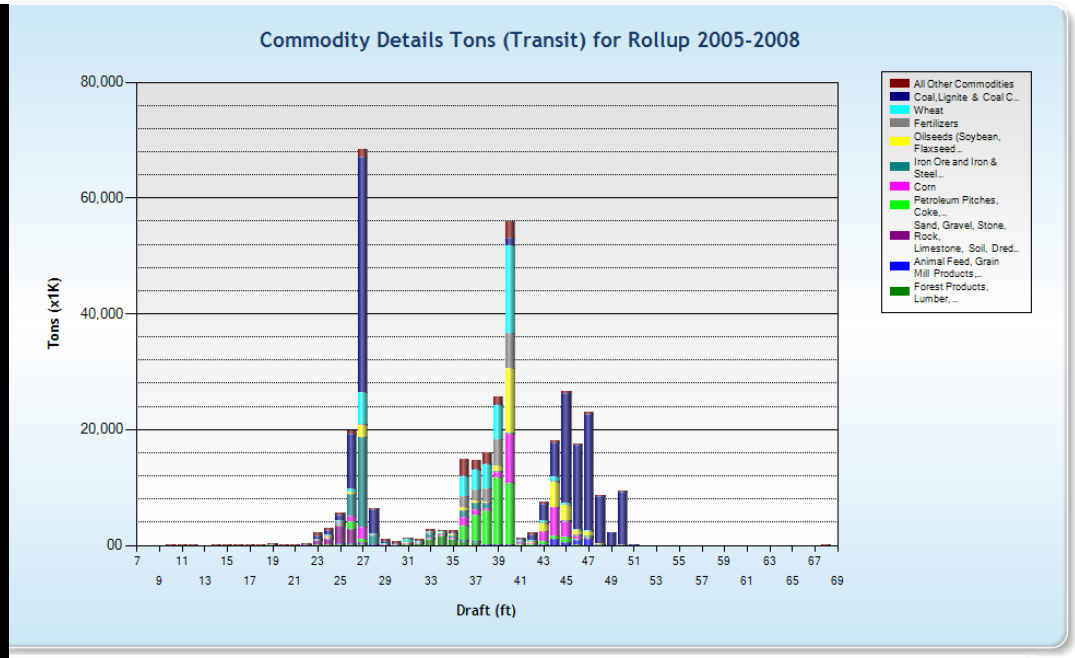
Vessel Type	Imports/ Exports	# Vessels Disrupted by 3-ft Shoaling Scenario	Thousand Short Tons Disrupted
Tanker	Imports	168	2,159
Tanker	Exports	71	1,025
Dry Bulk	Imports	42	784
Dry Bulk	Exports	68	640
Container	Imports	38	26.2
Container	Exports	68	381
		TOTAL:	**5,015**

HSC, 3-ft Shoaling Scenario

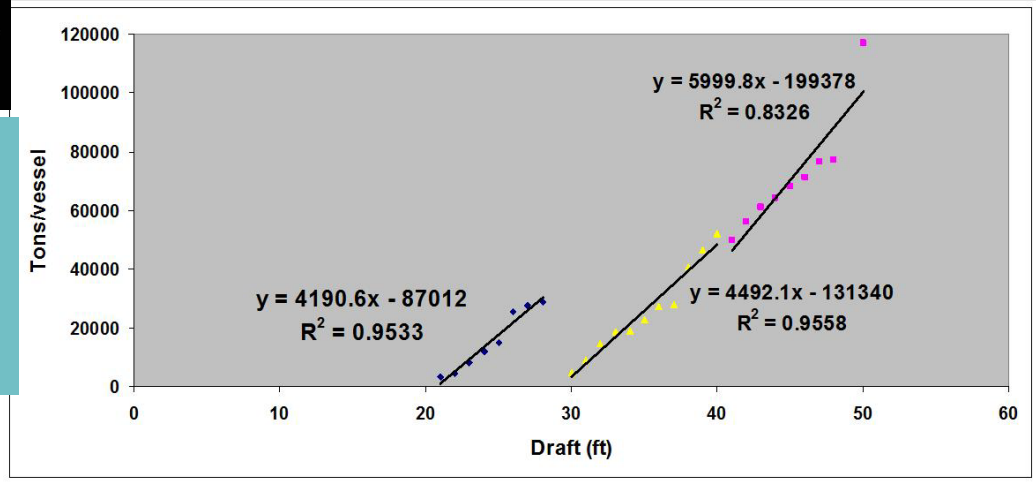
Vessel Type	Imports/ Exports	# of Additional Voyages Needed to Transport Disrupted Cargo (3-ft Shoaling Scenario)
Tanker	Imports	**33**
Tanker	Exports	**29**
Dry Bulk	Imports	**20**
Dry Bulk	Exports	**17**
Container	Imports	**3**
Container	Exports	**32**
	Total:	**133**

Further Automation of Metrics (via CPT)



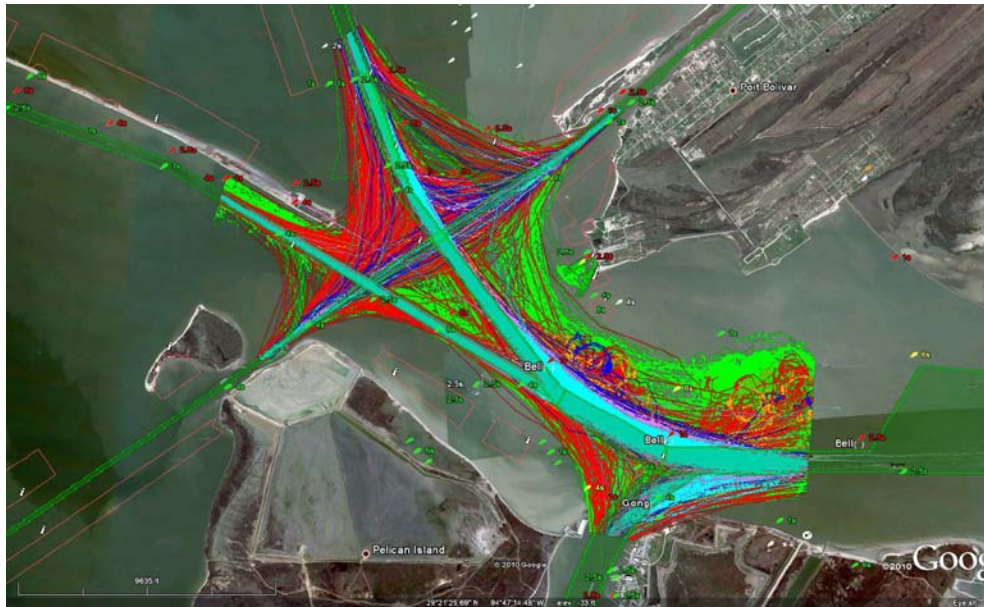


Continued development of CPT will enable rapid, scalable metrics to estimate additional shipping costs due to shoaling.



Aggregate AIS Record

- Automatic Identification System (AIS) essentially provides a remote sensing technology for:
  - Quantifying vessel interactions with navigation projects
  - Assessing system-level dynamics (project-to-project vessel movements)
  - Real-time monitoring of navigable conditions in USACE projects
  - Use to bridge the time-lag with WCSC data



Channel Portfolio Tool (CPT) and Impacts of Draft Restrictions

Questions?

Dr. Ned Mitchell
US Army Engineer Research & Development Center
Coastal and Hydraulics Lab
Vicksburg, Miss.

Kenneth.n.mitchell@usace.army.mil
601-634-2022