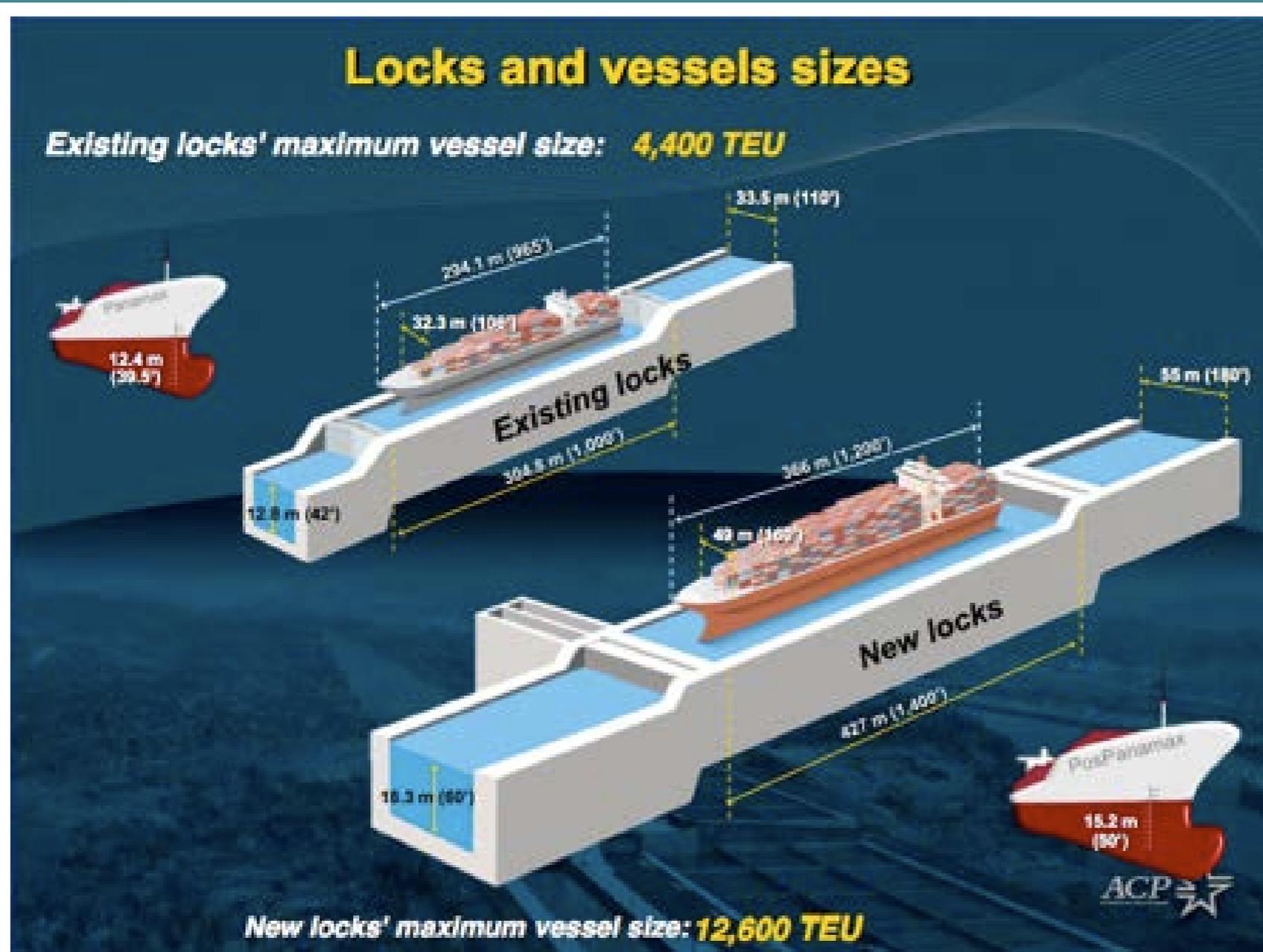


Navigation Update: Charleston Branch Pilots Association

Captain John Cameron
US Coast Guard (Ret.)
Executive Director

Driver 1: Panama Canal



Panamax (Current)

1000' long
106' wide
39.5' deep

+20% +55% +25%

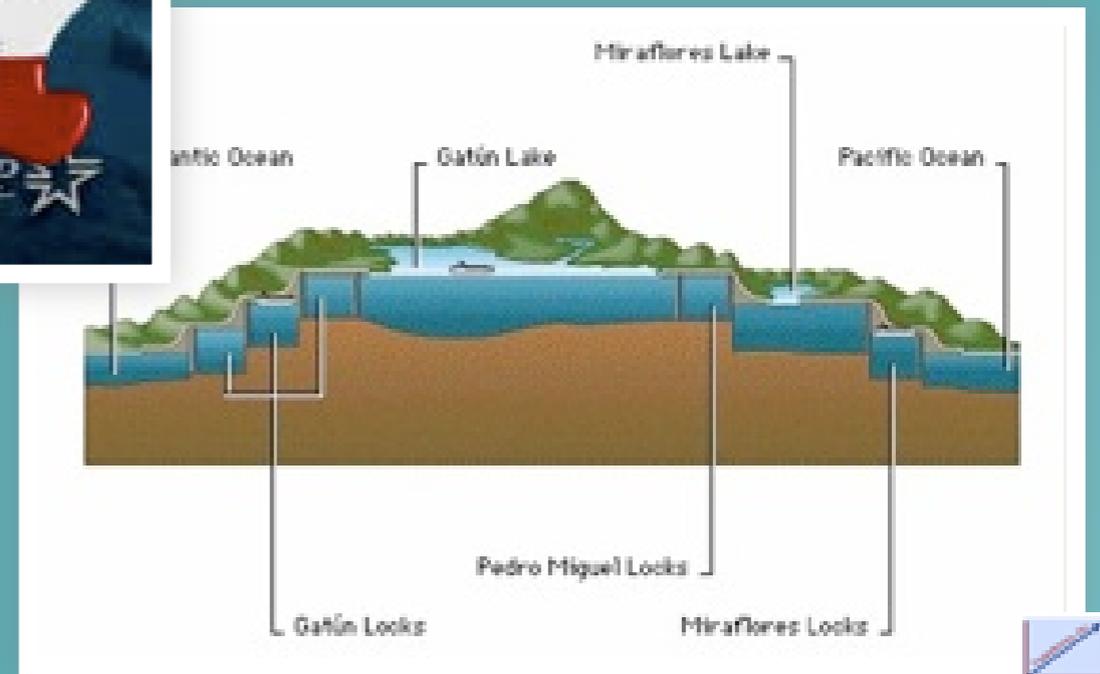
Post-Panamax

1200' long
160' wide
50' deep

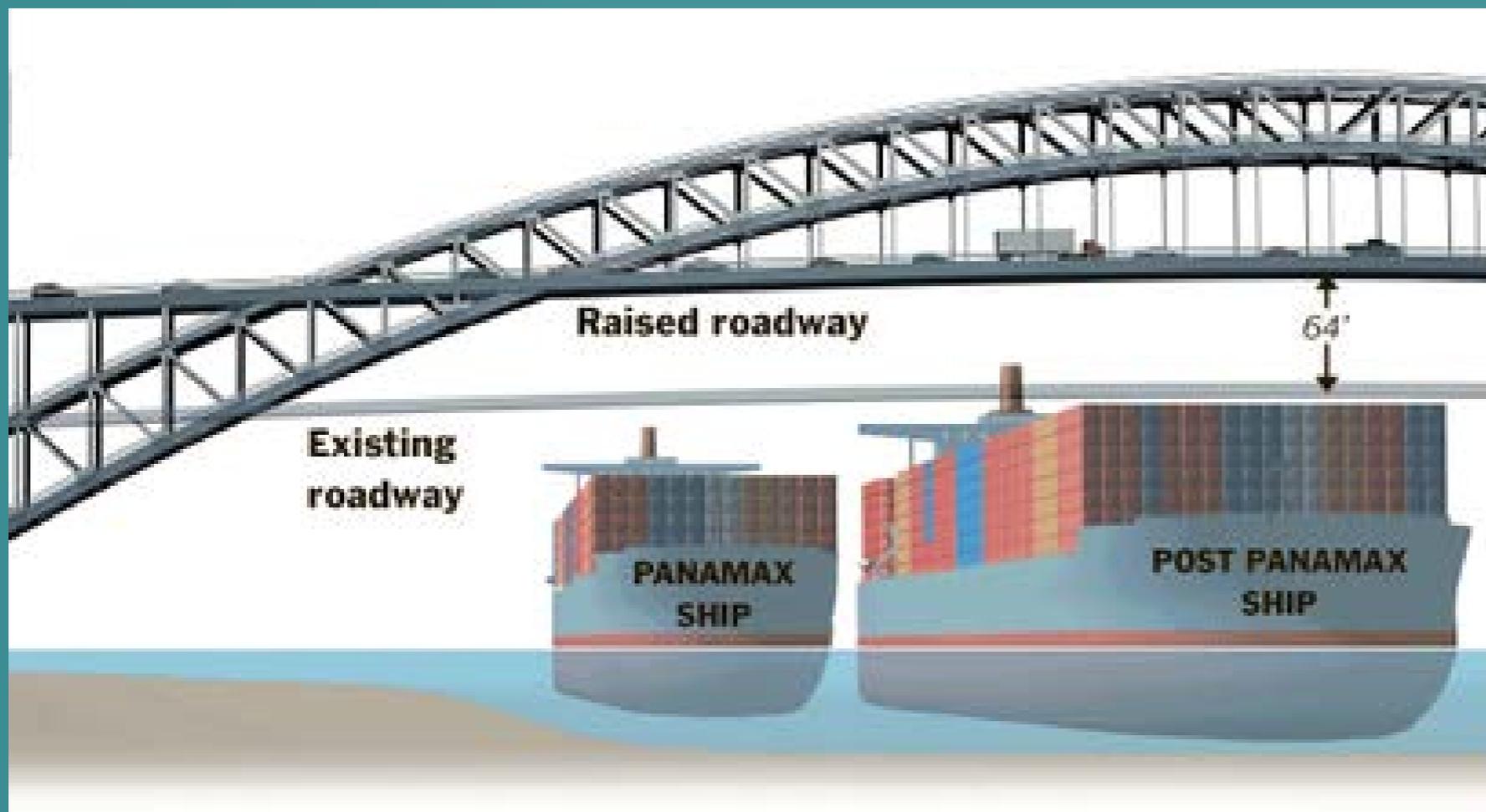
Post Panamax = Resale Value for Larger Ships

3x the container capacity; > 13,000 TEU

2x the cargo tonnage; > 100,000 DWT



Driver 2: Bayonne Bridge



“Bayonne-Max”
153’ High

+42 %

Post-Bayonne-Max
217’ High

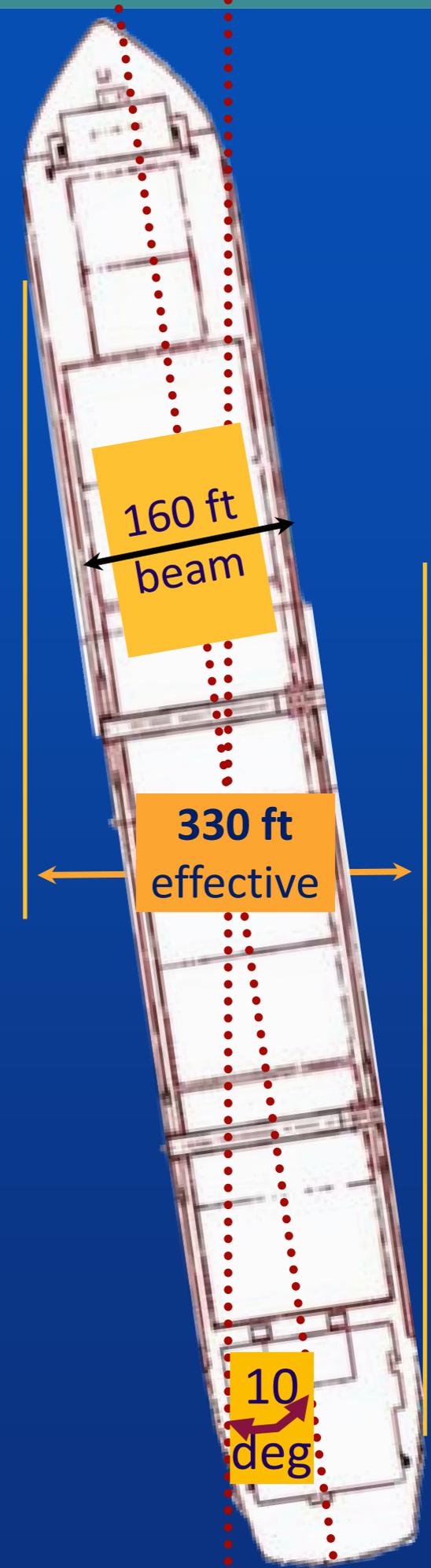
These two projects will allow 13,000 TEU vessels to trade on the US East Coast



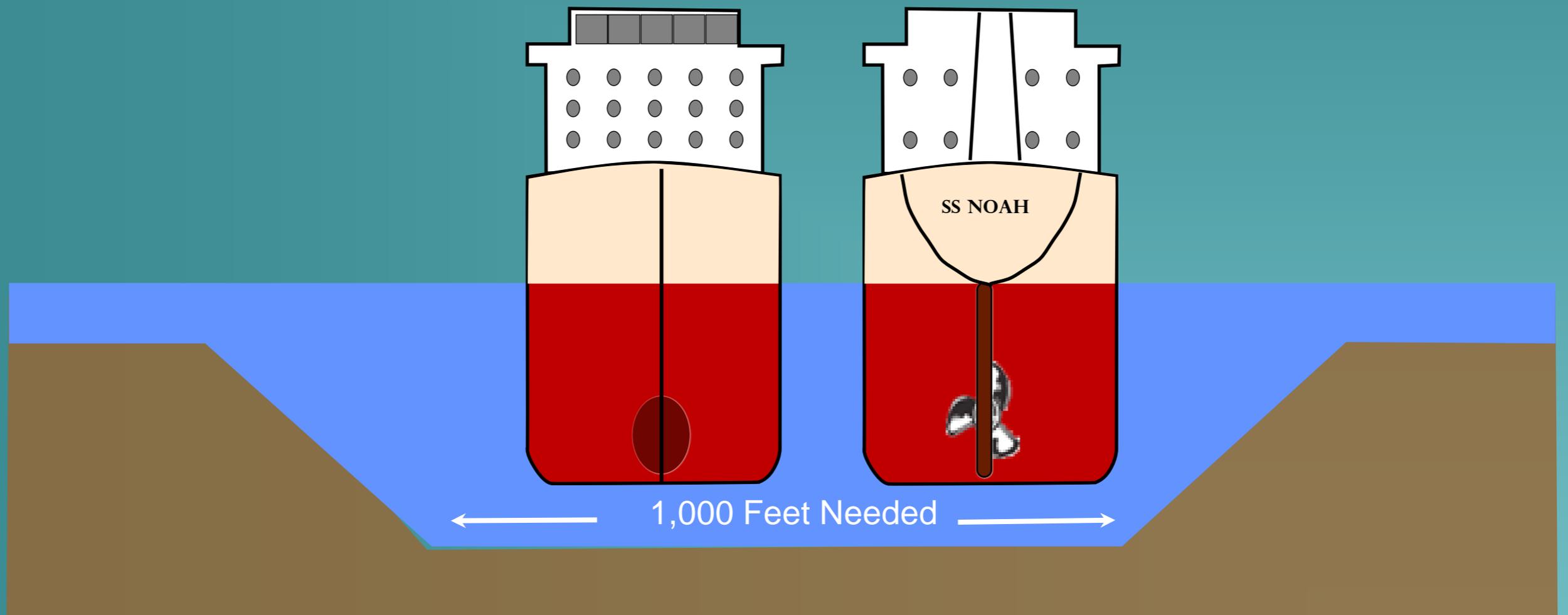
Ships in Channels: Width is as Important as Depth

Due to lateral wind and current, typical in an ocean channel, ships “crab”.

At 10 degrees, a full size Post Panamax ship’s beam effectively doubles.



Two-Way* Traffic Capability



Channel must be wide enough to allow
two ships to meet and pass



Ships in Channels: Harbor Entrance



Dredged harbor channel, 52'
desired

Dredged entrance channel,
55' desired

Channels are deeper outside the harbor than so ships can go up and down, and roll side-to-side, in ocean waves. ACOE Channel Design Manual says 110% of draft inshore & 120% of draft offshore.



Draft & Economic Advantage: Every Foot Counts

Deeper drafts mean more cargo.



**One foot of draft equates to \$10 - \$15 Million of additional cargo.
Every voyage, import and export.**



Navigating Post Panamax Vessels

Channel Dimensions

- ◆ Turning Basins: Current limiting feature in Charleston.
- ◆ Our maximum is 13,000 TEU until turning basins are improved with Post-45 Project.
- ◆ Bends: Easing turns is essential to safety.
- ◆ Ranges: required to check vessel swing to manage turns

A 13,000 TEU ship carries \$15,000,000 for each available foot of draft.

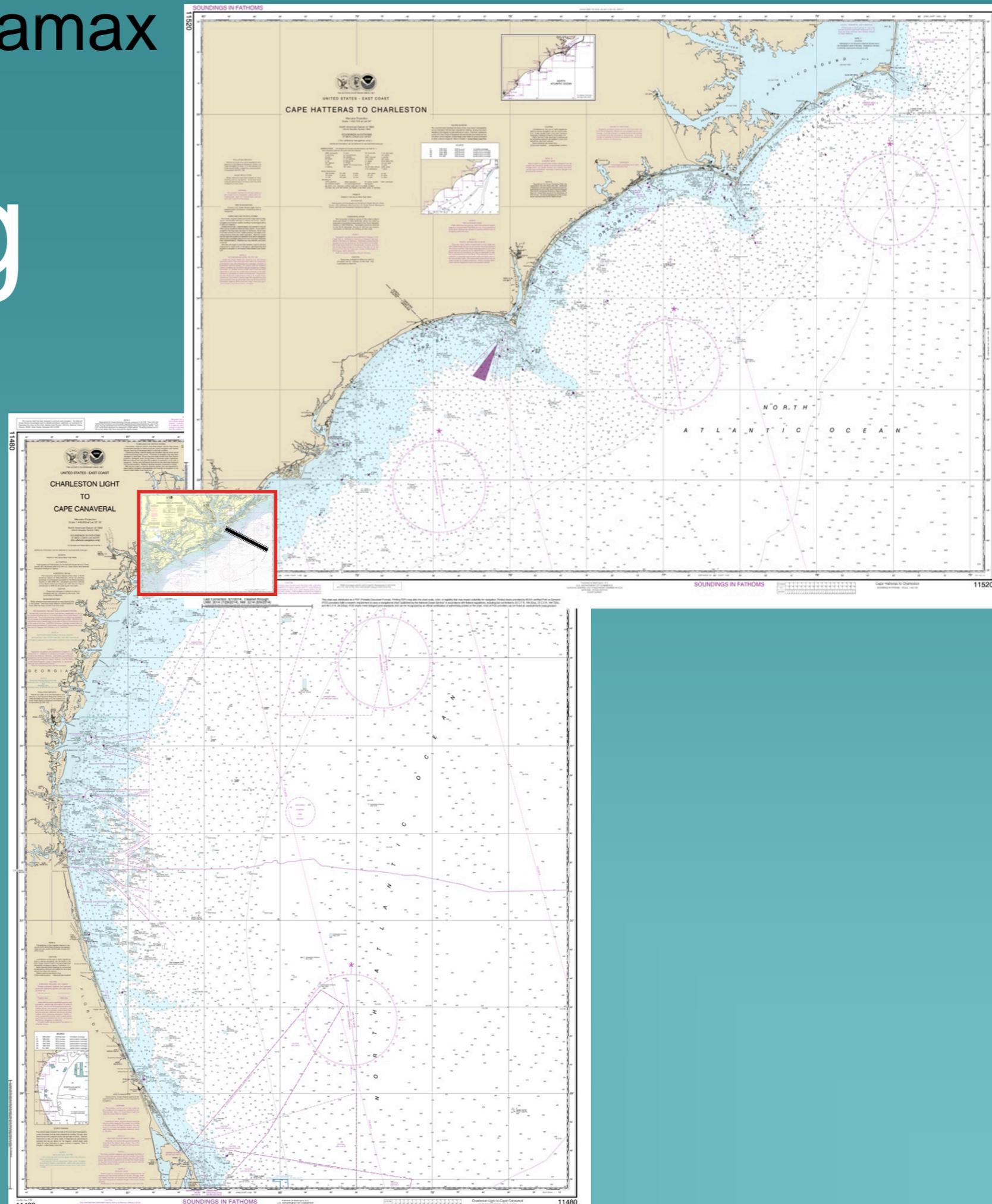
The first fully loaded ship the day we complete our \$350 million deepening will import \$75 million and export another \$75 million more than it could today.

Investing in channel dimensions upfront avoids delays later and is a guaranteed ROI.

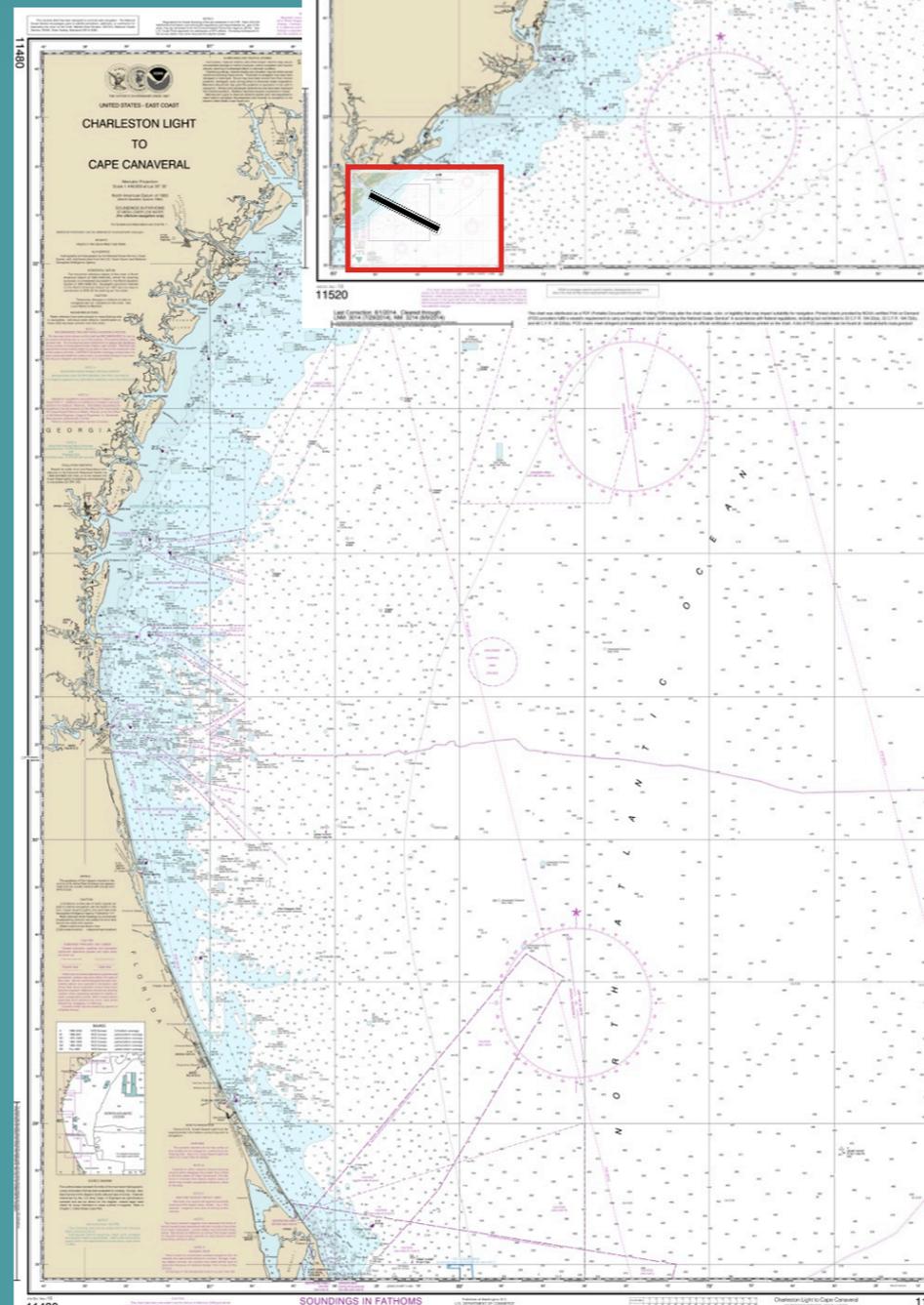
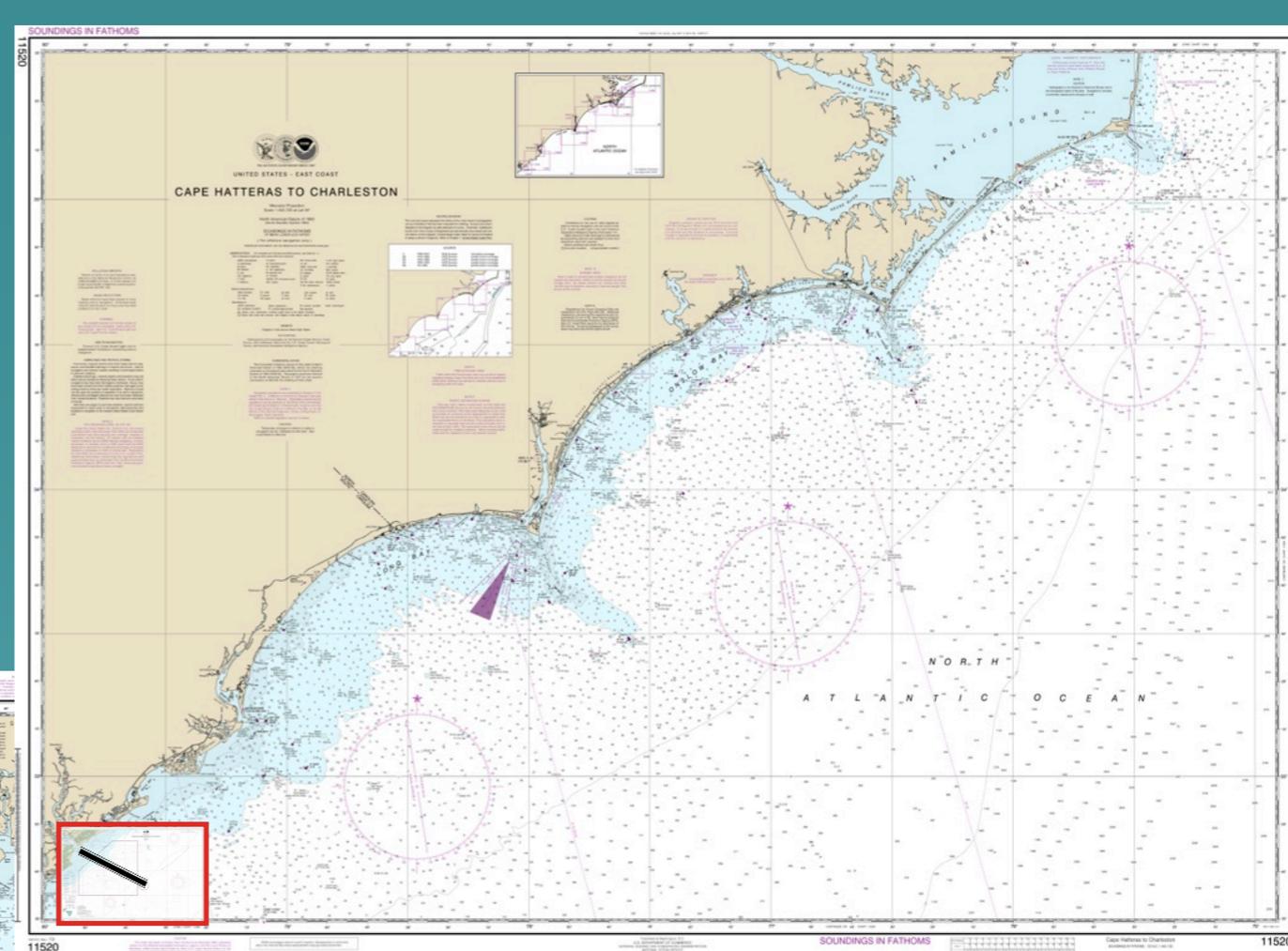
Navigating Post Panamax Vessels

Charting

Chart 11521
extends only 2
miles past channel,
and is at the seam
of two ocean
charts.



Navigating Post Panamax Vessels Charting

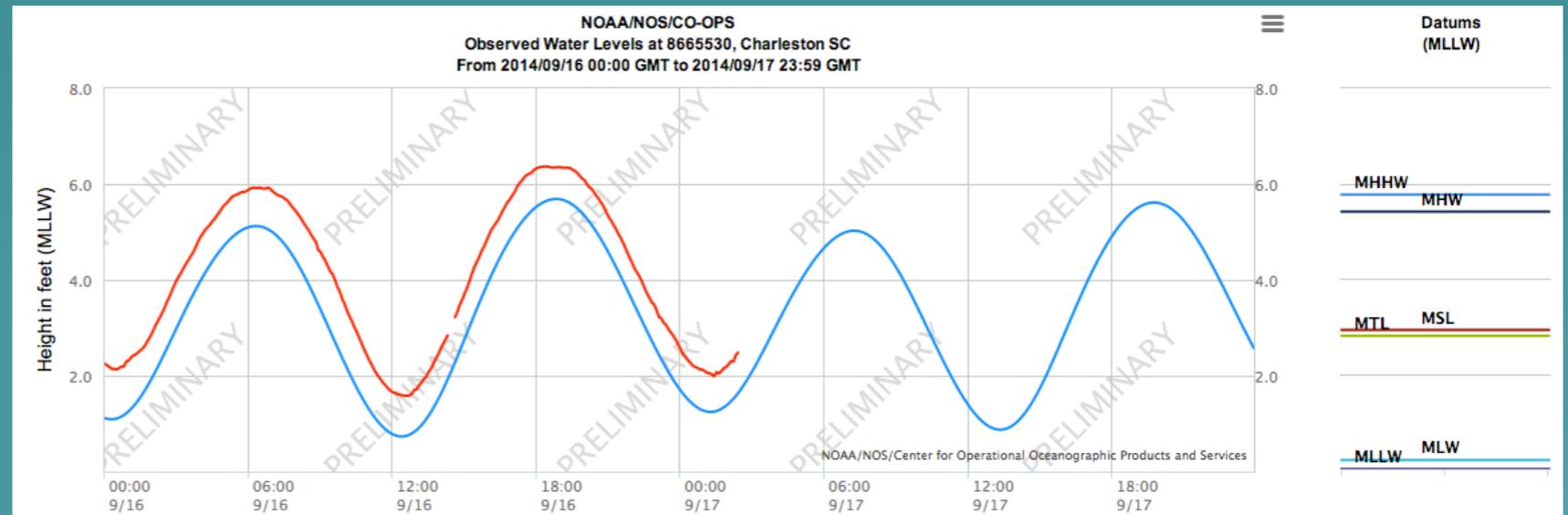


New Chart 11528
extends 7 miles past
channel

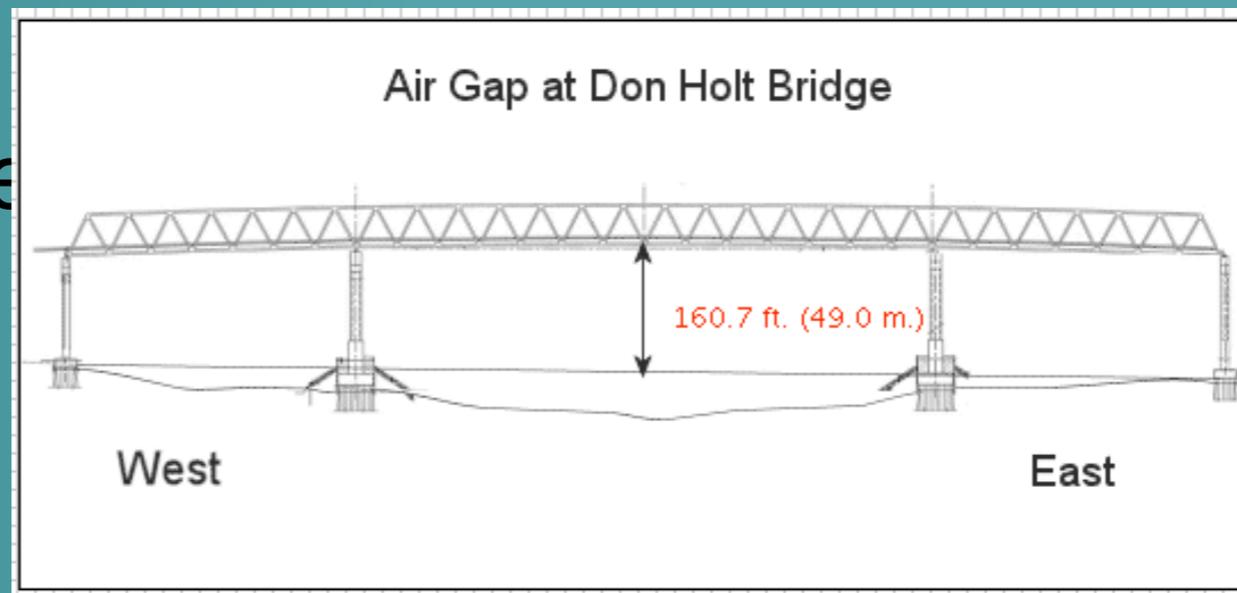
Navigating Post Panamax Vessels

PORTS

Depth



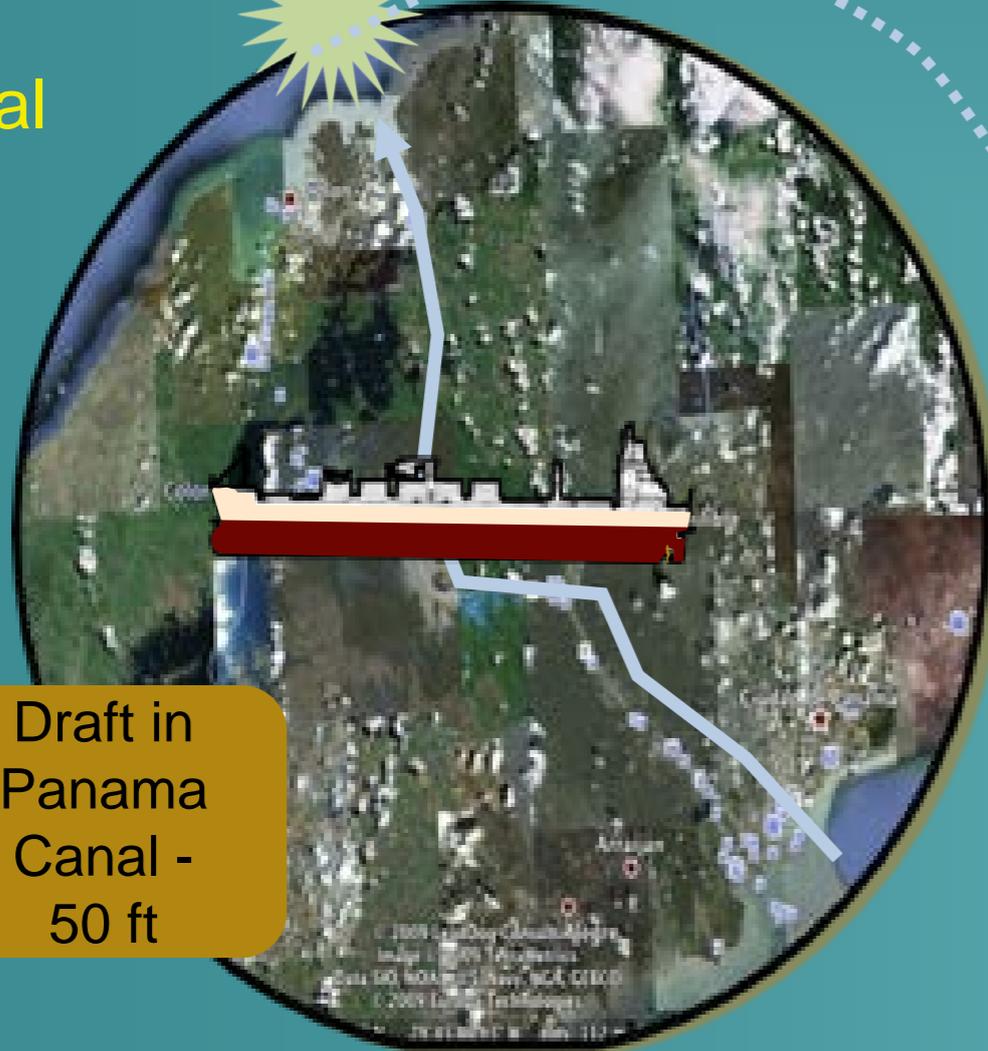
Bridge Clearance



Salinity??

Draft Variance: Salinity

Panama Canal



Draft in Panama Canal - 50 ft

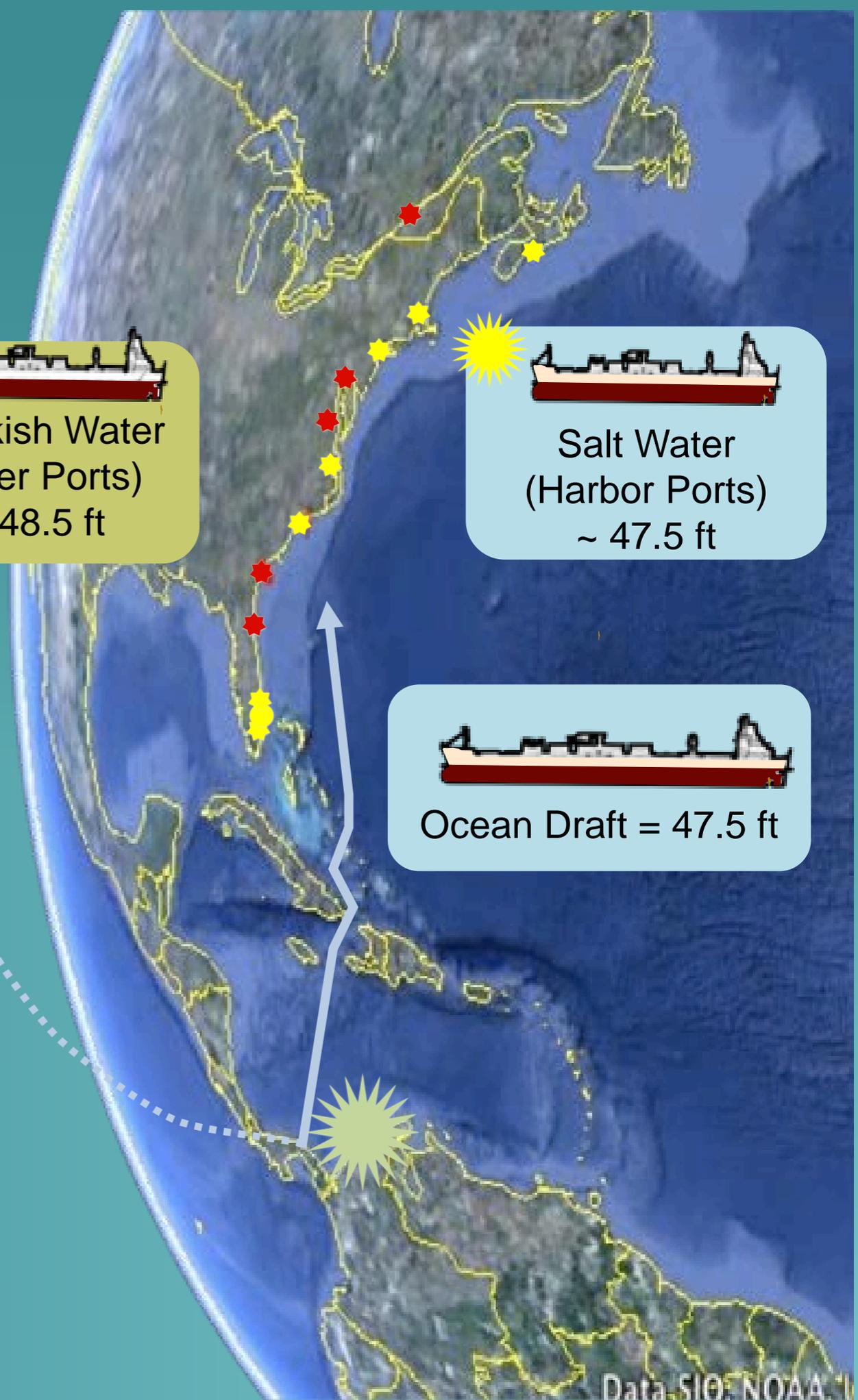
Brackish Water (River Ports) ~ 48.5 ft

A yellow starburst icon is positioned above the box. A white and red ship icon is shown above the text.

Salt Water (Harbor Ports) ~ 47.5 ft

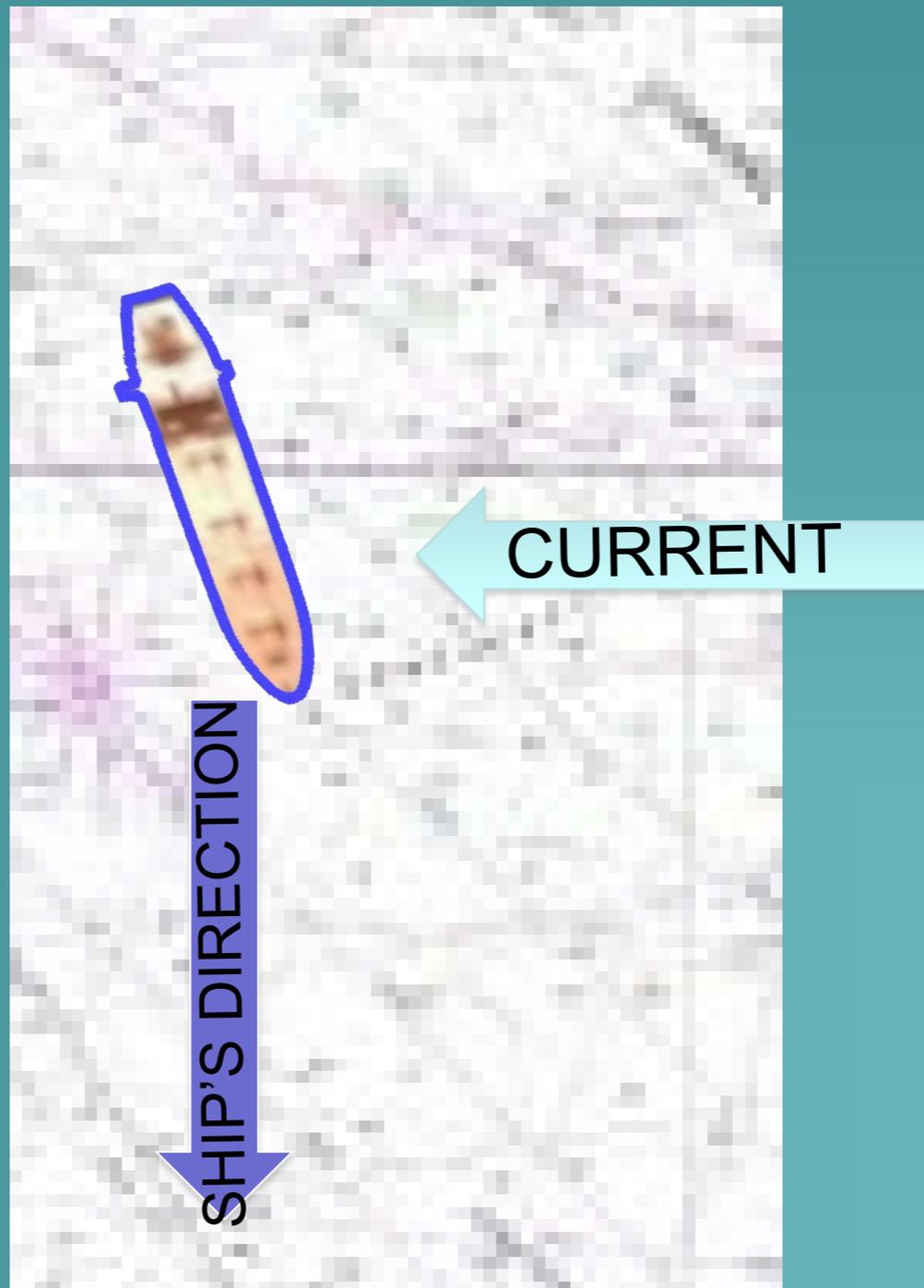
A yellow starburst icon is positioned above the box. A white and red ship icon is shown above the text.

Ocean Draft = 47.5 ft

A white and red ship icon is shown above the text.

Right Whale Speed Rule: Unsafe for Open Ocean Channels

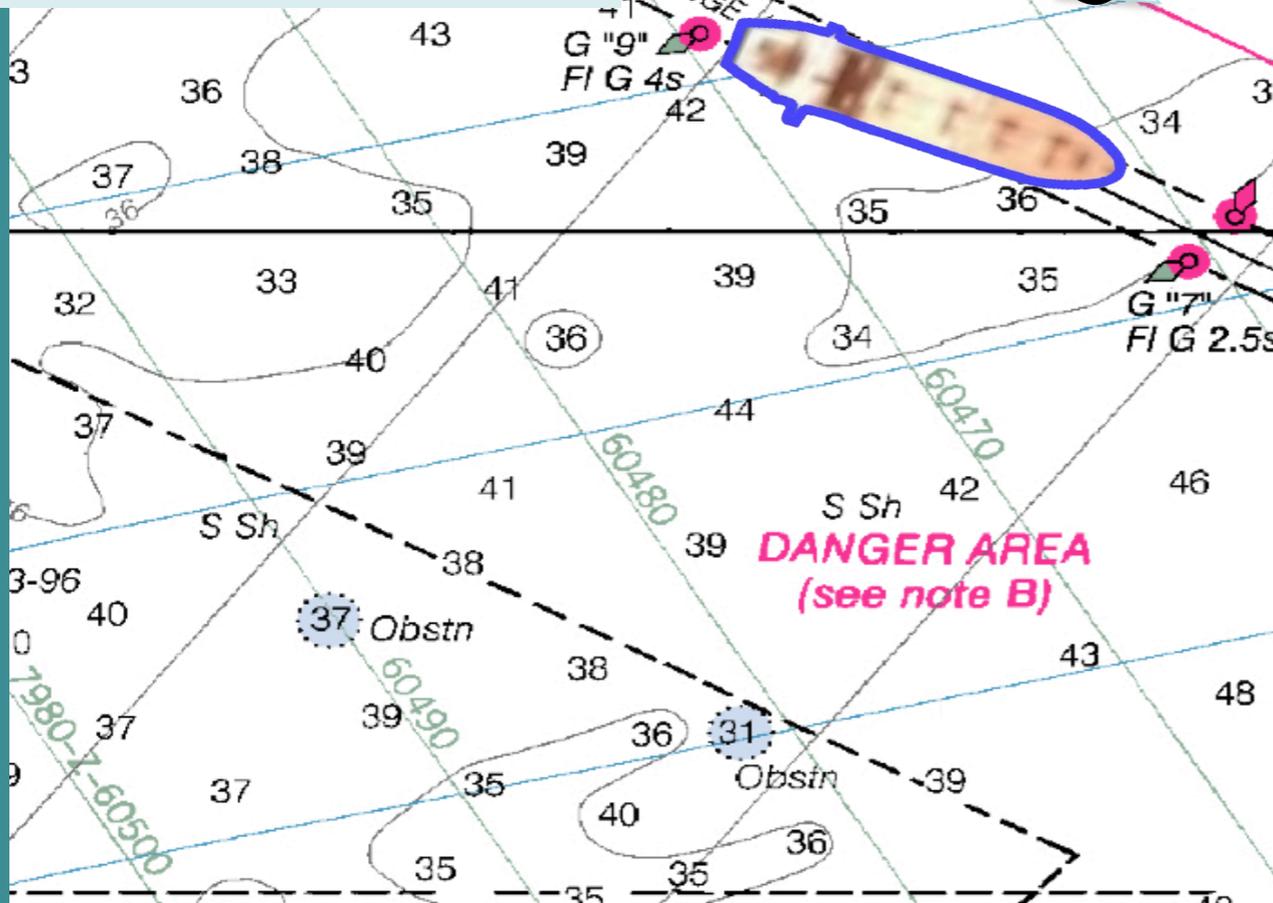
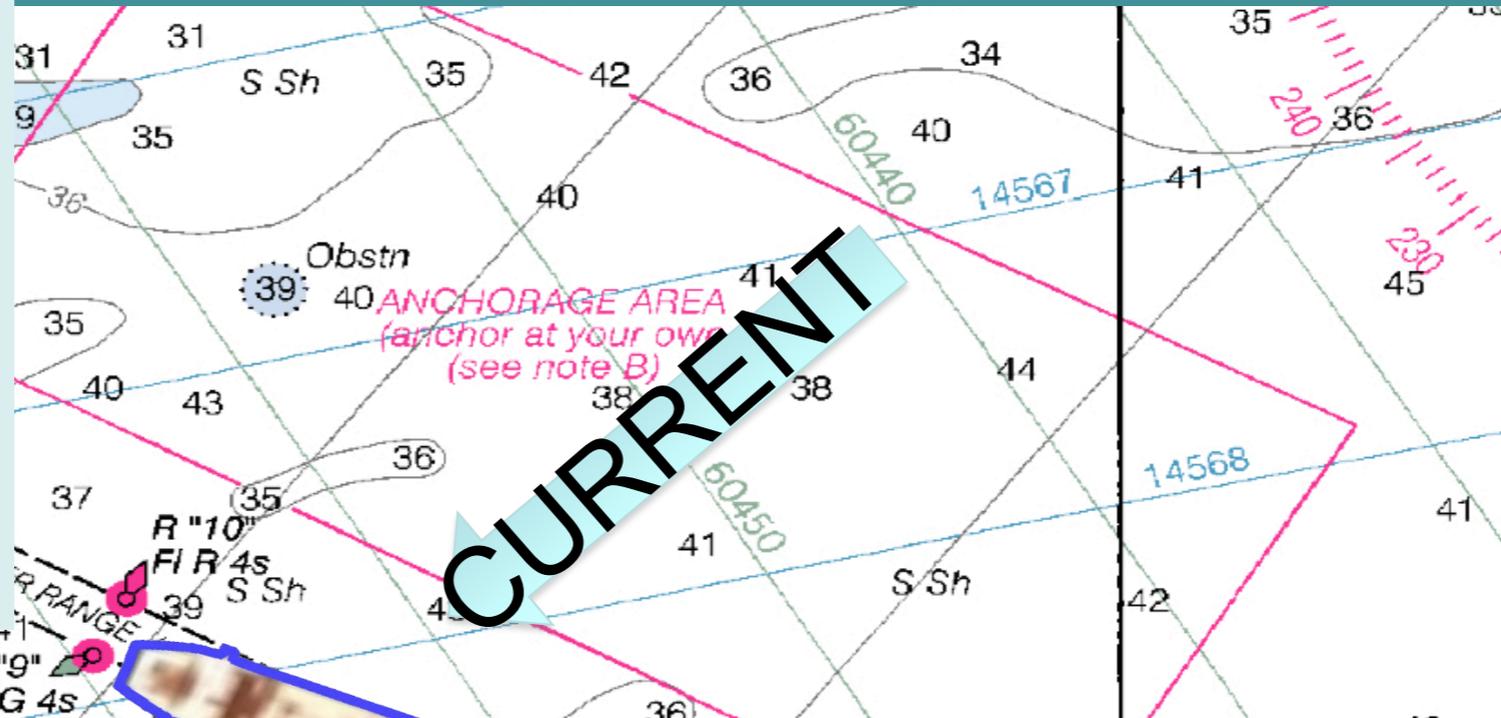
Ocean current is seldom in line with ship's direction:
So ship has to steer partly into the current to go straight.



In open ocean, there are no obstacles,
So “crabbing” is not a problem.

Right Whale Speed Rule: Unsafe for Open Ocean Channels

To stay in the channel, a ship has to steer partly into the current to go straight (i.e. it “crabs”).



The slower it goes, the more it crabs, until it “stalls”, which is what caused the BAHAMA SPIRIT grounding in 2004.

Right Whale Speed Rule Unsafe for Open Ocean Channels

Model Ships: 1100 ft long by 150 ft wide

Channel Width: 800 feet

Weather: From NOAA weather buoy archives

Scenario: Inbound ship meets outbound ship

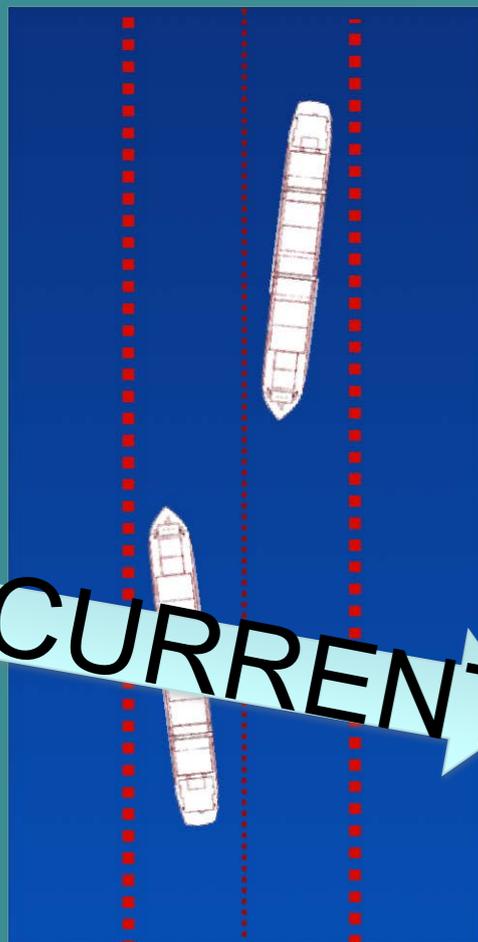
At 15 kts, ships occupied

71% of the channel

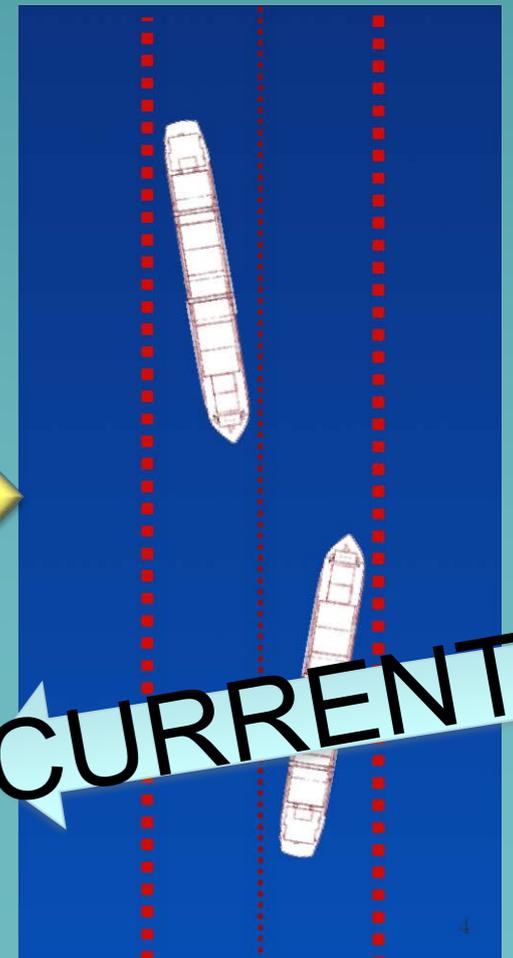
At 10 kts, ships

occupied 85% of the channel.

This is a 50% reduction in the margin of safety.

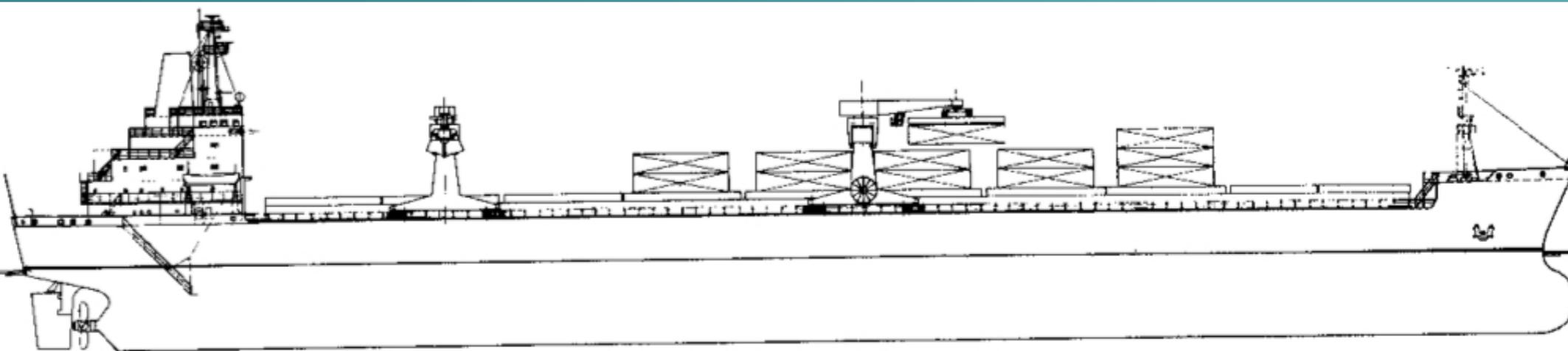


CURRENT



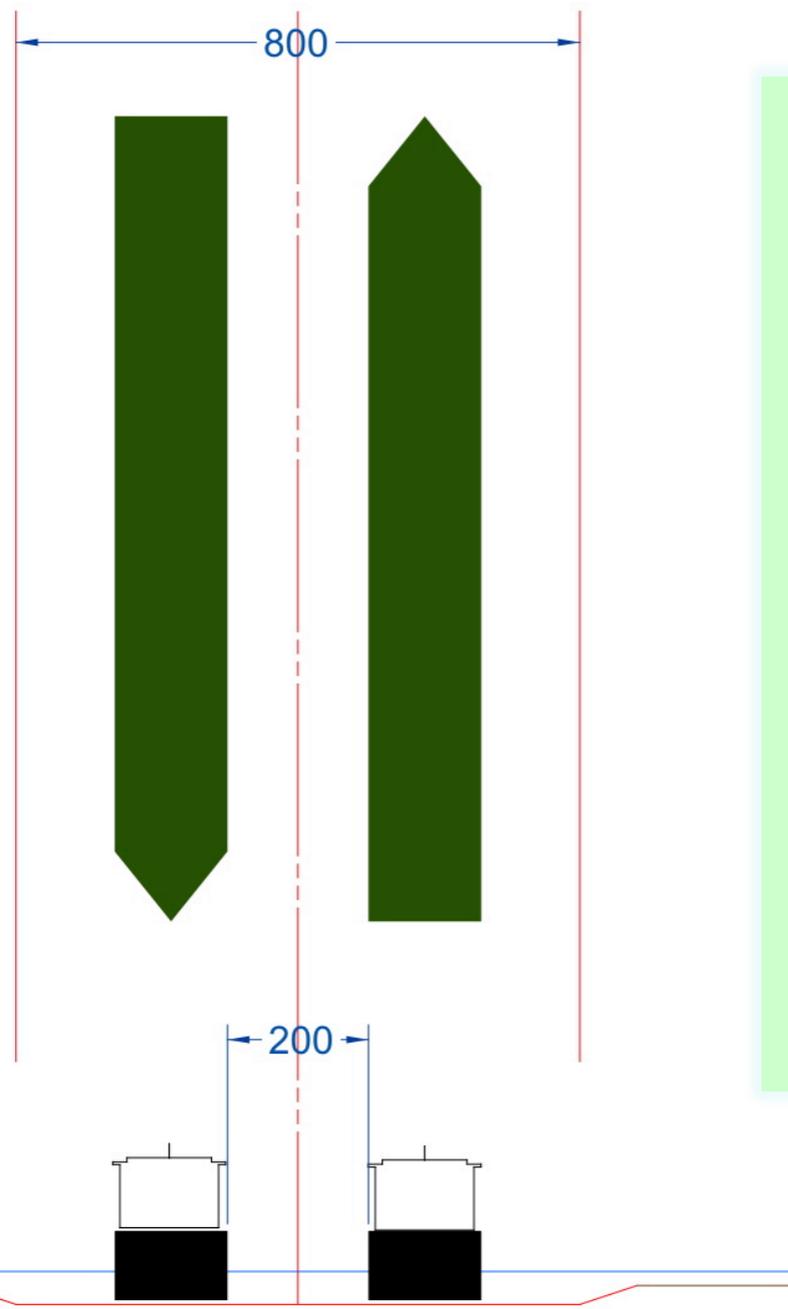
CURRENT

Right Whale Speed Rule Unsafe for Open Ocean Channels



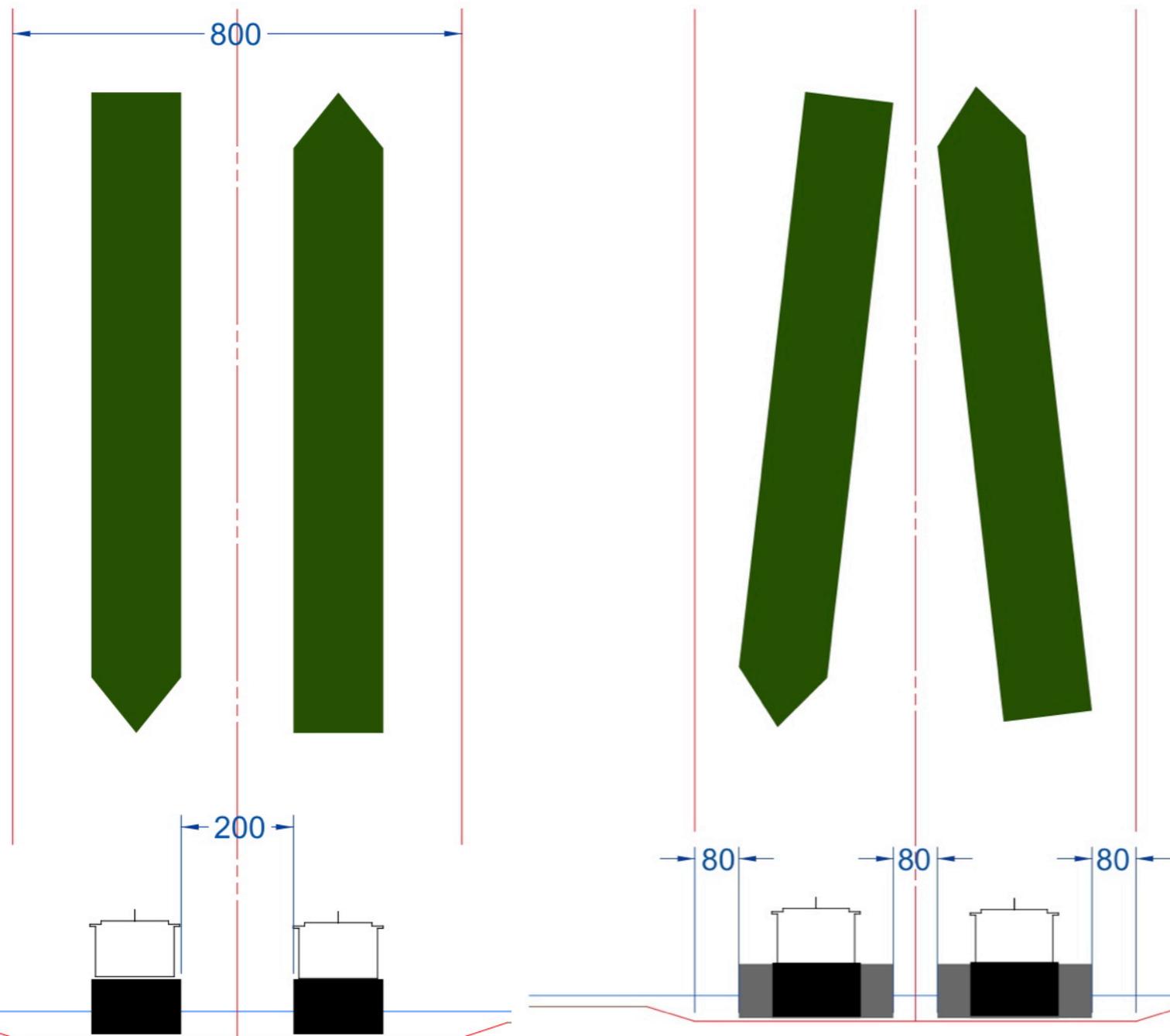
At 10 kts, probability of getting through the open door is 40% less than at 20 kts.

Right Whale Speed Rule: Unsafe for Open Ocean Channels



For six months of the year, ships can navigate at speeds sufficient to reduce crabbing, and maintain good navigational precision

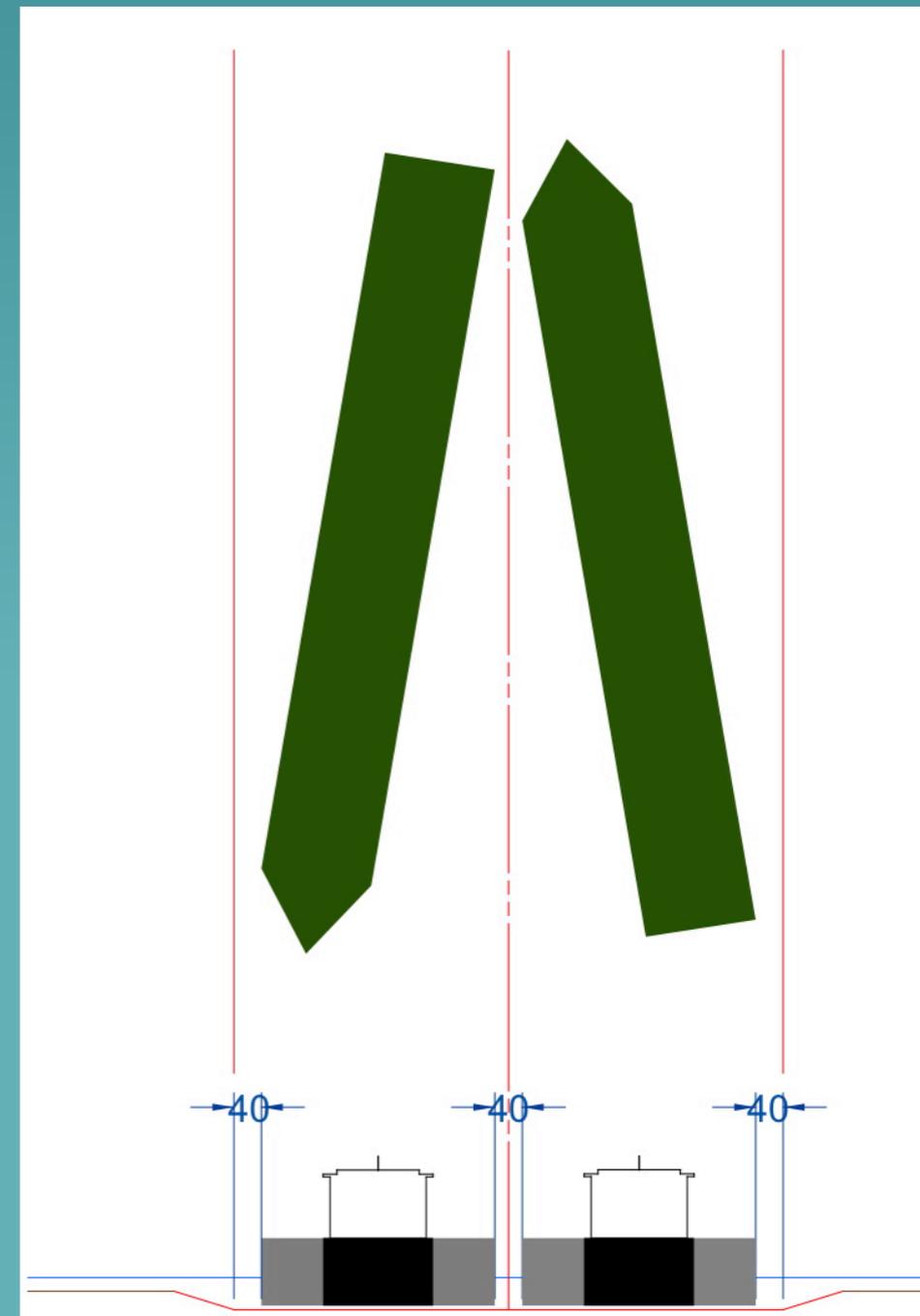
Right Whale Speed Rule: Unsafe for Open Ocean Channels



At 15 kts, ships experience significant crabbing, severely decreasing distance to the channel edge, and significantly reduced navigational precision.

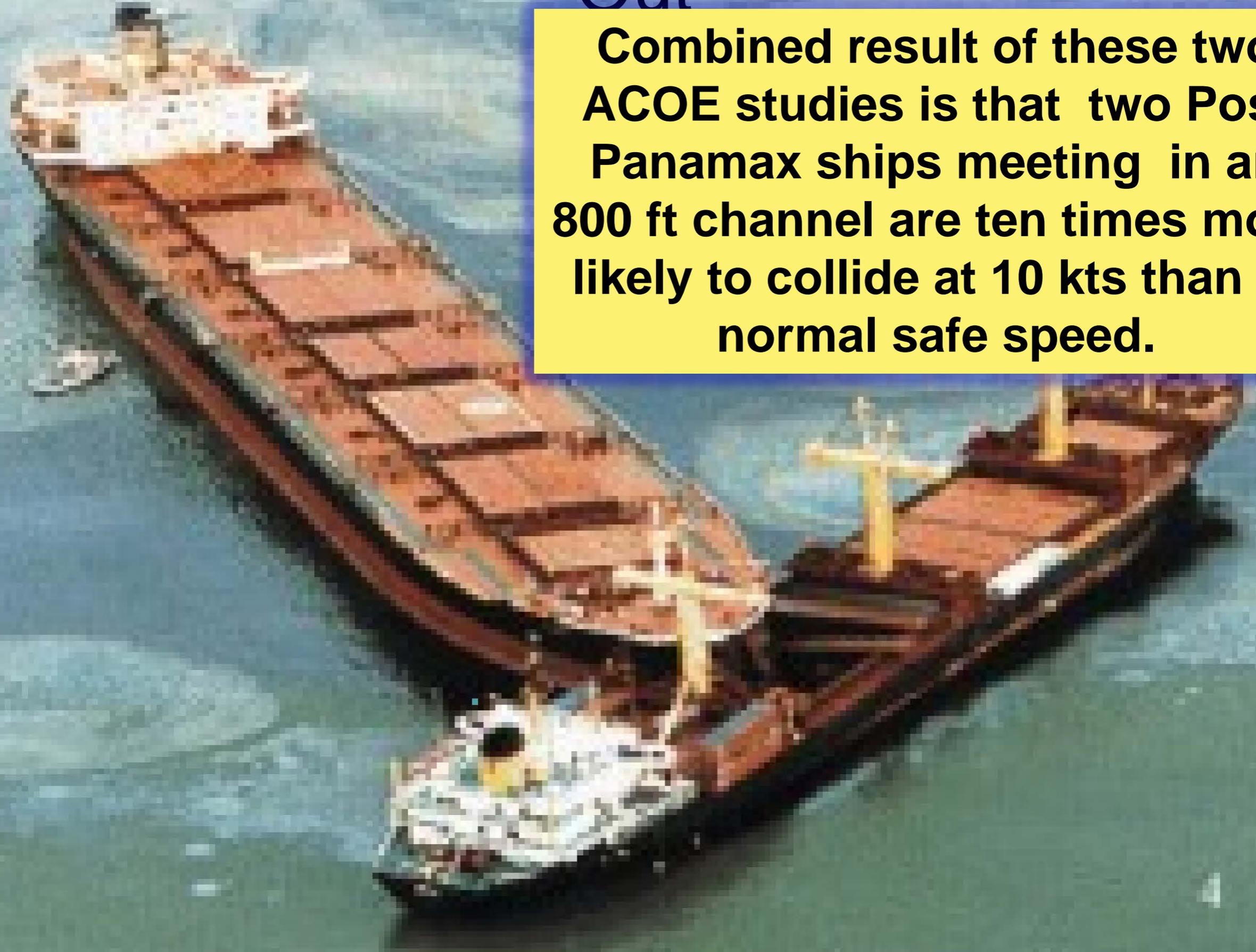
Right Whale Speed Rule: Unsafe for Open Ocean Channels

At 10 kts, ships experience debilitating crabbing, decreasing distance to the channel edge to the point of danger, and reduced navigational precision, to the point of losing control altogether.



Likely Consequence When it Doesn't Work Out

Combined result of these two ACOE studies is that two Post Panamax ships meeting in an 800 ft channel are ten times more likely to collide at 10 kts than at normal safe speed.



When it Doesn't Work Out

Bahama Spirit, 2004

Charleston Entrance Channel.

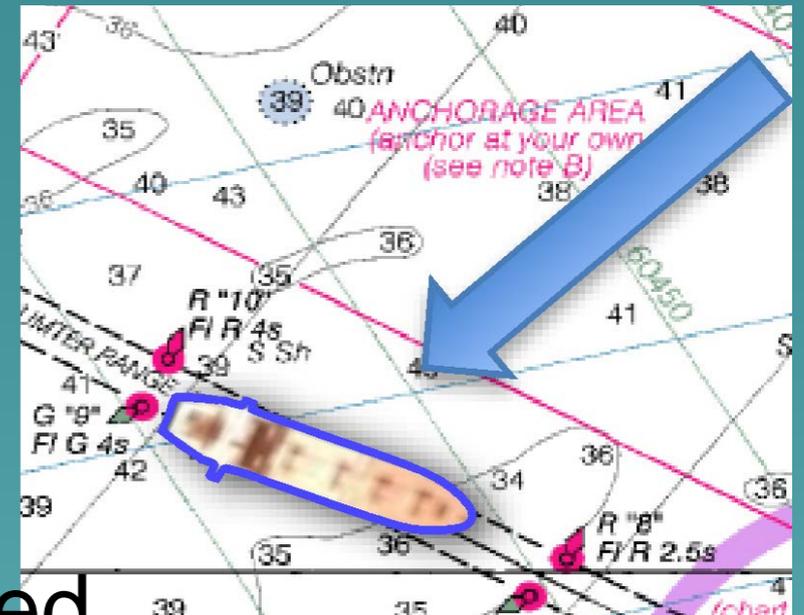
Winds 25 kts with gusts to 30 kts.

Ship had mechanical issues limiting speed.

The more the Pilot and Master increased rudder angle to steer into the wind, the more it slowed the ship from the drag of the rudder.

Eventually the ship “stalled” and could not make enough speed to counter the current and wind.

The stern hit the right edge of the channel and it became stuck.



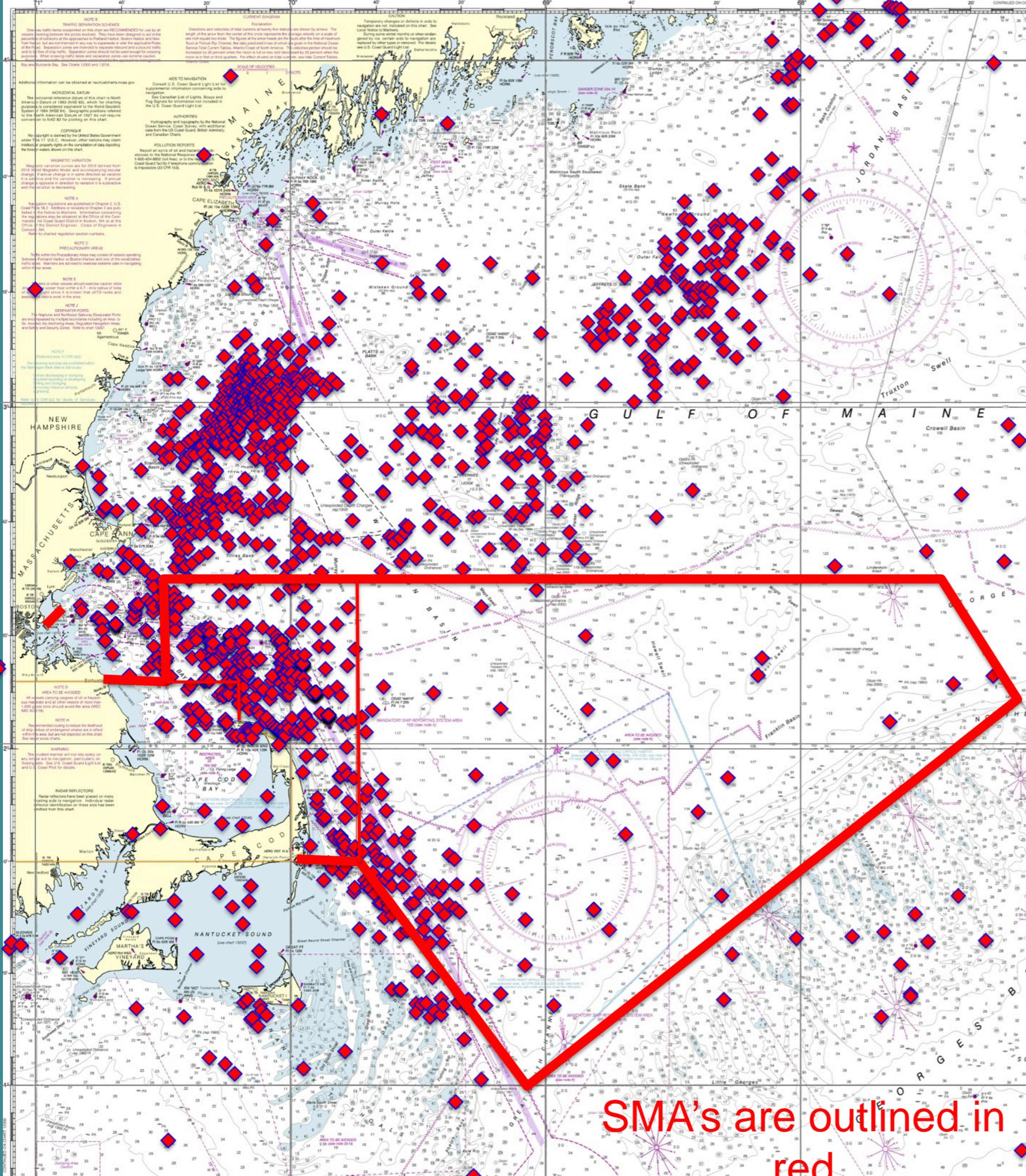
This is what happens when the margin of safety becomes “negative.”

Why now?

Ships are now typically 30 – 50 % larger than in 2006 when the Coast Guard expressed concern, meaning margins of safety in channels are greatly reduced.

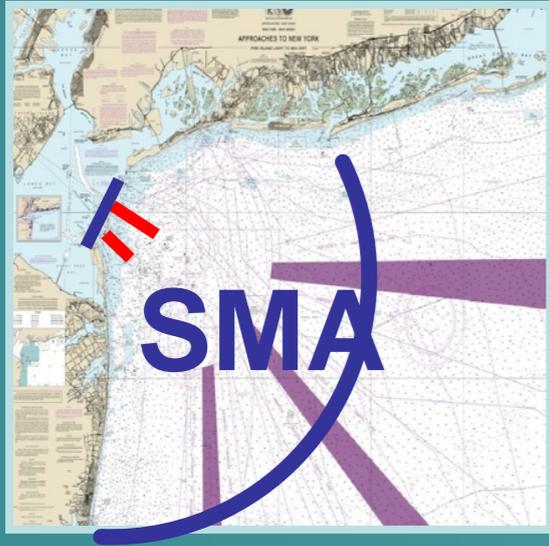
NOAA Precedent for Exemptions: 25% of recorded sightings are unprotected by current regulations

- ◆ In a ten-year period (2002-2011) NOAA recorded 16,010 Right Whale sightings in Northern New England.
- ◆ 3,989 (~ 25%) would be unprotected by current regulations.
- ◆ Regulating confined channels to the brink of severe risk from slow-speed induced ship accidents is inexplicable while protecting only 75% of the documented habitat elsewhere.

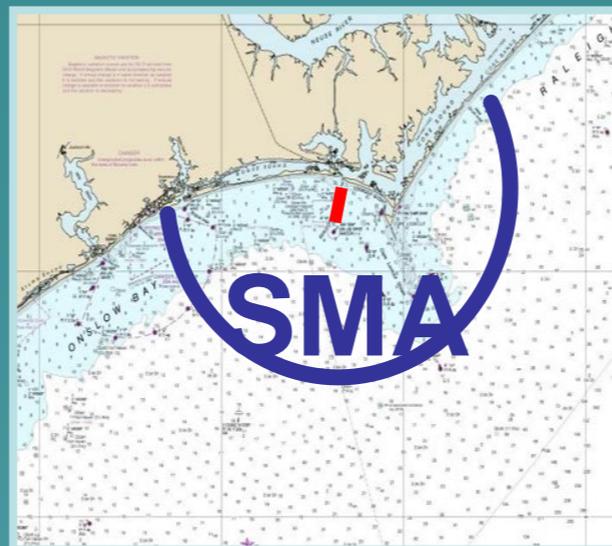


SMA's are outlined in red

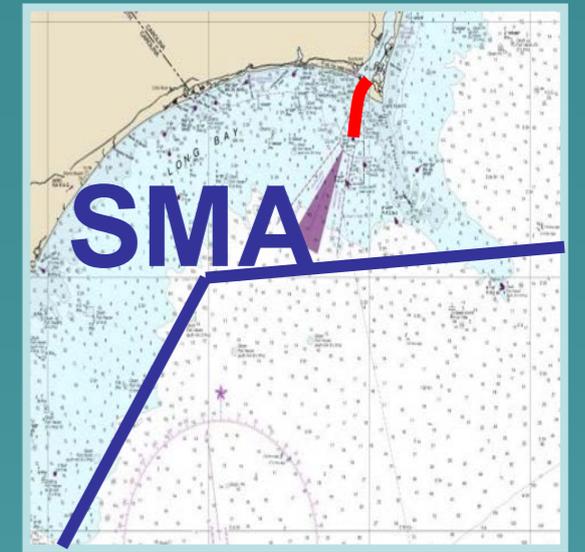
NEW YORK: .9 nm²



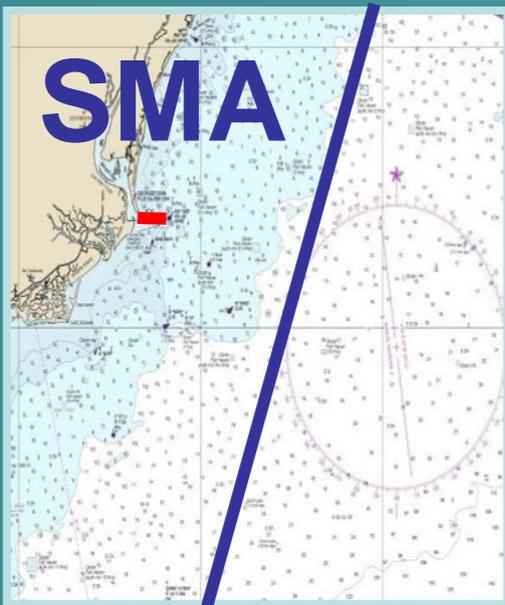
MOREHEAD: .5 nm²



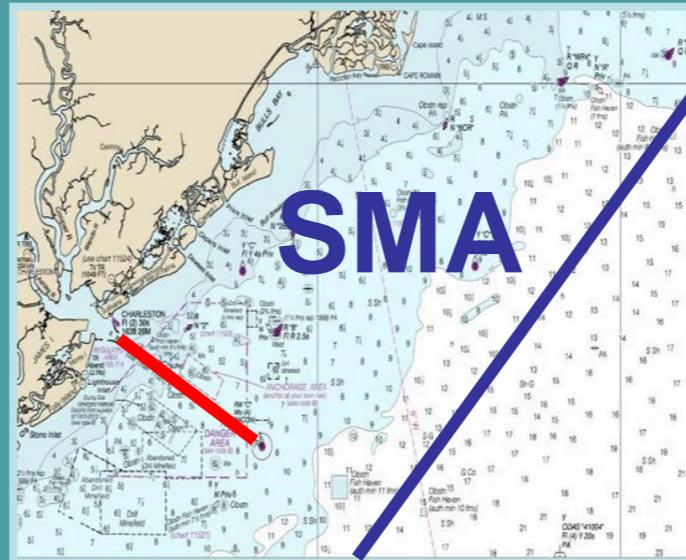
WILMINGTON: .6 nm²



GEORGETOWN: .2 nm²



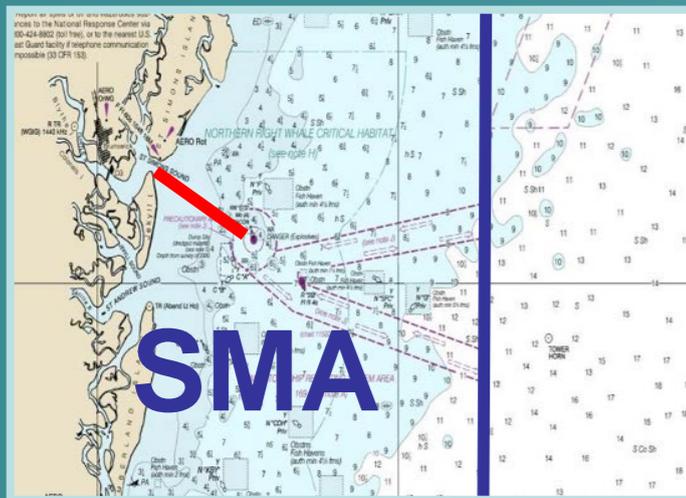
CHARLESTON: 2 nm²



SAVANNAH: .7 nm²



BRUNSWICK: .8 nm²



FERNANDINA: .5 nm²



JACKSONVILLE: .4 nm²



Navigating Post Panamax Vessels

Right Whale Speed Rule Unsafe & Unjustified for Open Ocean Channels

- ◆ Only regulation that postpones risk mitigation until vessel is already “severely” impaired.
- ◆ ACOE found a 5 kt. speed reduction in dredged ocean channels decreases margin of safety 50%.
- ◆ ACOE found a 5 kt. speed reduction decreases navigational precision 20%.
- ◆ Regulates ten of twelve port entrance channels within right whale migratory range even though no studies show they can accommodate slow speeds, or that the eleventh and twelfth unregulated channels can't.
- ◆ These ten regulated channels cover only 6.7 square nautical miles out of 17,600 sq nm of Seasonal (speed) Management Areas (0.04%).
- ◆ Documented sightings over last ten years in New England show 25% of sightings are unprotected by current Seasonal (speed) Management Areas.
- ◆ Regulating confined channels to the brink of severe environmental risk from slow-speed induced ship accidents is inexplicable while protecting only 75% of the documented habitat elsewhere.