Evolution of Flood Control and Navigation on the Mississippi River

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Western Dredging Confernce
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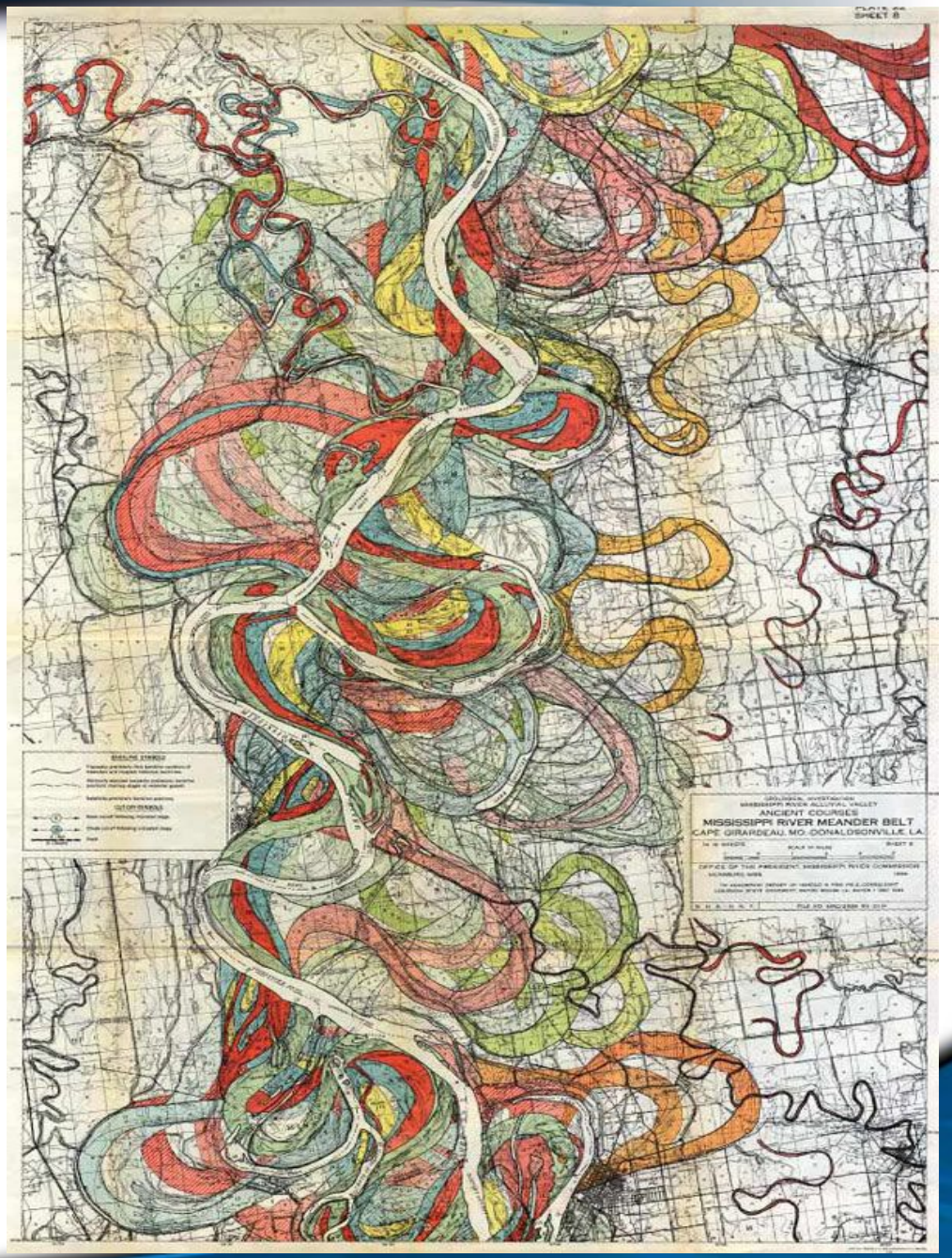
Thanks for many slides:
Brian Rentfro, MRC Historian, Charles Camillo, MRC Exec Director & USACE MVD & Lisa Parker

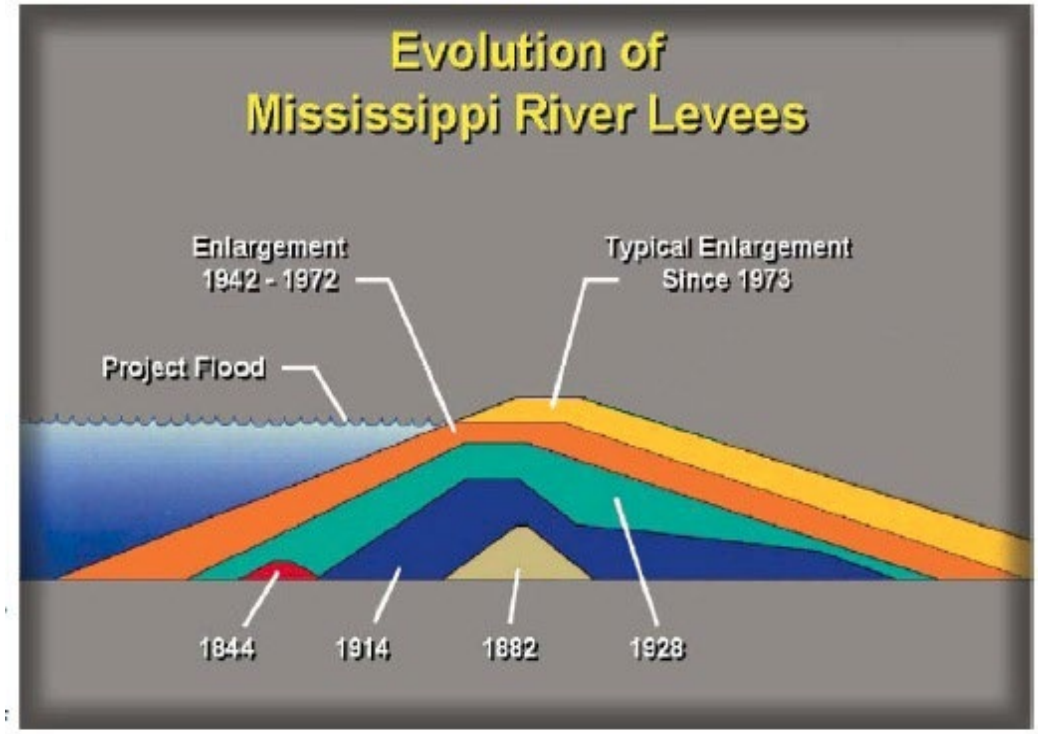
Mississippi River Watershed

Flood Control?
Reliable Navigation?



Mississippi River Levees

- Seasonal floods dropped heaviest sediment at banks
- Landowners added to the 3’ natural levees
- Floods of 1735, 1785, etc.
- By 1812, west bank leveed to ~Old River, east bank to Baton Rouge, by plantation owners
- Henry Shreve, and his dredge, began cutoffs



Pre-1927 floodway plans “Levees Only”

- Above Cairo - citizens wanted reservoirs
- Between Cairo and Baton Rouge - levees and cut-off
- In New Orleans - spillways and floodways, to carry excess flows created by the high levees upstream
  - 1920s, the Safe River Committee of 100 lead a well-planned fight in Congress for a spillway

Then Came the Flood…

The Flood of 1927

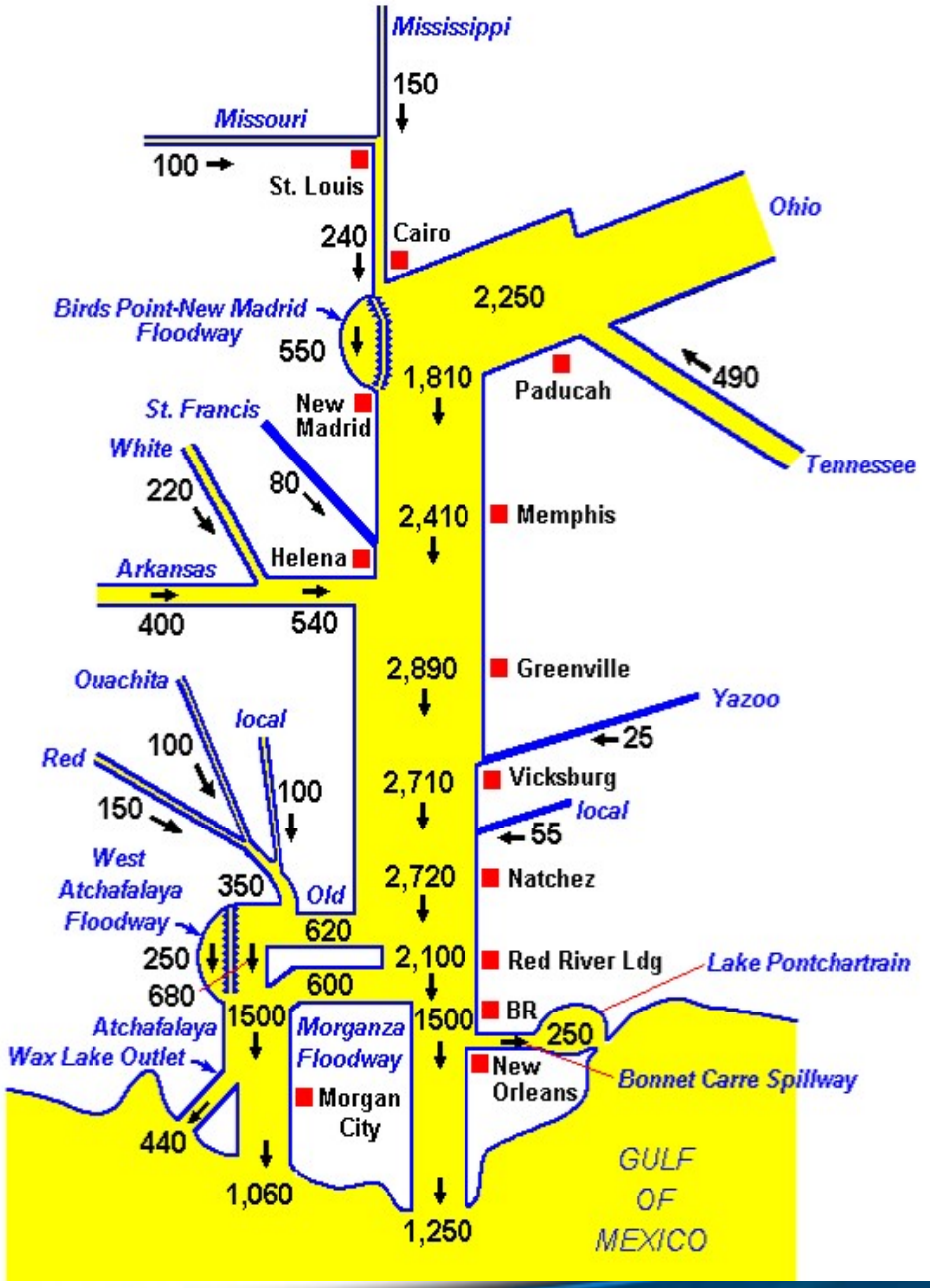
- 1927 flood today would cost ~$1TR
- Total losses $1B, federal budget ~$3B
- Most destructive natural disaster in US history
- Leads to a complete re-evaluation of flood control plan

The "Jadwin Plan"
1928 Flood Control Act

- "Jadwin Plan" (evolves into MR&T Project)
  - Floodways to reduce flood stages and relieve pressure on levees
    - Birds Point-New Madrid
    - Boeuf Floodway in Arkansas
    - Bonnet Carre Spillway
    - Morganza Floodway
  - Levees protect against project design flood (PDF)
  - PDF of 3M cfs between Atchafalaya & Mississippi rivers
  - Prevent levee failure by using floodways/backwater areas

MR&T Project Design Flood

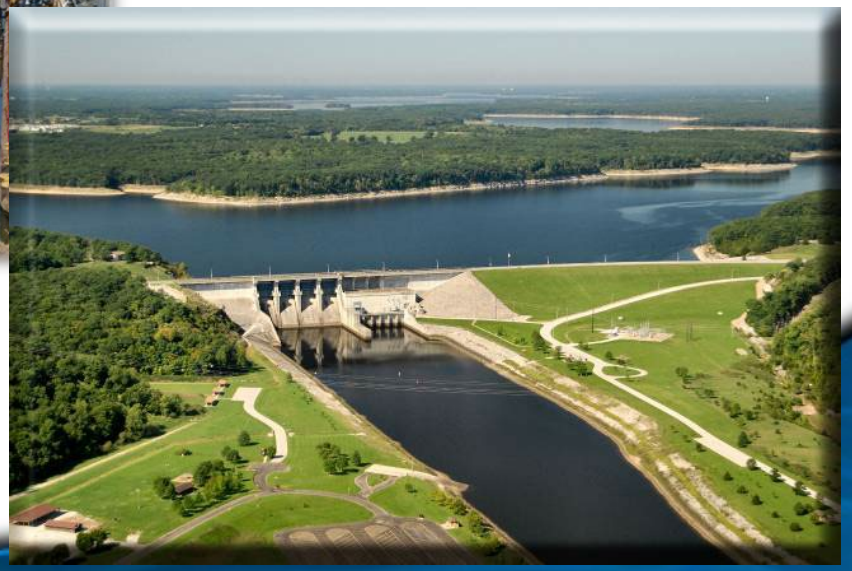
Discharge in 1,000 cfs



MR&T Features

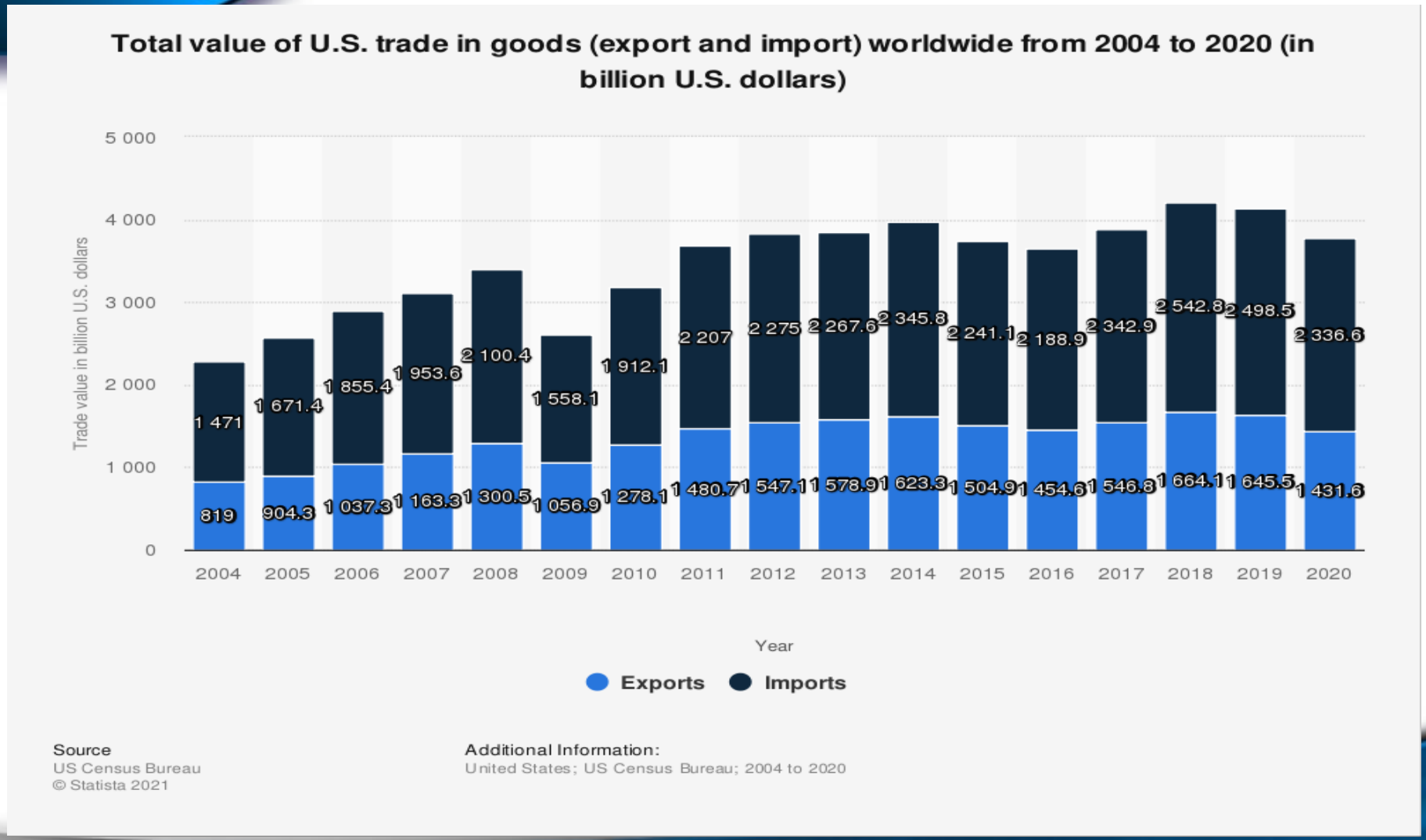
Flood Control & Navigation

- Revetment
- Dikes/Channel stabilization
- Dredging and Cutoffs
- Levees
- Floodways
  - pumping plants
  - reservoirs, & drainage structures
- Backwater areas
- Environmental features

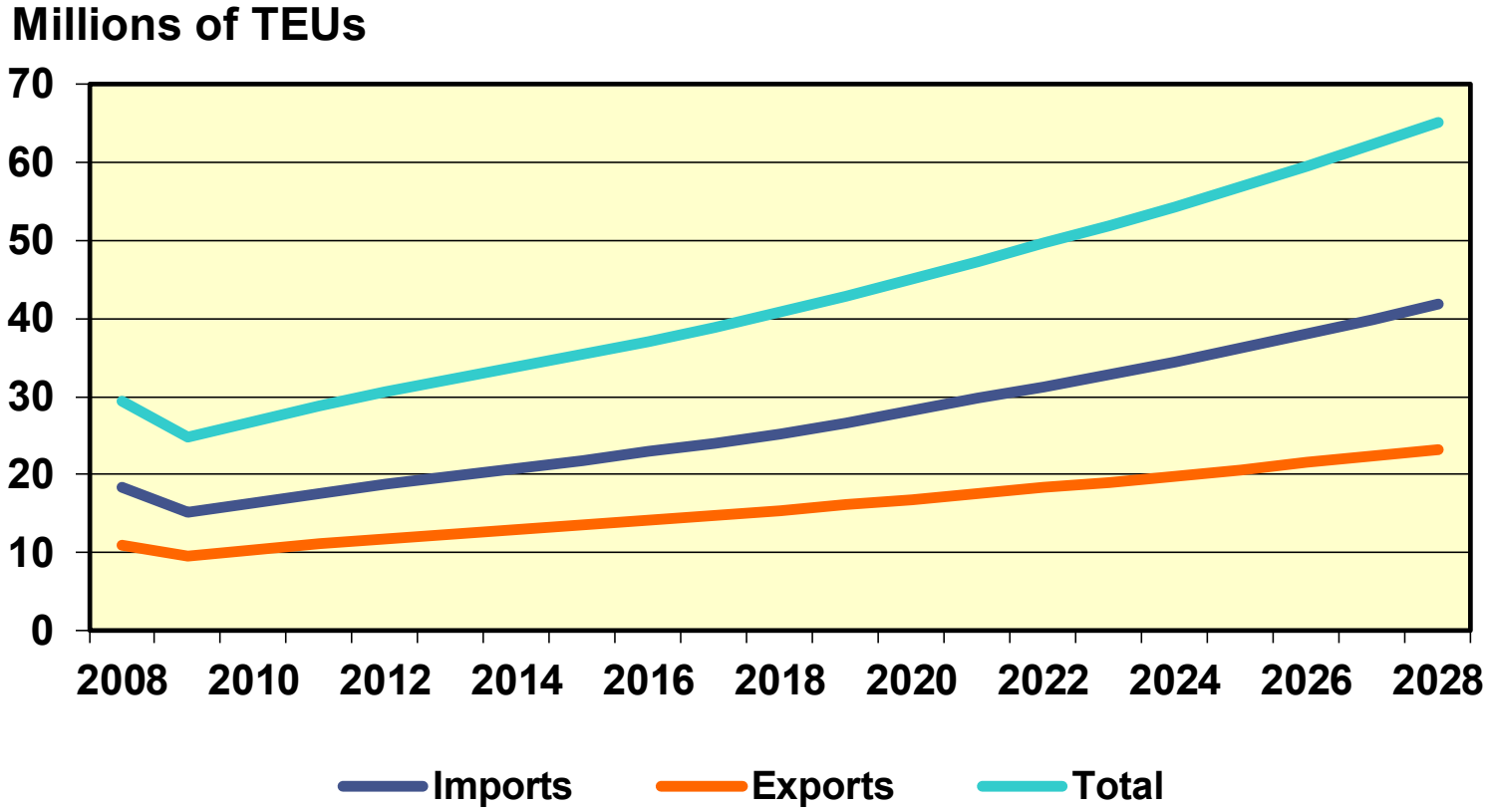


Why is federal investment in this important?

US Exports/Imports 2004-2020



US Trade to Double (2008-28)



Source: I H S G I World Trade Service

US Exports vs US Imports

Dept of Commerce 2021

Total EXPORTS = $2539B

- AGRI = $177B
- What: Soybeans, wheat, other feed, corn, cotton
- Who: China, Canada, Mexico, Japan, Europe, S Korea, Hong Kong, Taiwan, Indonesia, Philippines

Total IMPORTS = $3388B

- AGRI = $171B
- What: coffee, wine, cocoa, misc. horticulture, malt beverages
- Who: Canada, Mexico, Europe, China, India, Brazil, Indonesia, Chile, Australia, Thailand

Draft of Containerships

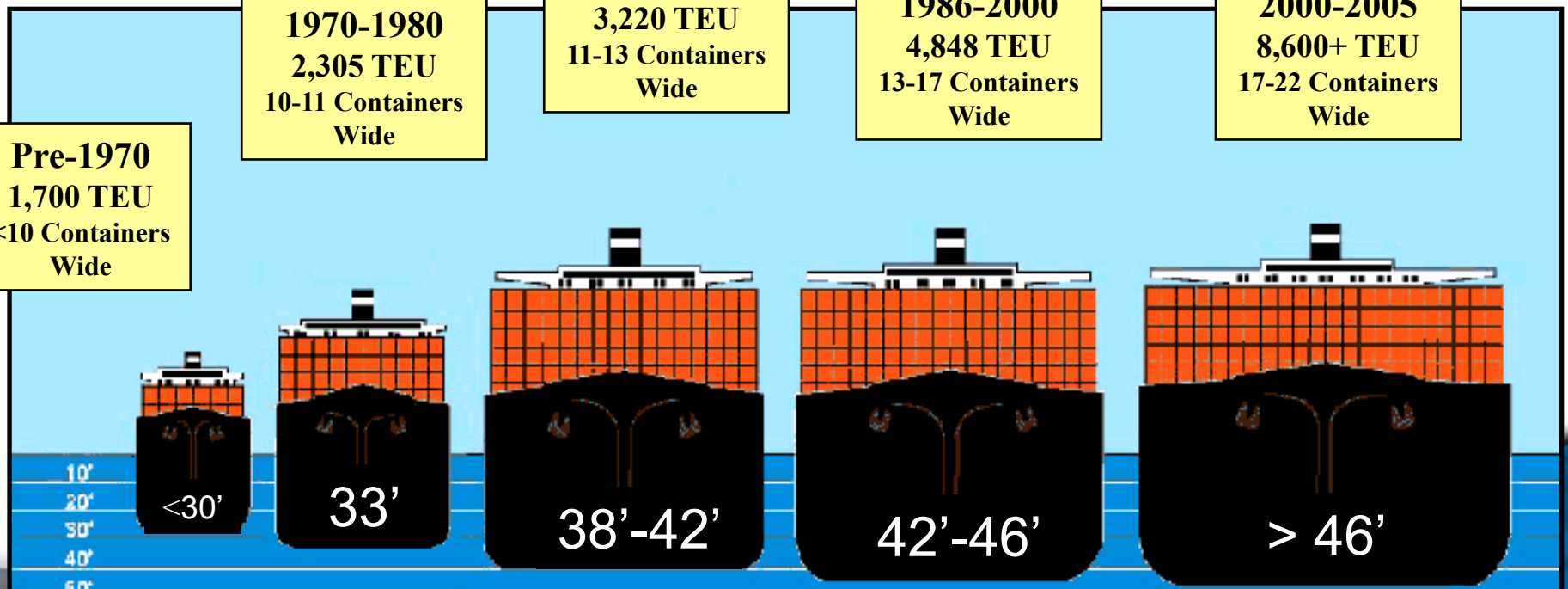
Pre-1970
1,700 TEU
<10 Containers Wide

1970-1980
2,305 TEU
10-11 Containers Wide

1985
3,220 TEU
11-13 Containers Wide

1986-2000
4,848 TEU
13-17 Containers Wide

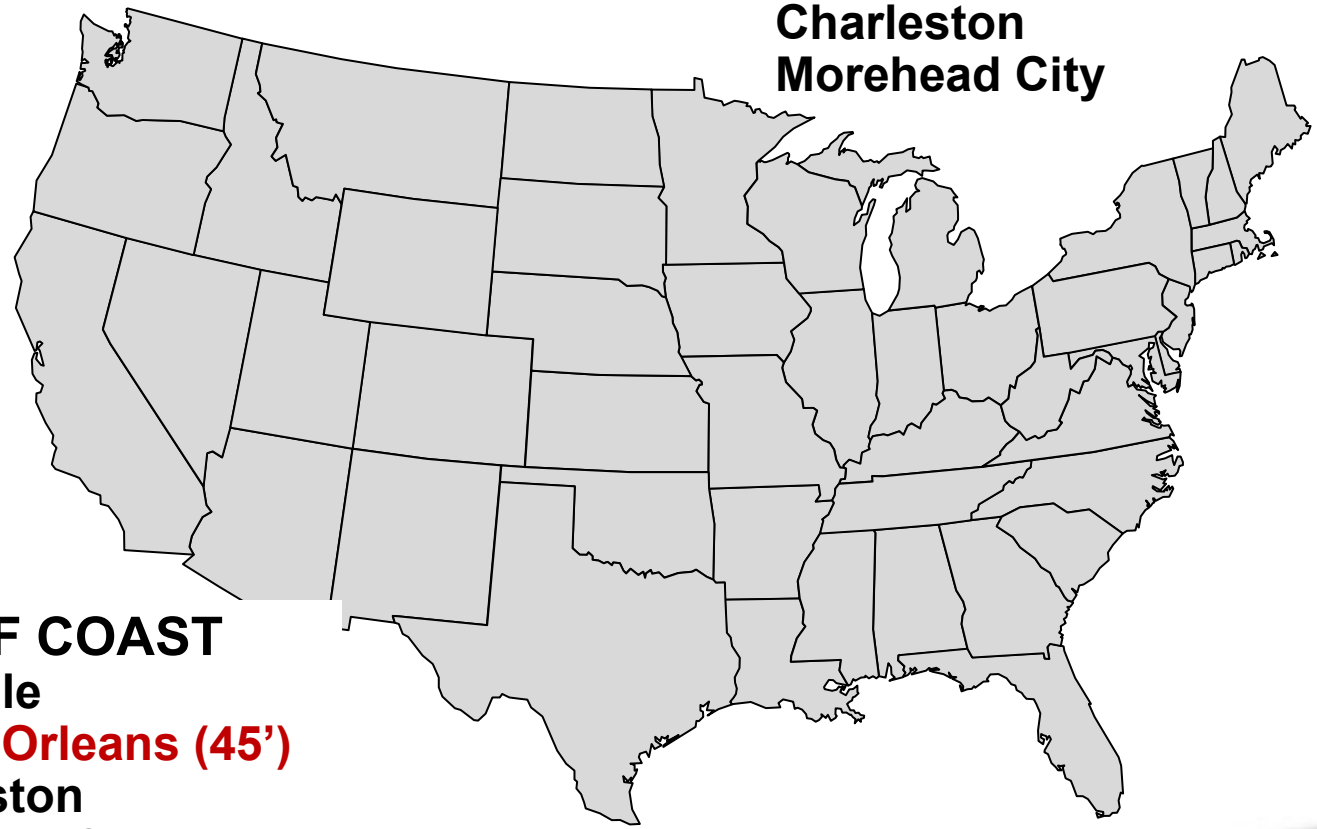
2000-2005
8,600+ TEU
17-22 Containers Wide



New Orleans authorized: 55’

EAST COAST
NY/NJ (50’ underway)
Baltimore (50’)
Hampton Roads (50’)
Charleston
Morehead City

WEST COAST
SeaTac (>50’)
Oakland (50’)
LA/LB (>50’)
San Diego (47’)



GULF COAST
Mobile
New Orleans (45’)
Houston
Corpus Christi
Freeport

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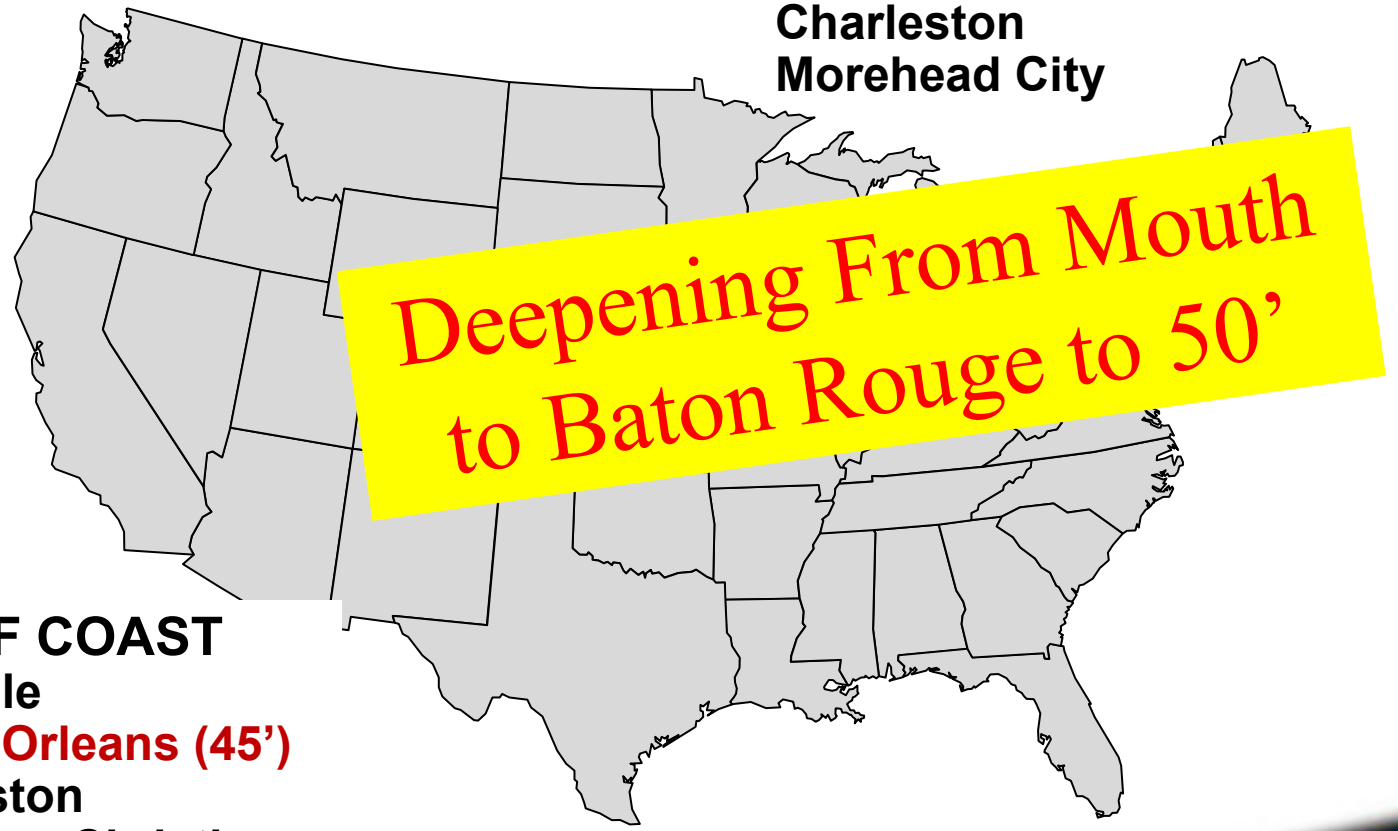

Deepening From Mouth to Baton Rouge to 50’

GULF COAST
Mobile
New Orleans (45’)
Houston
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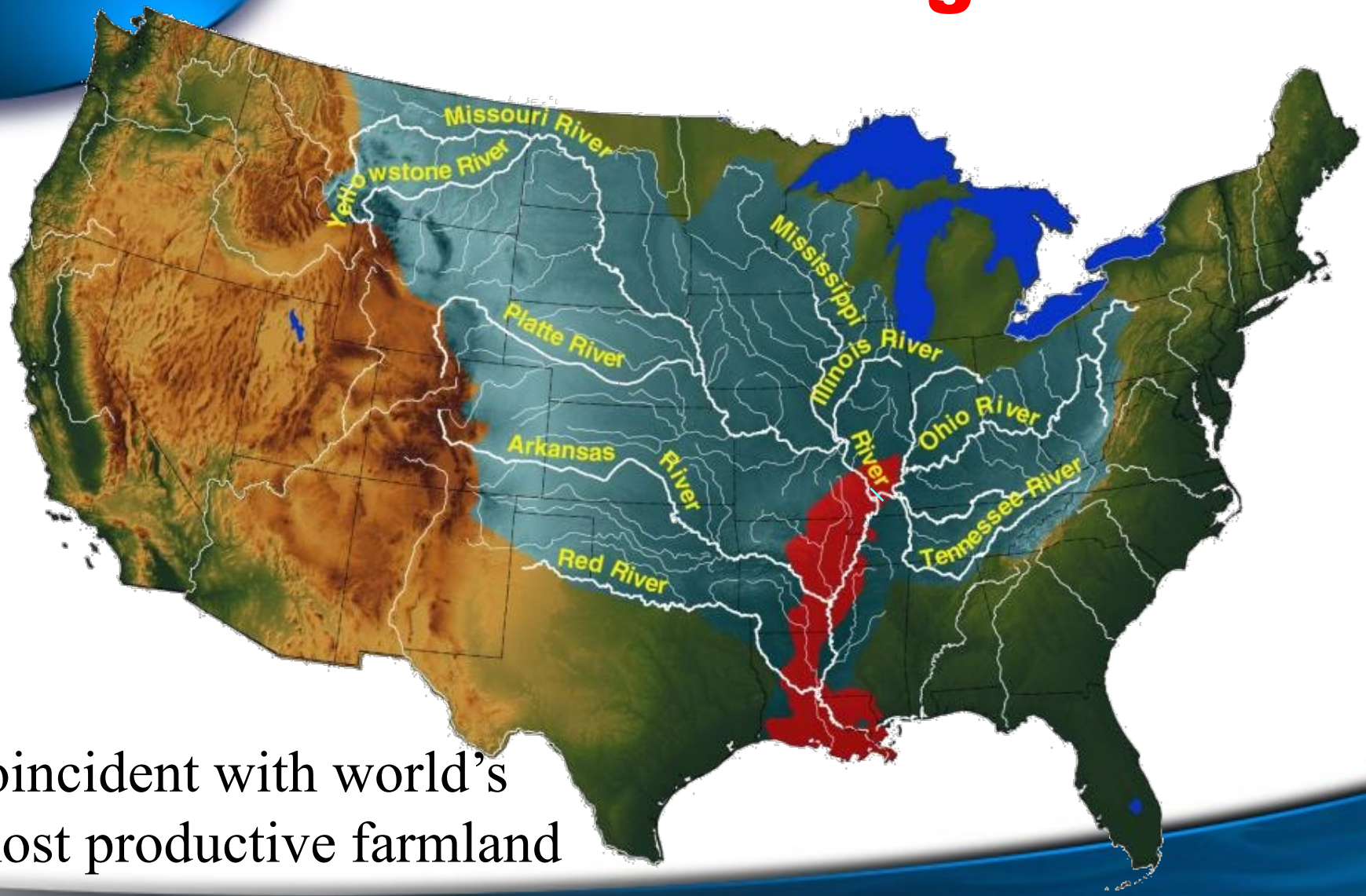
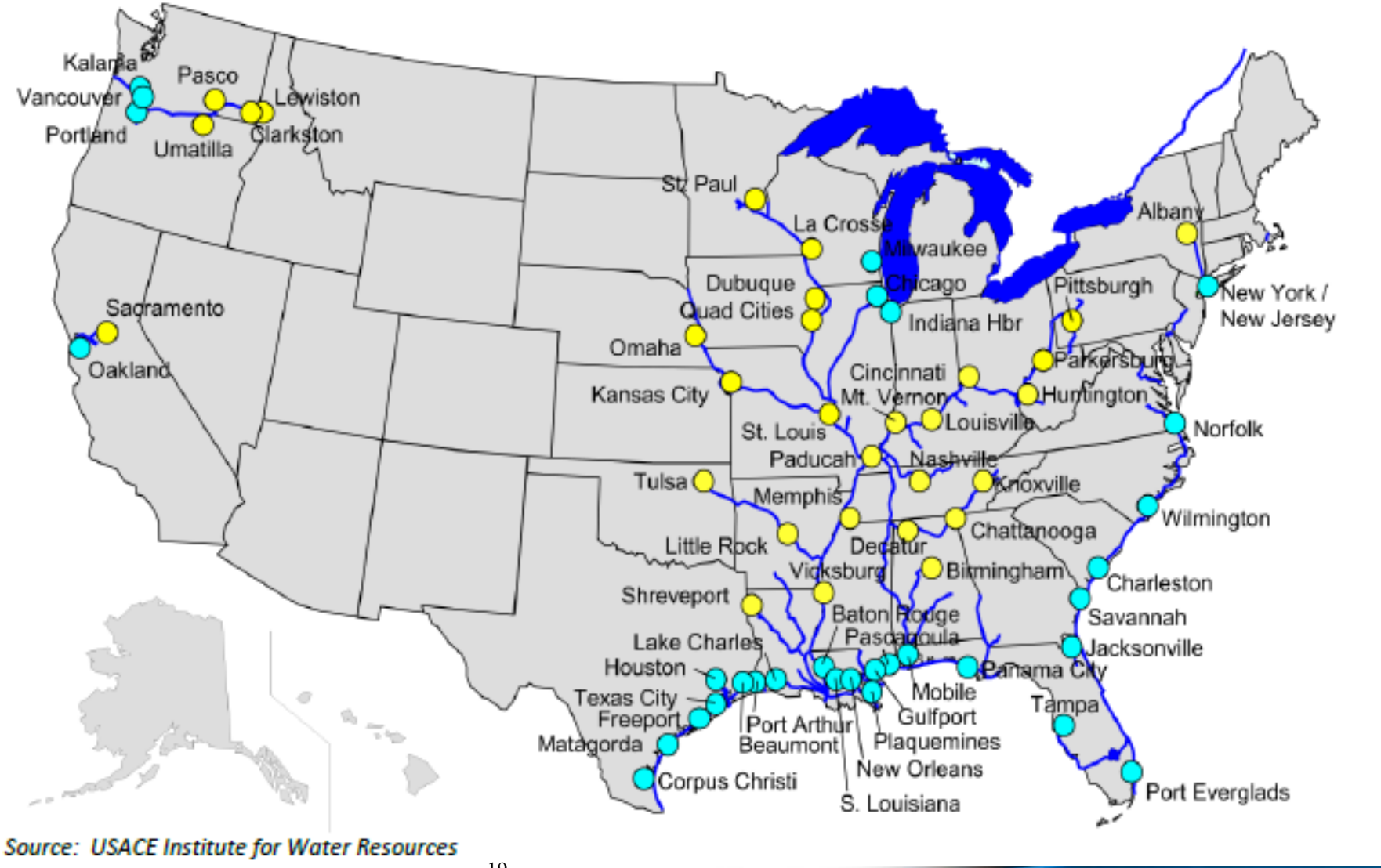
World's Largest Naturally Navigable Watershed



Coincident with world's most productive farmland

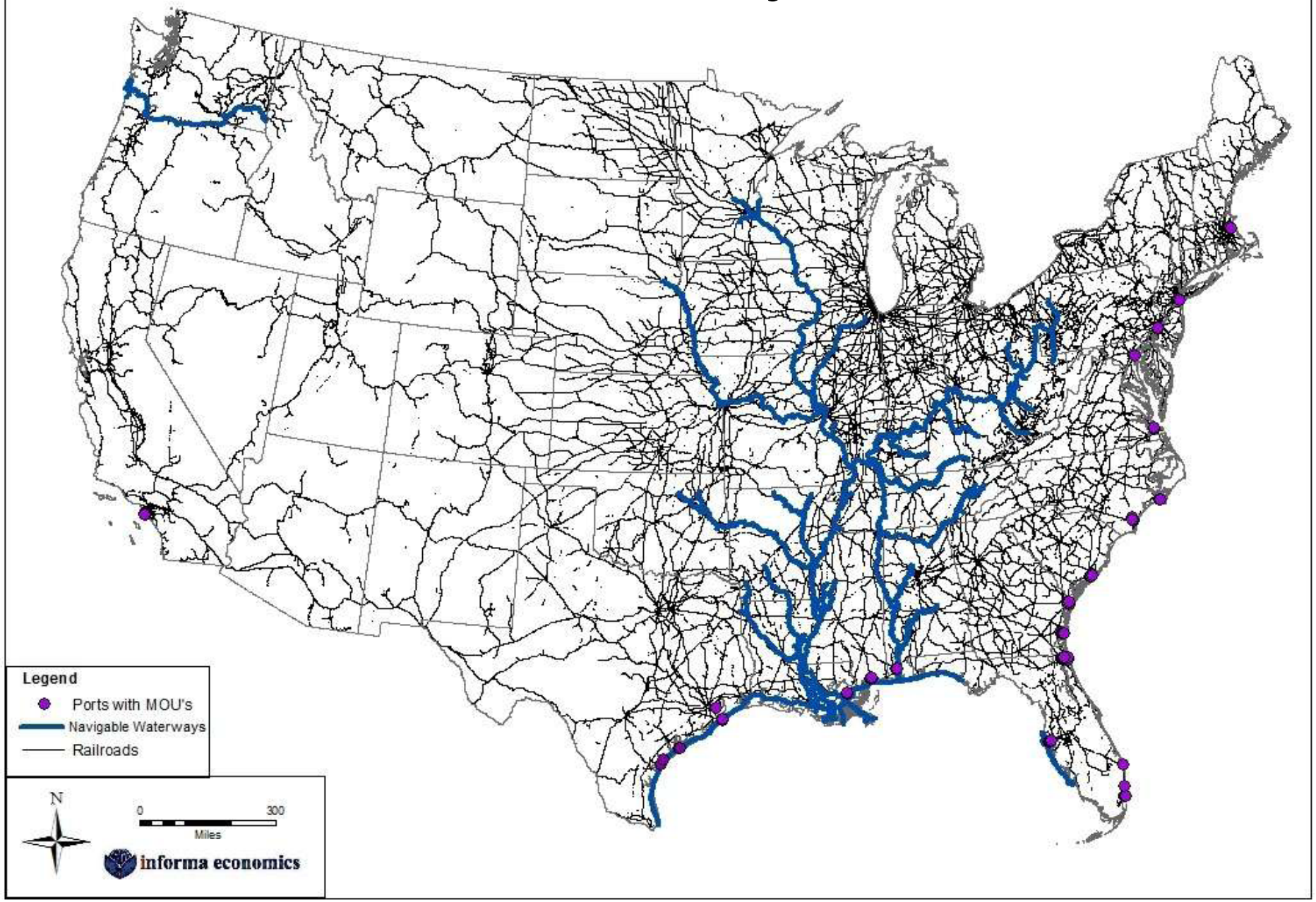
Some US Locks & Dams

Inland Ports



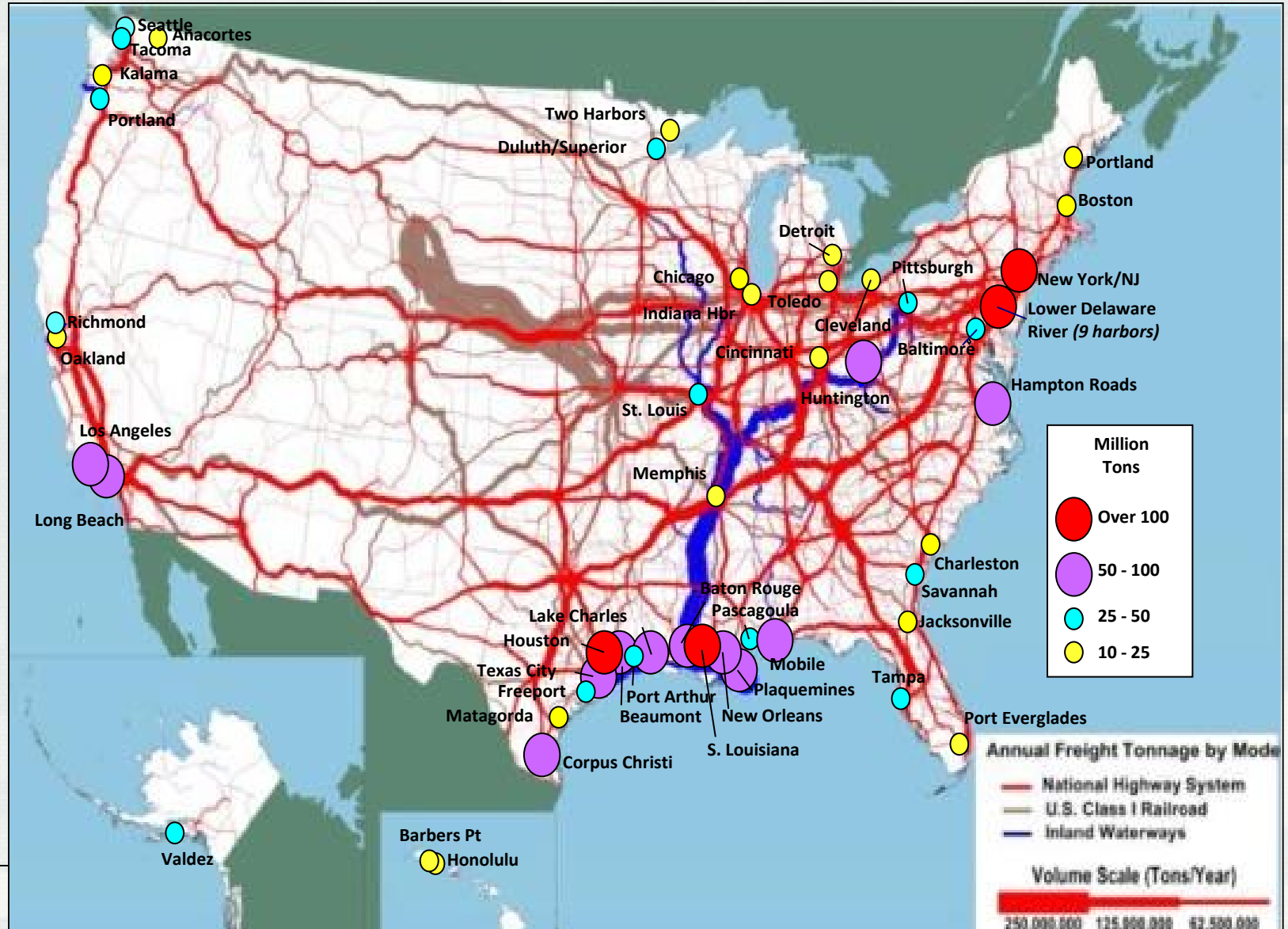
Source: USACE Institute for Water Resources

Inland Waterways & Rail



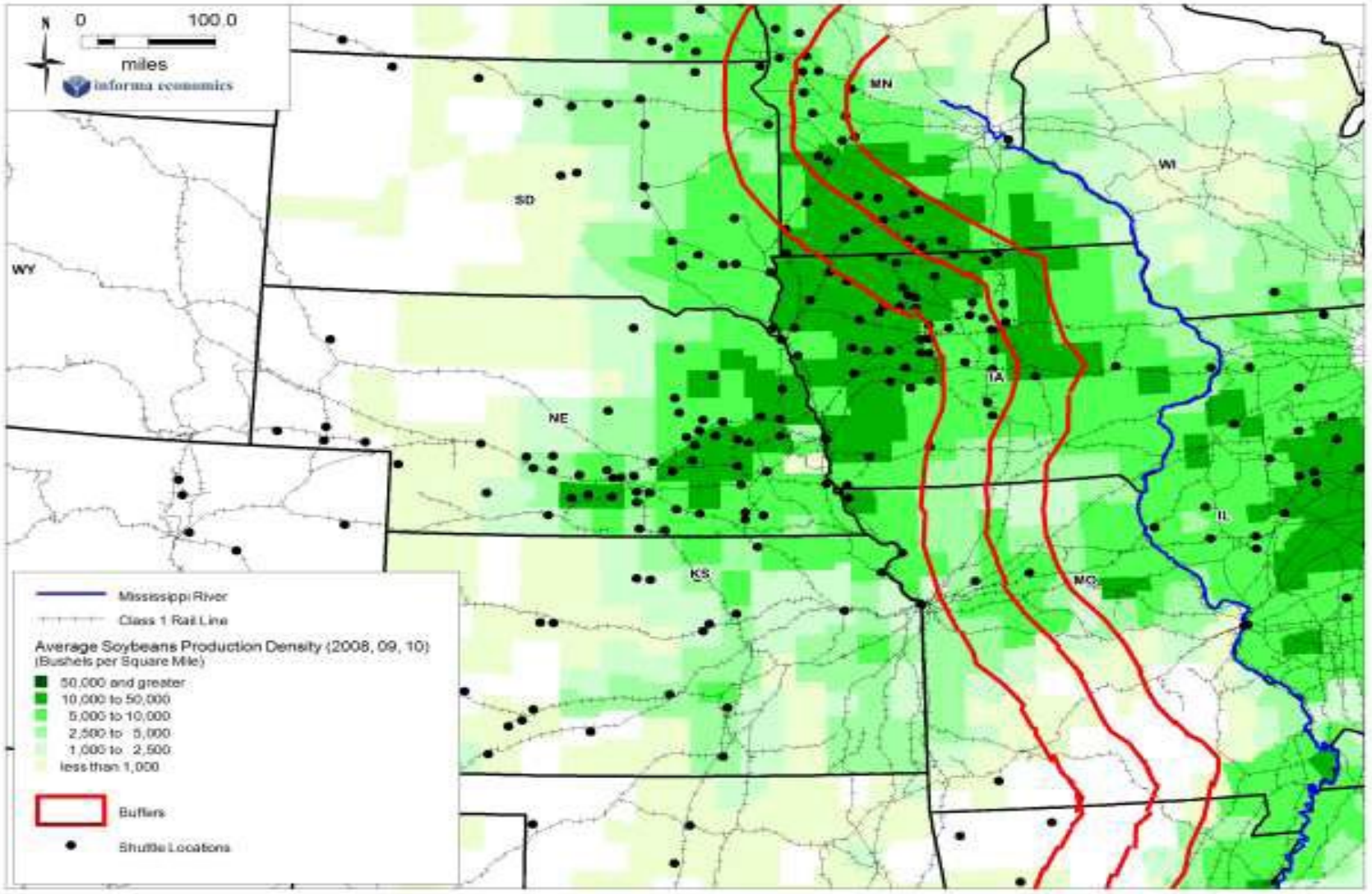
U.S. PORTS AND INLAND WATERWAYS: VITAL TO OUR NATIONAL ECONOMY

- 95% of all U.S. imports & exports ($1.4TR) move on waterways and/or ports
- Inland waterways connect major industry/cities w/ coastal ports
- Inland waterways overlay prime agricultural areas.



Panama Canal Expansion

Source: Soybean Growers study



Return of Manufacturing to US

Osceola, Ark. steel mill


Bossier, Louisiana steel mill

Is our inland waterway system ready to move more cargo?

2021 Report Card for America's Infrastructure

by the American Society of Civil Engineers

C-

America's Cumulative G.P.A.

Aviation	**D+**	**Ports**	**B-**
Bridges	**C**	**Public Parks/Recreation**	**D+**
Dams	**D**	**Rail**	**B**
Drinking Water	**C-**	**Roads**	**D**
Energy	**C-**	**Schools**	**D+**
Hazardous Waste	**D+**	**Solid Waste**	**C+**
Inland Waterways	**D+**	**Transit**	**D-**
Levees	**D**	**Wastewater**	**D+**

A = Exceptional
B = Good
C = Mediocre
D = Poor
F = Failing

Estimated investment needed by 2025 =

2.5% to 3.5% of US GDP

Challenges for Inland Waterways

- Most locks on system 600’x110’
  - Limits barge tows to 8 barge w/ towboat – most tows >12 (need “cut” to pass thru locks)
  - Most beyond design life – increased risk of outage
- Inland ports do not make the “cut” for dredging via Harbor Maintenance Trust Fund
- Deepening river to New Orleans
  - Cost of dredging, bank/levee stability, saltwater wedge

2019 Wettest Year in US on Record

- Records for past ~126 years
  - 36.2” on average (NOAA)
  - Except Pacific Northwest and parts of New Mexico and Colorado
- Expected long term trend, with increasing climate temperatures intensifying rain

Floodways Operation

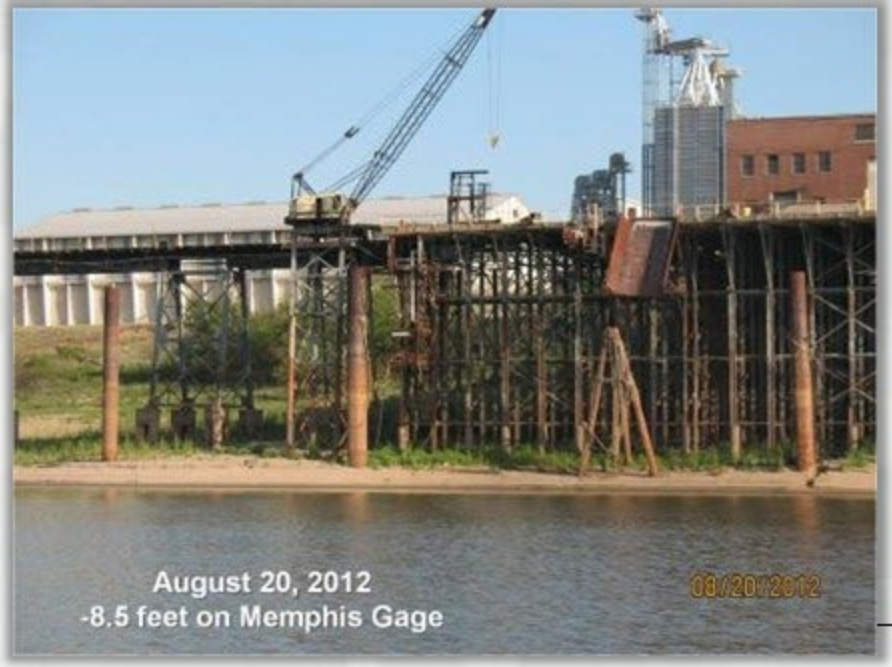
Year	Floodway
1937	Bonne Carré
1945	Bonne Carré
1950	Bonne Carré
1973	Bonne Carré, Morganza
1975	Bonne Carré
1979	Bonne Carré
1983	Bonne Carré
1997	Bonne Carré
2008	Bonne Carré
2011	Bonne Carré, Morganza, New Madrid
2016	Bonne Carré
2018	Bonne Carré
2019	Bonne Carré, Bonnet Carré
2020	Bonne Carré

MR&T Tested in 2011

- Record or near record stages throughout lower Mississippi River
- Greatest flood since 1927
- Opportunity to test/evaluate MR&T system and gather flow data
- Operated three floodways

2012 Drought

- Low water levels negatively impacted navigation
- Threatened closure of the Mississippi River at the "Pinnacles" in Illinois
- The Administration placed a high priority in removing the rock and allowing navigation to be sustained by streamlining contracting



Mississippi River Low Water

Mississippi River	Difference in River Elevation between 2011 & 2012 (as of Aug 24, 2012)
Cape Girardeau, MO	**39 feet**
Cairo, IL	**53 feet**
New Madrid, MO	**48 feet**
Memphis, TN	**59 feet**
Vicksburg, MS	**57 feet**
Red River Landing, LA	**50 feet**
New Orleans, LA	**16 feet**

BUILDING STRONG®

2018-19 Mississippi River High Water Season

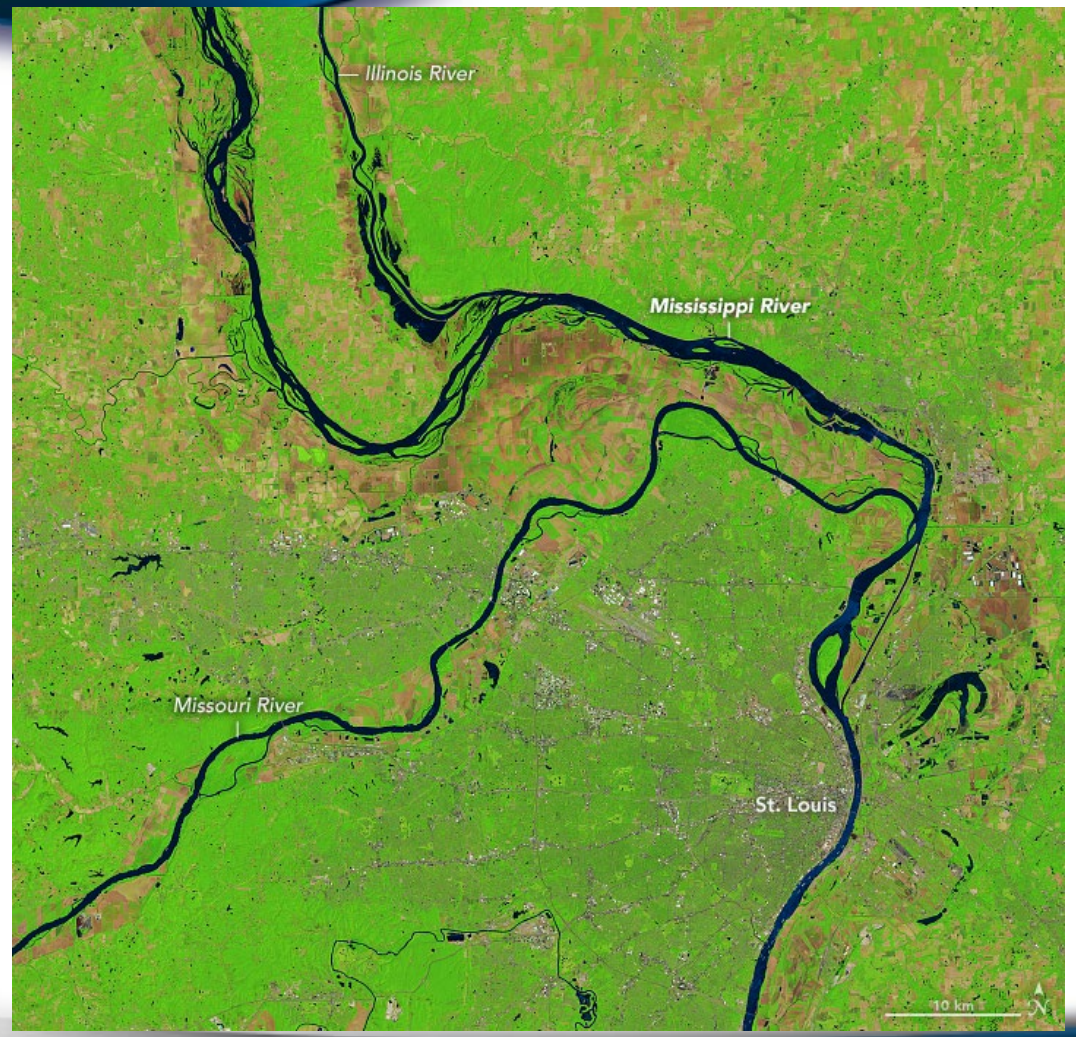
Extended High Water Season: flood fighting 200+ days

Pin Oak Levee Breach, IL

Dardenelle Levee Breach, AR

2019 Flood Fighting - +200 days

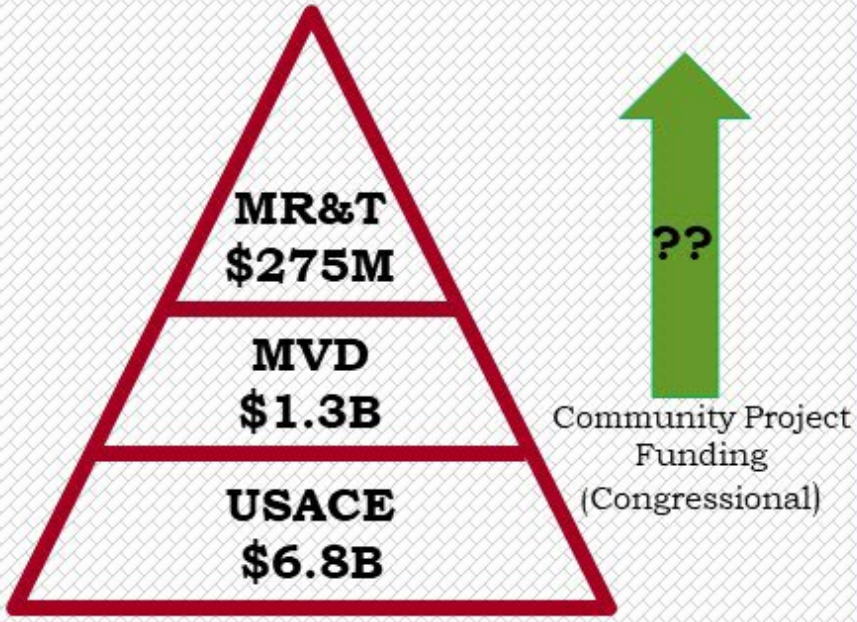
Confluence of Mississippi, Missouri and Illinois Rivers



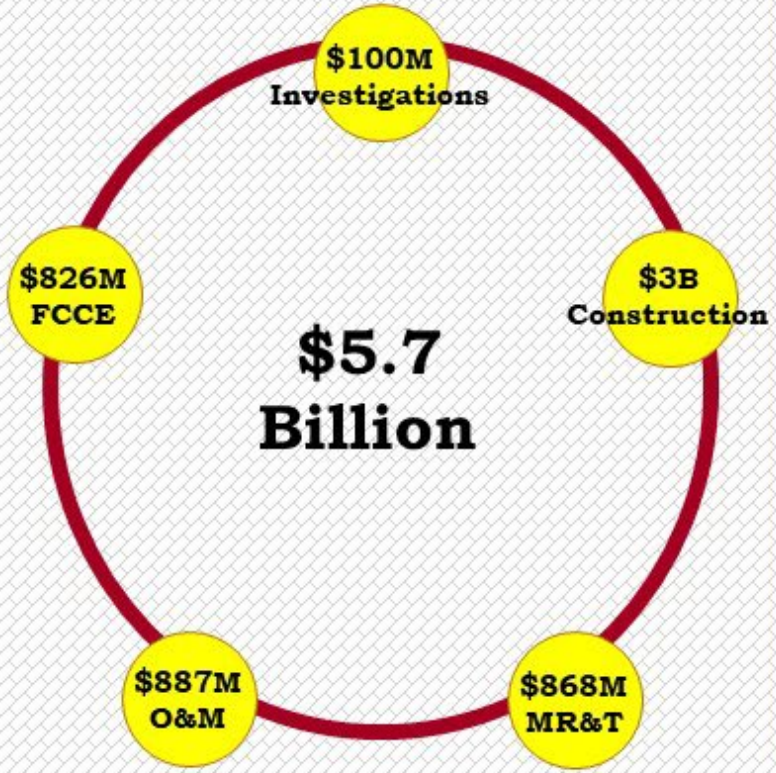
2022 Drought

- Sustained record drought over the entire watershed
  - Low water levels negatively impact navigation
  - Dredging is keeping the navigation channel open
  - Forecasts aren't looking good until 2023
  - Issues are still in play

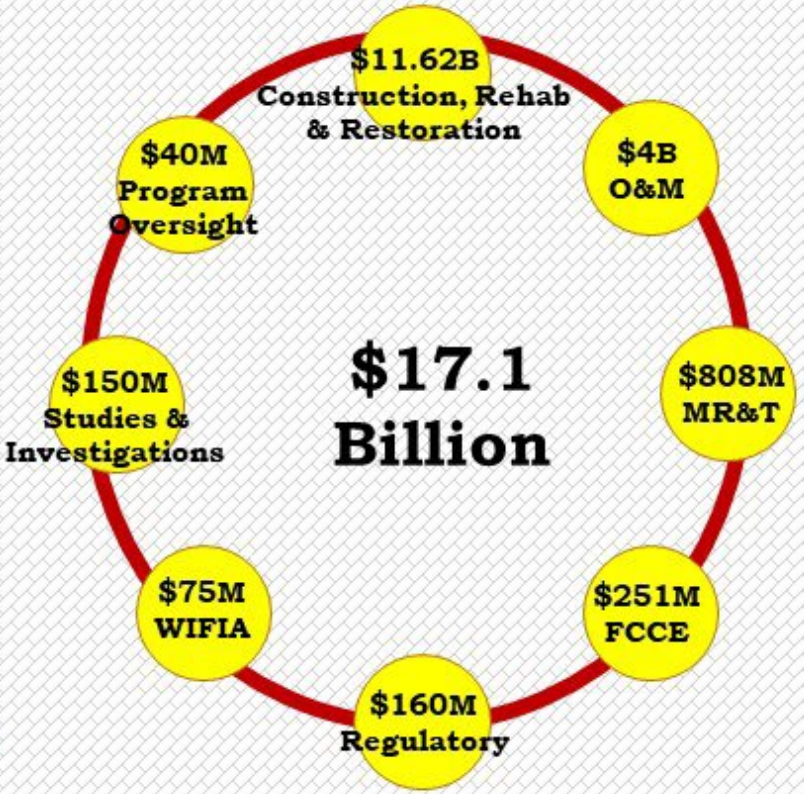
FY22 President's Budget Civil Works



Ida Supplemental



Infrastructure Investment & Jobs Act



Opportunity knocks!