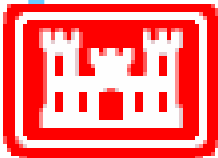


Waterways – Dredging and Operational Improvements

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Outline

- Role of Inland Navigation System in U.S.
- Overview of Dredging in U.S.
- Current items focusing on improving inland waterway operations
- Thoughts on future of Inland Navigation Policies

Federal Role in U.S. Waterway Transport

Major Programs

- 1824 – authority to clear snags and make improvements
- Canal building era to mid-1800s (states)
- Post Civil War – suction dredging, jetties
- 1885: 1st of 46 locks and dams on Ohio

- 1930s: Present system of locks constructed on Upper Miss, Illinois, Tennessee, other waterways

- 1950s: Construction starts on present-day higher lift locks on Ohio

- 1960s-70s: Navigation improvements to Columbia-Snake, Arkansas River

- 1985: Tenn-Tom Waterway completed

- 1994 – Present: Upper Mississippi River & Illinois Waterway Navigation Study

National Development Context

1824 – 1936: *Nation Building Era* of primarily Single Purpose Navigation Projects

1936 – 1986: *Era of Economic Efficiency* focusing on Multi-Purpose Projects

1969 – 1986: *Era of Environmental Enlightenment*, focusing on Multi-Objective Planning

1986 – Present: *Beneficiary Pays Era*, evolving towards *Integrated Water Resources Management*

U.S. Army Corps of Engineers Activities

Water Resources Missions

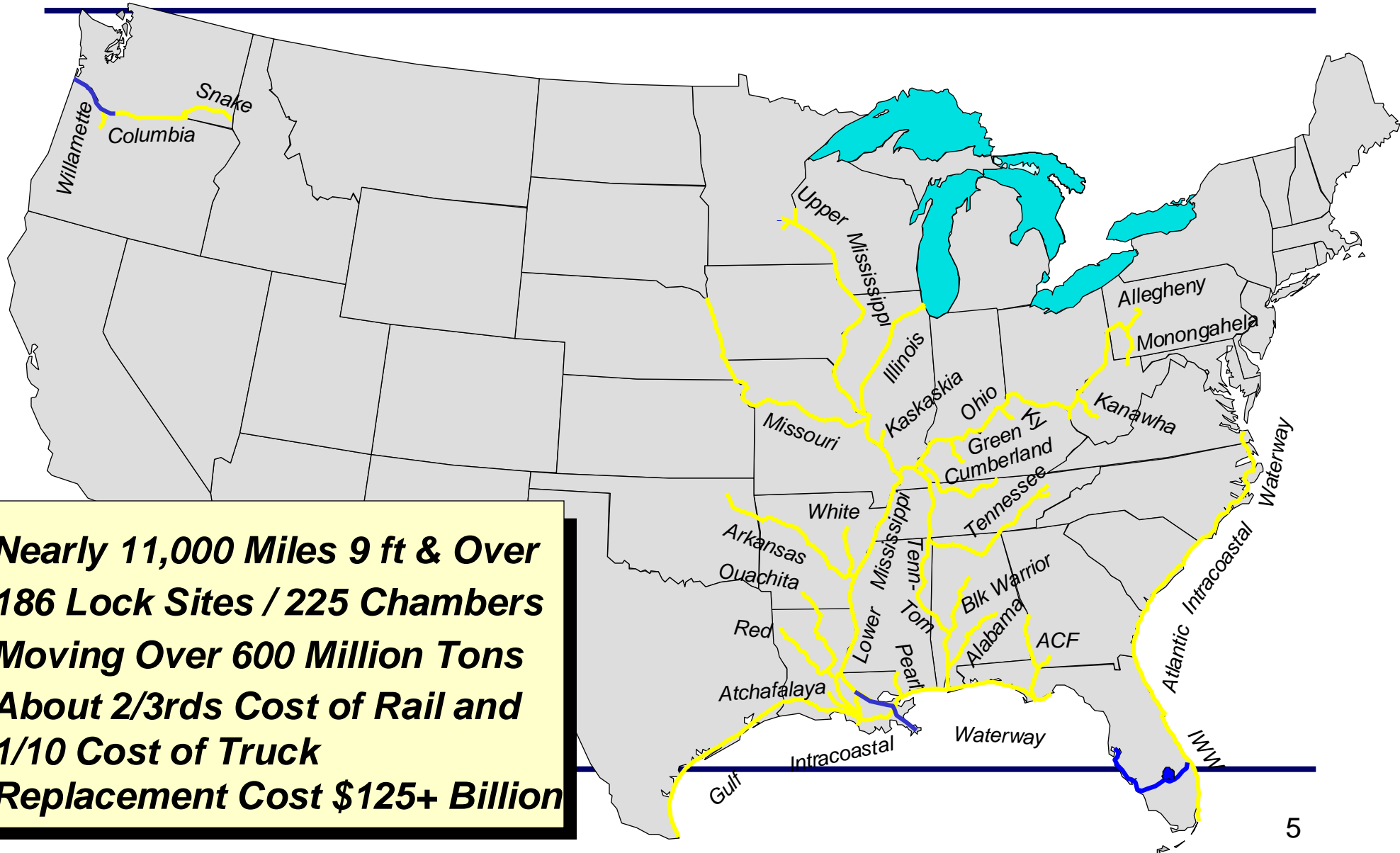
- **Primary**
 - Navigation
 - Flood Control & Shore Protection
 - Ecosystem Restoration
 - Disaster Response & Recovery

- **Allied Purposes**
 - Hydropower
 - Environmental Stewardship
 - Water Supply
 - Recreation

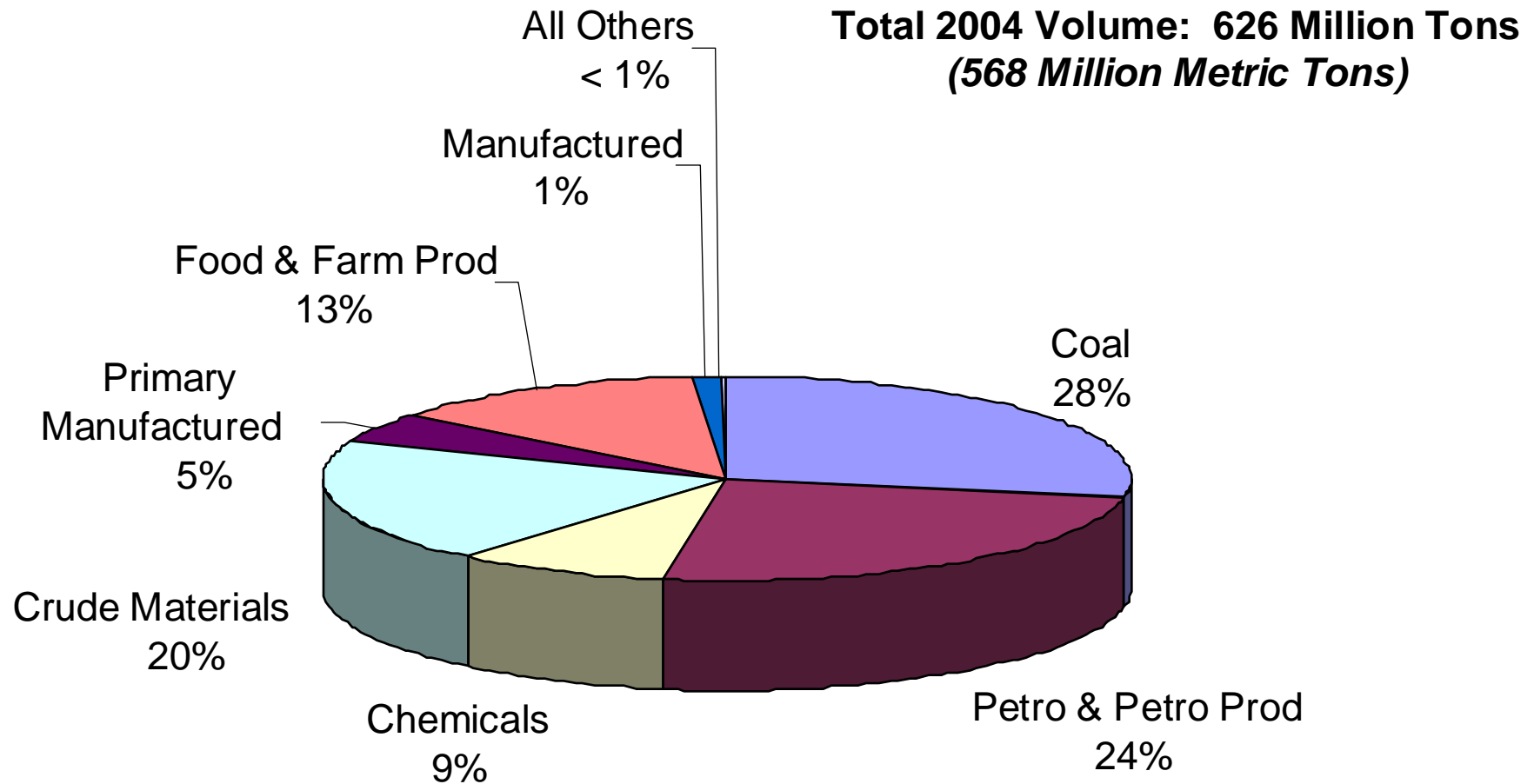
- **Regulatory Programs**



Fuel-Taxed Inland Waterway System

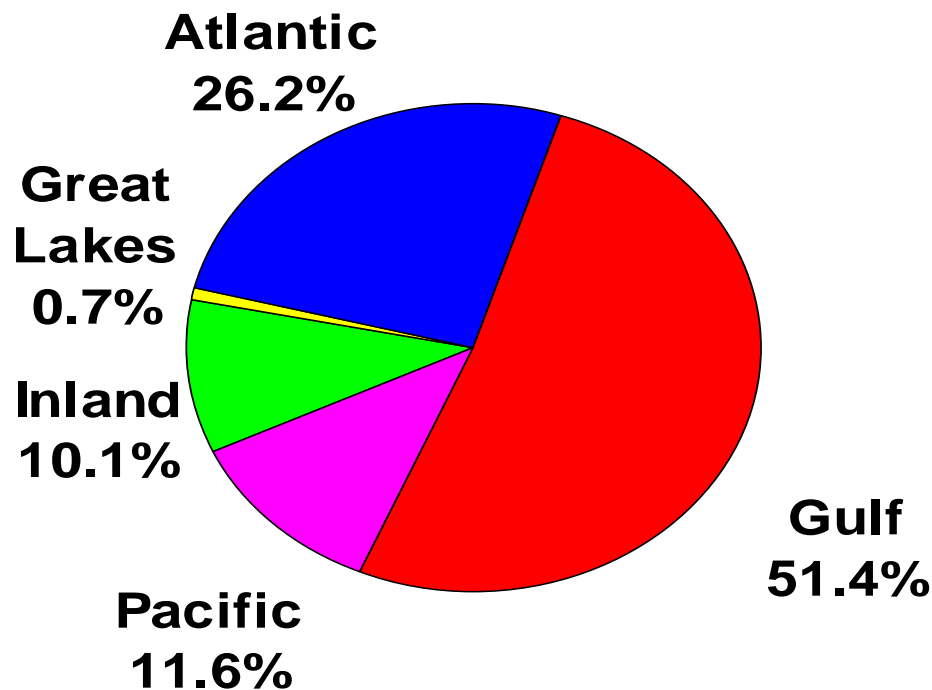


U.S. Inland Water Transport, Top Commodities by Tons, 2004



Dredging “Requirements”

By Region



● Total dredging

- \$956.5 million,
- 255.1 million cubic yards

● Maintenance

- \$628.9 million (65.8%)
- 213.2 million cubic yards (83.6%)

● New Work

- \$327.6 million (34.2%)
- 41.8 million cubic yards (16.4%)

Federal Versus Non-Federal Channels

- All navigable waters in U.S. are responsibility of U.S. Government
- Once a navigation project is deemed to be a federal responsibility, that responsibility remains with the federal government in perpetuity
- Excludes private terminals or channels

Key Legislation Influencing Navigation Channel Activities

- National Environmental Policy Act
 - Clean Water Act/Marine Protection, Research & Sanctuaries Act
 - Coastal Zone Management Act
 - Endangered Species Act
 - Commerce Clause of the Constitution provides supreme power to the Federal Government to protect navigation
 - International Agreements (Great Lakes, London Convention, IMO, etc.)
 - River and Harbor Act
 - Water Resource Development Acts (WRDA)
-

Corps District Responsibility for Dredging

- Work of Corps done at a District level - each a self contained office but share resources, people, etc.
- New Construction or proposed improvements go to Navigation Design Group at each District
- Operations responsible for maintenance needs
- Inland responsibilities include locks and dams in addition to waterways

Six Step Planning Process for Dredging (Construction)

- Step 1 Problem Perception
 - local community
 - Step 2 Requires for Federal Action
 - local community with Corps
 - Step 3 Study Problem and Report Preparation
 - local community, Corps and Congressional request for Reconnaissance report
 - Step 4 Report Review and Approval
 - Corps District, other Federal Agencies
 - Step 5 Congressional Authorization
 - Corps Headquarters and Congress
 - Step 6 Project Implementation
 - President, Corps HQ and Congress, Local sponsor, WRDA
-

Steps To A Maintenance Dredging Project

(1 of 2)

1. Notification from Users
 2. Survey to verify Shoaling
 3. Identification of need, project justification
 4. Sampling and Testing
 5. Identification of Project Plan (Disposal Plan)
 6. Develop Environmental Assessment (or Environmental Impact Statement)
-

Steps To A Maintenance Dredging Project

(2 of 2)

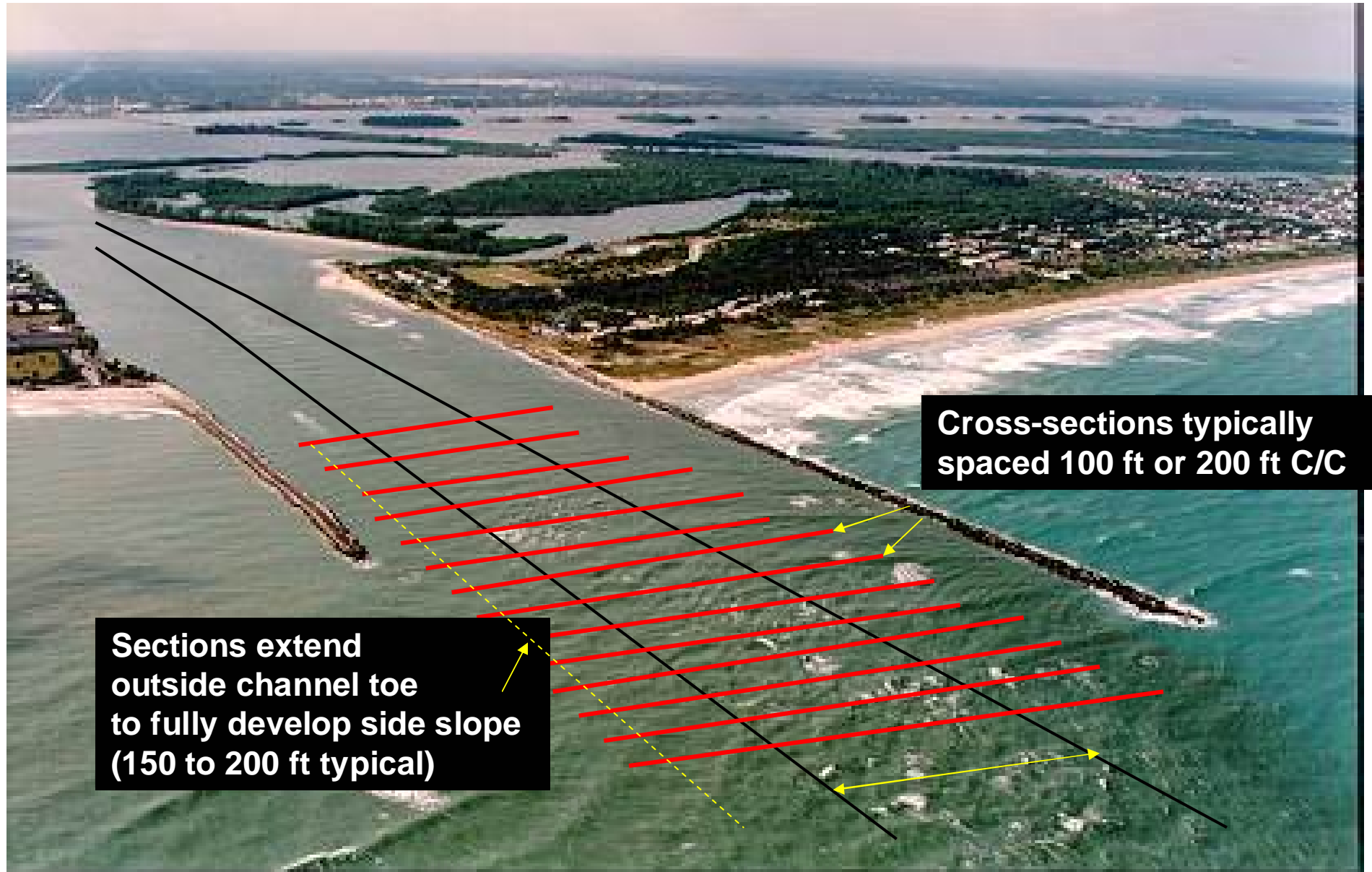
7. Coordinate work with Local, State and Federal Resource Agencies
8. Develop cost estimate, budget for project
9. Develop Plans and Specifications
10. Bid Process (more later)
11. Undertake and Complete Construction

Since this is maintenance work, so you do the whole thing over again in a few years!!

Dredging Monitoring and Management

- Ongoing survey– focus on surveys to assist in understanding dredging needs
 - Moved away from hindcasting to proactive planning and predictions
 - Manage timing of dredging needs to minimize mobilization costs
 - Systematic monitoring of sediment, waves, ecosystem disruption and responses during and post dredging to ensure transparency
 - Need to convey what is really occurring “below the water”
-

Condition Surveys



Seasonal Restrictions/ Environmental Windows

● Restriction on Dredging or Placement Due to an Environmental Concern

- Endangered Species
- Fish Spawning
- Sea Turtles
- Turtle Nesting
- Crabs
- Birds



● About 85 % of Corps dredging projects have seasonal restrictions.

● Significantly increase cost of dredging

Consideration Factors for Disposal

- ◆ Availability
 - ◆ Economics
 - ◆ Environmental Considerations
 - ◆ Dredging Method
 - ◆ Volumes
 - ◆ Distance to Site
 - ◆ Legal and Policy Constraints
 - ◆ Material Characteristics
-

Dredging and Disposal Innovations

- Evaluations and Cooperative Demonstrations
- Monitoring disposal areas
- Economic Versus Engineering Approaches To Examining Dredging Needs
- Developing improved dredging equipment
- Predictive models for dredging & placement processes & options
- DOER <http://el.erdc.usace.army.mil/dots/doer/dmm.html>

Research remains critical to discover innovative solutions

Dredged Material Management Plans

- Long term (25 year) plan for the dredging and dredged material placement of a project.
 - Work with a non-Federal sponsor to provide dredged material placement sites and possible cost sharing.
 - Developed with participation of environmental resource agencies
 - Working on Regional Sediment Approaches to understand ways to better manage sediment, dredging, etc.
-

Contract Management

- Price Estimation for bid formulation
 - Estimate fair price for use of equipment
 - Contract authority extends to prevent abuse of contractor collusion
 - Monitoring insures Federal Government get what was requested
 - Violators subject to federal contracting oversight, which can prevent work on other federal projects
 - Contract also protects both parties from misrepresentation or unapproved contract modifications
-

Does Inland Shipping Matter Today?

◆ Can we say:

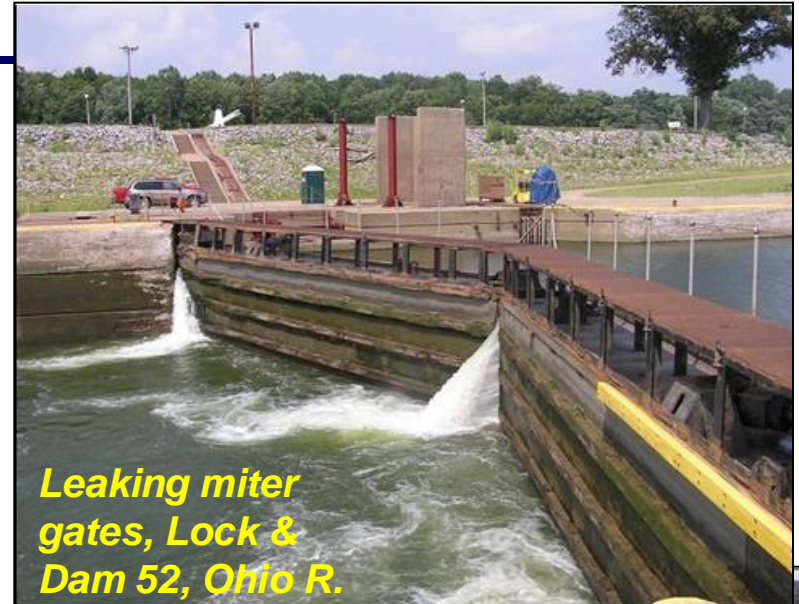
- Does the system deliver what it promises?
- How are users (shippers, carriers) approaching the inland system?

◆ Considerations regarding future use

- Alleviate congestion in other modes
 - “Endless Capacity”?
 - Integration with other modes, including deep-sea ports
 - Environmental advantages
-

Challenge: Aging Water Resources Infrastructure

- Half of locks more than 50 years old
- Investments in water resources infrastructure have declined in real terms
- Result: more frequent closures for repairs, decreased performance and costly delays



Leaking miter gates, Lock & Dam 52, Ohio R.



Crumbling lock wall, Lower Mon 3, opened in 1907

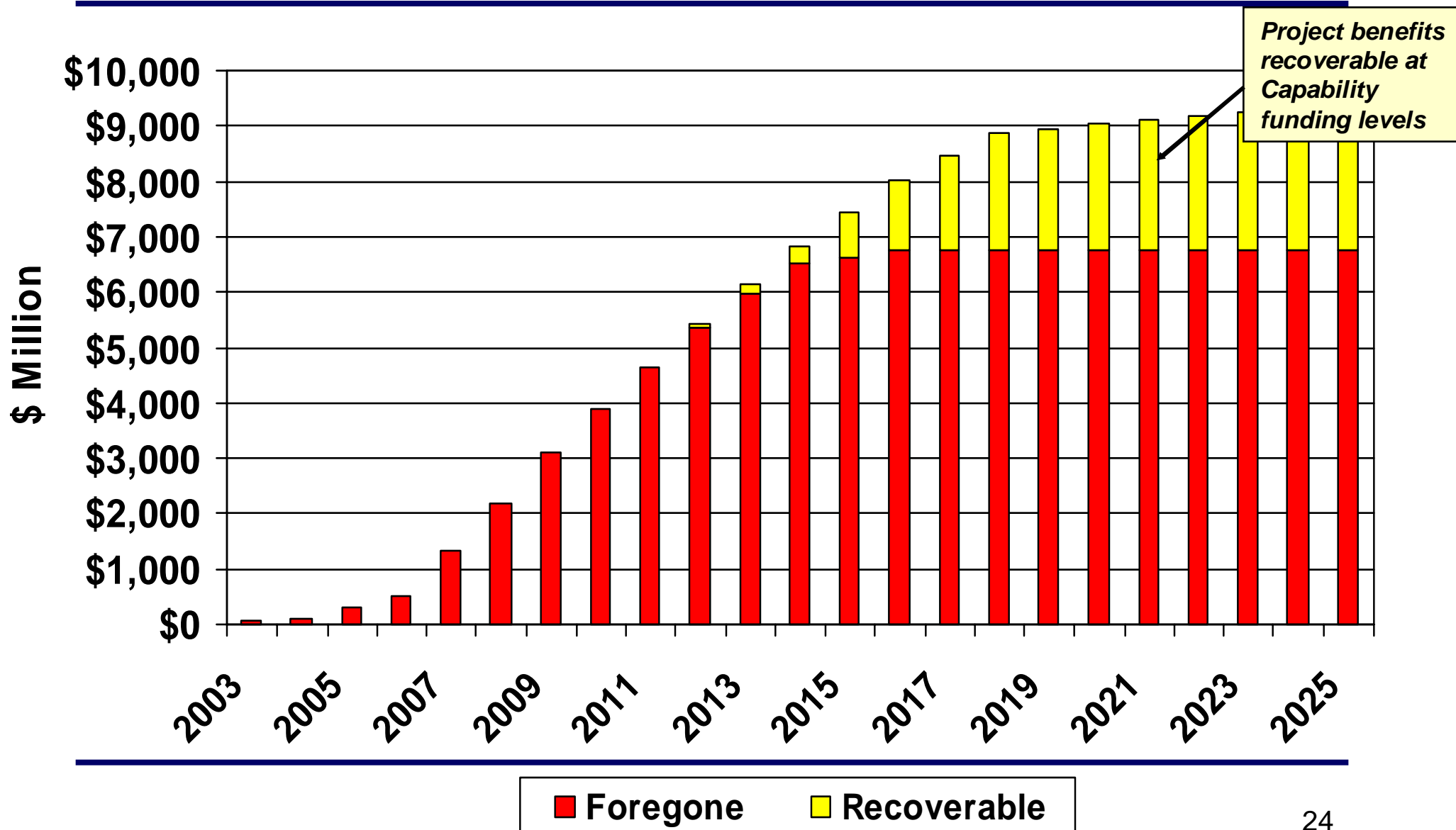
Concrete deterioration at Chickamauga could result in lock failure



Waterway Value Assessment – What is The Effect of Inland River Closures

- Reliability - Closure Impact Avoidance
 - Plant Closure/Idling
 - Jobs/Earnings
 - Lost Output
 - Water Supply Disruption
 - Industrial/Hydropower
 - Municipal
 - Road Closures
 - Recreational Losses
 - Environmental Losses
-

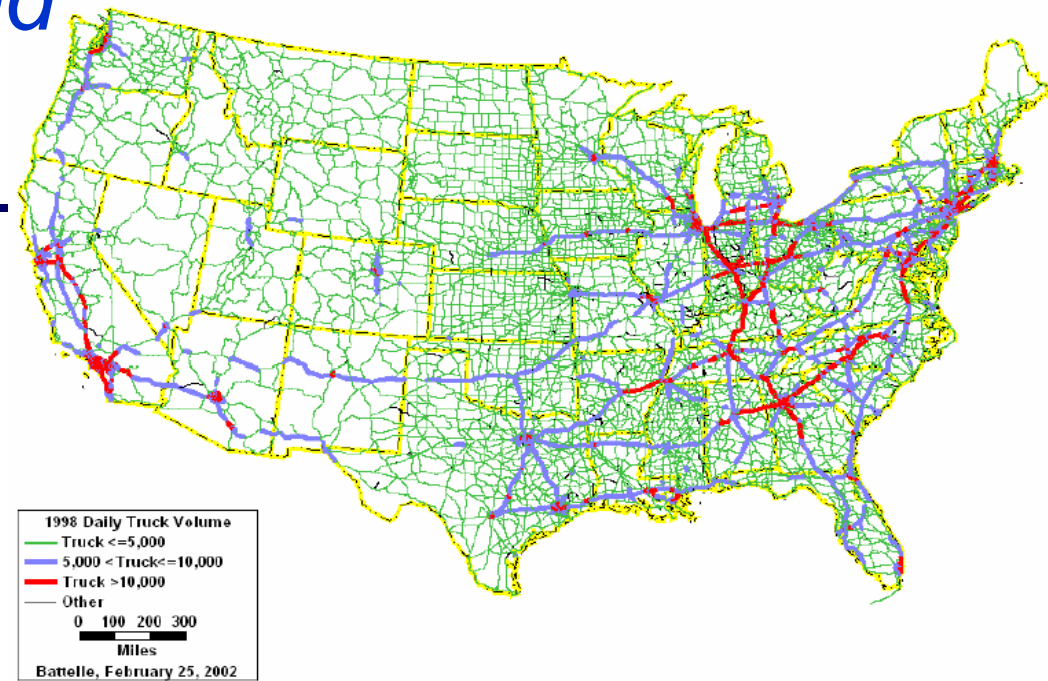
Cumulative Economic Benefits Foregone from Construction Delays



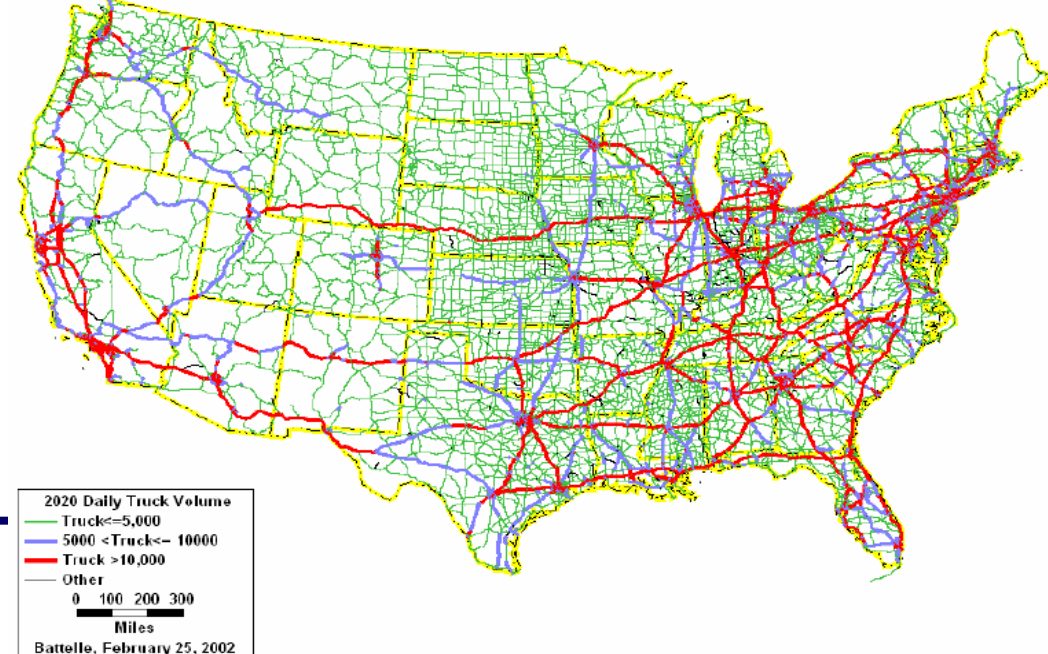
Future Freight Demand in US 1998-2020

- Domestic freight traffic expected to increase by 67%
- General cargo freight by 113%
- Highway traffic grows from 11 billion to 19 billion tons (17.2 billion metric tons)
- Rail grows from 2 to 3.7 billion tons (3.4 billion metric tons)
- How is this cargo going to move?
 - Little room left to expand highways, especially in urban areas
 - Rail mileage has been decreasing; much former right-of-way has been developed
 - Rail capacity constraints in urban areas, tunnel clearances, single-track bridges

Truck Volumes –1998



Truck Volumes–2020



Reliability – A System Maintenance Approach

- ◆ Goal: Achieve Acceptable Levels of Reliability
 - Working on redefining acceptable levels of navigation system reliability
 - Defining Reliability Performance Standards
 - Applying reliability standard to each project site
 - Dredging is component of operational needs
- ◆ Clear dialog with stakeholders – partnership critical
- ◆ A risk management methodology as cornerstone to way forward

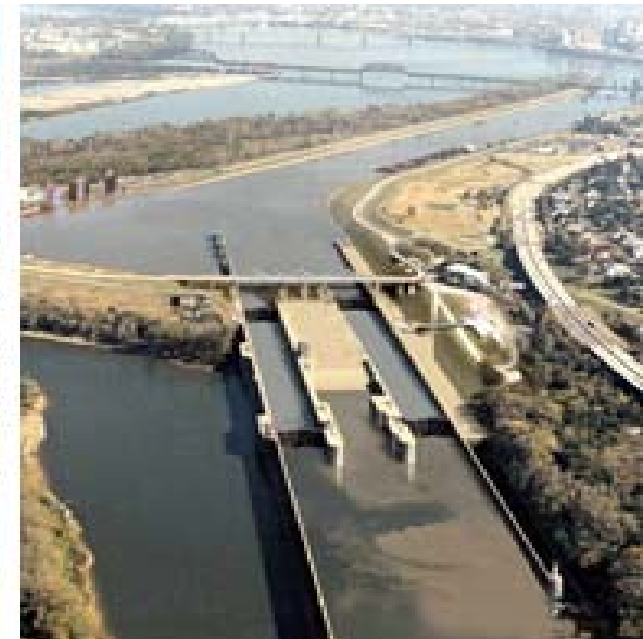


PIANC – Updated on Related Activities

- International Guidance on navigation projects from member National Groups
 - Inland Commission (InCom)
 - Innovations in navigation lock design
 - Maintenance & renovation of navigation infrastructure
 - Performance indicators for inland waterway transport
 - Environmental Commission (EnviCom)
 - Environmental benefit of waterborne transport
 - Dredged Material beneficial use options & constraints
 - Management of ports & waterways for habitat
 - Argentina now a PIANC National Section – many individuals members in region
-

SmartRivers 2007 – Louisville, KY

- Sept 16: Welcome Reception & Cultural Tours
- Sept 17 – 18: Technical Sessions
- Sept 19: Technical Tours
- Sept 20 – 21: Related meetings (RNDDT, PIANC InCom Working Groups), more tours



SmartRivers – Focus Areas

- Strategies to develop transportation corridors
- Improve container transportation on inland waterways
- Improve lock and traffic management strategies
- Integrate inland water into intermodal supply chain
- Improving security on waterways
- Improve role of ports in intermodal system
- Economic Development
- Education of the value of system

Thoughts on Improving Dredging Activities

- Need to outline who clearly owns the navigation channels – transboundary, riverine, multiple jurisdictions
 - Lack of National Dredging Goals tied to industrial policies or consistent funding vehicles
 - No transparency in project/dredging selection, approval and review processes
 - Monitoring provides assurances but requires partnership between dredger and contracting office
 - Maintenance not properly developed, funded, or conducted – oftentimes different agencies or permits
 - Concerns over environmental laws
 - Inconsistent permitting and project transparency
 - Lack of clear regulatory oversight on dredging activities
 - Research innovation tied to environmental monitoring and cost control
-

But policy is complicated by other factors...

- Equity: Can't build everything everyone wants everywhere.
 - Funding: relink construction with life cycle cost management, work with private-public sector to understand responsibility for true project costs
 - Project determination: Balance project needs with relevant policy goals.
 - Education: Failure to understand investment needs (new and ongoing work) over different timeframes
-

Conclusion?

- Waterways critical component of economic growth in past and hopefully into the future
 - Improving navigation different from past years
 - Multiuse - Environmental concerns
 - New capital and maintenance investments are critical to maintaining and managing world-class waterway system.
 - Public Private partnership in planning and operations
 - Navigation system in becoming more accountable
 - Need transparency in policies, objectives, monitoring
 - New tools can help improve understanding of system
 - Need to “relink” transportation to economic growth
 - Information, Institutions, Infrastructure
-



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