

TRANSPORTATION RESEARCH BOARD
SPECIAL REPORT 315

Funding and Managing the U.S. Inland Waterways System

What Policy Makers Need to Know



NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES

The Federal Inland Waterways System

- enables domestic barge shipping as part of the nation's freight transportation system
- managed by the U.S. Army Corps of Engineers (USACE)
- funded by Congress through the USACE civil appropriations for the inland navigation budget

Purpose of the Report

To describe for policy makers the issues relevant to decisions about funding and management of the inland waterways system

Study Origin

Executive Committee of the Transportation Research Board of The National Academies reports of deteriorating and aged infrastructure

- perceived inadequate capital investment
- growing backlog of capital projects
- declining federal funding for inland navigation

Statement of Task

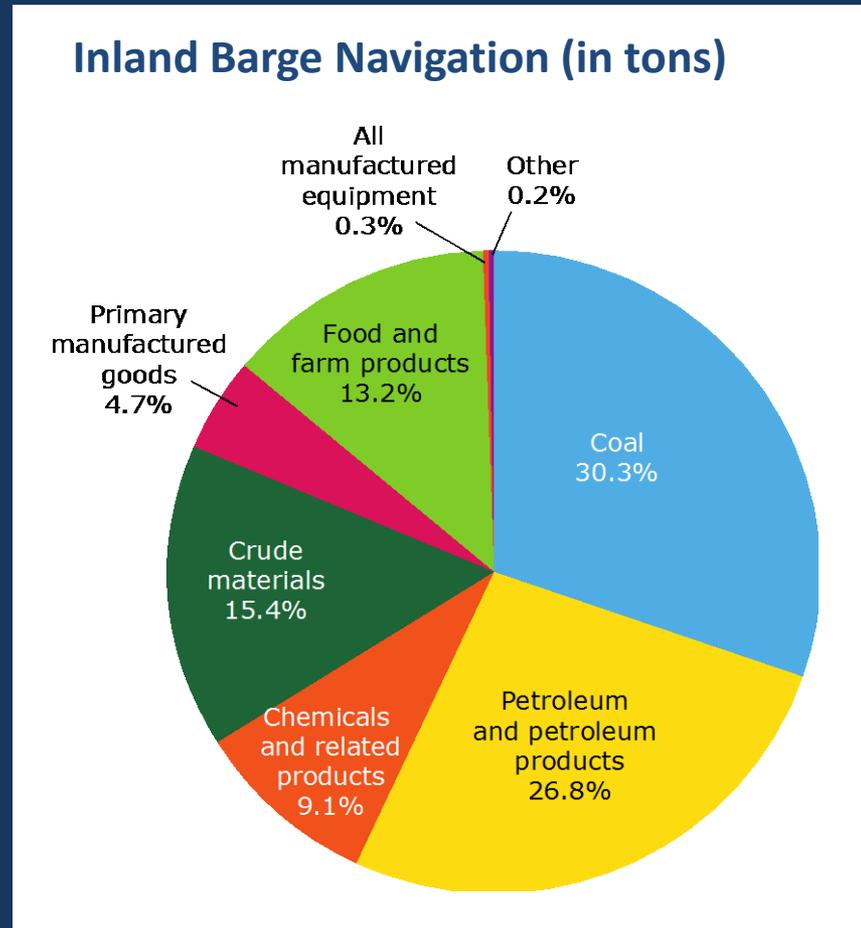
- the role of the inland waterways in the nation's freight system
- required level of investment in the inland waterways
- who should pay and how to charge



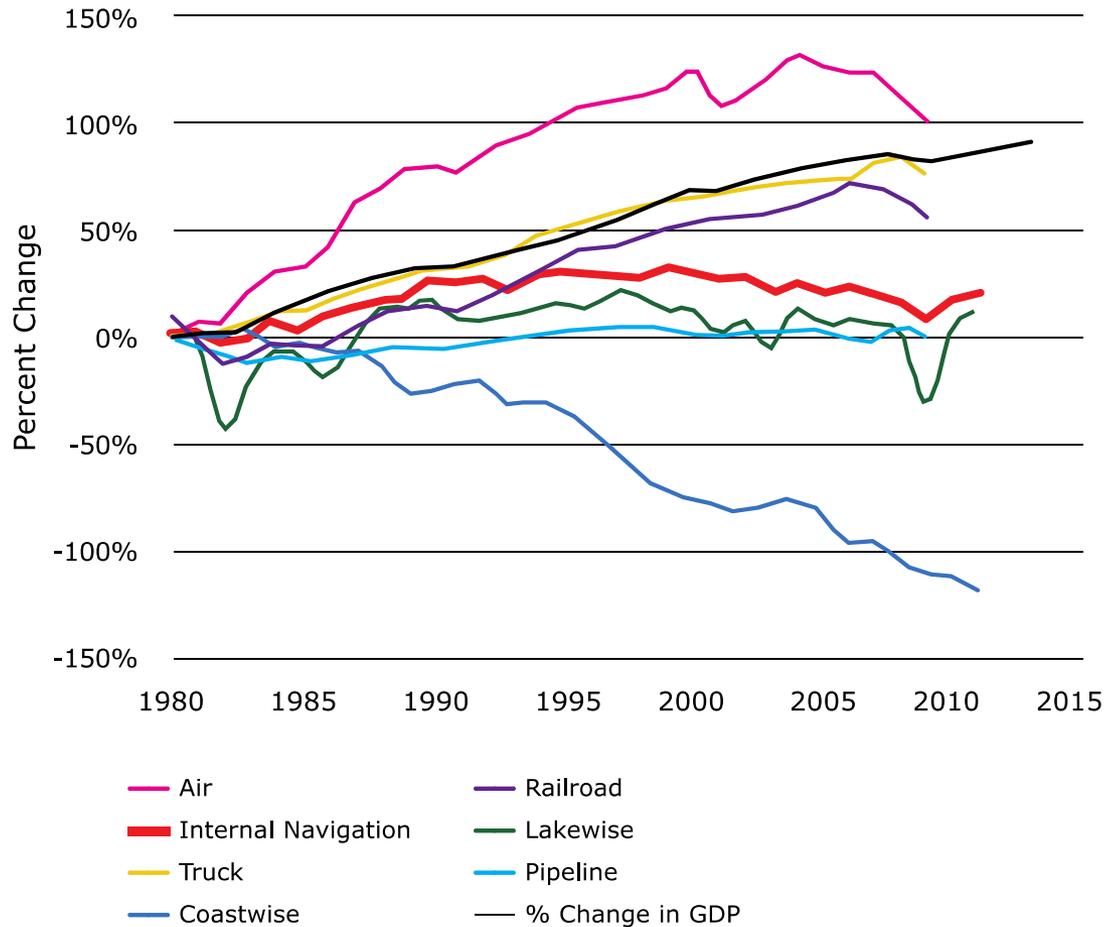
CONCLUSION 1.

The inland waterways system is a small but important component of the national freight system

- 6 to 7 percent of domestic cargo (measured in ton-miles)
- Mainly bulk commodities

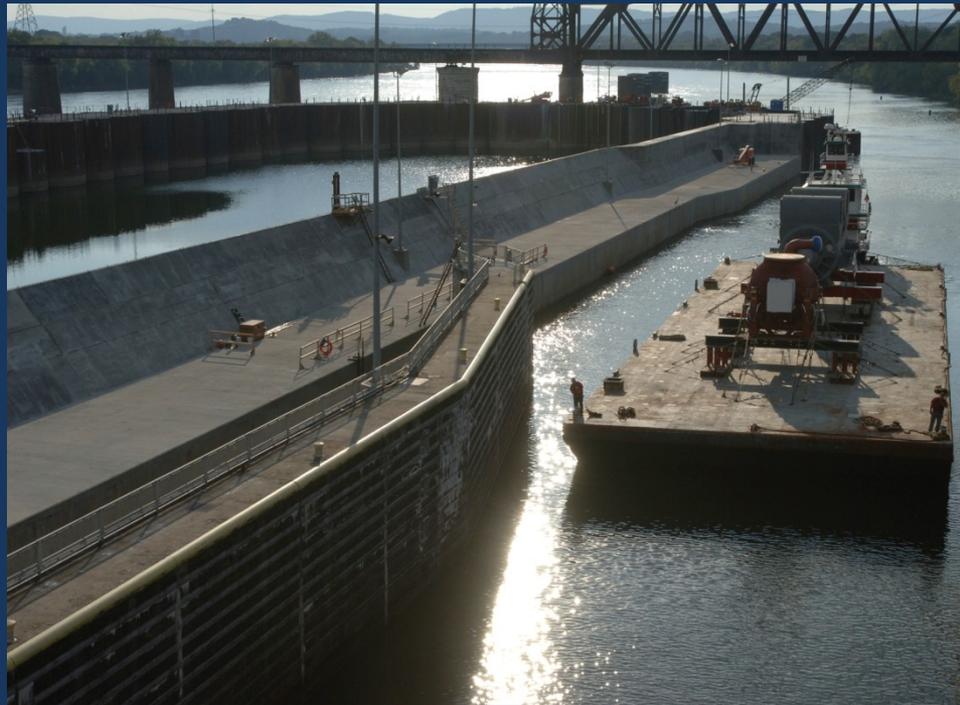


Trends for various modes in terms U.S. GDP

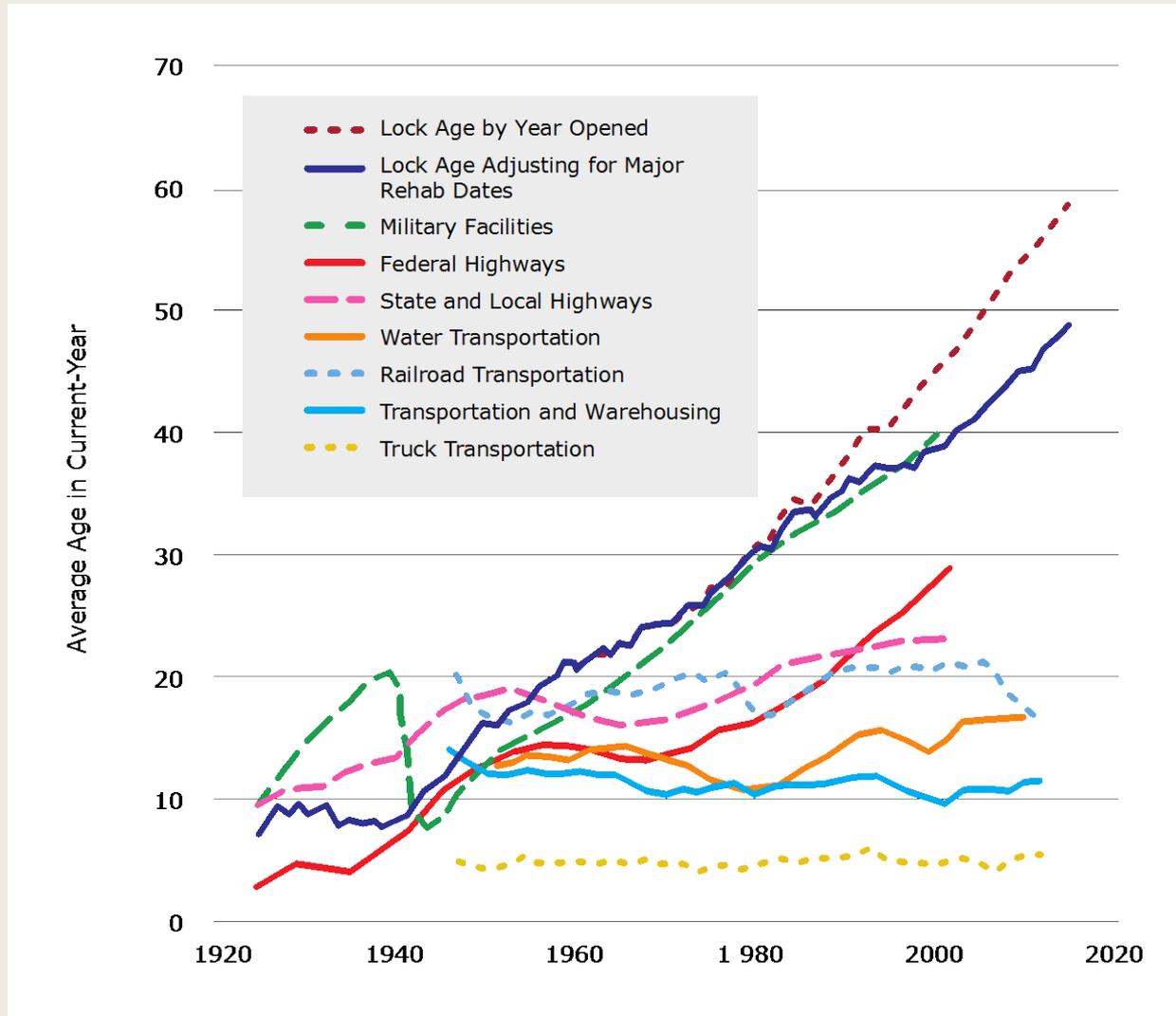


CONCLUSION 2.

The most critical need is a sustainable and well-executed plan for maintaining system reliability and performance that ensures efficient use of limited navigation resources.

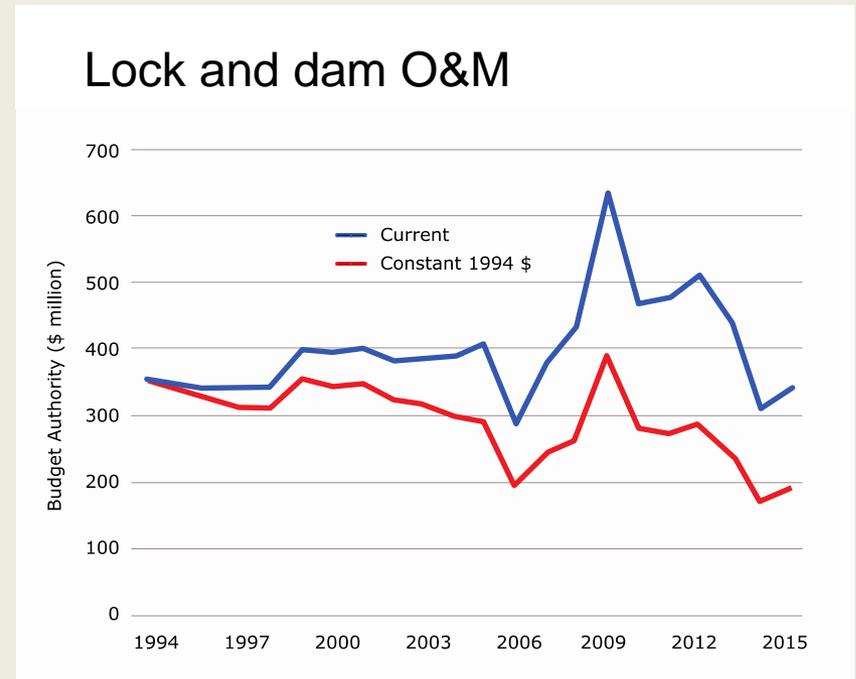
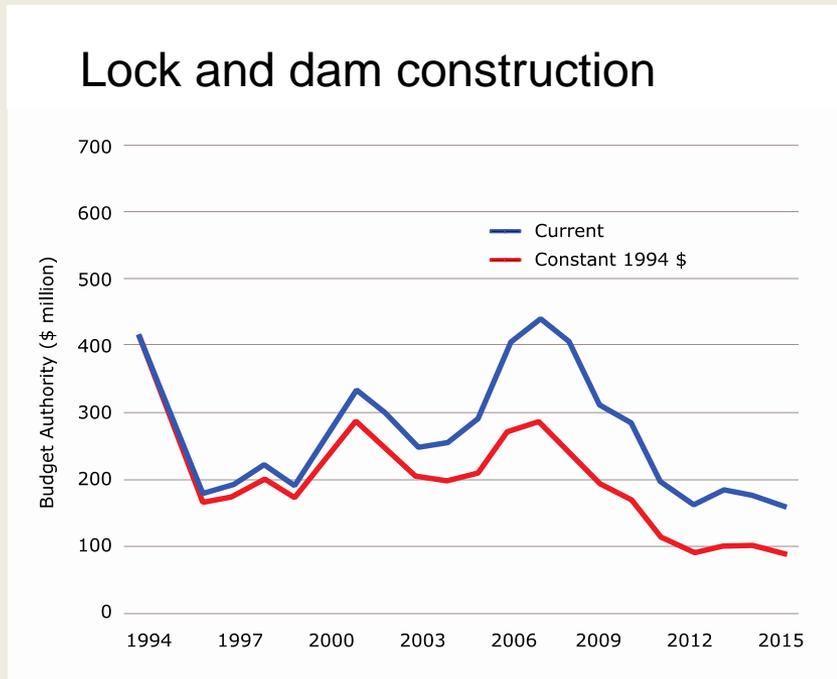


Lock Age With and Without Rehabilitation



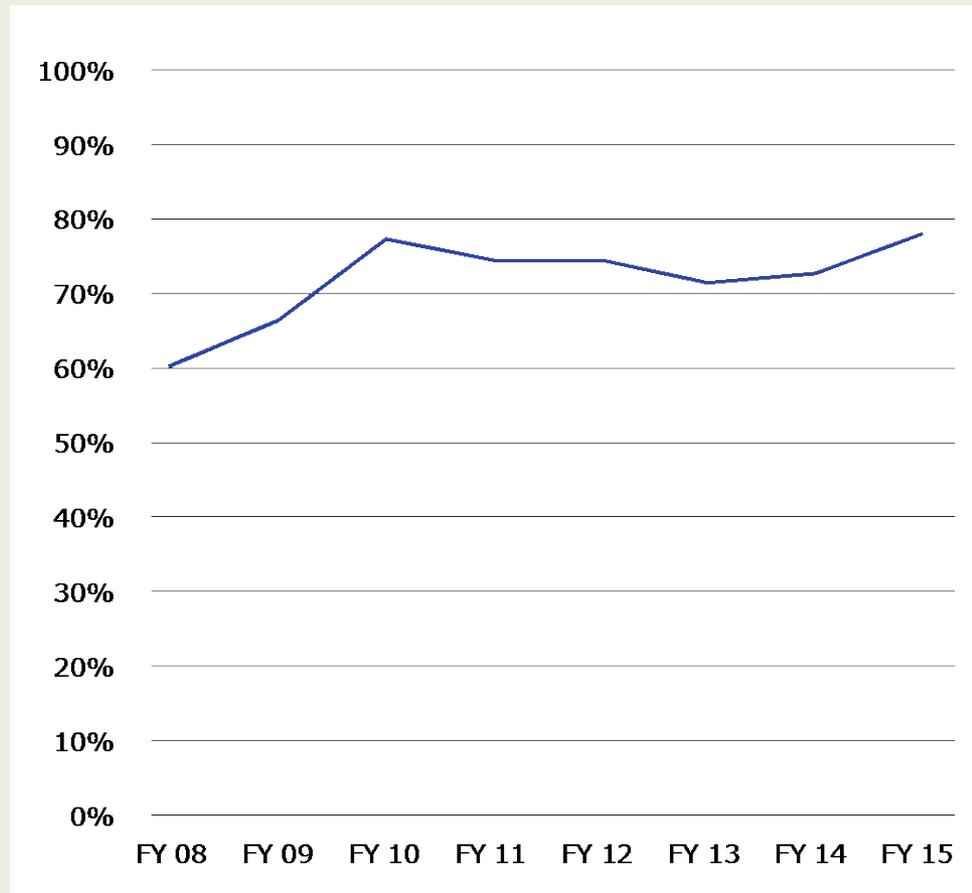
ISSUE 1.

Federal budget constraints for operations and maintenance (O&M)



Appropriations for locks and dams lowest in 20 years in constant dollars.

Lock O&M is now three-fourths of the total annual budget request for inland navigation (roughly \$650 million)



Legislation passed in 1978 and 1986 established the current funding and cost-sharing framework:

O&M 100% federal general revenue
(up to \$20 million)

Capital 50% federal, 50% barge industry via fuel tax
paid via Inland Waterways Trust Fund

An increase in the barge fuel tax passed by the 113th Congress heightens the urgency of a plan for maintenance.

- New revenues from the fuel tax are only for capital.
- Any new funds for capital require a federal match.
- As a result, O&M competes with capital for federal funds.

Without a new funding strategy that prioritizes O&M

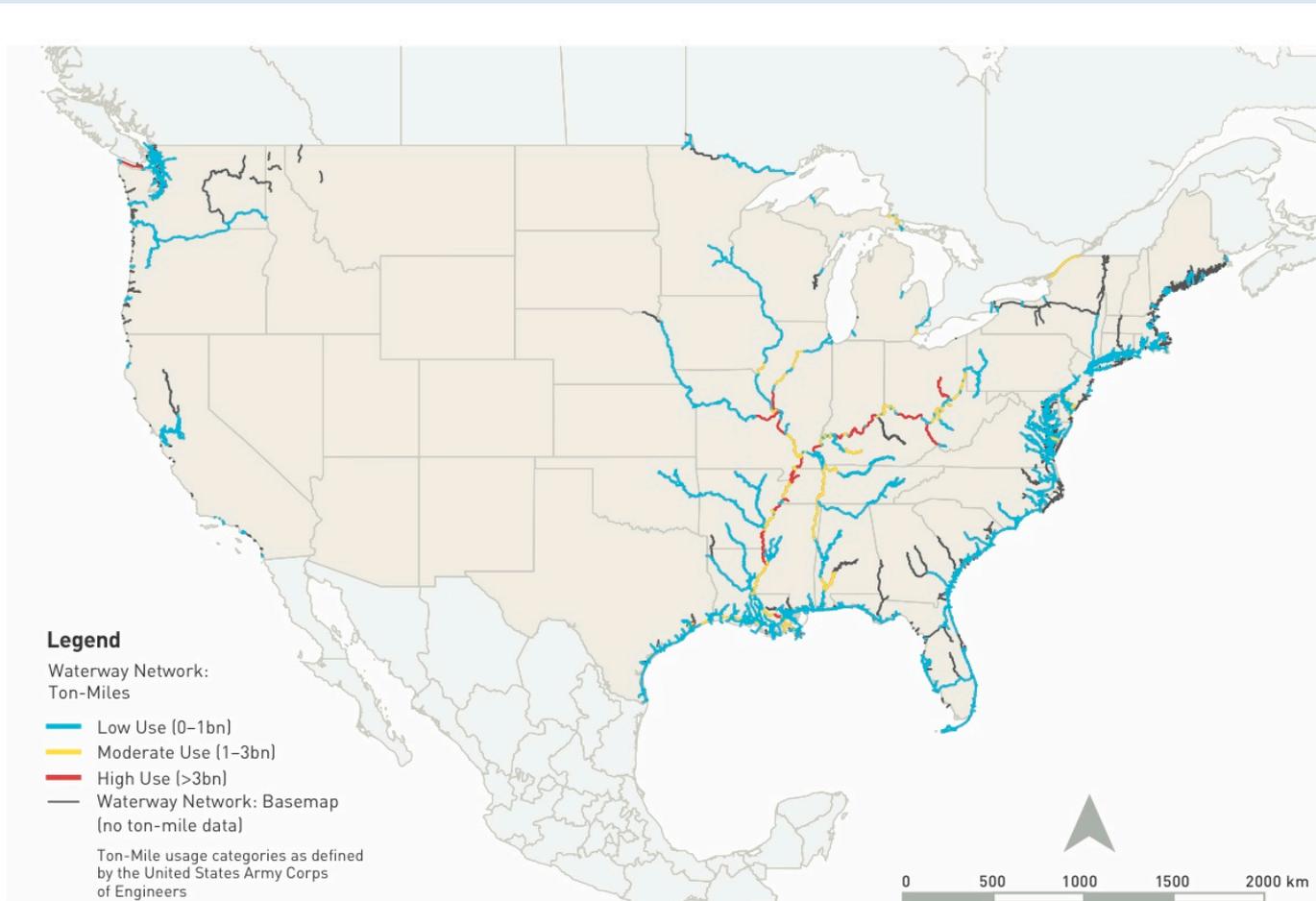
- maintenance deferred until \$20 million (until classified as a capital expenditure, by budgetary definition)
- further deterioration
- a less cost-effective and less reliable system

ISSUE 2.

A strategy needed to target limited funds to segments and facilities essential to freight transportation

- Freight flows are highly concentrated: 76% of cargo (in ton-miles) moves on 22% of the 36,000 waterway miles.
- 50% of cargo on six major corridors—the Upper Mississippi River, the Illinois River, the Ohio River, the Lower Mississippi River, the Columbia River system, and the Gulf Intracoastal Waterway (16% of the total waterway miles).
- Some segments have minimal or no freight traffic.
- “Triage” for maintenance spending is already occurring in the USACE budgeting process.

Inland Waterways Network (Usage Levels in Ton-Miles, 2011)



CONCLUSION 3.

More reliance on a user-pays approach to funding the commercial navigation system is feasible and could generate new revenues for maintenance while promoting economic efficiency.

2014 WRRDA (Section 2004, Inland Waterways Revenue Studies)—called for a study of whether and how to charge beneficiaries.



Commercial Navigation Beneficiaries

- commercial navigation primary beneficiary
- also imposes significant marginal costs
- charge at segment or lock level to identify most valued assets warranting maintenance
- charging could be restructured in a variety of ways

Other Beneficiaries of the Commercial Navigation System

Flood control and hydropower

- Few commercial navigation projects provide a flood control or hydropower benefit.
- Flood control costs are allocated already and paid via general revenues.
- Hydropower costs are allocated already, and 100% of the capital and marginal costs paid directly by the hydropower beneficiary.

Other Beneficiaries of the Commercial Navigation System

Ancillary Beneficiaries

Municipal water supply, irrigation, higher property values for property owners, sewage assimilation, mosquito control, and recreation

None imposes marginal costs and would be feasible for charging, except lockages for recreational craft to pass between pools, which can

- increase financial outlays for system operations
- increase wear on the lock
- cause traffic delays.

History of User Fee Proposals for the Commercial Navigation System

- **User fees for maintenance:** proposed since the 1940's
- **Opposition:** shipping industry (but supported an increase in the 2014 fuel tax for capital spending).
- **Supporters:** the OMB, the GAO, and Presidential administrations of both parties since Roosevelt, both before and after implementation of the first fuel tax approved by Congress in 1978.

Environmental Beneficiaries

Compared with other modes, barge may provide a benefit for which the federal government would pay:

- lower emissions
(some corridors favor barge; others favor rail)
- better safety
- fewer spills
- less congestion
(assessment has been inadequate and is difficult)

Whether size of the benefit warrants federal investment is uncertain. Further analysis of corridors would be needed and funding of the analysis one of the challenges to overcome.

Choosing Among the User Charge Options

No single best option; the preferred choice may be a combination

Multiple criteria would apply:

- ease of administration/revenue potential
- distribution of burden across user group
- design components that would reinforce the efficient use of resources and cost-effective expenditures.

A Special Case: Payments for Segments With No or Minimal Freight Traffic

Ancillary beneficiaries dependent on waterways no longer maintained for freight would become primary beneficiaries.

This case enables fresh analysis of cost sharing among

- remaining users
- local beneficiaries
- states
- federal agencies (USACE or other, but preferably not the USACE navigation budget)

A Trust Fund for Capital *and Maintenance*

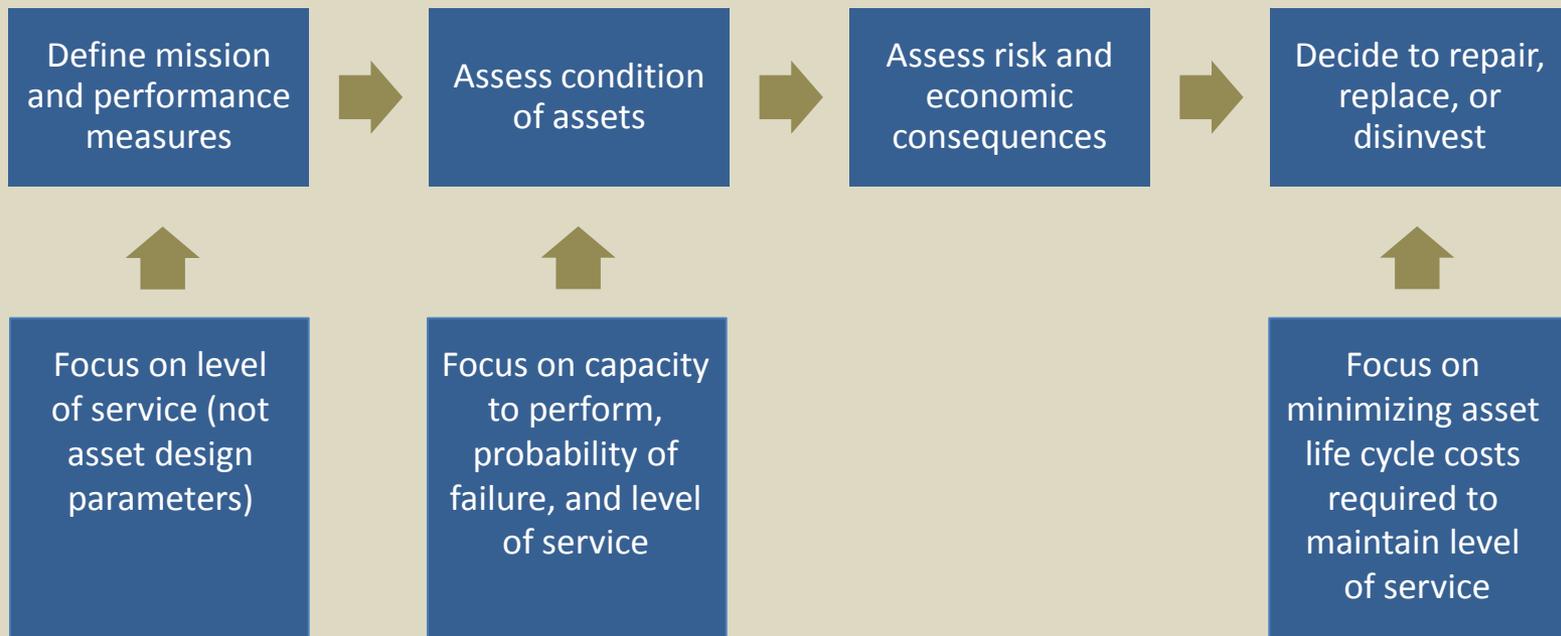
- ensure dedication of new funds to inland navigation
- enable the USACE to disburse funds as needed to maintain the system
- criteria for administration approved by Congress, with an advisory role for the Inland Waterways Users Board, whose current advisory role is limited to capital spending.

CONCLUSION 4.

Asset management can help prioritize maintenance spending and ascertain the level of funding required for the system.

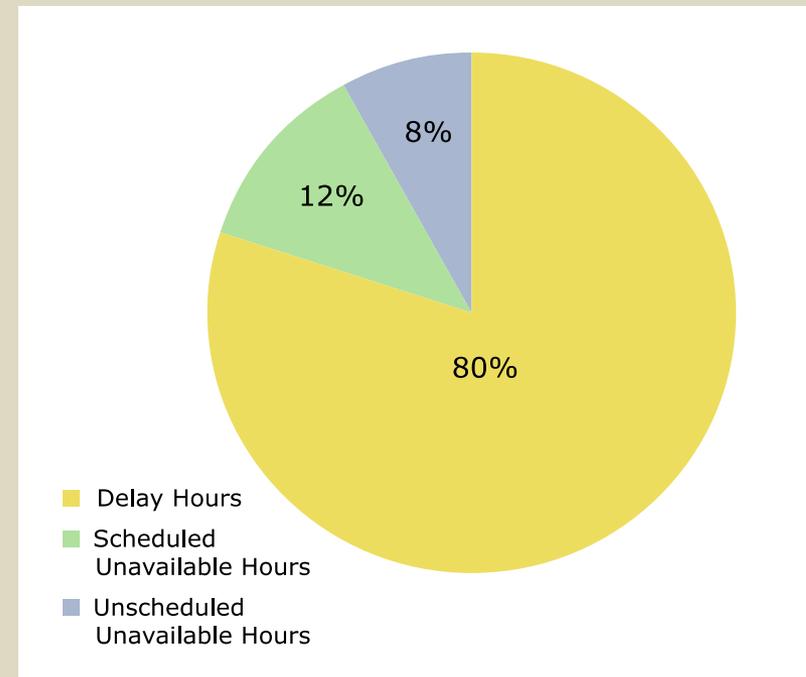
- Economically efficient asset management (EEAM)
- USACE adopted a three-part framework consistent with EEAM
 - probability of infrastructure failure
 - infrastructure usage (defined as level of freight traffic)
 - economic consequences of failure to shippers and carriers.
- USACE framework not fully developed or deployed
- The committee offers suggestions for implementing an improved asset management approach.

Simplified model of the economically efficient asset management process

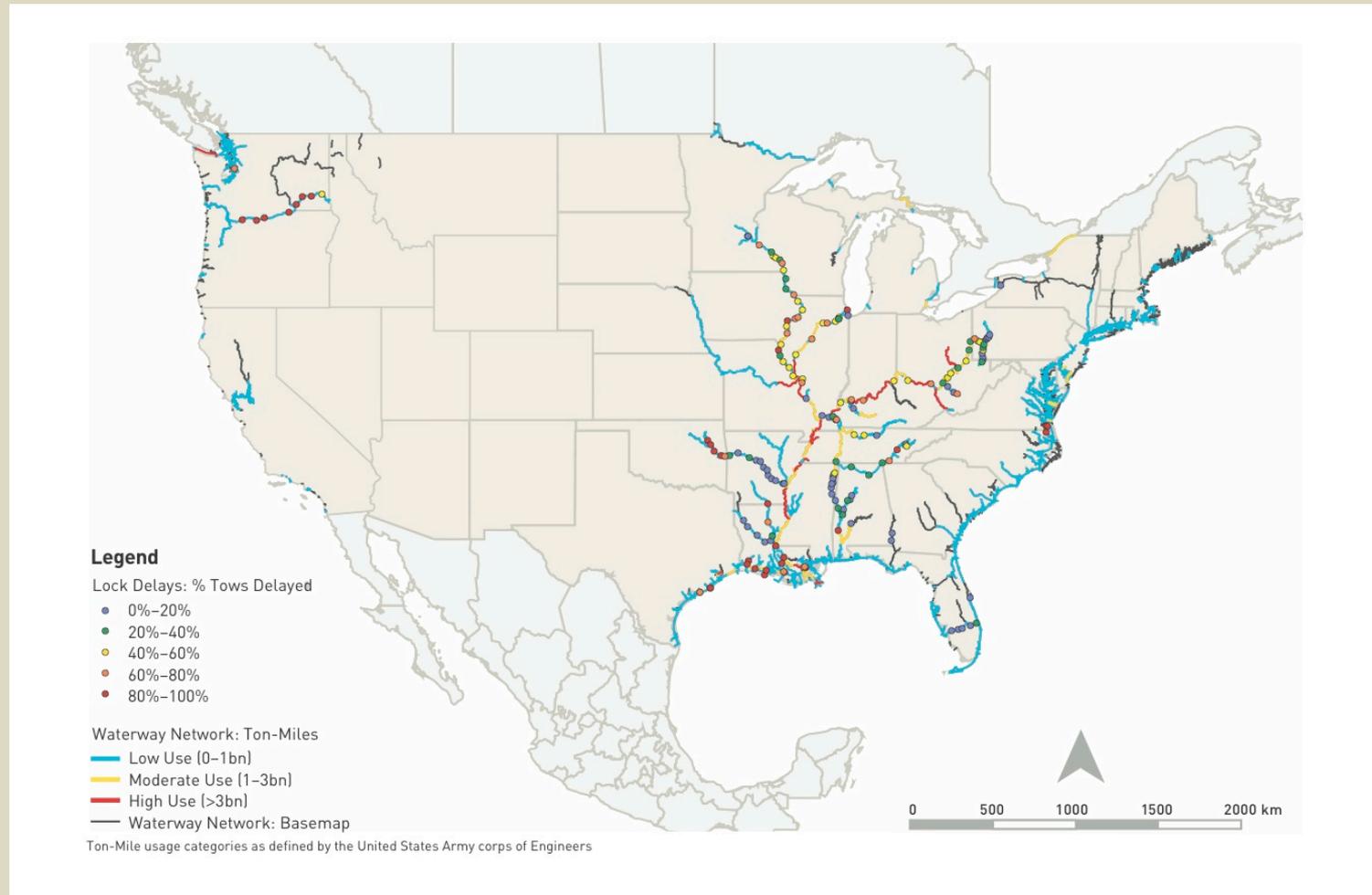


Asset management

- Fully implemented and linked to the budgeting process
- Target spending on segments and facilities most in need of maintenance and for which the economic cost of disruption would be highest
- Transportation time lost due to outages and other delays is a cost to shippers.
- Information lacking on reasons for delay



49 percent of tows in 2013 (on average) delayed on the 10 highest-tonnage locks



- most delays at high-demand locks used for agricultural exports, suggesting seasonal congestion
- deployed with appropriate metrics, asset management can help decide the most efficient way to handle delay
 - traffic management
 - more targeted O&M
 - capacity enhancement
 - some combination

- asset management—a more reliable approach to determining investment needs
- capital projects backlog—not a reliable indicator
 - modest number of projects related to the inland navigation mission
 - does not include O&M
 - derived from cost–benefit analysis not used to rank projects
- age of infrastructure—not a reliable indicator

Summary of Major Conclusions

1. The inland waterways system is a small but important component of the national freight system.
2. The most critical need for the inland waterways system is a sustainable and well-executed plan for maintaining system reliability and performance that ensures efficient use of limited navigation resources.

3. More reliance on a “user-pays” funding strategy for the commercial navigation system is feasible, would generate new revenues for maintenance, and would promote economic efficiency.

4. Systematic asset management can help prioritize maintenance and ascertain the level of funding required for the system.

Committee on Reinvesting in Inland Waterways: What Policy Makers Need to Know

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USACE

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Public Meetings and Information

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Ingram Barge Company Site Visit (Craig Philip, Bill Porter, and Richard Kern)

US DOT (Rolf Schmitt and Jack Wells)

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Daniel Murray, American Transportation Research Institute

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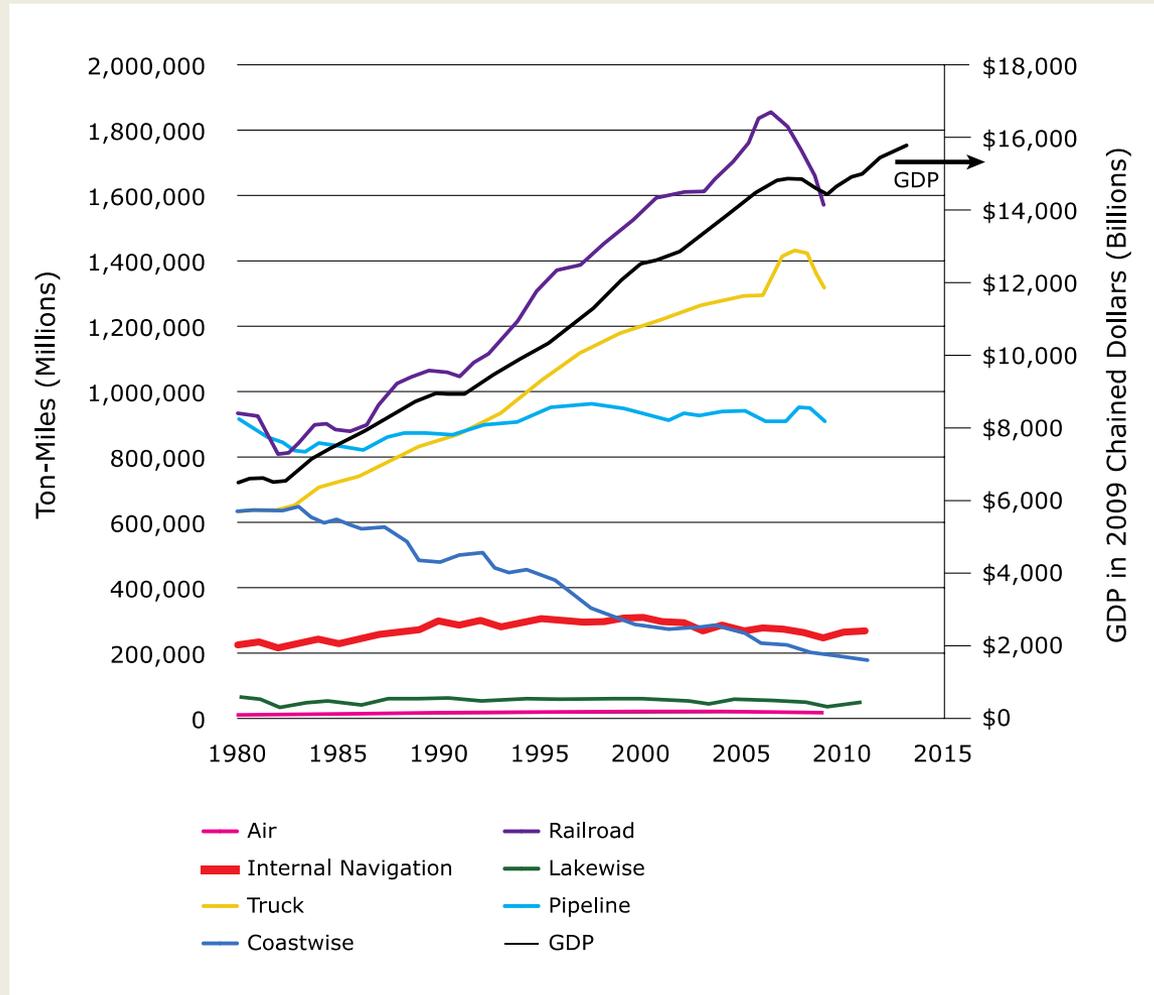
Melissa Samet, National Wildlife Federation

Michael Steenhoek, Soy Transportation Coalition

Michael J. Toohey, Waterways Council, Inc.

Christopher Dager, University of Tennessee

Trends for various modes in terms of ton-miles



Federal budget appropriations support commercial navigation:

O&M 100% federal general revenue
(up to \$20 million)

Capital (including major rehabilitation)

50% federal, 50% barge industry via fuel tax
paid via Inland Waterways Trust Fund

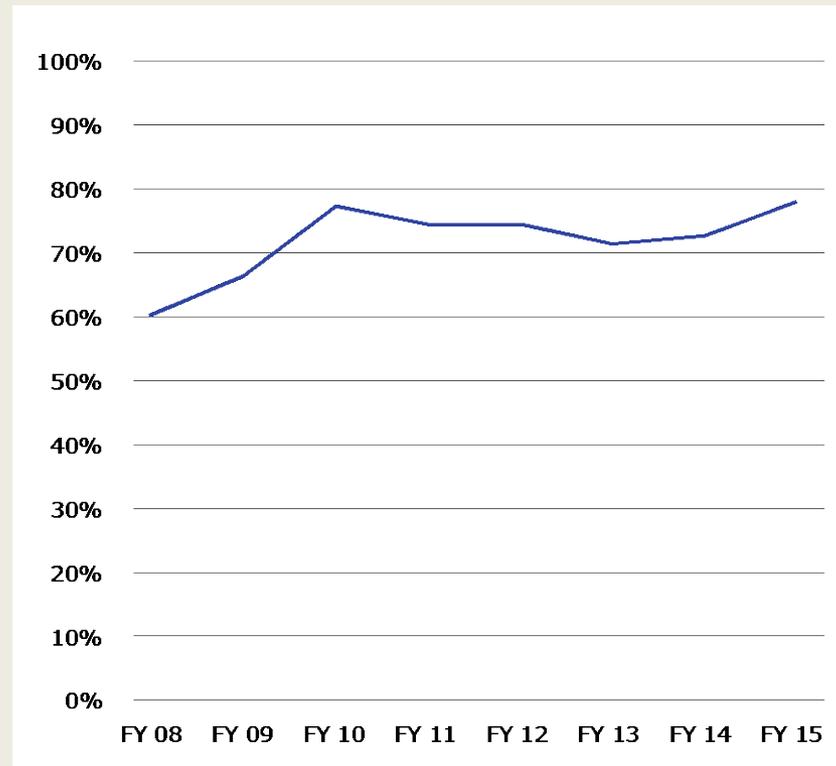
Might the Beneficiaries Pay?

- **User fees for maintenance:** proposed since the 1940's; limited contribution through fuel tax beginning in 1986.
- **Opposition:** shipping industry (supported an increase in the 2014 fuel tax for capital spending).
- **Supporters of funding reform:** Presidential administrations of both parties since Roosevelt, both before and after implementation of the first fuel tax approved by Congress in 1978.

What Are the Key Ideas in the Report?

- A clear view of how revenues would be used (O&M)
- Beneficiaries means more than those who pay the initial fees/taxes
- Few benefit other than commercial navigation
- There are tradeoffs in design of a user fee system
- Need to “fence” revenues for O&M (revolving trust fund)
- Propose funding strategy for facilities with minimal or no commercial freight

Lock O&M is now three-fourths of the total annual budget request for inland navigation (roughly \$650 million)



Hence there is a need for spending prioritization methods as good or better than those used for assessing capital projects.

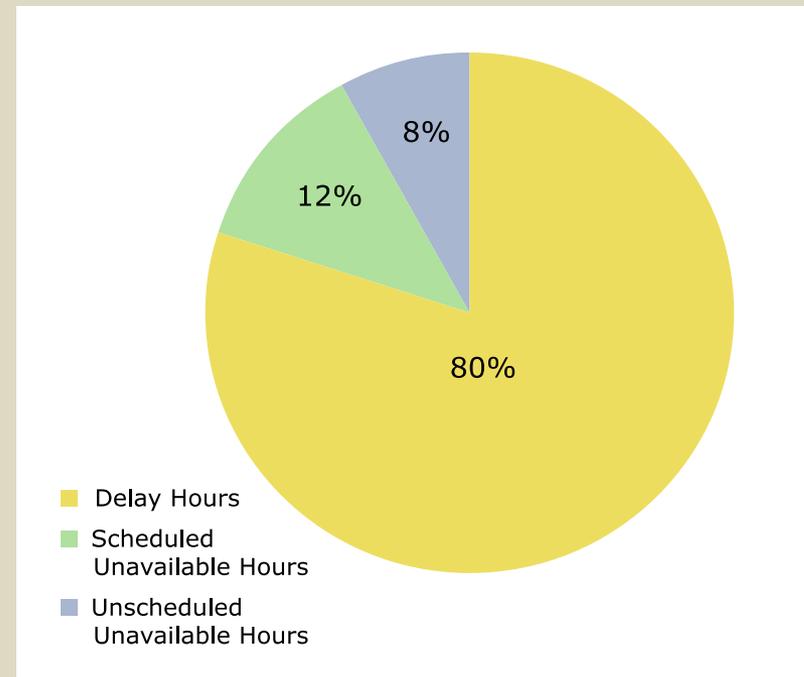
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Asset management

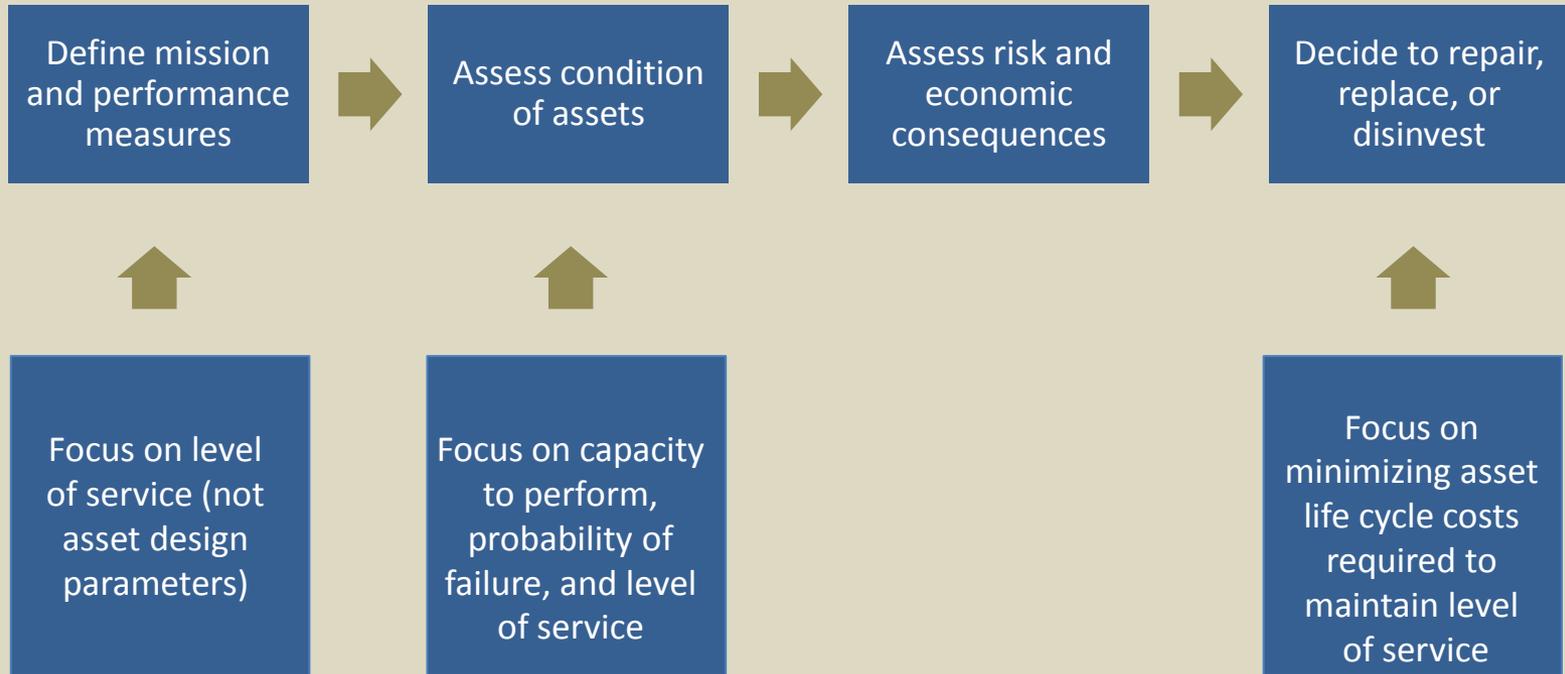
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Simplified model of the economically efficient asset management process



USACE is in process of deploying a system very similar to this model.

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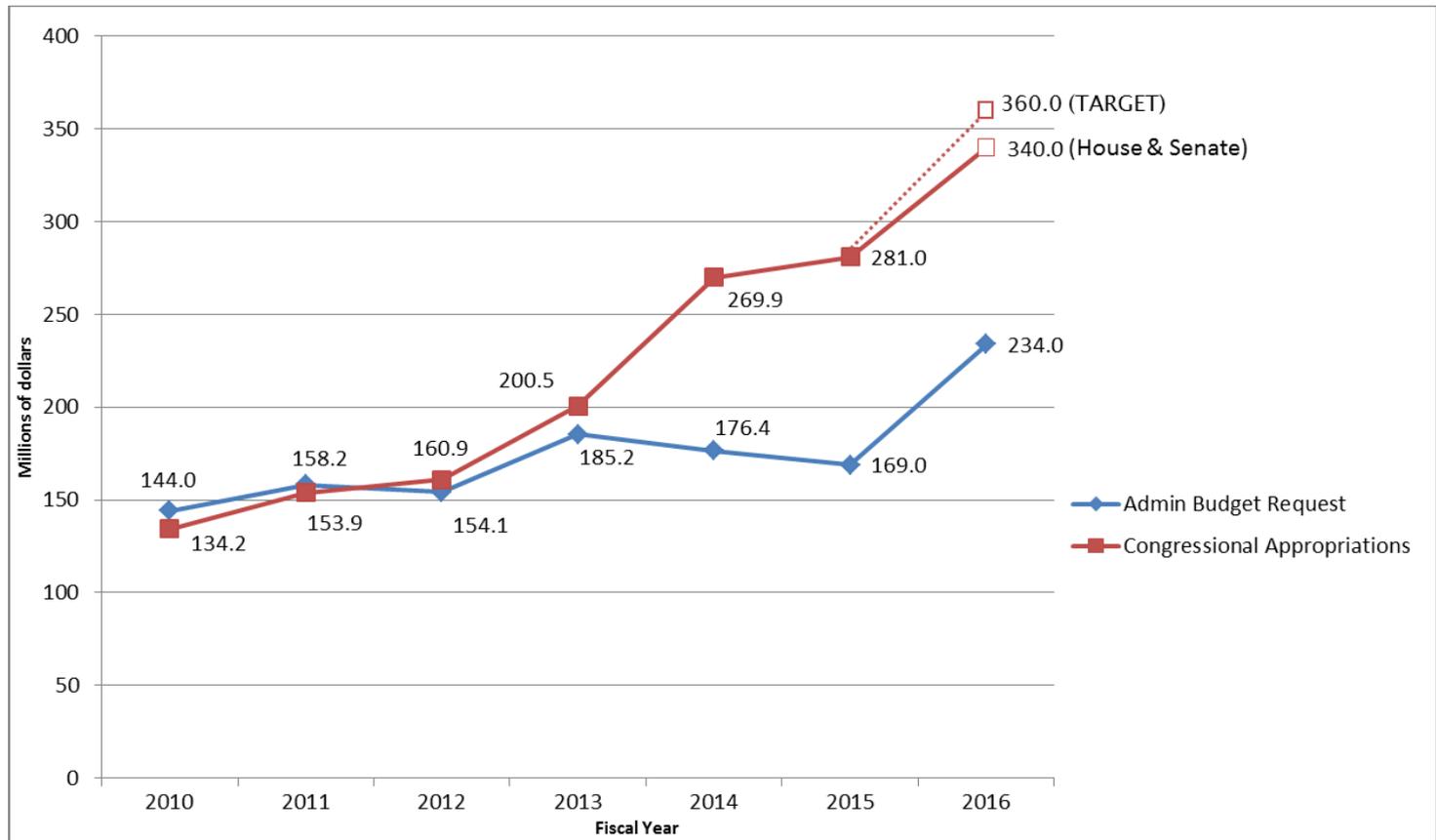


Transportation Research Board

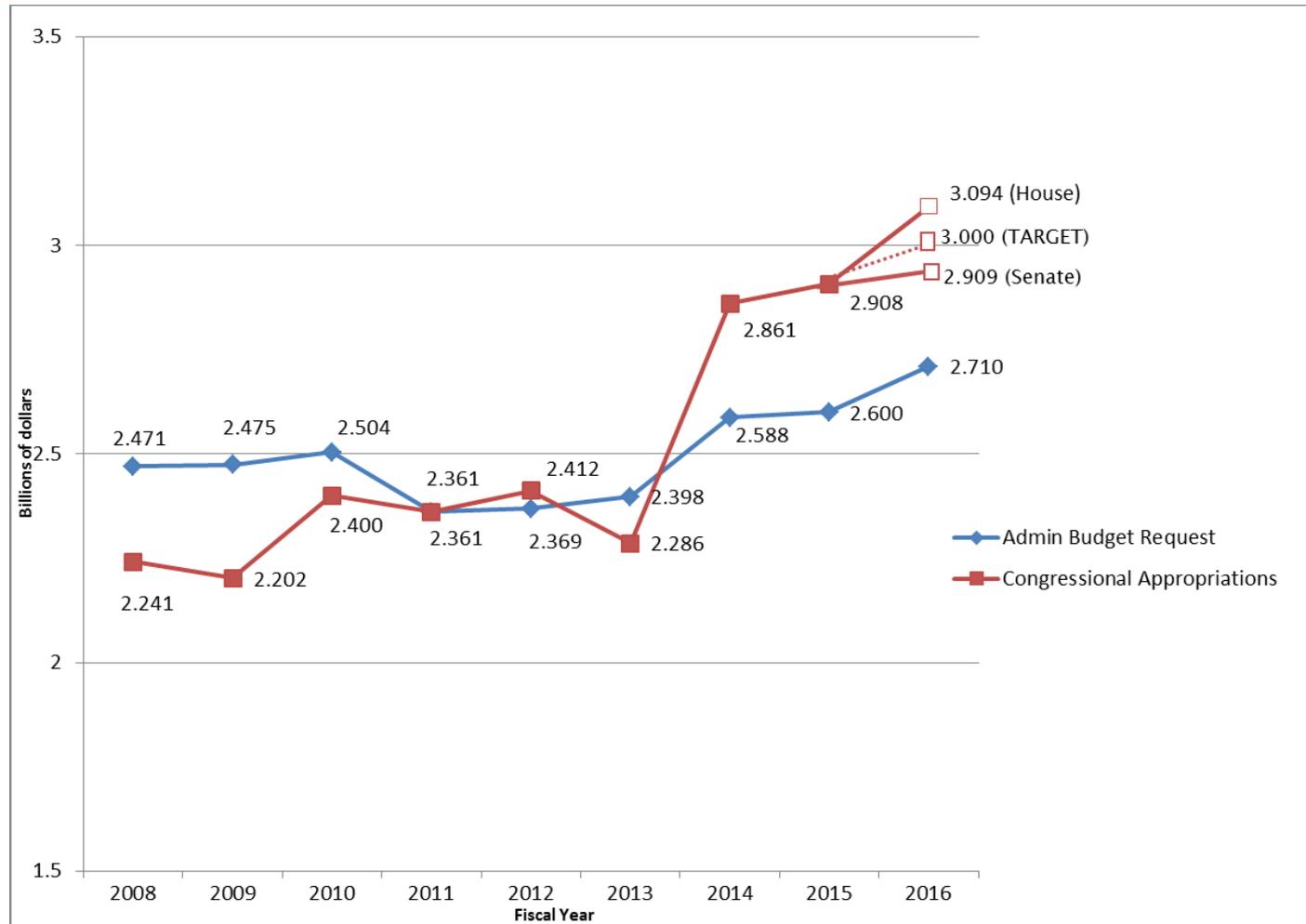
Mike Toohey, President/CEO

June 16, 2015

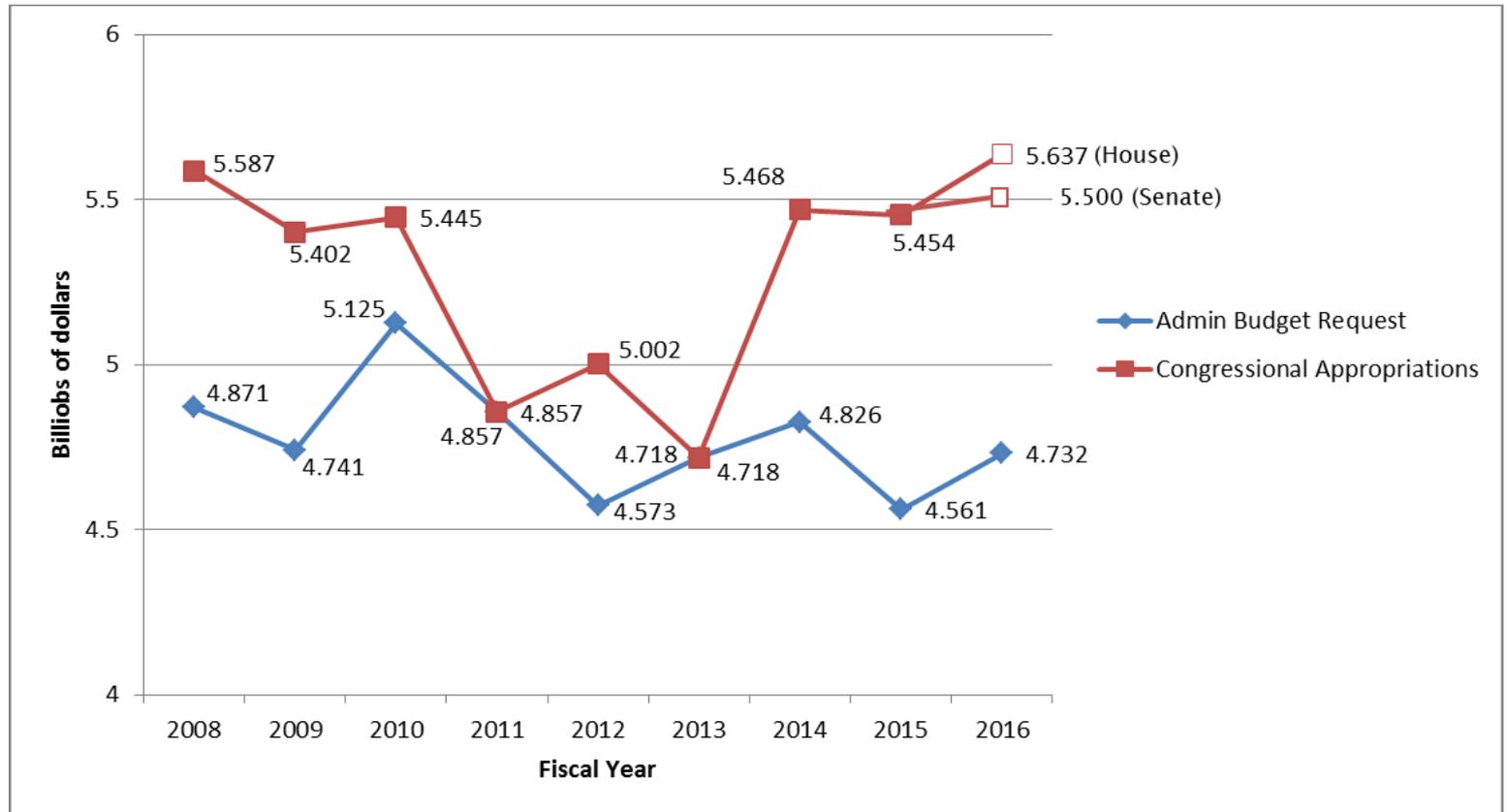
Annual Funding for IWTF Modernization Projects



Operation & Maintenance Account Civil Works Program, Corps of Engineers



Base Program Annual Funding: Civil Works Program Corps of Engineers



Trends: How We Move Things ...

Transportation and the Economy

By 2045, the U.S. economy is forecast to grow by **115%** to **\$36.7 trillion**—and the transportation sector will represent about

\$1.6 trillion

of total Gross Domestic Product.

Global Demand for U.S. Products

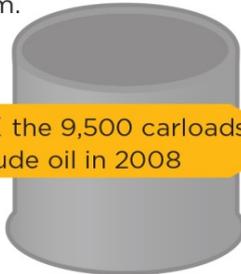
Global trade is one of the brightest spots in our economy.

U.S. exports reached **\$2.3 trillion** in 2013, setting a new record for the 4th straight year.

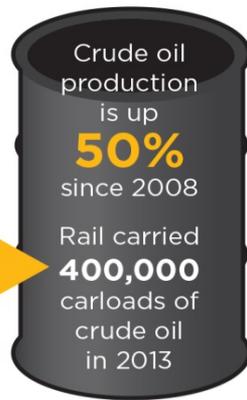
\$1 billion in exports = **5,000 U.S. jobs**

The U.S. energy boom

is placing unprecedented demand on our transportation system.



42x the 9,500 carloads of crude oil in 2008



Crude oil production is up **50%** since 2008

Rail carried **400,000** carloads of crude oil in 2013

By 2040, U.S. freight volume will grow to **29 billion tons**—an increase of **45%**.



Major gains in freight movement are predicted by 2040

By 2040, the value of freight will grow to **\$39 trillion**—an increase of **125%**.



54 million tons of freight move across our nation every day

Freight Movement is Multimodal

Every mode of transportation moves freight, but trucking is the primary mode of freight travel.

	2012	(in tons)	2040
 Truck	13.2 billion	+43%	18.8 billion
 Rail	2.0 billion	+37%	2.8 billion
 Waterborne	975 million	+10%	1.1 billion
 Air	15 million	+250%	53 million

System Performance and the Cost of Congestion

By 2040, nearly **30,000** miles of our busiest highways will be clogged on a daily basis.

Truck congestion wastes **\$27 billion** in time and fuel annually.





1924 Brockway 2.5 Ton

Engine Type:
Wisconsin TAV 25 hp engine

Transmission Type:
Brown Lipe 3 speed transmission

Truck Information:

A brand new Brockway 2.5 Ton would have cost \$3,000 in 1924, when this one was made. One could get these in Cortland, New York from 1912 to 1977. In 1956, Brockway was purchased by Mack Trucks. Top speed—20 MPH

