



UPPER MISSISSIPPI INLAND WATERWAY INFRASTRUCTURE

PUBLIC-PRIVATE PARTNERSHIP EVALUATION



Stakeholder Summit

June 8, 2018



Welcome



Current Infrastructure, Funding & Commodities

Upper Mississippi Inland Waterway



- 27 Locks and Dams
 - St. Paul District: L/Ds 1 – 10 (11 sites)
 - Rock Island District: L/Ds 11 – 22 (12 sites)
 - St. Louis District: L/Ds 24 – 27 (4 sites)
- 750 miles of 9-foot navigation channel
- 1,200-foot locks at Locks 27, Mel Price & 19
- Remaining sites are 600-locks
- Primary construction in the 1930's
- Note: Illinois Waterway (8 locks and dams) is a part of the UMIW navigation system.



Locks & Dams 101



Inland Navigation Funding

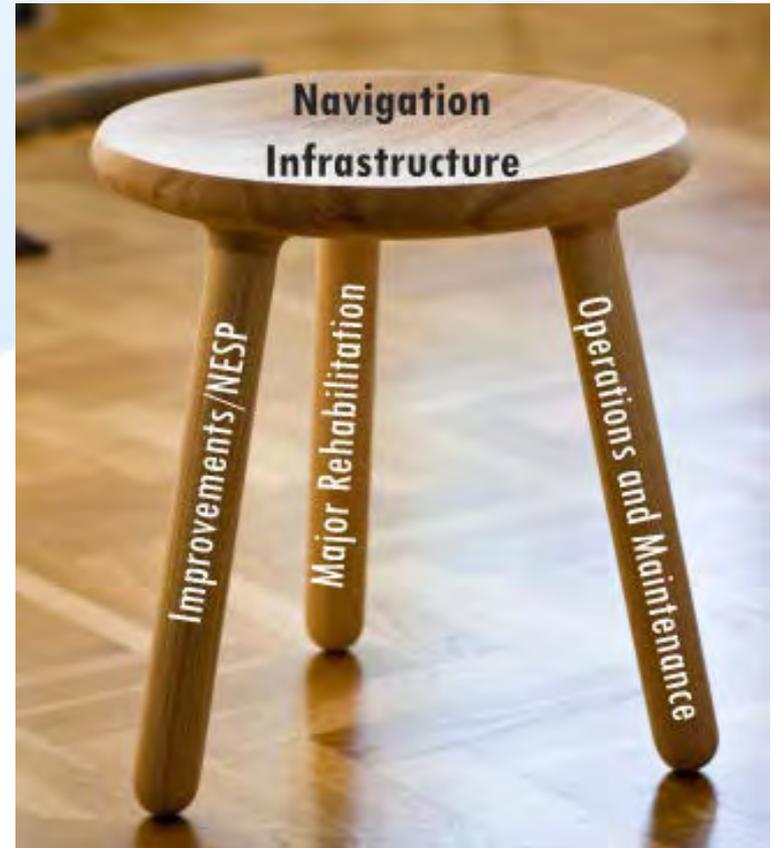


- US Army Corps of Engineers' inland navigation funding accounts:
 - General Investigations (GI) – funds planning and feasibility studies
 - Operations & Maintenance (O&M) – funds day-to-day operation and maintenance costs plus the Major Maintenance program (maintenance projects < \$21 million)
 - Construction General (CG) – funds design and construction of new projects and Major Rehabilitation program (rehabilitation projects > \$21 million)
- Inland Waterway Trust Fund (IWTF)
 - Provides 50% - 50% cost-sharing on CG funded Inland Navigation new project construction and Major Rehabilitation projects.

Navigation Infrastructure Funding



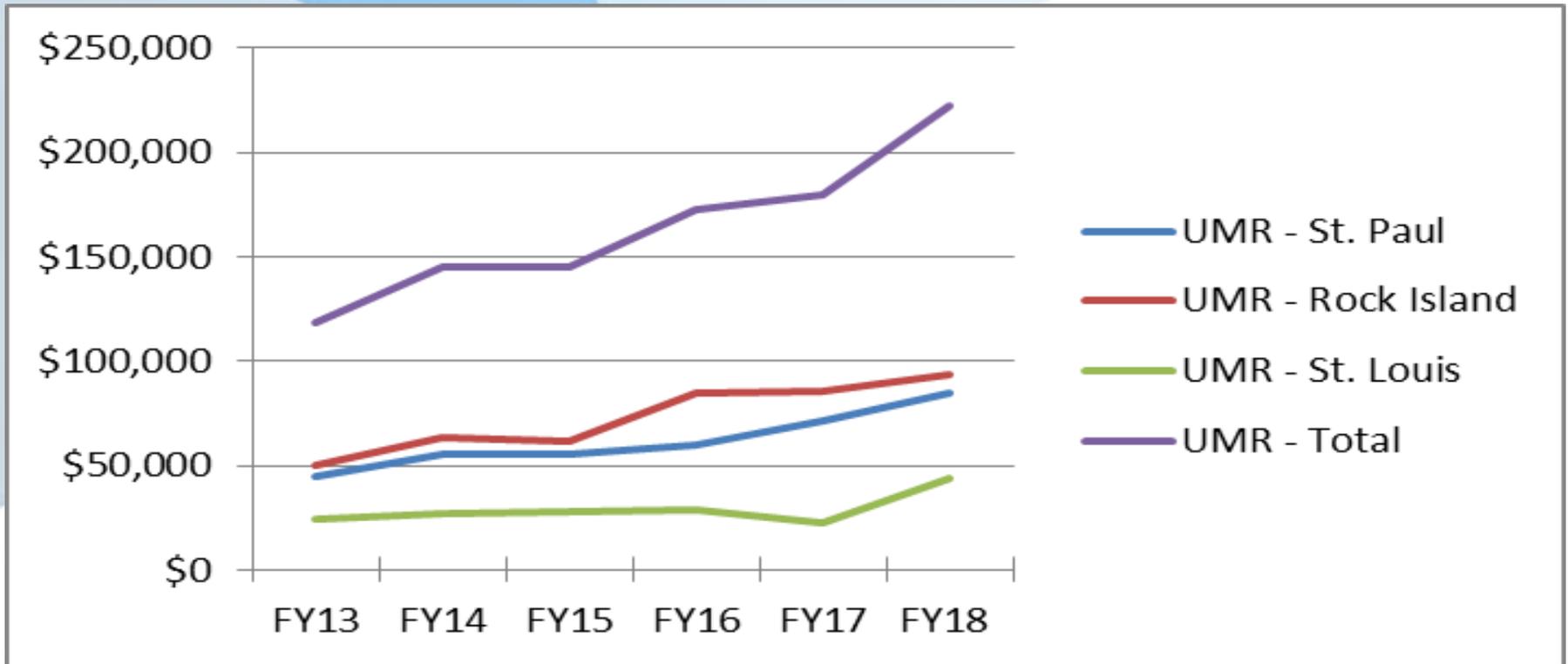
- 3-leg Navigation Infrastructure stool
 - O&M including Major Maintenance
 - Major Rehabilitation
 - New Improvements
 - UMR&IWW Navigation & Ecosystem Sustainability Program (NESP)
 - WRDA 2007 Authorization of NESP projects
- UMIW Waterway has been operating on one leg for the past 10+ years (O&M \$s)



O&M Funding for UMR Waterway



- Good News! O&M funding has been trending upward over the past 6 years
 - FY 2013: \$118.5 million (~ \$4.4 million per site)
 - FY 2018: \$222.4 million (~ \$8.2 million per site)



O&M Accomplishments since FY13



- Rock Island District Priority O&M Navigation Projects in 2013:

Work / Project	Funding Account	Status (as of March 2018)
UMR Lock Miter Gates @ 3 Locks	O&M	Funded – Completed
UMR Bulkhead Slots @ 7 Locks	O&M	Funded – Completed
UMR Dam 18 – Concrete Repairs	O&M	Funded - Under Contract
UMR Lock 19 – Concrete Repairs	O&M	Not Funded
UMR L&D 15, 21 & 22 – Dam Gate Repairs	O&M	Partially Funded - Dam 22 Under Contract, Dams 15 & 21 in Design
IWW LaGrange Lock – Major Maintenance	O&M	Potential for FY18 Work Plan
IWW LaGrange Lock – Replace Miter Gates	O&M	Funded – Completed
IWW Peoria Lock – Replace Miter Gates	O&M	Funded – Completed
IWW – Joliet Channel Wall Concrete Repairs	O&M	Not Funded
IWW Dresden Dam – Replace Gates	O&M	Funded - Under Contract
IWW O'Brien Lock – Major Maintenance	O&M	Funded – Completed

O&M Accomplishments since FY13



- St. Paul District Priority O&M Navigation Projects in 2013:

Work / Project	Funding Account	Status (as of March 2018)
UMR Lock & Dam 9 – Winter Maintenance	O&M	Funded – Completed
UMR Lock & Dam 1 – Dam Scour Repair	O&M	Funded - Under Contract
UMR Locks 4 & 6 – Tow Haulage Repair	O&M	Funded - Under Contract
UMR Dams 8, 9 & 10 – Pier House Roofs	O&M	Funded – Completed
USAF & USLF – Electrical Repair	O&M	Funded – Completed
UMR Locks & Dams 3-10 – Permanent Bulkheads for Aux Chamber	O&M	L&D 7 Funded - Completed L&D 2 & 5 Funded
UMR Dams 3, 5A & 10 – Dam Bulkhead Repairs & Painting	O&M	Not Funded
UMR Dam 5 – Dam Gates Painting	O&M	Not Funded
UMR Lock 2 – Miter Gate Replacement	O&M	Funded - Under Contract
UMR Dam 5A – Dam Painting	O&M	Not Funded
UMR Lock and Dam 4 – Concrete Repairs	O&M	Funded – Completed
UMR Lock 7 – Guidewall Crib Repairs	O&M	Funded – Completed

Top 10 O&M Projects – FY17



- UMIW Waterway FY17 Prioritization of Maintenance (POM) – Top 10

FY17 POM Ranking	District	Waterway	Project Name	Work Package Title	Range of Funding Requirement
1	MVR	Mississippi	Lock No. 18	Lock 18 – chamber dewatering & maintenance repairs	\$5M-\$10M
2	MVS	Mississippi	Lock No. 27	Lock 27– lift gate counterweight basket modifications	\$100K-\$1M
3	MVS	Mississippi	Lock No. 27	Lock 27 – lift gate hoisting chain rehab	\$1M-\$5M
4	MVS	Mississippi	Lock No. 25	Lock 25 – miter gate anchorage replacement (4)	\$5M-\$10M
5	MVP	Mississippi	Lock No. 10	Lock 10 – miter gate replacement	\$5M-\$10M
6	MVR	Mississippi	Lock No. 20	Locks 20, 21, & 22 – replace embedded anchorages	\$1M-\$5M
7	MVS	Mississippi	Lock No. 24	Lock 24 – miter gate anchorage replacement	\$5M-\$10M
8	MVP	Mississippi	Lock No. 5a	Lock 5A – miter gate replacement	\$5M-\$10M
9	MVR	Mississippi	Lock No. 15	Lock 15 – replace upstream monolith bullnose	\$1M-\$5M
10	MVP	Mississippi	Lock No. 5	Lock 5 – auxiliary chamber closure	\$1M-\$5M

- Range of Funding Requirement: \$29 - \$71 million

UMIW Lock 11 Miter Gates



EMERGENCY REPAIRS KEEP LOCKS OPERATIONAL FOR SPRING RUSH



Mississippi River Project maintenance crews perform emergency repairs at Lock and Dam 11 in Dubuque, Iowa, after a crack was found in a critical piece of one of the lock's miter gates. Photo by Matt Thurman

- Emergency repairs were on the embedded miter gate anchorages.
- Cracking on one of the gate anchorages resulted in a 1-day unscheduled lock closure.
- A full failure of the gate anchorage would result in displacement of the miter gate and a multiple day lock closure.

Source: USACE – Rock Island, Tower Times, May/June 2018

UMIW Investment Needs



- O&M Program:
 - Funding at ~ \$90 million annually addresses routine Operational needs (O of O&M).
 - Funding above \$90 million addresses priority Maintenance needs (M of O&M).
 - FY18 at \$222 million should result in funding of Top 10 POM (Major Maintenance) projects plus some additional projects.
- Major Rehabilitation Program:
 - Recapitalization of the existing locks and dams will be needed in the near future. CG and IWTF funding of \$45 million per site is anticipated, or a total of \$1.2 billion spread over the next 25 years.
 - Assumption is each Major Rehabilitation project will include an additional \$15 million of O&M funded work.
- Navigation and Ecosystem Sustainability Program (NESP):
 - 1,200-foot locks @ 5 sites @ \$450 million per lock = \$2.2 billion
 - Mooring cells @ 10 sites @ \$2 M per cell = \$20 million

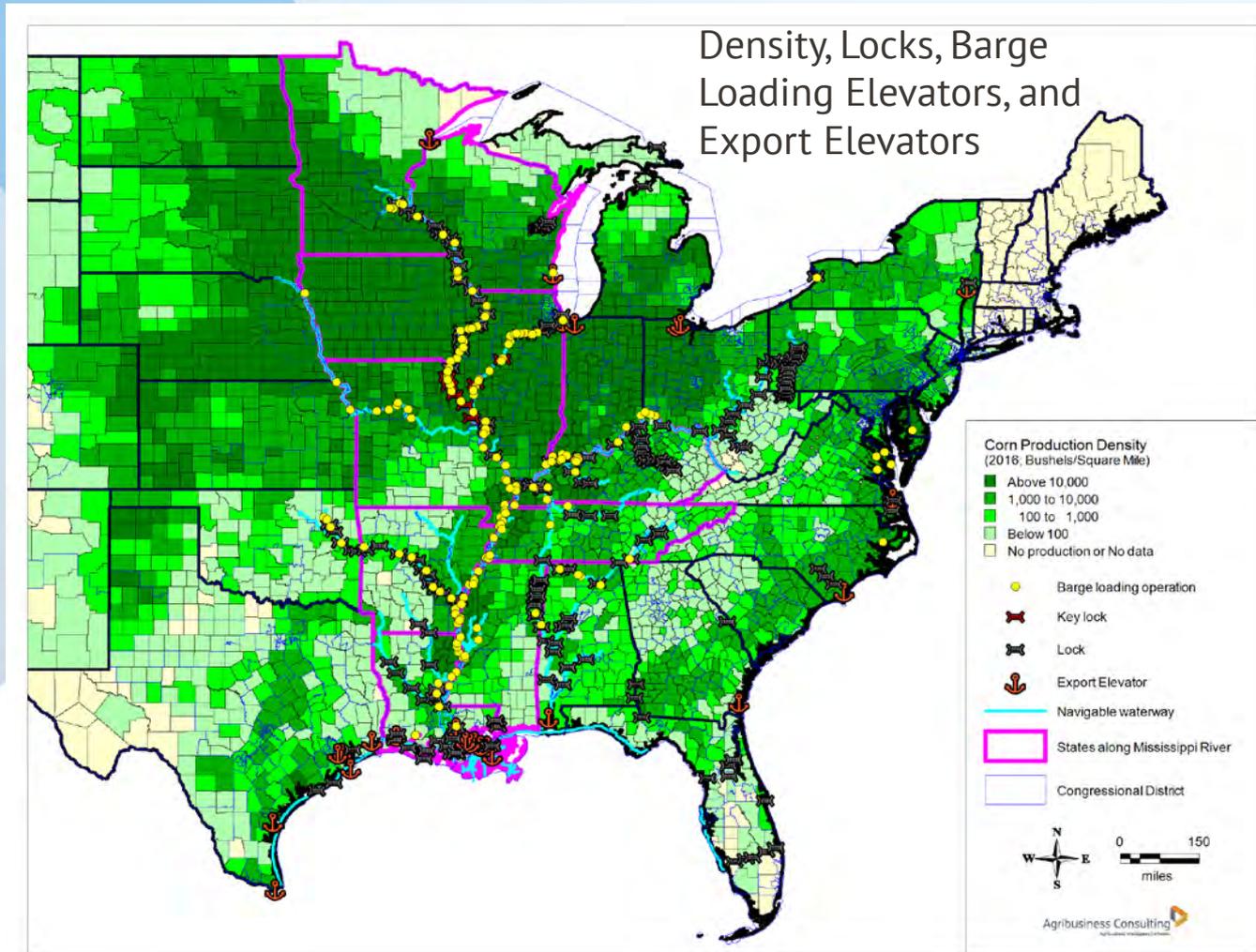


Commodity Forecast

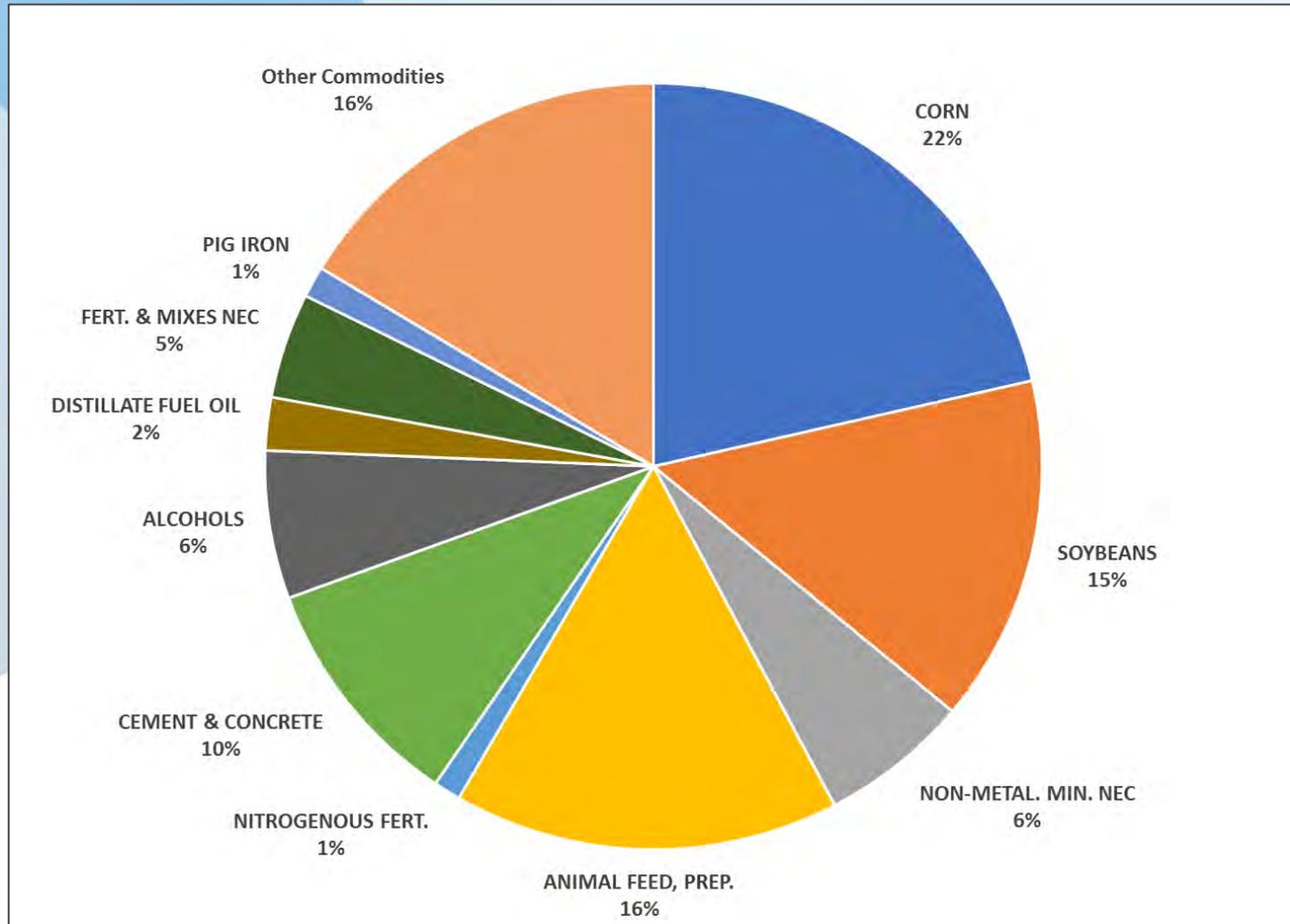


- Informa Economics IEG
 - Specialized agribusiness experience
 - Access to barge fleet profile and commodity data
- General approach:
 - Based on government data
 - Multiple geographic views (world, US, region, state)
 - Balance sheet approach (surplus/deficit)
- Also considers economic factors, modal shares, drivers of barge movement

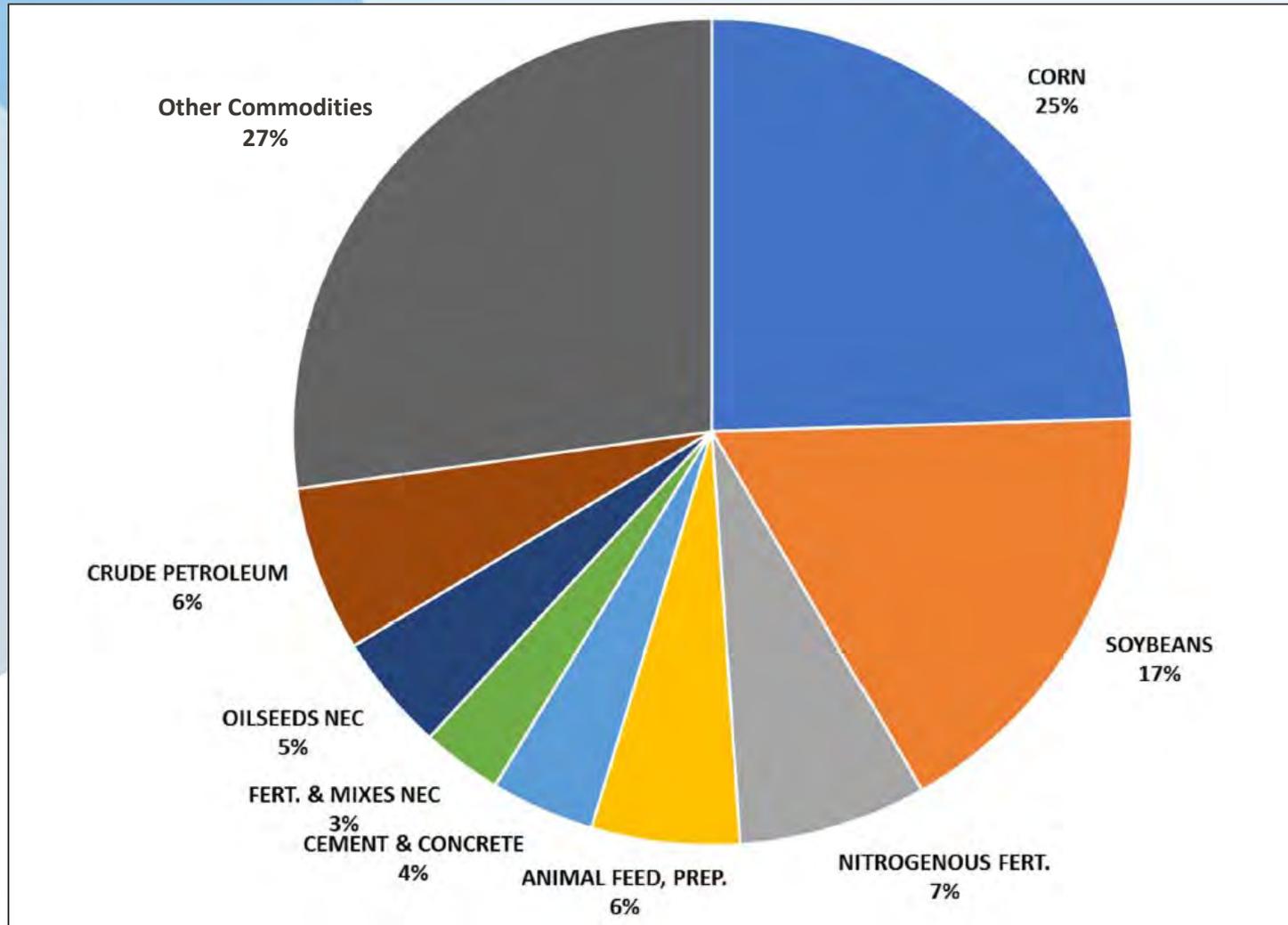
Mississippi River System and Corn Production



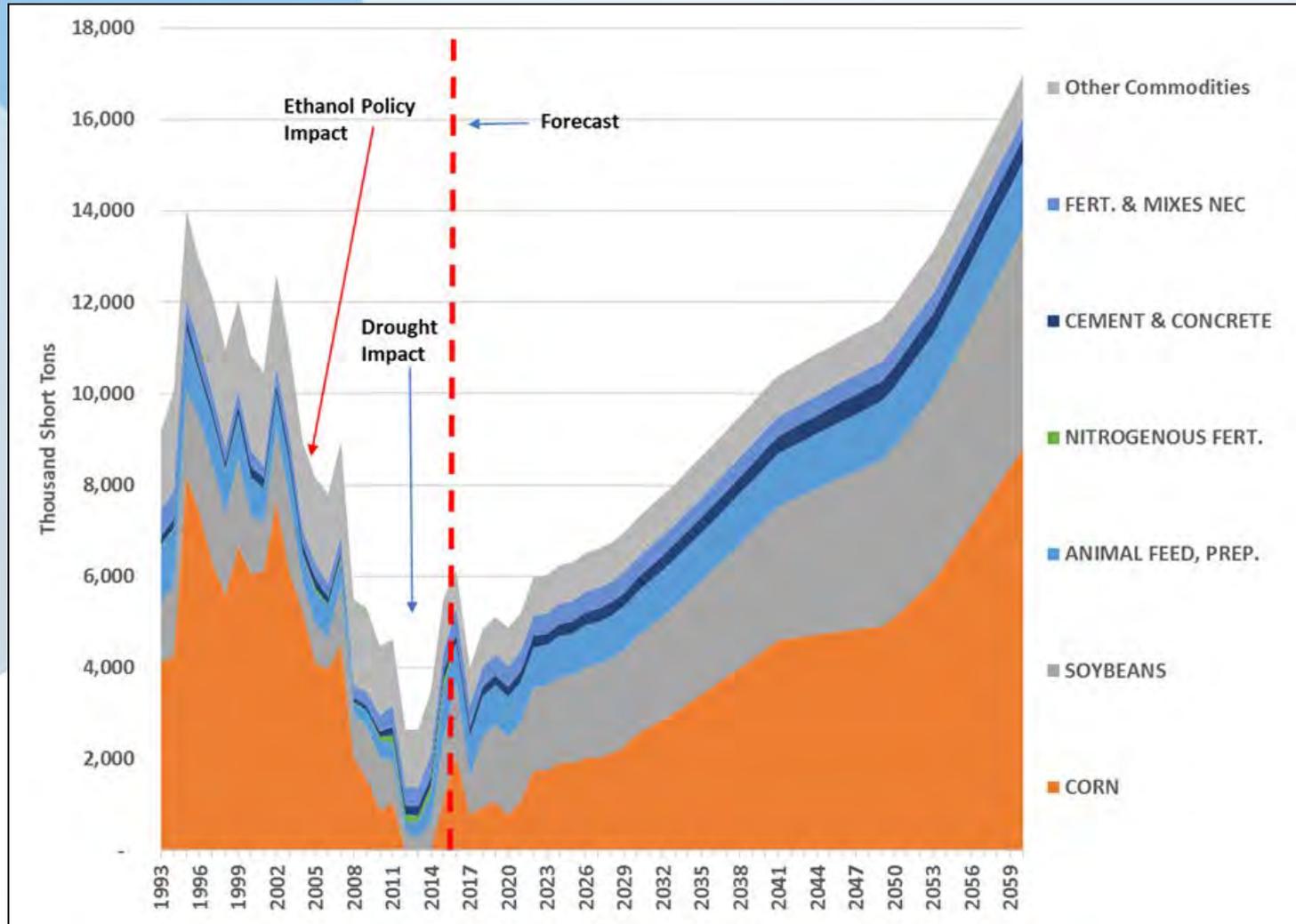
Iowa Barge Commodity Share



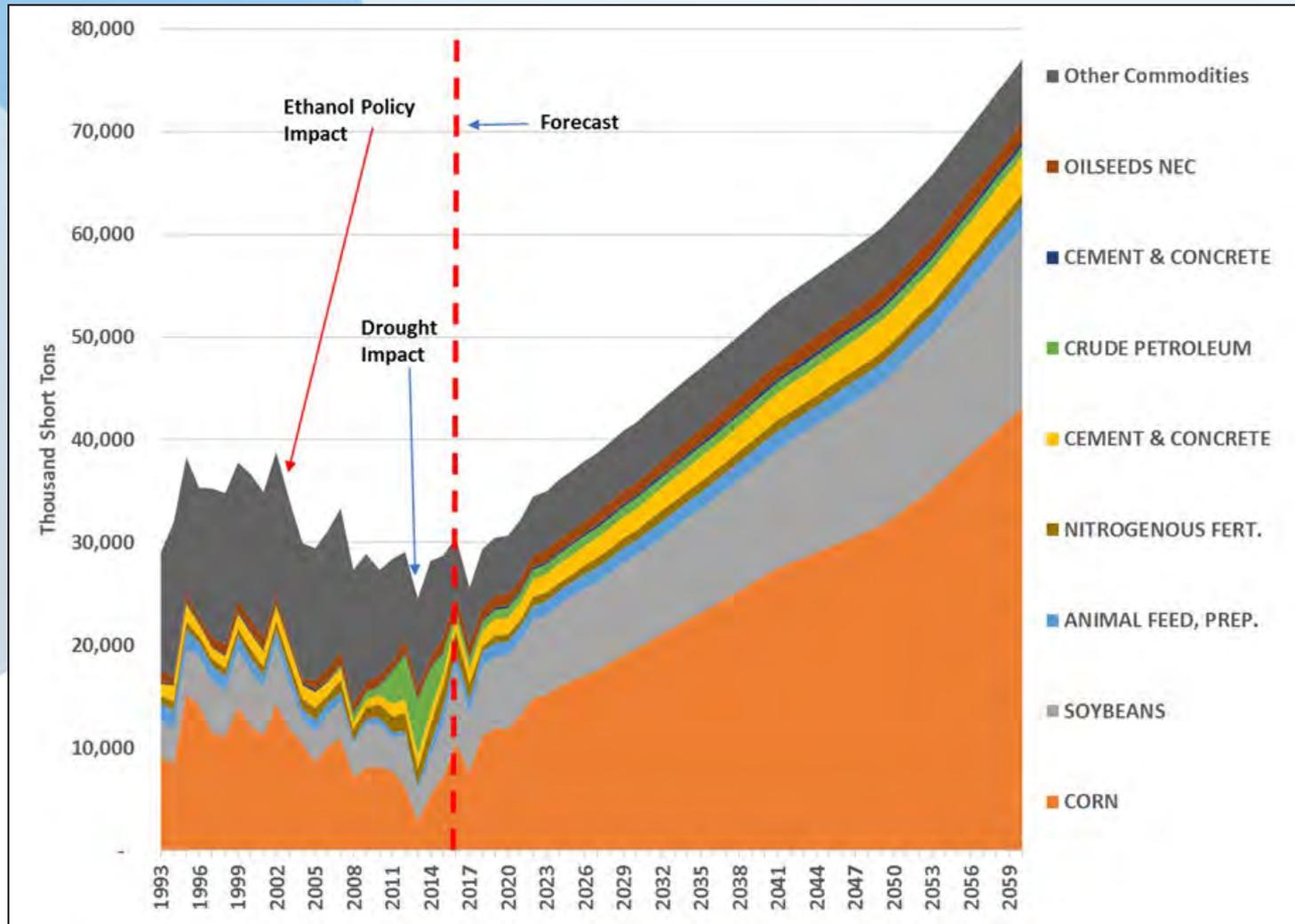
Regional (5-State) Barge Commodity Share



Iowa Barge Commodity Flows



Regional (5-State) Barge Commodity Flows



Providing a Robust & Reliable System

Upper Mississippi River Waterway – Three Pilot Project Scenarios

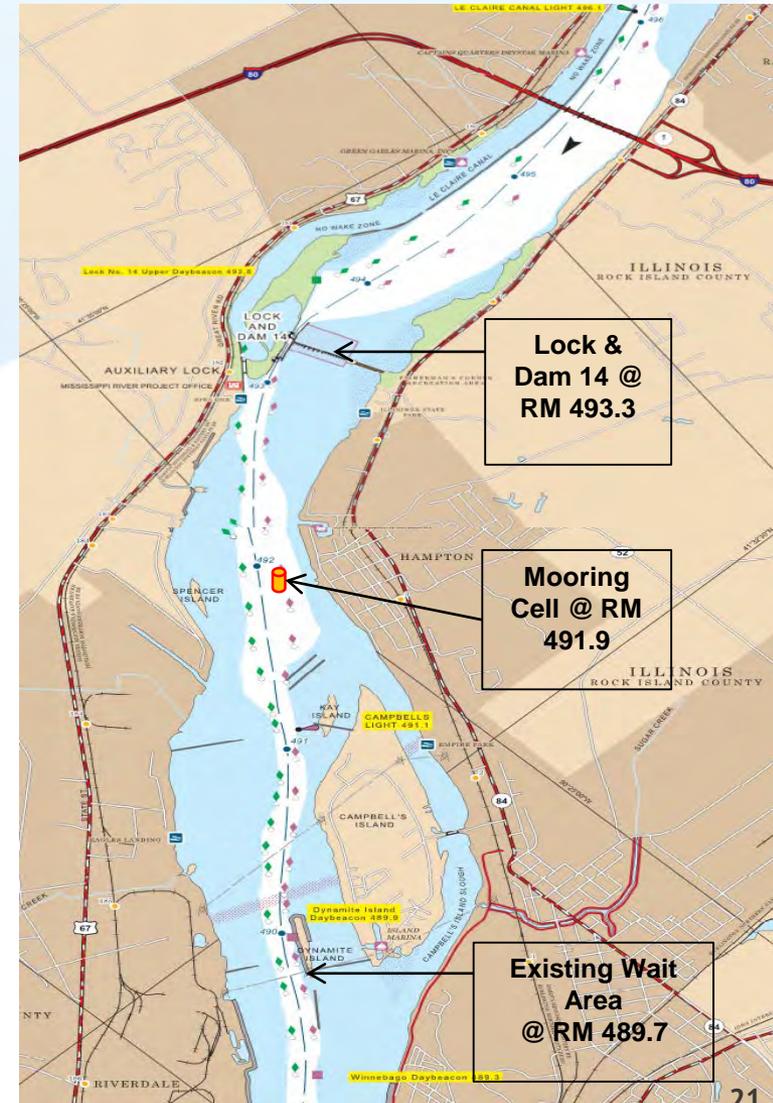


- Scenarios that upgrade or improve the efficiency, reliability and capacity of the existing system of locks and dams:
 - Efficiency - Micro Upgrade
 - Small scale stand-alone navigation efficiency improvement project that can be replicated on the UMIW Waterway.
 - Reliability - System Improvements
 - Projects that improve the long-term durability and sustainability of the existing locks and dams on the UMIW Waterway.
 - Capacity – Large Scale Upgrade
 - Major recapitalization projects that expand the ability of the existing UMIW Waterway locks to meet future traffic demands.

Efficiency – Micro Upgrade



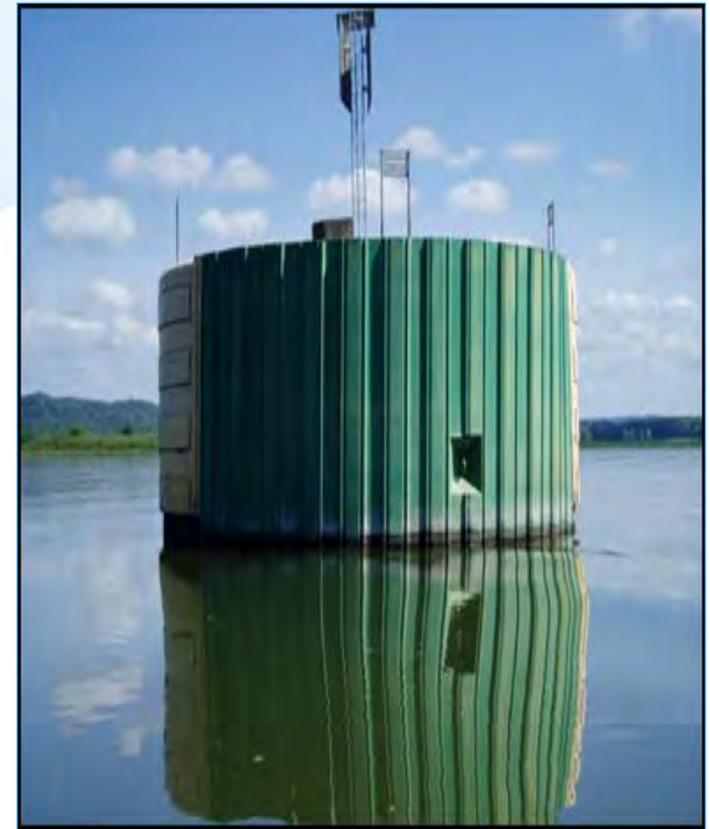
- Mooring Cells
 - Mooring cells provide for a more efficient and environmentally friendly location for tows to moor while waiting for the lock approach channel and lock chamber to become available.
- Lock 14 Mooring Cell
 - Existing wait area => River Mile 489.7
 - Mooring cell wait area => River Mile 491.9
 - Moves wait area 2.2 miles closer to Lock 14



Pilot Project - Lock 14 Mooring Cell



- Approach time savings (maximum)
 - 55 minutes for exchange lockages
- Mean time savings (mean)
 - 20 minutes for across all exchange lockages
- Annual time savings
 - 217 hours / 9 days
 - Based upon 2016 traffic data for Lock 14
- Cost
 - \$1.9 million
- Timeline: 2 years
 - 1 year Design and Permitting
 - 1 year Construction



Source: USACE – Rock Island

Recommended UMR & IWW Mooring Cells – 10 Sites



Site	Pool Location	Priority
Lock & Dam 14	Lower pool (upbound)	1
IWW LaGrange Lock & Dam	Upper pool (downbound)	2
Lock & Dam 24	Upper pool	3
Lock & Dam 15	Lower pool	4
Lock & Dam 11	Upper pool	5
Lock & Dam 19	Lower pool	6
Lock & Dam 21	Lower pool	7
Lock & Dam 18	Lower pool	8
Lock & Dam 20	Lower pool	9
Lock & Dam 24	Lower pool	10

Reliability - System Improvements



- Reliability – improving the long-term durability and sustainability
 - A scenario that resets the design life of the existing UMR locks and dams
 - Major Rehabilitation Program – USACE’s program for reliability improvements
- Major Rehabilitation – Locks and Dams
 - Individual locks and dam project costs must exceed \$21 million
 - Cost-shared at 50% Federal and 50% Inland Waterway Trust Fund (user fuel tax @ \$0.29 /gallon)
- Fuel tax generates about \$110 million
- Inland Waterways User Board is a panel that provides advisory oversight for the trust fund.



Pilot Project – UMIW's Major Rehabilitation Program



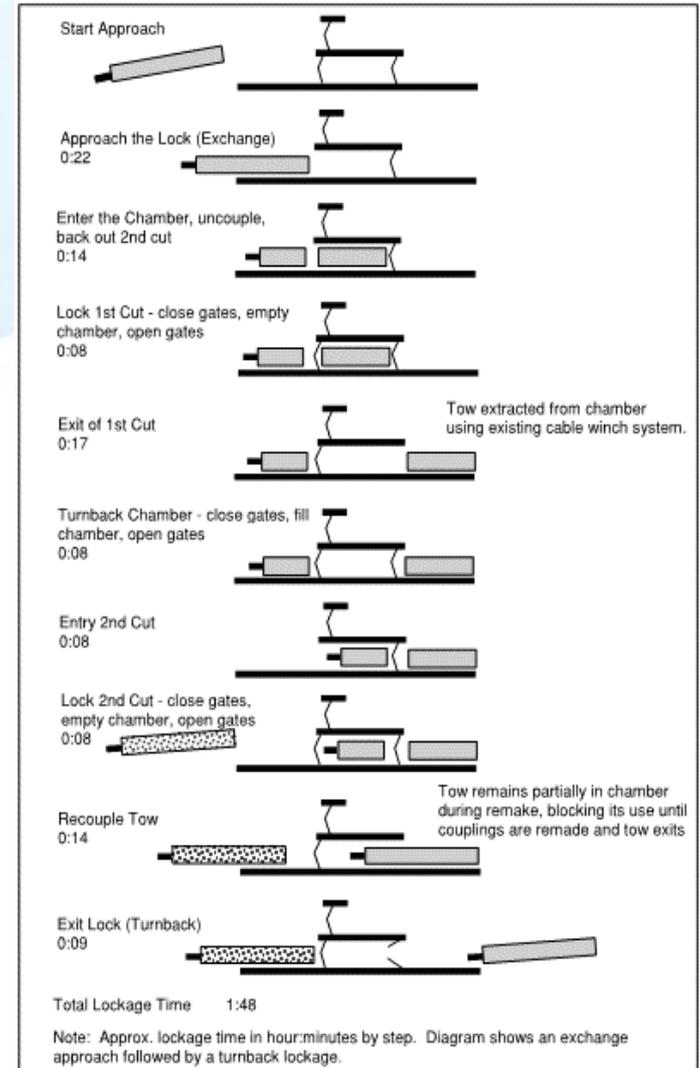
- One cycle of system wide rehabilitation has occurred (1986 – 2008)
- No new major rehabilitation projects have been approved on the UMIW in the past 15 years.
- Indexing historical UMIW project costs yield an average project cost of \$45 million per site.
- Total cost: \$1.2 billion for the 27 UMIW locks and dams
 - \$600 million – Federal / \$600 million - IWTF



Capacity – Large Scale Upgrade



- Capacity – expand the UMIW's ability to meet future traffic volumes in an efficient and reliable manner with new 1,200-foot locks.
- Improves lock processing times
 - 600-foot Lock: 1 hour 48 minutes
 - 1,200-foot Lock: 46 minutes
- 1,200-foot locks also provide
 - Reduced lock wait/queuing times
 - Redundancy when coupled with the existing 600-foot lock
 - Improved safety for deckhands



Double Cut Lockage



Source: Google Earth

Pilot Project - 1,200-Foot Locks @ UMIW Locks 22, 24 and 25



- UMIW Locks 22, 24 and 25 were selected for the 3 Lock Large Scale Upgrade Scenario (*no Lock 23*)
- Cost: \$1.35 billion
- Timeline: 13 years
 - 9 years per 1,200-foot lock (4 years design, permitting & contract award + 5 years construction)
 - 2 year interval between project starts at Locks 25, 24 and 22.

Site	1,200-Foot Lock Project Cost (March 2016)	Lift (feet)	Foundation Condition
Lock & Dam 25	\$543 million	15	Sand
Lock & Dam 24	\$434 million	15	Mixed
Lock & Dam 22	\$372 million	10.5	Rock

1,200-Foot Lock @ UMIW Lock 22



Economic Impact Analysis & Benefit-Cost Analysis



Preliminary Results

Approach to Economic Impact Analysis



- **Approach** used for baseline economic analysis:
 - Derive value-per-ton for each commodity under a baseline scenario
 - Monetize commodity forecast volumes
 - Obtain baseline IMPLAN results on an industry basis
- Analysis conducted at a **regional level** (combined, 5-state study area)
- Iowa results estimated by taking long-term average forecast of waterborne tonnage share in 5-state study area

State	Average Share
Minnesota	43.7%
Iowa	18.5%
Illinois	18.3%
Wisconsin	11.8%
Missouri	7.7%

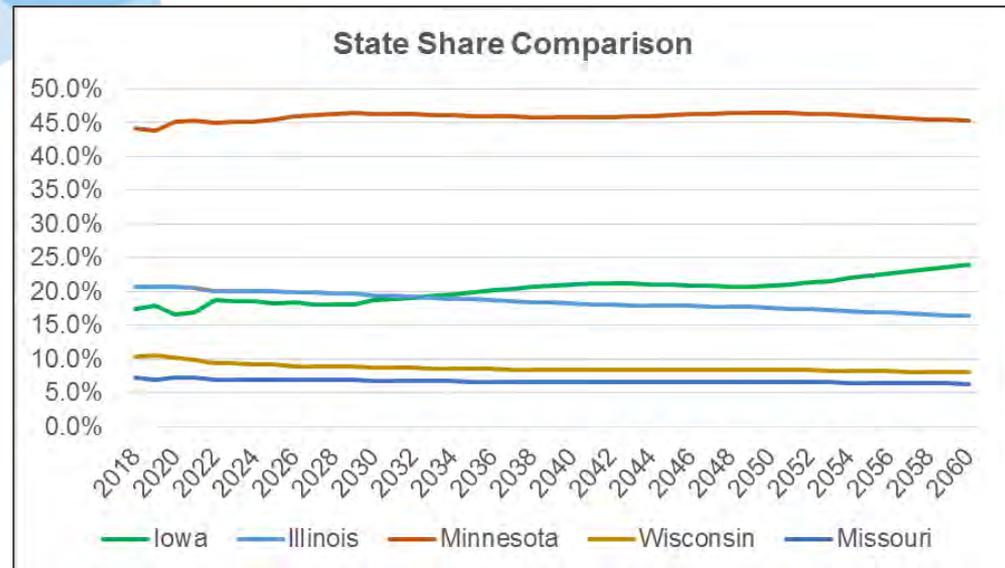
Source: IEG Forecasts



Evolution of State Shares



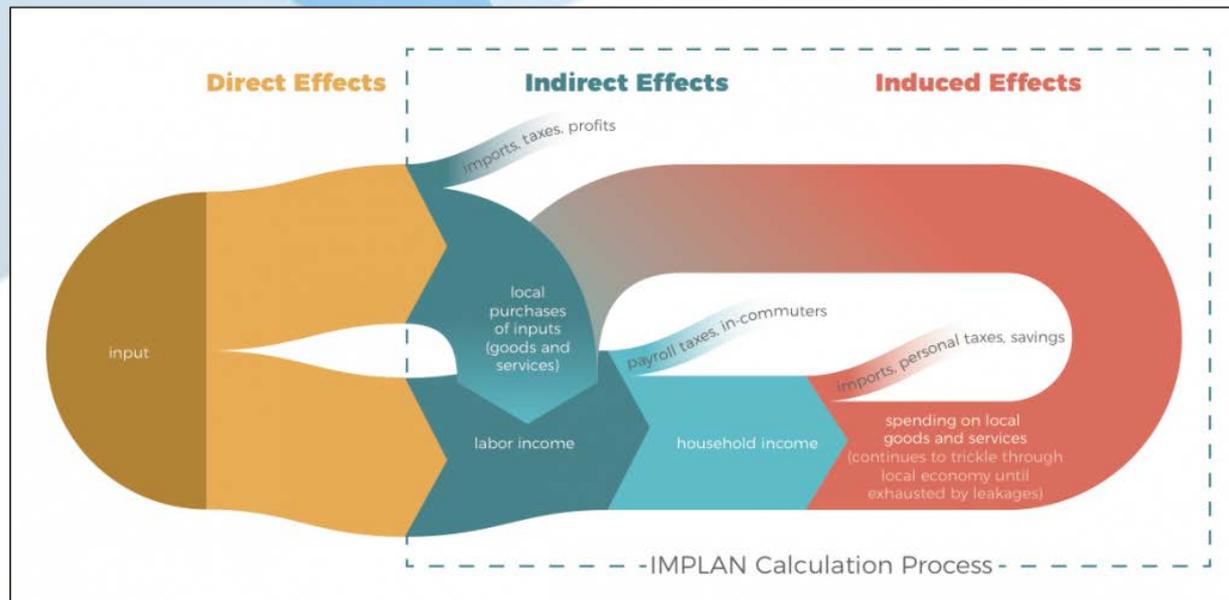
- State shares predominantly due to **agricultural commodities** (corn, soybean, and animal feed) – 70% of total commodity volume
- **Iowa's share** of waterborne agricultural tonnage is **expected to expand** relative to other states in region
 - Increase in **corn volumes** (5.4% average growth 2018-2060)
- Shares for other states (Missouri, Wisconsin, and Minnesota) expected to remain fairly constant



Economic Impact Analysis



- The following economic impacts were estimated using IMPLAN:
 - **Direct Effects** - Initial economic effects of capital expenditures, transportation cost savings, and increased demand
 - **Indirect Effects** - Additional economic activities from purchases of production inputs, goods, and services
 - **Induced Effects** - Extra economic activity from greater employment income and consumption



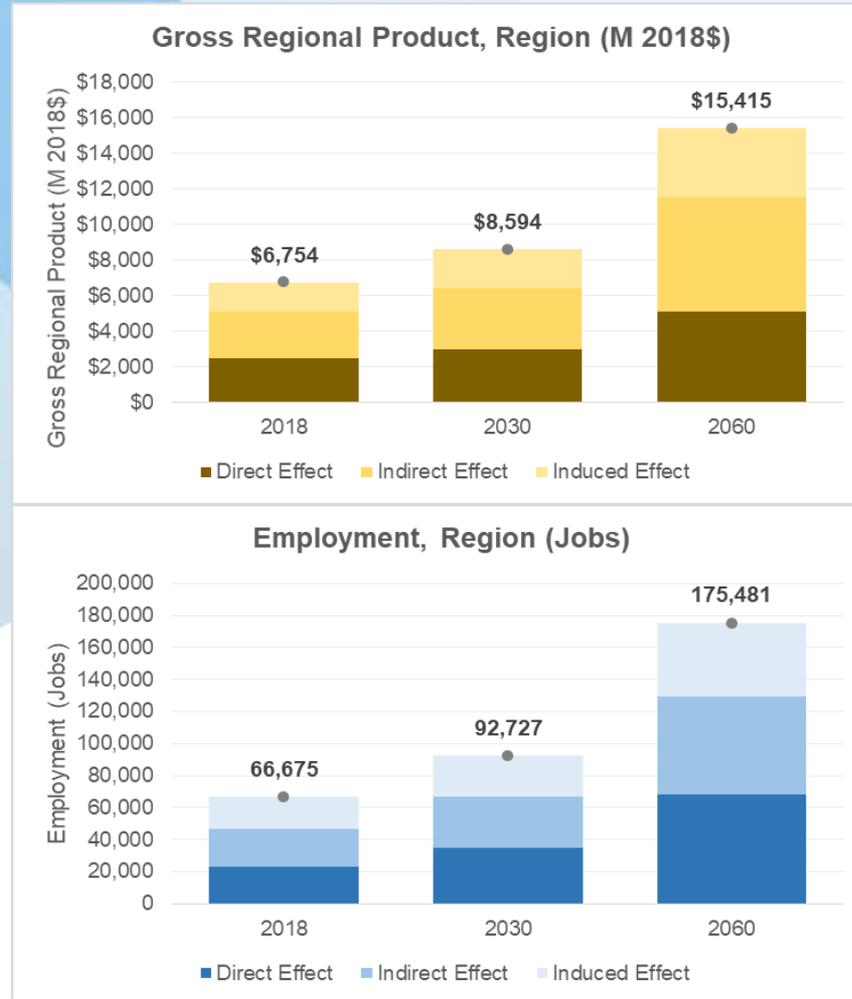
Source: IMPLAN

Baseline Contributions to Economy



- Results capture contributions to the regional economy of commodities transported along the inland waterway system
 - If nothing changes, this is what we expect...
- Economic impact results are shown in terms of:
 - **Gross Regional Product** - value added of all final (finished) goods and services
 - **Employment** - total number of part- and full-time jobs measure in job-years

Major Impact of Inland Waterway System on Regional Economy



Major Impact of Inland Waterway System on Regional Economy



- Oilseed farming (soybean), grain farming (corn), and agricultural chemicals are directly affected by the Inland Waterway System
 - Create indirect impacts in wholesale trade and real estate
 - Also lead to employment in agricultural support activities
- In terms of employment, crude petroleum is also affected (but low value added)

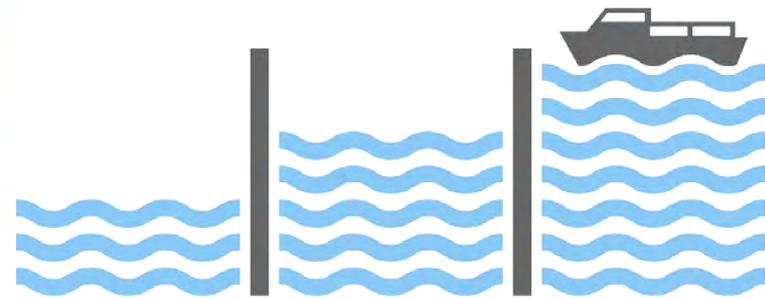
2030 Gross Regional Product (M 2018\$)

Industry	Direct	Indirect	Induced	Total
Oilseed farming (soybean)	\$970.5	\$84.6	\$0.3	\$1,055.4
Wholesale trade	\$0.0	\$470.0	\$109.8	\$579.9
Real estate	\$0.0	\$373.0	\$155.4	\$528.4
Grain farming (corn)	\$403.8	\$21.3	\$0.5	\$425.6
Pesticide & other ag. chemical	\$142.8	\$142.9	\$0.7	\$286.4

Three Scenarios



- **Micro Upgrade** – Lock 14 mooring cell
- **System Reliability** – Major rehabilitation on UMR locks and dams
- **Large Scale Upgrade** – 1,200-foot locks at Locks 25, 24 and 22
 - Low impact
 - High impact



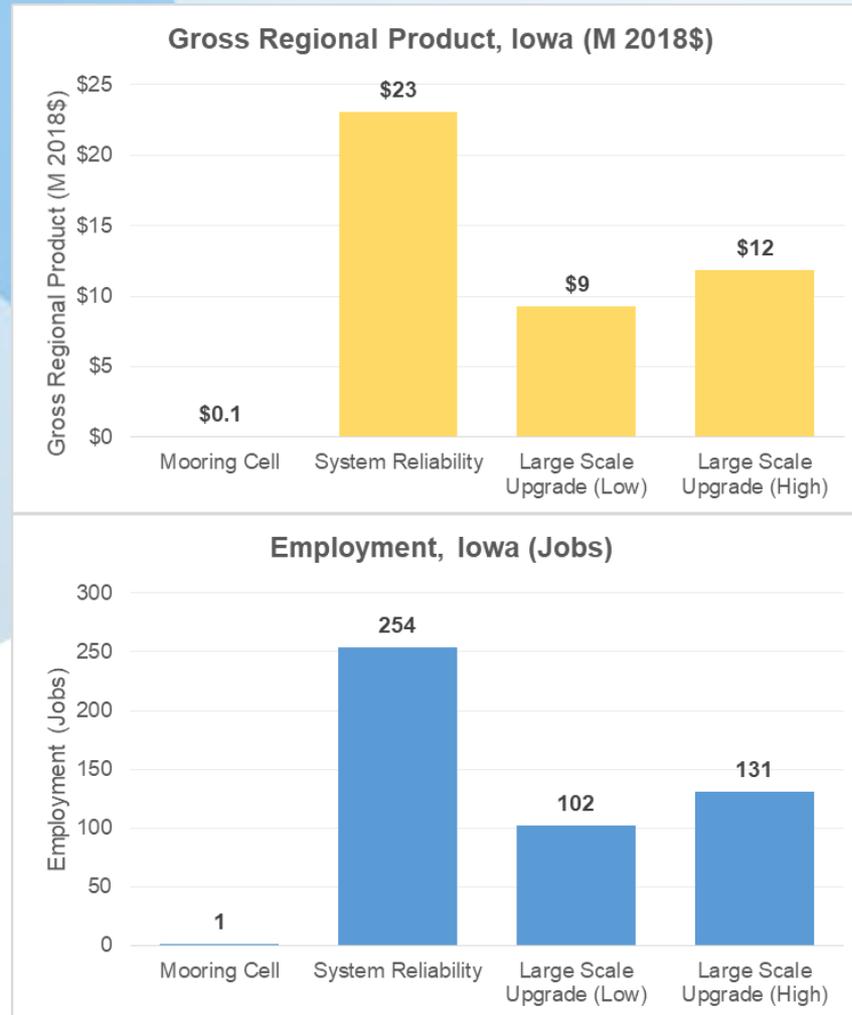
Results capture economic impacts as a result of improvements to inland waterway system

Regional Results by Scenario (2018-2060 average year)



- Impacts for scenarios much **smaller than baseline** contributions to economy
- System-wide reliability improvements generate **largest impacts**
- Large-scale upgrades (on three locks) generate about **half the impacts** of reliability improvements
 - Low and high estimates similar, but show range of results
- Mooring cell impacts are **small** (but, so are the investments)

Similar Results for Iowa (2018-2060 average year)



Similar Results for Iowa (2018-2060)



Employment, Iowa (Jobs)

Scenario	2018	2030	2060
Mooring Cell	0	1	2
System Reliability	72	144	575
Large Scale Upgrade (Low)	29	58	231
Large Scale Upgrade (High)	29	65	330

Gross Regional Product, Iowa (M 2018\$)

Scenario	2018	2030	2060
Mooring Cell	\$0.0	\$0.1	\$0.2
System Reliability	\$7.3	\$13.4	\$50.8
Large Scale Upgrade (Low)	\$2.9	\$5.4	\$20.4
Large Scale Upgrade (High)	\$3.0	\$6.1	\$29.2

- Inland waterway improvements create up to 600 jobs by 2060...
- And generate annual GRP gains of up to \$51 million by 2060

Benefit-Cost Analysis



- Simple calculation (differs from USACE methodology)
 - Benefits include barge operator and fuel consumption costs
 - Annual operating and maintenance (O&M) cost assumed to be 3% of capital expenditures
 - Benefits and costs estimated from 2018 to 2060 and discounted at 7%

Benefit Cost Analysis Results, Discounted at 7%

Scenario	B/C Range
Mooring Cell	3+
System Reliability Improvements	1-2
Large Scale Upgrade (Low Impact)	Near 1
Large Scale Upgrade (High Impact)	Near 1



Break



Come back at 10:30!

Define Key Issues & Priorities

Breakout Groups



- Assign a note-taker to write on notebooks
- Brainstorm within the following categories:
 - Navigation Infrastructure, Economics, Alternative Financing, Governance
- Round Robin
- Vote on top three issues per category by placing color dots next to the issues you would like to vote for



Lunch



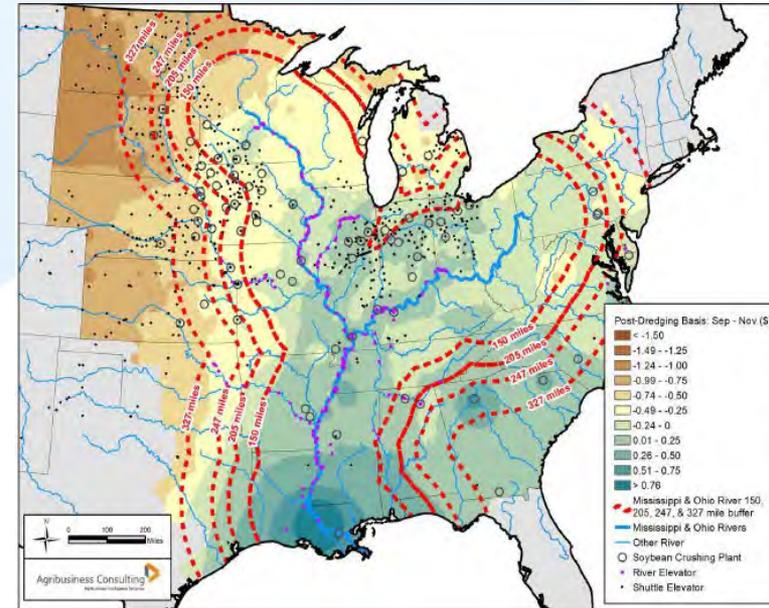
Eat, take a break, and come back at 1:00!

Governance and Alternative Financing Options

Regional Authority



- Focused on system needs
- Can be defined based on economic zones
- Avoids many of the Federal barriers to alternative financing
- More Flexible



Iowa Code 28J and 28K



Dictates...

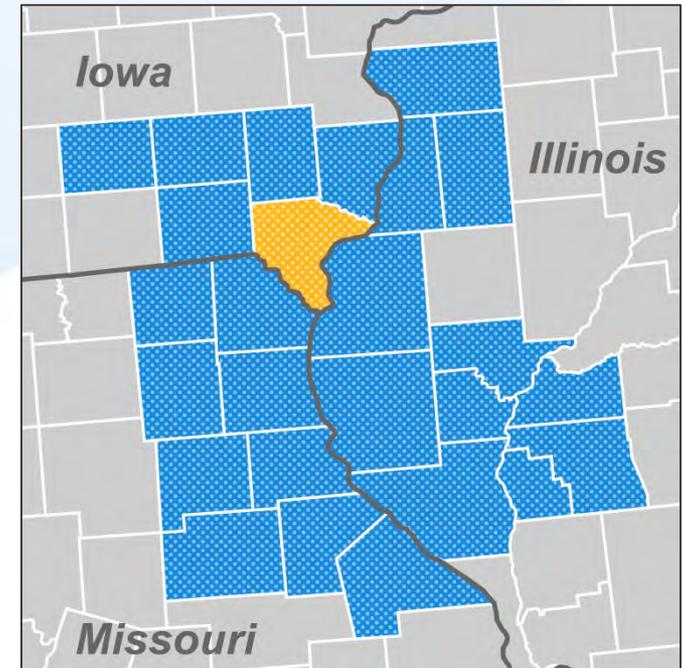
- What Port Authorities are allowed to spend on,
- How they can spend their money,
- And how they do contracting.



Existing Port Authorities



- The Southeast Iowa Regional Economic and Port Authority (SIREPA) is established in Lee County, Iowa
- Iowa Code 28K provides for the creation of the Mid-America Port Commission. Includes 26 counties in Iowa, Missouri and Illinois

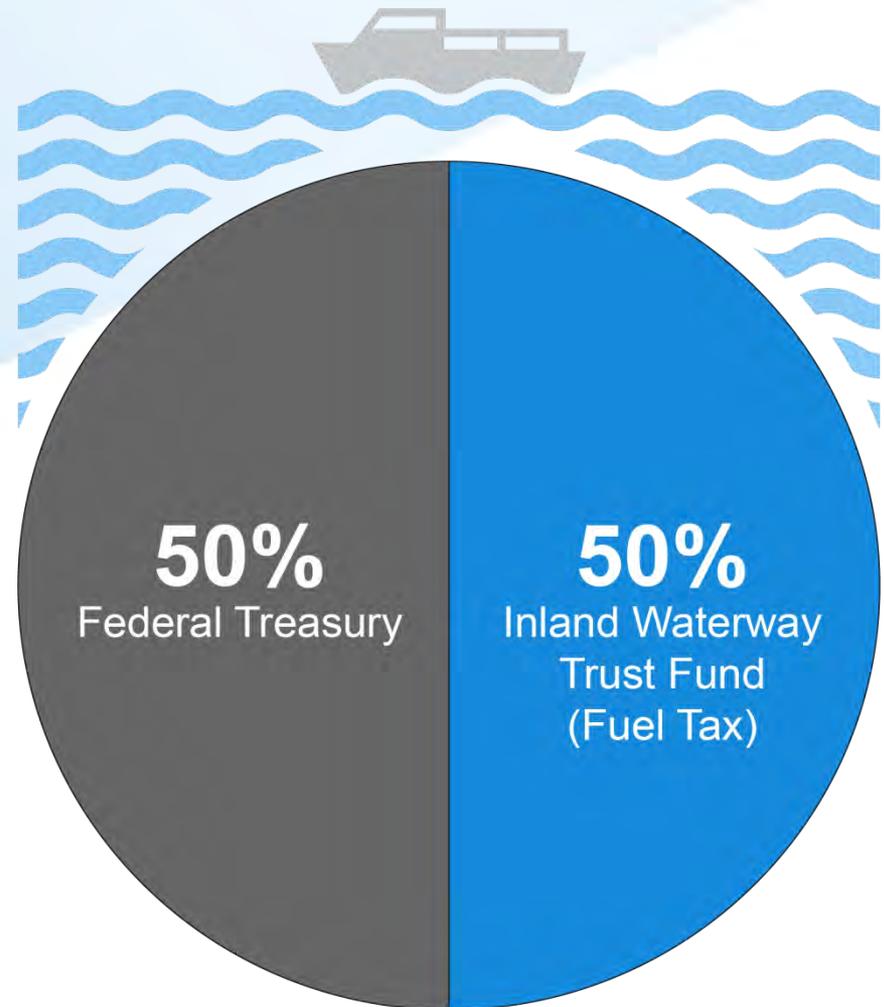


- SIREPA and Mid-America Port Commission highlight the need to create **public-private partnerships** to advance their missions.

Revenue Capture Under Existing Authorities



- Under current federal law, inland waterway improvements are the responsibility of the federal treasury and the Inland Waterway Trust Fund.



Existing Fuel Taxes



- The Inland Waterway Trust Fund fuel tax is a self-reported by commercial vessels.
- Non-commercial vessels are exempt from the Inland Waterway Trust Fund fuel tax.



Other Existing Taxes



- Non-commercial users pay other federal taxes and local/state licensing fees, but this revenue goes to non-navigation purposes or comes back through the U.S. treasury's general fund.
- Existing local or state tax paid by waterway users is also used for non-navigation purposes.

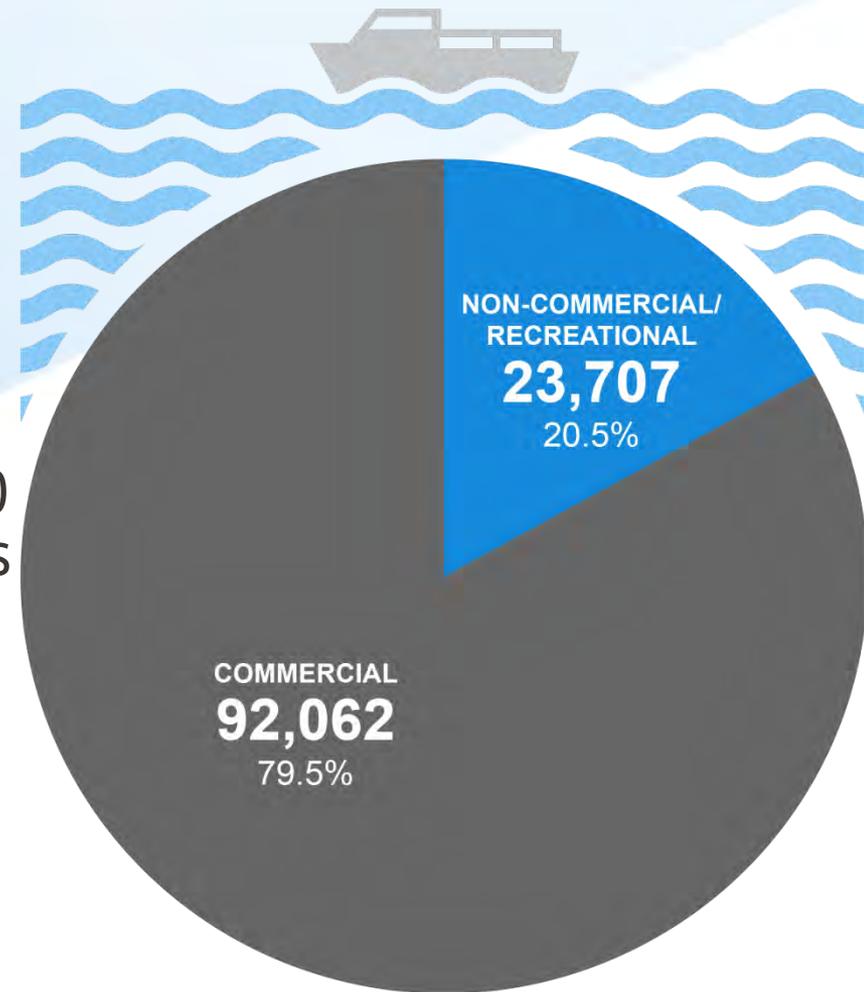
Could some % of existing local or state taxes be dedicated to inland waterway financing?



Non-Commercial Gas Taxes



- Using 2016 data, non-commercial and recreational vessels accounted for 20.5 percent of the total lockage on the UMR Inland Waterway
- This represents about 62,000 total non-commercial vessels that locked through the entire system in 2016
- If they each used 500 gals a year, that is about \$9 million in gas tax at \$0.29/gal



33 USC 565 River and harbor improvement by private or municipal enterprise



- *Any person or persons, corporations, municipal or private, who desire to improve any navigable river, or any part thereof, **at their or its own expense and risk may do so upon the approval of the plans and specifications of said proposed improvement by the Secretary of the Army and Chief of Engineers of the Army.** The plan of said improvement must conform with the general plan of the Government improvements, must not impede navigation, and **no toll shall be imposed on account thereof**, and said improvement shall at all times be under the control and supervision of the Secretary of the Army and Chief of Engineers.”*
(June 13, 1902, ch. 1079, §1, 32 Stat. 371)

Modifying 33 USC 565 to charge tolls to non-commercial and recreational vessels.



22,568 recreational vessel lockage's representing
53,242 recreational vessels

1,139 non-commercial lockage representing
1,205 non-commercial vessels

- At \$15 per lockage per non-commercial vessel, the toll would raise approximately \$840,000
- A \$150 per lockage per non-commercial vessel would raise approximately \$8,400,000

\$840,000
at \$15/lockage

\$8,400,000
at \$150/lockage

Charging for Water Use



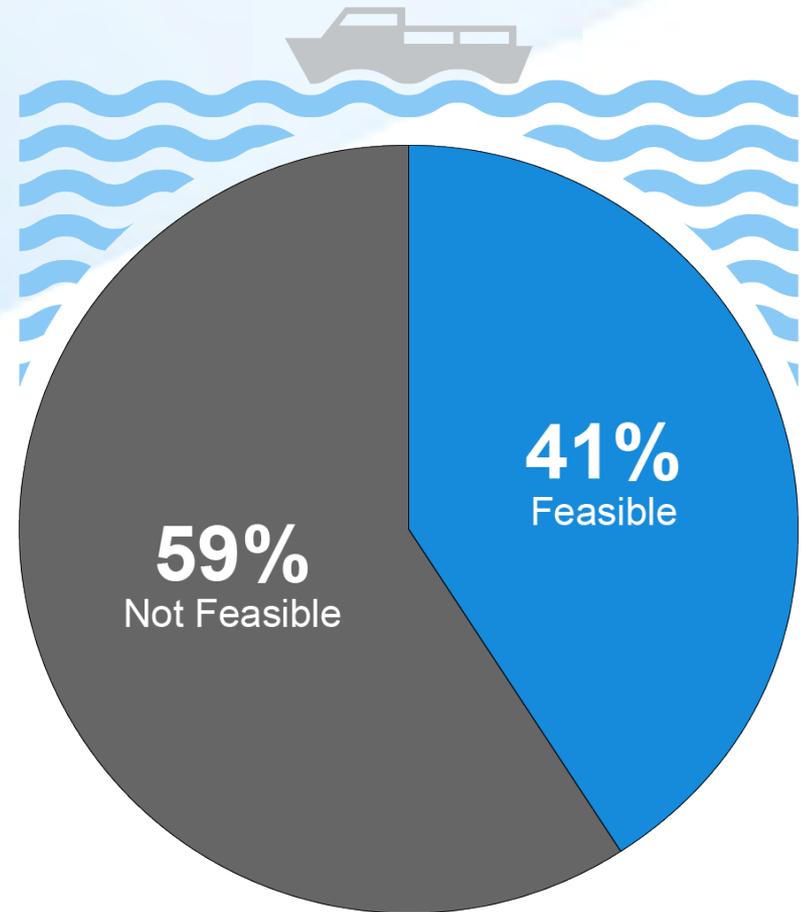
- According to the Upper Mississippi River Basin Association, over 7 billion gallons of water are withdrawn from surface water sources each day in the 60 counties that border the navigable Upper Mississippi River.

Water Fee \$/gallon	Potential Annual Revenue (\$ millions)	Percent Increase in Median Water Rate*
0.00001/gallon	\$25.55	0.17
0.0001/gallon	\$255.50	1.7
0.001/gallon	\$2,555	17
0.01/gallon	\$25,550	167

Additional hydropower revenue and revenue capture



- 34 dams in UMRB USACE districts that currently do not have a power station.
- 14 were considered feasible relative to hydropower production using the USACE criteria contained in a USACE report.



Hydropower Development



- A portion of dedicated hydropower revenue could be used towards maintaining inland waterway



2,928,051 MWh
generated hydropower

X



\$0.0967/KWh
average retail price

=



\$283 Million
potential revenue

- Barriers include regulatory burden, developing power purchase agreement, wholesale vs. retail pricing, subsidies of other renewable sources of power

Improving the benefit side of the benefit cost ratio



- Source: American Patriot Holdings LLC & PPHTD Creating Inland Marine Innovation, November 10, 2017 PowerPoint Presentation

State-Federal Governance Framework



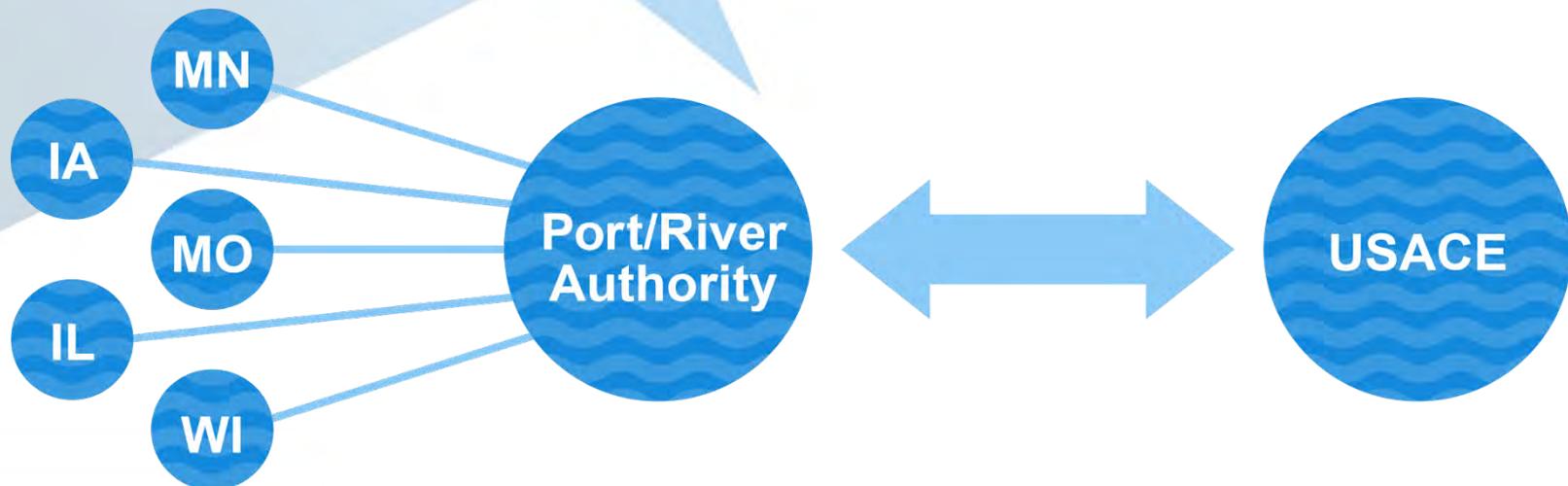
- Establishment of a project partnership agreement (<http://www.usace.army.mil/Missions/Civil-Works/Project-Partnership-Agreements/>) using a contributed funds memorandum of agreement.
- Constructing a Project Under Section 408 Approvals with turn back to USACE



State-Port Authority-Federal Governance Framework



- Mid America Port Authority is an example of a regional, multi-state port authority
- A regional port authority could serve as a sponsor and a mechanism to foster additional public and private investment in the UMR inland waterway



State-Authority-Private-Federal Governance (P4) Framework



**Alternative
Project
Delivery**

**Long Term
Maintenance
Contracting**

**Consistent
Funding/
Availability
Payments**

**Revenue
Generation**

Why is consistent funding important



PREDICTABLE AND RELIABLE FUNDING APPROACH: LOWER COSTS; GREATER BENEFITS

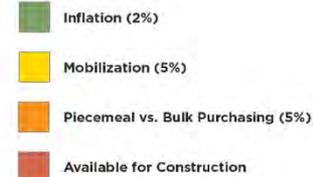


\$500 million was provided up front. Construction was completed in 5 years without delay. Inputs were purchased in bulk or secured up front. No inflation or repeated mobilization costs.

CURRENT UNPREDICTABLE AND UNRELIABLE FUNDING APPROACH: WASTING TAXPAYER DOLLARS; DELAYING TAXPAYER BENEFITS



Time	Allocation	Inflation	Mobilization Costs	Piecemeal vs. Bulk Purchasing	Available for Construction
Year 2 Month 1	\$150.0	\$3.0			\$147.0
Year 3 Month 1	\$140.0	\$5.6	\$7.0	\$7.0	\$120.4
Year 5 Month 1	\$180.0	\$14.4	\$9.0	\$9.0	\$147.6
Year 5 Month 12	\$70.6	\$7.1		\$3.5	\$60.0
Year 7 Month 11	\$32.7	\$4.4	\$1.6	\$1.6	\$25.0
Total	\$573.3	\$34.5	\$17.6	\$21.2	\$500.0



Funded by the soybean checkoff.

- Source: Soy Transportation Coalition. 2018. *A Recipe for Cost Overruns and Project Delays: STC Research Highlights Nation's Approach to Funding Locks and Dams.* http://www.soytransportation.org/newsroom/PressRelease_PredictableFundingForLocksAndDams%20_4-16-18.pdf.

Breakout Groups



- Identify the most plausible alternative financing options and determine the pros and cons of each option
- Round Robin
- Voting



Action Items & Future Coordination



Discussion; Next Steps