Maj. Gen. Michael C. Wehr
President

Hon. Sam E. Angel
Senior Member

Hon. R. D. James
Member, Civil Engineer

Hon. Norma Jean Mattei, Ph.D.
Member, Civil Engineer

Rear Adm. Gerd F. Glang
Member

Brig. Gen. Richard G. Kaiser
Member

Brig. Gen. David C. Hill
Member

Mississippi River Commission

2016 Executive Summary 395th Session

Listening, Inspecting, Partnering & Engineering since 1879

Table of Contents

Mississippi River Commission 3

Inspection Trip Objectives 4

Strategic Messages 5

395th Session of the MRC, High-Water Trip 9

- Public Meetings 11
- Partnering Sessions 12
- Top Regional Issues 13
- Inspection Sites 20

MR&T 2016 Mississippi River Winter Flood Event 24

MR&T Authorized Work Remaining 26

MR&T Project Economic Value 27

MRC Values 28

MRC Priorities 29

MR&T Project Fact Sheet 30

200-Year Working Vision 31

Partners Engaged 33

Mississippi River Commission

www.mvd.usace.army.mil/mrc/

The Mississippi River Commission has a proud heritage that dates back to June 28, 1879, when Congress established the seven-member presidential commission with the mission to transform the Mississippi River into a reliable commercial artery, while protecting adjacent towns and fertile agricultural lands from destructive floods.

In its current capacity, the Mississippi River Commission prosecutes the Mississippi River & Tributaries (MR&T) project authorized by the 1928 Flood Control Act. The MR&T project employs a variety of engineering techniques, including an extensive levee system to prevent disastrous overflows on developed alluvial lands; floodways and backwater areas that provide expansion room for the river so that the levee system will not be unduly stressed; channel improvements and stabilization features to protect the integrity of flood control measures and to ensure proper alignment and depth of the navigation channel; and tributary basin improvements, to include levees, headwater reservoirs and pumping stations, that maximize the benefits realized on the main stem by expanding flood protection coverage and improving drainage into adjacent areas within the alluvial valley.

Since its initiation, the MR&T program has brought an unprecedented degree of flood protection to the four million people living in the 35,000-square-mile project area within the lower Mississippi Valley. The nation has contributed $14.8 billion toward the planning, construction, operation and maintenance of the project. To date the nation has received a 45 to 1 return on that investment, including $666 billion in flood damages prevented.

The performance of the MR&T system during the Great Flood of 2011 validated this wise investment. Despite record high flows and stages, not a single life was lost as a result of the flood. Water lapped at the top of floodwalls and levees the length of the river, exerting unprecedented pressure on the backbone of the protection system, but the levees withstood the record stages and pressure due in large part to the operation of three floodways and the storage capacity provided by non-MR&T reservoirs in the Ohio and Arkansas-White basins. All told, the MR&T project prevented in excess of $234 billion in damages, not including potential losses from interrupted business activities and related impact. One year later, with much of the drainage basin under exceptional drought conditions and river stages plunging to near historic lows more than fifty feet lower than the 2012 highs on the major gages between Cairo and Red River Landing, the performance of the MR&T system is again validating the nation's wise investment, as the navigation channel remains viable.

The Mississippi River Commission continued its 136-year process of listening to the concerns of partners and stakeholders in the Mississippi valley, inspecting the challenges posed by the river, and partnering to find sustainable engineering solutions to those challenges through the 2016 high-water inspection (395th session of the commission). The official record of the Proceedings of the Mississippi River Commission, complete with recorded hearings of public meetings, copies of signed formal statements provided by the public, executive summaries of the Proceedings, and other documents of significance, are kept on file in the Office of the President in Vicksburg, Miss.

Mississippi River Commission

Inspection Trip Objectives

LISTEN to partners, stakeholders and public – provide opportunities to meet with the commission for mutual understanding, education and discussion on value and use of water resources in the local and regional area. The vertical team hears the themes, issues and concerns at the same time – Headquarters, Mississippi Valley Division, Northwestern Division, Great Lakes & Ohio River Division, Southwestern Division, district, stakeholders and partners. Listen to issues of major concerns and on projects and studies and increase the understanding of how the entire system is related and impacted while formulating mature recommendations.

PARTNER with key associations and interest groups. Meet with partners to help enhance relationships and broaden collaboration. Discover and include diverse forums for collaboration, dialogue and education.

SHARE information with partners; in particular, the lessons that the MRC and partners have discovered since 1879 by listening, inspecting, partnering and engineering in the watershed.

LEARN from partners from the upper Mississippi, Ohio, Missouri, Arkansas, Tennessee, Cumberland, Illinois, Atchafalaya and Red river basins. Gain an understanding of the methods, procedures, systems and other resources used in these basins to improve the development and delivery of policy, planning, construction and operation and maintenance of the greater watershed.

INSPECT maintenance status of key MR&T structures used to convey the project design flood and to facilitate commerce on the inland navigation structure.

REVIEW/DISCUSS the Mississippi and Atchafalaya rivers and the MR&T project and impacts from and on the Mississippi, Ohio, Missouri, Red, Arkansas and Illinois river basins and projects; review status of current and future work. Review and identify comprehensive water resource engineering needs of the watershed.

EDUCATE our partners, stakeholders and public on water investments and water resource engineering capabilities for the Mississippi Valley watershed.

VISION -- continue to champion the broad participation, national/international recognition and working vision process for America's Watershed – the largest "navigable" system in the world! Gather feedback from international dialogue, across diverse sectors, through inspections and engagements with partners, stakeholders and the public.

Strategic Messages

Four Revolutions that will Compel Significant Investment

Four ongoing revolutions will drive changes in the greater Mississippi River basin. How the nation responds to the revolutions and invests in potential solutions will dictate the level of future economic prosperity of the valley and the greater watershed.

Revolution 1: Explosive growth of agricultural productivity will increase water, rail and overland transportation demands on the inland waterway system.

- Yields per acre doubling and tripling over the past few decades.
- World population expected to grow by 2 billion in the next few decades
- Ability to feed the world will impact American security and global stability.

Four Revolutions Video

Revolution 2: Increased energy production in the United States will increase demand on transportation systems.

- 2013 - U.S. became top producer of natural gas.
- 2014 - U.S. passed Saudi Arabia as largest producer of oil.
- U.S. energy prices cheaper than European energy (by as much as 75%).
- Water transportation is the only system with the excess capacity to meet increase in demand.

Strategic Messages

Four Revolutions that will Compel Significant Investment
(continued)

Revolution 3: Return of manufacturing to the U.S near inland waters spurred by cheap fuel and cost advantages of inland navigation system.

- Growth in manufacturing investment driven by energy production revolution.
- U.S. remains world leader in manufacturing output due to past infrastructure investment.
- Using the U.S. model, other nations are investing more in water infrastructure and closing the manufacturing and export gap.

Revolution 4: Accelerating impacts of climate change demand system resiliency

- Intense precipitation falling in more condensed periods.
- Increased runoff from development.
- More prolonged drought
- Rising sea levels along the coast.

Strategic Messages

Call to Action

- Protecting productive farmland, manufacturing, refineries, pipelines and overland commerce through reliable flood control based on resiliency.
- Inland water transportation is the only economic game changing transportation system with the capacity capable of handling the increase in moving agricultural, energy and manufacturing products to the coasts for export.
- Water infrastructure makes delivery of domestic stability and security possible.

"The time for action is now, and the moment to start is immediately."

– A Call to Action, Mississippi River Commission

A partner's call to action:

"We've had forty years of disregard for the future and now we are paying for it."

- Sean Duffy, Big River Coalition

A partner's call to action:

"Our current dismal situation, in my opinion, is due to an unacceptable neglect of our infrastructure needs."

– Harvey Joe Sanner, White River Coalition, Ark.

A partner's call to action:

"It is a cruel irony that most of the time flood events victimize those who are least financially able to cope with the devastation."

- William Keiser, Lake County Levee and Drainage Board, Tenn.

Strategic Messages

We Are a Maritime Nation

- We are losing hard-fought ground earned by prior generations through their financial and personal sacrifices.
- We have benefitted from the investments of our forefathers but have done little to assure this heritage will be passed on to our children's children.
- Our economic prosperity, standard of living, and environmental quality are increasingly vulnerable to threats posed by aging infrastructure and increase potential for failure.
- Reliable ports, harbors and channels matter.
- Reliable living in highly productive areas makes our nation great.
- The people in the alluvial valley drive productivity and help to feed the world.
- National security and global stability are assured through success in the Mississippi Valley.

"The Mississippi River Commission strives to help maintain the nation's global economic competitiveness by ensuring a reliable navigation channel and the commercial reliability of ports and harbors…."

- Statement on extreme low water, Mississippi River Commission

Resolution 16-126

"The Greater Mississippi Basin, together with the Intracoastal Waterway, has more kilometers of navigable waterways than the rest of the world combined. The American Midwest is both overlaid by this waterway and is the world's largest contiguous piece of farmland…"

- The Geopolitics of the United States: The Inevitable Empire, STRATFOR Global Intelligence

"Our dependence on the seas and inland waterways has driven our national security and economic success throughout our nation's history."

- Statement on inland waterway navigation system, Mississippi River Commission

395th Session of the Mississippi River Commission High-water Inspection Trip

Cairo, Illinois

Memphis, Tennessee

Lake Providence, Louisiana

New Orleans, Louisiana

High-Water Inspection Trip

April 11-17, 2016

The 395th session of the Mississippi River Commission took place from April 11-17, 2016. The annual high-water inspection of approximately 1,000 miles of the lower Mississippi River between Cairo, Ill., and Head of Passes, La., followed a significant winter flood crest emanating from heavy rains along the upper Mississippi River and Ohio River, and flash flooding from early spring rains in Arkansas, Louisiana and Mississippi.

A total of approximately 800 people, representing boards, agencies and associations with memberships and constituencies numbering in the tens of thousands, partnered directly with the commission through public hearings, partnering sessions and other engagements during the high-water inspection (see "Partners Engaged," pages 33-36).

The members of the Mississippi River Commission present during the 395th session were:

- Maj. Gen. Michael Wehr, appointed as president on August 5, 2015.
- Hon. Sam E. Angel, reappointed as member on December 30, 2010.
- Hon. R. D. James, civil engineer, reappointed as member on April 6, 2003.
- Hon. Norma Jean Mattei, PhD, civil engineer, appointed as member on December 3, 2012.
- Rear Adm. Gerd F. Glang, appointed as member on September 19, 2013.
- Brig. Gen. Richard Kaiser, appointed as member on August 5, 2015.
- Brig. Gen. David C. Hill, appointed as member on December 8, 2015.
- Col. Michael Derosier served as secretary of the commission, a non-voting position.

From left to right: Brig. Gen. Richard Kaiser, Dr. Norma Jean Mattei, Mr. Sam Angel, Maj. Gen. Mike Wehr, Mr. R. D. James, Rear Adm. Gerd Glang and Brig. Gen. David Hill.

High-Water Inspection Trip

Listening – Public Meetings

The Mississippi River Commission held formal public hearings at Cairo, Ill., Memphis, Tenn., Lake Providence, La., and New Orleans, La. Mississippi River Commission hearings are held in accordance with Section 8 of the 1928 Flood Control Act:

> *"Sec. 8. …The commission shall make inspection trips of such frequency and duration as will enable it to acquire first-hand information as to conditions and problems germane to the matter of flood control within the area of its jurisdiction; and on such trips of inspection ample opportunity for hearings and suggestions shall be afforded persons affected by or interested in such problems."*

The hearings, engagements and dialogue help maintain a consistent connection — an exchange of viewpoints and ideas among the public, partners, stakeholders, elected officials, the Mississippi River Commission, the Corps of Engineers and agencies from the private, state and federal sectors. This process provides a greater voice for those who live and work in the region in shaping federal management and policy on the river.

Approximately 300 members of the public attended the public meetings and listened to the testimony presented by 71 individual speakers.

"Every time I attend one of these meetings, I get to see American democracy in action: ordinary people like me, speaking freely to our chosen leaders and making known our opinions, needs, wants and desires."

- William Keiser, Lake County Levee and Drainage Board, Tenn.

High-Water Inspection Trip

Listening – Partnering Sessions

As part of the 395th session, the Mississippi River Commission directed the Vicksburg and New Orleans districts to host round-table discussions to facilitate dialogue among our partners, Corps of Engineers staff and the commission.

- **April 13, Lake Providence, La., to Vicksburg, Miss.** ***(30 stakeholders in attendance)***
  - ✓ John Stringer, Tensas Basin Levee District
  - ✓ Reynold Minsky, Fifth Louisiana Levee Board
  - ✓ Richard Brontoli, Red River Valley Association
  - ✓ Bill Hobgood, Ouachita River Valley Association
  - ✓ Peter Nimrod, Mississippi Levee Board
- **April 14, Old River, La., to Baton Rouge, La.** ***(100 stakeholders in attendance)***
  - ✓ John Bradberry, Coastal Protection and Restoration Authority Board
  - ✓ Bill Hildalgo, St. Mary Parish Levee District
  - ✓ Monica Salins, Pontchartrain Levee District
  - ✓ Shawn Wilson, Louisiana Department of Transportation and Development
  - ✓ Mac Wade, Port of Morgan City, La.

Major Issues

- **Section 408 permitting process**
- **Shortage of dredging funds for Southwest Pass, Atchafalaya, Red River.**
- **Partners not being treated as partners.**

"It isn't a partnership if the first word we hear from the Corps is "No."

– Chairman John Bradberry, CPRA

High-Water Inspection Trip

What We Heard:
Top Regional Issues

ISSUE: The need to repair and complete the MR&T system.

"If we don't fix these deficiencies and damages throughout the MR&T system, we will be facing a future catastrophe."

- Peter Nimrod, Mississippi Levee Board

"The MR&T system is not complete and will not pass the project design flood."

- Rob Rash, Mississippi Valley Flood Control Association

"If we are going to protect people, property and commerce, we are going to need to invest in this system."

- Dustin Boatwright, Little River Drainage District, Mo.

"This project must be targeted for swift completion, proper maintenance, and increased investment for recapitalization."

- Rob Rash, Mississippi Valley Flood Control Association

MR&T System Component	Funds Required to Complete
Floodways	$1.2 billion
Levees	$1 billion
Channel Improvement	$1 billion
Tributary Improvements	$1.4 billion
Investigation/Construction	$1 billion
TOTAL	**$5.6 billion**

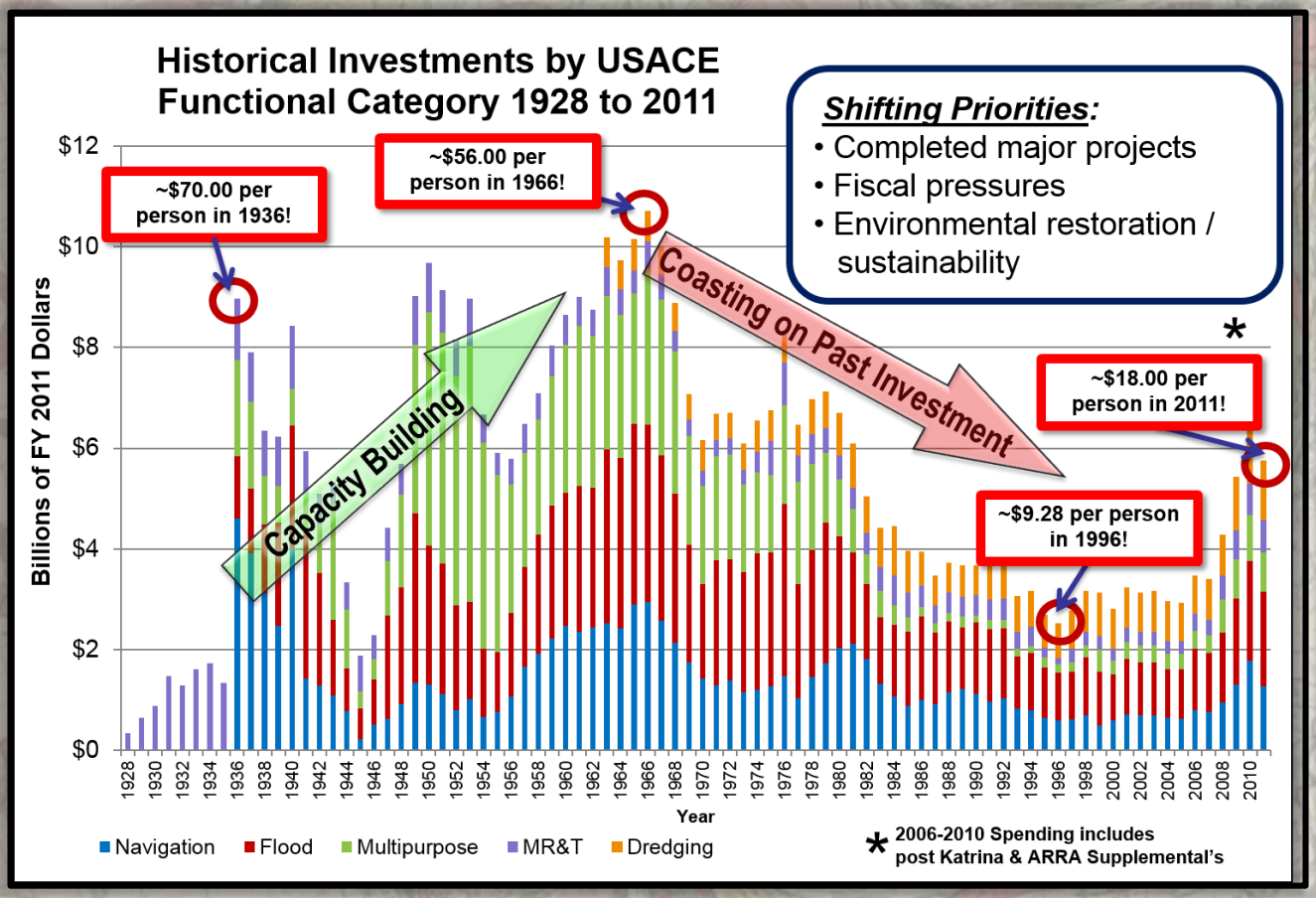
Local people, representing 10 states and covering 17 million acres of land, industry and infrastructure, have passed resolutions calling for investment in the MR&T system.

Levee slide, Lake Village, Ark.

High-Water Inspection Trip

What We Heard:
Top Regional Issues

ISSUE: The need for investment in water infrastructure.



"We've had 40 years of disregard for the future and now we are paying for it."

– Sean Duffy, Big River Coalition, La.

"Our current dismal situation in my opinion is due to an unacceptable neglects of our infrastructure needs."

– Harvey Joe Sanner, White River Coalition, Ark.

"The big question is are we investing in maintaining the infrastructure necessary to ensure people and property are protected . . . are were investing to ensure our economic viability, in the way of commerce, for the future? If you look at funding trends . . . the answer is clearly, NO."

– Dustin Boatwright, Little River Drainage District, Mo.

High-Water Inspection Trip

What We Heard:
Top Regional Issues

ISSUE: The importance of ports, harbors and inland navigation.

Port Rankings

#1	South Louisiana	267 million tons annually
#7	New Orleans, La.	84 million tons annually
#8	Baton Rouge, La.	69 million tons annually
#12	Plaquemines, La.	55 million tons annually

"Ports and harbors are a part of the network that is so important to moving goods along the Mississippi River Valley."

– Greg Curlin, Hickman-Fulton County Riverport Authority, Ky.

"If the channel is allowed to continue to fill with sediment, the workforce, suppliers, service companies and other businesses that contribute to sustaining this community will no longer survive."

- Mac Wade, Port of Morgan City, La.

"...waterborne transportation is the only competition to long haul rail...If our waterway is forced to close, rail rates will increase."

- Richard Brontoli, Red River Valley Association

"When we have draft restrictions we broadcast to the world that the Mississippi is unreliable."

- Sean Duffy, Big River Coalition, La.

" We have lost several million dollars worth of business because of the shallow river."

– Jim McElroy, Conrad Shipyards, La.

"525 jobs in Louisiana - one in every five jobs - are dependent upon companies located along the ports of our state and move cargo by water...."

- Joe Acardo, Ports Assn. of La.

"Every time a ship doesn't make it into the channel, we lose money, fuel, taxes...."

- Louis Tamporello, Morgan City, La.

High-Water Inspection Trip

What We Heard:
Top Regional Issues

ISSUE: Water security, water scarcity and aquifer depletion.

"This project provides an excellent opportunity for the Corps and the sponsor to show what can be done to restore an ecosystem when surface water and base stream flows return."

- Ann Cash, Boeuf-Tensas Regional Irrigation Water Distribution District, Ark.

"Protecting our food and water supply must become a priority at all levels of government and by private interests."

- Gene Sullivan, Bayou Meto Basin, Ark.

"Aquifer levels continue to decrease ... we feel that a coordinated response is needed to address this before it becomes a crisis for our region."

- Reynold Minsky, Fifth Louisiana Levee Board

"We would like to respectfully request that the Corps make "groundwater" a major mission emphasis."

- Robert Knecht, Director of Public Works, Memphis, Tenn.

"I am impressed by what I've seen in the valley. There is much we can share with the world."

- Ali Zaidi, Office of Management and Budget

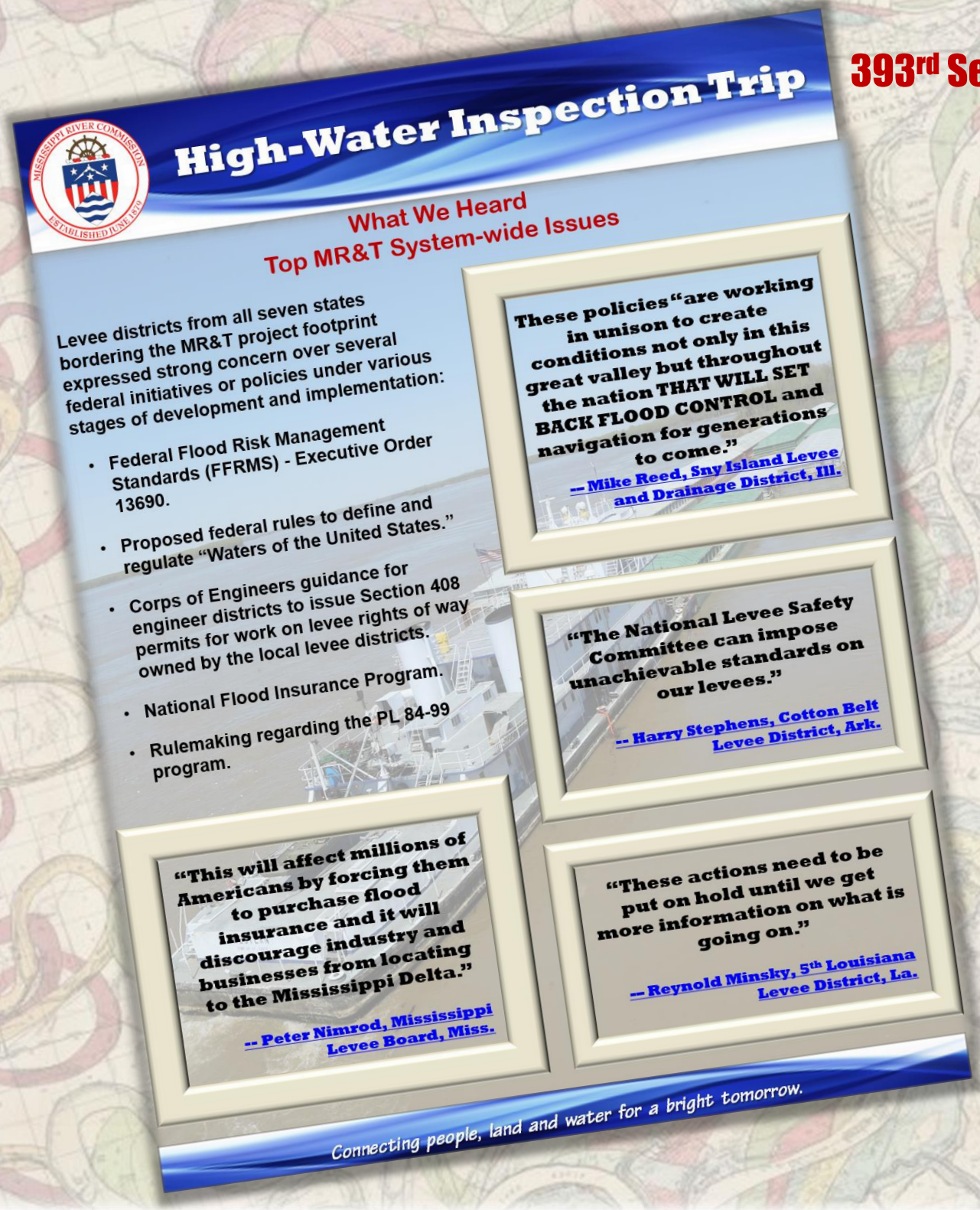
- Each state/water management district is acting autonomously; water laws vary widely by state; there is reluctance to adopt mandatory water use regulations.
- The Corps only includes groundwater protection as a project purpose when it is mandated by Congress.
- U.S. Department of Agriculture is directing funding to farmers to adopt conservations measures and to construct small storage reservoirs.
- Any project to develop new water to address the problem is generally too small and only addressed local needs.
- Universities and extensions agencies are focusing on conservation and the development of crops which require less water.

High-Water Inspection Trip

What We Heard:
Top Regional Issues

ISSUE: Continuing concerns with the National Levee Safety Program, the Section 408 process and levee certification.

393rd Session



High-Water Inspection Trip

What We Heard:
Top Regional Issues

ISSUE: Continuing concerns with the National Levee Safety Program, the Section 408 process and levee certification.

How can a levee system be rated "unacceptable" or "minimally unacceptable" and pass a record flood?

- Bruce Cook, Yazoo-Mississippi Levee District, Miss.

The recommendation from the National Levee Safety Committee, if used, forces unachievable maintenance standards and predatory flood plain management tactics. This will needlessly destroy economic development for over 22,000,000 acres of land in this country. Please do not use a "one size fits all approach and place false fear in the minds of people living behind levees.

- Rob Rash, Mississippi Valley Flood Control Association

"We are at the point where delays with the 408's are becoming problematic for Morgan City."

- Louis Tamporella, Morgan City, La.

High-Water Inspection Trip

What We Heard:
Top Regional Issues

ISSUE: The need for comprehensive flood control and investment on the upper Mississippi.

Flood control works and systemic flood control works better.

- Jim Koeller, Upper Mississippi, Illinois, Missouri Rivers Association

This is not a situation that can easily be controlled and navigation on the Upper Mississippi is greatly at risk.

– Jeff Denny, Alexander County, Ill.

The MR&T project in the lower valley is proof that flood control works. We need to model the MR&T project in the upper valley.

- Mike Reed, Sny Island Levee and Drainage District, Ill.

ISSUE: Impacts of climate change.

The storms we have been receiving are getting more severe and producing substantial more amounts of rain up the Ohio River Valley.

- Charles Davis, St. Francis Levee District of Missouri

The fact remains flooding is occurring more frequently and at higher stages than it has in the past.

– Dustin Boatwright, Little River Drainage District, Mo.

- The changing climate will exacerbate the groundwater shortages in the world's most populous countries.

High-Water Inspection Trip

Inspection of Southwest Pass Dredging Operations & Baton Rouge-Gulf Ship Channel

High-Water Inspection Trip

Inspection of Southwest Pass Dredging Operations & Baton Rouge-Gulf Ship Channel

High-Water Inspection Trip

Inspection of Old River Control Complex

The MR&T project in Louisiana amounts to an elaborate plumbing system, with multiple entrance, transfer and exit points needed to accommodate the 3,000,000 cubic feet per second (cfs) expected under the project design flood. In that regard, the Mississippi River between Old River and New Orleans is one of the most engineered sections of river in the world.

The goal of the system in this reach of the river is to divert flows a little at a time so that the Mississippi River discharge will not exceed the manageable rates of 1,250,000 cfs past New Orleans and 1,500,000 cfs past Baton Rouge, while ensuring a distribution of 30 percent of the combined waters and sediment of the Mississippi and Red rivers at the latitude of Red River Landing pass through to the Atchafalaya basin.

Authorized in 1954, the Old River Control Complex was constructed to prevent the Atchafalaya River from capturing the Mississippi River. Three separate structures comprise the Old River Control Complex. The low sill structure and the auxiliary structure remain operable at all river stages, but the overbank structure is only operated during larger floods. During project flood conditions, the Old River Control Complex is designed to divert up to 620,000 cfs from the Mississippi River to the Atchafalaya River.

High-Water Inspection Trip

Inspection of Old River Control Complex

Mississippi River & Tributaries Project

2016 Mississippi River Winter Flood Event

Mississippi River & Tributaries:
$558,819,200

PL-84-99:
$54,000,000

Operations & Maintenance:
$180,861,000

MR&T Winter Flood Impacts

- Channels impacts:
  - ✓ Dredging: significant shoaling is expected at locations that are historical problematic crossings.
  - ✓ Ports and harbors: expect substantial shoaling, requiring approximately 50 percent more than normal effort to recover from this event.
  - ✓ Revetments: excessive scour along the toe and upper bank failures are expected along the main stem.
  - ✓ Dikes: increased degradation and loss of bank head (key in) is expected to occur at dikes along the main stem. Without repair, dikes cannot perform as designed which leads to an increased need for dredging and a potential for accidents and/or groundings.
- Delaying repairs to existing revetments and dikes results in higher risk during future events and increased repair costs. Increased scour along the toe of the revetments leads to upper bank failures which threaten the integrity of levees and channel alignment which adversely impacts navigation.
- Levee impacts: numerous levee slides, sand boils, damaged culverts, gates and relief wells have been identified along the main stem Mississippi River levees.
- Without repair, uncontrolled under seepage through levee slides, damaged gates and culverts, and relief wells can result in the loss of material from the levee foundation. Over time, continued migration of material from the levee subgrade results in increased seepage and material loss accelerates. If left unaddressed, uncontrolled seepage can lead to a levee breach.

Mississippi River & Tributaries Project

2016 Mississippi River Winter Flood Event

- The MR&T system performed effectively as designed without loss of life or land flooded that was not intended to be flooded.
- The repairs from the 2011 Flood have proven to be effective.
- The system is not complete and not capable of passing the design flood.
- Partnerships with local, state and federal entities are critical to the success and operation of the MR&T system.
- Approximately 68 items remain to be completed from the 2011 post flood repairs at an approximate value of $110 million.

- The 2016 Winter flood caused significant damages to the system that must be repaired.
  - ✓ If the current MR&T appropriation is to be used to respond to future events and to repair the damages incurred from this event, both present and future funded work will be deferred.
  - ✓ The flood control and navigation features have suffered impacts that may make the system vulnerable heading into the 2016 flood season.
  - ✓ Extra vigilance and advanced preparedness is required to ensure the safety and security of our citizens, infrastructure, and industry.

Levee slides

Structure damage

Revetment and dike damage

Mississippi River & Tributaries Project

Authorized Work Remaining Necessary to Convey the Project Design Flood

* MR&T System Component	Funds Required to Complete
Floodways	$1.2 billion
Levees	$1 billion
Channel Improvement	$1 billion
Tributary Improvements	$1.4 billion
Investigation/Construction	$1 billion
TOTAL	**$5.6 billion**

Main Stem Levees and Floodwalls:

- 187 levee and/or floodwall segments below design elevation (approximately 370 miles).
- 97 levee segments - confirmed seepage.
- 31 locations - floodwalls that do not meet stability standards.
- 4 floodwalls require additional structural evaluation for stability.
- 2 locations require levee gap closure structures.
- 2 locations require slope paving to protect levee from erosion.

Main Stem Structures:

- 8 navigation locks are below design elevation:
  - Harvey Lock, IHNC Lock, Empire Lock, Bayou Sorrel Lock, Port Allen Lock, Berwick Lock, Bayou Boeuf Lock, Algiers Lock.
- Improvements to the Old River Overbank Structure.
- 5 pump stations require major reconstruction to perform at design standard:
  - 10th Street (Cairo), 28th Street (Cairo), Cottonwood Slough, Goose Pond, Yellow Bayou.

Main Stem Channel Improvements & Stabilization:

- 14 new revetments to be constructed.
- 54 existing revetments to be extended.
- 2 gaps in revetments to be filled.
- Numerous revetments to be reinforced.

Tributary Levees and Floodwalls:

- 6 levee reaches remain to be constructed – Total 67.5 miles.
- 33 levee reaches are below design grade.
- 23 levee segments require seepage or stability berms.

Tributary Structures:

- Yazoo Backwater – construct 1 new pump station.
- St. Johns New Madrid – construct 2 new pump stations.
- Various locations where work required to complete is still under evaluation:
  - Little Bayou Meto drainage, Tillatoba Creek grade control structures, Panola-Quitman grade control structures, 47 stoplog water control structures.

MR&T Operation and Maintenance

- Proper operation and function of the features of the system is critical.
- Known deficiencies require enhanced readiness and increased flood fighting.
- Maintenance funding has not kept pace with required work, increasing performance uncertainty and risk.
- Over $120 million in deferred maintenance needs have been identified.

* *Costs reflect estimate per the MR&T Strategic Investment Plan dated July 2015. To be revised after the completion of the MR&T Flowline Study and the Economic Re-evaluation Report. (August 2016)*

Mississippi River & Tributaries Project

Economic Values

Congress authorized the Mississippi River & Tributaries project in 1928; one year after the devastating Great Flood of 1927 flood cut an 80-mile wide swath across the alluvial valley. The massive flood ravaged the valley by inundating 26,000 square miles of land, destroying 41,000 buildings, killing 500 people and creating up to 700,000 refugees. The flood was not merely one that impacted the valley; its consequences were felt nationwide as the raging waters put more than the 3,000 miles of rail and thousands of miles of highways out of service, severing east-west communications and commerce for months.

To prevent a similar tragedy, the nation invested heavily in a unified system of public works to provide unprecedented flood protection and a reliable commercial artery. The resultant MR&T project has four main features:

1. Levees and floodwalls to confine ordinary floods.
2. Floodways and backwater areas to provide room for the river to expand and relieve pressure on the levee system during larger floods.
3. Channel stabilization and channel improvements to provide an efficient channel that carries more water at lower stages during floods.
4. Tributary basin improvements that maximize the benefits of main stem protection by providing reservoirs for headwater protection and interior drainage improvements.

These features work in tandem to provide a safe and dependable commercial navigation channel on the Mississippi River, while protecting adjacent towns, farms, industry, manufacturers, energy providers, public and private investment, ports and transportation systems from "uncontrolled" flooding.

This increases reliability and productivity, and protects the nation's high-value investments.

The MR&T provides flood protection for:

- More than 4 million people and 900,000 households.
- 10.6 million acres of prime agricultural lands needed to feed the world.
- 3,600 miles of rail used by four major Class I freight carriers with combined (nationally) operating revenues of $50 billion in 2011.
- 5,100 miles of highways, including major sections of I-10, I-20, I-40, I-55 and I-57, needed to transport commerce.
- 12 major oil refineries with a combined capacity of nearly 3 million barrels per day.
- Hundreds of thousands of oil and gas wells and related pipelines.
- 102 power plants, including three nuclear power plants.
- Hundreds of manufacturers, which generate more than $100 billion and provide approximately 400,000 jobs.

In addition, the MR&T project provides:

- For more than 670 million tons of cargo to move annually ($5.6 billion in annual transportation rate savings).
- Authorized depths for continued water commerce during severe droughts (1988, 1999, 2012).
- A commercial link from the bread basket and sugar and rice bowls of the nation to more than 30 ports, including four of the nation's busiest ports.

---

[1] Association of American Railroads, *Class I Railroad Statistics*, April 17, 2013.The major Class I freight operators include Burlington Northern-Sante Fe Railroad ($19.6 billion), Kansas City Southern Railroad ($1.2 billion), Canadian National Railroad ($9.1 billion), and the Union Pacific Railroad ($19.5 billion).

[2] Oil and Gas Journal, *List of Oil Refineries in the United States*

[3] Industrial Economics, Inc., *Economic Profile of the Lower Mississippi Region*. This report states that in 1998 manufacturing generated $87 billion in revenues and provided 383,000 jobs. The $87 billion figure, when adjusted for inflation, amounts to approximately $126 billion in revenues in 2014.

Mississippi River Commission

We Value

Listening - Access
… providing an equal opportunity for all citizens to share their insight and wisdom in a free and open forum – a forum that offers greater access for citizens to actively engage in and shape federal water resource management policy.

Inspecting - Professionalism
… setting the highest professional, engineering and process standards that are emulated nationally and internationally, and offer an intergenerational vision for the world's 3rd largest watershed.

Partnering – Relationships
… establishing and nurturing long-term collaborative relationships with diverse interests, elected representatives, state and federal agencies, and the Corps of Engineers to develop sustainable solutions for current and future watershed challenges.

Engineering - Action
… protecting lives, property, economic prosperity and the nation's natural resources by advancing balanced and sound water resource engineering solutions reached through collaboration and long-term relationships.

Mississippi River Commission

Priorities

Navigation – *assuring availability, preparing for the future by improving delivery of goods*

- Consider, discuss and address container on barge with opening of the new Panama Canal set of locks (2015).
- Dredging of small ports and harbors.
- Navigation, Ecosystem Sustainability Program (NESP).

Infrastructure

- Use MRC process of listening, inspecting, partnering and engineering to increase awareness of the deteriorating infrastructure in the watershed.
- Through established relationships develop plans to address infrastructure in the watershed; lead federal efforts.
- Use MRC process to increase and help improve infrastructure investment.

Comprehensive Flood Control and Management – *a systems approach*

- MR&T (2011 flood system restoration; Mississippi River levees, Morganza to the Gulf).
- Upper Mississippi / Illinois Rivers Comprehensive Plan.
- Communicate MRC/MR&T process as a comprehensive balanced watershed approach to follow in the six major sub-basins comprising the world's largest watershed inland navigation system – the Mississippi, Missouri, Ohio, Red, Arkansas, Illinois river basins and tributaries.

Environmental Sustainability – *uniting water, land and people*

- Integrate science based, sustainable and resilient work into all projects (life-cycle cost and delivery of solutions to long term viability of water resources).
- LCA: Explore and recommend innovative science based approaches and solutions to coastal challenges … such as water and sediment diversions.

Water Supply and Ground Water

- Prolonged drought concerns / storage of runoff.
- Multi-state aquifer depletion.

200-year working Vision – America's Watershed

- MRC signed a working vision on Aug. 20, 2009 (revised 2015). It serves as:
  - A system-wide balanced approach, offers an intergenerational commitment and compliments a national vision.
  - A platform for broad participation, international recognition and a long term balanced working vision for the world's largest navigable watershed.

Mississippi River & Tributaries Project

Facts

The Mississippi River and Tributaries project was authorized by the 1928 Flood Control Act. In the wake of the 1927 flood, it was deemed necessary to put into place a comprehensive, unified system of public works within the lower Mississippi Valley that would provide unprecedented protection from floods and an equally efficient navigation channel.

The MR&T project has four major features:

- Levees/floodwalls
- Floodways
- Channel improvement and stabilization
- Tributary basin improvements

These features work together to provide flood protection and navigation, and foster environmental protection and enhancement.

PROJECT BENEFITS

Flood Control

- $14.8 billion invested for planning, construction, operation and maintenance since 1928.
- $666 billion in flood damages prevented, since 1928.
- Approximately 4 million people protected.
- $234 billion damages prevented in 2011.
- 45 to 1 return on each dollar invested.
- 1927 Flood = 16.8 million acres flooded.
- 2011 Flood = 6.4 million acres flooded.
- Untold economic productivity enables farms, towns & factories.

Navigation

- More than 670 million tons of cargo move on the Mississippi River system each year.
- $5.6 billion saved annually in transportation benefits.
- The Mississippi River remained opened during the 1988, 1999 and 2012 droughts, as well as the 2011 record flood. The ability to keep the river open offered unequivocal evidence of the benefit of the MR&T project to the nation. Keeping it open and reliable is a pillar of economic stability and national security.

America's Watershed: A 200-year working vision

An Intergenerational Commitment

Our people enjoy a quality of life unmatched in the world:

- **We lead secure lives along the river or tributary.**
- **We enjoy fresh air and the surrounding fauna, flora and forests while hunting, fishing and recreating.**
- **We travel easily, safely and affordably.**
- **We drink from and use the abundant waters of any river, stream or aquifer.**
- **We choose from an abundance of affordable basic goods and essential supplies that are grown, manufactured and transported efficiently and reliably along and by the river to local and world markets.**

The Mississippi watershed is 41% of the U.S., 31 states, 1.25 million square miles, more than 250 tributaries.

Balancing needs for:

- ✓ **National security, flood control and flood damage reduction**
- ✓ **Environmental sustainability and recreation**
- ✓ **Infrastructure and energy**
- ✓ **Water supply and water quality**
- ✓ **Movement of goods; agriculture and manufacturing**

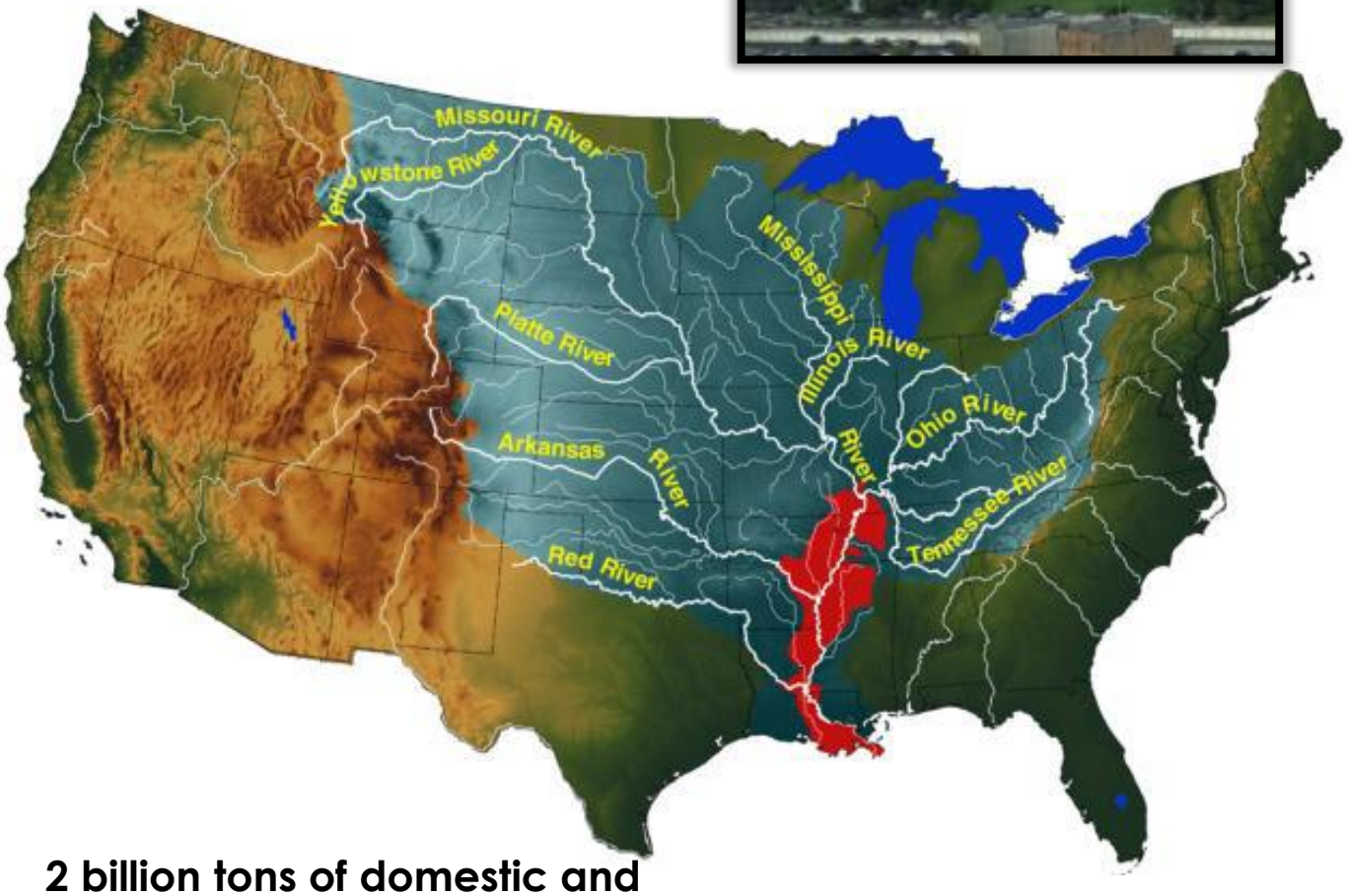
Leveraging local citizens' input, international dialogue, science, engineering, technology and public policy.

Join the dialogue, visit:

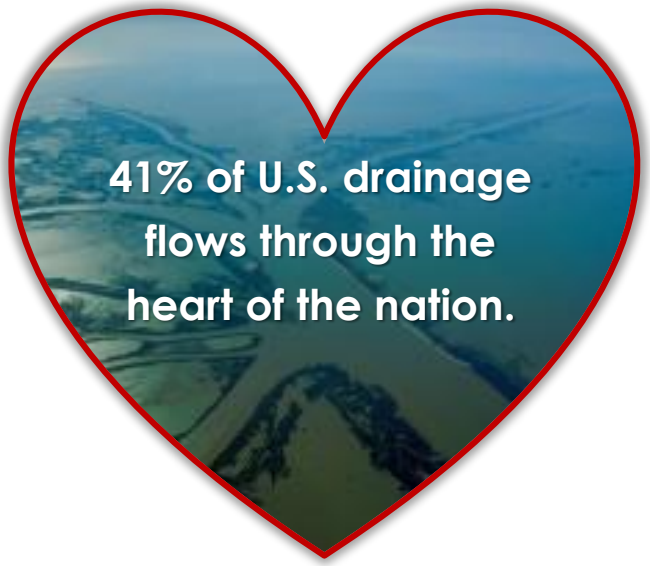
- **www.mvd.usace.army.mil/mrc**
- **cemvd-ex@usace.army.mil**

World's Largest Naturally Navigable Watershed

95% of al U.S. imports and exports (about $1.4 trillion) move on waterways and/or ports.



2 billion tons of domestic and import/export cargo move on the U.S. waterways annually.



High-Water Inspection Trip

Partners Engaged

AGRICULTURE AND ECONOMIC DEVELOPMENT

- Delta Council, Miss.
- East Arkansas Enterprise
- Economic Development Growth Engine (EDGE) Memphis, Tenn.
- Illinois Farm Bureau
- Louisiana Cotton & Grain Association
- Louisiana Farm Bureau

BUSINESS AND MANUFACTURING

- Associated General Contractors of America

EDUCATIONAL AND RESEARCH

- Clyde C. Miller Academy, Mo.
- Great Rivers Environmental Law Center, Ill.
- Louisiana State University
- Presbyterian Day School, Memphis, Tenn.
- University of Arkansas, Pine Bluff
- University of Illinois
- University of Memphis

ENVIRONMENTAL CONSERVATION AND RECREATION

- Audubon Society, La.
- Big River Strategic Initiative
- Friends of the Riverfront, Memphis
- Gulf of Mexico National Wildlife Federation
- Gulf Restoration Network
- Lower Mississippi River Conservation Committee
- Mississippi River Corridor
- The Nature Conservancy

FLOOD CONTROL

- Alexander County, Ill.
- Atchafalaya Basin Levee District, La.
- Drainage District No. 7, Ark.
- Dyer County Little Levee District, Tenn.
- Fifth Louisiana Levee District
- Fulton County Levee Board, Ky.
- Hatchie Drainage District, Miss.
- Lake County Levee and Drainage District, Tenn.
- Len Small Levee & Drainage District, Ill.
- Levee District No. 3, Mo.
- Little River Drainage District, Mo.
- Mississippi Levee Board, Miss.
- Mississippi Valley Flood Control Association (MVFCA)
- Piney Drainage District, Ark.
- Pontchartrain Levee District, La.
- Sny Island Levee District, Ill.
- Southeast Levee District of Arkansas
- St. Francis Levee District of Missouri
- St. Francis Levee District of Arkansas
- St. Johns Levee & Drainage District, Mo.
- St. Mary Levee District, La.
- Tensas Basin Levee District, La.
- Terrebonne Conservation Levee District, La.
- Upper Mississippi, Illinois, Missouri Rivers Association (UMIMRA)
- White River Drainage District, Ark.
- Yazoo-Mississippi Delta Levee Board, Miss.

High-Water Inspection Trip

Partners Engaged

PORTS AND HARBORS

- Hickman-Fulton County Riverport, Ky.
- New Madrid County Port Authority, Mo.
- Pemiscot County Port Authority, Mo.
- Poinsett County Port Authority, Ark.
- Port of Claiborne County, Miss.
- Port of Greater Baton Rouge, La.
- Port of Lake Providence, La
- Port of Greater Baton Rouge, La.
- Port of Memphis, Tenn.
- Port of Morgan City, La.
- Ports Association of Louisiana
- Southeast Missouri Regional Port Authority, Mo

RIVER INDUSTRY

- AEP River Operations, Mo.
- American Waterways Operators
- Bar Pilots Association
- Big River Coalition
- Blue Water Shipping
- Bunge North American
- Conrad Shipyards
- Federal Pilots Association
- Ingram Barge Line, Tenn.
- Kirby Corporation, Tex.
- Louisiana Maritime Association
- River Industry Executive Task Force
- Steamship Pilots Association

RIVER BASIN ASSOCIATIONS

- Big River Coalition, La.
- Gulf Intracoastal Canal Association
- Ouachita River Valley Association, La.
- Mississippi River Delta Coalition
- Red River Valley Association, La.
- White River Coalition, Ark.

WATER SUPPLY / WATER MANAGEMENT ENTITIES

- Amite River Basin Drainage & Water Conservation, La.
- Bayou Meto Water Management District, Ark.
- Boeuf-Tensas Water District, La. and Ark.
- Union County Water Conservation Board, Ark.
- White River Irrigation District, Ark.
- Yazoo-Mississippi Delta Joint Water Management District, Miss.

High-Water Inspection Trip

Partners Engaged

U.S. SENATE

- Sen. Bill Cassidy, La. (Michael Eby & Angie Robert)
- Sen. Claire McCaskill, Mo. (Christy Mercer)
- Sen. David Vitter, La. (Murphy Chestnut)
- Sen. John Boozman, Ark. (Chris Caldwell and Ty Davis)
- Sen. Lamar Alexander, Tenn. (Chris Connolly)
- Sen. Roy Blunt, Mo. (Derrin Lingle)
- Sen. Thad Cochran, Miss. (JoAnn Clark)
- Sen. Tom Cotton, Ark. (Shane Fletcher & Jeff Morris)

U.S. HOUSE OF REPRESENTATIVES

- Rep. Garret Graves, LA-6 (Lynn Dunston)
- Rep. Jason Smith, MO-8 (Eric Bohl)
- Rep. Mike Bost, IL-12 (Carol Klaine)
- Rep. Rick Crawford, AR-1 (Jay Sherrod)
- Rep. Steve Cohen, TN-9 (Jeremy Jordon)
- Rep. Trent Kelly, MS-1 (Walt Starr)

MAYORS AND PARISH PRESENTS

- Mayor Allen Latimer, Horn Lake, Miss.
- Mayor Benny McGuire, Obion County, Tenn.
- Mayor David Lattus, Hickman, Ky.
- Mayor Fred Reeves, Port Gibson, Miss.
- Mayor Kevin Mainord, East Prairie, Mo.
- Mayor Paxton Branch, Tallulah, La.
  Mayor Rita Flummer, Mound City, Ill.
- Mayor Stephen Tisdale, Eudora, Ark.
- Mayor Steven Burch, Sikeston, Mo.
- Mayor Tyrone Coleman, Cairo, Ill.
- Mississippi River Cities & Towns Initiative

CITIES, TOWNS, COUNTIES AND PARISHES

- Adams County, Miss.
- Baton Rouge, La.
- Blytheville, Ark.
- Cairo, Ill.
- Cape Girardeau, Mo.
- Claiborne County, Miss.
- DeSoto County, Miss.
- Dyer County, Tenn.
- East Baton Rouge, La.
- Fulton County, Ky.
- Hickman, Ky.
- Horn Lake, Miss.
- Lake County, Tenn.
- Memphis, Tenn.
- Morgan City, La.
- Obion County, Tenn.
- Poinsett County, Ark.
- Port Gibson, Miss.
- Pulaski County, Ill.
- Shelby County, Tenn.
- St. Mary Parish, La.
- Terrebonne Parish, La.

High-Water Inspection Trip

Partners Engaged

FEDERAL AGENCIES

- Assistant Secretary of the Army for Civil Works (Lowry Crook, LetMon Lee)
- Office of Management and Budget (Ali Zaidi)
- National Oceanic and Atmospheric Administration
- National Weather Service
- U.S. Fish & Wildlife Service

STATE AGENCIES

- Arkansas Game and Fish Commission
- Arkansas Natural Resources Commission
- Arkansas Waterways Commission
- Illinois Emergency Management Agency
- Louisiana Coastal Protection and Restoration Authority
- Louisiana Department of Environmental Quality
- Louisiana Department of Natural Resources
- Louisiana Department of Transportation and Development
- Louisiana Governor's Office of Homeland Security and Emergency Preparedness
- Mississippi Department of Agriculture and Commerce
- Mississippi Department of Environmental Quality
- Mississippi Department of Transportation
- Tennessee Department of Agriculture
- Tennessee Emergency Management Agency