

Operation Watershed Responding to the Historic Mississippi River Flood of 2011

Recovery Operations

Scott Whitney

MVD REGIONAL FLOOD RISK MANAGER
USACE-USGS Joint Meeting
24 Aug 2011

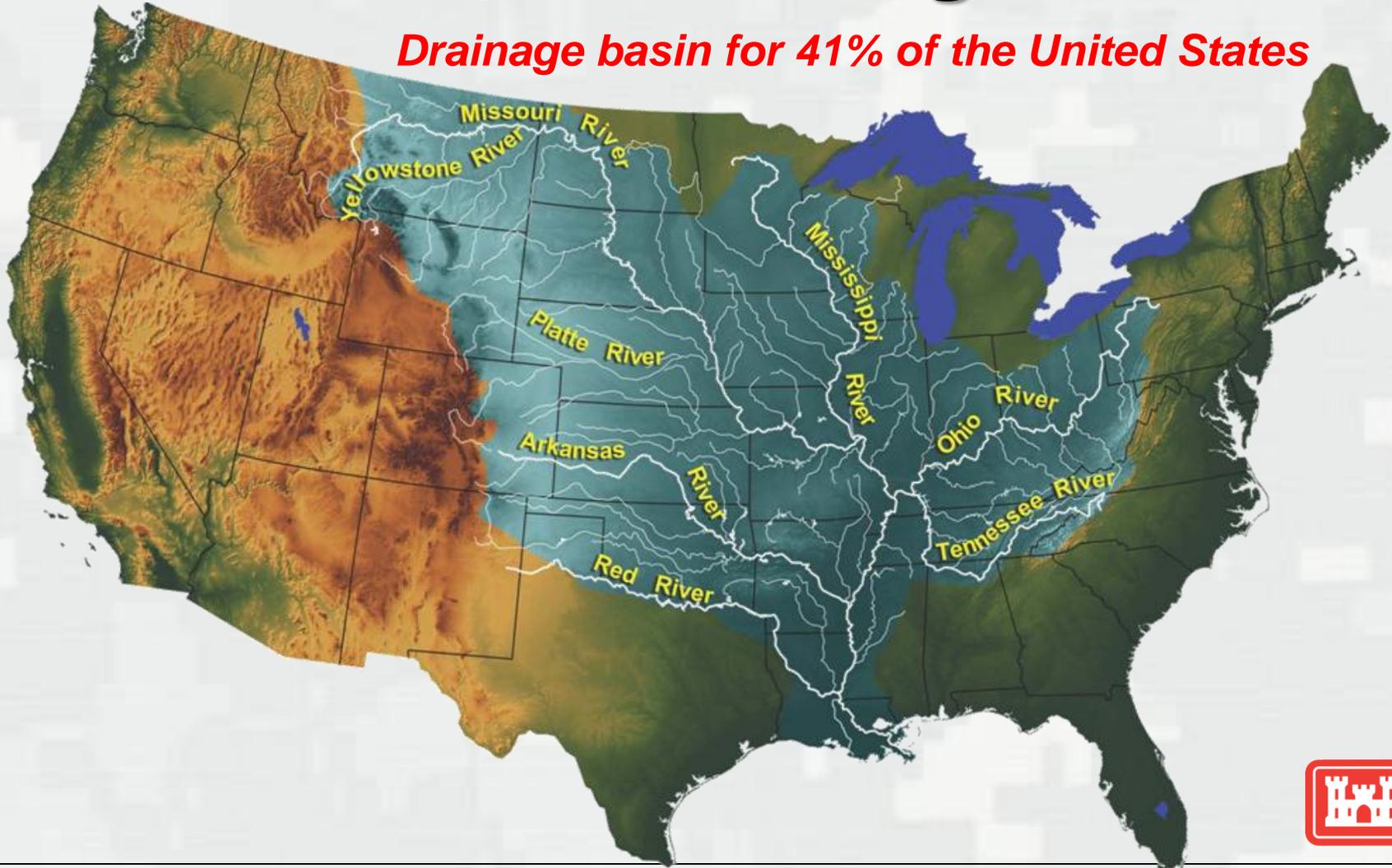


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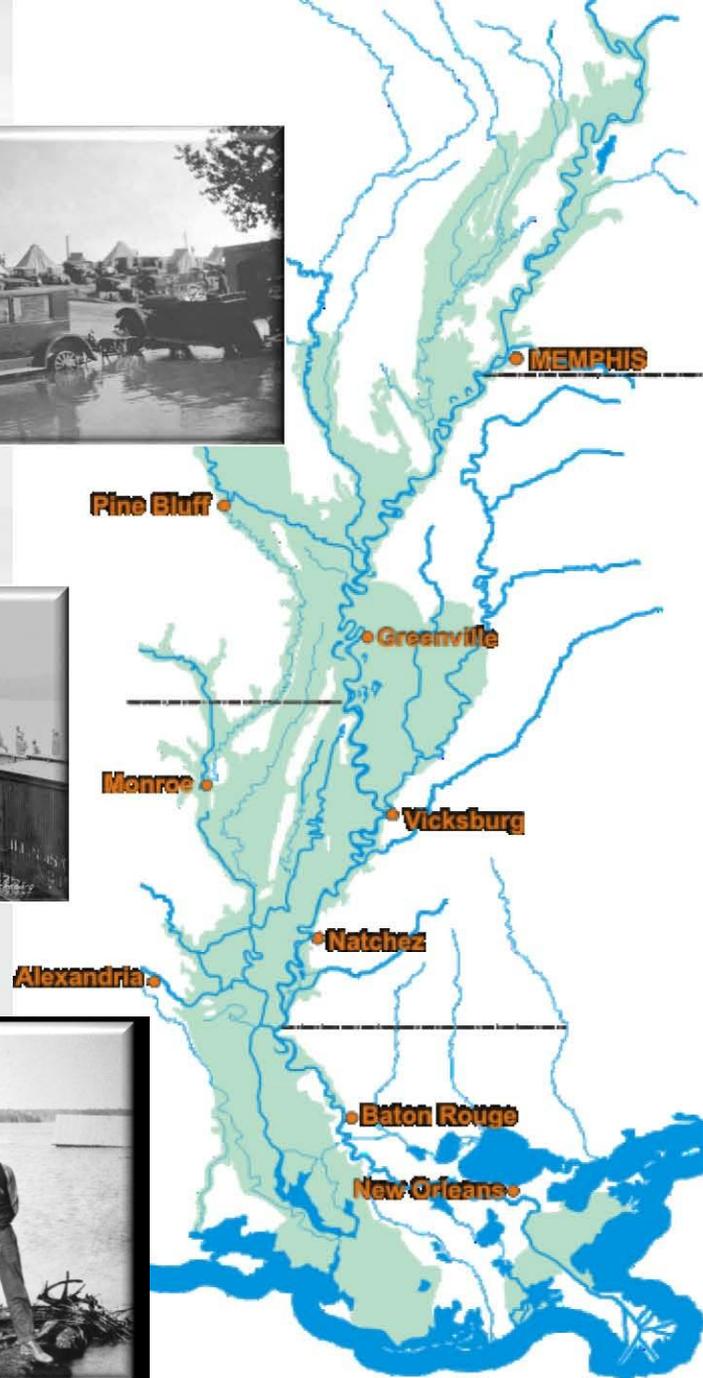
Mississippi River Watershed World's 3rd Largest

Drainage basin for 41% of the United States



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1927 Flood



Legend

 1927 Flooded Area

26,000 Square Miles Flooded
500 People Killed
325,000 Refugees



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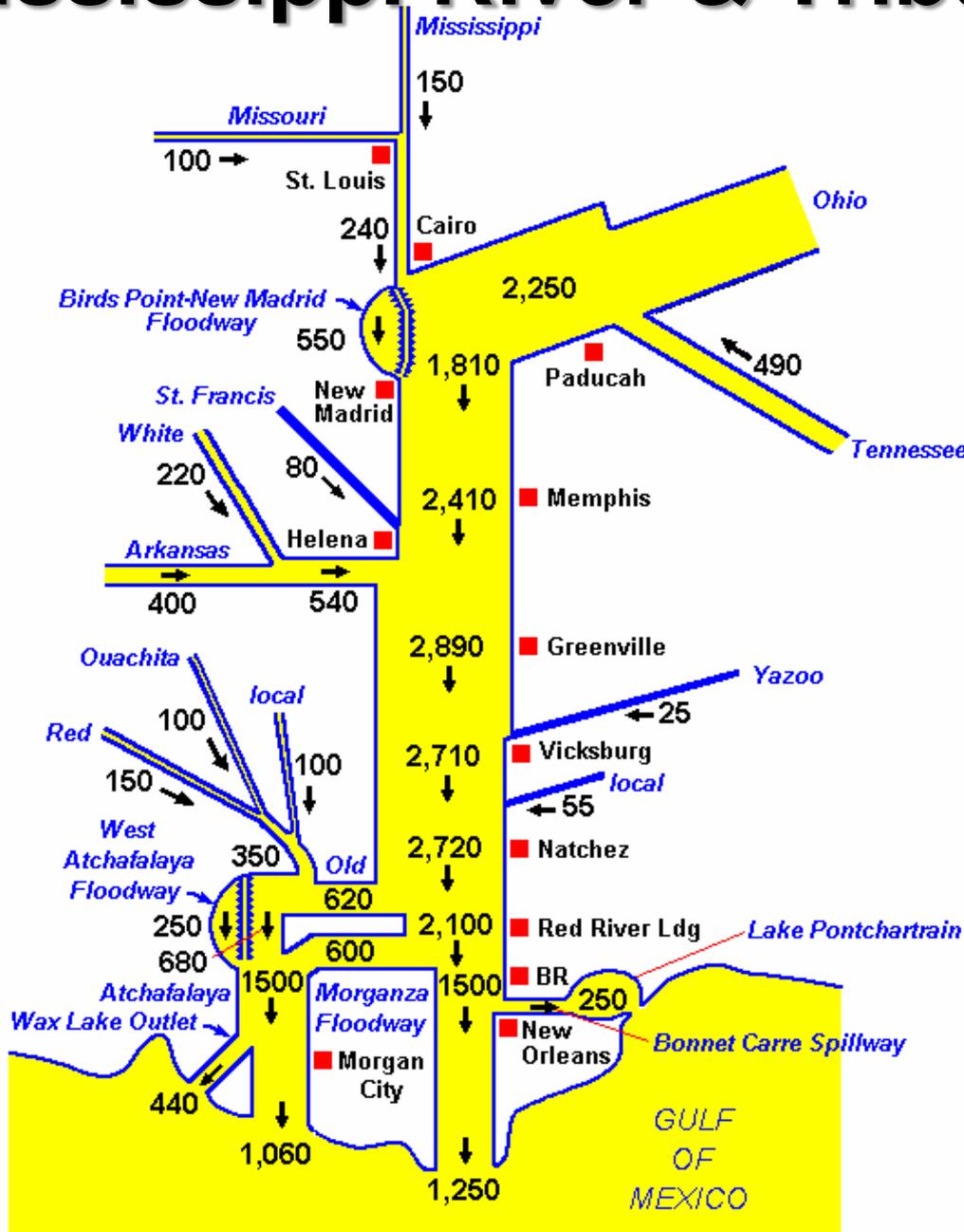
Mississippi River & Tributaries Project



- Largest and most comprehensive FRM in the world.
- Comprised of Levees, Channel Stabilization, Tributary improvements and Floodways
- 35,000-square-mile flood plain
- \$13.9 billion invested
- \$478.3 billion in flood damages prevented
- 34 to 1 return on investment
- 4.5 million people protected
- MR&T Project Currently 89% Complete



Mississippi River & Tributaries Project



*Project
Design
Flood*

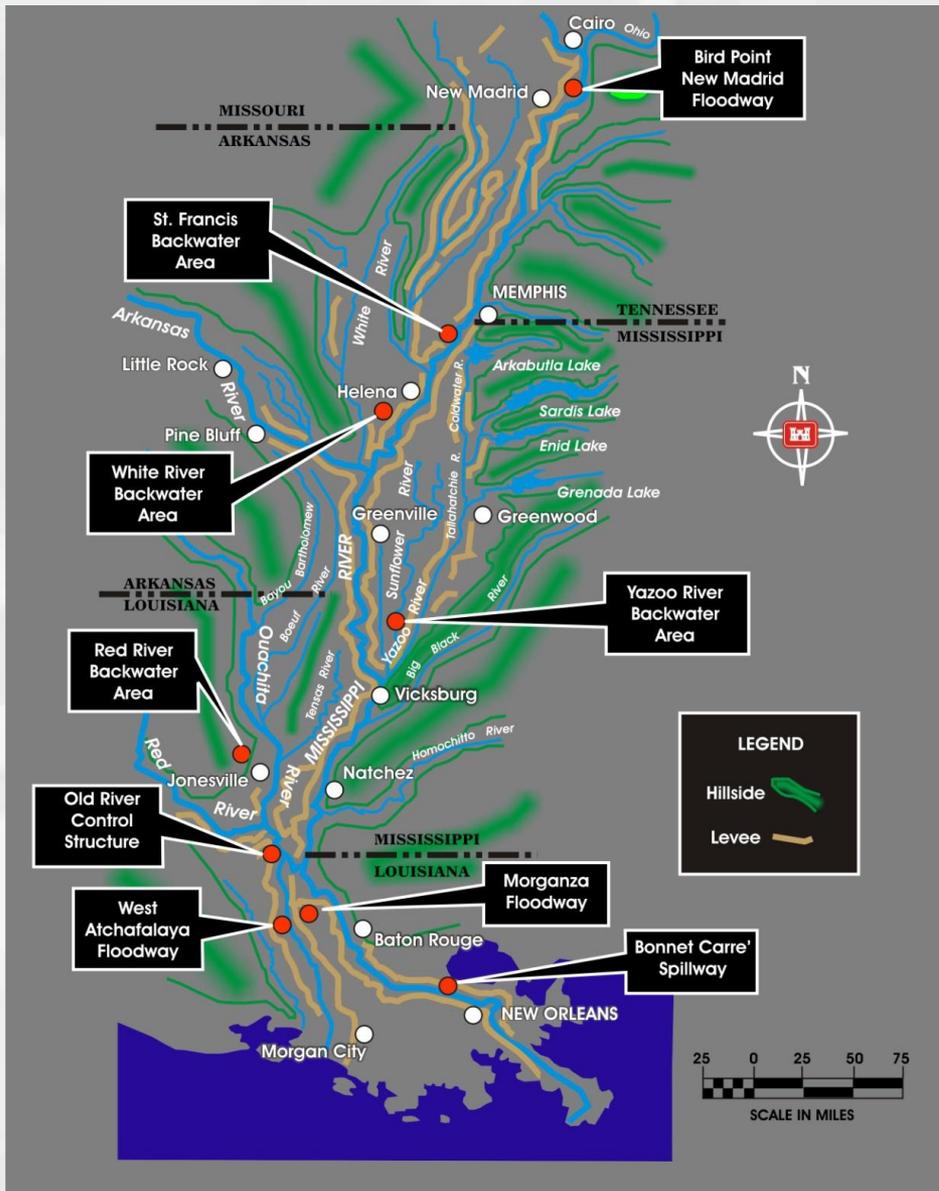


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MR&T Levees



Floodways and Backwater Areas



- Floodways
 - Birds Point – New Madrid = 133,000 acres
 - Morganza Floodway = 71,500 acres
 - Bonnet Carré Spillway = 7,600 acres
 - West Atchafalaya Floodway = 154,000 acres
- Backwater Areas
 - St. Francis Backwater Area = 500,000 acres
 - White River Backwater Area = 145,000 acres
 - Yazoo Backwater Area = 634,000 acres
 - Red River Backwater Area = 373,000 acres



“CRITICAL LESSONS LEARNED AND APPLIED”

Room for the River Concept

- 1927 Flood
 - Flooded 26,000 square miles = 16,800,000 acres

“The MR&T flood control system was designed to conform to the natural tendencies of the river, it is not forced or driven.”

– 1927 Jadwin Plan

- Total used during 2011 Flood = 335,000 acres (interior flooding)
- Over 1.5 million acres of floodways and backwater areas were not inundated during the 2011 Flood
- While the 2011 Flood is not as large as the Project Design Flood, there is still ***Room for Larger Floods***

Mississippi & Atchafalaya STAGES – 29 July 2011 – 0600 CDT

Station	Flood Stage	Current Stage	Actual/Forecasted Crest Stage	Date	Record Stage	Record Year
Cairo, IL	40.0	28.49	61.72****	2 May	59.51	1937
New Madrid, MO	34.0	17.91	48.35	6 May	47.97	1937
Caruthersville, MO	32.0	19.51	47.61	7 May	46.00	1937
Memphis, TN	34.0	12.84	47.87	10 May	48.70	1937
Helena, AR	44.0	19.98	56.59	12 May	60.21	1937
Arkansas City, AR	37.0	18.38	53.14	16 May	59.20	1927
Greenville, MS	48.0	29.87	64.22	17 May	65.4*****	1927
Vicksburg, MS	43.0	25.50	57.1	19 May	56.20*	1927
Natchez, MS	48.0	34.57	61.95	19 May	58.04	1937
Red River Lndg, LA	48.0	37.32	65.5*** (63.09***)	21 May	61.61	1997
Baton Rouge, LA	35.0	21.33	47.5*** (45.01***)	18 May	47.28	1927
New Orleans, LA	17.0**	7.13	19.5*** (17.0***)	14 May	21.27	1922
Simmesport, LA	47.0	15.15	44.94	23 May	59.13	1927
Butte LaRose, LA	25.0	8.06	23.15	26 May	27.28	1973
Morgan City, LA	4.0	3.78	9.5*** [10.35***]	30 May	10.53	1973

*62.2 ' If Levees Held

**Levees Protect New Orleans to 20.0' Stage

****NWS Crest of 63.0' on 5 May w/o BPNM Operation – Actual Stage of 59.7' on 5 May w/BPNM Operation

*****Adjusted to Current Gage Location - Prior to 1940 stages were taken at City Front or Warfield Point

Note: With Morganza Operation, Baton Rouge to N. Orleans crests will occur before upstream locations and will remain steady during the floodway operations.

New Record Stage

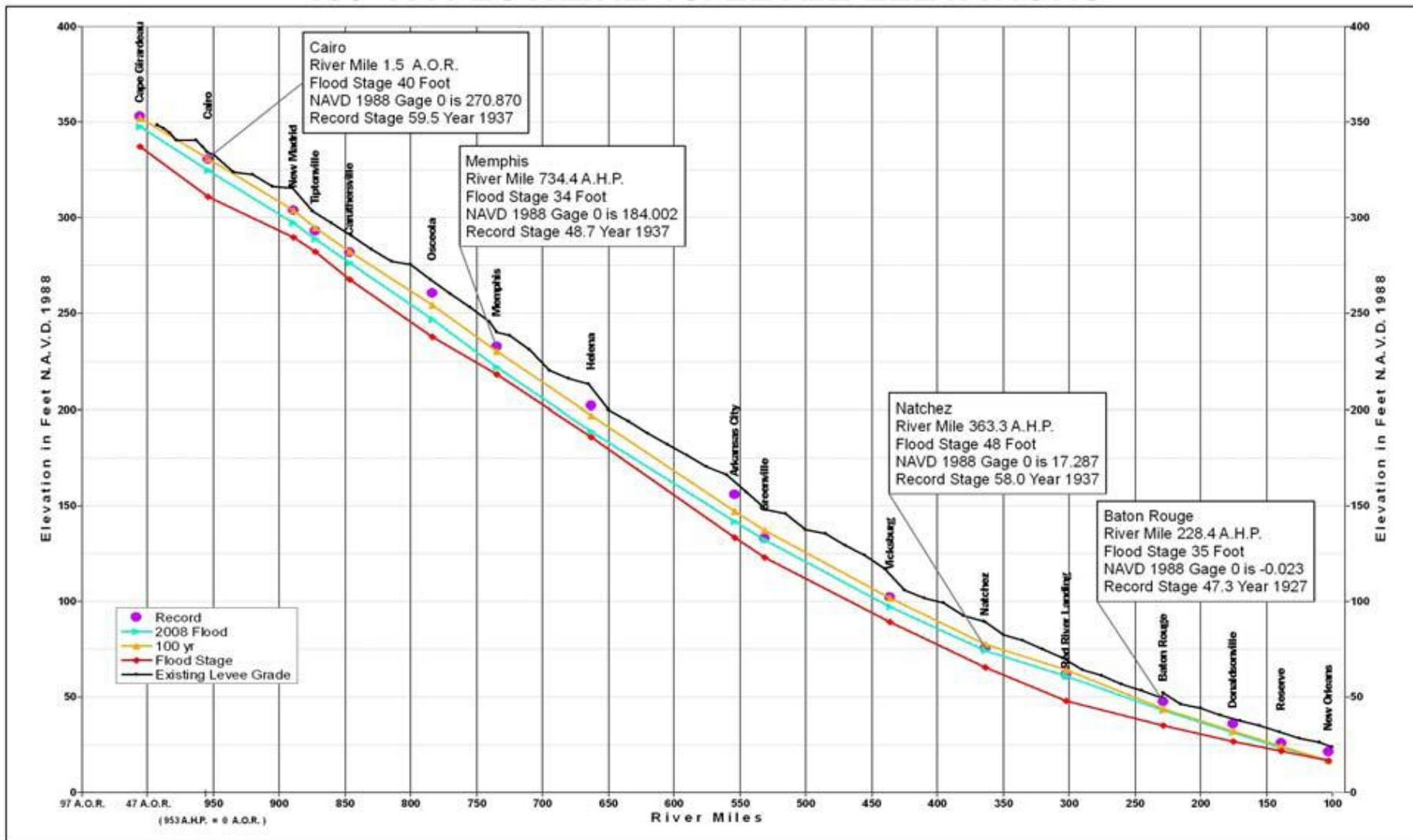
Exceeding Current Record Stage

***w/o Morganza Operation

***w/Morganza Operation

MISSISSIPPI RIVER LEVEES

100-YR FLOWLINE vs. LEVEE ELEVATIONS



Historical Discharges

Station	2011	1927 ^{5/} Actual	1927 Confined	1937 ^{5/}	1973	PDF ^{3/}
Cairo, IL ^{1/}	1,936,000 ^{C/2/}	1,626,000	1,765,000	2,010,000 ^{4/}	1,536,000	2,360,000
Memphis, TN	2,136,000 ^C	N/A	1,744,000	2,020,000	1,633,000	2,410,000
Helena, AR	2,130,000 ^C	1,756,000	N/A	1,968,000	1,627,000	2,490,000
Arkansas City, AR	2,293,000 ^C	1,712,000	2,472,000	2,159,000	1,879,000	2,890,000
Vicksburg, MS	2,272,000 ^C	1,806,000	2,278,000	2,060,000	1,962,000	2,710,000
Natchez, MS	2,227,000 ^C	N/A	N/A	2,046,000	2,024,000	2,720,000
Red River Landing, LA	1,641,000 ^C	1,461,000	1,779,000	1,467,000	1,498,000	2,100,000

C - Peak Discharge, Provisional

1/ Discharge Range at Hickman, KY

2/ Approximate mile 950.8 at 1400 CDT 5/02/2011 near Wickliffe, KY, prior to operation of Birds Point-New Madrid Floodway

3/ Project Design Flood (PDF) provides design flows for MR&T project - Currently estimated to be complete in 2032 at the average rate of funding over the last 10 years

4/ Includes flow through Birds Point-New Madrid Floodway

5/ Reference - "Annual Maximum, Minimum, and Mean Discharges of the Mississippi River and Its Outlets and Tributaries to 1963"

Revised 22 June 11



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RECOVERY OPERATIONS

Scott D. Whitney

MVD Regional Flood Risk Manager

“SHOULD DIVINE PROVIDENCE ever send a flood of the maximum predicted by meteorological and flood experts as a remote probability but not beyond the bounds of ultimate possibility, the floodways provided in the plan are still normally adequate for its passage without having its predicted heights exceed those of the strengthened levees.”

Edgar Jadwin,

Major General, Chief of Engineers

December 1, 1927 in transmitting the Jadwin Plan to Secretary of War



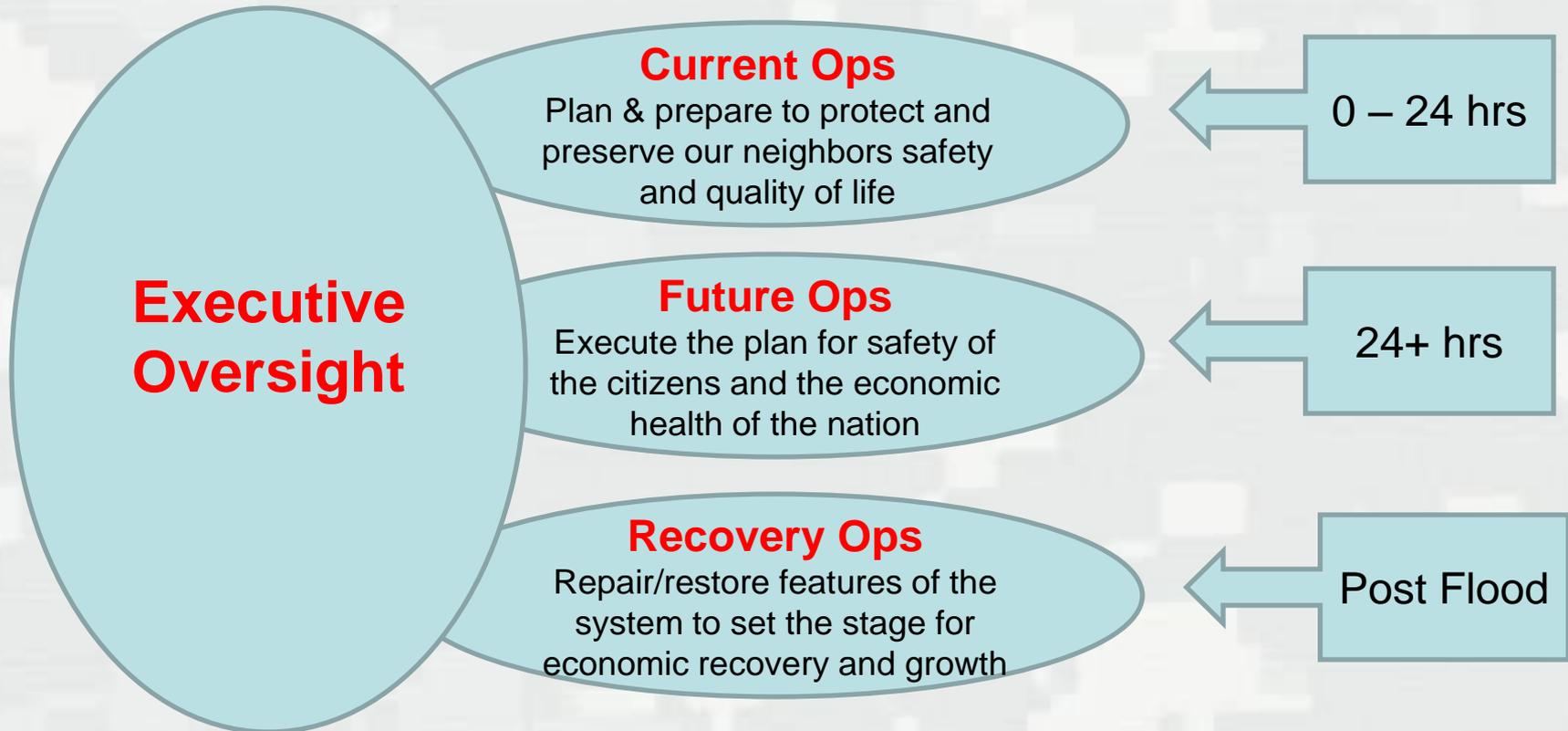
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RESPONSE OVERVIEW

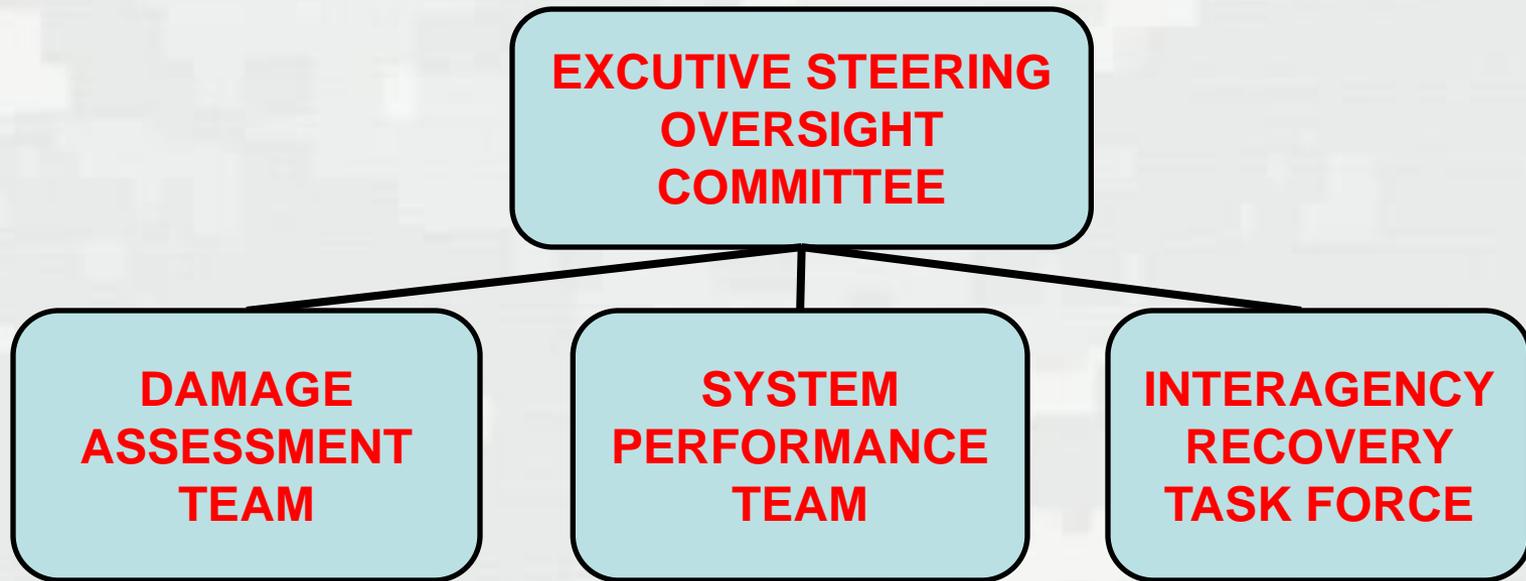


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RECOVERY



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PHASE I: PRELIMINARY ASSESSMENT CRITICAL REPAIRS



• 3 Aug - DST Preliminary Ranking



• 4-9 Aug – Review by DPMs, E & C Chiefs, Ops Chiefs



• 9-10 Aug – St. Louis face to face E & C Chiefs/Ops Chiefs



• 10 Aug – Final Review by ESOC



• 15 Aug – Final Reset/Restore Priorities presented to MRC



• 22 Aug – MVD Commander certifies life safety priorities per OPORD



• 23 Aug – Preliminary Phase I Briefing to Interagency Recovery Task Force

• 24 Aug – MVD submittal of MR&T system life safety repairs to USACE for funding.

• 31 Aug – Initiation of Phase I repairs pending receipt of funding



WHAT MILITARY TEAM IS ON A MISSION
TO PROTECT US FROM TERROR



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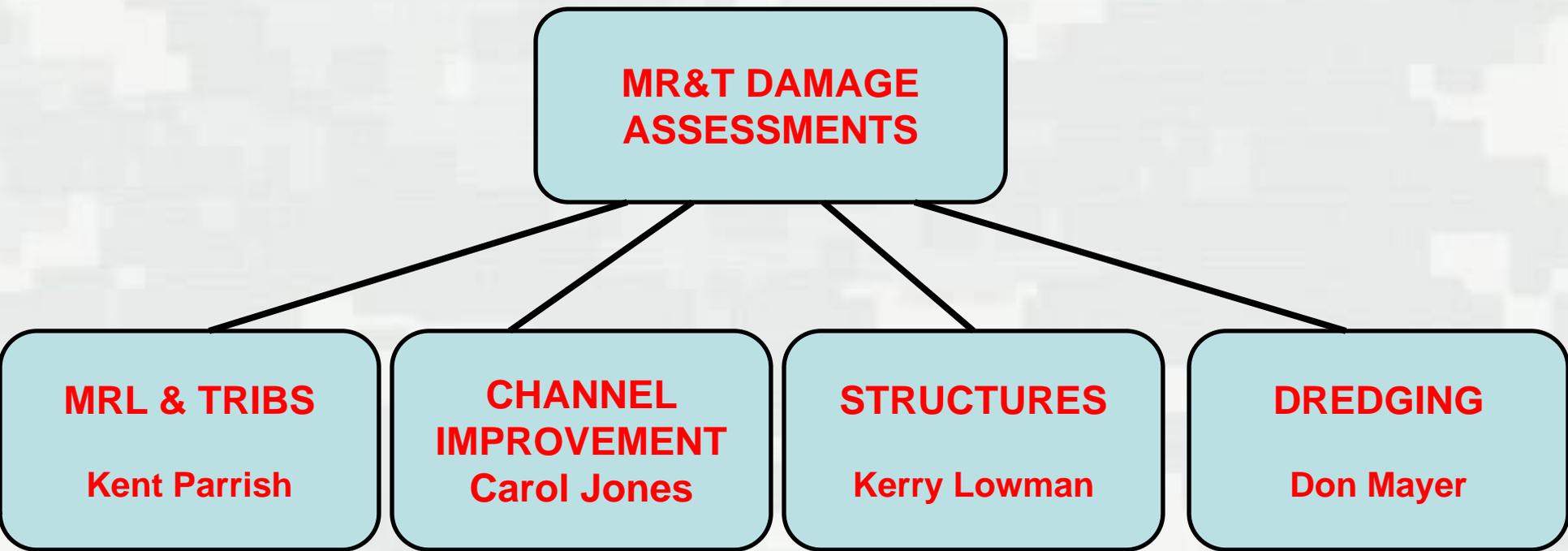
DAMAGE ASSESSMENTS

- (1) Physical data collection
- (2) Historic perspective analysis
- (3) Repair options
- (4) District QA review
- (5) ROM Repair Cost



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Failure Likelihood vs Consequences

Failure Likelihood	High	Class III	Class II	Class II	Class I
	Moderate	Class IV	Class III	Class II	Class II
	Low	Class IV	Class III	Class III	Class II
	Remote	Class IV	Class IV	Class IV	Class III
		Level 0	Level 1	Level 2	Level 3

Consequences



Phase I Summary

As of 23 August 2011

- 93 Items identified
- \$778 million total (By FRAGO Class)

12 - Class I	\$ 85 million
43 - Class II	\$549 million
37 - Class III	\$144 million
1 - Class IV	\$ 1 million
- \$778 million total (By MR&T Component)

32 – Miss River Levee	\$327.7 million
22 – Channel Improvements	\$222.5 million
25 – Dredging	\$157.4 million
13 – Structures	\$ 70.6 million

***** See Handouts for Phase I listing of 93 identified critical repair areas****



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WE'RE REINFORCING THE LEVEE WITH NATIONAL TV REPORTERS.



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SYSTEM PERFORMANCE EVALUATION

Purpose:

- (1) Objectively evaluate and document the performance of the MR&T System and how the entire watershed was managed during the 2011 Flood.
- (2) Identify and prioritize recapitalization requirements to prepare the system for future events
- (3) Identify opportunities to improve the systems performance and reliability.



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SYSTEM PERFORMANCE EVALUATION

SCOPE: The assessment to be conducted by the internal team will focus primarily on the performance and contributions from the following major structural & relational items:

1. Reservoirs
2. Levees/Floodwalls
3. Floodways and Backwater Areas
4. Channel Improvements
5. Outlet Structures (e.g. Old River...etc)
6. Operational Decisions
7. Collaboration
8. Communication



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SYSTEM PERFORMANCE EVALUATION

DRAFT SCHEDULE AND DELIVERABLES:

1. Press Release (16 Aug 2011)
2. IRTF Presentation (23 Aug 2011)
3. Exec Steering Committee IPR (25 Aug 2011)
4. DRAFT Data Inventory and Data Mgmt Plan (31 Aug 2011)
5. Talking Paper/Fact Sheets (16 Sept 2011)
6. Revised DRAFT PMP (16 Sept 2011)
7. Interim Report (10 Feb 2012)
8. DRAFT Report (1 June 2012)
9. FINAL Report (10 August 2012)



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INTERAGENCY RECOVERY TASK FORCE

- **Representatives**

- ✓ Governors: MO, IL, TN, KY, AR, MS and LA
- ✓ Fed Agencies: USCG, USGS, FEMA, NWS, USDA, MARAD, USEPA and USFWS
- ✓ Corps MSCs: MVD, NWD, SAD, SWD and LRD

- **Goals & Objectives:**

- ✓ Implement a collaborative and communicative approach across regional and state boundaries in order to prioritize our efforts and resources during the challenging recovery process.
- ✓ Create strong regional efforts to inspect, review, reset and restore our flood risk management system and adjacent projects.



IRTF COMMON PURPOSE

- A multi-agency forum does not currently exist to solve the many regional issues and challenges that will be presented in the recovery from this historic flood event.
- Provide Safety and Security for Citizens Lives and Livelihoods
- Create strong regional effort to inspect, review, reset and restore our flood risk management system
- Pursue all potential funding methods from federal and state sources.
- Give consideration to traditional and non-traditional alternatives in repair and restoration.
- Implement a collaborative and communicative approach across regional and state boundaries to prioritize our efforts and resources during the challenging recovery process



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Mississippi River Levees



QUESTIONS?



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