The Lower Mississippi River Basin
May 1-3, 2012

Special recognition for ...
Harvard University
Water Federalism Team

John Briscoe, PhD
Jonathan Baker (HKS)
Laila Kasuri (College)
Sarah Katz (HLS)
William Niebling (HLS)
Kim Smet (SEAS)
Preview of Topics

1. Introduction
   Mississippi at a Glance
   Historical Context

2. Basin Overview

3. Contemporary Challenges
   Process/Procedure
   Navigation & Flood Control
   Environment

4. Conclusions
1. Introduction  a) Mississippi at a Glance

The Mississippi River basin showing states and tributaries

3rd largest
41% of contiguous US
31 states; 2 provinces
1. Introduction  b) Historical Context

Flooding & Navigation challenges  Great Flood  CWA & NEPA  Flood of 2011

Early 1800’s  1824  1927  Early 1970’s  2011

Federal Gov’t (USACE) - Navigation  MRC – Navigation & Flood Control  MR&T  USACE – Environment

Federal government has become increasingly involved
Preview of Topics

1. Introduction
   - Mississippi at a Glance
   - Historical Context

2. Basin Overview

3. Contemporary Challenges
   - Process/Procedure
   - Navigation & Flood Control
   - Environment

4. Conclusions
2. Basin Overview  a) Hydrology

Relative discharge from major tributaries

-Average flows of 16,800 m$^3$ per sec

**High water:**
-Occurs in March to May
-65,700 (m$^3$/s) in 2011

**Low water:**
-August to October
-River height varies by as much as 15 m
Historic changes in sediment discharge

**1700’s:**
- Total sediment load of 400 million tons per year

**1990’s:**
- Total sediment load of ~125 million tons per year
2. Basin Overview  b) Infrastructure

Meander cutoffs

Revetments for bank stabilization

Levees
2. Basin Overview  b) Infrastructure

Floodways

Bird’s Point New Madrid Floodway
Old River Control Structure Complex
Bonnet Carre Spillway

Morganza Floodway
2. Basin Overview  

c) Administrative Entities

Principal Agencies

• Mississippi River Commission  
• Local Levee Boards  
• U.S. Army Corps of Engineers  
• U.S. Congress

Regulatory & Advising Agencies

• State governments  
• U.S. Environmental Protection Agency  
• U.S. Geological Survey  
• U.S. Fish and Wildlife Service  
• And many more...
Preview of Topics

1. Introduction
   - Mississippi at a Glance
   - Historical Context

2. Basin Overview

3. Contemporary Challenges
   - Process/Procedure
   - Navigation & Flood Control
   - Environment

4. Conclusions
3. Contemporary Challenges  a) Process/Procedure

Authorization: (A)  Appropriation: (B)

Fieldwork

Project identification → Reconnaissance budget → (A)

(A) ← Feasibility study funds ← Reconnaissance study ← (B)

(B) → Complete feasibility study ← Review by agencies → (A)

(B) ← Negotiate project-partnership agreement ← Conduct pre-construction and engineering design phase

Construction ← Definition of operation, maintenance, repair, rehabilitation and replacement procedures
3. Contemporary Challenges  a) Process/Procedure

Complex and time consuming processes

- Priorities
- Regulations
- Money

backlog of projects

$$ project benefits $$
3. Contemporary Challenges  b) Navigation

Benefits of river Transport
- $70 Billion
- 60% of grain exports

U.S. Port and Inland Waterways Modernization study
3. Contemporary Challenges

Communication

Flood Control

Flood Risk Reduction

[Map showing estimated maximum inundation extents]
3. Contemporary Challenges  
d) Environment

increased nutrient loading in river → dead zone in the Gulf of Mexico
3. Contemporary Challenges  
   d) Environment

- loss of coastal Louisiana
- reduced sediment load & altered deposition
1. Introduction
   Mississippi at a Glance
   Historical Context

2. Basin Overview

3. Contemporary Challenges
   Process/Procedure
   Navigation & Flood Control
   Environment

4. Conclusions
How do we balance competing interests and address changing priorities in a time of limited federal funding and a complex regulatory environment?

Couple this with future challenges such as:

- Increased Development/Growth
- Climate Change/Climate Variability
- Uncertainty
WATER: reliability through flood control for living / business & supply for cooling energy plants, consumption, irrigation, environment, and reliability for navigation

ENERGY: Nuclear, Coal, Hydro (transportation for, cooling water and water power)
Our people enjoy a quality of life unmatched in the world. We ...

- Lead secure lives along the river or tributary.
- Enjoy fresh air and the surrounding fauna, flora, and forests while hunting, fishing, and recreating.
- Travel easily, safely, and affordably.
- Drink from and use the abundant waters of any river, stream, or aquifer.
- Choose from an abundance of affordable basic goods and essential supplies that are grown, manufactured, and transported along the river to local and world markets.

Leveraging science, engineering, technology, and public policy

Balancing the nation’s needs for:
- National Security & Flood Damage Reduction
- Environmental sustainability & recreation
- Infrastructure & energy
- Water supply & water quality
- Movement of goods; agriculture & manufacturing
Thank You
Room for the River Concept

- **1927 Flood**
  - Flooded 26,000 square miles = 16,800,000 acres
  - Levees only policy – No floodways or backwater areas

- **2011 Flood**
  - Flooded 9,900 square miles = 6,350,000 acres
  - Protected 62% of the area flooded by 1927 Flood (the 38% of the area flooded in 2011 was by design to make room for the river)
  - MR&T project includes levees and floodways and backwater areas to **Make Room for the River**

- **Floodways and Backwater Areas**
  - Total acreage of floodways = 366,000 acres
    - Total used during 2011 Flood = 212,000 acres
  - Total acreage of backwater areas = 1,652,000 acres
    - 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**
REFERENCES


United States of America, House of Representatives, 70th Congress, 1st Session (1927), Document 90, “Flood Control in the Mississippi Valley.”

The 2011 Mississippi River Flood and How the Mississippi River & Tributaries Project System Provides “Room for the River” by Charles E. Shadie & Barbara A. Kleiss, Jan 2012

Water Policy 14 (2012) 21–40, Reflections on the nexus of politics, ethics, religion and contemporary water resources decisions. Jerome Delli Priscoli; BOG World Water Council; Institute for Water Resources USACE, Editor in Chief: Water Policy. E-mail: priscoli@erols.com, Feb 2012

A water and sediment budget for the lower Mississippi–Atchafalaya River in flood years 2008–2010: Implications for sediment discharge to the oceans and coastal restoration in Louisiana, Mead A. Allison a, Charles R. Demas b, Bruce A. Ebersole c, Barbara A. Kleiss d, Charles D. Little d, Ehab A. Meselhe e, Nancy J. Powell f, Thad C. Pratt c, Brian M. Visburg g

a University of Texas Institute for Geophysics, University of Texas, 10100 Burnet Road (R2200), Austin, TX 78758-4445, USA
b Louisiana Water Sciences Center, US Geological Survey, Baton Rouge, LA 70816, USA
c Coastal & Hydraulics Laboratory, Engineering Research and Development Center, US Army Corps of Engineers, Vicksburg, MS 39180, USA
d LCA Science & Technology Office, US Army Corps of Engineers, Mississippi Valley Division, Vicksburg, MS 39180-6199, USA
e Department of Civil Engineering, University of Louisiana, Lafayette, LA 70504, USA
f US Army Corps of Engineers, New Orleans District, New Orleans, LA 70160, USA
g Louisiana Coastal Protection and Restoration Authority, Baton Rouge, LA 70804-4027, USA.
2011: Year of the Floods