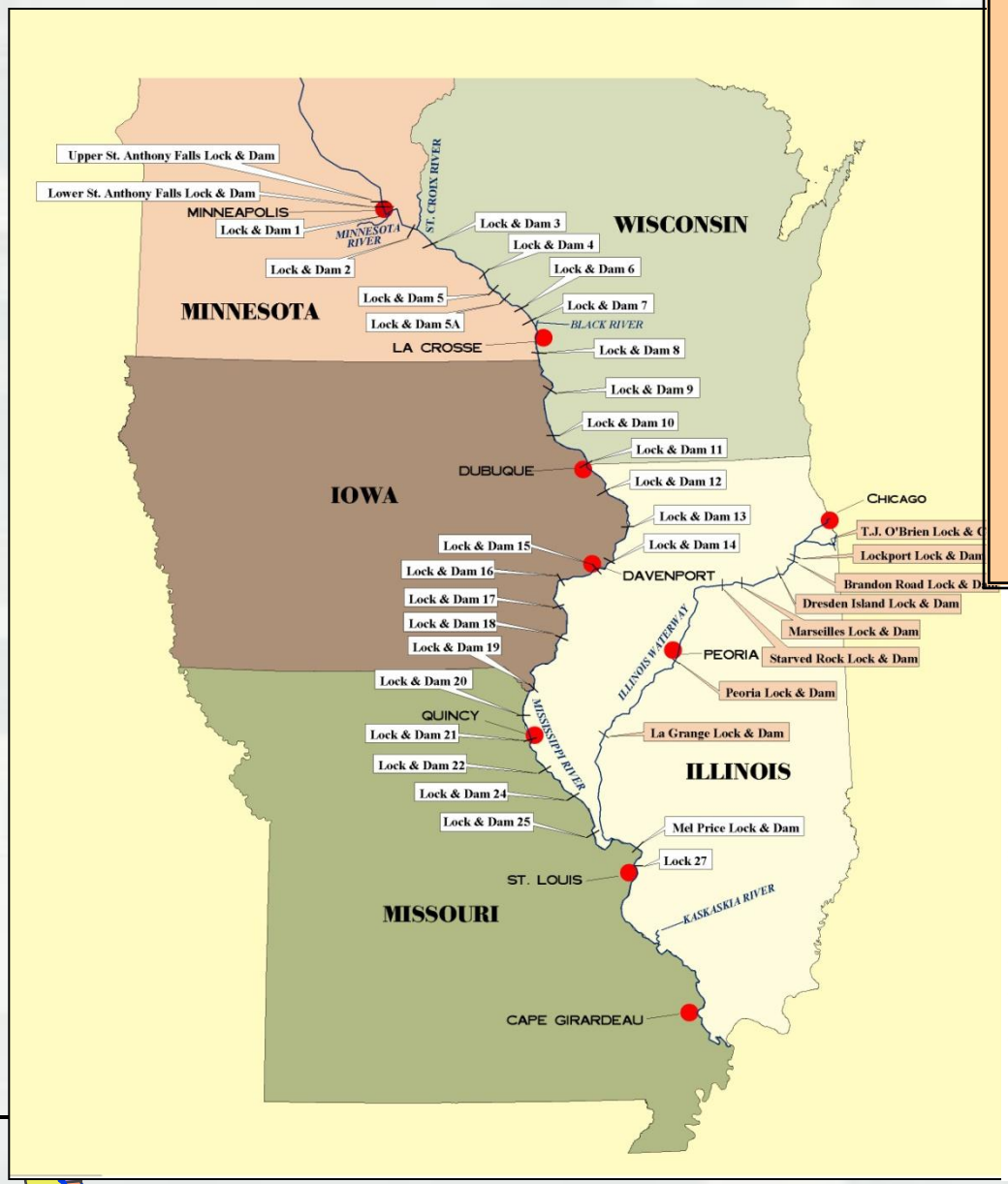
Towards Effective Adaptive Management on the Upper Mississippi river System

TITLE VIII WRDA 2007:
UPPER MISSISSIPPI RIVER and ILLINOIS WATER SYSTEM
Navigation & Ecosystem Sustainability Program (NESP)

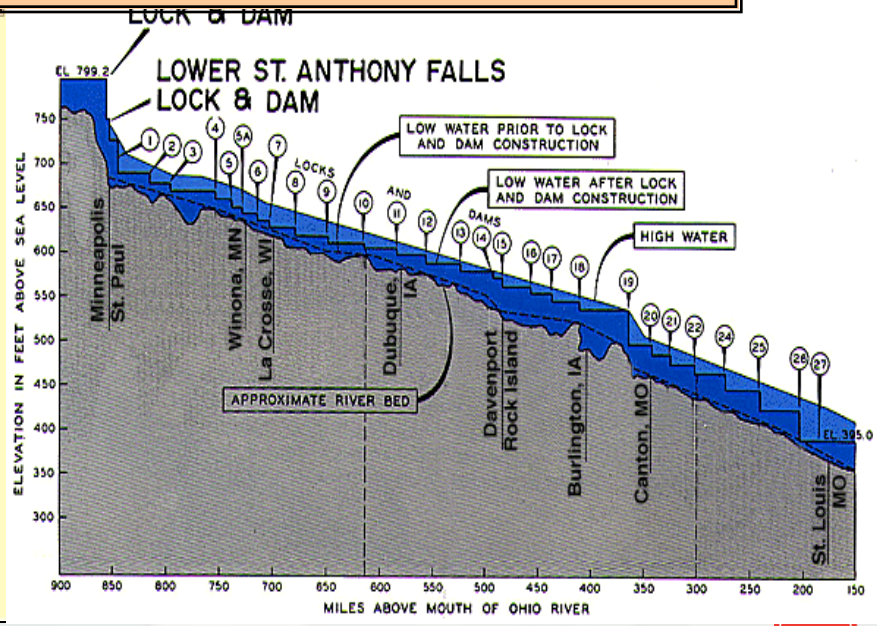
UPPER MISSISSIPPI RIVER RESTORATION
Environmental Management Program (EMP)

Ken Barr
Corps of Engineers
Rock Island District

UMR-IWW NAVIGATION SYSTEM



- 37 Lock Sites
- 1,200 Miles of River
- 226,000 refuge acres
- Significant Ecosystem (2.5 million acres)
- Constructed 1930-45



Vision for UMR-IWW System

To seek long-term sustainability of the economic uses and ecological integrity of the Upper Mississippi River System

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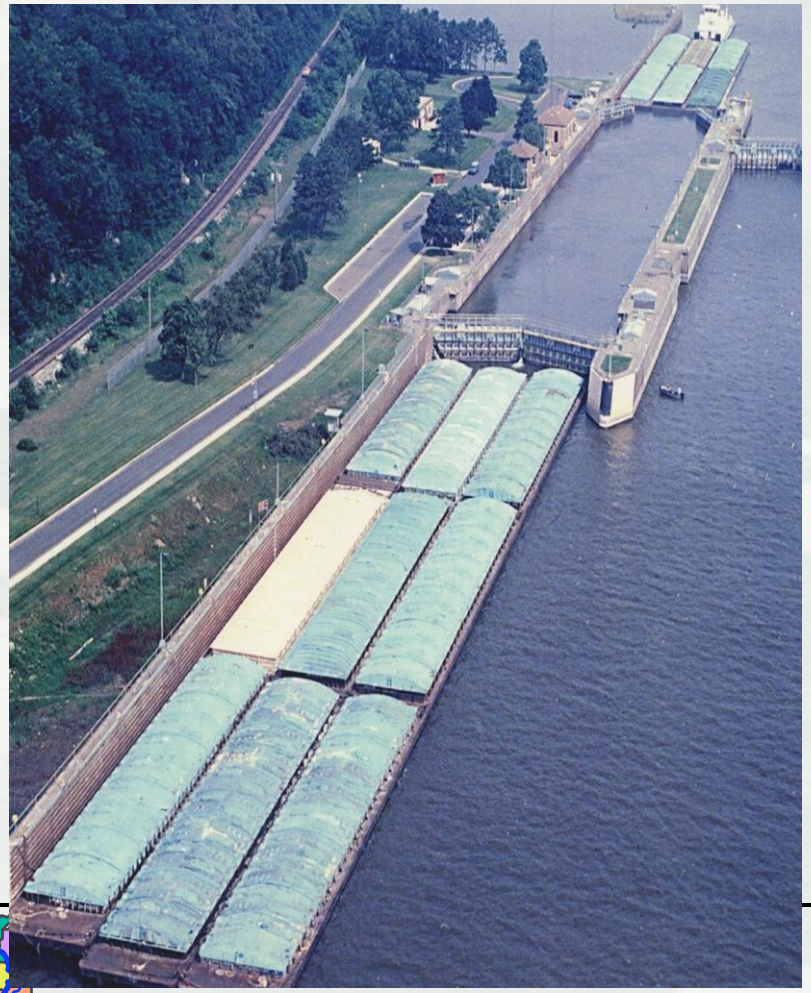
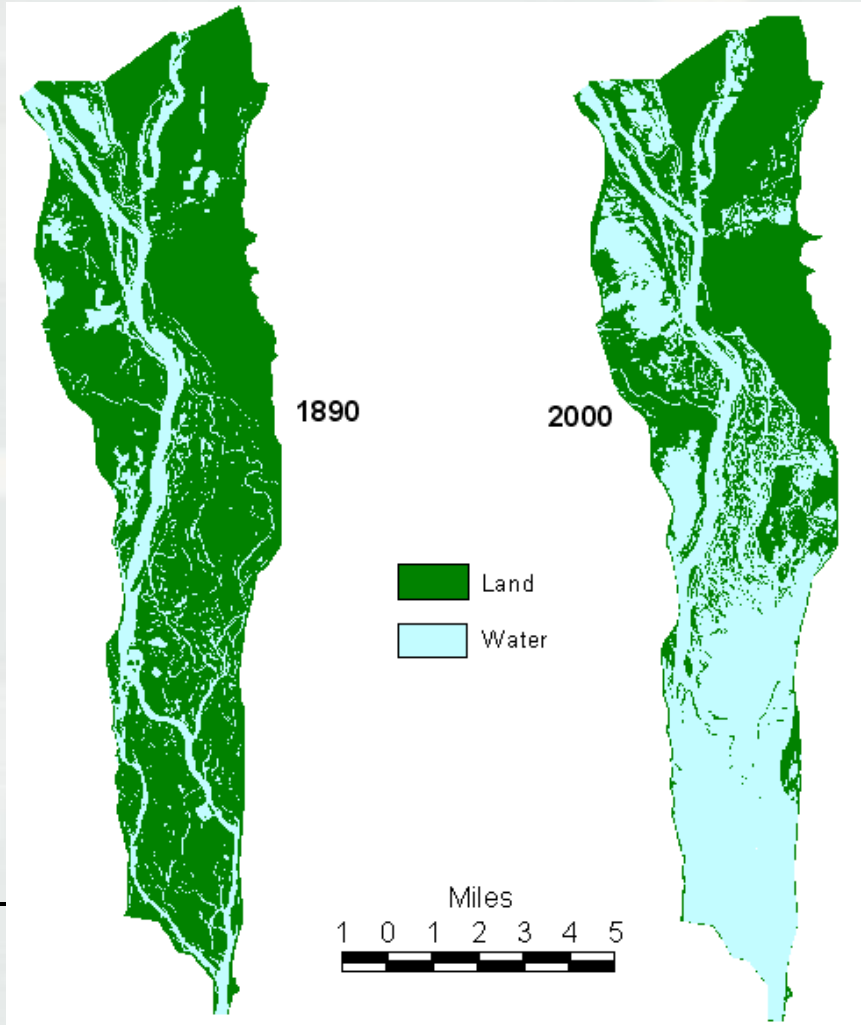
Challenges

Navigation delays



Impoundment/ Loss of diversity and connectivity



WRDA 2007 Authorized plan

Nav $2 billion Eco $1.8 billion

- Navigation 7 locks and small scale
- Fish Passage @ Dams 4,8,22, and 26
- Changes in Water Level Control @ Dams 25 and 16
- Forest & Cultural Resources Mngt Plans
- Adaptive Implementation of 225 small projects of less than $25 million each
  - Island Building
  - Water Level Management
  - Backwater/Side Channel Restoration
  - Wing Dam/Dike Alterations
  - Island Shoreline Protection
- 35,000 Acres of Floodplain Restoration
- Adaptive Management and Monitoring

Adaptive Management

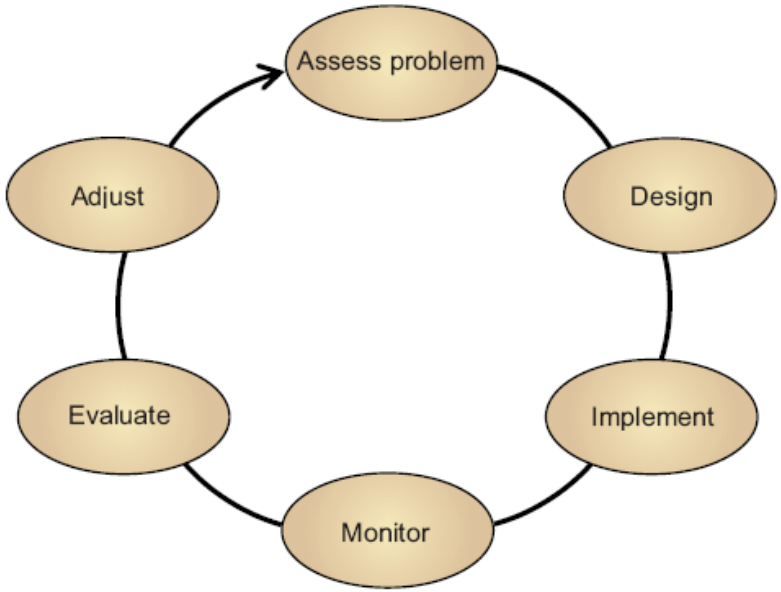
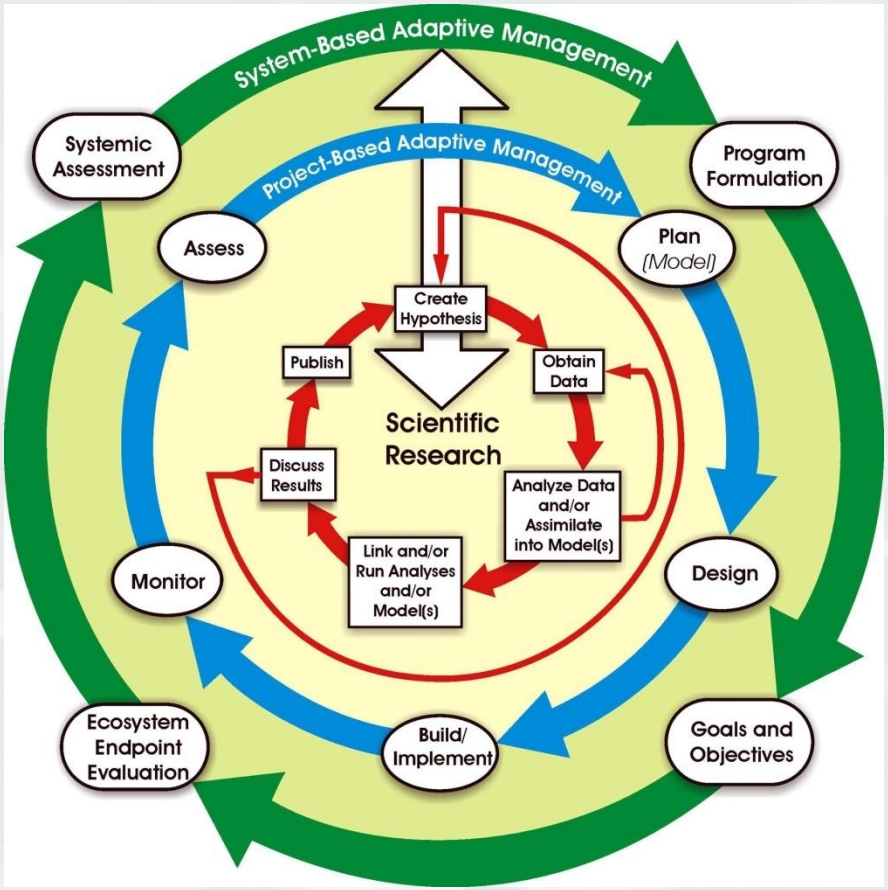
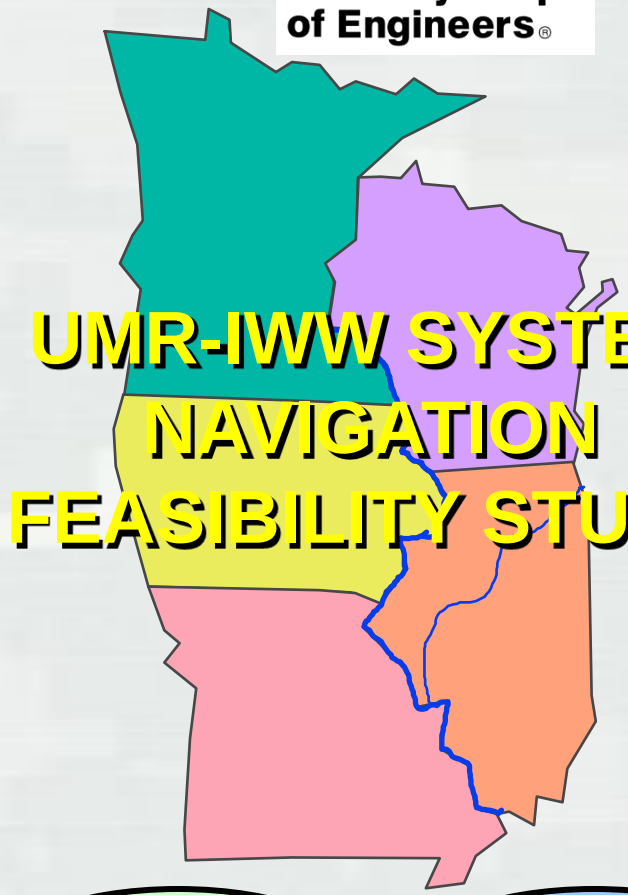


Figure 1.1. Diagram of the adaptive management process.



Weber in Galat et al 2007

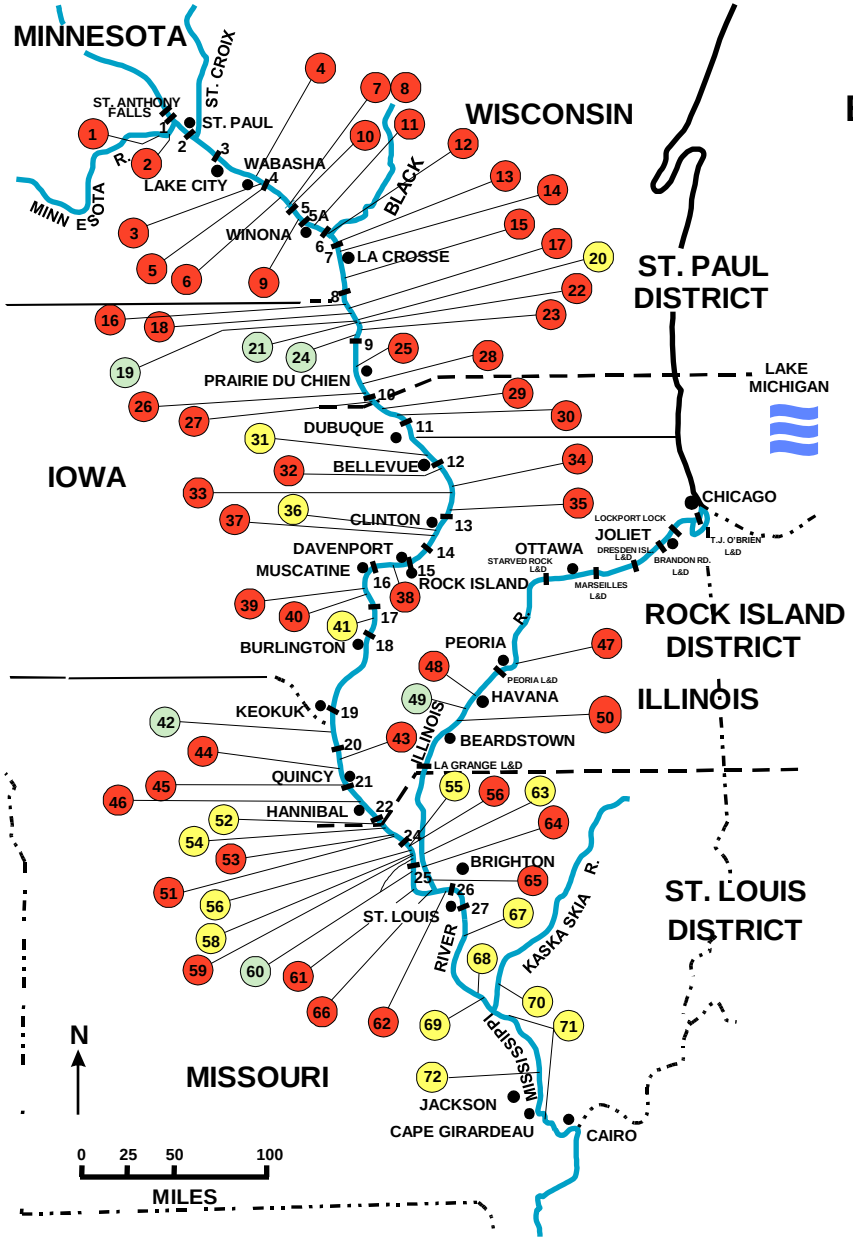
COLLABORATION



UMR-IWW SYSTEM
NAVIGATION
FEASIBILITY STUDY

PUBLIC

NGO's



http://www.mvr.usace.army.mil/EMP/default.htm

UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM

HABITAT REHABILITATION AND ENHANCEMENT PROJECTS

SITE NO.	PROJECT
1.	RICE LAKE, MN
2.	LONG MEADOW LAKE, MN
3.	PETERSON LAKE, MN
4.	INDIAN SLOUGH, WI
5.	FINGER LAKES, MN
6.	ISLAND 42, MN
7.	SPRING LAKE PENINSULA, WI
8.	SPRING LAKE ISLANDS, WI
9.	POLANDER LAKE, MN
10.	SMALL SCALE DRAWDOWN, WI
11.	TREMPEALEAU REFUGE, WI
12.	LONG LAKE, WI
13.	LAKE ONALASKA, WI
14.	EAST CHANNEL, WI/MN
15.	POOL 8 ISLANDS, WI
16.	POOL SLOUGH, IA/MN
17.	BLACKHAWK PARK, WI
18.	LANSING BIG LAKE, IA
19.	CONWAY LAKE, IA
20.	LAKE WINNESHIEK, WI
21.	CAPOLI SLOUGH, WI
22.	POOL 9 ISLAND, WI
23.	COLD SPRINGS, WI
24.	HARPERS SLOUGH, IA/WI
25.	AMBROUGH SLOUGH, WI
26.	BUSSEY LAKE, IA
27.	GUTTENBERG PONDS, IA
28.	MISS RIVER BANK STABILIZATION, IA/MN/WI
29.	BERTOM-McCARTNEY LAKES, WI
30.	POOL 11 ISLANDS, IA/WI
31.	POOL 12 OVERWINTERING, IA-IL
32.	PLEASANT CREEK, IA
33.	BROWN'S LAKE, IA
34.	SPRING LAKE, IL
35.	POTTERS MARSH, IL
36.	BEAVER ISLAND, IA

SITE NO.	PROJECT
37.	PRINCETON REFUGE, IA
38.	ANDALUSIA REFUGE, IL
39.	BIG TIMBER, IA
40.	LAKE ODESSA, IA
41.	HURON ISLAND, IA
42.	FOX ISLAND, MO
43.	GARDNER DIVISION, IL
44.	COTTONWOOD ISLAND, MO
45.	MONKEY CHUTE, MO
46.	BAY ISLAND, MO
47.	PEORIA LAKE, IL
48.	BANNER MARSH, IL
49.	RICE LAKE, IL
50.	CHAUTAUQUA REFUGE, IL
51.	CLARKSVILLE REFUFE, MO
52.	TED SHANKS, MO
53.	PHARRS ISLAND, MO
54.	ANGLE BLACKBURN, MO
55.	REDS LANDING, IL
56.	NORTON WOODS, MO
57.	STAG & KEETON ISLANDS, MO
58.	SANDY CHUTE, IL
59.	BATCHTOWN MGMT AREA, IL
60.	POOLS 25 & 26, MO
61.	CUIVRE ISLAND, MO
62.	DRESSER ISLAND, MO
63.	GODAR REFUGE AREA, IL
64.	STUMP LAKE, IL
65.	SWAN LAKE, IL
66.	CALHOUN POINT, IL
67.	JEFFERSON BARRACKS, IL
68.	FT. CHARTRES SC, IL
69.	ESTABLISHMENT CHUTE SC, MO
70.	KASKASKIA OXBOWS, IL
71.	STONE DIKE ALTERATIONS, MO/IL
72.	SCHENIMANN CHUTE, MO

STATUS AS OF: JUNE 2007

- UNDER CONSTRUCTION OR CONSTRUCTED
- GENERAL DESIGN INITIATED
- PLANNING PROCESS
- LOCK & DAM SITES

USACE Arrangements for Guidance, Partnership, Collaboration & Coordination

POLICY

UMR - Watershed

MISSISSIPPI RIVER COMMISSION

FEDERAL PRINCIPALS

UPPER MISSISSPPI RIVER BASIN ASSOCIATION (States)

ILLINOIS RIVER COORDINATING COUNCIL (Illinois)

IMPLEMENTATION

UMRS - System

NESP ADVISORY PANEL

NESP NAV ENVIRONMENTAL COORDINATING COMMITTEE

NESP NAVIGATION INTERESTS COORDINATING COMMITTEE

EMP COORDINATING COMMITTEE (EMPCC)

NETWORK for INTEGATED RIVER MANAGEMENT

UMRS Reach & Project

RIVER RESOURCES COORDINATING TEAM — **WORK GROUPS**

ILLINOIS RIVER TEAM — **WORK GROUPS**

RIVER RESOURCES ACTION TEAM — **WORK GROUPS**

RIVER RESOURCES FORUM — **WORK GROUPS**

PROJECT DELIVERY TEAMS … include partners and work within “management plans”

VISION STATEMENT:

To seek long-term sustainability of the economic uses and ecological integrity of the Upper Mississippi River System (UMRS)

OVERARCHING SYSTEM-WIDE NAVIGATION GOAL:

To increase regional and national value of commercial navigation on the UMRS in an environmentally acceptable manner consistent with the vision.

- Manage for safe, reliable, efficient, effective, and environmentally sustainable navigation for movement of commerce, national security needs, and recreation.

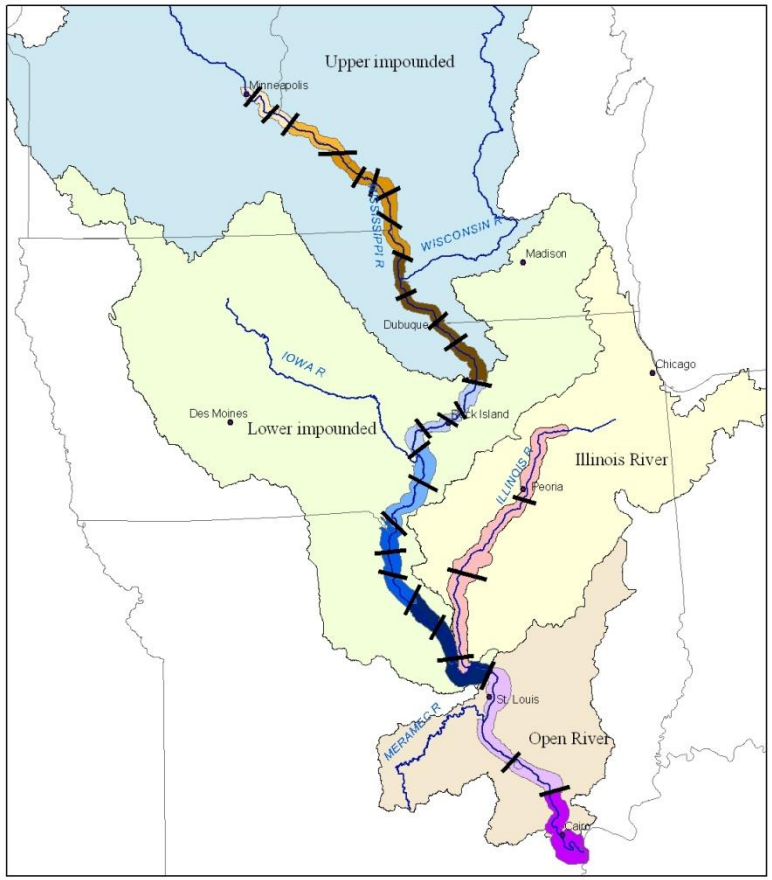
- Manage for effective utilization of commercial navigation on the UMRS in meeting current and future challenges in the regional and national multimodal transportation systems

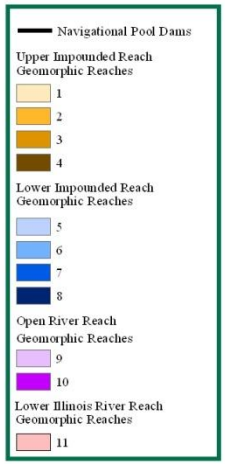
OVERARCHING SYSTEM-WIDE ECOSYSTEM GOAL: To conserve, restore, and maintain the ecological structure, process, function and composition of the UMRS to achieve the vision.

- Manage for a more natural hydrologic regime (hydrology and hydraulics)
- Manage for processes that shape a physically diverse and dynamic river-floodplain system (geomorphology)
- Manage for processes that input, transport, assimilate, and output material within UMR basin river-floodplains: e.g. water quality, sediments, and nutrients (biogeochemistry)
- Manage for a diverse and dynamic pattern of habitats to support native biota (habitat)
- Manage for viable populations of native species within diverse plant and animal communities (biota)

Upper Mississippi River System Issues of Scale

- Upper Mississippi River Basin
- Upper Mississippi River System
- Reaches
- Geomorphic Reaches
- Nav. Pools
- Project Areas





12 Upper Illinois

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Upper Mississippi River System Ecosystem Restoration Objectives 2009

US Army Corps of Engineers

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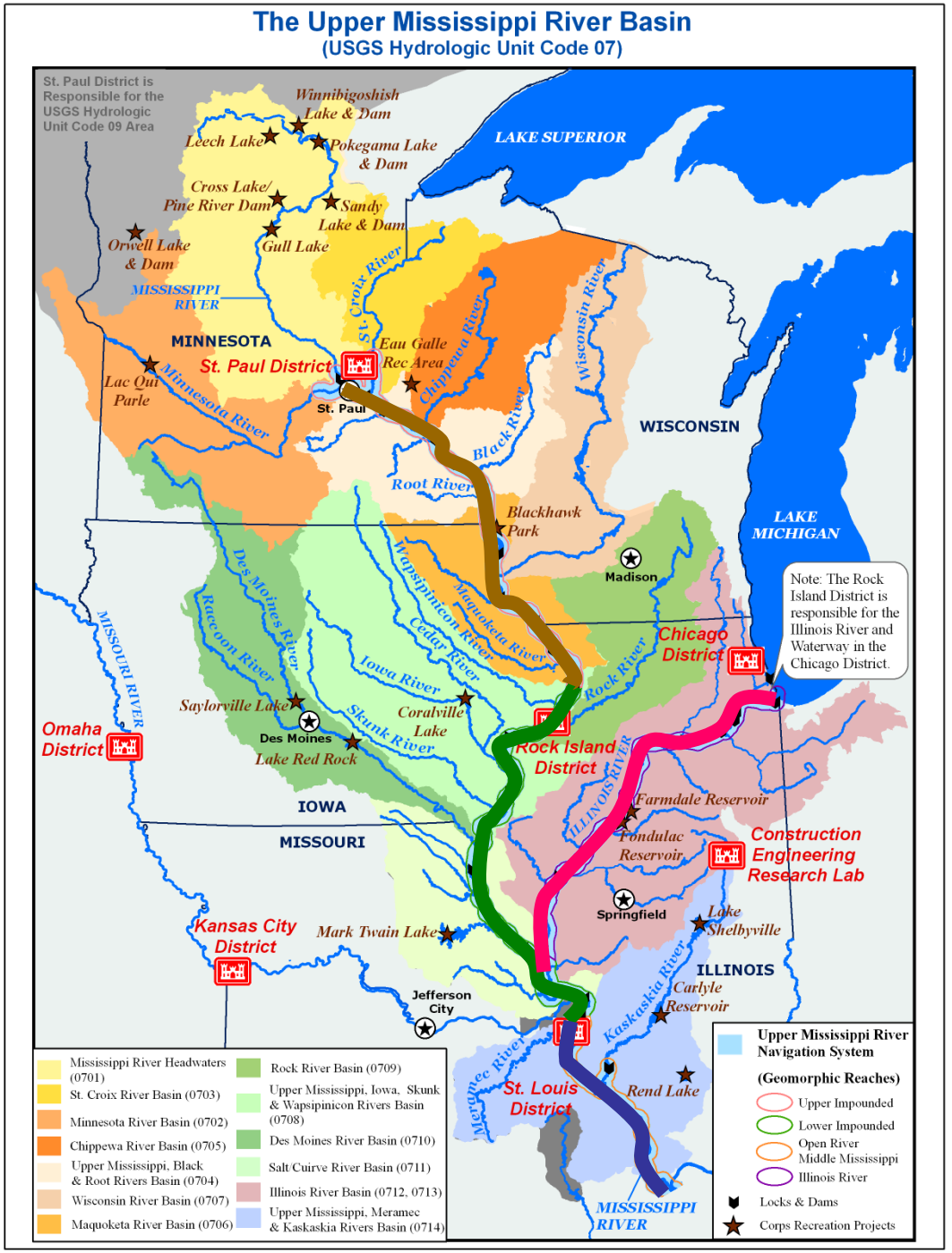
Upper Mississippi River Basin

Upper Mississippi River & Illinois Waterway System



Integrated Water Resources Management
UMR System and Watershed
Geographic Breakdown

200-Year Vision

- Mississippi River Basin
  - Upper Mississippi River Basin
    - Upper Mississippi River System
      - (4) Floodplain Reaches

Integrated Planning

      - **(12) Geomorphic Reaches**
        - Navigation Pools/Sub-Areas/Project Areas/Habitat Areas

Compatible Objectives

      - Tributary Watersheds

Integrated Planning

        - **HUC8 Watersheds**
          - HUC12 Watersheds
            - "Watershed Address"

Personal Responsibility

America's Watershed: A 200-year vision

An Intergenerational Commitment

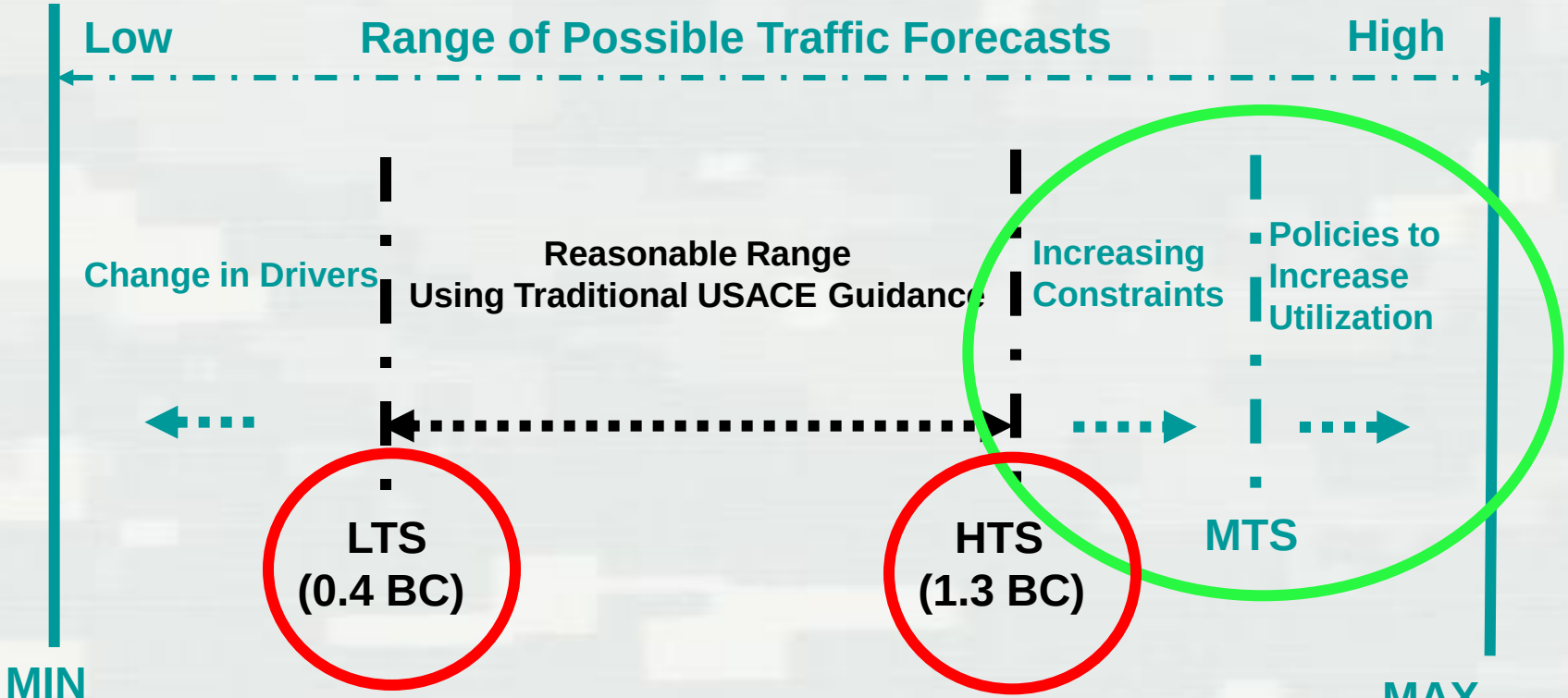
Our people ...

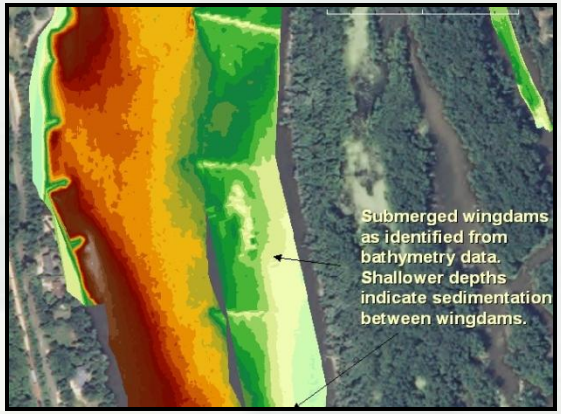
- Enjoy a quality of life unmatched in the world.
- Lead secure lives along the river or tributary.
- Enjoy fresh air and the surrounding fauna, flora, and forests while hunting, fishing, and recreating.
- Travel easily, safely, and affordably.
- Drink from and use the abundant waters of any river, stream, 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.

- National Security & Comprehensive Flood Control
- Environmental sustainability & recreation
- Infrastructure & energy
- Water supply & water quality
- Movement of goods; agriculture & manufacturing

Leveraging science, engineering, technology and public policy

NESP – Risk Framework




Submerged wingdams as identified from bathymetry data. Shallower depths indicate sedimentation between wingdams.


Wing Dam/Dike Alteration - Pool 2
Pool WLM - Pool 3
Minnesota
Floodplain Restoration - Root River
Forestry Restoration - Reno Bottoms
Cultural Site Protection
Wisconsin
Cultural Site Protection
Iowa
Cultural Site Protection
Mooring Cell L&D 14
Pool WLM Pool 18
Backwater - Upper Peoria Pool
Mitigation Project SAV
Floodplain Restoration Emiquon West
Mitigation Project Bank Protection
Mooring Cell - La Grange
DS Guidewall - Lock 22
Fish Passage - L&D 22
Island Shoreline Protection Twin Is.
Mooring Cell - L&D 24
Switchboat - L&D 25
Missouri
Illinois
Cultural Site Protection
Wing Dam/Dike Alteration - Herculaneum
Legend
Ecosystem Restoration Projects
Navigation Efficiency Projects
Locks and Dams
New 1200' Locks
Side Channel - Buffalo Chute

Lessons Learned

- Collaboration & Transparency essential
- Need a strong vertical team
- Be explicit about Goals & Objectives
- Deal directly with uncertainty and risk
- Establish adaptive management team (Institutional arrangements are important)
- Be aware of issues of scale - System/ Reach/ Project
- Don’t let Adaptive Management become a buss word, the focus is on DOING well learning

Dual Purpose Plan …

To seek long-term sustainability of the economic uses and ecological integrity of the Upper Mississippi River System

Our Mississippi

America's Great River

Photo by Rudi Nissan, Wisconsin DNR

Integrated Water Resources Management
UMR System

1870's – Constructed 4-Foot Channel

1970's - Environmental Degradation Recognized

1980's - Dredged Material Management

1986 - WRDA – EMP Authorization

1993 - Start Systemic Navigation Study

2000 - Shared Vision for Dual Purpose Operation

2007 - WRDA – NESP Authorization

Future - Continue Advancement of IWRM

Integrated Water Resources Management
UMR System and Watershed
USACE Participation

- Nine-foot Navigation Channel Project
- Environmental Management Program (UMR Restoration Program)
- Illinois River Basin Restoration Program
- Navigation and Ecosystem Sustainability Program
- UMR Comprehensive Plan
- Other:
  - Emergency Management
  - Regulatory Management
  - Small Projects Program
  - Floodplain Management Services and Planning Assistance to States
  - Watershed Planning (Section 729)
  - Participation on Interagency Teams: Regional Levee Task Force, Gulf Hypoxia Task Force