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
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
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 WINNESHEIK, 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. | POOL 12 OVERWINTERING, IA-IL
36. | POOL SLOUGH, IA
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. | CHAUTALOQUA REFUGE, IL
51. | CLARKSVILLE REFUFE, MO
52. | TED SHANKS, MO
53. | PHARRS ISLAND, MO
54. | ANGLE BLACKBURN, MO
55. | REDS LANDING, IL
56. | LAKE WINNESHEIK, WI
57. | STAG & KEETON ISLANDS, MO
58. | SANDY CHUTE, IL
59. | BATHCTOWN MGMT AREA, IL
60. | POOLS 25 & 26, MO
61. | CIUJRE 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 DIK 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 MISSISSIPPI 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 INTEGRATED RIVER MANAGEMENT

**UMRS Reach & Project**
- RIVER RESOURCES COORDINATING TEAM
- ILLINOIS RIVER TEAM
- RIVER RESOURCES ACTION TEAM
- RIVER RESOURCES FORUM
- PROJECT DELIVERY TEAMS … include partners and work within “management plans”

NETWORK for INTEGRATED RIVER MANAGEMENT
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

Geomorphc Reaches

Nav. Pools

Project Areas

12
Upper Illinois
Upper Mississippi River Basin

Upper Mississippi River & Illinois Waterway System
Integrated Water Resources Management
UMR System and Watershed Geographic Breakdown

- Mississippi River Basin
  - Upper Mississippi River Basin
    - Upper Mississippi River System
      - (4) Floodplain Reaches
        - (12) Geomorphic Reaches
  - (4) Floodplain Reaches
  - (12) Geomorphic Reaches
- Tributary Watersheds
  - HUC8 Watersheds
    - HUC12 Watersheds
      - “Watershed Address”
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.

Leveraging science, engineering, technology and public policy

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

Range of Possible Traffic Forecasts

Low

High

Change in Drivers

Reasonable Range
Using Traditional USACE Guidance

Increasing Constraints
Policies to Increase Utilization

MIN
Flat or Falling Traffic
(0.2 BC or less)

LTS = Low Traffic Scenario
MTS = Multimodal Transportation Scenario

HTS = High Traffic Scenario

MAX
Optimum System Utilization

LTS (0.4 BC)

HTS (1.3 BC)

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