



*April 11<sup>th</sup>, 2014*

# USING MULTIPLE DREDGE METHODS FOR HABITAT RESTORATION



# The Upper (Mississippi River)

## America's Best Kept Secret

- Home to outdoor enthusiasts
  - 326 Bird Species (60% of North America)
  - 150 Freshwater fish and mussel species (25% of North America)
  - 145 Amphibian and Reptile Species
  - 50 Mammal species

\*Upper Mississippi River Conservation Committee





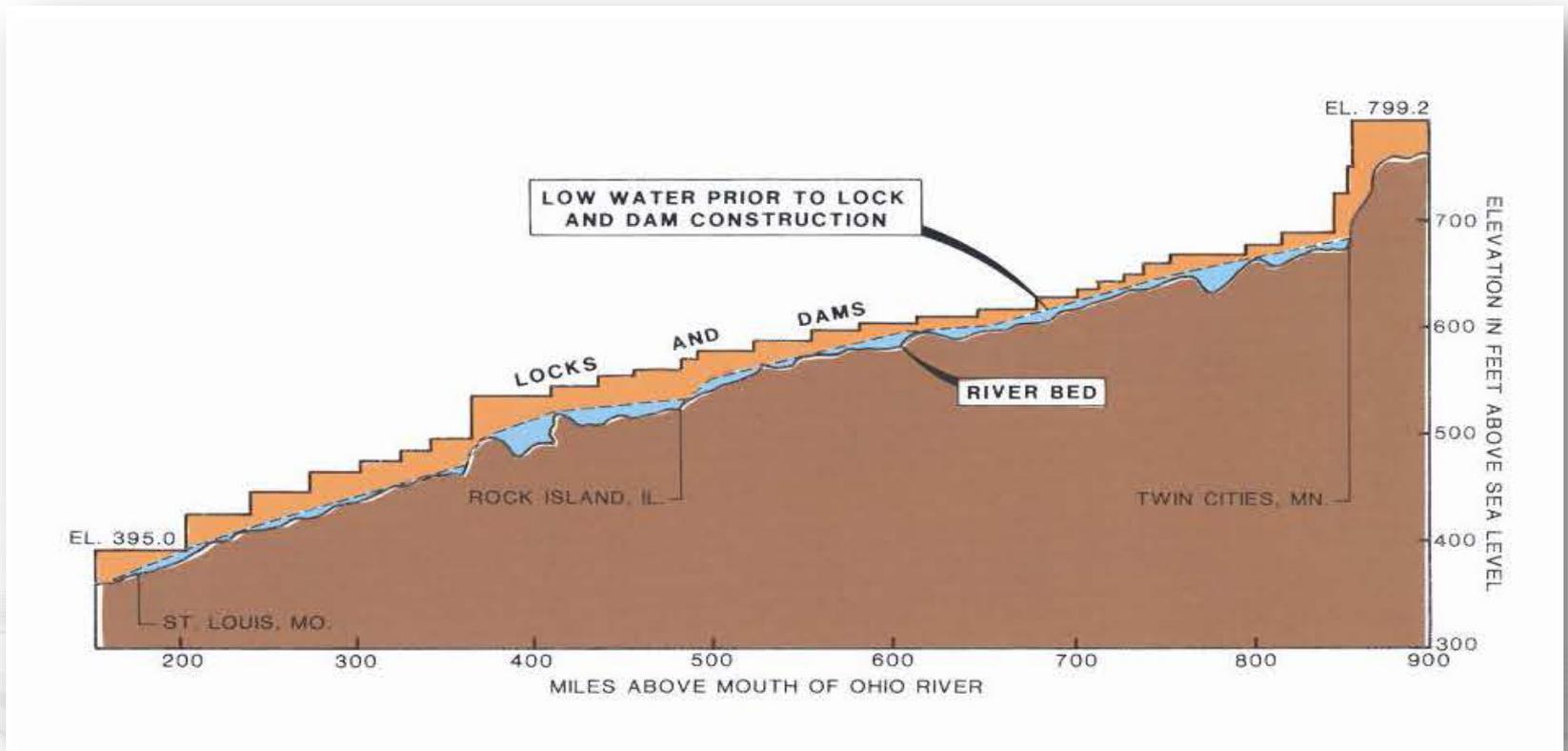
# Navigation

- The Rivers and Harbors Act of 1930
  - Established a 9-foot navigational channel
  - 29 Locks and Dams
  - 400-foot drop between Minneapolis and St. Louis (600 miles)
- Grain is king
- One 15-barge tow
  - = 200 Train cars
  - = 870 Large semi trucks





# Changes for Navigation



\*Diagram courtesy of the U.S. Army Corps of Engineers





# USACE EMP Program

- **UMRR-EMP**

- Upper Mississippi River Restoration – Environmental Management Program
- Authorized by WRDA 1986
- 54 projects to date, restoring over 100,000 acres
- Team Approach
  - Oversight by the USACE
  - Involvement from USFWS, USGS, USEPA, State DNRs, Local Governments



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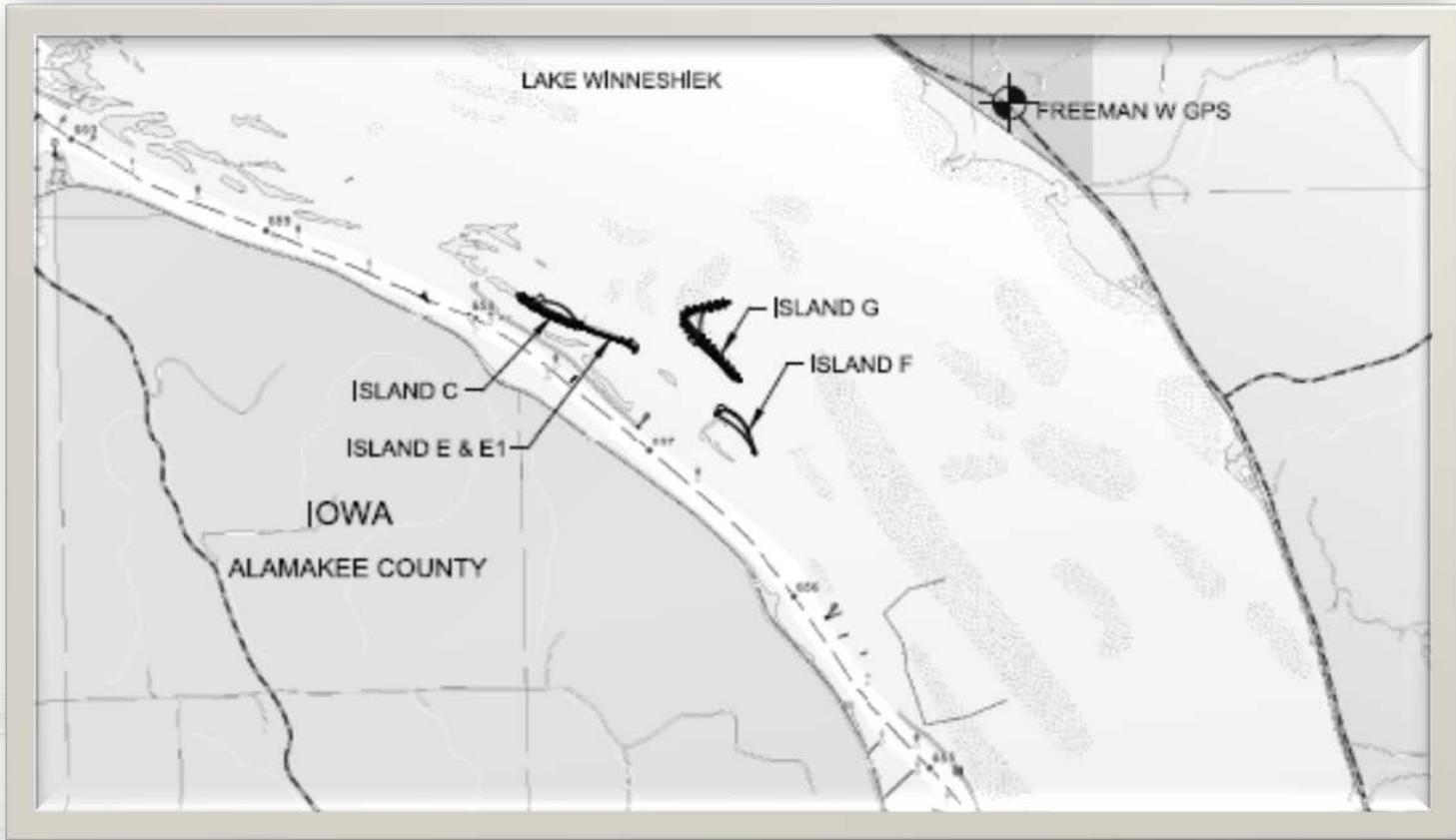




# Capoli Slough Islands

- Upper Mississippi River Pool 9 EMP, Phase II
  - 5 Islands
  - 1 Emergent wetland
  - 27 acres of new land created
  - 12 acres of access channels dredged
  - 229,000 Cubic Yards of sand and topsoil used
  - 15,000 tons of rock placed
  - 6 miles from nearest access point

# Capoli Slough Islands





# Building the Islands

- Multiple dredge methods
  - Hydraulic
  - Mechanical
  - Amphibious
- Multiple methods of transport
  - Hydraulic
  - Material barge
- Scour and erosion control
- Native seeding and planting





# Creating the Base



- 12” Swinging ladder cutter head dredge
  - Dredged 183,000 CY of sand
  - Pumped through 4,050 feet of pipeline
  - Borrowed material from main channel
  - Compaction using dozers, excavators, and amphibious equipment



# Base Layer Challenges

- Challenging placement
  - Displaced unsuitable foundation material before sand placement
  - 2013 flood season
    - Lasted well into July
    - Required base of islands to be built underwater
  - Shallow water access only before channels were dug





# Installing Topsoil

- Excavator with 4 CY bucket
  - Material moved using barges
  - Black dirt dredged from designated areas forming access channels
- Material was then placed in drying beds
- Spread using dozers





# Topsoil Challenges



- 56,000 yards of material placed\*
- Borrow sites were located in environmentally sensitive areas
- During extended flood season, topsoil could not be placed



# Amphibious Dredging

- Specialty equipment used in areas with very limited access
  - Initial material placement
  - Shallow marsh areas
  - Used to construct the emergent wetlands





# Scour and Erosion Control

- To keep the islands in place
  - 15,000 tons of rock were placed
  - Dikes
  - Vanes
  - Groins
  - Embankment protection





# Scour and Erosion Challenges



- Rock was brought in from an access point located 6 miles upstream
- Placement was completed throughout the duration of the project



# Survey



- Tight tolerances
- Island layout
- Elevation verification
- RTK-GPS system used





# Finishing





# Thank You

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