GLMRIS Update and Aquatic Nuisance Species Control Efforts

Dave Wethington, P.E.
GLMRIS Program Manager

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US Army Corps of Engineers
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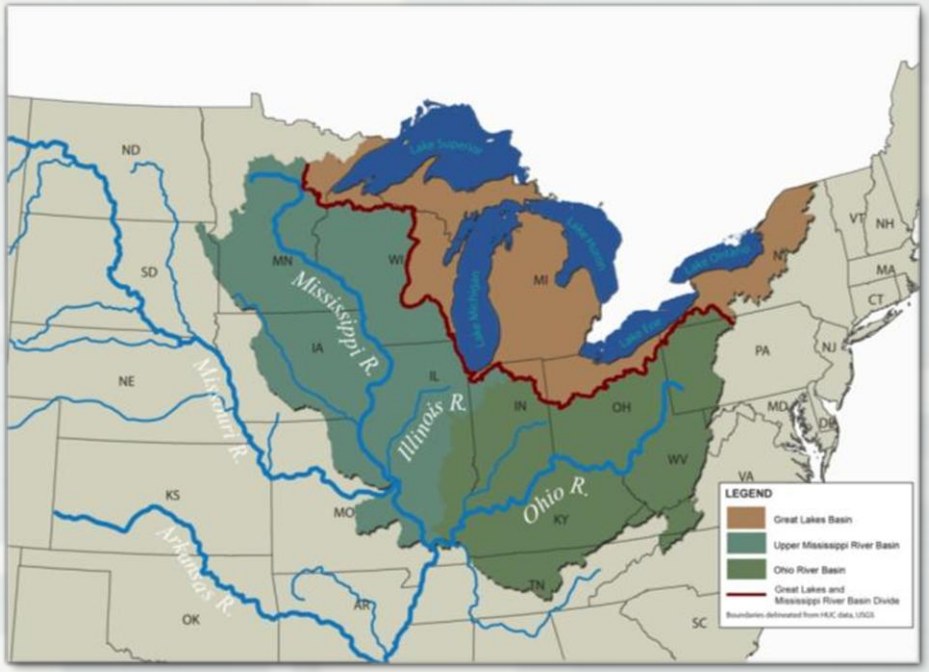
GLMRIS - Scope of Study

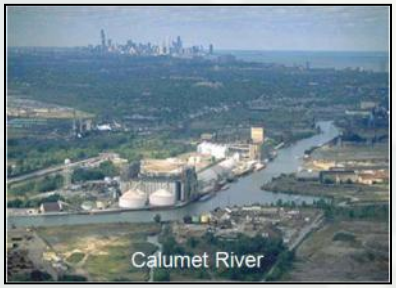
- Interbasin transfer of ANS via aquatic pathways
- Range of options and technologies
- Study Goals
  - Prevent ANS transfer
  - Mitigate adverse impacts to waterway uses
- Stakeholder engagement
- July 2012 Legislation
  - Expedited completion of report to 18-mo timeline
  - Focused efforts on CAWS
  - Evaluate hydrologic separation

GLMRIS – Detailed Study Area



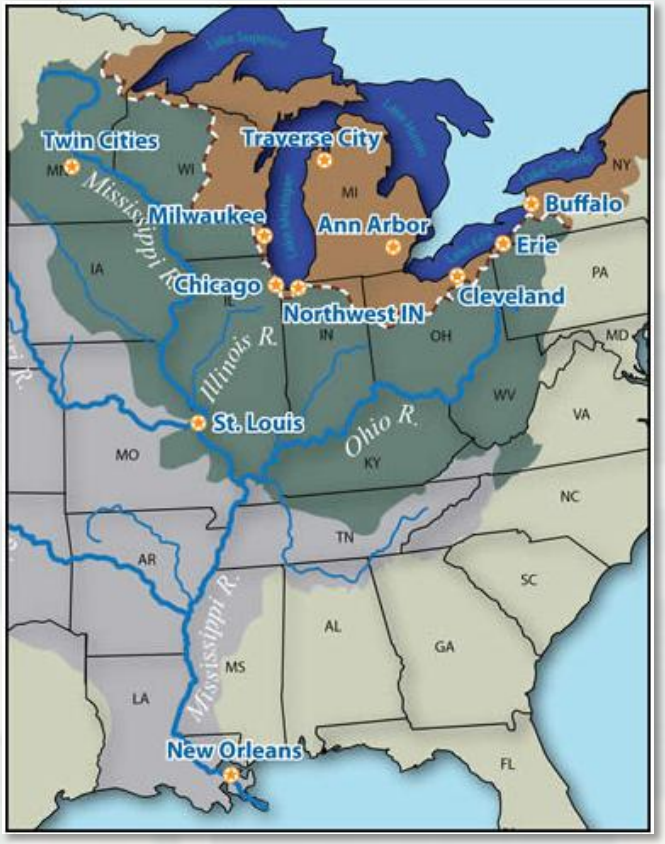
GLMRIS Report - Alternatives

- Sustained Activities (No New Federal Action)
  - Continue existing efforts, such as operation of electric barriers
- Nonstructural Measures
  - Best-management practices to address ANS of Concern
- Technology Alternatives – Flow Bypass & Buffer Zone
  - Utilizes refined list of ANS Controls from screening process
- Hydrologic Separation Alternatives
  - Lakefront – Hydrologic, Water Quality & Navigation modeling underway
  - Mid-System – Hydrologic, Water Quality & Navigation modeling underway
- Hybrids
  - Combine/mix physical barriers and technologies to optimize effects



GLMRIS Report - Public Engagement

- Eleven public meetings in U.S.
  - ~15.5 hours of public testimony
  - Transcripts posted on March 24, 2014
- Eight state agency meetings
  - IL, IN, OH, NY, MI, MN, PA and WI
- 1500+ individual comments submitted
  - 3900+ from Sierra Club campaign
  - Comment period closed on March 31, 2014
- Dedicated briefings for international, local, and non-governmental organizations
- Comments will be compiled and posted on the GLMRIS website in early May 2014
  - Comment Period Summary Report



http://glmris.anl.gov

Public Meeting Themes

- Protect the Great Lakes
  - Bighead, silver carp are of greatest concern
- Immediate action is urgently needed, including interim measures
  - Proposed timelines of 10 or 25 years are too long
- Physical separation will be the most effective solution
- Importance of waterway commerce to the regional economy
  - Chicago, NW Indiana, New Orleans, St. Louis
- **Overall positive feedback for GLMRIS Report**
  - Praised for the thorough and comprehensive nature of the report
  - Significant appreciation of the 25p. GLMRIS Summary Report; Website
  - Many commenters thanked the Corps for hosting public meetings; allowing the public the opportunity to comment

Public Stakeholder Feedback/Suggestions to Date

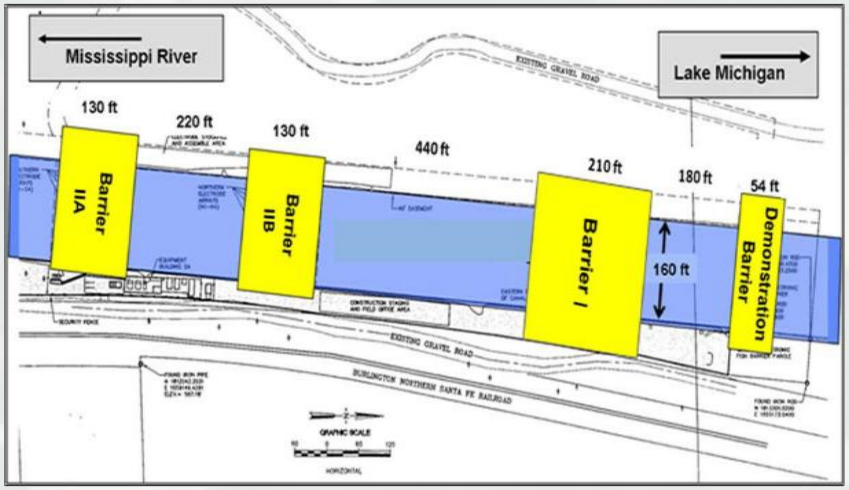
- Technical concerns
  - Mitigation assumptions
    - Water quality mitigation assuming no significant new pollutant load to Lake Michigan
    - Flood risk mitigation to the 500-year event
  - No discussion of cost/benefit; What are the benefits to preventing ANS?
- Continue near-term actions
  - Continue fishing/harvesting efforts of carp by state agencies
  - Commercial uses of carp (consumption, fertilizer, export)
  - Continue to operate electric barriers; finalize Barrier I (FY17)
- Interim Measures: Further research re. Brandon Road Lock & Dam
  - Mutually agreeable to navigation interests and hydro-sep advocates
  - Concern by environmental stakeholders to retain visibility on long-term goals of ecological or physical separation

ANS Control Technologies

Current and Possible Future Efforts

CSSC Electric Barriers

- Operation & Maintenance of Barriers
- Construction of Barrier I
  - Two narrow (high field) arrays
  - Demo Barrier used as wide (low field) array
  - Redundant power feeds
  - Increased power capacity
  - Uninterrupted power supply
  - Anticipated operational in late 2016




Demo Barrier

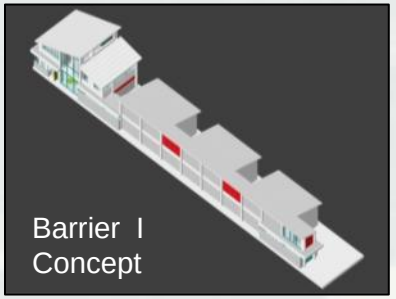
2002


Barrier IIA

2009


Barrier IIB

2011


Barrier I Concept

Research: CSSC Barriers

Barge-Fish Interaction Study and DIDSON

- Summary of joint USACE/USFWS research released in December
- Preliminary findings indicated:
  - Vessel-induced flows can trap fish and transport them across the barriers
  - Certain barge configurations impact electric field strength
  - Potential exists for very small fish to pass through barrier in large groups
- Way ahead
  - Continued field testing by USFWS using the DIDSON
  - Additional laboratory research
    - Validation of barrier optimal operating parameters
    - Comparative testing of Asian carp and surrogate species
  - Development of a Task Force:
    - USACE, USCG and navigation industry
    - Identify potential solutions to issues caused by barge traffic

Research: Carbon Dioxide

- USACE allocated $1.1M in GLRI funds to ERDC for CO_2 research (PI: David Smith). Funded construction of a flume, pumps, chillers, tanks, etc. On track to finish construction in Summer 2014.
- Proposed three year study to examine: impacts to water quality, concrete structures, and ecosystem.
- Three-year study plan is currently unfunded. Estimated costs: $1.33M in Year 1; $1.58M in Year 2; and $718K in Year 3.
- Efficiencies may be gained by re-scoping effort in collaboration with USGS, IL-DNR.

CO_2 study flume. Vicksburg, MS

Research: Electrical Control for Mussel Attachment/Detachment on Stationary Surfaces

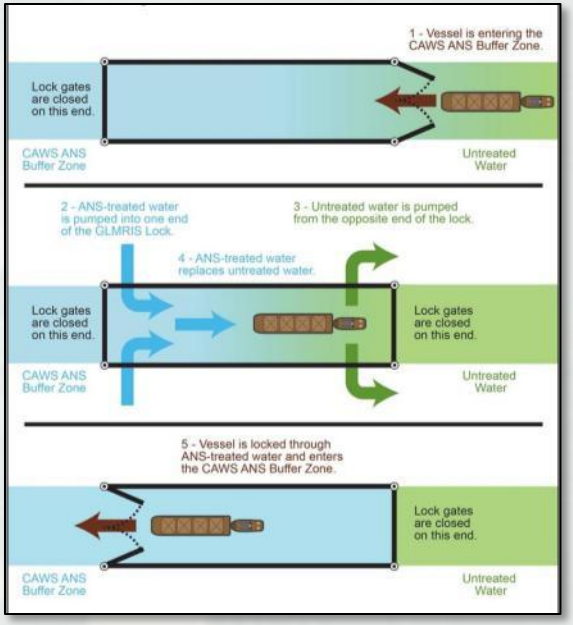
- ERDC-EL (Vicksburg, MS)
- Concept may be applicable to hull fouling
- Focus is on invertebrates (not plants)
- Primary study organism: Dreissenid mussels
- Addition of 2 GLMRIS high and medium risk surrogates
  - *Hyalella azteca* (scud surrogate)
  - *Ceriodaphnia dubia* (fishhook waterflea surrogate)
- Assess if test species change behavior, positioning or attachment under a variety of electrical settings
  - DC with a negative pulse
  - DC (no pulse)
  - DC pulse (mimic Barrier IIB waveform)
- Estimated Schedule
  - FY14 – Equipment acquisition, set up and laboratory trials
  - FY15 – Laboratory trials continue
  - FY16 – Field demonstration, data analysis, publication

Possible Future Activities

- ANS control is a shared responsibility
- A collaborative path forward is a critical element of identifying a consensus-based solution to existing ANS control issues
- Public input will be evaluated to assess if there is consensus among stakeholder groups
  - Input may be utilized to inform future decisions
- MAP-21 allows Secretary to proceed to Preconstruction Engineering & Design if a project is deemed “justified”
- The Corps is currently awaiting further direction prior to conducting additional study efforts

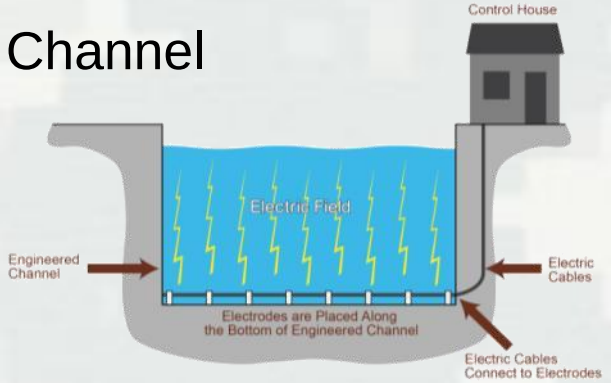
Possible Future Activities

- Further development of GLMRIS Lock concept
  - See GLMRIS Report, Appendix A, Attachment H (p. A-217) *GLMRIS Lock – Reducing Risk of Aquatic Nuisance Species Transfer through Locks*
  - Potential future research to inform design
    - Computational model
    - Physical model
  - Would answer questions
    - Quantify exchange volumes
    - Validate and refine mixing processes
    - Determine pumping requirements
  - Estimated requirements
    - Time: ~15 months
    - Cost: ~$1.1M



Possible Future Activities

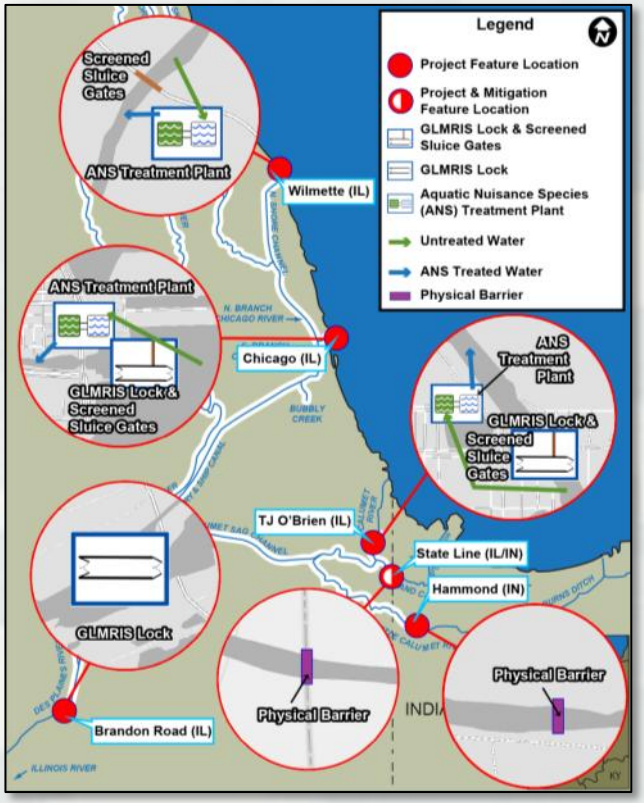
- Study/design Electric Barriers with Engineered Channel
  - Research goals
    - Prevent interferences with lock gates, other equipment
    - Reduce stray current
    - Optimize dimensions and electrode configuration
  - Estimated requirements not yet scoped



- Collaborate with local, state and federal agencies toward implementation of GLMRIS Alt #2: Nonstructural Controls
- Long-term timeframe – many potential unknown factors
  - Surveys for High and Medium Risk species
  - ANS Treatment Plant bench-scale tests
  - Continued analysis of GLMRIS Alternative Plans – if directed
    - Planning model certification
    - NEPA documentation

Brandon Road Lock and Dam

- Detailed impacts and efficacy of location and ANS Controls need to be assessed
  - GLMRIS Lock, Engineered Channel with Electric Barrier
  - NEPA Analysis
- Opportunity for staged implementation
  - Depends on long term control strategy
- One-way control that reduces transfer risk for MR basin species
  - Would not address LM basin species
- Brandon Road
  - "Pinch point" for all five aquatic pathways
  - High-head dam leaves lock chamber as the only pathway
    - Avoids potential bypass via the Lower Des Plaines



Alternative Plan 4
Technologies with Buffer Zone

Other Agency Support Activities in FY 14

- USFWS – eDNA Plan: CAWS
- USFWS – Comprehensive Great Lakes Early Dedication Sampling
- USFWS – Asian Carp Monitoring and Surveillance
- USFWS – DIDSON and Barge Interaction Studies
- USFWS – Dual Frequency Identification Sonar
- IDNR – Continue to communicate with scientific community
- IDNR – Commercial Harvesting Activities
- IDNR (and other State Agencies) – Mobile Electric Barrier
- IDNR/USGS/USEPA – Chlorination
- IDNR/USGS/USEPA – Carbon Dioxide Barrier
- USGS – Integrated Pest Management system
- USGS – Seismic Technology
- USGS/USFWS – Micro-particles: Targeted Pesticides & Chemical Attractants

GLMRIS

Great Lakes and Mississippi River Interbasin Study

Aquatic Nuisance Species

Ecosystems

Navigation

Recreation

Flood Risk Management

Water Use