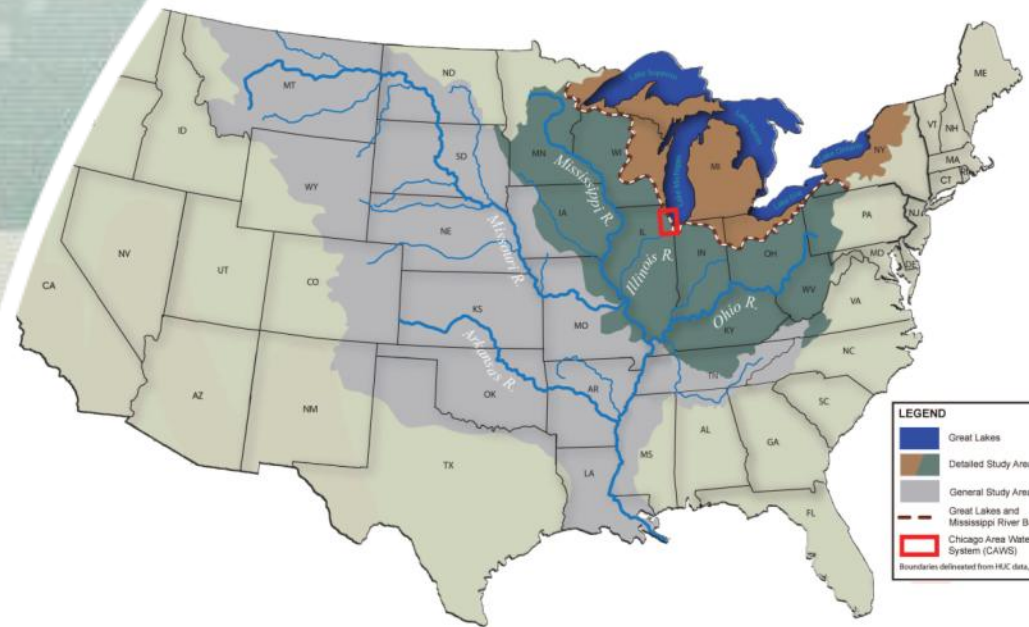


GLMRIS Update and Aquatic Nuisance Species Control Efforts

Dave Wethington, P.E.
GLMRIS Program Manager

April 29, 2014

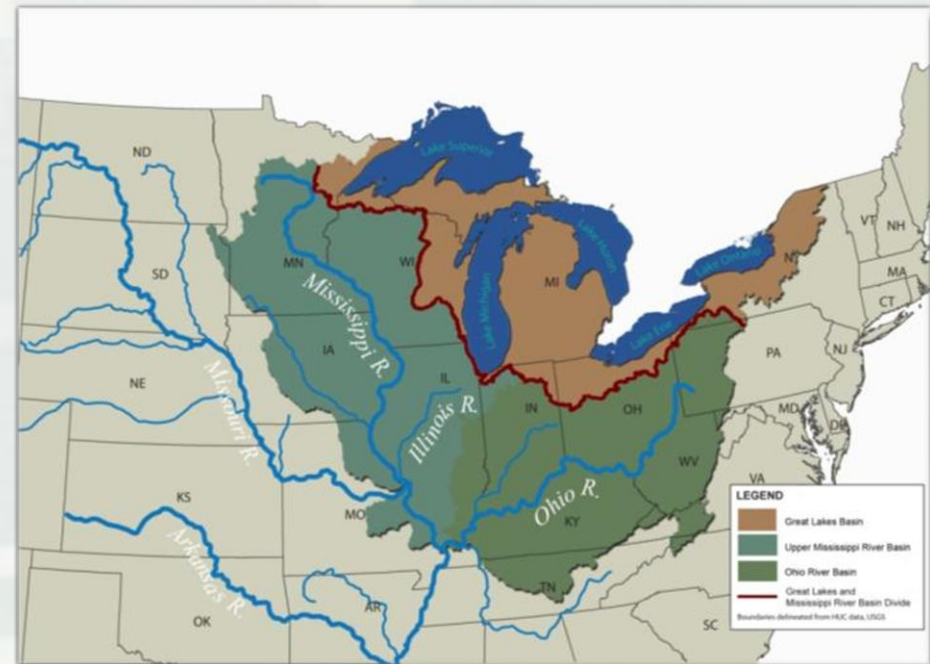




GLMRIS - Scope of Study

- 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

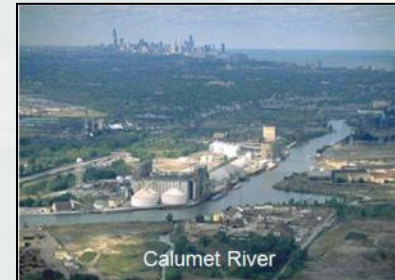
GLMRIS – Detailed Study Area





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





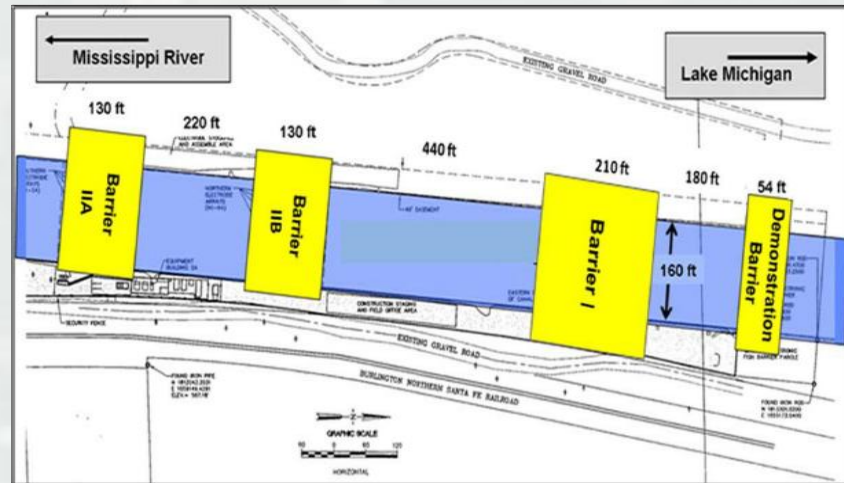
ANS Control Technologies Current and Possible Future Efforts





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



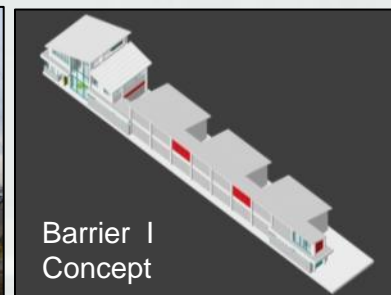
Demo Barrier



Barrier IIA



Barrier IIB



Barrier I Concept



2002

2009

2011



BUILDING STRONG®



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 CO₂ 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.



CO₂ 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

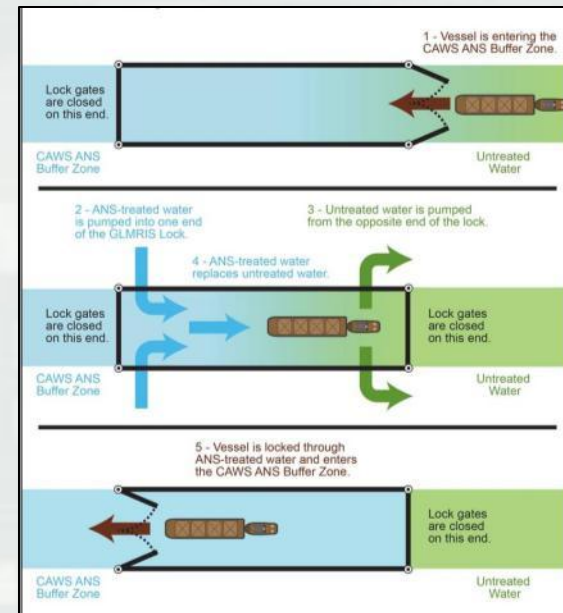
- ANS control is a shared responsibility
- A collaborative path forward is a critical element of identifying a consensus-based solution to existing ANS control issues
- Public input will be evaluated to assess if there is consensus among stakeholder groups
 - ▶ Input may be utilized to inform future 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

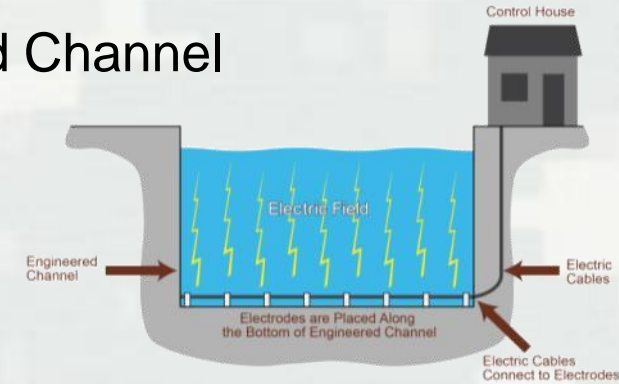
- Further development of GLMRIS Lock concept
 - See GLMRIS Report, Appendix A, Attachment H (p. A-217)
GLMRIS Lock – Reducing Risk of Aquatic Nuisance Species Transfer through Locks
 - Potential future research to inform design
 - Computational model
 - Physical model
 - Would answer questions
 - Quantify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





Possible Future Activities

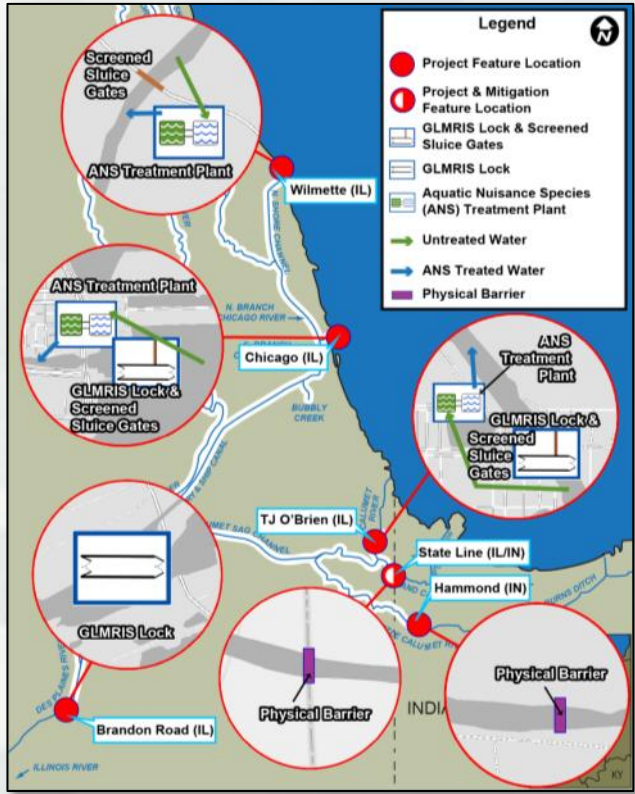
- Study/design Electric Barriers with Engineered Channel
 - ▶ Research goals
 - Prevent interferences with lock gates, other equipment
 - Reduce stray current
 - Optimize dimensions and electrode configuration
 - ▶ Estimated requirements not yet scoped
- Collaborate with local, state and federal agencies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



GLMRRIS

GREAT LAKES AND MISSISSIPPI RIVER INTERBASIN STUDY



AQUATIC NUISANCE SPECIES



ECOSYSTEMS



NAVIGATION



RECREATION



FLOOD RISK MANAGEMENT



WATER USE