Asian Carp Framework 2015

Great Lakes, Ohio River & Upper Mississippi River Basins

June 30, 2015

Speakers:
Mike Weimer, USFWS, Co-chair, ACRCC
Cameron Davis, USEPA, Co-chair, ACRCC
Col. Christopher Drew, USACE, Chicago District
Aaron Woldt, USFWS
Leon Carl, USGS

Overview

- ACRCC, Framework Initiatives & Overview
  Mike Weimer, ACRCC Co-Chair & USFWS

- Framework Funding
  Cameron Davis, ACRCC Co-Chair & USEPA

- Great Lakes Mississippi River Interbasin Study & Brandon Road Lock
  Col. Christopher T. Drew, Chicago District Commander, USACE

- Bighead & Silver Carp Monitoring & Migration in CAWS
  Aaron Woldt, USFWS

- Technology Research & Development
  Leon Carl, USGS

- Q & A

Overview of the 2015 Framework

Mike Weimer

Co-chair ACRCC

U.S. Fish and Wildlife Service

Asian Carp Regional Coordinating Committee

"The purpose of the ACRCC is to prevent the introduction of Asian carp in the Great Lakes."

Framework Initiatives

New for in the 2015 Framework:

- Covers two Federal fiscal years (FY2015 and 2016)
- Includes two additional Asian carp species (Grass and Black Carp)
- Includes addition of Canadian partner efforts

Additional Highlights:

- Research and development of AIS control alternatives for use at Brandon Road Lock and Dam
- Agency collaboration on development and implementation of new tools/technologies (e.g. CO2)
- Construction of new permanent electrical barrier (3rd barrier)
- Completion of Eagle Marsh project (Fort Wayne, Indiana)
- Developing IPM Plans for strategic deployment of tools
- Canadian/US collaboration on development of rapid response plans, risk assessments, and control technologies

Overview of the 2015 Framework

Cameron Davis

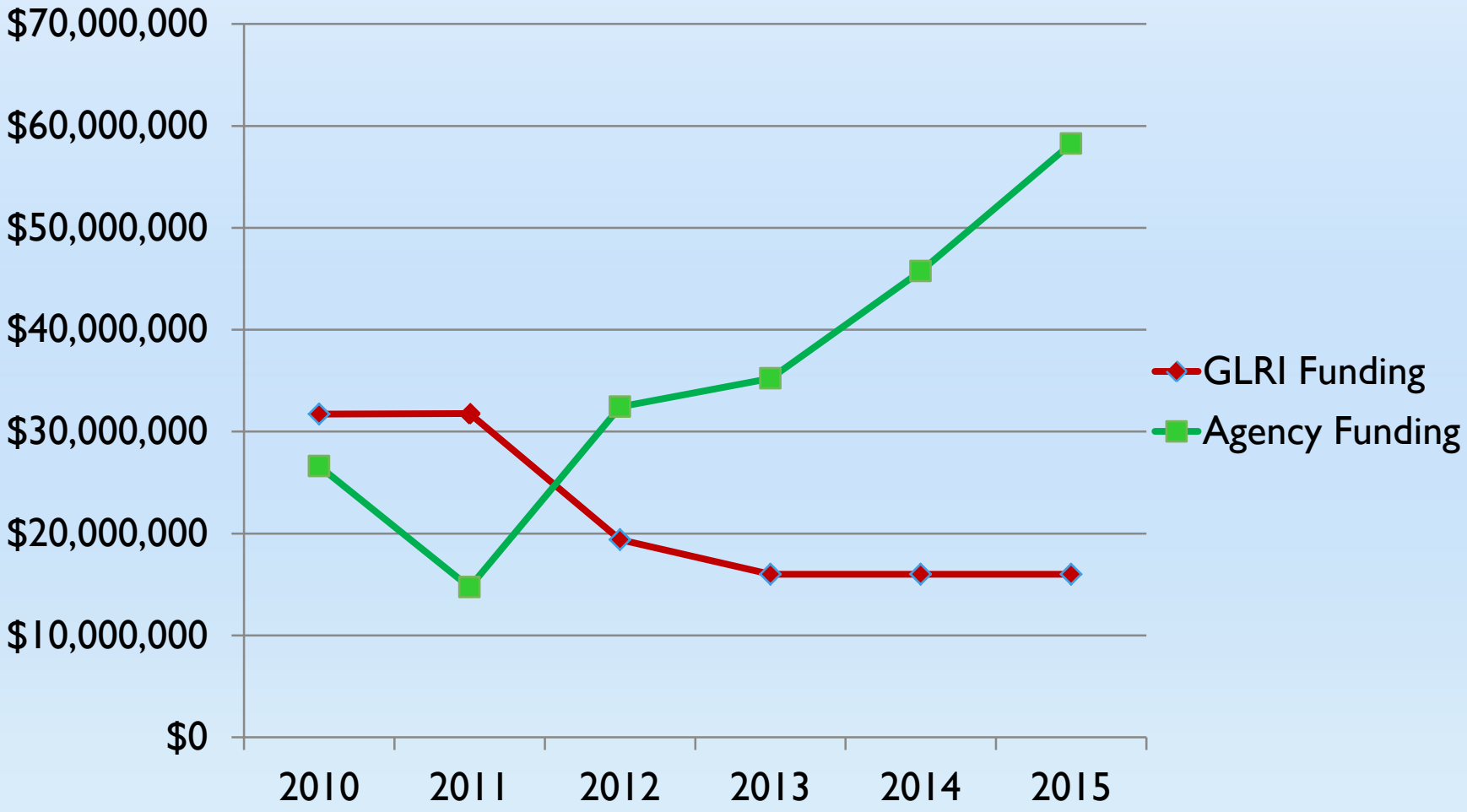
Co-chair ACRCC

U.S. Environmental Protection Agency

FY 2015 Funding Summary by Agency

Agency	FY 2015 GLRI Funding	FY 2015 Agency Funding
USACE	$3,916,500	$50,200,000
USCG	$0	$5,600
USEPA	$0	$0
USFWS	$4,024,028	$2,797,088
USGS	$3,935,500	$5,260,229
USFWS – IL DNR	$4,124,000	$0
Total	$16,000,000	$58,262,917

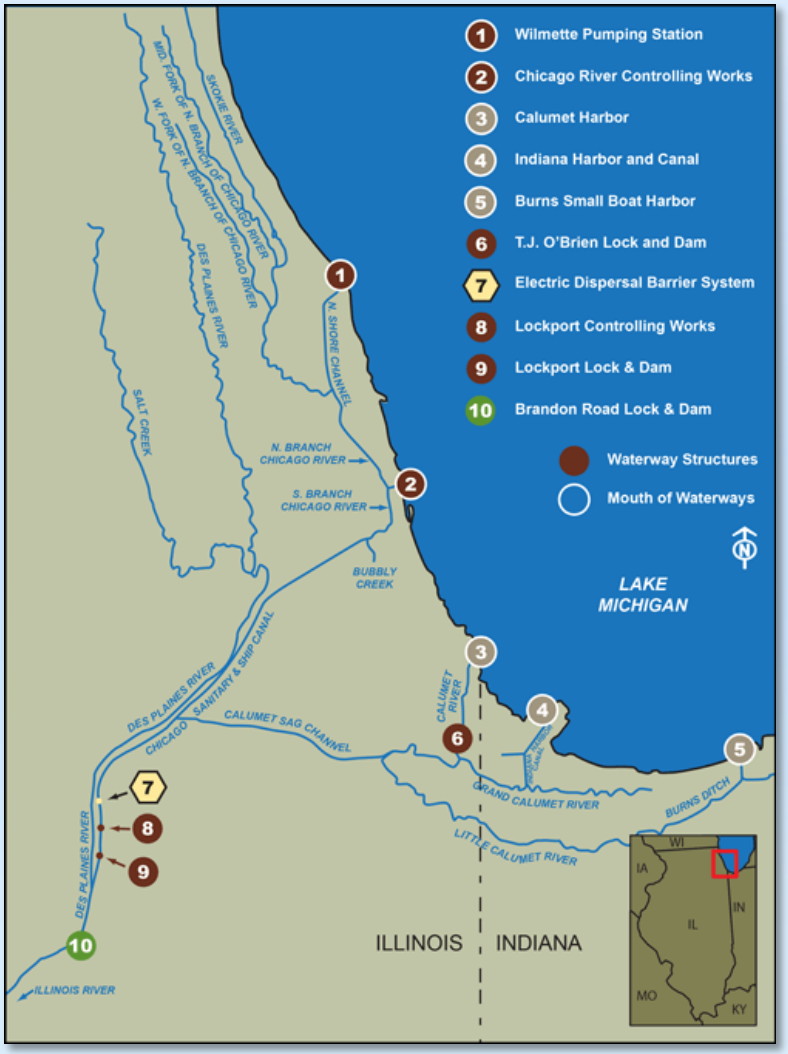
Fiscal Years in Review



GLMRIS – Brandon Road Update

COL Christopher T. Drew
Commander, Chicago District

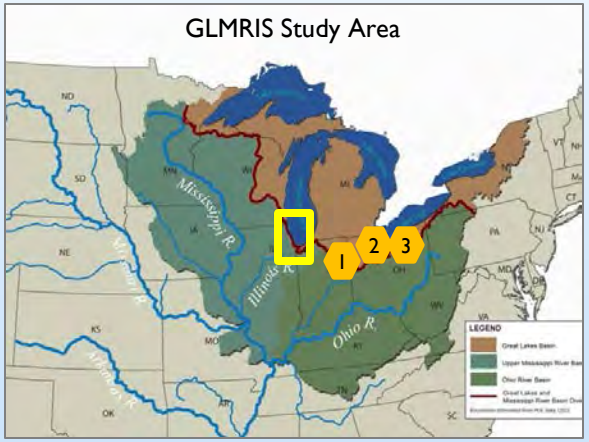
30 June 2015



US Army Corps of Engineers
BUILDING STRONG®

ACRCC

The GLMRIS Program



GLMRIS Program

- LRC Lead
- Coordination of program elements
- Budget development and defense
- Stakeholder engagement, including ACRCC related activities
- Collaboration with ERDC and other agencies on ANS research, including control measures

Focus Area I - CAWS

- LRC Lead
- GLMRIS Report released Jan 2014

Focus Area II – Other Pathways

- LRB Lead
- GLRI funded
- Pathway assessments by state
- Summary Report released May 2013

Brandon Road

- MVR Lead
- One-way control point identified in three alternatives in GLMRIS Report

Eagle Marsh, IN

- LRL Lead
- Highest risk pathway outside CAWS
- Control implemented by NRCS with USACE support
- Phase I complete Sep 2015

1

Ohio – Erie Canal, OH

- LRB Lead
- Control implemented by State of Ohio
- Complete by Sep 2017

2

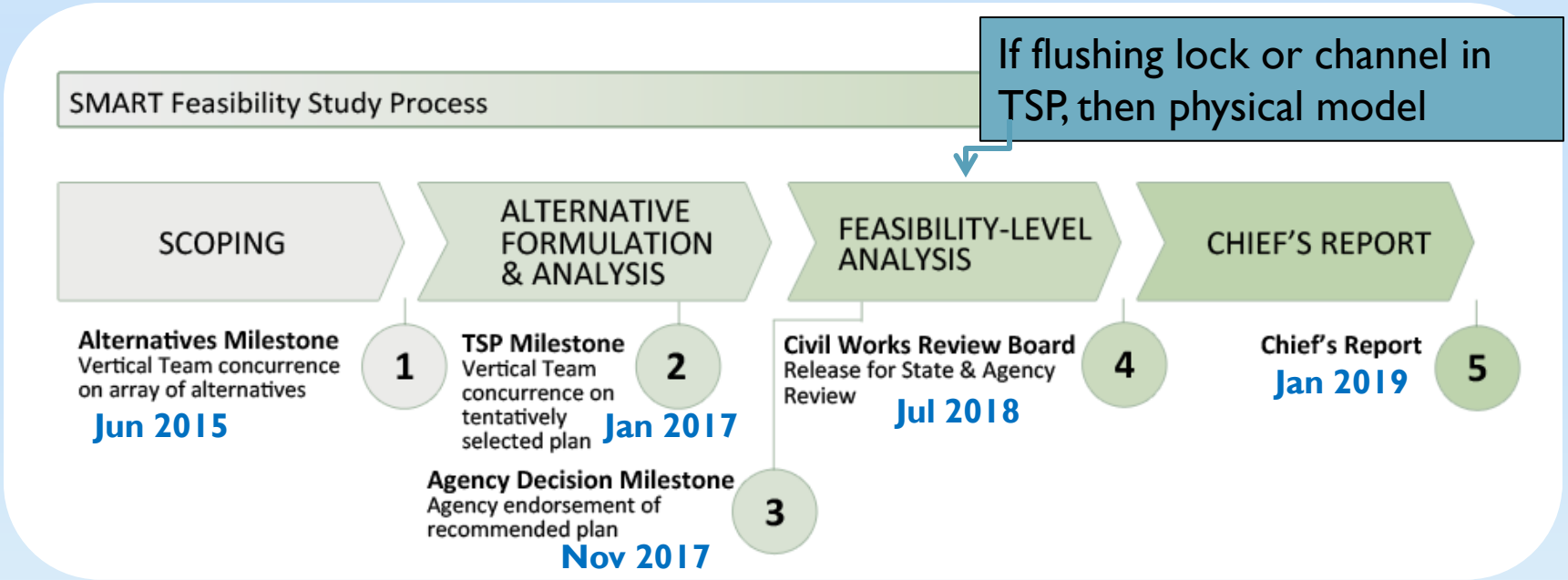
Ohio-Erie Canal, OH

- LRB Lead
- Control implemented by State of Ohio with USACE support
- Complete by Sep 2017

3

Brandon Road Study

Study Goal: *Evaluate potential control options and technologies at Brandon Road Lock & Dam to reduce the risk of upstream interbasin transfer of ANS while minimizing impacts to waterway uses and users and identify a recommended plan.*



Brandon Road Study

Alternative concepts

- No New Federal Action – Sustained Activities Alternative
- Nonstructural Alternative
- Swimmer Alternative
- Swimmer and Floater Alternative
- Swimmer, Floater, and Hitch Hiker Alternative

- Potential Controls by ANS Type
  - Swimmers
    - Electric Barrier
    - Other Emerging Technologies, such as Carbon Dioxide, Hydroguns, Acoustics
  - Floaters
    - Flushing lock
    - Other concepts, such as lock treatment with hot water or ozone
  - Hitchhikers
    - Not Addressed
    - Possible opportunities include lock closure or lock treatment

Monitoring Update

Aaron Woldt

U.S. Fish and Wildlife Service

Asian Carp Monitoring

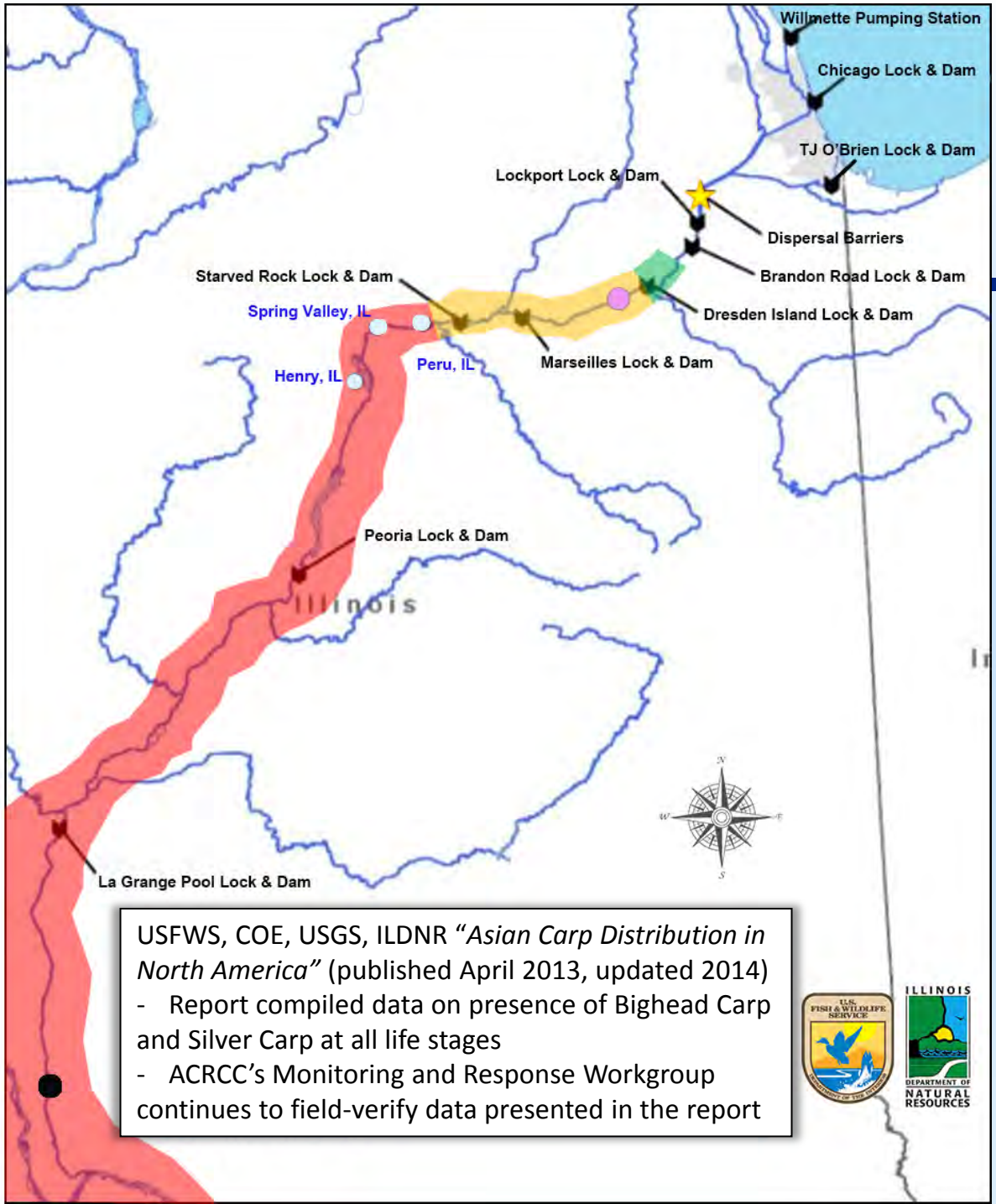
- Monitoring of Asian Carp in the CAWS: vigilance on new occurrences or change in range expansion. Targeting tools in specific areas based on known population status.
- MRWG maintains seasonal intensive monitoring above barriers
  - June 8-19 (Lake Calumet) and September 14-25 (Chicago River)
- Increase efforts below the barriers:
  - focus removal efforts where Asian carp are in moderate abundances (>3.25M lbs removed to date)
  - increase monitoring where Asian carp are present in low numbers or not detected (leading edge)
- Heightened evaluations at Brandon Road Lock and Dam

Presence of Bighead and Silver Carp in the Illinois Waterway

- Adult Population Front
- Presence of Adults
- Observed Spawning
- Verified Spawning
- Three Captures of Black Carp
- Juvenile Collection
- Lock & Dam
- Dispersal Barriers

Distance From Lake Michigan

- 55 Miles : Adult Population Front
- 62 Miles : Potential Spawning
- 64 Miles : Observed Spawning
- 110 Miles : Verified Spawning
- 37 Miles : Dispersal Barriers



USFWS, COE, USGS, ILDNR "*Asian Carp Distribution in North America*" (published April 2013, updated 2014)

- Report compiled data on presence of Bighead Carp and Silver Carp at all life stages
- ACRCC's Monitoring and Response Workgroup continues to field-verify data presented in the report

May 2015

Small Asian Carp Monitoring

- USFWS and MRWG have always monitored for small Asian carp
  - identified in 2010 MRP, implemented in CAWS, Upper, and Lower IWW, primarily led by USFWS and IDNR/INHS efforts

- Observations:
  - 2013: Observed spawning behavior Marseilles Pool; moderate to low spawn in lower river as detected by INHS/others
  - 2014: BIG Spawn detected in lower Illinois River (largest since 2008); detection of larvae/eggs – Henry, IL (RM 190) and downstream
  - 2015: sampling confirmed 2014 spawn success; detected small sized silver carp 33 miles farther upstream (RM 223), more spawning observed

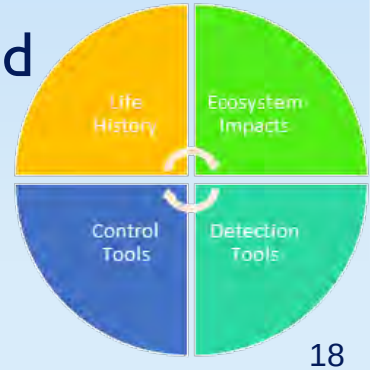
- Concern: small fish are much farther downstream than leading edge of adults, however we need to monitor closely because presence of fish < 6 inches have increased risk of passage at the electric barriers under varying operational settings.

USGS Asian Carp Technologies Update

Dr. Leon M. Carl
Regional Director
USGS Midwest Region

USGS Strategic Science Approach
In Collaboration with Partners

- Development of control tools and technologies, early detection methods (with FWS), and assessing risk of AC survival; Partner outreach/tech transfer
- Application of science/tools developed in Great Lakes to other basins (e.g. Miss. , OH, and MO Rivers) and other invasives such as grass and black carp
- Using an IPM Approach to integrate latest tools and knowledge using an adaptive strategy
- Essential to know life history of Asian carp and affected native species for effective IPM and control tool development



USGS Control Tools/Technologies

- *Waterguns:* 2014 - Fish behavior altered but some barrier bypass; Refined 2015 strategy 4 waterguns, tighter array, faster firing, setup mimics BRLD approach channel; field tested early June
- *CO2*: 2014 pond testing – fish moved away; 2015 field testing late summer; ongoing testing of native mussel effects (to meet FWS needs)
- *Microparticles:* 2015 lab trials validated 2014 results- little or no BG or LMB mortality; 2015 pond trials this summer with algal attractants and sound
- *Registration:* CO2 and Microparticles – working with EPA and FWS on data requirements; USGS provides regulatory support
- *Feeding Attractants/Sound*: Pairing with netting (IL DNR, MO DNR) and microparticles; Electrophysiology to ID attraction chemical
- *Hand-held eDNA kit:* Law enforcement use - Rapid testing of live fish shipments; Also identify species present in a waterbody.
- *Grass/Black Carp Update:* Documented successful GC reproduction in GL Basin and BC reproduction in Miss. River basin 2011-2014.

Brandon Rd Lock & Dam Support
Meeting USACE/GLMRIS Needs

- Working closely with the USACE to obtain data they need to support their efforts and inform model development.
  - Real-time stage and velocity gage installed
  - 2 Continuous data stations for CO2 testing
  - Upcoming dye tracer to track flow in lock
  - Testing of affects of Watergun pressure on lock structures
- Lock Treatment options – Published USGS Report of TNC funded work on potential chemicals for use in locks. Hot Water and Ozone best options; USGS to set up lab testing; CAWS Advisory Committee interest

THANK YOU

For more information

Please visit www.asiancarp.us

Water Resources Reform & Development Act: Supporting Asian Carp Management in the Ohio and Upper Mississippi River Basins

Mike Weimer
Aaron Woldt
Greg Conover

U.S. Fish and Wildlife Service

WRRDA 2014

WRRDA and Asian Carp Prevention

- Provides direction to the U.S. Fish and Wildlife Service on Asian carp prevention in Upper Mississippi and Ohio River basins

- USFWS to:
  - Submit annual report to Congress on AC prevention and expenditures in UMR/OR basins for prior 2 years
  - Lead a collaborative multiagency effort to slow the spread of Asian carp in UMR/OR basins

WRRDA 2014

WRRDA Report to Congress: Components

I. **Observed changes in the range of Asian carp** during the previous 2 years;

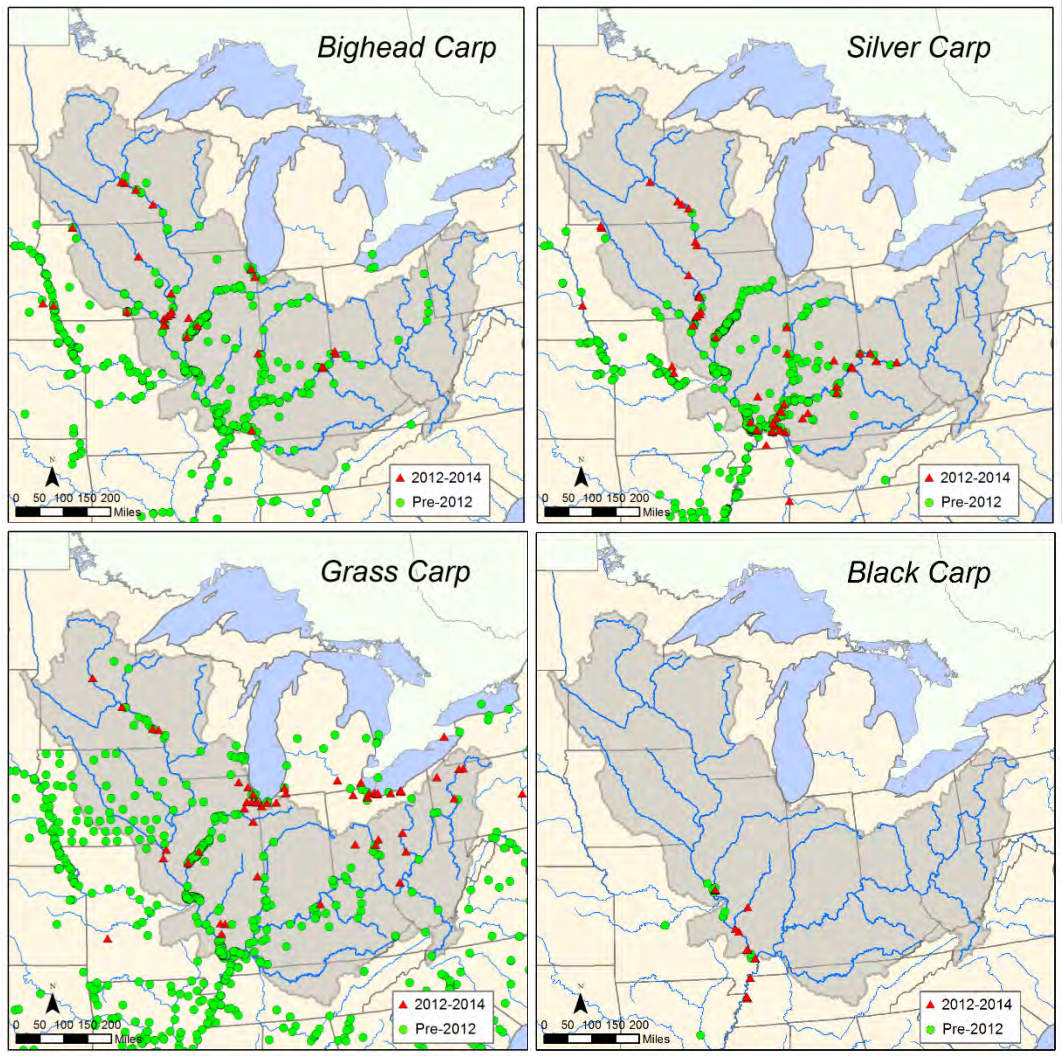
II. **Summary of Federal agency and non-Federal partners efforts** to control the spread of Asian carp during the previous 2 years;

III. **Research** that could improve the ability to control the spread of Asian carp;

IV. **Quantitative measures** proposed for use to document progress in controlling the spread of Asian carp; and

V. **Cross-cut accounting of Federal and non-Federal expenditures** to control the spread of Asian carp during the previous 2 years.

Results: Range Expansion, 2012 -2014



- All four species increased range in the UMRB
- In UMRB and ORB, most expansion by Silver Carp
  - Range increased upriver in the UMRB over 100 miles/over 50 miles in the ORB
- Black Carp exhibited least range expansion, although a lack of targeted sampling for this species
  - Currently 305 miles from Lake Michigan

WRRDA 2014

Results: Expenditures and Current Actions

- ~ $94.5M spent on Asian carp prevention from June 2012 to June 2014 **(~$12.2M outside of CAWS and Great Lakes**)
- AC management strategies developed for portions or all of both UMR and OR basins
- Prevention activities being conducted in both basins (e.g. early detection/monitoring; risk assessment; public outreach; law enforcement; and development of new control tools), **but opportunities for enhanced collaboration and leveraging**.

Funding

USFWS Base Funding for Asian Carp Monitoring and Surveillance

FY	FWS Base: Great Lakes	FWS Base— non Great Lakes	TOTAL
2010	$0	$189,000	$189,000
2011	$0	$189,000	$189,000
2012	$1,987,000	$0	$1,987,000
2013*	$2,881,000	$373,000	$3,254,000
2014	$2,900,000	$600,000	$3,500,000
2015	$3,130,000	$2,370,000	$5,500,000
2016**	$5,300,000	$2,600,000	$7,900,000

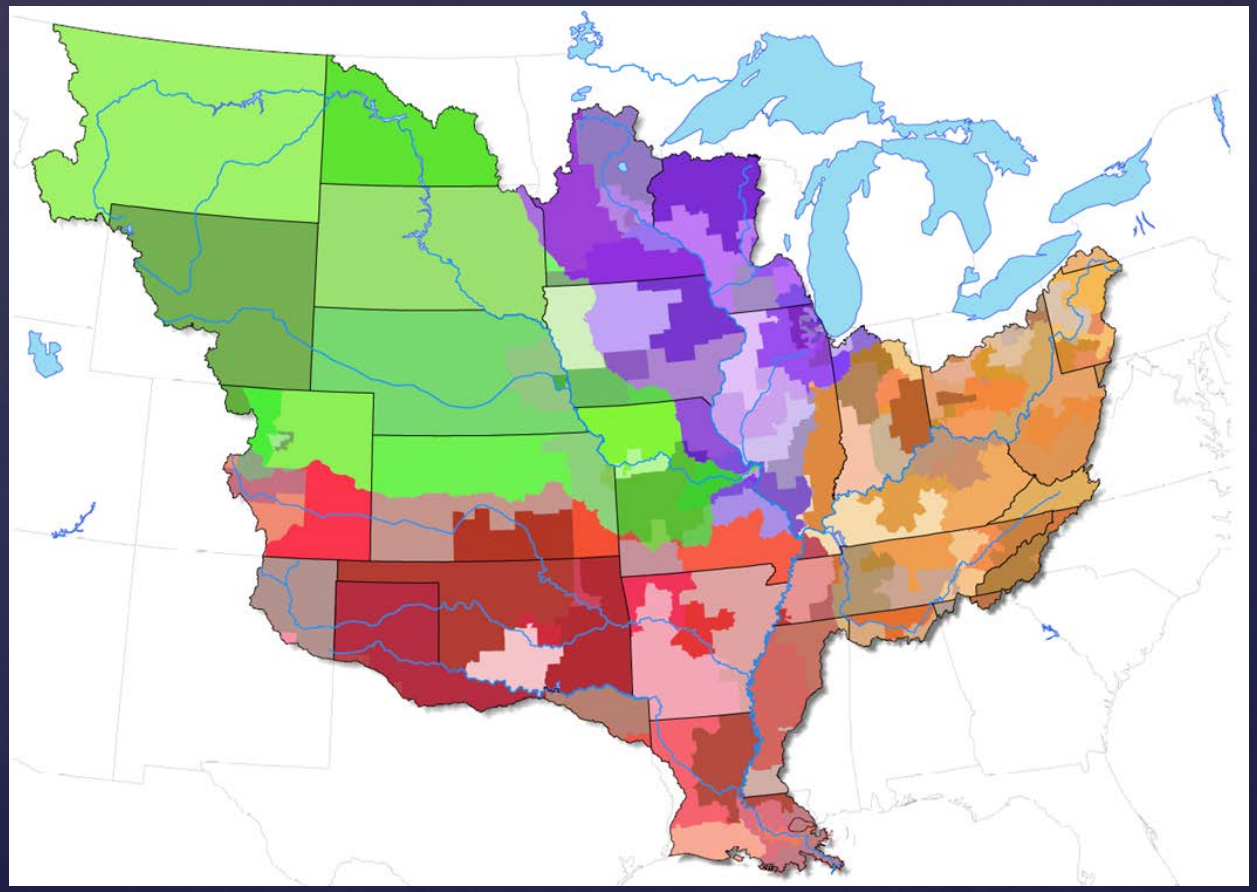
*FY13 base funds reflect sequester
**FY16 funding is level is based on President's request and allows Service to fully wean from GLRI funding.

ORB and UMRB Partnership Meetings

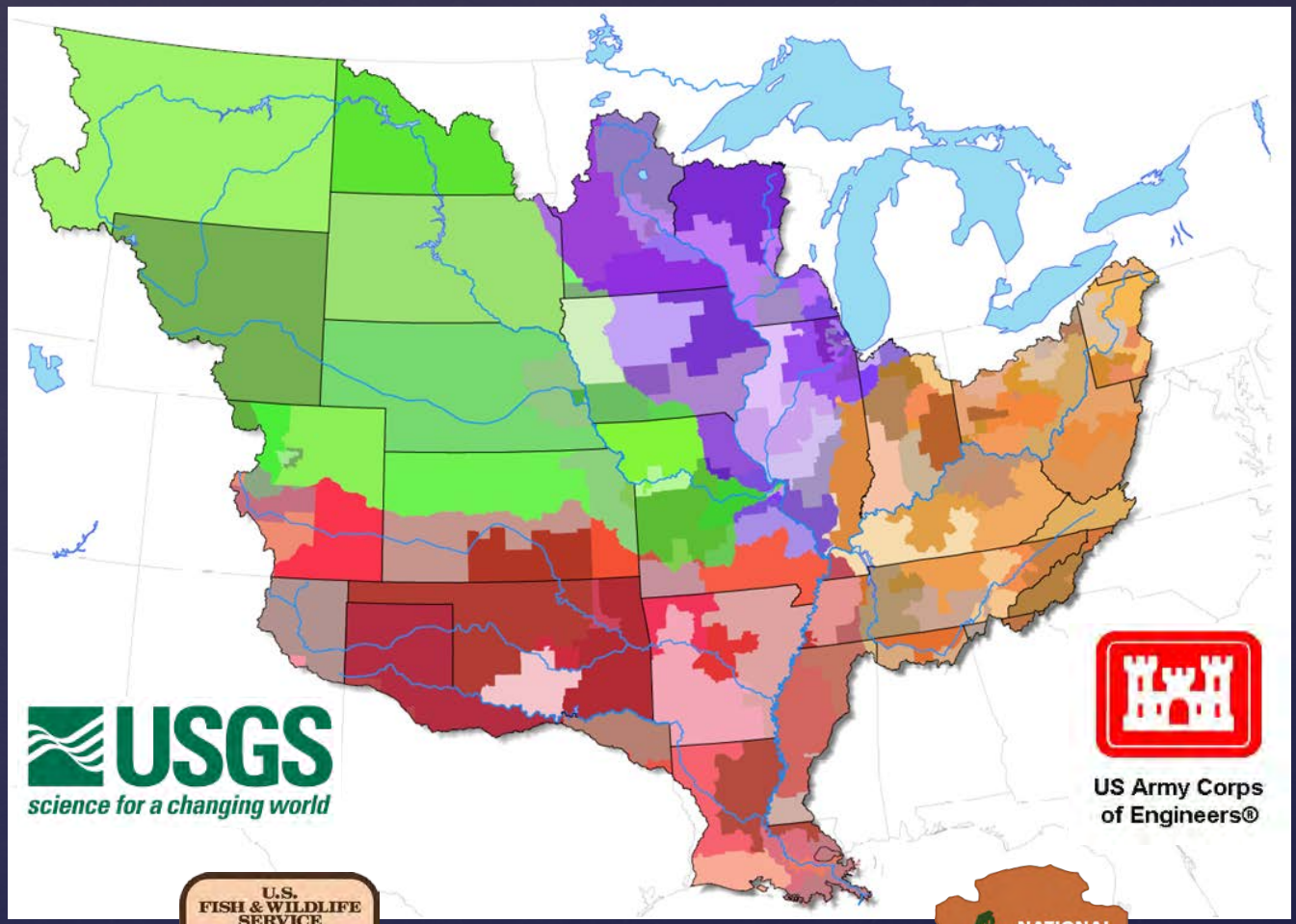
- USFWS met with ORB states and federal partners (USACE, USGS) February 3-4, 2015, in Indianapolis, IN
  - ORB FMT requested USFWS engage MICRA and its existing sub-basin teams to coordinate efforts to finalize sub-basin control strategy frameworks and develop, prioritize, and recommend projects to support with Service base funding

- USFWS met with UMRB states and federal partners (USACE, USGS, NPS) March 10-11, 2015, in Dubuque, IA
  - UMRB partners concurred with MICRA role

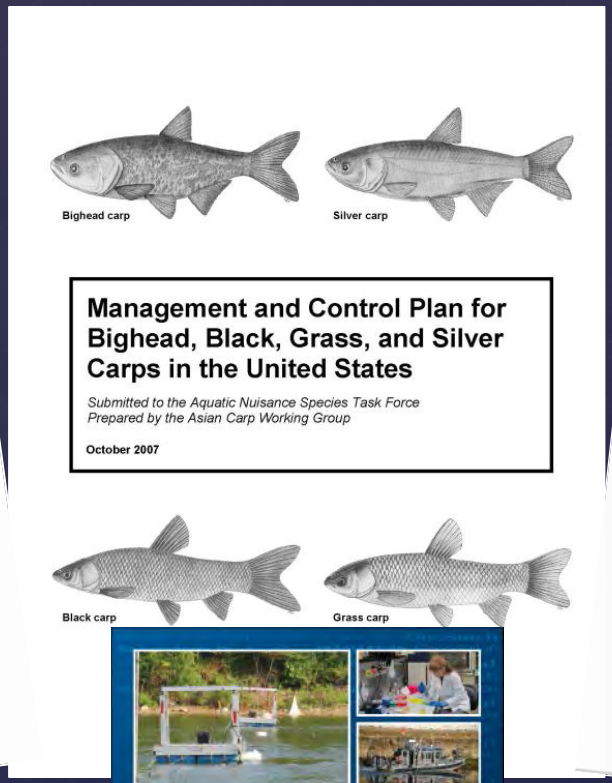
Mississippi Interstate Cooperative Resource Association (MICRA)

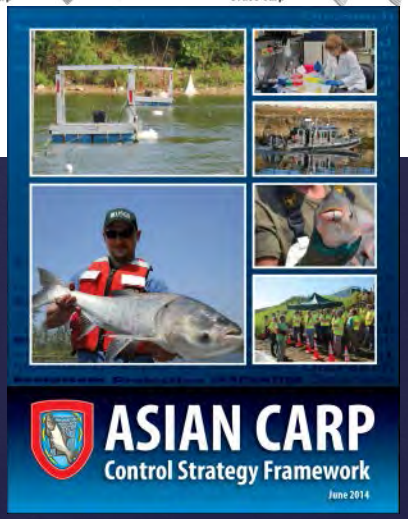


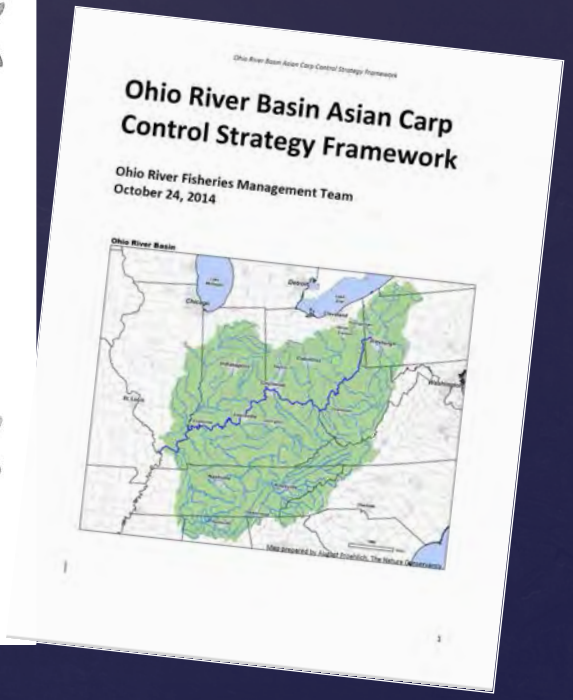
MICRA
Asian Carp Advisory Committee



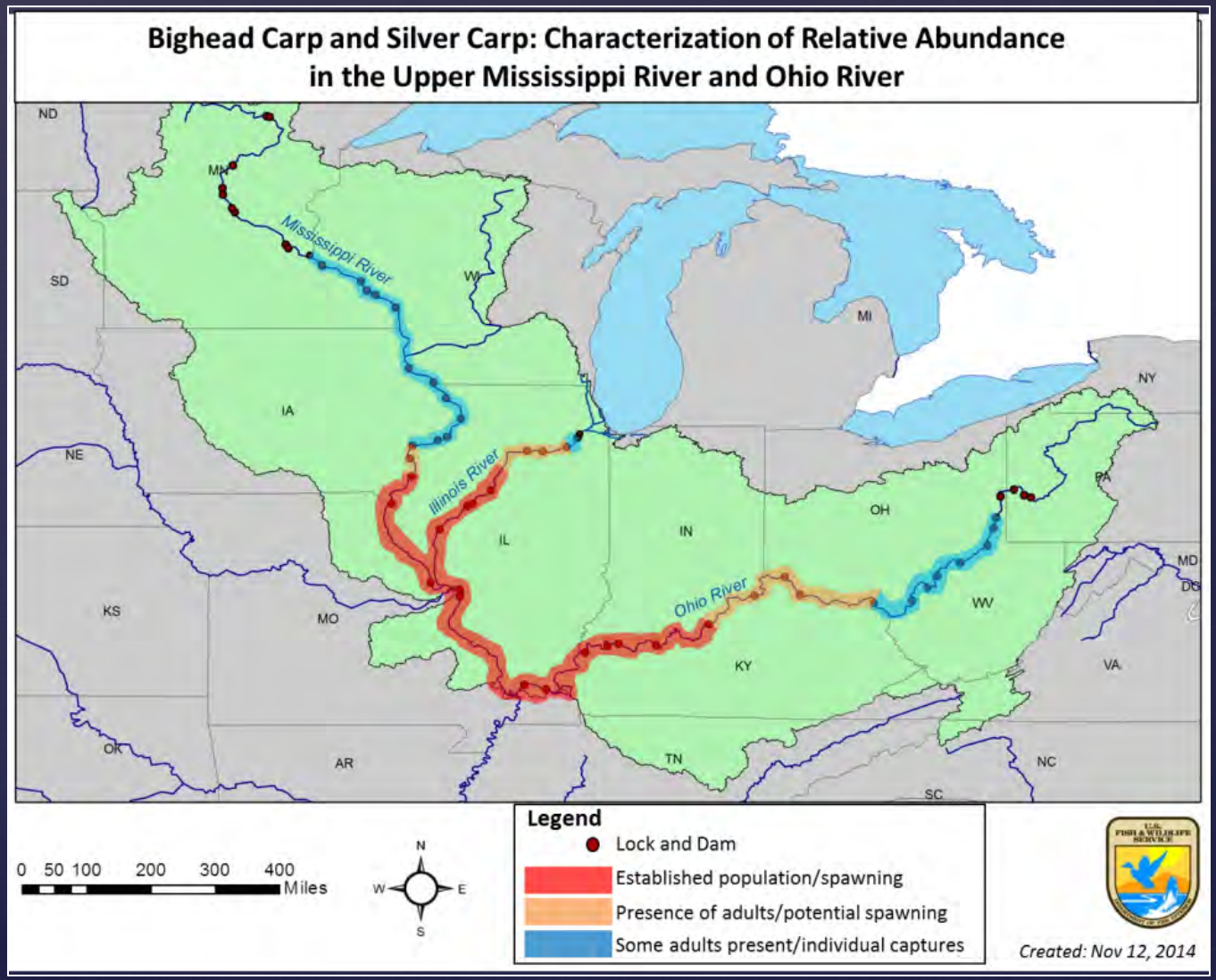
Asian Carp Control Strategy Frameworks





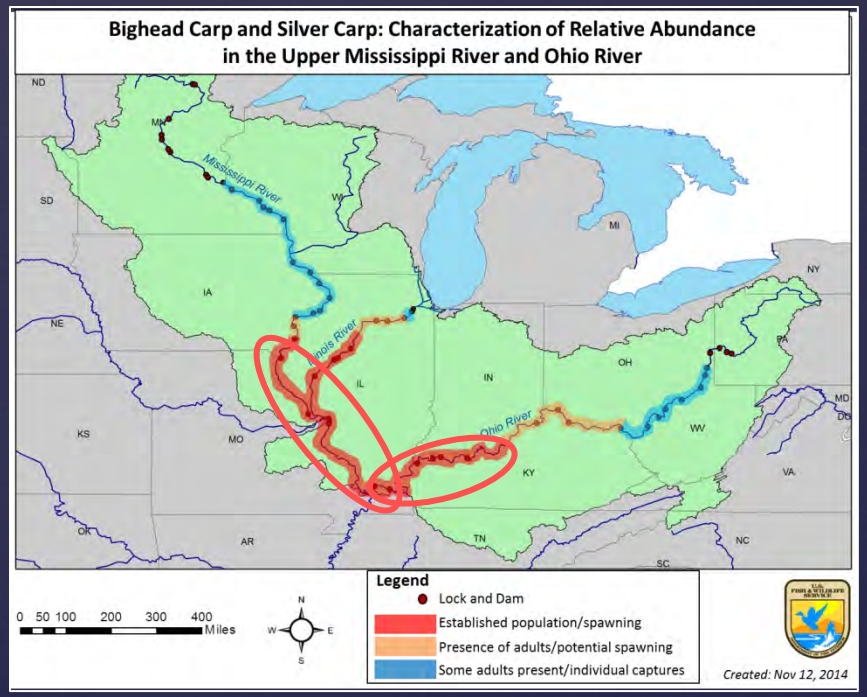


Upper Mississippi and Ohio River Basin Asian Carp Projects



Asian Carp Strategies and Projects

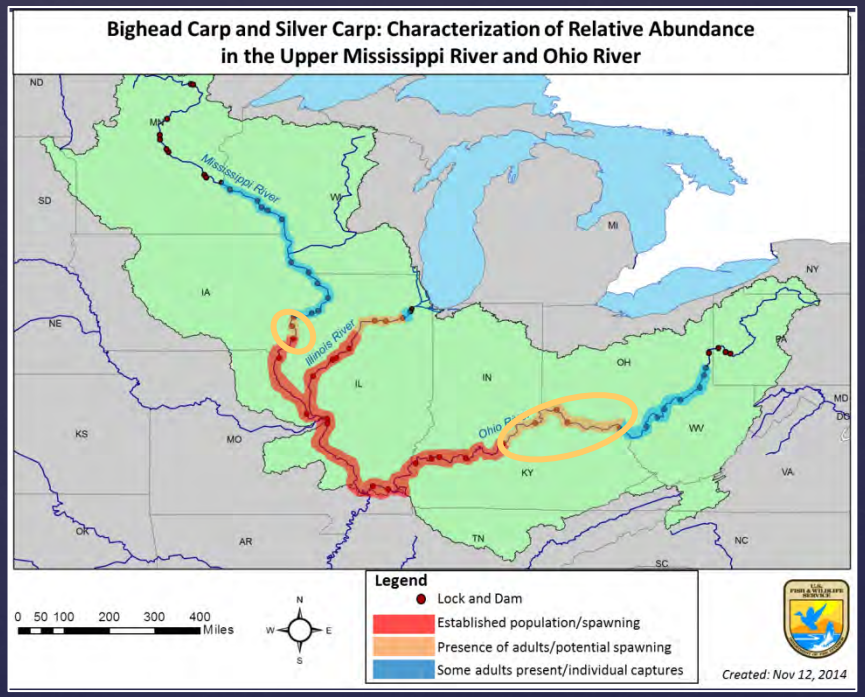
Abundant Populations: Self-sustaining



- Reduce abundance
  - Contract fishing
  - Field test GLRI tools
- Targeted sampling to determine limit of reproduction

Asian Carp Strategies and Projects

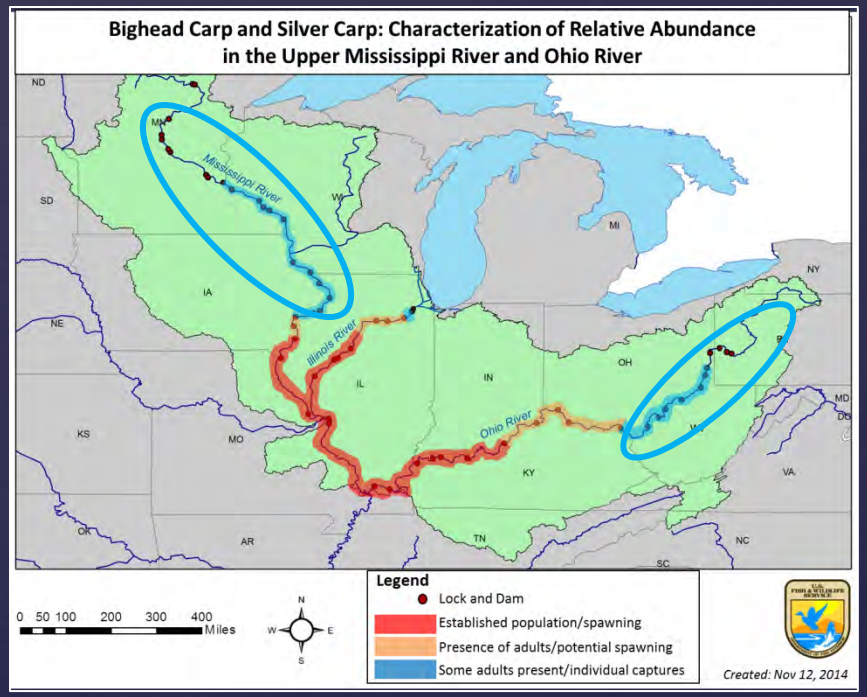
Abundant Populations: Not Self-sustaining



- Intensive sampling for all life stages: eggs, juveniles, adults
  - Traditional gears
- Targeted removal
  - Contract fishing
- Evaluation of control points to prevent upstream distribution
  - Fish passage at locks/dams

Asian Carp Strategies and Projects

Individual Captures



- Early detection monitoring
  - Targeted sampling with traditional fisheries gear
  - environmental DNA (eDNA)
  - Contract commercial fishers
- Rapid assessment/response
  - Intensive sampling effort following collection
  - Targeted removal
- Outreach
  - Public awareness/reporting

Next Steps

- Continue to improve understanding of invasion to inform management actions
- Maximize prevention and control efforts using best available information and science
- Evaluate and leverage GLRI tools and technologies
- Refine strategy using adaptive management

More Information

www.Asiancarp.us

Invasive zebra and quagga mussels (*Dreissena polymorpha* and *D. rostriformis bugensis*, respectively) are causing significant ecological and economic impacts and the scope of these impacts has increased as they continue to spread from the Great Lakes across North America, from the Hudson River in the east to Lake Mead in the west. They alter ecosystem dynamics and affect industrial, municipal and recreational water users. The negative impacts of these dreissenid mussels drove scientists to search for effective control methods beginning in the early 1990s. That search took a dramatic step forward when scientists from the New York State Museum Field Research Laboratory discovered that the killed-cells of a specific strain (CL145A) of a common soil bacterium, *Pseudomonas fluorescens*, caused mortality in dreissenid mussels with limited non-target animal impacts based on testing conducted to date. A second dramatic step forward was the registration and approval by the U.S. Environmental Protection Agency of the commercial product Zequanox® (containing *P. flouorescens* CL145A as the active ingredient) for use in open water environments.[1]

Effects of biocontrol application
A colony of zebra mussels attached to a native mussel. The native mussel survives the application of biocontrol; the zebra mussels do not.

New biocontrol technology represents an exciting potential technique to manage invasive mussels. In light of this new opportunity, diverse management goals must be identified and understood and knowledge gaps addressed in order to move forward with a joint and strategic approach to managing invasive mussels. Further investigation is needed to address uncertainties in the use of biocontrol, such as potential effects on invertebrates and ecosystems, and optimal application procedures. In addition, the coordinated and integrated application of several different control tools has been proven to yield the most effective control strategy for other invasive species. Consequently, research should continue to identify the next set of control tools (e.g., spawning inhibitors and microparticles to target control agent delivery). Ideally, managers and scientists would have a forum in which to communicate and coordinate this work using an iterative and collaborative process.

A Collaborative Approach

The **Invasive Mussel Collaborative** is being established to advance scientifically sound technology for invasive mussel control to produce measurable ecological and economic benefits. The Collaborative will provide a framework for communication and coordination, identify the needs and objectives of resource managers, prioritize the supporting science, recommend communication strategies, and align science and management goals into a common agenda for invasive mussel control.

The founding members of the collaborative are the U.S. Geological Survey, Great Lakes Commission, National Oceanic and Atmospheric Administration and the Great Lakes Fishery Commission. The Great Lakes Commission will provide coordination and neutral backbone support for the collaborative. A broad membership base of states, provinces, tribal and other entities and a well-organized communication network will facilitate the exchange of information between scientists, managers and stakeholders, and provide ongoing guidance and feedback within an adaptive management framework. Strong connections with other regions will be developed and will provide a framework for application elsewhere.

Founders
- Great Lakes Commission
- Great Lakes Fishery Commission
- National Oceanic and Atmospheric Administration
- U.S. Geological Survey

Members
- U.S. and Canada
- Federal, Tribal, state, provincial and local agencies
- Nongovernment organizations
- Industry
- Academia

External Connections
- Local groups (e.g., lake associations)
- Other regional groups (e.g., Western U.S.)
- Other national and international stakeholders

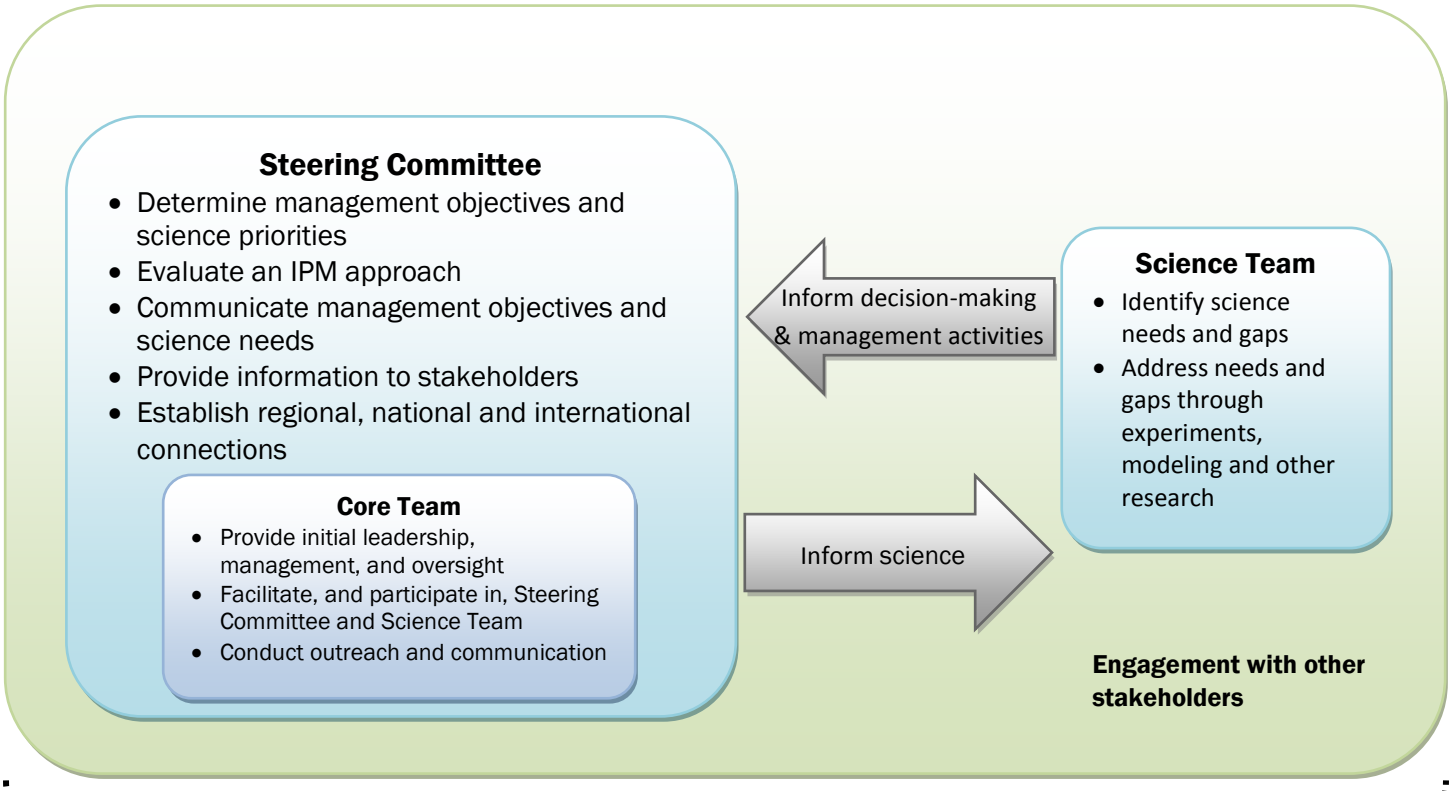
[1] Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Invasive Mussel Collaborative

Mission: Advance scientifically sound technology for invasive mussel control to produce measurable ecological and economic benefits.

Objectives:

- Facilitate information exchange between decision-makers, scientists and stakeholders
- Develop and guide a joint and strategic approach to invasive mussels
- Implement communication and outreach activities



Neutral backbone support and coordination (Great Lakes Commission)

Example science questions. These examples of science questions related to dreissenid mussels are expected to be modified as the collaborative process matures and updates critical management objectives and science information gaps.

Develop models and decision support tools

- Develop population models for quagga mussels
- Predict how dreissenid population growth would vary with different control strategies
- Develop models to assess effects of varying levels of control on ecosystem services, including risk assessments

Understand ecosystem effects

- Determine the relationship between dreissenid mussels and harmful algal blooms
- Determine the effect of dying and dead mussels on oxygen and nutrient concentrations, and the surrounding microbial and invertebrate community
- Determine whether dreissenid mussels affect fish populations

Develop and refine management strategies

- Optimize biocontrol application procedures
- Continue development of additional control tools
- Assess and understand the direct effects of control strategies, including biocontrol, on native and non-target species