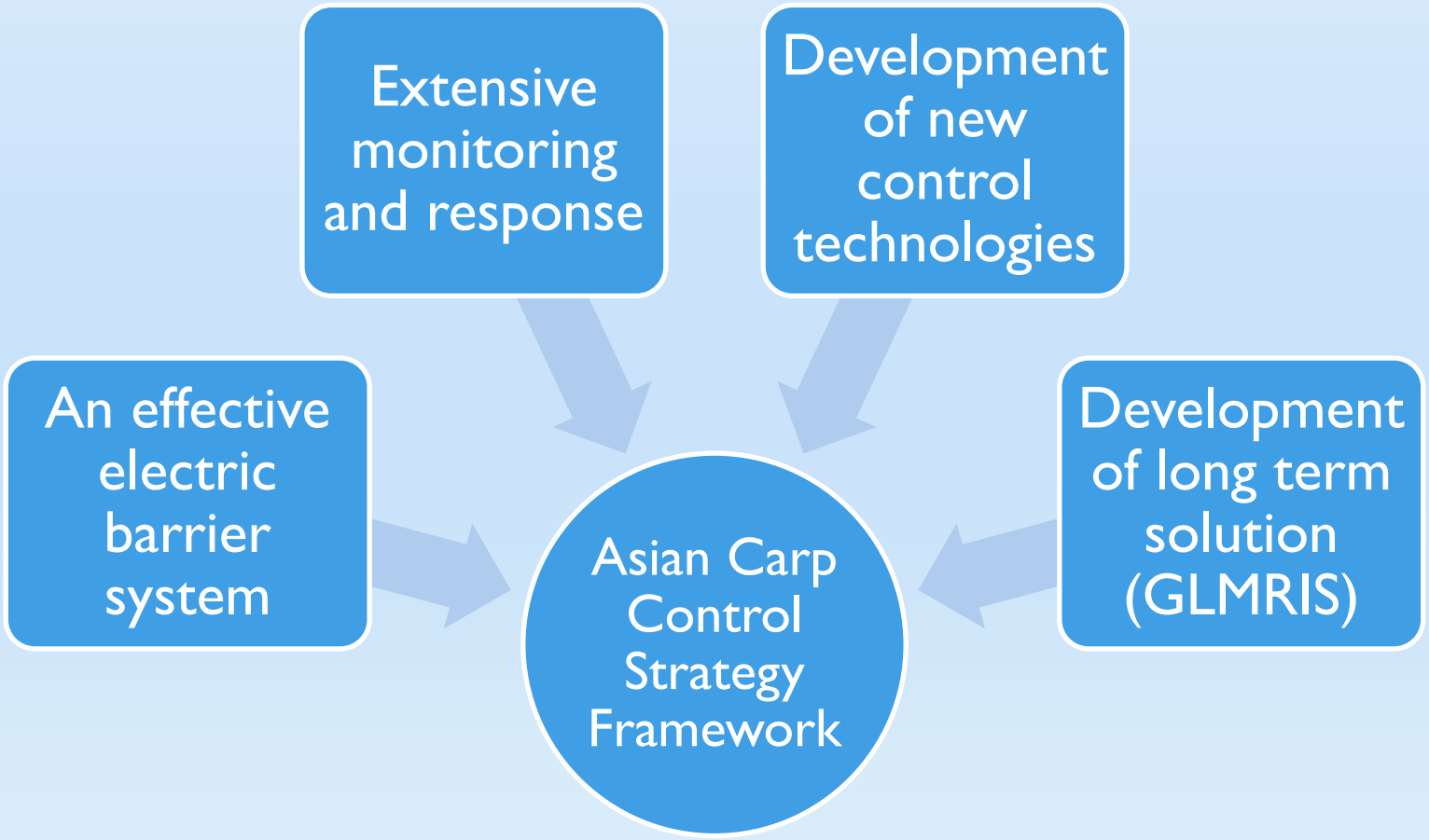
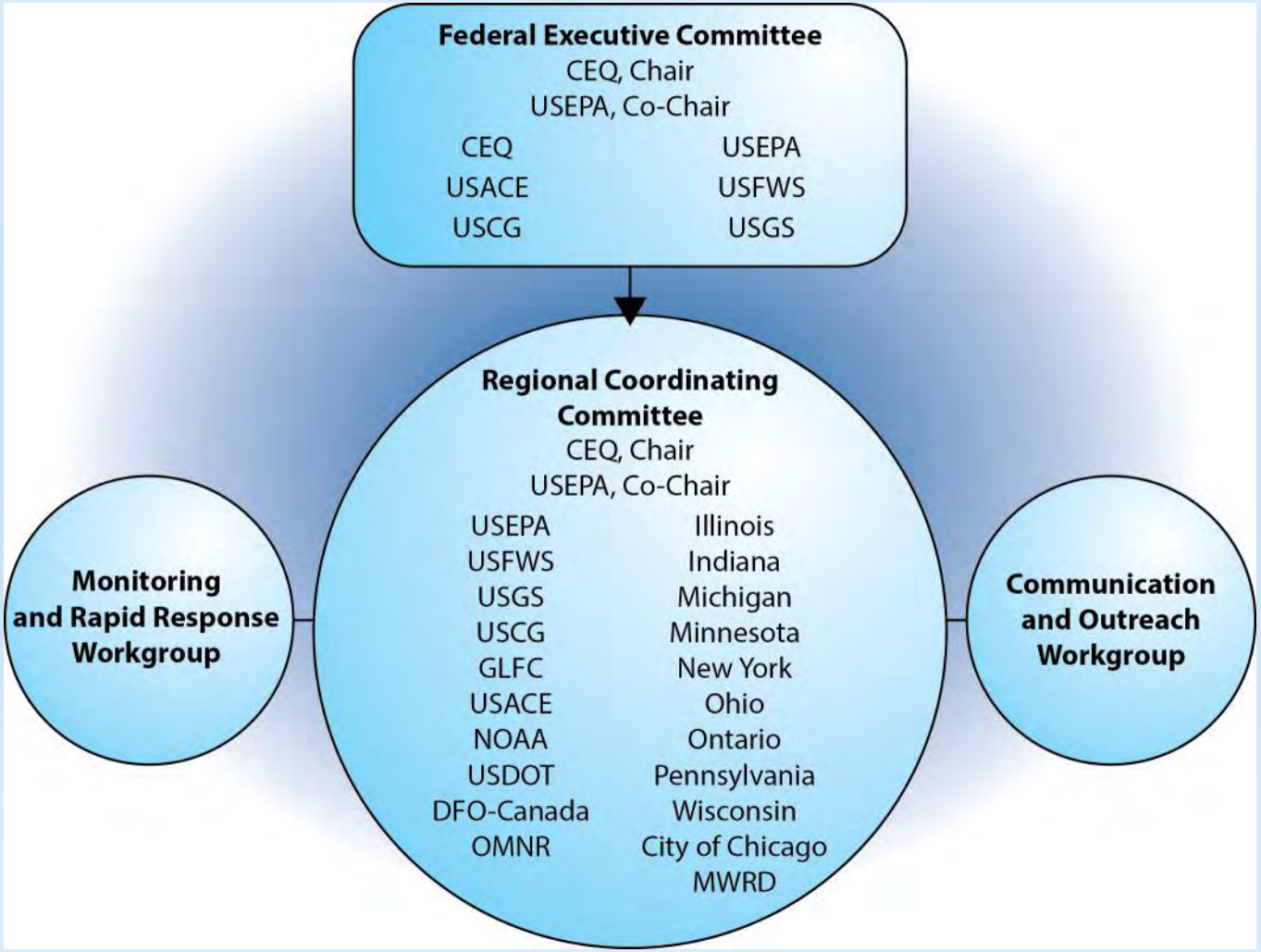
# Asian Carp Regional Coordinating Committee

The ACRCC, with support from Federal, state, and local agencies, and private stakeholders and citizens, are creating a sustainable Asian carp control program to prevent the establishment of an Asian carp population in the Great Lakes.

# Response to the Threat



# Asian Carp Regional Coordinating Committee



# ACRCC Control Actions

## Accomplishments

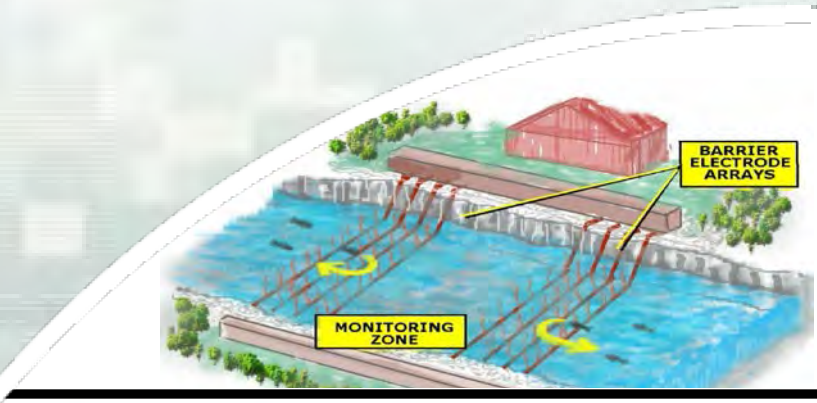
- Asian carp not established in Chicago or the Great Lakes
- All Great Lakes States, Ontario and Canada as partners
- Only CAWS a high risk pathway for Asian carp
- Redundant and effective electric barriers
- New nets, gear and sampling techniques for Asian carp

## Ongoing Actions

- Best GLMRIS control options identified in 2013
- eDNA and fish sampling Great Lakes basin wide
- Testing new technologies like water guns and toxicants
- Harvest Asian carp below the electric barrier
- Refining eDNA technology and identifying vectors

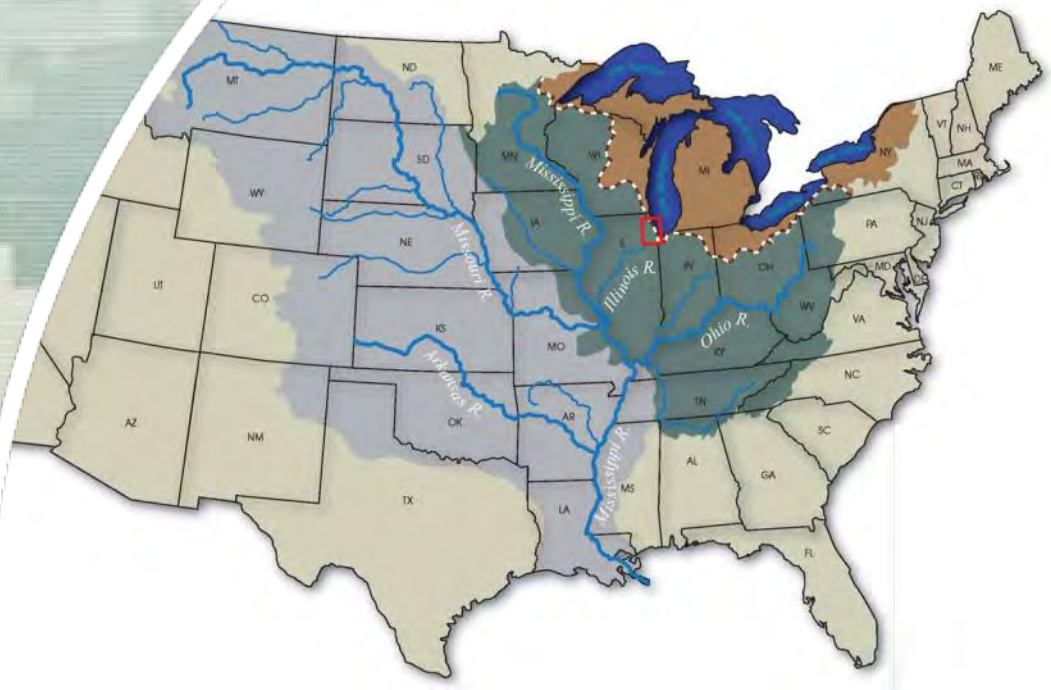
# Asian Carp Regional Coordinating Committee (ACRCC)

## U.S. Army Corps of Engineers Activities




**Mr. Jack Drolet**
Program Manager

September 17, 2013




US Army Corps of Engineers
**BUILDING STRONG®**

# USACE Activities in the FY13 Framework

## USACE Lead Agency

- 10 Action Items
  - O&M / Construction Barriers
  - Telemetry
  - Efficacy of Barriers
  - eDNA Transition & ECALS

## USACE Supporting Agency

- 16 Action Items
  - Monitoring & Response
  - Marine Safety & Risk Assessment
  - Forecasting AIS Spread
  - Other Pathways
  - Emerging Technologies
  - eDNA Support Capability

Agency Base Budget: $29M

GLRI: $3.5 M

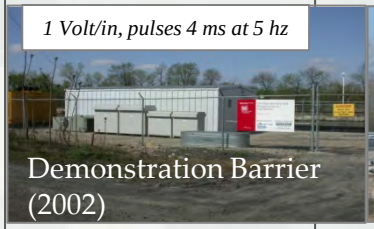
# USACE Aquatic Invasive Species (AIS) Strategy

FY10 FY11 FY12 FY13 FY14 FY15 FY16 FY17

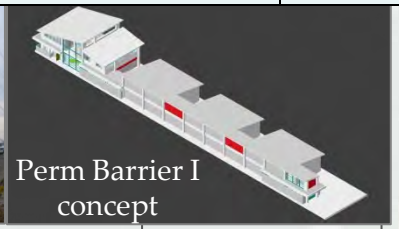
LINES OF OPERATION

1 **Operation of Electric Barriers**

Barrier I Design | Barrier I Site Prep | Barrier I Building & Electronics | Barrier I Testing & Commissioning | Project O&M Funded






2 **Asian Carp Monitoring**

**eDNA Monitoring and Calibration** ✓ ✓ **eDNA Monitoring by USFWS**

3 **Efficacy Study: Implement Solutions as Funding and Authority Permit**

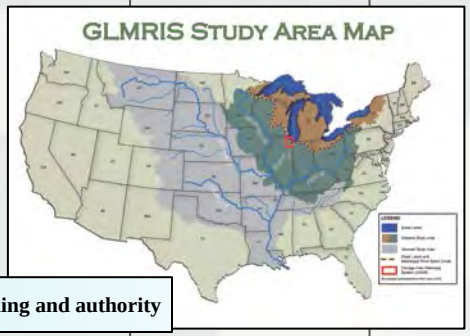
**Des Plaines River Bypass (Int. I)** ✓

**Modified Structural Operations (Int. III)** ✓

**Optimum Parameters Research (Int. II)** ✓

**Comprehensive Report**






GLMRIS Report

4 **Great Lakes and Mississippi River Interbasin Study (GLMRIS)** ◆ **Continued efforts pending funding and authority**

# Barrier I Construction & Des Plaines Bypass Improvements

**Barrier I Construction**

**Des Plaines Bypass Improvements**

# USACE Monitoring

- Telemetry
  - Continued program to assess efficacy of barrier
  - Individual transmitters recorded by mobile and stationary hydrophones
  - Demonstrates barrier is effective against upstream passage of many species and sizes of fish
  - 238 tagged fish with over 6 million detections
  - 18 individual common carp “approached” barrier 130 different times.
    - Highest number of “approaches” in summer, least amount in winter

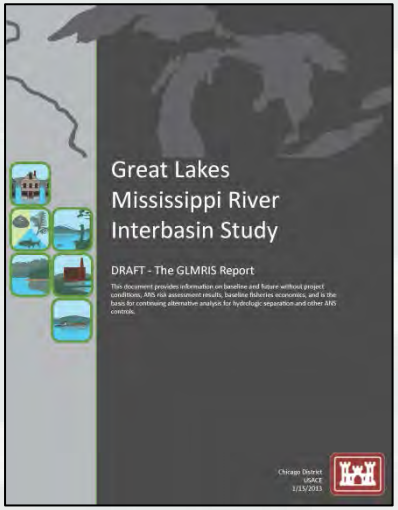
# USACE Monitoring

- eDNA
  - Successful transition of eDNA monitoring to USFWS in 2013
  - USACE: program management support, ERDC redundant lab
  - USACE lead for interagency eDNA Calibration Study

- ACRCC Monitoring and Response Work Group efforts
  - USACE advisory role on MRWG
  - Continued vigilance at barrier; surveillance efforts associated with barrier maintenance
  - USACE/ILDNR/USGS published "*Asian Carp Distribution in North America*" in April 2013
    - Current data on presence of bighead carp and silver carp at all life stages; black carp and grass carp occurrences
    - Mississippi River, Ohio River and Great Lakes Basins
    - Living resource to be updated regularly
    - Available on asiancarp.us

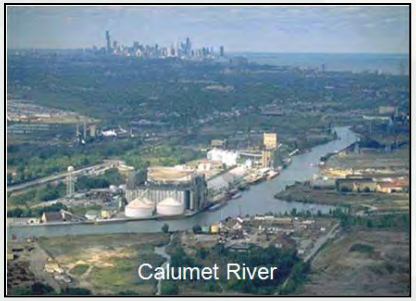
# GLMRIS Report – Plan Formulation

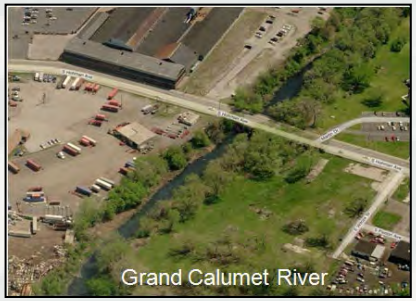
- GLMRIS Report will present information on a range of alternatives
- Alternative comparison tool to support decision-making
  - Evaluation criteria will be presented in GLMRIS Report
  - GLMRIS Report will **NOT** include ranking or rating of plans
- Contents
  - Conceptual design of alternatives
  - General mitigation requirements of alternatives
  - Range of cost estimates commensurate with design detail
  - Evaluation criteria
- Remaining analyses would need to be addressed after Dec 2013 but prior to PED
  - Detailed design analyses
  - Completion of the environmental compliance analysis
  - Required internal reviews
  - Public state/agency reviews



# GLMRIS Report – Alternatives

- No New Federal Action
  - Includes current activities (Dispersal Barriers, Monitoring, etc)
- Non-Structural Measures
  - Best-management practices to address ANS of Concern
- Technology Alternatives
  - Utilizes refined list of ANS Controls from screening process
  - Combines control technologies to develop preliminary alternatives
  - Develop conceptual designs or treatment trains & delivery platforms
- 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

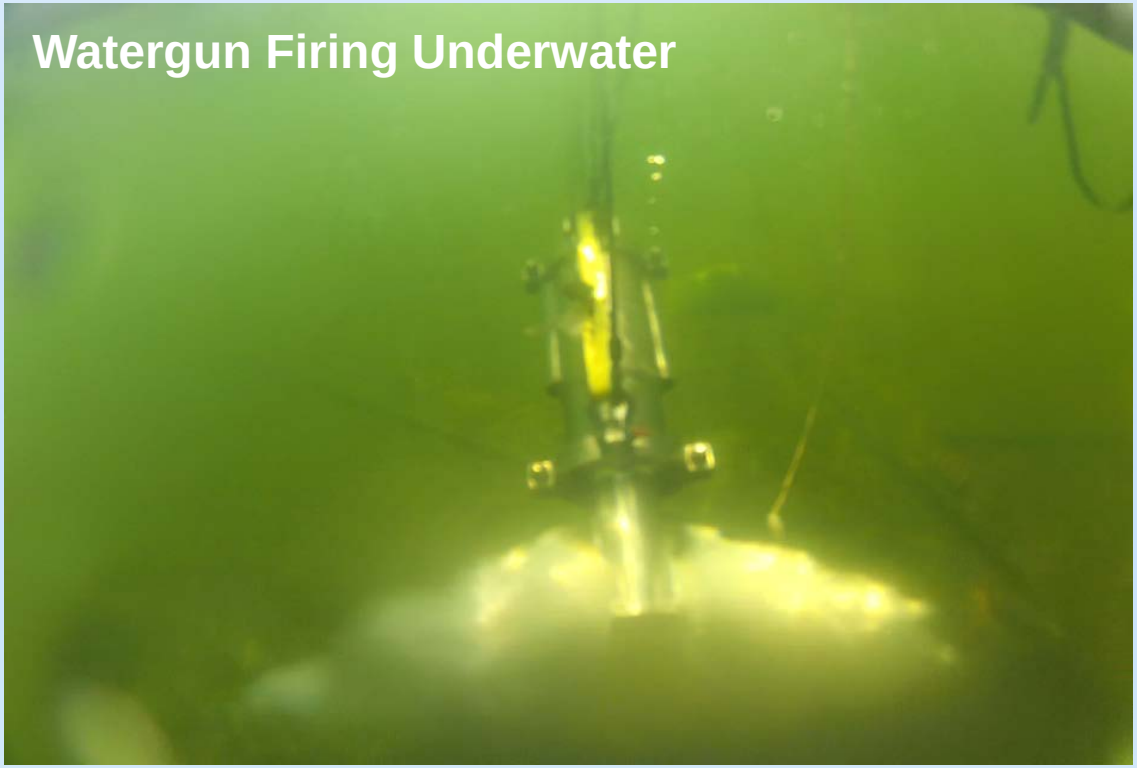



# GLMRIS Report – Path Forward

## Review

- Submit draft GLMRIS Report for USACE technical review **Aug-Sep**
  - Incorporation of technical review comments
- Submit draft GLMRIS Report to HQ's & ASA(CW) for policy compliance review **Oct 2013**
  - Incorporation of policy compliance review comments
- OMB review before submission to Congress **Nov - Dec**
- Submittal to Congress **Dec 2013**

# Asian Carp – U.S. Geological Survey




Leon Carl
U.S. Geological Survey

# Asian Carp - USGS/ACRCC Objectives

- Developing new management tools to control or remove carp
- Actively and efficiently managing the science
- Building a framework for tool development
  - Standardizing creation of methods and tools which can then be tailored and applied to control other invasive species
- Working toward direct transferability of invasive species control technology and methods outside the Great Lakes basin (e.g. Mississippi, OH, MO River basins)

USGS

# USGS Asian Carp Science Focus: Management Tools and Information

- IPM Approach - Asian carp biological and life history knowledge
  - Understanding is essential for prevention, surveillance, and control tool development and application
- Asian carp control technologies
  - Tools to keep Asian carp from moving into the Great Lakes and to reduce current populations outside the Great Lakes basin
- Asian carp monitoring
  - eDNA and rapid microbial methods to detect Asian carp and trigger management response/action

USGS

# Tributary Assessment Tool – Assessing Suitability of Rivers for Spawning – Part A

**A) Field Assessment of 2 Lake Michigan and 2 Lake Erie Rivers. Final Results:**

- **River reaches as short as 16 miles may allow AC eggs sufficient time to develop and hatch.**
- **This means that more GL tributaries than previously thought would be suitable for AC spawning.**
- **This is valuable information for informing potential management actions**

**USGS Report highlight and link on *asiancarp.us***

USGS

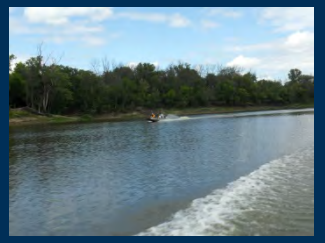
# Tributary Assessment Tool – Assessing Suitability of Rivers for Spawning – Part B

**B) Development of the Tributary Assessment Tool**

**Final Results:**

- **The Tool (a model) incorporates biological and hydraulic data to assess risk of successful AC spawning in a river.**
- **The Tool will help managers target locations in GL tributaries where eggs may settle to the river bottom and die. This will inform control efforts.**
- **Tool could be applied to assess rivers both in and out of the GL basin for AC spawning suitability.**

**Journal article highlight and link on *asiancarp.us***



USGS

# Asian Carp Control Tool: Waterguns

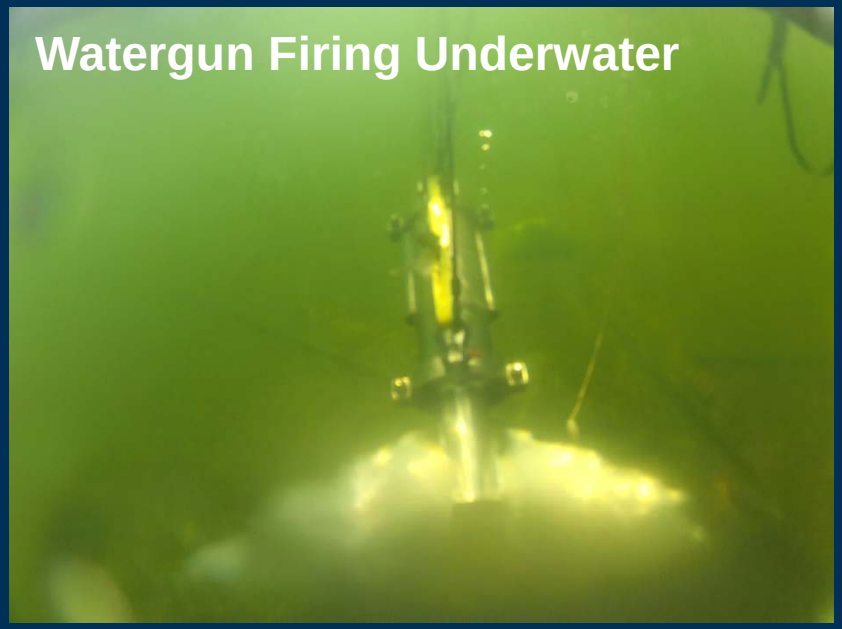
**Latest Results:**

- Spring 2013: Completed Study Pond Trials at USGS
  - Results showed Asian carp avoided the water gun barrier
  - Further analysis is in progress
- August 2013: Completed Field Trials in backwater of IL River near Morris, IL (Hanson Material Services)
  - Data analysis in progress - preliminary results also show AC are avoiding the watergun barrier
- Next Steps:
  - Test use for reducing number of AC moving to or in preferred spawning habitat. Test on Wabash?
  - Complete structural trials

USGS

# Integrated Control Tool Field Trials at Morris, IL

## IL DNR/USGS/Southern IL U. Collaboration



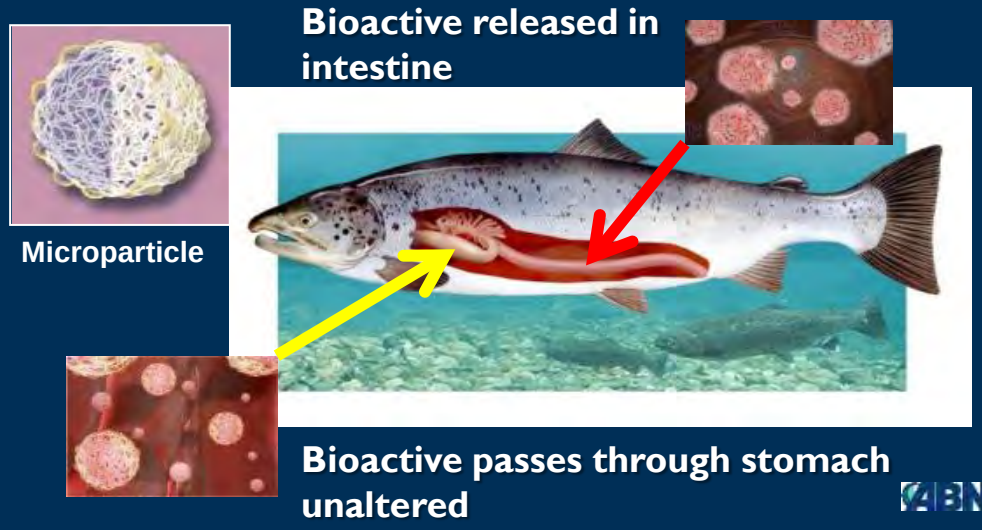
# Technology Demo for Managers
## Describing Tools and Communicating Results

State Participants: IL, IN, MI, OH, WI, MN
Federal: CEQ, EPA, FWS, USACE, DOT, USGS

# Targeted Toxic Microparticles

**Goal: Target Asian carp, avoid harming native species**

- **Final Results of Microparticle Design Research:**
  - **Selective agent /toxin – Antimycin**
  - **Selective uptake by AC – Identified preferred food size**
  - **Selective release within – Research of AC organs showed intestines as best place for release of toxin and the enzyme trypsin to trigger release**




USGS

# Microparticle Development

**Latest Results of Final Phases of Development:**

- Advanced BioNutrition (ABN) produced and delivered 4 microparticle formulations to USGS
  - USGS completed assessments of particle size, buoyancy and stability and determined antimycin levels
  - ABN now producing final microparticles due in October
- Working with EPA/FWS to complete microparticle registration process
- Field Trials: Spring 2014 - Bioassay trailer testing/microparticle toxicity studies
  - Initial field testing at Morris, IL

USGS

# Algal Attractants

**Latest Results:**

- Completed Missouri River feeding station trials
  - Tested under different field conditions in spring 2013 to demonstrate utility in attracting carp
  - Various algal delivery methods were evaluated
- Applied MO River results to attract carp at August Field Trials in Morris, IL - integrated with waterguns and commercial fishing efforts
  - Used algal attractants to lure carp to a location
  - Waterguns used to create barriers and move carp
  - Commercial netting used to catch carp
- Long term goal: incorporate into microparticle

USGS

# Early Detection - eDNA

- eDNA extraction method improvement – we have been working in collaboration with USACE and FWS (ECALS). FWS testing new methods in their new eDNA facility
  - Upcoming USGS Report : New methods to extract more DNA from water samples more quickly, at less cost, and with more consistent results
- Using qPCR (a genetic method) as an Asian carp screening tool
  - Now generating data on new markers that will help us to see how recently the eDNA was deposited

USGS

# eDNA – Key USGS Results

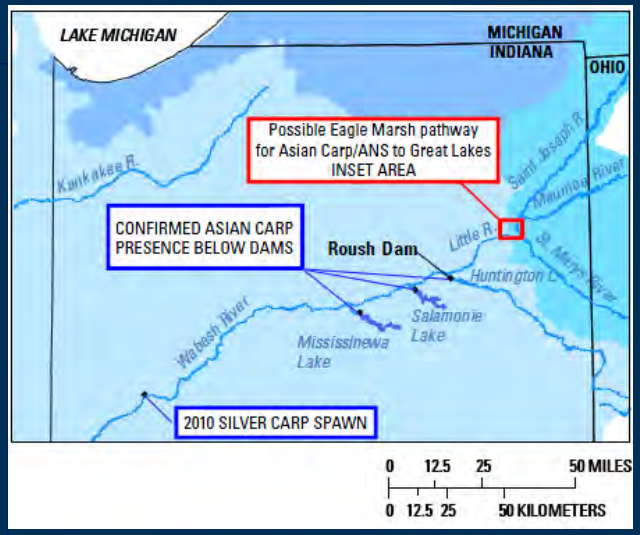
- Found alternate eDNA extraction kit that is cheaper, faster & extracts more DNA than PW
- Determined piscivorous birds can be vector of eDNA
- Determined potential for Asian carp carcasses to be sources of eDNA
- Determined persistence of silver carp DNA in eagle feces and in fish slime under ambient “summer” conditions
- Designed >20 markers for silver carp and bighead carp for cPCR and qPCR
- Determined DNA strands are longer closer to time of deposit; shorter as degradation occurs

USGS

# Wabash-Maumee Interbasin Connection:

## *USGS water level alerts at Asian Carp barrier fence*

- Adult Carp barrier fence at Eagle Marsh prevents adult Carp transfer between Wabash and Maumee basins
- USGS water level alert technology provides early warning of water level and flow changes at fence
- USGS streamflow data critical component of development of W-M Basin separation design



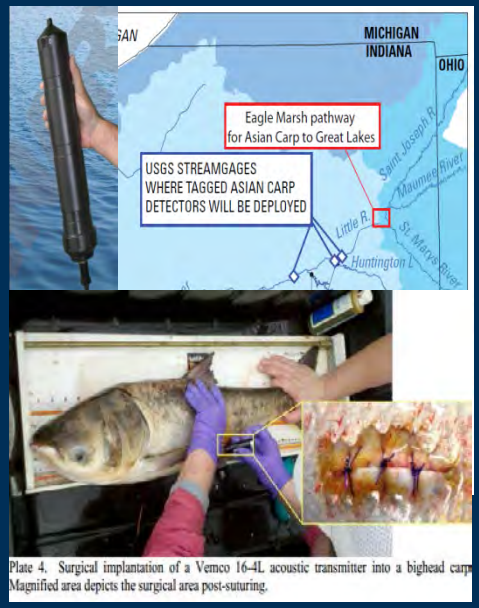


USGS

# Integrating Wabash River Efforts

*USGS, Purdue U., IN DNR, USACE*

- Real-time AC detection at Wabash and trib sites
  - August 2013: Receivers installed at USGS streamgages on upper Wabash and Little Rivers
  - System detects signals from radiotagged Asian Carp (Purdue Univ) and transmits data to USGS database
  - Data relates Asian Carp behavior to hydrology and water quality
  - The System alerts managers and informs management actions
  - Future integration: Apply control tools such as waterguns or microparticles




USGS

# Evidence of Successful Recruitment of Grass Carp in Lake Erie Basin

- Four grass carp captured in Sandusky River
  - Scientific analysis strongly suggests the 4 fish are wild (i.e. they reproduced naturally)
- Implications
  - Grass carp could be problematic for Great Lakes
  - Adds credence to USGS Tributary Tool results that identify the Sandusky and other shorter rivers as possible spawning locations for Asian carp
  - Bighead and silver carps have similar requirements

USGS

# Actions to Address Grass Carp Issue

- Work with ACRCC on next steps
- Review IPM approach with focus on grass carp life history to identify weaknesses and target controls
- Review current Asian carp control research for applicability to grass carp

USGS

# Chicago Area Waterway System and Great Lakes Monitoring

Charlie Wooley
U.S. Fish and Wildlife Service

Kevin Irons
Illinois Department of Natural Resources

ACRCC

# Focus of Sampling 2009 - 2011

# 2013

# Characterizing Risk

## Distances from Lake Michigan

**37 miles** **Dispersal barriers** ★

**55 miles** **Adult Population Front**

**62 miles** **Presence of Adults/Potential Spawning**

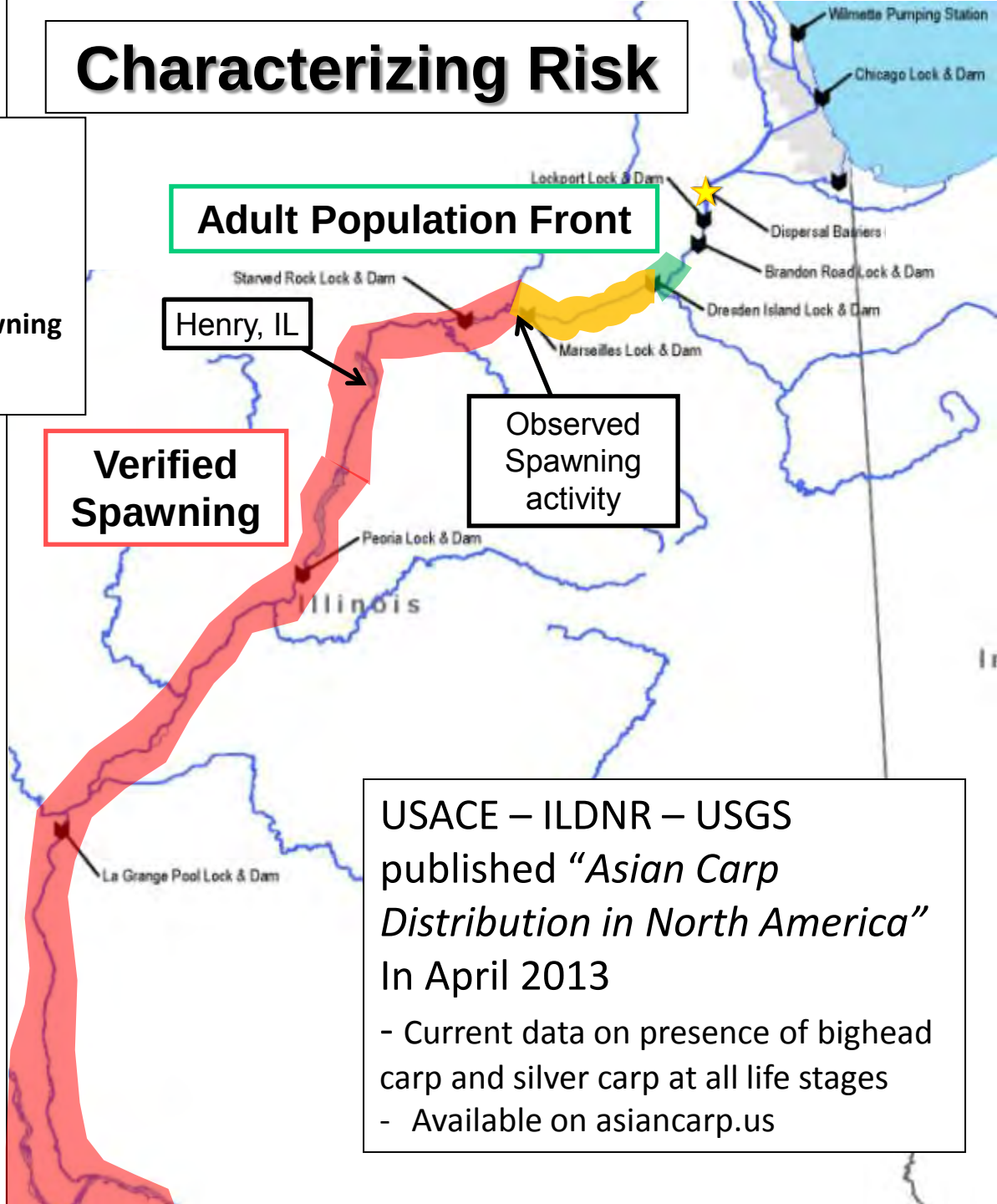
**62 miles** **Verified Spawning**

## Areas of Concern

1) Verified Spawning Marseilles Pool

2) Verified Identification of AC eggs and larvae near Henry Illinois

***Overall leading edge has not changed**




USACE – ILDNR – USGS published "*Asian Carp Distribution in North America*" In April 2013

- Current data on presence of bighead carp and silver carp at all life stages
- Available on asiancarp.us

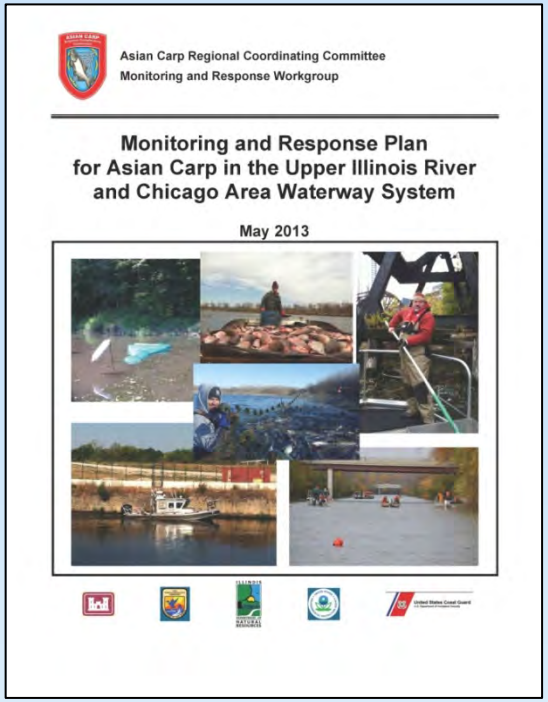
# CAWS Monitoring 2012

- Estimated total effort both upstream and downstream of the electric barrier system:
  - 17,919 person-hours; 195,552 fish collected
  - 228 hours of electrofishing
  - 409.7 miles of trammel/gill nets fished
  - No Bighead or Silver Carp captured or observed upstream of the electric barrier system

- eDNA samples processed upstream of the electric barrier system in 2012
  - 428 estimated person-hours were spent collecting and filtering 1,210 water samples
  - 4 positives for Bighead Carp DNA upstream of the electric barrier system
  - 153 positives for Silver Carp DNA upstream of the electric barrier system

# CAWS Monitoring 2013

- FWS works side by side with our partner agencies to monitor for Asian carp in the CAWS and surrounding area.
  - eDNA, DIDSON, netting, electrofishing, etc.
- Monitoring and Response Plan 2013 guides group sampling efforts.




ROMAN 6

# Barrier Clearing and Defense

- MRWG Supported barrier maintenance and outages (multiple agencies)
  - Surveillance included Side scan sonar, hydro-acoustics, and DIDSON
- Fish removal/clearing included:
  - Electrofishing and recently 30-ft gill nets with pounding and noise to drive fish
- Future Plans:
  - Continued development of decision making guide for responding to outages

# eDNA Transition

- FWS has assumed eDNA sampling and processing responsibilities from USACE.
- FWS will continue to work with all of its partners to ensure seamless coordination and implementation of the QAPP and eDNA sample processing.
- Final Transition Report and updated QAPP at:

  www.fws.gov/midwest/fisheries/eDNA

# Area of Focus has Expanded

# Comprehensive Great Lakes Early Detection Sampling

- Funded via GLRI Asian Carp Framework & Service's FY13 base budget
- Continue development and implementation of an early detection program for Asian carps in and near the Great Lakes.
- Working closely with federal, tribal, state, and provincial partners to select sample sites and implement protocol in hotspots around the basin.

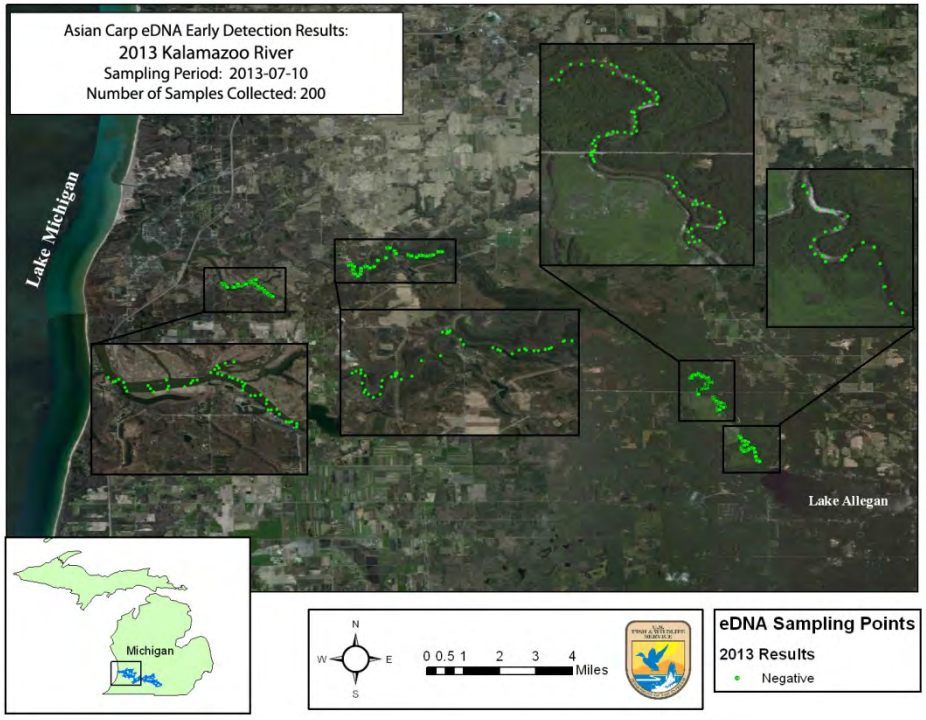
# Great Lakes eDNA Sampling

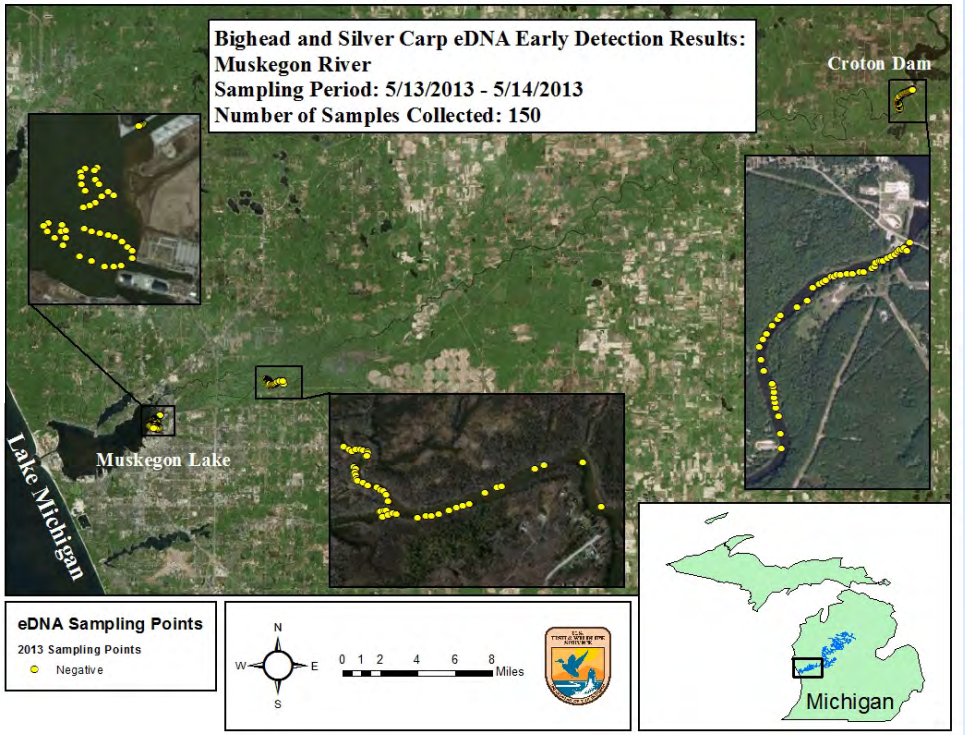
- 2013 eDNA sample sites included:
  - Lake Michigan Basin: Muskegon, St. Joseph, Kalamazoo, and Grand Rivers
  - Lake Erie Basin: Sandusky and Maumee bays, Raisin and Swan Rivers
  - Erie-Huron Corridor: Belle, Black, and Rouge Rivers
  - Lake Superior Basin: St Louis River Estuary

- Results can be viewed as available at:

  www.fws.gov/midwest/fisheries/eDNA

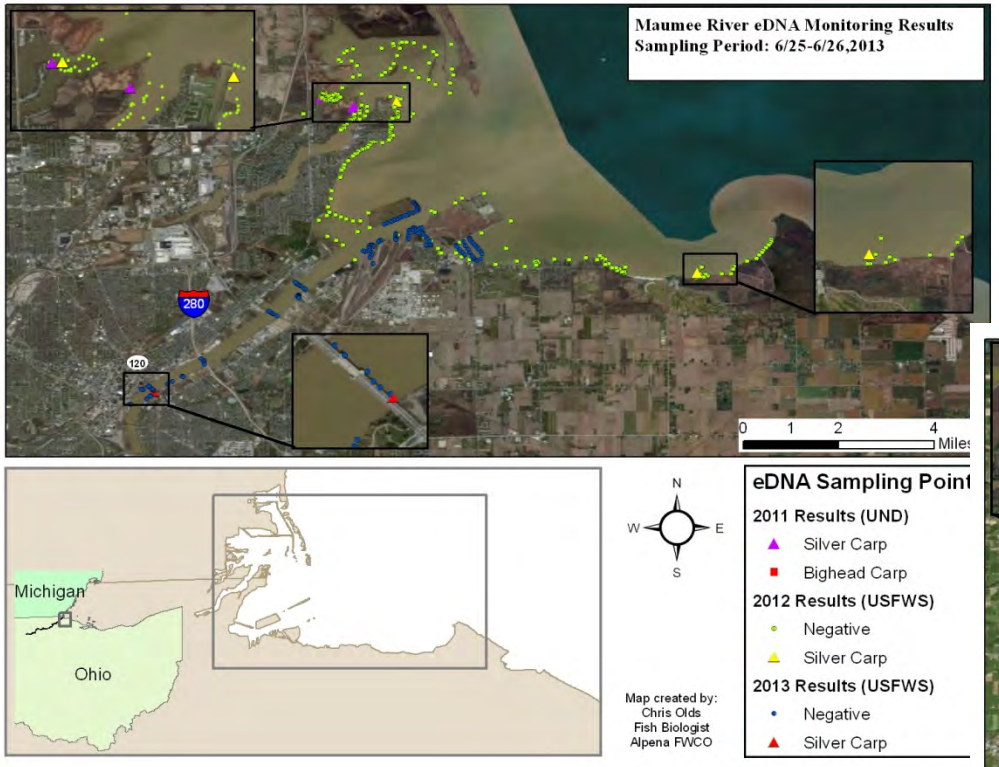
# Asian Carp eDNA Early Detection Results

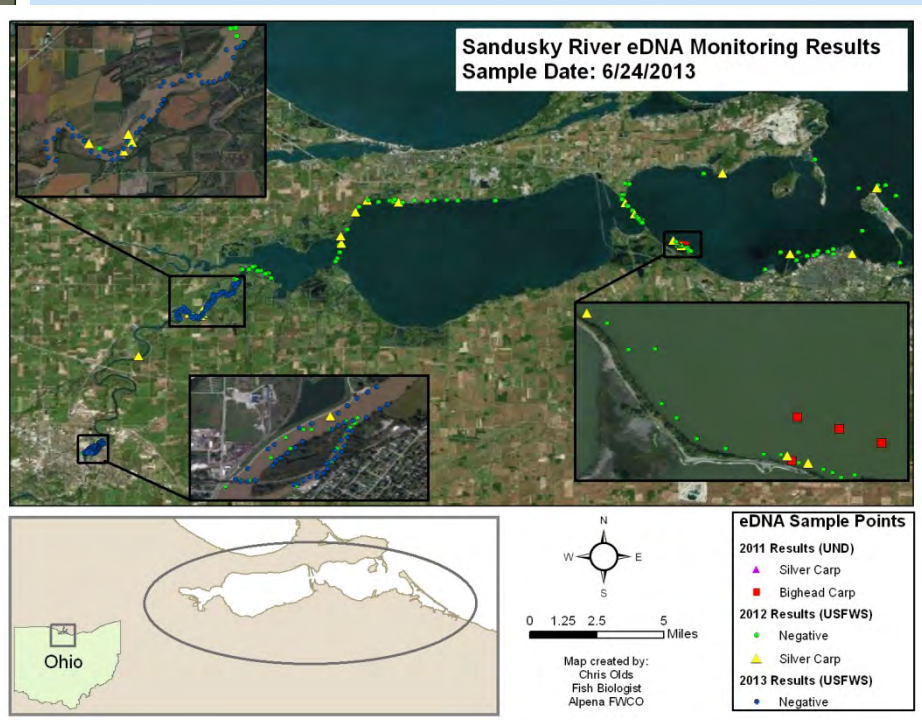



ACRCC

# Asian Carp eDNA Early Detection Results




ACRCC

# eDNA Informational Video


This video can be viewed at:
www.asiancarp.us/multimedia

# Asian Carp – U.S. Environmental Protection Agency

Bill Bolen

U.S. Environmental Protection Agency

# GLRI and Asian Carp Funding

- Over a billion dollars invested in Great Lakes
- Asian carp an Administration priority
- Increasing sustainability of program
- GLRI monies in 2014 and beyond dedicated to advancing separation of the basins.

Action Area

| FY | Base | GLRI | Total |
|---|---|---|---|
| 2010 | $26,604,846 | $38,583,000 | $65,187,846 |
| 2011 | $14,741,122 | $24,900,756 | $39,641,878 |
| 2012 | $32,275,000 | $19,389,717 | $51,664,717 |
| 2013 | $35,223,180 | $16,010,800 | $51,233,980 |
| **Total** | **$108,844,148** | **$98,884,273** | **$201,728,421** |

# FY 2013 Actions Areas for Funding

| Action Area | FY 2013 GLRI Funding | FY 2013 BASE Funding |
|---|---|---|
| Targeted Monitoring and Assessment | $3,170,000 | $1,667,000 |
| Commercial Harvesting and Removal Actions | $1,600,000 | $0 |
| Electric Barrier and Waterway Separation Measures | $2,958,000 | $24,451,000 |
| CAWS Barrier and GLMRIS | $1,142,800 | $5,425,180 |
| Research and Technology Development | $1,025,000 | $2,240,000 |
| eDNA Technology Refinement | $2,585,000 | $1,440,000 |
| Enforcement and Outreach | $880,000 | $0 |
| Other Support | $2,650,000 | $0 |

# THANK YOU

For more information

Please visit www.asiancarp.us

ACRCC

Great Lakes RESTORATION