Ohio River Basin and Upper Mississippi River Basin Asian Carp Briefing

June 22, 2016
Asian Carp Management and Control in the Upper Mississippi and Ohio River Basins

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U.S. Fish and Wildlife Service
Deputy ARD Fisheries, Midwest Region
The Service currently helps implement two different strategies to address the threat of Asian carps in the U.S. The first is *The Management and Control Plan for Bighead, Black, Grass, and Silver Carps in the United States* (National Plan), which is national in scope.

Coordination is done through the Service, in cooperation with State, Federal, Tribal, and international partners. Its goal is eradication of all but "triploid" grass carp in the wild.
Asian Carp Control Strategy Framework/Asian Carp Action Plan

- The second is the more recent Asian Carp Control Strategy Framework/Asian Carp Action Plan created in 2010, which focuses on Great Lakes waters only.

- This approach is being implemented through the Asian Carp Regional Coordinating Committee (ACRCC), a partnership of federal, Great Lakes states, and local agencies led by the Service (formerly led by White House Council on Environmental Quality).
WRRDA and Asian Carp Prevention (PL 113–121, June 2014)

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

  - Submit annual report to Congress on AC prevention and expenditures in UMR/OR basins

  - Lead a collaborative multiagency effort to slow the spread of Asian carp in UMR/OR basins
WRRDA Report to Congress:

I. Observed changes in the range of Asian carp;

II. Summary of Federal agency and non-Federal partners efforts to control the spread of Asian carp;

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.
2015 Report Results:

- AC management strategies developed for portions or all of both UMR and OR basins
- ~$49.9M spent on Asian carp prevention from July 2014 to September 2015 (~$5.7 M outside of CAWS and Great Lakes)
- Some range increases observed; new/increased sampling effort providing more accurate picture
- Documents examples of population control/reduction
2015 Report Results:

- Summarizes strong federal/state collaboration for planning a path forward (MICRA, State/fed agencies, others).
- In FY15, USFWS provided $800 K for high-priority Asian carp management project projects ($400 K UMRB; and $400 K ORB)
- In FY16, USFWS will provide $1.0 M for high-priority Asian carp management project projects ($500 K UMRB; and $500 K ORB)
- Enhances collaboration between UMRB/ORB and Great Lakes Asian carp prevention efforts
- Now available online: www.asiancarp.us
Current State of Asian Carp Threat in the Mississippi River Basin

Greg Conover
U.S. Fish and Wildlife Service
Large Rivers Coordinator, Midwest Region
Bighead Carp and Silver Carp: Characterization of Relative Abundance in the Upper Mississippi River and Ohio River
Established Populations / Reproduction

Goals: Reduce Abundance and Assess Reproduction

- Increased harvest
  - Contract fishing
  - Field test GLRI tools
- Targeted sampling to assess reproduction
  - Determine where and when reproducing
  - Identify habitat used by spawning fish, eggs, and young fish
- Inform future control efforts
Presence of Adults / Potential Reproduction

Goals: Prevention and Containment

- Intensive sampling for all life stages
  - Eggs, juveniles, adults
- Targeted removal
  - Prevent reproduction
- Evaluate locations and technologies for “barriers”
  - Reduce upstream passage
Individual Adult Captures / No Reproduction

Goal: Prevention

- 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
Monitoring, Control/Removal, Telemetry and eDNA in the Ohio River, 2015

Ron Brooks
Kentucky Department of Fish and Wildlife Resources
Director, Fisheries Division
MICRA Chairman
Objectives

- Surveillance, Early Detection, Distribution and Movement of Asian Carps
- Monitor Asian carp population dynamics in the Ohio River

- US Fish and Wildlife Service
- Kentucky Department of Fish and Wildlife Resources
- West Virginia Division of Natural Resources
- Indiana Department of Natural Resources
- Ohio Division of Wildlife
- Pennsylvania Fish and Boat Commission
- New York Division of Fish and Wildlife
# Telemetry

Table 1. Distribution of telemetry receivers in 2015 (Rec. = receivers, RM = river miles)

<table>
<thead>
<tr>
<th>Ohio River Pool</th>
<th># of Rec.</th>
<th>RM in Pool</th>
<th>Rec./RM</th>
<th>Rec. in Locks</th>
<th>Rec. in Tribs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>McAlpine</td>
<td>8</td>
<td>75</td>
<td>9.4</td>
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<td>0</td>
</tr>
<tr>
<td>Markland</td>
<td>16</td>
<td>95</td>
<td>5.9</td>
<td>3</td>
<td>0</td>
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<tr>
<td>Capt. A. Meldahl</td>
<td>54</td>
<td>95</td>
<td>1.8</td>
<td>3</td>
<td>6</td>
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<tr>
<td>Greenup</td>
<td>14</td>
<td>62</td>
<td>4.4</td>
<td>3</td>
<td>2</td>
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<tr>
<td>R.C. Byrd</td>
<td>13</td>
<td>42</td>
<td>3.8</td>
<td>3</td>
<td>4</td>
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<tr>
<td>Racine</td>
<td>6</td>
<td>31</td>
<td>5.1</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Belleville</td>
<td>12</td>
<td>42</td>
<td>3.5</td>
<td>3</td>
<td>1</td>
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<tr>
<td>Willow Island</td>
<td>1</td>
<td>35</td>
<td>n/a</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>123</strong></td>
<td></td>
<td></td>
<td><strong>21</strong></td>
<td><strong>13</strong></td>
</tr>
</tbody>
</table>
Stationary receivers recorded 1,578,888 detections of 98 Silver and Bighead Carp.

Most of the fish tagged during 2014 and 2015 remain in the Ohio River pool where they were tagged.

Only one fish (Bighead Carp) moved upstream out of the pool in which it was tagged (>174 river miles, past three lock and dams).

Six Silver Carp left the Ohio River to the Middle Mississippi River during 2014 (4 moved in a 4-d period: 8 locks and dams; 600 miles).

At least one had returned to the McAlpine Pool 10 months later (1,200 miles).
Monitoring and Response of Asian Carp in the Ohio River

July – August & October - December 2015
McAlpine, Markland, Meldahl, and Greenup pools

Methods

- Sampled 4 Macro-Habitat Types (island back channels; embayments; dam tailwaters; tributaries)
- 48 Electrofishing Sites (24 random; 24 fixed); 12 Gill Netting Sites (6 random; 6 fixed)

Electrofishing Results

- Summer (181 fish/hr); Fall (297 fish/hr)
- Total: 183 transects: 10,648 fish; 48 species
- No Bighead Carp; 55 Silver Carp, only from McAlpine Pool

Gill Net Sampling Results

- Summer 2015: 10,733 yards of net deployed; 55 sets: 78 fish; 10 sp.
- Fall 2015: 3,475 yards of net deployed; 14 sets; 66 fish; 10 sp.
- Total: 14,208 yards of net deployed; 69 sets; 144 fish; 10 sp.
- Bighead Carp: 1 in McAlpine, 2 in Meldahl; Silver Carp: 4 in McAlpine
Control and Removal of Asian Carp in the Ohio River

**Objectives**
- Remove Asian carp from Ohio River pools above McAlpine Dam
- Compile information on Asian carp population dynamics
- Encourage commercial removal of Asian carp in the Ohio River
- Provide information and data to monitoring and response efforts

**Methods (August- October 2015)**
- Electrofishing (47.19 hrs)
- Gill netting (2,566 yds); 8 weeks (4d/wk)
- Sampling sites: tributaries and embayments

**Results**
- 4,054 lbs of Asian carp for removal (~90%) or telemetry (~10%).
- Silver carp and grass carp most susceptible species to electrofishing
- Bighead carp are more effectively caught using gill nets
The Ohio River Basin Asian Carp - 2016 and Beyond

- **Increasing funding sources** (partnerships; ANS stamps)
- **Increasing removal effort** (rapid response; experimental gears and methods)
- **Increasing scope of telemetry array** (more tributaries, larger portion of the river)
- **Creating stronger public/private partnerships** (facilitate commercial removal)
- **Expanding effort to major Ohio River tributaries** (Tennessee and Cumberland)
- **Support increased funding** (Asian Carp National Plan)
  - e.g. - Tombigbee; Mobile River drainage
Upper Mississippi River Projects

Nick Frohnauer
Upper Mississippi Invasive Carp Workgroup Representative
Minnesota Department of Natural Resources
Upper Mississippi River – Monitoring and Assessment

- Comprehensive monitoring
  - Minnesota, Iowa (Iowa State University), Illinois (Western Illinois University), Missouri
  - USFWS, USGS
- All life stages
- Throughout basin
  - Mississippi River Pools 1-20
  - Minnesota and St. Croix Rivers
  - Des Moines, Skunk, Iowa, Rock, and Wapsipinicon

Credit: USFWS
Upper Mississippi River – Monitoring and Assessment

Acoustic Telemetry

- Participating Agencies – Minnesota, Missouri, US ACE, US Coast Guard, Western Illinois University, University of Minnesota – St. Mary’s, USGS, Southern Illinois University
- 155 tagged invasive carp
- Receivers cover almost 1,000 river miles
- Millions of detections
Upper Mississippi River – Commercial Fishing

- Lead - Illinois
- Reduce population above Lock and Dam 19
  - Impact reproduction
  - Slow upstream expansion
- Aid monitoring
  - Population size
  - Fish for telemetry
  - Recapture tagged fish

Credit: MN DNR
Started Fall 2015

- 700 tagged bighead, grass, and silver carp in Pool 19
- 1,800 tagged bighead, grass, and silver carp in Pool 20

Fish Removed
- Bighead – 6,241
- Grass – 10,240
- Silver – 19,493
Upper Mississippi River – Deterrent Measures

- Acoustic technology
  - Workshop – May 2016 (75 participants)
  - Evaluation – University of Minnesota – Twin Cities, University of Minnesota-Duluth, USGS

- UMR deterrent strategy
  - Where to focus
  - What technology to use
  - How to deploy
Asian Carp Activities in the Upper Mississippi and Ohio River Basins

Charlie Hanneken
US Army Corps of Engineers
Corps Asian Carp Activities

- Main Stem Upper Mississippi River basin
- Main Stem Ohio River basin
- General Activities

Note: The Corps does not directly receive appropriations or have a mission to control Asian carp on the Mississippi or Ohio Rivers. The primary mission of the Corps on both Rivers is to support inland navigation. However, the senior leaders of the Corps recognize the threat that Asian carp present to the environment and are supporting efforts to contain these invasive species.
Upper Mississippi River Basin

- **Closure of Upper St. Anthony Falls Lock – June 2015**
- Coordinated with University of Minnesota to test Acoustic Barrier demonstration at Lock and Dam 8
- Coordinating other deterrent demonstrations at Locks 1, 2 and 5
Ohio River Basin

- Evaluation of AC Deterrent Measures that are Compatible with Existing Corps Infrastructure
  - Complex Noise Systems
  - Water Velocity

- Support of Ohio River Fisheries Management Team (ORFMT)
  - Monitoring (Telemetry Receivers in Lock Chambers)
  - Active Member of Ohio River Asian Carp Coordination Committee
Corps General AC Activities

- **Research**
  - Asian carp swim speed
  - Use of Carbon Dioxide as a deterrent
- **Emergency Response Planning**
- **Coordinating Knowledge transfer**
  - GLMRIS Focus Area II Efforts (Eagle Marsh & Erie Canal)
  - Chicago Area Electric barrier operation & Efficacy
  - Barge Entrainment studies
  - Telemetry
USGS Asian Carp Technologies Update

Rip Shively, Director
USGS Columbia Environmental Research Center
Control Tools - 2016

**Carbon Dioxide** \((CO_2)\)
- Identifying minimum concentrations; continue field tests;
- Assessing injection systems
- Collaborating with FWS to complete CO\(_2\) Registration with EPA

**Underwater Sound**
- Evaluating where carp are abundant
- Completing sound mapping at potential application sites
- Examining high frequency sound
- Sound barrier workshop – May 17-18, 2016 (USGS, USFWS, UMN-Duluth & St. Paul)

**Microparticles**
- Pond trials to finalize microparticle development; ID field sites for testing;
- Initiate development of delivery system for grass carp
- Initiate lab studies of potential toxicants identified through modeling and cell assays
Portable, Rapid Asian Carp eDNA Detection Kit

- Detect a single, minnow-sized silver carp comingled with > 10,000 fathead minnows; potential to identify unintentional or illegal AC transfer
- Train, equip and develop procedures/data for law enforcement use
  - 10 kits for distribution
  - Law Enforcement Officer training – Illinois, Michigan and Ohio Departments of Natural Resources, May 3, 2016 – Vickery, Ohio
  - Initial use to look for Asian carp in bait tanks at bait shops
- Promising tool to improve AIS and pathogen detection
- Aid management decisions (prevent, contain, control)

Molecular Toolbox

- Refine methods to enhance detection e.g. shedding rates and degradation
- Collaborating with FWS to refine high-throughput sequencing protocols
- Supporting validation of genetic markers (with FWS and USACE)
Risk Assessment

**FluEgg Model**
- Using to predict AC spawning locations and egg/larvae survival to assess risk; use data to inform control strategies
  - Applying model to Grass Carp eggs found in 2015

**Grass Carp**
- Sandusky River
  - Monitoring for proof/location of spawning
  - Detect and model risk of recruitment

- Use of triploids to identify possible concentrations of GC

**Black Carp**
- Continue working partners to process wild BC to determine source
- Design and development of a targeted BC bait to protect endangered mussels
GLMRIS Support

- Providing hydraulic and WQ data/analyses to inform USACE GLMRIS decisions
  - USGS streamgages up and downstream of BRLD; Dye study in lock chamber to examine mixing; Provide data to inform USACE models

IPM Support

- Coordinating telemetry database to inform management and removal efforts
- Deploying more automated telemetry receivers to help track carp movement

Barge Entrainment

- Initiate hydraulic modeling to assess movement of eggs and larvae and the potential of barge entrainment
Coordinating and Leveraging with ACRCC Asian Carp Prevention & Control Efforts

Mike Weimer
U.S. Fish and Wildlife Service
Asian Carp Regional Coordinating Committee
Asian Carp Regional Coordinating Committee

- ACRCC partnership formed in 2009 for Great Lakes protection - 24 U.S. and Canadian federal, state, provincial, and local agencies
- Focused on preventing dispersal through Illinois Waterway, Chicago Area Waterway System, and GLMRIS “Secondary Pathways”
- Provides a bi-national forum for near- and long-term interagency planning and coordination
- Develops annual “Action Plan” continuing portfolio all agency Asian carp projects for the year
- Support provided for development of potential new early detection and control tools - GLRI and agency base funds
Implementing New Developments on the Landscape

- Leverage efforts between Great Lakes and UMR/OR basin partnerships
  - Detection and Control Tools
  - Monitoring and Assessment Strategies/Science
  - Contingency/Response Planning
  - Model Partnerships for interbasin prevention opportunities (e.g. Eagle Marsh GLMRIS pathway)
- Extend limited resources to develop critical tools
- Coordinate more broadly across jurisdictions
- Support goals of the National Asian Carp Plan
Moving Forward

- Interbasin/interagency Asian carp researchers and managers workshop
  - Fall 2016 (FWS and USGS leads)
- ACRCC/ORB/UMRB interbasin coordination
  - Sumer/Fall 2016 (ongoing dialogue to inform cross-basin partnership research priority/project development/data needs)
- 2016 WRRDA Report to Congress
  - Report will identify further opportunities and showcase existing examples of interbasin coordination and net benefits