



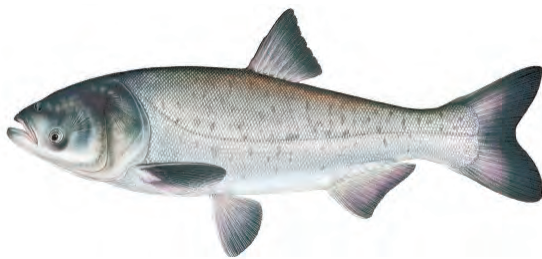
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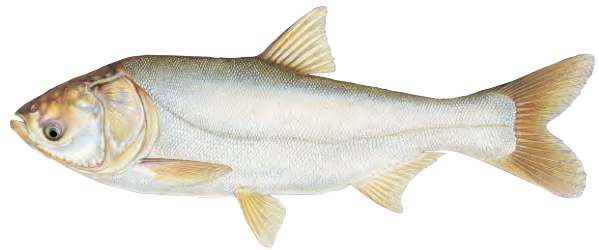
May 2012

Status Report for the Proposed 2010 Plan for the Prevention, Detection, Assessment, and Management of Asian Carps in Michigan Waters, April 2012

David F. Clapp, Jessica L. Mistak,
Kregg M. Smith, and Mark A. Tonello



Bighead carp *Hypophthalmichthys nobilis*



Silver carp *Hypophthalmichthys molitrix*



Grass carp *Ctenopharyngodon idella*



Black carp *Mylopharyngodon piceus*

Cover art courtesy of Joe Tomelleri.

MICHIGAN DEPARTMENT OF NATURAL RESOURCES FISHERIES DIVISION

Fisheries Special Report 61
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Status Report for the Proposed 2010 Plan for the Prevention, Detection, Assessment, and Management of Asian Carps in Michigan Waters, April 2012

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Introduction

In April 2010, members of the Fisheries Division Asian Carp Work Group (ACWG; Clapp, Mistak, Smith, Tonello), convened by Fisheries Division Chief Kelley Smith in March 2010, delivered to the Fisheries Division Management Team a report titled “Proposed 2010 plan for the prevention, detection, assessment, and management of Asian carps in Michigan waters”. At the June 2010 management team meeting, the ACWG delivered a revised draft, based on management team member comments and review. Between June and October 2010 additional minor edits were completed based on comments from reviews by other divisions. The completed plan was presented to the Natural Resources Commission at their October 7, 2010 meeting in Lansing and to a wider public audience at the “Michigan Asian Carp Prevention Workshop”, November 22, 2010 in Lansing. Since formal roll-out of the plan to the public, it has been presented and discussed at numerous venues and to numerous groups throughout the state.

Additionally, on March 13, 2011, Executive Order 2011-1 re-established the Michigan Department of Natural Resources (DNR) and the Michigan Department of Environmental Quality (DEQ). This executive order reversed previous Executive Order 2009-45, which had combined these two agencies to establish the Michigan Department of Natural Resources and Environment. Re-establishment of the DNR and DEQ changed some of the specific agency responsibilities outlined in the Michigan Asian carp plan, but in most cases the people identified as responsible for this work in the original plan were still responsible under the revised agency structure.

As a result of significant input received, changes in organizational structure that have occurred for the DNR and DEQ since the plan was released, and ongoing efforts and developments in

Michigan and other Great Lakes states related to management of Asian carps, this status report was prepared to document accomplishments and additions to the plan that have occurred during the period January 2011 through December 2011. The status report is organized following the structure of the original plan and incorporates the following elements:

- 1) Description of ongoing efforts and developments in Michigan, other Great Lakes states, and the scientific community related to management of Asian carps.
- 2) An updated “decision tree” for response to reports of Asian carp in Michigan waters.
- 3) An updated “database plan” for the online reporting page developed in November 2010 (see http://www.michigan.gov/dnr/0,1607,7-153-10364_52261_54896-246818--,00.html).
- 4) An outline of specific assessment plans for field evaluation, should the DNR receive reports of Asian carp in Michigan waters.
- 5) An outline of specific potential management actions to be taken following positive detection of Asian carp in Michigan waters.

Goal I: Prevent the accidental or deliberate introduction of bighead, black, grass, and silver carps in Michigan

Since release of the “Proposed 2010 plan for the prevention, detection, assessment, and management of Asian carps in Michigan waters” to the public in November 2010, the DNR and DEQ have taken the following actions to address the prevention of accidental or deliberate introduction of bighead, black, grass, and silver carps in Michigan:

- Secured additional funding for, and increased inspections by, Law Enforcement Division.

Through a Great Lakes Restoration Initiative (GLRI) grant for aquatic invasive species (AIS) activities, the State of Michigan received \$667,500 (5 FTEs; administered by the DEQ) each year in 2010 and 2011 from the U.S. Fish and Wildlife Service to fund a state-level AIS Core Team and other monitoring and response activities associated with AIS in the state. Michigan is eligible for this funding as a result of us having developed a state AIS management plan (http://www.michigan.gov/documents/deq/deq-ogl-ANSPlan2002_249062_7.pdf), pursuant to the National Invasive Species Act (<http://anstaskforce.gov/Documents/NISA1996.pdf>). The funding for the AIS Core Team activities is currently distributed as follows: Fisheries and Wildlife divisions, 1 position each; Parks and Recreation and Law Enforcement divisions, 1/3 of a position each; Department of Agriculture and Rural Development, 1/3 of a position; Department of Environmental Quality, 2 positions. In 2011 the state received expanded funding under this grant, including two additional positions and approximately \$109,000 in a program projects fund. A significant portion of the additional funding will be used for prevention actions for high risk pathways that block new species, specifically Asian carps, through enhanced and coordinated monitoring and surveillance activities by Law Enforcement Division and Fisheries Division.

- Improved communication with public and industry stakeholders.

During 2010-11, Fisheries Division staff conducted significant communication and outreach with stakeholder groups concerning the Asian carps plan and the importance of prevention activities. These communication efforts included the following (see also Goal II):

- Public rollout of Asian carps management plan to NRC (October 2010)
- Lansing Asian carps workshop (November 2010)
- Presentation to Michigan Aquaculture Association (February 2011)

- Presentation at MSU-ANR Week Great Lakes workshop (March 2011)
- Legislative tour (Linwood, Alpena, Muskegon, Traverse City; May 2011)
- Stewardship Network webcast (September 2011)
- Burt Lake Preservation Association (October 2011)
- Multiple media contacts
- Multiple legislative hearings
- Expanded collaborations with other agencies, formally through the Asian Carp Regional Coordination Committee and informally through increased communication between DNR biologists and Asian carp experts in other areas of the United States.

Work continues in other states, by federal government agencies, and by university researchers to address Asian carp range expansion. New developments since release of the DNR plan include:

- 2011 Asian Carp Control Strategy Framework (December 2010): “Updated in 2011, the Framework outlines an aggressive, multi-tiered strategy that includes Asian carp monitoring and netting, identifying and blocking pathways to the Great Lakes, and a series of other short- and long-term actions, including the development of long term biological controls.” (From Asian Carp Control Strategy Framework web page, <http://asiancarp.us/documents/2011Framework.pdf>.)
- Monitoring and Rapid Response Plan for Asian Carp in the Upper Illinois River and Chicago Area Waterway System (MRRP; May 2011): The revised MRRP “...review[s] plan development in light of 2010 sampling results, update[s] overarching strategic objectives, identif[ies] tools available to complete necessary work, and present[s] 18 specific project plans detailing tactics and protocols that will allow us to accomplish strategic objectives and achieve the overall goal of preventing Asian carp from establishing populations in the CAWS and Lake Michigan.” [From MRRP introduction, <http://asiancarp.us/documents/2011mrrp.pdf>.]
- Binational Risk Assessment (2011, in development): Launched in October 2010, this is “...the first binational effort to evaluate the likelihood of Asian carps spreading throughout the Great Lakes basin and to gauge the potential effect of the species on the Great Lakes ecosystem. The assessment will involve preeminent scientists in the field, will be peer-reviewed, and should take about eighteen months to complete.” [From Great Lakes Fishery Commission (GLFC) October 5, 2010 press release, <http://www.glfc.org/pressrel/pr101005.pdf>.]
- Great Lakes Mississippi River Interbasin Study (GLMRIS; 2011, in development): A study implemented by the USACOE, “...pursuant to Section 3061(d) of Water Resources Development Act of 2007. GLMRIS will explore options and technologies, collectively known as aquatic nuisance species (ANS) controls, that could be applied to prevent ANS transfer between the Great Lakes and Mississippi River basins through aquatic pathways.” [From GLMRIS web page, <http://glmr.is.anl.gov/index.cfm>.]
- “Envisioning a Chicago Waterway System for the 21st Century” (January 2012): “The Great Lakes Commission (GLC) and the Great Lakes and St. Lawrence Cities Initiative (GLSLCI) are leading an initiative to develop and evaluate scenarios for separating the Mississippi River and Great Lakes watersheds to prevent the transfer of aquatic invasive species (AIS), with a focus on the Chicago Area Waterway System (CAWS)...With support from a team of consultants, the project will provide a detailed

evaluation of potential scenarios for separation, including their costs, benefits and impacts.” [From GLC web page, <http://glc.org/ans/chicagowaterway.html>.]

- Asian Carp Response Simulation Exercise and Draft Asian Carp Response Plan (Ontario Ministry of Natural Resources (OMNR) and Department of Fisheries and Oceans – Canada (DFO-CA); March 2011): “...As part of the final stages of the [OMNR and DFO-CA] plan development process, we are planning an exercise to simulate an incident that requires an emergency response to an Asian carp infestation in Ontario waters...The goal of this exercise is to test the plan and engage key agencies and stakeholders to ensure a coordinated and successful response to such a serious threat. The exercise will provide an overview of the [OMNR and DFO-CA] draft Asian Carp Response Plan, examine agency responsibilities, explore how others may play a role in decision making, and test the draft response plan.” [From email to Kelley Smith from Eric Boysen, Director, Biodiversity Branch, OMNR.]
- The Nature Conservancy/Notre Dame University ecological forecast, environmental DNA (eDNA), and risk assessment projects: In 2010-11, DNR and DEQ staff participated in regular meetings of the Management Transition Board (MTB) for these projects.
- Research: Including “Framework” research projects, as well as the following peer-reviewed publications (see <http://www.asiancarp.us/documents/2011Framework.pdf>):

Cooke, S., and W.R. Hill. 2010. Can filter-feeding Asian carp invade the Laurentian Great lakes? A bioenergetic modeling exercise. *Freshwater Biology* 55:2138-2152.

Jerde, C.L., A.R. Mahon, W.L. Chadderton, and D.M. Lodge. 2011. “Sight-unseen” detection of rare aquatic species using environmental DNA. *Conservation Letters* 4:150-157. (http://edna.nd.edu/Environmental_DNA_at_ND/Publications_and_Reports_files/2011%20Conservation%20Letters%20Jerde%20et%20al%20full.pdf)

Rasmussen, J.L., H.A. Regier, R.E. Sparks, and W.W. Taylor. 2011. Dividing the waters: the case for hydrologic separation of the North American Great Lakes and Mississippi River Basins. *Journal of Great Lakes Research* 37:588-592.

Goal II: Effectively share information to improve management and control of bighead, black, grass, and silver carps in Michigan

Since release of the “Proposed 2010 plan for the prevention, detection, assessment, and management of Asian carps in Michigan waters” to the public in November 2010, the DNR and DEQ have taken the following actions to share information to improve management and control of bighead, black, grass, and silver carps in Michigan:

- Developed web page, brochure, show display, and video materials to enhance ability of public and institutional partners to identify Asian carps.

A brochure to assist the public in identification of juvenile Asian carps was developed in November/December 2010 and distributed during 2011. Complementary web-based identification aids were also developed during this time period (www.michigan.gov/asiancarp). A floor display unit and adult Asian carp mount were also purchased by the DNR in 2011, for use at outdoor/trade shows and interpretive centers.

- Secured additional funding to enhance communication efforts.

Funding was obtained through the Asian Carp Control Strategy Framework for development of an Asian carp identification video and public service announcement. Michigan will work with the Great Lakes Fishery Commission to develop and edit the footage and consult with the Asian Carp Regional Coordination Committee (ACRCC) Communications Subcommittee as needed.

- Shared information with the public, through web and print outlets, concerning 1) regulations applicable to possession and transport of Asian carps; and 2) DNR developments and responses to Asian carp range expansion.

Communication materials developed during 2010-11 included a brochure, web page, and display materials providing information related to applicable regulations and DNR activities related to Asian carp range expansion. In addition, this information was communicated to the public at numerous meetings (see also Goal I).

- Continued development of a multi-agency working group and increased communication among Michigan agencies with responsibility for Asian carps and AIS generally.

While a specific multi-agency Asian carp working group has not been formed, most activities conducted during the past year related to the Asian carps plan have been coordinated through the state AIS Core Team, with significant participation and time commitments from Fisheries Division and DEQ staff members.

Goal III: Detect the presence of bighead, black, grass, and silver carps in Michigan

Since release of the “Proposed 2010 plan for the prevention, detection, assessment, and management of Asian carps in Michigan waters” to the public in November 2010, the DNR and DEQ have taken the following actions to detect the presence of bighead, black, grass, and silver carps in Michigan:

- Implemented an eDNA surveillance program in Michigan waters of the Lake Michigan and Lake Erie basins with an associated results communication protocol (Appendix A).

To date, Fisheries Division staff have assisted staff from the Notre Dame University – Center for Aquatic Conservation in obtaining eDNA samples from Michigan waters (Lake Michigan tributaries, and Lakes Erie and St. Clair). In 2010, eDNA surveillance sampling was conducted on the St. Joseph, Galien, and Paw Paw Rivers (Figure 1). In 2011, sampling was conducted on the following systems; Galien River, Kalamazoo River, Muskegon River, Grand River, and Lake St. Clair/St. Clair River. No Asian carp DNA was detected in any of these systems.

Processing of these samples was funded entirely through a separate grant to Notre Dame. In 2012, the GLRI AIS program projects fund will be used to implement a state eDNA surveillance plan, as outlined in the Asian carps management plan.

- Developed a system for public reporting of Asian carp sightings. A database plan for the online reporting page was developed in November 2010.

In November 2010, Fisheries Division staff developed an online form for public reporting of potential Asian carp sightings (http://www.michigan.gov/dnr/0,1607,7-153-10364_52261_54896-246818--,00.html). Members of the Asian Carp Work Group (ACWG; Clapp, Mistak, Smith, Tonello), along with Tracy Kolb, met in February 2011 to review the structure and usefulness of the original form and to develop a database plan

for the online reporting page. Recommendations to the Fisheries Division Management Team at their March 2011 meeting included:

- Requiring mandatory use of the online reporting form for DNR staff contacted by public or sampling Asian carp themselves.
 - Revising and reorganizing the reporting form to emphasize the need for a photo or sample from “reporters”, and using this evidence in prioritization of reports for further action by Fisheries Division staff (Figure 2).
 - Separating the four primary Asian carp species on the reporting form, and adding an “unknown” option.
 - Providing information and a photo of common carp on the online reporting page and identification page by utilizing hyperlinks and reminding “reporters” to be certain sighting was not of a common carp.
 - Adding “drop-down” selections for reporting variables, as appropriate.
 - Developing a database (Table 1) to complement the online reporting form. Potential benefits include improved division-wide access to reporting records, the ability to sort reports by their characteristics, the ability to implement spatial tracking of reports, use in informing decisions on how or where to implement management, and use in tracking efficacy of treatments or responses.
- Developed a “decision tree” for response by Fisheries Division staff to reports or detection of Asian carps in Michigan waters.

A report of an Asian carp sighting, capture, or other positive indicator (e.g., eDNA result), by Fisheries Division staff or sources outside of Fisheries Division, will trigger a response from Fisheries Division according to a “decision tree” (Figure 2).

As of December 2011, there had been fewer than ten formal, web-based reports of Asian carps in Michigan waters, and no valid observations of bighead or silver in Michigan waters (not including trucked fish apprehended at the Michigan/Canadian border).

Goal IV: Gather population level data on Asian carps at areas where they have been detected in Michigan waters; measure response of Michigan fish populations to introduction of Asian carps

Since release of the “Proposed 2010 plan for the prevention, detection, assessment, and management of Asian carps in Michigan waters” to the public in November 2010, the DNR and DEQ have taken the following actions to gather population level data on Asian carps at areas where they have been detected in Michigan waters, and to measure response of Michigan fish populations to introduction of Asian carps:

- There have been no positive detections of silver, bighead, or black carps in Michigan waters to date; as a result, there has been no need for the increased assessment activities outlined in the original plan.
- A few grass carp were found in the St. Joseph and Kalamazoo rivers, and Lakewood Lake in Wexford County.

Finding grass carp in Michigan tributaries or water of the Great Lakes is not an unusual occurrence. Numbers are usually 1–2 fish per year and the fish are likely releases or escapes from ponds or other jurisdictions where genetically altered or triploid fish are allowed. Triploid fish have a low probability of reproduction; thus, while the division

tracks these findings, at this time grass carp do not pose a significant ecological threat in Michigan at these low densities.

- During 2011, DNR Fisheries Division staff developed a more comprehensive outline of specific assessment plans for field evaluation, should the DNR receive reports of Asian carp in Michigan waters.

Once Asian carps have been detected in Michigan's waters, assessment will be an important component of a DNR response strategy. Assessments will address two, linked questions: 1) how many Asian carps are present in the area of concern and 2) how are introduced Asian carps affecting resident fish populations in the area of introduction? Providing answers to these two questions will be critical in formulating a response to an introduction event and in assessing resource damage, should Asian carps become established. Assessment response will necessarily be situation specific; for example, significant field assessment may be warranted for several independent reports of Asian carp from a major tributary, but might not be recommended for a single dead Asian carp washed up on a Lake Michigan beach.

Any significant expansion of assessment efforts will depend on detected presence of Asian carps in Michigan's waters and identification of an important role for assessment activities in leading to a successful management outcome. Waters vulnerable to invasion by Asian carps for which sufficient baseline data is lacking may also be identified for additional/expanded assessment activities; identification of these waters will be undertaken by the Asian Carps Task Group and/or AIS Core Program.

The extent and cost of assessment activities will depend on the specifics of each introduction event (Table 2). For example, the size and complexity of the system invaded, the amount of information already available on the system, the problem of interest, and the possible management responses being considered will all influence the cost of implementing an assessment. In the original plan, cost estimates were developed for a few likely assessment scenarios. These are intended to provide a range of potential assessment costs that are likely to be incurred should Asian carps become established in Michigan waters.

- During 2011, DNR Fisheries Division staff formalized a protocol for ploidy (genetic) testing of Asian carps captured in Michigan waters.

It is now Fisheries Division protocol to attempt to test for ploidy any Asian carps, including grass carp, captured in Michigan waters. Samples will be collected and processed according to the field collection protocol developed by Southern Illinois University (Appendix B). In addition otolith and scale samples should be collected and held at the office responsible for sample collection, for possible future genetic and elemental analysis.

Goal V: Eradicate, contain, or manage populations of Asian carps if they become established in Michigan

Since release of the "Proposed 2010 plan for the prevention, detection, assessment, and management of Asian carps in Michigan waters" to the public in November 2010, the DNR and DEQ have taken the following actions to eradicate, contain, or manage populations of Asian carps in Michigan:

- There have been no positive detections of Asian carps in Michigan waters to date (with the exception of grass carp); as a result, there has been no need for the eradication/management activities outlined in our original plan.

- During 2011, DNR Fisheries Division staff developed a more comprehensive outline of specific potential management actions to be taken following positive detection of Asian carp in Michigan waters.

In the original plan, a specific generic response plan was not developed because it was decided it would be impossible to develop a logical, succinct generic response plan for detection of an Asian carp in the large variety of Michigan waters in which they might be found. For example, an isolated introduction with no detected reproduction or expansion will likely trigger a different response than detection of a large or rapidly expanding population of Asian carps. In this status report to the original plan, a table is provided that outlines likely responses based on water body classification (Table 3). As seen in this table, for some waters the specific response will be left to the discretion of a “command group” (Figure 2) that will work with stakeholders to develop a specific appropriate response strategy. It is acknowledged that responses may be dictated by political considerations and concern by the public.

Conclusion

Several activities have occurred to prepare Michigan for an agency response if silver, bighead, or black carp are found in Michigan waters. Fisheries Division will continue to seek external funds and opportunities to continue implementation of the “Proposed 2010 plan for the prevention, detection, assessment, and management of Asian carps in Michigan waters”. In the coming year, the division will continue to use eDNA as a surveillance tool, develop and implement a response exercise if resources allow, and develop products and tools for informing the public about the importance of preventing Asian carp from entering the Great Lakes. Fisheries Division will also continue to work diligently with other Great Lakes states, federal agencies, tribes, and the Province of Ontario to prevent bighead, silver, and black carp from entering the Great Lakes.

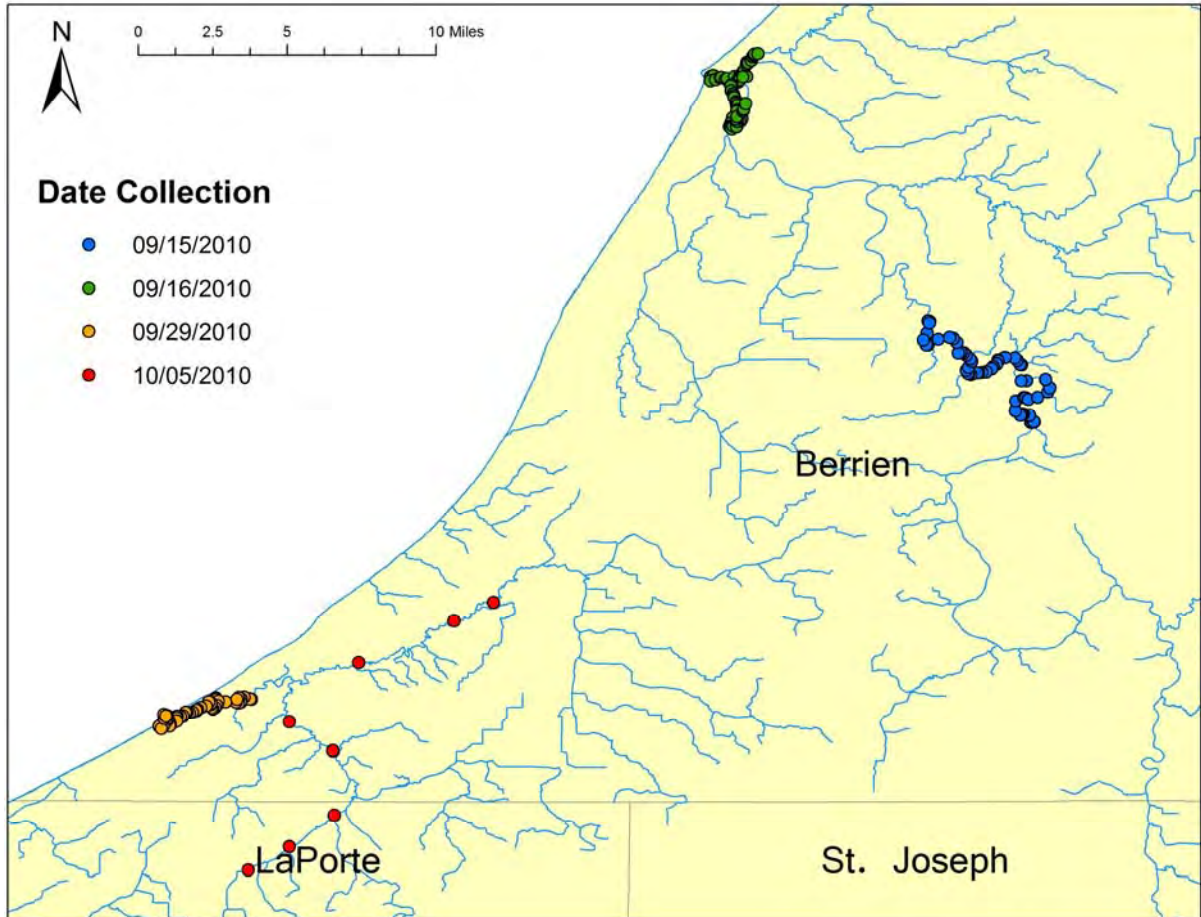
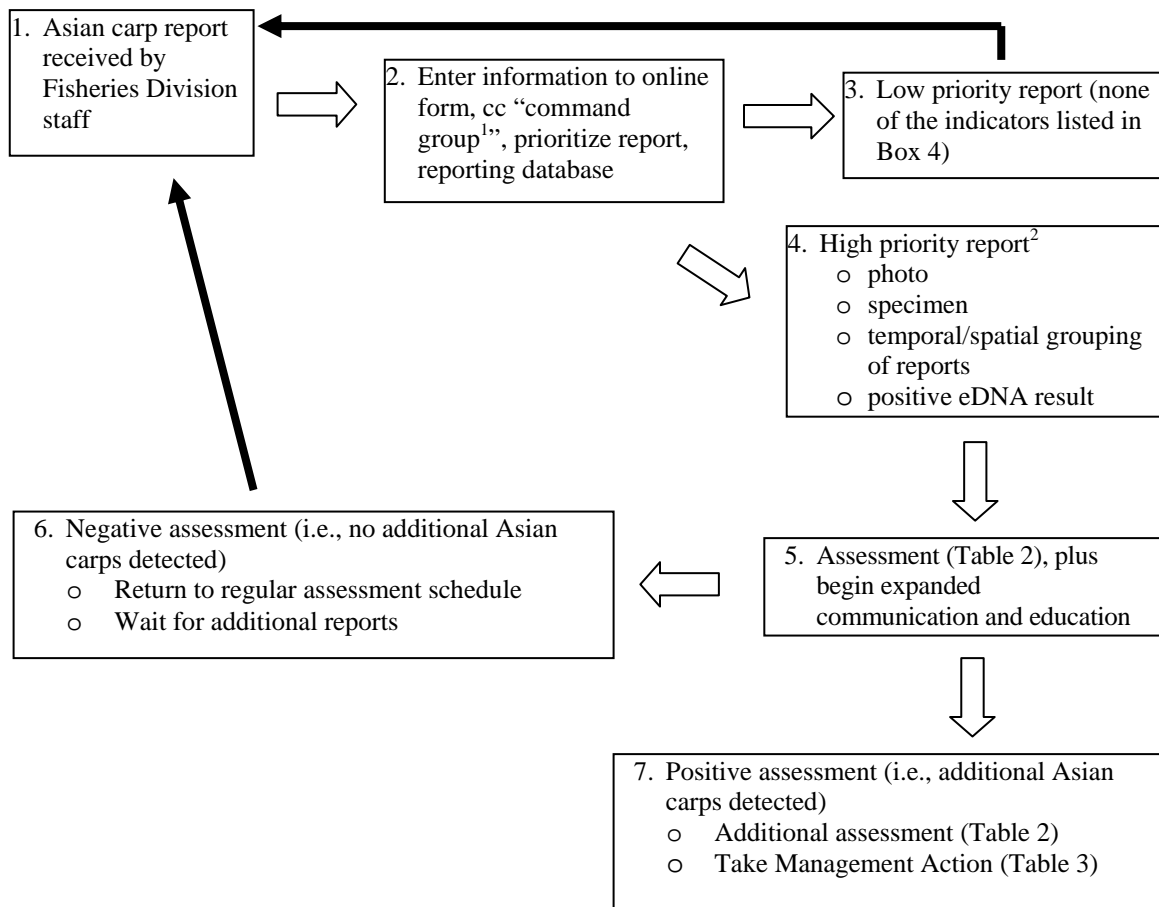


Figure 1.–Asian carp eDNA surveillance sites and sampling dates on the St. Joseph, Galien, and Paw Paw rivers, 2010. Sampling was conducted in collaboration with the Notre Dame University – Center for Aquatic Conservation. (Figure courtesy of W. Chadderton and C. Jerde, Notre Dame University.)



¹“Command group” includes: Aquatic Species and Regulatory Affairs Unit supervisor, Basin Coordinator, GIS expert, Management Unit supervisor, and Habitat Unit supervisor.

² A high priority report includes a confirmed fish sighting or positive eDNA:

- Within 24 hrs – email sent to the state and the USFWS
- Within 36 hrs – USFWS will notify all appropriate federal agencies and other impacted states and tribes
- Within 48 hours – state lead will convene phone conference to discuss interpretation of results and to coordinate the communication of results
- The phone conference will coordinate:
 - Who will lead the release of information and how will that occur?
 - What monitoring actions will be needed?
 - What response actions need to be taken?
 - Who will participate in any press release/press conference?
 - When will the information release occur?
- The draft press release will be shared among appropriate agencies, with each providing comments in appropriate areas of expertise.
- Before release, the affected state point of contact will notify partner Great Lakes states.
- The press release will identify state and federal roles, and acknowledge GLRI as the funding source (as applicable).

Figure 2.—“Decision tree” for response by Fisheries Division staff to reports or detection of Asian carps in Michigan waters. Similar response protocols are also presented in the “Draft Asian Carp Response Plan” (Canada) and the “Monitoring and Rapid Response Plan for Asian Carp in the Upper Illinois River and Chicago Area Waterway System”.

Table 1.—Structure of the data tables and variables included in the Asian carp reporting database. Type of field is provided in parentheses.

Main table	Observer Information table	Follow-up table
<ul style="list-style-type: none"> • Observation ID (Autonumber, key variable) • Date of observation (entry template) • Species observed (drop down) • Water body (drop down, based on existing division tables) • County (drop down) • Township (drop down) • Range (drop down) • Section (drop down) • GPS coordinates (entry template) • Access site • Photo submitted (Y/N?) • Specimen retained (Y/N?) 	<ul style="list-style-type: none"> • Observation ID (Autonumber, key variable) • Last name • First name • Street • City • State (drop down) • Zip code (entry template) • Phone (entry template) • Email (entry template) 	<ul style="list-style-type: none"> • Observation ID (Autonumber, key variable) • Date report received (entry template) • Date of follow-up (entry template) • Follow-up contact (drop down, division staff) • Species identification (drop down) • Maturity (adult/young?) • Number observed • Follow-up action • Comments • Attachments

Table 2.—Strategies for consideration by DNR Fisheries Division staff to assess various species and life stages of Asian carps in lotic and lentic systems in Michigan. Cost estimates for a subset of these scenarios are provided in the DNR “Proposed 2010 plan for the prevention, detection, assessment, and management of Asian carps in Michigan waters”. All positive reports should include collection of ploidy sample, aging sample, and microchemistry sample (see Appendix B).

Water body	Species and life stage			
	Adult (>300 mm)		Juvenile (<300 mm)	
	Bighead and silver carp	Grass carp	Bighead and silver carp	Grass carp
Isolated inland lake, <100 acres	- Hoop, Fyke, Trap - Gill, Trammel - Electrofishing	- Hoop, Fyke, Trap - Gill, Trammel - Electrofishing	- Hoop, Fyke, Trap - Gill, Trammel - Electrofishing	- Hoop, Fyke, Trap - Gill, Trammel - Electrofishing
Isolated inland lake, >100 acres	- Hoop, Fyke, Trap - Gill, Trammel - Electrofishing	- Hoop, Fyke, Trap - Gill, Trammel - Electrofishing	- Hoop, Fyke, Trap - Gill, Trammel - Electrofishing	- Hoop, Fyke, Trap - Gill, Trammel - Electrofishing
Connected inland lake	- Hoop, Fyke, Trap - Gill, Trammel - Electrofishing	- Hoop, Fyke, Trap - Gill, Trammel - Electrofishing	- Hoop, Fyke, Trap - Gill, Trammel - Electrofishing	- Hoop, Fyke, Trap - Gill, Trammel - Electrofishing
Inland lotic system	- Electrofishing	- Electrofishing	- Electrofishing	- Electrofishing
Great Lakes tributary (upstream of barrier)	- Electrofishing	- Electrofishing	- Electrofishing	- Electrofishing
Great Lakes tributary (downstream of barrier)	- Hoop, Fyke, Trap - Gill, Trammel - Electrofishing - ELH sampling	- Hoop, Fyke, Trap - Gill, Trammel - Electrofishing - ELH sampling	- Hoop, Fyke, Trap - Gill, Trammel - Electrofishing - ELH sampling	- Hoop, Fyke, Trap - Gill, Trammel - Electrofishing - ELH sampling
Great Lakes	- Hoop, Fyke, Trap - Gill, Trammel - Electrofishing	- Hoop, Fyke, Trap - Gill, Trammel - Electrofishing	- Hoop, Fyke, Trap - Gill, Trammel - Electrofishing	- Hoop, Fyke, Trap - Gill, Trammel - Electrofishing
Boundary waters (Wisconsin, Indiana)	See above ^a	See above ^a	See above ^a	See above ^a

^a In consultation with adjoining state agency.

Table 3.—Working guidelines for strategies to be employed by DNR Fisheries Division staff to eradicate or manage various species and life stages of Asian carps in lotic and lentic systems in Michigan. Cost estimates for a subset of these scenarios are provided in the DNR “Proposed 2010 plan for the prevention, detection, assessment, and management of Asian carps in Michigan waters”. For all scenarios, DNR Fisheries Division staff in coordination with partners will implement barrier management and alternative technologies as appropriate. All positive reports, assessments, and management actions require communication and education actions. MT = Fisheries Division Management Team.

Water body	Species and life stage			
	Adult (>300 mm)		Juvenile (<300 mm)	
	Bighead and silver carp	Grass carp	Bighead and silver carp	Grass carp
Isolated inland lake, <100 acres	Reclamation (rotenone)	Reclamation (rotenone)	Reclamation (rotenone)	Reclamation (rotenone)
Isolated inland lake, >100 acres	MT and Command Group ^a	MT and Command Group ^a	MT and Command Group ^a	MT and Command Group ^a
Connected inland lake	MT and Command Group ^a	MT and Command Group ^a	MT and Command Group ^a	MT and Command Group ^a
Inland lotic system	Single-site rotenone ^b	Single-site rotenone ^b	Single-site rotenone ^b	Single-site rotenone ^b
Great Lakes tributary (upstream of barrier)	Single-site rotenone ^b	Single-site rotenone ^b	Single-site rotenone ^b	Single-site rotenone ^b
Great Lakes tributary (downstream of barrier)	Single-site rotenone ^b	Single-site rotenone ^b	Single-site rotenone ^b	Single-site rotenone ^b
Great Lakes	Commercial operations	Commercial operations	Commercial operations	Commercial operations
Boundary waters (Wisconsin, Indiana)	See above ^c	See above ^c	See above ^c	See above ^c

^a See Figure 2 for details about Command Group.

^b See Table 3 in Clapp et al. 2012.

^c In consultation with adjoining state agency.

Literature Cited

Clapp, D. F., J. L. Mistak, K. M. Smith, and M. A. Tonello. 2012. Proposed 2010 plan for the prevention, detection, assessment, and management of Asian carps in Michigan waters. Michigan Department of Natural Resources, Fisheries Special Report 60, Lansing.

Reviewed by Fisheries Division Management Team
Tammy J. Newcomb, Editor
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Approved by Tammy J. Newcomb

Environmental DNA (eDNA) Analyses: Communication of eDNA Results to Partner Agencies

Purpose: For communication of results from environmental DNA (eDNA) analysis, the information must be relayed to partnering agencies with the following protocols:

The University of Notre Dame Environmental Change Initiative (ND-ECI) agrees to the following protocol for notification of eDNA results:

If a positive eDNA detection is made:

1. Once all Quality Assurance/Quality Control protocols are complete and the positive result is confirmed, within 24 hours an email will be sent to the agency's point of contact (POC) for the state in which the positive detection is made as well as the POC for the USFWS. (The Forest Preserve District of Cook County, or the Chicago Park District will also be notified of positive detections within their respective jurisdictions.) If multiple positive detections range across state boundaries, then all POCs for the states in whose waters positives were detected will be informed in the same email. A location (Latitude/Longitude), preliminary strength of the positive signal (number of positives), and the species of detection will be communicated in the email.
2. Within 36 hours the USFWS will notify all appropriate Federal agencies and other potentially impacted states and tribes.
3. Soon thereafter (within approximately 48 hours), a phone conference between ND-ECI, the affected state(s), USFWS, CEQ, and any other state/federal/tribal agencies that the affected state(s) and the USFWS desire should occur to discuss interpretation of results and to coordinate the communication of results. The appropriate state agency will coordinate the phone conference. The phone conference will seek to answer the following questions:
 - Who will lead the release of information and how will that occur?
 - What monitoring actions need to be taken to respond to the discovery (more sample collection, processing, etc.)?
 - What response actions need to be taken to respond to the discovery (sharing of results, deployment of resources, etc.)?
 - Who will participate in any press release/press conference (people, agencies, stakeholders, etc.)?
 - When will the release of information to the public occur?

At the end of the phone conference, a clear time line of events and responsibilities by all parties must be in place.

4. Before any statement is released to the public, a draft of the statement will be shared between the state POC, ND-ECI, USFWS, CEQ and any other affected state/federal/tribal agency. In general, ND-ECI will comment only on analysis process, state POCs will detail any response actions. The State in collaboration with the USFWS, CEQ, and USEPA will lead discussions on possible implications pertaining to impacts on the Great Lakes, potential funding implications and Federal coordination.

- USFWS and USEPA will be afforded the opportunity to also comment about broader actions with respect to the GLRI.
 - The statement must indicate the roles of ND-ECI, USFWS, CEQ, USEPA, state agencies, and tribes, and acknowledge GLRI as the funding source.
5. Shortly before any statement is released the affected State will notify all other partner State POC's around the Great Lakes basin of these results. A draft list of agreed partner agencies is compiled below.
 6. If a unified response between the parties cannot be agreed upon, but a response by all parties is desired, then independent press releases can be released by state agencies, USFWS and ND-ECI.
 7. If no public response by state agencies is desired, then by default, the responsibility will be delegated to USFWS.

If a sampling effort results in no positive eDNA detections, then:

1. UND will inform the POCs from the relevant state(s) and the USFWS of the results by email. Regular reports prepared by UND (every three months as part of the GLRI) will be provided to the relevant state POCs and the USFWS.
2. The state POC(s) will work with ND-ECI to determine if a press release is desired.

All agencies agree to not publish this data without ND-ECI permission.

State Agency Contact List:

Illinois DNR

Debbie Bruce, 217-524-4111, debbie.bruce@illinois.gov

Kevin Irons, 217-557-0719, Kevin.Irons@Illinois.gov

Indiana DNR

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Michigan DNR

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Michigan DEQ

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Shipping and Handling of Grass Carp for Ploidy Analysis by Flow Cytometry

Field Protocol

1. Record GPS Location (if available, otherwise a description of collection location), fish weight and total length, and date of capture.
2. Contact Dr. Whitledge (gwhit@siu.edu; 618-453-6089) to make overnight priority shipping arrangements for incoming sample. A pre-paid UPS shipping label can be e-mailed to you if we know the dimensions and weight of the package (see packaging instructions below).
3. We're interested in three structures: eyes for ploidy analysis, post-cleithra bones (for aging) and otoliths (for microchemistry). Removing the head from the freshly killed fish is preferred, cutting well behind the pectoral fin to avoid severing the post-cleithra. For small fish, the whole fish could be shipped, but removing the head is preferred to reduce weight and to help keep the sample cool during shipping.
4. Ship sample immediately after catch if possible. Otherwise, maintain the sample at refrigerator temperature (4°C-8°C) no more than 10 days. If shipping does not occur within that time frame, freeze the sample (see below options).
5. Options for sample handling in order of preference from high to low:
 - a. Remove head from freshly killed animal and store at 4°C-8°C.
 - b. Remove head from frozen animal and send frozen head. Do not use dry ice for shipping.
6. Place the fish's head in a styrofoam cooler within a box. Use ice packs to maintain 4°C–8°C; if ice is used, put in double ziplock bags. Seal the cooler with tape if there is a threat of leakage of fluid.
7. Ship priority overnight to address below.

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