

Appendix D. Actual Events

January 2025

This appendix contains descriptions of actual events that have occurred since adoption of the invasive fishes communications protocol by the Council of Great Lakes Fishery Agencies in 2019. A summary table references all final event descriptions processed through the protocol, followed by full event descriptions in their sequence of occurrence. This document is subject to periodic revision; users should refer to the date designation above and contact the Great Lakes Fishery Commission (see Appendix C) for more current information.

Summary Table of Final Event Descriptions

#	YEAR	EVENT TYPE	SPECIES	LIFE STAGE	LOCATION	RESPONSIBLE AGENCY	COMMENT
1	2019	important	grass carp	egg	Sandusky R., OH	USGS	new knowledge
2	2019	important	grass carp	adult	Sandusky R., OH	ODNR	removal
3	2019	important	ruffe	adult	St. Marys R., MI	USFWS	range expansion
4	2019	important	tubenose goby	adult	Cheboygan R., MI	USFWS	range expansion
5	2019	routine	grass carp	adult	Cuyahoga R., OH	ODNR	removal
6	2019	important	silver carp	eDNA	Sandusky R., OH	ODNR	new '+' detection
7	2020	important	grass carp	adult	Tittawabassee R, MI	MDNR	1 st known diploid
8	2020	important	grass carp	adult	Jordan Harbour, ON	DFO	1 st at location
9	2021	important	grass carp	adult	St. Joseph, Galien R, MI	MDNR	two fish, bow kills
10	2021	important	bighead carp	eDNA	Sandusky R., OH	ODNR	one '+' sample
11	2021	important	grass carp	adult	Little Calumet R, IN	INDNR	bow kill
12	2021	important	grass carp	adult	Milwaukee R, WI	WDNR	1 st since 2015
13	2021	important	grass carp	adult	Muskegon Lake, MI	MDNR	1 st known diploid
14	2021	important	bighead carp	eDNA	Milwaukee R, WI	WDNR	new '+' detection
15	2021	important	bighead carp	eDNA	Milwaukee R, WI	WDNR	2nd '+' detection
16	2021	routine	grass carp	adults	Huron, Grand R, OH	ODNR	1 st known diploids
17	2021	important	e.b. killifish	adults	Lake Michigan, WI	WDNR	new knowledge
18	2022	important	silver carp	eDNA	Presque Isle, PA	PFBC	new '+' detection
19	2023	important	grass carp	egg	Huron R, OH	ODNR	new knowledge
20	2023	important	silver carp	eDNA	Maumee R, OH	ODNR	new knowledge
21	2023	routine	grass carp	eDNA	Presque Isle, PA	PFBC	rare occurrence
22	2023	important	silver carp	eDNA	St Joseph R, MI	MDNR	new '+' detection
23	2024	important	bigheaded carps	eDNA	Maumee R, OH	ODNR	new knowledge
24	2024	important	bigheaded carps	eDNA	Kalamazoo R, MI	MDNR	1 st since 2014
25	2024	important	silver carp	eDNA	Sandusky R, OH	ODNR	2 nd '+' detection
26	2024	important	bigheaded carps	eDNA	Milwaukee R., WI	WDNR	1 st since 2021
27	2024	important	bighead carp	eDNA	Sandusky R., OH	ODNR	2 nd '+' detection
28	2024	important	silver carp	eDNA	Milwaukee R., WI	WDNR	'+' detection

#1: Grass carp eggs, Sandusky River, USGS

Event Description Form

NOTE: This information is confidential, not for distribution or use beyond intended audiences.

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: Grass Carp (eggs)

Location: Sandusky River

Event time/duration: 13 and 26 June 2019

Responsible agency: US Geological Survey

Contact person/e-mail: Patrick Kočovský (pkocovsky@usgs.gov)

Type: ☒ Unexpected ☐ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☐ Management ☒ Research

<input type="checkbox"/> prevention	<input checked="" type="checkbox"/> population status
<input type="checkbox"/> surveillance	<input type="checkbox"/> ecological impacts
<input type="checkbox"/> response	<input type="checkbox"/> fishery impacts
<input type="checkbox"/> suppression	<input type="checkbox"/> tools/techniques
<input type="checkbox"/> control	<input type="checkbox"/> other

Talking Points (bullets):

- Grass Carp eggs were collected at 5 sampling sites between the Highway 6/Highway 20 bridge downstream of Fremont, OH and the Hayes Avenue Bridge in Fremont under previously unreported environmental conditions
- This information was rapidly communicated to Ohio DNR, which began response activities within hours. Specific communications about the LEC's capture activities will be reported in a separate event form by Ohio DNR
- Time of year (mid-May through mid-July) and water temperature ($> 19^{\circ}\text{C}$) were consistent with spawning events by Grass Carp in the Sandusky River in previous years
 - Peak discharge of the high-flow event during which eggs were collected was 1,850 cfs (~85th percentile), which was lower than past peak events during which eggs were collected (previous minimum peak was 5420 cfs, 5/23/2018).
- A subset of eggs will be genetically verified to confirm species identification
- Developmental stages will be determined, and hydraulic simulations of egg drift will be used to assess whether spawning occurred upstream of the Ballville Dam site

Supporting information: (attach additional files or links as necessary)

- Sampling for grass carp eggs is conducted annually by USGS in partnership with the University of Toledo to learn more about reproduction and potential control of this invasive species in Lake Erie.
- At our upstream-most sampling location, just downstream of the Hayes Avenue Bridge along the left bank (facing upstream), there were many large fish swimming near the surface apparently spawning. There were two anglers fishing from the same shoreline. When asked what they were catching they stated buffalo. This was communicated in real time to the Ohio DNR strike team leader.
- The hydraulic model required to assess whether spawning occurred upstream of the Ballville Dam site does not yet exist; its development is contingent on that work being funded.

#2: Grass carp, Sandusky River, ODNR

Event Description Form

NOTE: This information is confidential, not for distribution or use beyond intended audiences.

☐ Draft ☒ Final

☐ URGENT ☐ Important ☒ Routine

Species: Grass Carp

Location: Sandusky River, Fremont, Ohio, Lake Erie watershed

Event time/duration: 05/29/19-06/06/19, 6 days of sampling

Responsible agency: OH DNR Division of Wildlife

Contact person/e-mail: Travis Hartman, travis.hartman@dnr.state.oh.us

Type: ☐ Unexpected ☒ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☐ surveillance

☐ ecological impacts

☒ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☒ control

☐ other

Talking Points (bullets):

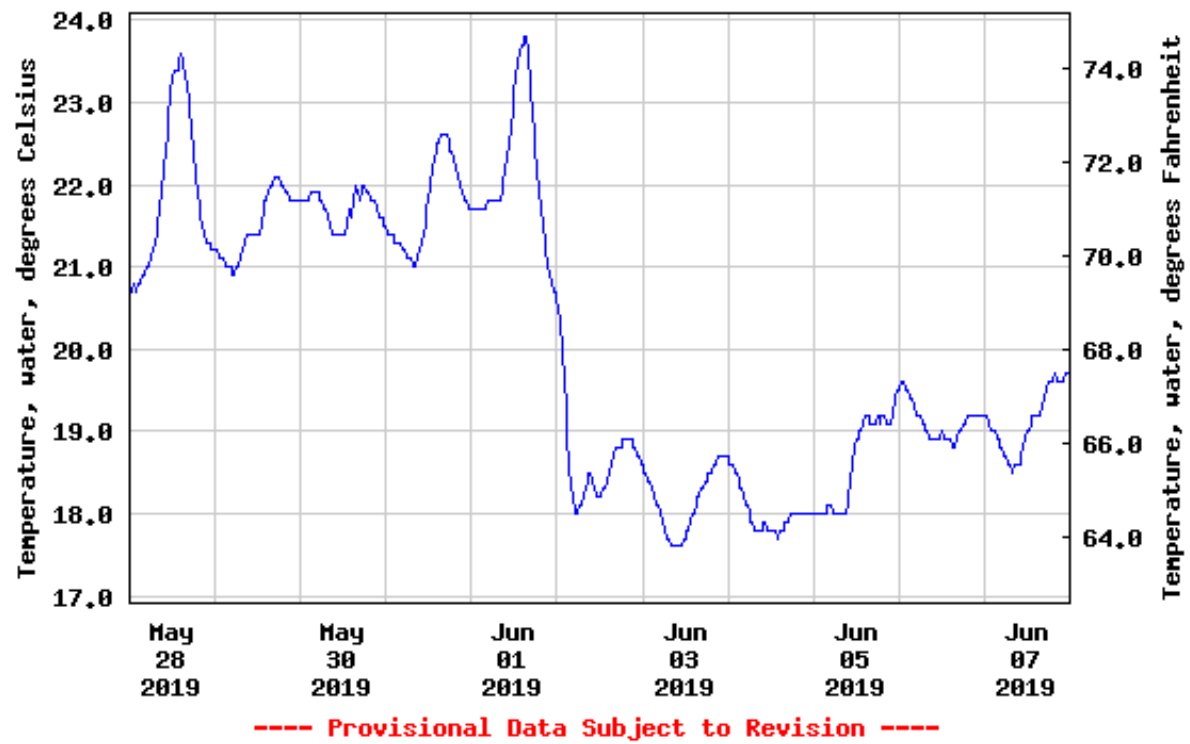
- Two sampling events over a 2-week period resulted in the capture of 23 adult grass carp in the Sandusky River.
- A response effort was initiated on 5/29 based on increased river flow, real-time receiver detections of tagged grass carp, and the presence of eggs in USGS/Univ. of Toledo samples, and resulted in 3 captures over 3 days of sampling with electrofishing.
- ODNR responded on May 29th (afternoon) with one electrofishing vessel, and on May 30th with two electrofishing vessels (no fish seen/captured). Electrofishing crews from USFWS-Detroit, MDNR, and ODNR (2) responded on May 31st and worked in coordination, resulting in the capture of 3 grass carp adults. Other fish were viewed (approximately 7 fish) but were not captured.
- The following week forty-one crew members from eight agencies/offices participated (ODNR, MDNR, USFWS-Detroit, USFWS-Columbia, University of Toledo, DFO, Quebec MFFP, and USGS) in a gear/methodology trial that resulted in 20 captures over 3 days.

- The methodology trial included eleven boats; 8 electrofishing or hybrid boats, 1 dedicated net boat, and 2 electrified trawl boats from USFWS-Columbia (Dozer and Paupier trawls). In total 11 grass carp were captured in trammel nets and 9 were captured by electrofishing, but many electrofishing captures occurred in or around nets.
- Two fish were acoustic-tag recaptures; one was implanted in the Sandusky River during the 2018 Planned Action and did not survive the current capture and handling. A second fish was implanted in 2016 in Maumee Bay and was also recaptured and released during the 2018 Planned Action; the loss of the external loop tag led to the removal of this fish during the current capture.
- All 20 fish from the methodology trial were processed at the University of Toledo.
- The three fish captured during the response event were implanted with acoustic transmitters and released.
 - There are still fewer than 50 live tagged fish at large
 - These were tagged to meet LEC objectives associated with the fine scale movement project in the Sandusky River system.
- So far in 2019, 46 grass carp have been captured in Ohio waters and tributaries of Lake Erie, and 43 have been removed.
- Additional actions will be taken throughout the summer by dedicated ODNR, MDNR and USFWS teams.

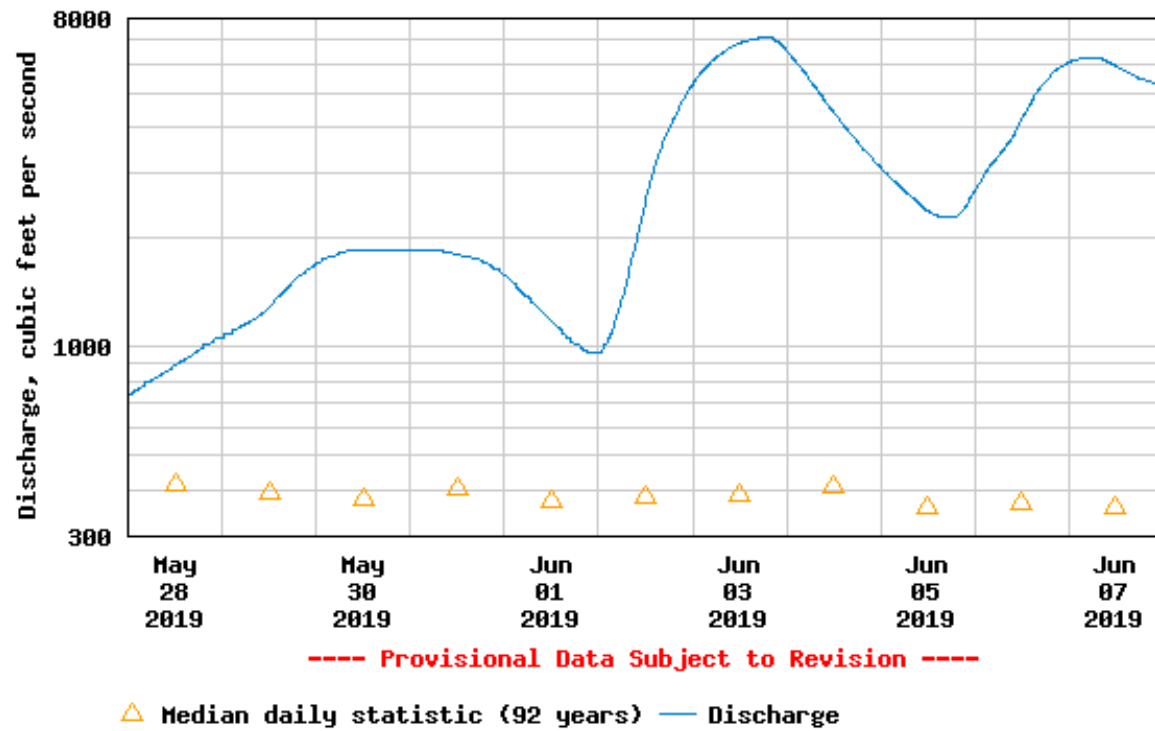
Supporting information: (attach additional files or links as necessary)

Lessons learned/summary: Despite temperatures not being ideal for grass carp spawning during the June 4-6th event, fish in spawning condition (pre-spawn/flowing/spent) were in potential spawning areas. We were far more successful using nets and electrofishing together, even during quicker flows in the spawning areas. Electrofishing alone, even in larger groups, isn't as effective without the nets. Trammel nets can be used in higher currents to great effect if you have the right anchors, but there is a threshold that they just don't hold well, and that appears to be somewhere above 2500 cfs. At 2500 cfs with Quebec's anchors we had few problems with nets moving, but the following day at 3500 cfs (with additional debris flowing downstream) the nets didn't hold, and we had to grab upstream anchors and hook them around rocks on shore to keep them from causing safety issues. The USFWS electrified trawls did not capture grass carp during sampling. Ohio believes that electrified trawls are not a good fit for spawning conditions on the Sandusky River (they operate at higher speeds than standard electrofishing boats and reach gear saturation quickly, which makes coordinated sampling difficult), and are not likely to invest in this gear in the future. Electrified trawls may be useful for sampling juvenile grass carp. Please see the attached temperature and discharge graphs.

USGS 04198000 Sandusky River near Fremont OH



USGS 04198000 Sandusky River near Fremont OH



#3: Ruffe, St. Marys River, USFWS

Event Description Form

NOTE: This information is confidential, not for distribution or use beyond intended audiences.

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: Ruffe, *Gymnocephalus cernua*

Location: St. Marys River, near Lime Island, 46.07450 -84.00665

Event time/duration: 12 June 2019

Responsible agency: U.S. Fish and Wildlife Service

Contact person/e-mail: Anjanette Bowen, Anjanette_Bowen@fws.gov

Type: ☒ Unexpected ☐ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

- One Ruffe, 94 mm male, was captured as a result of spring AIS early detection and monitoring in the St. Marys River by the USFWS. The Ruffe was collected near Lime Island off Raber, MI with bottom trawling gear in 23.8 ft water (11.4 C bottom water temperature).
- This is a new finding for this species in this area.
- This effort is in follow up to 2017 reports of Ruffe captured in the St. Marys River. The Michigan DNR collected ten Ruffe during one experimental gill net lift in Waika Bay on 8/8/2017 and the Ontario MNRF reported an angler captured one Ruffe at Little Lake George on 8/13/2017.
- No Ruffe were collected by the USFWS during 2018 AIS early detection and monitoring in the St. Marys River.

- This is the only Ruffe collected to date during 2019 spring AIS early detection and monitoring in the St. Marys River by the USFWS. Gears included bottom trawls, fyke nets, and experimental gill nets. Areas sampled included Waiska Bay, near Little Lake George, Sault St. Marie area, Baie de Wasai, Lake George, Munuscong Lake, Raber Bay, DeTour Village area, and Potagannissing Bay. Additional Fyke netting will be conducted the week of 6/24.

Supporting information: (attach additional files or links as necessary)



#4: Tubenose Goby, Cheboygan River, USFWS

Event Description Form

NOTE: This information is confidential, not for distribution or use beyond intended audiences.

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: Tubenose Goby, Proterorhinus semilunaris

Location: Cheboygan River, mouth, 45.65464 -84.46369 and 45.65431 -84.46643

Event time/duration: 28 May 2019

Responsible agency: U.S. Fish and Wildlife Service

Contact person/e-mail: Anjanette Bowen, Anjanette_Bowen@fws.gov

Type: ☒ Unexpected ☐ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

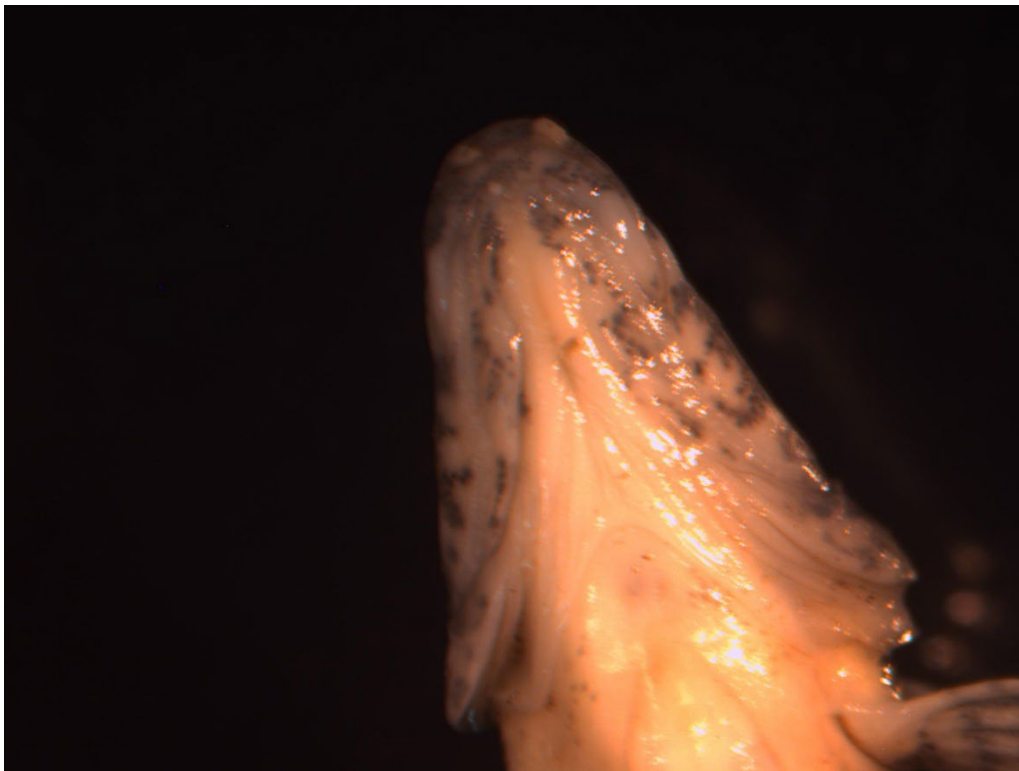
☐ other

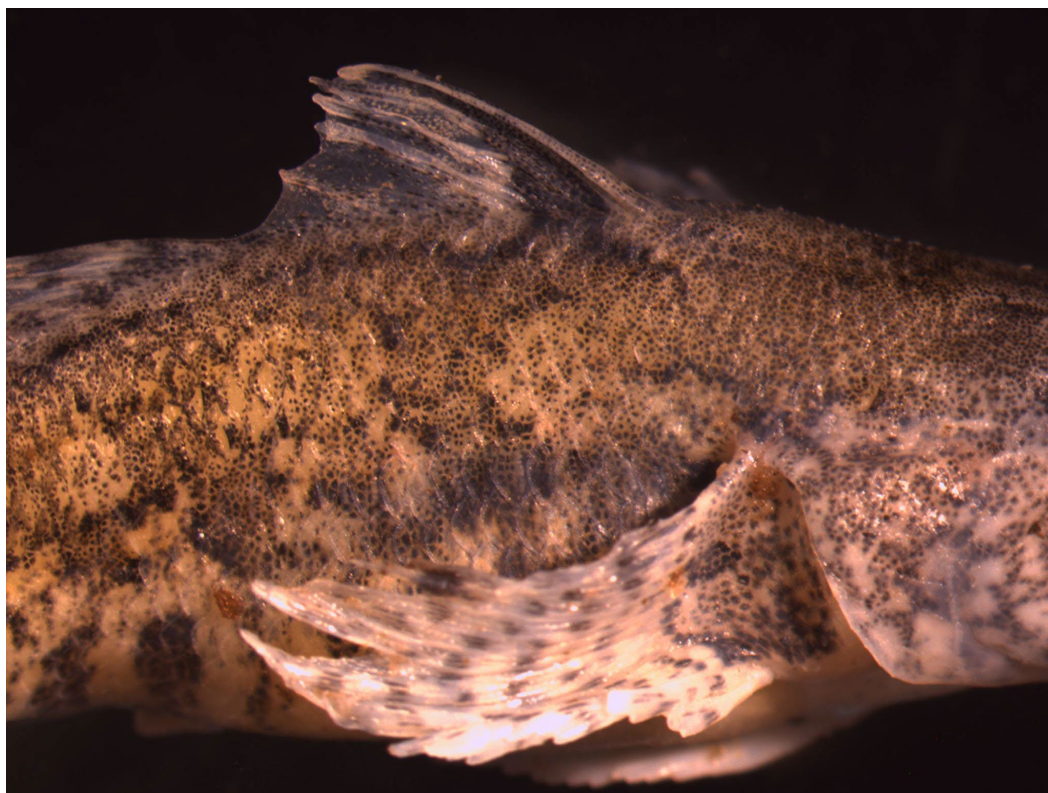
Talking Points (bullets):

- Two Tubenose Goby were captured as a result of spring AIS early detection and monitoring in the Cheboygan River mouth by the USFWS. One Tubenose Goby, 45 mm was captured at 45.65464 -84.46369; and one other Tubenose Goby 43 mm was captured at 45.65431 -84.46643. The Tubenose Gobies were collected with bottom trawling gear at water depths of 25.4 ft (9.1 C bottom water temperature) and 28.0 ft (9.3 C bottom water temperature), respectively.
- This is a new finding for this species in this area. According to the USGS Nonindigenous Aquatic Species Database (nas.er.usgs.gov), Tubenose Goby have not been captured from Michigan waters of northern Lake Huron.
- This area is one of seven Lake Huron locations annually sampled by the USFWS for the presence of AIS.

Supporting information: (attach additional files or links as necessary)







#5: Grass carp in Cuyahoga River

Event Description Form

☐ Draft ☒ Final

☐ URGENT ☐ Important ☒ Routine

Species: Grass Carp

Location: Cuyahoga River, Cleveland, Ohio, Lake Erie watershed

Event time/duration: 08/20/19-08/29/19, 5 days of sampling

Responsible agency: OH DNR Division of Wildlife

Contact person/e-mail: Travis Hartman, travis.hartman@dnr.state.oh.us

Type: ☐ Unexpected ☒ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

- 5 days of sampling over a 2-week period resulted in the capture and removal of 41 adult grass carp in the Cuyahoga River (Cleveland, OH).
- There was previous knowledge of grass carp captures in the Cuyahoga River watershed, but information obtained recently documented 26 sightings and captures associated with North East Ohio Regional Sewer District (NEORS) assessment work since 2006.
- Utilizing NEORS information a USFWS crew (1 boat) captured 17 fish in 3 days of sampling from 8/20/19 through 8/22/19.
- In response to the 17 captures, teams from OH DNR Division of Wildlife/University of Toledo (1 boat) and OH DNR Division of Wildlife Fairport Harbor (1 boat) joined the USFWS team on 8/28/19 and 8/29/19, resulting in 24 additional captures and removals.
- Ploidy analysis results from blood samples determined that 36 of 39 fish tested were triploids, with only 3 diploids.

- The high proportion of triploids suggests that the Cuyahoga River is likely harboring sterile fish that have escaped from connected waterways.
- So far in 2019, 118 adult grass carp have been captured in Ohio waters and tributaries of Lake Erie, and 110 have been removed.
- Additional actions will continue to be taken by dedicated ODNR, MDNR and USFWS teams.

Supporting information: (attach additional files or links as necessary)

Environmental Conditions and Site Description

- August 20-22 sampling (between rkm 10 and 14): water temperatures ranged from 23.3-25.4°C; dissolved oxygen ranged from 5.43-8.16 mg/L; water turbidity ranged from 6.55-60.24 FNU; ambient water conductivity ranged from 711-813 $\mu\text{S}/\text{cm}$; and discharge ranged from 650-931 cfs.
- August 28-29 sampling: water temperatures ranged from 21.3-22.6°C; dissolved oxygen ranged from 7.57-9.07 mg/L; water turbidity ranged from 3.72-9.07 FNU; ambient water conductivity ranged from 875-913 $\mu\text{S}/\text{cm}$; and discharge ranged from 362-500 cfs.
- The Cuyahoga River from rkm 10-14 consists mainly of water that is 3.0-4.5 m in depth, with vertical sheet pile shorelines that is maintained for some shipping use. Upstream of ~rkm 14 the river narrows and gets quite shallow (max. depth ~1.0-1.5 m), with many shallow riffles/gravel bars. Large electrofishing boats are limited to downstream areas at current flows ($<28.3 \text{ m}^3/\text{s}$). A smaller, jet outboard powered electrofishing boat (ODNR-Toledo) worked in this area August 28-29 but still had issues navigating around shallow water.

Size of Fish Captured

- Size range of the grass carp caught during both weeks ranged from 791 to 1204 mm total length (776 to 1165 mm total length frozen, indicating shrinkage).
- Grass carp caught downstream were typically larger than those from rkm 17.

Prior Sampling Efforts

- An attempt by University of Toledo researchers to collect eggs during a flow event on July 24th was unsuccessful; however, conditions were not favorable for egg collection (several days after peak flows, late summer, etc.).

Cuyahoga River Access Challenges

- Sampling in the Cuyahoga has a unique set of challenges. The City of Cleveland has established a no-wake zone for most/all the lower river, and when launching from Edgewater Marina in Cleveland Harbor it takes 2-3 hours to reach the nearest area in which crews can sample (~rkm 10). There may be a small, gravel boat ramp available upstream (~rkm 18) that would provide closer access, but it may not be large enough to launch our electrofishing boats. Also, debris may be blocking the river downstream of the gravel ramp. We will work with partners to identify additional access.

#6: Silver carp eDNA, Sandusky River

Event Description Form

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: Silver Carp eDNA

Location: Sandusky River, Tiffin, Ohio, Lake Erie watershed

Event time/duration: September 24-27, 2019, 3 days of sampling

Responsible agency: OH DNR Division of Wildlife

Contact person/e-mail: John Navarro, john.navarro@dnr.state.oh.us

Type: ☐ Unexpected ☒ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

- The Ohio Department of Natural Resources (ODNR) and U.S. Fish and Wildlife Service (USFWS) are collaborating to assess the current status of Bighead and Silver Carp within Ohio's waters of western Lake Erie bays and select tributaries.
- Laboratory results received Wednesday October 30, 2019 indicated the presence of Silver Carp environmental DNA (eDNA) in 1 of the 616 water samples collected in the Sandusky River from September 24 to 27, 2019. The positive detection was collected in Tiffin, OH in the Sandusky River at Latitude N 41.09747232 and Longitude W -83.19474665, which is above the lowest barrier in the river system.
- The findings indicate the presence of genetic material left behind by the species, such as scales, excrement or mucous, but not the establishment of Silver Carp in the Sandusky River. Silver Carp eDNA can come from other sources (ex. bird droppings, boats and equipment from infested waters) and is not a positive indication of the presence of live fish but is an indication that fish may be present.

- The response to a positive detection of Silver Carp eDNA is addressed in the *Asian Carp Response Guidelines* (Ohio Department of Natural Resources Division of Wildlife, October 23, 2015) and specifies that a risk assessment will be conducted as outlined below:
 - If Silver Carp eDNA is detected in a Lake Erie tributary, then ODNR Division of Wildlife will determine whether the return of an action would have a high likelihood of success.
 - Because a successful action is possible, there will be two follow-up activities: 1) USFWS will collect additional water samples the week of Nov. 4 for eDNA analysis to better define the presence of Silver Carp eDNA and results will be available in late November; and 2) On November 1, 2019, ODNR Division of Wildlife sampled 0.75 miles of the Sandusky River with electrofishing gear (55 minutes) in the vicinity of the positive eDNA result and no Silver Carp were collected.
 - If no additional Silver Carp eDNA are collected by the USFWS, then the action will be considered complete and routine surveillance will continue through currently planned activities. This would constitute a Level 1 positive eDNA finding with live fish likely NOT being present (see attached eDNA findings table in supporting information).
 - If additional Silver Carp eDNA is collected, then ODNR DOW will move to the next phase of the risk assessment.
- From September 15, 2019 to October 30, 2019, Ohio's Grass Carp strike team conducted removal efforts on 14 days in the Sandusky River, mostly immediately downstream of Fremont, OH, which is downstream of the detection area in Tiffin. These efforts implemented electrofishing, trammel nets, and hoop nets. The hoop nets were deployed continuously for over a month during this timeframe. No Silver Carp were captured during these efforts.
- Since 2010, numerous agencies have partnered to collect water samples from the Great Lakes basin, including southern Lake Michigan, western Lake Erie and tributary streams of lakes Michigan and Erie. The collaborative early-detection Asian carp surveillance program is funded by the USFWS with a federal Great Lakes Restoration Initiative grant.
- Asian carp, including Bighead and Silver Carp, pose a significant threat to the Great Lakes ecosystem, the \$7 billion-dollar fishery, and other economic interests dependent on the Great Lakes and its tributaries. Silver and Bighead Carp are likely to compete with native and recreational fish species and are known to quickly reproduce. Anglers are urged to become familiar with the identification of Asian carp, including both adults and juveniles, as the spread of juvenile Asian carp using live bait buckets has been identified as a potential point of entry into Great Lakes waters.
- ODNR is committed to the conservation, protection, management, use and enjoyment of the region's natural and cultural resources for current and future generations. The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people.

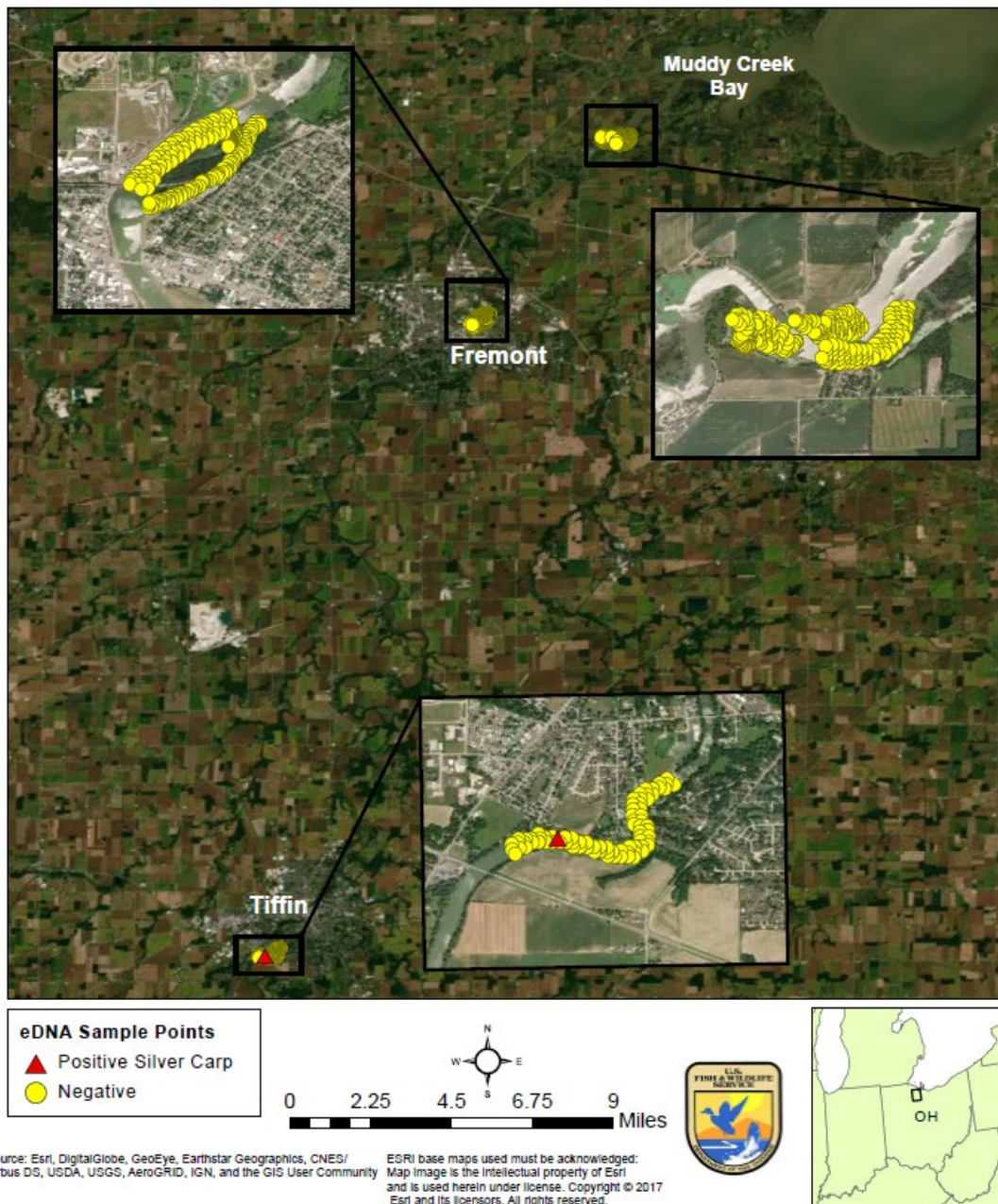
Supporting information:

USFWS Bighead & Silver Carp eDNA Early Detection Results:

<https://www.fws.gov/midwest/fisheries/eDNA.html>

USFWS Map of eDNA sampling results in the Sandusky River:

Bighead and Silver Carp eDNA Early Detection Results:
Sandusky River
Sampling Period Week: Week of September 30, 2019
Number of Samples Collected: 616



eDNA Findings Table, as available on the GLFC web site (<http://www.glfc.org/science-transfer-toolkit.php>)

If a positive result (regardless of the number of replicates testing positive) is obtained in any biological or technical replicates, this initial positive result is a **Level 1 positive**. It will remain a Level 1 if there are no subsequent positives during follow-up monitoring, but it will increase to Levels 2, 3, or 4 if subsequent positive detections are noted, as summarized below.

**SUMMARY:
CRITERIA AND RECOMMENDED ACTION WHEN eDNA IS DETECTED**

LEVEL	DETECTION CRITERIA	ACTION
1	Initial positive detection in any sample	Repeat sampling: <ul style="list-style-type: none"> • If no further samples are positive, remains at Level 1: species likely not present • If repeat sampling yields positive detections, level increases: see below
2	% positive detections is: <i>decreasing over time</i> OR <i>stable over time with <10% (low) samples testing positive over entire data set</i>	Repeat monitoring in one month
3	% positive detections is: <i>stable over time with 10–70% (medium) samples testing positive over entire data set</i>	Continue monitoring weekly
4	% positive detections is: <i>increasing over time</i> AND/OR <i>>70% samples test positive over entire data set</i>	SPECIES IS LIKELY PRESENT AND MAY HAVE SUFFICIENT ABUNDANCE TO SUPPORT A POPULATION

Additional steps currently in place to prevent Asian carp movement into the Great Lakes:

- ODNR Division of Wildlife and USACE are working to close direct water connection points along the Mississippi River and Great Lakes basin divide at the Ohio-Erie Canal, Little Killbuck Creek, and Grand Lake St. Marys to prevent the Interbasin transfer of AIS, including Silver Carp.
- ODNR Division of Wildlife routinely inspects bait outlets to ensure that the bait used by anglers is free of all AIS.
- ODNR Division of Wildlife and Wildlife Forever have an angler outreach effort through the “Trash Unused Bait” campaign to encourage anglers to properly dispose of live bait.
- ODNR Division of Wildlife and partners routinely conduct early detection efforts to identify new high risk AIS or to monitor range expansion of high risk AIS populations present in Ohio.
- **#6: Silver carp eDNA, Sandusky River**

#7: Grass carp, Tittabawassee River

Event Description Form

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: Grass Carp *Ctenopharyngodon idella*

Location: Tittabawassee River, Midland, MI, Lake Huron Watershed

Event time/duration: March 17th, 2020

Responsible agency: Michigan DNR Fisheries Division

Contact person/e-mail: Randy Claramunt, MDNR Lake Huron Basin Coordinator;
ClaramuntR@michigan.gov

Type: ☒ Unexpected ☐ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

- On March 17th, 2020 a single Grass Carp was captured by the Michigan Department of Natural Resources (MDNR) while conducting routine field work targeting Walleye in the Tittabawassee River, a Saginaw Bay tributary, near Dow Dam in Midland, MI (43.593094, -84.231376).
- No other Grass Carp were observed during that day of field work or during an additional day field work, at the same location, on March 23, 2020.
- Eyeballs were extracted from the Grass Carp and sent to the USFWS Fish Health Center lab for ploidy testing on March 18th, 2020. Results indicating the fish was diploid (i.e., reproductively viable) were provided to MDNR on March 20th, 2020.
- This is the first known diploid Grass Carp captured in the Lake Huron watershed.
 - One additional Grass Carp of unconfirmed ploidy was reported by an angler in the Tittabawassee River in 2013

- In response to the finding, MDNR field staff will conduct response actions as soon as feasible following recommendations and executive orders from Michigan's administration
 - The MDNR plans to conduct sustained response actions in the Tittabawassee River and Saginaw River throughout the 2020 field season to further assess risk of establishment.
 - At this time establishment is not presumed based on the high sampling efforts (e.g., annual fish surveys and commercial fishing effort) that resulted in only a single capture of a Grass Carp in 2020.
 - The response plans will be finalized in the coming weeks with Lake Huron partners
- It is important to note that while the MDNR will conduct grass carp response actions and surveillance in the Tittabawassee River and connecting waters in 2020, the MDNR will continue to prioritize grass carp response efforts in Lake Erie. This decision is based on the available science that indicates Lake Erie is presumed to have a greater risk of establishment and targeting Lake Erie during response efforts is thought to be the most effective response strategy.
- Communication Timeline
 - During the two weeks following the Grass Carp capture, Michigan DNR communicated the findings to:
 - Regional U.S. Congressional offices
 - Lake Huron Committee
 - Council of Great Lakes Fisheries Agencies via the Invasive Fishes Communications Protocol (this document)
 - Lake Huron Citizens Fish Advisory Committee
 - Asian Carp Regional Coordinating Committee (ACRCC)
 - Lake Erie Grass Carp working group

#8: Grass carp, Jordan Harbour

Event Description Form

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: _Grass Carp _____

Location: _Jordan Harbour, Lake Ontario (43.17732: -79.37850)_____

Event time/duration: _July 2, 2020 at approximately 11amET_____

Responsible agency: _Fisheries and Oceans Canada (DFO)_____

Contact person/e-mail: _Tom Hoggarth (Thomas.Hoggarth@dfo-mpo.gc.ca)_____

Type: ☐ Unexpected ☒ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

- An invasive Grass Carp was captured during annual early detection surveillance activities; Grass Carp have not previously been captured in Jordan Harbour.
- Specimen measured 1058mm (TL), weighed 16.324kg and was confirmed to be a diploid female through ploidy analysis and the presence of eggs.
- This is the 9th Grass Carp captured in the Canadian waters of Lake Ontario since 2013 (of which 7 were diploids).
- Fisheries and Oceans Canada (DFO) initiated response protocols following the capture and initiated targeted sampling operations upon confirmation that the fish was diploid.
- Targeted sampling continued July 3, 4, 5 and 7. No additional Grass Carp were found.

Supporting information: (attach additional files or links as necessary)

Figure 1: Grass Carp captured July 2, 2020 in Jordan Harbour.



#9: Grass carp, St. Joseph and Galien Rivers

Event Description Form

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: Grass Carp Ctenopharyngodon idella

Location: St. Joseph River, Benton Harbor, MI and Galien River, New Buffalo, MI

Event time/duration: April 11, 2021 and April 25, 2021

Responsible agency: Michigan DNR Fisheries Division

Contact person/e-mail: Jay Wesley, MDNR Lake Michigan Basin Coordinator,
WesleyJ@michigan.gov

Type: ☒ Unexpected ☐ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

- On April 11th, 2021 a bow fisher harvested a single grass carp in the St. Joseph River near Benton Harbor, Michigan. On April 25th, 2021 the bow fisher harvested a second grass carp in the Galien River near New Buffalo, MI.
- The first fish was reported as a 55-pound female with eggs. The carcass has not been provided to MDNR for further processing. The second fish was provided to MDNR and determined to be a triploid (i.e., sterile) based on ploidy analysis by U.S. Fish and Wildlife Service.
- The MDNR is aware of 14 other captures of Grass Carp in the St. Joe River since 2007. Of those, two were confirmed diploid (i.e., fertile).
- Based on a query of the United States Geological Survey Nonindigenous Aquatic Species database, over 60 Grass Carp (15 confirmed diploid) have been documented in Wisconsin, Illinois, and Michigan waters of Lake Michigan and connecting tributaries since the 1980's. Otolith microchemistry analyses have indicated Grass Carp captured in Lake Michigan may be the

result of multiple sources, including hatchery introductions or dispersal from Lake Erie tributaries (Whitledge et al. 2020).

- To date there is no evidence of Grass Carp spawning outside of the Lake Erie Basin.
- In response to the finding, MDNR will coordinate with regional partners to develop response actions throughout the 2021 field season. Additional surveillance efforts using boat electrofishing in tandem with trammel nets will be implemented to evaluate the status and associated risk of Grass Carp in the St. Joseph River. Water depths and the narrow width of the channel present challenges for implementing response actions throughout most of the Galien River, however the river will be evaluated for future efforts.
- Although the MDNR will work with regional partners to conduct grass carp response actions and surveillance in the St. Joseph River in 2021, MDNR will continue to prioritize Grass Carp response efforts in Lake Erie. This decision is based on the available science that indicates Lake Erie is presumed to have a greater risk of establishment and targeting Lake Erie during response efforts is thought to be the most effective response strategy for reducing risks throughout the Great Lakes Basin.
- Communication Timeline
 - During the week following the Grass Carp captures, Michigan DNR communicated or will communicate the findings to:
 - Lake Michigan Committee
 - Council of Great Lakes Fisheries Agencies via the Invasive Fishes Communications Protocol (this document)
 - Grass Carp Advisory Committee and Lake Erie Grass Carp working group partners

#10: Bighead carp eDNA, Sandusky River

Event Description Form

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: Bighead Carp, eDNA

Location: Sandusky River, NE of Fremont, Ohio, Lake Erie watershed

Event time/duration: Week of March 21, 2021

Responsible agency: OH DNR Division of Wildlife

Contact person/e-mail: John Navarro, john.navarro@dnr.state.oh.us

Type: ☐ Unexpected ☒ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

- The Ohio Department of Natural Resources (ODNR) and U.S. Fish and Wildlife Service (USFWS) are collaborating to assess the current status of Bighead and Silver Carp within Ohio's waters of western Lake Erie bays and select tributaries.
- Laboratory results received Wednesday May 5, 2021 indicated the presence of Bighead Carp environmental DNA (eDNA) in 1 of the 528 water samples collected in the Sandusky River during the week of March 22, 2021. The positive detection was collected NE of Fremont, OH in the Sandusky River.
- The findings indicate the presence of genetic material left behind by the species, such as scales, excrement or mucous, but not the establishment of Bighead Carp in the Sandusky River. Bighead Carp eDNA can come from other sources (ex. bird droppings, boats and equipment from infested waters) and is not a positive indication of the presence of live fish but is an indication that fish may be present.

- The response to a positive detection of Bighead Carp eDNA is addressed in the *Invasive Carp Response Guidelines* (Ohio Department of Natural Resources Division of Wildlife 2021) and specifies that a risk assessment will be conducted as outlined below:
 - If Bighead Carp eDNA is detected in a Lake Erie tributary, then ODNR Division of Wildlife will determine whether the return of an action would have a high likelihood of success.
 - Because a successful action is possible, a request has been sent to the USFWS to collect additional water samples to better define the presence of Bighead Carp eDNA.
 - If no additional Bighead Carp eDNA are collected by the USFWS, then the action will be considered complete and routine surveillance will continue through currently planned activities. This would constitute a Level 1 positive eDNA finding with live fish likely NOT being present (see attached eDNA findings table in supporting information).
 - If additional Bighead Carp eDNA is collected, then ODNR DOW will move to the next phase of the risk assessment.
 - The ODNR DOW and the University of Toledo are also collaborating on efforts to remove Grass Carp in the Sandusky River and these crews will be notified to redirect some of their effort to this area and to also be on the lookout for Bighead Carp as part of their routine sampling activities.
- Grass Carp removal crews from USFWS, USGS, and University of Toledo have sampled the area of the detection between April 27 and May 12.
 - Crews used methods that effectively capture Bighead Carp like electrofishing, trammel netting, and hoop netting. No Bighead Carp have been seen/captured.
- Invasive carp, including Bighead and Silver Carp, pose a significant threat to the Great Lakes ecosystem, the \$7 billion-dollar fishery, and other economic interests dependent on the Great Lakes and its tributaries. Bighead and Silver Carp are likely to compete with native and recreational fish species and are known to quickly reproduce. Anglers are urged to become familiar with the identification of invasive carp, including both adults and juveniles, as the spread of juvenile invasive carp using live bait buckets has been identified as a potential point of entry into Great Lakes waters.
- ODNR DOW is committed to the conservation, protection, management, use and enjoyment of the region's natural and cultural resources for current and future generations. The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people.

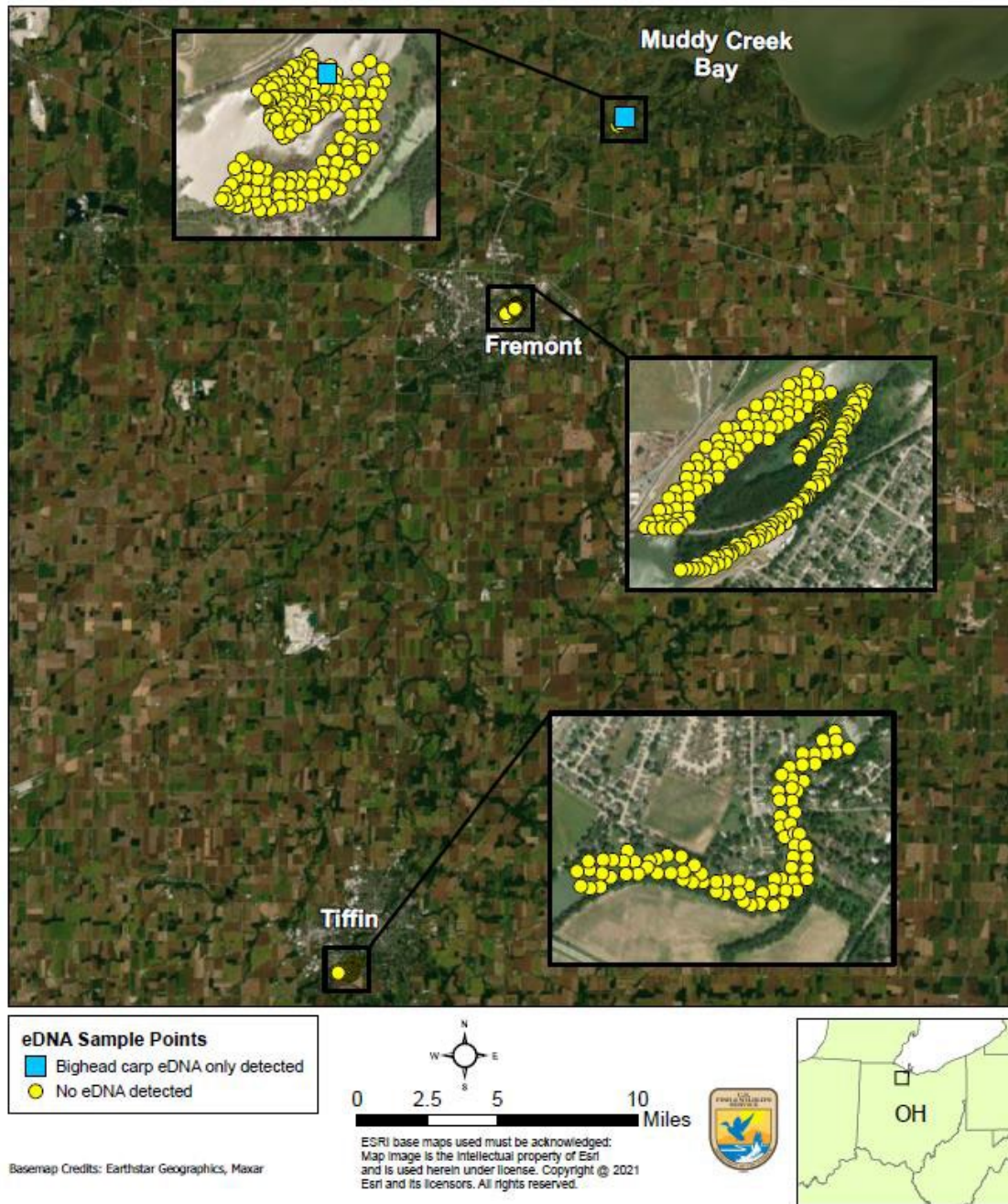
Supporting information:

USFWS Bighead & Silver Carp eDNA Early Detection Results:

<https://www.fws.gov/midwest/fisheries/eDNA.html>

USFWS Map of eDNA sampling results in the Sandusky River:

Bighead and Silver Carp eDNA Early Detection Results:
Sandusky River
Sampling Period: Week of March 22, 2021
Number of Samples Collected: 528



Additional steps currently in place to prevent invasive carp movement into the Great Lakes:

- ODNR DOW and USACE are working to close direct water connection points along the Mississippi River and Great Lakes basin divide at the Ohio-Erie Canal, Little Killbuck Creek, and Grand Lake St. Marys to prevent the Interbasin transfer of AIS, including Bighead Carp.
- ODNR DOW routinely inspects bait outlets to ensure that the bait used by anglers is free of all AIS.
- ODNR DOW and Wildlife Forever have an angler outreach effort through the “Trash Unused Bait” campaign to encourage anglers to properly dispose of live bait.
- ODNR DOW and partners routinely conduct early detection efforts to identify new high risk AIS or to monitor range expansion of high risk AIS populations present in Ohio.

#11: Grass carp, Little Calumet River

Event Description Form

NOTE: This information is confidential, not for distribution or use beyond intended audiences.

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: Grass Carp

Location: Little Calumet River

Event time/duration: May 22 or 23, 2021 – single collection

Responsible agency: Indiana DNR – DFW Office of Science and Research

Contact person/e-mail: Jeremy Price, North Region Fisheries Supervisor, jprice@dnr.in.gov

Type: ☒ Unexpected ☐ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

- On the weekend of May 22-23, 2021 a bow fisher harvested what is believed to be a single Grass Carp in a warm water discharge in the Little Calumet River near Burns Harbor, IN (Figure 1). The bow fisher caught numerous common carp at this location but caught only one Grass Carp and did not observe any others.
- The angler posted a picture (Figure 2) on social media on May 24 but did not report the catch to Indiana DNR staff until the afternoon of June 3, 2021.
- The carcass was disposed of in a farm field as “fertilizer” on the day after capture and is thus unavailable for confirmation of identification or ploidy analysis.
- The first recorded collection of a Grass Carp in the Burns Harbor/Little Calumet area occurred in 1984. Since that time nine more Grass Carp collections have been recorded. Three of the ten Grass Carp were determined to be diploid. Two were triploid, and five were undetermined.

- The collection by the bow fisher last week makes the seventh in the Little Calumet River/Burns Harbor area since 2014. Given the increasing frequency of captures IDNR intends to conduct targeted sampling in the area during summer of 2021 to further evaluate the distribution and abundance of Grass Carp in the vicinity.

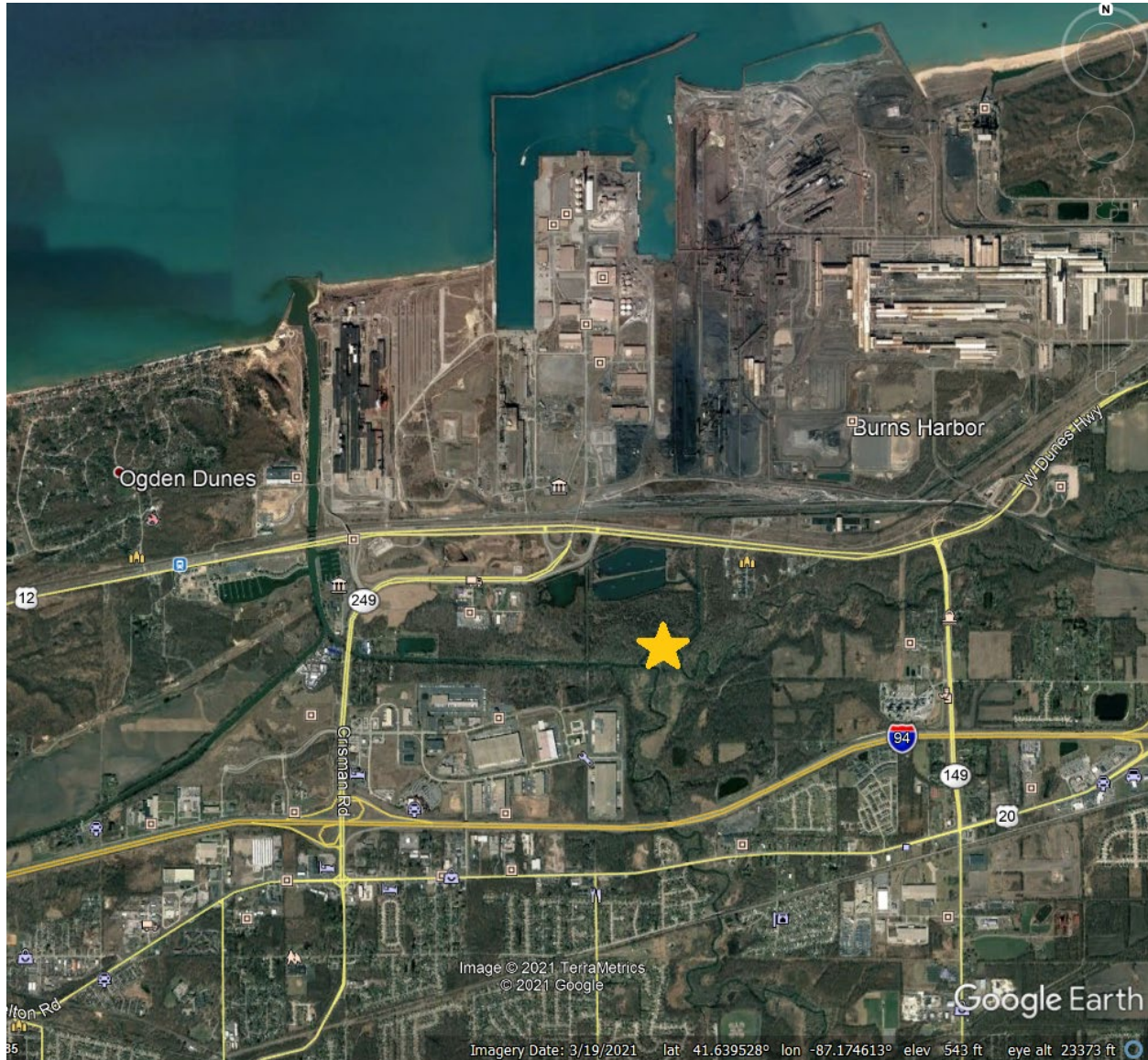


Figure 1. Approximate location of reported grass carp capture by bow fisher in May 2021.



Figure 2. Photo of Grass Carp captured by bow fisher in Little Calumet River, IN in May 2021.

#12: Grass carp, Milwaukee River

Event Description Form

NOTE: This information is confidential, not for distribution or use beyond intended audiences.

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: Grass Carp Ctenopharyngodon idella

Location: Milwaukee River, Milwaukee WI

Event time/duration: June 23, 2021

Responsible agency: Wisconsin DNR Fisheries

Contact person/e-mail: Aaron Schiller, Fisheries Biologist, Aaron.schiller@wisconsin.gov

Type: ☒ Unexpected ☐ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

- On June 23, 2021 while conducting a non-wadable baseline electrofishing survey from a miniboom shocker on the Milwaukee River a live grass carp was collected.
- The exact location and coordinates are attached in the map below.
- No other grass carp were seen during the remainder of sampling.
- The total length of the fish was 1105mm (43.5 inches), the standard length was 1022mm (40.25 inches) and the girth was 692mm (27.25 inches).
- The carp weighed 17.15kg (37.8 lbs) and was a male.
- We removed a lapillus otolith, post cleithrum, pectoral spine and scales from the fish along with the eyes. We also took a fin snip that is preserved in ethanol for any potential genetics work.
- We attempted to remove gonads but the testes were extremely soft and would fall apart when we tried to separate them from the rest of the internals.

- The fish was extremely fatty. When we opened what appeared to be the stomach all we found was fat. The intestines did contain a dark green substance.
- The eyes will be sent to USGS along with the post cleithra and pectoral spine.
- We did not collect vertebrae from this fish.
- At least 7 grass carp have been captured on the Milwaukee River prior to this event. Capture dates range from 1983 to 2015 and now 2021.
- We do not have plans to conduct any targeted grass carp surveys but we will continue to watch for them in other routine surveys.

Communication Timeline

- 6/23/21- DNR Great Lakes Supervisor Brad Eggold was contacted for protocols and forms
- 6/24/21- Patrick Kocovsky USGS was contacted for information on what to collect and where to send it
- 6/25/21- This form was filled out and sent

#13: Grass carp, Muskegon Lake

Event Description Form

NOTE: This information is confidential, not for distribution or use beyond intended audiences.

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: Grass Carp Ctenopharyngodon Idella

Location: Muskegon Lake, Muskegon, MI

Event time/duration: July 17, 2021

Responsible agency: Michigan DNR Fisheries Division

Contact person/e-mail: Jay Wesley, MDNR Lake Michigan Basin Coordinator,
WesleyJ@michigan.gov

Type: ☒ Unexpected ☐ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

- As previously communicated to the Lake Michigan Committee, a recreational bowfisher harvested a single Grass Carp in Muskegon Lake, Michigan on July 17th, 2021.
- The fish was determined to be a diploid (i.e., capable of reproduction) based on ploidy analysis by U.S. Fish and Wildlife Service.
- The only other documented record of Grass Carp in Muskegon Lake was a recreational harvest in 1998, however other anecdotal records have been reported.
- The capture represents the first confirmed diploid documented in Muskegon Lake. The only other confirmed captures of diploids in Michigan waters of Lake Michigan have been in the Kalamazoo (x1 in 2011) and St. Joseph Rivers (x3, most recent in 2021).
- Based on a query of the United States Geological Survey Nonindigenous Aquatic Species database, over 70 Grass Carp (20 confirmed diploids) have been documented in

Wisconsin, Illinois, and Michigan waters of Lake Michigan and connecting tributaries since the 1980's. Otolith microchemistry analyses have indicated Grass Carp captured in Lake Michigan may be the result of multiple sources, including hatchery introductions or dispersal from Lake Erie tributaries (Whitledge et al. 2020).

- To date there is no evidence of Grass Carp spawning outside of the Lake Erie Basin.
- In response to the finding, MDNR will continue to coordinate with regional partners to conduct additional surveillance efforts targeting Grass Carp adults and eggs in the Lake Michigan Basin to inform the understanding of Grass Carp distribution and spawning potential.
- MDNR will continue to prioritize Grass Carp response efforts in Lake Erie, where spawning activity has been documented.
- Communication Timeline
 - During the week following the Grass Carp ploidy analysis, Michigan DNR communicated or will communicate the findings to:
 - Lake Michigan Committee
 - Council of Great Lakes Fisheries Agencies via the Invasive Fishes Communications Protocol (this document)
 - Grass Carp Advisory Committee and Lake Erie Grass Carp working group partners

#14: Bighead carp eDNA, Milwaukee River

Event Description Form

NOTE: This information is confidential, not for distribution or use beyond intended audiences.

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: eDNA result from USFWS routine sampling – eDNA from bighead carp

Location: Milwaukee River, Milwaukee WI

Event time/duration: June 2021 sampling event

Responsible agency: Wisconsin DNR Fisheries

Contact person/e-mail: Bradley Eggold, Great Lakes Fisheries District Supervisor

Type: ☐ Unexpected ☒ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

Speaking Points – 2021 Bighead Carp eDNA Results from USFWS: 1 positive

September 2021

ISSUE

- 1 of 100 water samples collected from the Milwaukee River in June 2021 and analyzed by U.S. Fish and Wildlife Service for Bighead and Silver carp Environmental DNA (eDNA) came back positive for Bighead carp. Ninety-nine other water samples collected from the Milwaukee River showed no Bighead or Silver carp eDNA.
- These test results have been posted to a USFWS website and may be read by members of the press, government officials including staff from congressional offices and the general public.

ACTION

- WI DNR is not doing a press or separate announcement at this time.
- WI DNR has asked the U.S. Fish and Wildlife Service to collect more samples to help better understand if this single sample detection is a concern. U.S Fish and Wildlife Service will be performing a third eDNA sampling the week of Sept. 6th along with setting fyke/gill nets and electrofishing the week of Sept. 13th. The WI DNR is working closely with USFWS helping in any way needed.
- Any further action is dependent upon the outcome of this follow up verification. Overall, WI DNR concern is low.

BACKGROUND

- eDNA sampling cannot specify whether the detected DNA was from a live fish or from another source. eDNA is released into water with the urine, feces, and scales of live fish. Other possible sources could include a bait bucket that accidentally contained young Invasive carp, water transported in the live well of a recreational boat that had recently been used in waters infested by bighead carp, or feces from a migrating bird that had eaten a bighead carp
- Repeated detections over time of eDNA increases the likelihood that the genetic material came from fish living in the area where the sample was collected rather than from other sources that would be of less concern.
- The WI DNR's Southern Lake Michigan Fisheries Team monitors fish populations in the Milwaukee River using electrofishing for other purposes in 2021 and have not found any Bighead carp, nor are we aware of any reports of Bighead carp from anglers or commercial fishermen at this time. The Fisheries team have been electrofishing the Milwaukee River in Milwaukee County multiple times a year for over 20 years. Since 2013 the team has also gill netted the Milwaukee Harbor and surrounding nearshore area for juvenile lake sturgeon. They have not had any encounters with Bighead Carp alive or dead during any of their monitoring.

Environmental DNA (eDNA) sampling was conducted by the US Fish and Wildlife Service once during May and once during June of 2021 in the following Lake Michigan Tributaries; Milwaukee River and the Fox River. One hundred water samples were collected per tributary/per sampling date with 8 replicates of each sample. Bighead carp eDNA was found in only one of the replicates of one of the 100 water samples collected at one site during the June Milwaukee River sampling event

#15: Bighead carp eDNA, Milwaukee River (2nd detection)

Event Description Form

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: eDNA result from USFWS follow-up sampling – eDNA from ‘Invasive Carp’

Location: Milwaukee River, Milwaukee WI

Event time/duration: September 2021 sampling conducted as follow up to June sampling

Responsible agency: Wisconsin DNR – Bureau of Fisheries Fisheries Management

Contact person/e-mail: Bradley Eggold, Great Lakes Fisheries District Supervisor

Type: ☐ Unexpected ☒ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

Speaking Points – 2021 Invasive Carp eDNA Results from USFWS: 1 positive out of 150 samples

September 2021

ISSUE

- 1 of 100 water samples collected in June 2021 was positive for bighead carp, triggering follow up eDNA and physical sampling reported in this event notice.
- 1 of 150 water samples collected from the Milwaukee River in September 2021 and analyzed by U.S. Fish and Wildlife Service for Bighead and Silver carp Environmental DNA (eDNA) came back positive for ‘Invasive carp’. One hundred forty-nine other water samples collected from the Milwaukee River showed no Bighead or Silver carp eDNA or ‘Invasive Carp’ eDNA.
- These new eDNA test results will be posted on October 6 to the USFWS website and may be read by members of the press, government officials including staff from congressional offices and the general public. Until the results are released, the information in this event notice is not to be distributed.

- These eDNA results stem from a sampling event that was one part of the follow-up sampling plan put in place after the initial eDNA result for bighead carp in the Milwaukee River. The second component of the follow-up sampling was sampling by the Fish and Wildlife Service conducted as part of their annual sampling of the Milwaukee River; nets and electroshocking were deployed by the Fish and Wildlife Service the week of Sept 13, 2021. There were no invasive carp (including bighead and silver) found in the physical sampling.

ACTION

- We are considering doing a press release pending discussion with the WI DNR communications team.
- The WI DNR is discussing additional physical sampling options that would be targeted to invasive carp as a follow up to these eDNA results.
 - Electrofishing conducted Wednesday, September 29, 2021
 - Trammel nets in conjunction with electrofishing to be conducted the week of October 4, 2021 with the assistance of USFWS

BACKGROUND

- eDNA sampling cannot specify whether the detected DNA was from a live fish or from another source. eDNA is released into water with the urine, feces, and scales of live fish. Other possible sources could include a bait bucket that accidentally contained young Invasive carp, water transported in the live well of a recreational boat that had recently been used in Invasive carp infested waters, or feces from a migrating bird that had eaten an Invasive carp.
- Repeated detections over time of eDNA increases the likelihood that the genetic material came from fish living in the area where the sample was collected rather than from other sources that would be of less concern.
- The WI DNR's Southern Lake Michigan Fisheries Team monitors fish populations in the Milwaukee River using electrofishing for other purposes in 2021 and have not found any Silver or Bighead carp, nor are we aware of any reports of Silver or Bighead carp from anglers or commercial fishermen at this time. The Fisheries team have been electrofishing the Milwaukee River in Milwaukee County multiple times a year for over 20 years. Since 2013 the team has also gill netted the Milwaukee Harbor and surrounding nearshore area for juvenile lake sturgeon. They have not had any encounters with Invasive Carp (including Silver or Bighead carp) alive or dead during any of their monitoring.
- In the original event, Environmental DNA (eDNA) sampling was conducted by the US Fish and Wildlife Service once during May and once during June of 2021 in the following Lake Michigan Tributaries; Milwaukee River and the Fox River. One hundred water samples were collected per tributary/per sampling date with 8 replicates of each sample. Bighead carp eDNA was found in only one of the replicates of one of the 100 water samples collected at one site during the June Milwaukee River sampling event (no invasive carp eDNA was found during routine sampling by the FWS in May).

In the follow-up physical sampling, no invasive carp were recovered, and eDNA follow-up samples collected at 150 sites in the Milwaukee River had one positive result for 'invasive carp'.

#16: Grass carp, Huron and Grand Rivers, OH

Event Description Form

NOTE: This information is confidential, not for distribution or use beyond intended audiences.

☐ Draft ☒ Final

☐ URGENT ☐ Important ☒ Routine

Species: Grass Carp

Location: Grand River and Huron River, Ohio, Lake Erie watershed

Event time/duration: July and August 2021

Responsible agency: ODNR Division of Wildlife

Contact person/e-mail: Travis Hartman, travis.hartman@dnr.ohio.gov

Type: ☐ Unexpected ☒ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

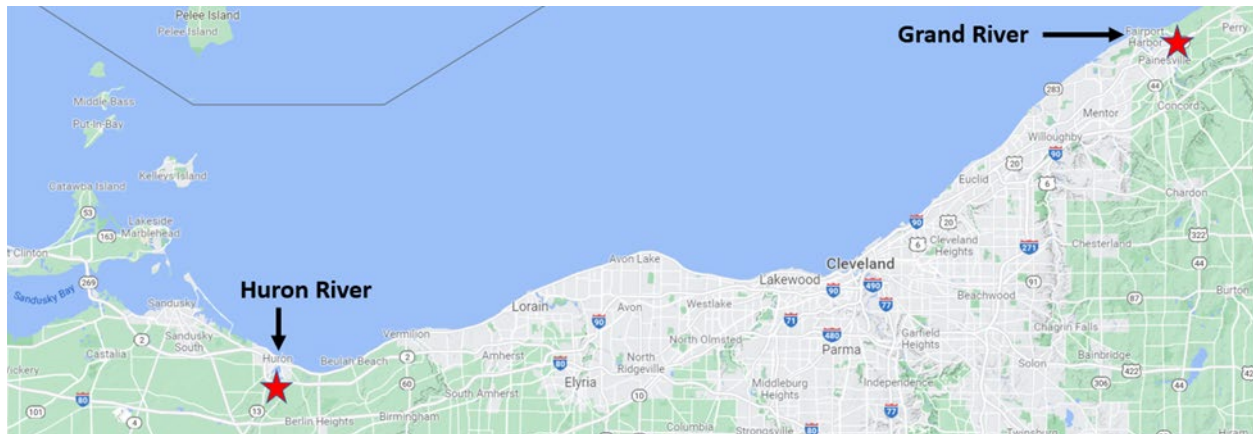
Talking Points (bullets):

- During surveillance efforts in July and August 2021 four grass carp were captured in the Grand River, Fairport Harbor, OH, and one grass carp was captured in the Huron River, Huron, OH. Of those captures, one in Grand River was confirmed to be a mature diploid female and the one Huron River fish was confirmed to be a mature diploid female.
- Both rivers had sporadic grass carp captures historically, going back to 1995 in the Grand River, but these two diploid fish are the first confirmation of fertile fish in each river.
- Limited exploratory egg sampling was completed in the Huron River in 2018, 2020, and 2021 and no grass carp eggs were collected.
- Ohio removal efforts will continue to be focused on the Sandusky and Maumee rivers where eggs have previously been collected. The Cuyahoga, Grand, and Huron rivers will be prioritized for continued exploratory egg sampling and surveillance work.

- One additional sample from a Huron River fish captured in October has not been analyzed yet.

Supporting information: (attach additional files or links as necessary)

Map



#17: Eastern Banded Killifish, Lake Michigan (WI)

Event Description Form

NOTE: This information is confidential, not for distribution or use beyond intended audiences.

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: Eastern Banded Killifish (*Fundulus diaphanus diaphanus*)

Location: Lake Michigan

Event time/duration: 2001 - October 2021

Responsible agency: Wisconsin DNR – Bureau of Fisheries Fisheries Management

Contact person/e-mail: Kari Fenske (Great Lakes Specialist)

kari.fenske@wisconsin.gov, 608-590-5285

Type: ☒ Unexpected ☐ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

Please note the attached summary of information from John Lyons, University of Wisconsin Zoological Museum

ISSUE

- Non-native Eastern Banded Killifish have been identified in Wisconsin waters of Lake Michigan, based on museum samples collected in 2002, but re-evaluated in 2021.
- The Eastern Banded Killifish was first identified in Lake Michigan in 2001, but that invasion also wasn't recognized until a decade later.
- The Western Banded Killifish is the native Killifish sub-species to Wisconsin (including Lake Michigan).

- Currently, the Eastern Banded Killifish is found in the Wisconsin waters of Lake Michigan and the mouths of tributaries as far north as Kewaunee County.
- The invasive population is likely established and reproducing; it is not known how the species was introduced to Lake Michigan.
- Identification between the two Killifish subspecies requires a microscope or genetic analysis.

ACTION

- The WI DNR is not planning a press release.
- The University of Wisconsin staff involved in this discovery is planning expanded sampling of the Lake Michigan shoreline in spring 2022.
- The WI DNR is not planning targeted sampling at this time, but will provide any incidentally-caught specimens during routine sampling to the University.

BACKGROUND

- See the attached summary from John Lyons, University of Wisconsin Zoological Museum for additional background.

The eastern banded killifish in Lake Michigan, a new non-native fish subspecies in Wisconsin

By John Lyons, University of Wisconsin Zoological Museum (and WDNR, retired)

jdlyons@wisc.edu

October 2021

A new non-native fish subspecies has been discovered in Wisconsin waters of Lake Michigan, the eastern banded killifish. Here's what we know:

Status and Distribution: The banded killifish is a small (less than 4 inches) topwater species that lives along partially vegetated shorelines of lakes and slow-moving streams and rivers. It occurs in eastern North America and has two subspecies. The eastern banded killifish (*Fundulus diaphanus diaphanus*) was historically found along the Atlantic seaboard and in the upper Ohio River basin, and the western banded killifish (*Fundulus diaphanus menona*) was found throughout the Upper Midwest and Upper Great Lakes including all of Wisconsin. Of note, the western banded killifish was first recognized and scientifically described from specimens collected from the outlet of Lake Monona in Madison in the late 1800's. The two species overlap in distribution and have intergraded and hybridized in the Lake Ontario and eastern Lake Erie basins.

In 2001, the eastern banded killifish became established along the southwestern shore of Lake Michigan near Chicago, although this was not recognized until well over a decade later (Willink et al. 2018). How the non-native eastern subspecies arrived in Lake Michigan is unknown, but transfer via the ballast water of a ship moving between the East Coast, Lake Erie, or Lake Ontario and Lake Michigan is a plausible scenario.

The first record of the eastern banded killifish from Wisconsin waters came from the mouth of an unnamed tributary to Lake Michigan in Crestview, just north of Racine, in 2002, although this was not realized until museum specimens were re-examined in 2021. The eastern subspecies has spread widely over the last 20 years and is now found in the Wisconsin waters of Lake Michigan and the mouths of tributaries as far north as Kewaunee County (Jeremy Tiemann, Illinois Natural History Survey, Champaign, personal communication). Museum specimens document that the western subspecies once occurred along the entire Wisconsin Lake Michigan shoreline, but it has been replaced by the non-native eastern subspecies from Kenosha to Kewaunee, and the native western subspecies now persists only along the Door County shoreline of Lake Michigan and throughout Green Bay. The non-native eastern subspecies has also spread to the Michigan shoreline of Lake Michigan along the Lower Peninsula and has apparently used the Chicago Waterway system to move into the Illinois River and downstream to the Mississippi River and then upstream to the lower Rock River in central Illinois. It has not yet reached Wisconsin waters via the Mississippi River, and all current inland populations of banded killifish in Wisconsin, including those in the upper parts of drainages tributary to Lake Michigan such as the Milwaukee River, appear to be the native western subspecies. No banded killifish are known from the Lake Superior basin in Wisconsin.

Identification: The two subspecies of banded killifish are distinctive morphologically and genetically (April and Turgeon 2006), although the morphological differences require a microscope to be seen. The presence of the eastern subspecies in Wisconsin waters has been confirmed by both morphological and genetic analyses (Jeremy Tiemann, Illinois Natural History Survey, Champaign, personal communication).

The primary morphological difference between the two subspecies is the number of lateral-line scales. The western banded killifish usually has 39-44 and the eastern banded killifish 46-50, with hybrids and intergrades typically 44-46. Lateral-line scale number is straightforward to determine under a microscope, but almost impossible to count in a live fish in hand or from a photograph. Superficially, the two subspecies look very similar (Figure 1). Thus, specimens must be preserved for positive identification.

Although currently classified as subspecies, the western banded killifish and eastern banded killifish differ enough morphologically and genetically that I would not be surprised if they were eventually considered different species, given trends in ichthyology in how fish species are defined. If that were to happen, the eastern banded killifish would become a new non-native species in Wisconsin.

Implications: Whether the eastern banded killifish has actually displaced the western banded killifish along the Lake Michigan shoreline or merely occupied empty habitats is unknown. Western banded killifish have declined in southern Wisconsin over the last 50 years because of environmental degradation (Lyons et al. 2000). Outside of Door County and Green Bay, the most recent confirmed records of western banded killifish from the Lake Michigan shoreline are from the 1960's and early 1970's. It is unknown whether western banded killifish had viable populations along the Lake Michigan shoreline from the 1970's to the 2000's. Eastern banded killifish are more tolerant of pollution and habitat modification than the western banded killifish (Ohio EPA 1988). It is plausible that the more sensitive western banded killifish had disappeared from the Lake Michigan shoreline and that the more tolerant eastern banded killifish has occupied the western banded killifish's former habitats there.

Alternatively, the eastern banded killifish could have directly eliminated established western banded killifish populations along the Lake Michigan shoreline. If that were the case, then western banded killifish populations in Door County, Green Bay, and inland waters could be at risk if the eastern banded killifish were to spread further. The general ecology of the two subspecies is similar, but, as illustrated by their differences in tolerance to environmental degradation, not identical, and the potential ecosystem impacts of displacement of western banded killifish by eastern banded killifish are unclear.

I will be sampling the Lake Michigan shoreline and elsewhere in spring 2022 to better understand the current distribution of the two subspecies in Wisconsin. If you collect any banded killifish and want to know the subspecies identification, I am happy to help. Preserve the fish in 70% or higher ethanol or by freezing, and I can check the lateral-line scale count. And I can send pdf's of any of the references if you're interested.

References:

April, J., and J. Turgeon. 2006. Phylogeography of the banded killifish (*Fundulus diaphanus*): glacial races and secondary contact. *Journal of Fish Biology* 69(Supplement B):212-228.

Lyons, J., P. A. Cochran, and D. Fago. 2000. Wisconsin fishes 2000: status and distribution. University of Wisconsin Sea Grant Institute, Madison, Publication WISCU-B-00-001.

Ohio EPA (State of Ohio Environmental Protection Agency). 1988. Biological Criteria for the Protection of Aquatic Life: Volume II: Users Manual for Biological Field Assessment of Ohio Surface Waters. Ecological Assessment Section, Division of Water Quality Planning and Assessment, Columbus, OH.

<http://www.wapp.epa.state.oh.us/dsw/bioassess/Volume2.pdf>

Willink, P. W., T. A. Widloe, V. J. Santucci, Jr., D. Makauskus, J. S. Tiemann, S. D. Hertel, J. T. Lamer, and J. L. Sherwood. 2018. Rapid expansion of banded killifish *Fundulus diaphanus* across northern Illinois: dramatic recovery or invasive species? *American Midland Naturalist* 179:179-190.

#18: Silver Carp eDNA, Lake Erie (PA)

Event Description Form

NOTE: This information is confidential, not for distribution or use beyond intended audiences.

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: eDNA result from U.S. Fish and Wildlife Service sampling for invasive carp – eDNA from Silver Carp *Hypophthalmichthys molitrix*

Location: Presque Isle Bay, Lake Erie, Erie PA

Event time/duration: May 5, 2022

Responsible agency: Pennsylvania Fish and Boat Commission

Contact person/e-mail: David Nihart, Chief, Division of Fisheries Management
davnihart@pa.gov

Type: ☐ Unexpected ☒ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

- The U.S. Fish and Wildlife Service (USFWS) and the Pennsylvania Fish and Boat Commission (PFBC) are collaborating to assess the status of invasive carp within Presque Isle Bay.
- Laboratory results received Monday July 11, 2022, indicated the presence of Silver Carp environmental DNA (eDNA) on 1 of the 100 water samples collected in Presque Isle Bay on May 5, 2022. The eDNA signal was amplified in only 1 of 8 replicates from the positive sample. The positive detection was collected in the southwest corner (head) of the bay at Latitude N 42.11696167 and Longitude W -80.14582000.
- The findings indicate the presence of genetic material left behind by the species, such as scales, excrement or mucous, but not the establishment of Silver Carp in Presque

Isle Bay. Silver Carp eDNA can come from other sources (e.g., bird droppings, boats, and equipment from infested waters) and is not a positive indication of the presence of live fish, but an indication that fish may be present.

- The response to a positive detection of Silver Carp eDNA is addressed in the *Rapid Response Plan and Procedures for Responding to Aquatic Invasive Species in Pennsylvania* and specifies that a risk assessment will be conducted as outlined below:
 - If the species is considered a new invasion to the state or geographic location and is known to cause significant negative (i.e., ecology, economy, or human health) impacts within its native range or outside of its native range, then the species is designated high risk and is a candidate for further scientific assessment.
 - The PFBC's Division of Fisheries Management conducted targeted boat electrofishing sampling at and near the detection location on July 14, 2022. No Silver Carp were collected or observed during sampling efforts.
 - On May 17, 2022, prior to the positive eDNA findings, PFBC biologists conducted boat electrofishing sampling for Spotted Gar *Lepisosteus oculatus* in the vicinity of the detection location and no Silver Carp were collected or observed.
 - The PFBC is requesting the USFWS collect additional water samples during September 2022 to better define the presence of Silver Carp in Presque Isle Bay.
 - If no additional Silver Carp eDNA is collected by the USFWS, then the action will be considered complete and routine surveillance will continue through currently planned activities.
 - If additional Silver Carp eDNA is collected, then the PFBC will move to the next phase of the risk assessment.
- Invasive carp, including Bighead Carp and Silver Carp, pose a significant threat to the Great Lakes ecosystem, the \$7 billion-dollar fishery, and other economic interests dependent on the Great Lakes and its tributaries. Bighead and Silver Carp are likely to compete with native and recreational fish species and are known to quickly reproduce. Anglers are urged to become familiar with the identification of invasive carp, including both adults and juveniles, as the spread of juvenile invasive carp using live bait buckets has been identified as a potential point of entry into Great Lakes waters.
- eDNA test results are anticipated to be posted on or before July 25, 2022, to the USFWS website and may be read by members of the press, government officials including staff from congressional offices and the general public. Until the results are released, the information in this event notice is not to be distributed.
- The PFBC, in coordination with the USFWS, will issue a press release and notify interested parties of the results prior to them being available on the USFWS's website.

Supporting information: (attach additional files or links as necessary)

Rapid Response Plan and Procedures for Responding to Aquatic Invasive Species in

Pennsylvania: [**DRAFT Model Rapid Response Plan for Pennsylvania \(pa.gov\)**](#)

USFWS Bighead Carp and Silver Carp eDNA monitoring data:

<https://www.fws.gov/office/whitney-genetics-laboratory/what-we-do/projects-research>

USFWS Maps of eDNA sampling locations and results in Presque Isle Bay:

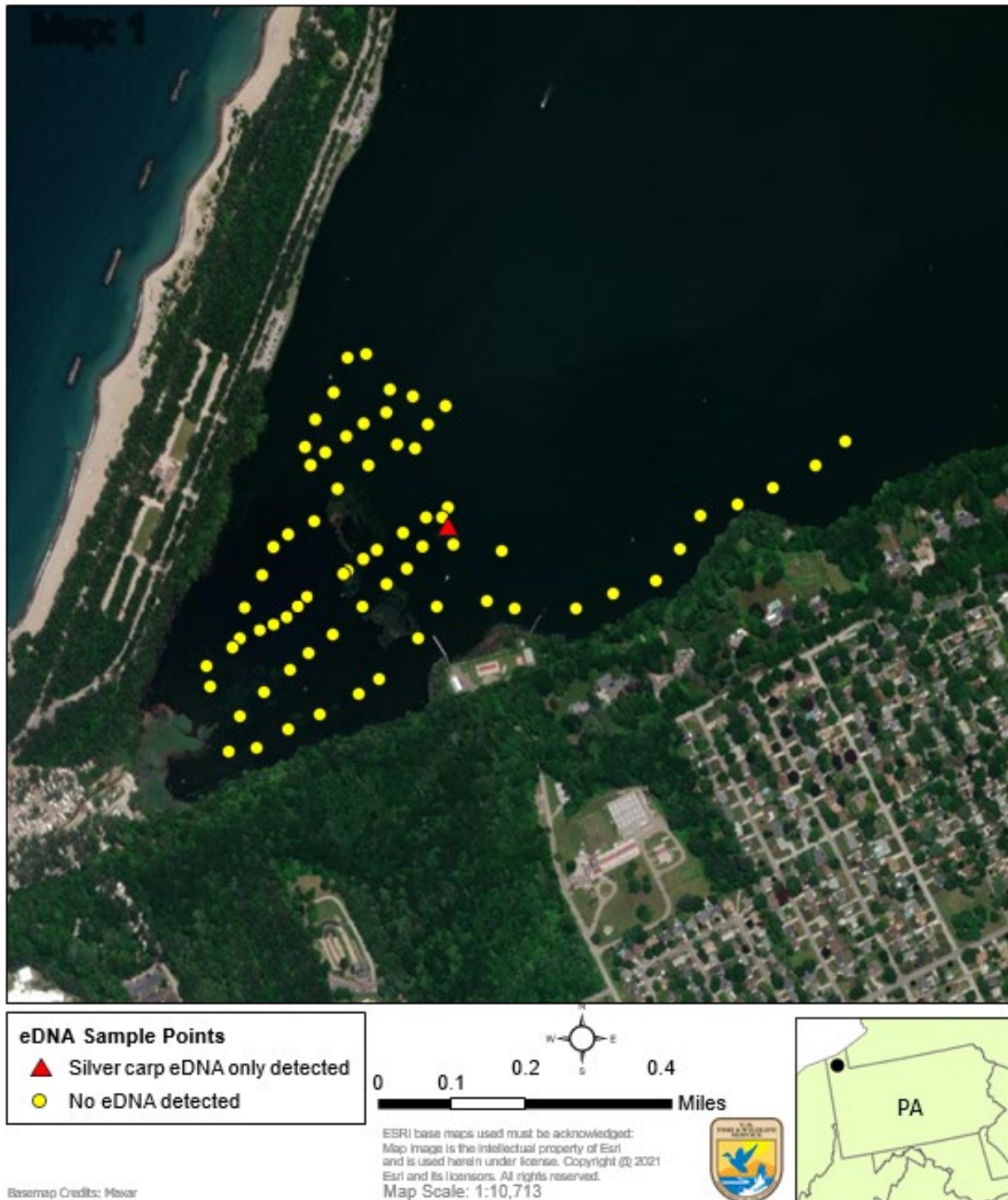
Bighead and Silver Carp eDNA Early Detection Results:
 Presque Isle Bay
 Sampling Period: Week of May 2, 2022
 Number of Samples Collected: 100



Bighead and Silver Carp eDNA Early Detection Results:
 Presque Isle Bay
 Sampling Period: Week of May 2, 2022
 Number of Samples Collected: 79



Bighead and Silver Carp eDNA Early Detection Results:
 Presque Isle Bay
 Sampling Period: Week of May 2, 2022
 Number of Samples Collected: 79



#19: Grass Carp eggs, Huron River (OH)

Event Description Form

NOTE: This information is confidential, not for distribution or use beyond intended audiences.

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: Grass Carp

Location: Huron River, Ohio, Lake Erie watershed

Event time/duration: May 23, 2022

Responsible agency: ODNR Division of Wildlife

Contact person/e-mail: Travis Hartman, travis.hartman@dnr.ohio.gov

Type: ☐ Unexpected ☒ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

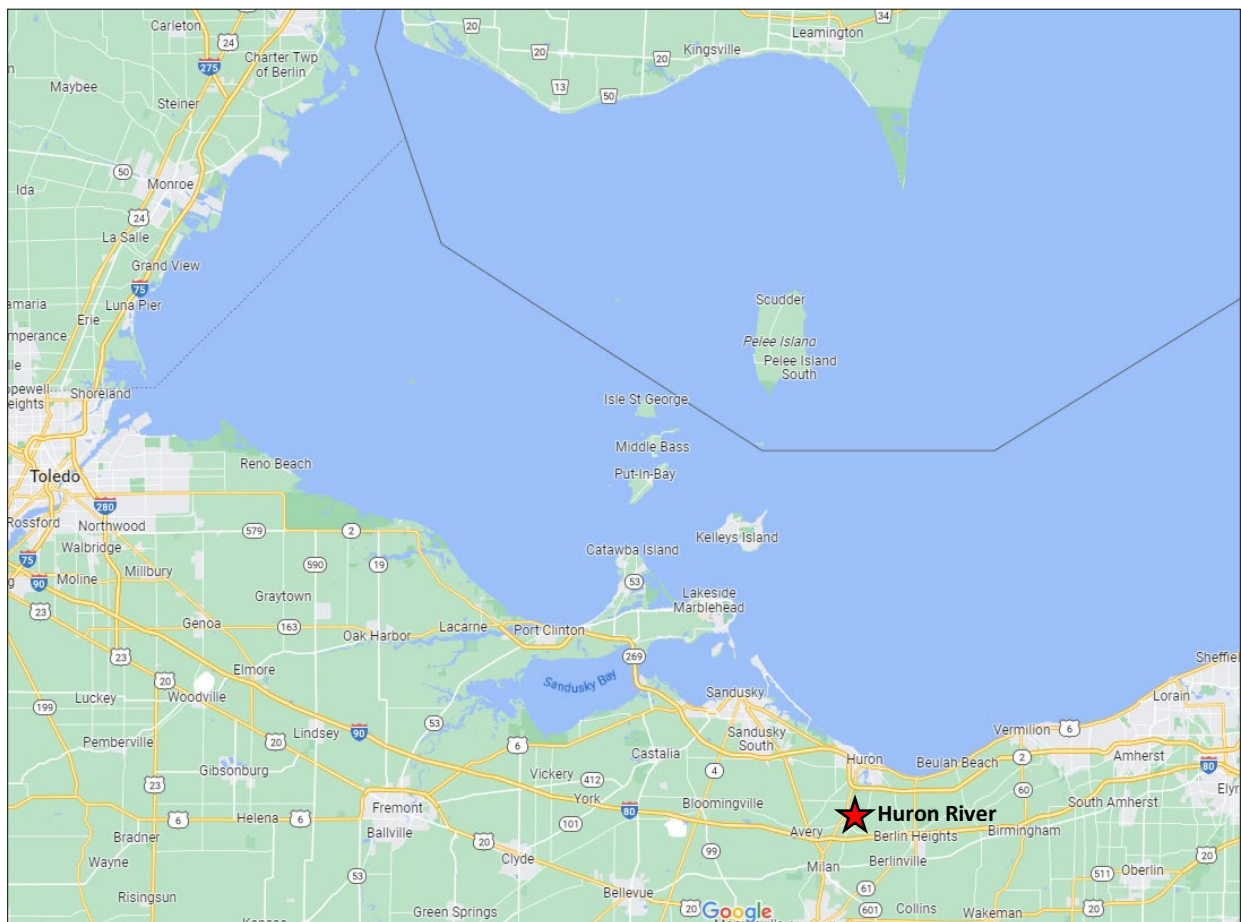
Talking Points (bullets):

- During early life history surveillance efforts by the USGS Lake Erie Biological Station on May 23, 2022, 14 eggs were collected in an ichthyoplankton sample in the Huron River, Huron, OH, that were later determined (results received on 04/07/2023) through genetic testing to be grass carp eggs. The sample containing these eggs was collected at ~rkm 12.5 (Latitude 41.3305, Longitude -82.5812).
- Eggs were identified during sample processing during fall 2022. Eggs were genetically verified to confirm species identification.
- Peak discharge of the high-flow event during which eggs were collected was 7120 cfs (5/22/2022; >85th percentile) and water temperature ranged from 16.9-19.9°C (temperatures were falling throughout event). The sample containing grass carp eggs was collected at 4:57 pm on 5/23.

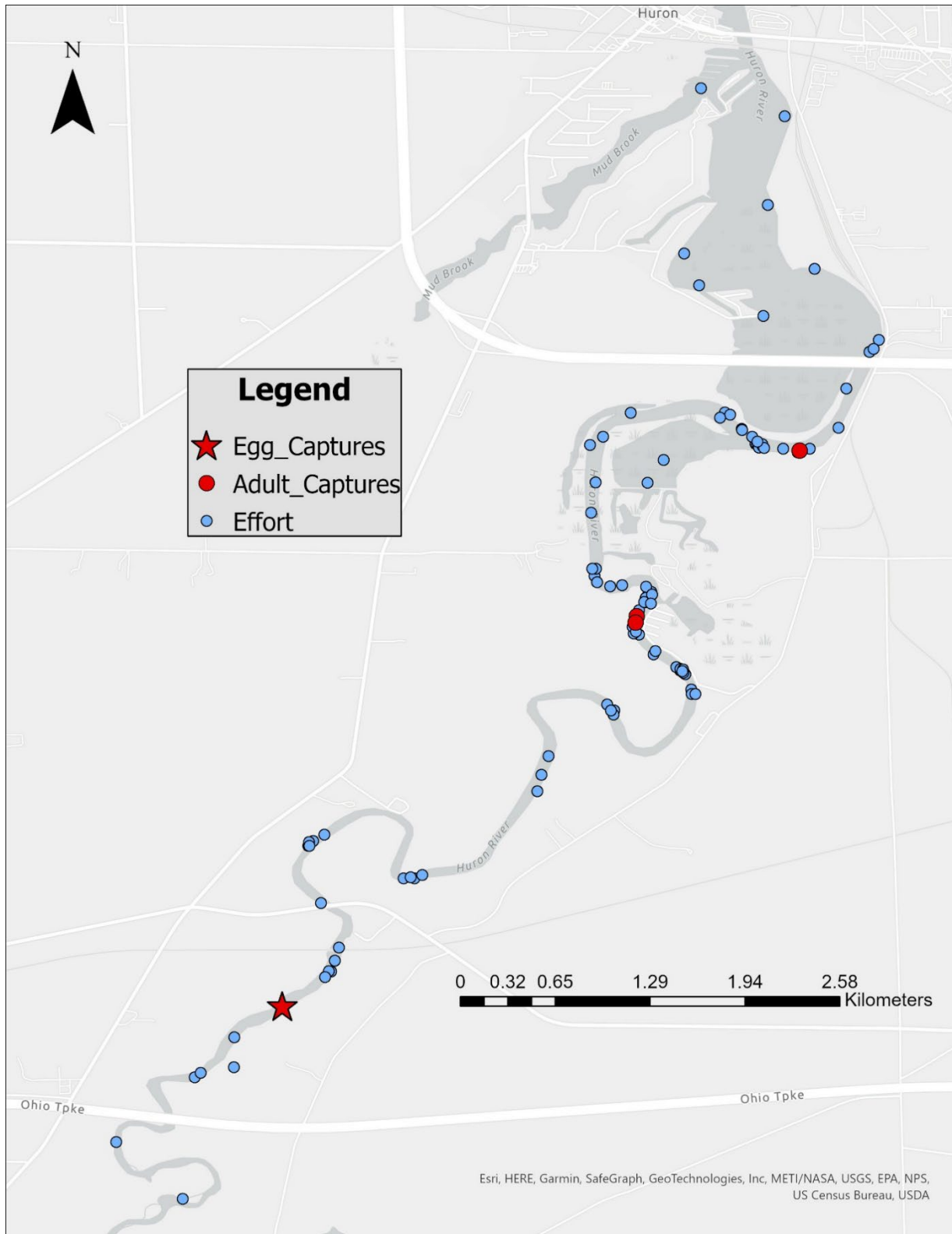
- Developmental stages were determined for 6 of 14 eggs, ranging in stages from 3 to 13. Stage estimates are being verified and will be used to identify general spawning areas to inform response efforts.
- The Huron River had sporadic grass carp captures historically, with the only diploid fish captured in 2021.
- Limited exploratory egg sampling was completed in the Huron River in 2018, 2020, and 2021 and no grass carp eggs were collected.
- Removal efforts in Ohio will continue to be focused on the Sandusky and Maumee rivers where eggs have previously been collected; however, efforts in the Huron River will be prioritized for continued exploratory egg sampling and more frequent removal work.

Supporting information: (attach additional files or links as necessary)

Maps



Map 1. Huron River, Ohio.



Map 2. Summary of adult grass carp removal effort (blue dots) and captures (red dots) in the Huron River 2020-22, and the location of grass carp eggs collected May 23rd, 2022. Map provided by Ryan Brown (Un. Of Toledo).

#20: Silver Carp eDNA, Maumee River (OH)

Event Description Form

NOTE: This information is confidential, not for distribution or use beyond intended audiences.

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: Silver Carp eDNA

Location: Maumee River, Grand Rapids, Ohio, Lake Erie watershed

Event time/duration: April 24, 2023

Responsible agency: Ohio DNR Division of Wildlife

Contact person/e-mail: John Navarro, john.navarro@dnr.state.oh.us

Type: ☐ Unexpected ☒ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

- The Ohio Department of Natural Resources (ODNR) and U.S. Fish and Wildlife Service (USFWS) are collaborating to assess the current status of Bighead and Silver Carp within Ohio's waters of western Lake Erie bays and select tributaries.
- Laboratory results received Wednesday July 19, 2023, indicated the presence of Silver Carp environmental DNA (eDNA) in 1 of the 528 water samples collected in the Maumee River during the week of April 24, 2023. The positive detection was collected in the vicinity of Grand Rapids, Ohio.
- The findings indicate the presence of genetic material left behind by the species, such as scales, excrement or mucus, but not the establishment of Silver Carp in the Maumee River. Silver Carp eDNA can come from other sources (ex. bird droppings, boats and equipment from infested waters) and is not a positive indication of the presence of live fish but is an indication that fish may be present.

- The response to a positive detection of Silver Carp eDNA is addressed in the *Invasive Carp Response Guidelines* (Ohio Department of Natural Resources Division of Wildlife 2021) and specifies that a risk assessment will be conducted as outlined below:
 - If Silver Carp eDNA is detected in a Lake Erie tributary, then ODNR Division of Wildlife will determine whether the return of an action would have a high likelihood of success.
 - Because a successful action is possible, a request has been sent to the USFWS to collect additional water samples to better define the presence of Silver Carp eDNA.
 - If no additional Silver Carp eDNA are collected by the USFWS, then the action will be considered complete and routine surveillance will continue through currently planned activities. This would constitute a Level 1 positive eDNA finding with live fish likely NOT being present (see attached eDNA findings table in supporting information).
 - If additional Silver Carp eDNA is collected, then ODNR DOW will move to the next phase of the risk assessment.
 - The ODNR DOW and the University of Toledo are also collaborating on efforts to remove Grass Carp in the Maumee River and these crews will be notified to redirect some of their effort to this area and to also be on the lookout for Silver Carp as part of their routine sampling activities.
- Grass Carp removal crews from USFWS, USGS, and University of Toledo have sampled the area of the detection during spring 2023.
 - Crews used methods that effectively capture Silver Carp like electrofishing and trammel netting. No Silver Carp have been seen/captured.
- Invasive carp, including Bighead and Silver Carp, pose a significant threat to the Great Lakes ecosystem, the \$7 billion-dollar fishery, and other economic interests dependent on the Great Lakes and its tributaries. Bighead and Silver Carp are likely to compete with native and recreational fish species and are known to quickly reproduce. Anglers are urged to become familiar with the identification of invasive carp, including both adults and juveniles, as the spread of juvenile invasive carp using live bait buckets has been identified as a potential point of entry into Great Lakes waters.
- ODNR DOW is committed to the conservation, protection, management, use and enjoyment of the region's natural and cultural resources for current and future generations. The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people.

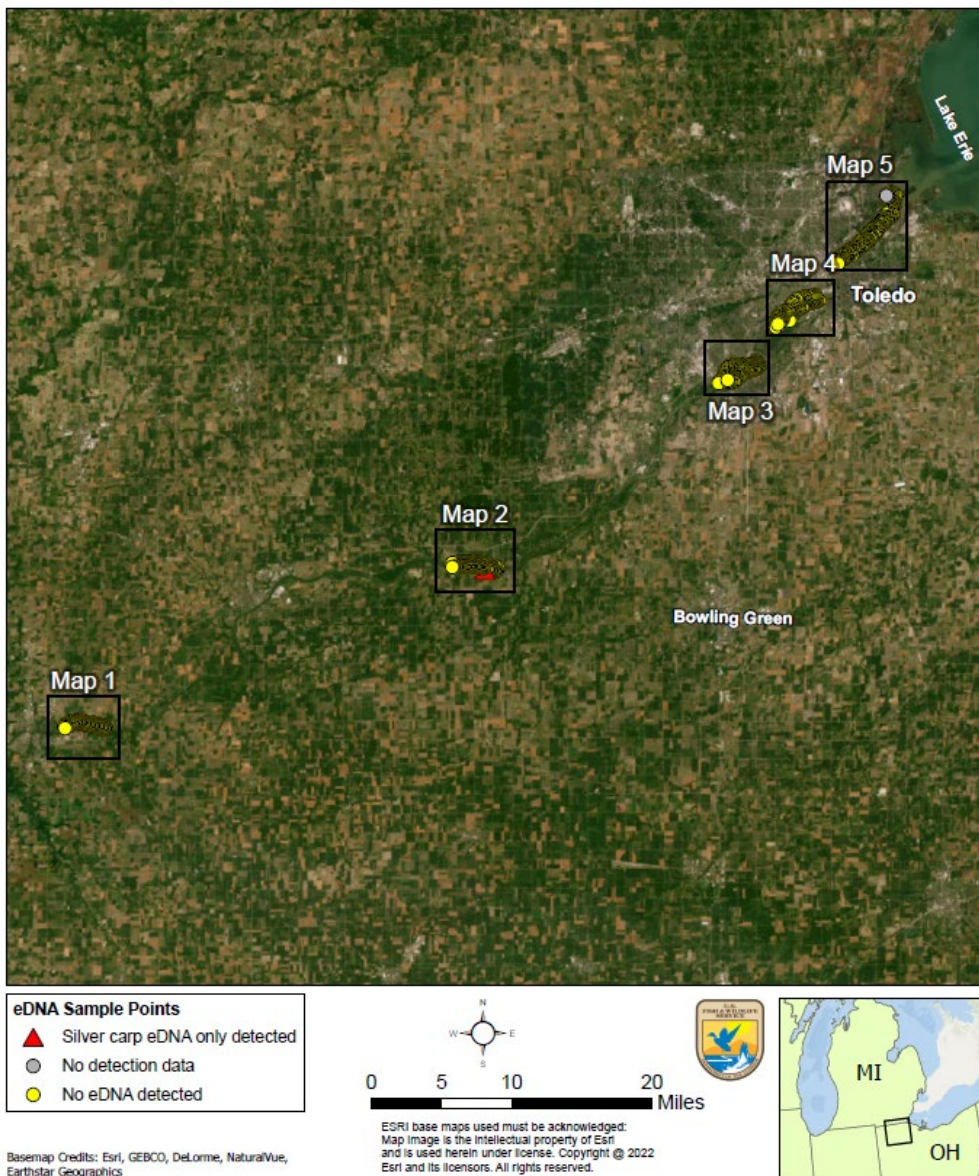
Supporting information:

USFWS Bighead & Silver Carp eDNA Early Detection Results:

<https://fws.maps.arcgis.com/apps/dashboards/52b22abe9c4d4575adfe851a946f444d>USFWS

Map of eDNA sampling results in the Maumee River, the positive result was collected in the area designated as “Map 2”:

Bighead and Silver Carp eDNA Early Detection Results:
Maumee River
Sampling Period: Week of April 24, 2023
Number of Samples Collected: 528



Additional steps currently in place to prevent invasive carp movement into the Great Lakes:

- ODNR DOW and USACE are working to close direct water connection points along the Mississippi River and Great Lakes basin divide at the Ohio-Erie Canal, Little Killbuck Creek, and Grand Lake St. Marys to prevent the Interbasin transfer of AIS, including Bighead Carp.
- ODNR DOW routinely inspects bait outlets to ensure that the bait used by anglers is free of all AIS.
- ODNR DOW and Wildlife Forever have an angler outreach effort through the “Trash Unused Live Bait” campaign to encourage anglers to properly dispose of live bait.
- ODNR DOW and partners routinely conduct early detection efforts to identify new high-risk AIS or to monitor range expansion of high-risk AIS populations present in Ohio.

#21: Grass Carp eDNA, Presque Isle (PA)

Event Description Form

NOTE: This information is confidential, not for distribution or use beyond intended audiences.

☐ Draft ☒ Final

☐ URGENT ☐ Important ☒ Routine

Species: eDNA result from the U.S. Fish and Wildlife Service sampling for invasive carp – eDNA from Grass Carp *Ctenopharyngodon idella*

Location: Presque Isle Bay, Erie, Pennsylvania.

Event time/duration: May 3 and 4, 2023

Responsible agency: Pennsylvania Fish and Boat Commission

Contact person/e-mail: David Nihart (davnihart@pa.gov)

Type: ☐ Unexpected ☒ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

- Laboratory results received Thursday August 3, 2022, indicated the presence of Grass Carp environmental DNA (eDNA) on 3 of the 220 water samples collected in Presque Isle Bay on May 3 and 4, 2023. The positive detections were collected in the northeast corner (Misery Bay) of the bay at Latitude N 42.15608276 and Longitude W - 80.09259191, Latitude N 42.15900727 and Longitude W -80.09486683, and Latitude N 42.15860019 and Longitude W -80.08947641.
- The findings indicate the presence of genetic material left behind by the species, such as scales, excrement or mucous, but not the establishment of Grass Carp in Presque Isle Bay. Grass Carp eDNA can come from other sources (e.g., bird droppings, boats, and equipment from infested waters) and is not a positive indication of the presence of live fish, but an indication that fish may be present.

- The positive detection of Grass Carp eDNA does not warrant a rapid response and the PFBC and USFWS will continue to monitor Presque Isle Bay as part of their routine AIS monitoring programs this summer and fall.

Supporting information: (attach additional files or links as necessary)

USFWS Maps of eDNA sampling locations and results in Presque Isle Bay:

Bighead and Silver Carp eDNA Early Detection Results:
Presque Isle Bay
Sampling Period: Week of May 01, 2023
Number of Samples Collected: 220



#22: Silver Carp eDNA, St. Joseph River (MI)

Event Description Form

NOTE: This information is confidential, not for distribution or use beyond intended audiences.

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: Silver Carp *Hypophthalmichthys molitrix*

Location: St. Joseph River, St. Joe/Benton Harbor, MI

Event time/duration: June 13, 2023

Responsible agency: Michigan DNR Fisheries Division

Contact person/e-mail: Jay Wesley, MDNR Lake Michigan Basin Coordinator,
WesleyJ@michigan.gov

Type: ☐ Unexpected ☒ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management

☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

- The United States Fish and Wildlife Service (USFWS) conducts routine environmental DNA (eDNA) surveillance for invasive Bighead and Silver Carp at priority locations in the Great Lakes.
- 220 eDNA samples were collected on June 13, 2023 from the St. Joseph River, distributed near the mouth of the river and downstream of Berrien Springs, MI.
- One of the 220 samples had a positive detection for Silver Carp at the marker set SCTM 4/5. The result was shared to the Michigan Department of Natural Resources (MDNR) on August 28, 2023.
- This was the first eDNA detection of Silver Carp in the St. Joseph River out of a total of 3,200 samples collected and processed since 2013 ([USFWS eDNA dashboard](#)).

- The detection of genetic material does not immediately indicate the presence of a live fish, given the potential for genetic material to come from other sources (e.g., dead fish, transfer from boat or other gear recently in carp-infested waters, etc.).
- The detection location was near a marina and a heavily used city boat launch that is used by both St. Joseph River and Lake Michigan recreational boaters and anglers.
- The Great Lakes Fishery Commission funded a project on the *Uses and limitations of environmental DNA (eDNA) in fisheries management* (Welsh et al., 2019; <http://www.glfsc.org/science-transfer-toolkit.php>), which provides guidance on the interpretation and potential responses to eDNA detections.
- Since 2022, USFWS-Green Bay has conducted monthly electrofishing throughout the summer in the St. Joseph River to monitor, capture and remove invasive Grass Carp. The efforts have taken place near where the eDNA detection occurred, however no Silver Carp have been observed or captured during these efforts. An additional two-three weeks of previously scheduled removal efforts will occur in the fall of 2023.

In response to this finding:

- MDNR requested assistance from USFWS to conduct another round of eDNA sampling in the St. Joseph River as soon as possible. If additional detections occur, MDNR will evaluate and determine if additional response actions are warranted.
- Communication Timeline
 - During the week following the Silver Carp positive eDNA detection, Michigan DNR communicated or will communicate the findings to:
 - Lake Michigan Committee
 - Council of Great Lakes Fishery Agencies via the Invasive Fishes Communications Protocol (this document)
 - A news release will be issued once key constituents and partners are notified.

#23: Bighead and Silver Carp eDNA, Maumee River (OH)

Event Description Form

NOTE: This information is confidential, not for distribution or use beyond intended audiences.

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: Bighead and Silver Carp eDNA

Location: Maumee River, Toledo, Ohio, Lake Erie watershed

Event time/duration: Week of April 15, 2024 (sample collection); June 13, 2024 (results)

Responsible agency: Ohio DNR Division of Wildlife

Contact person/e-mail: John Navarro, john.navarro@dnr.ohio.gov

Type: ☐ Unexpected ☒ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

- The Ohio Department of Natural Resources (ODNR) and U.S. Fish and Wildlife Service (USFWS) are collaborating to monitor for the potential presence of Bighead and Silver Carp within the Ohio waters of western Lake Erie bays and select tributaries using environmental DNA (eDNA) surveillance.
- Laboratory analysis received Wednesday June 13, 2024, yielded one positive detection for Bighead and Silver Carp eDNA among 340 water samples collected in the Maumee River during the week of April 15, 2024. The positive detection was collected in the vicinity of Toledo, Ohio, just downstream of Delaware Island and Delaware Creek near the Maumee River Yacht Club
- Bighead and Silver Carp eDNA can come from other sources (e.g., bird droppings, boats, and equipment from infested waters) and is not a confirmation of the presence of live fish.
- When interpreting low positivity rates, particularly single positives, we examine other pieces of information available.

- History: The USFWS has eDNA sampled the Maumee River since 2013. There has been one silver carp positive during that time which occurred in 2023.
- Replicates: The lab runs eight replicates per sample. One out of the eight replicates tested positive.
- Markers: The lab runs three sets of markers: a bighead carp specific marker, a silver carp specific marker, and a marker that is common to both bighead and silver carp. This replicate was positive for all three.
- Copy #: Copy number is the number of eDNA marker fragments found in a replicate sample. Copy numbers are variable so definitive conclusions are not made based on these numbers. They can be looked at from a relative lens. Typically, copy #'s run from less than 1 to 10 in very low to moderate fish densities. Copy numbers were around 10 for the replicate in this sample. On the higher end of what is normally seen.
- The response to a positive detection of Bighead and Silver Carp eDNA is addressed in the *Invasive Carp Response Guidelines* (ODNR Division of Wildlife 2021) and specifies that a risk assessment will be conducted as outlined below:
 - If Bighead and Silver Carp eDNA is detected in a Lake Erie tributary, then ODNR Division of Wildlife will determine whether the return of an action would have a high likelihood of success.
 - Because a successful action is possible, the USFWS will collect additional water samples in the fall of 2024 to better define the presence of Bighead and Silver Carp eDNA.
 - If no additional Bighead and Silver Carp eDNA are collected by the USFWS, then the action will be considered complete and routine surveillance will continue through currently planned activities. This would constitute a Level 1 positive eDNA finding with live fish likely NOT being present (see attached eDNA findings table, supporting text, and flow chart in supporting information).
 - If additional Bighead and Silver Carp eDNA is collected, then ODNR will move to the next phase of the risk assessment.
 - The ODNR, University of Toledo, and USFWS are currently collaborating on efforts to remove Grass Carp in the Maumee River and these crews will be notified to redirect some of their effort to this area and to also be on the lookout for Bighead and Silver Carp as part of their routine sampling activities.
 - As of June 12th, Grass Carp removal crews from USFWS, USGS, and University of Toledo have sampled the Maumee River on 203 sampling occasions consisting of 83 hours of electrofishing and no Bighead or Silver Carp have been detected.
 - Under the USFWS Early Detection and Monitoring (EDM) sampling in the Maumee River using electrofishing, gill nets, single and paired fyke nets, and bottom trawling has occurred on April 8th, 9th, 18th and May 14th, 20th, and 21st and no Bighead or Silver Carp were detected. Additional USFWS EDM work is scheduled in Maumee River during the following weeks: Aug 26-30, Sept 30-Oct 3, Nov 12-14.

Supporting information:

- USFWS maps of the positive eDNA detections at the end of this document
- State Management Plan for Aquatic Invasive Species 2014 (ODNR)
- Invasive Carp Tactical Plan 2021-2030 (ODNR)
- Invasive Carp Response Guidelines 2021 (ODNR)
- Lake Erie Grass Carp Adaptive Response Strategy 2024-2028 (Great Lakes Fishery Commission)
- ODNR Participates in the following groups: Great Lakes Panel, Mississippi River Basin Panel, and Invasive Carp Regional Coordinating Committee

Additional steps currently in place to prevent invasive carp movement into the Great Lakes:

- ODNR and USACE are working to close direct water connection points along the Mississippi River and Great Lakes basin divide at the Ohio-Erie Canal and Little Killbuck Creek to prevent the Interbasin transfer of AIS, including Bighead and Silver Carp.
- ODNR routinely inspects bait outlets to ensure that the bait used by anglers is free of all AIS.
- ODNR and Wildlife Forever have an angler outreach effort through the “Trash Unused Live Bait” campaign to encourage anglers to properly dispose of live bait.
- ODNR and partners routinely conduct early detection efforts to identify new high-risk AIS or to monitor range expansion of high-risk AIS populations present in Ohio.



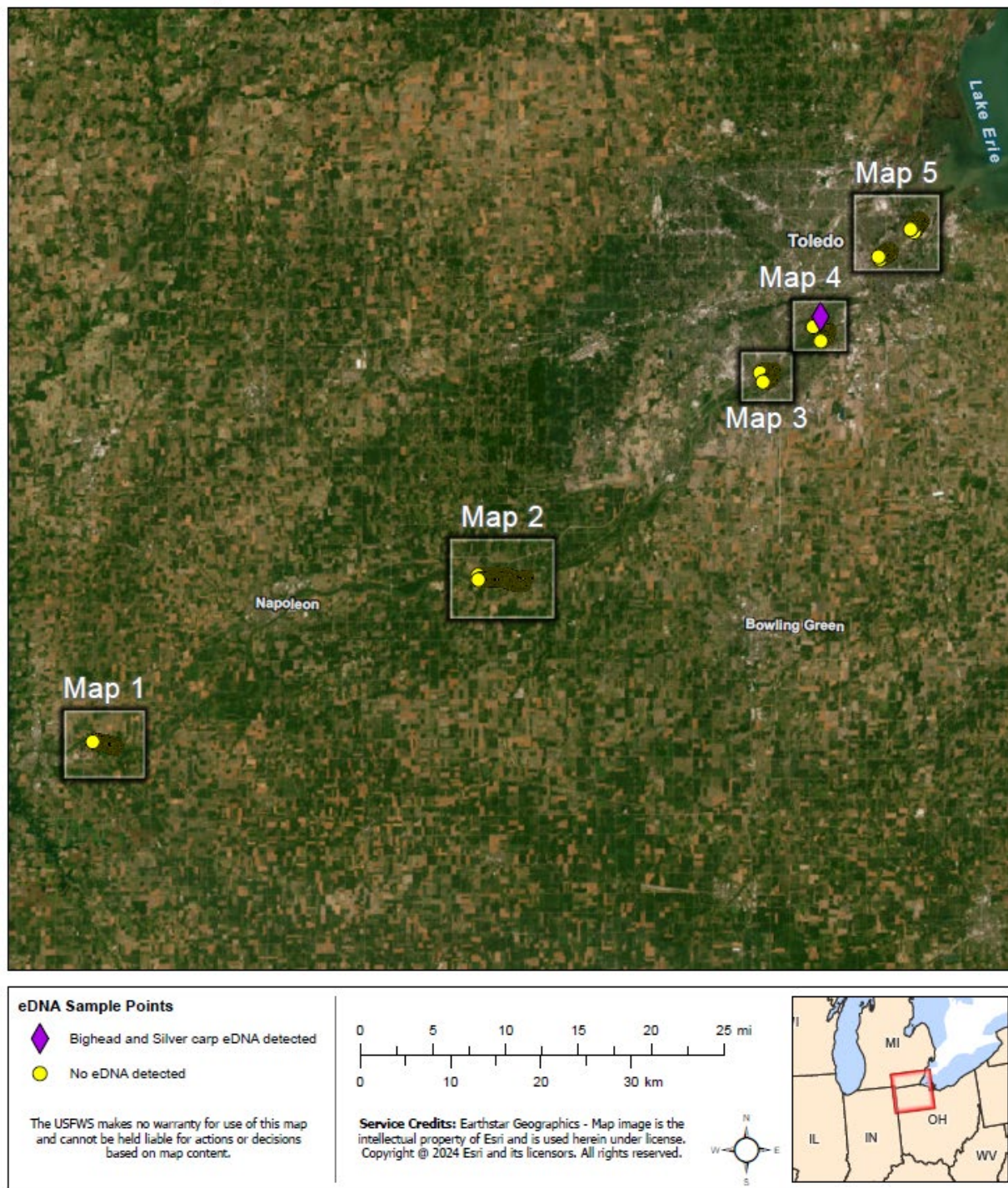
U.S. Fish and Wildlife Service



Bighead and Silver Carp eDNA Early Detection Results for the **Maumee River**

Sampling Period: Week of April 15, 2024

Number of Samples Collected: 440



Map 1. Map from USFWS report showing all sampling locations, with the Bighead and Silver Carp positive eDNA detections denoted as a purple diamond in the area labeled “Map 4”.



U.S. Fish and Wildlife Service



Bighead and Silver Carp eDNA Early Detection Results for the **Maumee River**

Sampling Period: Week of April 15, 2024

Number of Samples Collected: 44

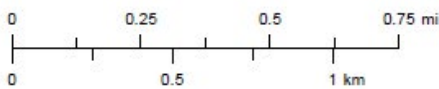
Map: 4



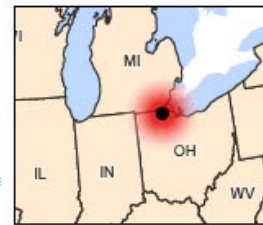
eDNA Sample Points

- ◆ Bighead and Silver carp eDNA detected
- No eDNA detected

The USFWS makes no warranty for use of this map and cannot be held liable for actions or decisions based on map content.



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Map 2. Map from USFWS report showing the Bighead and Silver Carp positive eDNA detections just downstream of Delaware Island, as denoted by the purple diamond.

eDNA Findings Table, supporting text, and Flow Chart from: *ODNR Division of Wildlife. 2021. Invasive Carp Response Guidelines: 2021. Ohio Department of Natural Resources, Division of Wildlife. Columbus, Ohio.*

Lake Erie Watershed		Risk		Return	
eDNA		Low	High	Low	High
Open Lake			X	X	Communicate
Tributaries			X		Planned Response
Reservoirs		X		X	Report

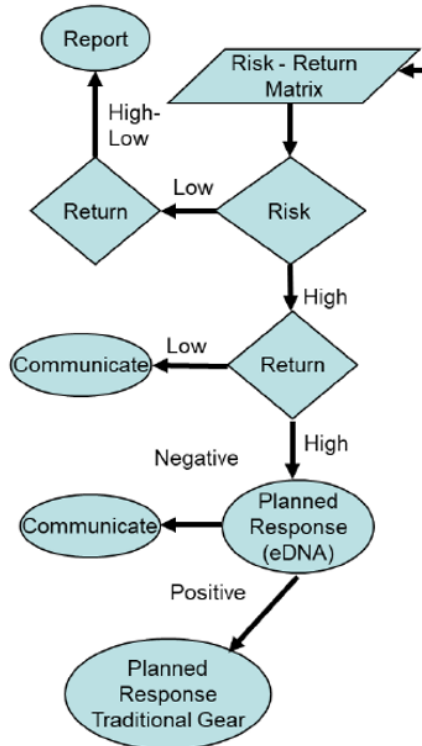
Low Risk Scenarios:

- Locations where findings are based on eDNA, which detects the presence of genetic material but is not a confirmation of a live fish.

Low Return Scenarios:

- Locations in large systems where an action is not practical.

eDNA Flow Chart for Bighead and Silver Carp:



#24: Bigheaded carp eDNA, Kalamazoo River (MI)

Event Description Form

NOTE: This information is confidential, not for distribution or use beyond intended audiences.

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: Invasive Carp (Silver Carp *Hypophthalmichthys molitrix* or Bighead Carp *Hypophthalmichthys nobilis*)

Location: Kalamazoo River, MI

Event time/duration: April 23-26, 2024

Responsible agency: Michigan DNR Fisheries Division

Contact person/e-mail: Jay Wesley, MDNR Lake Michigan Basin Coordinator, WesleyJ@michigan.gov

Type: ☐ Unexpected ☒ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

- The United States Fish and Wildlife Service (USFWS) conducts routine environmental DNA (eDNA) surveillance for invasive Bighead and Silver Carp at priority locations in the Great Lakes.
- 220 eDNA samples were collected from April 23-26, 2024 from the Kalamazoo River, distributed in two locations: near the mouth of the river and near Dunningville, MI.
- One of the 220 samples had a positive detection using the non-specific invasive carp maker. The same sample was not positive using the Bighead or Silver Carp specific marker. The result was shared to the Michigan Department of Natural Resources (MDNR) on July 9, 2024.

- This was the second eDNA detection of invasive carp in the Kalamazoo River out of a total of 4,400 samples collected and processed since 2013 ([USFWS eDNA dashboard](#)). The first detection was of Silver Carp eDNA, detected downstream of Lake Allegan in 2014.
- The detection of genetic material does not immediately indicate the presence of a live fish, given the potential for genetic material to come from other sources (e.g., dead fish, transfer from boat or other gear recently in carp-infested waters, etc.).
- The detection location was near vegetated backwaters and downstream from a boat marina. In the lower Kalamazoo River, there is heavy traffic of recreational boat use from boats that hail from other Lake Michigan ports.
- The Great Lakes Fishery Commission funded a project on the *Uses and limitations of environmental DNA (eDNA) in fisheries management* (Welsh et al., 2019; <http://www.glfc.org/science-transfer-toolkit.php>), which provides guidance on the interpretation and potential responses to eDNA detections.
- Extensive large mesh gill net surveys were conducted from March through May in the mouth of the Kalamazoo River up to Allegan (Calkins) Dam. This section of the river is also frequented by bow anglers. No Bighead or Silver Carp have been captured or observed in the Kalamazoo River.

In response to this finding:

- MDNR was in communication with USFWS regarding ongoing analysis of a second round of routine invasive carp eDNA samples that were collected in the Kalamazoo River on June 12, 2024. The USFWS analyzed these 220 samples on July 19, 2024 and found **no samples tested positive for invasive carp eDNA**. Given these negative June results, MDNR will not pursue emergency response actions at this time. MDNR will continue to consult with USFWS on routine invasive carp eDNA sampling results throughout the remainder of the 2024 calendar year.
- Following the eDNA detection, Michigan DNR communicated findings to:
 - Lake Michigan Committee
 - Council of Great Lakes Fishery Agencies via the Invasive Fishes Communications Protocol (this document)

#25: Silver carp eDNA, Sandusky River (OH)

Event Description Form

NOTE: This information is confidential, not for distribution or use beyond intended audiences.

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: Silver Carp eDNA

Location: Sandusky River, Fremont, Ohio, Lake Erie watershed

Event time/duration: Week of April 19, 2024 (sample collection); July 17, 2024 (results)

Responsible agency: Ohio DNR Division of Wildlife

Contact person/e-mail: John Navarro, john.navarro@dnr.ohio.gov

Type: ☐ Unexpected ☒ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

- The Ohio Department of Natural Resources (ODNR) and U.S. Fish and Wildlife Service (USFWS) are collaborating to monitor for the potential presence of Bighead and Silver Carp within the Ohio waters of western Lake Erie bays and select tributaries using environmental DNA (eDNA) surveillance.
- Laboratory analysis received Wednesday July 17, 2024, yielded one positive detection for Silver Carp eDNA among 440 water samples collected in the Sandusky River during the week of April 29, 2024. The positive detection was collected in the vicinity of Fremont, Ohio, at Bradys Island.
- Silver Carp eDNA can come from other sources (e.g., bird droppings, boats, and equipment from infested waters) and is not a confirmation of the presence of live fish.

- The response to a positive detection of Silver Carp eDNA is addressed in the *Invasive Carp Response Guidelines* (ODNR Division of Wildlife 2021) and specifies that a risk assessment will be conducted as outlined below:
 - If Silver Carp eDNA is detected in a Lake Erie tributary, then ODNR Division of Wildlife will determine whether the return of an action would have a high likelihood of success.
 - Because a successful action is possible, the USFWS will collect additional water samples in the fall of 2024 to better define the presence of Silver Carp eDNA.
 - If no additional Silver Carp eDNA are collected by the USFWS, then the action will be considered complete and routine surveillance will continue through currently planned activities. This would constitute a Level 1 positive eDNA finding with live fish likely NOT being present (see attached eDNA findings table, supporting text, and flow chart in supporting information).
 - If additional Silver Carp eDNA is collected, then ODNR will move to the next phase of the risk assessment.
 - The ODNR, University of Toledo, and USFWS are currently collaborating on efforts to remove Grass Carp in the Sandusky River and these crews will be notified to redirect some of their effort to this area and to also be on the lookout for Silver Carp as part of their routine sampling activities.
 - As of July 5th, there have been 318 sampling events with 122 hours of electrofishing on the Sandusky River in 2024 with no evidence of Silver Carp.

Supporting information:

- USFWS maps of the positive eDNA detections at the end of this document
- State Management Plan for Aquatic Invasive Species 2014 (ODNR)
- Invasive Carp Tactical Plan 2021-2030 (ODNR)
- Invasive Carp Response Guidelines 2021 (ODNR)
- Lake Erie Grass Carp Adaptive Response Strategy 2024-2028 (Great Lakes Fishery Commission)
- ODNR Participates in the following groups: Great Lakes Panel, Mississippi River Basin Panel, and Invasive Carp Regional Coordinating Committee

Additional steps currently in place to prevent invasive carp movement into the Great Lakes:

- ODNR and USACE are working to close direct water connection points along the Mississippi River and Great Lakes basin divide at the Ohio-Erie Canal and Little Killbuck Creek to prevent the Interbasin transfer of AIS, including Bighead and Silver Carp.
- ODNR routinely inspects bait outlets to ensure that the bait used by anglers is free of all AIS.
- ODNR and Wildlife Forever have an angler outreach effort through the “Trash Unused Live Bait” campaign to encourage anglers to properly dispose of live bait.
- ODNR and partners routinely conduct early detection efforts to identify new high-risk AIS or to monitor range expansion of high-risk AIS populations present in Ohio.



U.S. Fish and Wildlife Service



Bighead and Silver Carp eDNA Early Detection Results for the **Sandusky River**

Sampling Period: Week of April 29, 2024

Number of Samples Collected: 44



Map 1. Map from USFWS report showing the Silver Carp positive eDNA detection in the side channel along Bradys Island, as denoted by the red triangle.



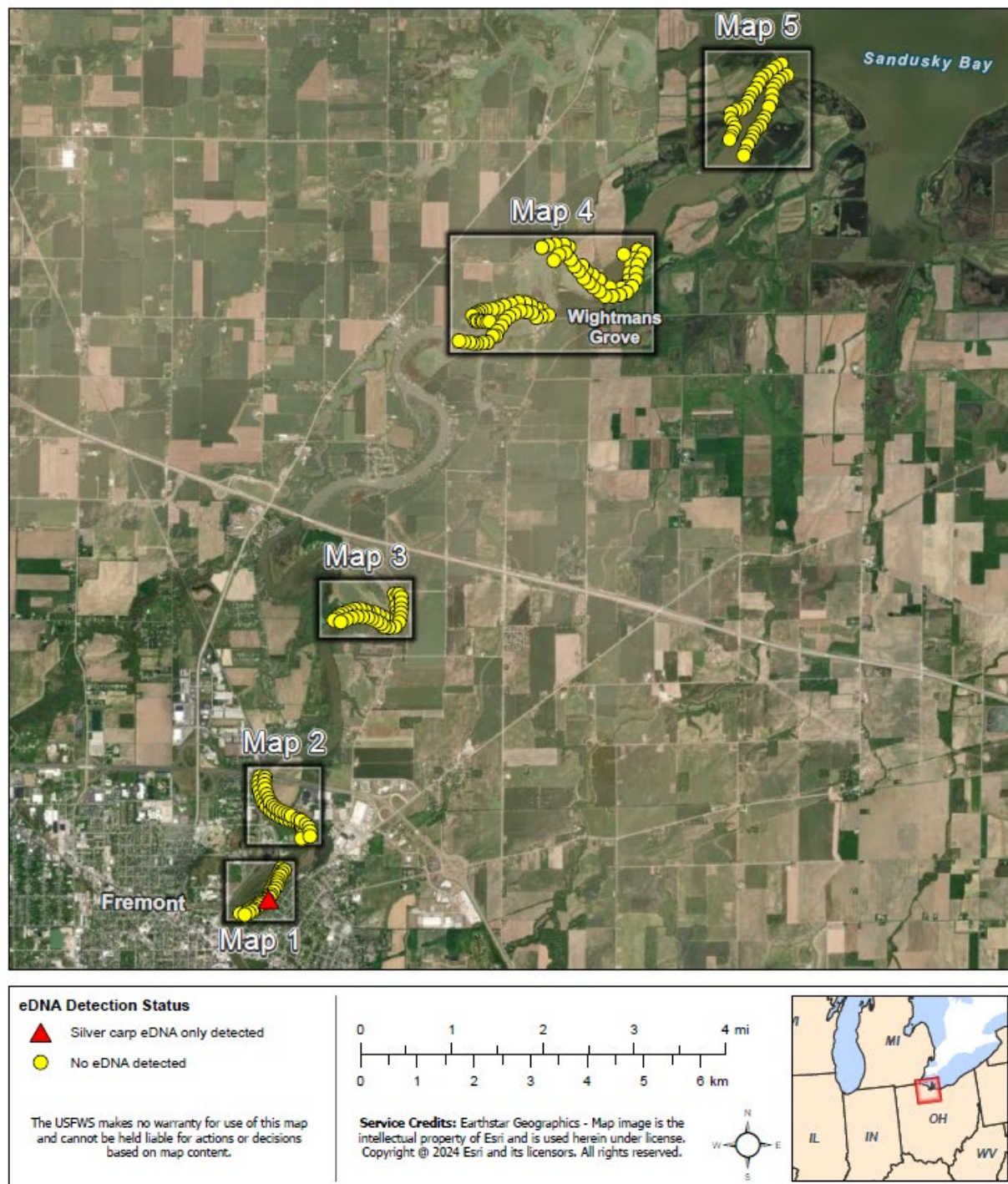
U.S. Fish and Wildlife Service



Bighead and Silver Carp eDNA Early Detection Results for the **Sandusky River**

Sampling Period: Week of April 29, 2024

Number of Samples Collected: 264



Map 2. Map from USFWS report showing all sampling locations, with the Silver Carp positive eDNA detection denoted as a red triangle in the area labeled “Map 1”.

eDNA Findings Table, supporting text, and Flow Chart from: *ODNR Division of Wildlife. 2021. Invasive Carp Response Guidelines: 2021. Ohio Department of Natural Resources, Division of Wildlife. Columbus, Ohio.*

Lake Erie Watershed		Risk		Return	
eDNA		Low	High	Low	High
Open Lake			X	X	Communicate
Tributaries			X		Planned Response
Reservoirs		X		X	Report

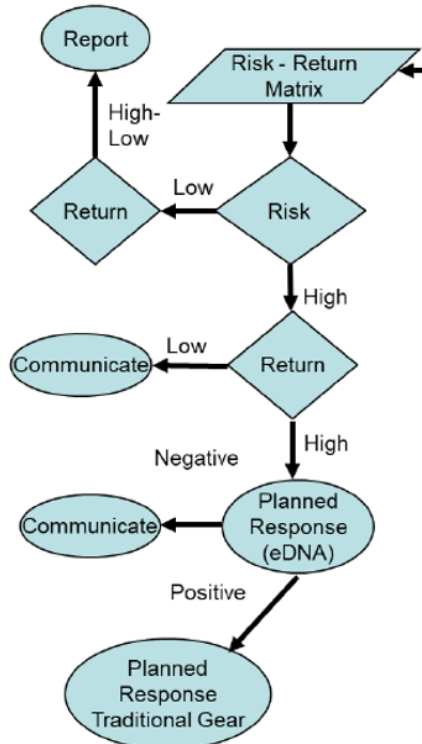
Low Risk Scenarios:

- Locations where findings are based on eDNA, which detects the presence of genetic material but is not a confirmation of a live fish.

Low Return Scenarios:

- Locations in large systems where an action is not practical.

eDNA Flow Chart for Bighead and Silver Carp:



#26: Bigheaded carps eDNA, Milwaukee River Estuary (WI)

Event Description Form

NOTE: This information is confidential, not for distribution or use beyond intended audiences.

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: Bighead carp (*Hypophthalmichthys nobilis*) and silver carp (*H. molitrix*)

Location: Milwaukee River Estuary

Event time/duration: USFWS eDNA, June 26, 2024

Responsible agency: Wisconsin Department of Natural Resources

Contact person/e-mail: Brad Eggold, Bradley.Eggold@wisconsin.gov (Fisheries Management contact)

Type: ☐ Unexpected ☒ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

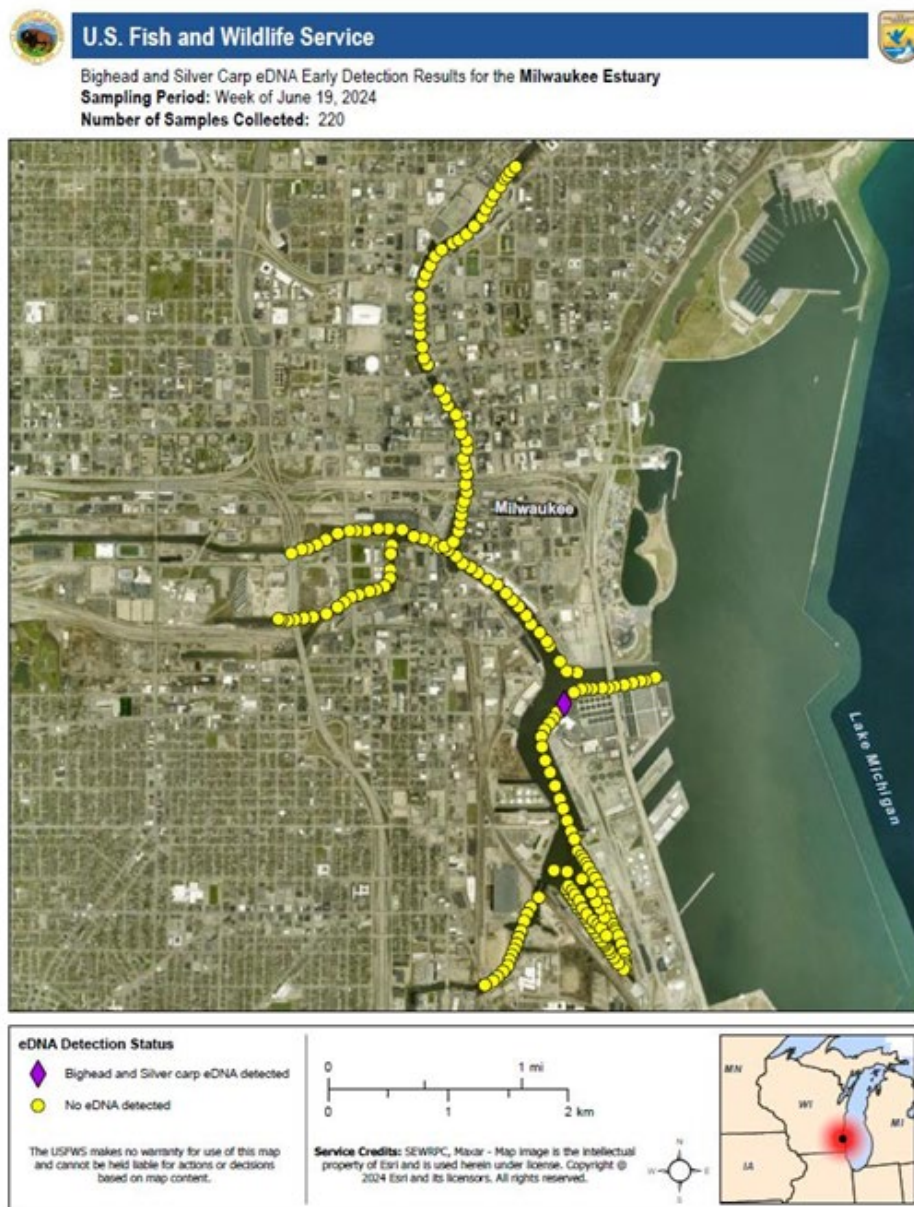
- The United States Fish and Wildlife Service (USFWS) conducted routine environmental DNA (eDNA) sampling at the Milwaukee River Estuary on June 26, 2024, for invasive silver and bighead carp.
- 220 samples were collected near the mouth of the Milwaukee and Kinnickinnic Rivers.
- The Wisconsin Department of Natural Resources were notified on September 3, 2024, one water sample had three positive markers: bighead carp, silver carp, and invasive carp.
- This is the first positive eDNA detection of invasive carp since 2021.
- The WI DNR's Southern Lake Michigan Fisheries Team monitors fish populations in the Milwaukee River Estuary using electrofishing and gillnetting, most recently in 2024, and have not found any invasive carp, nor are we aware of any reports of bighead carp from anglers or commercial fishermen at this time. The Fisheries team has been electrofishing the Milwaukee River in Milwaukee County multiple times a year for over 20 years. Since 2013 the team has also gill netted

the Milwaukee Harbor and surrounding nearshore area for juvenile lake sturgeon. They have not had any encounters with bighead or silver carp alive or dead during any of their monitoring.

In response to this finding:

- USFWS will collect additional eDNA samples during the week of October 6, 2024. The USFWS also conducts routine AIS early detection and monitoring sampling in the area. As part of this effort, they will be electrofishing October 7-11, 2024. The WI DNR is working closely with USFWS to plan for future monitoring.
- At this time, WI DNR is not planning a press release nor further monitoring outside of regular USFWS monitoring in the area.

Supporting information:



#27: Bighead carp eDNA, Sandusky River

Event Description Form

NOTE: This information is confidential, not for distribution or use beyond intended audiences.

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: Bighead Carp eDNA

Location: Sandusky River, Fremont, Ohio, Lake Erie watershed

Event time/duration: Week of September 9, 2024 (sample collection); October 11, 2024 (results)

Responsible agency: Ohio DNR Division of Wildlife

Contact person/e-mail: John Navarro, john.navarro@dnr.ohio.gov

Type: ☐ Unexpected ☒ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

- The Ohio Department of Natural Resources (ODNR) and U.S. Fish and Wildlife Service (USFWS) are collaborating to monitor for the potential presence of Bighead and Silver Carp within the Ohio waters of western Lake Erie bays and select tributaries using environmental DNA (eDNA) surveillance.
- Laboratory analysis received Friday October 11, 2024, yielded one positive detection for Bighead Carp eDNA among 176 water samples collected in the Sandusky River during the week of September 9, 2024. The positive detection was collected in the vicinity of Fremont, Ohio, at Bradys Island.
- Bighead Carp eDNA can come from other sources (e.g., bird droppings, boats, and equipment from infested waters) and is not a confirmation of the presence of live fish.

- The response to a positive detection of Bighead Carp eDNA is addressed in the *Invasive Carp Response Guidelines* (ODNR Division of Wildlife 2021) and specifies that a risk assessment will be conducted as outlined below:
 - If Bighead Carp eDNA is detected in a Lake Erie tributary, then ODNR Division of Wildlife will determine whether the return of an action would have a high likelihood of success.
 - Because a successful action is possible, the USFWS will collect additional water samples in the fall of 2024 to better define the presence of Bighead Carp eDNA.
 - If no additional Bighead Carp eDNA are collected by the USFWS, then the action will be considered complete and routine surveillance will continue through currently planned activities. This would constitute a Level 1 positive eDNA finding with live fish likely NOT being present (see attached eDNA findings table, supporting text, and flow chart in supporting information).
 - If additional Bighead Carp eDNA is collected, then ODNR will move to the next phase of the risk assessment.
 - The ODNR, University of Toledo, and USFWS are currently collaborating on efforts to remove Grass Carp in the Sandusky River, and these crews will be notified to redirect some of their effort to this area and to also be on the lookout for Bighead Carp as part of their routine sampling activities.
 - As of October 1st, there have been a total of 608 sampling events, 514 electrofishing transects and 94 gill net sets, resulting in 190.14 hours of electrofishing and 35,250 feet of gill nets fished on the Sandusky River in 2024 with no evidence of Bighead Carp.

Supporting information:

- USFWS maps of the positive eDNA detections at the end of this document
- State Management Plan for Aquatic Invasive Species 2014 (ODNR)
- Invasive Carp Tactical Plan 2021-2030 (ODNR)
- Invasive Carp Response Guidelines 2021 (ODNR)
- Lake Erie Grass Carp Adaptive Response Strategy 2024-2028 (Great Lakes Fishery Commission)
- ODNR Participates in the following groups: Great Lakes Panel, Mississippi River Basin Panel, and Invasive Carp Regional Coordinating Committee

Additional steps currently in place to prevent invasive carp movement into the Great Lakes:

- ODNR and USACE are working to close direct water connection points along the Mississippi River and Great Lakes basin divide at the Ohio-Erie Canal and Little Killbuck Creek to prevent the Interbasin transfer of AIS, including Bighead and Silver Carp.
- ODNR routinely inspects bait outlets to ensure that the bait used by anglers is free of all AIS.
- ODNR and Wildlife Forever have an angler outreach effort through the “Trash Unused Live Bait” campaign to encourage anglers to properly dispose of live bait.

- ODNR and partners routinely conduct early detection efforts to identify new high-risk AIS or to monitor range expansion of high-risk AIS populations present in Ohio.



U.S. Fish and Wildlife Service



Bighead and Silver Carp eDNA Early Detection Results for the Sandusky River

Sampling Period: Week of September 9, 2024

Number of Samples Collected: 44



Map 1. Map from USFWS report showing the Bighead Carp positive eDNA detection in the side channel along Bradys Island, as denoted by the blue square.



U.S. Fish and Wildlife Service





Bighead and Silver Carp eDNA Early Detection Results for the Sandusky River

Sampling Period: Week of September 9, 2024

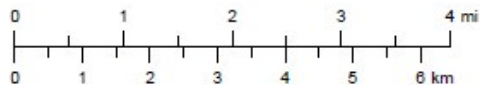
Number of Samples Collected: 176



eDNA Detection Status

-  Bighead carp eDNA only detected
-  No eDNA detected

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Map 2. Map from USFWS report showing all sampling locations, with the Bighead Carp positive eDNA detection denoted as a blue square in the area labeled “Map 1”.

eDNA Findings Table, supporting text, and Flow Chart from: *ODNR Division of Wildlife. 2021. Invasive Carp Response Guidelines: 2021. Ohio Department of Natural Resources, Division of Wildlife. Columbus, Ohio.*

Lake Erie Watershed		Risk		Return	
eDNA		Low	High	Low	High
Open Lake			X	X	Communicate
Tributaries			X		Planned Response
Reservoirs		X		X	Report

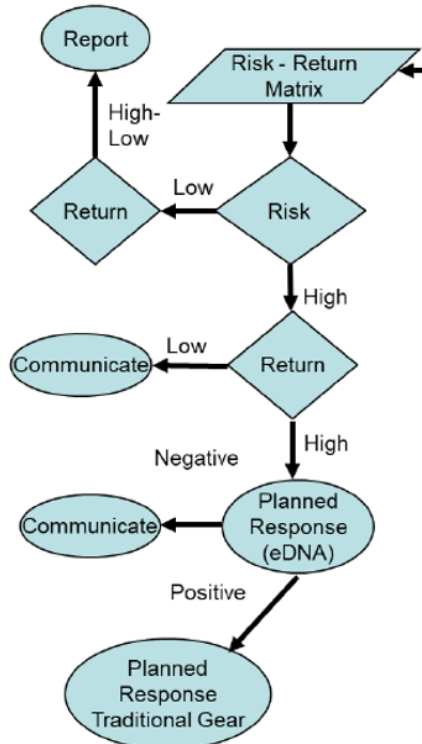
Low Risk Scenarios:

- Locations where findings are based on eDNA, which detects the presence of genetic material but is not a confirmation of a live fish.

Low Return Scenarios:

- Locations in large systems where an action is not practical.

eDNA Flow Chart for Bighead and Silver Carp:



#28: Silver carp eDNA, Milwaukee River Estuary (WI)

Event Description Form

NOTE: This information is confidential, not for distribution or use beyond intended audiences.

☐ Draft ☒ Final

☐ URGENT ☒ Important ☐ Routine

Species: Silver carp - One of two hundred twenty samples detected markers for silver carp

Location: Milwaukee River Estuary

Event time/duration: : eDNA sampling event: October 8, 2024 – results: October 23, 2024

Responsible agency: Wisconsin Department of Natural Resources

Contact person/e-mail: Brad Eggold, Bradley.Eggold@wisconsin.gov (Fisheries Management contact)

Type: ☐ Unexpected ☒ Planned

Information category: ☒ Population status ☐ Impacts

Activity: ☒ Management ☐ Research

☐ prevention

☐ population status

☒ surveillance

☐ ecological impacts

☐ response

☐ fishery impacts

☐ suppression

☐ tools/techniques

☐ control

☐ other

Talking Points (bullets):

- The United States Fish and Wildlife Service (USFWS) conducted follow up environmental DNA (eDNA) sampling at the Milwaukee River Estuary on October 8, 2024, for invasive silver and bighead carp.
- 220 samples were collected near the mouth of the Milwaukee and Kinnickinnic Rivers.
- The Wisconsin Department of Natural Resources (WI DNR) was notified on October 23, 2024, that one water sample had a positive marker for silver carp.
- This is the second positive eDNA detection of invasive carp in the Milwaukee Estuary since 2021.
- On September 3, 2024, the WI DNR was notified by USFWS of the first positive eDNA detection in the Milwaukee Estuary during sampling that occurred in June 2024. This single water sample contained a positive marker for both bighead and silver carp.
- Following water collection of eDNA sampling, USFWS also performed traditional monitoring methods, utilizing electrofishing and gillnets. No silver or bighead carp were detected.

- The WI DNR's Southern Lake Michigan Fisheries Team monitors fish populations in the Milwaukee River Estuary using electrofishing and gillnetting, most recently in 2024, and have not found any invasive carp, nor are we aware of any reports of silver or bighead carp from anglers or commercial fishermen at this time. The Fisheries team has been electrofishing the Milwaukee River in Milwaukee County multiple times a year for over 20 years. Since 2013 the team has also gillnetted the Milwaukee Harbor and surrounding nearshore area for juvenile lake sturgeon. They have not had any encounters with bighead or silver carp alive or dead during any of their monitoring.

In response to this finding:

- At this time, WI DNR is not planning a press release nor further monitoring outside of regular USFWS monitoring in the area.
- In spring of 2025, WI DNR will continue to collaborate with USFWS on invasive carp and AIS monitoring with the Milwaukee Estuary being an area of high importance.

Supporting information:

