Contingency Response Plan 2024

for the Upper Illinois Waterway

Invasive Carp Monitoring and Response Plan Interim Summary Report

U.S. FISH & WILDLIFE SERVICE

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

USGS science for a changing world

Upper Illinois Waterway Contingency Response Plan

Table of Contents

Appendices

Acronym List

Acronym	Definition
AIS	Aquatic Invasive Species
BR	Brandon Road
Ch.	Chapter
C&G	Command and General Staff
Cal-Sag	Calumet-Saganashkee
CAWS	Chicago Area Waterway System
CO_2	Carbon Dioxide
CRP	Contingency Response Plan
CSSC	Chicago Sanitary and Ship Canal
DC	Direct Current
DNA	Deoxyribonucleic Acid
DNR	Department of Natural Resources
EDBS	Electric Dispersal Barrier System
eDNA	Environmental Deoxyribonucleic Acid
EEI	Essential Elements of Information
EPA	Environmental Protection Agency
ERDC	Environmental Research and Development Center
ESRI	Environmental Systems Research Institute
FWCO	Fish and Wildlife Conservation Office
GLFC	Great Lakes Fishery Commission
GPS	Global Positioning System
H.R.	House of Representatives
IAP	Incident Action Plan
ICRCC	Invasive Carp Regional Coordinating Committee
ICS	Incident Command System
IL	Illinois
ILCS	Illinois Compiled Statutes
ILDNR	Illinois Department of Natural Resources
ILDOA	Illinois Department of Agriculture
INHS	Illinois Natural History Survey
IPA	International Port Authority

Acronym	Definition
IWW	Illinois Waterway
LP	Lockport
MRP	Monitoring and Response Plan
MRWG	Monitoring and Response Work Group
MWRD	Metropolitan Water Reclamation District
MWRDGC	Metropolitan Water Reclamation District of Greater Chicago
Par.	Paragraph
P.L.	Public Law
POC	Point of Contact
RM	River Mile
SIU	Southern Illinois University
Stat.	Statute
U.S.	United States
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USCG	US. Coast Guard
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VHF	Very High Frequency
v/cm	Volts per centimeter
WG	Work Group
YOY	Young-of-Year

Upper Illinois Waterway Contingency Response Plan

Participating Agencies: U.S. Army Corps of Engineers (USACE) (lead), Illinois Department of Natural Resources (IL DNR), U.S. Fish and Wildlife Service (USFWS), U.S. Geological Survey (USGS), Illinois Natural History Survey (INHS), U.S. Environmental Protection Agency (USEPA), Great Lakes Fishery Commission (GLFC), Metropolitan Water Reclamation District of Greater Chicago (MWRDGC)

Introduction and Need

This Contingency Response Plan (CRP) describes specific response actions that will be implemented within the five navigation pools of the Upper Illinois Waterway (IWW)—Lockport, Brandon Road, Dresden Island, Marseilles, and Starved Rock pools (Figure 1) (River Miles [RM] 231 to 327)—in the event a change is detected in the status of invasive carp in those pools, indicating an increase in risk level. The interagency Monitoring and Response Work Group (MRWG) has maintained a robust and comprehensive invasive carp monitoring program in the CRP area and will continue these efforts as the foundation for early detection capability in the IWW. Annual interim summary reports describing these efforts can be found at icrcc.fws.gov. Based on this experience, the MRWG is confident in its ability to detect changes to invasive carp status in the navigation pools in the Upper IWW.

The MRWG and Invasive Carp Regional Coordinating Committee (ICRCC) member agencies acknowledge that any actions recommended by the MRWG or ICRCC would be considered for implementation by member agencies in a manner consistent with their authorities, policies, and available resources, and subject to the decision-making processes of that particular member agency. Nothing in this plan is meant to supplement or supersede the authorities of the state or federal agencies regarding their particular jurisdictions. For instance, no other state has authority to direct or approve actions affecting the IWW aquatic resources other than the state of Illinois (Illinois Wildlife and Natural Resource Law [515 ILCS 5/1-150; from Ch. 56, par. 1-150]).

Purpose

The purpose of this CRP is to outline the process and procedures the MRWG and ICRCC member agencies will follow in response to detected changes in invasive carp distribution or abundances of particular life stages in any given pool of the Upper IWW.

Communication

Communicating captures of various invasive carp life stages is a critical component of the CRP. While several monitoring strategies require in-depth analyses in both the field and laboratory setting, it is critical that potential changes are immediately forwarded to the MRWG Co-Chairs, John Dettmers and Brian Schoenung. Each agency should follow its respective chain of command to ensure that the MRWG co-chairs are notified in a quick and timely manner. Quick and efficient communication allows for appropriate dissemination and rapid implementation of a response action if needed. Not only should new occurrences of invasive carp of any life stage be communicated to the co-chairs, but potential population changes in areas where invasive carp are known, as well as rare occurrences of specific life stages within the Upper Illinois River, should be reported. Recognizing and establishing a baseline where all life stages of invasive species have been captured is necessary, but it is important to prevent this from convoluting what information needs to be communicated to the co-chairs. For example, if significant changes in abundances of a specific life stage occur within an area where they are known to exist, that data should be reported. In general, it is best to be proactive in the information communicated to the MRWG co-chairs, and if you are unsure, send the data to the co-chairs for consideration.

Outside of communicating captures and changes to invasive carp populations, it is also important to note the capture of other uncommon invasive species to the IL DNR. The MRWG has a robust monitoring plan,

and MRWG partner agencies may encounter other invasive species that may pose a threat to aquatic resources in the region. If a novel or uncommon introduced species is captured during the MRWG monitoring activities, please report those findings to IL DNR immediately, so it can make a risk-based decision about the need for additional actions outside the CRP and MRWG Monitoring Response Plan (MRP).

For a detailed list of definitions to accurately determine any changes in invasive carp populations and size classes, please review Attachment 3 of Appendix B at the end of this CRP.

Background

Existing plans for responding to the collection of invasive carp or changing barrier operations have been in place since 2011 and provide guidance focused on potential actions that could be undertaken in and around the USACE Electric Dispersal Barrier System (EDBS) and the Chicago Area Waterway System (CAWS), upstream of Lockport Lock and Dam (RM 291). The ICRCC relies on the EDBS within the Chicago Sanitary and Ship Canal (CSSC) at Romeoville, Illinois, operated by USACE, as a key tool to prevent the establishment of invasive carp in the Laurentian Great Lakes Basin. In support of the current EDBS, and with the goal of preventing establishment, this CRP seeks to ensure that invasive carp populations in the Upper IWW remain low and that the probability of invasive carp arrival at the EDBS is as low as practicable.

Previous response operations have been successfully conducted by the MRWG in response to detections of invasive carp above the EDBS. The most recent response action occurred in 2022 when a physical capture of a Silver Carp occurred in Lake Calumet (details provided in the 2022 Interim Summary Report). Prior to 2022, an interagency response in 2017 was initiated after a Silver Carp was captured in the Little Calumet River, and a 2010 response was initiated in the Little Calumet River, where piscicide was applied to over 2 miles of waterway. In addition, a response was conducted downstream of the EDBS in 2009 to prevent fish passage during a scheduled maintenance outage, in which 5 miles of the CSSC were treated with a piscicide.

This enhanced CRP expands the geographic scope of contingency planning efforts prior to 2017, as well as the range of potential tools that are available if a response action is needed. This plan also considers operations and status of the EDBS and related fish suppression considerations, which are detailed in Appendix A.

Finally, this CRP provides a communication framework and response procedure that may be utilized for any planned event to mitigate the risk of invasive carp passage into Lake Michigan. These events may include scheduled maintenance of the EDBS or the opening of hydraulic connections that may allow the passage of invasive carp. The same protocols outlined for a response to an unplanned event may be applied in advance of these planned events to reduce the risk of a progressing invasion front.

Invasive carp distribution has not changed significantly in the Upper IWW since individuals were discovered in the Dresden Island Pool in 2006. However, densities of adult invasive carp have declined in the Upper IWW from 2012 to 2019 based on hydroacoustic scans. The 2021 MRP Interim Summary Report highlights a significant amount of monitoring effort from the Starved Rock Lock and Dam upstream through the CAWS with no evidence of an established population of any life stage above the Dresden Island Pool (MRWG 2021). The lack of range expansion and decreased densities may be due to intensive contracted fishing efforts, lack of suitable upstream habitat, water quality conditions, or a combination of other factors not yet fully understood. Despite no evidence of range expansion or increasing abundance of the invasive carp population in the Upper IWW in recent years, it is generally recognized that invasive fish populations may expand their range and abundance. Examples of introduced fishes exhibiting this phenomenon are available from other locations.

Small invasive carp (less than 6 inches in length) are of special concern when considering response actions because of the risk that smaller fish may not be as effectively repelled by electric barriers or may become inadvertently entrained by barge tows and propelled through locks. In 2017, biologists from the USFWS Carterville Fish and Wildlife Conservation Office (FWCO) conducted a study in the LaGrange and Peoria pools of the Illinois River, specifically focused on invasive carp entrainment. Biologists found that small Silver Carp (less than 60 millimeters) released into a barge junction gap can be transported upstream while entrained in commercial tow junction gaps over distances of up to 4 miles (Davis and Neeley 2017). However, such entrainment has not been observed to occur naturally for either Bighead Carp or Silver Carp outside these studies. Observations of small fish in advance of adult population fronts have not been reported in either the IWW or other large navigable rivers of the U.S.

While the focus of the CRP is related to the status of the more abundant Silver Carp and Bighead Carp in the Upper IWW, the plan is also applicable and adaptable to Black Carp. Black Carp have become a greater concern in the Upper Illinois River over the past several years. Black Carp's diet of mollusks, which include native freshwater mussels, is of special concern due to the imperiled status of many mussel species throughout North America. As of January 2021, the closest known capture of Black Carp occurred within the Peoria Pool. While more data is needed to fully understand the population dynamics of Black Carp in the Illinois River, captures of Black Carp may result in a response action by the MRWG. In addition, while Grass Carp have been established within the region for several decades, the MRWG continues to monitor and record information on population trends throughout the Upper IWW and the CAWS.

Location

The IWW is a series of rivers and canals running from Lake Michigan circa Chicago, Illinois, to the Mississippi River near St. Louis, Missouri. This waterway contains approximately 336 miles of canal and navigable rivers, including the Chicago, Calumet, Des Plaines, and Illinois Rivers and connecting canals. The five pools of the Upper IWW (upstream toward Lake Michigan) are covered by this document: Lockport, Brandon Road, Dresden Island, Marseilles, and Starved Rock (Figure 1), RM 231 to 327. Each pool is defined as the body of water between two structures, locks and dams, as well as any tributaries connected to that pool. For instance, the Brandon Road Pool is the body of water upstream of the Brandon Road Lock and Dam and downstream of the Lockport Lock and Dam. The distances (miles) from the upstream structure of a given pool to the EDBS are as follows: Lockport - not applicable, Brandon Road - 5.5, Dresden Island - 10.5, Marseilles - 26, and Starved Rock - 49.5. While the LaGrange and Peoria pools and the Alton Reach of the Lower IWW are not covered by this CRP, the status and trends of invasive carp populations in these pools are monitored by the MRWG to elevate awareness of potential changes in the upper pools.

The reaches upstream of the EDBS are sampled in the spring and fall each year through the Seasonal Intensive Monitoring event. Given that invasive carp are absent to rare in these areas, response actions have been triggered through the CRP in the past.

MRWG activities and this response plan do not extend into Lake Michigan. However, various detection sampling programs are in place in Lake Michigan and its tributaries for numerous aquatic invasive species (AIS). IL DNR conducts AIS sampling, including for invasive carp, in the nearshore waters of Lake Michigan and Illinois harbors annually. The USFWS Green Bay Fish and Wildlife Conservation Office aquatic invasive species team samples harbors within southern Lake Michigan every year as a surveillance tool. Targeted efforts to remove invasive Grass Carp are currently being led by the USFWS and Michigan Department of Natural Resources (DNR) in southwestern Lake Michigan harbors and tributaries. Should a response in Lake Michigan become necessary, that decision would be led by the Lake Michigan Committee, comprised of the fishery management agencies involved in Lake Michigan fishery decisions. During discussions with

MRWG partners, it is anticipated that the MRWG would consider assisting with a response if an invasive carp was captured within Illinois portions of Lake Michigan. The request for assistance will occur through the Lake Michigan Committee, which the MRWG Co-chair John Dettmers is a participant in, and the GLFC facilitates.

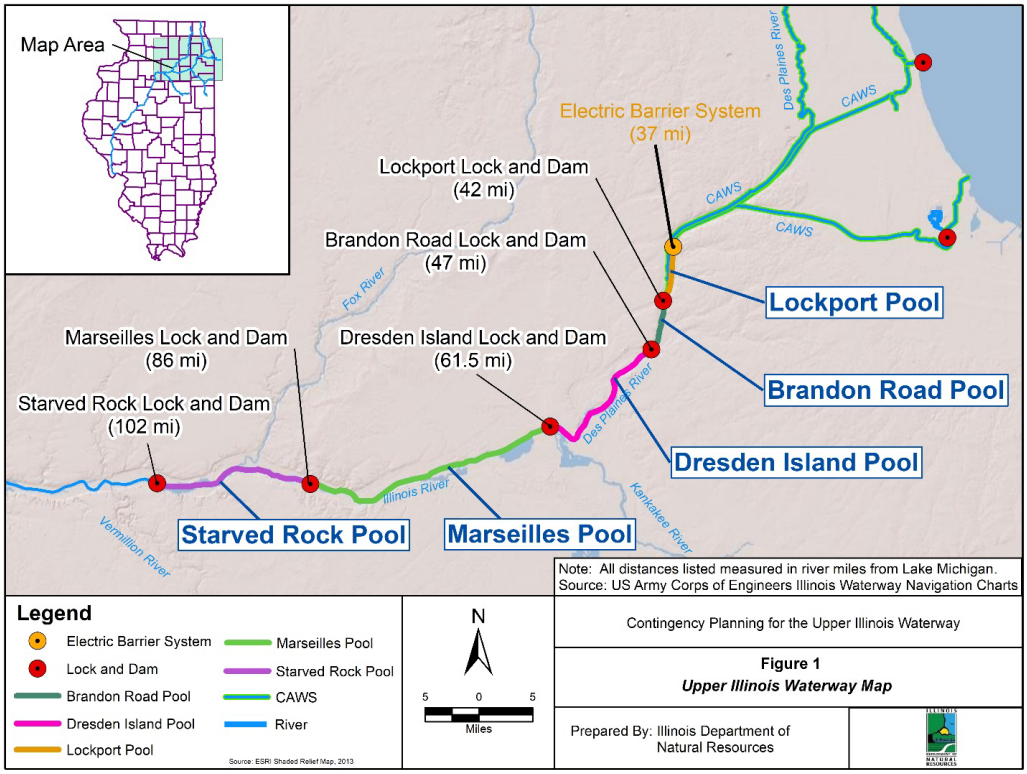


Figure 1. *IWW map and profile. Note: For the purposes of this map, the Lockport Pool is only highlighted up to the electric barrier system.*

Mission and Goal

The MRWG convened a panel of experts to evaluate invasive carp population status and waterway conditions, forecast invasive carp risk scenarios, and develop a plan to direct appropriate and prudent contingency response actions as needed in the Upper IWW. Current and/or expected regulatory or other required actions are noted for each contingency measure as practical. The goal of the panel was to develop contingency plans to meet the ICRCC mission as stated:

> *The purpose of the ICRCC is to coordinate the planning and execution of efforts of its members to prevent the introduction, establishment, and spread of Bighead Carp, Black Carp, Grass Carp, and Silver Carp populations in the Great Lakes.*

In support of this mission statement, the goal of the CRP is to provide a process to consider appropriate response actions that account for available tools and the authorities of member agencies to implement actions. The intent is for the plan to be clear and easy to understand while allowing flexibility to ensure response actions fully address situation-specific issues. This plan ensures open and transparent communication with the public and stakeholder groups while providing consistent terminology defined by the MRWG panel of experts about invasive carp population, ecology, and invasion front dynamics.

The CRP is a living document that will evolve over time as information changes and additional technologies/tools are developed, including ozone, thermal, or carbon dioxide (CO_2) barriers; attractants

such as pheromones, audio cues, or feeding stimulants; or other unspecified tools that may be developed at a future time.

Additional Resources Considerations

This CRP allows for the deployment of monitoring or control tools deemed most appropriate by the MRWG, the ICRCC, and the governmental agencies holding locational or operational jurisdictional authority. For example, one of the most aggressive responses for invasive carp prevention occurred in 2009, when approximately 5 miles of the CSSC were treated with fish piscicide (Rotenone) in support of an EDBS maintenance operation. This control action occurred when invasive carp abundance patterns and the risk of a barrier breach were less understood. The IL DNR remains the sole entity with legal authority to apply piscicide to waters of the state of Illinois and has previously made decisions to do so in close consultation with many local, state, and federal partners. Illinois retains the authority, ability, and responsibility to facilitate similar actions, but has already determined that this tool is not appropriate for most of the rivers and locations included in this plan. While not listed as a tool in this CRP for the MRWG to consider, IL DNR reserves the right to authorize the use of piscicide or other developing technologies as appropriate and/or permitted in cooperation with other regulatory agencies in the CSSC.

Temporary modification of lock operations may be used under existing USACE authorities when necessary to support other control measures within the CRP. The duration of the modified operation would be limited to the time necessary to carry out the supported control measures. Such modifications have supported previous barrier-clearing events when electrofishing, water cannons, and/or nets were used to sample fish in and around the barrier system. In some instances, restriction of navigation traffic in the waterway may be necessary to safely execute a control measure. Such restrictions fall under the authority of the U.S. Coast Guard (USCG). As with temporary modification of lock operations, the duration of the restriction would be limited to the time necessary to carry out the control measure. The USACE and USCG have processes to provide timely evaluation and decisions in response to requests for temporary modified operations to support control actions by other entities and fulfill other necessary posting and communication requirements.

Status

This CRP was placed into operation in spring 2016, building upon existing and complementary response plans, and has been updated annually based on new scientific information and available technical capacity for invasive carp control.

Data collected since 2011 have further clarified where invasive carp are located in the IWW. Figure 2 summarizes our current knowledge of the status of Bighead Carp and Silver Carp, developed through ongoing monitoring efforts. This graphic was originally established in 2015 as the benchmark year to evaluate progress in future years. The MRWG concurred that the establishment of a point of reference would aid in evaluating the status of invasive carp in the Upper IWW, and 2015 was characterized by significant monitoring and detection efforts, which led to a thorough understanding of the invasive carp population status. Due to these increased efforts, the MRWG reached a consensus on invasive carp status in 2015. The results of ongoing surveillance and management efforts have been used to establish the current status of invasive carp populations in each pool of the IWW, as described below:

- **Lake Michigan:** No established invasive carp population.
- **CAWS:** No established invasive carp population. Three individual fish have been captured since 2010 (Figure 2).
- **Lockport Pool:** No established invasive carp population. One fish was captured in 2009 (Figure 2).

- **Brandon Road Pool:** No established invasive carp population.
- **Dresden Island Pool:** Adult Silver Carp and Bighead Carp population front. Larval invasive carp were observed for the first time in 2015 and have not been observed since. No Black Carp have been captured.
- **Marseilles Pool:** Adult Silver Carp and Bighead Carp consistently present, and their eggs have been detected. Spawning has been observed. No Black Carp have been captured.
- **Starved Rock Pool:** Abundance of adult Silver Carp and Bighead Carp present, and high densities of their eggs have been detected in some years. Juvenile Silver Carp (less than 6 inches in total length) were observed in 2015 and have not been observed since. In 2020 and 2021, early-stage invasive carp larvae were captured in Starved Rock Pool at RMs 238.5 and 240.5. These larvae were pre-gas bladder inflation (Attachment 3 of Appendix B). Additionally, post-gas bladder inflation larvae were captured in the Fox River for the first time in 2021. No Black Carp have been captured.
- **Peoria Pool (downstream to confluence with Mississippi River):** An established population with all life stages of Silver Carp and Bighead Carp have been observed. Black Carp over 6 inches have been captured.

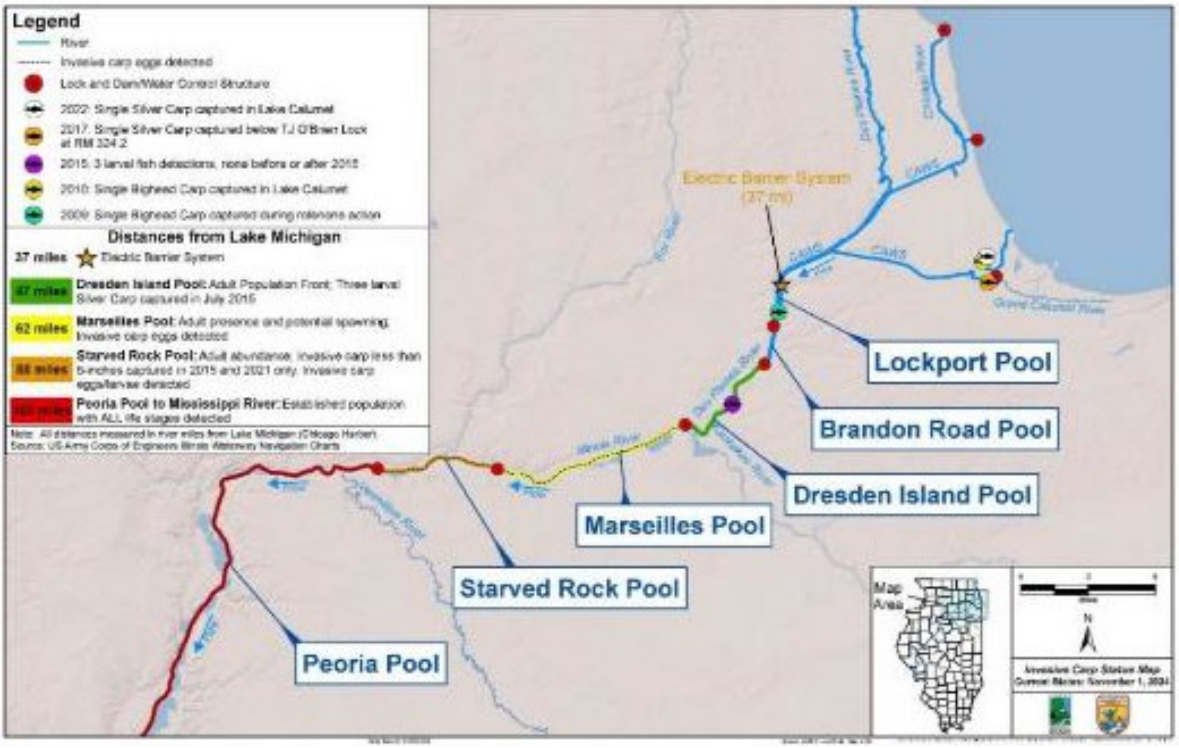


Figure 2. *Invasive carp status map. Current Status: September 1, 2024.* [1] *Invasive carp larvae (pre-gas bladder inflation) were captured in the Starved Rock Pool for the first time in 2020. The furthest upstream post-gas bladder inflation larvae (outside of the three captured in Dresden Island in 2015) were captured was in the Fox River near RM 240 in the Starved Rock Pool in 2021.* [2] *Black Carp over 6 inches have been captured in Peoria Pool. Review definitions in Attachment 3 of Appendix B for any clarification on terminology used within the map.*

Planning Assumptions

These planning assumptions anticipate potential realistic situations and constraints on the ICRCC, other stakeholder agencies, and partners. The following assumptions pertain to all responding agencies and their resources, as well as the response situation, and are relevant to this planning initiative:

Situation Assumptions

- Response actions will be selected based on waterway conditions, the time and geographic location of invasive carp detection, and other factors.
- Response actions will be located within the designated area of the Upper IWW described in the CRP (from Starved Rock Pool to the Lockport Pool, as depicted in Figure 1).
- For planning purposes, under this CRP, invasive carp primarily refers to Bighead Carp and Silver Carp. However, this CRP may also serve to inform potential response actions in the event a Black Carp is captured above Starved Rock Lock and Dam.

Command, Control, and Coordination Assumptions

- All response operations will be conducted under the Incident Command System (ICS) or Unified Command as mandated under Presidential Policy Directive 8.
- Actions recommended by the ICRCC are dependent on agency authority to act at their discretion.

Logistics and Resources Assumptions

- The MRWG may request ICRCC support to leverage additional resources needed to conduct appropriate contingency response actions.
- Illinois, as a signatory to the Mutual Aid Agreement of the Conference of Great Lakes & St. Lawrence Governors and Premiers, may request assistance if deemed necessary. http://www.cglslgp.org/media/1564/ais-mutual-aid-agreement-3-26-15.pdf
- The need for mobilization of personnel and resources from outside coordinating agencies may affect the response time and should be planned accordingly.

Concept of Operations for Response

The following sections present the implementation options for the local response and coordination with the MRWG and the ICRCC stakeholders. If conditions continue to warrant response, the number of coordinating entities could increase, along with the need for additional response operations. This expansion will trigger additional command, control, and coordination elements. The overall incident complexity and the ICS span of control principles should guide the incident management organization.

Methods

Subject matter experts from participating agencies discussed the importance of many factors within the IWW that could potentially cause invasive carp populations to change and result in increased potential for invasion of the Great Lakes. The subject matter experts independently evaluated the abundances and distribution of each invasive carp life stage across each of the pools within the IWW. The group then met jointly to discuss and develop a consistent opinion about the changes and determine the risk associated with each scenario. Individuals made independent assessments as to what type and level of response they would choose under the varying conditions within the decision support trees. These responses were then discussed and agreed upon by the group, which resulted in the contingency table presented in Attachment 1 of Appendix B.

Direct Considerations for Response

Data collected in the field considers the location of invasive carp populations (at the pool scale), life history stages (eggs/larvae, small fish [less than 6 inches], and large fish), and abundance (rare, common, and abundant). The data is then cross-referenced with the contingency table and identifies whether a change (moderate or significant) in management or monitoring action is needed.

Pool

The navigation pool was determined to be the most appropriate scale of reference for contingency planning purposes since pools are delimited by locks and dams that could at least partially restrict movements of fish.

Life History

Fish life history relates to the age, size, and reproductive status of fish, which affects their vulnerability to monitoring and control tools (i.e., smaller fish are less susceptible to electricity, larger fish are more susceptible to electricity; therefore, management actions may be size-specific) and indicates the occurrence of spawning and recruitment.

Abundance

Increased abundance of any life stage signifies a change in the population structure at a given location and increases concern of upstream population expansion. Generally, larval invasive carp have not been found in the upper IWW. Finding invasive carp larvae would represent a potential change in the dynamics of the population in the upper IWW. As larvae are not a life stage that effective management action can be directed toward, responses related to the detection of larval invasive carp would likely be directed at adult or juvenile life stages. Similarly, changes in juvenile populations may signify evidence of spawning success and recruitment for the area, while changes in adult populations may indicate increases in immigration rates or the previous year's recruitment success.

Electric Barrier Functionality

The operational status of the EDBS (barrier functionality) directly impacts the ability of invasive carp to potentially breach the barriers and move upstream of the Lockport Pool. That is, decreased barrier function increases the probability of invasive carp passage. Barrier operational status will inform actions considered when planning responses. Meetings of the MRWG and ICRCC will be convened in the event of a complete barrier outage and may lead to response actions. Incomplete outage events at one or more barrier arrays that may allow for upstream passage to the next barrier array have a separate process, Barrier Maintenance Fish Suppression. This process, outlined in Appendix A, uses the same decision-making structure as the CRP in a more routine and operationalized manner.

Additional Considerations for Actions and Decision-Making Process

This process includes a recommended set of response actions for decision makers to consider when a change to the baseline condition is identified. Factors that may affect decision-making may include, but are not limited to, changes in fish population abundance, life stage presence, or new geographical positions in upstream and/or downstream pools, the ongoing rate of change in invasive carp population characteristics, season and/or water temperature, the habitat where fish are sighted or collected, flow conditions, the amount of available data, and whether multiple lines of evidence exist to support changing conditions. The validity of evidence that a response trigger has been met will also be considered. Evidence of invasive carp presence in new locations within the IWW may come from physical captures, confirmed sightings by trained biologists, or via detections of telemetered specimens on active or passive receivers. These observations may be reported by any activity within the MRP or by external work conducted by other groups. The MRWG will evaluate the validity of each reported observation and discuss whether an

actionable trigger has been met. A dead invasive carp found where live fish are rare or absent should be collected and communicated with the MRWG co-chairs for consideration.

The status of invasive carp populations is continuously monitored by the MRWG, and communication of important findings occurs rapidly. Consensus on the current population status on a pool-by-pool basis is made annually with a holistic review of data collected by all MRWG agencies. Quarterly meetings of the MRWG serve as a checkpoint to discuss potential population changes through each sampling season as new data is collected. The group recognized that the identified response options are recommendations only. An action(s) could be more or less intense based on the nature (e.g., magnitude/life stage) and location (e.g., close or far from Lake Michigan/Electric Barrier) of the change. One example scenario is illustrated in Attachment 1 of Appendix B. The scenario is based on a change in conditions in Brandon Road Pool and is one example of when a contingency plan is called into action. Attachment 2 of Appendix B provides the decision-making process and flow of likely activities in such an event. This scenario and decision process illustrate what could occur should a change be identified from this Decision Support Framework.

Command, Control, and Coordination

Command and control of an invasive carp response in the IWW will be implemented under the MRWG. The ICS is a management system designed to enable effective and efficient incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure. The MRWG will utilize the ICS to manage response operations to maximize efficiency and ensure a standard approach across all participating agencies. Area Command, Unified Command, or single Incident Commander, depending on the needs, will be maintained to determine the overarching response objectives and implement individual tactics necessary to accomplish each objective. Local command and control involve directing resources to achieve objectives for eradication, control, or identification of invasive carp during a response operation.

Figure 3 shows the basic Unified Command organization structure that will be utilized for any response that requires the mobilization of resources and multi-agency personnel, as well as provides a visual representation of the basic command, control, and coordination relationships for invasive carp response personnel serving during an event.

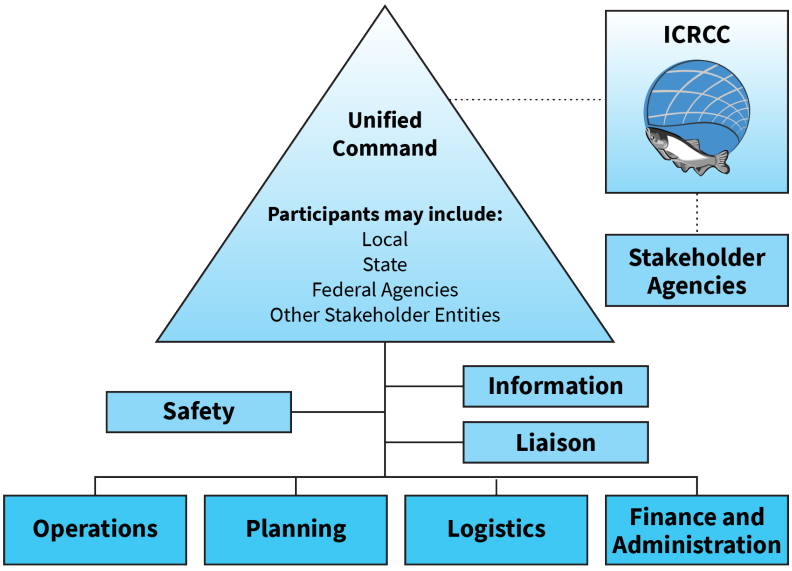


Figure 3. *Unified Command organization structure.*

Incident Action Planning

An Incident Action Plan (IAP) is a standard means of documenting and communicating objectives, strategies, and tactics to address issues resulting from an incident. At the core of a functional IAP are well-written objectives. The standard acronym is "SMART" objectives—objectives that are (1) Specific, (2) Measurable, (3) Achievable, (4) Realistic, and (5) Time-bound. Objectives can then be inserted into an IAP template. Each response is unique, but the basic concepts of operations and objectives can be the building blocks for a solid IAP that communicates, internally and externally, the jurisdiction's plans for managing an incident. An example of an IAP is provided in Attachment 4 of Appendix B. The example outlines pertinent sections and considerations used in a recent response. Attachment 5 of Appendix B is meant to provide a template, and various sections may be added based on the objectives of the IAP.

SMART Objective Example

State agency X will contain 2 miles of the river using block nets within 8 hours of notification.

Incident action planning extends farther than just the preparation and distribution of the IAP. This planning includes the routine activities during each operational period of an incident response that provide a steady tempo and routine structure to incident management. The ICS Planning "P" is a guide to the steps, relative chronology, and basic elements for managing an incident. By incorporating the Planning "P" into planning efforts, overlaying anticipated daily operational and logistical chronologies, a local jurisdiction can establish a framework for incident management that provides a rough playbook for local, state, federal, and outside resources to respond to invasive carp under emergency incident conditions.

Figure 4 depicts the ICS Planning "P" and further describes agencies involved at various steps in the process, what actions may be taken, and when actions will be implemented.

Response Decision Matrix

To inform contingency response planning in the Upper IWW, the MRWG developed a "response decision matrix" that will aid the MRWG in determining the need for a contingency response action. This decision-support guide uses common, agreed-upon definitions (Attachment 3 of Appendix B). The process consists of identifying: 1) the pool of interest, 2) the proper life stage of invasive carp captured, observed, or detected (verified physical observations by agency personnel or confirmed telemetry-based detections), and 3) whether the sampling result is Rare, Common, or Abundant relative to 2015 reference conditions.

Once all determinations have been made, the decision response matrix (Figure 5) will funnel the user to an action response level. This action response level will identify actions that could occur. Response actions may be determined by new findings in one pool but occur in a different pool. Each pool has an agreed-upon set of response actions that can be taken. If change is apparent and a response is warranted, the proper agencies will be notified and can discuss how best to proceed based on the options available. A chart of the potential response actions to be considered is provided in Table 1. An example is also provided in Attachment 1 of Appendix B for illustrative purposes.

Information and Data Management

The ICRCC Communications Work Group will be the primary conduit for ensuring open and transparent communication with both the public and other stakeholder agencies during an invasive carp contingency response operation. The public and stakeholder groups will be notified as early as possible and according to messaging protocols established by the ICRCC Communications Work Groups.

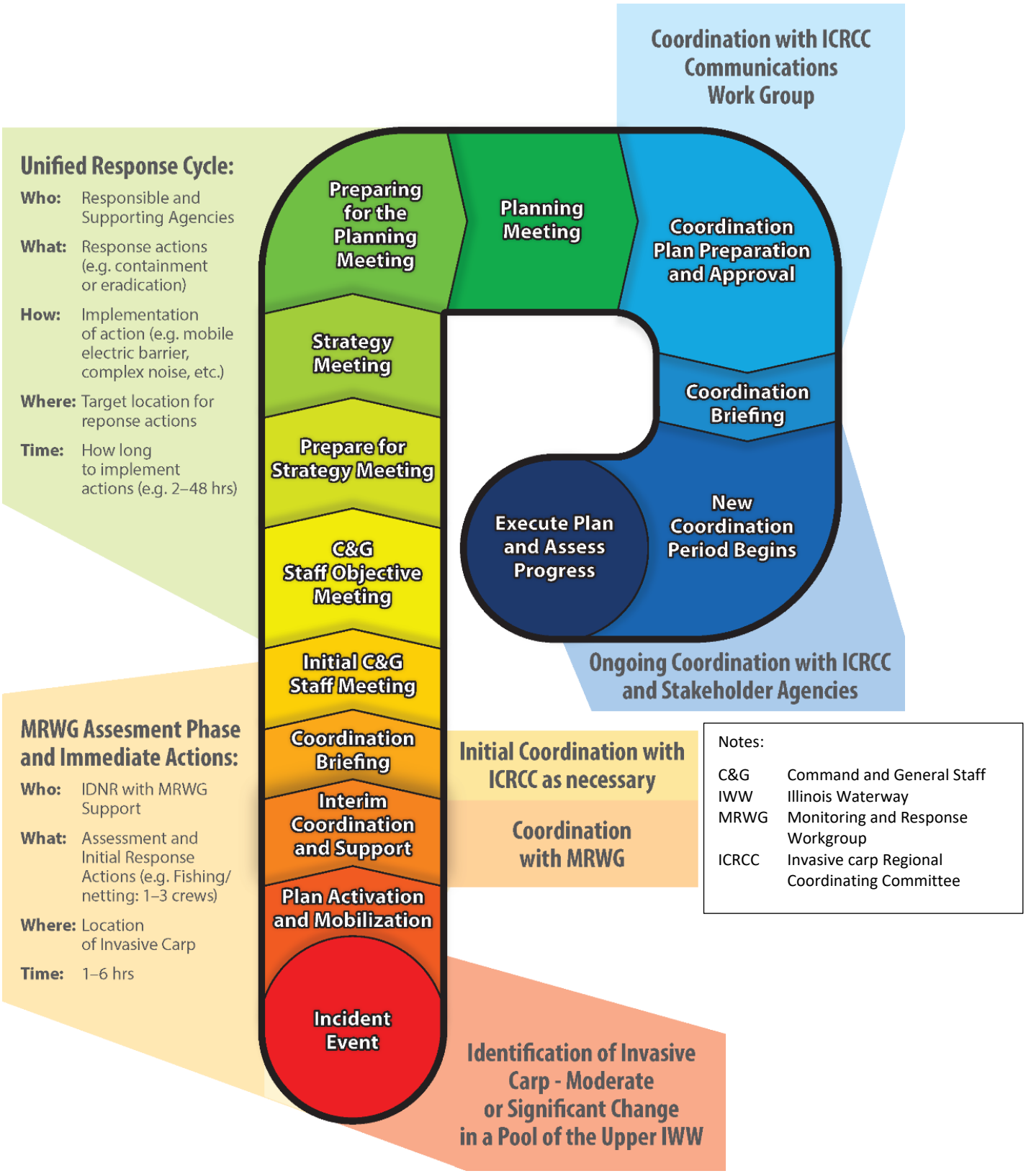


Figure 4. *ICS Planning "P"*

Essential Elements of Information

At all points of the incident management process, essential elements of information (EEI) should be collected and managed in a standard format. Paper forms, when power and electronic systems are not available, and electronic data should be collected with end usage in mind. For instance, if data on how various waterways' conditions are used as the basis for logistical requests and response decisions, these data should be separated and properly analyzed to ensure the acquisition of adequate supplies for a selected response. For response personnel, simple numerical counts of each fish species, and all other critical data must be communicated up the chain early and often. Additionally, routine recording and reporting of staffing levels, available resources, and capability gaps are all important for managing overall response under a specific scenario.

Upper Illinois Waterway Invasive Carp Response Decision Matrix*

	Distance from Lake Michigan (miles)		Eggs/Larvae			Small Fish			Large Fish		
			Rare	Common	Abundant	Rare	Common	Abundant	Rare	Common	Abundant
Direction of flow	0 - 37	**Chicago Area Waterway System (CAWS)**							1		
	37 - 42	**Lockport Pool to Electric Barrier System**							2		
	42 - 47	**Brandon Road Pool**							3		
	47 - 62	**Dresden Island Pool**									
	62 - 88	**Marseilles Pool**									
	88 - 102	**Starved Rock Pool**									

Notes:

= Significant change from baseline requiring further response action

= Moderate change from baseline requiring further response action

= No change/Status Quo from baseline. No further action

1 This status is based on the collection of a single Bighead Carp by contracted fishers in 2010 and a single Silver Carp in 2017.

2 This status is based on the collection of a single Bighead Carp during piscicides treatment in 2009.

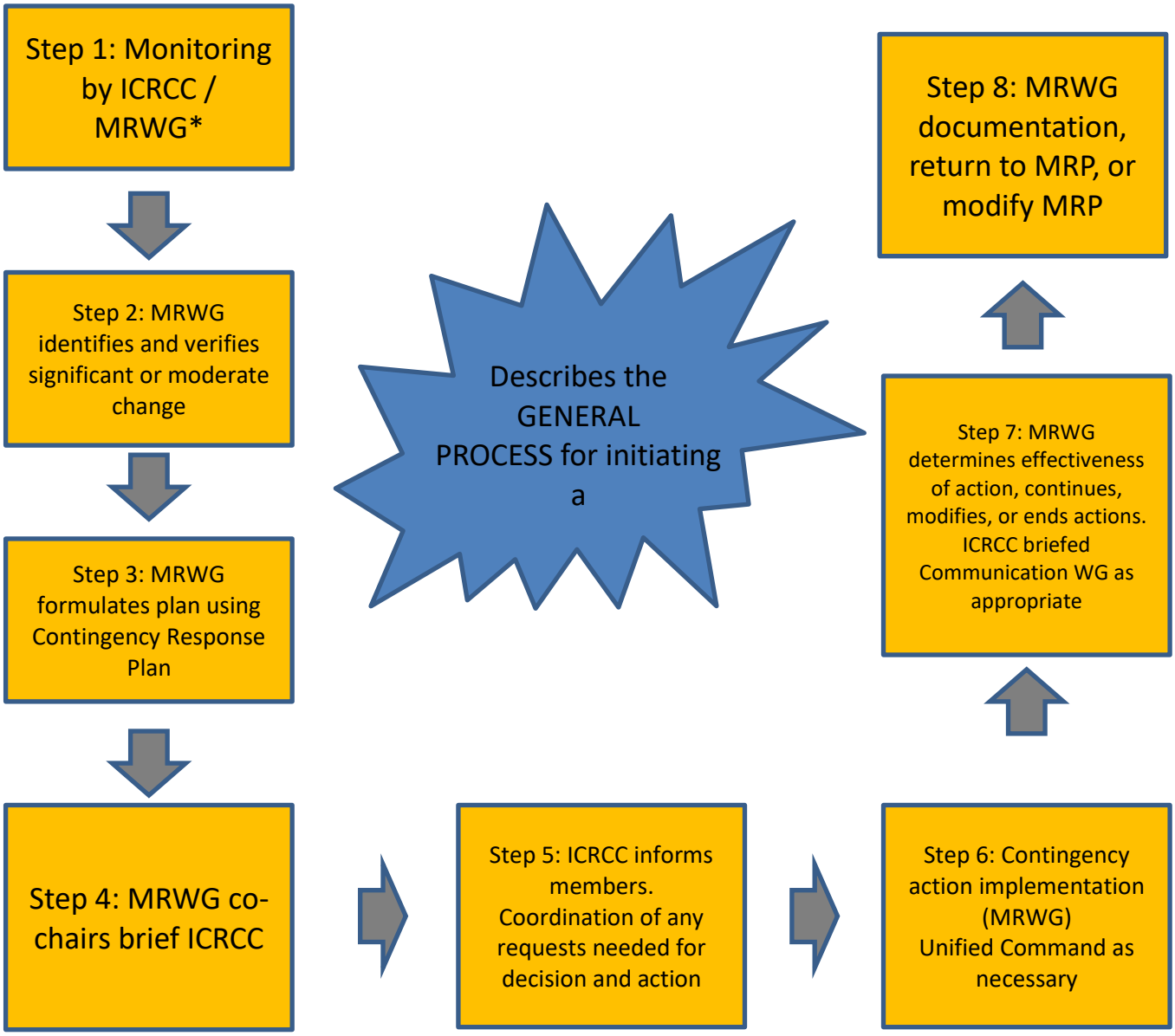
3 This status is based on sightings of one Bighead Carp and one Silver Carp by MRWG efforts in 2010-2011. No invasive carp have been collected in this pool.

*Baseline for comparison and determination of response action is the status of invasive carp populations as of December 31, 2015. At that time, the total monitoring effort was the highest it ever was. Since 2015, efforts have varied by gear times across pools, but overall effort increased dramatically compared to **2015**. A total of 5,463 samples across gear types occurred in 2021 compared to 3,857 in 2015 resulting in over 285,380 more yards of net and over 14,396 **additional** hours of monitoring. After collecting data for several years the statuses for large fish were reevaluated in 2023 and it was determined that large fish are abundant in both Marseilles and Starved Rock Pools.

Definitions are available in Attachment 3 of Appendix B at the end of this CRP.

Figure 5. *Upper IWW invasive carp Response Decision Matrix.*

Figure 6 describes the entire contingency response process for all ICRCC stakeholder agencies. The response decision matrix is utilized in steps 3 through 7 to assess the need for further response actions.



* MRWG is the working level body of the ICRCC. The MRWG implements the annual MRP and contingency actions subject to agency authorities and approvals by their individual agency

** In this general process, multiple steps may happen concurrently to facilitate the most effective and efficient action is implemented.

Figure 6. *Simplified Process Flow Chart for a Contingency Response*

Table 1. *Contingency Response Action Matrix**

Level of Urgency [1]	Potential Actions[2]	Applicable Locations	Responsible Agencies	Estimated Time to Implement	Regulatory or Other Requirements	Relative Cost ($-$$$$)
Significant Change	Increased Sampling Efforts[3]	All	IL DNR/USFWS	1-7 days	Sampling permits	($$)
Significant Change	Modify Barrier Operations	LP, BR	USACE	1 day	Coordinate with contractors	($)
Significant Change	Acoustic Deterrents-Stationary[4]	All	USGS/USACE	1-7 days	Coordinate with local stakeholders	($$)
Significant Change	Acoustic Deterrents-Mobile	All	USGS/USFWS	1 day	None	($)
Significant Change	Commercial Contract Netting	All	IL DNR	1-7 days	Sampling permits/contracts	($)
Significant Change	Hydroacoustics	All	USFWS/SIU/USGS	1-7 days	None	($)
Significant Change	Block Nets	All	IL DNR	1-7 days	Notice to navigation	($$)
Significant Change	Temporary Flow Control	LP, BR	MWRD	1 day	Notice to navigation	($)
Significant Change	Mobile Electric Array	All	INHS/IL DNR	1-7 days	Coordinate with local stakeholders and Coast Guard	($$$)
Moderate Change	Increased Sampling Efforts	All	IL DNR/USFWS	1-7 days	Sampling permits	($$)
Moderate Change	Modify Barrier Operations	All	USACE	1 day	Coordinate with contractors	($)
Moderate Change	Acoustic Deterrents-Stationary	All	USGS/USACE	1-7 days	Coordinate with local stakeholders	($$)
Moderate Change	Acoustic Deterrents-Mobile	All	USGS/USFWS	1 day	None	($)
Moderate Change	Commercial Contract Netting	All	IL DNR	1-7 days	Sampling permits/contracts	($)
Moderate Change	Hydroacoustics	All	USFWS	1-7 days	None	($)
Moderate Change	Block Nets	All	IL DNR	1-7 days	Notice to navigation	($$)
No Change	Maintain Current Level of Effort	N/A	All	Ongoing	N/A	($)

[1] Action Response Level

[2] Additional Response Considerations describes other measures that may be implemented as necessary and aligned with agency authorities

[3] Response techniques encompassed by Increased Sampling Efforts under Potential Actions in above table

[4] Acoustic deterrents can be deployed in various ways. A stationary system may include the deployment of speakers at a fixed location or structure to strategically deter fish while a mobile system may be used from a boat to help heard/push fish to a point of interest.

Notes:
*The implementation of some of these actions may require temporary lock closures or navigation restrictions, which fall under the authority of USACE and the USCG, respectively. Temporary lock closures and navigation restrictions would be limited to the time necessary to carry out the supported measures. Such lock closures have supported previous barrier clearing events when electrofishing, water cannons, and/or nets were used to sample fish in and around the barrier system.

LP Lockport
BR Brandon Road

Technique	Participating Agencies
Electrofishing	USFWS, IL DNR, INHS, USACE
Netting (Gill, Trammel, Pound, Ichthyoplankton)	USFWS, IL DNR, INHS
Fyke Netting	IL DNR, USFWS, USACE
Dozer Trawl	USFWS
Telemetry	USGS, USACE, SIU, USFWS

References

Davis, J. J. and R. N. Neeley. (2017). Dynamics of Silver Carp Entrainment and Transport by Commercial Tows on the Illinois Waterway- Preliminary Results 2017 Field Studies. Internal US Fish and Wildlife Service - Midwest Region Fisheries report: unpublished.

Monitoring and Response Work Group (MRWG). (2021). 2020 invasive carp monitoring and response plan: interim summary report. Invasive Carp Regional Coordinating Committee.

APPENDIX A. BARRIER MAINTENANCE FISH SUPPRESSION

Appendix A: Barrier Maintenance Fish Suppression

Participating Agencies: IL DNR (lead); USFWS and USACE – Chicago District, (field support); USCG (waterway closures); USGS (flow monitoring); MWRDGC (waterway flow management and access); and USEPA (project support); Nicholas Barkowski, Alex Catalano Dayla Dillon, and John Belcik (USACE– Chicago District) Brian Schoenung, Mindy Barnett, Justin Widloe (IL DNR), Jen Luc-Abeln, and Elizabeth Harrell (USFWS Carterville FWCO, Wilmington Substation)

MRWG Work Group: Behavioral Deterrents

Pools Involved: N/A

INTRODUCTION

The USACE operates three electric aquatic invasive species dispersal barriers (Barrier 1 [1D, 1N, and 1S], Barrier 2A, and Barrier 2B) in the CSSC at approximately RM 296.1 near Romeoville, Illinois. The Demonstration Barrier was the first barrier constructed by USACE, and it became operational in April 2002 and is farthest upstream at RM 296.6 (approximately 244 meters above Barrier 2B). The Demonstration Barrier is operated at a setting (0.4 volts per centimeter [v/cm]) that has been shown to induce behavioral responses in fish over 137 millimeters in total length. The Demonstration Barrier is now referred to as 1D and has been integrated into Barrier 1. Barrier 2A became operational in April 2009 and is 67 meters downstream of Barrier 2B, which went online in January 2011. Barriers 2A and 2B can operate at parameters shown to repel or stun juvenile and adult fish greater than 137 millimeters long at a setting of 0.79 v/cm or fish greater than 63 millimeters long at a setting of 0.91 v/cm. The higher setting of 0.91 v/cm has been in use since October 2011. Barrier 1 was activated in February 2021. Barrier 1 consists of a northern array (1N), a southern array (1S), and 1D, as outlined above. Barrier 1 is capable of increased operational settings in comparison to Barriers 2A and 2B, but safety testing is required before USACE can operate above 0.91 v/cm.

All barriers (Barriers 1, 2A, and 2B) must be shut down independently for maintenance approximately every 12 months, and the IL DNR agreed to support maintenance operations by conducting fish suppression and/or clearing operations at the barrier site. Fish suppression can vary widely in scope and is at the discretion of the MRWG members. With Barriers 1, 2A, and 2B now operational, fish suppression actions will be smaller in scope because at least one barrier can remain on while another is taken down for maintenance.

Barrier 2B operated as the principal barrier from the time it was brought online and tested in January 2011 through December 2013. During that time, Barrier 2A was held in warm standby mode (so it could be energized to normal operating levels in minutes) unless Barrier 2B experienced an unexpected outage or planned maintenance event. In January 2014, the standard operating procedure was changed to run Barriers 2A and 2B concurrently. This change further increased the efficacy of the EDBS by continuously maintaining power in the water regardless of a lapse in operation at any single barrier. USACE plans to operate two barriers, when possible, to minimize any risk of fish passage because of maintenance needs and cost-effectiveness. However, as barriers are turned on and off for scheduled and unscheduled outages, there is a need to assess the risk of invasive carp and clear fish from the spaces between the barriers as deemed necessary by the MRWG. Depending on the sequence of outages and if the outage(s) are for a length of time sufficient to allow fish passage as deemed by the MRWG, a clearing evaluation/action may need to take place. If a clearing action is needed but does not happen, fish have the potential to utilize the outages to “lock through” the EDBS. “Locking through” happens if an outage is experienced at Barrier 2A, allowing fish present just downstream to move up to Barrier 2B, becoming stuck in the 67-meter space between Barriers 2A and 2B once Barrier 2A is reactivated. If an outage is

experienced at Barrier 2B, the fish trapped between the barriers would then be able to move into the 148-meter area between Barriers 1 and 2B. If Barrier 1 lost power, the fish could move into the upper Lockport Pool. The suppression plan calls for an assessment of the risk of invasive carp passage at the time of the reported outage and further clearing actions if deemed necessary. This status report outlines the number of changes in the EDBS operations that triggered a fish-clearing decision by the MRWG, the decisions made by the MRWG, and the results of any actions taken in response to changes in EDBS operations.

OBJECTIVES

- Remove fish greater than 300 millimeters (12 inches) in total length from between applicable barrier arrays before maintenance operations are initiated at upstream arrays and after maintenance is completed at downstream arrays by physical collection (surface noise, surface pulsed-DC electrofishing, and surface-to-bottom gill nets).
- Assess fish less than 300 millimeters in total length between applicable barrier arrays, if present, for species composition to ensure invasive carp juvenile or young-of-year (YOY) individuals are not present. Physical capture gears focused on small-bodied fishes, such as electrified paupier surface trawls and surface pulsed-DC electrofishing, could be utilized in support of this effort.
- Assess the results of fish clearing operations by reviewing the physical captures and surveying the area between barrier arrays with remote sensing gear (split-beam hydroacoustic and side-scan sonar).

The goal of fish clearing operations is to remove as many fish (greater than 300 millimeters in total length) as possible between the barriers, as determined with remote sensing gear, or until the MRWG deems the remaining fish in the barrier as low risk. Fish less than 300 millimeters in total length at the barriers are deemed a low risk to be invasive carp until further evidence from downstream monitoring suggests a change in the known population front for this size class of invasive carp.

PROJECT HIGHLIGHTS

- The MRWG agency representatives discussed the risk level of invasive carp at the EDBS during each primary barrier loss of power in the water.
- Ten electrofishing runs were conducted within the barrier, resulting in 105 individuals captured across 13 species.
- USFWS conducted 14 hydroacoustic scans within the barrier from January 4 to December 2, 2024.
- No invasive carp were captured or observed during routine fish sampling operations within the Lockport Pool, providing support for not needing suppression activities.
- USFWS found one dead Silver Carp, resulting from a day-long response effort from USACE and USFWS, in which the entire Lockport Pool was shocked from Lockport Lock and Dam to the EDBS.

METHODS

An “outage” is defined as any switch in operations at the barriers that would allow for the upstream movement of fish within the safety zone of the CSSC or any complete power loss in the water. A change in operations at the barrier that results in a loss of power in the water of less than 1 minute is considered

too short to allow for the upstream passage of fish. At the occurrence of any barrier outage greater than 1 minute, USACE notified MRWG as soon as possible and contacted key agencies to discuss the need for a barrier-clearing action. The decision to perform a clearing action based on a barrier outage was based on factors related to the likelihood of invasive carp passing the barrier under the conservative assumption that they may be present in Lockport Pool and near or at the barriers. If invasive carp exist near the barriers, the MRWG currently expects only adult fish (greater than 300 millimeters) to be present. This risk evaluation may change if small invasive carp are detected upstream of the known population front for this size class in any given year. Based on the current and joint understanding of the location of various sizes of invasive carp in the CAWS and Upper IWW and the operational parameters of the EDBS, the MRWG believes that either the wide or narrow array of each barrier provides a minimally effective short-term barrier for juveniles or adults. Thus, the MRWG views a total outage of both wide and narrow arrays as a situation of increased risk for invasive carp passing a given barrier. The MRWG decision to initiate a clearing action at the barriers is made only during heightened risk of invasive carp passage based on the most up-to-date monitoring results and current research.

The MRWG selected a cut-off of 300 millimeters in total length for fish to be removed from the barrier area when a clearing action is recommended. By selecting a cut-off of 300 millimeters, sub-adult and adult invasive carp were targeted, and YOY and juvenile fish were excluded. Excluding YOY and juvenile invasive carp from the assessment was based on over 10 years of sampling in the Lockport Pool with no indication of any YOY invasive carp present or any known locations of spawning. However, monitoring in the lower reaches of the IWW has resulted in the capture of small invasive carp less than 153 millimeters. Juvenile Silver Carp were reported in substantial numbers from the Starved Rock Pool beginning in April 2016, with several individual captures of similar-sized juvenile Silver Carp reported from the Marseilles Pool by October of the same year. These records prompted resource managers to take a more conservative approach to the barriers by sampling all sizes of fish between the barriers during a clearing event. It was determined that all fish over 300 millimeters be removed from the area and fish less than 300 millimeters be sub-sampled to ensure no juvenile or YOY invasive carp are present. Invasive carp less than 300 millimeters have been primarily captured in the Peoria Pool, with only a handful of fish captured upstream of Starved Rock Lock and Dam since 2017.

A key factor in any response is the risk of invasive carp being at or in the EDBS. The MRWG has taken a conservative approach to barrier responses by implementing continued work and surveillance below the EDBS despite little evidence that invasive carp are directly below the barrier. Considering budgetary costs, responder safety, and continued monitoring in reaches directly below the barrier, the MRWG will continue to discuss the need for a clearing action as best professional judgment suggests. A barrier maintenance clearing event will be deemed successful when all fish greater than 300 millimeters are removed from the barrier or until the MRWG deems the remaining fish in the barrier a low risk and a sub-sample of fish less than 300 millimeters have been identified to species.

The initial clearing action is likely to use split-beam hydroacoustic and side-scan sonar imaging to determine if fish are present in the target area of the EDBS, including the areas between each barrier. This action is aimed specifically at identifying the number of fish over 300 millimeters. This sonar scan may be completed upon request, or the MRWG may decide to utilize the most recent data available as USFWS continues biweekly surveillance of the vicinity. If one or more fish targets over 300 millimeters are present, the MRWG will convene and decide if a clearing action is warranted for the area between the affected barriers. Initial response to any loss of power to the water should occur within a week of the outage and upon completion of the sonar survey. Additional clearing actions can range from a nearly “instantaneous” response with electrofishing to combined netting and electrofishing or any combination of other

deterrent technologies that may or may not require USCG closures of the canal/waterway. The USCG generally requires at least a 45-day notice for requests to restrict navigation traffic in the waterway.

RESULTS AND DISCUSSION

In 2024, 57 outages of 1 minute or greater occurred across all the barriers (Table A-1). Of the 57 outages, 23 were unplanned and occurred due to utility power loss, generator function issues, various equipment faults, and cooling issues. Seven unplanned outages occurred at Barrier 1D, nine unplanned outages occurred at Barrier 1N, one unplanned outage occurred at the narrow array of Barrier 2B, four unplanned outages occurred at the wide array of Barrier 2B, and two outages occurred at both the wide and narrow arrays of Barrier 2B. Similar to 2023 outages, the bulk of the unplanned outages (34 percent in 2023) were a result of utility power loss. Planned outages for maintenance, inspections, software updates, construction, and power studies occurred 34 times in 2024, accounting for 60 percent of the total outages. Both planned and unplanned outages were coordinated through the MRWG as USACE confirmed schedules.

Planned and unplanned outages were coordinated through the MRWG as USACE confirmed schedules.

Table A-1. *Summary of barrier outages for each of the barriers at the EDBS in 2024*.

Barrier	Outages	Planned
1D	12	5
1N	17	8
IIB	15	8
IIA	13	13

No official response actions were needed in 2024. USACE conducted 10 biweekly electrofishing surveys within the barriers as a new precautionary fixed site in the 2024 field season. Across 13 species, 105 individuals were captured within the barrier in 2024 (Table 2), and 40 fish captured were over 300 millimeters. No invasive carp were captured during those efforts.

Table A-2. *2024 Electric Dispersal Barrier System Fish Monitoring***.** *Summary of counts and total length ranges (in parenthesis) of fish captured during USACE fixed fish monitoring sites within the EDBS. A total of 10 sites were sampled in 2024: March (1), April (3), May (2), June (1), July (2), and October (1). (* indicates length data of the fish was not collected).*

Species	March	April	May	June	July	October
Banded Killifish	2 (32-55)	0	15 (50-85)	0	0	0
Bluntnose Minnow	1 (45)	0	0	0	0	0
Brook Silverside	0	1*	0	0	0	0
Channel Catfish	0	0	3 (440-552)	0	0	0
Common Carp	0	0	1*	0	0	0
Emerald Shiner	0	0	1 (54)	0	9 (68-85)	0
Freshwater Drum	0	1 (128)	0	0	0	0

Appendix A: Barrier Maintenance Fish Suppression

Species	March	April	May	June	July	October
Gizzard Shad	0	0	1 (111)	0	34 (154-395)	0
Largemouth Bass	0	0	1 (363)	0	0	0
Sand Shiner	0	1 (54)	0	0	0	0
Threadfin Shad	0	0	0	0	1 (111)	0
White Bass	0	1 (335)	0	0	0	0
Yellow Perch	0	2 (68-71)	1 (71)	0	0	0
TOTALS	**3**	**6**	**23**	**0**	**44**	**0**

RECOMMENDATIONS

The MRWG agency representatives should continue to assess the risk of invasive carp presence at the primary downstream barrier. The group should consider the most recent downstream monitoring data, known locations of invasive carp (adults and juveniles), safety, and other biotic and abiotic factors relative to invasive carp movement and dispersal patterns. Clearing actions that address the removal of fish from between the barriers should include surface, pulsed DC-electrofishing, and noise-scaring tactics (tipped-up motors, push plungers, hull banging, etc.). It is recommended to continue the removal of all fish greater than 300 millimeters in total length and to sub-sample fish less than 300 millimeters in total length for species identification when deemed necessary. Identification of fish less than 300 millimeters will help further inform decision-makers of the risk of juvenile invasive carp presence. Deep water gill net sets and other submerged bottom deployed gears are not recommended for use between the barriers as a removal action because of safety concerns for personnel. However, these tools should continue to be used in the immediate downstream area to enhance understanding of fish species assemblage and risk of invasive carp presence. Additionally, there should be continued research and deployment of novel fish driving and removal technologies, such as complex noise generation, carbon dioxide, and other techniques.

APPENDIX B. CONTINGENCY RESPONSE SUPPORTING DOCUMENTS

Appendix B: Contingency Response Plan Supporting Documents

ATTACHMENT 1: HYPOTHETICAL SCENARIO

Small invasive carp are collected in Brandon Road Pool while the barrier is operating normally. The location is first identified in the matrix, then the barrier efficacy function, then fish life history, and finally the abundance. Based on this scenario, a significant change in actions should be considered.

Upper Illinois Waterway Invasive Carp Response Decision Matrix*

Fish Life History

Direction of flow	Distance from Lake Michigan (miles)		Eggs/Larvae			Small Fish			Large Fish		
			Rare	Common	Abundant	Rare	Common	Abundant	Rare	Common	Abundant
	0 - 37	Chicago Area Waterway System (CAWS)							1		
	37 - 42	Lockport Pool to Electric Barrier System							2		
	42 - 47	Location → Brandon Road Pool							3		
	47 - 62	Dresden Island Pool									
	62 - 88	Marseilles Pool									
	88 - 102	Starved Rock Pool									

Abundance

Significant Change; Action Implemented

Notes:

= Significant change from baseline requiring further response action

= Moderate change from baseline requiring further response action

= No change/Status Quo from baseline. No further action

1 This status is based on the collection of a single Bighead Carp by contracted fishers in 2010 and a single Silver Carp in 2017.

2 This status is based on the collection of a single Bighead Carp during piscicides treatment in 2009.

3 This status is based on sightings of one Bighead Carp and one Silver Carp by MRWG efforts in 2010-2011. No invasive carp have been collected in this pool.

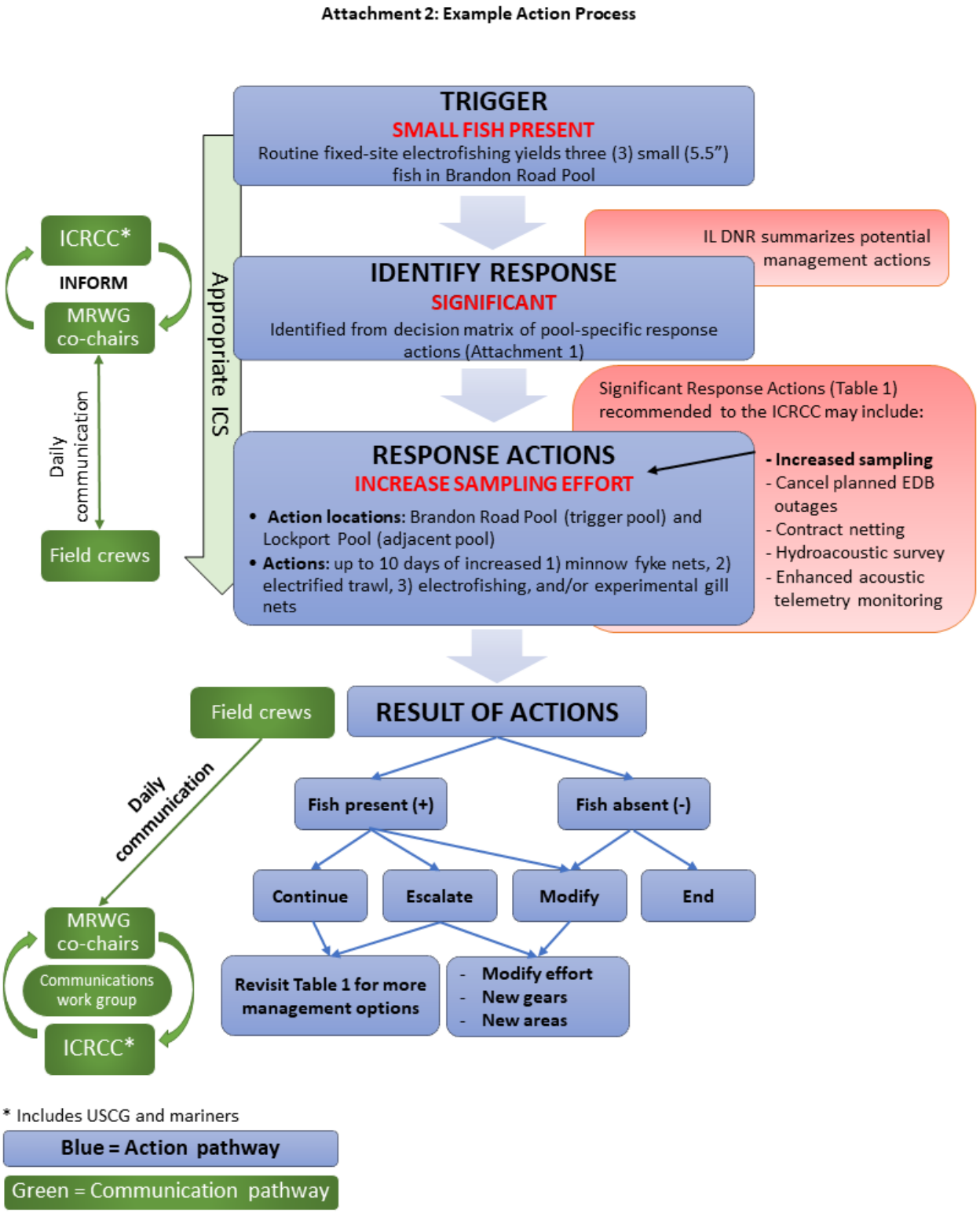
*Baseline for comparison and determination of response action is the status of invasive carp populations as of December 31, 2015. At that time, the total monitoring effort was the highest it ever was. Since 2015, efforts have varied by gear times across pools, but overall effort increased dramatically compared to **2015**. A total of 5,463 samples across gear types occurred in 2021 compared to 3,857 in 2015, resulting in over 285,380 more yards of net and over 14,396 **additional** hours of monitoring. After collecting data for several years, the statuses for large fish were reevaluated in 2023, and it was determined that large fish are abundant in both Marseilles and Starved Rock pools.

Definitions are available in Attachment 3 of Appendix B.

Appendix B: Contingency Response Plan Supporting Documents

ATTACHMENT 2: EXAMPLE ACTION PROCESS

This example illustrates the process should three small invasive carp be collected in Brandon Road Pool.



Appendix B: Contingency Response Plan Supporting Documents

ATTACHMENT 3: DEFINITIONS

Term	Definition
Egg	The rounded reproductive body produced by females.
Larvae	A distinct juvenile form of fish, before fins and scales are fully developed. Larvae are further separated into two categories (Pre- and Post-Gas Bladder Inflation) as they pose different risks.
Larvae- Pre-Gas Bladder Inflation	Any larval stage from the time of hatching until the time that the gas bladder appears. Bigheaded carp larvae at these stages are generally capable of vertical swimming but are not able to swim horizontally or maintain position in the water column without active swimming and generally do not feed.
Larvae- Post-Gas Bladder Inflation	Any larval stage from the time the gas bladder appears until fins and scales are fully developed (juvenile stage). Bigheaded carp larvae at these stages are capable of horizontal swimming and maintaining their position in the water column without actively swimming. They begin feeding shortly after gas bladder appearance and are thought to be more capable of actively exiting main channel habitats and selecting nursery areas. Besides the three larvae captured in Dresden Island, post-gas bladder inflation larvae have been captured as far upstream as RM 197 near Henry, Illinois, prior to 2021. Two post-gas bladder inflation larvae were captured in the Fox River near RM 240 in 2021.
Young of Year (YOY)	Fish hatched that calendar year. Also known as age-0 fish.
Juvenile	A post-larval individual that has not yet reached its adult form, sexual maturity, or size. Juvenile fish may range in size from 1 inch to over 12 inches long or approximately age 0 to 5, depending on the species.
Adult	A sexually mature organism.
Size	**Definition**
Small	Fish that are less than 6 inches (a conservative length designation to inform actions in which the Electric Dispersal Barrier may be challenged by fish found to be less susceptible to electrical deterrence, identified in USACE Efficacy reports).
Large	Fish that are greater than 6 inches.
Populations	**Definition**
Adult Population Front	The most upstream pool where detection/presence of adult fish is common (see below), and either repeated immigration or recruitment has been verified.
Capture Record	Capture of an adult, juvenile, larvae, and egg verified by agency efforts/personnel, does not note any qualification of population size/establishment.
Small Fish Population Front	The most upstream pool where detection/presence of small fish is repeatedly recorded, and either repeated immigration or recruitment has been verified.
Established	Interbreeding individuals of Bighead Carp and/or Silver Carp, as well as the presence of eggs, larvae, YOY, and juveniles that leads to a self-sustaining population.
Range Expansion	Verified population front upstream of the previously identified pool.
Reproduction	**Definition**
Recruitment	Juveniles survive to be added to an adult population, by successful spawning.
Observed Spawning	Visually documented spawning activity.
Successful Spawning	Spawning that has been confirmed by the collection of eggs or larvae.

Appendix B: Contingency Response Plan Supporting Documents

Captures	Definition
New Record/ Single Occurrence	When a single fish/egg/larva is collected in a location it was not previously found. Also referred to as a novel occurrence.
Sighting	A visual confirmation with high likelihood (experience/professional opinion) that the item seen was in fact a Bighead Carp or Silver Carp at the noted life stage/activity (spawning behavior could be a sighting; Silver Carp in an electrofishing field but not netted would be a sighting).
Sampling Occurrences	**Definition**
Rare	One sample containing the targeted species or size group where the species or size group is not expected to occur; invasive carp collections are not predictable and may take multiple sampling trips to collect just one individual.
Common	Consistent catches within a pool; invasive carp collection is predictable with one or multiple individuals being collected on a given day/week of sampling.
Abundant	Consistent catches within a pool in large quantities, e.g., invasive carp collection is predictable with multiple fish being collected with nearly every deployment of gear, numerous individuals collected often and daily/weekly. However, some seasonality or environmental conditions may play an important role in specific life stages (i.e., eggs/larvae) when they are captured and should be accounted for when determining occurrences across pools.
Action Response Level	**Definition**
No Change/ Current Level	Maintain current levels of sampling effort.
Moderate Change	Heightened level of response may occur along with maintaining current levels of sampling effort. Prior to any moderate change response, the MRWG will evaluate the data and situation and recommend a suite of responses to the ICRCC for implementation. Strategies will then be determined for the best course of action and tools available based on status change and concurrence with jurisdictional authorities and abilities.
Significant Change	Substantial or heightened levels of response may occur along with maintaining current levels of sampling effort. All tools from “moderate change” are available during a significant change response, as are additional robust tools, along with “maintaining current levels of sampling effort” for consideration. Prior to any moderate change response, the MRWG will evaluate the data and situation and recommend a suite of responses to the ICRCC. After reviewing MRWG recommendations, the ICRCC may concur or offer opinions regarding the appropriate response(s) to implement. Prior to any significant change response, the MRWG will evaluate the data and situation, and strategies will be made on the best course of action and tools available based on the status change and concurrence with jurisdictional authorities and abilities.

Appendix B: Contingency Response Plan Supporting Documents

Potential Response Actions	Definition
Increased Sampling Efforts	Modified or increased number of samples using fish sampling/detection methods currently used by MRWG in Monitoring.
Electrofishing	Standard fish sampling method to sample small and adult invasive carp currently used by MRWG in Fixed and Targeted Sampling.
Hoop Netting	Standard fish sampling method to sample adult invasive carp currently used by MRWG in Fixed and Targeted Sampling.
Minnow Fyke Netting	Standard fish sampling method to sample small invasive carp currently used by MRWG in Fixed and Targeted Sampling.
Electrified Dozier Trawl	Experimental fish sampling method to sample small and adult invasive carp currently used by MRWG.
Ichthyoplankton Tows	Standard fish sampling method to sample larvae and eggs of invasive carp currently used by MRWG in Fixed and Targeted Sampling.
Pound Nets	Experimental fish sampling method to sample adult invasive carp currently used by MRWG.
Modify Barrier Operations	MRWG and USACE will coordinate on potential postponements and operations of planned barrier outages.
Acoustic Deterrent	Noise methods to drive/herd/deter fish, including revving of outboard boat motors, banging on boats in the waterway, and deployment of speakers with developed sounds.
Commercial Contract Netting	Mobilizing contracted commercial fisherman and using commercial fishing methods currently used by MRWG in sampling/detection and removal, including gill netting, trammel netting, large mesh seine, small mesh seine, and hoop netting.
Hydroacoustics	Electronic Fish survey and locating techniques used currently by MRWG, including side-scan sonar and DIDSON sonar, to evaluate the number and density of large or small invasive carp in a given area.
Temporary Flow Control	MWRD authority and ability to reduce flow velocities to complete response actions.
Block Netting	Large nets that can block the waterway or contain selected areas from small and adult invasive carp movement used currently by MRWG for removal.
Mobile Electric Array	Experimental electric array that can be used as a temporary barrier or drive/herd and deter small and adult invasive carp.
Other	**Definition**
Pool	The water between two successive locks or barriers within the river system.
Developing Technologies	Technologies and methodologies currently being investigated that show promise in deterring invasive carp or increasing harvest efficiency that are not currently approved for use in the field by the applicable regulatory agencies.

ATTACHMENT 4: INCIDENT RESPONSE PLAN EXAMPLE
*******EXAMPLE*******
OPERATION BUBBLY CREEK
INCIDENT ACTION PLAN
WEEK OF NOV 18, 2019

Unified Command/Operations Chief – IL DNR
Agency Representative – USACE
Agency Representative – USFWS
Agency Representative – Brian Schoenung, IL DNR
Agency Representative – John Dettmers, GLFC
Liaison – IL DNR
Industry liaison/ United States Coast Guard Safety –
Industry liaison/ICRCC Co-Chair – Mike Weimer, USFWS
Onsite support – Tetra Tech

Background

The USFWS Whitney Genetics Lab presented results of their environmental DNA (eDNA) sampling of the CAWS above the electric fish dispersal barrier that occurred from October 8 through 10, 2019. Collected water samples indicated that of the 414 samples collected, 49 were found to be positive for Silver Carp eDNA and 27 were found to be positive for Bighead Carp eDNA (Figure B-1).

These detections followed a thorough and extensive multiple agency assessment of the CAWS looking for Bighead Carp and Silver Carp from September 9 to 20, 2019. While no Bighead Carp or Silver Carp were found during that assessment, out of an abundance of caution, the IL DNR is leading the ICRCC agencies in 2 weeks of intense sampling in the waters around Bubbly Creek. Effort will be similar to as if live fish had been captured as outlined in the ICRCC's CRP.

It is important to note that these positive eDNA findings do not confirm the presence of Bighead Carp or Silver Carp, nor that a reproducing population of these species exists above the electric dispersal barriers or within the Great Lakes. In 10 consecutive years of intensive fish monitoring in the CAWS that included 1,425 hours of electrofishing, 701 miles of gill/trammel net, 11 miles of seine, 13 net pound net nights, 18 hoop net nights, and 175 fyke net nights, only one Bighead Carp and one Silver Carp have been captured.

Description

Agency personnel and contracted commercial fishing crews will intensively sample areas where positive eDNA detections occurred in a coordinated and unified fashion. Areas directly upstream and downstream of those locations deemed as potentially suitable habitat for invasive carp will also be sampled.

Commercial netting boats will be paired with an electrofishing boat, forming a sampling crew. Sampling crews will deploy various sampling methods (e.g., gill/trammel net and electrofishing) and employ various fish driving strategies, such as banging, block net, underwater sound, electricity, and revving boat motors. Following net deployment, crews will start driving the deployed net utilizing the driving methods described above. Commercial boats will lead the driving of the net, followed by electrofishing boats. After electrofishing boats have completed their run, the commercial boat will begin to retrieve the net. This net will then be "hopscotched" ahead of the crews and the 2nd net and deployed at a strategic location. All boats will maintain the same driving pace toward the previously set gill nets. As boats approach the net, crews will coordinate the next drive in a unified manner. This incident action plan will serve as a tracking device for personnel throughout the 9-day operation.

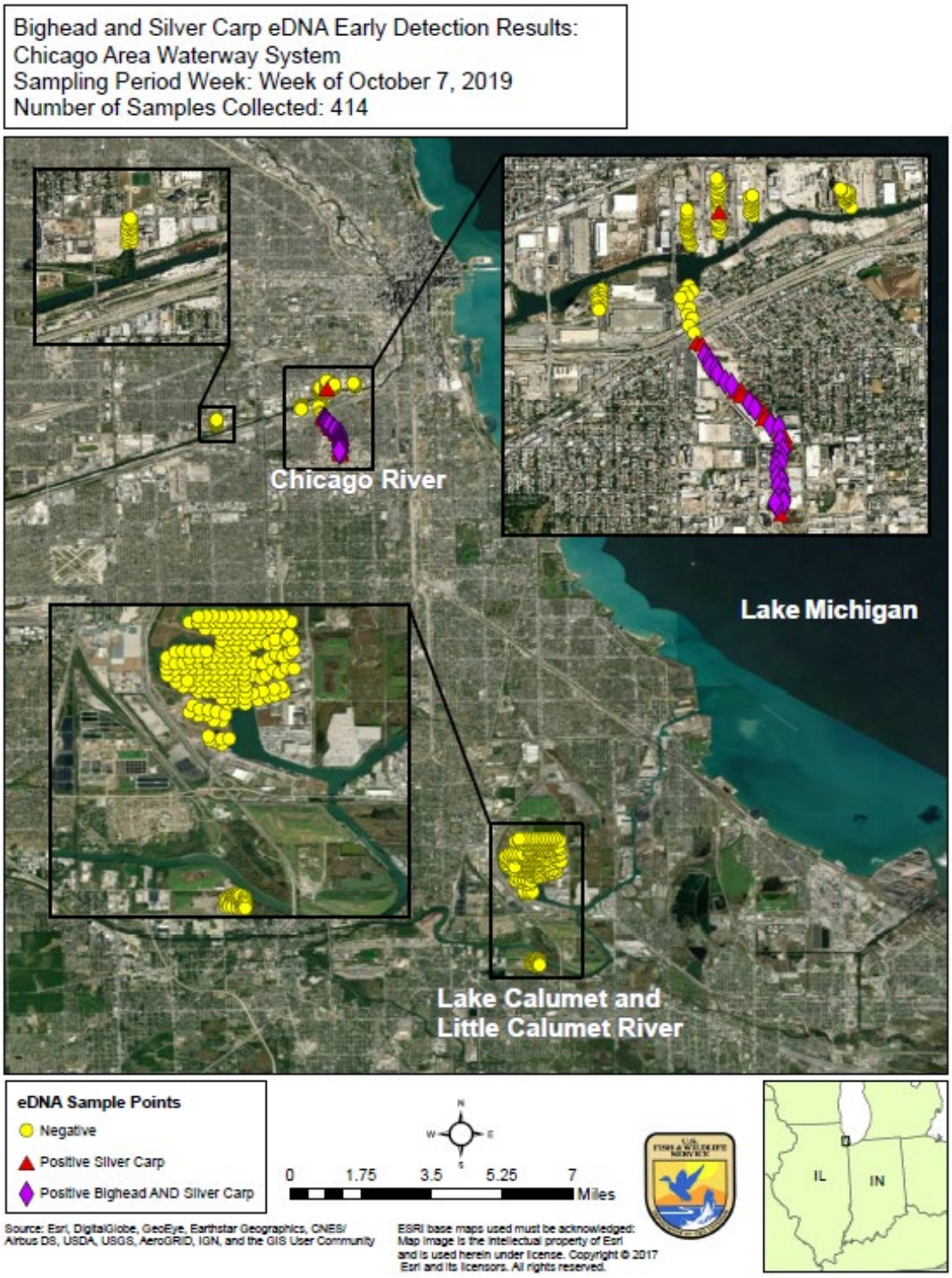


Figure B-1. Geographic locations of water collections and results of ensuing Bighead Carp and Silver Carp eDNA analysis.

Appendix B: Contingency Response Plan Supporting Documents

Operation Briefing

Monday, November 18, Richard J. Daley Park (0900). Richard J. Daley Park boat ramp will serve as the incident management team command area throughout the event. Incident command will brief crews on sampling goals, weather, safety, communications, check-in and check-out procedures, and event tracking each day. This is an appropriate time for questions, but it is important to keep communication open. **During the event, all boats will be utilizing Marine Radio Channel 72A.** Crew leaders are responsible for keeping crew names updated and immediately confirming changes to Nathan Lederman or Justin Widloe via phone/radio/in person. At the end of the day, crew leaders should confirm that all personnel are accounted for and off the water by calling or texting the operations chief. Datasheets from that day are to be turned into the operations chief/unified command following the completion of each day.

If you are approached by the public or a reporter, indicate the agency you are working for, explain the operation objective (e.g., monitoring for the presence of Bighead Carp and Silver Carp), and provide basic/general information on what is occurring. If other questions are asked, direct them to contact the MRWG co-chairs for additional information.

Daily Briefings

Tuesday through Friday. Prior to launch each day, a daily briefing will be held at the incident management team command area (Richard J. Daley Park). The operations chief will update and give each crew assignments for each respective day. This briefing will serve as a guide for personnel and provide updates on weather, findings, and safety. At the end of day, crew leaders should hand their datasheets to Nathan Lederman.

Designated boat numbers and crews and sample area with crew leaders (POC for each)

Electrofishing Boats

Electro Boat 1 ---------- *USFWS Wilmington*

POC:

Electro Boat 2 ---------- *IL DNR*

POC:

Electro Boat 3 ---------- *IL DNR*

POC:

Netting Boats

Commercial Net Boat 1 --------- POC:

Commercial Net Boat 2 --------- POC:

Safety Boat

IL DNR boat ---------- POC:

Schedule

<u>Monday – Richard J. Daley Park (Western Ave) 9:00 am to 4:00 pm</u>

Electro Boat 1 – Pair up with net boat 1; Fish from north end of Bubbly Creek down and back

Electro Boat 2 – Pair up with net boat 2; Fish from south end of Bubbly Creek up and back

Electro Boat 3 – 10 random sites North Branch Chicago River

Net Boat 1 – Pair up with electro boat 1; Fish from north end of Bubbly Creek down and back

Net Boat 2 – Pair up with electro boat 2; Fish from south end of Bubbly Creek up and back

IL DNR Boat – Set block net across channel on downstream end of Bubbly Creek

Tuesday – Richard J. Daley Park (Western Ave) 8:00 am to 4:00 pm

Electro Boat 1 – Pair up with net boat 1; Fish upstream end of Goose Island down the east side

Electro Boat 2 – 10 random sites near Downtown Chicago

Electro Boat 3 – Pair up with net boat 2; Fish upstream end of Goose Island down the west side

Net Boat 1 – Pair up with electro boat 1; Fish upstream end of Goose Island down the east side

Net Boat 2 – Pair up with electro boat 3; Fish upstream end of Goose Island down the west side

Wednesday – Richard J. Daley Park (Western Ave) 8:00 am to 4:00 pm

Electro Boat 1 – 10 random sites North Branch Chicago River

Electro Boat 2 – Pair up with net boat 2; Fish from south end of Bubbly Creek up and back

Electro Boat 3 – Pair up with net boat 1; Fish from north end of Bubbly Creek down and back

Net Boat 1 – Pair up with Electro boat 3; Fish from north end of Bubbly Creek down and back

Net Boat 2 – Pair up with Electro boat 2; Fish from south end of Bubbly Creek up and back

IL DNR Boat – Set block net across channel on downstream end of Bubbly Creek, pull when done for the day

Thursday – Richard J. Daley Park (Western Ave) 8:00 am to 4:00 pm

Electro Boat 1 – Pair up with net boat 1; Fish downtown Chicago Lock Area

Electro Boat 2 – Pair up with net boat 2; Fish downstream end of Goose Island Up

Electro Boat 3 – 10 random sites in Chicago Lock Area; RM 317 in CSSC to Bubbly Creek

Net Boat 1 – Pair up with electro boat 1; Fish downtown Chicago Lock Area

Net Boat 2 – Pair up with electro boat 2; Fish downstream end of Goose Island Up

Friday – Richard J. Daley Park (Western Ave) 8:00am to 1:00 pm

Electro Boat 1 – 8 targeted sites upstream of Bubbly Creek (toward downtown Chicago)

Electro Boat 2 – 8 targeted sites downstream of Bubbly Creek (toward CSSC)

Electro Boat 3 – 8 targeted sites downstream of downtown Chicago

Net Boat 1 – 8 targeted sites in and around Bubbly Creek

Net Boat 2 – 8 targeted sites downstream of Bubbly Creek (toward CSSC)

IL DNR Boat – Pull block net

Best Management Practices

Boat Decontamination

The MRWG recommends the use of Best Management Practices prior to and after the event. Please use the provided power washer kept at the Silver Springs field office if your boat needs to be decontaminated. Best Management Practices to prevent the spread of aquatic nuisance species during invasive carp monitoring and response field activities are outlined in the 2018 Monitoring and Response Plan for Invasive Carp in the Upper Illinois River and Chicago Area Waterway. We appreciate your diligence in this matter.

Safety

ALL boats will be equipped with required safety equipment and flotation devices, including a basic first aid kit to treat any minor injury. Operators and crews will **wear** personal flotation devices while working on the water. To avoid dehydration, each crew should carry water and take adequate breaks. Be aware of your crew members and identify health and safety concerns. **Health and safety of all workers on the water is the highest concern.**

Temperatures may be cold, and proper field gear is essential. If participants get cold/wet and need to get warm, a warming station and hypothermia kit will be located at the incident management team command area. It is recommended that each crew have dry clothes stored in a vehicle on site.

Communication among boats, staff, security, and shore command will be by marine radio or cell phone. A briefing before any crew enters the water will be held at Richard J. Daley Park (3150 S Western Blvd, Chicago, IL 60680) on Monday, November 4, at 9:00 a.m., and will ensure all staff have a copy of this IAP, which contains all critical contact information. This IAP includes a map of the sample area. All boats will be equipped with hand-held marine radios, monitoring Channel 16A for the operation, with cell phones. Communication with USCG and to initiate communication with other vessels, please use VHF marine radio channel 16A. **Crews may have interactions with commercial vessels traveling to and from the operations site and should have marine radios (VHF-16).** Crew leaders see Nathan Lederman for a hand-held marine radio if one is not on your boat.

Emergency contact numbers (local ambulance, fire/rescue service, USGC contact info, Port Authority) will be included on the handout if needed for unforeseen reasons, yet the primary communicator to these services will be the operations coordinator. If the operations coordinator is not the first call for emergencies, notify them at the earliest possible time.

Navigation Safety Zone

No safety zone closure has been requested for this operation. The sampling will take place between RM 317 of the CSSC and RM 326 of the North Branch of the Chicago River. VHF-16 would be the call channel to hail any vessel in the waterway. USCG will issue a broadcast to mariners as notification of our activities/operations.

Notice to Coast Guard

Over the next week from November 18 to November 22, 2019 (Monday-Friday), the IL DNR, along with USFWS and USACE, will have increased presence on the CAWS as part of the ICRCC CRP. During this time, mariners should be aware of these crews and additional agency boats. All boaters should be aware of possible fishing nets in the water, as all nets will be marked with floats and always attended by agencies. The activity will be between RM 329.0 on the North Branch of the Chicago River to RM 314.0 on the Cal-Sag, with emphasis placed between RM 321.0 and RM 322.0 (Figure 2). All crews will be monitoring VHF channel 16A. Gears utilized will include pulsed DC-electrofishing, trammel and gill nets, deep water gill nets, and block nets to capture and remove any invasive carp present.

There will be two IL DNR contracted commercial fishing boats (20 to 26 feet in length), three agency electrofishing boats, and one safety boat during this intensive sampling. If more details are needed, please contact Nathan Lederman or Kevin Irons of IL DNR. An IAP, daily schedule, and maps will be provided, and any changes to the schedule will be posted.

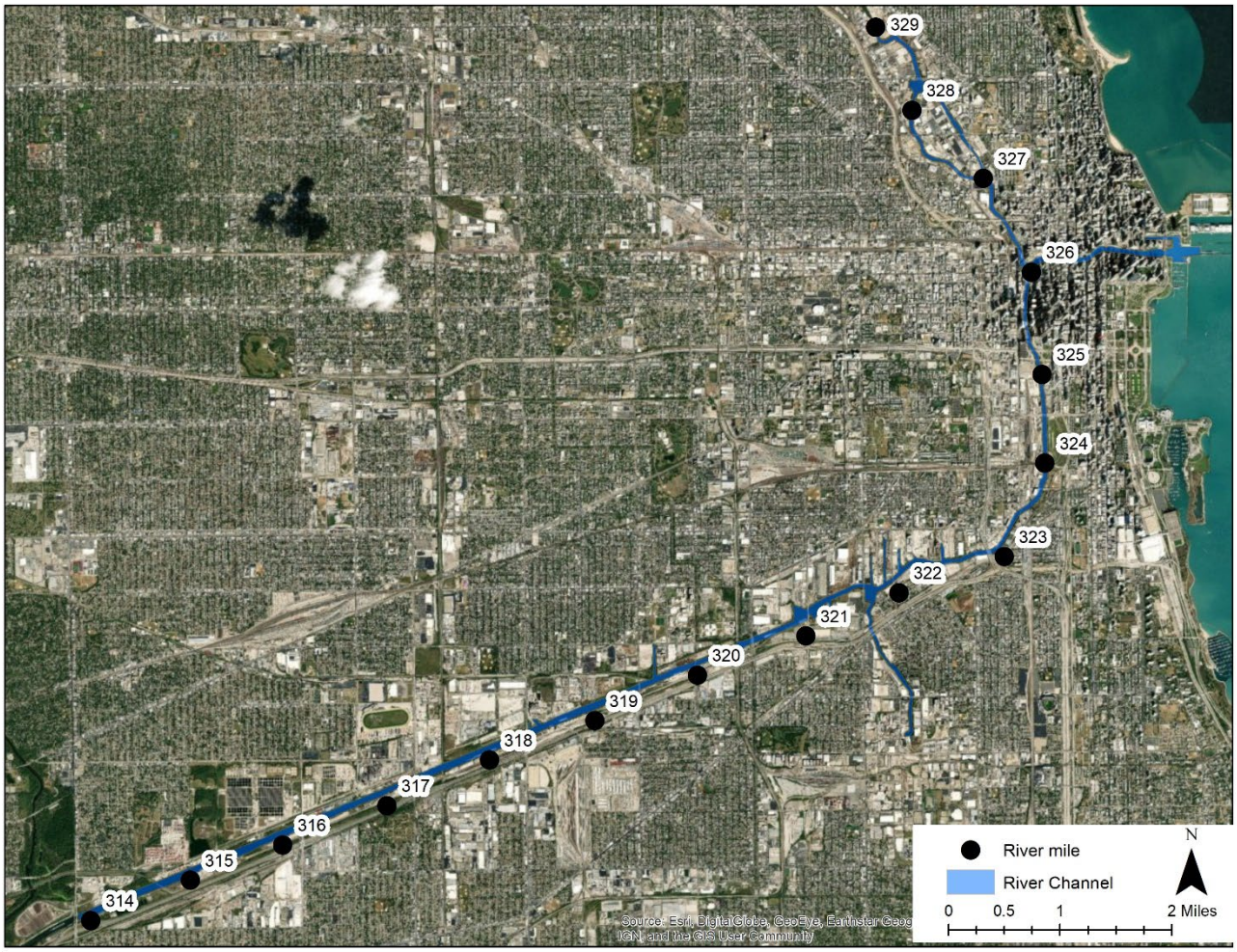


Figure B-2. Incident action spatial extent.

Capture of Silver Carp, Bighead Carp, or Grass Carp

If a boat crew believes they have captured a Bighead Carp or Silver Carp, they should cease further collection and take a GPS reading of where the fish was found. An on-board fish biologist should confirm the identification of fish species, euthanize the individual, put the individual on ice, and take it to the staging area (Richard J. Daley Park). The boat crew leader should notify Unified Command upon confirmation, and the Unified Command will immediately notify the agency representatives, MRWG superiors, ICRCC co-chairs, and the conservation police commander.

At the staging area, the fish should have a unique identifying fish tag created, have a picture taken with the tag, be measured it for total length (millimeters) and weight (grams), be placed in a plastic bag, and be sealed in a cooler with wet ice with evidence tape placed across the opening of the cooler. Captured fish should not be frozen or preserved with chemicals, as these techniques distort the DNA, but the individual should be kept chilled. The evidence cooler with the fish will be transferred to the Illinois conservation police commander. The conservation police commander will deliver the sealed fish to the sampling laboratory on-site or arrange for transport to the genetics laboratory at the University of Illinois (contact: Dr. John Epifanio). Soft tissue for genetic testing and hard tissue for aging and/or chemical analysis will be removed at the University of Illinois Chicago laboratory. Only authorized IL DNR tissue samplers or persons designated by an operations coordinator or chief will unseal the fish and remove the tissue samples from the fish for preservation and delivery to the laboratory. The laboratory samples will maintain the same sample ID as the subject fish but will also include an additional sequential letter (AC 001a, AC001b, AC002a, AC002b, etc.) for multiple samples from one fish. While soft tissue and hard tissue

extraction occurs, the fish and samples will remain under supervision of the IL DNR conservation police officer, who will maintain the chain-of-custody form. Additional soft tissue samples will be collected for other cooperating genetics laboratories (e.g., ERDC), as needed. Hard tissue will be transported to Southern Illinois University Carbondale for analysis (contact: Dr. Greg Whitledge).

A chain-of-custody system will be used when any Bighead Carp or Silver Carp are captured. Chain-of-custody is a legal term that refers to the ability to guarantee the identity and integrity of a sample from collection through reporting of the test results. During each transfer of the fish from one person to another, a chain-of-custody form will be filled out legibly with permanent ink. Chain-of-custody will be maintained when transporting hard tissue between university laboratories.

If a Grass Carp is captured, use the same procedure as described above, except for contacting the Illinois conservation police commander, and the use of evidence tape is unnecessary. Additionally, the crew is to continue sampling.

Additional Contacts and Emergency Phone Numbers

USCG

No on-scene representative will be present during this sampling operation. If needed, the USCG can be contacted by phone at 630-336-0296 or VHF-16. They will have a Broadcast Notice to Mariners for information purposes on VHF. D09-DG-MSUChicago-Waterways@uscg.mil

Environmental Protection Agency (EPA)

POC:

MWRD

No on-scene representative, not affected in operation

POC:

O'Brien Lock and Dam

Phone: (773) 646-2183

Coordinates: 41°39'5"N 87°34'1"W

Address: 1615 E. 130th St., Chicago, IL 60633

POC:

International Port Authority (IPA)

No on-scene representative will be present during this sampling operation.

POC:

Local Emergency

Chicago Police: (Emergency): 911 or 312-746-6000; (non-emergency): 312-747-8205

Chicago Fire: (Emergency): 911 or 312-746-6000

Chicago Police: 2255 E 103rd St Chicago, IL

Ingalls Memorial

Address: 1 Ingalls Dr, Harvey, IL 60426

Phone: (708) 333-2300

Roseland Community Hospital

Address: 45 W 111th St, Chicago, IL 60628

Phone: (773) 995-3000

Appendix B: Contingency Response Plan Supporting Documents

ATTACHMENT 5: AUTHORITIES

Key authorities linked to response actions are listed below. The list may not include all federal, state, and local authorities tied to ongoing operation and maintenance activities.

Illinois - Other Illinois agency authorities may apply, e.g., Illinois Environmental Protection Agency (Illinois EPA), Illinois Department of Agriculture (ILDOA), but key IL DNR authorities are below.

IL DNR (from Illinois Compiled Statutes http://www.ilga.gov/legislation/ilcs/ilcs.asp)

- 20 ILCS 801/1-15; 20 ILCS 805/805-100; 515 ILCS 5/1-135; 515 ILCS 5/10-80
- Illinois Administrative Rules (17 ILCS Part 890 Fish Removal with Chemicals)
- Section 890.30 Treatment of the Water Area
- Authority for 17 ILCS Part 890 Fish Removal with Chemicals (found in statute below):
- 515 ILCS 5/1-135
- 515 ILCS 5/1-150
- ARTICLE 5. FISH PROTECTION
- 515 ILCS 5/5-5

USACE

- Water Resources Development Act of 2007 Section 3061(b) - Chicago Sanitary and Ship Canal Dispersal Barriers Project, Illinois; Authorization.
- Water Resources Reform and Development Act of 2014. Section 1039(c) – Invasive Species; Prevention, Great Lakes and Mississippi River Basin.

USFWS

- H.R. 3080 Water Resources Reform and Development Act of 2014
- Fish and Wildlife Coordination Act (16 U.S.C. 661-667e; the Act of March 10, 1934; Ch. 55; 48 Stat. 401), as amended by the Act of June 24, 1936, Ch. 764, 49 Stat. 913; the Act of August 14, 1946, Ch. 965, 60 Stat. 1080; the Act of August 5, 1947, Ch. 489, 61 Stat. 770; the Act of May 19, 1948, Ch. 310, 62 Stat. 240; P.L. 325, October 6, 1949, 63 Stat. 708; P.L. 85-624, August 12, 1958, 72 Stat. 563; and P.L. 89-72, 79 Stat. 216, July 9, 1965.
- Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990
- Lacey Act (16 U.S.C. §§ 3371–3378)
- Executive Order 13112 of February 3, 1999 - Invasive Species
- H.R.223 - Great Lakes Restoration Initiative Act of 2016