

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

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Executive Summary

This document was prepared in response to a charge from the Michigan Department of Natural Resources and Environment (hereafter “DNRE” or “Department”) Fisheries Division Management Team to, “Develop a draft plan for Michigan to address potential monitoring and assessment needs for Asian carps.”

Questions the Fisheries Division Asian Carps Working Group (D. Clapp, J. Mistak, K. Smith, and M. Tonello) ultimately attempted to address in this document include the following:

- What does the Department need to do to adequately address the threat of Asian carp species invading Michigan waters?
- What sampling strategies are appropriate in addressing this threat?
- What should the state response be if Asian carps, either isolated individuals or abundant populations, are detected in Michigan waters?
- What are the pros and cons of various possible management strategies?
- What types of resources (both financial and human) are necessary to adequately address this threat?

This is not intended as a rapid response plan, but rather as the beginning of a comprehensive strategy for addressing the threat of Asian carps dispersing, or being introduced, into Michigan waters. In this plan, the phrase “Asian carps” refers to bighead carp, black carp, grass carp, silver carp, and large-scale silver carp. An alphabetical list of common fish names and their corresponding

scientific names is provided (Appendix A). Since 2007, it has been illegal to transport or possess live Asian carps (any species) in Michigan.

In developing this document, the Fisheries Division, Asian Carps Working Group chose to follow the outline suggested in *A Model Comprehensive State Management Plan for the Prevention and Control of Nonindigenous Aquatic Nuisance Species* (Glassner-Shwayder 1996). This model plan is based on the findings of a regional workshop titled *Aquatic Nuisance Species/Coastal Management Programs: Toward a Regional Strategy in the Great Lakes Basin*, funding for which was provided by the National Oceanic and Atmospheric Administration (NOAA; A list of acronyms is provided in Appendix B) to the Michigan Department of Natural Resources (MDNR). This model plan was presented to the Great Lakes states as guidance in developing comprehensive state management plans under Section 1204 of the federal *Nonindigenous Aquatic Nuisance Prevention and Control Act* (NANPCA; P.L. 101-646).

This plan contains nine sections (Executive Summary, Asian Carp Background, Policy Background, Management Actions, Implementation, Program Monitoring and Evaluation, Agency Responses to Public Comments, Tables, and Appendices), closely following the format suggested by Glassner-Shwayder (1996). In preparing the Asian Carp Background and Management Actions sections, we relied heavily on a core group of previously-published reports and plans, including: Conover et al. (2007), Kolar et al. (2007), Mandrak and Cudmore (2004), and Minnesota DNR (2007) [Note: Original citations from these core reports were generally not carried forward into our report – see *American Fisheries Society Style Guide; Section 8.6, “References not seen”*. Additional fact checking and citation of original references may be included in revised versions of our report.]. From these and other reports and literature, 145 strategies were identified as important in addressing the charge from the Management Team. These were subsequently reduced, through in-depth discussion, to a list of 22 strategies that constitute integral parts of a DNRE Asian carps management plan.

Within this report, common strategies are combined under five goals: prevention, communication, detection, assessment, and management. These goals are presented in priority order for management action. Prevention and communication are of immediate importance. If Asian carps are detected in Michigan waters, the state will undertake assessment and management actions. Analysis and documentation of strategies and actions were limited to those that could be directly implemented by DNRE and other Michigan agency staff. So, while implementing ecological separation (for example, between Lake Michigan and the Mississippi River system) is probably the strategy with the highest likelihood of success, this strategy was beyond the scope of the Michigan plan since the DNRE cannot independently implement separation. Likewise, while political action has some likelihood of success in preventing Asian carps from reaching Michigan, such action is not directly within the scope of Fisheries Division authority.

As suggested by Glassner-Shwayder (1996), and as included in other plans that were reviewed, a plan synopsis is included as an implementation table (Table 4). This table includes recommended lead agencies or groups, likely collaborators, general cost estimates, current implementation status, and suggested implementation actions for each of our goals/strategies. This table provides a good orientation to the overall plan. More detailed discussion of each strategy, recommended specific actions, and example scenarios are included within Section 4 (Management Actions).

While further discussion and evaluation of the details of this plan will be critical, immediate recommendations can be summarized as follows:

- Prevention is the highest priority goal, but also the goal that Michigan has the least ability to realize through Department actions. It is well-documented that, once introduced, aquatic invasive species (AIS) are difficult to eradicate and expensive to manage.
- Communication will be critical to preventing the dispersal of Asian carps into and throughout Michigan waters. Kolar et al. (2007) describe a public education campaign to be the only tool available for immediate use in controlling the spread of Asian carps. This plan outlines six

specific strategies for communication with the public and agency partners. A priority will be timely development of an effective public reporting system (see below; surveillance).

- This plan relies heavily on the promise of environmental DNA (eDNA) technology, as well as on efforts of public and agency partners, as means of early detection of Asian carps in Michigan waters. Due to the high cost of conventional fisheries assessment techniques and the low likelihood of success of these techniques for early detection of Asian carps, eDNA technology should instead be employed as a priority component of a detection program.
- While agency assessments are not an ideal means of early detection, assessments will be an important precursor to management if Asian carps are detected in Michigan waters. The evaluation of Asian carps' abundance and determination of their effects on Michigan aquatic habitats and resident fish species is the first step in developing specific management strategies. This document provides examples of generalized assessment plans for a variety of state waters.
- Finally, a preliminary analysis is presented of six management strategies that could be employed, with some likelihood of success, by the DNRE and partner agencies. These strategies range from relatively less costly implementation of best management practices (Hazard Analysis and Critical Control Point – HACCP) by Department field crews and private aquaculture interests to more costly strategies involving incentives to commercial fishers or chemical reclamation of large tributaries. While management of Asian carp will likely be a difficult undertaking, the six recommended strategies carry with them a reasonable expectation of success. Attempts at management of Asian carps are not futile, and “writing off” Michigan waters in which Asian carps have been detected is not a responsible approach for managing aquatic resources in Michigan. However, the costs of all recommended actions are high relative to the costs of the preferred alternative—not having to manage Asian carps in Michigan waters.

The Department should begin as soon as possible to act on the recommendations outlined in this report. To facilitate such action, the following strategies are most critical to immediately addressing the threat of introduction of Asian carps to Michigan waters:

- The first step that should be taken is formation of a Michigan Asian Carps Task Group, with initial membership coming from DNRE and Michigan Department of Agriculture (MDA) (see Goal II, Strategic Action 6). Initial charges to this task group should be to implement a public education and communication plan (Goal II), evaluate potential regulatory changes (Goal I), investigate and implement (as appropriate) new technologies (e.g., eDNA, pheromone attractants, deterrent technologies) for containing and managing Asian carps (Goal V, Strategic Action 6), and seek sources of additional funding to implement priority strategies. Because it may take some time for an interdepartmental task group to be convened and operational, the Fisheries Division group will work within the DNRE to begin implementing some of these strategies, until such time as a larger, state-level effort is in place. Ultimately, these efforts will be integrated with those of the AIS Core Program, coordinated by the Water Resource Division.
- A public education campaign is a critical tool for use in controlling the spread of Asian carps (Kolar et al. 2007); recommended communication and education strategies are described in detail under Goal II. Immediate attention should be given to addressing Strategic Action 5 (communicating with the public concerning recent developments and Department strategies) and Strategies 1–3 (getting information to the public concerning identification of Asian carps, potential ecosystem effects of invasion and establishment of Asian carps, and pertinent state and federal regulations). Other Michigan DNRE divisions should begin immediately to work with Media and Communications staff in implementing these strategies.
- As described in more detail later in this report, preventing the establishment of Asian carps in Michigan waters is the principal method available to avoid negative ecological, recreational,

and economic effects. Preventing transport and release or improper disposal of Asian carps that may be intermixed with baitfish (Goal I, Strategic Action 1) and controlling ongoing and permitted fish stocking efforts to prevent inadvertent introduction of Asian carps (Goal I, Strategic Action 2) are two strategies that our group recommends for immediate action. Implementing these strategies will necessitate close coordination among Fisheries Division, Law Enforcement Division, and MDA.

- Finally, quick implementation of an effective surveillance plan is critical, and will provide significant benefits by allowing us to target management actions at an early stage of invasion, should Asian carps reach Michigan waters. Environmental DNA surveillance holds great promise, and we should work to implement an eDNA surveillance program in Michigan waters within the next year (Goal III, Strategic Action 1). Despite the likely usefulness of an eDNA program, it is probable that members of the public – including anglers, charter captains, commercial fishers, riparian landowners, and recreational boaters – will be among the first to sight Asian carps if they do invade Michigan waters. A method should be developed as soon as possible to allow the public to report sightings of Asian carps to the DNRE (Goal III, Strategic Action 2). In addition, information on identifying characteristics of all life stages of Asian carps should be distributed to the public (Goal II, Strategic Action 1), to improve their ability to assist us in monitoring Michigan waters for introductions of Asian carps.

Asian Carp Background

There are four species of Asian carp that currently threaten Michigan waters; bighead carp, black carp, grass carp, and silver carp. All of these species are native to fresh waters in eastern Asia, and all have been introduced to North American waters. The native ranges of these four species encompass areas that are similar in climate to Michigan (Conover et al. 2007). A fifth species of Asian carp that could potentially threaten North American waters is the largescale silver carp; although that species has not been documented in North American waters (USEPA 2007). As of April 2010, of the four Asian carp species that have been documented in North American waters, only grass carp have been documented in Michigan waters.

Asian Carp Biology and Distribution

Bighead Carp

The bighead carp is a large, deep-bodied fish that can grow to lengths of nearly five feet and weights exceeding 90 lbs (Conover et al. 2007). They are characterized by a very large head, with a large toothless mouth, and their eyes, clearly seen in a ventral view of the fish, are located far forward and low on the head (Kolar et al. 2007). Bighead carp are dark gray above and cream colored below, with dark, irregular blotches on the back and sides. Bighead carp feed in benthic, mid-water, and surface environments. They feed mostly on zooplankton using gill rakers that strain plankton from the water, but will also consume algae, aquatic insects, and detritus (Conover et al. 2007). Bighead carp lack a true stomach, which requires them to feed continuously, giving them a reputation as voracious feeders that sometimes consume over 20% of their body weight on a daily basis (Asian Carp Workgroup 2010). Although a range of preferred water temperatures has been documented for bighead carp, their distribution in Asia suggests that they would be capable of tolerating the cold water temperatures that are found in Michigan waters in winter (Kolar et al. 2007).

According to Kolar et al. (2007), sexual maturity in bighead carp is dependent on climate and may be reached between ages 2 and 7, with males often maturing one year earlier than females. Of