STATE OF MICHIGAN

MDNR Early Detection and Response Program

Amendment to the Environmental Assessment of treatment methods for controlling aquatic invasive species

April 4, 2016

A summary of potential impacts of response and control options associated with treatment of high priority aquatic invasive species across the state of Michigan through the MDNR Wildlife Division Early Detection and Response Program

Table of Contents

I. Introduction to Amendment

This document is an amendment to the Environmental Assessment (EA) of treatment methods for controlling aquatic invasive species. On July 6, 2015, the Michigan Department of Natural Resources (MDNR) and the United States Fish and Wildlife Service (USFWS) determined that implementing the proposed action, described in the EA, would not result in significant impact on the environment, and did not require an environmental impact statement (EIS).
The EA was developed to summarize the potential impacts of response and control options associated with treatment of high priority aquatic invasive species across the state of Michigan through the MDNR Wildlife Division Early Detection and Response Program.

Why an Amendment is Necessary

This amendment has been prepared to include species that require continued treatment and in anticipation of possible invaders. Early detection and management are crucial for increasing the chances of preventing establishment and limiting potential ecological, social, and economic impacts. The species to be added are: Brazilian water-weed (*Egeria densa*), hydrilla (*Hydrilla verticillata*), water-chestnut (*Trapa natans*), water soldier (*Stratiotes aloides*), and yellow floating heart (*Nymphoides peltat*).

II. Authority and Purpose

This section was extracted from the EA.

The purpose of this document is to evaluate and summarize potential environmental impacts of proposed management activities in conjunction with the Michigan Department of Natural Resources (DNR) Wildlife Division Early Detection and Response Program.

In 2010, the DNR and Michigan Natural Features Inventory (MNFI) were granted $1,028,548.00 from the Environmental Protection Agency to develop and implement an Early Detection and Response (EDR) program with the goal of detecting and eradicating high-threat aquatic invasive species in the state of Michigan. In 2013, additional funding was awarded through the US Fish and Wildlife Service for continued administration of the EDR program. Overall, the project aims to use the best known methods to detect, eradicate and control several high-priority aquatic invasive species that impact the health of the Great Lakes.

This grant project supports the Great Lakes Restoration Initiative and the Great Lakes Water Quality Agreement, pursuant to Public Law 111-88 and will help direct future resources for invasive species control to the most cost-effective, strategic and highest threat locations.

III. General Plant Information

A. Brazilian water-weed (*Egeria densa*)

Description: Brazilian water-weed (BW) is a submergent aquatic plant that can be rooted or free floating and is commonly found in still or slow moving waters, including ponds, lakes, rivers, and streams. BW is native to South America and was imported to the United States for use as an aquarium plant. The predominant method of spread is through overland transport via boats and recreational equipment.

Identification and Reproduction: BW has blunt, finely serrated leaves that curve back towards the stem and are arranged in whorls of 4-6. BW also has a smooth midrib on the underside of the leaf, which distinguishes it from Hydrilla. BW produces a white three-petaled flower with a bright yellow center that is held above the water on a slender stem. To date, there have been no reports of a female plant in the United States. As a result, reproduction is limited to spread by vegetative fragments.

Distribution and Range: BW was first introduced to the United States in 1893 as part of the aquarium trade. Since its introduction, BW has spread to 37 states; however, it has not yet been confirmed in Michigan.

Impacts: Rapid growth leads to dense, monospecific mats on the surface of the water. These mats crowd out native aquatic plant species, provide poor habitat for fish, and impede boat movement and other recreational activities.

B. Hydrilla (*Hydrilla verticillata*)

Description: Hydrilla (HD) is a submergent, perennial, aquatic plant native to Central Africa that can grow in springs, lakes, ditches, marshes, or rivers. It can tolerate a variety of nutrient conditions and has the ability to grow in low light conditions, giving it an advantage over native species.

Identification and Reproduction: HD has serrated leaves arranged in whorls of 4 to 8 with a reddish midrib containing a row of spines that give it a rough texture. It has long slender stems that can grow up to 30 feet long and branch out considerably near the surface. Flowers have three translucent petals on a long stem that floats upwards. Hydrilla primarily reproduces vegitatively by tubers, winter buds called turions, and vegetative fragments; however, reproduction by seed is possible but does not appear to be significant.

Distribution and Range: HD is located on every continent except Antarctica. HD is mainly located in the southeastern region of the U.S. However, there are reports as far north as Indiana. HD has not yet been confirmed in Michigan.

Impacts: HD is a threat to native aquatic ecosystems. Dense mats shade out native aquatic vegetation and alter the ecology of the water body. Invasion also interferes with recreational activities like boating and fishing.

C. Water Chestnut (*Trapa natans*)

Description: Water Chestnut (TN) is a rooted, floating, mat-forming annual in shallow or deep freshwater, and grows in depths of up to 15 feet. TN is native to Europe, Africa, and Asia and was introduced into the United States in 1877.

Identification and Reproduction: TN has green, triangular shaped floating leaves with sharply serrated edges. The leaves form a densely covered rosette and the plant produces a small white 4-petaled flower. TN also produces a hard "woody" nut surrounded by sharp barbed spines that can remain viable for up to twelve years.

Distribution and Range: TN was introduced to the United States during the 1800s. It is now located throughout much of the northeastern part of the country. TN has not yet been confirmed in Michigan.

Impacts: TN forms dense mats that shade out native aquatic vegetation, leading to a decrease in biodiversity. Decomposition of vegetation below a dense mat decreases oxygen levels and can cause fish kills. Boating and other recreational activities become almost impossible in an area invaded by water chestnut.

D. Water Soldier (*Stratiotes aloides*)

Description: Water soldier (SA) is a submerged aquatic plant that becomes buoyant during the summer months. Its roots can be, but are not always, attached to the sediment. Plants can be found growing in depths of up to 5 meters. SA is native to Europe and western Asia.

Identification and Reproduction: SA leaves are bright green, long, sword-shaped, and have sharply serrated edges. The leaves form a large rosette. SA may produce a white flower with three petals as well as seeds. However, it reproduces mainly by vegetative means, as mature plants produce plantlets which detach and are carried downstream to take root in other locations.

Distribution and Range: One population of SA has been found in the Trent River, Ontario. There have been no confirmed sightings in the U.S.

Impacts: Dense mats of vegetation can form to crowd out native species and decrease biodiversity. SA can potentially alter water chemistry and could harm other aquatic organisms. Mats also hinder recreational activities and the sharp edges of this plant can cut swimmers.

E. Yellow Floating Heart (*Nymphoides peltata*)

Description: Yellow Floating Heart (FH) is a rooted, aquatic perennial with floating leaves native to Europe and Asia. FH is commonly found in lakes, ponds, slow-moving rivers and streams.

Identification and Reproduction: FH are heart-shaped to almost round, less than four inches long, opposite, and arising on long stalks from underwater rhizomes. The leaves float on the surface forming dense patches. FH produces yellow five-petaled flowers with fringed margins; held above the water. FH reproduces by floating seed or vegetatively. Fragmented pieces of plants can

establish new populations and seeds are engineered to disperse by attaching to the feathers of waterfowl.

Distribution and Range: FH was first recorded in the United States in 1882 in Winchester, Massachusetts and has since spread to 28 states. Dispersal of FH to new locations may be aided by the transport of seeds by avian vectors; however, the trade and potential escape of FH through the water garden industry may have played a larger role in its spread. FH can now be found in locations across New England and the Midwest.

Impacts: FH creates dense mats that shade out native aquatic plants, decrease oxygen levels, increase mosquito breeding habitat, and impede boating activity, fishing, and swimming.

IV. Preferred Alternatives

A. Area of Control

This section was extracted from the EA.

The Michigan Department of Natural Resources (DNR) has implemented an Early Detection and Response program to survey and treat infestations of the species listed above on a statewide level in coordination with federal (U.S. Fish and Wildlife Service) and local (Cooperative Invasive Species Management Areas (CISMA)) partners. Given the potential impact of these species to Michigan's natural resources, the Michigan DNR proposes expansion of current efforts to improve efficiency and efficacy in control of these species.

Response efforts have occurred in four main areas of the state based on reported occurrences: Southeast Michigan, Saginaw Bay, the Thunder Bay watershed in Alpena County, and Munuscong Bay in Chippewa County. Through cooperative efforts, the EDR program has verified 128 reports and responded to 63 infestations of 6 priority species across the state.

Continued efforts will be primarily directed by the Michigan DNR in coordination with local CISMAs to respond to all reports of the priority species and conduct response efforts at verified sites across the state.

B. Treatment Methods

For many of the species targeted through this program, herbicide is the most successful method of control. While for some infestations and some species, mechanical treatments may be an effective means of control, many situations will require the use of herbicides. Mechanical treatments can be successful in certain situations, however are rarely an effective stand-alone method. Treatment options will be assessed on a site-by-site basis, accounting for size of infestation, potential non-target impacts and likelihood for success. Our preferred method will involve a combination of herbicide and mechanical treatments to achieve greatest efficacy and minimize impact to non-target species.

Brazilian water-weed (BW), hydrilla (HD), water chestnut (TN), and water soldier (SA) have not been found in Michigan; however, their presence is being closely monitored. If infestations are detected, the best available science will determine the primary treatment method and may consist of herbicide application and/or mechanical control.

Yellow Floating Heart (FH) has been verified in one watershed in Michigan to date and is being closely monitored through follow-up surveys of infested and adjacent water bodies. If infestations warrant response, these locations may be treated with herbicide application and/or mechanical control to minimize spread.

V. Alternative Actions

A. Biological Control

There are currently no viable biological control methods for the species listed in this addendum; however, research is being conducted and bio-control agents may become available in the future. Additional consideration of the costs of both research and introduction of bio control agents render this method highly impractical at the scale of work being conducted.

B. Mechanical control

Physical control is a viable option for some smaller infestations and is a method that will be employed where appropriate. Physical control methods may include the use of benthic mats, hand pulling, and hand pulling with assisted suction harvesting. However, where infestations cover a large area, mechanical control by hand pulling is only moderately effective at reducing the overall population. This method is time-consuming, labor-intensive and requires a means of proper disposal, which may be prohibitive. Given this information, physical removal should be applied on a scale that will result in successful reductions of the population.

Mechanical removal (harvesting) of large infestations would require specialized amphibious equipment that is cost-prohibitive. Additionally, large-scale mechanical removal may create unnecessary and undesirable disturbance to sensitive or high-value sites. Due to the nature of spread in many of these species, disturbance may actually increase populations of invasive aquatic plants by removing native and desirable species and providing openings for invasive plants to colonize. Some of the target species reproduce through rhizomes or stolons, which through mechanical removal may be unintentionally spread in the treatment area and to other sites. For this reason, mechanical removal is not likely a viable option. If utilized, it should be applied in conjunction with herbicide treatment.

C. Hydrologic manipulation

This section was extracted from the EA.

For many of the target species, it is not well understood how water level manipulation will effect survival or re-emergence post-treatment. Seed viability and reproductive potential in dry conditions

have not been well documented for the majority of the target species, therefore the efficacy of this type of treatment is unknown.

The work of this project will be carried out over a larger geographic area, encompassing multiple land ownerships and treatment will occur on a variety of sites with highly individual characteristics. Water manipulation is highly cost-prohibitive and limited in applicability across the range of sites where treatment could occur. Additionally, this method of treatment may cause negative impacts on native or desirable species.

Given the cost of installing and maintaining equipment used in water level manipulations, and limited understanding of the likelihood for success, this method has been eliminated.

D. No Action

This section was extracted from the EA.

The species targeted through this project were chosen due to their limited distribution and the potential for negative economic, social and biological impacts as a result of their introduction and spread. Many of these plants are found in high-value areas including coastal wetlands and waterfowl management areas which provide both essential habitat for native species and immense recreational value. Increases in populations of invasive species such as flowering rush, parrot feather and European frog-bit will result in reductions of native aquatic vegetation which serves as an important resource for migratory birds and other wildlife. Additionally, these aquatic species, if untreated, fill the water column resulting in decreased oxygen levels and subsequent die-offs of native fish and aquatic organisms. The impacts of these plants extend far beyond the ecological as infestations result in loss of recreational opportunity.

The goal of this work is to detect species occurrences early and respond immediately so as to enhance the likelihood for successful eradication of infestation and enhanced capacity for limiting spread. With no action, small or localized populations may become larger populations that will eventually grow to a point where management and control are no longer feasible or effective.

VI. Federally-listed Threatened, Endangered, Proposed and Candidate Species

This section was extracted from the EA.

The scope and scale of work associated with this project presents challenges when considering impacts to threatened and endangered species. In light of these challenges, all necessary and available precautions to protect listed species and limit disturbances will be undertaken during the planning and implementation of control methods.

Using available resources provided through the Michigan Natural Features Inventory, including a database of known occurrences of federally- and state-listed species and a habitat rarity index, staff conduct a site-based review for presence/absence of listed species and assess treatment options to ensure minimal impact. These resources are compiled though long-term monitoring data, verification of

rare species reports and routine data collection. Additionally, during site assessment, field staff will note the presence of federally listed species and evaluate impacts of potential management before initiating control actions.

Primary herbicide application methods utilized on this project are targeted and designed to be selective. Applications are conducted through the use of hand-held sprayers as opposed to larger boom sprayers or aerial spraying to allow operators greater control of herbicide release and to treat only targeted species. In this way, we minimize the impacts to non-target species and reduce likelihood of disturbing federally listed species.

VII. Sources

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