Pictured, Eurasian water-milfoil (*Myriophyllum spicatum*)

2019 Aquatic Invasive Plant Survey at Lake Roaming Rock

Prepared for Lake Roaming Rock Board and Management Staff

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This report details the methods and results of an aquatic plant survey conducted at Lake Roaming Rock on June 17, 2019 by Cleveland Metroparks Aquatic Invasive Species Program. The project is funded by Ohio Department of Natural Resources (ODNR) via US Fish and Wildlife Service (USFWS) (F18AP00829) and support Aquatic Invasive Species (AIS) outreach, education, and detection in Ohio's Lake Erie Basin. Lake Roaming Rock is one of over 200 waterbodies assessed for aquatic invasive plants in Ohio's Lake Erie Basin.

Introduction

Early Detection and Rapid Response (EDRR) is recognized by the U.S. Department of the Interior as the greatest opportunity for eradication and cost-effective management of newly established invasive species (USEPA, 2016). Of substantial concern to Cleveland Metroparks and the ODNR are aquatic invasive species (AIS) that are not yet widespread in the Lake Erie basin, but has the potential to become so. Such as Hydrilla (*Hydrilla verticillata*) and Yellow floating-heart (*Nymphoides peltata*). Cleveland Metroparks is in its third year of a project to survey Ohio's Lake Erie Basin for aquatic invasive plants and recommend control measures on potentially-damaging invaders. Not all aquatic invasive plants require a rapid response. A list of plants that do merit a rapid response can be found in the annual report on Cleveland Metroparks website (Warman, Weldon 2018).

Goals of this report are to:

- Identify aquatic invasive species
- Provide a species list of plants in Lake Roaming Rock
- Advocate for best management practices to reduce the spread and introduction of aquatic invasive species.

It is imperative to prevent the aquatic invasive Hydrilla from entering Lake Roaming Rock. Pymatuning Reservoir, 14 miles from Lake Roaming Rock, hydrilla has congested marinas, interfered with water level control features by clogging outflow pipes, and cost Ohio and Pennsylvania over $250,000.00 each year for annual treatment. With underwater stems that can colonize waters 25 feet deep, shallow lake margins with boat docks, launch ramps, and marinas are all potential hydrilla territory.

Thank you to the Rome Rock Association board and management staff that facilitated Cleveland Metroparks survey.

Methods

Cleveland Metroparks surveyed Lake Roaming Rock on June 17, 2019. A partial lake survey was completed in north and south of the lake on a patrol boat and from a flat-bottom, barge-pushing work boat. Water levels were higher than average in June and the entire lake was under no wake speeds. Even though the entire lake was not surveyed, the sampled help predict the un-surveyed area contents. Survey design generally followed recommendations from Trebitz et al. (2009), Hoffman et al. (2016), and Cleveland Metroparks annual Hydrilla Report (Warman and Weldon, 2018). Sampling points were concentrated in areas of interest including the inflow, outflow, marina and boat launch ramp. Sample point selection was also directed by lake management staff knowledge of dense plant communities.

At each sample point, plants were collected with rakes or observed visually and recorded. The rakes were double-headed 14-tine rake heads attached to approximately 50 feet of 3/8" polypropylene rope. The survey targeted submerged, floating, and emergent taxa. At each station a rake was tossed to a distance of 5-10 meters from the boat, allowed to sink to the lake bottom, and slowly retrieved. Rake tosses were made from each side of the boat (i.e. four rake tosses).

Plants were identified to species in the field by a biologist (Mark Warman, Cleveland Metroparks). When specimen could not be identified in the field (e.g. when identification required scrutiny of morphological features under a microscope) the plant was vouchered and identified to species (or lowest possible taxonomic level) in the laboratory. The total number of species collected at each sample location was tallied for data analysis. GPS coordinates and plant species observed were recorded electronically in the field in Fulcrum. Handheld GPS units (Garmin GPSMAP 64) were used to track the route and mark sampling stations during the survey.

There is no substitute for a full lake survey effort. Although the entire lake was not surveyed "there is potential for exploiting patchiness in distributions to increase efficiency," for aquatic invasive plant detection (Trebitz et al, 2009). Survey effort was instructed by lake management staff familiar with the aquatic plant community. Special attention was paid to the marina and boat launch area and southern inflow as possible points of introduction of aquatic invaders to Lake Roaming Rock.

Such surveying has a different goal than many studies in ecology, in that it emphasizes qualitative rather than the quantitative endpoints (detection, not abundance). A random design with sufficient station density is one way of achieving coverage of space, but with some system-specific knowledge, sampling strategies can be refined through stratification or deliberately unequal allocation across habitat and gear types so that species are detected more efficiently and monitoring becomes less resource-intensive.

Results

Eighteen (18) species were collected from 15 sample stations over an area of nearly 120 acres (Figure 1, Table 1). Three plants could only be identified to genus (*Elodea*, *Sparganium* and *Wolffia*). Three non-native species were found. All three are widely established in the Great Lakes basin (*Myriophyllum spicatum*, *Iris pseudacorus*, and *Phalaris arundinacea*) and do not merit a rapid response in Lake Roaming Rock.

An average of 4.5 species were collected per sampling site. Two plants appeared with high frequency during the inventory, Eurasian water-milfoil (*Myriophyllum spicatum*) and Coontail (*Ceratophyllum demersum*), both at 14 of 15 locations. Both plants were dense at southern section of the lake. Lizard's tail (*Saururus cernuus*) was the only plant collected as fragments from the center of the lake. Aquatic plants were collected at 100% of the sample sites (15 of 15). The highest species richness for any single sampling location was at the Roaming Rock Marina, where 10 species were collected (Figure 2). June 17 is early in the growing season and it is probable that a survey later in the season would result in higher densities and increased diversity of plants throughout the lake.

Management Options for Aquatic Plants at Lake Roaming Rock

In general, "Lakes in watersheds dominated by row cropping have systematically high nitrogen and phosphorous" (Arbuckle, Downing 2001). The watershed of Lake Roaming Rock is 73.5 square miles, with a large percentage of agricultural row cropping. There will be an ongoing input of nitrogen and phosphorous from the watershed into Lake Roaming Rock, which can induce growth of aquatic plants and algae, Figure 3.

Triploid grass carp have been considered by the Rome Rock Association to reduce aquatic vegetation. Triploid grass carp can be part of a successful plant management strategy, but used alone may not achieve desirable results. Carp do not eat all plants with equal enthusiasm (O'Keefe, 2018). Eurasian water-milfoil, for instance, "…grass carp can only control milfoil when they are so abundant that they remove virtually all aquatic plant growth…" (O'Keefe, 2018). If an over-abundance of triploid grass carps are stocked nutrients once used by plants may become available for algae instead, resulting in an algae-dominated lake.

Mechanical harvesting of aquatic plants is currently used on Lake Roaming Rock. Mechanical harvesting has a variety of benefits: water can be used immediately following harvesting, plants that are removed do not decompose and some nutrients are removed, and the habitat remains intact because not all plants are collected by the harvester. One drawback is that mechanical harvesting may fragment and spread plants. At Lake Roaming Rock, with seemingly uniform distribution of the invasive Eurasian water-milfoil and native coontail, the risk of spread may be negated. No matter which management options are conducted at Lake Roaming Rock, mechanical harvesting should continue because of the benefits and the Association's ability to conduct it.

Chemical control through the use of EPA-approved pesticides is widely used by aquatic plant managers throughout the United States. Eurasian water-milfoil and coontail are two abundant species in Lake Roaming Rock that may be controlled by herbicides. Eurasian water-milfoil is an invader in the Great Lakes region and several herbicides can be used to effectively manage it. Contact herbicides including diquat and endothall provide good control, whereas systemic herbicides such as 2,4-D, fluridone and triclopyr provide excellent control. A newly approved, selective herbicide ProcellaCOR is recommended for Eurasian water-milfoil but is only available to certified applicators trained by the manufacturer. Herbicides should be selected based on the site size and conditions, water exchange characteristics, potential water use restrictions, federal, state and local regulations and economic considerations.

Cleveland Metroparks Aquatic Invasive Strike Team is trained to detect and respond to AIS, not to advise on whole-lake aquatic plant management. Consider consulting with a state extension expert (contact details in the resources section) or a lake management company for the best options for your waterbody.

Prevention of Introduction and Spread of Aquatic Invasive Species

There were three invasive plant species in Lake Roaming Rock detected during the survey (Table 1). With only a few of aquatic invasive plant species, Lake Roaming Rock has an opportunity to implement AIS prevention and response strategies such as:

- Develop policy around clean vessels entering Lake Roaming Rock from outside locations - especially from waterways with known invasive species challenges such as hydrilla at Pymatuning Reservoir. Plants may be transported on trailers, angling gear, live wells, and in bilge water.

- Enroll in the Ohio Clean Marina Program and Clean Boater Pledge. The program will serve as helpful support programs to keep invasive species out of Lake Roaming Rock.

- Consider policy that prohibits the introduction of aquatic plants to Lake Roaming Rock. One vector for invasive species introductions are via water gardens. Cleveland Metroparks has detected two infestations of hydrilla at local aquatic garden supply stores, mixed in with plants that are for sale. In other instances, plants like the state-listed, invasive yellow floating heart (*Nymphoides peltata*) have likely been introduced by landowners in an effort to 'beautify' areas.

- Display invasive species awareness signage, such as Stop Aquatic Hitchikers, to educate recreational boaters at the boat ramp and marina. Consider the addition of disposal stations to facilitate disposal of plants and unused boat, Figures 4 & 5.

- Perform surveys for aquatic invasive species during your own backyard training

- Contact Cleveland Metroparks in 2020 to host an aquatic plant identification workshop for residents and interested parties. Aquatic plant awareness has helped states like Minnesota and New York identify aquatic invasive plants early and respond rapidly. Cleveland Metroparks has funding through 2020 and would like to build a similar, regional network in Ohio's Lake Erie Basin.

The investment Ohio has made in aquatic invasive species prevention has been significant and its value should be protected through enhanced prevention strategies where feasible. A list of aquatic invasive plants and the proximity to Lake Roaming Rock is in Table 2.

Resources

Ohio is home to other professionals to expand the conversation on nutrients, algae, plant management, herbicides, and prevention strategies for aquatic invasive species.

Eugene Braig, Program Director of Aquatic Ecosystems for Ohio State University. Plant management, herbicides, using vegetation to reduce erosion and to control nutrients, algae management, and more. Link to website, https://senr.osu.edu/our-people/eugene-c-braig-iv, Braig.1@osu.edu or at 614-292-3823.

Sarah Orlando, Clean Marinas Program Manager with Ohio Sea Grant. The Ohio Clean Marina Program, ohiocleanmarinas@osu.edu or at 419-609-4120.

Stop Aquatic Hitchhikers website: http://stopaquatichitchhikers.org.

Tables

Table 1. Species list of Lake Roaming Rock aquatic plant survey, June 17, 2019. (*) indicates non-native species. Occupancy is calculated as the percentage of sample units (out of 15) where the species was observed.

Species name	Common name	# incidences	Occupancy
Ceratophyllum demersum	Coontail	14	93%
*Myriophyllum spicatum**	Eurasian water-milfoil	14	93%
Nymphaea odorata	American white waterlily	7	47%
Lemna minor	Lesser duckweed	6	40%
Elodea spp.	Water weed	3	20%
Elodea canadensis	Canadian waterweed	3	20%
*Iris pseudacorus**	Paleyellow iris	3	20%
Ceratophyllum echinatum	Spineless hornwort	2	13%
*Phalaris arundinacea**	Reed canarygrass	2	13%
Potamogeton foliosus	Leafy pondweed	2	13%
Potamogeton nodosus	Longleaf pondweed	2	13%
Sparganium spp.	Bur-reed	2	13%
Spirodela polyrrhiza	Common duckweed	2	13%
Najas guadalupensis	Southern waternymph	1	7%
Potamogeton pusillus var pusillus	Bluntleaf pondweed	1	7%
Potamogeton pusillus var tennuissimus	Small pondweed	1	7%
Saururus cernuus	Lizard's tail	1	7%
Vallisneria americana	Eel-grass	1	7%
Wolffia spp.	Watermeal	1	7%

Table 2. List of aquatic invasive plants not yet present in Lake Roaming Rock but present in Great Lakes region. Location nearest Lake Roaming Rock indicates the closest county to Rome Township.

Scientific name	Common name	Location Nearest Lake Roaming Rock
Egeria densa	Brazilian waterweed	Aquarium plant, illegal in Ohio but widely available
Hydrilla verticillata	Hydrilla	Pymatuning State Park, Ashtabula State Park
Hydrocharis morsus-ranae	European frogbit	Lorain County, Ohio
Nitella obtusa	Starry stonewort	Erie County, Ohio
Nymphoides peltata	Yellow floating-heart	Mentor Marsh, Lake County, Ohio
Trapa natans	Water chestnut	New York, Little Shanango river watershed

Figures:

Figure 1. Survey area for Lake Roaming Rock showing selected sampling locations (white circles) and route of survey (yellow line). Fifteen (15) sample plots were taken over the course of the day on June 17, 2019.

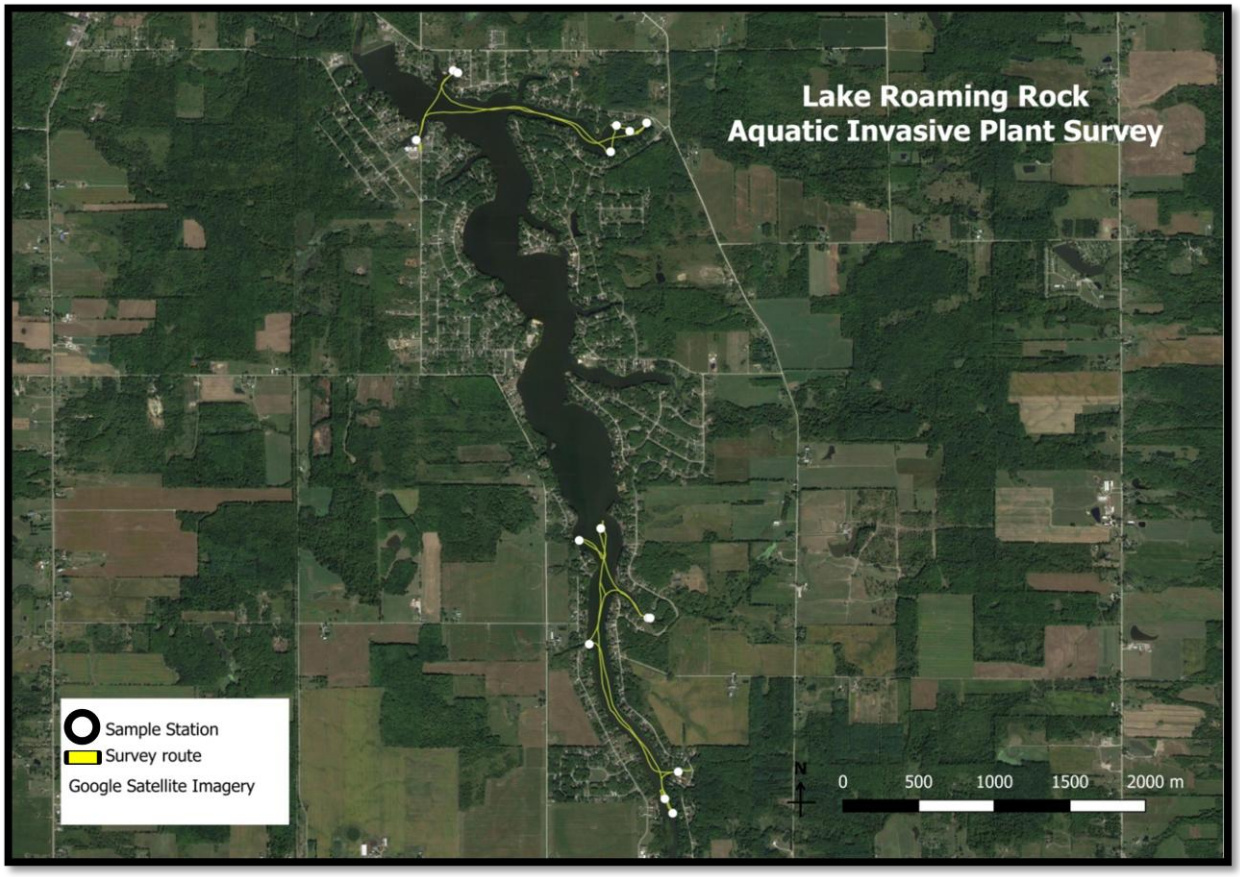

Figure 2. Frequency histogram showing the number of species collected at each of the 15 sampling sites (e.g. four different species were observed at six of the sample sites).

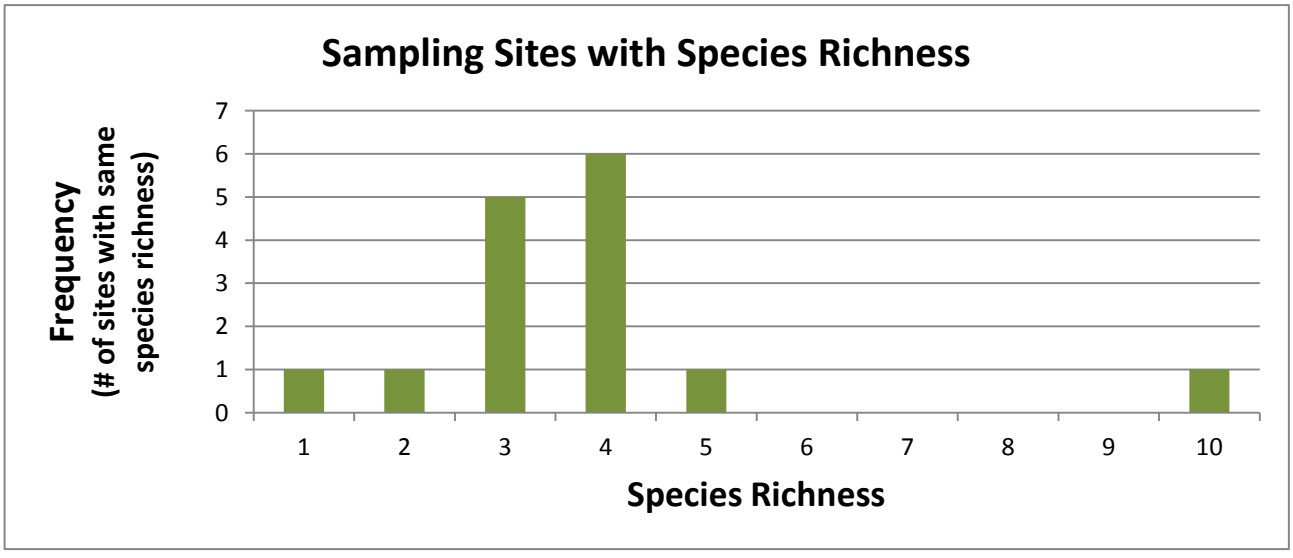

Figure 3. Algal growth, species unknown, at Lake Roaming Rock near the marina. Photo, Rachel Nypaver.

Figures 4. Example of Aquatic Invasive Species signage.

Figure 5. Disposal station at Pymatuning State Park.

References

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