

Eagle River Chain of Lakes Management Planning Project

December 2016 Update

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In 2013, the Eagle River Chain of Lakes Association, Inc. (ERCLA), with the assistance of Onterra, initiated a multi-phased project to systematically study and create comprehensive management plan updates for the 10 lakes within the Lower Eagle River Chain (Figure 1). Given the number of lakes being studied and the time needed to conduct the studies, the project was designed to be completed in four phases each comprised of two to three lakes.

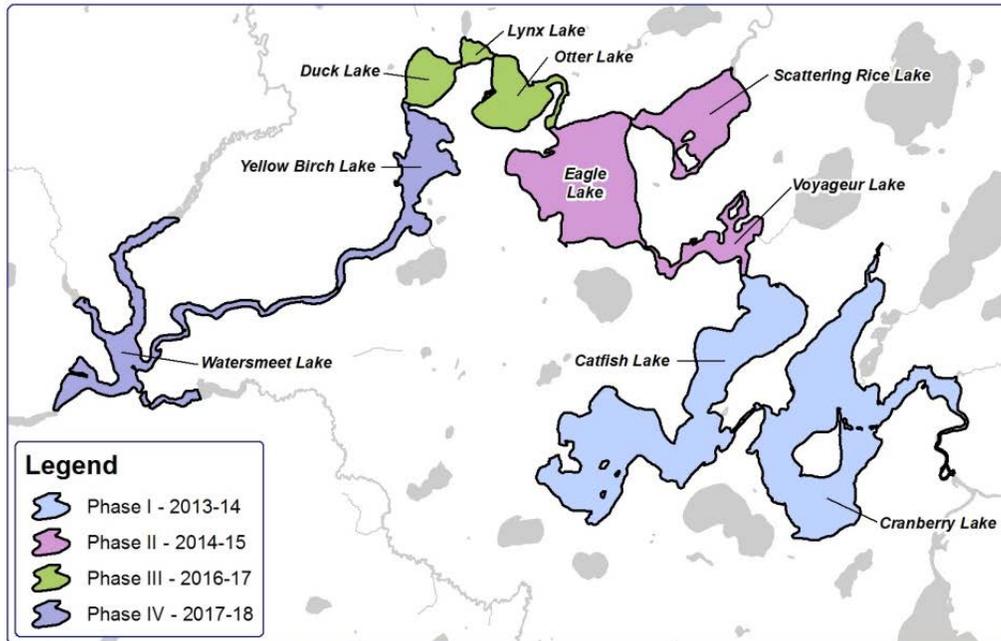


Figure 1. Lower Eagle River Chain of Lakes Management Planning Project Phases.

Following ERCLA's successful application of two Wisconsin Department of Natural Resources (WDNR) Aquatic Invasive Species (AIS) Education, Planning and Prevention Grants, baseline studies were completed on the Phase I and II lakes in 2013 and 2014, respectively. However, due to revisions to the methods for which the WDNR reviews AIS grant applications in 2014, ERCLA's application to aid in funding the studies for the Phase III lakes in 2015 was unsuccessful and the management planning project was postponed until the grant application could be resubmitted the following year.

Following the resubmission of the grant application in December of 2015, ERCLA was successful in securing funding to move forward with the management planning project and complete the studies on the Phase III lakes in 2016. To date, baseline studies to assess the health of the aquatic plant communities, water quality, watersheds, and immediate shoreland areas have been completed by Onterra on the Phase I, II, and III lakes. In addition, perceptions of the chain's stakeholders were also gathered through the distribution of an anonymous stakeholder survey in 2013. This project update is intended to provide Eagle River Chain stakeholders with some study highlights from the lakes studied thus far, as well as provide a timeline for the remaining actions that will be taken as

part of this project. While much of the data are still being analyzed for the Phase III lakes, some study highlights that are available are discussed.

Water Quality Studies

Water quality data were collected from each lake within each phase multiple times during the growing season and once during the winter months. These data provide ecologists with a picture of what nutrient dynamics are like within the lake over the course of a year as well as which nutrients (phosphorus or nitrogen) regulate algal growth. In addition, any available historical data are also analyzed to determine if water quality has changed over time. Results from the Phase I and II lakes and preliminary results from the Phase III lakes indicate that water quality parameters fall within the *good* category for Wisconsin's drainage lakes.

In addition to collecting water quality data on the Phase III lakes in 2016, additional water quality data were also collected from Scattering Rice Lake. Analysis of water quality data collected from Scattering Rice Lake in 2014 under Phase II indicated that phosphorus concentrations were higher than expected. It was suspected that the elevated concentrations of phosphorus were due to a natural process known as *internal nutrient loading*. Internal nutrient loading is a process by which anoxic (devoid of oxygen) bottom waters cause phosphorus to be released from bottom sediments into the overlying water. While internal nutrient loading occurs on many lakes, Scattering Rice Lake's shallow nature allows this sediment-released phosphorus to be mixed to surface waters where it can fuel higher levels of algal growth.

To gain a better understanding of nutrient dynamics in Scattering Rice Lake and to determine if internal nutrient loading is contributing to the higher-than-expected phosphorus concentrations, additional water quality data were collected from the lake in 2016. This included samples collected by Onterra ecologists as well as temperature and dissolved oxygen data collected on a weekly basis from June through October by Scattering Rice Lake volunteers. These data are currently being analyzed, and results will be included within the Phase III draft report that will be created later this winter.

Aquatic Plant Studies

Comprehensive aquatic plant studies were completed on the Eagle River Chain in 2012 as a part of the EWM management project. These studies found that the native aquatic plant community of the chain was of higher quality than the majority of the lakes within the region and the state. Of the 67 aquatic plant species located in the chain, the most abundant are two



Figure 2. Two relatively rare native aquatic plants, alpine pondweed (left) and Vasey's pondweed (right), found in the Lower Eagle River Chain of Lakes. Photo credit Onterra.

native species, slender naiad (*Najas flexilis*) and wild celery (*Vallisneria americana*). Four non-native, invasive species were located and include Eurasian water milfoil (*Myriophyllum spicatum*), purple loosestrife (*Lythrum salicaria*), garden yellow loosestrife (*Lysimachia vulgaris*), and pale-yellow iris (*Iris pseudacorus*). The chain was also found to harbor two native aquatic plant species that are considered relatively rare in Wisconsin, Vasey’s pondweed (*Potamogeton vaseyi*) found in all 10 lakes, and alpine pondweed (*Potamogeton alpinus*) found in Cranberry, Voyageur, and Scattering Rice Lakes (Figure 2).

Shoreland Condition

While water quality within the lakes studied thus far is good for Wisconsin drainage lakes and the aquatic plant community within the chain is of higher quality than the majority of lakes within the state, shoreland conditions assessment surveys completed on the Phase I, II, and III lakes by Onterra ecologists revealed a higher degree of shoreland development. Of the lakes studied thus far, approximately 32% (12.6 miles) of the chain’s shoreline is considered *urbanized* or *developed-unnatural*, categories which are assigned to areas with little to no intact natural habitat. These areas provide little benefit to and may have adverse impacts to the chain’s ecology.

Shoreland development is likely one of the largest stressors to the ecology of the Eagle River Chain, and in planning meetings held with Planning Committees from both the Phase I and II lakes a management goal was developed address shoreland development. This management goal is to *lessen the impact of shoreland development on the Eagle River Chain of Lakes*, and includes actions to restore developed shorelands and protect those that currently have little to no development.

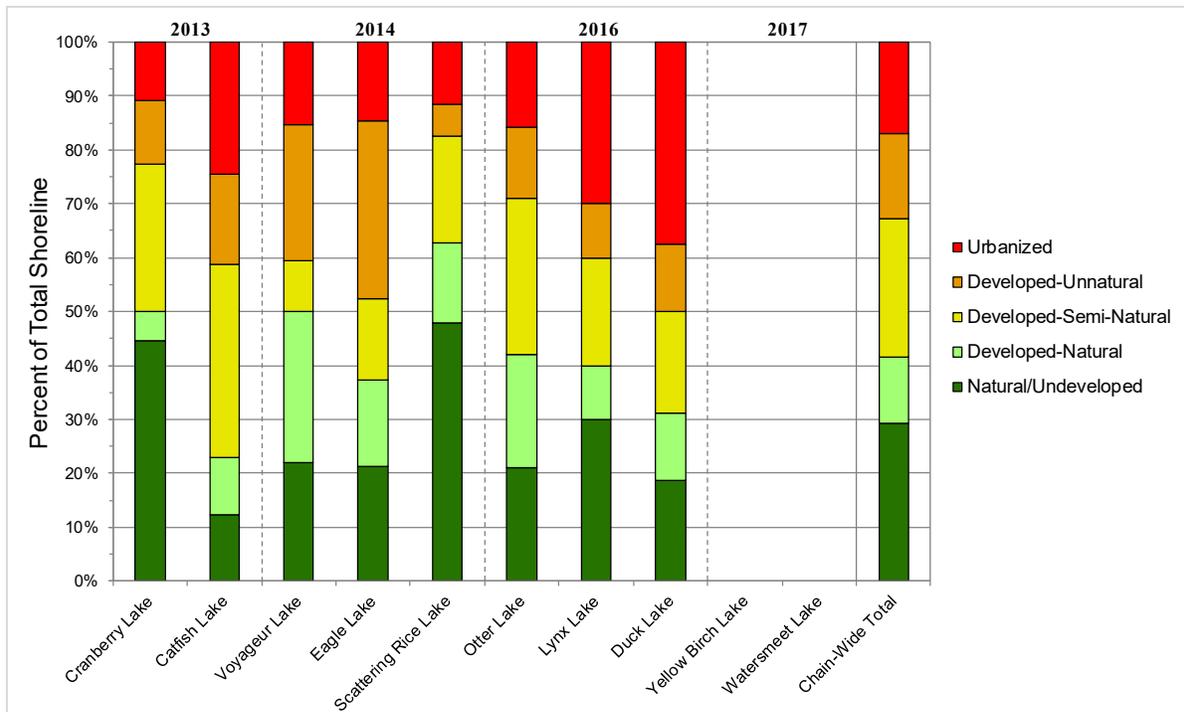


Figure 3. Eagle River Chain of Lakes shoreland condition. Created using data from Onterra shoreland condition assessment surveys.

Additional Lake Studies

In addition to water quality, aquatic plant, and shoreland studies, Onterra ecologists will also be completing a watershed modeling assessment which will be completed in the final phase of the project. This assessment is designed to determine if phosphorus concentrations measured within each lake match phosphorus concentrations predicted based on each lakes' watershed size and land cover composition. This modeling has already been completed for Scattering Rice Lake, and aided in determining that phosphorus concentrations were higher than expected based upon the size and composition of its watershed. This modeling will be completed for the remaining lakes following the collection of water quality data from the Phase IV lakes.

Remaining Steps

In summary, all project components are on schedule and proceeding as planned. Onterra is currently analyzing the data collected on the Phase III lakes in preparation for a meeting with the Phase III Planning Committee in the spring/early summer of 2017. The meeting will be held to discuss the results of the studies completed to date from a chain-wide perspective along with a specific focus on the results from the Phase III lakes. The Implementation Plan developed by the Planning Committees for the Phase I and II lakes was recently approved by the WDNR, and the Implementation Plan will continue to be developed with the Phase III Planning Committee. In addition, another WDNR AIS-Education, Planning and Prevention Grant application will be submitted in December to seek funding for the Phase IV studies scheduled to completed on Yellow Birch Lake and Watersmeet in 2017.