

Habitat and Invasive Issues on Leech Lake

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Walleye stocking and cormorants are hot topics of debate on Leech Lake currently. However, the overarching concerns about long-term lake health and the economic viability of the Walker community will likely be driven by two interconnected issues: habitat quality/quantity, and non-native invasive species.

Due to the large amount of public lands that surround the lake, shorelines and adjacent uplands are less degraded than if these areas were in private ownership. None the less, privately owned shorelines have experienced degradation due to clearing for beaches, docks, boat lifts, and travel lanes to open water. Clearing vegetation on private lots may seem like small impacts, but cumulatively clearing is responsible for considerable habitat loss. Ironically, this habitat loss contributes (directly and indirectly) to the establishment of harmful aquatic invasive species. Although laws and regulations exist to prevent or lessen these losses, it is difficult to enforce non-compliance of landowners. Excessive and unauthorized clearing by landowners impairs lake health through both habitat loss and (potential) invasive species. Impacts may be experienced lake-wide by a many different kinds of lake users.

The clearing of uplands adjacent to lakes and streams is also an issue, as these areas serve as buffers that filter runoff and prevent or reduce the amount of nutrients, fertilizer, and pesticides that enter the lake. Many lakeshore landowners want to clear vegetation down to the water's edge, but this reduces or eliminates the buffering effect of these areas. There are efforts to educate landowners about the importance of these areas so they will not clear them or in some cases work to restore these buffers.

Of all the habitat types on Leech Lake the DRM is most concerned about the wild rice beds that are scattered around the lake. This resource is one of the most important to the Reservation due to its cultural importance to our people. It also provides critical habitat for invertebrates and small fish that form the basis of the food chain for larger fish. Rice beds are degraded by boat traffic in and near the beds. Bass fishing in the rice beds is particularly damaging. Non-native species like rusty crayfish that reduce vegetation are also of concern.

Artificially stable water levels, controlled by the dam at the lake's outlet, continue to be a concern. The plants and animals species that live in Leech Lake are adapted to varying water levels. Loss of these fluctuations alters growing conditions required by native species (especially wild rice and bulrush) and over time result in major changes to the ecosystem. Fluctuations, particularly draw-downs, are critical to the health of the lake, but they are greatly reduced under current water flow management. Low water years encourage shallow areas to revegetate, encourage rice germination, scour and clear fish spawning beds, and flush silt from substrate in spawning streams. As a result of stable water levels, Leech Lake has all but lost river run walleye spawning, and has become reliant on lake spawning walleye.

The introduction and proliferation of non-native species is also of critical concern as they can quickly damage a lake ecosystem. Leech Lake already has a number of non-native species that are affecting its

health. These include Eurasian milfoil, rusty crayfish, curly leaf pond weed, banded mystery snails, and purple loosestrife. Current efforts to control Eurasian milfoil by the MnDNR include herbicide application known populations in harbors. It is uncertain how long this method will control milfoil. It is also unknown what the long-term effect herbicides will have on lake-ecosystem health or the traditional and recreational use of aquatic resources.

Purple loosestrife is being controlled by the LLDRM by releasing a biological control insect that eats the plant and greatly reduces seed production. Unfortunately biological control agents are not currently available for many species, and despite best efforts, effective agents may ever be developed for many species.

Non natives in the upland can also be of concern as what happens in the uplands eventually ends up affecting our lakes. Non-native earthworms are an issue in this area. None of the red-colored terrestrial earthworms found in this area are native. They have all been introduced from Europe, primarily through the activities of anglers. Almost all of the maple basswood forests surrounding Leech Lake are already heavily infested. Unfortunately, there appears to be no way of controlling non-native earthworms. Once earthworms invade, they alter ecosystem function from the forest floor and up. Major impacts include: 1) changes in the process of decomposition within the litter-duff layer, 2) negative impacts to plant diversity and abundance, and 3) reduction of tree growth and tree seedlings survival that is important to forest regeneration.

So why should these changes concern lake users? These changes to the forest floor likely result in increased water run-off, which in turn, may result in nutrient loading and sedimentation of nearby streams and lakes. Research aimed at understanding soil nutrient loss and run-off has been started here on the Leech Lake Reservation (through University of Delaware).

Two of the biggest threats Leech Lake faces are the introduction of zebra mussels and carp. Zebra mussels are in the Superior drainage and are documented in Mille Lacs, Mississippi drainage. This species, in high numbers, has the ability to change the base of the food chain in the lake by consuming much of the food supply for smaller organism.

Carp are also of grave concern as they uproot vegetation and reduce water clarity. This species alone is the reason we support the retention of the dams on some of our lakes, despite all the problems associated with dams, as they are delaying the arrival of carp. Proliferation of carp in Leech Lake would be far worse than the affects of the dam.

In summary, non-native invasive species are (potentially) extremely detrimental to natural aquatic systems. They can destroy native aquatic habitats, alter species composition, impact food-web dynamics, and create potential for further invasions. Preventing invasives species from establishing is more involved than just checking, draining, or drying equipment---**habitat** is the foundation to a prosperous lake. The underlying foundation of habitat must remain sufficiently healthy (quality) and widespread (quantity) to work properly and support recreation. As we stated earlier, habitat within the lake, as well as, the surrounding landscape play critical roles in assuring the long-term health of Leech Lake, and the economic viability of the water-based recreation of Walker.