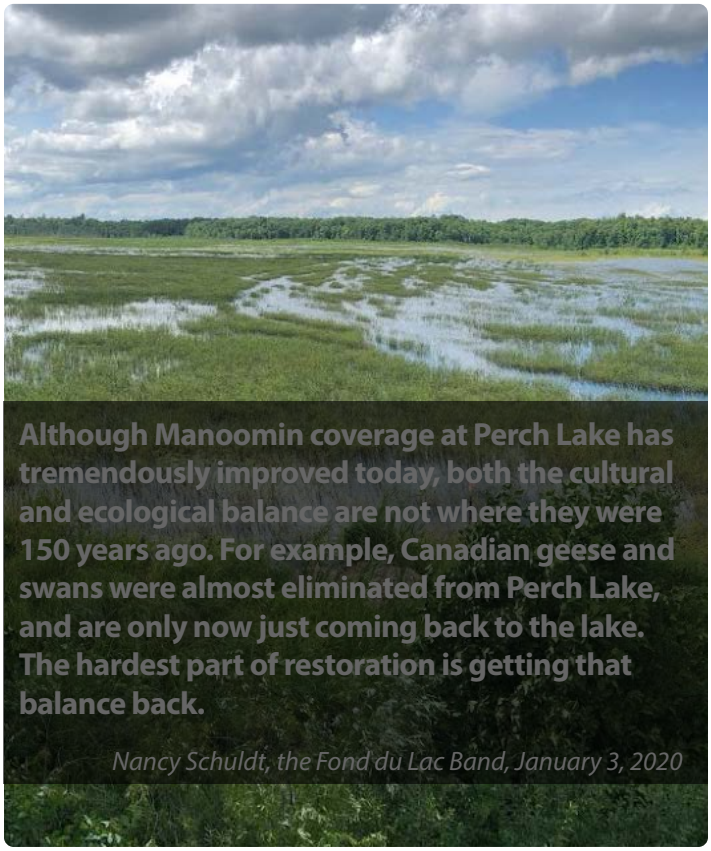
Restoration of Perch Lake increases cultural and ecological services

Efforts by the Fond du Lac Band show some improvement in Manoomin coverage

Recent restoration efforts at Perch Lake, or Aatawemegokokaaning, have improved the cultural and ecological services of the lake's Manoomin (wild rice) and its associated habitat. However, given the significant historical losses, much more restoration is needed. Based on methods applied in this study, it would take an additional 5,204 acres of similar Manoomin restoration to counter-balance the lost cultural and ecological services that have occurred over time. This is equivalent in scale to 13 times the current restoration efforts at Perch Lake.



Although Manoomin coverage at Perch Lake has tremendously improved today, both the cultural and ecological balance are not where they were 150 years ago. For example, Canadian geese and swans were almost eliminated from Perch Lake, and are only now just coming back to the lake. The hardest part of restoration is getting that balance back.

Nancy Schuldt, the Fond du Lac Band, January 3, 2020

Credit: Lake Superior National Estuarine Research Reserve education intern Riley Oliver

Threats to Manoomin at Perch Lake

Historically, Perch Lake had abundant Manoomin habitat. In the early 1900s, many streams and wetland areas were ditched and drained to accommodate farming. After Perch Lake was ditched for agriculture around 1918 to 1921, the lake experienced a decline in Manoomin (Nancy Schuldt, personal communication, October 7, 2019).

To try to minimize the impacts of ditching, a concrete dam was installed at the lake outlet in 1936. The dam was managed to mimic the natural fluctuation of the water to benefit Manoomin. By the 1960s, the dam fell into disrepair and was non-functional. For the following several decades, lake levels were lower and stagnant, which allowed ginoozhegoons (pickerelweed) to displace Manoomin and become the dominant vegetation in the lake's rice waters (Fond du Lac Band, 2018, 2019).

About Perch Lake

Perch Lake is located on the Fond du Lac Band of Lake Superior Chippewa Reservation in Minnesota. It is an approximately 650-acre, double-basin lake. The shallow, southern portion of the lake is approximately 400 acres, and it is the largest Manoomin-containing habitat on the Reservation (Fond du Lac Band, 2008). The northern basin also supports some Manoomin along its fringes.

Perch Lake is an important traditional cultural property, used as a wild rice lake, a fisheries/spearing and netting site, and hunting grounds (Fond du Lac Band, 2018). Historical evidence suggests that Manoomin has been present at Perch Lake for over 2,000 years, with historical stands on approximately 392 acres (Fond du Lac Band, 2018).

Actions taken to improve the abundance of Manoomin at Perch Lake

In 1998, a new water control structure was built at the outlet of Perch Lake to manage water levels for Manoomin and improve hydrologic function throughout the watershed (Fond du Lac Band, 2018). In 2001, the Fond du Lac Band began intensive mechanical vegetation removal of ginoozhegoons, a native perennial species that occupies the same habitat as Manoomin and often outcompetes Manoomin (Fond du Lac Band, 2018). Using a sedge mat cutter and aquatic harvesters, the Fond du Lac Band removed ginoozhegoons vegetation at least twice yearly. This process led to high Manoomin density in restored areas initially. However, three to five years after each removal, ginoozhegoons became dominant again, which called for a rotating schedule for removing this competing plant.

In 2012, Perch Lake experienced a 500-year flood in mid-summer, and the Fond du Lac Band used the water control structure to keep water levels high and eliminate as much ginoozhegoons as possible. The following year, Manoomin stands were so thick that it was difficult to travel through the lake. Learning from the natural flood event, the Fond du Lac Band then developed a management strategy to bring lake levels to flood stage every four years to stress perennial species, such as ginoozhegoons, which compete with Manoomin for habitat. Although this strategy also limits Manoomin production in flood years, it provides Manoomin with a competitive advantage in the years following a flood stage year (Fond du Lac Band, 2018).

With water level management and mechanical removal of competitive vegetation, the Fond du Lac Band has successfully restored Manoomin to over 200 acres on Perch Lake (Fond du Lac Band, 2019).

Sedge mat cutter. Credit: Fond du Lac Band, 2018.

Aquatic harvester. Credit: Fond du Lac Band, 2018.

Perch Lake. Credit: Lake Superior National Estuarine Research Reserve education intern Riley Oliver.

Approach to characterizing Manoomin at Perch Lake

Twelve metrics characterize the cultural and ecological functions of Perch Lake's Manoomin and its associated habitat. These metrics describe how Manoomin at Perch Lake contributes to maintaining connections with the Anishinaabe culture, how it supports ecological functionality and is resilient to changing conditions, and how it allows for continued learning and sharing of Anishinaabe values.

Cultural Metrics

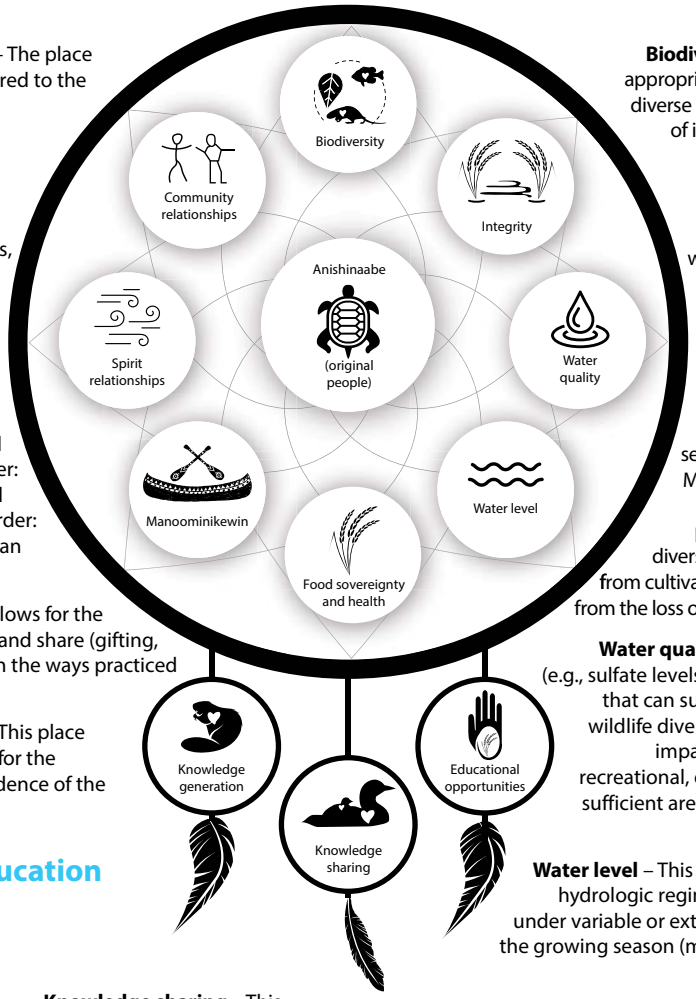
Anishinaabe (original people) – The place provides Manoomin, which is sacred to the Anishinaabe and central to the foundations of their culture, sovereignty, and treaty rights.

Community relationships – Manoomin at this place contributes to bonding, traditions, and strengthening family and community connections.

Spirit relationships – Manoomin at this place enables the Anishinaabe to maintain connections and balance with spirit beings (or relatives) from all other orders of creation (first order: rock, water, fire and wind; second order: other plant beings; third order: animal beings; fourth order: human beings).

Manoominikewin – This place allows for the Anishinaabe to harvest, prepare, and share (gifting, healing, and eating) Manoomin in the ways practiced by their ancestors for centuries.

Food sovereignty and health – This place provides the capacity to provide for the sustenance, health, and independence of the Anishinaabe.



Ecological Metrics

Biodiversity – Healthy Manoomin and appropriate habitat at this place supports diverse biological communities (e.g., free of invasive species) that indicate the capacity of the place to support abundant associated plant and animal species (e.g., other native aquatic vegetation, fish, waterfowl, muskrat), providing for spiritual and subsistence needs.

Integrity – Physical habitat and hydrology, and water and sediment chemistry support stands of Manoomin that exhibit natural annual variability; viable seed bank ensures that sustainable Manoomin populations will persist even after occasional poor production years. Natural genetic diversity is maintained without impact from cultivated strains, or reduced gene flow from the loss of nearby Manoomin populations.

Water quality – This place has clean water (e.g., sulfate levels below 10 ppm) and sediments that can support robust stand density and wildlife diversity; is free of contamination or impacts from industrial, agricultural, recreational, or residential influence; and is of sufficient areal extent to sustain a Manoomin population.

Water level – This place has a natural or managed hydrologic regime that can maximize resilience under variable or extreme climatic conditions across the growing season (maintaining optimal depth range and flow).

Cultural and Ecological Education Metrics

Knowledge generation – This place allows for continued learning and generation of the Anishinaabe practices, values, beliefs, and language through experience.

Knowledge sharing – This place allows for the continued sharing and transmittal of the Anishinaabe practices, values, beliefs, and language among family members and community.

Educational opportunities – This place provides opportunities for language, land stewardship, and other educational programs, such as educational rice camps.

Cultural and ecological characterization at Perch Lake

Manoomin and its associated habitat at Perch Lake were characterized over four time periods. Each metric was ranked using the following five-point descriptive scale: No use, Very bad, Not very good, Pretty good, Doing great

1900 to 1920: Before agricultural ditching

Before it was ditched for agriculture, Perch Lake historically had abundant Manoomin stands. Fond du Lac resource managers estimate that nearly 60% of the lake had extensive Manoomin stands during this time, and it was harvested by the community. Based on the combined ranking of cultural and ecological metrics, Perch Lake was characterized as "doing great" during this first time period.

1921 to 1970: With agricultural ditching

After agricultural ditching of Perch Lake, Manoomin and its associated habitat declined abruptly. Lower and stagnant water levels allowed ginoozhegoons to become the dominant vegetation in the lake, displacing Manoomin, which resulted in a decline in use of the lake by waterfowl and other wildlife. Band members were unable to harvest Manoomin in the ways they did historically, which limited the generation and sharing of Anishinaabe practices, values, and beliefs. During this period of time, Perch Lake was characterized as "not very good" based on the combined ranking of cultural and ecological metrics.

1971 to 1997: Before the new water control structure and restoration actions

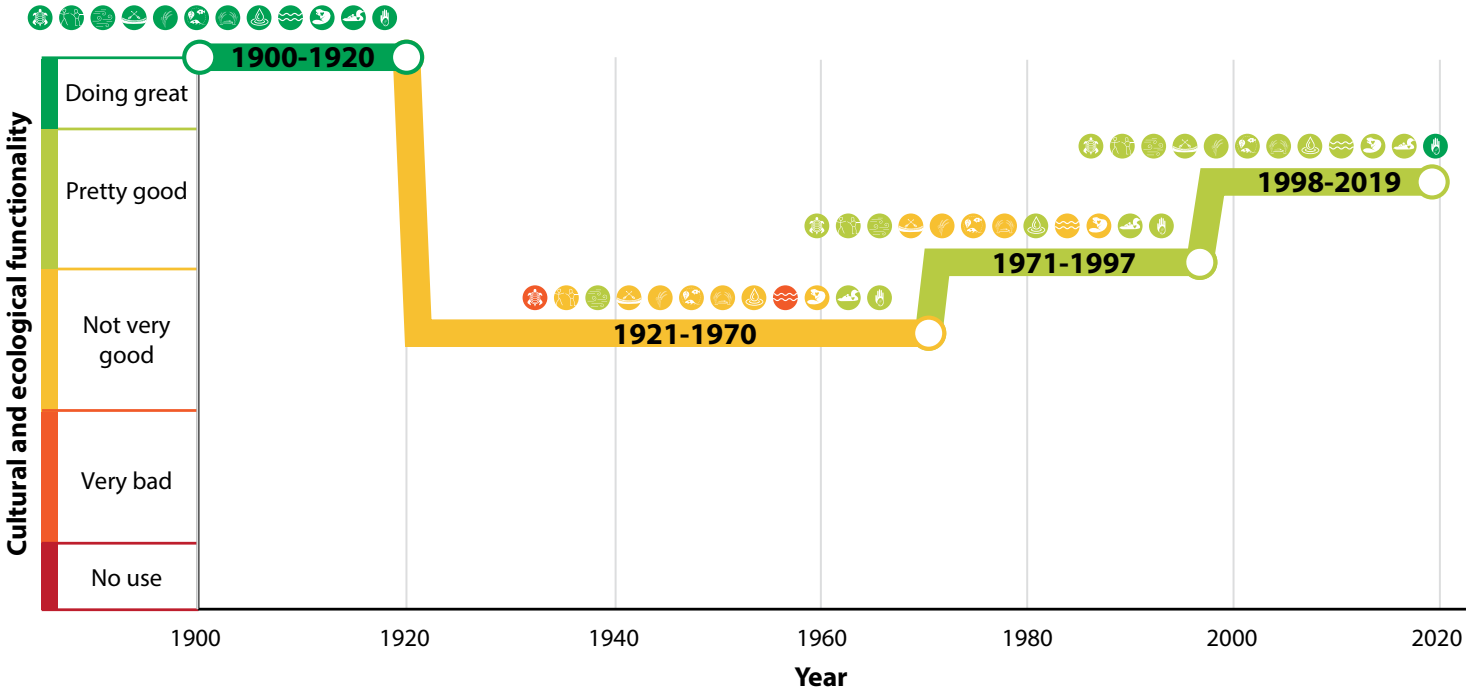
During this period, Perch Lake had a significant decline in Manoomin abundance and functionality; approximately 75% of the lake was covered with plant species that occupy the same habitat as and compete with Manoomin. Although Perch Lake's ecological and cultural functionality remained low, Band members continued to try to harvest at the lake; therefore, the lake provided some cultural services during this period. Many elders and wild rice chiefs believe Manoomin is a blessing and is seen as a golden age of their youth. For these reasons, Perch Lake ranked as "pretty good," which was slightly higher than the previous time period.

1998 to 2019: With the new water control structure and restoration actions

The water control structure built at the outlet of Perch Lake in 1998 helped restore the hydrologic conditions of the lake and improve Manoomin and its associated habitat. Active management of the lake started in 2001 and accelerated in 2012, which further restored hydrologic conditions of the lake and removed competing vegetation, all benefiting Manoomin. During this time period, the Fond du Lac Band was fairly successful at restoring Manoomin on Perch Lake. Manoomin covers over 200 acres of Perch Lake, which is about 30% of its historical coverage. Currently, Perch Lake is ranked as "pretty good" based on the combined ranking of cultural and ecological metrics.

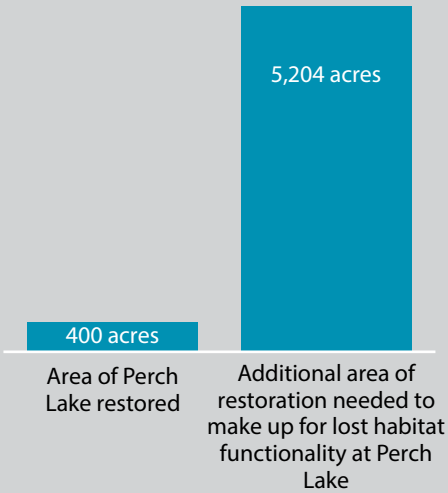
Cultural and ecological characterization at Perch Lake

The cultural and ecological functionality provided by the Manoomin and its associated habitat at Perch Lake varied over time, both in aggregate and for individual metrics.



Additional restoration needed

Using the characterization of Perch Lake over the four time periods, a habitat equivalency analysis demonstrates the additional equivalent units of restoration needed to counter-balance the severity and timespan of degradation. Given the success of restoration over the shallow, southern 400 acres of Perch Lake, approximately 5,204 acres of similar Manoomin restoration are needed to counter-balance the lost habitat functionality that has occurred over time. In other words, 13 equivalent restoration efforts at Perch Lake (from 1971 to 2019) are needed to counter-balance the lost cultural and ecological habitat functionality (from 1921 to 1970).



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About this effort

This case study is part of the Lake Superior Manoomin Cultural and Ecosystem Characterization Study. The project was initiated by a team of Lake Superior Basin Anishinaabe communities, and federal and state agencies, with technical support from Abt Associates. This project aims to describe the importance of Manoomin to help foster community stewardship and education; and to inform Manoomin management, protection, and policy in the Lake Superior region and throughout the Great Lakes. Funding for this project was received via Great Lakes Restoration Initiative. For more information on the Initiative and Action Plan go to https://www.glri.us/.

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