



# Restoration of Lac Vieux Desert's Rice Bay increases cultural and ecological functionality

## Significant progress made but additional restoration could counter-balance losses

Recent restoration efforts at Lac Vieux Desert's Rice Bay have improved the cultural and ecological functionality of the bay's Manoomin (wild rice) and its associated habitat. However, given the significant losses, much more restoration is needed. Based on the methods applied in this study, it would take an additional 3,034 acres of similar Manoomin restoration to counter-balance the lost cultural and ecological functionality that has occurred over time. This is equivalent in scale to 12 times the current restoration efforts at Rice Bay. In addition, future restoration actions will need to be adaptive to respond to changing precipitation patterns.

### Threats to Manoomin at Rice Bay

Lac Vieux Desert was dammed around 1870 for logging operations. By 1907 the Wisconsin Valley Improvement Company (WVIC) began operating the lake as a storage reservoir and used the dam to create uniform stream flow down the Wisconsin River to reduce flooding events, facilitate hydroelectric power generation, and regulate effluent discharge downstream. In 1937, WVIC replaced the wooden dam with a reinforced concrete and steel structure. The high water levels caused by the dam initiated a decline in Manoomin (Labine, 2017). From 1938 to 1952, Manoomin declined steadily and community members stopped harvesting it during this period (Barton, 2018). During this period, lakeside property owners became concerned about the erosion caused by rising lake levels.

More recently, heavy rainfall events have negatively affected Manoomin in Lac Vieux Desert [Roger Labine, Lac Vieux



**"Manoomin is like the canary in the coal mine for water quality. It grows in high water quality, and when water quality declines, so does Manoomin."**

*Roger Labine, Lac Vieux Desert Band of Lake Superior Chippewa  
November 12, 2019*

*Credit: Todd Marsee, Michigan Sea Grant*

Desert Band of Lake Superior Chippewa (LVD Band), personal communication, February 15, 2020]. In the spring, Manoomin is in the floating leaf stage, and can be uprooted by heavy rainfall that raises water levels. In the summer, when Manoomin is in the flowering stage, heavy rainfall can knock Manoomin pollen down from the flower to the water's surface, which prevents pollination and results in "ghost rice" or empty hulls that never fill. In addition, the combination of heavy rainfall events and higher air temperatures may also increase the amount of brown spot – a destructive wild rice fungal disease – in Manoomin beds.

### About Lac Vieux Desert's Rice Bay

Lac Vieux Desert, located in Vilas County, Wisconsin, and Gogebic County, Michigan, is over 4,000 acres. Historically, Manoomin covered many parts of Lac Vieux Desert, including Rice Bay, Thunder Bay, Slaughters Bay, Misery Bay, and along the northwestern shore to the Wisconsin River and parts of the south shore.

Rice Bay is a 243-acre bay on the northeastern portion of Lac Vieux Desert, which historically contained a significant stand of Manoomin that was traditionally managed and harvested by the LVD Band. West of Rice Bay is Ketegitigaaning, a ricing village used intermittently in the early 18th century by the LVD Band, followed by continuous habitation by 1900. In 2015, Rice Bay was registered as a Traditional Cultural Property on the National Register of Historic Places.





## Actions taken to improve the abundance of Manoomin at Rice Bay

In 1991, a coalition of tribal, state, and federal governments and governmental agencies determined the operating regime of the dam on Lac Vieux Desert had been detrimental to Manoomin and its associated habitat (Onterra, 2012). By 2001, following a decade of negotiation and litigation, WVIC lowered the maximum operating level by about nine inches and provided financial contribution toward a Manoomin seeding and monitoring program (Barton, 2018). From 2002 to 2005, Lac Vieux Desert was seeded with 14,000 pounds of Manoomin, most of which occurred in Rice Bay (Labine, 2017). From 2007 through 2012, as Manoomin became reestablished on Rice Bay, the LVD Band held traditional ricing camps and workshops, which included traditional practices and activities (Barton and Labine, 2013).

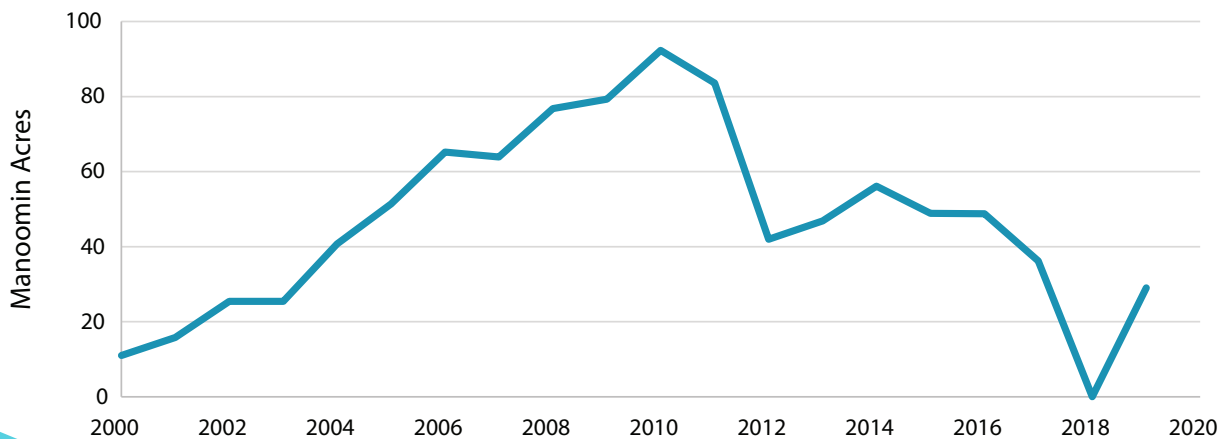


From 2000 to 2010, the acreage of Manoomin on Rice Bay significantly increased. In 2000, Rice Bay had just 11 acres of Manoomin coverage (or 5% of Rice Bay). After the first year of seeding, Manoomin coverage increased to over 25 acres (or 10% of Rice Bay; top aerial photograph). With below-average rainfall conditions in 2010, the extent of Manoomin increased to over 92 acres (or 38% of Rice Bay; bottom aerial photograph). While the extent of Manoomin on Rice Bay was less than its historical coverage, it was considered an improvement over conditions caused by the operating regime of the concrete dam (Barton, 2018).



Since 2011, the acreage of Manoomin on Rice Bay has been declining, with 34 acres in 2019 (GLIFWC, 2019). Because Manoomin abundance on Rice Bay is generally greatest during low-water years, natural resource managers believe this may be due to above-average precipitation over the past seven years (Peter David, GLIFWC, personal communication, November 12, 2019).

Manoomin abundance on Lac Vieux Desert Lake's Rice Bay in 2003 (above) and 2010 (below). Credit: Peter David, Great Lakes Indian Fish & Wildlife Commission (GLIFWC).



**Manoomin acreage on Rice Bay, 2000 to 2019**

Credit: GLIFWC, 2019.



## Approach to characterizing Manoomin at Rice Bay

Twelve metrics characterize the cultural and ecological functions of Rice Bay's Manoomin and its associated habitat. These metrics describe how Manoomin at Rice Bay contributes to maintaining connections with the Anishinaabe culture, how ecological functionality is supported and resilient to changing conditions, and how continued learning and sharing of Anishinaabe values are promoted.

### 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.

### 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.

### 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.



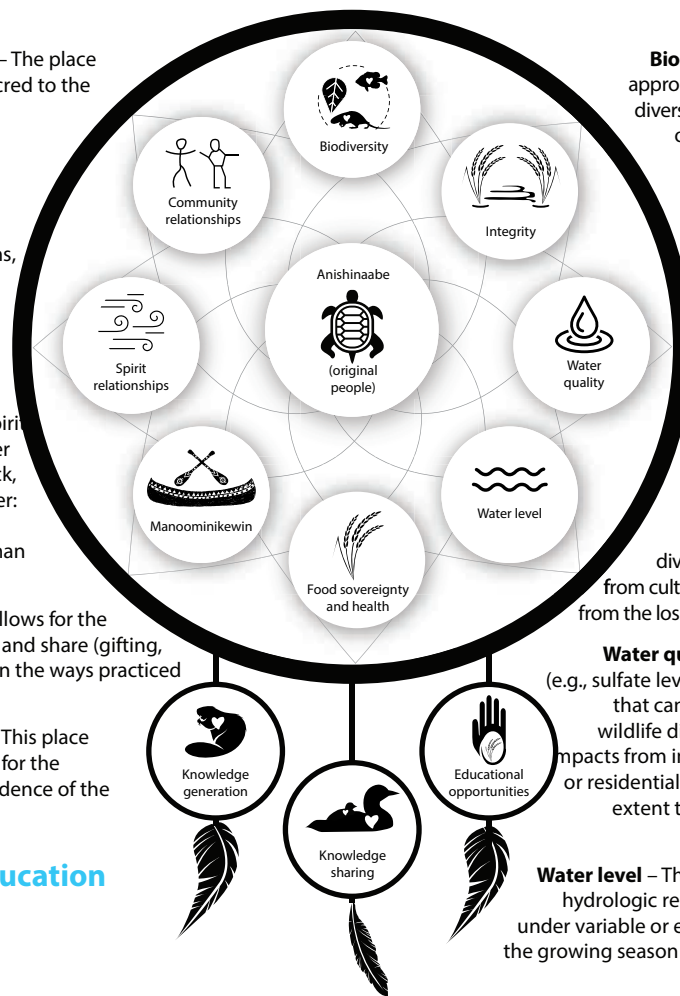
**Integrity** – Physical habitat and hydrology, and water and sediment chemistry support stands of Manoomin that exhibit natural annual variability; viable seed bank ensures that sustainable Manoomin populations will persist even after occasional poor production years. Natural genetic diversity is maintained 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 characterization at Rice Bay

Rice Bay's Manoomin and its associated habitat 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 1936: With a wooden dam



Based on the combined ranking of cultural and ecological metrics, Rice Bay was characterized as “doing great” during this period. In the early 1900s, Ketegitigaaning was inhabited and the community harvested Manoomin in Rice Bay for gifting, healing, and consumption. The area also boasted a rich biodiversity; and hunting, trapping, fishing, and gathering local resources were common.

### 1937 to 1990: With a concrete and steel dam



After the replacement of the wooden dam with a concrete and steel structure, Manoomin declined steadily until the mid-1950s to the point that it was no longer harvestable by community members. During this time period, community members moved away from the lake and into surrounding towns, and stopped harvesting Manoomin in Rice Bay. The “disappearance of Manoomin started the deterioration of the Lac Vieux Desert community,” where bonding, traditions, and community connections ceased (Roger Labine, LVD Band, personal communication, November 12, 2019). There was a steady decline in cultural and ecological functionality provided by Manoomin from 1937 to the mid-1950s, when Rice Bay was characterized as “very bad” based on the combined ranking of cultural and ecological metrics.

### 1991 to 2012: With restoration actions



Once restoration actions began in the 1990s, cultural and ecological functionality provided by Manoomin improved. By 2008, the LVD Band opened Rice Bay for Manoomin harvest and began hosting rice camps in the area for the first time since 1940. Although the community began knowledge sharing, knowledge generation, and educational opportunities increased, it remained difficult to get many community members interested in Manoomin because of its absence over the last 50 years. Even so, restoration actions led to an increase in cultural and ecological functionality. By 2012, Rice Bay ranked as “pretty good” based on the combined ranking of cultural and ecological metrics.

### 2013 to 2019: With restoration actions and above-average precipitation

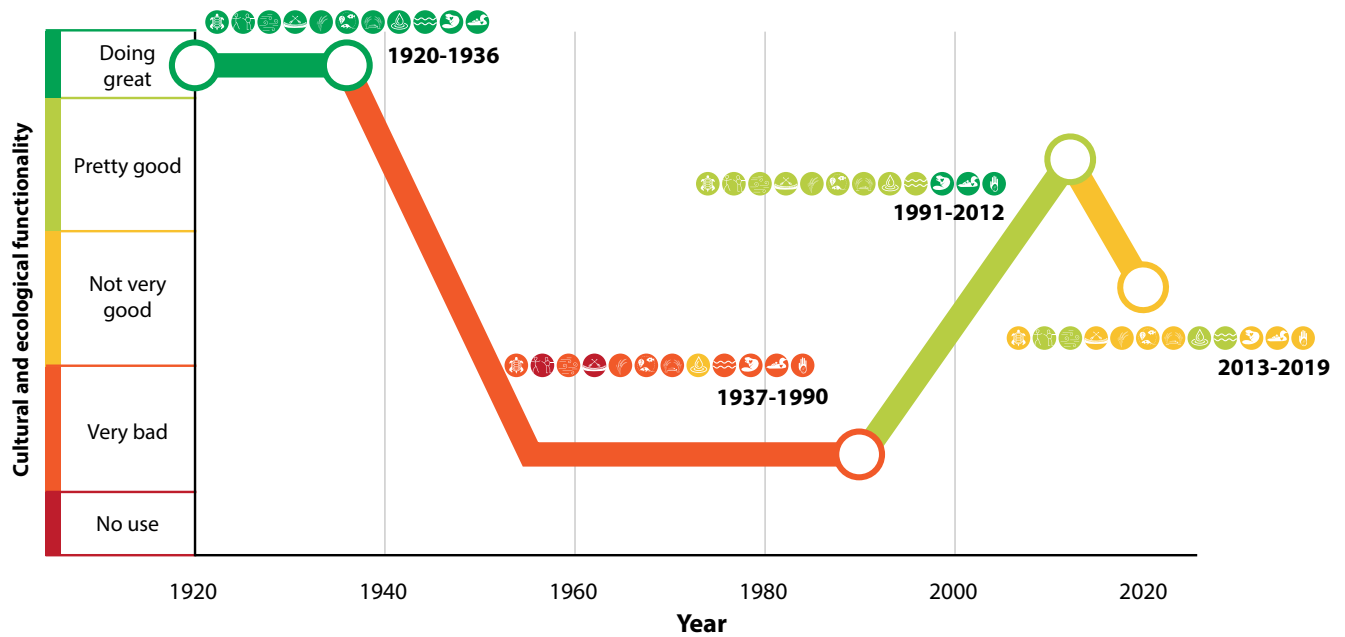


With heavy rainfall events negatively affecting Manoomin beds during the growing season, cultural and ecological functionality at Rice Bay have declined. Currently, Rice Bay is ranked as “not very good” based on the combined ranking of cultural and ecological metrics. The decrease in ecological and cultural functionality provided by Manoomin in recent years suggests the need for adaptive management of Manoomin. Actions taken that may have been successful in restoring Manoomin in the past may need to be adjusted to respond to additional threats, such as climate change, to be successful in the future.



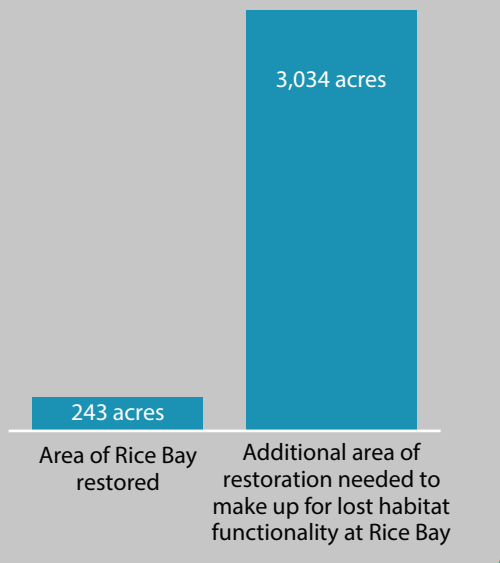
## Cultural and ecological characterization at Rice Bay

Cultural and ecological functionality provided by Manoomin and its associated habitat at Rice Bay have changed over time, both in total and for individual metrics.



### Additional Restoration Needed

Based on the characterization of the degree of cultural and ecological function 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 at the 243-acre Rice Bay, 3,034 acres of similar Manoomin restoration is needed to counter-balance the lost habitat functionality that has occurred over time. In other words, 12 equivalent restoration efforts at Rice Bay (from 1991 to 2019) are needed to counter-balance the lost cultural and ecological habitat functionality (from 1937 to 1990).





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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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