



**Manoomin (Wild Rice)
Enhancement and Research
in the Ceded Territories in 2001**

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MANOOMIN (WILD RICE) ENHANCEMENT AND RESEARCH IN THE CEDED TERRITORIES - 2001

INTRODUCTION

The Great Lakes Indian Fish and Wildlife Commission (GLIFWC) conducts a wild rice (*Zizania aquatica*) enhancement and research program in the territories ceded in the Treaties of 1836, 1837, 1842 and 1854. Most wild rice management projects are conducted cooperatively with other natural resource agencies. This report summarizes activities carried out under this program in 2001

Manoomin has been a staple in the diet of native people in the upper Great Lakes region for over 1000 years (Johnson 1970). It has been an important component of the diet and the culture of the Ojibwe people since their immigration into the heart of wild rice range nearly 3 centuries ago (Vennum 1988). With the arrival of Europeans, wild rice also became an important economic commodity, providing critical nutrition to the fur-trappers and traders moving into the area. Today, manoomin retains extraordinary significance to the Chippewa, and is considered sacred food. The September moon is still referred to as the rice making moon (Manoominike Giizis), and the harvest season is still celebrated with traditional pow-wows.

In addition to its value to Native Americans, wild rice provides a valuable food source for wildlife, and its presence increases the biological diversity of wetlands. Wild rice can also improve water quality by tying up nutrients and by decreasing the wind action across lakes that can suspend particles and lead to water clarity and quality problems. Unfortunately, wild rice is much less abundant than it was historically.

The re-affirmation of off-reservation treaty rights has restored the Tribes' opportunity to manage wild rice in the ceded territories. The general objective for the enhancement program is to increase the amount of wild rice in the ceded territories through the reestablishment of historic beds and the development of new beds. In 1985, GLIFWC and the Wisconsin DNR cooperated in the first attempt to inventory wild rice beds in Wisconsin. In 1987, GLIFWC began off-reservation seeding activities by planting 200 pounds of seed in Pat Shay Lake, Vilas County, Wisconsin in cooperation with the Nicolet National Forest (NNF), and providing approximately 100 pounds of seed to the Wisconsin Department of Natural Resources (WDNR) for seeding on a state wildlife area. The seeding program grew gradually over the next several years, until it expanded significantly to 5,775 pounds in 1991 (Figure 1) with funding support from the Bureau of Indian Affairs' Circle of Flight program. The seeding of over 7,200 pounds in 2001 is summarized below.

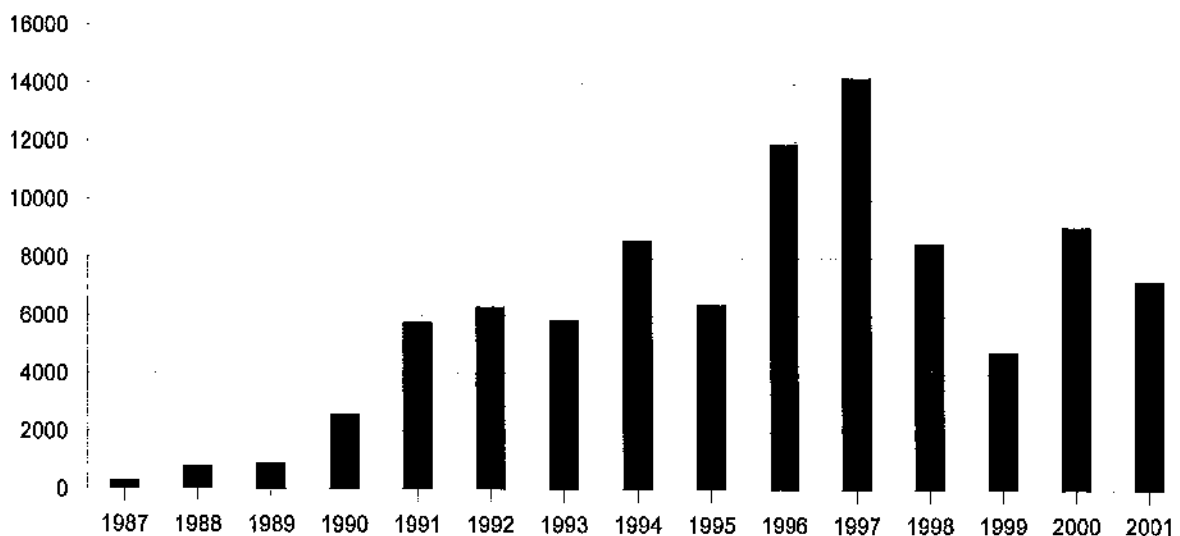


Figure 1. Pounds of wild rice seeded, 1987-2001.

ENHANCEMENT

Seeding Summary

In 2001, as in other recent years, GLIFWC concentrated its management efforts on purchasing locally harvested rice and distributing it to cooperators (listed below) who conducted the majority of the seeding. Seeding sites were selected by GLIFWC staff, member Tribes, cooperators, or some combination of the three. With the assistance of these cooperators a total of 7,223 pounds of wild rice was seeded in at least 21 waters in 7 Wisconsin and 3 Michigan counties. A special emphasis in 2001 was an intensive seeding on Lac Vieux Desert (see below).

Cooperative Activities

GLIFWC's wild rice seeding program is a highly cooperative effort. Without the strong financial and manpower support of numerous partners, this important undertaking would be far less successful. The tribes' interest in this resource has acted as a catalyst, stimulating effective partnerships with other agencies sharing a concern for this resource. Cooperators in 2001 included GLIFWC member tribes, including the Lac Vieux Desert Band, the Keweenaw Bay Indian Community, the Bay Mills Community, the Lac du Flambeau Band, and the Red Cliff Band; the Chequamegon/Nicolet and Ottawa National Forests; the Wisconsin Department of Natural Resources (WDNR), the Michigan Department of Natural Resources (MDNR), Langlade County, and the Wisconsin Valley Improvement Company. The contributions of each of these cooperators on individual waters are summarized by project site below.

Seed Purchasing

Similar to 2000, seed purchasing in 2001 was hindered by a poor manoomin crop in Wisconsin, but aided by good production on many Minnesota waters. In Wisconsin, the crop was 29% below the 1985-2001 average, based on GLIFWC's annual crop index (David 2008); the third lowest index recorded over that period. However, by paying \$2 per pound for green seed, and with better production on many Minnesota lakes, including those on the Fond du Lac and Leech Lake reservation, GLIFWC was able to purchase 7,223 pounds of seed (Figure 1). Seed purchased was harvested from at least 12 different waters, with the largest amounts coming from Upper Ninemile Flowage (Vilas County WI, 1,695 pounds), Pillager Lake (Cass County, MN, 1,547 pounds), and Perch Lake, (Carlton County, MN, 973 pounds). No other water supplied more than 500 pounds of seed.

Seeding

At least 16 Wisconsin and six Michigan waters received 7,223 pounds of seed under cooperative seeding ventures in 2001. (One water, Lobischer Creek, crosses the state line, and was seeded in both states.) The number of sites seeded in 2001 was lower than in many recent years because emphasis was placed on heavily seeding Lac Vieux Desert as part of an experimental restoration effort. This effort required a reduction in the maximum operating level of this lake, a change that was done under a temporary modification of the operating license for the dam on the lake's outlet. This license, held by the Wisconsin Valley Improvement Company, is issued by the Federal Energy Regulatory Commission (FERC).

Seeding was done at a rate of approximately 50 pounds per acre, so approximately 145 acres were seeded. Figure 2 displays the locations of seeded waters. All sites were seeded in the fall. Sites seeded were:

- 1-3) Name:** Cylon Wildlife Area Sites: 3 unnamed flowages: T31N, R16W, Sections 14, 16 and 22
Location: North-central St. Croix County
Cooperator: WDNR
Seed Source: Mondeaux Flowage, Taylor County, WI
Summary: A total of 178 pounds of seed was divided roughly equally among 3 unnamed flowages on the Cylon Wildlife Area in the second seeding attempt on this wildlife area. Seed was cost-shared by WDNR and GLIFWC; seeding was done by DNR staff.

- 4) Name:** Red Cliff On-Reservation Sites
Location: Northeast Bayfield County
Cooperator: Red Cliff Band of Lake Superior Chippewas
Seed Source: Rice (Pillager) Lake, Cass County, MN (281 pounds); Upper Ninemile Lake, Vilas County, WI (117 pounds); Rice Lake, Forest County, WI (68 pounds) and Long (Wills) Lake, Todd County, MN (55 pounds)

- Summary:** 521 pounds of seed purchased by GLIFWC on behalf of the Red Cliff Band was seeded by the Band on various on-reservation waters.
- 5) **Name:** Popple Creek Flowage
Location: Northern Price County
Cooperator: USFS
Seed Source: Mondeaux Flowage, Taylor County, WI
Summary: Approximately 107 pounds of seed purchased by GLIFWC with USFS and COF funds was seeded by the USFS in the third seeding of this water. This is a relatively new flowage, located north of the Wilson Flowage. Only minor take was noted from the previous seedings, despite a growing take on the Wilson Flowage located just downstream.
- 6) **Name:** Upper Wilson Flowage
Location: Northern Price County
Cooperator: USFS
Seed Source: Mondeaux Flowage, Taylor County, WI
Summary: Approximately 200 pounds of seed purchased by GLIFWC with USFS and COF funds was seeded by the USFS in at least the third seeding of this water. This site is associated with the Wilson, which is located immediately downstream, and the two flowages are often collectively referred to simply as Wilson; rice is now established on both flowages, but the northern one supports the larger beds.
- 7-8) **Name:** Lac du Flambeau On-Reservation Sites: Sugarbush Impoundment and Chewelah Lake
Location: Sugarbush Impoundment: Southeast Iron County; Chewelah Lake: West-central Vilas County
Cooperator: Lac du Flambeau Band
Seed Source: Not recorded
Summary: 300 pounds and 270 pounds of seed purchased by GLIFWC on behalf of the Lac du Flambeau Band was seeded by the Band on Chewelah Lake and the Sugarbush Impoundment respectively.
- 9-14) **Name:** Ackley Wildlife Area Flowages: Gleason/South Grade, Middle Trappe, Pot, Section 27, Tower and Upper Trappe
Location: Southwest Langlade County, WI
Cooperators: Wisconsin Department of Natural Resources, Langlade County
Seed Source: Upper Ninemile Flowage, Vilas County, WI
Summary: A total of 1,000 pounds of seed purchased by GLIFWC and Langlade County was seeded into these 6 small flowages on the Ackley Wildlife Area by the WDNR. Approximate distribution of seed was: Gleason/South Grade: 150 pounds; Middle Trappe: 150 pounds; Pot: 200 pounds; Section 27: 150 pounds; Tower: 150 pounds; Upper Trappe: 200 pounds. These are believed to be the initial seeding attempts for each site.

- 15) **Name:** Grub Hoe Lake
Location: Central Florence County, WI
Cooperator: None
Seed Source: Perch Lake, Carlton County, MN (140 pounds) and Upper Ninemile, Vilas County, WI (130 pounds)
Summary: 270 pounds of seed purchased by GLIFWC with COF funds was seeded by GLIFWC on this undeveloped lake in an initial seeding attempt.
- 16) **Name:** Presque Isle Flowage
Location: South-central Gogebic County, Michigan
Cooperator: MiDNR
Seed Source: Upper Ninemile, Vilas County, WI (191 pounds); Pillager Lake, Cass County MN (120 pounds); Tamarack Lake, Carlton County, MN (100 pounds) and Long Lake, Burnett County, WI (95 pounds)
Summary: 506 pounds of seed purchased by GLIFWC with COF funds was seeded by GLIFWC on this flowage, which had previously been seeded in 1997, 1998 and 2000. A bed is becoming established near the mid-point of this flowage, and along bends adjacent to the primary channel.
- 17) **Name:** Lac Vieux Desert
Location: Southeastern Gogebic County, Michigan
Cooperators: Lac Vicux Desert Band of Chippewa Indians; Nicolet/Chequamegon and Ottawa National Forests; MiDNR, Wisconsin Valley Improvement Company
Seed Source: Pillager Lake, Cass County MN (1,142 pounds); Perch Lake, Carlton County, MN (693 pounds); Lac Vieux Desert (399 pounds); Tamarack Lake, Carlton County, MN (279 pounds); Rogers Lake, Todd County, MN (107 pounds); Long Lake, Burnett County, WI (52 pounds); North Fork Flowage, Burnett County, WI (52 pounds); Long Lake, Todd County, MN (52 pounds) and Upper Ninemile Flowage, Vilas County WI (44 pounds).
Summary: 2,820 pounds of seed purchased by GLIFWC with funds from the Wisconsin Valley Improvement Company was seeded in Rice Bay (2,700 pounds) or Misery Bay (120 pounds) of Lac Vieux Desert by the National Forest Service and GLIFWC. Although this site had been frequently seeded by the LVD Band in recent years, this large seeding was the first conducted under a new experimental modification of the operational license for the dam, reducing the maximum operating depth of the lake by roughly 10 inches.
- 18) **Name:** Lobischer Creek
Location: Southeastern Gogebic County, Michigan and Northeast Vilas County, Wisconsin
Cooperator: None
Seed Source: Perch Lake, Carlton County, MN (110 pounds) and Upper Ninemile Flowage, Vilas County, WI (70 pounds)
Summary: 180 pounds of seed purchased by GLIFWC with COF funds was seeded by GLIFWC in the initial seeding of this small tributary to Lac Vieux Desert. About half of

the seed was sown into the Wisconsin section of the creek; the other half in the adjacent Michigan section.

- 19) Name:** Keweenaw Bay On-reservation Sites
Location: Northcentral Baraga County, Michigan
Cooperator: Keweenaw Bay Indian Community
Seed Source: Upper Ninemile Flowage, Vilas County, WI (143 pounds); Pillager Lake, Cass County, MN (121 pounds); North Fork Flowage, Burnett County, WI (106 pounds) and Perch Lake, Carlton County, MN (30 pounds)
Summary: 400 pounds of seed purchased by GLIFWC and paid for by the KB Indian Community was seeded by KB on select on-reservation waters.
- 20, 21) Name:** Bay Mills On-reservation Sites: Waishkey (Back Bay), Lake Superior and Spectacle Lake
Location: Central Chippewa County, Michigan
Cooperator: Bay Mills Community of Chippewa Indians
Seed Source: Long Lake, Burnett County, WI (245 pounds) and North Fork Flowage, Burnett County WI (226 pounds)
Summary: 471 pounds of seed purchased by GLIFWC on behalf of the Bay Mills Community was seeded by Bay Mills in the seventh seeding of this bay on Lake Superior and the eighth seeding of this lake. Seed was roughly split between the two sites. While beds have become established at both sites, neither has become as robust as desired by the Tribe.

RESEARCH

Environmental threats that place both existing populations and restoration activities at risk have created a need for a better understanding of rice's phenotypic and genotypic variation, and how that variation may be related to local adaptation. Wild rice is known to show fairly high levels of phenotypic variation across its range, but little is known about patterns in this variation, especially in Wisconsin. In addition, the relationship between phenotypic variation and genetic variation is largely unknown. Although wild rice is wind pollinated, the pollen is relatively heavy, and the seed is not believed to disperse great distances under normal conditions. Thus it is believed that individual stands may in time develop into unique strains, adapted to local conditions.

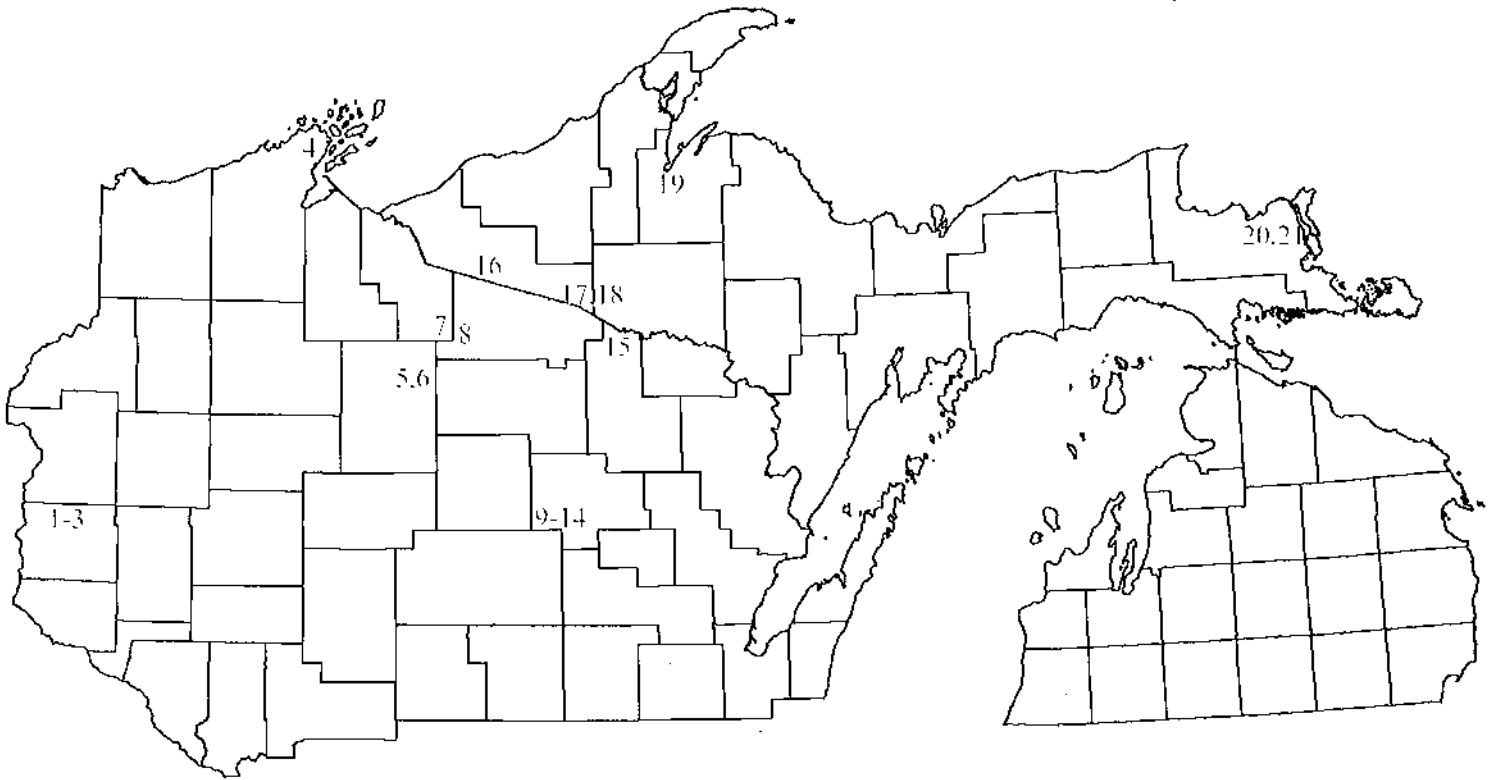
In 1996 the first phase of a cooperative study with the UW-Madison Botany Department examining genetic variation in wild rice was concluded with the completion of the report "Genetic Variability in Wild Rice populations in northern Wisconsin" (Lu and Waller, 1996).

From 1997 through 1999, GLIFWC continued working with Dr. Don Waller at UW-Madison by collecting additional wild rice tissue samples for genetic studies. Work on the analysis of these samples proceeded in 2000, and a final report on the project was completed in

2001 (Dole et.al., 2001). This project, funded in large part by the Nicolet/Chequamegon National Forest, presents some of the first genetic studies of wild rice in the region. It found high levels of overall genetic variability, including a high degree of among-population differentiation that was correlated with the geographic distance between populations. The results indicate that gene flow (in the form of seeds or pollen) is limited and that individual populations - especially those that are remote or isolated - could harbor unique alleles and genetic combinations. This suggests it may be important to preserve and protect individual populations in order to maintain overall diversity for the species.

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- 1-3. Cylon Wildlife Area Sites: 3 unnamed flowages, T31N, R 16W, Sections 14, 16 and 22
- 4. Red Cliff On-Reservation Sites
- 5. Popple Creek Impoundment
- 6. Upper Wilson Flowage
- 7-8. Lac du Flambeau On-Reservation Sites: Sugarbush Impoundment and Chewelah Lake
- 9-14. Ackley Wildlife Area Flowages: Gleason/South Grade, Middle Trappe, Pot, Section 27, Tower and Upper Trappe

- 15. Grub Hoe Lake
- 16. Presque Isle Flowage
- 17. Lac Vieux Desert
- 18. Lobischer Creek
- 19. Keweenaw Bay On-Reservation Sites
- 20. Bay Mills On-Reservation Site: Waishkey (Back) Bay on Lake Superior and Spectacle Lake.

Figure 2. Waters seeded in 2001 GLIFWC cooperative ventures.