



**Manoomin (Wild Rice)
Enhancement and Research
in the Ceded Territories in 1999**

by
Peter F. David
Wildlife Biologist

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& Wildlife Commission**

Biological Services Division

P.O. Box 9

Odanah, WI 54861

(715) 682-6619

MANOOMIN (WILD RICE) ENHANCEMENT AND RESEARCH IN THE CEDED TERRITORIES - 1999

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 1999.

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 5775 pounds in 1991 (Figure 1) with funding support from the Bureau of Indian Affairs' Circle of Flight program. The seeding of nearly 4,800 pounds in 1999 is summarized below.

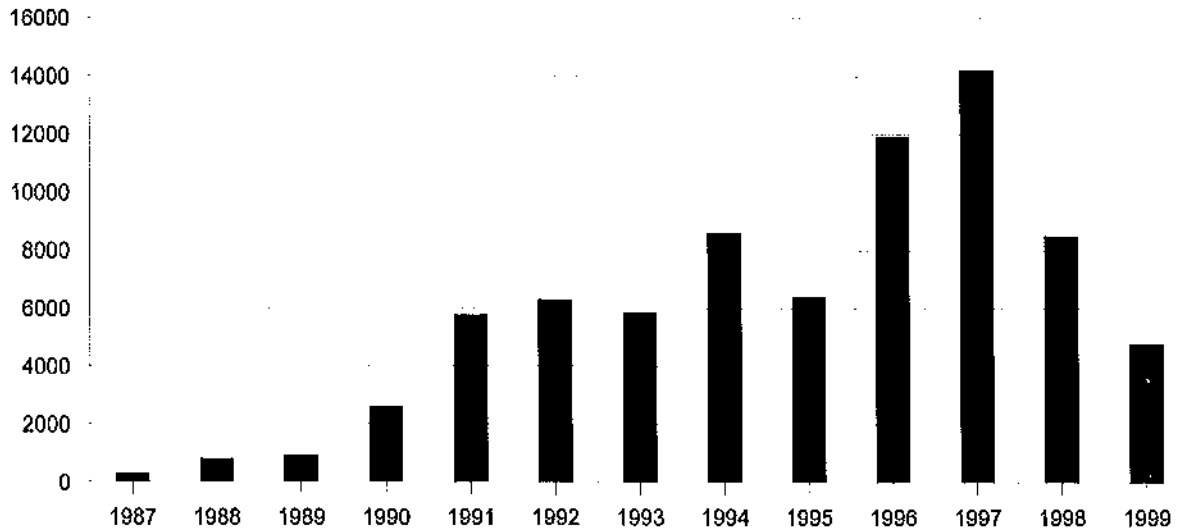


Figure 1. Pounds of wild rice seeded, 1987-1999.

ENHANCEMENT

Seeding Summary

In 1999, 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 4,793 pounds of wild rice was seeded in 25 waters in 9 Wisconsin and 4 Michigan counties.

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 1999 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 Lac Courte Oreilles Band; the Chequamegon and Ottawa National Forests; and the Wisconsin Department of Natural Resources (WDNR). The contributions of each of these cooperators on individual waters are summarized by project site below.

Seed Purchasing

Seed purchasing in 1999 was hindered by a poor regional manoomin crop. In Wisconsin, for example, the crop was 38% below the 1985-1999 average, based on GLIFWC's annual crop index (David 2001); the second lowest index recorded over that period. Despite increasing the amount paid per pound for green seed from \$1.50 to \$1.75, GLIFWC was only able to purchase 4,793 pounds of seed (Figure 1), compared to over 8,500 pounds in 1998. Seed purchased was harvested from 21 different waters, with the largest amounts coming from Dean Lake, (Crow Wing County, MN, 780 pounds), the Kakagon Sloughs (Ashland County, WI, 704 pounds), the Mississippi River (Crow Wing County, MN, 544 pounds), and Briggs Lake (Burnett County, WI, 532 pounds). All other waters supplied less than 320 pounds of seed.

Seeding

Nineteen Wisconsin and six Michigan waters received 4,793 pounds of seed under cooperative seeding ventures in 1999. Seeding was done at a rate of approximately 50 pounds per acre, so approximately 96 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: Clam Lake, Burnett County (103 pounds); North Lang Lake, Burnett County (49 pounds) and Phantom Flowage, Burnett County (26 pounds)
Summary: A total of 178 pounds of seed was divided roughly equally among 3 unnamed flowages on the Cylon Wildlife Area in the initial seeding attempts on this wildlife area. Seed was cost-shared by WDNR and GLIFWC; seeding was done by DNR staff.
- 4-5) Name:** Crex Meadows Wildlife Area Sites: Lower Hay Creek Flowage and Upper North Fork Flowage
Location: Western Burnett County
Cooperator: WDNR
Seed Source: Lower Hay Creek: Clam Lake, Burnett County (59 pounds), Pacwawong Lake, Sawyer County (37 pounds) and Phantom Flowage, Burnett County (29 pounds); Upper North Fork Flowage: Phantom Flowage, Burnett County (113 pounds), Clam Lake, Burnett County (111 pounds), Mulligan Lake, Douglas County (102 pounds)
Summary: Crex Meadows sites received a total of 451 pounds of seed, with 326 going to Upper North Fork Flowage, and 125 to Lower Hay Creek Flowage. Upper North Fork Flowage had been seeded in 1992, 1993, and 1998, and while some rice has become established, it has not yet responded as strongly as at the nearby North Fork Flowage. Lower Hay Creek Flowage was seeded for the 8th year, to expand a well-established bed. Seed was cost-shared by WDNR and GLIFWC; seeding was done by DNR staff.

- 6) **Name:** Casey Creek Flowage
Location: Northwest Washburn County
Cooperator: WDNR
Seed Source: Briggs Lake, Burnett County
Summary: 173 pounds of seed purchased by GLIFWC with COF and WDNR funds was seeded by the DNR in the third seeding effort on this water. A small bed has reportedly become established from previous seedings.
- 7) **Name:** Tranus Lake
Location: Northeast Washburn County
Cooperator: None
Seed Source: Kakagon Sloughs, Ashland County
Summary: 201 pounds of seed purchased by GLIFWC with COF funds was seeded by GLIFWC in the third consecutive seeding on this historic rice water. While some response has been noted, it appears beaver control may be necessary to make restoration on this site successful.
- 8) **Name:** Yellow River Flowage
Location: Along the Yellow River just east of Spooner
Cooperator: WDNR
Seed Source: Briggs Lake, Burnett County
Summary: 131 pounds of seed purchased by GLIFWC with COF and WDNR funds was seeded by the DNR in the third consecutive seeding effort on this historic water. Beds are believed to have been lost after an extended drawdown of this flowage. Response to seeding thus far has been fairly limited.
- 10) **Name:** Chippewa Lake
Location: Southeast Bayfield County
Cooperator: Chequamegon National Forest
Seed Source: Kakagon Sloughs, Ashland County
Summary: 235 pounds of rice purchased by GLIFWC with COF funds was seeded by GLIFWC in the fourth annual seeding on this historic rice water. Nice rice beds are becoming well established on the north and west shores and near the outlet, although a family of trumpeter swans nesting on the lake continues to heavily browse the bed on the north.
- 11) **Name:** Gile Flowage (northeast bay)
Location: North-central Iron County
Cooperator: WDNR
Seed Source: Mississippi River, Crow Wing County MN (124 pounds); Dean Lake, Crow Wing County MN (53 pounds) and Pillager Lake, Cass County, MN (49 pounds)
Summary: 226 pounds of seed purchased by GLIFWC with WDNR and COF funds was seeded by the DNR in the fourth seeding of this water. The rice was planted into the

northeast bay of this flowage adjacent to HWY 2, which now has a separate water level control structure. A fair bed of rice is becoming established along the east shore of this bay.

- 12) **Name:** Hay Lake
Location: Northcentral Price County
Cooperator: USFS
Seed Source: Some combination of Long Lake, Burnett County; Dean Lake, Crow Wing County MN; and Chequamegon Waters Flowage, Taylor County; details not recorded.
Summary: 140 pounds of seed purchased by GLIFWC with USFS and COF funds was seeded by the USFS in the fourth seeding of this location. While the habitat generally appears suitable, and the lake is undeveloped and fluctuates naturally, the response thus far has been limited.

- 13) **Name:** Upper Squaw Flowage
Location: Northern Price County
Cooperator: USFS
Seed Source: Some combination of Long Lake, Burnett County; Dean Lake, Crow Wing County MN; and Chequamegon Waters Flowage, Taylor County; details not recorded.
Summary: 115 pounds of seed purchased by GLIFWC with USFS and COF funds was seeded by the USFS in the third consecutive seeding of this water. Take thus far has been limited, and browsing of the plants that have grown has been heavy.

- 14) **Name:** Popple Creek Flowage
Location: Northern Price County
Cooperator: USFS
Seed Source: Some combination of Long Lake, Burnett County; Dean Lake, Crow Wing County MN; and Chequamegon Waters Flowage, Taylor County; details not recorded.
Summary: 60 pounds of seed purchased by GLIFWC with USFS and COF funds was seeded by the USFS in the initial seeding of this water. This is a relatively new flowage, located north of the Wilson Flowage.

- 15) **Name:** Wilson Flowage
Location: Northern Price County
Cooperator: USFS
Seed Source: Some combination of Long Lake, Burnett County; Dean Lake, Crow Wing County MN; and Chequamegon Waters Flowage, Taylor County; details not recorded.
Summary: 165 pounds of seed purchased by GLIFWC with USFS and COF funds was seeded by the USFS in the fourth seeding of this water, with the previous seedings taking place in 1995-1997. This site really includes 2 flowages, Wilson and Upper Wilson, but they are often collectively referred to as Wilson; some rice has now become established on both flowages, but the northern one supports the better beds.

- 16) **Name:** Cranberry Creek Flowage
Location: South-central Price County
Cooperator: WDNR
Seed Source: Chequamegon Waters Flowage, Taylor County
Summary: 206 pounds of seed purchased by GLIFWC with WDNR and COF funds was seeded by the WDNR in the initial seeding of this water, located about 2 miles east of the Spring Creek Wildlife Area.
- 17) **Name:** Chewelah Lake
Location: West-central Vilas County
Cooperator: Lac du Flambeau Band
Seed Source: Dean Lake, Crow Wing County, MN (301 pounds) and Pillager Lake, Cass County, MN (55 pounds)
Summary: 356 pounds of seed purchased by GLIFWC on behalf of the Lac du Flambeau Band was seeded by the band in the third consecutive seeding of this on-reservation lake.
- 18) **Name:** Lake Wausau
Location: Central Marathon County
Cooperator: WDNR
Seed Source: Lake Alice, Lincoln County
Summary: 144 pounds of seed purchased by GLIFWC with WDNR and COF funds was seeded on this flowage by the WDNR. This site had also been seeded in 1997, and a small take was reported from that seeding.
- 19) **Name:** Berkhahn Flowage, Mead Wildlife Area
Location: South-Central Marathon County
Cooperator: WDNR
Seed Source: Dean Lake, Crow Wing County, MN (204 pounds) and Rice Lake, Forest County (41 pounds)
Summary: 245 pounds of seed purchased by GLIFWC with WDNR and COF funds was seeded on this flowage by the WDNR in the third consecutive seeding effort. Response thus far has reportedly been limited.
- 20) **Name:** Lac Vieux Desert
Location: Southeastern Gogebic County, Michigan
Cooperator: Lac Vieux Desert Band of Chippewa Indians
Seed Source: Mississippi River, Crow Wing County MN (204 pounds); Gull Lake, Burnett County (70 pounds); Dean Lake, Crow Wing County, MN (28 pounds)
Summary: 302 pounds of seed purchased by GLIFWC with funds from the LVD Band was seeded in Rice Bay of Lac Vieux Desert by the LVD Band. This was a continuation of seeding efforts conducted over the past 9 years aimed at reestablishing the historic beds on this lake. While the initial response from these seedings has been favorable, the long term success of this bed will be dependant upon future water level regulation.

- 21) **Name:** Mallard Lake
Location: Northeast Iron County, Michigan
Cooperator: Ottawa National Forest
Seed Source: Minong Flowage, Douglas County WI (148 pounds); Cranberry Creek, Washburn County, WI (100 pounds); Webb Creek, Burnett County, WI (60 pounds); Upper Ox Lake, Douglas County, WI (50 pounds) and Pacwawong Lake, Sawyer County WI (36 pounds)
Summary: 394 pounds of seed purchased by GLIFWC with COF and USFS funds was seeded by the Forest Service in the initial seeding of this water. USFS staff reported a lot of empty hulls in the seed, likely a result of poor pollination.
- 22) **Name:** Mud Lakes
Location: Northwest Baraga County, Michigan
Cooperator: Keweenaw Bay Indian Community
Seed Source: Kakagon Sloughs, Ashland County WI
Summary: 243 pounds of seed purchased by GLIFWC and paid for by the KB Indian Community was seeded by KB in the fifth seeding of these small on-reservation lakes. Previous years seeded include 1994-1996 and 1998. It remains to be seen if this bed will persist without regular seeding.
- 23) **Name:** The Pinery Lakes
Location: Northcentral Baraga County, Michigan
Cooperator: Keweenaw Bay Indian Community
Seed Source: Cranberry Creek, Washburn County, WI
Summary: 167 pounds of seed purchased by GLIFWC and paid for by the KB Indian Community was seeded by KB in the ninth seeding of these small, twin, on-reservation lakes. Seeding was concentrated in the southwestern most bay. It remains to be seen if these beds will persist without regular seeding.
- 24) **Name:** Lightfoot Bay on Huron Bay of Lake Superior
Location: Northeast Baraga County, Michigan
Cooperator: Keweenaw Bay Indian Community
Seed Source: Kakagon Sloughs, Ashland County WI
Summary: 25 pounds of seed purchased by GLIFWC on the Community's behalf was seeded by KBIC staff in a small initial test seeding on this small, on-reservation bay.
- 25) **Name:** Waishkey (Back Bay), Lake Superior
Location: Central Chippewa County, Michigan
Cooperator: Bay Mills Community of Chippewa Indians
Seed Source: Mississippi River, Crow Wing County, MN (216 pounds) and Dean Lake, Crow Wing County, MN (61 pounds)

Summary: 277 pounds of seed purchased by GLIFWC on behalf of the Bay Mills Community was seeded by Bay Mills in the fifth seeding of this bay on Lake Superior. Seeding was concentrated in the areas of the Deep Creek inlet, where the best take to date has been reported.

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 generally disperse great distances. 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).

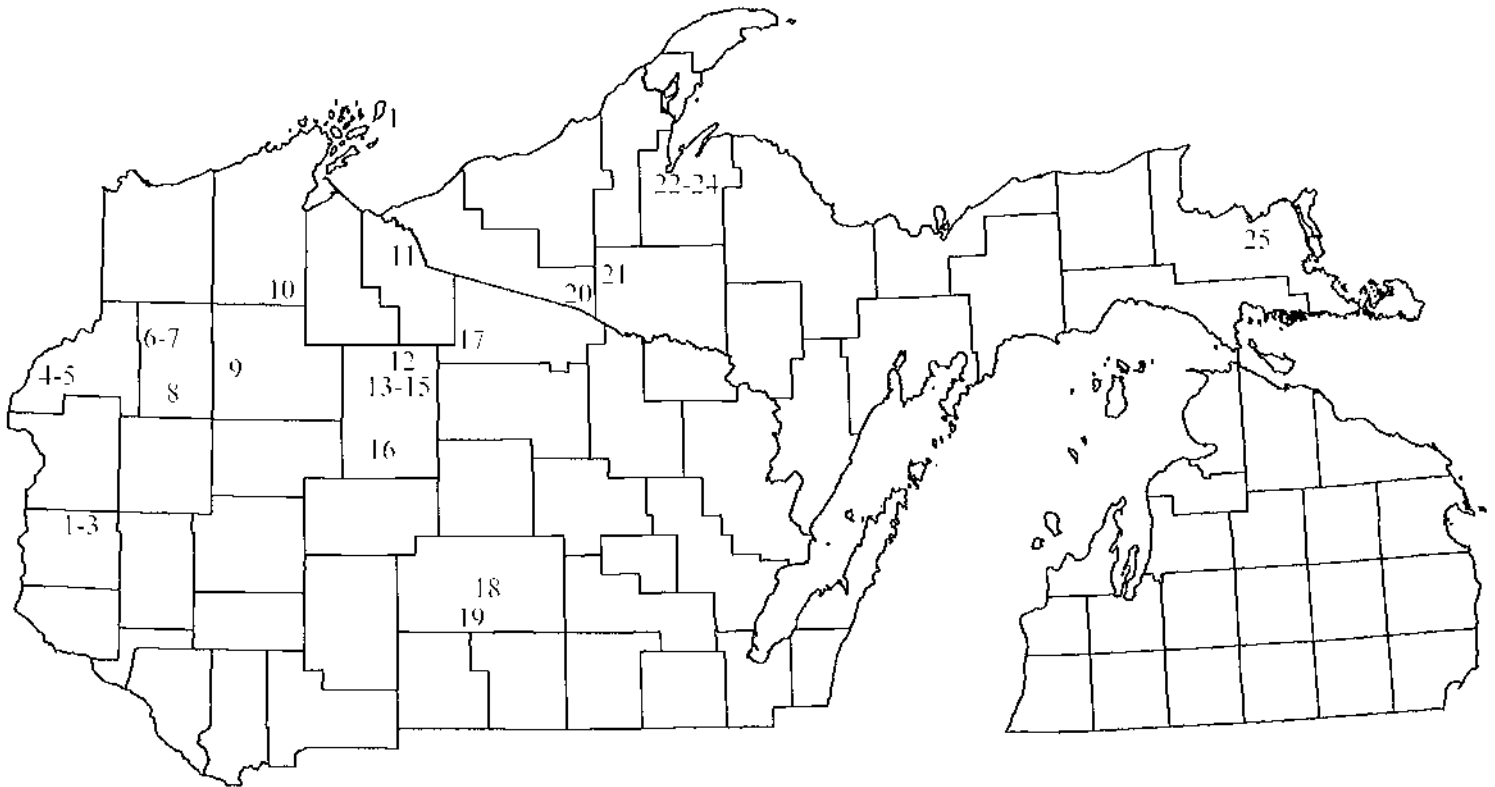
In 1999, as in 1997 and 1998, GLIFWC continued working with Dr. Don Waller at UW-Madison by collecting additional wild rice tissue samples for later genetic studies. Samples from 1999 focused on resampling 4 stands in Wisconsin and 1 in Michigan whose previous tissue samples were of poor quality, limiting DNA extraction. These samples have been preserved by staff at the UW for genetic analysis at a later date, with funding provided from the US Forest Service, in an effort to gather data that might improve rice restoration efforts at Lac Vieux Desert and other Forest Service properties.

Work was carried out on two other studies being conducted with support from the Forest Service. In one study, an index to sediment density was gathered from Rice and Misery Bays of Lac Vieux Desert, and compared to results from 22 other regional rice waters. In the second study, we began gathering data on water turbidity levels in Rice Bay, in an effort to help determine if turbidity levels could be limiting restoration efforts on the lake. A full report on both of these studies will be completed at a later date.

Also in 1999, many of GLIFWC's staff contributed to the preparation and execution of the Wild Rice Research and Management Conference, held July 7-8 in Carlton, MN. This very successful conference included 25 oral or poster presentations on a wide array of topics related to manoomin, and was attended by approximately 250 people. It was made possible with support from the Environmental Protection Agency. Proceeding from the conference are expected to be completed in 2000.

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- Vennum, T. 1988. Wild rice and the Ojibwa people. Minnesota Historical Society Press. 357 pp.



- 1-3. Cylon Wildlife Area Sites: 3 unnamed flowages, T31N, R 16W, Sections 14, 16 and 22
- 4-5. Crex Meadows Wildlife Area Sites: Lower Hay Creek Flowage and Upper North Fork Flowage
- 6. Casey Creek Flowage
- 7. Transus Lake
- 8. Yellow River Flowage
- 9. LCO Reservation Site: Billy Boy Flowage
- 10. Chippewa Lake
- 11. Gile Flowage
- 12. Hay Lake
- 13. Upper Squaw Creek Flowage
- 14. Popple Creek Flowage

- 15. Wilson Flowage
- 16. Cranberry Creek Flowage
- 17. Lac du Flambeau Reservation Site: Chewelah Lake
- 18. Lake Wausau
- 19. Berkhahn Flowage, Mead Wildlife Area
- 20. Lac Vieux Desert
- 21. Mallard Lake.
- 22-24. Keweenaw Bay Reservation Sites: Mud Lakes, Pinery Lakes, and Lightfoot Bay on Huron Bay
- 25. Bay Mills Reservation Site: Waishkey (Back) Bay on Lake Superior

Figure 2. Waters seeded in 1999 GLIFWC cooperative ventures.