Manoomin (Wild Rice) Enhancement and Research in the Ceded Territories in 1998

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MANOOMIN (WILD RICE) ENHANCEMENT AND RESEARCH IN THE CEDED TERRITORIES - 1998

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 1998.

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. Nearly 3 or more tons of rice have been seeded annually since, including the seeding of 4.25 tons of green seed in 1998, which is summarized below.

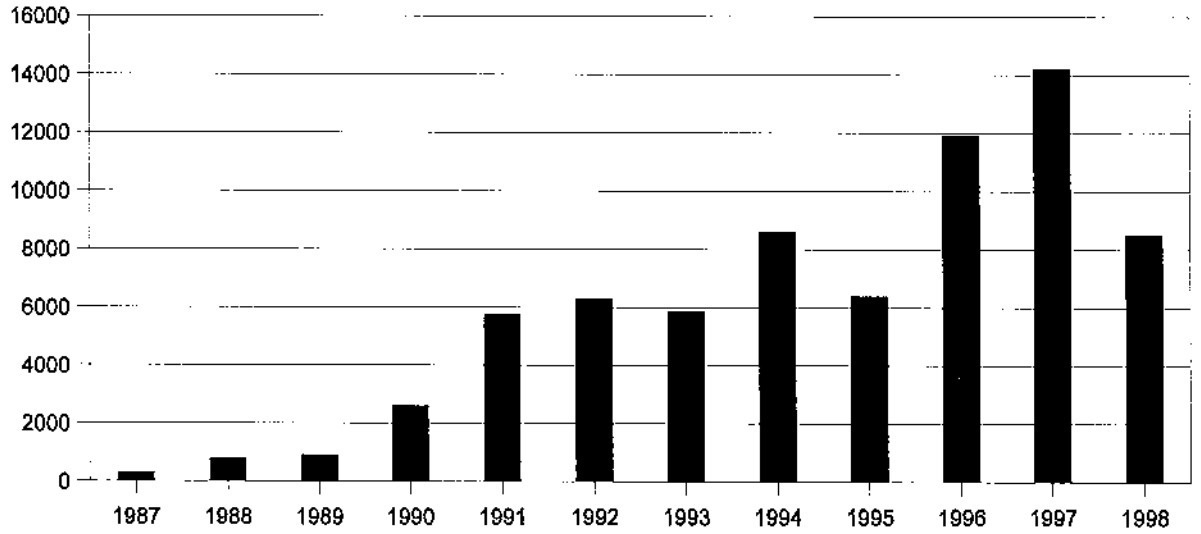


Figure 1. Pounds of wild rice seeded, 1987-1998.

ENHANCEMENT

Seeding Summary

In 1998, 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 8,505 pounds of wild rice was seeded in 42 waters in 11 Wisconsin and 5 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 1998 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 Nicolet, Chequamegon and Ottawa National Forests; the Wisconsin Department of Natural Resources (WDNR), the Michigan Department of Natural Resources (MiDNR), and the Silver Creek Sportsmen Club. The contributions of each of these cooperators on individual waters are summarized by project below.

Seed Purchasing

Seed purchasing in 1998 was hindered to some degree by much poorer manoomin abundance in Wisconsin than was witnessed in the "boom" year of 1997. Across the state, the crop was about 20% below average, based on GLIFWC's annual crop index (David 2000). However, by purchasing more seed than usual from Minnesota waters, especially Leech Lake, GLIFWC was still able to purchase 4.25 tons of seed (Figure 1). Seed purchased was harvested from at least 19 different waters, with the largest amounts coming from Leech Lake, (Cass County, MN, 4515 pounds), Rice Lake (Forest County, WI, 2,070 pounds), Mondeaux Flowage (Taylor County, WI, 659 pounds), and Spur Lake (Oneida County, WI, 456 pounds). All other waters supplied less than 300 pounds of seed.

Seeding

Twenty-nine Wisconsin and thirteen Michigan waters received 8,505 pounds of seed under cooperative seeding ventures in 1998. Seeding was done at a rate of approximately 50 pounds per acre, so approximately 170 acres were seeded. Figure 2 displays the locations of seeded waters. All sites were seeded in the fall. Sites seeded were:

1-2) **Name:** Fish Lake Wildlife Area Sites: CTY O and Corduroy Dike Flowages
Location: Southwestern Burnett County
Cooperator: WDNR
Seed Source: Leech Lake, MN
Summary: CTY O and Corduroy Dike Flowages received approximately 150 and 50 pounds of seed respectively in initial seeding attempts on each water. Seed was cost-shared by WDNR and GLIFWC; seeding was done by DNR staff.

3-12) **Name:** Crex Meadows Wildlife Area Sites: Dike 4 Flowage, Dike 6 Flowage, Lower Hay Creek Flowage, Lower L Dike Flowage, Middle North Fork Flowage, Upper North Fork Flowage, West Paulson Flowage, Whiskey Creek Flowage, Zalesky Pond, Zulliger Flowage
Location: Western Burnett County
Cooperator: WDNR
Seed Source: Leech Lake, MN for all sites
Summary: Crex Meadows sites received a total of 800 pounds of seed as follows: Dike 4 Flowage: 50 pounds, Dike 6 Flowage: 100 pounds, Lower Hay Creek Flowage: 100 pounds, Lower L Dike Flowage: 100 pounds, Middle North Fork Flowage: 200 pounds, Upper North Fork Flowage: 50 pounds, West Paulson Flowage: 50 pounds, Whiskey Creek Flowage: 20 pounds, Zalesky Pond: 100 pounds, Zulliger Flowage: 30 pounds. This was the initial seeding on Dike 4 Flowage, Middle North Fork Flowage, West Paulson Flowage, Whiskey Creek Flowage, Zalesky Pond, and Zulliger Flowage. Dike 6 Flowage and Lower L Dike Flowage had each been seeded once previously, in 1997 and 1991 respectively. Upper North Fork Flowage had been seeded in 1992 and 1993, while

Lower Hay Creek Flowage was seeded for the 7th year, to expand a well-established bed. Seed was cost-shared by WDNR and GLIFWC; seeding was done by DNR staff.

13) **Name:** Casey Creek Flowage
Location: Northwest Washburn County
Cooperator: WDNR
Seed Source: Mondeaux Flowage, Taylor County (238 pounds); Chequamegon Waters Flowage, Taylor County (62 pounds)
Summary: A total of 300 pounds of seed purchased by GLIFWC with COF and WDNR funds was seeded by the DNR in the second seeding effort on this water.

14) **Name:** Tranus Lake
Location: Northeast Washburn County
Cooperator: None
Seed Source: St. Croix River, Douglas County (100 pounds); Radigan Flowage, Douglas County (52 pounds) and Pacwawong Lake, Sawyer County (34 pounds)
Summary: A total of 186 pounds of seed purchased by GLIFWC with COF funds was seeded by GLIFWC in the second consecutive seeding on this historic rice water.

15) **Name:** Yellow River Flowage
Location: Along the Yellow River just east of Spooner
Cooperator: WDNR
Seed Source: Mondeaux Flowage, Taylor County
Summary: 116 pounds of seed purchased by GLIFWC with COF and WDNR funds was seeded by the DNR in the second consecutive seeding effort on this historic water. Beds are believed to have been lost after an extended drawdown of this flowage.

16-17) **Name:** Red Cliff Reservation sites: Eagle Bay and Raspberry River
Location: Northeastern Bayfield County
Cooperator: Red Cliff Band of Lake Superior Chippewas
Seed Source: Each site received approximately: St. Croix River, Douglas County (58 pounds) and Radigan Flowage, Douglas County (29 pounds)
Summary: Each site received approximately 87 pounds of seed, in the fifth seedings of these on-reservation waters. Seed was purchased by GLIFWC on behalf of the band; seeding was done by band staff.

18) **Name:** Chippewa Lake
Location: Southeast Bayfield County
Cooperator: Chequamegon National Forest
Seed Source: Totagatic Lake, Bayfield County (250 pounds) and Minong Flowage, Douglas County (41 pounds)
Summary: 291 pounds of rice purchased by GLIFWC with USFS and COF funds was seeded by the USFS in the third annual seeding on this historic rice water. Although

some initial take was observed, it appears beaver control may be needed to improve success on this site, as a dam a short distance below the lake on the outlet is holding water up approximately 12-15 inches. A nesting family of trumpeter swans also appears to be heavily browsing the rice.

19) **Name:** Murphy Flowage
Location: Northwest Rusk County
Cooperator: WDNR
Seed Source: Mondeaux Flowage, Taylor County
Summary: 150 pounds of seed purchased by GLIFWC with COF and WDNR funds was seeded by the DNR in the second consecutive seeding effort on this flowage.

20) **Name:** Pershing Flowage, Pershing Wildlife Area
Location: Northwestern Taylor County
Cooperator: WDNR
Seed Source: Mondeaux Flowage, Taylor County
Summary: 155 pounds of seed purchased by GLIFWC with WDNR and COF funds was seeded on this flowage by the WDNR in an initial seeding attempt. This is the flowage located behind the Wildlife Area building.

21) **Name:** Gile Flowage (northeast bay)
Location: North-central Iron County
Cooperator: WDNR
Seed Source: Spur Lake, Oneida County (100 pounds) and Leech Lake, MN (70 pounds)
Summary: 170 pounds of seed purchased by GLIFWC with WDNR and COF funds was seeded by GLIFWC in the third 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. Marginal take was noted from the 1996 and 1997 seedings.

22) **Name:** Turtle Flambeau Flowage: South End near Beaver Creek inlet
Location: Southeast Iron County
Cooperator: WDNR
Seed Source: Leech Lake, MN
Summary: 70 pounds of seed was purchased by GLIFWC with WDNR and COF funds was seeded by the WDNR in the initial seeding of this area on the Flowage, near the Beaver Creek inlet.

23) **Name:** Hay Creek
Location: Northcentral Price County
Cooperators: USFS
Seed Source: Spring Creek Wildlife Area Flowages, Price County
Summary: 193 pounds of seed purchased by GLIFWC with USFS and COF funds was seeded by the USFS in the initial seeding of this location. This section of the creek that

was seeded is located about a mile east of Blockhouse Lake, T40N, R1E, Section 12. There is a small dam here that creates a widening of the stream, but not a large flowage. Although sometimes referred to as the Hay Creek Flowage, it should not be confused with the much larger flowage with the same name that exists several miles above Hay Lake in Iron County.

24) **Name:** Upper Squaw Flowage
Location: Northern Price County
Cooperator: USFS
Seed Source: Spring Creek Wildlife Area Flowages, Price County
Summary: 100 pounds of seed purchased by GLIFWC with USFS and COF funds was seeded by the USFS in the second consecutive seeding of this water.

25) **Name:** Chewelah Lake
Location: West-central Vilas County
Cooperator: Lac du Flambeau Band
Seed Source: Rice Lake, Forest County
Summary: Approximately 250 pounds of seed purchased by GLIFWC on behalf of the Lac du Flambeau Band was seeded by the band in the second consecutive seeding of this on-reservation lake.

26) **Name:** Middle Sugarbush Lake
Location: Southwest Vilas County
Cooperator: Lac du Flambeau Band
Seed Source: Rice Lake, Forest County
Summary: Approximately 117 pounds of seed purchased by GLIFWC on behalf of the Lac du Flambeau Band was seeded by the band in the second consecutive seeding of this on-reservation lake. The area seeded was the north side of the narrows west of the inlet from Lower Sugarbush.

27) **Name:** Berkhahn Flowage, Mead Wildlife Area
Location: South-Central Marathon County
Cooperator: WDNR
Seed Source: Irving Lake, Vilas County (93 pounds); Lake Alice, Lincoln County (58 pounds); Spider Creek Flowage, Langlade County (52 pounds), Big Lake Thoroughfare (20 pounds)
Summary: 223 pounds of seed purchased by GLIFWC with WDNR and COF funds was seeded on this flowage by the WDNR in the second consecutive seeding effort.

28) **Name:** Hiles Millpond
Location: East-central Forest County
Cooperator: USFS
Seed Source: Rice Lake, Forest County (258 pounds) and Spur Lake, Oneida County (71 pounds)

Summary: 329 pounds of rice purchased by GLIFWC with COF and USFS funds was seeded by USFS staff along the upper end of this flowage. Although this was an initial seeding attempt, some small patches of existing rice were observed, possibly the result of seeding done by private individuals. GLIFWC previously contributed COF funds to the rebuilding of the water control structure on this flowage.

29) **Name:** Halsey Lake
Location: West-central Forest County
Cooperator: None
Seed Source: Leech Lake MN
Summary: 200 pounds of rice purchased by GLIFWC and with COF funding was seeded by GLIFWC in the second consecutive seeding attempt on this lake, which reportedly historically supported rice. Little take from the initial seeding was apparent. The bottom of this lake is highly flocculent, somewhat similar to Pay Shay Lake in Forest County.

30) **Name:** Presque Isle Flowage
Location: South-central Gogebic County, Michigan
Cooperator: MiDNR
Seed Source: Rice Lake, Forest County Wisconsin
Summary: 225 pounds of rice purchased by GLIFWC with COF funds was seeded by GLIFWC, in cooperation with the MiDNR, in the second consecutive seeding of this Flowage.

31) **Name:** Crooked Lake
Location: Southeastern Gogebic County, Michigan
Cooperators: Lac Vieux Desert Band of Chippewa Indians, Ottawa National Forest
Seed Source: Leech Lake, MN
Summary: Approximately 440 pounds of seed purchased by GLIFWC with funds from the Lac Vieux Desert Band was seeded in Crooked Lake by the Band. This was the seventh year of seeding in an effort to reestablish the historic bed on this lake. Excellent results were observed from the previous seedings, with a substantial bed established on the south-west most bay of this lake located in the Sylvania Wilderness Area.

32) **Name:** Lac Vieux Desert
Location: Southeastern Gogebic County, Michigan
Cooperator: Lac Vieux Desert Band of Chippewa Indians
Seed Source: Leech Lake, MN
Summary: Approximately 560 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 8 years aimed at reestablishing the historic beds on this lake. While the initial response from these seedings was favorable, increasing water levels appear to be reducing the size of the bed. The long term success of this bed will be dependant upon future water level regulation.

33) **Name:** Brule Lake
Location: Southwestern Iron County, Michigan
Cooperator: Ottawa National Forest
Seed Source: Spur Lake, Forest County WI (285 pounds) and Upper Ninemile Flowage, Forest County WI (161 pounds)
Summary: 446 pounds of seed purchased by GLIFWC with COF and USFS funds was seeded near the outlet by the Forest Service in the initial seeding of this water.

34) **Name:** Perch Lake
Location: West-Central Iron County, Michigan
Cooperator: Ottawa National Forest
Seed Source: Rice Lake, Forest County WI (495 pounds) and Aurora Lake, Vilas County WI (60 pounds)
Summary: 555 pounds of rice purchased by GLIFWC with funds provided by the USFS and COF was seeded by the Ottawa in the first seeding attempt on this water.

35-36) **Name:** Sturgeon River Sloughs Wildlife Area Pools 1 and 7
Location: Southeastern Gogebic County, Michigan
Cooperator: MiDNR
Seed Source: Leech Lake, MN
Summary: 637 pounds of seed purchased by GLIFWC with COF and MiDNR funds was seeded by the MiDNR between Pools 1 and 7 on the Surgeon River Sloughs Wildlife Area. Various pools on this wildlife area were seeded in 1993, 1994 and 1997.

37) **Name:** Mud Lakes
Location: Northwest Baraga County, Michigan
Cooperator: Keweenaw Bay Indian Community
Seed Source: Leech Lake MN (322 pounds) and Big Lake Throughfare, Oneida County WI (24 pounds)
Summary: 346 pounds of seed purchased by GLIFWC and paid for by the KB Indian Community was seeded by KB in the forth seeding of these small on-reservation lakes. Previous years seeded include 1994-1996. It remains to be seen if this bed will persist without regular seeding.

38) **Name:** The Pinery Lakes
Location: Northcentral Baraga County, Michigan
Cooperator: Keweenaw Bay Indian Community
Seed Source: Leech Lake, MN
Summary: 281 pounds of seed purchased by GLIFWC and paid for by the KB Indian Community was seeded by KB in the eighth 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.

39-40) **Name:** Unnamed Baraga County ponds, T50N, R30W, Sections 6 and 9.
Location: East-central Baraga County, Michigan
Cooperator: Keweenaw Bay Indian Community
Seed Source: Section 6 Pond: Leech Lake, MN; Section 9 Pond: unknown.
Summary: The section 6 and section 9 ponds received 60 and 56 pounds of seed respectively in initial seeding attempts on both waters. Seed was purchased by GLIFWC on the Community's behalf, and was seeded by KBIC staff.

62) **Name:** Spectacle Lake
Location: Central Chippewa County, Michigan
Cooperator: Bay Mills Community of Chippewa Indians
Seed Source: Leech Lake, MN
Summary: 170 pounds of seed purchased by GLIFWC on behalf of the Bay Mills Community was seeded by Bay Mills in the sixth seeding of this water. Seedings from prior years have reportedly produced several acres of rice.

63) **Name:** Waishkey (Back Bay), Lake Superior
Location: Central Chippewa County, Michigan
Cooperator: Bay Mills Community of Chippewa Indians
Seed Source: Leech Lake, MN
Summary: 705 pounds of seed purchased by GLIFWC on behalf of the Bay Mills Community was seeded by Bay Mills in the fourth seeding of this bay on Lake Superior. Seeding was concentrated in the areas of the Deep Creek inlet (300 pounds), BRT's Bay (255 pounds) and Justin's Cove (150 pounds). The best take to date has reportedly been in the area near the Deep Creek inlet.

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 1998, as in 1997, GLIFWC continued working with Dr. Don Waller at UW-Madison by collecting additional wild rice tissue samples for later genetic studies. Samples from 1998 focused on 12 stands in Wisconsin and 1 in Michigan that are located on or near Forest Service lands. 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.

Another cooperative study initiated in 1998 with the support of the Forest Service involved examining the density of sediments associated with rice stands. This work was spurred by the efforts to restore the rice beds on Lac Vieux Desert, where some individuals have suggested that sediments may have become too flocculent to support rice.

In order to better determine if sediment density could be a limiting factor, a weighted probe was built following a design used by Jim Meeker in his studies in the Kakagon Sloughs. Test applications were made on several waters, leading to some modifications in the design intended to make the probe more sensitive to very soft sediments. Actual measurements of sediment density on LVD's Rice and Misery Bays and 22 other regional rice waters will be carried out in 1999.

Finally, GLIFWC staff also began making preparations for a Wild Rice Research and Management Conference to be held in 1999.

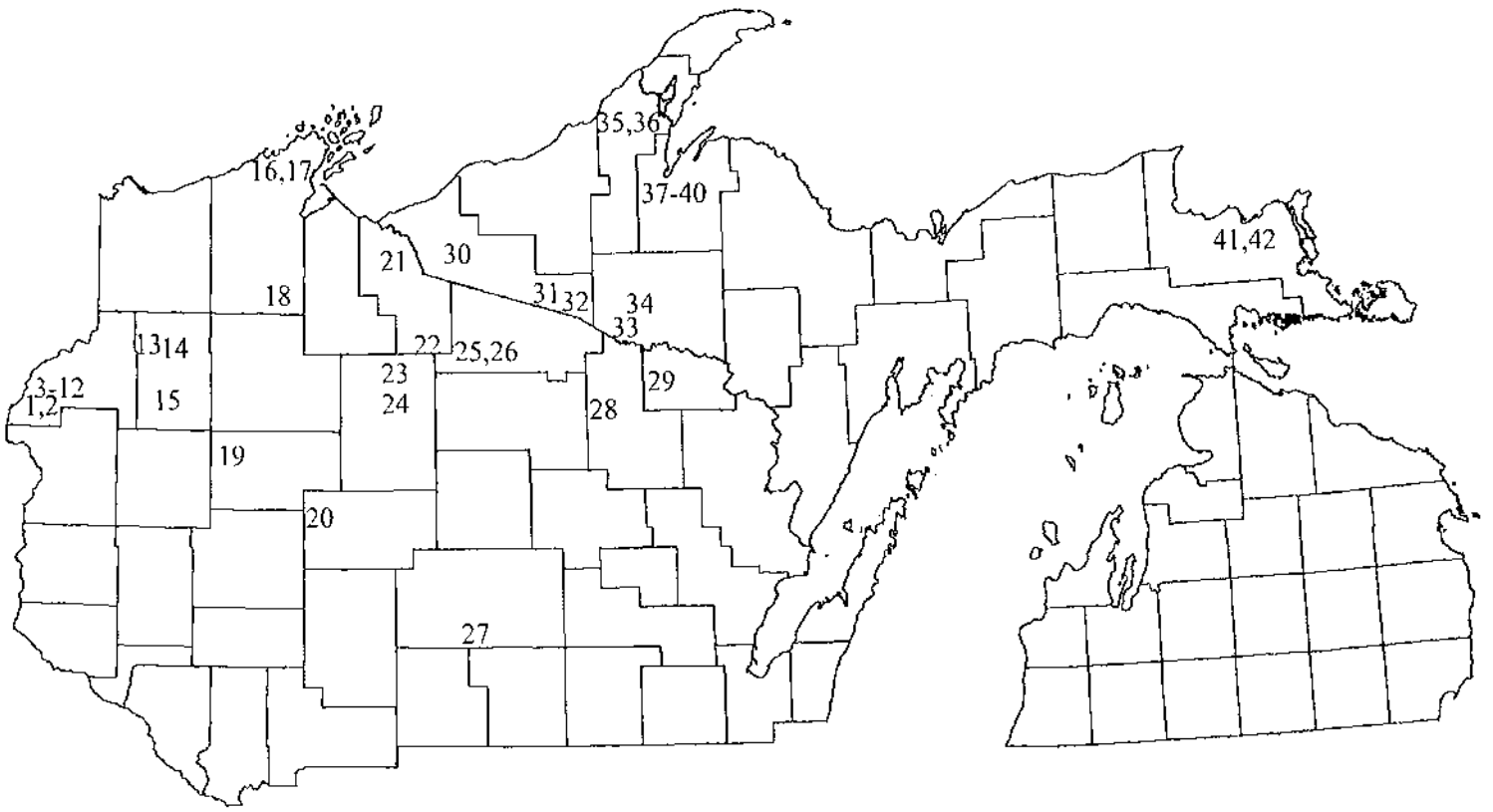
LITERATURE CITED

David, P.F. 2000. Wild rice (manoomin) abundance and harvest in northern Wisconsin in 1998. Great Lakes Indian Fish and Wildlife Commission Admin. Report 00-1. 16 pp.

Johnson, E. 1970. Preliminary notes on the historic use of wild rice. The Minnesota Archaeologist, Vol XXX, Number 2.

Lu, Y. and D.M. Waller. 1996. Genetic variability in wild rice (*Zizania palustris* var. *palustris*) populations in northern Wisconsin. Report to GLIFWC. 45 pp.

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



1-2. Fish Lake Wildlife Area Sites: County O Flowage and Corduroy Dike
3-12. Crex Meadows Wildlife Area Sites: Dike 4 Flowage, Dike 6 Flowage, Lower Hay Creek Flowage, Lower L Dike Flowage, Middle North Fork Flowage, Upper North Fork Flowage, West Paulson Flowage, Whiskey Creek Flowage, Zalesky Pond, Zulliger Flowage
13. Casey Creek Flowage
14. Tranus Lake
15. Yellow River Flowage
16-17. Red Cliff Reservation Sites: Eagle Bay and Raspberry River
18. Chippewa Lake
19. Murphy Flowage
20. Pershing Flowage, Pershing Wildlife Area
21. Gile Flowage
22. Turtle Flambeau Flowage (Beaver Creek site)
23. Hay Creek (T40N, R1E, Section 12)
24. Upper Squaw Creek Flowage
25-26. Lac du Flambeau Reservation Sites: Chewelah Lake and Middle Sugarbush Lake
27. Berkhahn Flowage, Mead Wildlife Area
28. Hiles Millpond
29. Halsey Lake
30. Presque Isle Flowage
31. Crooked Lake
32. Lac Vieux Desert
33. Brule Lake
34. Perch Lake
35-36. Sturgeon River Sloughs Wildlife Area, Pools 1 and 7
37-40. Keweenaw Bay Reservation Sites: Mud Lakes, Pinery Lakes, and two small, unnamed ponds, T50N, R30W, Sections 6 and 9
41-42. Bay Mills Reservation Sites: Waishkey (Back) Bay on Lake Superior and Spectacle Lake

Figure 2. Waters seeded in 1998 GLIFWC cooperative ventures.