



**Manoomin (Wild Rice)
Enhancement and Research
in the Ceded Territories in 2000**

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Administrative Report 10-13
October 2010

**Great Lakes Indian Fish
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MANOOMIN (WILD RICE) ENHANCEMENT AND RESEARCH IN THE CEDED TERRITORIES - 2000

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 2000.

Manoomin has been a staple in the diet of native people in the upper Great Lakes region for over 1,000 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 9,000 pounds in 2000 is summarized below.

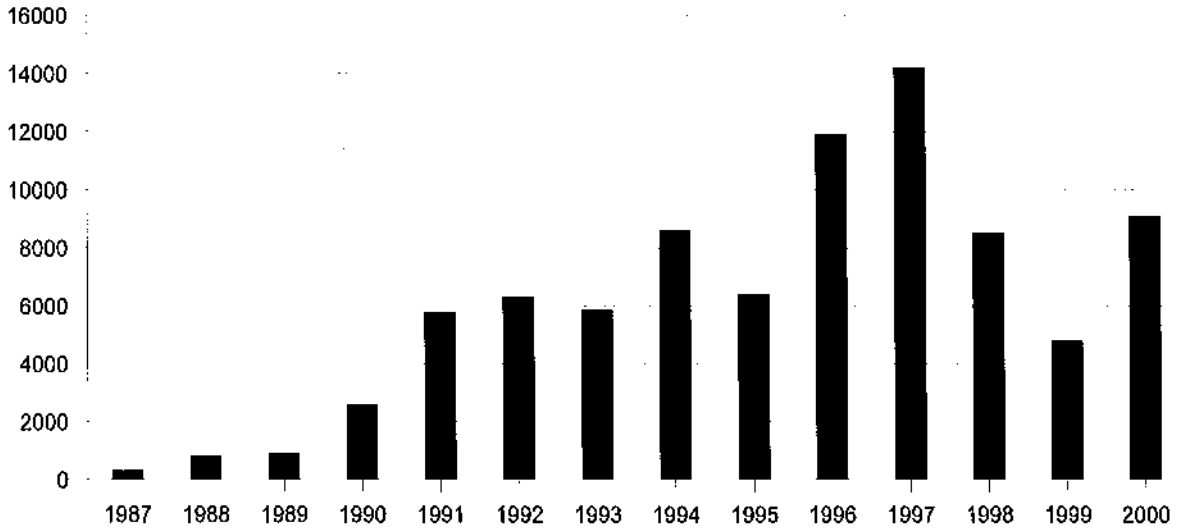


Figure 1. Pounds of wild rice seeded, 1987-2000.

ENHANCEMENT

Seeding Summary

In 2000, 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 9,089 pounds of wild rice was seeded in 44 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 2000 included GLIFWC member tribes, including the Lac Vieux Desert Band, the Keweenaw Bay Indian Community, the Bay Mills Community, the Lac du Flambeau Band, the Red Cliff Band and the Bad River Band; the Chequamegon and Ottawa National Forests; the Wisconsin Department of Natural Resources (WDNR), the Michigan Department of Natural Resources (MiDNR), Washburn County, and the US Fish and Wildlife Service. The contributions of each of these cooperators on individual waters are summarized by project site below.

Seed Purchasing

Seed purchasing in 2000 was hindered by a poor manoomin crop in Wisconsin, but aided by good production on many Minnesota waters. In Wisconsin, the crop was 56% below the 1985-2000 average, based on GLIFWC's annual crop index (David 2008); the lowest index recorded over that period. However, by increasing the amount paid per pound for green seed from \$1.75 to \$2.00, and with better production on many Minnesota lakes, including those on the Fond du Lac and Leech Lake reservation, GLIFWC was able to purchase 9,089 pounds of seed (Figure 1), compared to 4,793 pounds in 1999. Seed purchased was harvested from at least 18 different waters, with the largest amounts coming from Natures Lake (Itasca County, MN, 1535), Perch Lake, (Carlton County, MN, 1,427 pounds), and the Phantom Flowage (Burnett County, WI, 1,310 pounds). No other water supplied more than 900 pounds of seed.

Seeding

Thirty-eight Wisconsin and six Michigan waters received 9,089 pounds of seed under cooperative seeding ventures in 2000. Seeding was done at a rate of approximately 50 pounds per acre, so approximately 180 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: Not recorded by seeder; a mix of 4 Minnesota sources consisting of Dean Lake, Platte Lake, and the Mississippi River, all in Crow Wing County, and Sullivan Lake, Morrison County
Summary: A total of 228 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:** Tranus Lake
Location: Northeast Washburn County
Cooperator: None
Seed Source: Phantom Flowage, Burnett County (327 pounds) and Perch Lake, Carlton County, MN (100 pounds)
Summary: 427 pounds of seed purchased by GLIFWC with COF funds was seeded by GLIFWC in the fourth consecutive seeding on this historic rice water. While some response has been noted, especially on the north end of the lake, it appears beaver control may be necessary to make restoration on this site more successful.

- 5) **Name:** Chippanazie (Davis) Flowage
Location: Northeast Washburn County
Cooperator: Washburn County
Seed Source: Phantom Flowage, Burnett County
Summary: 227 pounds of seed purchased by GLIFWC with COF funds was seeded by GLIFWC in the initial seeding of this flowage located on county lands. The primary area seeded was on the east end of the flowage near the inlet.
- 6-15) **Name:** Brule Area Small Ponds
Location: Northeastern Douglas County
Cooperator: WDNR
Seed Source: Not recorded by seeder; a mix of 4 Minnesota sources consisting of Dean Lake, Platte Lake, and the Mississippi River, all in Crow Wing County, and Sullivan Lake, Morrison County
Summary: A total of 514 pounds of seed purchased by GLIFWC with COF and WDNR funds was seeded by the DNR in the initial seeding effort on this group of small ponds. Ponds were seeded at the following rates: 1: 53 pounds, 2: 50 pounds, 3: 53 pounds, 4: 57 pounds, 5: 94 pounds, 6: 47 pounds, 7: 45 pounds, 8: 20 pounds, 9: 40 pounds, 10: 55 pounds. A detailed map of pond locations is included as Appendix 1.
- 16-18) **Name:** Red Cliff On-Reservation Sites: Raspberry River, Fish Hatchery Ponds and Red Cliff Creek/Schooner Bay
Location: Northeast Bayfield County
Cooperator: Red Cliff Band of Lake Superior Chippewas
Seed Source: Mallard Lake, Aitken County, MN (106 pounds) and Long Lake, Morrison County MN (106 pounds)
Summary: 212 pounds of seed purchased by GLIFWC on behalf of the Red Cliff Band was seeded by the Band on the 3 listed locations. On the Raspberry River and the Fish Hatchery Ponds, seed was distributed around the edges of beds established in previous years; the Red Cliff Creek/Schooner Bay location was seeded for the first time.
- 19) **Name:** Northern Great Lakes Visitor Center/Whittlesey Creek NWR ponds
Location: East Central Bayfield County
Cooperator: USFWS
Seed Source: Not recorded
Summary: 90 pounds of seed purchased by GLIFWC with COF funds was seeded by the USFWS in the initial seeding of two small ponds associated with the newly opened Northern Great Lakes Visitors Center. Although the suitability of this site appears to be marginal, it is hoped that establishment of even a small bed could have educational value for the many annual visitors to this location.

- 20) **Name:** Fish Creek Sloughs
Location: East Central Bayfield County
Cooperator: None
Seed Source: Natures Lake, Itasca County, MN
Summary: 177 pounds of seed purchased by GLIFWC with COF funds was seeded by GLIFWC in the third seeding in this location. This is an effort to rejuvenate small beds which had resulted from seedings in 1992 and 1993, but which seem to be loosing vigor.
- 21) **Name:** Chippewa Lake
Location: Southeast Bayfield County
Cooperator: Chequamegon National Forest
Seed Source: Bowstring Lake, Itasca County, MN (166 pounds); Mississippi River, Crow Wing County, MN (154 pounds); Dean Lake, Crow Wing County, MN (55 pounds); Platte Lake, Crow Wing County, MN (49 pounds) and Long Lake, Morrison County, MN (14 pounds)
Summary: 438 pounds of rice purchased by GLIFWC with COF and USFS funds was seeded by GLIFWC in the fifth annual seeding on this historic rice water. Nice rice beds are becoming well established on the north and west shores and near the outlet. A family of trumpeter swans nesting on the lake continues to heavily browse the bed on the north end of the lake.
- 22) **Name:** Bad River On-Reservation Site: Kakagon Sloughs
Location: North-central Ashland County
Cooperator: Bad River Band of Lake Superior Chippewa
Seed Source: Kakagon Sloughs, Ashland County
Summary: 437 pounds of seed purchased by GLIFWC on behalf of the Bad River Band was seeded by the Band into areas where the Kakagon rice beds appear to be loosing vigor due to competition with other aquatics.
- 23-25) **Name:** Turtle-Flambeau Flowage Sites: Beaver Creek Flats, Otter Creek inlet and Grant Creek inlet.
Location: South-central Iron County
Cooperator: WDNR
Seed Source: Perch Lake, Carlton County MN (Beaver Creek and Otter Creek sites); Perch Lake Carlton County MN (62 pounds) and Rice Lake, Forest County WI (61 pounds) (Grant Creek Site)
Summary: Seed purchased by GLIFWC with WDNR and COF funds was seeded by the DNR at these 3 sites, with Beaver Creek Flats receiving 204 pounds, Otter Creek inlet receiving 176 pounds, and Grant Creek inlet receiving 123 pounds. The seeding at the Beaver Creek Flats continued to expand from seeding conducted over the last several years; Otter Creek inlet had little rice present, but reportedly had been seeded once previously without GLIFWC involvement. The Grant Creek inlet area was an initial seeding attempt.

- 26) **Name:** Hay Lake
Location: Northcentral Price County
Cooperator: USFS
Seed Source: Phantom Flowage, Burnett County
Summary: 75 pounds of seed purchased by GLIFWC with USFS and COF funds was seeded by the USFS in the fifth seeding of this location. While the habitat generally appears suitable, and the lake is undeveloped and fluctuates naturally, the response thus far has remained limited.
- 27) **Name:** Popple Creek Flowage
Location: Northern Price County
Cooperator: USFS
Seed Source: Phantom Flowage, Burnett County
Summary: 110 pounds of seed purchased by GLIFWC with USFS and COF funds was seeded by the USFS in the second seeding of this water. This is a relatively new flowage, located north of the Wilson Flowage. Only minor establishment was noted from the initial seeding.
- 28) **Name:** Upper Wilson Flowage
Location: Northern Price County
Cooperator: USFS
Seed Source: Phantom Flowage, Burnett County
Summary: 218 pounds of seed purchased by GLIFWC with USFS and COF funds was seeded by the USFS in the fifth seeding of this water, with the previous seedings taking place in 1995-1997 and 1999. 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 larger beds.
- 29) **Name:** Upper Squaw Flowage
Location: Northern Price County
Cooperator: USFS
Seed Source: Phantom Flowage, Burnett County
Summary: 202 pounds of seed purchased by GLIFWC with USFS and COF funds was seeded by the USFS in the fourth consecutive seeding of this water. Establishment thus far has been limited, and browsing of the plants that have grown has been heavy. This year a smaller area was more heavily seeded in an effort to establish a denser bed that may discourage browsing.
- 30) **Name:** McKennsey Slough
Location: Northeast Price County
Cooperator: USFS
Seed Source: Phantom Flowage, Burnett County

Summary: 104 pounds of seed purchased by GLIFWC with USFS and COF funds was seeded by the USFS in the initial seeding of this water, which consists of 3 small, adjacent impoundments just north of Round Lake.

- 31) **Name:** Schmuland Flowage
Location: Northern Price County
Cooperator: USFS
Seed Source: Phantom Flowage, Burnett County
Summary: 47 pounds of seed purchased by GLIFWC with USFS and COF funds was seeded by the USFS in the second seeding of this water. The initial seeding took place in 1997.
- 32) **Name:** Lac du Flambeau On-Reservation Sites
Location: West-central Vilas County
Cooperator: Lac du Flambeau Band
Seed Source: Perch Lake, Carlton County, MN
Summary: 495 pounds of seed purchased by GLIFWC on behalf of the Lac du Flambeau Band was seeded by the band in select on-reservation waters.
- 33) **Name:** Lake Wausau
Location: Central Marathon County
Cooperator: WDNR
Seed Source: Not recorded by seeder; some combination of Upper Ninemile Flowage, Vilas County and/or Mondeaux Flowage, Taylor County
Summary: 100 pounds of seed purchased by GLIFWC with WDNR and COF funds was seeded on this flowage by the WDNR. This site was also seeded in 1997 and 1999, with a small amount of rice reportedly established from those seedings.
- 34) **Name:** Berkhahn Flowage, Mead Wildlife Area
Location: South-Central Marathon County
Cooperator: WDNR
Seed Source: Not recorded by seeder; some combination of Upper Ninemile Flowage, Vilas County and/or Mondeaux Flowage, Taylor County
Summary: 150 pounds of seed purchased by GLIFWC with WDNR and COF funds was seeded on this flowage by the WDNR in the fourth consecutive seeding effort. Response thus far has reportedly been limited, although habitat appears suitable.
- 35) **Name:** North Townline Flowage, Mead Wildlife Area
Location: South-Central Marathon County
Cooperator: WDNR
Seed Source: Not recorded by seeder; some combination of Upper Ninemile Flowage, Vilas County and/or Mondeaux Flowage, Taylor County

- Summary:** 130 pounds of seed purchased by GLIFWC with WDNR and COF funds was seeded on this flowage by the WDNR; it had previously been seeded in 1995 and 1996 with some establishment reported.
- 36) **Name:** Small Flowage #7, Mead Wildlife Area
Location: South-Central Marathon County
Cooperator: WDNR
Seed Source: Lake Alice, Lincoln County
Summary: 62 pounds of seed purchased by GLIFWC with WDNR and COF funds was seeded on this flowage by the WDNR in an initial seeding attempt.
- 37) **Name:** Small Flowage # 37, Mead Wildlife Area
Location: South-Central Marathon County
Cooperator: WDNR
Seed Source: Not recorded by seeder; some combination of Upper Ninemile Flowage, Vilas County and/or Mondeaux Flowage, Taylor County
Summary: 140 pounds of seed purchased by GLIFWC with WDNR and COF funds was seeded on this flowage by the WDNR; it had also been seeded in 1997.
- 38) **Name:** Townline Flowage, Mead Wildlife Area
Location: South-Central Marathon County
Cooperator: WDNR
Seed Source: Not recorded by seeder; some combination of Upper Ninemile Flowage, Vilas County and/or Mondeaux Flowage, Taylor County
Summary: 144 pounds of seed purchased by GLIFWC with WDNR and COF funds was seeded on this flowage by the WDNR in the second seeding effort, with the initial seeding taking place in 1997.
- 39) **Name:** Presque Isle Flowage
Location: South-central Gogebic County, Michigan
Cooperator: MiDNR
Seed Source: Kettle Lake, Carlton County MN (643 pounds) and the Moose Horn River, Carlton County, MN (87 pounds)
Summary: 730 pounds of seed purchased by GLIFWC with COF funds was seeded by GLIFWC on this flowage, which had previously been seeded in 1997 and 1998. A bed is becoming established near the mid-point of this flowage, and along bends adjacent to the primary channel.
- 40) **Name:** Lac Vieux Desert
Location: Southeastern Gogebic County, Michigan
Cooperator: Lac Vieux Desert Band of Chippewa Indians
Seed Source: Natures Lake, Itasca County MN (654 pounds) and the Ontonagon River, Gogebic County, MI (481 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 decade aimed at reestablishing the historic beds on this lake. While the initial response from these seedlings has been favorable, the long term success of this bed will be dependant upon future water level regulation.

- 41) **Name:** Mallard Lake
Location: Northeast Iron County, Michigan
Cooperator: Ottawa National Forest
Seed Source: Bowstring Lake, Itasca County, MN (573 pounds); Platt Lake, Crow Wing County, MN, (97 pounds) and Mallard Lake, Aitken County, MN (57 pounds)
Summary: 727 pounds of seed purchased by GLIFWC with COF and USFS funds was seeded by the Forest Service in the second consecutive seeding of this water. USFS staff reported a lot of empty hulls in the seed in the initial year (likely a result of poor pollination) and little initial establishment was observed.
- 42) **Name:** Brule Lake
Location: Southwestern Iron County, Michigan
Cooperator: Ottawa National Forest
Seed Source: Bowstring Lake, Itasca County MN
Summary: 130 pounds of seed purchased by GLIFWC with COF and USFS funds was seeded by the Forest Service in the second seeding of this site. Good establishment was noted from the 1998 seeding.
- 43) **Name:** Keweenaw Bay On-reservation Sites
Location: Northcentral Baraga County, Michigan
Cooperator: Keweenaw Bay Indian Community
Seed Source: Perch Lake, Carlton County, MN (390 pounds) and Kakagon Sloughs, Ashland County, WI (43 pounds)
Summary: 433 pounds of seed purchased by GLIFWC and paid for by the KB Indian Community was seeded by KB on select on-reservation waters.
- 44) **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: Natures Lake, Itasca County, MN
Summary: 704 pounds of seed purchased by GLIFWC on behalf of the Bay Mills Community was seeded by Bay Mills in the sixth seeding of this bay on Lake Superior and the seventh 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 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).

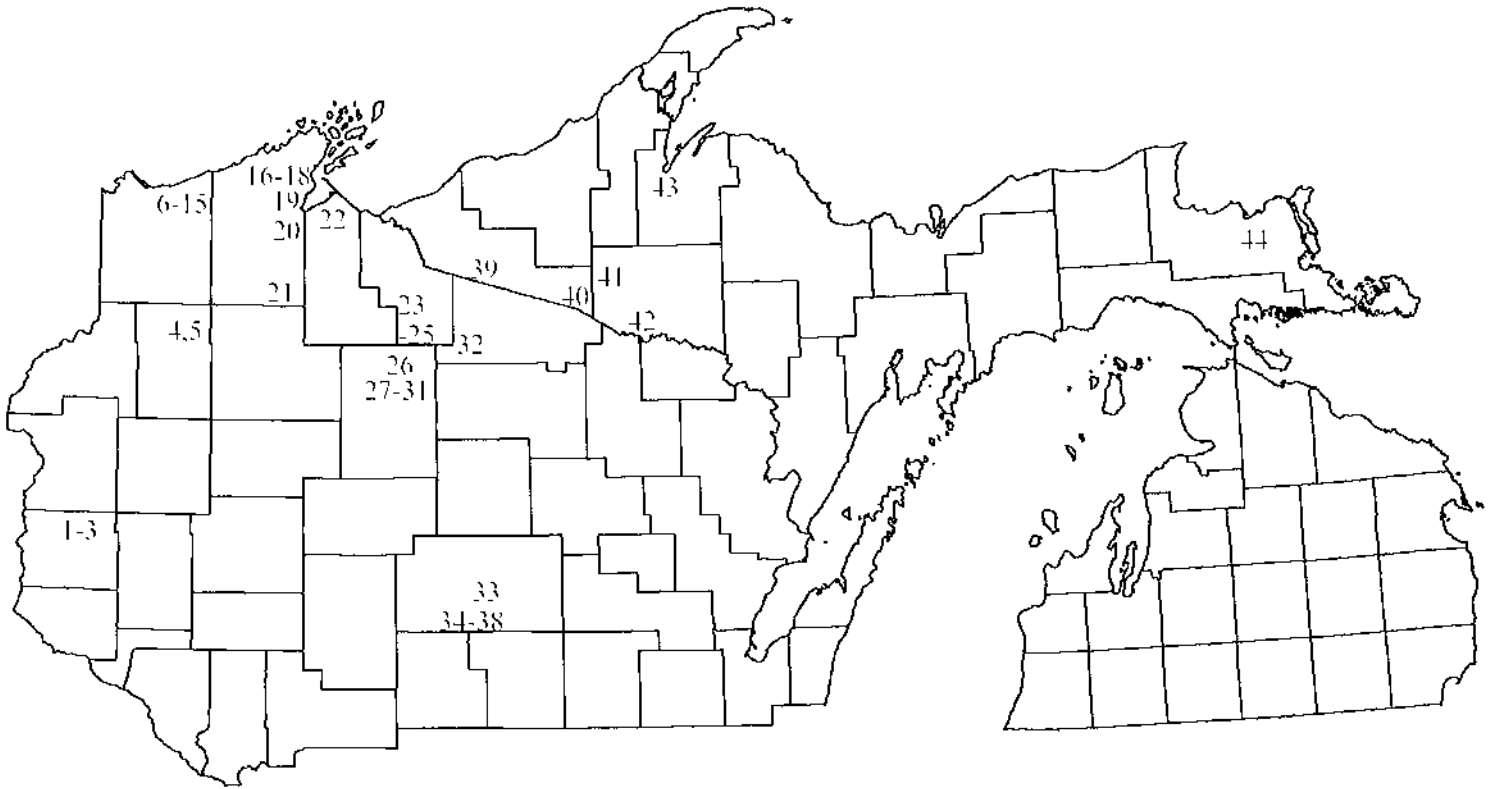
From 1997 through 1999, GLIFWC continued working with Dr. Don Waller at UW-Madison by collecting additional wild rice tissue samples for genetic studies. Work on the analysis of these samples proceeded in 2000, and a final report on the project will be completed in 2001. Work on this project was funded in large part by the Nicolet/Chequamegon National Forest.

Work was also carried out on a second study being conducted with support from the Forest Service. This study involved gathering turbidity data from Rice Bay of Lac Vicux Desert, and examining the possible impacts of boating activities on turbidity levels in the bay. It is hoped these studies will help determine if turbidity levels could limit restoration efforts on the lake. A full report on both of these studies will be completed at a later date.

Also in 2000, GLIFWC published the proceedings of the Wild Rice Research and Management Conference held in Carlton, Minnesota July 7-8, 1999 (Williamson et al., 2000). This conference included 25 oral or poster presentations on a wide array of topics related to manoomin, and was attended by approximately 250 people. The conference and its proceedings were made possible with support from the Environmental Protection Agency.

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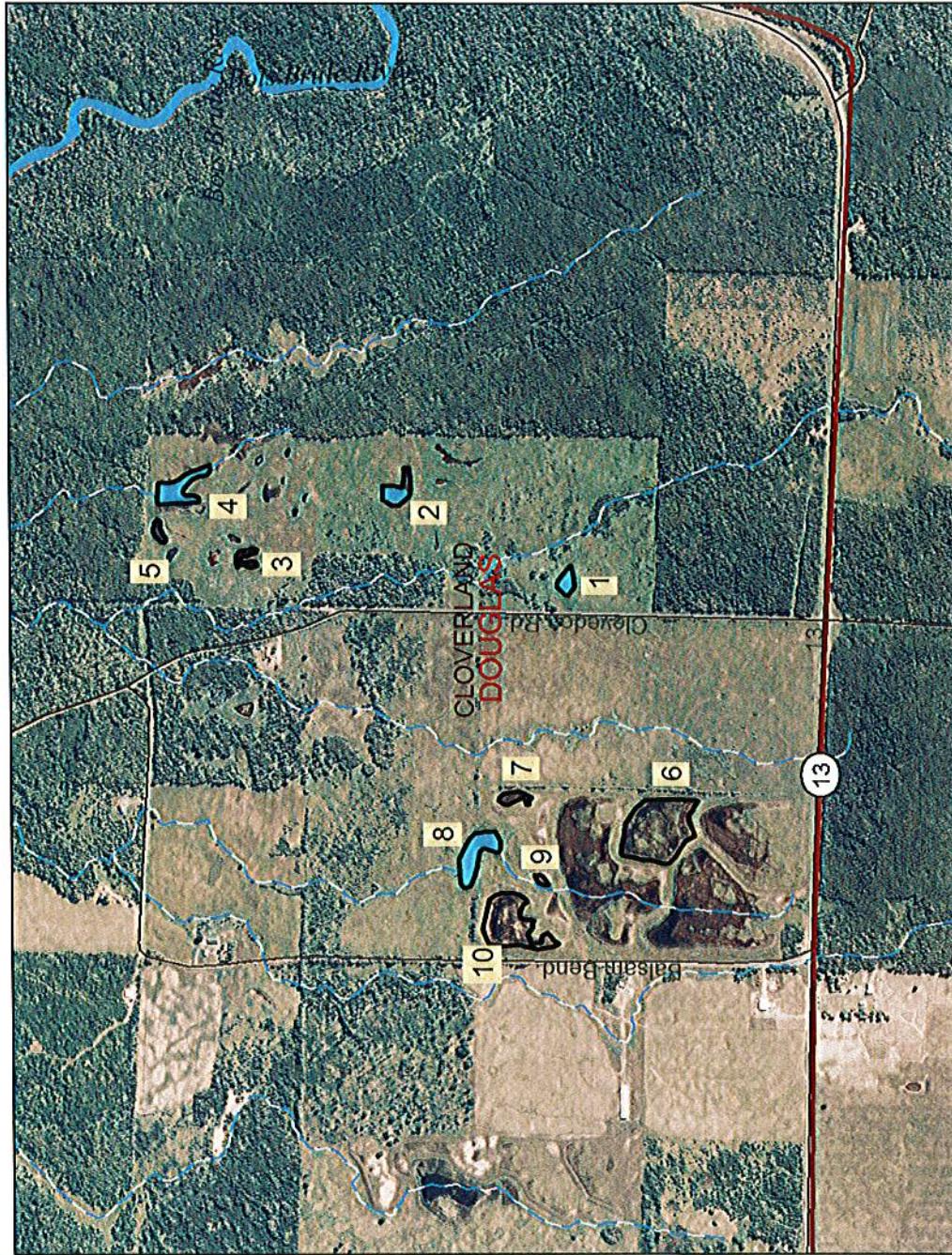
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- 20. Fish Creek Sloughs
- 21. Chippewa Lake
- 22. Kakagon Sloughs
- 23-25. Turtle Flambeau Flowage Sites
- 26. Hay Lake
- 27. Popple Creek Flowage
- 28. Upper Wilson Flowage

- 29. Upper Squaw Creek Flowage
- 30. McKennsey Slough
- 31. Schmuland Flowage
- 32. Lac du Flambeau On-Reservation Sites
- 33. Lake Wausau
- 34-38. Mead Wildlife Area Flowages: Berkahn, North Townline, Small Flowage 7, Small Flowage 37, Townline.
- 39. Presque Isle Flowage
- 40. Lac Vicux Desert
- 41. Mallard Lake
- 42. Brule Lake
- 43. Keweenaw Bay On-Reservation Sites
- 44. Bay Mills On-Reservation Site: Waishkey (Back) Bay on Lake Superior and Spectacle Lake.

Figure 2. Waters seeded in 2000 GLIFWC cooperative ventures.

Appendix 1.

2000 Brule Area Rice Seedings



Legend

- Major Highways
 - Interstate
 - State Highway
 - U.S. Highways
 - County Roads
 - Local Roads
- 24K County Boundaries
- Civil Towns
- Civil Town
- 24K Open Water
- 24K Rivers and Shorelines
 - Intermittent
 - Fluctuating
 - Perennial
- Cities and Villages
 - Village
 - City



Scale: 1:15,661



This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Notes: 10 small ponds seeded. WBIC codes as follows: 1: 5500364; 2:5500355; 5:5500344; 8: 5500358. Other ponds not assigned codes.

