



**Wild Rice (Manoomin)  
Abundance and Harvest  
in Northern Wisconsin in 2004**

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*Mitigwech!*

## **MANOOMIN (WILD RICE) ABUNDANCE AND HARVEST IN NORTHERN WISCONSIN IN 2004**

### **INTRODUCTION**

As part of its wild rice management program, the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) conducts annual surveys of wild rice abundance on northern Wisconsin waters. These surveys provide a long term data base on wild rice abundance and annual variability in the ceded territory.

GLIFWC also conducts an annual survey to estimate the amount of wild rice harvested off-reservation in the Wisconsin ceded territory. The Wisconsin Department of Natural Resources (WDNR) cooperates with this survey by providing the names and addresses of state wild rice harvest license purchasers, so that both state and tribal harvest can be estimated. The 2004 survey was similar in design to a survey first conducted in 1987, and repeated each year since 1989, with minor modifications as described in the Methods section.

### **METHODS**

#### **Abundance Estimation**

A select group of 30 lakes and 10 river or flowage sites have been ground surveyed most years since 1985; abundance information from these waters is used to derive a yearly index of rice abundance in the ceded territory. The index is derived by multiplying the number of acres of rice on each water surveyed by a factor ranging from 1 to 5 which relates to rice density (1=sparse, 5=dense) and then summing the values derived for each of the 40 waters. In addition to abundance information, ground surveys include information on habitat suitability (e.g. abundance of competing vegetation, presence of beaver, obvious development impacts). Ground surveys were conducted from mid-July through late August.

Aerial surveys of some of these waters, and additional waters not ground surveyed, were conducted on August 5<sup>th</sup>, 26<sup>th</sup> and 30<sup>th</sup>. Aerial survey information is limited to an estimate of the size and approximate density of the rice beds. These surveys provide abundance information from waters not ground surveyed, help verify ground estimates of manoomin acreage, occasionally fill in survey gaps when ground crews are unable to access lakes, and help the Commission direct ricers to the more productive stands.

One water, Rice Bed Creek in Polk County, with an average abundance index of 49 (1985-2003) was not surveyed in 2004. Thus, when comparisons are made between 2004 and 2003, data for this lake was suppressed for 2003 as well. For comparisons between 2004 and long term averages, an index was estimated for this water by applying the ratio between the 2004 overall index for all other waters and the long term overall index (4,396/5,399) to the long term index for Rice Bed Creek (49). This produced an estimated index of 40 for this water in 2004.

## Harvest Estimation

Slightly different techniques were used to estimate harvest by tribal and state ricers. Tribal members who wished to harvest rice off-reservation were required to obtain an off-reservation harvesting permit validated for ricing. This permit was obtained by 831 individuals in 2004. When individuals obtained their 2004 permit, they were asked if they harvested rice the previous year. Twenty-eight percent (41/147) of the individuals who indicated they had riced in 2003 (“active” ricers) were surveyed by phone, as well as 35% (152/436) of those individuals who indicated they had not riced the previous year (“inactive” ricers). Since 248 permit holders failed to answer the question, these individuals were treated as a third group in this survey (as was done in 2001 and 2003); 31% (78/248) of these individuals were also surveyed (“non-responsive” ricers) (Table 1).

The number of tribal members who actually harvested off-reservation in 2004 was estimated by extrapolating the percent of active respondents in each group (Table 1). Due to differences in sampling and activity rates among groups, separate harvest estimates were made for each group, then combined to estimate total tribal harvest. However, among tribal respondents was one individual in the “active” group who reported a harvest that far exceeded that of other tribal ricers. Because of this, the tribal harvest for the active group was estimated by extrapolating the harvest reported by all other “active” respondents to the other 64 estimated active ricers in this group, then adding the harvest reported by this individual.

GROUP	TOTAL NUMBER	# SURVEYED	% SAMPLED	% ACTIVE OFF-RESERVATION	EST. # ACTIVE OFF-RESERVATION
ACTIVE <sup>1</sup>	147	41	28%	43.9%	65
INACTIVE <sup>1</sup>	436	152	35%	2.6%	11
NON-RESPONSIVE <sup>1</sup>	248	78	31%	3.8%	10
TOTAL	831	271			86

<sup>1</sup> Based on activity the previous year; see discussion in text.

State ricers were required to obtain a state license. A mail questionnaire was mailed to 647 of the 665 individuals who obtained the state license. The number of active ricers was estimated by expanding the results reported by the 305 respondents to the state survey (46% of licensees).

Among state respondents was one individual who reported a harvest that far exceeded that of other state ricers. Because of this, total state harvest was estimated by extrapolating the harvest reported by all other state respondents to the other 579 estimated active state ricers, then adding the harvest reported by this individual.

## RESULTS AND DISCUSSION

### Abundance Estimation

Ground survey results and abundance information for the 40 waters surveyed annually are reported in Figures 1 and 2, and Table 2. In addition, abundance estimates for 50 additional waters surveyed only from the air are listed in Table 3. A total of 2,241 acres of wild rice were estimated for these 90 surveyed waters. Andryk (1986) estimated that the Wisconsin ceded territories supported approximately 5,000 acres of rice in 1985, a year with an abundance index considerably higher than in 2004.

Survey results and field observations indicate that the 2004 rice crop was similar to 2003 in the north-central part of the state, and improved in the northwest (Table 2). Among north-central waters, 7 showed a decline, 6 an increase, and 5 essentially no change, and the abundance index remained similar to 2003. The abundance index increased about 25% on northwestern waters, with much of the increase being observed on Sawyer County waters (Table 2, Figure 2). Among 20 northwest waters surveyed both years, 11 increased, 6 declined and 3 were largely unchanged. Overall, the 2004 index was 83% of the long-term index average (1985-2004).

It remains difficult to determine why rice changes in abundance on either the regional or local scale because the environmental factors that influence abundance are not well understood. Wild rice is affected by a variety of factors, and the relative impact of each varies by year. Some of these factors, such as spring temperatures and water levels, can affect rice regionally, and may account for instances where beds in the north-central counties display one trend in abundance while those in the northwestern region may show another. At the other extreme, a localized impact can cause a stand to fail while those around it flourish. Furthermore, those factors that might explain some of the variation in rice abundance are not being monitored systematically. Thus, explanations about changes in rice abundance remain largely a matter of conjecture.

Annual variability in rice abundance may be inversely related to the amount of water flow through the system. Relatively open systems such as rivers and flowages appear to vary less in rice abundance than relatively closed lake systems. Although open systems may still experience boom and bust years, the level of abundance tends to be closer to the average level most years. This may be because some environmental variables, such as nutrient availability or spring water temperatures, are more consistent in these systems from year to year.

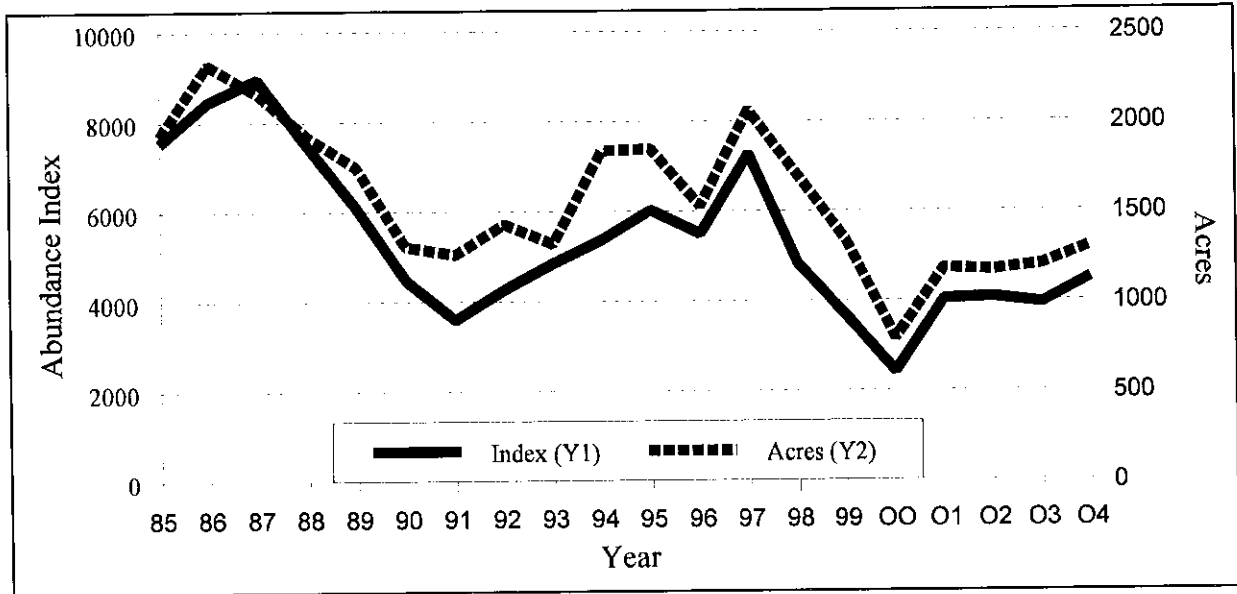


Figure 1. Manoomin acreage and abundance index from 40 Wisconsin rice waters surveyed annually from 1985-2004.

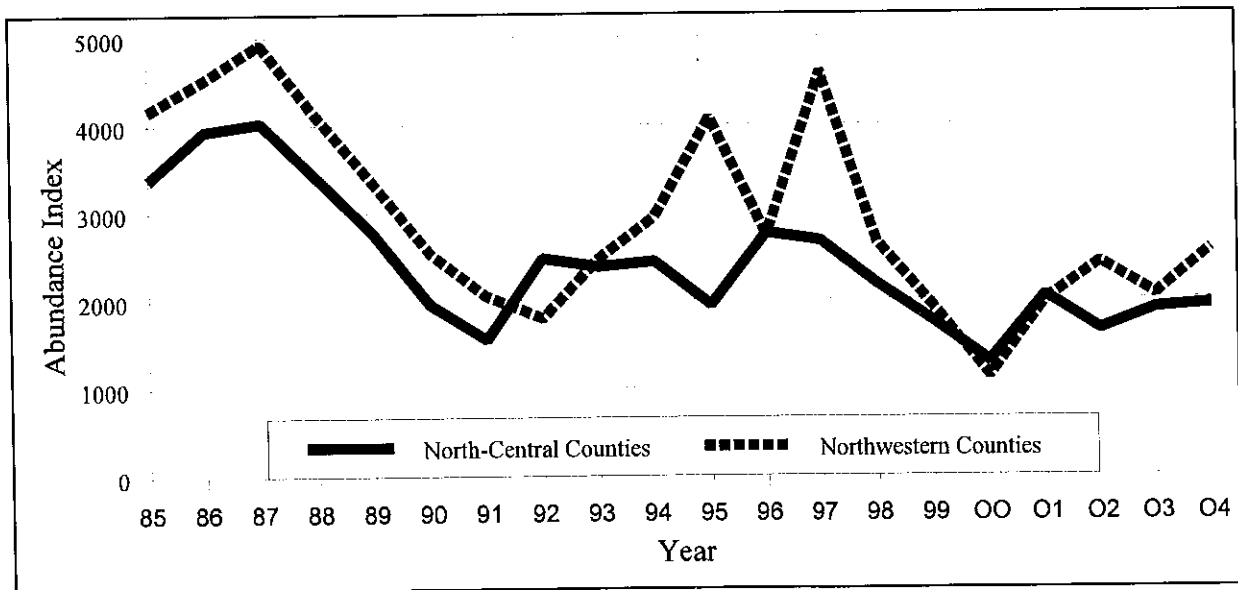


Figure 2. Manoomin abundance index from 40 Wisconsin rice waters surveyed annually from 1985-2004; northwestern versus north-central Wisconsin waters (Highway 13 was used to separate northwestern from north-central waters).

Table 2. Manoomin acreage, density and abundance index from 40 Wisconsin waters for 2001-2004, and the 1985-2004 means.  
(Data for 1985-2000 can be found in David, 2001 and David, 2008)  
(\*Index for Rice Bed Creek, Polk County, year 2004 estimated; see text.)

WATER	2001			2002			2003			2004			1985-2004		
	ACRES	DEN.	INDEX	ACRES	DEN.	INDEX	ACRES	DEN.	INDEX	ACRES	DEN.	INDEX	ACRES	DEN.	INDEX
<b>NORTHWESTERN CTYS.</b>															
<b>BARRON</b>															
SWEENEY CREEK	3	2	6	5	3	15	20	3	60	1	1	1	10	3	37
<b>BAYFIELD</b>															
TOTOGATIC LAKE	65	3	195	18	2	36	120	2	240	135	2	270	151	3	485
<b>BURNETT</b>															
BASHAW LAKE	7	3	21	3	3	9	6	2	12	2	2	4	11	3	31
BIG CLAM LAKE	125	2	250	190	4	760	135	3	405	165	3	495	152	3	528
BRIGGS LAKE	41	4	164	8	4	32	12	5	60	19	3	57	28	4	112
GASLYN LAKE	15	3	45	7	3	21	12	4	48	25	4	100	25	3	90
LONG LAKE	20	3	60	60	2	120	20	1	20	40	3	120	72	2	184
MUD LAKE (2)	15	3	45	12	5	60	14	5	70	10	4	40	14	4	51
WEBB CREEK	20	5	100	9	4	36	11	5	55	12	4	48	12	4	56
<b>DOUGLAS</b>															
MULLIGAN LAKE	18	3	54	10	3	30	20	4	80	38	3	114	25	2	59
<b>POLK</b>															
RICE BED CREEK	15	4	60	8	3	24	15	4	60			40*	11	4	49
RICE LAKE (1)	50	3	150	40	3	120			130*	40	4	160	51	3	180
WHITE ASH LAKE	6	4	24	9	3	27	6	4	24	6	4	24	13	3	42
<b>SAWYER</b>															
BILLY BOY FLOW.	4	2	8	15	4	60	7	3	21	5	2	10	13	2	45
BLAISDELL LAKE	72	3	216	95	1	95	95	1	95	95	2	190	78	3	225
PACWAWONG LAKE	120	3	360	135	5	675	105	4	420	120	5	600	93	4	364
PHIPPS FLOWAGE	18	5	90	25	4	100	22	3	66	25	4	100	31	4	124
<b>WASHBURN</b>															
DILLY LAKE	18	3	54	13	4	52	16	5	80	16	4	64	21	4	90
POTATO LAKE	12	2	24	24	5	120	16	4	64	20	4	80	14	3	46
RICE LAKE	11	4	44	4	4	16	8	3	24	8	3	24	23	3	85
SPRING LAKE (1)	5	1	5	3	2	6	4	2	8	8	2	16	14	3	49
TRANUS LAKE	5	2	10	2	2	4	3	2	6	5	2	10	37	2	56
<b>SUBTOTAL</b>	<b>665</b>		<b>1,985</b>	<b>695</b>		<b>2,418</b>	<b>667</b>		<b>2,048</b>	<b>795</b>		<b>2,567</b>	<b>901</b>		<b>2,987</b>
<b>NORTH-CENTRAL CTYS.</b>															
<b>FOREST</b>															
ATKINS LAKE	0	0	0	0	0	0	0	0	0	0	0	0	20	1	55
INDIAN/RILEY LAKE	5	5	25	11	4	44	14	4	56	2	3	6	6	3	17
PAT SHAY LAKE	8	4	32	1	3	3	0	0	0	1	1	1	44	2	69
RAT RIVER	18	5	90	22	5	110	24	5	120	24	5	120	22	5	104
WABIKON LAKE	36	5	180	65	2	130	65	3	195	60	4	240	42	3	117
<b>LINCOLN</b>															
ALICE LAKE	12	4	48	30	4	120	15	2	30	60	3	180	50	3	181
<b>ONEIDA</b>															
FISH LAKE	14	2	28	5	3	15	5	2	10	6	2	12	36	3	123
LITTLE RICE LAKE	0	0	0	0	0	0	0	0	0	0	0	0	8	1	31
RICE LAKE	70	1	70	60	1	60	60	1	60	22	3	66	72	1	123
SPUR LAKE	45	2	90	30	2	60	68	3	204	65	2	130	73	3	278
WISCONSIN RIVER	180	5	900	145	5	725	125	5	625	120	5	600	146	5	651
<b>PRICE</b>															
BLOCKHOUSE LAKE	4	1	4	1	1	1	5	1	5	1	1	1	19	3	64
<b>VILAS</b>															
ALLEQUASH LAKE	35	5	175	20	3	60	26	4	104	30	4	120	70	4	289
LITTLE RICE LAKE	20	4	80	23	3	69	36	3	108	36	4	144	13	3	42
MANITOWISH RIVER	16	5	80	13	5	65	13	5	65	11	4	44	15	4	70
PARTRIDGE LAKE	18	5	90	9	4	36	13	4	52	18	4	72	19	4	84
RICE LAKE	28	5	140	36	4	144	43	5	215	43	4	172	25	4	90
WEST PLUM LAKE	6	2	12	2	3	6	20	2	40	7	3	21	22	3	74
<b>SUBTOTAL</b>	<b>515</b>		<b>2,044</b>	<b>473</b>		<b>1,648</b>	<b>532</b>		<b>1,889</b>	<b>506</b>		<b>1,929</b>	<b>702</b>		<b>2,461</b>
COUNT:			40			40			39			39			40
<b>TOTAL:</b>	<b>1,180</b>		<b>4,029</b>	<b>1,168</b>		<b>4,066</b>	<b>1,199</b>		<b>3,937</b>	<b>1,301</b>		<b>4,496</b>	<b>1,603</b>		<b>5,448</b>
AVERAGE:			101			102			98			114			136

Table 3. Estimated manoomin acreage and density for waters aerially surveyed in 2004.					
COUNTY	WATER	2004 EST. ACRES	2004 EST. DENSITY	2003 EST. ACRES	2003 EST. DENSITY
Barron	Bear Lake	32	medium	26	sparse-medium
Burnett	Clam River Flowage	30	dense	27	dense
	Loon Lake (Carters Bridge)	70	medium-dense	not surveyed	
	North Fork Flowage	25	medium	50	medium-dense
	North Lang Lake	2	medium	4	dense
	Phantom Flowage	50	sparse-medium	55	medium
	Rice Lake <sup>1</sup>	13	medium-dense	10	medium
	Rice Lake <sup>2</sup>	3	medium	not surveyed	
Douglas	Yellow Lake	20	medium-dense	16	medium-dense
	Lower Ox Lake	9	medium	10	medium
	Minong Flowage (Smiths Bridge)	25	medium	28	medium-dense
	Radigan Flowage	8	sparse-medium	4	sparse
	St.Croix River/Cutaway Dam	35	medium-dense	40	medium-dense
Forest	Upper Ox Lake	4	dense	6	dense
	Hiles Millpond	4	sparse-medium	10	medium
	Little Rice Flowage	90	medium-dense	80	medium
Iron	Scott Lake	6	medium	2	medium
	Little Turtle Flowage	15	medium	20	dense
Langlade	Mud Lake	8	dense	6	medium-dense
	Daly Pond	8	dense	8	medium-dense
Oneida	Goose Island (Pickerel Creek)	4	dense	not surveyed	
	Miniwaukan Lake	7	medium	4	medium
	Spider Creek Flowage	5	sparse	30	dense
	Big Lake	12	medium-dense	10	medium
Polk	Cuenin Lake	15	medium-dense	15	medium-dense
	Roe Lake	1	medium	not surveyed	
	Scott Creek Impoundment	10	medium	8	medium
	The Thoroughfare	60	sparse-medium	75	medium-dense
	Wolf River <sup>3</sup>	16	medium-dense	14	medium-dense
Price	Joel Flowage	10	medium	6	medium
	Little Butternut	4	medium	3	medium
	Rice Lake <sup>4</sup>	3	sparse-medium	not surveyed	
Sawyer	Spring Creek Wildlife Area	15	medium-dense	8	medium-dense
Vilas	Partridge Crop Lake	3	medium	14	medium
	West Branch Chippewa River	12	medium	16	medium-dense
Washburn	Aurora Lake	65	sparse-dense	45	sparse-dense
	Devine Lake	4	medium	6	medium
	Frost Lake	7	medium	9	medium
	Irving Lake	25	medium	20	sparse-medium
	Island Lake	60	sparse-dense	60	sparse-medium
	Lower Ninemile Lake	18	sparse-dense	18	medium
	Nixon Lake	5	sparse-medium	3	sparse
	Rest Lake	4	medium	4	medium-dense
	Rice Creek <sup>5</sup>	9	medium-dense	8	sparse-medium
	Rice Creek <sup>6</sup>	11	dense	10	medium-dense
	Round Lake	3	medium-dense	2	medium-dense
	Upper Ninemile Lake	72	dense	80	sparse-dense
	Washburn	Long, Mud, & Little Mud Lakes	23	medium-dense	23

<sup>1</sup> W of Frederic, (T37N, R18W, S36); <sup>2</sup> Near Hertel; <sup>3</sup> NW of Lennox; <sup>4</sup> N of Big Lake; <sup>5</sup> N of Island Lake <sup>6</sup> NW of Frederic



## Harvest Estimation

Responses were obtained from 271 tribal permit holders and 305 state licensees. Survey respondents were asked to report all harvest which occurred under their permit. For state licensees, this included on- and off-reservation harvest; for tribal members it included only off-reservation harvest, since no permit is required to harvest on-reservation. Twenty-five of the tribal and 266 of the state licensees surveyed reported harvesting rice in 2004. The total number estimated active in each group was 86 tribal members and 580 state licensees (Table 4).

Tribal harvesters active off-reservation reported making from 1 to 19 ricing trips, averaging 6.0 trips. Tribal survey respondents made a total of 142 off-reservation harvesting trips, gathering 7,975 pounds of green rice (Appendix 1), with an extrapolated total harvest estimate of 24,265 pounds in 515 trips, an average of 47 pounds per trip (Table 4). The total off-reservation harvest per active license averaged 282 pounds.

	NUMBER OF PERMIT HOLDERS	ESTIMATED NUMBER ACTIVE	AVERAGE NUMBER OF TRIPS	AVERAGE HARVEST/ TRIP	AVE. HARVEST/ ACTIVE LICENSE	TOTAL ESTIMATED HARVEST / TRIPS
TRIBAL	831	86	6.0	47	282	24,265 / 515
STATE	665	580	2.7	36	99	57,607 / 1,581
TOTAL	1,496	666	3.1	39	123	81,872 / 2,096

In comparison, active state licensees reported making from 1 to 21 ricing trips, averaging 2.7 trips. Collectively, state survey respondents made 735 trips and harvested a total of 27,288 pounds of green rice (Appendix 1), an average of 36 pounds per trip. The total harvest per active state license averaged 99 pounds.

The amount of rice harvested per individual varied greatly (Table 5). The unique state ricer discussed in the Methods section reported harvesting 1,700 pounds of rice, while the most reported by one tribal ricer was 2,610 pounds.

Eighty-seven percent of the state-licensed respondents gathered rice in 2004, versus 10% for the tribes. Differences in permit systems between the two groups accounts for the different activity levels observed. The tribal ricing permit is a simple check-off category on a general natural resources harvesting permit available at no cost to tribal members. The category is frequently checked by individuals whose primary interest is one of the other harvest activities listed on the permit. The state permit is a unique license available for a fee, and thus is rarely obtained by individuals without a strong intention of ricing. The tribal activity rate is also lowered because members are asked to respond only if they harvested rice off-reservation. When on-reservation rice beds have good stands, many tribal ricers concentrate their efforts there.

Table 5. Distribution of harvest among active respondents to the 2004 harvest survey.			
TRIBAL			
POUNDS OF GREEN RICE HARVESTED	INDIVIDUALS		PERCENT OF TOTAL HARVEST
	NUMBER	PERCENT	
0 - 50	2	8.7	1.3
51 - 100	5	21.7	4.2
101 - 150	2	8.7	3.4
151 - 200	6	26.1	13.0
201 - 300	1	4.3	2.8
301 - 500	3	13.0	16.7
501 - 1000	3	13.0	26.0
1001 +	1	4.3	32.7
STATE			
POUNDS OF GREEN RICE HARVESTED	INDIVIDUALS		PERCENT OF TOTAL HARVEST
	NUMBER	PERCENT	
0 - 50	128	48.1	12.0
51 - 100	72	27.1	19.6
101 - 150	20	7.5	8.9
151 - 200	12	4.5	8.1
201 - 300	14	5.3	12.3
301 - 500	12	4.5	17.6
501 - 1000	7	2.6	15.2
1001 +	1	0.4	6.2

The data collected in this survey can be used to estimate off-reservation harvest by tribal permit holders, and both total and off-reservation harvest by state licensees. It cannot be used to estimate on-reservation harvest by tribal members, who are not required to have a permit to harvest on-reservation.

Using the approach to estimate harvest described above in the Methods section, total off-reservation harvest for tribal permit holders was estimated at 24,265 pounds of green rice (Table 4). The total harvest for state permittees was estimated at 57,607 pounds, with all but 239 pounds of it coming from off-reservation waters. Thus, the total off-reservation harvest was estimated at 81,633 pounds, with tribal ricers accounting for 30% of the harvest.

This harvest estimate is very similar (+6%) to the 2003 off-reservation harvest estimate of 76,943 pounds (David, 2008), but the proportion attributable to state and tribal ricers differed somewhat. Tribal harvest decreased 13% from 2003, primarily as a result of a decline in the estimated number of active ricers. State harvest increased 17%, the product of small increases in the number of active ricers, pounds harvested per trip, and trips made per license. Manoomin harvest tends to vary with abundance as well as other factors (Figure 3).

The distribution of ricing effort and harvest has tended to reflect the distribution of rice waters in the state, and the abundance of rice on those waters (Figure 4). Approximately ninety-two waters were reported riced in 2004 (not including unnamed locations), one more than in 2003.

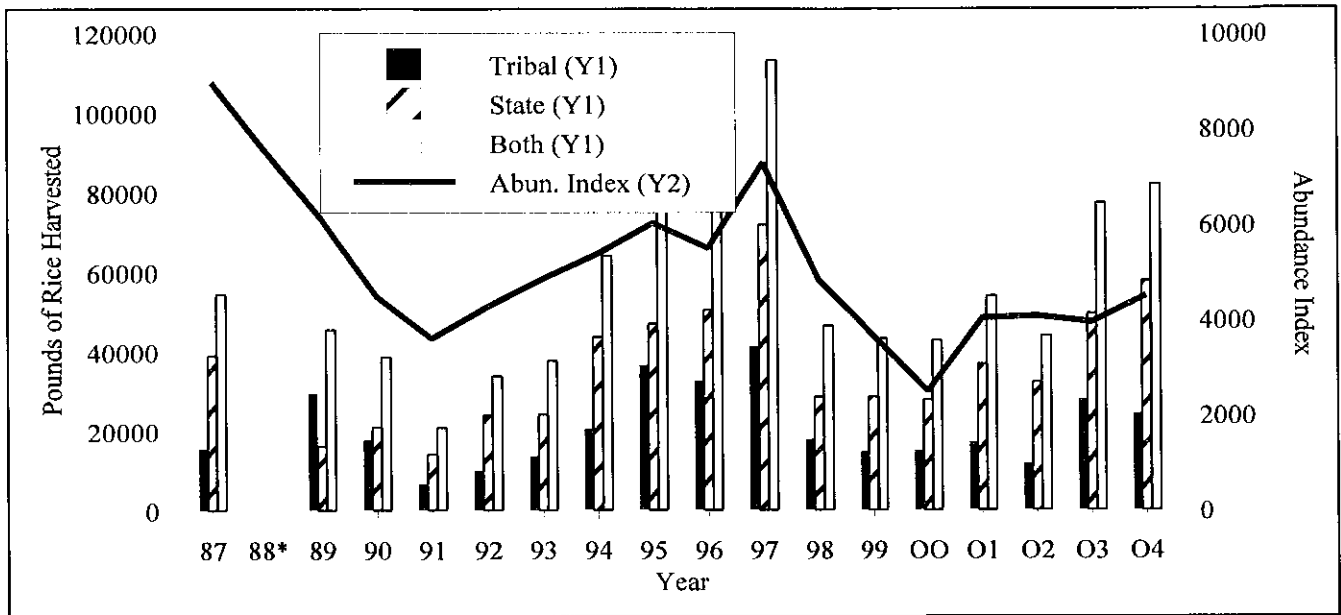


Figure 3. Harvest trends versus abundance index, 1987-2004 (\* no harvest estimates for 1988).

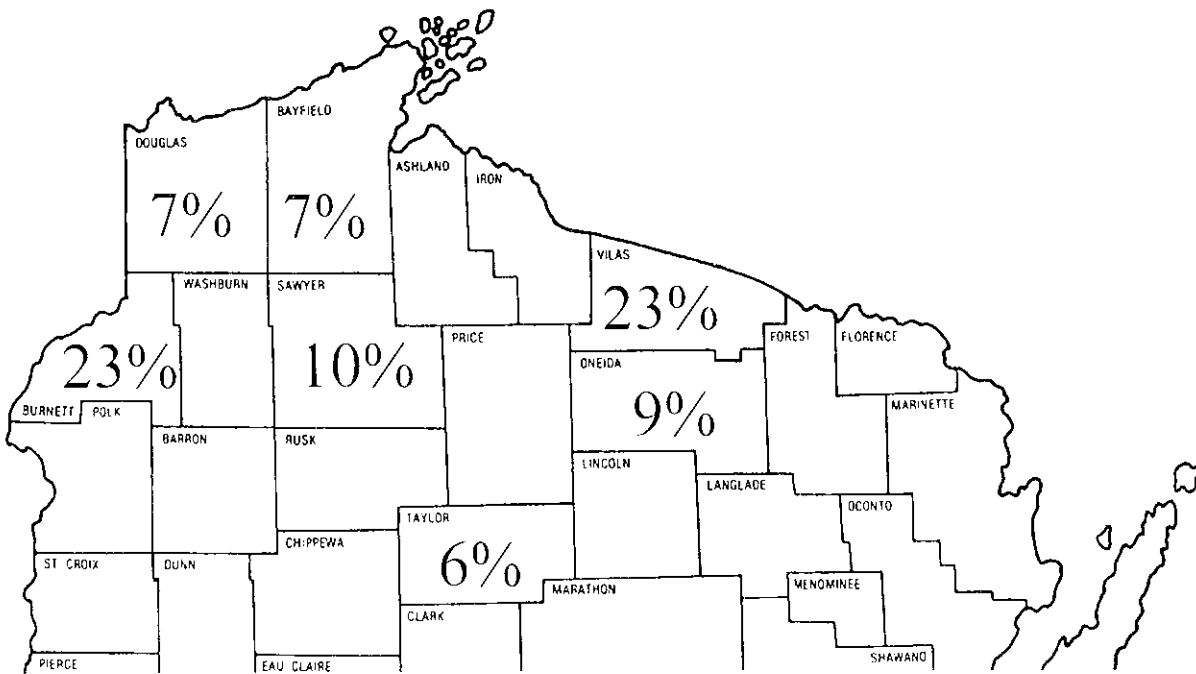


Figure 4. Distribution of counties accounting for 5% or more of the manoomin harvest reported by county by respondents to the 2004 harvest survey, tribal and state harvesters combined.

Less than 1% of the harvest reported by surveyed state licensees came from waters outside the ceded territory (Appendix 1). Approximately 13% of harvest reported from named locations came from sites planted by the WDNR, the U.S. Forest Service, GLIFWC, or other seeding cooperators. This was down from 30% in 2003, apparently as a result of good stands on many historic waters, including Pacwawong Flowage (Sawyer), Aurora Lake (Vilas), Clam Lake (Burnett), and others.

### Opinions of Respondents

**Annual Abundance:** Individuals were asked if they felt the 2004 wild rice crop was better, the same, or worse than the 2003 crop. Among the 187 active respondents with an opinion, 56% felt 2004 was better than 2003, 31% felt both years were about the same, and 13% were of the opinion that 2004 was worse than 2003.

Collectively, these opinions correlated fairly well with results from the abundance surveys of 40 rice waters discussed earlier, which showed a 14% increase in overall abundance state-wide between years.

**Rice Worm Abundance:** For the first time, survey respondents were asked how they rated the abundance of “rice worms” (larvae stage of the moth *Apamea apamiformis*) in the current year. Among the 257 respondents who expressed an opinion, 22% (n=56) rated them as very low, 45% (N=116) as low, 23% (n=58) as average, 7% (n=18) as medium high, and 3% (n=9) as high. This question will also be asked in future surveys in an effort to develop an index to rice worm abundance, and to attempt to determine if any correlation exists between rice abundance and harvest.

**Date-Regulated Waters:** Respondents were also asked their opinion about how many waters should be date-regulated. Twenty-two of 25 tribal and 214 of 305 state ricers expressed an opinion. More than half of both tribal and state ricers favored keeping the number of date-regulated waters the same (Table 6). Opinions among the remaining state respondents were split fairly evenly among the other categories, while most of the other tribal members favored increasing the number of date-regulated waters. Overall, 84% of respondent favored keeping at least some waters date-regulated.

Opinion	Tribal	State	Total	Percent
More	6	23	29	13.6
Same	12	117	129	60.3
Fewer	1	21	22	10.3
None	1	33	34	15.9
Total	22	194	214	100

**Comments:** Respondents offered a number of comments and opinions, although relatively few consistent themes surfaced.

The most frequent comment made (11 individuals) concerned problems with posting lake openings at the site and on the GLIFWC web page. Nine individuals expressed thanks for managing and/or protecting the resource, and several suggested additional efforts that could be made such as managing some lakes specifically for rice and wildlife and focusing land acquisition on rice waters.

There were many regulation-related comments, which varied greatly: don't regulate hours (1); hours should be sunrise to sunset (1); liked open/closed cycles on date-regulated lakes (2); found open/closed cycles confusing (1); Pacwawong Flowage should not be date-regulated (1); Pacwawong should be date-regulated (2); date-regulate more lakes, but remove those with little harvest (2). Two individuals also felt the state license fee was too high.

Comments about specific rice beds included: Mondeaux Flowage (Taylor) was affected by disease, possibly brown-spot; water levels on Phantom and Black Brook Flowages (Burnett) need to be carefully managed; need to educate property owners on White Lake (Waupaca) about the value of rice; high levels of smut on Aurora Lake (Vilas); Wabicon Lake (Forest) opened too late; and interest in why Mud Hen Lake (Burnett) did not open.

Several respondents mentioned seeding wild rice at various sites, including Ogema Mill Pond, Price County (seeded with a "small amount from Spring Creek Wildlife Area"); Bog Brook Flowage, Forest County; and the Main flowage on McMillian Marsh Wildlife Area, Marathon County, where it reportedly grew well.

Other respondents simply shared their enthusiasm for manoomin, with comments such as: "*glorious*", "*special time and place*", "*honored to be participating*", "*awesome experience*", "*will teach it to my children*", and "*son wrote a paper for school about his first ricing trip*".

**Potential Waters for Seeding or Other Restoration:** Respondents suggested 20 different waters which might be candidates for seeding or other restoration efforts. Sites named are listed in Appendix 2.

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Appendix 1. Ricing trips and pounds of green manoomin harvested by respondents to the 2004 harvest survey.							
COUNTY	WATER	TRIBAL		STATE		COMBINED TOTAL	
		TRIPS	POUNDS	TRIPS	POUNDS	TRIPS	POUNDS
ASHLAND	KAKAGON SLOUGHS			2	100	2	100
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>100</b>	<b>2</b>	<b>100</b>
BARRON	BEAR LAKE			21	493	21	493
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>21</b>	<b>493</b>	<b>21</b>	<b>493</b>
BAYFIELD	CHIPPEWA LAKE			8	247	8	247
	TOTOGATIC LAKE	19	790	38	1,090	57	1,880
	<b>Subtotal</b>	<b>19</b>	<b>790</b>	<b>46</b>	<b>1,337</b>	<b>65</b>	<b>2,127</b>
BURNETT	BLACK BROOK FLOWAGE			1	35	1	35
	BRIGGS LAKE			9	260	9	260
	CLAM LAKE	3	60	48	2,173	51	2,233
	CLAM RIVER FLOWAGE			7	325	7	325
	GASLYN LAKE	3	100	6	192	9	292
	LIPSETT LAKE			1	3	1	3
	LONG LAKE			29	1,725	29	1,725
	LOON LAKE			5	165	5	165
	LOWER L DIKE FLOWAGE			1	9	1	9
	MEMORY LAKE			1	3	1	3
	MUD LAKE			1	2	1	2
	NORTH FORK FLOWAGE			22	1,129	22	1,129
	PHANTOM FLOWAGE			26	814	26	814
	RICE LAKE			5	222	5	222
	UNNAMED WATER			1	25	1	25
	WEBB LAKE			1	33	1	33
	YELLOW LAKE			2	90	2	90
	YELLOW RIVER			3	80	3	80
	<b>Subtotal</b>	<b>6</b>	<b>160</b>	<b>169</b>	<b>7,285</b>	<b>175</b>	<b>7,445</b>
DOUGLAS	AMNICON LAKE			1	29	1	29
	LOWER OX LAKE			4	76	4	76
	MINONG FLOWAGE			9	484	9	484
	MULLIGAN LAKE	6	150	15	915	21	1,065
	RADIGAN FLOWAGE			12	506	12	506
	ST. CROIX RIVER			6	191	6	191
	UNNAMED WATER			1	30	1	30
	UPPER OX LAKE			2	40	2	40
<b>Subtotal</b>	<b>6</b>	<b>150</b>	<b>50</b>	<b>2,271</b>	<b>56</b>	<b>2,421</b>	
FOREST	BOG BROOK FLOWAGE			1	75	1	75
	LITTLE RICE LAKE	8	230	3	238	11	468
	SCATTERED RICE LAKE	4	300	1	35	5	335
	UNNAMED WATER			1	4	1	4
	WABIKON LAKE			1	10	1	10
<b>Subtotal</b>	<b>12</b>	<b>530</b>	<b>7</b>	<b>362</b>	<b>19</b>	<b>892</b>	
IRON	BEAR RIVER			2	168	2	168
	LITTLE TURTLE FLOWAGE			2	85	2	85
	MUD LAKE			3	85	3	85
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>338</b>	<b>7</b>	<b>338</b>

(Appendix 1 continued on the next page.)

Appendix 1. Ricing trips and pounds of green manoomin harvested by respondents to the 2004 harvest survey.							
COUNTY	WATER	TRIBAL		STATE		COMBINED TOTAL	
		TRIPS	POUNDS	TRIPS	POUNDS	TRIPS	POUNDS
LANGLADE	LILY RIVER			2	140	2	140
	<b>Subtotal</b>			<b>2</b>	<b>140</b>	<b>1</b>	<b>140</b>
LINCOLN	ALICE LAKE			10	265	10	265
	WISCONSIN RIVER			5	70	5	70
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>15</b>	<b>335</b>	<b>15</b>	<b>335</b>
MARINETTE	NOQUEBAY LAKE			3	1	3	1
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>3</b>	<b>1</b>
MARQUETTE	NESHBORO MILLPOND			1	10	1	10
	WHITE RIVER MILLPOND			2	18	2	18
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>28</b>	<b>3</b>	<b>28</b>
ONEIDA	CUNIN LAKE			3	19	3	19
	GARY LAKE			1	40	1	40
	LITTLE RICE LAKE			4	160	4	160
	RICE LAKE			1	1	1	1
	SPUR LAKE	7	850	12	540	19	1,390
	THE THOURGHFARE	4	525	3	84	7	609
	UNNAMED WATER			3	60	3	60
	<b>Subtotal</b>	<b>19</b>	<b>1,745</b>	<b>41</b>	<b>1,321</b>	<b>60</b>	<b>3,066</b>
OUTAGAMIE	WOLF RIVER			1	1	1	1
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
POLK	JOEL FLOWAGE			9	84	9	84
	RICE LAKE			6	388	6	388
	SOMERS LAKE			2	73	2	73
	UNNAMED WATER			3	193	3	193
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>20</b>	<b>738</b>	<b>20</b>	<b>738</b>
PRICE	LOWER STEVE CREEK FLOW.			2	65	2	65
	SPRING CREEK WA			17	549	17	549
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>19</b>	<b>614</b>	<b>19</b>	<b>614</b>
RUSK	LEA FLOWAGE	1	50			1	50
	<b>Subtotal</b>	<b>1</b>	<b>50</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>50</b>
SAWYER	BLAISDELL LAKE			5	124	5	124
	HUNTER LAKE			3	61	3	61
	MOSQUITO CREEK			3	15	3	15
	NAMEKAGON RIVER	2	80	2	60	4	140
	NELSON LAKE			3	39	3	39
	PACWAWONG FLOWAGE	36	930	69	1,558	105	2,488
	PHIPPS FLOWAGE	1	80	14	267	15	347
	UNNAMED WATER			1	30	1	30
	W. FORK CHIPPEWA RIVER			3	117	3	117
	<b>Subtotal</b>	<b>39</b>	<b>1,090</b>	<b>103</b>	<b>2,271</b>	<b>142</b>	<b>3,361</b>
TAYLOR	CHEQUAMEGON WATERS			22	1,102	22	1,102
	MONDEAUX FLOWAGE			25	865	25	865
	MONDEAUX RIVER			1	10	1	10
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>48</b>	<b>1,977</b>	<b>48</b>	<b>1,977</b>

(Appendix 1 continued on the next page.)

Appendix 1. Ricing trips and pounds of green manoomin harvested by respondents to the 2003 harvest survey.							
COUNTY	WATER	TRIBAL		STATE		COMBINED TOTAL	
		TRIPS	POUNDS	TRIPS	POUNDS	TRIPS	POUNDS
UNNAMED	UNNAMED WATER	10	700	23	1,840	33	2,540
	<b>Subtotal</b>	<b>10</b>	<b>700</b>	<b>23</b>	<b>1,840</b>	<b>33</b>	<b>2,540</b>
VILAS	ALLEQUASH LAKE			6	266	6	266
	AURORA LAKE	5	600	24	1,537	29	2,137
	IRVING LAKE	3	435			3	435
	ISLAND LAKE			4	90	4	90
	LITTLE RICE LAKE	5	550	16	801	21	1,351
	LOST CREEK			4	20	4	20
	LOWER NINEMILE LAKE	6	655	2	37	8	692
	MANITOWISH RIVER			7	315	7	315
	MANN FLOWAGE			2	63	2	63
	PARTRIDGE LAKE			2	76	2	76
	PLUM LAKE			1	30	1	30
	RICE CREEK			1	80	1	80
	UPPER NINEMILE FLOWAGE	5	335	29	1,397	34	1,732
	WEST PLUM LAKE	2	75	2	60	4	135
	WILD RICE LAKE			1	13	1	13
	<b>Subtotal</b>	<b>26</b>	<b>2,650</b>	<b>101</b>	<b>4,785</b>	<b>127</b>	<b>7,435</b>
WASHBURN	BOYER CREEK			1	40	1	40
	DILLY LAKE	1	70	17	271	18	341
	MULLIGAN LAKE			8	250	8	250
	POTATO CREEK			1	20	1	20
	POTATO LAKE			6	120	6	120
	SPRING LAKE	2	10			2	10
	TRANUS LAKE			5	195	5	195
	TREGO FLOWAGE	1	30	5	85	6	115
	YELLOW RIVER			3	31	3	31
	<b>Subtotal</b>	<b>4</b>	<b>110</b>	<b>46</b>	<b>1,012</b>	<b>50</b>	<b>1,122</b>
WAUPACA	WHITE LAKE			6	27	6	27
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>27</b>	<b>6</b>	<b>27</b>
WAUSHARA	SAXESVILLE MILLPOND			2	12	2	12
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>12</b>	<b>2</b>	<b>12</b>
	<b>GRAND TOTAL</b>	<b>142</b>	<b>7,975</b>	<b>735</b>	<b>27,288</b>	<b>877</b>	<b>35,263</b>



Appendix 2. Waters suggested for seeding or restoration by respondents to the 2004 wild rice harvest survey.*	
COUNTY	WATER
Barron	Bear Creek (near Haugen) Duck Lake (near Cumberland) Lake Montanis Rice Lake (river channel; bay on north end of south lake)
Bayfield	DOT mitigation wetland east side of HWY H, Roosevelt Township Rust Flowage (near Drummond)
Burnett	Upper North Fork Flowage Yellow River (esp. downstream from Glendening Road)
Douglas	Flat Lake (east of Solon Springs) St. Louis River
Iron	Deer Lake (near Mercer)
Polk	Clam Falls Flowage Lotus Lake
Sawyer	Lac Courte Oreilles (Musky Bay) Upper Tiger Cat Flowage
Vilas	Snyder Lake
Washburn	Chippanazie (Davis) Flowage Gull Lake (upper or lower end) Spooner Lake
Waushara	Pine River Millpond

\* Suggested waters with relatively well established beds not included.