



**Wild Rice (Manoomin)
Abundance and Harvest
in Northern Wisconsin in 2007**

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Miigwech!

MANOOMIN (WILD RICE) ABUNDANCE AND HARVEST IN NORTHERN WISCONSIN IN 2007

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 2007 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 2nd, 3rd, and 16th. 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 Lake in Polk County, with an average abundance index of 168 (1985-2006) was not surveyed in 2007. Thus, when comparisons were made between 2007 and 2006, data for this lake were suppressed for 2006. For comparisons between 2007 and long term averages, an index was estimated for this water by applying the ratio between the 2007 overall index for all other waters and the long term overall index for all other waters (3,272/5,044) to the long term index for Rice Lake (168). This produced an estimated index of 110 for this water in 2007.

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 1248 individuals in 2007. When individuals obtained their 2007 permit, they were asked if they harvested rice the previous year. Forty-five percent (94/211) of the individuals who indicated they had riced in 2006 ("active" ricers) were surveyed by phone, as well as 18% (162/885) of those individuals who indicated they had not riced the previous year ("inactive" ricers). Since 152 permit holders failed to answer the question, these individuals were treated as a third group in this survey (as has been done in most years since 2001); 22% (33/152) of these individuals were also surveyed ("non-responsive" ricers) (Table 1).

The number of tribal members who actually harvested off-reservation in 2007 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.

GROUP	TOTAL NUMBER	# SURVEYED	% SAMPLED	% ACTIVE OFF-RESERVATION	EST. # ACTIVE OFF-RESERVATION
ACTIVE ¹	211	94	45%	33.0%	70
INACTIVE ¹	885	162	18%	2.5%	22
NON-RESPONSIVE ¹	152	33	22%	6.1%	9
TOTAL	1248	289			101

¹ 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 571 of the 605 individuals who obtained the state license. All harvest estimates were made by expanding the results reported by the 301 respondents to the state survey (50% of licensees).

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 47 additional waters surveyed only from the air are listed in Table 3. A total of 2,081 acres of wild rice was estimated for these 87 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 2007.

Survey results and field observations indicate that rice abundance in 2007 was relatively poor compared to 2006, particularly in the northwest part of the state. Overall, the abundance index decreased 20% between years (Table 2, Figure 1). However, this decline was very unevenly distributed; the index for northwest waters fell 43%, while the index for north-central waters actually increased 23%. In the northwest, the abundance index increased on 8 waters, fell on 9, and was essentially unchanged on 4, but declines were much larger than increases. Clam Lake in Burnett had a dramatic decline, and all 4 Sawyer County waters surveyed declined as well. Among north-central waters, 8 rose, 6 fell and 4 were unchanged (Table 2, Figure 2). Vilas County waters had a noticeably good year, with all 6 waters surveyed showing an improvement from 2006. Overall, the 2007 index was 65% of the long-term index average (1985-2007).

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. However, many areas experienced drought in 2007, particularly in the northwest part of the state. (The on-reservation beds on the Kakagon Sloughs were closed for perhaps the first time due to low water levels on Lake Superior.) Water levels were so low that some rice was left out of the water column by summer end, likely affecting production as well as harvest.

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.

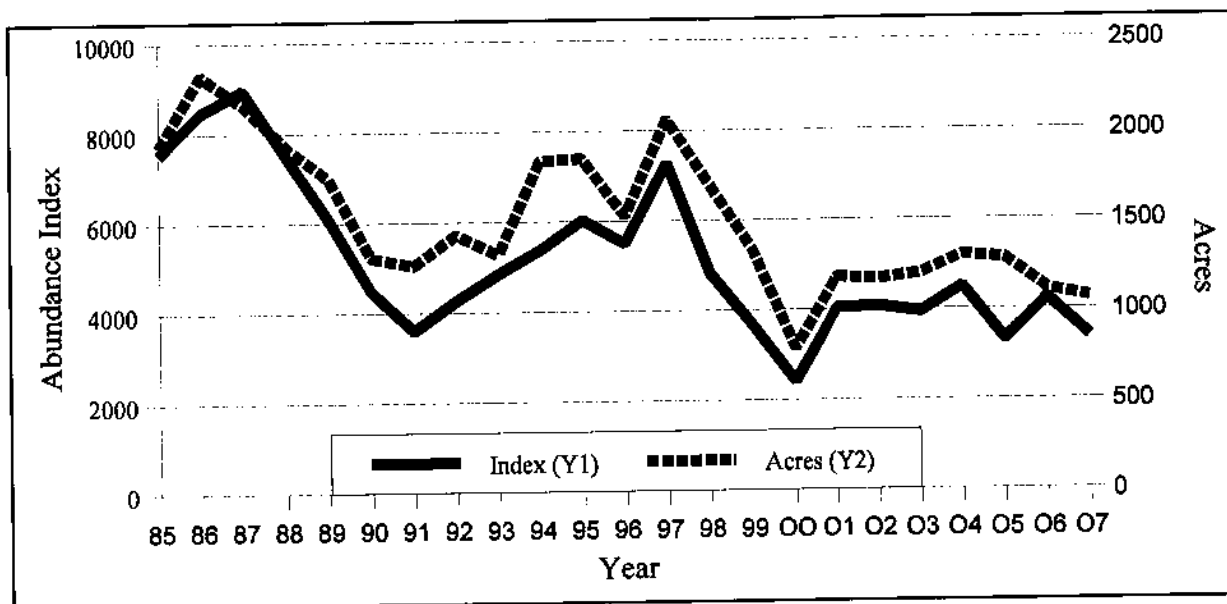


Figure 1. Manoomin acreage and abundance index from 40 Wisconsin rice waters surveyed annually from 1985-2007.

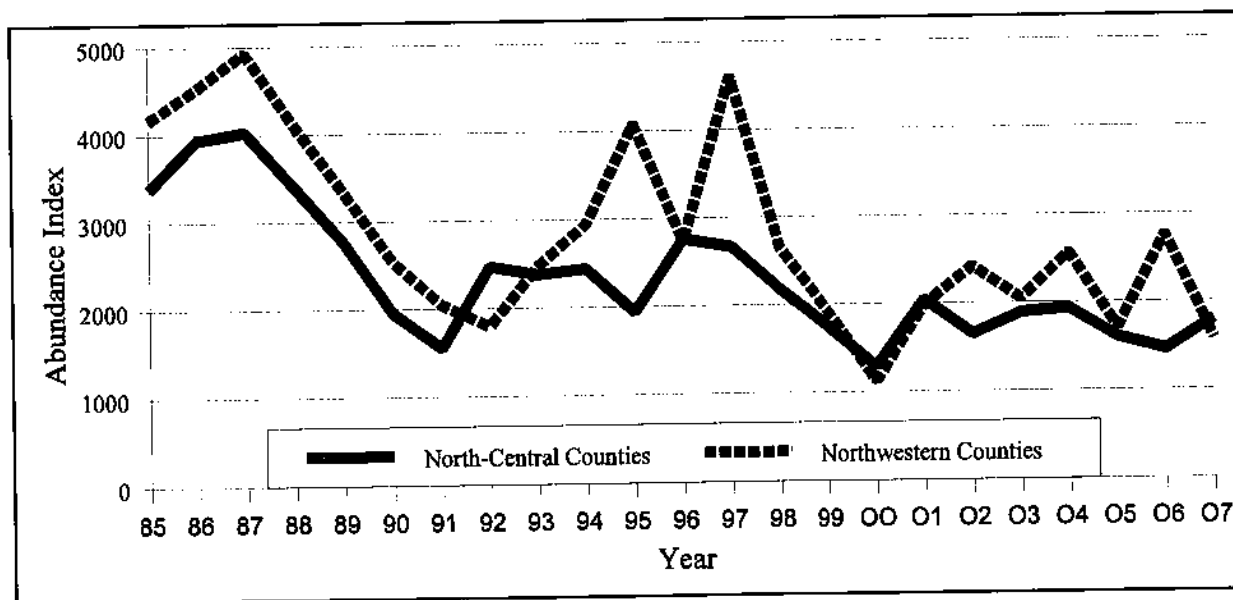


Figure 2. Manoomin abundance index from 40 Wisconsin rice waters surveyed annually from 1985-2007; northwestern versus north-central Wisconsin waters (Highway 13 was used to separate northwestern from north-central waters).

Table 2. Manoomin acreage, density and abundance index from 40 Wisconsin waters for 2004-2007, and the 1985-2007 means.
(Data for 1985-2003 can be found in David, 2001 and David, 2008a.)

WATER	2004			2005			2006			2007			1985-2007		
	ACRES	DEN.	INDEX	ACRES	DEN.	INDEX	ACRES	DEN.	INDEX	ACRES	DEN.	INDEX	MEAN ACRES	MEAN DEN.	MEAN INDEX
NORTHWESTERN CTYS.															
BARRON															
SWEENEY CREEK	1	1	1	11	2	22	0	0	0	1	4	4	9	2.5	34
BAYFIELD															
TOTOGATIC LAKE	135	2	270	350	2	700	108	2	216	215	1	215	161	2.6	471
BURNETT															
BASHAW LAKE	2	2	4	4	2	8	1	1	1	0	0	0	10	2.4	28
BIG CLAM LAKE	165	3	495	120	2	240	220	4	880	15	2	30	148	3.3	509
BRIGGS LAKE	19	3	57	22	3	66	30	4	120	33	4	132	28	3.8	111
GASLYN LAKE	25	4	100	5	1	5	1	1	1	28	4	112	23	3.2	83
LONG LAKE	40	3	120	20	2	40	65	4	260	65	4	260	69	2.6	184
MUD LAKE (2)	10	4	40	10	1	10	13	5	65	15	3	45	14	3.5	50
WEBB CREEK	12	4	48	12	3	36	20	5	100	15	5	75	12	4.0	58
DOUGLAS															
MULLIGAN LAKE	38	3	114	42	3	126	9	2	18	23	3	69	25	2.2	60
POLK															
RICE BED CREEK			40*	10	2	20	15	4	60	15	5	75	11	4.3	49
RICE LAKE (1)	40	4	160	30	4	120	4	2	8			110*	48	3.3	168
WHITE ASH LAKE	6	4	24	7	4	28	7	2	14	5	3	15	12	3.2	39
SAWYER															
BILLY BOY FLOW.	5	2	10	7	2	14	7	5	35	7	2	14	13	2.3	41
BLAISDELL LAKE	95	2	190	90	1	90	65	4	260	90	1	90	78	2.7	215
PACWAWONG LAKE	120	5	600	24	2	48	90	4	360	40	3	120	87	3.7	339
PHIPPS FLOWAGE	25	4	100	15	1	15	26	5	130	5	3	15	29	3.9	115
WASHBURN															
DILLY LAKE	16	4	64	8	4	32	11	3	33	11	5	55	20	4.1	84
POTATO LAKE	20	4	80	8	2	16	1	1	1	4	3	12	13	3.0	41
RICE LAKE	8	3	24	8	3	24	9	3	27	7	3	21	21	3.3	77
SPRING LAKE (1)	8	2	16	17	2	34	43	4	172	32	3	96	16	2.8	56
TRANUS LAKE	5	2	10	4	3	12	3	2	6	14	1	14	32	1.6	50
SUBTOTAL	795		2567	824		1706	748		2767	640		1579	880		2861
NORTH-CENTRAL CTYS.															
FOREST															
ATKINS LAKE	0	0	0	0	0	0	0	0	0	0	0	0	16	0.6	48
INDIAN/RILEY LAKE	2	3	6	3	2	6	3	4	12	1	1	1	5	3.0	16
PAT SHAY LAKE	1	1	1	2	1	2	1	1	1	2	2	4	36	1.5	59
RAT RIVER	24	5	120	22	5	110	22	5	110	15	5	75	22	4.7	103
WABIKON LAKE	60	4	240	55	3	165	70	3	210	40	4	160	45	2.7	125
LINCOLN															
ALICE LAKE	60	3	180	55	2	110	6	3	18	10	1	10	47	3.0	163
ONEIDA															
FISH LAKE	6	2	12	4	2	8	2	2	4	7	2	14	30	3.1	108
LITTLE RICE LAKE	0	0	0	0	0	0	0	0	0	0	0	0	7	1.2	27
RICE LAKE	22	3	66	16	1	16	3	1	3	3	1	3	61	1.3	108
SPUR LAKE	65	2	130	18	2	36	8	2	16	3	3	9	65	3.1	245
WISCONSIN RIVER	120	5	600	140	5	700	150	5	750	140	5	700	144	4.6	660
PRICE															
BLOCKHOUSE LAKE	1	1	1	1	1	1	1	1	1	0	0	0	16	2.5	56
VILAS															
ALLEQUASH LAKE	30	4	120	20	3	60	8	2	16	65	3	195	63	3.9	263
LITTLE RICE LAKE	36	4	144	36	3	108	23	3	69	54	5	270	17	2.7	56
MANITOWISH RIVER	11	4	44	12	5	60	13	5	65	14	5	70	15	4.5	70
PARTRIDGE LAKE	18	4	72	16	3	48	23	3	69	24	5	120	19	4.2	83
RICE LAKE	43	4	172	43	3	129	28	4	112	40	4	160	27	18.8	96
WEST PLUM LAKE	7	3	21	14	3	42	2	2	4	6	2	12	20	3.1	67
SUBTOTAL	506		1929	457		1601	363		1460	424		1803	655		2351
COUNT:			39			40			40			39			40
TOTAL:	1301		4496	1281		3307	1111		4227	1064		3382	1535		5212
AVERAGE:			114			83			106			84			130

*water not surveyed; index value estimated.

Table 3. Estimated manoomin acreage and density for waters aerially surveyed in 2007.					
COUNTY	WATER	2007 EST. ACRES	2007 EST. DENSITY	2006 EST. ACRES	2006 EST. DENSITY
Barron	Bear Lake	5	sparse-medium	17	sparse-medium
Bayfield	Chippewa Lake	48	sparse-dense	50	sparse-dense
Burnett	Clam River Flowage	24	medium-dense	30	medium-dense
	Grettum Flowage	32	medium-dense	40	medium-dense
	Loon Lake (Carters Bridge)	70	medium-dense	70	dense
	North Fork Flowage	60	medium-dense	52	medium-dense
	North Lang Lake	3	medium-dense	3	dense
	Phantom Flowage	8	medium	55	medium
	Rice Lake ¹	10	medium-dense	12	medium-dense
Yellow Lake	6	medium	3	sparse	
Douglas	Gordon (St. Croix) Flowage	10	medium	9	medium
	Lower Ox Lake	14	medium-dense	14	medium
	Minong Flowage (Smiths Bridge)	30	dense	14	dense
	Radigan Flowage	10	dense	12	medium-dense
	St.Croix River/Cutaway Dam	40	sparse-medium	48	dense
	Upper Ox Lake	6	medium-dense	7	dense
Forest	Hiles Millpond	4	medium	9	medium
	Little Rice Flowage	85	medium	130	medium-dense
	Scott Lake	16	dense	8	medium
Iron	Little Turtle Flowage	20	dense	not surveyed	
	Mud Lake	20	medium	not surveyed	
Langlade	Daly Pond	4	medium	8	medium-dense
	Goose Island (Pickerel Creek)	5	dense	6	dense
	Miniwaukan Lake	3	medium	18	sparse-dense
	Spider Creek Flowage	5	medium	30	dense
Oneida	Big Lake	10	medium	12	medium-dense
	Cuenin Lake	27	dense	4	sparse-medium
	Fourmile Lake	7	dense	8	medium-dense
	Roe Lake	6	medium	8	medium-dense
	The Thoroughfare	65	medium-dense	55	medium-dense
Wolf River ²	20	dense	17	dense	
Polk	Rice Lake ³	3	sparse-medium	3	sparse-medium
Sawyer	Chippewa River (West Branch)	10	sparse-dense	12	sparse-dense
	Partridge Crop Lake	10	sparse-medium	10	sparse-medium
Vilas	Aurora Lake	35	medium-dense	80	dense
	Devine Lake	12	medium-dense	12	medium-dense
	Frost Lake	27	medium-dense	9	medium-dense
	Irving Lake	38	sparse-dense	35	sparse-dense
	Island Lake	54	medium-dense	50	sparse-medium
	Lower Ninemile Lake	40	medium-dense	34	sparse-dense
	Nixon Lake	25	medium-dense	5	sparse-dense
	Rice Creek ⁴	18	dense	18	dense
	Rice Creek ⁵	8	medium-dense	9	dense
	Round Lake	4	dense	4	medium-dense
	Upper Ninemile Lake	35	medium-dense	65	dense
Washburn	Long, Mud, & Little Mud Lakes	18	medium	20	medium
	Trego Flowage	7	medium-dense	4	medium

¹ Near Hertel; ² NW of Lennox; ³ NW of Frederic ⁴ N of Island Lake ⁵ N of Big Lake;

Harvest Estimation

Responses were obtained from 289 tribal permit holders and 301 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. Thirty-seven of the tribal and 252 of the state licensees surveyed reported harvesting rice in 2007. The total number estimated active in each group were 101 tribal members and 507 state licensees (Table 4).

Tribal harvesters active off-reservation reported making from 1 to 18 ricing trips, averaging 5.4 trips. Tribal survey respondents made a total of 190 off-reservation harvesting trips, gathering 11,049 pounds of green rice (Appendix 1), with an extrapolated total harvest estimate of 30,123 pounds in 545 trips, an average of 55 pounds per trip (Table 4). The total off-reservation harvest per active license averaged 298 pounds.

	NUMBER OF PERMIT HOLDERS	ESTIMATED NUMBER ACTIVE	AVERAGE NUMBER OF TRIPS	AVERAGE HARVEST/ TRIP	AVE. HARVEST/ ACTIVE LICENSE	TOTAL ESTIMATED HARVEST / TRIPS
TRIBAL	1248	101	5.4	55	298	30,123 / 545
STATE	605	507	2.6	25	65	33,120 / 1,316
TOTAL	1,853	608	3.1	34	104	63,243 / 1,861

In comparison, active state licensees reported making from 1 to 21 ricing trips, averaging 2.6 trips. Collectively, state survey respondents made 642 trips, gathering 16,156 pounds of green rice (Appendix 1), with an extrapolated total harvest estimate of 33,120 pounds in 1,316 trips, an average of 25 pounds per trip. The harvest per active state license averaged 65 pounds.

The amount of rice harvested per individual varied greatly (Table 5). The most reported by a state ricer was 1062 pounds, while the most reported by a tribal ricer was 1200 pounds. On the low end of the range, the percent of ricers who harvested a total of 50 pounds or less rose from 14% in 2006 (David, 2008b) to 30% among tribal ricers, and from 43% to 69% among state licensees. These figures are consistent with a poorer crop in 2007.

Eighty-four percent of the state-licensed respondents gathered rice in 2007, versus 8% 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 200 harvest survey.			
TRIBAL			
POUNDS OF GREEN RICE HARVESTED	INDIVIDUALS		PERCENT OF TOTAL HARVEST
	NUMBER	PERCENT	
0 - 50	11	29.7	2.4
51 - 100	3	8.1	2.4
101 - 150	2	5.4	2.4
151 - 200	3	8.1	5.1
201 - 300	5	13.5	11.4
301 - 500	5	13.5	19.8
501 - 1000	6	16.2	35.8
1001 +	2	5.4	20.8
STATE			
POUNDS OF GREEN RICE HARVESTED	INDIVIDUALS		PERCENT OF TOTAL HARVEST
	NUMBER	PERCENT	
0 - 50	170	68.8	22.6
51 - 100	42	17.0	19.7
101 - 150	13	5.3	9.7
151 - 200	3	1.2	3.3
201 - 300	7	2.8	10.7
301 - 500	10	4.0	23.3
501 - 1000	1	0.4	4.1
1001 +	1	0.4	6.6

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 30,123 pounds of green rice and the total harvest for state permittees was estimated at 33,120 pounds (Table 4). Since all of the 2007 state harvest came from off-reservation waters, the total off-reservation harvest was estimated at 63,243 pounds, with tribal ricers accounting for 48% of the harvest.

This harvest estimate is about three-fourths the 2006 estimate of 83,771 pounds (David, 2008b). The 2007 harvest estimate is unusual in that while the state harvest estimate declined significantly (53%) from 2006 - as might have been anticipated on the basis of abundance information - the 2007 tribal harvest estimate actually increased 38% from 2006.

The decline in state harvest was attributable to declines in the number of active ricers, which fell from 605 to 507, and in the amount harvested per trip, which declined from 37 to 25 pounds (while the average number of trips made was essentially unchanged). Although tribal participation also declined (from 116 to 101), the amount harvested per trip remained stable, and the average number of trips made increased from 3.5 to 5.4 per active license.

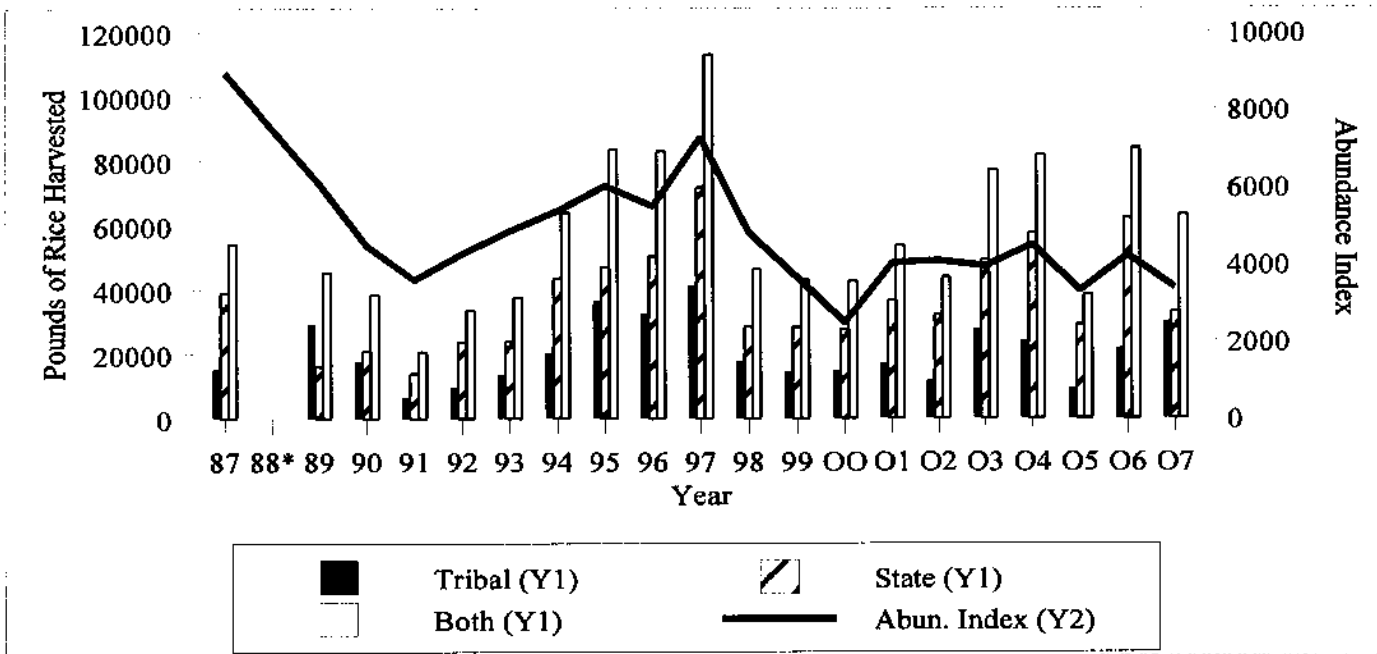


Figure 3. Harvest trends versus abundance index, 1987-2007 (* no harvest estimates for 1988).

These results may have been the product, at least in part, of a shift in which tribal members were active off-reservation in 2007. Given the poor crop, some less enthusiastic pickers may have passed on the year. However, some more committed ricers - especially from the Bad River Tribe, who typically harvest on-reservation but could not in 2007 due to low water levels on Lake Superior - may have ventured off-reservation in greater than usual numbers. Overall, 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). The percentage of the total harvest which came from Burnett County (16%) was lower than in most years, while the percent coming from Taylor and Douglas counties (17% and 16% respectively) was unusually high. It appears ricers had to look harder to find rice in 2007 than 2006. They reported harvesting rice from 98 sites in 2007 (not including unnamed locations) versus 91 in 2006 (David, 2008b); they also reported visiting 10 additional sites which produced no harvest.

Approximately 1% of the harvest reported by state licensees came from waters outside the ceded territory (Appendix 1). Thirty-one percent of the harvest reported from named locations came from sites planted by the WDNR, the U.S. Forest Service, GLIFWC, or other seeding cooperators. This was up from 26% in 2006, and similar to the 34% observed in 2005. Two of the 5 sites most heavily harvested in 2007 had been seeded, including the Chequamegon Waters Flowage in Taylor County, the most heavily harvested location.

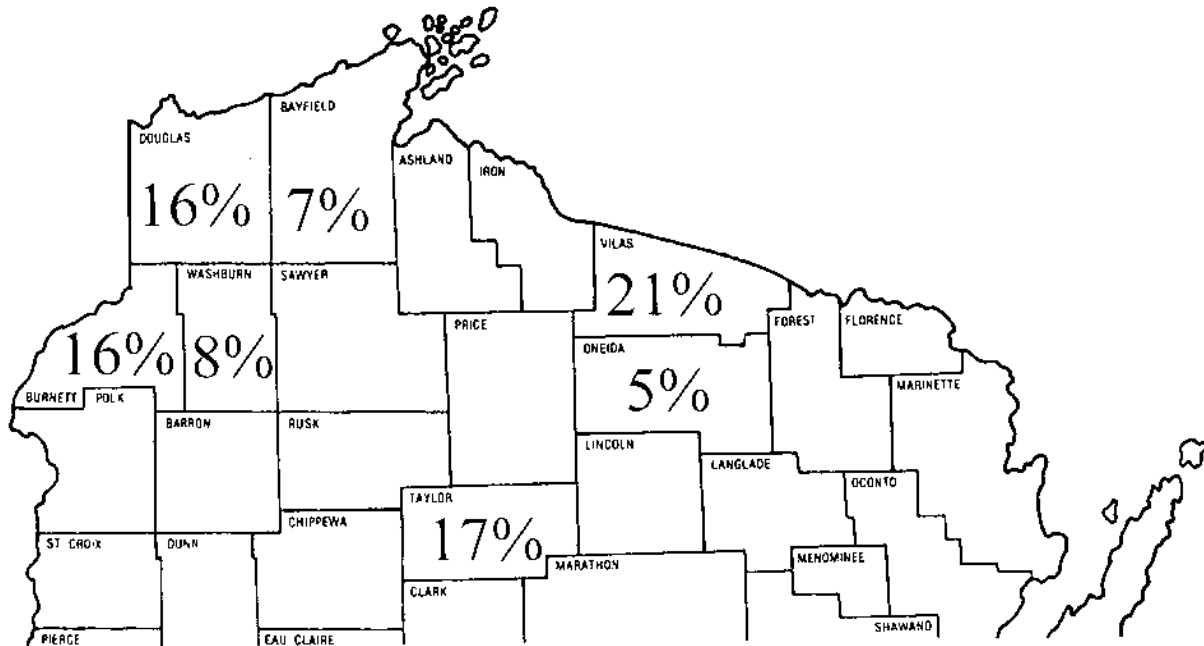


Figure 4. Distribution of counties accounting for 5% or more of the manoomin harvest reported by county by respondents to the 2007 harvest survey, tribal and state harvesters combined.

Opinions of Respondents

Annual Abundance: Individuals were asked if they felt the 2007 wild rice crop was better, the same, or worse than the 2006 crop. Among the 197 active respondents with an opinion, 64% felt 2006 was worse than 2006, 24% felt both years were about the same, and 12% were of the opinion that 2007 was better than 2006.

Collectively, these opinions correlated fairly well with results from the abundance surveys of 40 rice waters discussed earlier, which showed a 20% decrease in abundance state-wide between years. The impression of decline may also reflect the difficulties in harvesting due to low water levels that many respondents reported (see *Comments* section below).

Rice Worm Abundance: For the fourth consecutive year, 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 245 respondents who expressed an opinion, 18% rated them as very low, 42% as low, 33% as average, 6% as medium high, and 1% as high. These figures suggest a decline in rice worm abundance from 2006 (Figure 5).

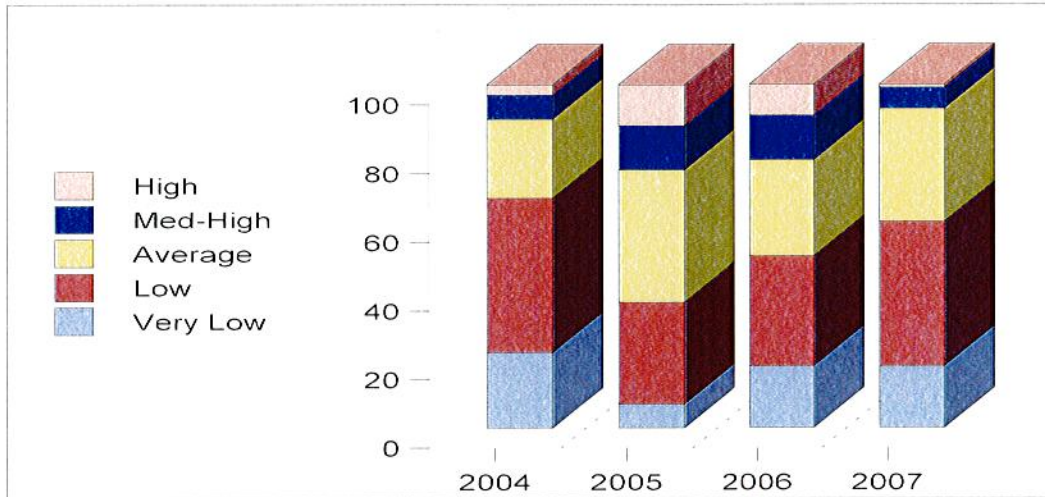


Figure 5. Opinions of mannomin harvest survey respondents on the abundance of rice worms, 2004 through 2007.

Comments: Respondents offered a number of comments and opinions, many reflecting the atypical conditions of the season.

The most frequent comment was that harvest was hindered by low water (n=20), or by storms (n=6). The second-most frequent comment (n=13) was that date-regulated lakes opened too late. This perception may have been influenced by people finding little rice when they got out to harvest. However the lack of rice may have actually been the product of poor pollination or drought stress; indeed 8 additional respondents noted that the plants looked healthy, but produced only “ghost rice”, or empty hulls.

Four individuals mentioned their appreciation for management efforts, and 4 more that crop information was posted on the internet, but another 4 were unhappy that Phantom Flowage had been drawn down. While draw downs may hurt rice production in a particular year, they can also keep rice beds healthy in the long run by reducing competition; these comments suggest some public education may be needed to let ricers know the management value of draw downs. No other comments were made by more than 2 respondents.

Two respondents mentioned seeding wild rice; one mentioned seeding Andrus Lake in Burnett County a decade prior, the other indicate seeding Jersey Flowage in Lincoln County in recent years. One person indicated that rice had been present in Eldorado Marsh, Fond du Lac County only for about 4 years.

Some comments were more personal in nature, reflecting the great fondness many ricers develop for this activity. One stated “We have little finished rice to show for our work, but participation in this historical activity and the experience of the lake and marsh are rewards enough.” A person who indicated he was of Ho-Chunk descent wrote that “This year I could feel the Rice Nation was having a hard time, but maybe next year things will be better for the rice and

my family.” And a woman with a total harvest of 8 pounds wrote to say that she was 58 years old, and had never riced before. She stated “It was wonderful! I loved the entire procedure. I want to thank the Native Americans for this great tradition; it was one of the greatest experiences of my life.”

Potential Waters for Seeding or Other Restoration: Respondents suggested 22 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 2007 harvest survey.							
COUNTY	WATER	TRIBAL		STATE		COMBINED TOTAL	
		TRIPS	POUNDS	TRIPS	POUNDS	TRIPS	POUNDS
ASHLAND	BEAR LAKE	0	0	1	10	1	10
	Subtotal	0	0	1	10	1	10
BARRON	BEAR LAKE	0	0	16	142	16	142
	Subtotal	0	0	16	142	16	142
BAYFIELD	CHIPPEWA LAKE	1	50	42	894	43	944
	TOTOGATIC LAKE	3	120	30	704	33	824
	Subtotal	4	170	72	1,598	76	1,768
BURNETT	BRIGGS LAKE	7	365	10	315	17	680
	CLAM LAKE	0	0	2	0	2	0
	CLAM RIVER FLOWAGE	1	50	2	19	3	69
	GASLYN LAKE	0	0	8	279	8	279
	GREEN LAKE	0	0	1	20	1	20
	JOHNSON LAKE	0	0	1	0	1	0
	LONG LAKE	4	130	11	319	15	449
	LOON LAKE	2	75	3	47	5	122
	MUD LAKE	0	0	1	40	1	40
	MUD HEN LAKE	0	0	4	75	4	75
	NORTH FORK FLOWAGE	0	0	62	1,833	62	1,833
	NORTH LANG LAKE	0	0	1	13	1	13
	PHANTOM FLOWAGE	5	200	10	220	15	420
	RICE LAKE	0	0	1	1	1	1
	UNNAMED WATER	2	100	0	0	2	100
	UPPER NORTH FORK FLOWAGE	0	0	1	34	1	34
	WEBB CREEK	0	0	3	121	3	121
Subtotal	21	920	121	3,336	142	4,256	
CHIPPEWA	O'NEIL CREEK	0	0	1	5	1	5
	UNNAMED WATER	0	0	1	15	1	15
	Subtotal	0	0	2	20	2	20
COLUMBIA	PINE ISLAND WA	0	0	1	5	1	5
	Subtotal	0	0	1	5	1	5
DOUGLAS	AMNICON LAKE	0	0	1	4	1	4
	BEAR LAKE	0	0	2	2	2	2
	GORDON (ST.CROIX) FLOWAGE	0	0	5	90	5	90
	MINONG FLOWAGE	22	1,390	42	1,401	64	2,791
	MULLIGAN LAKE	1	40	10	174	11	214
	RADIGAN FLOWAGE	0	0	1	0	1	0
	ST. CROIX RIVER	10	450	20	488	30	938
	UPPER OX LAKE	1	15	7	243	8	258
Subtotal	34	1,895	88	2,402	122	4,297	
FOND DU LAC	ELDERADO MARSH	0	0	2	1	2	1
	Subtotal	0	0	2	1	2	1
FOREST	LITTLE RICE FLOWAGE	5	460	6	376	11	836
	RILEY LAKE	0	0	2	0	2	0
	SCOTT LAKE	0	0	2	6	2	6
	WABIKON LAKE	1	150	5	105	6	255
	Subtotal	6	610	15	487	21	1,097

(Appendix 1 continued on the next page.)

Appendix 1. Ricing trips and pounds of green manoomin harvested by respondents to the 2007 harvest survey.							
COUNTY	WATER	TRIBAL		STATE		COMBINED TOTAL	
		TRIPS	POUNDS	TRIPS	POUNDS	TRIPS	POUNDS
IRON	BEAR RIVER	0	0	1	16	1	16
	BEAR RIVER FLOWAGE	0	0	4	90	4	90
	LITTLE BEAR FLOWAGE	0	0	3	85	3	85
	LITTLE TURTLE FLOW.	1	20	3	1	4	21
	MUD LAKE	0	0	2	5	2	5
	TURTLE FLAMBEAU FLOW.	1	30	2	0	3	30
	Subtotal	2	50	15	197	17	247
LANGLADE	ACKLEY WA	0	0	1	35	1	35
	UNNAMED WATER	0	0	1	25	1	25
	Subtotal	0	0	2	60	2	60
LINCOLN	ALICE LAKE	3	100	0	0	3	100
	JERSEY FLOWAGE	0	0	3	17	3	17
	WISCONSIN RIVER	0	0	4	120	4	120
	Subtotal	3	100	7	137	10	237
MARINETTE	LAKE NOQUEBAY	0	0	4	50	4	50
	PESHTIGO RIVER	0	0	3	25	3	25
	Subtotal	0	0	7	75	7	75
MARQUETTE	HARRISVILLE POND	0	0	2	25	2	25
	NESHKORO MILLPOND	0	0	1	10	1	10
	Subtotal	0	0	3	35	3	35
ONEIDA	BIG LAKE	3	75	2	15	5	90
	CLEAR LAKE	0	0	2	1	2	1
	CUENIN LAKE	0	0	2	35	2	35
	GARY LAKE	0	0	2	12	2	12
	LOWER WISCONSIN RIVER	1	0	0	0	1	0
	ONEIDA LAKE	1	150	0	0	1	150
	ROE LAKE	1	40	0	0	1	40
	SPUR LAKE	1	2	10	107	11	109
	THE THOROUGHFARE	0	0	10	89	10	89
	UNNAMED WATER	7	645	0	0	7	645
	WISCONSIN RIVER	2	60	2	6	4	66
	Subtotal	16	972	30	265	46	1,237
POLK	APPLE RIVER	0	0	1	5	1	5
	JOEL FLOWAGE	0	0	12	142	12	142
	STRAIGHT RIVER	0	0	1	2	1	2
	Subtotal	0	0	14	149	14	149
PRICE	LOWER STEVE CK. FLOW.	0	0	1	2	1	2
	MUSSER LAKE	3	100	0	0	3	100
	SAILOR LAKE	0	0	1	30	1	30
	SPRING CREEK	0	0	2	45	2	45
	WILSON FLOWAGE	0	0	1	20	1	20
	Subtotal	3	100	5	97	8	197
RUSK	LEA FLOWAGE	3	150	0	0	3	150
	Subtotal	3	150	0	0	3	150

(Appendix 1 continued on the next page.)

Appendix 1. Ricing trips and pounds of green manoomin harvested by respondents to the 2007 harvest survey.							
COUNTY	WATER	TRIBAL		STATE		COMBINED TOTAL	
		TRIPS	POUNDS	TRIPS	POUNDS	TRIPS	POUNDS
SAWYER	BARKER LAKE	0	0	1	0	1	0
	BLAISDELL LAKE	0	0	3	22	3	22
	CHIPPEWA FLOWAGE	0	0	1	20	1	20
	CHIPPEWA RIVER	0	0	2	45	2	45
	HUNTER LAKE	0	0	1	0	1	0
	LAC COURTE ORIELLES	0	0	1	0	1	0
	NELSON LAKE	0	0	10	139	10	139
	PACWAWONG FLOWAGE	6	255	3	11	9	266
	PARTRIDGE CROP LAKE	0	0	5	45	5	45
	PHIPPS FLOWAGE	0	0	1	0	1	0
	Subtotal	6	255	28	282	34	537
TAYLOR	CHEQUAMEGON WATERS FLOW	7	390	57	3,533	64	3,923
	MONDEAUX FLOWAGE	2	200	20	531	22	731
	MONDEAUX RIVER	0	0	1	10	1	10
	SHOULDER CREEK IMPOUND.	3	50	0	0	3	50
	Subtotal	12	640	78	4,074	90	4,714
UNKNOWN	UNNAMED WATER	0	0	3	30	3	30
	Subtotal	0	0	3	30	3	30
VILAS	ALLEQUASH LAKE	7	300	9	120	16	420
	AURORA LAKE	5	179	8	132	13	311
	FROST LAKE	2	100	0	0	2	100
	IRVING LAKE	6	340	7	83	13	423
	ISLAND LAKE	8	485	9	73	17	558
	LAC VIEUX DESERT	7	200	0	0	7	200
	LITTLE RICE LAKE	1	100	5	85	6	185
	LOST CREEK	0	0	5	30	5	30
	LOWER NINEMILE FLOWAGE	4	400	6	182	10	582
	MANITOWISH RIVER	0	0	6	290	6	290
	MANN FLOWAGE	4	400	0	0	4	400
	NIXON LAKE	14	720	17	436	31	1,156
	PARTRIDGE LAKE	0	0	11	248	11	248
	RICE CREEK	0	0	2	130	2	130
	RICE LAKE	0	0	3	0	3	0
	ROUND LAKE	0	0	3	85	3	85
	SPRING LAKE	1	50	0	0	1	50
	UNNAMED WATER	6	105	0	0	6	105
UPPER NINEMILE FLOWAGE	5	308	5	187	10	495	
	Subtotal	70	3,687	96	2,081	166	5,768
WASHBURN	DILLY LAKE	0	0	4	41	4	41
	ROCKY CREEK	0	0	2	69	2	69
	SPRING LAKE	10	1,500	13	301	23	1,801
	TRANUS LAKE	0	0	9	182	9	182
	YELLOW RIVER	0	0	1	17	1	17
	Subtotal	10	1,500	29	610	39	2,110
WAUPACA	WHITE LAKE	0	0	3	8	3	8
	WOLF RIVER	0	0	3	40	3	40
	Subtotal	0	0	6	48	6	48
WAUSHARA	SAXVILLE POND	0	0	1	15	1	15
	Subtotal	0	0	1	15	1	15
	GRAND TOTAL	190	11,049	642	16,156	832	27,205

Appendix 2. Waters suggested for seeding or restoration by respondents to the 2007 wild rice harvest survey.*	
COUNTY	WATER
Bayfield	Twin Lake (the smaller; T42N R6W S20)
Burnett	Mud Lake, Oakland Township Mud Hen Lake
Chippewa	Marsh-Miller Lake
Douglas	Gordon Flowage St. Louis River Estuary
Forest	Pat Shay Lake
Iron	Turtle Flambeau Flowage (at mouth of Little Turtle River) Turtle Flambeau Flowage (at Beaver and Otter Creeks)
Marathon	Lake Dubay Lake Wausau
Polk	Apple River Flowage (East of HWY64 bridge) Clam Falls Flowage Straight River Wildlife Area Flowages
Sawyer	Chippewa Flowage (if water level fluctuations are reduced) Christner Lake Osprey Lake Star Lake Tiger Cat Flowage
Shawano	Navarino Wildlife Area Flowages
Washburn	Grassy Lake Welsh Lake

* Suggested waters with relatively well established beds not included.