



**Wild Rice (Manoomin)  
Abundance and Harvest  
in Northern Wisconsin in 2009**

by  
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Administrative Report 10-04  
April 2010

**Great Lakes Indian Fish  
& Wildlife Commission**

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Acknowledgments: I would like to thank Dara Olson, Micah Cain and John Patrick for their assistance in entering and analyzing the data summarized in this report, and Neil Kmiecik for his editorial review. *Miigwech!*

## **MANOOMIN (WILD RICE) ABUNDANCE AND HARVEST IN NORTHERN WISCONSIN IN 2009**

### **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 2009 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 five days between August 6<sup>th</sup> and 31<sup>st</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 Lake in Washburn County, with an average abundance index of 75 (1985-2008) was not surveyed in 2009. Thus, when comparisons were made between 2009 and 2008, data for this lake were suppressed for 2008 as well. For comparisons between 2009 and long term averages, an index for 2009 was estimated for this water by applying the ratio between the 2009 overall index for all other waters and the long term overall index for all other waters (3,822/4,981) to the long term index for Rice Lake (75). This produced an estimated index of 58 for this water in 2009.

## 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 858 individuals in 2009. When individuals obtained their 2009 permit, they were asked if they harvested rice the previous year. Forty percent (75/188) of the individuals who indicated they had riced in 2008 (“active” ricers) were surveyed by phone, as well as 26% (175/670) of those individuals who indicated they had not riced the previous year (“inactive” ricers) (Table 1).

The number of tribal members who actually harvested off-reservation in 2009 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 <sup>1</sup>	188	75	40%	60.0%	113
INACTIVE <sup>1</sup>	670	175	26%	12.6%	84
TOTAL	858	250	29%		197

<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 890 of the 914 individuals who obtained a state license. All harvest estimates were made by expanding the results reported by the 473 respondents to the state survey (52% 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 49 additional waters surveyed only from the air are listed in Table 3. A total of 2,874 acres of wild rice was estimated for these 89 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 2009.

Survey results and field observations indicate that rice abundance in 2009 was below average, particularly in the north-central part of the state. Overall, the abundance index increased 32% from 2008, a very poor year (Table 2, Figure 1). However, while the index for

northwest waters nearly doubled from 2008, the index for north-central waters fell 9%. In the northwest, the abundance index increased on 11 waters, fell on 6, and was essentially unchanged on 4. However, Upper Clam Lake, perhaps the most significant lake in this region, had its third consecutive crop failure. Among north-central waters, 8 rose, 5 fell and 5 were unchanged (Table 2, Figure 2), but declines were generally larger than increases. Overall, the 2009 index was just 78 % of the long-term index average (1985-2009).

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, drought conditions which began in 2007 continued for the third year in some areas, especially the Burnett County area.

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.

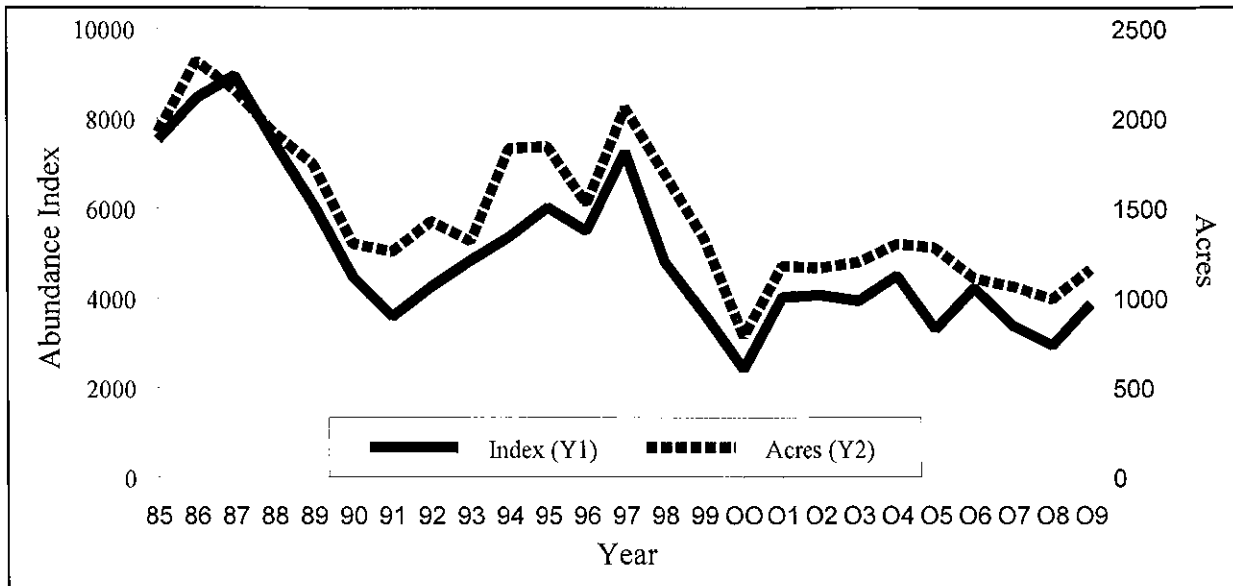


Figure 1. Manoomin acreage and abundance index from 40 Wisconsin rice waters surveyed annually from 1985-2009.

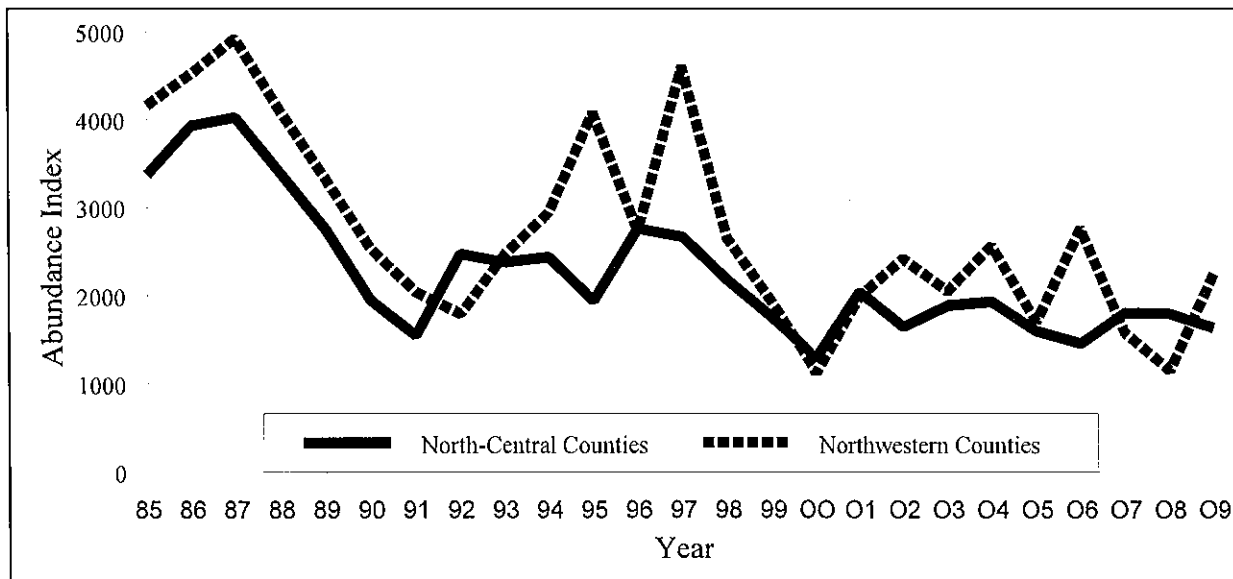


Figure 2. Manoomin abundance index from 40 Wisconsin rice waters surveyed annually from 1985-2009; northwestern versus north-central Wisconsin waters (Highway 13 used to separate northwestern from north-central waters).

Table 2. Manoomin acreage, density and abundance index from 40 Wisconsin waters for 2006-2009, and the 1985-2009 means. A density value of 1=sparse, 5=dense. (Data for 1985-2004 can be found in David, 2001; David, 2008 and David 2009.)

WATER	2006			2007			2008			2009			1985-2009		
	ACRES	DEN.	INDEX	ACRES	DEN.	INDEX	ACRES	DEN.	INDEX	ACRES	DEN.	INDEX	MEAN ACRES	MEAN DEN.	MEAN INDEX
<b>NORTHWESTERN CTYS.</b>															
<b>BARRON</b>															
SWEENEY CREEK	0	0	0	1	4	4	1	1	1	8	3	24	9	2.5	32
<b>BAYFIELD</b>															
TOTOGATIC LAKE	108	2	216	215	1	215	54	1	54	180	2	360	157	2.5	450
<b>BURNETT</b>															
BASHAW LAKE	1	1	1	0	0	0	21	1	21	0	0	0	10	2.2	26
BIG CLAM LAKE	220	4	880	15	2	30	10	2	20	8	3	24	137	3.3	470
BRIGGS LAKE	30	4	120	33	4	132	25	4	100	21	4	84	28	3.8	109
GASLYN LAKE	1	1	1	28	4	112	6	2	12	16	3	48	22	3.1	79
LONG LAKE	65	4	260	65	4	260	64	3	192	120	4	480	71	2.6	196
MUD LAKE (2)	13	5	65	15	3	45	4	4	16	9	4	36	13	3.6	48
WEBB CREEK	20	5	100	15	5	75	11	5	55	9	4	36	12	4.0	57
<b>DOUGLAS</b>															
MULLIGAN LAKE	9	2	18	23	3	69	4	2	8	0	0	0	23	2.1	56
<b>POLK</b>															
RICE BED CREEK	15	4	60	15	5	75	19	5	95	15	4	60	12	4.3	52
RICE LAKE (1)	4	2	8			110*	15	3	45	50	5	250	46	3.3	163
WHITE ASH LAKE	7	2	14	5	3	15	10	3	30	12	2	24	12	3.2	38
<b>SAWYER</b>															
BILLY BOY FLOW.	7	5	35	7	2	14	16	3	48	15	3	45	13	2.4	42
BLAISDELL LAKE	65	4	260	90	1	90	50	3	150	80	2	160	77	2.7	210
PACWAWONG LAKE	90	4	360	40	3	120	35	2	70	80	4	320	85	3.6	328
PHIPPS FLOWAGE	26	5	130	5	3	15	23	4	92	25	4	100	29	3.9	113
<b>WASHBURN</b>															
DILLY LAKE	11	3	33	11	5	55	2	2	4	2	2	4	18	4.0	77
POTATO LAKE	1	1	1	4	3	12	13	3	39	20	4	80	13	3.0	42
RICE LAKE	9	3	27	7	3	21	9	3	27			58*	20	3.3	75
SPRING LAKE (1)	43	4	172	32	3	96	18	2	36	3	1	3	16	2.7	53
TRANUS LAKE	3	2	6	14	1	14	18	2	36	26	2	52	31	1.6	50
<b>SUBTOTAL</b>	<b>748</b>		<b>2767</b>	<b>640</b>		<b>1579</b>	<b>428</b>		<b>1151</b>	<b>699</b>		<b>2248</b>	<b>843</b>		<b>2727</b>
<b>NORTH-CENTRAL CTYS.</b>															
<b>FOREST</b>															
ATKINS LAKE	0	0	0	0	0	0	0	0	0	0	0	0	15	0.6	44
INDIAN/RILEY LAKE	3	4	12	1	1	1	2	1	2	4	3	12	5	2.9	15
PAT SHAY LAKE	1	1	1	2	2	4	6	1	6	15	2	30	34	1.5	56
RAT RIVER	22	5	110	15	5	75	13	3	39	18	4	72	21	4.6	99
WABIKON LAKE	70	3	210	40	4	160	70	4	280	74	3	222	47	2.8	135
<b>LINCOLN</b>															
ALICE LAKE	6	3	18	10	1	10	20	3	60	26	3	78	45	3.0	155
<b>ONEIDA</b>															
FISH LAKE	2	2	4	7	2	14	5	2	10	2	4	8	28	3.1	100
LITTLE RICE LAKE	0	0	0	0	0	0	0	0	0	0	0	0	6	1.1	25
RICE LAKE	3	1	3	3	1	3	35	1	35	0	0	0	58	1.3	100
SPUR LAKE	8	2	16	3	3	9	70	1	70	0	0	0	62	2.9	228
WISCONSIN RIVER	150	5	750	140	5	700	150	4	600	165	4	660	145	4.6	657
<b>PRICE</b>															
BLOCKHOUSE LAKE	1	1	1	0	0	0	0	0	0	0	0	0	15	2.3	51
<b>VILAS</b>															
ALLEQUASH LAKE	8	2	16	65	3	195	80	4	320	25	2	50	63	3.8	257
LITTLE RICE LAKE	23	3	69	54	5	270	45	3	135	48	4	192	19	2.8	64
MANITOWISH RIVER	13	5	65	14	5	70	14	5	70	17	4	68	15	4.5	70
PARTRIDGE LAKE	23	3	69	24	5	120	22	4	88	20	3	60	19	4.2	83
RICE LAKE	28	4	112	40	4	160	30	2	60	36	4	144	27	3.5	96
WEST PLUM LAKE	2	2	4	6	2	12	5	4	20	12	3	36	19	3.1	63
<b>SUBTOTAL</b>	<b>363</b>		<b>1460</b>	<b>424</b>		<b>1803</b>	<b>567</b>		<b>1795</b>	<b>462</b>		<b>1632</b>	<b>635</b>		<b>2266</b>
COUNT:			40			39			40			40			40
TOTAL:	1111		4227	1064		3382	995		2946	1161		3880	1478		4993
AVERAGE:			106			84			74			97			125

\*water not surveyed; index value estimated as discussed in methods section.

Table 3. Estimated manoomin acreage and density for waters aerially surveyed in 2009.					
COUNTY	WATER	2009 EST. ACRES	2009 EST. DENSITY	2008 EST. ACRES	2008 EST. DENSITY
Barron	Bear Lake	27	medium	24	sparse-med/dense
Bayfield	Chippewa Lake	28	medium-dense	38	sparse-medium
Burnett	Black Brook Flowage	3	medium	6	medium-dense
	Grettum Flowage	140	medium-dense	140	medium-dense
	Loon Lake (Carters Bridge)	24	medium	33	dense
	Lower Hay Creek Flowage	19	medium	4	sparse-medium
	Mud Lake (Oakland Township)	30	medium	12	sparse
	North Fork Flowage	60	medium	40	sparse-medium
	North Lang Lake	4	dense	3	dense
	Phantom Flowage	145	medium-dense	75	medium
	Rice Lake <sup>1</sup>	40	dense	20	medium
Douglas	Lower Ox Lake	12	medium	4	sparse-medium
	Minong Flowage (Smiths Bridge)	30	medium-dense	20	medium
	Radigan Flowage	40	dense	30	medium-dense
	St. Croix (Gordon) Flowage	12	medium	15	medium-dense
	St. Croix River/Cutaway Dam	45	medium-dense	42	medium
	Upper Ox Lake	5	dense	6	dense
Forest	Hiles Millpond	10	medium	7	medium
	Little Rice Flowage	245	medium-dense	200	sparse-dense
	Scott Lake	10	medium	8	medium
Iron	Little Turtle Flowage	2	sparse	4	sparse
	Mud Lake	19	medium	5	sparse-medium
Langlade	Daily Pond	11	medium	10	sparse-dense
	Miniwaukan Lake	11	medium-dense	8	medium-dense
	Pickrel Creek (Goose Island)	8	medium-dense	15	medium-dense
	Spider Creek Flowage	37	medium-dense	6	medium
Oneida	Big Lake	11	dense	10	medium
	Cuenin Lake	19	dense	11	medium-dense
	Fourmile Lake	16	medium-dense	16	sparse-dense
	Roe Lake	3	sparse-medium	8	medium
	The Thoroughfare	75	medium-dense	25	sparse-dense
	Wolf River <sup>2</sup>	20	dense	20	dense
Polk	Somers Lake	11	dense	11	dense
Price	Lower Steves Creek Flowage	10	dense*	10	dense
	Spring Creek WA Flowages	135	medium-dense	130	dense
Sawyer	Partridge Crop Lake	4	medium	12	medium-dense
Vilas	Aurora Lake	65	medium-dense	24	sparse-dense
	Frost Lake	37	medium-dense	13	medium-dense
	Irving Lake	36	medium-dense	30	medium-dense
	Island Lake	75	sparse-medium	70	sparse-medium
	Lower Ninemile Lake	38	sparse-dense	48	sparse-dense
	Nixon Lake	20	sparse-dense	12	medium-dense
	Rice Creek <sup>3</sup>	12	sparse-medium	18	sparse-medium
	Rice Creek <sup>4</sup>	16	medium-dense	22	medium-dense
	Upper Ninemile Lake	36	medium-dense	33	medium-dense
Washburn	Long, Mud, & Little Mud Lakes	31	medium-dense	27	medium-dense
	Trego Flowage	26	dense	20	medium-dense

<sup>1</sup> Near Hertel; <sup>2</sup> NW of Lennox; <sup>3</sup> N of Island Lake <sup>4</sup> N of Big Lake

\* Site appeared highly infected with Brown Spot disease.



## Harvest Estimation

Responses were obtained from 250 tribal permit holders and 473 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. Sixty-seven of the tribal and 436 of the state licensees surveyed reported harvesting rice in 2009. The total number estimated active in each group were 197 tribal members and 843 state licensees (Table 4).

Tribal harvesters active off-reservation reported making from 1 to 23 ricing trips, averaging an estimated 3.7 trips. Tribal survey respondents made a total of 262 off-reservation harvesting trips, gathering 9,425 pounds of green rice (Appendix 1), with an extrapolated total harvest estimate of 26,805 pounds in 731 trips, an average of 37 pounds per trip (Table 4). The total off-reservation harvest per active license averaged 136 pounds.

	NUMBER OF PERMIT HOLDERS	ESTIMATED NUMBER ACTIVE	AVERAGE NUMBER OF TRIPS	AVERAGE HARVEST/ TRIP	AVE. HARVEST/ ACTIVE LICENSE	TOTAL ESTIMATED HARVEST / TRIPS
TRIBAL	858	197	3.7	37	136	26,805 / 731
STATE	914	843	2.5	41	104	88,008 / 2,135
TOTAL	1,772	1040	2.8	40	110	114,813 / 2,866

In comparison, active state licensees reported making from 1 to 17 ricing trips, averaging 2.5 trips. Collectively, state survey respondents made 1104 trips, gathering 45,518 pounds of green rice (Appendix 1), with an extrapolated total harvest estimate of 88,008 pounds in 2,135 trips, an average of 41 pounds per trip. The harvest per active state license averaged 104 pounds.

The amount of rice harvested per individual varied greatly (Table 5). The most reported by a state ricer was 1779 pounds, while the most reported by a tribal ricer was 1000 pounds. On the low end of the range, the 40% of tribal ricers who harvested a total of 50 pounds or less was higher than the 29% reported from 2008 (David, 2010), but the percentage of state ricers harvesting a total of 50 pounds or less fell from 53% in 2008 to 42% in 2009.

Ninety-two percent of the state-licensed respondents gathered rice in 2009, versus 23% 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 2009 harvest survey.			
TRIBAL			
POUNDS OF GREEN RICE HARVESTED	INDIVIDUALS		PERCENT OF TOTAL HARVEST
	NUMBER	PERCENT	
0 - 50	27	40.3	8.6
51 - 100	13	19.4	10.2
101 - 150	6	9.0	8.0
151 - 200	8	11.9	15.4
201 - 300	4	6.0	12.4
301 - 500	8	11.9	34.8
501 - 1000	1	1.5	10.6
1001 +	0	0.0	0.0
STATE			
POUNDS OF GREEN RICE HARVESTED	INDIVIDUALS		PERCENT OF TOTAL HARVEST
	NUMBER	PERCENT	
0 - 50	183	42.0	9.9
51 - 100	119	27.3	19.6
101 - 150	58	13.3	16.5
151 - 200	24	5.5	9.4
201 - 300	27	6.2	14.6
301 - 500	18	4.1	15.3
501 - 1000	5	1.1	8.2
1001 +	2	0.5	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 26,805 pounds of green rice and the total harvest for state permittees was estimated at 88,008 pounds (Table 4). Since all but 290 pounds of the estimated 2009 state harvest came from off-reservation waters, the total off-reservation harvest was estimated at 114,523 pounds, with tribal ricers accounting for 23% of the harvest.

This off-reservation harvest estimate is 54% higher than the 2008 estimate of 74,247 pounds (David, 2010), and is, by a narrow margin, the highest estimate made since surveys were begun in 1987 (Figure 3).

The marked increase in harvest for state ricers would appear to be inconsistent with the relatively modest abundance index (Figure 3). Interestingly, anecdotal evidence suggests this large increase was largely attributable - directly and indirectly - to the weather during the harvest season. Across most of the rice range, the harvest period was marked by the best weather

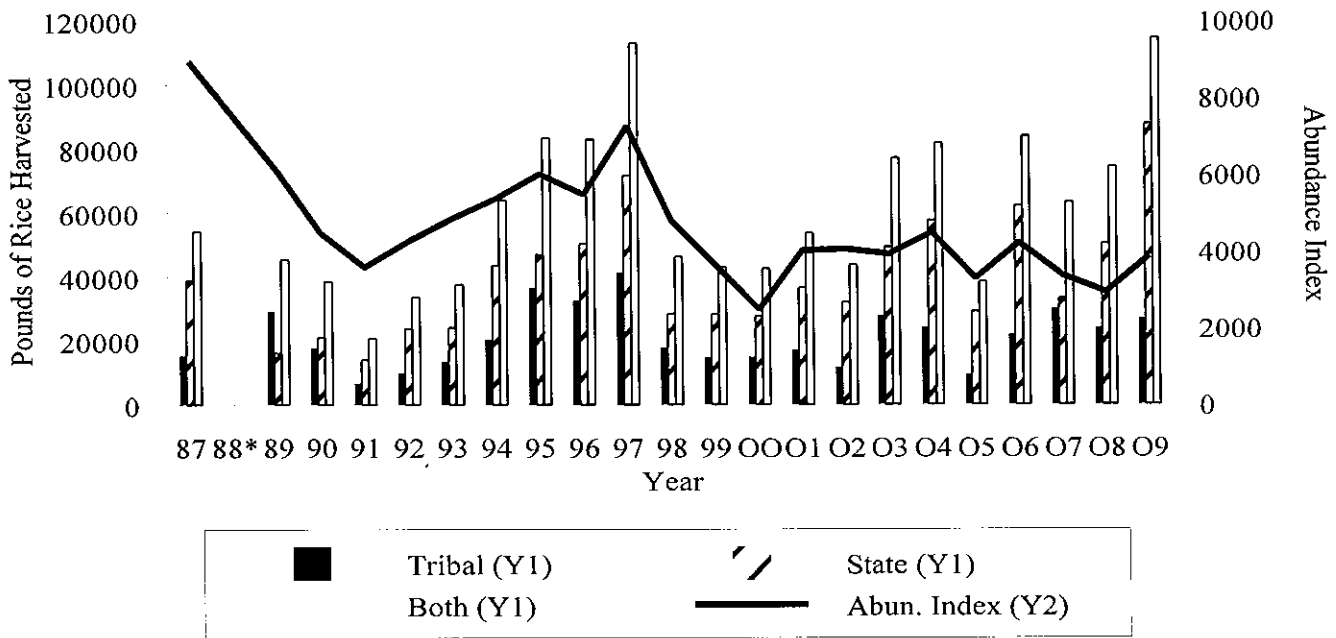


Figure 3. Harvest trends versus abundance index, 1987-2009 (\* no harvest estimates for 1988).

conditions in most ricers memories, with very little precipitation or high winds. As a result, ricers were able to rice nearly any day, and little rice was lost to weather events. These conditions also appeared to encourage infrequent ricers to participate in 2009, and to get many other individuals to try it for the first time. State license sales increased 40% from 2008, exceeding the 900 level for the first time since these annual harvest surveys began. First-time ricers accounted for 29% of state respondents in 2009, versus 24% in 2008, and the average years of ricing experience fell from 9 to 7 between years.

Despite the ideal weather, tribal harvest showed only a modest increase. This may be because some on-reservation waters were very good in 2009, and because the activity rate of tribal ricers tends to be less influenced by stand abundance. However, there were some signs that recent efforts to recruit more tribal youth to rice may be having an effect: the estimated number of active tribal ricers increased 29% from 2008, to the highest level estimated since 1997, and the average number of years of ricing experience fell markedly from 27 in 2008 to 17 in 2009.

It is also important to remember that the abundance index uses acreage and stand density factors to create an index to seed abundance, but this methodology does not measure actual seed production. Evidence from the paddy rice industry indicates that seed production declines in dense stands, and it is possible that seed production was above average under the relatively low stand densities observed in 2009. (This also suggests that our abundance index may overestimate seed production in years when average stand density is high.) The index also does not account for weather conditions during the harvest period which may influence harvest levels.

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

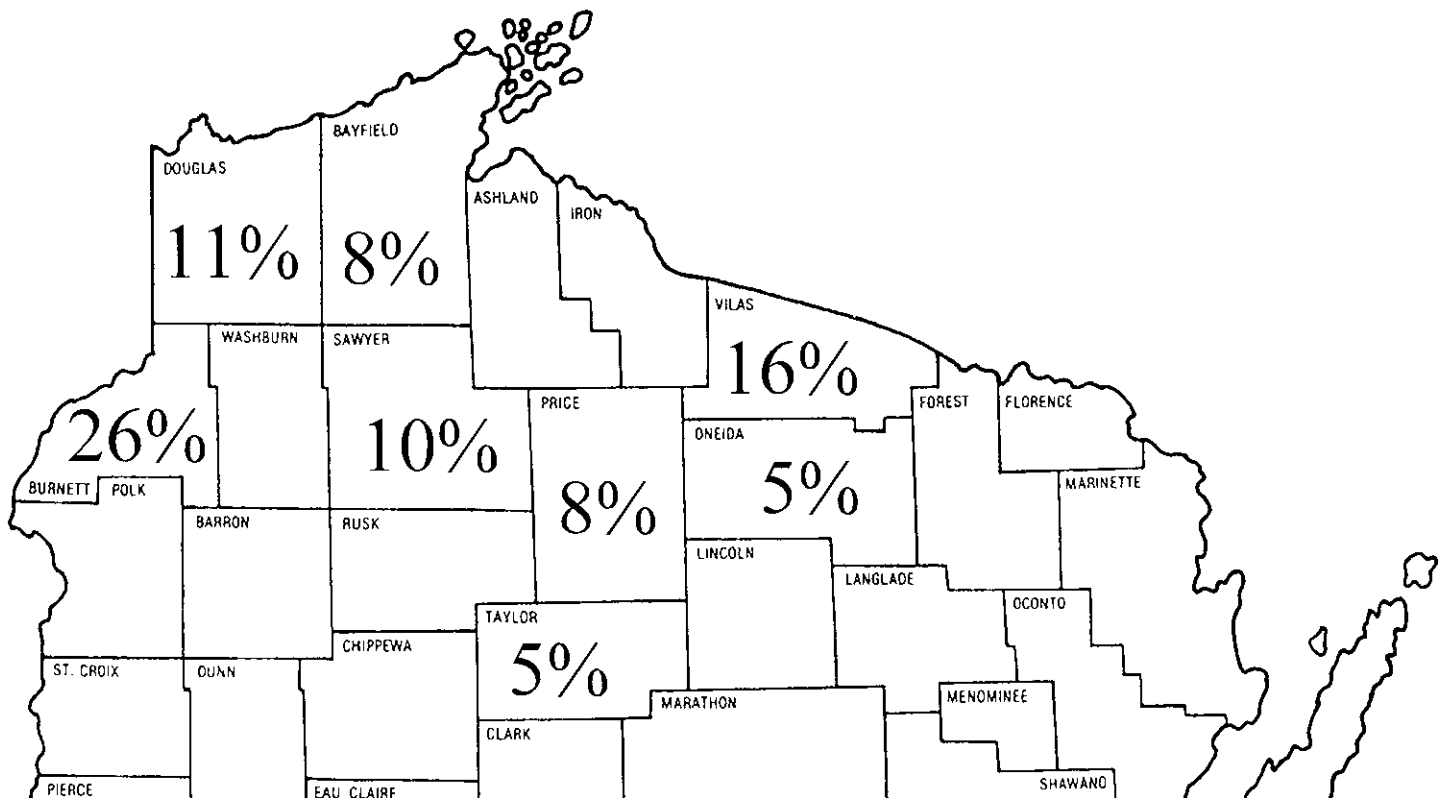


Figure 4. Distribution of counties accounting for 5% or more of the manoomin harvest reported by county by respondents to the 2009 harvest survey, tribal and state harvesters combined.

total harvest which came from Burnett County (26%) was lower than the 1992-2009 average of 33%, while the 8% coming from Price County was above the long term average of 3%. At least one pound of harvest was reported for 102 different named waters, identical to 2008 (David, 2010). Respondents also reported visiting 5 additional sites which produced no harvest.

Less than 1% of the harvest reported by state licensees came from waters outside the ceded territory (Appendix 1). At least 24% 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 down slightly from 27% in 2008, 31% in 2007, and 26% in 2006. Two of the 5 sites most heavily harvested in 2009 had been seeded, including the Spring Creek Wildlife Area in Price County (3<sup>rd</sup>) and the Chequamegon Waters Flowage in Taylor County (5<sup>th</sup>). (Seeded sites are marked with an asterisk in Appendix 1.)

### Opinions of Respondents

**Annual Abundance:** Individuals were asked if they felt the 2009 wild rice crop was better, the same, or worse than the 2008 crop. Among the 324 active respondents with an opinion, 64% felt 2009 was better than 2008, 28% felt both years were about the same, and only 8% were of the

opinion that 2009 was worse than 2008.

Collectively, these opinions are consistent with the results from the abundance surveys of 40 rice waters discussed earlier, which showed a 32% increase in abundance state-wide between years. However, these results may also suggest that respondents may be equating the improvement in their *harvest* with an improvement in the *crop* - which may or may not be the case.

Rice Worm Abundance: For the sixth 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 407 respondents who expressed an opinion, 6% rated them as very low, 21% as low, 30% as average, 17% as medium high, and 26% as high.

These were the highest abundance ratings reported since this question was added to the survey. Although conjecture, it is possible that the ideal weather that contributed to high harvests also created conditions that lead to high rice worm abundance; rain, for example, may normally reduce worm populations by dislodging them from the plants. It also appears that abundance ratings were inflated by the high number of novice ricers this year. First-time ricers accounted for 26% of all respondents in 2009, versus 21% in 2008. The high number of worms that are gathered when ricing often appears to surprise novice ricers, and it is interesting that while only 11% of first time ricers offered an opinion on the crop relative to the previous year, 43% had an opinion on worm abundance. Furthermore, among respondents with an opinion, 37% (53 of 145) of those who have riced 3 years or less rated rice worm abundance as high, versus 20% (53 of 262) of those who had riced 4 years or more.

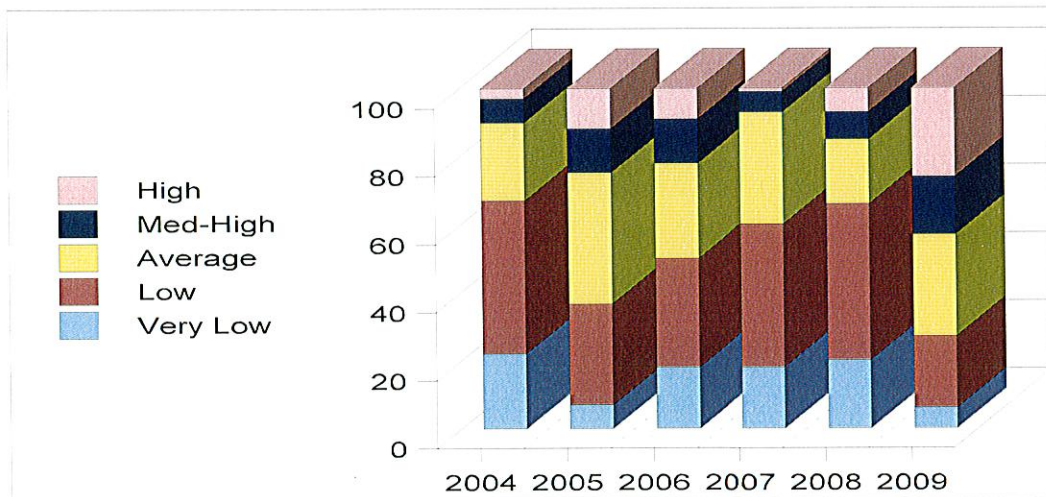


Figure 5. Opinions of manoomin harvest survey respondents on the abundance of rice worms, 2004 through 2009.

Comments: Respondents offered a large number of comments. Other than comments about being a first time ricer or enjoying the experience, the highest number of comments (17) related to it being an exceptionally good season. Perhaps related to these were the 3 comments about the season being unusually long.

Twelve individuals expressed appreciation for management efforts, while twelve also expressed concern about the loss of beds on Clam Lake in Burnett County. The continuation of drought conditions in the Burnett County area was mentioned 9 times.

Nine comments were made regarding the need for more information for novice ricers, including information on abundance, access points, processors, or how to process rice oneself. Interestingly, 4 people mentioned that harvest pressure was light, and only 2 that it seemed high, despite the large increase in the estimated number of active ricers. (The favorable weather may have distributed harvesting pressure more evenly throughout the season.)

Three people mentioned concern about illegal picking (before 10:00 am or before a date-regulated lake was opened), with Allequash Lake being specifically noted. Two mentions were made of rice removal by lake shore owners on both Little Rice Lake (Forest Co.) and Long Lake (Burnett Co.). Concern about negative boating impacts were made for Chequamegon Waters Flowage (Taylor Co.) and the Wisconsin River.

Two people discussed seeding efforts. One mentioned seeding McMillan Marsh in Marathon County, the other discussed seeding unnamed sites in several counties in northeast Wisconsin. The latter indicated that over the years he has seeded more than a ton of rice that he has picked.

No other comments were made by more than two respondents.

**Potential Waters for Seeding or Other Restoration:** Respondents suggested 31 different waters which might be candidates for seeding or other restoration efforts. Sites named are listed in Appendix 2. (Sites already supporting well-established beds, and sites without flowing water were not listed.)

## LITERATURE CITED

- Andryk, T. 1986. Wild rice wetland inventory of northwest Wisconsin. Great Lakes Indian Fish and Wildlife Commission Administrative Report 86-4. 51 pp.
- David, P.F. 2001. Wild rice abundance and harvest in the Wisconsin Ceded Territories in 1999. Great Lakes Indian Fish and Wildlife Commission Administrative Report 01-02. 16 pp.
- David, P.F. 2008. Wild rice (manoomin) abundance and harvest in Northern Wisconsin in 2005. Great Lakes Indian Fish and Wildlife Commission Administrative Report 08-22. 15 pp.
- David, P.F. 2010. Wild rice (manoomin) abundance and harvest in Northern Wisconsin in 2008. Great Lakes Indian Fish and Wildlife Commission Administrative Report 10-02. 16 pp.

Appendix 1. Ricing trips and pounds of green manoomin harvested by respondents to the 2009 harvest survey.  
Seeded waters are marked by an asterisk.

COUNTY	WATER	TRIBAL		STATE		COMBINED TOTAL	
		TRIPS	POUNDS	TRIPS	POUNDS	TRIPS	POUNDS
Ashland	Kakagon Sloughs	0	0	3	150	3	150
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>150</b>	<b>3</b>	<b>150</b>
Bayfield	Chippewa Lake*	15	225	38	1,532	53	1,757
	Totagatic Lake	31	655	67	1,943	98	2,598
	<b>Subtotal</b>	<b>46</b>	<b>880</b>	<b>105</b>	<b>3,475</b>	<b>151</b>	<b>4,355</b>
Burnett	Bashaw Outlet	0	0	2	20	2	20
	Briggs Lake	4	200	8	584	12	784
	Clam Lake	0	0	1	0	1	0
	Clam River Flowage	1	12	9	281	10	293
	Lang Lake	3	45	0	0	3	45
	Long Lake	50	2,185	141	7,515	191	9,700
	Loon Lake	3	100	1	0	4	100
	Mud Lake	1	5	12	441	13	446
	North Fork Flowage*	0	0	34	1,488	34	1,488
	Phantom Flowage*	0	0	28	1,185	28	1,185
	Rice Lake	0	0	3	50	3	50
	Unnamed Water	0	0	3	60	3	60
	Webb Creek	0	0	1	50	1	50
	Yellow River	0	0	1	60	1	60
<b>Subtotal</b>	<b>62</b>	<b>2,547</b>	<b>244</b>	<b>11,734</b>	<b>306</b>	<b>14,281</b>	
Chippewa	Cedar Creek	0	0	1	5	1	5
	Unnamed Water	0	0	1	40	1	40
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>45</b>	<b>2</b>	<b>45</b>
Douglas	Bear Lake	0	0	9	204	9	204
	Lower Ox Lake	1	20	8	293	9	313
	Minong Flowage	23	753	40	1,527	63	2,280
	Radigan Flowage	0	0	13	691	13	691
	St Croix Flowage	2	90	2	57	4	147
	St Croix River	20	790	40	1,554	60	2,344
	St Louis River	0	0	4	126	4	126
	Unnamed Water	0	0	2	22	2	22
	Upper Ox Lake	0	0	4	159	4	159
<b>Subtotal</b>	<b>46</b>	<b>1,653</b>	<b>122</b>	<b>4,633</b>	<b>168</b>	<b>6,286</b>	
Fond Du Lac	Unnamed Water	0	0	1	30	1	30
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>30</b>	<b>1</b>	<b>30</b>
Forest	Hiles Millpond*	0	0	2	108	2	108
	Little Rice Lake	1	150	20	1,548	21	1,698
	Rat River	1	50	3	238	4	288
	Scattered Rice Lake	0	0	1	120	1	120
	Scott Lake	0	0	6	120	6	120
	Wabikon Lake	0	0	3	90	3	90
<b>Subtotal</b>	<b>2</b>	<b>200</b>	<b>35</b>	<b>2,224</b>	<b>37</b>	<b>2,424</b>	
Green Lake	White River Marsh	0	0	2	4	2	4
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>2</b>	<b>4</b>

(Appendix 1 continued on the next page.)

Appendix 1 (cont.). Ricing trips and pounds of green manoomin harvested by respondents to the 2009 harvest survey. Seeded waters are marked by an asterisk.							
COUNTY	WATER	TRIBAL		STATE		COMBINED TOTAL	
		TRIPS	POUNDS	TRIPS	POUNDS	TRIPS	POUNDS
Iron	Bear Creek	0	0	2	17	2	17
	Manitowish River	3	20	1	25	4	45
	Mud Lake*	0	0	15	354	15	354
	Unnamed Water	0	0	5	177	5	177
	<b>Subtotal</b>	<b>3</b>	<b>20</b>	<b>23</b>	<b>573</b>	<b>26</b>	<b>593</b>
Langlade	Lily River	0	0	1	85	1	85
	Pickereel Creek	1	65	0	0	1	65
	Spider Creek Flowage	0	0	2	40	2	40
	Wolf River	0	0	5	200	5	200
	<b>Subtotal</b>	<b>1</b>	<b>65</b>	<b>3</b>	<b>125</b>	<b>4</b>	<b>190</b>
Lincoln	Alice Lake	0	0	1	10	1	10
	Pine Creek	0	0	3	87	3	87
	Wisconsin River	0	0	9	93	9	93
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>13</b>	<b>190</b>	<b>13</b>	<b>190</b>
Marinette	Lake Noquebay	0	0	1	25	1	25
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>25</b>	<b>1</b>	<b>25</b>
Marquette	Harrisville Millpond	0	0	2	27	2	27
	Neshkoro Millpond	0	0	4	77	4	77
	White River	0	0	1	0	1	0
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>104</b>	<b>7</b>	<b>104</b>
Menominee	Wolf River	0	0	1	100	1	100
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>100</b>	<b>1</b>	<b>100</b>
Oneida	Big Lake	0	0	23	990	23	990
	Cuenin Lake	0	0	6	130	6	130
	Docs Pond	0	0	2	218	2	218
	Gary Lake	0	0	1	15	1	15
	The Thoroughfare	0	0	4	172	4	172
	Wisconsin River	0	0	5	290	5	290
	Wolf River	0	0	6	1,135	6	1,135
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>47</b>	<b>2,950</b>	<b>47</b>	<b>2,950</b>
Polk	Apple River	0	0	1	20	1	20
	Joel Flowage*	4	90	16	239	20	329
	Little Butternut Lake	0	0	1	3	1	3
	Rice Bed Creek	1	3	1	20	2	23
	Rice Lake	0	0	3	227	3	227
	Round Lake	0	0	1	10	1	10
	St Croix River	0	0	1	40	1	40
	White Ash Lake	2	2	0	0	2	2
	<b>Subtotal</b>	<b>7</b>	<b>95</b>	<b>24</b>	<b>559</b>	<b>31</b>	<b>654</b>
Price	Lower Steve Creek Flowage*	0	0	17	1,027	17	1,027
	Sailor Lake*	0	0	1	10	1	10
	Spring Creek WA*	0	0	55	3,015	55	3,015
	Unnamed Water	0	0	5	335	5	335
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>78</b>	<b>4,387</b>	<b>78</b>	<b>4,387</b>

(Appendix 1 continued on the next page.)



Appendix 1 (cont.). Ricing trips and pounds of green manoomin harvested by respondents to the 2009 harvest survey. Seeded waters are marked by an asterisk.

COUNTY	WATER	TRIBAL		STATE		COMBINED TOTAL	
		TRIPS	POUNDS	TRIPS	POUNDS	TRIPS	POUNDS
Sawyer	Barker Lake	0	0	2	40	2	40
	Blaisdell Lake	0	0	7	93	7	93
	Hunter Lake	0	0	1	14	1	14
	Nelson Lake	0	0	4	141	4	141
	Pacwawong Flowage	28	1,021	88	3,677	116	4,698
	Phipps Flowage	8	200	8	151	16	351
	Unnamed Water	0	0	3	252	3	252
	West Fork Chippewa River	0	0	1	14	1	14
	<b>Subtotal</b>	<b>36</b>	<b>1,221</b>	<b>114</b>	<b>4,382</b>	<b>150</b>	<b>5,603</b>
Taylor	Chequamegon Waters Flow.*	7	300	37	2,177	44	2,477
	Mondeaux Flow.	0	0	13	143	13	143
	<b>Subtotal</b>	<b>7</b>	<b>300</b>	<b>50</b>	<b>2,320</b>	<b>57</b>	<b>2,620</b>
Unnamed	Unnamed	0	0	1	4	1	4
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>4</b>	<b>1</b>	<b>4</b>
Vilas	Allequash Lake	3	160	20	392	23	552
	Aurora Lake	7	305	29	1,883	36	2,188
	Irving Lake	3	60	3	295	6	355
	Island Lake	16	455	17	550	33	1,005
	Lac Vieux Desert*	3	1,000	0	0	3	1,000
	Little Rice Lake	1	20	7	117	8	137
	Lost Creek	0	0	6	100	6	100
	Lower Ninemile Lake	0	0	28	1,436	28	1,436
	Manitowish River	0	0	7	253	7	253
	Nixon Lake	1	30	20	382	21	412
	Partridge Lake	0	0	5	64	5	64
	Plum Lake	0	0	2	62	2	62
	Rest Lake	0	0	3	90	3	90
	Rice Creek	0	0	8	276	8	276
	Rice Lake	0	0	3	135	3	135
	Round Lake	0	0	2	50	2	50
	Trout River	0	0	1	0	1	0
	Unnamed Water	0	0	1	5	1	5
	Upper Ninemile Flowage	2	150	8	264	10	414
	West Plum Lake	0	0	3	55	3	55
<b>Subtotal</b>	<b>36</b>	<b>2,180</b>	<b>173</b>	<b>6,409</b>	<b>209</b>	<b>8,589</b>	
Washara	County Lake	0	0	1	16	1	16
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>16</b>	<b>1</b>	<b>16</b>
Washburn	Dilly Lake	0	0	1	0	1	0
	Little Mud Lake	0	0	1	3	1	3
	Long Lake	0	0	1	14	1	14
	Mud Lake	3	15	0	0	3	15
	Potato Lake	0	0	2	14	2	14
	Rocky Ridge Creek	0	0	3	73	3	73
	Tranus Lake	12	245	9	182	21	427
	Trego Flowage	0	0	19	466	19	466
	Unnamed Water	0	0	5	78	5	78
	Whalen Lake	0	0	1	3	1	3
	White Lake	0	0	1	20	1	20
	Yellow River	1	4	3	23	4	27
<b>Subtotal</b>	<b>16</b>	<b>264</b>	<b>46</b>	<b>876</b>	<b>62</b>	<b>1,140</b>	

(Appendix 1 continued on the next page.)

Appendix 1 (cont.). Ricing trips and pounds of green manoomin harvested by respondents to the 2009 harvest survey.  
Seeded waters are marked by an asterisk.

COUNTY	WATER	TRIBAL		STATE		COMBINED TOTAL	
		TRIPS	POUNDS	TRIPS	POUNDS	TRIPS	POUNDS
Washington	Lowes Lake	0	0	1	0	1	0
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>
Waupaca	White Lake	0	0	1	3	1	3
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>3</b>
	<b>Grand Total</b>	<b>262</b>	<b>9,425</b>	<b>1,104</b>	<b>45,518</b>	<b>1,366</b>	<b>54,943</b>

Appendix 2. Waters suggested for seeding or restoration by respondents to the 2008 wild rice harvest survey.*	
COUNTY	WATER
Ashland	Fish Creek Sloughs White River Flowage (Above HWY 112 dam)
Barron	Pine Slough on Pokegama Lake near Chetek Prairie Lake
Bayfield	Bibon Marsh Lost Creek Slough Marengo Lake Marengo River (above the falls)
Burnett	Clam Lake (historic bed in decline; mentioned 4 times) Fish Lake Kriener Lake Mud Hen Lake (historic bed in decline)
Douglas	Cranberry Lake Lyman Lake St. Louis River
Forest	Briss Lake Impoundment Hay Meadow Flowage
Marathon	Big Rib River Lake Wausau (mentioned twice) Little Rib River
Oconto	Waupee Lake
Oneida	Diamond Lake
Polk	Clam Falls Flowage St. Croix River (near Osceola landing off HWY 243)
Price	Hultman Lake Spirit Lake
Sawyer	Chippewa Flowage Musky Bay, Lac Courte Oreilles
Shawano	Shawano Lake
Vilas	Cedar Lake Lake Genevieve

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