

## LAKE MANAGEMENT PLAN

Region	Area F212	D.O.W Number	County	D.O.W. Lake Name	Acreege										
2	Brainerd	18-34	Crow Wing	Bay	2,392										
<p><b>Long Range Goal:</b> Maintain a low density walleye population with a CPUE of 1-3/gill net. Maintain a largemouth bass electrofishing catch rate of 50 fish/hour with a PSD value of 50.</p>															
<p><b>Operational Plan:</b></p> <ol style="list-style-type: none"> <li>1. Stock walleye fry annually at a rate of 1,000/littoral acre (1,000,000 fry).</li> <li>2. Test net on a six year rotation, with every second netting being a full survey. The next netting should be a full survey in 2014, followed by an assessment netting in 2020.</li> <li>3. Conduct spring electrofishing in netting years to assess the largemouth bass population and maintain a database of sampling results.</li> <li>4. Encourage the lake association to embrace riparian habitat restoration and aquatic best management practices and to help educate their membership to the benefits it can provide.</li> <li>5. Implement a toolbox regulation combining a 24"-36" protected slot length limit with 1 over 36" and 9 in possession on northern pike, pending legislative approval.</li> <li>6. Continue to monitor and maintain the Bay Lake Island AMA Conservation Easement.</li> <li>7. Consider habitat improvement to enhance walleye spawning if fry stocking is successful.</li> </ol>															
<p><b>Midrange Objective:</b> Determine the success of walleye stocking. Determine the success of maintenance of the AMA Conservation Easement.</p>															
<p><b>Potential Plan:</b></p> <table> <tbody> <tr> <td>Creel survey</td> <td>25,000.</td> </tr> <tr> <td>Aquatic management area</td> <td>500,000.</td> </tr> <tr> <td>Consider Bay Lake for Muskellunge Management</td> <td>2,000.</td> </tr> <tr> <td>Consider habitat improvement to enhance walleye spawning</td> <td>10,000.</td> </tr> <tr> <td colspan="2" style="text-align: right;"><b>TOTAL \$ 537,000.</b></td> </tr> </tbody> </table>						Creel survey	25,000.	Aquatic management area	500,000.	Consider Bay Lake for Muskellunge Management	2,000.	Consider habitat improvement to enhance walleye spawning	10,000.	<b>TOTAL \$ 537,000.</b>	
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<p><b>NARRATIVE:</b> (Historical perspectives - various surveys; past management; social considerations; present limiting factors; survey needs; land acquisition; habitat development and protection; commercial fishery; stocking plans; other management tools; and evaluation plans)</p>				<p><b>Check the appropriate boxes below:</b></p> <p><input type="checkbox"/> BWCAW</p> <p><input type="checkbox"/> Superior National Forest</p> <p><input type="checkbox"/> Chippewa National Forest</p> <p><input type="checkbox"/> Leech Lake Indian Reservation</p> <p><input type="checkbox"/> 1854 Ceded Territory</p> <p><input type="checkbox"/> 1837 Ceded Territory</p> <p><input type="checkbox"/> Fond du Lac Indian Reservation</p> <p><input type="checkbox"/> Voyageurs National Park</p>											
<p><b>Primary Species Management:</b> Largemouth bass</p>		<p><b>Secondary Species Management:</b> Northern pike, Walleye</p>													
<p><b>Area Supervisor Signature:</b></p>		<p><b>Date:</b></p>		<p><b>Date sent from DNR Area Fisheries to USFS District Ranger:</b></p>											
<p><b>Regional Manager Signature:</b></p>		<p><b>Date:</b></p>		<p><b>Date sent from DNR Regional Fisheries to USFS Forest Supervisor:</b></p>											

**Various Surveys:** The lake map was completed in 1957. Test nettings were done in 1948, 1971, 1982, 1987, 1992, 1997, 2002, 2008, and 2011. A summary of these nettings is found in Table 1. Spring electrofishing was done in 2002 to sample largemouth bass. A water quality evaluation was done by a private firm in 1973. A five-year aquatic vegetation management plan was done in 2005.

Walleye and yellow perch catches have never exceeded the first quartile in the nine nettings from 1948-2011. After a slow increase, walleye CPUE peaked at 3.67/gill net in 1992 and has been slowly decreasing since then. Walleye under 12 inches long continue to be absent from the gill net catch. The median yellow perch catch is only 0.14/gill net, though a limited number of small perch were caught while shoreline seining in 2002. Northern pike, black crappie, and bluegill catches tend to be above average. Northern pike have exceeded the third quartile in each netting since 1982, reaching 17.4/gill net in 2008. Most of these fish tend to be small with median lengths less than 20 inches. Black crappie trap and/or gill net catches have exceeded the third quartile in each of the nettings to date. Only in 1997 (0.17/gill net) did the CPUE fall below the lake class median. Size of these fish is respectable with at least 59% or more of the crappies measuring at least 8" in 6 of the 8 nettings since 1971 and fish over 10" present in all surveys. Bluegill trap net CPUE has exceeded the third quartile in five of the eight nettings to date, ranging from 38.2 – 157.1/trap net. Tullibee catches from 1948-1987 exceeded the third quartile in three of the four nettings, ranging up to 12.9/gill net in 1982. Since then CPUE has remained in the first quartile each year until 2011 (0.8/gill net). Largemouth bass CPUE for both gill and trap nets tends to be average, remaining within the interquartile range in all but two nettings when the catch exceeded the third quartile (2008, 1.3/gill net; 1971, 5.2/trap net). Spring electrofishing was done in 2002 resulting in a CPUE of 90.7/hr, and further suggesting a relatively high abundance of largemouth bass.

**Past management:** In the 1950's and 1960's, management consisted primarily of the removal of panfish, perch, bullheads and dogfish by DJ crews. Northern pike were stocked in the 1960's and 1970's and may have contributed to enhancing a population that has resulted in high gill net catches in subsequent years. Walleye fingerling stocking was done in the 1980's and 1990's. Stocking was done in alternate years at a rate of ½ pound per littoral acre (500 lbs) from 1987-1995. Annual fry stocking was from 1999-2003 at a rate of 1,000 per littoral acre (1,000,000 fry). No walleyes from fry-stocked year classes were caught in the 2002 assessment and the decision was made to resume fingerling stocking despite the fact that those fry-stocked year classes were not yet fully catchable in the gill nets and 58% of the walleyes caught in 2002 resulted from natural reproduction. In 2005, the lake was designated as a core lake for fingerling stocking and as such was stocked in alternate years at a rate of 2 pounds per littoral acre (2,010 lbs). Subsequently in 2008, fry-stocked year classes contributed 54% and non-stocked years another 25% to the total walleye catch, suggesting a fry-stocking strategy may work as well or better than fingerlings. The previous management plan called for walleye stocking to be discontinued if fingerling stocking fails to improve the walleye CPUE to 5/gill net. As of the 2011 assessment, the strategy of 2 lbs/littoral acre in alternate years does not appear to be working any better than previous strategies and is unlikely to attain the goal of 5/gill net. The notion of terminating walleye stocking has been unpopular with lake residents and has led to the current fry-stocking strategy to maintain a lower density "bonus" type walleye fishery.

Other management activities include a 1973 water quality study. A great deal of effort has also been expended to try to control Eurasian water milfoil since its discovery in 1992. Hybrid water lilies are also

present in the lake, presumably from water gardens and intentional plantings by local riparian owners. Efforts to eradicate them by the DNR Exotic Species Specialist have taken place in recent years.

**Social considerations:** There is a great deal of interest on the part of riparian landowners and sportsman club members in walleye management. Bay Lake is the destination of a huge transient human population from metropolitan locations and, as a result, there is an enormous pressure on the lake's resources. Additionally, many of the seasonal homes are being upgraded to year-round residency, with huge homes replacing cottages. The tax driven system has obviously encouraged riparian owners to subdivide further and develop second and third tiers around the lake. There is also a great deal of interest by riparian owners to improve lake water quality and conditions in the watershed. The lake association should be encouraged to take advantage of the Clean Water Legacy Grant Program for funding for water quality improvement initiatives. The lake association has spent a great deal of time and money in Eurasian watermilfoil control efforts and has also applied a great deal of pressure on the Area Fisheries Office to stock more walleye fingerlings, maintain a fishable walleye fishery, and reduce the number of northern pike in the lake.

This management plan was drafted with input from members of the Bay Lake Improvement Association (BLIA) and a draft of this management plan was available for public review in February and March 2012. Comments were solicited via news release and were accepted for consideration through March ??, 2012.

**Present limiting factors:** Extremely high populations of northern pike and largemouth bass have severely depressed the abundance of yellow perch, an important forage source for walleyes and buffer against predation by other species. The demand for aquatic plant control permits is high, and near-shore plant communities have been negatively impacted. The presence of Eurasian watermilfoil and its attempted control could well become another negative impact on native plant communities in the future.

**Survey needs:** Test netting should be done on a six-year rotation and should include spring electrofishing to monitor the largemouth bass population. Full surveys should be done every other netting. The next netting should be a full survey in 2014, followed by an assessment netting in 2020.

**Land acquisition:** Acquisition of an AMA by fee title or conservation easement should be pursued as opportunities arise. Priority should be given to larger tracts of land/shoreline, particularly those with high quality habitat.

**Habitat development and protection:** Fisheries currently holds a conservation easement on the church camp island and it should be monitored as time allows. Development of walleye spawning areas has been suggested as a joint project by members of BLIA and may be considered if fry stocking is successful. Habitat protection should be done by use of aquatic plant management, DOW and WCA programs. Riparian habitat restoration projects and use of BMPs by riparian landowners should be encouraged.

**Commercial fishery:** No appreciable commercial fishery exists at the present time. In addition, the lake is classified as infested by the exotic Eurasian water milfoil, thus complicating commercial fishing in the lake.

**Stocking plans:** Fry stocking was discontinued after 2003 and the lake was declared a core lake for walleye fingerling stocking in 2005, stocked in alternate years with two pounds of fingerlings per littoral acre (2,010 lbs). Stocking under this program began in fall of 2006. The previous management plan called for walleye stocking to be discontinued if this strategy did not improve the walleye catch to at least 5/gill net and as of the 2011 assessment, it has not been successful. Given the poor success of fingerlings in the past and the unpopularity with terminating walleye stocking, the current strategy is to stock walleye fry annually at a rate of 1,000/littoral acre (1,000,000 fry) to maintain a lower density “bonus” type walleye fishery.

**Other management tools:** Consider establishing experimental regulations for northern pike as an attempt to control their abundance if requested by local anglers. The process of implementing a 22”-36” protected slot length limit with 1 over 36” and 9 in possession for northern pike was initiated during the winter of 2010, but was not able to move forward due to legislation passed in 2011 limiting the number of lakes with northern pike regulations. A creel survey would provide important information about fishing pressure, catch, and harvest to supplement routine survey data. A variety of directed sampling may also be used to enhance data available for important fish species. Cooperation with local anglers and BLIA members on special projects should also be considered when possible.

**Evaluation plans:** Walleye stocking success will be monitored by periodic test nettings. Spring electrofishing will be used to monitor largemouth bass abundance. The northern pike population can be monitored using ice-out netting when time and manpower constraints allow. Directed sampling of panfish could occur in late May/early June should the need occur for more detailed data on these species.

Table 1.

Bay Lake (18-34) netting summary			Number caught per net lift								Lake Class 22	
Species	Gear	Q1-Q3	1948	1971	1982	1987	1992	1997	2002	2008	2011	
Walleye	G	4.01 - 9.63	0	0.53	1.13	2.133.6	72.8	32.07		1.87	1.47	
Northern Pike	G	3.00 - 7.89	1.83	6.07	15	15	8.25	15.58	16.6	17.4	12.93	
Yellow Perch	G	7.06 - 33.87	1.46	0.8	0.25	0	0.67	0	0.2	0.07	0	
Tullibee	G	0.5 - 5.2	10.61	1.4	12.88	7	0.250.3	30.13		0.07	0.8	
Largemouth Bass	G	0.25 - 1.2	0.64	0.4	0.250	.250.7	50.2	51.07		1.27	0.87	
Largemouth Bass	T	0.37 - 1.38	na	5.2	1.6	0.4	1.171.0	8	0.8	1.4	na	
Largemouth Bass	EF	none	na	na	na	na	na	na	90.7	na	na	
Black Crappie	G	0.22 - 1.14	3.93	0.87	1	1	1.830.1	71.67		1.33	3.87	
Black Crappie	T	0.25 - 1.74	2	1.4	2.1	1.5	0.5	3.581.27		1.67	na	
Bluegill	T	3.73 - 42.85	118	157.07	118.9	40.8	43.92	38.17	50.8	39.27	na	

Gear codes: G = gill net; T = trap net; EF = electrofishing (fish/hr)

Table 2.

## Bay Lake (18-34) stocking summary, 1981-2010

Year	Fry Number	Fingerlings No. (lbs)	Yearlings No. (lbs)	Adults No. (lbs)	Year	Fry Number	Fingerlings No. (lbs)	Yearlings No. (lbs)	Adults No. (lbs)
1981		9,000			1999	1,000,000			
1982	500,000				2000	1,000,000			
1983		11,600			2001	900,000			
1987		6,998 (300)			2002	1,000,000			
1989		16,271(492)	24 (8)		2003	1,000,000			
1991		11,615 (480)	32 (3)		2004		7,837 (316)	556 (210)	1,440 (480)
1993			3,177 (215)	793 (340)	2006		47,654 (1994)		
1995		9,143 (502)			2008		67,028 (2007)		
					2010		30,260 (2017)		

# Bay Lake Historical Catches

	GN	WAE	NOP	YEP	TLC	LMB	BLC	TN	BLG	LMB	BLC
1948		0	1.83	1.46	10.61	0.64	3.93		118		2
1971		0.53	6.07	0.8	1.4	0.4	0.9		157.07	5.2	1.4
1982		1.13	15	0.25	12.88	0.25	1		118.9	1.6	2.1
1987		2.13	15	0	7	0.25	1		40.8	0.4	1.5
1992		3.67	8.25	0.67	0.25	0.75	1.83		43.92	1.17	0.5
1997		2.83	15.58	0	0.33	0.25	0.17		38.17	1.08	3.58
2002		2.07	16.6	0.2	0.13	1.07	1.67		50.8	0.8	1.27
2008		1.87	17.4	0.07	0.07	1.27	1.33		39.27	1.4	1.67
2011		1.47	12.93	0	0.8	0.87	3.87				
25%		4.01	3	7.06	0.5	0.25	0.22		3.73	0.37	0.25
50%		6.61	5	17.14	1.56	0.62	0.42		15.28	0.75	0.75
75%		9.63	7.89	33.87	5.2	1.2	1.14		42.85	1.38	1.74
Mean		1.96	13.35	0.25	2.86	0.64	1.47	Mean	69.85	1.66	1.72
Standard Error		0.35	1.44	0.11	1.65	0.14	0.39	Standard Error	18.15	0.61	0.36
Median		1.97	15.00	0.14	0.57	0.58	1.17	Median	43.92	1.17	1.5
Standard Deviation		0.98	4.08	0.32	4.67	0.41	1.10	Standard Deviation	48.01	1.61	0.95
Sample Variance		0.96	16.65	0.10	21.77	0.17	1.20	Sample Variance	2305.19	2.58	0.91
Minimum		0.53	6.07	0.00	0.07	0.25	0.17	Minimum	38.17	0.4	0.5
Maximum		3.67	17.40	0.80	12.88	1.27	3.87	Maximum	157.07	5.2	3.58

