2010 Fishery Report
Peppermill Lake
Adams County, WI

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BACKGROUND

Peppermill Lake is a drainage lake located at the headwaters of Peppermill Creek in southeast Adams County. It is a shallow impoundment that has a size range of 52.5 to 100 acres over the years. The most recent size was documented in 2006 at 64.9 acres (Hartnett 2006), the maximum depth is 12.5 feet with an average depth of 4.3 feet. The lake has a shoreline of 4.4 miles.

Peppermill Lake was formed in the 1950's when a beaver dam on Peppermill Creek created the beginnings of an impoundment. In 1967, developers enlarged the impoundment creating the lake by dredging and placing a dam on Peppermill Creek adjacent to Cty Hwy G. The dam is currently owned by Adams County and managed by the Adams County Land and Water Conservation Department. There is one public access located on the northeast shore of the lake and is owned by the Town of Jackson.

The fishery in Peppermill Lake suffered multiple significant winterkill events during the 1970's and early 1980's. The winterkills were driven by decreased dissolved oxygen concentrations in the water during ice cover caused by the decomposition of vegetation and other organic materials. Two aerations systems were installed into the lake in 1992 and for many years prevented further winterkill occurrences. However during the winter of 2007-2008 at least one of the aerators failed and once again a winterkill occurred on Peppermill Lake.

Historically the fishery of Peppermill Lake has consisted of largemouth bass, northern pike, bluegill, yellow perch, pumpkinseed, black crappie and rock bass. Bluegill have been the dominant fish species for several decades and due to their high numbers they have tended to have a small size structure. The largemouth bass and northern pike densities have been low and therefore unable to control the ever abundant bluegill.

Peppermill Lake has had multiple stocking events throughout the 1990's and into the early 2000's (Table 1.) to help increase the number of predators in the system to help control the bluegill numbers.

Table 1. DNR and privately funded fish stocking 1990 through 2010 in Peppermill Lake, Adams County, Wisconsin. All stockings are DNR unless otherwise noted.

Year	***Species***	***Size (avg. in inches)***	**Number Stocked**
1991	Northern pike	8	110
1992	Largemouth bass	1	5,000
	Northern pike	8	500
	Northern pike	11	250 (private)
1994	Largemouth bass	1	5,000
	Northern pike	5	500
1995	Largemouth bass	2	5,000
1996	Largemouth bass	1	5,000
	Northern pike	4	354
1997	Largemouth bass	3	1,250
1999	Largemouth bass	4	6,150
	Largemouth bass	1	5,000
2000	Largemouth bass	3	2,500
	Northern pike	4	500
2001	Largemouth bass	1	5,000

Peppermill Lake has a high concentration of phosphorous in the sediment as a result of the initial flooding of the wetlands in the 1950's and 1960's. These high levels of phosphorus lead to the very abundant aquatic vegetation that has historically consumed the lake during the summer months. To add to the very abundant vegetation problems in 1998 Eurasion Milfoil was discovered in Peppermill Lake. The Peppermill Lake Group have been very active in securing funds and in carrying out both chemical treatments and mechanical harvest of some aquatic vegetation to both attempt to prevent the spread of the Eurasion Milfoil as well as reduce the vegetation choked channels for navigation and fisheries benefits.

In 2006 two areas of Peppermill Lake covering a total of 32.6 acres were designated as Critical Habitat areas (Figure 1.) These areas were chosen for their importance for fish and wildlife habitat, protection of water quality, providing a natural buffer of terrestrial vegetation and protecting the native aquatic plant community.

The Peppermill Lake District has been very active in improving fish habitat and trying to improve the fishery over the past couple of decades the Lake District has installed 9 pea gravel near shore bass spawning areas, multiple fish crib structures, tree drops along the shoreline a 10 different locations and have also periodically stocked fish.

METHODS and RESULTS

On the night of October 18, 2010 a single run electrofishing survey was carried out. A full size boomshocker with two dippers was used. For the first half mile all fish species were collected, for the next 1.5 miles only game fish were collected (following standard DNR protocols). A spring survey had been attempted but due to a very hot spring the water temperatures were too high and the spring survey was aborted. It was observed that the dippers felt they had not been able to capture all fish seen and that many hundreds and possibly thousands of small bluegill and to a less extent bass were present but not captured. The fish were not completely affected by the electric field and were able to swim away, this was caused by a combination of the clear water and the abundant vegetation into which the fish would swim and could not be seen to be caught by the dippers.

The catch per unit effort, maximum length, minimum length and mean length of the most abundant species for the 2010 survey are shown in Table 2. and are compared against electrofishing survey results from 1983, 1989, 1995, 1999, 2001 and 2006. There were no northern pike captured during the 1989 survey.

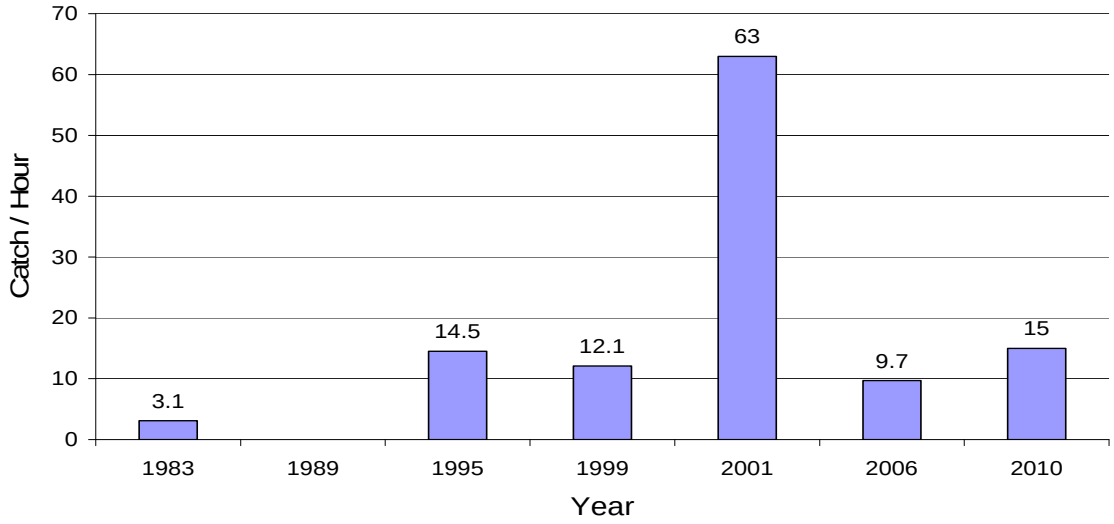
Table2. Catch per unit effort of gamefish and panfish species from fishery surveys carried out between 1983 and 2010 on Peppermill Lake Adams County, Wisconsin. CPUE is measured as number of fish caught per hour, all lengths are in inches.

YEAR	1983	1989	1995	1999	2001	2006	2010
DATE	10/18/84	10/31/89	06/12/95	08/16/99	10/10/01	10/03/06	10/18/10
Northern pike							
Catch / Hr.	3.1		14.5	12.1	63	9.7	15
Size Low	17.5		9.5	7.5	3.5	11.2	6.8
Size High	32.4		25	25	26.5	21.7	24.8
Mean Length	21.7		17.9	20.6	14.1	18.4	17
Largemouth bass							
Catch / Hr.	12.4	37.6	27.8	37.1	101	22.3	14
Size Low	9.5	3	7.5	7.5	2.5	5.2	2.2
Size High	17.4	17.9	30	20	19.5	20.7	14.6
Mean Length	12.6	9.7	13.6	10.6	7.1	13.4	6.2
Bluegill							
Catch / Hr.	47	51	64	342	306	135	85
Size Low	3.5	3.2	3	3	1.5	2.9	3
Size High	6.3	7.8	8.9	7.6	7	7.7	5.8
Mean Length	4.9	5.3	5.2	3.9	4.4	4.2	3.7

Northern pike

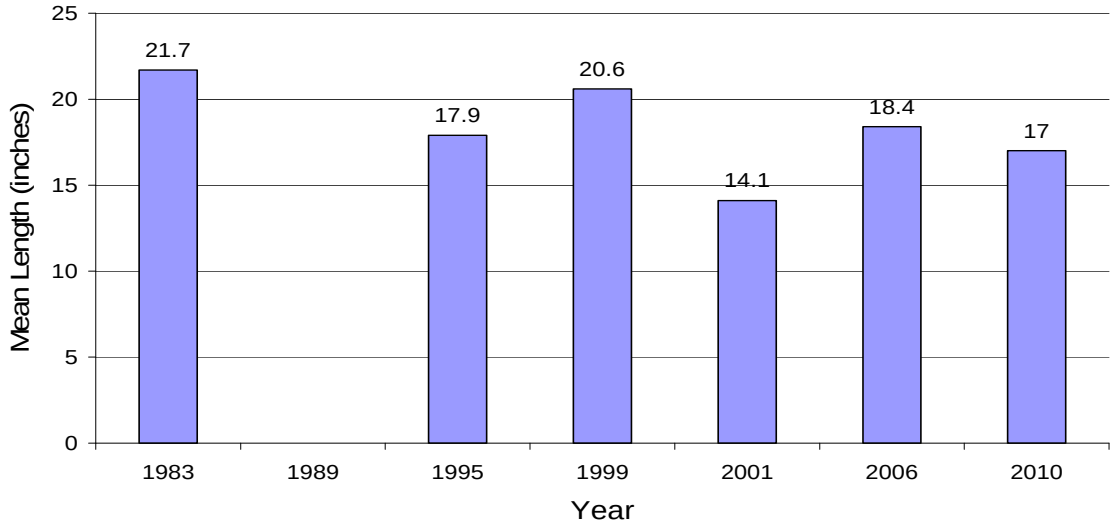
The catch per hour of northern pike in the 2010 survey of 15 fish per hour was well within the range of previous surveys (Figure 2.). However it was well below the all time high of 63 fish per hour caught during the 2001 survey.

Figure 2. Electrofishing Catch Per Hour Northern Pike Peppermill Lake Adams County, Wisconsin



The mean length of northern pike captured in the 2010 survey of 17 inches was also within the range of mean lengths compared with previous surveys (Figure 3.)

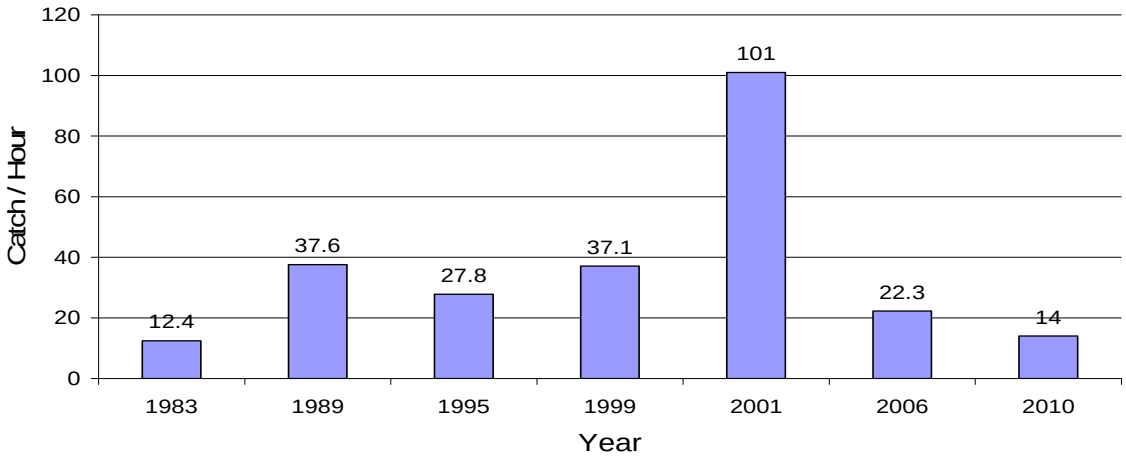
Figure 3. Mean Length of Northern Pike Peppermill Lake Adams County, Wisconsin



Largemouth bass

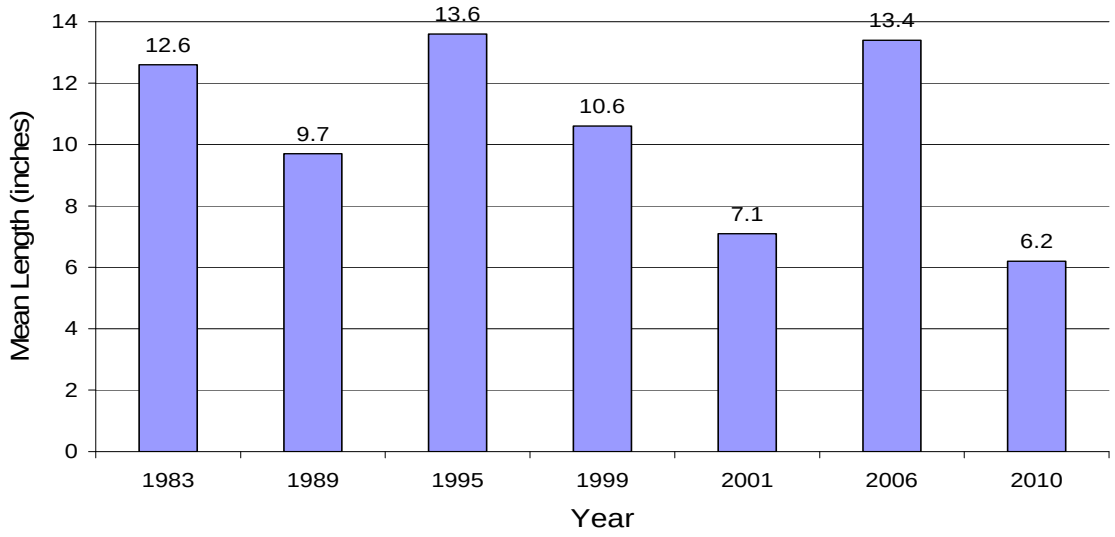
The catch per hour of largemouth bass in the 2010 survey of 14 fish per hour was the second lowest observed when compared to the previous surveys and fell well short of the high of 101 fish per hour captured during the 2001 survey (Figure 4.)

Figure 4. Electrofishing Catch per Hour Largemouth bass Peppermill Lake Adams County, Wisconsin



The mean length of largemouth bass captured in the 2010 survey of 6.2 inches was the lowest observed when compared with previous surveys (Figure 5.)

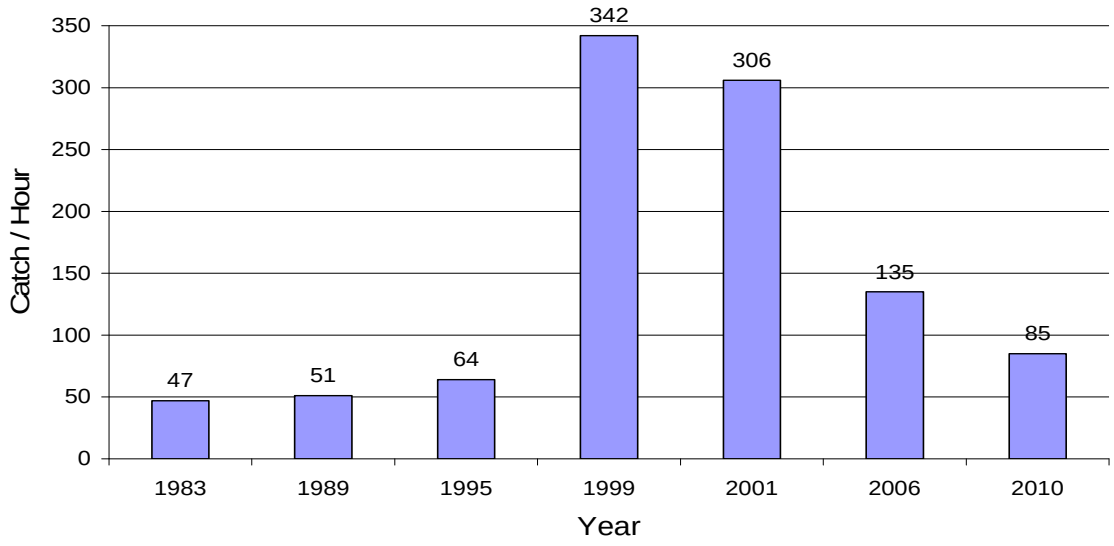
Figure 5. Mean Length of Largemouth bass Peppermill Lake Adams County, Wisconsin



Bluegill

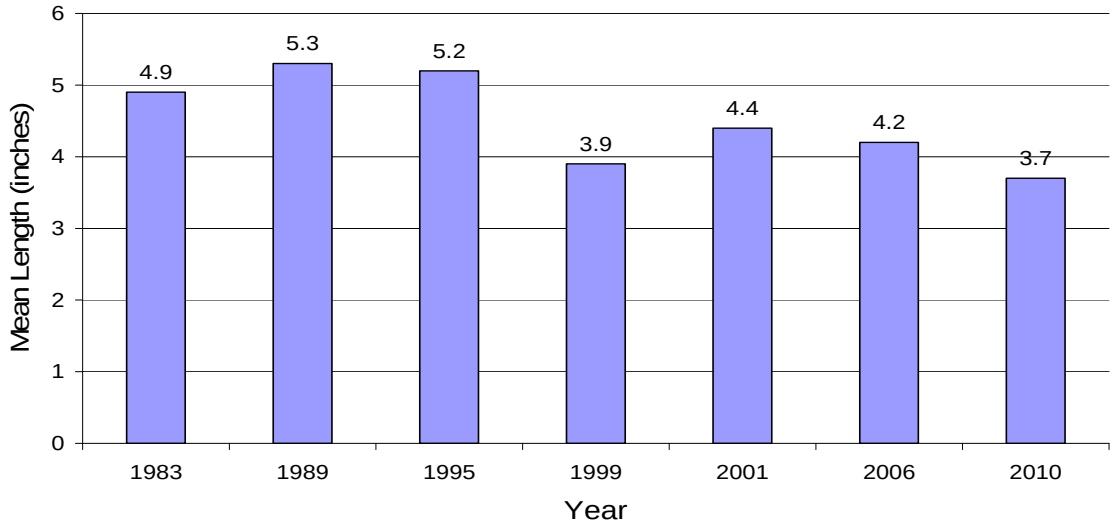
The catch per hour of bluegill in the 2010 survey of 85 fish per hour was well within the range of previous surveys (Figure 6.) However it was much lower than the highest catches of 342 and 306 fish per hour captured during the 1999 and 2001 surveys respectively

Figure 6. Electrofishing Catch per Hour Bluegill Peppermill Lake Adams County, Wisconsin



The mean length of bluegill captured in the 2010 survey of 3.7 inches was the lowest observed when compared with previous surveys (Figure 7.)

Figure 7. Mean Length of Bluegill Peppermill Lake Adams County, Wisconsin



DISSCUSSION

Fisheries surveys for the past three decades have shown that the fishery in Peppermill Lake Adams County Wisconsin has been consistently dominated by abundant numbers of small pan fish along with a low abundance of top predators.
There have been multiple attempts to decrease the number of small bluegill by trying to increase the number of largemouth bass and northern pike in the lake through habitat manipulation, improvements and additions of habitat to the lake along with stocking of top predators.

The impoundment that is Peppermill Lake has inherent problems associated with it regarding the fishery. As Peppermill Lake was formed from the flooding of a wetland area over 50 years ago this has lead to many of the issues that are seen with the fishery and the abundance of aquatic vegetation.
There are management tools available to help decrease the number of and increase the size structure of the panfish as well as increase the abundance of the top predators within the system. However, many of these tools have already been implemented on Peppermill Lake with little to no success.

The current low abundance of largemouth bass and northern pike along with the high abundance of small bluegill is a combination of long term and short term conditions within Peppermill Lake. The recent winterkill likely had a more direct impact on the number of larger largemouth bass and northern pike which in turn allowed the bluegill to become more abundant and in turn created a bottle neck of very small bluegill. The stocking of top predators such as northern pike and largemouth bass may help this situation out in the short term. During the shocking survey in October 2010 it was observed that there were many small largemouth bass present which over time will hopefully increase the adult population.

The continued plant management on Peppermill is important not only for the control of invasive species but also for providing the northern pike and largemouth bass areas to cruise and predate on the abundant bluegill.

I do not suggest the addition of more fisheries friendly habitat at this time as it does not appear that habitat is the major factor in the inbalance of the current fishery.

I do not suggest changing the fishing regulations on the lake at this time. I do not feel that increasing the minimum size limit on the largemouth bass and northern pike would be effective in controlling the bluegill, there are currently large enough bass and pike to eat the bluegill it is the abundance of these species in all size ranges that is more lacking. A closed fishing season on the largemouth bass and northern pike for several years might be effective but it is not a guarantee that this would help the abundance or size structure of these species.

We did take some aging data and found that there were different year classes of largemouth bass and northern pike present, showing that there is successful natural reproduction taking place. However we could not determine from this survey how successful the reproduction is as the number of fish collected was low and the confounding factor of the winterkill which killed and undetermined number and size range of these two species.

Overall Peppermill Lake should remain being managed for Largemouth bass, northern pike and bluegill. The intermittent stocking of largemouth bass and northern pike could help with the abundance issues of the top predators to help gain some control over the highly abundant and stunted bluegill fishery. However, there is very little chance that Peppermill Lake will have the stability to have a balanced fishery with a good abundance of top predators along with a moderate abundance of good sized panfish, it is just not in the nature of the lake.