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**To:** Bureau of Fisheries and Habitat Protection

**From:** Thomas (Skip) Sommerfeldt  
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**Subject:      2002 Lake Survey Summary - Plantation Lake, Oconto County**  
**(T33N, R15E, sec. 13; WBIC - 426200)**  
**Upper Green Bay GMU**

This report is submitted with the approval of Upper GB Fisheries Team Supervisor, Mike Donofrio; and Regional Fisheries Specialist, Lee Meyers. The report was written and work supervised by Thomas (Skip) Sommerfeldt, Fisheries Biologist - Senior under the Chequamegon and Nicolet National Forest contract fisheries program.

NOTED: \_\_\_\_\_  
Upper Chippewa Fisheries Team Supervisor, Dave Neuswanger      Date

APPROVED BY:

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Upper Green Bay Fisheries Team Supervisor, Mike Donofrio      Date

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Regional Fisheries Specialist, Lee Meyers      Date

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Bureau of Fisheries and Habitat Protection      Date

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Park Falls DNR (Skip)  
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USFS S.O. - Sue R.  
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**Executive Summary: 2002 Lake Survey Report -- Plantation Lake, Oconto County, WI**

Date of Report: January 7, 2004      Finalized 11/7/05

Investigator/Author: Thomas (Skip) Sommerfeldt, Fisheries Biologist - Senior  
Chequamegon/Nicolet National Forest Contract Fisheries Program

Executive Summary:

The survey objective was to inventory the fishery, identify limiting factors and provide future management direction for Plantation Lake. The 2002 survey found a fishery that appeared to be heavily impacted by past winterkill(s). The May shocker run and June fyke-net effort collected just 2 northern pike (23.1" and 23.5") and sampled abundant populations of small yellow perch, pumpkinseed, and bullhead - all species which are tolerant of low oxygen conditions. While largemouth bass have been previously reported in the lake from various sources, the species was not found during the May and June survey efforts. However, a total of 39 juvenile largemouth bass were obtained and field transferred into the lake on June 12, 2002. The largemouth bass ranged from 7.0 to 9.5 inches in length. It was hoped that the bass would exert some immediate predatory pressure on the abundant populations of small panfish and provide a sufficient brood stock to help re-establish the species in the lake.

Despite the potential for low winter oxygen levels, the management goal for Plantation Lake is to establish a viable sport fishery and maintain a balanced predator-prey relationship. The lake should be managed primarily as a largemouth bass and panfish fishery, with secondary emphasis on northern pike. In addition to the June 2002 field transfer of largemouth, supplemental stocking of the species was to be continued to hasten redevelopment of the population. If winter aeration became a priority, a wind-powered, water-mixing aeration system is recommended, similar to the units being operated on Logger Lake in Forest County and Twin Lake in Price County. The wind-powered unit would operate all winter long, maintain a small open-water area, and help to increase overwinter survival of sport fish in the lake. Other recommendations included the annual monitoring of winter dissolved oxygen levels to help determine the frequency of winterkill; maintaining the current harvest regulations for both bass (14-inch min., 5 daily bag) and northern pike (no minimum, 5 bag); and a spring electrofishing run every 2 to 3 years to assess the status of the fishery.

Title: **2002 Lake Survey Summary Report -- Plantation Lake, Oconto County, WI**

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Chequamegon/Nicolet National Forest Contract Fisheries Program

Lake Characteristics: 21 acres, maximum depth of 17 feet. Bog seepage lake in northern Oconto County. Stained water with very low fertility. No private development, shoreline entirely owned by US Forest Service. A small carry-in access site is available on the northeast side of the lake, right off Forest Road 2341.

Background Info: Past fisheries management activities on Plantation Lake have been minimal. There are no records of any fish stocking having occurred. A 1-day fyke-net survey in July 1957 found an abundant population of small yellow perch (mode at 4.6"), as well as 5 northern pike, 4 bluegill, and 1 white sucker. In 1983, a 1-night gill-net survey collected 19 perch and 49 black bullhead. Most of the bullhead were 3 to 4 inches long, but the perch measured from 8.0 to 8.9 inches in length. No management recommendations were associated with the 1983 survey. Five log fish cribs were installed in the lake in 1994.

2002

Survey Objective: Inventory the fishery, identify limiting factors and provide future management direction.

Field Work:	Winter DO Monitoring	March 19, 2002
	Spring Electro-fishing (0.3 hour, 0.1 for panfish)	May 23, 2002
	Panfish Fyke-Net Survey (6 net-days)	June 10-12, 2002
	Water Chem Measurements and Habitat Observations	August 22, 2002
	Fall Electro-fishing (0.4 hour - daytime)	September 19, 2002

Findings:

The 2002 survey on Plantation Lake found a fishery that appeared to be heavily impacted by past winterkill(s). The May shocker run and June fyke-net effort collected just 2 northern pike (23.1" and 23.5") and sampled abundant populations of small yellow perch, pumpkinseed, and bullhead - all species which are generally tolerant of low oxygen conditions. While largemouth bass have been previously reported in the lake from various sources, the species was not collected during the May and June survey efforts. However, a total of 39 juvenile largemouth bass were obtained and field transferred into the lake on June 12, 2002. The largemouth ranged from 7.0 to 9.5 inches in length. It was hoped that the bass would exert some immediate predatory pressure on the abundant populations of small panfish and provide a sufficient brood stock to help re-establish the species in the lake.

Winter DO monitoring in mid-March 2002 indicated good oxygen levels and the potential for winterkill was considered very low. The oxygen concentration was 13.2 mg/l at the 2-foot mark and declined to just 3.4 mg/l at the 14-foot level (just above bottom). It should be noted however, that the winter of 2001-02 was relatively mild and 'easy' in terms of low oxygen conditions, and the overall threat of winterkill was

low. The summer oxygen/temperature profile indicated that the lake did show some stratification, with the thermocline occurring just above bottom at the 10 to 12 foot depth.

Without any recorded stocking on Plantation Lake and no monitoring of winter oxygen levels until 2002, it was difficult to determine the frequency and extent of winterkill events. The presence of northern pike and larger perch (7 to 13 inches) suggests that winterkills may be partial and allow a portion of the sport fishery to survive. Another possibility was that the lake may have experienced one severe kill in the past. This could have caused the loss of the majority of the gamefish, and the population may not have been able to recover in the face of the abundant populations of small bullhead and panfish. Additional winter DO monitoring is needed to determine the frequency and extent of the winterkill problem in Plantation Lake.

It was apparent that winterkills are not an annual event, with the frequency believed to be on the order of once every 5 to 10 years - the level at which management activities are recommended to be limited. However, the lake does possess a good forage base and has the potential to grow quality sportfish. As such, management activities should be implemented to insure that sportfish populations maintain a significant presence in the lake.

Despite the potential for low winter oxygen levels, the management goal for Plantation Lake should be to establish a viable sport fishery and maintain a balanced predator-prey relationship. The lake should be managed primarily as a largemouth bass and panfish fishery, with secondary emphasis on northern pike. Northern pike have been a main part of the fishery in the past but no extra protection or enhancement should be used to increase their numbers (with the small size of the lake and limited amount of large forage, there exists a chance to see a hammer-handle fishery if numbers become too high). Largemouth bass are effective predators on perch and bullhead and the establishment of a moderate density population would help maintain a quality panfish population. With the field transfer of largemouth in June of 2002, the bass had a good start toward establishing a viable sport fishery. However, supplemental stocking of the species should be continued to hasten redevelopment of the population. Additional field transfer of adult fish or the periodic stocking of large fingerlings should be used to maintain the largemouth bass population at a moderate density. The field transfer of adult bass is the recommended approach as this provides spawning stock, as well as fish large enough to exert direct predation on the abundant panfish and bullhead populations.

If the occurrence of winterkill is found to be more frequent than once per 5 years or maintenance of a sport fishery becomes a high priority in Plantation Lake, winter aeration could be used to remedy the problem. With the remote nature of the lake, solar or wind powered aeration would have to be utilized. The recommended approach would be a wind-powered, water-mixing aeration system, similar to the units being operated on Logger Lake in Forest County and Twin Lakes in Price County. These wind-powered units operate all winter long, they maintain a small open-water area, and appear to increase overwinter survival of sport fish in the lakes. The approximate cost per unit was \$1200 (May 2003) and maintenance of the systems has been relatively minimal (basically installation before ice-up, erecting the barricade after ice-up and system removal after ice-out).

Shoreline and littoral habitat in Plantation Lake was good, containing adequate amounts of woody structure, aquatic vegetation, and bog/swamp edge. Proper riparian management to ensure future natural tree-falls into the lake should be a management objective. In addition, the small carry-in access was adequate for a lake of this size.

## Management Recommendations

1. Manage Plantation Lake primarily for largemouth bass and panfish, with secondary emphasis on northern pike (meaning no stocking or special regulations to increase their numbers). Specific management objectives are as follows:
  - a. Largemouth bass - maintain a spring electrofishing CPE near 80 bass per hour (>6") and a PSD<sub>12</sub> of greater than 40%.
  - b. Northern pike - maintain a spring electrofishing CPE of less than 4 pike per hour and the PSD<sub>21</sub> near 60%.
  - c. Panfish (yellow perch, pumpkinseed, and black bullhead) - maintain a combined spring electrofishing CPE of less than 400 fish per hour and the PSD<sub>x</sub> values near 40%.
2. As of September 2002, the fishery was still suffering from the effects of past winterkill(s). Thus, the supplemental stocking of largemouth bass should be continued to hasten re-development of the population. The field transfer of adult fish is recommended, at the rate of 2 per acre (42 fish) on an alternate year basis until the objective in 1.a. is achieved. At minimum, the stocking of extended-growth or large fingerlings should be used to boost the bass population to the desired goal.
3. The current harvest regulation for bass of a 14-inch minimum and 5 daily bag should be adequate to maintain and enhance the bass population. The current regulation for northern pike (no minimum, 5 bag) was appropriate as well.
4. On an annual basis, monitor winter dissolved oxygen levels to help determine the frequency of winterkill. A single measurement during the middle to late March period should be sufficient to assess winterkill potential. The USFS/WDNR fish program will incorporate this monitoring into their work program.
5. If the occurrence of winterkill is determined to be more frequent than once every 5 years, pursue winter aeration as priorities, funding and manpower allow. A wind-powered, water-mixing aeration system is recommended as the most cost-efficient approach on this small, remote lake.
6. Conduct periodic monitoring of the fishery to assess its status and adherence to the above objectives (1.a,b,c). A spring electrofishing run every 2 to 3 years should be adequate to monitor conditions in the lake. The USFS/WDNR fish program will incorporate this monitoring into their work program.
7. Maintain the wild nature of the lake by limiting any further shoreline development and by following the guidelines for riparian management zones as described in "Wisconsin's Forestry Best Management Practices for Water Quality" (PUB-FR-093 95).

Plantation Lake, Oconto County -- 2002 Survey Pictures



Access at Plantation Lake



Tub of bullheads from June netting

## Plantation Lake Oconto Co.

2002

Somm/Rublee/Risch

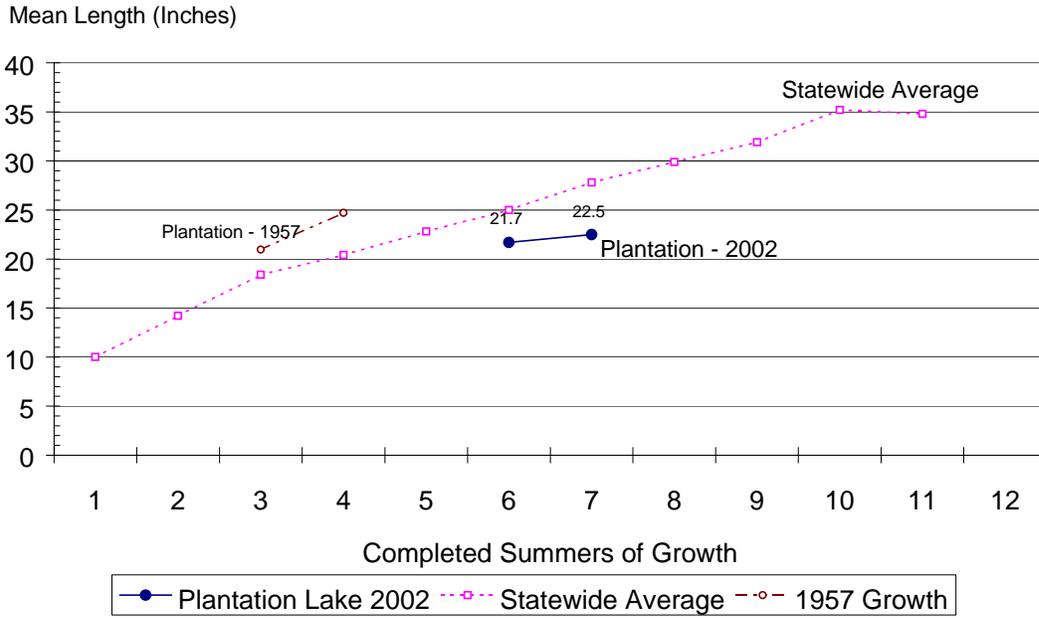
## Fish Survey Totals

Species	Spring Netting	05/23/2002 - 0.3 hr. Spring BS	6/10 - 12/02 - 6 lifts Summer Netting	9/19/02 - daytime Fall BS	Totals
Largemouth Bass Mode; Length range				1 11.4	1
Northern Pike Mode; Length range			2 23.1 - 23.5		2
Sucker Length range					
Bluegill Mode; Length range			1 8.7		1
Pumpkinseed Mode; Length range		50 4.2; 2.1 - 5.0	682 3.8; 3.4 - 6.0		732
Yellow Perch Mode; Length range		43 5.3; 4.0 - 13.0	17 5.7 - 8.1		60
Golden shiner					
Bullhead		5	1705		1710
Creek chub					

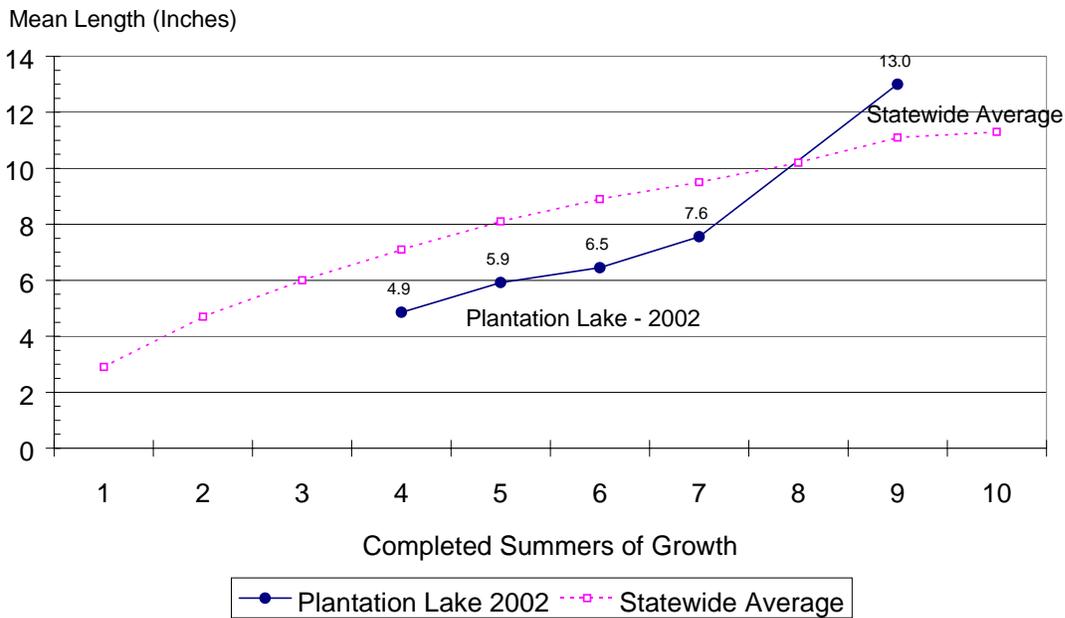
Table 1. Comparison of Summer Panfish Netting Catch Statistics  
Plantation Lake, Oconto Co. -- 2002 vs. 1957

	N Pike	Y Perch	Pmpkseed	Blk Bullhead	Other
<b>2002</b> (June 10 to 12) (3 nets, 6 net-days)					
<b>CPE</b>	<b>0.3 /n-d</b>	<b>3 /n-d</b>	<b>114 /n-d</b>	<b>284 /n-d</b>	1 Bluegill LMB were present
<b>Size/PSDx</b>	<b>2 of 2</b> (>21")	<b>53%</b> (>7")	<b>0%</b> (>6")	<b>0%</b> (>8")	
<b>1957</b> (July 12) (6 nets, 6 net-days)					
<b>CPE</b>	<b>0.8 /n-d</b>	<b>417 /n-d</b>	<b>0</b>	<b>0</b>	4 Bluegill 1 White Sucker
<b>Size/PSDx</b>	<b>3 of 5</b> (>21")	<b>0%</b> (>7")	<b>- -</b> (>6")	<b>- -</b> (>8")	
<b>Abundance Trend</b>	<b>Decrease?</b>	<b>Decrease</b>	<b>Increase</b>	<b>Increase</b>	
<b>Size/Growth Trend</b>	<b>Same</b>	Positive	<b>Negative</b>	<b>Negative</b>	

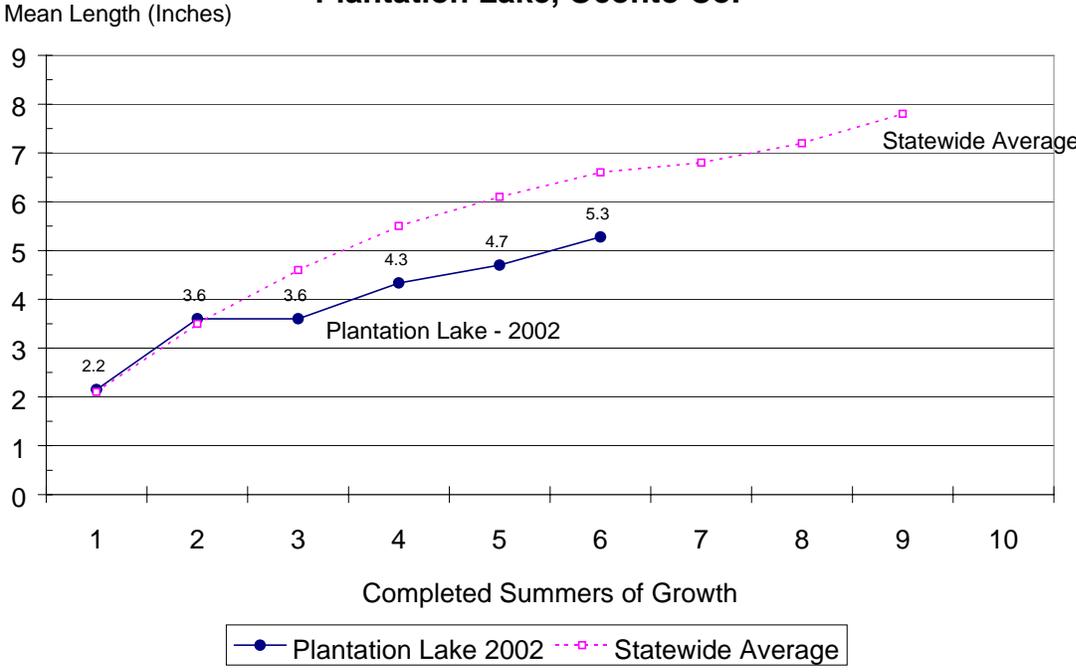
**Figure 1. Northern Pike Growth Rates  
Plantation Lake, Oconto Co.**



**Figure 2. Yellow Perch Growth Rates  
Plantation Lake, Oconto Co.**



**Figure 3. Pumpkinseed Growth Rates  
Plantation Lake, Oconto Co.**



**Figure 4. Bluegill Growth Rates  
Plantation Lake, Oconto Co.**

