

Date: December 10, 1999

File Ref: 3600

To: Bill Smith - Regional Director, Northern Region

From: Thomas (Skip) Sommerfeldt  
Senior Fisheries Biologist, Park Falls

Subject:  
**1998 Lake Survey Summary - Halsey Lake, Florence County**  
**(T39 N, R15 E, sec. 16,20,21; WBIC - 0679300)**  
**Headwaters (Upper Wisconsin) GMU**

This report is submitted with the approval of Basin Supervisor (GMU Team Leader), Tom Bashaw and Regional Fisheries Expert, Steve Avelallemant. The report was written and work supervised by Thomas (Skip) Sommerfeldt, Senior Fisheries Biologist under the Chequamegon and Nicolet National Forest contract fisheries program.

NOTED: \_\_\_\_\_  
Upper Chippewa Basin Supervisor, Bruce L. Swanson

APPROVED BY:

\_\_\_\_\_  
Headwaters (Upper Wisconsin) Basin Supervisor, Tom Bashaw Date

\_\_\_\_\_  
Fisheries Expert, Steve Avelallemant Date

\_\_\_\_\_  
Bureau of Fisheries and Habitat Protection Date

cc: Bureau of F & H Prot.  
Park Falls DNR (Skip)

USFS S.O. - Sue R.  
Peshtigo DNR (Russ H.)



Local Warden

USFS - Eagle River

## BACKGROUND INFORMATION

Halsey Lake is a 512-acre drainage lake in western Florence County. It is within the Florence District of the Chequamegon/Nicolet National Forest and is located 2 miles east of the town of Long Lake. Public access is provided by a gravel ramp on the northeast shore and there is parking for about 8 vehicles. The lake has a shoreline length of 4.09 miles, of which the US Forest Service owns about 35%. The water in the lake is basically clear, has a pH of 9.1 (alkaline), and a total alkalinity of 102 mg/l as CaCo<sub>3</sub> (hard water). The maximum depth is 10 feet but the majority of the area is in the 1 to 3-foot range. The major bottom substrate is a soupy, muck/marl mix, with much lesser amounts of sand, gravel, and rubble. There is very shallow water (0.5 to 2 feet) on the northeast and southwest ends of the lake, and coupled with the marl/muck substrate, boat travel is nearly impossible through these areas.

Past fisheries management activities have included several fisheries surveys and recent stockings of walleye and hybrid sunfish. Hybrid sunfish were stocked in the November of 1996 (2500 at 1 - 2") and walleye were stocked periodically through the 1990's. The last fishery survey was conducted in 1995 and utilized early spring fyke netting (walleye marking run), spring shocking (walleye recap run), and a fall shocker run. The spring walleye population was estimated at 195 fish, or 0.4 walleye per acre. The fall shocker run targeted gamefish and produced totals of 31 walleye, 50 largemouth bass, 19 smallmouth bass, and 4 northern pike. Walleye measured from 9.9 to 24.4 inches in length and were evenly distributed in this range. Largemouth bass ranged from 3.1 to 17.9 inches and most were in the 12 to 17 inch size. The smallmouth bass were generally small with most measuring in the 5 to 8 inch range. No report or management recommendations were available from this 1995 survey.

A fishery survey was initiated in 1998 through the Chequamegon/Nicolet National Forest contract fisheries program. The survey was designed to target the bass and panfish in Halsey Lake and gather important population data on these species (The lake is included in the Treaty Assessment rotation and is scheduled to have a walleye population estimate completed in 2003). To sample the bass and panfish populations, this survey utilized electrofishing runs in May and October and 12 fyke-net lifts in July, 1998. In addition to the fishery sampling, dissolved oxygen levels and other water quality parameters were measured in March (ice cover) and July.

## RESULTS

The following fish species were found during the 1998 survey on Halsey Lake:

Largemouth bass	( <i>Micropterus salmoides</i> )
Smallmouth bass	( <i>Micropterus dolomieu</i> )
Walleye	( <i>Stizostedion vitreum</i> )
Northern pike	( <i>Esox lucius</i> )
White sucker	( <i>Catostomus commersoni</i> )
Yellow perch	( <i>Perca flavescens</i> )
Bluegill	( <i>Lepomis macrochirus</i> )
Hybrid sunfish	( <i>Lepomis</i> spp.)
Black crappie	( <i>Pomoxis nigromaculatus</i> )

Pumpkinseed	<i>(Lepomis gibbosus)</i>
Black bullhead	<i>(Ameiurus melas)</i>
Yellow bullhead	<i>(Ameiurus natalis)</i>
Brown bullhead	<i>(Ameiurus nebulosus)</i>
Bluntnose minnow	<i>(Pimephales notatus)</i>
Golden shiner	<i>(Notemigonus crysoleucas)</i>
Tadpole madtom	<i>(Noturus gyrinus)</i>
Creek chub	<i>(Semotilus atromaculatus)</i>
Sculpin	<i>(Cottus sps)</i>

Largemouth bass were the most numerous gamefish found with a total of 204 fish measured during the 1998 survey. The largemouth ranged in length from 2.0 to 18.9 inches and had an overall PSD<sub>12</sub> of 31%. Natural reproduction was considered good in 1998 and recruitment to larger size classes was also good. Growth rates were above average for the first 5 years of life and declined slightly after that (Figure 1). Largemouth achieved a mean length of 12.9 inches after 4 summers of growth and increased to a mean of 16.5 inches by age 8.

Smallmouth bass were second in abundance to the largemouth with 62 smallies being sampled. They ranged from 2.7 to 11.4 inches long and had an overall PSD<sub>11</sub> of just 3%. The majority of the fish collected were in the 4 to 8 inch size and few greater than 10 inches were observed. Natural reproduction was evident in 1998 and recruitment to age 3 was considered fair. However, few fish larger than 10 inches (or older than age 3) were found. Growth was average for Wisconsin (Figure 2), as smallmouth reached a mean length of 6.9 inches after 2 summers of growth.

A total of 20 walleye were collected during the 1998 survey, with most sampled during the July fyke-net effort. The walleye measured from 14.0 to 24.4 inches long and had an overall PSD<sub>15</sub> of 90%. Natural reproduction was not evident in 1998. Survival of the last walleye plant (1997) was considered low as no fish less than 14 inches were observed. Age and growth data were not collected from the walleye.

Just 3 northern pike were sampled in 1998 and they were collected in the spring shocker run. The pike measured 12.8, 16.8, and 18.6 inches in length. They represented 3 different age classes (I, II, and III) and exhibited average growth for Wisconsin (Figure 3).

The panfishery was dominated by yellow perch, with much lesser abundances of hybrid sunfish, bluegill, pumpkinseed and black crappie. A total of 568 yellow perch were measured and they had a length range of 2.4 to 11.2 inches. The July fyke-net effort produced the best sample of perch, with a catch per effort of 28 fish per net day and a PSD<sub>7</sub> of 34%. Growth rates were above average for Wisconsin (Figure 4). Perch reached a mean length of 6.8 inches after 3 summers of growth and increased to 8.5 inches by age 5.

Hybrid sunfish were a distant second in abundance to the perch with 108 fish being measured. Local residents reported that 'hybrid bluegill' had been stocked but the fish did not look to have any bluegill characteristics. They appeared to be a cross between green sunfish and pumpkinseed and, as such, have been referred to as 'hybrid sunfish'. The hybrids that were collected ranged from 4.9 inches to 7.4 inches in length and had a PSD<sub>6</sub> of 90% in the July fyke-net effort. No age and growth data were taken but growth appeared to be very good based upon reported size at stocking

and length at capture. The hybrids reportedly were stocked in November 1996 at a length of about 2 inches. By July 1998, after about 1.5 years in the lake, the hybrids averaged 6.5 inches.

Totals of 35 bluegill, 21 pumpkinseed, and 7 black crappie were collected during the 1998 survey. The bluegill ranged in length from 1.7 to 10.0 inches. Growth rates were above average for Wisconsin (Figure 5), with bluegill reaching a mean length of 7.5 inches after 4 summers of growth. The pumpkinseed ranged from 3.5 to 8.3 inches long and no growth data were collected for the species. The crappie measured from 3.0 to 12.2 inches long and had above average growth rates (Figure 6).

The forage fish community was considered stable with white sucker, golden shiner, and bluntnose minnow being the predominant species. White sucker were considered abundant during the sampling efforts and most fish were in the 8 to 12 inch size.

Winter monitoring of dissolved oxygen concentrations indicated fair levels in mid-March of 1998. The DO was 8.6 mg/l just below the ice and declined to 1.0 mg/l just above the bottom in 6 feet of water. The threat of winterkill was considered low for the 1997-98 winter season.

## SUMMARY/DISCUSSION

The 1998 fish survey on Halsey Lake found self-sustaining populations of largemouth and smallmouth bass and low numbers of northern pike. Walleye were also found in low numbers and natural reproduction was not evident for the past several years. Yellow perch were the dominant panfish, with much lower densities of hybrid sunfish, bluegill, pumpkinseed, and black crappie. The panfish had above average growth rates and quality-size fish were available for all of the species.

Overall, the major limiting factor for the gamefish populations in Halsey Lake was the shallow, mucky nature of the lake. While over 500 acres in size, most of the lake area was considered to be unsuitable habitat for optimum gamefish/sportfish production. There were extensive areas of shallow water (1 to 3 feet in depth) that contained an abundance of vegetation and a very soft substrate of muck/marl. There was a small amount of suitable/useable habitat and this consisted of one deeper-water hole and the east-central shoreline of the lake. As such, there were a lot of fish, both in species and in numbers, competing for this limited resource. Other than massive dredging, there was basically little that can be done to rectify these habitat conditions. Thus, these conditions have to be accepted as is and management options should be adjusted accordingly (i.e. manage within the capabilities of what the limited resource can provide).

The yellow perch in Halsey Lake were exhibiting good reproduction and growth rates but the size structure of the population could only be considered fair. There were good numbers of 5 to 7 inch fish but the length distribution was truncated at about the 8-inch size. It was apparent that angler harvest was the likely cause of this size truncation. Heavy angling pressure was observed during this survey and local residents reported even higher pressure on weekends. Deep-water habitat was limited and confined to small area (approx. 30 acres) near the point on the southeast end of the lake. Larger perch likely congregated near this deep-water area where they were readily located and caught by the opportunistic anglers.

To remedy the lack of desirable-size perch (> 8 inches), the suggested approach is a reduced daily bag limit to 10 fish. The lake does support a popular sport fishery and it is capable of growing some nice perch, provided they live long enough to grow to a harvestable size. By reducing the bag limit, the available harvest would be spread out among more anglers and the overall number harvested should go down. This reduced harvest would allow more perch to grow into the desirable sizes (> 8 inches) and provide a sustainable high-quality angling experience.

With perch as the most abundant and dominant panfish, the other panfish species will continue to have a hard time establishing any higher densities. Direct predation on young fish and heavy competition for the available food and habitat will limit any expansion of the other panfish populations. The stocking of additional panfish (i.e. hybrid sunfish) shows mixed benefits. While the hybrid sunfish have shown good growth, one has to remember that they have consumed food that would have nourished the resident panfish in the lake. In addition, angler return of these hybrids has been relatively low as few fishermen reported catching any of the fish. Thus, any additional stocking of panfish is not suggested and efforts should be directed at improvement of the existing perch population.

The largemouth bass population was considered self-sustaining and moderate in density. Natural reproduction and recruitment were sustaining the fishery and bass were growing to quality (> 15 inches) and trophy sizes (> 18 inches). The shallow, weedy nature of the lake tended to favor the largemouth over the other predator species and would explain why they are maintaining their prominence as the more numerous gamefish. While aquatic vegetation was sufficient, there was a lack of woody cover in the lake and the installation of shallow-water woody cover would provide additional benefit to the largemouth population. Shoreline tree drops, low-profile log fish cribs, and half-log structures could be used to increase the amount of woody structure.

Smallmouth bass were also considered self-sustaining and were maintaining a low-density population. Their preferred habitats of rocky substrate/shorelines, woody cover, and sharp drop-offs to deeper water were limited in Halsey Lake and would account for the lower density of smallmouth bass. These habitat conditions are not likely to change and an increased or greatly improved smallmouth population can not be expected.

The same may be said for walleye in Halsey Lake. Most of the same habitat characteristics that are favored by smallmouth also are preferred by walleye - along with a sufficient amount of deep-water cover. With these critical habitat types being limited in Halsey Lake, it may help explain why walleye are not thriving in the lake.

However, to qualify this, the present survey was designed to assess the bass and panfish populations and limited data were collected on the walleye fishery. As such, no firm conclusions can be made and no specific recommendations will be offered on the species. A treaty assessment survey is scheduled for the year 2003 and walleye will be the target species at that time. Following this, specific recommendations regarding the walleye fishery can be developed.

## MANAGEMENT RECOMMENDATIONS

1. Reduce the daily bag limit for panfish on Halsey Lake to 10 in total. With the heavy angling pressure that this lake experiences, this will limit individual harvest and spread the available harvest out among more anglers. In addition, overall harvest should also go down and allow more fish to grow to a desirable size (>8 inches). The end result should be high-quality perch population that sustains an exceptional fishing experience.
2. Increase the amount of shallow-water woody structure through the installation of shoreline tree drops, low-profile log cribs, and/or half-log structures. These habitat structures should be placed on shorelines or in areas with firm substrates to provide the greatest benefit to the sportfish populations. A WDNR or US Forest Service fisheries biologist should be consulted to determine types of structures to install and specific placement of them.
3. The largemouth bass, smallmouth bass, and northern pike are all maintaining moderate to low populations without supplement stocking. Their numbers are or will likely stabilize at the density at which the lake and habitat can sustain. Thus, no stocking of these 3 species is recommended.
4. Conduct periodic monitoring runs to assess the status of the fishery. A spring electrofishing run every 2 to 3 years is suggested. Due to the inaccessibility of most of the shoreline, the same section of the east shore should be sampled with the shocker run (see map). The USFS contract fish program will incorporate this monitoring into their work program.
5. Following the treaty assessment survey of the walleye population in 2003, evaluate the status of the fishery and provide additional management direction on the gamefish species.

Pictures from the 1998 Survey:



Halsey Lake Landing - 7/98  
Fyke Net Set (Shallow)

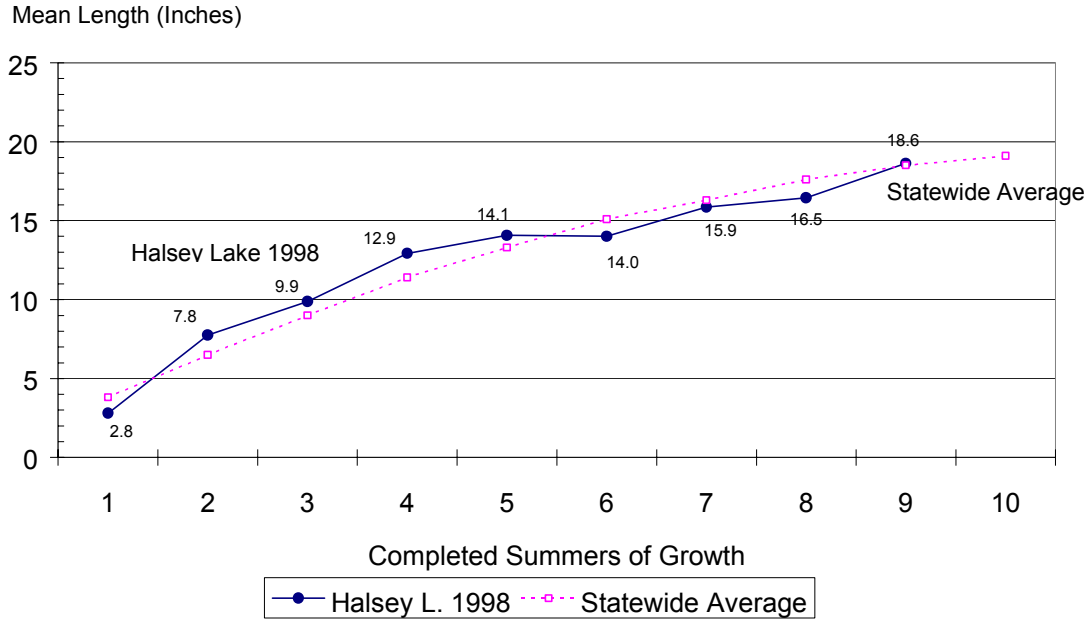


11" Perch (what anglers are after)  
Hybrid sunfish (~7")

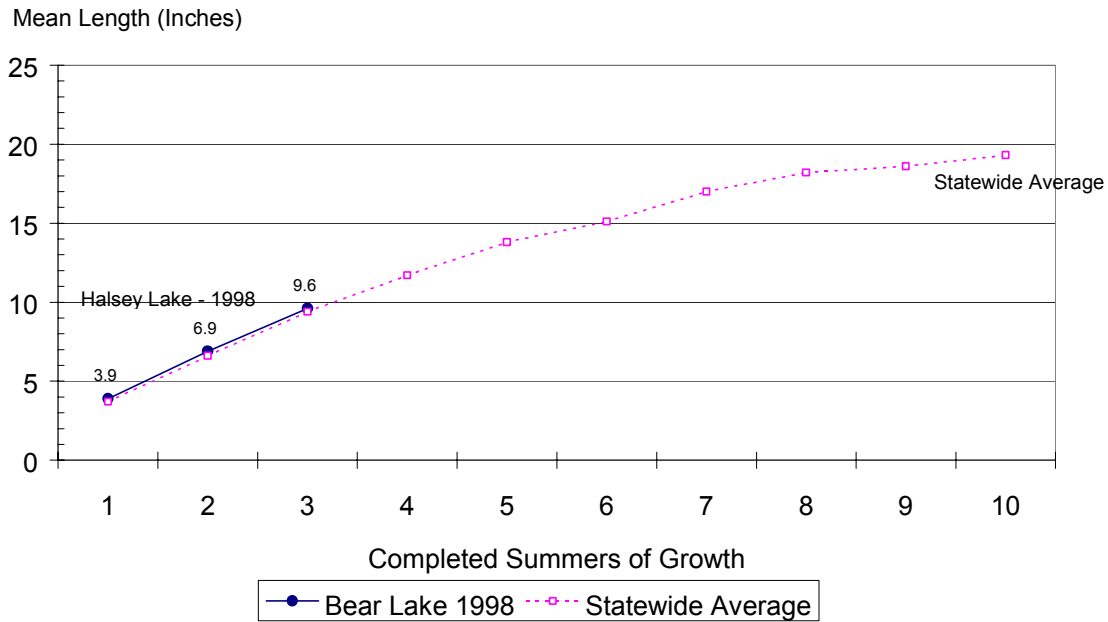




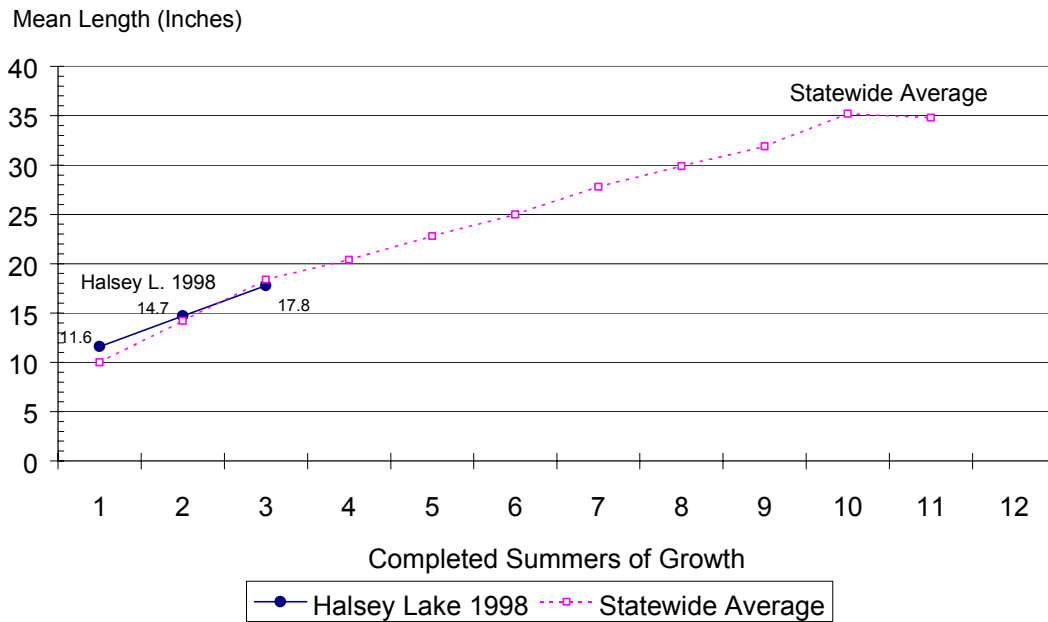
**Figure 1. Largemouth Bass Growth Rates  
Halsey Lake, Florence Co.**



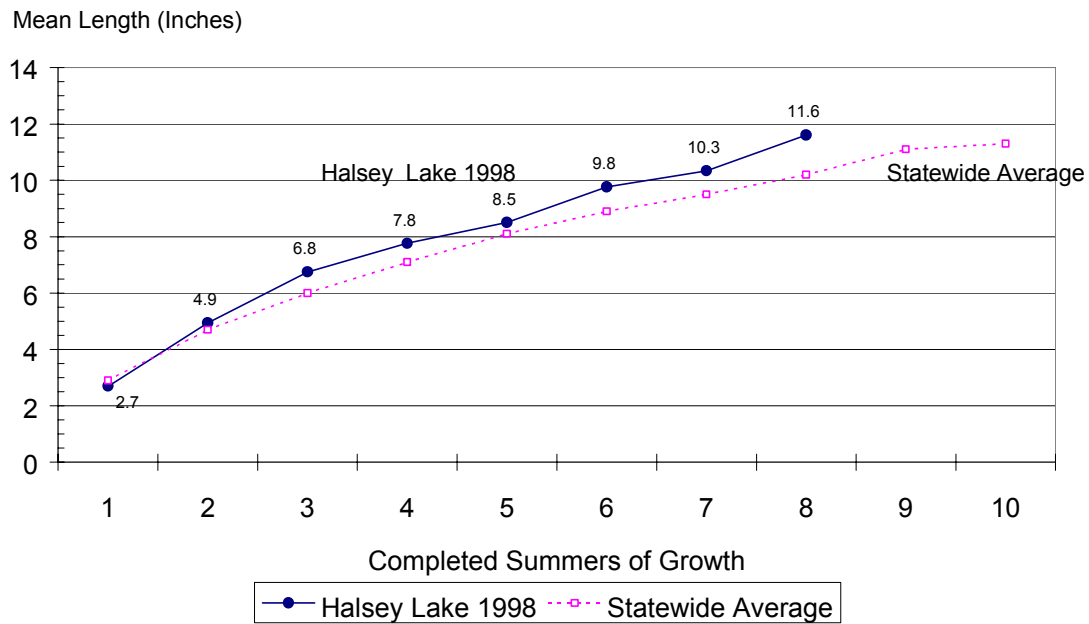
**Figure 2. Smallmouth Bass Growth Rates  
Halsey Lake, Florence Co.**



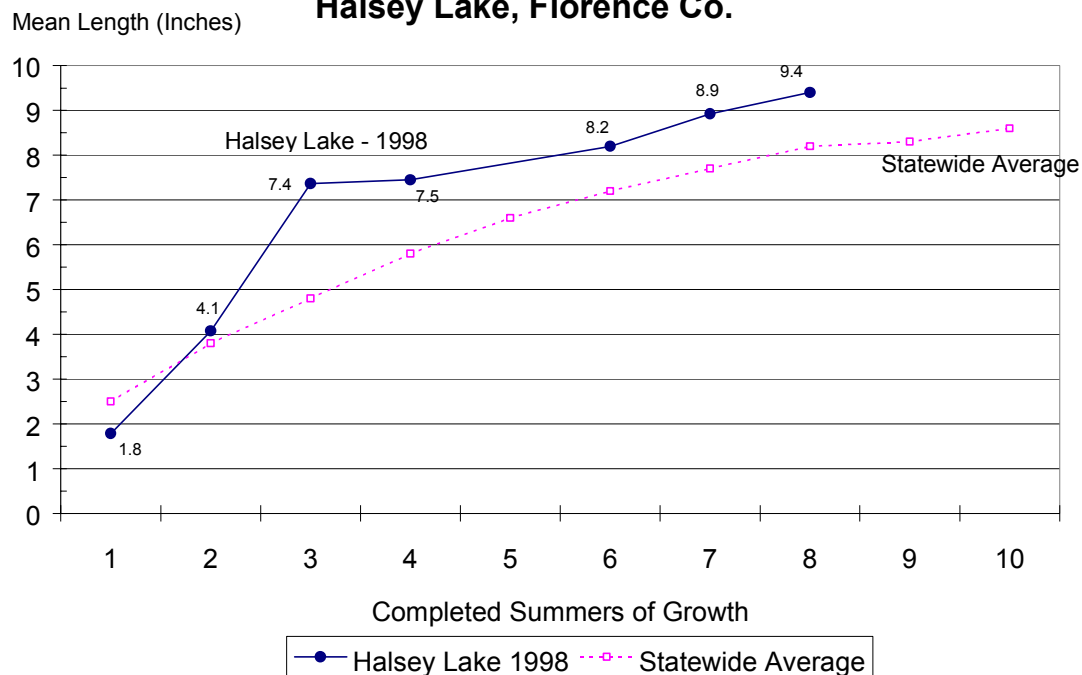
**Figure 3. Northern Pike Growth Rates  
Halsey Lake, Florence Co.**



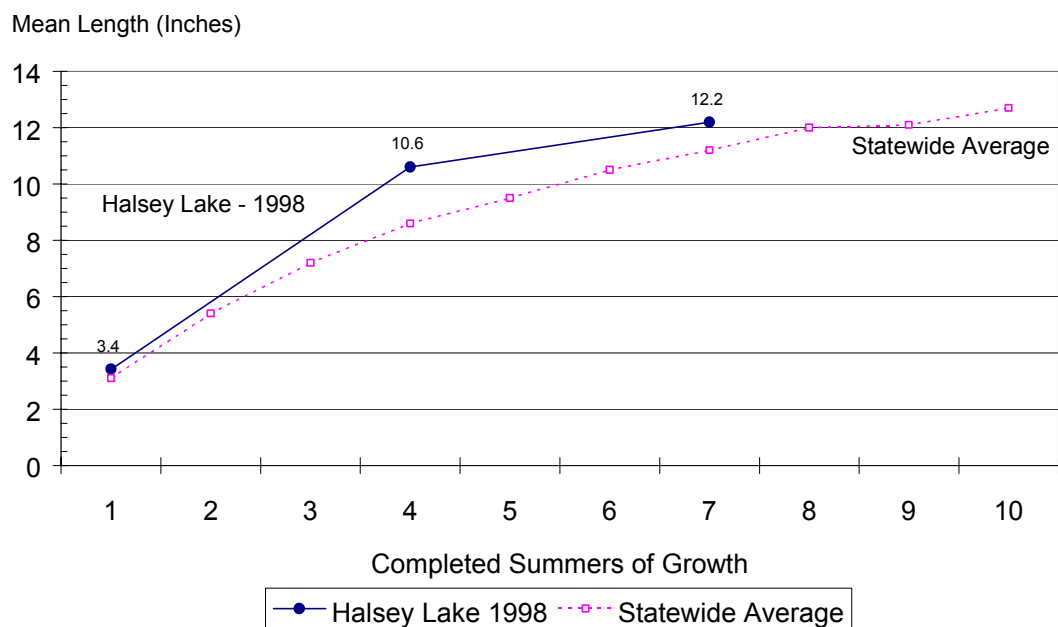
**Figure 4. Yellow Perch Growth Rates  
Halsey Lake, Florence Co.**



**Figure 5. Bluegill Growth Rates  
Halsey Lake, Florence Co.**



**Figure 6. Black Crappie Growth Rates  
Halsey Lake, Florence Co.**



# Halsey Lake -- 1998

## Fish Survey Totals

Species	Spring Netting	Spring BS	Summer Netting	Fall BS	Totals
Largemouth Bass Length range		42 4.5 - 18.9	13 4.9 - 14.2	149 2.0 - 15.3	<b>204</b>
Northern Pike Length range		3 12.7 - 18.8			<b>3</b>
Walleye Length range		7 14.0 - 24.4	13 18.3 - 24.0		<b>20</b>
Musky Length range					<b>0</b>
Smallmouth Bass Length range		28 3.2 - 8.8	17 4.7 - 11.4	17 2.7 - 9.9	<b>62</b>
Sucker Length range		16 7.5 - 1.9	28 5.6 - 17.1	13 6.5 - 18.9	<b>57</b>
Bluegill Length range		5 7.0 - 9.2	22 3.0 - 10.0	8 1.7 - 4.5	<b>35</b>
Black Crappie Length range			2 11.1 - 11.2	5 3.0 - 12.2	<b>7</b>
Pumpkinseed Length range		5 6.4 - 7.2	14 6.1 - 8.3	2 3.5 - 3.9	<b>21</b>
Yellow Perch Length range		96 2.8 - 10.7	341 4.7 - 11.2	131 2.4 - 8.8	<b>568</b>
Rock Bass Length range					<b>0</b>
Hybrid Sunfish Length range			98 4.9 - 7.4	10 5.6 - 7.4	<b>108</b>
Golden shiner		C	P	C	
Bullhead		P	P		
Creek chub			P		
Bluntnose minnow		P		A	
Sculpin		C			
tadpole madtom		P	P		
Crayfish		P	C	P	

County <b>FLORENCE</b>		Water <b>Halsey Lake</b>				Date: <b>1998</b>			Gear: Hours		Survey Totals Somm/Bunde/Wallner	
Size Range Inches	Total LMB	Total N Pike	NP Spring BS	NP Sum Fyke	NP Fall BS	LMB Spring BS	LMB Sum Fyke	LMB Fall BS	Size Range Inches	Total N Pike		
<3.0	81							81	27.0 - 27.4			
3.0 - 3.4	9							9	27.5 - 27.9			
3.5 - 3.9	3							3	28.0 - 28.4			
4.0 - 4.4	4							4	28.5 - 28.9			
4.5 - 4.9	4					1	1	2	29.0 - 29.4			
5.0 - 5.4	6					1	4	1	29.5 - 29.9			
5.5 - 5.9	2						2		30.0 - 30.4			
6.0 - 6.4	3						2	1	30.5 - 30.9			
6.5 - 6.9	1						1		31.0 - 31.4			
7.0 - 7.4	1						1		31.5 - 31.9			
7.5 - 7.9	11							11	32.0 - 32.4			
8.0 - 8.4	8							8	32.5 - 32.9			
8.5 - 8.9	14							14	33.0 - 33.4			
9.0 - 9.4	16					5		11	33.5 - 33.9			
9.5 - 9.9	9					8		1	34.0 - 34.4			
10.0 - 10.4	1							1	34.5 - 34.9			
10.5 - 10.9									35.0 - 35.4			
11.0 - 11.4									35.5 - 35.9			
11.5 - 11.9	2					1	1		36.0 - 36.4			
12.0 - 12.4									36.5 - 36.9			
12.5 - 12.9	3	1	1			2		1	37.0 - 37.4			
13.0 - 13.4	4					4			37.5 - 37.9			
13.5 - 13.9	4					4			38.0 - 38.4			
14.0 - 14.4	1						1		38.5 - 38.9			
14.5 - 14.9	1					1			39.0 - 39.4			
15.0 - 15.4	3					2		1	39.5 - 39.9			
15.5 - 15.9	5					5			40.0 - 40.9			
16.0 - 16.4	3					3			41.0 - 41.9			
16.5 - 16.9	1	1	1			1			42.0 - 42.9			
17.0 - 17.4	1					1			43.0 - 43.9			
17.5 - 17.9									44.0 - 44.9			
18.0 - 18.4	1					1			45.0 - 45.9			
18.5 - 18.9	2	1	1			2			46.0 - 46.9			
19.0 - 19.4									47.0 - 47.9			
19.5 - 19.9									48.0 - 48.9			
20.0 - 20.4									49.0 - 49.9			
20.5 - 20.9									50.0 - 50.9			
21.0 - 21.4									51.0 - 51.9			
21.5 - 21.9									52.0 - 52.9			
22.0 - 22.4									53.0 - 53.9			
22.5 - 22.9									54.0 - 54.9			
23.0 - 23.4									55.0 - 55.9			
23.5 - 23.9									56.0 - 56.9			
24.0 - 24.4									57.0 - 57.9			
24.5 - 24.9									58.0 - 58.9			
25.0 - 25.4									59.0 - 59.9			
25.5 - 25.9									60.0+			
26.0 - 26.4												
26.5 - 26.9												
<b>TOTALS</b>	<b>204</b>					<b>42</b>	<b>13</b>	<b>149</b>	<b>TOTALS</b>	<b>3</b>		

**OBSERVATIONS:** LMB PSD12 = 31%  
(6" stock size)  
NP PSD21 =  
(14" stock size)

State of Wisconsin  
Department of Natural Resources

Gamefish Length Frequency  
Form 3600-65 Rev.7-93

County <b>FLORENCE</b>		Water <b>Halsey Lake</b>				Date: <b>1998</b>			Gear: Hours		Survey Totals Somm/Bunde/Wallner	
Size Range Inches	Total SMB	Total Walleye	Walleye Spring BS	Walleye Sum Fyke	Walleye Fall BS	SMB Spring BS	SMB Sum Fyke	SMB Fall BS	Size Range Inches	Total Walleye		
<3.0	1							1	27.0 - 27.4			
3.0 - 3.4	5					4		1	27.5 - 27.9			
3.5 - 3.9	4					3		1	28.0 - 28.4			
4.0 - 4.4	8					8			28.5 - 28.9			
4.5 - 4.9	4					3	1		29.0 - 29.4			
5.0 - 5.4	5					2	3		29.5 - 29.9			
5.5 - 5.9	1						1		30.0 - 30.4			
6.0 - 6.4	7						5	2	30.5 - 30.9			
6.5 - 6.9	8					1	4	3	31.0 - 31.4			
7.0 - 7.4	2						1	1	31.5 - 31.9			
7.5 - 7.9	11					4	1	6	32.0 - 32.4			
8.0 - 8.4	2					1		1	32.5 - 32.9			
8.5 - 8.9	2					2			33.0 - 33.4			
9.0 - 9.4									33.5 - 33.9			
9.5 - 9.9	1							1	34.0 - 34.4			
10.0 - 10.4									34.5 - 34.9			
10.5 - 10.9									35.0 - 35.4			
11.0 - 11.4	1						1		35.5 - 35.9			
11.5 - 11.9									36.0 - 36.4			
12.0 - 12.4									36.5 - 36.9			
12.5 - 12.9									37.0 - 37.4			
13.0 - 13.4									37.5 - 37.9			
13.5 - 13.9									38.0 - 38.4			
14.0 - 14.4		2	2						38.5 - 38.9			
14.5 - 14.9									39.0 - 39.4			
15.0 - 15.4									39.5 - 39.9			
15.5 - 15.9									40.0 - 40.9			
16.0 - 16.4									41.0 - 41.9			
16.5 - 16.9									42.0 - 42.9			
17.0 - 17.4									43.0 - 43.9			
17.5 - 17.9		1	1						44.0 - 44.9			
18.0 - 18.4		1		1					45.0 - 45.9			
18.5 - 18.9		2	1	1					46.0 - 46.9			
19.0 - 19.4									47.0 - 47.9			
19.5 - 19.9									48.0 - 48.9			
20.0 - 20.4		2		2					49.0 - 49.9			
20.5 - 20.9									50.0 - 50.9			
21.0 - 21.4		3		3					51.0 - 51.9			
21.5 - 21.9		2	2						52.0 - 52.9			
22.0 - 22.4		2		2					53.0 - 53.9			
22.5 - 22.9									54.0 - 54.9			
23.0 - 23.4		3		3					55.0 - 55.9			
23.5 - 23.9									56.0 - 56.9			
24.0 - 24.4		2	1	1					57.0 - 57.9			
24.5 - 24.9									58.0 - 58.9			
25.0 - 25.4									59.0 - 59.9			
25.5 - 25.9									60.0+			
26.0 - 26.4												
26.5 - 26.9												
<b>TOTALS</b>	<b>62</b>					<b>28</b>	<b>17</b>	<b>17</b>	<b>TOTALS</b>	<b>20</b>		

OBSERVATIONS: SMB PSD11 = 3%  
(6" stock size)  
Walleye PSD15 = 90%  
(10" stock size)