JOSLIN LAKE

Washtenaw County, T1S R3E Sec 3
Huron River Watershed, Last surveyed May 2003

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Environment

Joslin Lake (Figure 1) lies in extreme northwestern Washtenaw County in southeastern Michigan and is within the boundaries of the Pinckney Recreation Area. It is in the upper headwaters of Portage Creek which is one of the major tributaries to the Huron River. Partial watershed measurements from topographic maps indicates that an area of just over 1,200 acres drains directly into the lake (Marsh and Borton 1974). There are also four small inlets from South Lake, which join together and enter Joslin Lake on its south end. The lake outlets via a small stream in the northeast corner that discharges to Portage Creek.

Approximately one-third of the shoreline of the 187-acre lake is characterized as marshy and undeveloped, with emergent wetland vegetation that includes lily pads, cattails, and bulrushes. The remaining shoreline is developed with mainly permanent homes although some summer cottages do exist. This developed shoreline (primarily the north and east sides of the lake) is mostly lawns with a fair number of trees and a few rock seawalls. A DNR public access site and gravel boat launch is located on the south side of the lake off of Joslin Lake Road to the east.

Joslin is a very shallow lake with depths averaging 5 to 8 feet. About two-thirds of the lake is shallower then 5 feet with one deeper area reaching the 20 foot maximum depth. The lake's bottom is composed mainly of sand, marl, pulpy peat and fibrous peat. It is mostly sand along the north and east sides of the lake with submerged aquatic vegetation sparse or absent. The central portion of the lake along with the south and west portions have dense submerged vegetation with peat and marl bottom substrates.

The latest limnological sampling was conducted in early September of 2003. Water color was a light brown with a secchi disk reading of 8.5 feet. From the surface down water conductivity ranged from 365 to 411uS and pH from 8.3 to 7.3. Temperature and oxygen profiles were also taken at this time. Temperature was fairly constant from 71F at the surface to 69Fat 17 feet. Dissolved oxygen ranged from 10.3ppm at the surface to 8.5 at 16 feet then dropped to 4.7 at the bottom. Water temperature was not stratified at the time of this sampling although dissolved oxygen may have been slightly stratified in the deepest part of the basin. Historical limnological data showed similar conditions also present during the summer.

History

The earliest surveys on record are from July of 1973 when fyke and gill nets were used to sample the fish population. This survey resulted in a "fair" catch of bluegill, pumpkinseeds and black crappie. Fish growth was not determined since no scales were taken from fish for age analysis purposes. Bullhead and largemouth bass populations were reported as very good and angler reports of good bluegill, bass and bullhead fishing were noted.

A trap net survey in November of 1985 resulted in the catch of many small panfish. Over 200 bluegills were captured, but they averaged just over 5 inches. This average was significantly smaller than the average size of bluegills in most area lakes, but the predominance of small panfish may have been due to cold water temperatures (53 F). Fish scale analysis indicated that bluegills were growing over half an inch below the state average. Black crappie also displayed similar growth patterns. However, several year classes of both species existed in the population to provide a fair fishery for anglers.

Joslin Lake was selected as a "control" lake for a southern Michigan bluegill study begun in 1988 to compare, contrast and measure the efficacy of selected management techniques for improving the size structure of bluegill populations of inland lakes. Joslin Lake was surveyed each year subsequent to 1988, but was dropped from the study after the 1994 survey since the lake maintained a satisfactory-to-good bluegill population structure (despite slow growth) and was not "typical" of the other lakes in the study (Schneider & Lockwood, 1996). The slow growth and longevity trends exhibited by Joslin Lake bluegills continued through 1994 and the structure of the fish population during this time period remained relatively unchanged.

Historically, Joslin Lake has had a relatively large pumpkinseed population. Pumpkinseed average size during the period between 1988 and 1994 was approximately 6.5 inches and growth rates were near the state average. Because of the large pumpkinseed and healthy snail populations which exist in Joslin Lake, an opportunity to create a trophy panfish fishery and quantitatively study the impacts of introducing redear sunfish became available. Redear sunfish have been stocked in several Jackson area lakes since 1984 with generally very good success. Not only have stocked redear grown to trophy panfish proportions, averaging nearly 9 inches in trap net catches, they have become self-sustaining in most of the lakes where they have been introduced. Redear sunfish were stocked into Joslin Lake in 1995, 1996 and 1997 according to the guidelines in the Redear Sunfish Management Plan. This consisted of 18,700 fall fingerlings in 1995 (100/acre), 7,500 fall fingerlings and yearlings in 1996 (40/acre) (yearlings used due to shortage of fall fingerlings), and 16,600 fall fingerlings in 1997 (89/acre). Joslin Lake was surveyed each year from 1996 through 2000, 2002 and 2003 using the same gear and level of effort as when this lake was part of the bluegill research project. This was done to provide post-stocking data on the fish community comparable to the 1988-1994 pre-redear survey data.

Current Status

The most recent fisheries survey was conducted in late May of 2003. It used five standard trap nets (pot size 8ft x 5ft x 3ft with 1.5-inch mesh) set over two nights and lifted daily. Gear, effort, and sampling locations used were similar to previous surveys conducted at this lake to facilitate data comparison (Figure 1).

A total of 17 fish species and 6 turtle species were collected or observed during this survey with 2,614 fish and 59 turtles handled in total. Panfish such as redear sunfish, bluegill, pumpkinseed sunfish, hybrid sunfish, rock bass, and black crappie dominated the survey making up over 90% of the total catch both by number and weight. Large gamefish such as largemouth bass and northern pike were about 2% of the total catch by number and weight. Brown, black and yellow bullhead were fairly numerous totaling over 5% of the catch while rough fish species such as bowfin and longnose gar were scarce at less than 1% of the total catch. Other fish caught in small numbers included golden shiner, lake chubsucker,

warmouth and yellow perch (Table 1). Turtle species observed included numerous musk, painted and snapping turtles along with a few spiny softshell and common map turtles. One Blanding's turtle, a special concern species, was caught as well.

Redear sunfish and bluegill were by far the most abundant fish species caught during this survey (55% and 28% of the total catch by number, respectively) (Table 1). The redear sunfish averaged an impressive 9.9 inches in length with about 63% (899 of 1,437) exceeding the 10-inch master angler minimum size requirement (Table 2). Over 99% of these sunfish collected during this survey exceeded the minimum size acceptable to anglers of 6 inches. Bluegill averaged 6.6 inches with 89% exceeding the minimum acceptable size of 6 inches and 163 of the 719 caught over 7 inches in length (Table 1 and 2). Growth rates for the redear sunfish were good with a mean growth index 0.7 inches over the state average. Bluegill growth was below average with a mean growth index 0.8 inches below the state average (Table 3). A wide range of age groups were present for both species (Table 4) indicating consistent reproductive success and multi-year survival is occurring in Joslin Lake.

Pumpkinseed sunfish were the next most abundant fish collected (141 individuals) accounting for 5.5% of the total catch by number. They averaged a healthy 7.0 inches in length with over 90% exceeding the 6-inch minimum size acceptable to anglers (Table 1). Nine individuals exceeded 8 inches, but none reached the master angler minimum size requirement of 9 inches (Table 2). Growth rates were very good with a mean growth index 0.6 inches above the state average (Table 3). As with the redear and bluegill, a wide range of age groups in significant numbers were collected in the survey (Table 4).

Other panfish caught during this survey (Table 1) included 54 hybrid sunfish (5-9 inches), 23 rock bass (5-8 inches), 21 warmouth (5-7 inches), 16 black crappie (8-11 inches), and 1 yellow perch (7 inches).

Largemouth bass was the only large gamefish collected in significant numbers with 42 individuals caught ranging from 6 to over 17 inches. This species averaged 10.1 inches in length with only 3 fish exceeding the minimum legal size limit of 14 inches (Table 1). Northern pike are also present in the lake, but only one individual was caught in this survey. Bass growth was below the state average by 0.8 inches (Table 3), but this is similar to many other lakes in southern Michigan.

Fair numbers of bullhead were collected in this survey. The 145 bullhead caught (141 of which were brown bullhead) ranged from 7 to over 13 inches in length with an average length over 10 inches and 82 individuals exceeding the minimum length acceptable to anglers of 10 inches (Table 1).

Nongame fish species caught in this survey included 8 bowfin (12-26 inches), 4 rather large longnose gar (30-40 inches), 1 golden shiner (8 inches) and 1 lake chubsucker (Table 1).

Analysis and Discussion

Since the introduction of redear sunfish in the mid-1990s, this species has taken over as the dominant panfish in Joslin Lake. The redear sunfish catch was double the bluegill catch in the 2003 survey and higher than any previous year's bluegill catch rate except the 1993 survey (Table 5). Trapnet catch per effort (CPE) data shows redear dominated in the 2002 survey as well. Redear average length in the trapnets has increased steadily since their introduction and seems to have stabilized just short of 10 inches. An impressive number of individuals exceeding the master angler minimum requirements were

caught during the last survey (Table 2). These data show the experimental stocking of redear sunfish has been successful in creating a naturally-reproducing, trophy panfish fishery in Joslin Lake.

Bluegill sizes seem to have been stable over this period based on average length data in the catch summary (Table 5). Growth rates (based on mean growth indices from trapnet catches) have also remained fairly stable at just under one inch below the state average based on length at age information. Trapnet catch rates seem to have declined slightly since redear were introduced with pre-redear CPEs averaging 88 and post-redear CPEs averaging 47 fish per net lift.

Pumpkinseed sunfish numbers have declined slightly since the redear introduction with CPEs averaging 31 prior to the introduction and only averaging 21 fish per net lift in the surveys afterwards. This is not unexpected since redear sunfish are one of the few species that utilize snails, one of the preferred foods of pumpkinseed sunfish, as a primary forage item (Towns 2003). Sharper drops in trapnet catch rates were recorded in the last three surveys (2000, 2002, and 2003) which had a 3-year average CPE of 9.7 (Table 5). Their average size has been stable or even increased slightly over the years since redear were stocked and growth seems to have improved as well with the growth index averaging about 0.6 inches above the state average compared to about even with the state average prior to the redear introduction.

What appears to be a significant number of hybrid sunfish were caught in this survey. Hybridization of redear sunfish with other sunfish and bluegill has been found to occur in other area lakes where redear sunfish were introduced (Towns 2003). Their abundance has ranged from 2% to 13% of the trapnet catch by number in the lakes where significant numbers of hybrids were detected. In Joslin Lake, hybrid sunfish comprised just over 2% of the trapnet catch in this latest survey and, although 54 individual hybrids seems a large number, this percentage is well within that found in the other lakes. Research has also shown these hybrids are likely not fertile enough to sustain themselves when they do appear. Hybridization in general does not appear to be a large problem since surveys in lakes that have had redear populations for over 40 years have not detected a persistent hybrid presence (Towns 2003).

The population of larger gamefish in Joslin Lake is stable with good numbers of largemouth bass, although only a small percentage are over the minimum legal size limit of 14 inches. Small numbers of northern pike have been consistently caught in previous surveys when gill nets were used to sample the deeper areas of the lake. The northern pike population appears fairly stable with a good percentage of legal-sized individuals (24 inches). A good population of bullhead continues to be present (all 3 species - black, brown and yellow) with many good-sized individuals for those anglers that choose to pursue this underutilized resource. A mix of small numbers of other gamefish such as black crappie, warmouth, hybrid sunfish, rockbass and yellow perch provide some variety to the fishery and help balance the fish community in the lake. Native non-game species such as bowfin and longnose gar are also present, with the unusual absence of carp in all the surveys. The lack of carp may be one factor in the success of the redear sunfish since this sunfish seems to do worse when carp populations are high (Towns 2003). Lake chubsucker have been consistently collected in small numbers through the years. They seem to have a stable population and provide a large food item for the larger predators present in the lake.

Overall, the introduction and establishment of a naturally-reproducing population of redear sunfish into Joslin Lake does not seem to have produced any significant changes in the fish community other than the addition of a trophy-sized panfish. Some changes in individual species may have occurred, but not enough to endanger their populations or significantly affect the fishery. A more detailed analysis of the

redear management program in Joslin Lake and its potential impacts on the fish community will be conducted in a technical report soon to be produced.

Management Direction

No active fishery management actions have occurred in Joslin Lake other than the redear sunfish introduction in the mid-1990s. Since the fish community is well-balanced and a popular fishery continues to be present in the lake, no further management actions are recommended. Occasional surveys should be planned to monitor the status of the panfish community and its response to the establishment of a redear sunfish population. Angler reports should also be taken and monitored for perceived or actual changes in the fishery.

References

Marsh, W. M., and T. E. Borton. 1974. Michigan inland lakes and their watersheds: an atlas. Prepared for Inland Lake Management Group, Water Quality Appraisal Section, Bureau of Water Management. Michigan Department of Natural Resources, Water Resources Commission, Lansing.

Towns, Gary L. 2003. Redear Sunfish Management in Michigan. Michigan Department of Natural Resources, Fisheries Division Technical Report Number 2003-3. Ann Arbor.

Figure 1. – Map of Joslin Lake showing 2003 survey sampling locations.

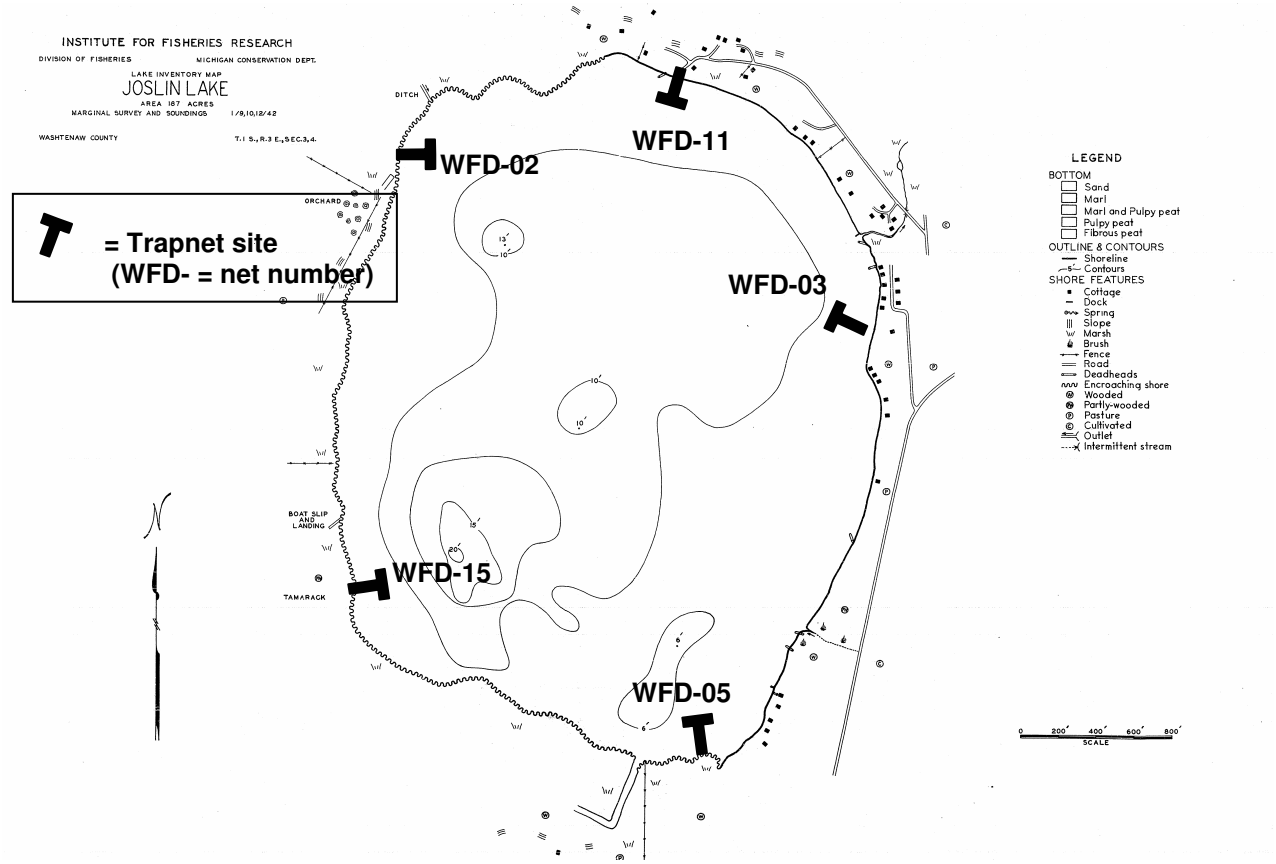

Table 1.-Number, weight and length indices of fish collected from Joslin Lake, May 28-30, 2003.

Species	Number	Percent by number	Weight (pounds)	Percent by weight	Length range (inches)	Average length	Percent legal size
Redear sunfish	1437	55	1133.6	75.3	4-11	9.9	100
Bluegill	719	27.5	146.8	9.7	3-8	6.6	89
Brown bullhead	141	5.4	72.9	4.8	7-13	10.2	57
Pumpkinseed sunfish	141	5.4	41.4	2.7	4-8	7	91
Hybrid sunfish	54	2.1	19.3	1.3	5-9	7.6	96
Largemouth bass	42	1.6	25.8	1.7	6-17	10.1	7
Rock bass	23	0.9	6.6	0.4	5-8	7.2	87
Warmouth	21	0.8	5.3	0.3	5-7	6.8	95
Black crappie	16	0.6	8.6	0.6	8-11	9.8	100
Bowfin	8	0.3	21.2	1.4	12-26	18.8	100
Longnose gar	4	0.2	18.8	1.3	30-40	35.8	100
Yellow bullhead	3	0.1	1.4	0.1	9-10	9.8	33
Black bullhead	1	0	1.1	0.1	13	13	100
Golden shiner	1	0	0.2	0	8	8	100
Lake chubsucker	1	0	0.5	0	9	9	100
Northern pike	1	0	2.5	0.2	22	22	0
Yellow perch	1	0	0.2	0	7	7	100
Total	2614	100	1506.1	100			

Table 2. - Number per inch group of selected fish species collected from Joslin Lake, May 28-30, 2003.

Inch Group	Black crappie	Bluegill	Brown bullhead	Hybrid sunfish	Largemouth bass	Pumpkinseed sunfish	Redear sunfish	Rock bass	Warmouth
2									
3		1							
4		14				2	1		
5		64		2		11	2	3	1
6		477		10	2	57	22	4	13
7		161	4	22	5	62	69	13	7
8	6	2	14	18	8	9	84	3	
9	1		43	2	9		360		
10	8		50		7		887		
11	1		22		4		12		
12			7		1				
13			1		3				
14					1				
15					1				
16									
17					1				
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
Totals	16	719	141	54	42	141	1437	23	21

Table 3.-Average total length (inches) at age, and growth relative to the state average, for five species of fish sampled from Joslin Lake, May 28-30, 2003. Number of fish aged is given in parentheses.

Species	Age											Mean growth
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	index*
Black crappie			8.6	10.4	10.4	10.8	11.1					+1.1
			(7)	(3)	(3)	(2)	(1)					
Bluegill				5.9	6.2	6.5	7.2	6.9	8.2	7		-0.8
				(13)	(10)	(5)	(6)	(8)	(1)	(1)		
Largemouth bass		6.9	8.6	10.4		12.7	13.3					-0.8
		(6)	(18)	(12)		(3)	(2)					
Pumpkinseed sunfish			5.3	6.3	6.8	7.3	7.6	7.8	7.9	8.4		+0.6
			(5)	(14)	(12)	(7)	(4)	(4)	(1)	(2)		
Redear sunfish		5.1	7.4	8.9	9.8	10	10.1	10.3	11			+0.7
		(2)	(25)	(17)	(5)	(8)	(9)	(5)	(3)			

Table 4.-Estimated weighted age frequency (percent) of fish caught from Joslin Lake, May 28-30, 2003.

	Age											Number
Species	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	caught
Black crappie			44	19	19	12	6					16
Bluegill				11	20	15	18	33	0.1	2		719
Largemouth bass		10	47	30	8	5						42
Pumpkinseed sunfish			4	28	31	17	9	5	3	2		141
Redear sunfish		0.1	7	10	9	22	32	19	1			1437

Table 5.-Summary of panfish survey information for Joslin Lake from 1988 through 2003.

TRAPNETS	Bluegill					Pumpkinseed Sunfish					Redear Sunfish				
Survey Year	CPE	Avg. L	% / Wt.	% / #	Index	CPE	Avg. L	% / Wt.	% / #	Index	CPE	Avg. L	% / Wt.	% / #	Index
1988	44.3	6.8	25.1	47.5	-0.6	25.5	6.5	14.3	27.3	+0.1					
1989	35.2	6.6	15.4	34.3	-0.9	27.5	6.5	13.8	26.8						
1990	39.3	6.8		48.8	-0.6	10.2	6.8		12.6						
1991	107.3	7.0		46.4	-0.8	90.0	6.7		38.9						
1992	39.5	6.6		45.6	-0.9	27.8	6.5		32.1						
1993	262.8	6.4	79.0	88.0	-1.1	18.2	6.6	7.0	6.0	-0.3					
1994	92.7	6.6	43.0	64.0	-1.2	16.0	6.8	10.0	11.0						
RSF Stocked 95-97															
1996	41.3	6.6	12.9	27.7	-1.1	48.3	6.9	20.3	32.4	+0.1					
1997	60.0	7.0	23.9	38.6	-1.0	14.2	7.2	7.3	9.1	+0.3	21.0	6.8	7.5	13.5	+2.2
1998	27.8	7.0	15.9	27.5	-1.0	25.7	7.2	16.4	20.2	+0.7	44.0	8.1	33.2	34.6	+1.7
1999	65.8	6.6	29.3	42.2	-0.8	29.3	6.3	13.4	18.8	+0.6	11.3	8.3	10.7	7.2	+1.7
2000	25.6	6.2	18.7	41.0	-0.9	5.7	6.9	6.7	9.1	+0.4	14.7	9.3	37.8	23.6	+1.7
2002	36.3	6.9	6.4	17.3	-0.9	9.2	7.2	2.2	4.4	+0.6	124.7	9.9	72.1	59.4	+0.4
2003	71.9	6.6	9.8	27.5	-1.0	14.1	7.0	2.8	5.4	+0.6	143.7	9.9	75.3	55.0	+0.3

ELECTROSHOCKING	Bluegill					Pumpkinseed Sunfish					Redear Sunfish				
Survey Year	CPE*	Avg. L	% / Wt.	% / #	Index	CPE	Avg. L	% / Wt.	% / #	Index	CPE	Avg. L	% / Wt.	% / #	Index
1988	87.4	3.2		44.7	-1.3	37.7	4.5		19.3						
1989	94.0	3.1		50.7	**	15.5	5.1		8.3						
1990	228.0	4.0		66.9	-1.1	35.3	5.0		10.4						
1991	248.0	3.4		69.7	**	86.2	5.6		15.7						
1992	225.0	4.0		50.4	**	126.0	5.9		28.3						
1993	141.3	3.7	18.0	54.0	**	53.1	5.4	22.0	20.0						
1994	44.7	4.7	15.0	44.0	**	12.3	5.4	7.0	12.0						
RSF Stocked 95-97															
1996	78.5	3.7	17.0	46.0	**	6.9	4.7	3.3	4.1	**	1.2	3.2	0.1	0.7	
1997	17.3	5.0	9.5	22.1	**	6.7	6.5	7.2	8.5	**	2.0	6.3	1.6	2.6	**
1998	80.0	3.0	10.1	44.7	**	13.0	6.3	10.6	7.3	**	3.0	4.7	1.5	1.7	**
1999	243.0	3.4	31.4	67.5	**	22.0	6.4	16.0	6.1	**	6.0	9.3	12.3	1.7	**
2000	53.5	2.8	5.8	38.4	**	14.5	6.2	11.1	10.4	**	9.5	8.3	18.0	6.8	**
2002	456.0	3.9	31.2	57.6	**	14.0	5.8	3.3	1.8	**	40.0	7.2	18.3	5.1	**
2003															

* = electroshocking CPE is catch per hour of sampling

** = combined growth index, same as trapnets