



Trapnet catch from Sweeney Lake, September 2013

**Trapnet Fish Surveys for
Sweeney Lake (27-0035-01) and Twin Lake (27-0035-02),
Hennepin County, September 17 - 19, 2013**

MnDNR Permit Number 19414

Submitted to:
Bassett Creek Watershed
Management Commission



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Trapnet Fish Surveys for Sweeney Lake and Twin Lake, Hennepin County, September 17 - 19, 2013

SUMMARY

Sweeney Lake (MnDNR ID: 27-0035-01) is a 66-acre lake and is connected by way of a channel to Twin Lake (MnDNR ID: 27-0035-02) which is 19 acres in area. In September of 2013, the Bassett Creek Watershed Management Commission contracted for trapnet fish surveys on both lakes with Blue Water Science. The fish surveys were conducted under MnDNR permit number 19414. The last trapnet surveys were conducted by the MnDNR in 1991. A recent electrofishing assessment was conducted on August 28, 2013.

The objectives of the trapnet survey were to characterize the fish community in both lakes and evaluate potential fish effects on lake water quality.

Sweeney Lake: A total of eleven fish species were sampled in Sweeney Lake on September 18 and 19, 2013. Bluegill sunfish and black crappies were the most abundant and the number of fish per net were at the upper end of the MnDNR normal range for a lake like Sweeney (Table 1). Gamefish included largemouth bass and northern pike (Table 1).

Twin Lake: A total of ten fish species were sampled in Twin Lake on September 18 and 19, 2013. The dominant fish were bluegill sunfish and yellow bullheads. Bluegills numbers were lower than Sweeney Lake and below the MnDNR normal range. Yellow bullheads were within the MnDNR normal range (Table 1). No black bullheads or carp were sampled in Twin Lake although they were found in Sweeney Lake. Green sunfish were sampled in Twin Lake but not in Sweeney Lake. The number of fish caught per net was generally lower in Twin Lake compared to Sweeney Lake.

Table S-1. Summary of the Sweeney Lake and Twin Lake fish survey conducted in September, 2013.

Species	SWEENEY Number of Fish per Net	TWIN Number of Fish per Net	MnDNR Normal Range
Black bullhead	1.1	0	1.3 - 26.0
Yellow bullhead	7.9	2.0	0.8 - 5.0
Black crappie	15	0.7	1.8 - 18.1
Bluegill	45	3.7	6.5 - 59.6
Carp	0.3	0	0.3 - 2.6
Gizzard shad	0	0	NA
Green sunfish	0	0.2	0.3 - 2.0
Hybrid sunfish	0.5	0.7	NA
Largemouth bass	0.2	0.2	0.3 - 0.8
Northern pike	0.8	0.2	NA
Pumpkinseed	1.6	0.7	0.8 - 5.3
White sucker	3.6	0.2	0.3 - 1.6
Yellow perch	0.3	0.2	0.3 - 1.5
Painted turtle	2.7	2.7	NA
Snapping turtle	0.2	0.3	NA
Softshell turtle	0.9	0	NA

Potential Impact of Fish on Sweeney and Twin Lakes Water Quality

It has been demonstrated that various fish species can impact water quality in lakes, but typically they need relatively high densities to adversely effect phosphorus and algae concentrations.

It appears the fish community in Sweeney and Twin Lakes does not adversely impact lake water quality (Table S-2).

Bluegill sunfish are omnivores and will feed in the sediments if other food sources are low. Bluegills don't appear to have a direct water quality impact in Sweeney Lake.

Table S-2. Potential impact of fish on water quality in Sweeney and Twin Lakes.

Species	Abundance		Impact on Water Quality
	Sweeney	Twin	
Carp	low to moderate	low	Because aquatic plants are still well distributed in Sweeney and Twin Lakes, carp impacts to plants and on phosphorus loading are probably low.
Black bullheads	low	very low	Low abundance in both lakes and the population in Sweeney is composed of large sizes, not stunted. Impacts on water quality are low.
Yellow bullheads	high	low	Although high density based on typical DNR ranges in Sweeney Lake, the fish per net is 8 fish/net and are not stunted. Should not adversely impact water quality.
Bluegill sunfish	moderate to high	low	At high densities, bluegills feed in sediments and may impact water quality. In Sweeney Lake, bluegills have a good range of lengths and are not stunted. Adverse impacts to water quality should be minor. In Twin Lake, bluegill abundance is low.
Gizzard shad	present but abundance is unknown	unknown	about 4 gizzard shad were found in a trapnet, but likely had been regurgitated from northern pike. Gizzard shad are filter feeders, and can remove zooplankton and algae from the water column. They recycle existing phosphorus, don't add new phosphorus. At high densities can reshape phytoplankton communities to small size algae.



Sweeney Lake, Day 1, Net 3



Twin Lake, Day 1, Net 1

Trapnet Fish Surveys for Sweeney Lake and Twin Lake, Hennepin County, September 17-19, 2013

Introduction

Sweeney Lake (MnDNR ID: 27-0035-01) is a 66-acre lake and is connected by way of a channel to Twin Lake (MnDNR ID: 27-0035-02) which is 19 acres in area. In September of 2013, the Bassett Creek Watershed Management Commission contracted for trapnet fish surveys on both lakes with Blue Water Science. The fish surveys were conducted under MnDNR permit number 19414. The last trapnet surveys were conducted by the MnDNR in 1991. A recent electrofishing assessment was conducted on August 28, 2013.

The objectives of the trapnet survey were to characterize the fish community in both lakes and evaluate potential fish effects on lake water quality.



Bluegill sunfish



Black crappie

Figure 1. Bluegill sunfish (left) and black crappie (right) were the most common fish sampled in the 2013 trapnet surveys.

Methods

Five standard trapnets were set in Sweeney Lake and three standard trapnets were set in Twin Lake on September 17, 2013 and then were sampled daily on September 18 and 19, 2013. Each trapnet was a MnDNR style with two 4x6 foot square frames followed by two funnel mouth openings. A 50-foot lead net was staked on shore which led to the opening in the square frames. Net mesh size was 3/8 inch. Trapnet locations were shown in Figure 2. In Sweeney Lake, Net 5-1 was moved after the first day to a new location for the second day of sampling and the location is shown as Net 5-2. In Twin Lake, Nets 2-1 and 3-1 were moved after sampling on the first day to new locations and were sampled there on Day 2. The locations on Day 2 are shown as Net 2-2 and Net 3-2 (Figure 2).

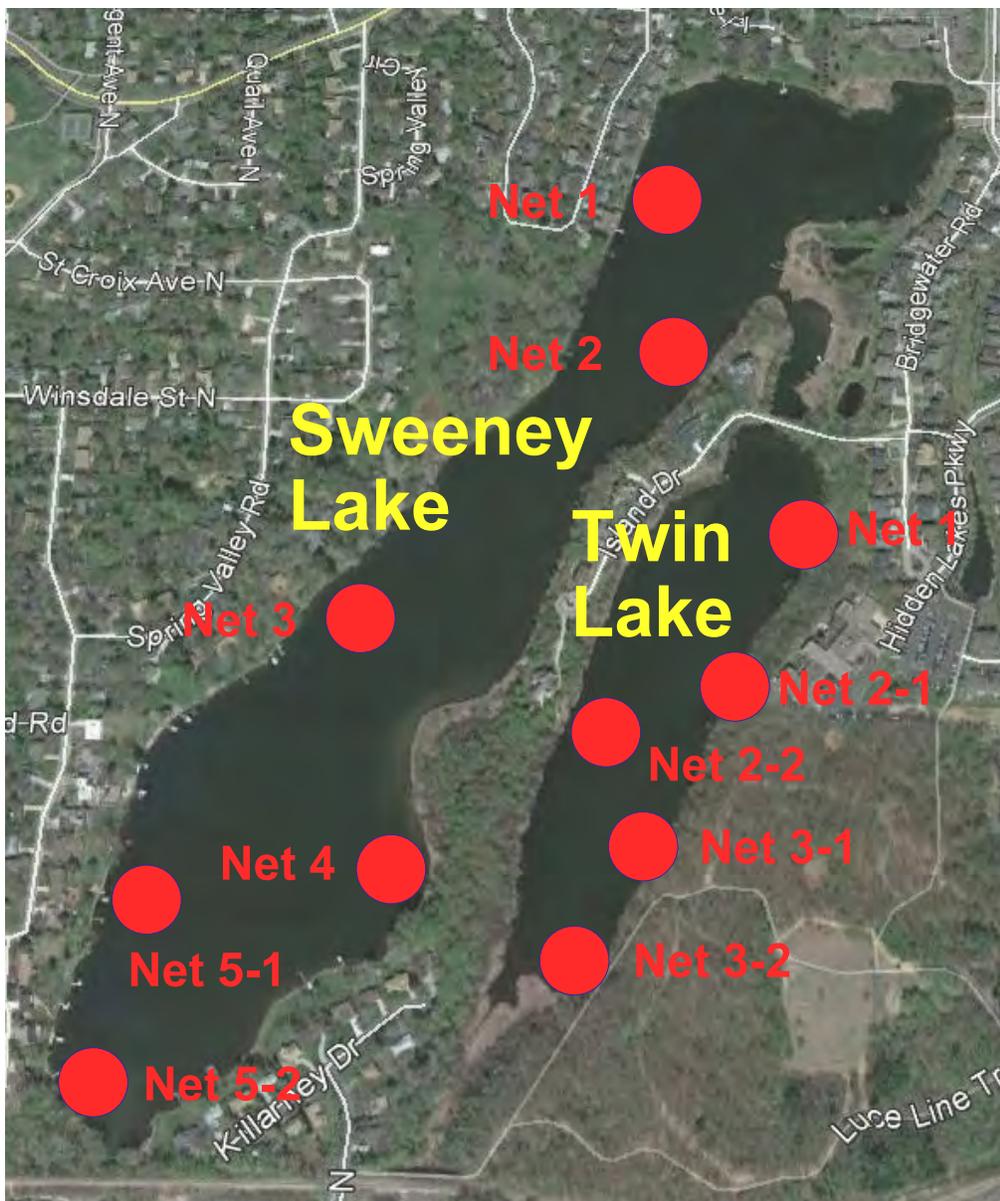


Figure 2. Locations of the trapnet sets on Sweeney and Twin Lakes on September 17-19, 2013.



A trapnet is a live fish trap. Fish run into the 50-foot lead net and follow it back through a series of hoops with funnel mouths. Fish end up in the back hoop.



The back hoop of the trapnet is propped up on the bow (front end) of the survey boat. A dip net is used to remove the fish from the back of the trapnet.



Fish are transferred to tubs, then they are counted and measured and released.

Figure 3. Trapnet set and fish sampling in the Sweeney Lake fish survey.

Results

Fish Caught Per Net

Sweeney Lake: A total of eleven fish species were sampled in Sweeney Lake on September 18 and 19, 2013. Bluegill sunfish and black crappies were the most abundant and the number of fish per net were at the upper end of the MnDNR normal range for a lake like Sweeney (Table 1). Gamefish included largemouth bass and northern pike (Table 1).

Twin Lake: A total of ten fish species were sampled in Twin Lake on September 18 and 19, 2013. The dominant fish were bluegill sunfish and yellow bullheads. Bluegills numbers were lower than Sweeney Lake and below the MnDNR normal range. Yellow bullheads were within the MnDNR normal range (Table 1). No black bullheads or carp were sampled in Twin Lake although they were found in Sweeney Lake. Green sunfish were sampled in Twin Lake but not in Sweeney Lake. The number of fish caught per net was generally lower in Twin Lake compared to Sweeney Lake.

Table 1. Summary of the Sweeney Lake and Twin Lake fish survey conducted on September 18 and 19, 2013.

Species	SWEENEY Number of Fish per Net	TWIN Number of Fish per Net	MnDNR Normal Range
Black bullhead	1.1	0	1.3 - 26.0
Yellow bullhead	7.9	2.0	0.8 - 5.0
Black crappie	15	0.7	1.8 - 18.1
Bluegill	45	3.7	6.5 - 59.6
Carp	0.3	0	0.3 - 2.6
Gizzard shad	0	0	NA
Green sunfish	0	0.2	0.3 - 2.0
Hybrid sunfish	0.5	0.7	NA
Largemouth bass	0.2	0.2	0.3 - 0.8
Northern pike	0.8	0.2	NA
Pumpkinseed	1.6	0.7	0.8 - 5.3
White sucker	3.6	0.2	0.3 - 1.6
Yellow perch	0.3	0.2	0.3 - 1.5
Number of fish species	11	10	--
Painted turtle	2.7	2.7	NA
Snapping turtle	0.2	0.3	NA
Softshell turtle	0.9	0	NA



Turtles were common in the nets. Turtle on top is a softshell turtle, on bottom is a painted turtle.

Fish caught for each net on each day in Sweeney and Twin Lakes are shown in Table 2. In Sweeney Lake, Net 2, had the highest catch rate for sunfish and crappies and Net 4 had the highest yellow bullhead catch. In Twin Lake, Net 3 was productive on both days, but catch rates were generally lower than Sweeney Lake.

Table 2. Summary of Sweeney Lake and Twin Lake trapnet survey results from September, 2013.

Species	Sweeney Lake											Twin Lake								
	Net 1		Net 2		Net 3		Net 4		Net 5		Total (2 days)	Number/net (n=10)	Net 1		Net 2		Net 3		Total (2 days)	Number/net (n=6)
	1 st Day	2 nd Day			1 st Day	2 nd Day	1 st Day	2 nd Day	1 st Day	2 nd Day										
Black bullhead	3		1		2		3	2			11	1.1							0	0
Yellow bullhead	4	5	12	3	11	2	23	19			79	7.9					9	3	12	2.0
Black crappie	21	20	43	15	5	11	20	11	6		152	15			1		2	1	4	0.7
Bluegill	48	56	134	46	43	31	53	35	1		447	45	6	6			2	8	22	3.7
Carp	1		1		1						3	0.3							0	0
Gizzard shad		4*									0	0							0	0
Green sunfish											0	0	1						1	0.2
Hybrid sunfish			3		2						5	0.5						4	4	0.7
Large-mouth bass			1			1					2	0.2						1	1	0.2
Northern pike	3	3			2						8	0.8						1	1	0.2
Pumpkin-seed	3	4	4	1	1		3				16	1.6	2	3				2	7	1.2
White sucker	10	8	2	2	2	2	6	2	2		36	3.6						1	1	0.2
Yellow perch	1			1			1				3	0.3					1		1	0.2
Total Fish	94	96	201	68	69	47	109	69	9	0	762	76	9	9	1	0	14	21	54	9
Painted turtle	1	1	3	3		3	3			13	27	2.7		1				15	16	2.7
Snapping turtle				1		1					2	0.2	1					1	2	0.3
Softshell turtle	1				1	1	1		5		9	0.9							0	0

*gizzard shad were regurgitated by Northern pike in the trapnet and are not included in the statistics.



Figure 4. Four gizzard shad were found in trapnet 1 on the second day of monitoring but they were in various states of decomposition and were likely regurgitated from northern pike that were also trapped in Net 1. Gizzard shad were not included in the catch statistics.

Fish Length

Sweeney Lake: Bluegill lengths ranged from less than 3 inches up to 8 inches with the majority of the population between 5 to 6.5 inches. The range of lengths indicates bluegills are not stunted. Black crappies were present with lengths up to 11 inches but the most common size was in the 7 to 8 inch range (Table 3). Several carp were sampled and measured from 19 to 26 inches. No young of the year carp were caught.

Twin Lake: The number of fish sampled in Twin Lake was less than Sweeney Lake however, fish lengths were generally within range of lengths found in Sweeney Lake (Table 3). Fish travel between the two lakes is likely, but fish in Sweeney appear to be more abundant. The channel between the two lakes is shown in Figure 5.



Figure 5. The channel between Sweeney Lake and Twin Lake, heading toward Twin Lake.

Table 3. Length frequency of fish species (as total length) for Sweeney and Twin Lakes fish survey for September 2013.

Length (inches)	Black bullhead		Yellow bullhead		Black crappie		Bluegill		Carp		Green sunfish		Hybrid sunfish		Largemouth bass		Northern pike		Pumpkin-seed		White sucker		Yellow perch	
	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin
<3							3	4																
3					1		8																	
3.5					2		3							1					2					
4							3	1							1									
4.5							35	1			1	1							4	1				1
5							86	3											4				2	
5.5							77	5				1							4					
6					3		97	4					2						1	6				
6.5			1		18		74	2					1						1					
7			4		36	3	59	3					2										1	
7.5				1	48		4	3																
8			7		32	1	1						1											
8.5			4		5								1											
9			10	2	3																			
9.5			10	1	2																			
10	3		10	1	1																			
10.5	1		10																					
11	5		10	2	1																			
11.5			7	1																				
12			5	1																				
12.5	1			1																				
13	1		1	1																		1		
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14				1																				
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33																			1					
33.5																			1					
34																								
Total	11	0	79	12	152	4	447	22	3	0	0	1	5	4	2	1	8	1	16	7	36	1	3	1

Representative Fish Species of Sweeney and Twin Lakes



Black bullhead



Yellow bullhead



Carp



Gizzard shad



Largemouth bass



Northern pike

Figure 6. Representative fish species sampled during the trapnet survey conducted in September 2013.

Comparison of 1991 and 2013 Fish Surveys

Most of the fish species found in Sweeney and Twin Lakes in 1991 were found in 2013 except for smallmouth buffalo and golden shiner. The number of fish per net were generally lower in 2013 compared to 1991, especially for bluegill sunfish and carp. However, black crappies and yellow bullheads in Sweeney Lake were higher in 2013 compared to 1991.

Table 4. Summary of the Sweeney Lake fish surveys conducted by the MnDNR in 1991 and by Blue Water Science in 2013.

Species	Sweeney Lake (Number of Fish per Net)		
	1991 - July MnDNR	2013 - Sept BWS	MnDNR Normal Range
Black crappie	0.5	15	1.8 - 18.1
Bluegill	124.5	45	6.5 - 59.6
Smallmouth buffalo	1.5	0	NA
Black bullhead	11.0	1.1	1.3 - 26.0
Yellow bullhead	2.8	7.9	0.8 - 5.0
Carp	4.8	0.3	0.3 - 2.6
Gizzard shad*	0	0	NA
Green sunfish	0.7	0	0.3 - 2.0
Hybrid sunfish	0.5	0.5	NA
Largemouth bass	0.3	0.2	0.3 - 0.8
Northern pike	1.5	0.8	NA
Pumpkinseed	4.0	1.6	0.8 - 5.3
White sucker	3.7	3.6	0.3 - 1.6
Yellow perch	0.2	0.3	0.3 - 1.5
Painted turtle		2.7	NA
Snapping turtle		0.2	NA
Softshell turtle		0.9	NA

*four gizzard shad were regurgitated by Northern pike in the sample net.

Table 5. Summary of the Twin Lake fish surveys conducted by the MnDNR in 1991 and by Blue Water Science in 2013.

Species	Twin Lake (Number of Fish per Net)		
	1991 MnDNR	2013 - Sept BWS	MnDNR Normal Range
Black crappie	1.4	0.7	1.8 - 18.1
Bluegill	29.8	3.7	6.5 - 59.6
Smallmouth buffalo	0.6	0	NA
Black bullhead	3.0	0	1.3 - 26.0
Yellow bullhead	1.2	2.0	0.8 - 5.0
Carp	0.8	0	0.3 - 2.6
Gizzard shad	0	0	NA
Golden shiner	0.2	0	0.2 - 1.4
Green sunfish	0.2	0.2	0.3 - 2.0
Hybrid sunfish	1.4	0.7	NA
Largemouth bass	0.4	0.2	0.3 - 0.8
Northern pike	0.2	0.2	NA
Pumpkinseed	1.4	0.7	0.8 - 5.3
White sucker	0.4	0.2	0.3 - 1.6
Yellow perch	0	0.2	0.3 - 1.5
Painted turtle		2.7	NA
Snapping turtle		0.3	NA
Softshell turtle		0	NA

Summary of Electrofishing Assessment in 2013 by the MnDNR

The MnDNR conducted an electrofishing assessment on Sweeney Lake on August 28, 2013. Results of their catch are shown in Table 6 and the entire report is found in Appendix D. The MnDNR found nearly the same species as the trapnet survey, but in addition, found golden shiners in Sweeney Lake with electrofishing.

Table 6. Electrofishing catch summary for Sweeney Lake conducted on August 28, 2013 (Table is from the Draft report).

STANDARD LAKE SURVEY REPORT					DRAFT			
SPECIAL ASSESSMENT DATED 08/28/2013 FOR DOW NUMBER 27-0035-01								
Electrofishing Catch Summary for EF								
Standard electrofishing								
Total run-time for all stations:		01:37:00						
Total on-time for all stations:		01:30:00						
First Sampling Date:		08/28/2013						
Last Sampling Date:		08/28/2013						
Daylight Sampling:		Yes						
Target Species:		N/A						
Abbr	Species	Summary By Numbers			Summary By Weight (pounds)			
		Total Number	Number per Hour Run-Time	On-Time	Total Weight	Lbs per Hour Run-Time	On-Time	Mean Weight
BLB	Black Bullhead	3	1.86	2.00	1.45	0.89	0.96	0.48
BLC	Black Crappie	17	10.52	11.33	3.65	2.26	2.43	0.21
BLG	Bluegill	86	53.20	57.33	9.97	6.17	6.65	0.12
CAP	Common Carp	7	4.33	4.67	57.91	35.82	38.61	8.27
GOS	Golden Shiner	5	3.09	3.33	0.48	0.30	0.32	0.10
GSF	Green Sunfish	3	1.86	2.00	0.35	0.22	0.23	0.12
HSF	Hybrid Sunfish	3	1.86	2.00	0.39	0.24	0.26	0.13
LMB	Largemouth Bass	42	25.98	28.00	31.96	19.77	21.31	0.76
NOP	Northern Pike	1	0.62	0.67	5.97	3.69	3.98	5.97
PMK	Pumpkinseed	1	0.62	0.67	0.15	0.09	0.10	0.15
WTS	White Sucker	8	4.95	5.33	13.05	8.07	8.70	1.63
YEB	Yellow Bullhead	17	10.52	11.33	8.87	5.49	5.91	0.52
YEP	Yellow Perch	2	1.24	1.33	0.08	0.05	0.05	0.04



Figure 7. Gizzard shad caught during the electrofishing assessment conducted in August 2013. Source: MnDNR fisheries.

Discussion

Impact of Fish on Sweeney and Twin Lake Water Quality: It has been demonstrated that various fish species can impact water quality in lakes, but typically they need relatively high densities to adversely effect phosphorus and algae concentrations.

Based on the trapnet survey results, it appears the fish community in Sweeney Lake has a relatively low to moderate impact on lake water quality and the fish community has little impact on lake water quality in Twin Lake (Table 8).

Table 8. Potential impact of fish on water quality in Sweeney and Twin Lakes.

Species	Abundance		Impact on Water Quality
	Sweeney	Twin	
Carp	moderate (est 77 lbs/ac)	low	Because aquatic plants are still well distributed in Sweeney and Twin Lakes, carp impacts to plants and on phosphorus loading are probably low.
Black bullheads	low	very low	Low abundance in both lakes and the population in Sweeney is composed of large sizes, not stunted. Impacts on water quality are low.
Yellow bullheads	high	low	Although high density based on typical DNR ranges in Sweeney Lake, the fish per net is 8 fish/net and they are not stunted. Yellow bullheads should not adversely impact water quality.
Bluegill sunfish	moderate to high	low	At high densities, bluegills feed in sediments and may impact water quality. In Sweeney Lake, bluegills have a good range of lengths and are not stunted. Adverse impacts to water quality should be minor. In Twin Lake, bluegill abundance is low.
Gizzard shad	present but abundance is unknown	unknown	About 4 gizzard shad were found in a trapnet, but likely had been regurgitated from northern pike. Gizzard shad are filter feeders, and can remove zooplankton and algae from the water column. They recycle existing phosphorus, and don't add new phosphorus to the water column. At high densities, they can reshape phytoplankton communities to small size algae. It appears the gizzard shad have a relatively low impact on water quality in the lakes.

Aquatic Plants: In some cases, aquatic plants can be used to determine if fish are adversely impacting lake water quality. Aquatic plant maps for Sweeney and Twin Lakes for 2008 are shown in Figure 8. Submerged aquatic plants were found to grow to water depths of 10 feet in Sweeney and to 16 feet in Twin and plant coverage was nearly 100% to these depths. If fish were impacting aquatic plants, there would be either no plants in each lake or plants with minimal coverage. It appears the fish community has not adversely impacted aquatic plants and probably is not adversely impacting water quality at this time.

Electrofishing Results: Additional support is based on the electrofishing assessment. A carp capture rate of four carp per hour (Table 6) is equivalent to nearly 20 carp per hectare based on an equation from Bajer and Sorensen (2012)[number of carp per hectare = 4.71 x number of carp captured per hour of electrofishing + 3.04, $r^2 = 0.83$]. With an average weight of 8.27 pounds per fish, this is equivalent to nearly 77 pounds of carp/acre. This is close a critical threshold value of about 100 pounds/acre or more where carp have been found to have adverse impacts on water quality.

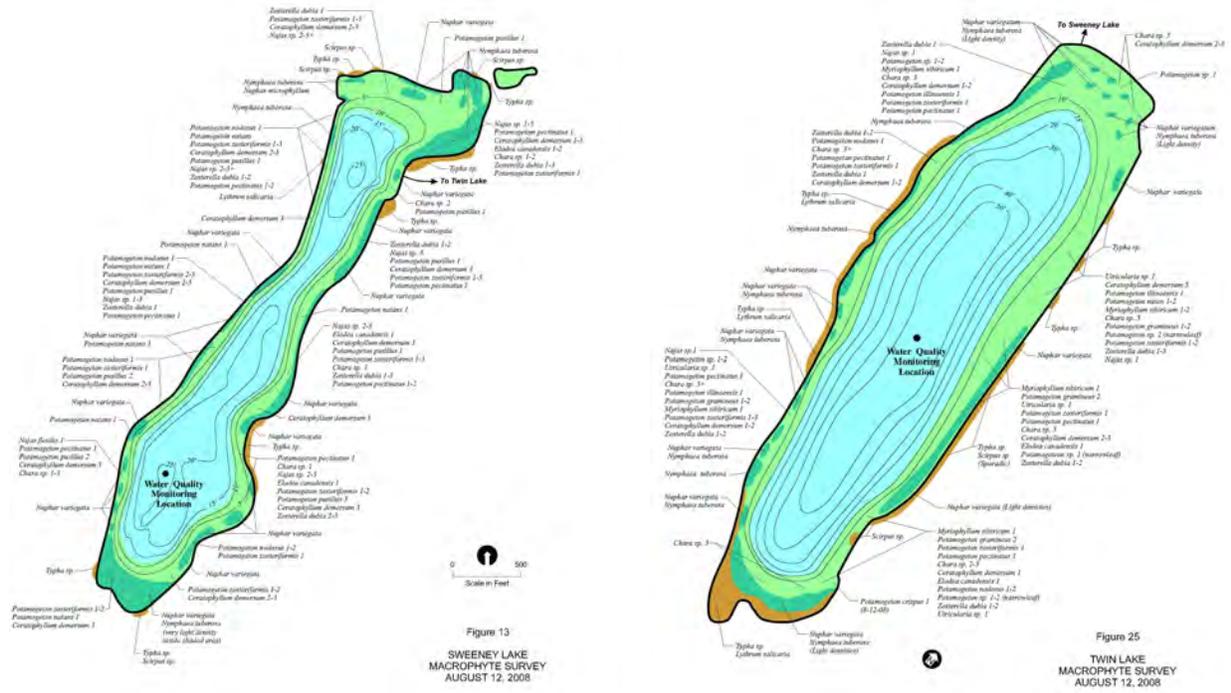


Figure 8. Aquatic macrophyte surveys conducted on August 12, 2008 for Sweeney Lake (left) and Twin Lake (right). Source: Bassett Creek Watershed Management Commission, February 2009. 2008 Lake water quality study, Sweeney Lake and Twin Lake. Maps prepared by Barr Engineering Co.

Zooplankton as Indicators: Gizzard shad were also found in Sweeney Lake although they did not show up in the catch statistics. At high densities, they have been found to adversely impact water quality (Schaus et al 1997). However, gizzard shad density appears to be below a threshold that would produce elevated phosphorus in Sweeney and Twin Lakes. No live gizzard shad were captured in trapnets and a number of gizzard shad were captured by electrofishing, but not on defined transects (Appendix D). At significant gizzard shad densities, slow swimming cladocerans are easily captured and are often absent in lakes (Drenner and McComas 1980). In 2008, in Sweeney and Twin Lakes, cladocerans were found throughout the summer (Figure 9). Therefore, the density of gizzard shad appears to be low to moderate and the impacts of gizzard shad on phosphorus loading to Sweeney and Twin Lakes appear to be minor.

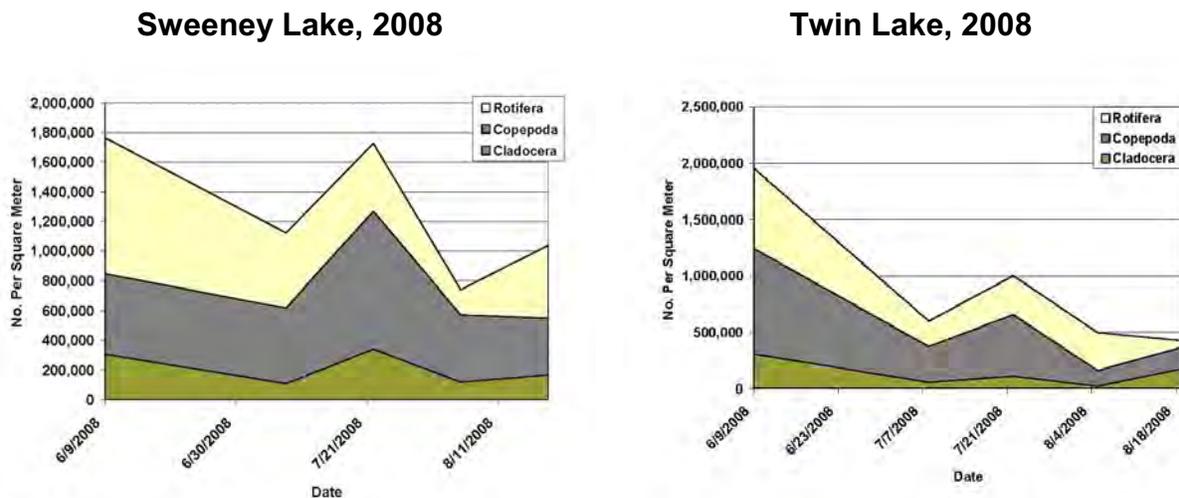


Figure 9. Zooplankton for 2008 in Sweeney Lake (left) and Twin Lake (right). Source: *Bassett Creek Watershed Management Commission, February 2009. 2008 Lake water quality study, Sweeney Lake and Twin Lake.* Maps prepared by Barr Engineering Co.

Fish Impacts on Water Quality in Other Lakes: For centuries (going back to Chinese fish farmer reports), it's been known fish have impacts on water quality. In Minnesota, as early as 1916, carp were being seined out of lakes because of their deleterious effect on aquatic plants and water clarity (McComas 2003a).

More recently, experiments in eutrophic Swedish lakes showed dense fish populations of planktivorous and benthivorous fish resulted in high concentrations of chlorophyll, blooms of blue-green algae and low transparency (Andersson et al 1978)(Table 9).

A variety of fish species can cause adverse water quality impacts, and a summary of fish species that can impact water quality is shown in Table 8. Based on the fish surveys in Sweeney and Twin Lakes, the impacts of fish on water quality would appear to be low to moderate.

Table 9. List of fish that have been documented to cause poor water clarity.

Species	Situation	Reference
Carp	Adverse water quality and plant impacts have been known for some time.	Braband et al 1990; Lamarra 1975; Zambrano et al 2001; Parkos et al 2003
Black bullheads	Eagle Lake, Cottonwood County, cleared up after a rotenone treatment	McComas, unpublished
Smallmouth buffalo	Mesocosm experiments found smallmouth buffalo enhanced turbidity, algae, nitrogen, and phosphorus.	Shormann and Cotner 1997
Crucian carp	Fish density: 1,960 lb/ac (in mesocosm) produces excessive algae.	Andersson et al 1978
Gizzard shad	Nutrient excretion by bottom-feeding fish, in this case gizzard shad, produces nutrients for algae growth. Fish density was 370 lbs per acre.	Schaus et al 1997
Bream and roach	Fish density: 800 lb/ac (in mesocosm) produces excessive algae.	Andersson et al 1978
Young of year walleye	Larval walleye (9 mm TL) stocked at 50 fish/m ³ produced lower clarity and more algae than ponds stocked at 10 fish/m ³ .	Qin and Culver 1995
Mosquitoe fish	Water quality improves dramatically when a fungal infection kills more than 80% of the <i>Gambusia</i> (Mosquitoe Fish).	Nagdali and Gupta 2002
Fathead minnows	Ponds with fathead minnows had poorer water clarity and fewer aquatic plants than fishless ponds.	Zimmer et al 2001; Zimmer et al 2006
Bluegill sunfish	High density of over 1,400 fish per trapnet was correlated with poor clarity and no submerged aquatic plants.	McComas, 2003b
Bluegill sunfish and black bullheads	High density of bluegill sunfish (465/lift) and black bullheads (97/lift) were suspected of causing poor water quality in Lee Lake, Minnesota.	McComas 2004

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Sampling crew on the second day of monitoring.

APPENDIX

Appendix A: Notification of Fish Survey conducted by Blue Water Science

Appendix B: Blue Water Science - Sweeney Lake Fish Survey, 2013

Appendix C: Blue Water Science - Twin Lake Fish Survey, 2013

Appendix D: MnDNR - Sweeney Electrofishing Assessment, August 28, 2013

Appendix E: MnDNR - Sweeney and Twin Lakes Fish Surveys from 1991

APPENDIX A: Notification of Fish Survey

From: Steve McComas [mailto:mccomas@pclink.com]
Sent: Friday, September 13, 2013 8:26 AM
To: Daryl Ellison ; Greg Salo
Cc: Laura Jester
Subject: Fish survey notification for Sweeney and Twin Lakes, Hennepin County

Hello all,

Blue Water Science will be conducting a fish survey in Sweeney Lake (MN ID 27-3501) and Twin Lake (MN ID 27-3502), Hennepin County, starting on Monday, September 16. We will set 8 fyke nets on Monday. The nets will be monitored daily on Tuesday and Wednesday and all fish will be weighed and measured and returned to the lake. The nets will be removed from the lake on Wednesday, September 18. The fish survey is sponsored by the Bassett Creek Watershed Management Commission with the objectives to determine if fish have an impact on water quality, to check for changes in the fish community structure since the last survey, and to supplement data collected with recent electrofishing that was conducted by the MnDNR – Fisheries..

This survey is being conducted under the permit number: 19414.

Thank you,

Steve McComas

BLUE WATER SCIENCE

550 South Snelling Avenue

St. Paul, MN 55116

651 690 9602

mccomas@pclink.com



Trapnet Fish Survey for Sweeney Lake (27-0035-01), Hennepin County, September 17 - 19, 2013

Submitted to:
Bassett Creek Watershed
Management Commission



Prepared by:
Steve McComas
Jo Stuckert
Blue Water Science
St. Paul, MN 55116

October 2013

Trapnet Fish Survey for Sweeney Lake, Hennepin County, September 17 - 19, 2013

Introduction

Sweeney Lake (MnDNR ID: 27-0035-01) is a 66-acre lake and is connected by way of a channel to Twin Lake (MnDNR ID: 27-0035-02) which is 19 acres in area. In September of 2013, the Bassett Creek Watershed Management Commission contracted for trapnet fish surveys on both lakes with Blue Water Science. The fish surveys were conducted under MnDNR permit number 19414. The last trapnet surveys were conducted by the MnDNR in 1991. A recent electrofishing assessment was conducted on August 28, 2013.

The objectives of the trapnet survey were to characterize the fish community in both lakes and evaluate potential fish effects on lake water quality.

Methods

Five standard trapnets were set in Sweeney Lake on September 17, 2013 and then were sampled daily on September 18 and 19, 2013. Each trapnet was a MnDNR style with two 4x6 foot square frames followed by two funnel mouth openings. A 50-foot lead net was staked on shore which led to the opening in the square frames. Net mesh size was 3/8 inch. Trapnet locations were shown in Figure 1. In Sweeney Lake, Net 5-1 was moved after the first day to a new location for the second day of sampling and the location is shown as Net 5-2 (Figure 1).

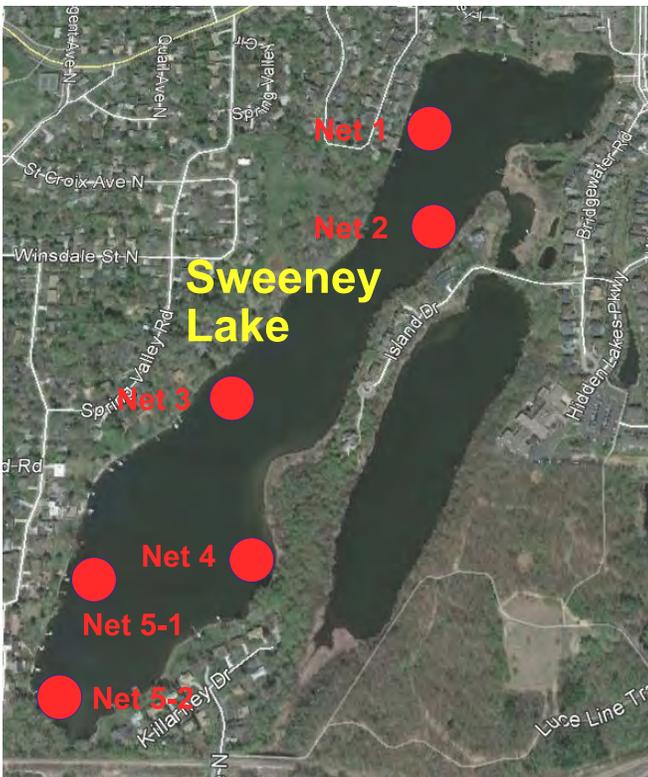


Figure 1. Locations of the trapnet sets on Sweeney Lake on September 17-19, 2013.

Table 1. Summary of the Sweeney Lake fish survey conducted on September 18 and 19, 2013.

Species	SWEENEY Number of Fish per Net	MnDNR Normal Range
Black bullhead	1.1	1.3 - 26.0
Yellow bullhead	7.9	0.8 - 5.0
Black crappie	15	1.8 - 18.1
Bluegill	45	6.5 - 59.6
Carp	0.3	0.3 - 2.6
Gizzard shad	0	NA
Green sunfish	0	0.3 - 2.0
Hybrid sunfish	0.5	NA
Largemouth bass	0.2	0.3 - 0.8
Northern pike	0.8	NA
Pumpkinseed	1.6	0.8 - 5.3
White sucker	3.6	0.3 - 1.6
Yellow perch	0.3	0.3 - 1.5
Number of fish species	11	--
Painted turtle	2.7	NA
Snapping turtle	0.2	NA
Softshell turtle	0.9	NA

Table 2. Sweeney Lake trapnet results for individual nets for the fish survey conducted in September, 2013.

Net	Black bullhead	Yellow bullhead	Black crappie	Bluegill	Carp	Gizzard shad	Green sunfish	Hybrid sunfish	Large-mouth bass	Northern pike	Pumpkin seed	White sucker	Yellow perch	Turtles		
														Painted	Snap	Softshell
Tuesday (9/17/13)																
1	3	4	21	48	1					3	3	10	1	1		1
2	1	12	43	134	1			3	1		4	2		3		
3	2	11	5	43	1			2		2	1	2				1
4	3	24	20	53							3	6	1	3		1
5			6	1								2				5
subtotal	9	51	95	279	3	0	0	5	1	5	11	22	2	7	0	8
average/net	1.8	10	19	56	0.6	0	0	1.0	0.2	1.0	2.2	4.4	0.4	1.4	0	1.6
Wednesday (9/18/13)																
1		5	20	56		4*				3	4	8		1		
2		3	15	46							1	2	1	3	1	
3		2	11	31					1			2		3	1	1
4	2	19	11	35								2				
5														13		
subtotal	2	29	57	168	0	4	0	0	1	3	5	14	1	20	2	1
average/net	0.4	5.8	11	34	0	0.8	0	0	0.2	0.6	1.0	2.8	0.2	4.0	0.4	0.2
Total Fish (all nets)	11	80	152	447	3	4	0	5	2	8	16	36	3	27	2	9
Fish/Trapnet	1.1	8.0	15	45	0.3	0.4	0	0.5	0.2	0.8	1.6	3.6	0.3	2.7	0.2	0.9

*gizzard shad were regurgitated by Northern pike in the sample net.

Table 3. Length frequency of fish species (as total length) for Sweeney and Twin Lakes fish survey for September 2013.

Length (inches)	Black bullhead		Yellow bullhead		Black crappie		Bluegill		Carp		Green sunfish		Hybrid sunfish		Largemouth bass		Northern pike		Pumpkin-seed		White sucker		Yellow perch	
	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin
<3							3	4																
3					1		8																	
3.5					2		3								1					2				
4							3	1								1								
4.5							35	1			1	1								4	1			1
5							86	3												4				2
5.5							77	5				1								4				
6					3		97	4					2							1	6			
6.5			1		18		74	2					1							1				
7			4		36	3	59	3					2											1
7.5				1	48		4	3																
8			7		32	1	1							1										
8.5			4		5								1											
9			10	2	3																			
9.5			10	1	2																			
10	3		10	1	1																			
10.5	1		10																					
11	5		10	2	1																			
11.5			7	1																				
12			5	1																				
12.5	1			1																				
13	1		1	1																		1		
13.5																						1		
14				1																				
14.5																						1		
15															1							6		
15.5																						6		
16																						8		
16.5																						5		
17																						7	1	
17.5																						1		
18																								
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28																		1						
28.5																								
29																								
29.5																								
30																			1					
30.5																			1					
31																								
31.5																								
32																			1					
32.5																								
33																			1					
33.5																			1					
34																								
Total	11	0	79	12	152	4	447	22	3	0	0	1	5	4	2	1	8	1	16	7	36	1	3	1



Trapnet Fish Survey for Twin Lake (27-0035-02), Hennepin County, September 17 - 19, 2013

Submitted to:
Bassett Creek Watershed
Management Commission



Prepared by:
Steve McComas
Jo Stuckert
Blue Water Science
St. Paul, MN 55116

October 2013

Trapnet Fish Survey for Twin Lake, Hennepin County, September 17 - 19, 2013

Introduction

Sweeney Lake (MnDNR ID: 27-0035-01) is a 66-acre lake and is connected by way of a channel to Twin Lake (MnDNR ID: 27-0035-02) which is 19 acres in area. In September of 2013, the Bassett Creek Watershed Management Commission contracted for trapnet fish surveys on both lakes with Blue Water Science. The fish surveys were conducted under MnDNR permit number 19414. The last trapnet surveys were conducted by the MnDNR in 1991. A recent electrofishing assessment was conducted on August 28, 2013.

The objectives of the trapnet survey were to characterize the fish community in both lakes and evaluate potential fish effects on lake water quality.

Methods

Three standard trapnets were set in Twin Lake on September 17, 2013 and then were sampled daily on September 18 and 19, 2013. Each trapnet was a MnDNR style with two 4x6 foot square frames followed by two funnel mouth openings. A 50-foot lead net was staked on shore which led to the opening in the square frames. Net mesh size was 3/8 inch. Trapnet locations were shown in Figure 1. In Twin Lake, Nets 2-1 and 3-1 were moved after sampling on the first day to new locations and were sampled there on Day 2. The locations on Day 2 are shown as Net 2-2 and Net 3-2 (Figure 1).

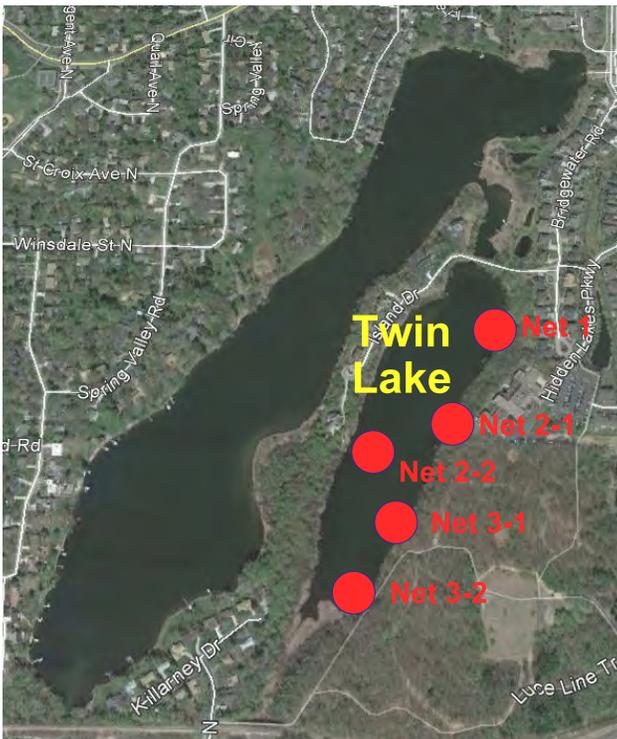


Figure 1. Locations of the trapnet sets on Twin Lakes on September 17-19, 2013.

Table 1. Summary of the Twin Lake fish survey conducted on September 18 and 19, 2013.

Species	TWIN Number of Fish per Net	MnDNR Normal Range
Black bullhead	0	1.3 - 26.0
Yellow bullhead	2.0	0.8 - 5.0
Black crappie	0.7	1.8 - 18.1
Bluegill	3.7	6.5 - 59.6
Carp	0	0.3 - 2.6
Gizzard shad	0	NA
Green sunfish	0.2	0.3 - 2.0
Hybrid sunfish	0.7	NA
Largemouth bass	0.2	0.3 - 0.8
Northern pike	0.2	NA
Pumpkinseed	0.7	0.8 - 5.3
White sucker	0.2	0.3 - 1.6
Yellow perch	0.2	0.3 - 1.5
Number of fish species	10	--
Painted turtle	2.7	NA
Snapping turtle	0.3	NA
Softshell turtle	0	NA

Table 2. Twin Lake trapnet results for individual nets for the fish survey conducted in September, 2013.

Net	Black bullhead	Yellow bullhead	Black crappie	Bluegill	Carp	Gizzard shad	Green sunfish	Hybrid sunfish	Large-mouth bass	North. pike	Pumpkin seed	White sucker	Yellow perch	Turtles		
														Painted	Snap	Softshell
Tuesday (9/17/13)																
1				6			1				2				1	
2			4													
3		9	2	2									1			
subtotal	0	9	6	8	0	0	1	0	0	0	2	0	1	0	1	0
average/net	0	3.0	2.0	2.7	0	0	0.3	0	0	0	0.7	0	0.3	0	0.3	0
Wednesday (9/18/13)																
1		6									3			1		
2																
3		3	1	12				4	1	1	2	1		15	1	
subtotal	0	9	1	12	0	0	0	4	1	1	5	1	0	16	1	0
average/net	0	3.0	0.3	4.0	0	0	0	1.3	0.3	0.3	1.7	0.3	0	5.3	0.3	0
Total Fish (all nets)	0	18	7	20	0	0	1	4	1	1	7	1	1	16	2	0
Fish/Trapnet	0	3.0	1.2	3.3	0	0	0.2	0.7	0.2	0.2	1.2	0.2	0.2	2.7	0.3	0

Table 3. Length frequency of fish species (as total length) for Sweeney and Twin Lakes fish survey for September 2013.

Length (inches)	Black bullhead		Yellow bullhead		Black crappie		Bluegill		Carp		Green sunfish		Hybrid sunfish		Largemouth bass		Northern pike		Pumpkin-seed		White sucker		Yellow perch	
	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin	Sweeney	Twin
<3							3	4																
3					1		8																	
3.5					2		3								1					2				
4							3	1								1								
4.5							35	1			1	1							4	1				1
5							86	3											4				2	
5.5							77	5				1							4					
6					3		97	4					2						1	6				
6.5			1		18		74	2					1						1					
7			4		36	3	59	3					2										1	
7.5				1	48		4	3																
8			7		32	1	1							1										
8.5			4		5								1											
9			10	2	3																			
9.5			10	1	2																			
10	3		10	1	1																			
10.5	1		10																					
11	5		10	2	1																			
11.5			7	1																				
12			5	1																				
12.5	1			1																				
13	1		1	1																		1		
13.5																						1		
14				1																				
14.5																						1		
15															1							6		
15.5																						6		
16																						8		
16.5																						5		
17																						7	1	
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33.5																			1					
34																								
Total	11	0	79	12	152	4	447	22	3	0	0	1	5	4	2	1	8	1	16	7	36	1	3	1

APPENDIX D: MnDNR Sweeney Electrofishing Assessment, August 28, 2013



Minnesota Department of Natural Resources
Fisheries Management



STANDARD LAKE SURVEY REPORT

DRAFT VERSION - PRELIMINARY DATA (AS OF 08/29/2013)

Lake Name: Sweeney

Survey Type: Special Assessment

DOW Number: 27-0035-01

Survey ID Date: 08/28/2013

SPECIAL ASSESSMENT Electrofishing Water Quality Measurement

Lake Identification

Alternate Lake Name: N/A
Primary Lake Class ID: 30

DNR Sounding Map Number: C1143
Alternate Lake Class ID: N/A

Lake Location

Primary County: Hennepin

Nearest Town: Glenwood Junction

Legal Descriptions

Lake Center: Township - 29N Range - 24W Section - 18
PLS Section Lake Center: 2902418

All Legal Descriptions:

Hennepin County: Township - 29N Range - 24W Sections - 18, 19

Area Office

Area Name: Metro West
Region Name: Central

ORG Code: F314
Region Number: 3

Lake Access

(Information based on Re-Survey dated 07/01/1991)

Station ID	Ownership	Public Use	Type	Location / Comments
------------	-----------	------------	------	---------------------

(Data excludes records where public use is not designated or is designated "No Public Use")

Lake Characteristics

Lake Area (planimetered acres):	66.00	GIS Shoreline Length (miles):	2.11
GIS Lake Area (acres):	67.64	Maximum Fetch (miles):	1.00
DOW Lake Area (acres):	0.00	Fetch Orientation (degrees):	N/A
Littoral Area (acres):	34.00	USGS Quad Map Number:	S16a
Area in MN (acres):	67.64	USGS Quad 24K GIS Index:	3632
Maximum Depth (feet):	28.0		
Mean Depth (feet):	N/A		

Watershed Characteristics

<u>Major Watershed</u>	<u>Minor Watershed</u>
Name: Mississippi River-TC	Name: Bassett Cr
Watershed Number: 20	Watershed Number: 95
Watershed size (acres): 644,320	Watershed size (acres): 13,581

Surveys And Investigations

Initial Survey: 08/03/1960.
 Re-Survey: 07/01/1991, 07/13/1981.
 Population Assessment: 07/02/1986, 07/13/1976.

Dissolved Oxygen And Temperature Profile Of Lake Water

<u>Station ID</u>	<u>Sampling Date</u>	<u>Bottom Depth (Feet)</u>	<u>Sample Depth (Feet)</u>	<u>Water Temperature (°F)</u>	<u>Dissolved Oxygen (ppm)</u>
WQ - 1	08/28/2013	22.0	Surface	82.6	7.2
			2.0	81.5	6.3
			4.0	80.6	6.1
			6.0	80.2	5.4
			8.0	80.1	4.9
			10.0	79.9	4.8
			12.0	79.7	4.2
			14.0	78.8	2.7
			16.0	78.1	1.4
			18.0	77.7	0.9
			20.0	76.8	0.5
			22.0	76.5	0.3

Field Measurements Of Water Quality

<u>Station ID</u>	<u>Sampling Date</u>	<u>Sample Depth (Feet)</u>	<u>Secchi Depth (Feet)</u>	<u>Field pH</u>	<u>Alkalinity (ppm)</u>	<u>Water Color</u>	<u>Color Cause</u>
WQ - 1	08/28/2013	Surface	4.0	N/A	N/A	Brown Grn	Algae

Electrofishing Catch Summary for EF

Standard electrofishing

Total run-time for all stations: 01:37:00
 Total on-time for all stations: 01:30:00
 First Sampling Date: 08/28/2013
 Last Sampling Date: 08/28/2013
 Daylight Sampling: Yes
 Target Species: N/A

Abbr	Species	Summary By Numbers			Summary By Weight (pounds)			
		Total Number	Number per Hour Run-Time	Number per Hour On-Time	Total Weight	Lbs per Hour Run-Time	Lbs per Hour On-Time	Mean Weight
BLB	Black Bullhead	3	1.86	2.00	1.45	0.89	0.96	0.48
BLC	Black Crappie	17	10.52	11.33	3.65	2.26	2.43	0.21
BLG	Bluegill	86	53.20	57.33	9.97	6.17	6.65	0.12
CAP	Common Carp	7	4.33	4.67	57.91	35.82	38.61	8.27
GOS	Golden Shiner	5	3.09	3.33	0.48	0.30	0.32	0.10
GSF	Green Sunfish	3	1.86	2.00	0.35	0.22	0.23	0.12
HSF	Hybrid Sunfish	3	1.86	2.00	0.39	0.24	0.26	0.13
LMB	Largemouth Bass	42	25.98	28.00	31.96	19.77	21.31	0.76
NOP	Northern Pike	1	0.62	0.67	5.97	3.69	3.98	5.97
PMK	Pumpkinseed	1	0.62	0.67	0.15	0.09	0.10	0.15
WTS	White Sucker	8	4.95	5.33	13.05	8.07	8.70	1.63
YEB	Yellow Bullhead	17	10.52	11.33	8.87	5.49	5.91	0.52
YEP	Yellow Perch	2	1.24	1.33	0.08	0.05	0.05	0.04

Length Frequency Distribution For EF

Standard electrofishing

(Field work conducted on 08/28/2013)

	<u>BLB</u>	<u>BLC</u>	<u>BLG</u>	<u>CAP</u>	<u>GOS</u>	<u>GSF</u>	<u>HSF</u>	<u>LMB</u>	<u>NOP</u>	<u>PMK</u>	<u>WTS</u>	<u>YEB</u>	<u>YEP</u>
< 3.00	-	-	-	-	1	-	-	2	-	-	-	-	-
3.00 - 3.49	-	-	1	-	-	-	-	1	-	-	-	-	-
3.50 - 3.99	-	-	2	-	-	-	-	2	-	-	-	-	-
4.00 - 4.49	-	-	4	-	-	-	-	1	-	-	-	-	1
4.50 - 4.99	-	-	24	-	-	1	-	2	-	-	-	-	1
5.00 - 5.49	-	-	23	-	-	1	-	-	-	1	-	-	-
5.50 - 5.99	-	-	18	-	1	1	3	-	-	-	-	-	-
6.00 - 6.49	-	-	6	-	1	-	-	-	-	-	-	-	-
6.50 - 6.99	-	1	7	-	1	-	-	-	-	-	-	-	-
7.00 - 7.49	-	6	1	-	-	-	-	1	-	-	-	-	-
7.50 - 7.99	-	9	-	-	1	-	-	-	-	-	-	-	-
8.00 - 8.49	1	1	-	-	-	-	-	2	-	-	-	1	-
8.50 - 8.99	-	-	-	-	-	-	-	1	-	-	-	2	-
9.00 - 9.49	-	-	-	-	-	-	-	2	-	-	-	3	-
9.50 - 9.99	1	-	-	-	-	-	-	3	-	-	-	3	-
10.00 - 10.49	1	-	-	-	-	-	-	4	-	-	-	2	-
10.50 - 10.99	-	-	1	-	-	-	-	4	-	-	-	5	-
11.00 - 11.49	-	-	-	-	-	-	-	4	-	-	-	1	-
11.50 - 11.99	-	-	-	-	-	-	-	2	-	-	-	-	-
12.00 - 12.99	-	-	-	-	-	-	-	3	-	-	-	-	-
13.00 - 13.99	-	-	-	-	-	-	-	1	-	-	-	-	-
14.00 - 14.99	-	-	-	-	-	-	-	1	-	-	-	-	-
15.00 - 15.99	-	-	1	-	-	-	-	1	-	-	2	-	-
16.00 - 16.99	-	-	-	-	-	-	-	1	-	-	6	-	-
17.00 - 17.99	-	-	-	-	-	-	-	2	-	-	-	-	-
18.00 - 18.99	-	-	-	-	-	-	-	-	-	-	-	-	-
19.00 - 19.99	-	-	-	-	-	-	-	-	-	-	-	-	-
20.00 - 20.99	-	-	-	-	-	-	-	-	-	-	-	-	-
21.00 - 21.99	-	-	-	-	-	-	-	-	-	-	-	-	-
22.00 - 22.99	-	-	-	1	-	-	-	-	-	-	-	-	-
23.00 - 23.99	-	-	-	2	-	-	-	-	-	-	-	-	-
24.00 - 24.99	-	-	-	-	-	-	-	-	-	-	-	-	-
25.00 - 25.99	-	-	-	2	-	-	-	-	-	-	-	-	-
26.00 - 26.99	-	-	-	1	-	-	-	-	-	-	-	-	-
27.00 - 27.99	-	-	-	1	-	-	-	-	-	-	-	-	-
28.00 - 28.99	-	-	-	-	-	-	-	-	-	-	-	-	-
29.00 - 29.99	-	-	-	-	-	-	-	-	1	-	-	-	-
30.00 - 30.99	-	-	-	-	-	-	-	-	-	-	-	-	-
31.00 - 31.99	-	-	-	-	-	-	-	-	-	-	-	-	-
32.00 - 32.99	-	-	-	-	-	-	-	-	-	-	-	-	-
33.00 - 33.99	-	-	-	-	-	-	-	-	-	-	-	-	-
34.00 - 34.99	-	-	-	-	-	-	-	-	-	-	-	-	-
35.00 - 35.99	-	-	-	-	-	-	-	-	-	-	-	-	-
= > 36.00	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	3	17	88	7	5	3	3	40	1	1	8	17	2
Min. Length	8.15	6.57	3.27	22.24	2.68	4.84	5.71	2.56	29.33	5.31	15.12	8.46	4.13
Max. Length	10.04	8.43	15.16	27.36	7.80	5.63	5.87	17.32	29.33	5.31	16.93	11.02	4.72
Mean Length	9.30	7.53	5.48	24.93	5.87	5.26	5.77	9.86	29.33	5.31	16.24	9.90	4.43
# Measured	3	17	88	7	5	3	3	40	1	1	8	17	2
No Lengths for	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: Unless all fish were measured in the catch, totals shown for some length-frequency distributions may differ from the total number of fish in the catch, due to rounding of fractions used in the estimation of length frequency from a subsample of measured fish

Survey Crew Notes

Electrofishing assessment targeting all fish for Bassett Creek Watershed Management Commission

Discussion

The Bassett Creek Watershed Management Commission requested data on the fish community in Sweeney Lake and the connected Twin Lake. Specifically, the Commission was interested in the presence of common carp and gizzard shad. Since the most recent assessment was in 1991, an electrofishing assessment targeting all fish was conducted on Sweeney Lake during the day on August 28, 2013.

Sweeney Lake

Four transects, encompassing the entire lake, were electrofished. All transects were near shore in 4 feet of water or less. The conductivity of the lake water was high (1042 mS) and fish were shocked only moderately well. Despite this, in 1.5 h of electrofishing on-time, 195 fish were sampled, this included 13 different species. Bluegill, largemouth bass, black crappie, and yellow bullhead were the most abundant, respectively. Seven common carp were netted and measured. Many additional common carp were observed but were able to escape the electrical field before they were netted. One buffalo (*Ictiobus* sp.) was observed but could not be netted. Only netted fish are included in the survey report.

No gizzard shad were sampled in the 4 standard transects. However, areas of "rippling" water were observed off shore. Upon investigation with the electrofishing boat, these "ripples" were caused by schools of gizzard shad. The water was calm and these schools were observed in many areas throughout the lake. All gizzard shad that were shocked ranged from 3 to 5 inches. Since the shad were not sampled in the standard transects, they are not included in the survey report. Gizzard shad are not common in lakes of this type but they seemed relatively abundant in Sweeney Lake.

Twin Lake

The channel between Sweeney and Twin Lakes is shallow. At times the electrofishing boat had to be propelled by a push pole or crew members waded in the water and pushed the boat by hand. There was approximately 6 inches of clearance between the boat rails and the top of the bridge that leads to Twin Lake. During high water it may be difficult to pass under this bridge.

Once in Twin Lake, it was immediately obvious that the lake is heavily used by the public to recreate. Many people had accessed the lake at several points along the eastern shore and were swimming. Due to the number of people swimming laps in this 19-acre lake, it was determined that it was unsafe to use electricity to sample fish. No fish sampling was conducted. Water clarity was noticeably greater than Sweeney Lake and common carp and bluegill were visually observed.

DRAFT

STANDARD LAKE SURVEY REPORT

SPECIAL ASSESSMENT DATED 08/28/2013 FOR DOW NUMBER 27-0035-01

Approval Dates And Notices

Date Approved By Metro West Area Fisheries Supervisor: _____

Date Approved By Central Region Fisheries Manager: _____

This Draft version of the Standard Lake Survey Report contains preliminary data (as of 08/29/2013), and is therefore subject to change at any time.



Minnesota Department of Natural Resources

By accepting the data in this report, the user agrees the data will be used for personal benefit and not for profit. Any other uses or publication of the data needs the consent of the Department. The Minnesota Department of Natural Resources assumes no responsibility for actual or consequential damage incurred as a result of any user's reliance on the data.

Standard Lake Survey Report revision: 04/05/2011-RJE . Data Date: 08/29/2013 at 3:04 pm .

REPORT OVERVIEW - FOR OFFICE USE ONLY

(This page is not part of the Standard Lake Survey Report and should be discarded)

Lake Name: Sweeney

Survey Type: Special Assessment

DOW Number: 27-0035-01

Survey ID Date: 08/28/2013

Electrofishing, Water Quality Measurement

Survey Status: Proposed

The following 22 (of 31) report components are not included in this report:

1. Current Water Level
2. Benchmark And Gauge Descriptions / Locations
3. Water Level History*
4. Water Level History - Readings*
5. Water Level History - Station Summary*
6. Lake Inlets
7. Additional Inlet Information
8. Lake Outlets
9. Additional Outlet Information
10. Water Control Structure (Dam)
11. Surrounding Watershed Characteristics, Shoreline Characteristics, and Riparian Landscape Observations
12. Resorts And Campgrounds
13. Fish Spawning Conditions
14. Erosion And Pollution
15. Fish Diseases And Parasites
16. Aquatic Vegetation And Shoalwater Substrates
17. Laboratory Analysis Of Water Chemistry
18. Length At Capture With Last Incremental Length*
19. Back-Calculated Lengths
20. Age Class Frequency Distributions
21. Other Species (added to revision 03/24/2009)
22. Water Quality (Winter Observations) (added to revision 01/21/2010)

* Water Level History report: This data has not yet been migrated into the Fisheries LSM database. On 01/08/2009, two additional Water Level History report components (Readings and Station Summary) were added.

* Length At Capture With Last Incremental Length report: The following criteria must be met for a report to be generated:

1. The fish species must have an assigned body scale constant.
2. Fish must have an "official" age assigned.
3. Fish must have a digitized measurement marked for back calculation use.

Note: The data source for Length and Age Class Frequency Distribution tables is updated twice daily - once at noon and once overnight. Any changes to the data made after noon on 08/29/2013 may not be reflected in the Distribution tables until 08/30/2013.

Fisheries Lake ID = 3129, Survey ID = 5171323833038000

Standard Lake Survey Report revision: 04/05/2011. Data Date: 08/29/2013 at 3:04 pm .

APPENDIX E: MnDNR Sweeney and Twin Lakes Fish Surveys from 1991



Lake information report

Name: SWEENEY

Nearest Town: GOLDEN VALLEY
Primary County: Hennepin

Survey Date: 07/01/1991
Inventory Number: 27-0035-01

Lake Characteristics

Lake Area (acres): 66.00
[Littoral Area](#) (acres): 34.00
Maximum Depth (ft): 28.00
[Water Clarity](#) (ft): N/A

[Dominant Bottom Substrate](#): N/A
[Abundance of Aquatic Plants](#): N/A
Maximum Depth of Plant Growth (ft): N/A

Fish Sampled for the 1991 Survey Year

Species	Gear Used	Number of fish per net		Average Fish Weight (lbs)	Normal Range (lbs)
		Caught	Normal Range		
White Sucker	Gill net	1.0	0.5 - 2.0	1.40	1.0 - 2.2
White Crappie	Gill net	1.0	0.5 - 4.8	0.65	0.2 - 0.3
Northern Pike	Gill net	2.0	2.5 - 7.9	3.55	1.8 - 3.3
Largemouth Bass	Gill net	1.0	0.3 - 1.1	1.10	0.4 - 1.5
Common Carp	Gill net	2.5	0.5 - 4.0	4.58	1.0 - 3.2
Bluegill	Gill net	21.5	N/A - N/A	0.12	N/A - N/A
Black Crappie	Gill net	4.5	1.9 - 18.0	0.22	0.1 - 0.3
Black Bullhead	Gill net	7.0	5.2 - 56.2	0.35	0.2 - 0.5
Yellow Perch	Trap net	0.2	0.3 - 1.5	0.10	0.1 - 0.2
Yellow Bullhead	Trap net	2.8	0.8 - 5.0	0.63	0.4 - 0.7
White Sucker	Trap net	3.7	0.3 - 1.6	1.26	1.0 - 2.2
Smallmouth Buffalo	Trap net	1.5	N/A - N/A	2.07	N/A - N/A
Pumpkinseed Sunfish	Trap net	4.0	0.8 - 5.3	0.08	0.1 - 0.2
Northern Pike	Trap net	1.5	N/A - N/A	3.08	N/A - N/A
Largemouth Bass	Trap net	0.3	0.3 - 0.8	0.60	0.2 - 1.1
Hybrid Sunfish	Trap net	0.5	N/A - N/A	0.10	N/A - N/A
Green Sunfish	Trap net	0.7	0.3 - 2.0	0.10	0.1 - 0.1
Common Carp	Trap net	4.8	0.3 - 2.6	4.12	2.0 - 4.5
Bluegill	Trap net	124.5	6.5 - 59.6	0.08	0.1 - 0.2
Black Crappie	Trap net	0.5	1.8 - 18.1	0.33	0.2 - 0.3
Black Bullhead	Trap net	11.0	1.3 - 26.0	0.35	0.2 - 0.5

Normal Ranges represent typical catches for lakes with similar physical and chemical characteristics.

Length of Selected Species Sampled for All Gear for the 1991 Survey Year

Species	Number of fish caught in each category (inches)								
	0-5	6-8	9-11	12-14	15-19	20-24	25-29	30+	Total
<i>Yellow Perch</i>	1	0	0	0	0	0	0	0	1
<i>Yellow Bullhead</i>	0	5	7	5	0	0	0	0	17
<i>White Crappie</i>	0	1	0	1	0	0	0	0	2
<i>Pumpkinseed Sunfish</i>	24	0	0	0	0	0	0	0	24
<i>Northern Pike</i>	0	0	0	0	3	4	5	1	13
<i>Largemouth Bass</i>	1	0	1	2	0	0	0	0	4
<i>Hybrid Sunfish</i>	3	0	0	0	0	0	0	0	3
<i>Green Sunfish</i>	4	0	0	0	0	0	0	0	4
<i>Bluegill</i>	233	38	0	0	0	0	0	0	271
<i>Black Crappie</i>	0	12	0	0	0	0	0	0	12
<i>Black Bullhead</i>	2	55	23	0	0	0	0	0	80

Status of the Fishery (as of 07/01/1991)

THE PRESENT FISH POPULATION IS DOMINATED BY BLHS, SMALL CEN, CATOSTOMIDS AND CYPRINIDS. BLGS AND BLBS WERE SAMPLED WELL ABOVE MEDIAN LEVELS; BLG AVERAGED 12.06 FISH PER POUND AND HAVE A PSD=10.1. BLBS AVERAGED 8.5-8.9 INCHES TOTAL LENGTH AND 2.88 FISH PER POUND. CARP WERE SAMPLED SLIGHTLY ABOVE MEDIAN LEVELS FOR NUMBER, BUT WELL ABOVE MEDIAN LEVELS FOR POUNDS PER SET FOR GILLNETS. CARP WERE SAMPLED WELL ABOVE TRAPNET MEDIANS. CAPTURED CARP AVERAGED 20.0 INCHES TOTAL LENGTH AND 4.19 POUNDS PER INDIVIDUAL. WTS AND NOP WERE SAMPLED NEAR MEDIAN LEVELS FOR GILLNETS AND WELL ABOVE MEDIAN LEVELS FOR TRAPNETS. SAMPLED NOP EXHIBITED A CALCULATED RSD = 76.92% FOR COMBINED GEAR TYPES. NOP GROWTH RATE APPEARS TO BE SLIGHTLY BELOW THE STATEWIDE AVERAGE. STOCKING OF LMB BY PRIVATE PERMIT ISSUED TO THE SWEENEY LAKE ASSOCIATION IS CONTRIBUTING ANOTHER PREDATOR SPECIES TO THE OVERALL POPULATION. GROWTH RATE FOR INDIVIDUALS SAMPLED IS SLIGHTLY ABOVE AVERAGE AND SEVERL YOY LMB WERE CAPTURED DURING SHORELINE SEINING. BLC WERE SAMPLED ABOVE MEDIAN LEVELS FOR GILLNETS, BUT BELOW FOR TRAPNETS. WHC AND YEP WERE ALSO CAPTURED DURING THIS SURVEY, BUT IN LOW NUMBERS. SEVERAL SAB WERE SAMPLED FOR THE FIRST TIME SINCE THE INITIAL SURVEY IN 1960. YEBS ARE ALSO PRESENT AND WERE SAMPLED ABOVE MEDIAN LEVELS FOR NUMBER OF INDIVIDUALS PER TRAPNET SET.



Lake information report

Name: SWEENEY TWIN

Nearest Town: GOLDEN VALLEY
Primary County: Hennepin

Survey Date: 07/02/1991
Inventory Number: 27-0035-02

Public Access Information

Ownership	Type	Description
Unknown	Unknown	ACCESS GAINED THROUGH GOLDEN VALLEY HEALTH CENTER PROPERTY BETWEEN SWEENEY

Lake Characteristics

Lake Area (acres): 19.00
Littoral Area (acres): 8.00
Maximum Depth (ft): 56.00
Water Clarity (ft): N/A

Dominant Bottom Substrate: N/A
Abundance of Aquatic Plants: N/A
Maximum Depth of Plant Growth (ft): N/A

Fish Sampled for the 1991 Survey Year

Species	Gear Used	Number of fish per net		Average Fish Weight (lbs)	Normal Range (lbs)
		Caught	Normal Range		
<i>Yellow Bullhead</i>	Gill net	0.5	1.0 - 6.9	0.20	0.4 - 0.7
<i>White Sucker</i>	Gill net	0.5	0.5 - 2.0	0.30	1.0 - 2.2
<i>Pumpkinseed Sunfish</i>	Gill net	1.5	N/A - N/A	0.07	N/A - N/A
<i>Northern Pike</i>	Gill net	0.5	2.5 - 7.9	1.10	1.8 - 3.3
<i>Bluegill</i>	Gill net	2.5	N/A - N/A	0.10	N/A - N/A
<i>Black Bullhead</i>	Gill net	7.0	5.2 - 56.2	0.34	0.2 - 0.5
<i>Yellow Bullhead</i>	Trap net	1.2	0.8 - 5.0	0.42	0.4 - 0.7
<i>White Sucker</i>	Trap net	0.4	0.3 - 1.6	1.00	1.0 - 2.2
<i>Smallmouth Buffalo</i>	Trap net	0.6	N/A - N/A	1.73	N/A - N/A
<i>Pumpkinseed Sunfish</i>	Trap net	1.4	0.8 - 5.3	0.16	0.1 - 0.2
<i>Northern Pike</i>	Trap net	0.2	N/A - N/A	2.50	N/A - N/A
<i>Largemouth Bass</i>	Trap net	0.4	0.3 - 0.8	0.15	0.2 - 1.1
<i>Hybrid Sunfish</i>	Trap net	1.4	N/A - N/A	0.20	N/A - N/A
<i>Green Sunfish</i>	Trap net	0.2	0.3 - 2.0	0.10	0.1 - 0.1
<i>Golden Shiner</i>	Trap net	0.2	0.2 - 1.4	0.35	0.1 - 0.1
<i>Common Carp</i>	Trap net	0.8	0.3 - 2.6	3.30	2.0 - 4.5
<i>Bluegill</i>	Trap net	29.8	6.5 - 59.6	0.13	0.1 - 0.2
<i>Black Crappie</i>	Trap net	1.4	1.8 - 18.1	0.30	0.2 - 0.3
<i>Black Bullhead</i>	Trap net	3.0	1.3 - 26.0	0.33	0.2 - 0.5

Normal Ranges represent typical catches for lakes with similar physical and chemical characteristics.

Length of Selected Species Sampled for All Gear for the 1991 Survey Year

Species	Number of fish caught in each category (inches)								Total
	0-5	6-8	9-11	12-14	15-19	20-24	25-29	30+	
<i>Yellow Bullhead</i>	0	3	4	0	0	0	0	0	7
<i>Pumpkinseed Sunfish</i>	9	1	0	0	0	0	0	0	10
<i>Northern Pike</i>	0	0	0	0	1	1	0	0	2
<i>Largemouth Bass</i>	2	0	0	0	0	0	0	0	2
<i>Hybrid Sunfish</i>	6	1	0	0	0	0	0	0	7
<i>Green Sunfish</i>	1	0	0	0	0	0	0	0	1
<i>Bluegill</i>	68	15	0	0	0	0	0	0	83
<i>Black Crappie</i>	0	7	0	0	0	0	0	0	7
<i>Black Bullhead</i>	0	24	5	0	0	0	0	0	29

Status of the Fishery (as of 07/02/1991)

THE PRESENT FISH POPULATION IS DOMINATED BY BLHS AND SMALL CEN. ONLY BLGS WERE SAMPLED ABOVE ALL MEDIAN LEVELS FOR BOTH GEAR TYPES. CAPTURED BLGS AVERAGED 7.86 FISH PER POUND AND EXHIBITED A CALCULATED PSD=16.7%. CARP, BLC, AND YEB WERE SAMPLED BELOW MEDIAN LEVELS FOR TRAPNETS. PMK WERE SAMPLED BELOW MEDIAN LEVELS FOR TRAPNETS, BUT ABOVE THE MEDIANS FOR GILLNETS. BLB WERE SAMPLED IN THE SECOND HIGHEST ABUNDANCE AND ABOVE MEDIAN LEVELS FOR GILLNETS, BUT BELOW LOCAL MEDIAN LEVELS FOR TRAP NETS. OTHER SPECIES SAMPLED, BUT IN LOW ABUNDANCE, INCLUDE NOP, WTS, GOS, HSF, GSF, AND LMB. LMB SHOWED AVERAGE GROWTH FOR THE AGE 1+ INDIVIDUALS SAMPLED AND YOY BASS WERE SAMPLED DURING SHORELINE SEINING. SAB WERE CAPTURED FOR THE FIRST TIME SINCE FISH SURVEYS BEGAN IN 1960. THE ONLY FISH SPECIES SAMPLED IN SWEENEY'S TWIN THAT WAS NOT CAPTURED IN SWEENEY LAKE WAS GOS. WHC AND YEP WERE SAMPLED IN SWEENEY LAKE, BUT NOT IN SWEENEY'S TWIN.