

## Simian Lake

Simian Lake is located west of County Road 5 and south of County Road 80 in St. Louis County. Simian Lake is an 80 acre lake with a mucky bottom type (Figure 1) and has a maximum depth of 12 feet (Figure 2). It is a flowage lake, with a contributing watershed of nearly 20,000 acres (predominantly wetlands), and is highly stained (mean filtered color = 155 PtCo units). It is moderately productive, at the upper end of the mesotrophic range, with a Carlson's Trophic State Index of 56.5 calculated by total phosphorus, chlorophyll a and secchi depth; and mean total hardness of 47.2 mg/l as CaCO<sub>3</sub>.

Trap net and gill net locations were established in 2008 (Figure 2). Nine trap nets (TN) and one gill net (GN) was set August 12-14. The purpose of this survey was to collect base line data of fish communities, and to use this data for future management decisions. Fish species observed in the 2008 survey included black bullhead (BLB), black crappie (BLC), bluegill (BLG), northern pike (NOP), pumpkinseed sunfish (PMK), white sucker (WTS) and yellow perch (YEP) (Table 1).

Black crappies were observed between 161 mm and 239 mm. (Figure 3). Catch rates for BLC were 0.0 / GN and 2.9 / TN (Table 1). The BLC length-at-age estimates were comparable to the Duluth area average established by the Minnesota Department of Natural Resources (MNDNR) (Table 2). 66% of the BLC sampled were 5 years old (Table 3). Stock density indices, e.g. PSD (proportional stock density) and RSD-P (relative stock density), are used as a quality index for a fish population, and describe fish in terms of specific length categories. The PSD value for this crappie population was  $82.6 \pm 15.5$ , indicating a population characterized by larger individuals (> than 7.8 inches). An RSD – P value of  $0.0 \pm 0.0$  suggests that there are no preferred-length fish (> 9.8 inches). Black crappies were only aged up to 5 years, which when combined with average growth, may indicate that anglers are harvesting individuals as soon as they reach a “preferred” length of approximately 10 inches. It is probably worth returning to Simian Lake with a different gear type, e.g. electrofishing, to attempt to sample smaller, younger individuals to monitor spawning success and recruitment within this population.

Catch rates for northern pike were 5.0 / GN and 1.1 / TN (Table 1). Lengths were between 351 mm and 760 mm (Figure 4). The five NOP collected from the gill net were used for mercury analysis (Table 4). All NOP caught by trap nets were released. Total wet weight mercury concentrations ranged from 0.193 – 0.251 µg/g, which would suggest a safe fish consumption advisory of one meal / week for the general population, and one meal / month for

the sensitive population. These mercury concentrations are somewhat lower than would be expected for this area, but none of the fish analyzed for mercury exceeded 606 mm (24 inches).

Pumpkinseeds were sampled between 86 mm and 185 mm (Figure 5). Catch rates were 0.0 / GN and 5.1 / TN (Table 1). The age distribution ranged from 2 to 5 years old (Table 5). The length at age data suggests slow growth for Simian Lake PMK when compared to the Duluth area average. On average, individuals are one year behind in length-at-age by age-4 when compared to other lakes in the Duluth area (Table 6). The PSD for pumpkinseed in Simian is  $14.6 \pm 10.8$ , suggesting a population characterized by small individuals. Slow growth and a population dominated by small individuals suggest that food resources for PMK may be limited in this lake.

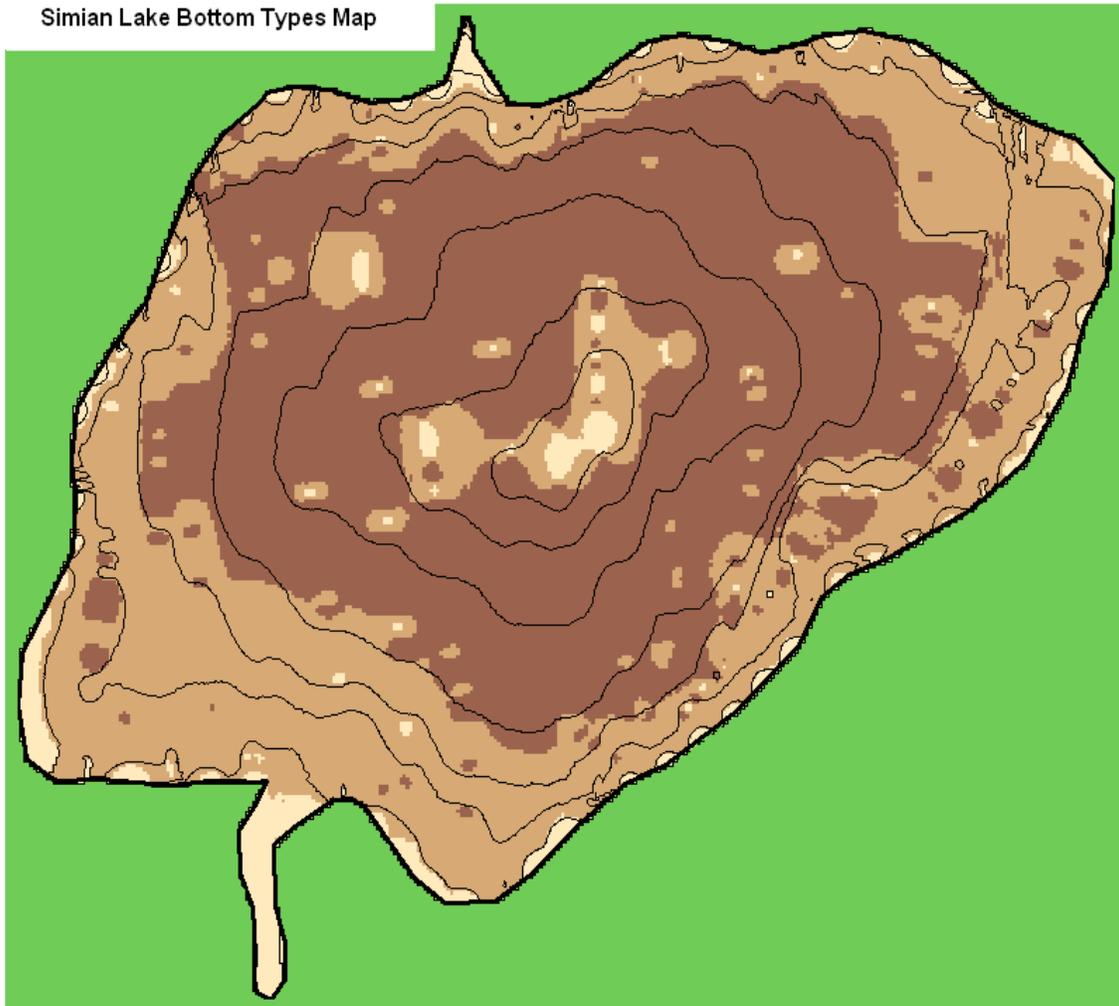
Bluegills were observed from 97 mm to 225 mm (Figure 6). Catch rates for BLG were 0.0 / GN and 3.8 / TN (Table 1). The age distribution data shows no 4 and 5 year old BLG sampled, which may suggest inconsistent recruitment (Table 7). Growth rates are comparable to the MNDNR area average (Table 8). The PSD value for this bluegill population was  $36.7 \pm 17.2$ , suggesting a balanced population of smaller and larger individuals. An RSD - P value of  $33.3 \pm 16.9$  is a bit higher than "normal" values of 5 - 10, suggesting that there may be a higher than desired proportion of preferred-length fish (7.8 inches). With individuals aged up to 8 years, angling overharvest is probably not occurring on Simian Lake.

Yellow perch were observed from 165 mm to 254 mm (Figure 7). Catch rates were 0.0 / GN and 1.4 / TN (Table 1). Ages were represented from 4 to 7 years old (Table 9). Growth rates for yellow perch are comparable to the Duluth area average (Table 10).

Fifteen white suckers were observed in Simian Lake, ranging in size from 281 mm to 426 mm (Figure 8) and catch rates were 1.0 / GN and 1.8 / TN (Table 1). Eighty-nine black bullheads were sampled from the gill net (Table 1).

Figure 1. Map below presents the 2008 bottom substrate data for Simian Lake in St.Louis County.

Simian Lake Bottom Types Map



Legend for Simian Lake Bottom Type Map

— Simian Lake Boundary

— Depth Contours (0.5m)

Simian Lake Bottom Types

Unknown Bottom Type

Organic Muck, Slight Grit

Soft Muck, Slight Grit

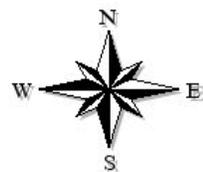
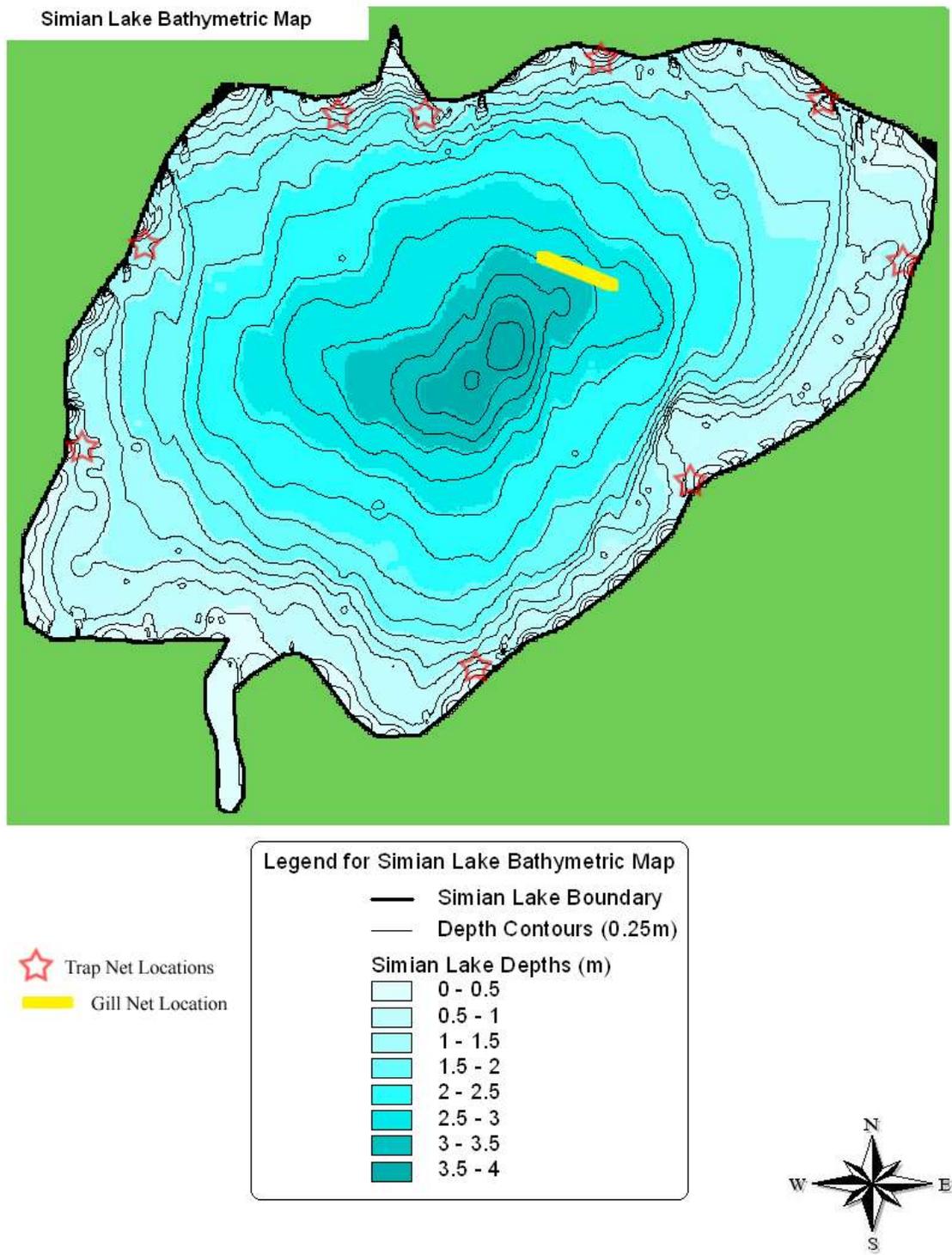


Figure 2. Map below presents depth data along with locations of trap nets and gill nets set in Simian Lake 2008.



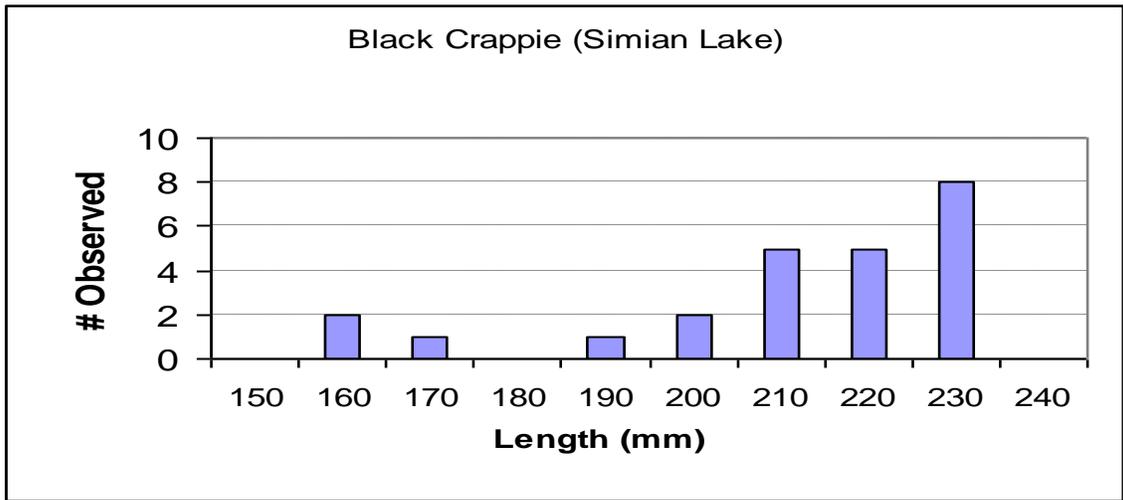


Figure 3. Length frequency distribution of black crappie observed in Simian Lake 2008.

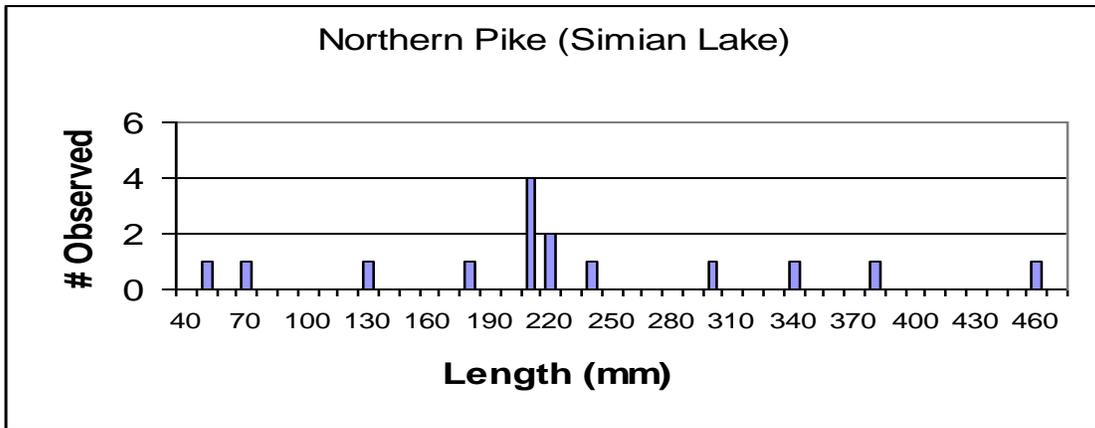


Figure 4. Length frequency distribution of northern pike observed in Simian Lake 2008.

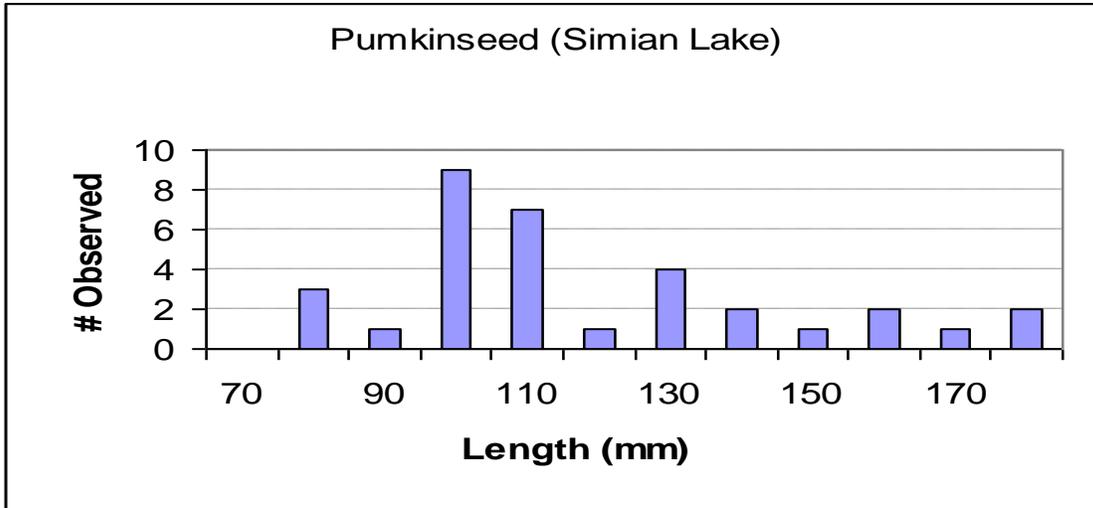


Figure 5. Length frequency distribution of pumpkinseed sunfish observed in Simian Lake 2008.

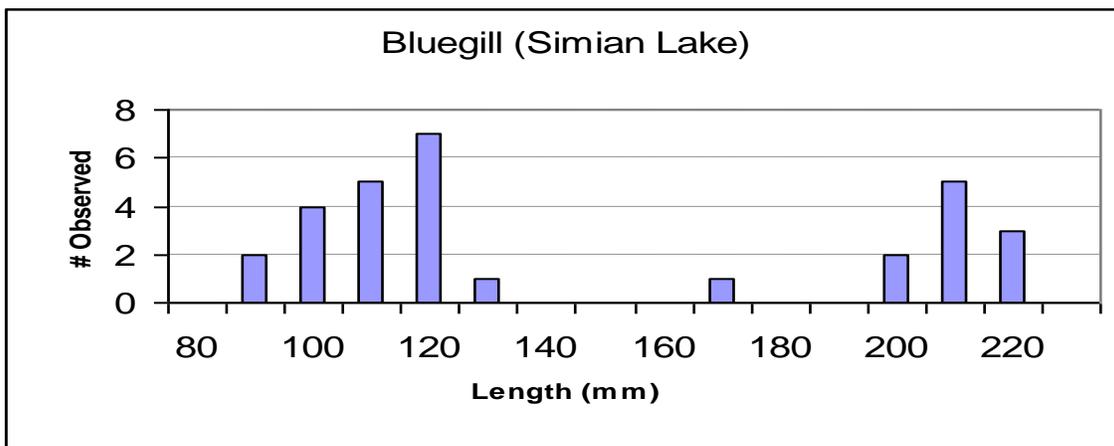


Figure 6. Length frequency distribution of bluegill observed in Simian Lake 2008.

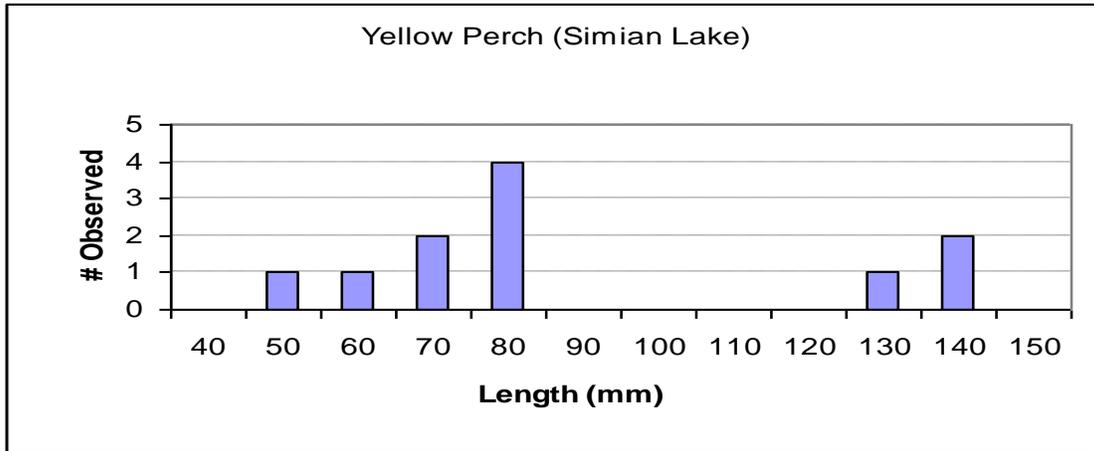


Figure 7. Length frequency distribution of yellow perch observed in Simian Lake 2008.

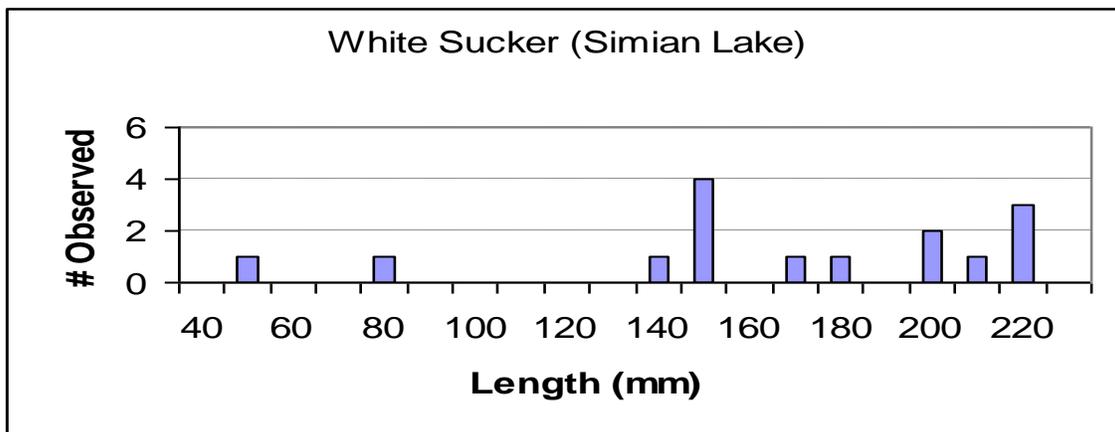


Figure 8. Length frequency distribution of white sucker observed in Simian Lake 2008.

Table 1. Number of fish sampled in Simian Lake, August 12-14, 2008 by gear type and by gear ID. Catch per effort, reported as the # fish / net type, is reported at the bottom of the table for the 2008 data..

Count of Species Code Gear I D	Species Code							Grand Total
	Blb	Blc	Blg	Nop	Pmk	Wts	Yep	
GN 1	89			5		1		95
TN 1			1			1		2
TN 3		5	3		7	3		18
TN 4		2	8	4	4			18
TN 5		7	11	1	5	1	1	26
TN 6		2		1	1			4
TN 7				1	3	1	1	6
TN 8		6	4	1	3	3	6	23
TN 9		1	3	1	18	5	3	31
Grand Total	89	23	30	14	41	15	11	223
Unknown Gear		1		1	2			
# Fish / GN	89.0	---	---	5.0	---	1.0	---	
# Fish / TN	---	2.9	3.8	1.1	5.1	1.8	1.4	

Table 2. Length at age estimates for black crappie sampled from Simian Lake in 2008, compared to the area averages established by the Minnesota Department of Natural Resources.

Age Class	N	Length (mm)	Length (in)	Area Average Length (mm)	Area Average Length (in)
1	19	59	2.3	48	1.9
2	19	103	4	100	3.9
3	19	144	5.7	155	6.1
4	17	184	7.2	196	7.7
5	13	206	8.1	227	8.9

Table 3. Age frequency distribution for black crappie observed in Simian Lake in 2008.

Length (mm)	Length (in)	# Observed	3	4	5
160	6.3	2	2		
170	6.7	1	1		
180	7.1				
190	7.5	1		1	
200	7.9	2		1	1
210	8.3	5		1	4
220	8.7	5			5
230	9.1	8		2	6
Total		24	3	5	16

Table 4. Mercury analysis results for northern pike, measured in micrograms of mercury per gram of fish tissue ( $\mu\text{g/g}$ ), for Simian Lake 2008.

Species	Length (mm)	Length (in)	$\mu\text{g/g}$ Tissue
NOP	520	20.5	0.195
NOP	606	23.9	0.24
NOP	510	20.1	0.193
NOP	524	20.6	0.251
NOP	482	19.0	0.194

Table 5. Age frequency distribution for pumpkinseed sunfish observed in Simian Lake 2008.

Length (mm)	Length (in)	# Observed	2	3	4	5
80	3.1	3	3			
90	3.5	10	6	4		
100	3.9	10	4	6		
110	4.3	7		7		
120	4.7	1			1	
130	5.1	4		1	3	
140	5.5	2		1	1	
150	5.9	1				1
160	6.3	2		2		
170	6.7	1				1
180	7.1	2			1	1
Total		43	13	21	6	3

Table 6. Length at age estimates for pumpkinseed sunfish sampled from Simian Lake in 2008, compared to the area averages established by the Minnesota Department of Natural Resources.

Age Class	N	Length (mm)	Length (in)	Area Average Length (mm)	Area Average Length (in)
1	30	50	2	46	1.8
2	30	85	3.3	104	4.1
3	23	113	4.5	130	5.1
4	9	136	5.4	165	6.5
5	3	161	6.3	196	7.7

Table 7. Age frequency distribution for bluegill observed in Simian Lake 2008.

Length (mm)	Length (in)	# Observed	2	3	4	5	6	7	8
90	3.5	2	2						
100	3.9	4	4						
110	4.3	5		5					
120	4.7	7		7					
130	5.1	1		1					
170	6.7	1		1					
200	7.9	2					2		
210	8.3	5					3	2	
220	8.7	3					1	1	1
Total		30	6	14	0	0	6	3	1

Table 8. Length at age estimates for bluegill sampled from Simian Lake in 2008, compared to the area averages established by the Minnesota Department of Natural Resources

Age Class	N	Length (mm)	Length (in)	Area Average Length (mm)	Area Average Length (in)
1	28	47	1.8	36	1.4
2	28	84	3.3	64	2.5
3	22	116	4.6	97	3.8
4	10	151	6	127	5.0
5	10	178	7	152	6.0
6	10	198	7.8	170	6.7
7	4	207	8.1	181	7.1
8	1	213	8.3	191	7.5

Table 9. Age frequency distribution for yellow perch observed in Simian Lake 2008.

Length (mm)	Length (in)	# Observed	4	5	6	7
160	6.3	1	1			
170	6.7	1	1			
180	7.1	2		2		
190	7.5	4	1	3		
240	9.4	1			1	
250	9.8	2			1	1
Total		11	3	5	2	1

Table 10. Length at age estimates for yellow perch sampled from Simian Lake in 2008, compared to the area averages established by the Minnesota Department of Natural Resources

Age Class	N	Length (mm)	Length (in)	Area Average Length (mm)	Area Average Length (in)
1	11	71	2.8	60	2.4
2	11	111	4.4	100	3.9
3	11	142	5.6	136	5.4
4	11	169	6.6	156	6.1
5	8	191	7.5	192	7.6
6	3	233	9.2	214	8.4
7	1	241	9.5	234	9.2