An Assessment of the Warmwater Fish Community in Kapowsin Lake (Pierce County), September 1999

by

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April 2000

Acknowledgments

This project was funded by the Warmwater Enhancement Program, which is providing greater opportunity to fish for and catch warmwater fish in Washington. We thank Jeff Skriletz, William Meyer, and Rebecca Colwell for their expertise in the field. We thank Steve Jackson and Jay Hunter for the use of their Kapowsin Lake files.

Abstract

Kapowsin Lake was surveyed by a three–person crew from September 7-9, 1999. Multiple gear types (electrofishing, gill nets, and trap nets) were utilized to reduce the sampling bias associated with each sampling method. Largemouth bass and bluegill were the most abundant species sampled both numerically (32.6 and 42.5 percent, respectively) and by biomass (39.4 and 26.3 percent, respectively). Other species sampled during the survey, in order of highest to lowest abundance, include: yellow perch; rock bass; pumpkinseed; black crappie; brown bullhead; and coho. Few largemouth bass of quality size and greater were encountered during the survey. Similar to bass, few bluegill of quality size and greater were sampled from the lake. Our recommendation is to resurvey Kapowsin Lake in the spring to obtain a truer account of size structure. Additionally, a creel survey is recommended to assess angler preference, pressure, and harvest on Kapowsin Lake.

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Introduction and Background

Kapowsin Lake is a 590–acre water body located south of Orting off Orville Road in Pierce County. The lake was formed 600 years ago when a mud flow from Mt. Rainier dammed Ohop Creek (Cummings, 1979). Kapowsin Lake is fed by Ohop Creek at the southern end of the lake and is drained by Kapowsin Creek at the northern end (eventually flowing into the Puyallup River). Champion International Timber Company, owners of the land surrounding Kapowsin Lake, used the lake as an excess log, snag, and piling dumping ground. There are two access sites on Kapowsin Lake. The first, at the north end of the lake, is owned by Champion International and anglers must walk in to access the lake to fish. The second, is a small resort on the northwest shoreline where the public can pay to launch small boats or fish from docks.

Kapowsin Lake is managed as a mixed–species water providing fishing for bass, bluegill, black crappie, yellow perch and rainbow trout. Kapowsin Lake has received annual plants of legal–sized rainbow trout since the 1960s, however, warmwater fish appear to the be the primary target of most anglers. A creel survey performed by Jim Cummins in 1976 revealed that 59 percent of the catch were warmwater fish and the remainder trout. Later in the 1970s, Fishing and Hunting News reported on Kapowsin Lake's tremendous crappie fishery with individuals reaching a pound or greater. Today, Kapowsin Lake receives a relatively high level of pressure from anglers. Informal creel reports suggests that the majority of anglers are targeting warmwater fish.

Materials and Methods

Data Collection

Kapowsin Lake was surveyed by a three–person team from September 7-9, 1999. Fish were captured using three sampling techniques: electrofishing; gill netting; and fyke netting. The electrofishing unit consisted of a Smith-Root SR-16s electrofishing boat, with a 5.0 GPP pulsator unit. The boat was fished using a pulsed DC current of 120 cycles/sec at 3-6 AMPS power. Experimental gill nets (45.7 meters long x 2.4 meters deep) were constructed of four sinking panels (two each at 7.6 meters and 15.2 meters long) of variable-size (1.3, 1.9, 2.5, and 5.1 centimeters stretch) monofilament mesh. Fyke (modified hoop) nets were constructed of 5-1.2–meter diameter hoops with two funnels and a 2.4–meter cod end (6.4–millimeter nylon delta mesh). Attached to the mouth of the net were two 7.6–meter wings and a 30.3–meter lead.

In order to reduce the gear induced bias in the data, the sampling time for each gear was standardized so that the ratio of electrofishing to gill netting to fyke netting was 1:1:1. The standardized sample is 1800 seconds of electrofishing (three sections), two gill net nights, and two fyke net nights. Sampling occurred during the evening hours to maximize the type and number of fish captured. Sampling locations were selected from a map (Figure 1) by dividing the entire shoreline into 400–meter sections and numbering them consecutively. Nightly sampling locations were randomly chosen (without replication) utilizing a random numbers table (Zar 1984). While electrofishing, the boat was maneuvered through the shallows at a slow rate of speed (~18 meters/minute, linear distance covered over time) for a total of 600 seconds of "pedal–down" time or until the end of the section was reached, whichever came first. Nighttime electrofishing occurred along 36 percent of the available shoreline. Gill nets were fished perpendicular to the shoreline; the small–mesh end was tied off to shore and the large–mesh end was anchored off shore. Fyke nets were fished perpendicular to the shoreline as well. The lead was tied off to shore and the cod–end was anchored off shore, with the wings anchored at approximately a 45° angle from the net lead. We tried to set fyke nets so that the hoops were .3-.6 meter below the water surface, this sometimes would require shortening the lead. Gill nets were set overnight at four locations around the lake, whereas fyke nets were set overnight at four locations.

With the exception of sculpin (*Cottidae*), all fish captured were identified to the species level. Each fish was measured to the nearest millimeter (mm) and assigned to a 10 mm size class based on total length (TL). For example, a fish measuring 156 mm TL was assigned to the 150 mm size class for that species, and a fish measuring 113 mm TL was assigned to the 110 mm size class, and so on. However, if a sample included several hundred young–of–year (YOY) or small juveniles (<100 mm TL) of a given species, then a sub–sample (N ~100 fish) were measured, and the remainder were just counted. The frequency distribution of the sub–sample was then applied to the total number collected. At least ten fish from each size class were weighed to the nearest gram (g); in some instances, multiple small fish were weighed together to get an average weight.

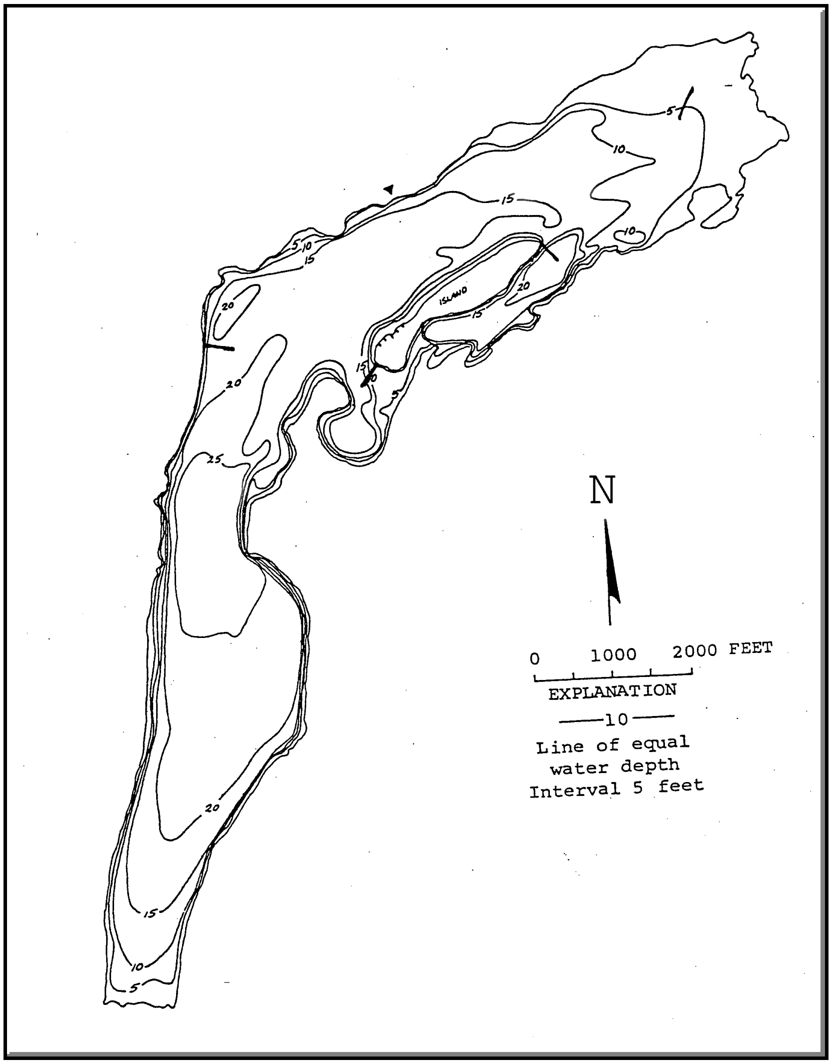

Figure 1. Map of Kapowsin Lake (Peirce County), WA.

Scales were taken from five individuals per size class, mounted, pressed, and aged using the Fraser-Lee method. However, members of the bullhead family (*Ictaluridae*) and non–game fish like carp (*Cyprinidae*), were not usually aged.

Water quality data was collected during mid–day from two locations on September 7, 1999. Using a Hydrolab® probe and digital recorder, dissolved oxygen, temperature, pH, and conductivity data was from the deepest section in the lake at 1 meter intervals through the water column.

Data Analysis

Species Composition

The species composition by number of fish captured, was determined using procedures outlined by Fletcher et al.(1993). Species composition by weight (kg) of fish captured, was determined using procedures adapted from Swingle (1950). Only fish estimated to be at least one year old were used to determine species composition. These were inferred from the length frequency distributions described below, in conjunction with the results of the aging process. YOY or small juveniles were not considered because large fluctuations in their numbers may cause distorted results (Fletcher et al. 1993).

Catch Per Unit of Effort

The catch per unit of effort (CPUE) of electrofishing for each species was determined by dividing the total number in all size classes equal or greater than stock size, by the total electrofishing time (sec). The CPUE for gill nets and fyke nets was determined similarly, except the number equal or greater than stock size was divided by the number of net nights for each net (usually one). An average CPUE (across sample sections) with 80 percent confidence interval was calculated for each species and gear type. For fishes in which there is no published stock size (i.e., sculpins, suckers, etc.), CPUE is calculated using all individuals captured.

Length Frequency

A length frequency histogram was calculated for each species and gear type in the sample. Length frequency histograms are constructed using individuals that are Age–1 and older (determined by the aging process) and calculated as the number of individuals of a species in a given size class, divided by the total sample of that species.

Stock Density Indices

Stock density indices (i.e., PSD and RSD) were calculated for warmwater gamefish species encountered during the survey. However, when useful to analyze, PSDs and RSDs were calculated for non–warmwater and non–game species such as trout, carp, or bullheads. Stock density indices calculated here are described by Gablehouse (1984). The indices are accompanied by a 80 percent confidence interval (Gustafson 1988) to provide an estimate of statistical precision. Appendix A lists, by species, length categories used to calculate stock density indices.

Relative Weight

A relative weight index (W_r) was used to evaluate the condition (plumpness or robustness) of fish in the lake. A W_r value of 100 generally indicates a fish in good condition when compared to the national average for that species and size. Following Murphy and Willis (1991), the index was calculated as $W_r = W/W_s$ x 100, where W is the weight (g) for an individual fish from the sample and W_s is the standard weight of a fish of the same total length (mm). W_s is calculated from a standard log–weight log–length relationship defined for the species of interest. The parameters for the W_s equations of many fish species, including the minimum length recommendations for their application, are listed in Anderson and Neumann (1996).

Age and Growth

Age and growth of warmwater fishes were evaluated according to Fletcher et al. (1993). Total length at annulus formation, L_n, was back–calculated using the Fraser-Lee method. Intercepts for the y axis for each species were taken from Carlander (1982). Mean back–calculated lengths at each age for each species were presented in tabular form for easy comparison between year classes. Mean back–calculated lengths at each age for each species were compared to averages calculated from scale samples gathered at lakes sampled by the warmwater enhancement teams.

Results and Discussion

Water Quality and Habitat

Kapowsin Lake can be described as relatively deep (maximum depth of 8.8 meters) with steep sloping shorelines and littoral zones located at the northern and southern ends of the lake. The shoreline development value is 2.6, which describes Kapowsin Lake as oblong in shape, with many shoreline irregularities. Emergent aquatic vegetation covers 10 percent of the shoreline, however, the lake is littered with logs, snags, and pilings. This mixture of aquatic vegetation and timber provides optimal habitat conditions for largemouth bass, bluegill, and other warmwater fish.

The water quality in Kapowsin Lake is within optimal limits for most warmwater fish. However, below 6 meters the lake becomes quite anoxic with DO levels below 1 ppm. Anoxic conditions are the result of decomposition of abundant woody debris on the lake bottom. Conductivity is low (<100 µs/cm) throughout the water column (Table 1). Conductivity readings are below the optimum range (100-400 µs/cm) for electrofishing efficiency outlined by Willis, 1998. Low conductivity could affect sampling if electricity is not efficiently transferred from the water into a fishes body.

Table 1. Water quality measurements taken from Kapowsin Lake on September 7, 1999. Measurements were taken at noon from mid-lake.

Location	**Depth (m)**	**Temp (C)**	**pH**	**DO mg/l**	**Cond µs/cm**
Mid-Lake	Surface	19.8	6.4	8.9	54.5
	1	19.6	6.6	8.7	54.4
	2	19.2	6.7	7.5	54.0
	3	18.6	6.7	7.5	54.2
	4	18.2	6.7	5.9	55.0
	5	18.2	6.7	3.5	57.7
	6	15.2	6.7	1.0	72.1
	7	12.9	7.0	0.4	94.2
	8	12.4	7.2	0.2	99.1

Species Composition and Relative Abundance

In all, eight species of fish were sampled from Kapowsin Lake. Of those, largemouth bass (*Micropterus salmoides*) and bluegill (*Lepomis macrochirus*) were the most abundant numerically at 32.6 and 42.5 percent, respectively. Together, largemouth bass and bluegill accounted for 54 percent of the total biomass (32.7 and 21.8 percent, respectively). Following bass and bluegill in order of highest to lowest abundance was yellow perch (*Perca flavescens*), rock bass (*Ambloplites rupestris*), pumpkinseed (*Lepomis gibbosus*), black crappie (*Pomoxis* *nigromaculatus*), brown bullhead (*Ictalurus nebulosus*), and coho (*Oncorhynchus kisutch*) (Table 2).

Similar to species composition, largemouth bass and bluegill exhibited the highest catch per unit effort (CPUE) at 31 fish/hour and 232 fish/hour, respectively (Table 3). With the exception of yellow perch (7 fish/net night ± 4.0 Gill Net CPUE), gill and trap nets were ineffective at capturing warmwater fish.

Table 2. Species composition by weight and number for fish captured (Age–1 and older) from Kapowsin Lake, September 1999.

	Species Composition					
	by Weight		by Number		Size Range (mm TL)	
Species	**(kg)**	**(%w)**	**(#)**	**(%n)**	**Min**	**Max**
Brown bullhead	1.0	1.2	3	0.2	185	362
Black crappie	0.4	0.5	6	0.3	48	222
Bluegill	21.8	26.3	739	42.4	28	208
Coho	0.3	0.3	3	0.2	147	222
Largemouth bass	32.7	39.4	567	32.6	31	465
Pumpkinseed	0.3	0.3	10	0.6	68	149
Rock bass	10.9	13.2	183	10.5	35	246
Yellow perch	15.5	18.7	230	13.2	40	226

Table 3. Average catch per unit effort for warmwater fish sampled from Kapowsin Lake, September 1999.

	Electrofishing			Gill Netting			Fyke Netting		
Species	**(# / hour)**	**80% CI**	**Sample Sites**	**#/net night**	**80% CI**	**# net nights**	**#/net night**	**80% CI**	**# net nights**
Brown Bullhead	0.4	0.6	13	0.5	0.4	4	-	-	4
Black Crappie	0.9	0.8	13	0.5	0.4	4	-	-	4
Bluegill	232	39	13	6	6	4	-	-	4
Coho	1	2	13	-	-	4	-	-	4
Largemouth Bass	31	6	13	1	1	4	-	-	4
Pumpkinseed Sunfish	4	3	13	0.3	0.3	4	-	-	4
Rock Bass	63	8	13	2	1	4	1	1	4
Yellow Perch	73	27	13	7	4	4	-	-	4

Summary by Species

Largemouth Bass (*Micropterus salmoides*)

Largemouth bass size structure is dominated by fish smaller than stock size (Figure 2). A PSD of 12 (CI of ± 5) suggests that few quality size and larger fish are not present in the lake and that the population is out of balance (Table 4). However, information from anglers and area fish biologists suggest that Kapowsin Lake has a large population of big bass. There are three likely explanations why the sample size of stock size and larger bass was low in Kapowsin Lake: 1) steep sloping shorelines; 2) low conductivity; and 3) season. Steep sloping shorelines can reduce sample size of larger bass because these individuals will reside deeper in the water column where the electrofishing boat is less effective. Low conductivity reduces the efficiency in which electricity transfers from water into a fishes body. Even though Kapowsin Lake was sampled during the fall, larger bass are more active in the shallower areas of the littoral zones during the spring due to warmer water temperatures following the winter and pre–spawn activities. It's likely that all three factors, to some degree, influenced the number of largemouth bass (greater than stock size) sampled in Kapowsin Lake.

Largemouth bass condition is good with nearly all individuals ranging between 90-110 (Figure 3). Largemouth bass growth is slower than the state average up until Age–5 where it exceeds the average (Table 5). With better than average condition factors, it is unlikely that forage base causes below average growth in largemouth bass Age–4 and under. Instead, small (<stock size) bass, in the presence of abundant bluegill and yellow perch populations, may be space limited. A more plausible explanation may simply be that Kapowsin Lake has a short growing season.

Table 4. Stock density indices (electrofishing) for fish sampled from Kapowsin Lake, September 1999.

		Quality		Preferred		Memorable		Trophy	
Species	**# Stock Length**	**PSD**	**80% CI**	**RSD-P**	**80% CI**	**RSD-M**	**80% CI**	**RSD-T**	**80% CI**
Black Crappie	2	50	45	0	0.0	0	0	0	0
Bluegill	501	8	2	0.4	0.4	0	0	0	0
Largemouth Bass	68	12	5	7	4	0	0	0	0
Pumpkinseed Sunfish	8	0	0	0	0.0	0	0	0	0
Rock Bass	137	47	5	1	1	0	0	0	0
Yellow Perch	163	16	4	0	0	0	0	0	0

Table 5. Fraser-Lee back calculated length at age of largemouth bass from Kapowsin Lake, September 1999.

		Mean Length at Age (mm)								
Year Class	**n**	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**
1998	28	64								
1997	12	71	123							
1996	17	73	124	163						
1995	14	75	136	173	212					
1994	3	73	113	220	277	311				
1993	1	60	134	182	244	288	310			
1992	1	79	168	227	286	320	345	396		
1991	1	90	143	195	248	318	360	395	412	
1990	3	59	132	198	255	301	341	374	408	433
Average		69	128	176	232	307	340	383	409	433
Direct Proportion		56	119	170	228	302	336	380	408	433
State Average		61	146	222	261	289	319	368	396	440

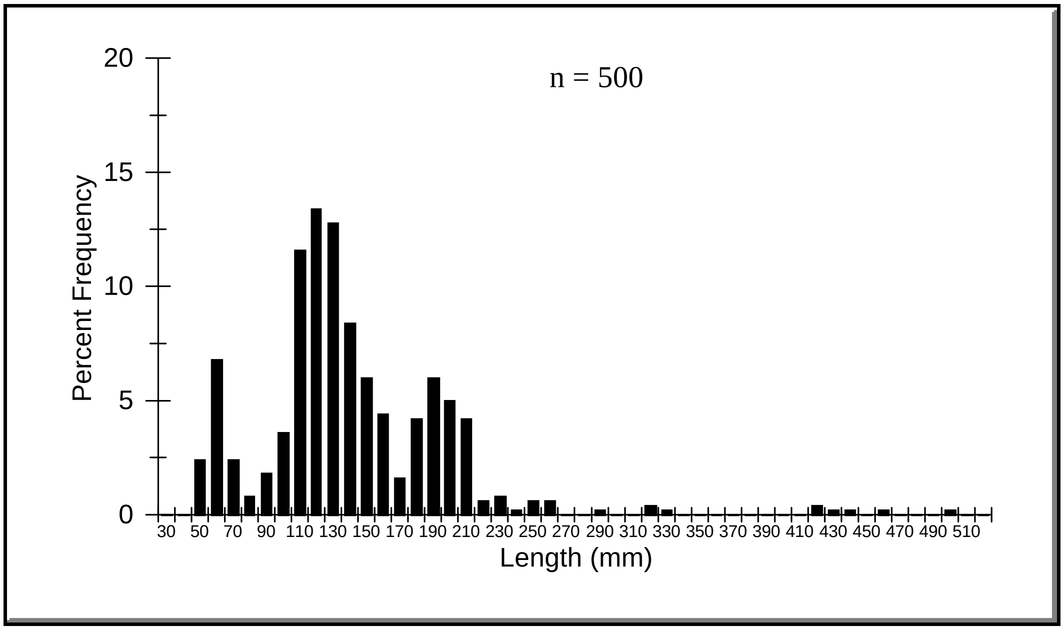

Figure 2. Electrofishing length frequency distribution of largemouth bass from Kapowsin Lake, September 1999.

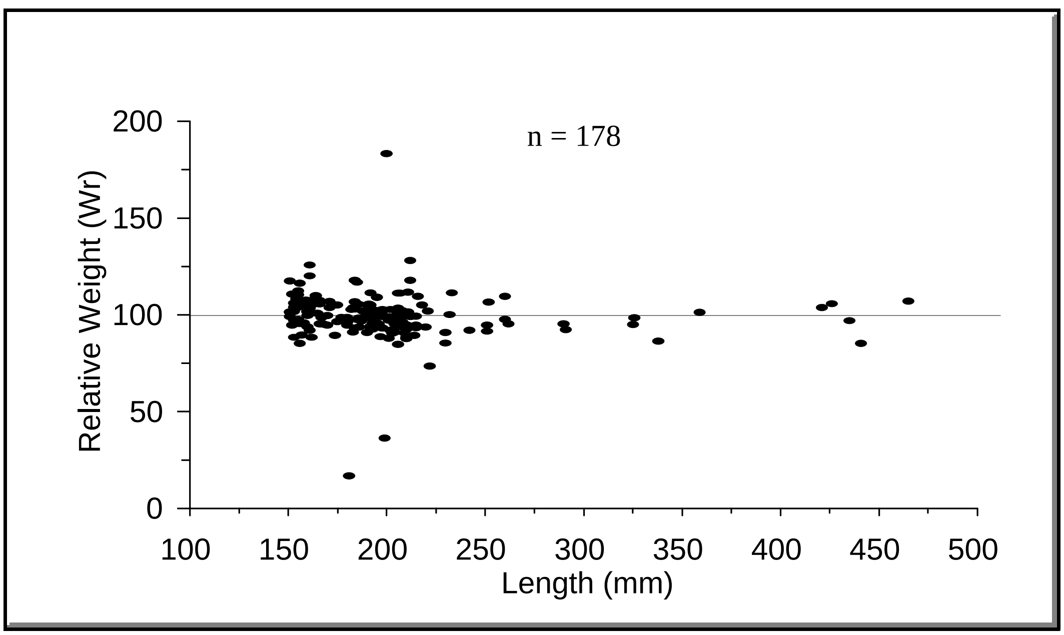

Figure 3. Condition (Wr), as compared to the national average (100), of largemouth bass from Kapowsin Lake, September 1999.

Bluegill (*Lepomis macrochirus*)

Although numerous (232 fish/hour electrofishing CPUE), bluegill are weighted heavily towards smaller individuals (Figure 4). Few bluegill larger than 130 mm were sampled from Kapowsin Lake. Bluegill PSD is 8 (± 2), which suggests an unbalanced population (Table 4). Similar to largemouth bass, larger bluegill may have been deeper in the water column reducing their chance of capture by the electrofishing boat.

Condition for bluegill is good with nearly all individuals ranging between 90-120 (Figure 5), showing that food resources are not lacking. Bluegill growth is below the state average (Table 6). Similar to largemouth bass, below average growth for bluegill may be related to fish density or space limitation.

Table 6. Fraser-Lee back–calculated length at age of bluegill from Kapowsin Lake, September 1999.

		Mean Length at Age (mm)				
Year Class	**n**	**I**	**II**	**III**	**IV**	**V**
1998	22	39				
1997	9	49	91			
1996	3	43	90	122		
1995	13	46	84	117	141	
1994	5	29	75	105	131	146
Average		42	85	115	138	146
Direct Proportion		26	76	109	136	145
State Average		37	97	132	148	170

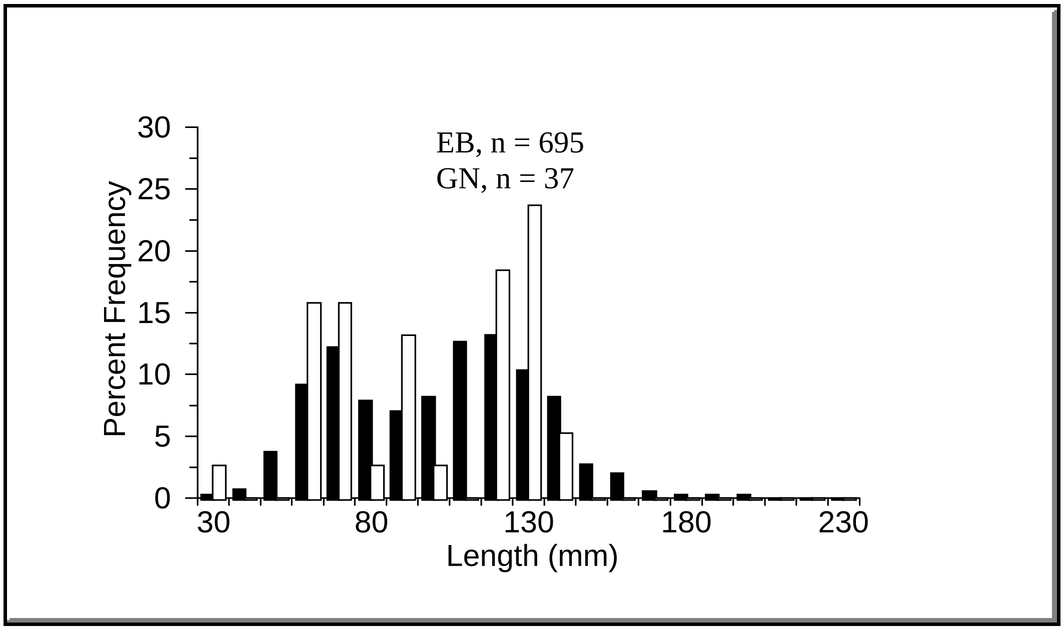

Figure 4. Electrofishing (dark bars) and gill netting (light bars) length frequency distribution of bluegill from Kapowsin Lake, September 1999.

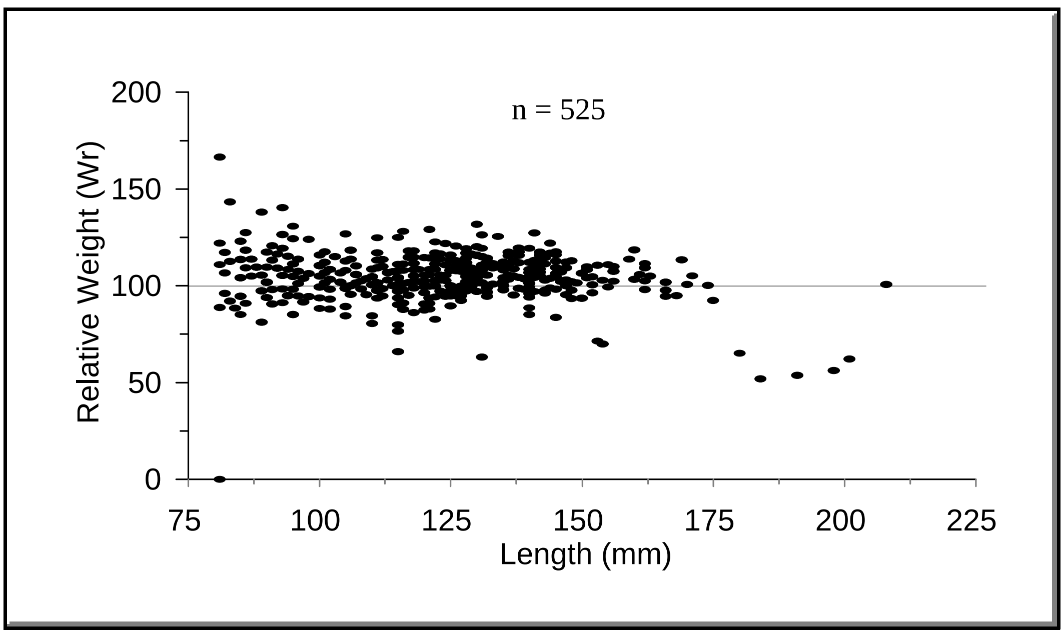

Figure 5. Condition (Wr), as compared to the national average (100), of bluegill from Kapowsin Lake, September 1999.

Yellow Perch (*Perca flavescens*)

Yellow perch size structure is composed primarily of stock size (130-199 mm) fish (Figure 6). Few fish below or above stock size were sampled from Kapowsin Lake. Yellow perch PSD is 16 (± 4), which suggests that few quality sized fish exist in Kapowsin Lake (Table 4).

Condition for yellow perch is fair (Figure 7). Although some individuals are above the national average, most yellow perch range between 75-90. Yellow perch growth is below the state average (Table 7). Interspecific competition for food resources with a dense bluegill population might explain the poor condition and slow growth yellow perch are experiencing.

Table 7. Fraser-Lee back–calculated length at age of yellow perch from Kapowsin Lake, September 1999.

		Mean Length at Age (mm)			
Year Class	**n**	**I**	**II**	**III**	**IV**
1997	7	66			
1996	16	63	110		
1995	14	69	141	174	
1994	11	69	119	151	175
Average		67	123	164	175
Direct Proportion		45	111	158	171
State Average		60	120	152	193

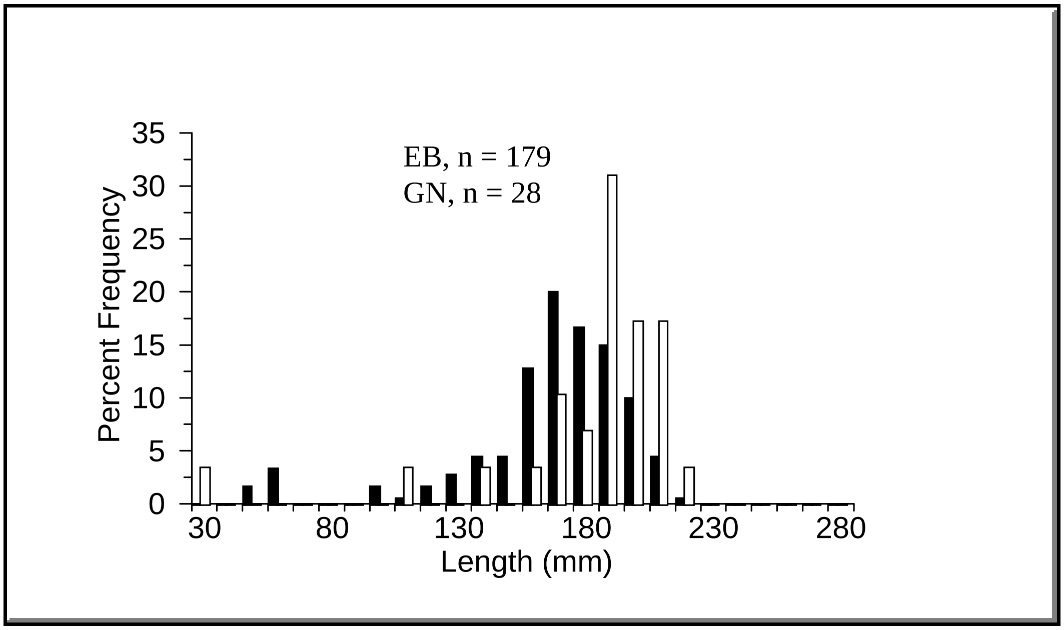

Figure 6. Electrofishing (dark bars) and gill netting (light bars) length frequency distribution for yellow perch from Kapowsin Lake, September 1999.

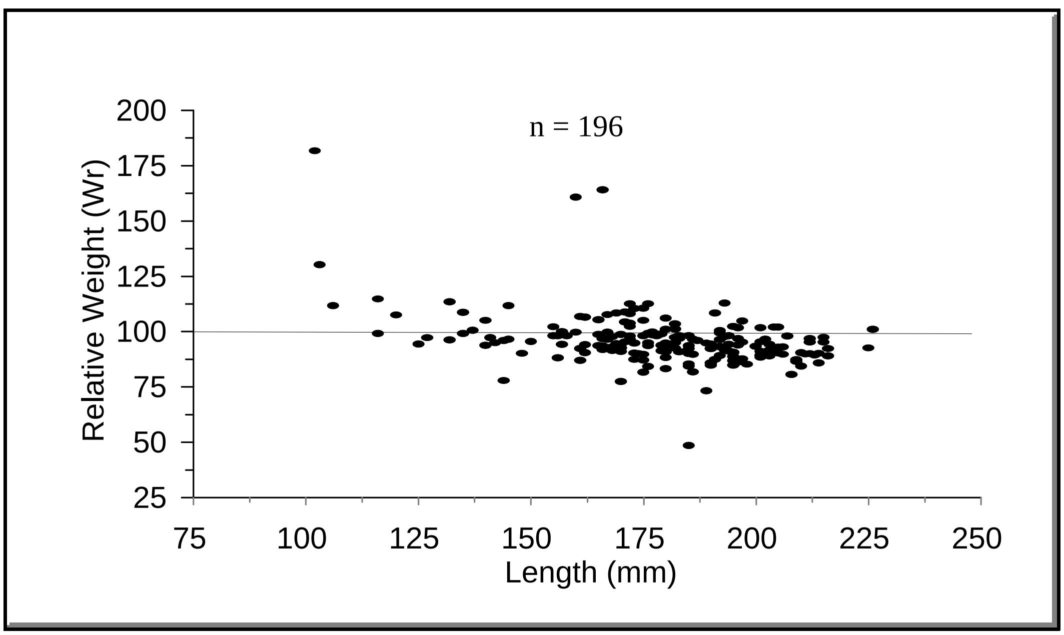

Figure 7. Condition (Wr), as compared to the national average (100), of yellow perch from Kapowsin Lake, September 1999.

Rock Bass (*Ambloplites rupestris*)

Rock bass size structure is good with the majority of individuals either being stock or quality size (Figure 8). Rock bass PSD is 47 (± 5), which suggests a high number of larger individuals in the population (Table 4).

Condition for rock bass is poor with most individuals below the national average (Figure 9). Rock bass growth is similar to the state average (Table 8).

Table 8. Fraser-Lee back–calculated length at age of rock bass from Kapowsin Lake, September 1999.

		Mean Length at Age (mm)						
Year Class	**n**	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
1998	3	46						
1997	11	52	75					
1996	13	52	77	96				
1995	14	49	81	117	142			
1994	14	49	84	112	137	156		
1993	5	51	80	118	148	172	192	
1992	2	65	99	138	163	187	201	213
1991	1	49	82	114	132	146	159	182
Average		51	80	111	142	162	190	203
Direct Proportion		32	68	103	137	159	188	201
State Average		70	118	147	178	193	203	N/A

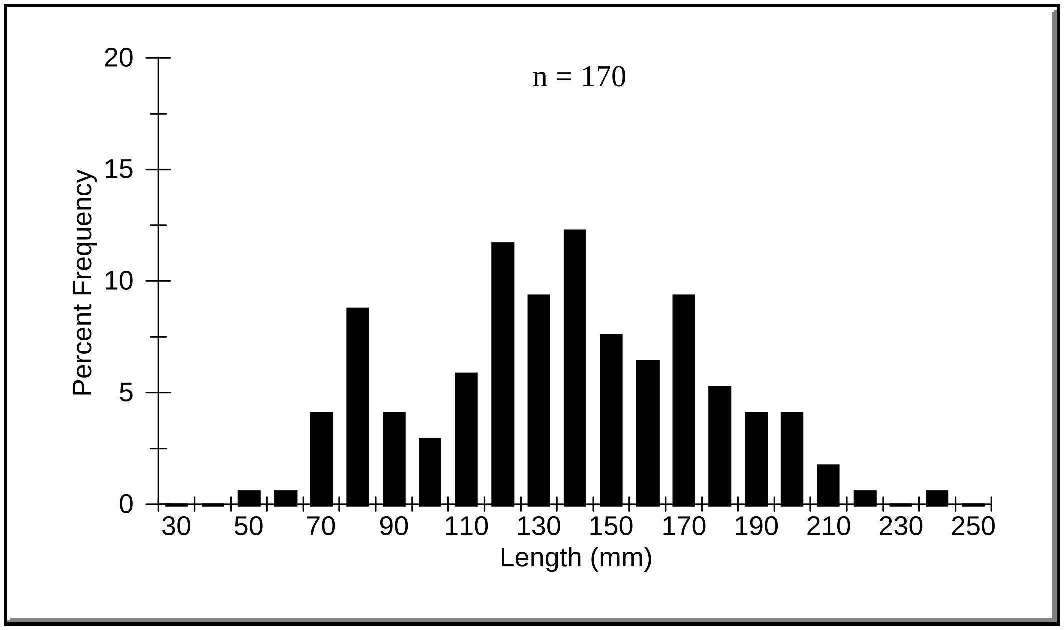

Figure 8. Electrofishing length frequency distribution for rock bass from Kapowsin Lake, September 1999.

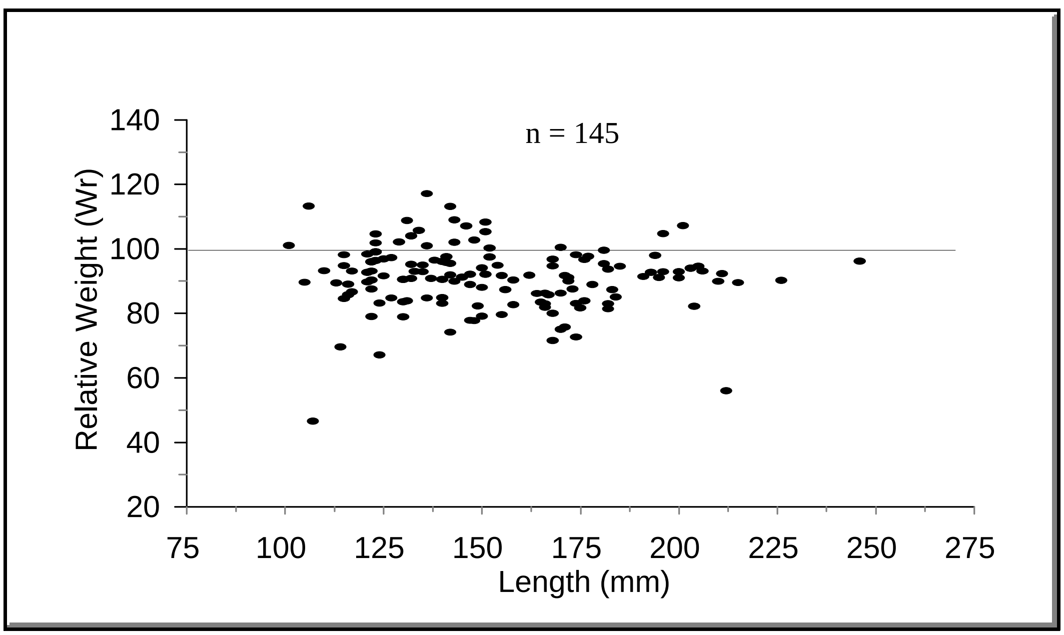

Figure 9. Condition (Wr), as compared to the national average (100), of rock bass in Kapowsin Lake, September 1999.

Pumpkinseed (*Lepomis gibbosus*)

Too few pumpkinseed were sampled during the survey (n = 10, CPUE = 4 fish/hour) to warrant any analysis. Of those fish captured, their lengths ranged from 68-149 mm. Pumpkinseed condition is high with all individuals ranging between 110-125. Growth is similar to the state average (Table 9).

Table 9. Fraser-Lee back–calculated length at age of pumpkinseed from Kapowsin Lake, September 1999.

		Mean Length at Age (mm)				
Year Class	**n**	**I**	**II**	**III**	**IV**	**V**
1998	7	51				
1997	1	44	83			
1996	-	-	-	-	-	
1995	-	-	-	-	-	
1994	1	55	71	113	124	139
Average		51	77	113	125	139
Direct Proportion		11	67	106	120	137
State Average		24	72	102	123	139

Black Crappie (*Pomoxis nigromaculatus*)

Too few black crappie were sampled during the survey (n = 6, CPUE = <1 fish/hour) to warrant any analysis. Of those fish captured, their lengths ranged from 48-222 mm. Black crappie condition is high with all individuals ranging between 100-125. Growth is below the state average until Age–3 where it exceeds the average (Table 10).

Table 10. Fraser-Lee back–calculated length at age of bluegill from Kapowsin Lake, September 1999.

		Mean Length at Age (mm)		
Year Class	**n**	**I**	**II**	**III**
1998	3	61		
1997	1	52	106	
1996	1	83	143	191
Average		64	124	191
Direct Proportion		38	107	185
State Average		46	111	157

Brown Bullhead (*Ictalurus nebulosus*)

Too few brown bullhead were sampled during the survey (n = 3, CPUE = <1 fish/hour) to warrant any analysis. Of those fish captured, their lengths ranged from 180-365 mm. Condition and growth calculations were not performed for brown bullhead.

Coho (*Oncorhynchus kisutch*)

Too few coho were sampled during the survey (n = 3, CPUE = <1 fish/hour) to warrant any analysis. Of those fish captured, their lengths ranged from 147-222 mm. Condition and growth calculations were not performed for coho.

Management Options

Judging from verbal reports given by area fish biologists and anglers, Kapowsin Lake appears to support a quality largemouth bass fishery. However, our data suggests that Kapowsin Lake is a poor largemouth bass fishery dominated by stock size and smaller fish. As indicated earlier in the report, low conductivity and season may explain the low number of quality and larger size bass encountered during the survey. Although conductivity cannot be manipulated, the time of year when we sample can. Re–sampling Kapowsin Lake in the spring will provide us with a better means of assessing size structure of largemouth bass than do fall time surveys. Largemouth bass are more active and likely to be captured in the spring because of warmer water temperatures following winter and pre–spawning activities.

Similar to largemouth bass, few quality or larger size panfish (bluegill, black crappie, and yellow perch) were encountered during our survey. In the 1970s, Kapowsin Lake was noted by Fishing and Hunting News as a tremendous black crappie fishery. Since then, there have been few to no reports on the condition of the panfish fishery. Since panfish growth statewide is slow and limits are liberal, it seems possible that angler harvest may negatively impact panfish from producing viable fisheries.

The following are management options that are in the best interest of the warmwater fish community in Kapowsin Lake:

1. Conduct a spring biological survey with largemouth bass as the primary species targeted for capture. Sampling larger bass when they are most likely to be captured will provide a better idea on size structure, which allows us to make better judgements on the quality of the fishery; and

2. Conduct a year–long creel survey to understand angler pressure, preference, harvest, and satisfaction as it relates to the warmwater fish community in Kapowsin Lake. A creel survey may provide information on the number of quality and larger size warmwater fish either harvested or caught that appear to be absent from our samples.

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Appendix A

Table A1. Length categories that have been proposed for various fish species. Measurements are for total lengths (updated from Neumann and Anderson 1996).

	Category									
	Stock		Quality		Preferred		Memorable		Trophy	
Species	**(in)**	**(cm)**	**(in)**	**(cm)**	**(in)**	**(cm)**	**(in)**	**(cm)**	**(in)**	**(cm)**
Black bullhead[a]	6	15	9	23	12	30	15	38	18	46
Black crappie	5	13	8	20	10	25	12	30	15	38
Bluegill[a]	3	8	6	15	8	20	10	25	12	30
Brook trout	5	13	8	20						
Brown bullhead[a]	5	13	8	20	11	28	14	36	17	43
Brown trout	6	15	9	23	12	30	15	38	18	46
Burbot	8	20	15	38	21	53	26	67	32	82
Channel catfish	11	28	16	41	24	61	28	71	36	91
Common carp	11	28	16	41	21	53	26	66	33	84
Cutthroat trout	8	20	14	35	18	45	24	60	30	75
Flathead catfish	11	28	16	41	24	61	28	71	36	91
Green sunfish	3	8	6	15	8	20	10	25	12	30
Largemouth bass	8	20	12	30	15	38	20	51	25	63
Pumpkinseed	3	8	6	15	8	20	10	25	12	30
Rainbow trout	10	25	16	40	20	50	26	65	31	80
Rock bass	4	10	7	18	9	23	11	28	13	33
Smallmouth bass	7	18	11	28	14	35	17	43	20	51
Walleye	10	25	15	38	20	51	25	63	30	76
Warmouth	3	8	6	15	8	20	10	25	12	30
White catfish[a]	8	20	13	33	17	43	21	53	26	66
White crappie	5	13	8	20	10	25	12	30	15	38
Yellow bullhead	4	10	7	18	9	23	11	28	14	36
Yellow perch	5	13	8	20	10	25	12	30	15	38

[a] As of this writing, these new, or updated length classifications have yet to go through the peer review process, but a proposal for their use will soon be in press (Timothy J. Bister, South Dakota State University, personal communication).