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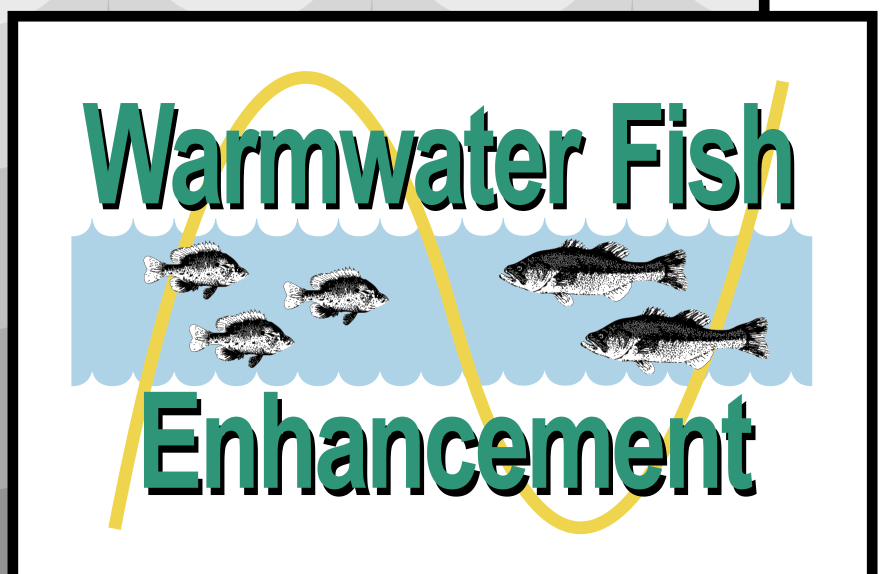
2004 Warmwater Fisheries Survey of Hutchinson and Shiner Lakes, Adams County Washington



by Michael Schmuck and Marc Petersen

Washington Department of
FISH AND WILDLIFE
Fish Program
Science Division

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2004 Warmwater Fisheries Survey of Hutchinson and Shiner Lakes, Adams County, Washington

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Abstract

Hutchinson-Shiner Lake, Adams County, Washington was sampled between October 4-6, 2004, using a boat electrofisher, gill nets, and fyke nets. Five warmwater fish species were observed during sampling efforts: Largemouth bass *Micropterus salmoides*, black crappie *Pomoxis nigromaculatus*, bluegill *Lepomis macrochirus*, pumpkinseed sunfish *L. gibbosus*, and yellow perch *Perca flavescens*.

Bluegill was the most abundant species collected and was second in terms of total biomass (31%). Bluegill have undergone a 72 percent decline in abundance since our 2001 survey. Bluegill ranged in age from 1 to 5 years and growth was below average for age 1 to 3 fish, yet above average for age 4 and 5 fish. Bluegill were in good condition with average relative weight above the national average (W_r = 100).

Largemouth bass was second in abundance yet provided the majority of biomass collected in our samples. Age ranged from 1 to 8 years; however, no age-seven fish were collected and the majority of fish (96%) were age 1 to 5. Relative weights for stock length and quality length largemouth bass were below the national average; whereas, relative weights for preferred length fish, and fish less than stock length were above the national average.

Yellow perch was the third most abundant species collected and biomass was slightly less than that of bluegill. Yellow perch ranged in age from 1 to 3 years and growth was well above the statewide average despite below-average relative weights. During a 2001 warmwater fisheries survey, very few yellow perch were collected; however, it appears that yellow perch have become well established and should provide angling opportunity.

Sampling indicated that predator/prey ratios are out of balance, based on biomass ratios, which indicate a large population of largemouth bass, and relatively few prey fish. Largemouth bass exploitation is likely low and predation by bass on panfish may be keeping panfish populations from growing to desired levels. Managers should encourage anglers to target and retain more largemouth bass in order to help control this population.

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Introduction and Background

Hutchinson and Shiner lakes are located approximately four miles west of Othello, WA. These lakes are fed by Hayes and Coyote creeks and are a part of the Seep Lakes chain that originates south of Potholes Reservoir. Hutchinson and Shiner lakes, combined, have a surface area of 33.6 ha, a mean depth of 3.5 m and a volume of 616,741 m^3. Water drains from Shiner Lake into Hutchinson Lake via a small channel approximately 50 m long. Fish can easily move from one lake to the other over much of the year, except under low water conditions. The shoreline of both lakes is comprised of emergent vegetation, bulrush *Scirpus spp.*, cattail *Typha latifolia*, sedge *Carex spp.* and talus cliffs in approximately equal amounts. Aquatic vegetation found in the lake includes: water milfoil *Myriophyllum spp.*, pondweed *Potamogeton spp.*, and filamentous algae. The soil surrounding Hutchinson and Shiner lakes is alkaline and supports plants such as saltgrass *Distichlis stricta*, and greasewood *Sarcobatus vermiculatus* as well as many other common shrub-steppe species such as big sagebrush *Artemesia tridentata*, green and grey rabbitbrush *Ericameria spp.*, and a variety of grass species. In addition to fish species, Hutchinson and Shiner lakes host various birds, such as great blue heron *Ardea herodias*, gulls *Larus spp.*, and terns *Sterna spp.*, and small mammals including beaver *Castor canadensis* and raccoon *Procyon lotor*.

From 1998 to 2000, the Washington Department of Fish and Wildlife (WDFW) stocked largemouth bass *Micropterus salmoides*, bluegill *Lepomis macrochirus*, black crappie *Pomoxis nigromaculatus*, rainbow trout *Onchorhyncus mykiss*, and Lahontan cutthroat trout *O. clarki henshawi* in Hutchinson and Shiner Lake (Table 1). Hutchinson and Shiner lakes are managed using statewide general freshwater species rules set forth by the WDFW. Both lakes open for fishing on April 1 and close on September 30 each year. Anglers are authorized to operate boats on both lakes; however, the use of gas engines is prohibited.

The last rehabilitation of both Hutchinson and Shiner lakes occurred in March 1998. After the rehabilitation, fish barriers were installed on Hayes Creek (Hutchinson Lake outlet) to prevent the migration of carp into Hutchinson Lake. This work was completed by Doug Fletcher (WDFW), Chad Jackson (WDFW), and U.S. Fish and Wildlife Service (USFWS) personnel. The WDFW and USFWS continue to work together with landowners to make improvements around the barriers. The last warmwater fisheries survey of Hutchinson and Shiner lakes was conducted in 2001 (Schmuck et al. in press). Based on results of that survey both Hutchinson and Shiner Lake are being treated as one body of water, hereafter referred to as Hutchinson-Shiner Lake.

Hutchinson-Shiner Lake is contained almost entirely within the Columbia National Wildlife Refuge (CNWR). The land at the west end of the lake is privately owned. The WDFW manages the fishery within this lake; however, the boat launch and associated infrastructure is managed and maintained by the USFWS.

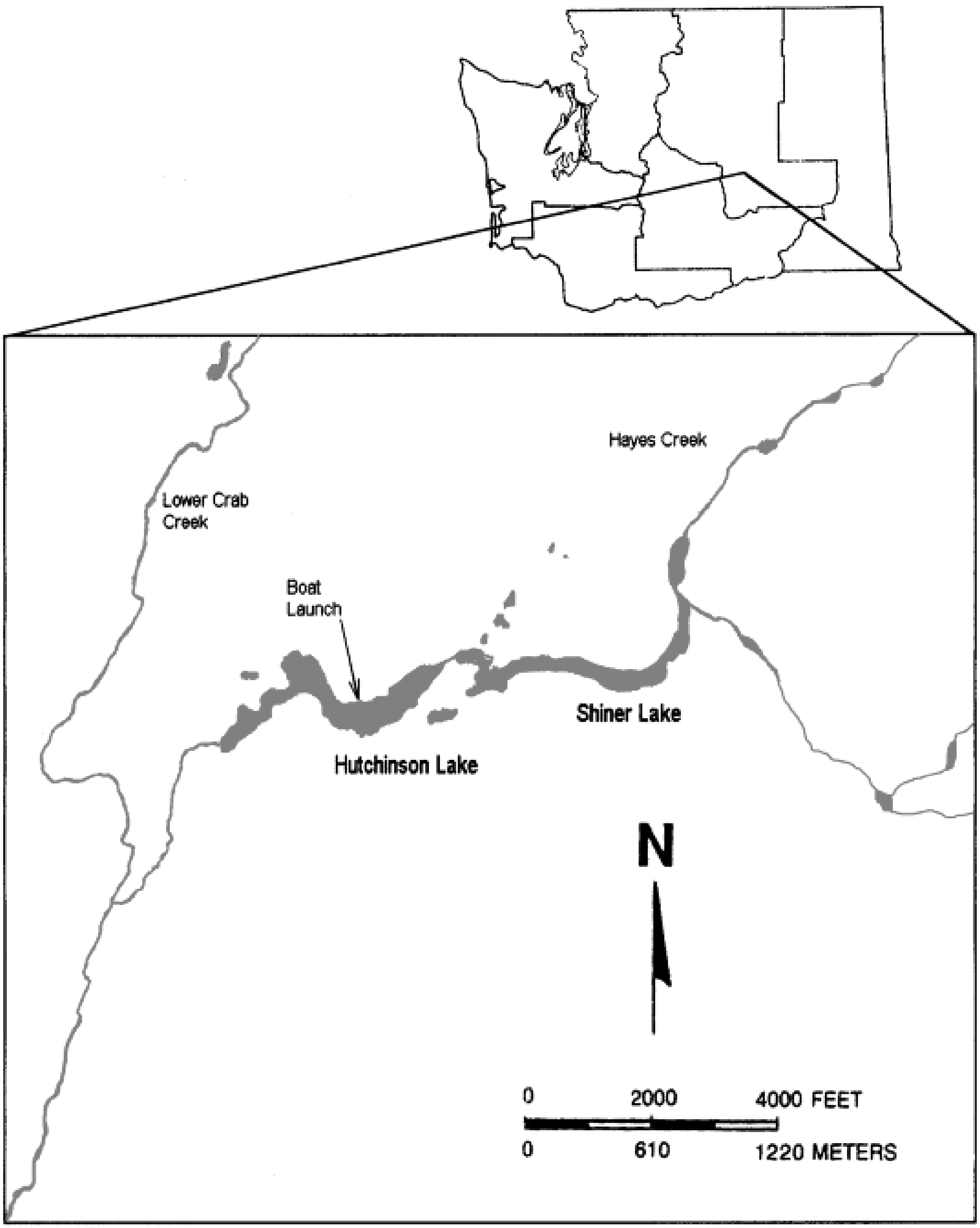

Figure 1. Map of Hutchinson and Shiner lakes near Othello, WA

Table 1. Summary of fish stocked in Hutchinson and Shiner lakes from 1998-2000

Year	Species	Size	Number
1998	Largemouth bass	Adults	10
		Juveniles	1,010
	Bluegill	Adults	17
		Fingerlings	94
		Fry	22,845
	Black crappie	Adults	583
		Fingerlings	11,270
	Rainbow trout	Fingerlings	8,037
	Lahontan cutthroat	Fingerlings	6,392
1999	Largemouth bass	Adults	242
		Juveniles	1,348
		Fry	912
	Bluegill	Adults	1,435
		Juveniles	1,068
		Fry	53,021
	Black crappie	Adults	1
		Juveniles	5
		Fry	2,030
2000	Rainbow trout	Fingerlings	20,264

Materials and Methods

Hutchinson-Shiner Lake was surveyed by a three-person team October 4-6, 2004. All fish were collected using a boat electrofisher, gill nets, and fyke nets. The electrofisher unit consisted of a 5.5 m Smith-Root GPP electrofisher boat with a DC current of 60 cycles/sec at 3 to 4 amps power (Bonar et al. 2000). Experimental gill nets (45.7 m x 2.4 m) were constructed of variable size (13, 19, 25, and 51 mm stretched) monofilament mesh. Fyke nets were constructed of a main trap (four 1.2 m aluminum rings), a single 30.3 m lead, and two 15.2 m wings. Fyke net material was constructed of 13 mm nylon mesh.

Sampling locations were selected by dividing the shoreline into 400 m sections determined from a map. The number of randomly selected sections surveyed were as follows: electrofisher 8, gill nets 4, and fyke nets 4. Electrofishing occurred in shallow water (depth range: 0.2 - 1.5 m), adjacent to the shoreline at a rate of approximately 18.3 m/minute for 600-second intervals (Bonar et al. 2000). Gill nets were set perpendicular to the shoreline with the small mesh end attached on or near the shore and the large-mesh end anchored offshore. Fyke nets were set perpendicular to the shoreline with the wings extended at 70° angles from the lead. Gill nets and fyke nets were set overnight, prior to electrofishing, and were pulled the following morning (1 net-night each). All sampling was conducted at night, when fish are typically found along the shoreline, thus maximizing the efficiency of each gear type.

Fish were identified to species, measured in millimeters (mm) to total length (TL) from the anterior-most part of head to the tip of the compressed caudal fin, and weighed to the nearest gram (g). Total length data were used to construct length-frequency histograms and to evaluate the size structure of the warmwater species in the lake. Warmwater fish species were assigned to a 10 mm size group based on total length, and scale samples were collected from the first five fish collected in each size group (Bonar et al. 2000). Scale samples were mounted on adhesive data cards and pressed onto acetate slides using a Carver® laboratory press (Fletcher et al. 1993). Lucinda Morrow (WDFW Scale Lab) aged fish from this survey using scales that were collected.

Species composition, by weight in kilograms (kg) and number, was determined from fish captured. Fish less than 1 year old, i.e., young-of-the-year (YOY), were excluded from all analyses. Eliminating YOY fish prevents distortions in analyses that may occur due to sampling location, method, and specific timing of hatches (Fletcher et al. 1993).

Catch per unit effort (CPUE) of each gear type was determined for each warmwater fish species collected. Electrofisher CPUE was determined by dividing the number of fish captured by the total amount of time electrofished. The CPUE's for gill nets and fyke nets were standardized, and determined by dividing the total number of fish captured by the total number of nights each gear was deployed. Since CPUE is standardized, it can be useful in comparing catch rates between lakes, or between sampling dates on the same water.

A relative weight (W_r) index was used to evaluate the condition of fish. As presented by Anderson and Neumann (1996), a W_r of 100 indicates that the fish is in a condition similar to the national average for that species and length. The index is defined as $W_r = W/W_s \times 100$, where W is the weight (g) of an individual fish and W_s is the standard weight of a fish of the same total length (mm). The standard weight was derived from a standard weight-length ($\log_{10}$) relationship, which was defined for each species of interest in Anderson and Neumann (1996). Minimum lengths were used for each species, as the variability can be significant for small fish (YOY). Relative weights less than 50 were also excluded from our analyses as we suspected unreliable weight measurements.

Age and growth of warmwater fish species were evaluated using procedures described by Fletcher et al. (1993). Fish from which scales were taken were evaluated using both the direct proportion method (Fletcher et al. 1993) and Lee's modification of the direct proportion method (Carlander 1982). Mean back-calculated lengths-at-age for all warmwater species were then compared to those of eastern Washington and/or statewide averages (Fletcher et al. 1993).

Proportional stock density (PSD) of each warmwater fish species was determined following procedures outlined in Anderson and Neumann (1996). Proportional stock density uses two measurements, stock length and quality length, to provide information about the proportion of various size fish in a population. Stock length is defined as the minimum size of a fish which provides recreational value, or approximate length when fish reach maturity (Table 2). Quality length is the minimum size of a fish that most anglers like to catch or begin keeping (Table 2). Proportional stock density is calculated using the number of quality-sized fish, divided by the number of stock-sized fish, multiplied by 100. Stock and quality lengths, which vary by species, are based on percentages of world-record lengths (Anderson and Weithman 1978). Stock length is 20-26percent of the world record length, whereas quality length is 36-41percent of the world record length.

Relative stock density (RSD) of each warmwater fish species was examined using the five-cell model proposed by Gabelhouse (1984). In addition to stock and quality lengths, the Gabelhouse model adds preferred, memorable, and trophy categories (Table 2). Preferred length (RSD-P) is defined as the minimum size of fish anglers would prefer to catch. Memorable (RSD-M) length refers to the minimum size fish anglers remember catching, and trophy length (RSD-T) refers to the minimum size fish worthy of acknowledgment. Preferred, memorable, and trophy length fish are also based on percentages of world record lengths (Anderson and Weithman 1978). Preferred length is 45-55 percent of world record length, memorable length is 59-64percent of world record length, and trophy length is 74-80percent of world record length. Relative stock density differs from PSD in that it is more sensitive to changes in year class strength. Relative stock density is calculated as the number of fish within the specified length category, divided by the total number of stock length fish, multiplied by 100. Confidence intervals of 80percent were selected from tables in Gustafson (1988) for PSD and RSD.

Table 2. Minimum total length (mm) categories of warmwater fish used to calculate PSD and RSD values (Willis et al. 1993).

	Length Category				
Species	Stock	Quality	Preferred	Memorable	Trophy
Black crappie	130	200	250	300	380
White crappie	130	200	250	300	380
Bluegill	80	150	200	250	300
Yellow perch	130	200	250	300	380
Largemouth bass	200	300	380	510	630
Smallmouth bass	180	280	350	430	510
Walleye	250	380	510	630	760
Channel catfish	280	410	610	710	910
Brown bullhead	150	230	300	390	460
Yellow bullhead	150	230	300	390	460

RESULTS AND DISCUSSION

Species Composition

Five fish species were collected during sampling efforts on Hutchinson-Shiner Lake (Table 3). Bluegill was the most abundant species collected and was second in terms of biomass collected. The most abundant fish collected in terms of biomass was largemouth bass, which was second in overall abundance behind bluegill. Yellow perch was third in overall abundance as well as biomass. Results of this survey suggest a significant decline (72%) in bluegill abundance coinciding with a significant increase in yellow perch abundance from 2001. Samples of largemouth bass remain relatively unchanged from 2001, and black crappie continue to struggle to establish a sizable population. Biomass of largemouth bass was 1.5 times that of other species combined which may indicate this community has an over abundance of predators (Swingle 1950).

Table 3. Species composition by weight, number, and size range of fish captured at Hutchinson-Shiner Lake during a warmwater fish survey October 2004.

	Species Composition					
	Weight		Number		Size Range (mm TL)	
Species	kg	%	No.	%	Min.	Max
Yellow perch	29.8	17.3	295	22.1	128	256
Bluegill	30.6	17.7	508	37.9	65	196
Pumpkinseed sunfish	6.6	3.8	82	6.1	82	180
Black crappie	2.1	1.2	27	2.0	147	235
Largemouth bass	103.3	59.9	426	31.8	144	502

Catch Per Unit Effort (CPUE)

Whether using active (electrofishing) or passive (gill netting or fyke netting) techniques to sample a lake or reservoir, CPUE can be a useful index to monitor size structure and relative abundance (Hubert 1996). Electrofishing is typically the most effective sampling method for collecting large samples of centrarchid fishes, and electrofisher catch rates during this survey were highest for bluegill and largemouth bass (Table 4). Gill net and fyke net catch rates were highest for yellow perch. Gill nets are typically the most effective gear for capturing percids, and gill net catch rates from this survey were noticeably higher for yellow perch. Largemouth bass was the only species not collected in fyke nets; however, catch rates for fyke nets were low for all species.

Table 4. Mean CPUE by sampling method, including 80 percent confidence intervals (CI), for fish collected from Hutchinson-Shiner Lake October 2004.

	Electrofisher			Gill Nets			Fyke Nets		
Species	No./ Hour	CI (+/-)	No. Sites	No./ Net Night	CI (+/-)	Net Nights	No./ Net Night	CI (+/-)	Net Nights
Yellow perch	8.8	3.1	15	29.4	7.9	8	4.8	2.0	8
Bluegill	195.2	32.7	15	1.3	0.6	8	1.6	1.2	8
Pumpkinseed sunfish	23.2	5.8	15	0.1	0.2	8	2.9	1.5	8
Black crappie	3.2	1.5	15	0.9	0.6	8	1.5	0.9	8
Largemouth bass	167.6	14.5	15	0.8	0.5	8	0	0	8

Stock Density Indices

Sample sizes of largemouth bass and bluegill captured with the boat electrofisher and yellow perch captured in gill nets allowed useful PSD estimates to be calculated. The PSD of largemouth bass collected with the boat electrofisher was 21, and the RSD-P was 8. These data indicate that 21 percent of the stock length or larger largemouth bass collected with the boat electrofisher were at least 12 inches, and 8 percent were at least 15 inches. The bluegill PSD generated from electrofishing data indicates that 38 percent of bluegill collected at least stock length were at least 6 inches. Neither gill nets nor fyke nets provided adequate samples of largemouth bass for PSD analysis. Yellow perch were sampled effectively with gill nets and the PSD from these data was 47, indicating that 47 percent of yellow perch (> stock length) collected in gill nets were at least 8 inches.

Table 5. Stock density indices, including 80 percent confidence interval, for warmwater fishes collected using boat electrofisher, gill nets, and fyke nets in Hutchinson-Shiner Lake during October 2004. PSD = proportional stock density, RSD = relative stock density, RSD-P = relative stock density of preferred fish, RSD-M = relative stock density of memorable fish, and RSD-T = relative stock density of trophy fish.

Species	#Stock Length	PSD	RSD-P	RSD-M	RSD-T
		Electrofisher			
Yellow perch	22	50 ± 14	0	0	0
Bluegill	467	38 ± 3	0	0	0
Pumpkinseed sunfish	58	40 ± 8	0	0	0
Black crappie	8	25 ± 20	0	0	0
Largemouth bass	288	21 ± 3	8 ± 2	0	0
		Gill Nets			
Yellow perch	234	47 ± 4	1 ± 1	0	0
Bluegill	8	0	0	0	0
Black crappie	7	0	0	0	0
Largemouth bass	6	17 ± 20	17 ± 20	0	0
		Fyke Nets			
Yellow perch	38	61 ± 10	3 ± 3	0	0
Bluegill	12	17 ± 14	0	0	0
Pumpkinseed sunfish	23	40 ± 13	0	0	0
Black crappie	12	0	0	0	0

Yellow perch

A total of 295 yellow perch were sampled during this survey and ages ranged from 1 to 3 years (Table 6). Growth was above the state average and fish were well represented throughout all age classes. The majority of yellow perch were collected in gill nets; and gill and fyke nets captured the largest yellow perch in our sample (Figure 2). Most yellow perch had relative weights lower than the national average (W_r = 100) (Figure 3); however, quality length (200-249mm) yellow perch had lower (p = .0001) relative weights than stock length (130-199mm) yellow perch. This may be an indication of inadequate food resources for larger yellow perch. In 1998, Hutchinson-Shiner Lake was rehabilitated in an attempt to remove undesirable fishes, including yellow perch; however, in 2001 we collected 5 yellow perch that likely survived the rehab. Based on data collected during this survey it appears that yellow perch are becoming well established and should provide angling opportunities in the near future.

Table 6. Age and growth of yellow perch captured at Hutchinson-Shiner Lake during October 2004. Shaded values are mean back-calculated lengths using the direct proportion method (Fletcher et al. 1993). Unshaded values are mean back-calculated lengths using Lee's modification of the direct proportion method (Carlander 1982)

		Mean length (mm) at age		
Year Class	# Fish	1	2	3
2003	16	58.1		
		76.9		
2002	11	79.8	167	
		98.2	172.9	
2001	28	76.3	146.9	189.2
		95.5	156.2	192.6
Direct Proportion mean		71.4	156.9	189.2
Fraser Lee mean		90.1	160.9	192.6
WA State Average (DP)		59.7	119.9	152.1

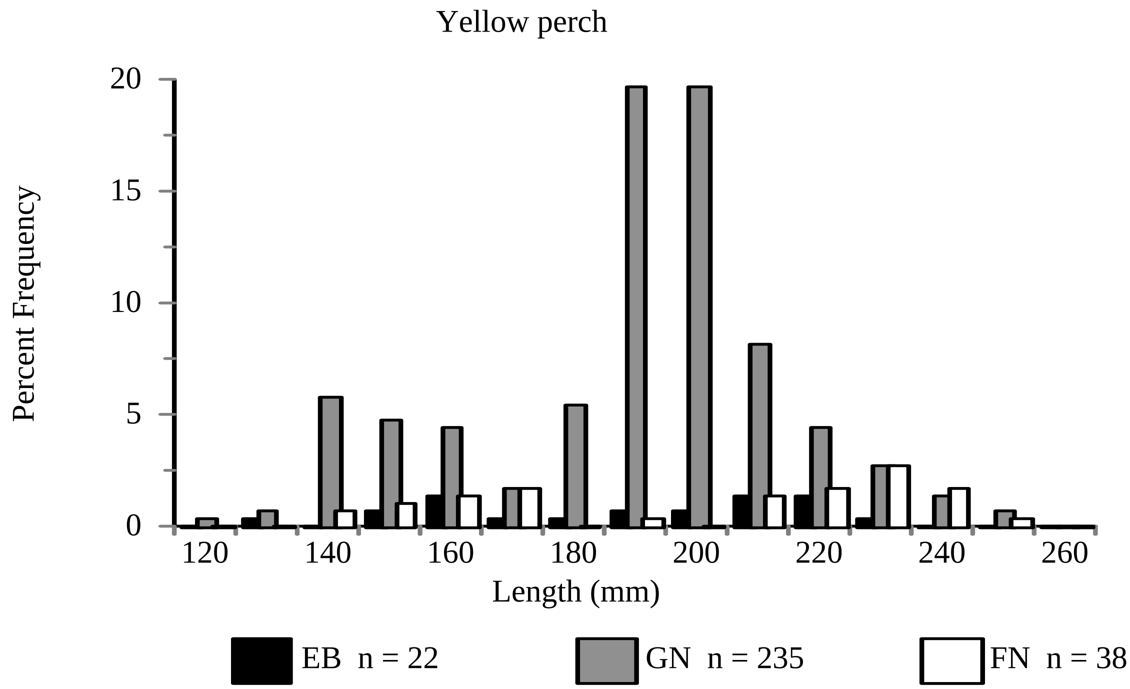

Figure 2. Length frequencies of yellow perch sampled using a boat electrofisher (EB), gill nets (GN), and fyke nets (FN) on Hutchinson-Shiner Lake, October 2004.

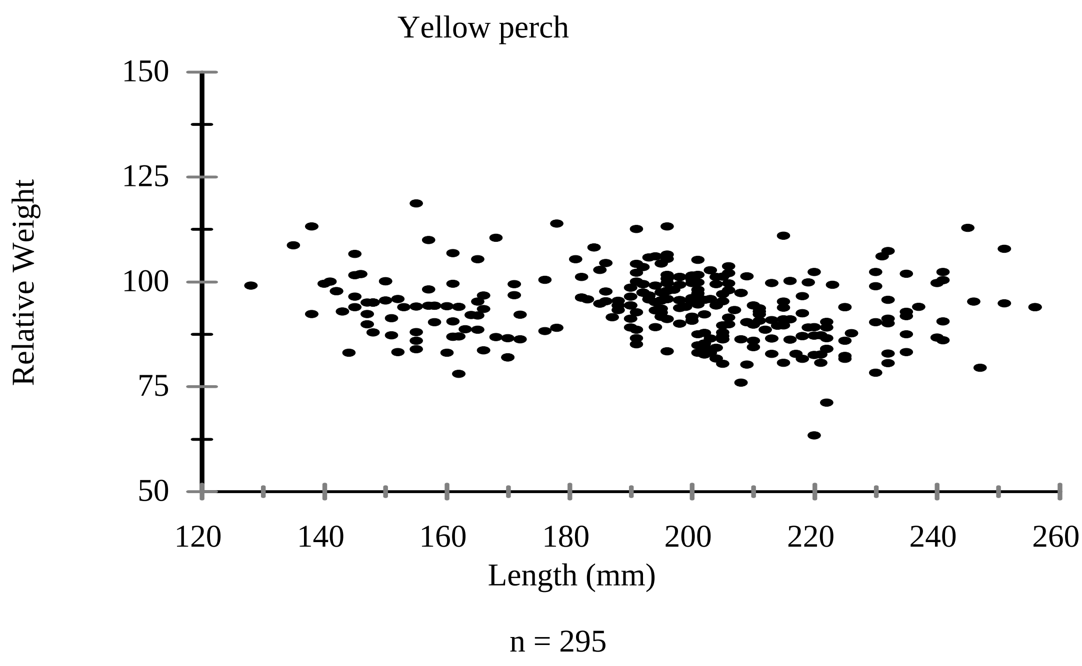

Figure 3. Relative weights for yellow perch sampled at Hutchinson-Shiner Lake, October 2004, compared to the national average W_r = 100 (Anderson and Neumann 1996).

Bluegill

A total of 508 bluegill were collected during this survey. This represents a 72 percent decline from 2001, and is primarily a decline in the number of stock-length fish. Growth was below average for all age classes except age-five fish (n=2)(Table 7); however average relative weights were well above average for stock length (80-149mm) and quality length (150-199mm) bluegill (Figure 5). Approximately 35 percent of bluegill collected were at least quality length (6 inches), and the majority of fish collected (95%) were captured with the boat electrofisher (Figure 4). Declines in bluegill abundance have coincided with an increase in yellow perch abundance and may be indicative of food competition and predation of YOY bluegill by yellow perch.

Table 7. Age and growth of bluegill captured at Hutchinson-Shiner Lake during October 2004. Shaded values are mean back-calculated lengths using the direct proportion method (Fletcher et al. 1993). Unshaded values are mean back-calculated lengths using Lee's modification of the direct proportion method (Carlander 1982)

		Mean length (mm) at age				
Year Class	# Fish	1	2	3	4	5
2003	21	25.8				
		39.4				
2002	18	17.4	62.4			
		34.5	71.9			
2001	11	20.0	67.0	118.8		
		37.3	78.0	122.8		
2000	18	15.9	51.8	106.5	150.9	
		34.0	65.8	114.3	153.6	
1999	2	20.7	63.3	123.0	159.2	178.6
		38.5	76.5	129.8	162.2	179.6
Direct Proportion mean		20.0	61.1	116.1	155.0	178.6
Fraser Lee mean		36.4	71.2	118.3	154.5	179.6
WA State Average (DP)		37.3	96.8	132.1	148.3	169.9

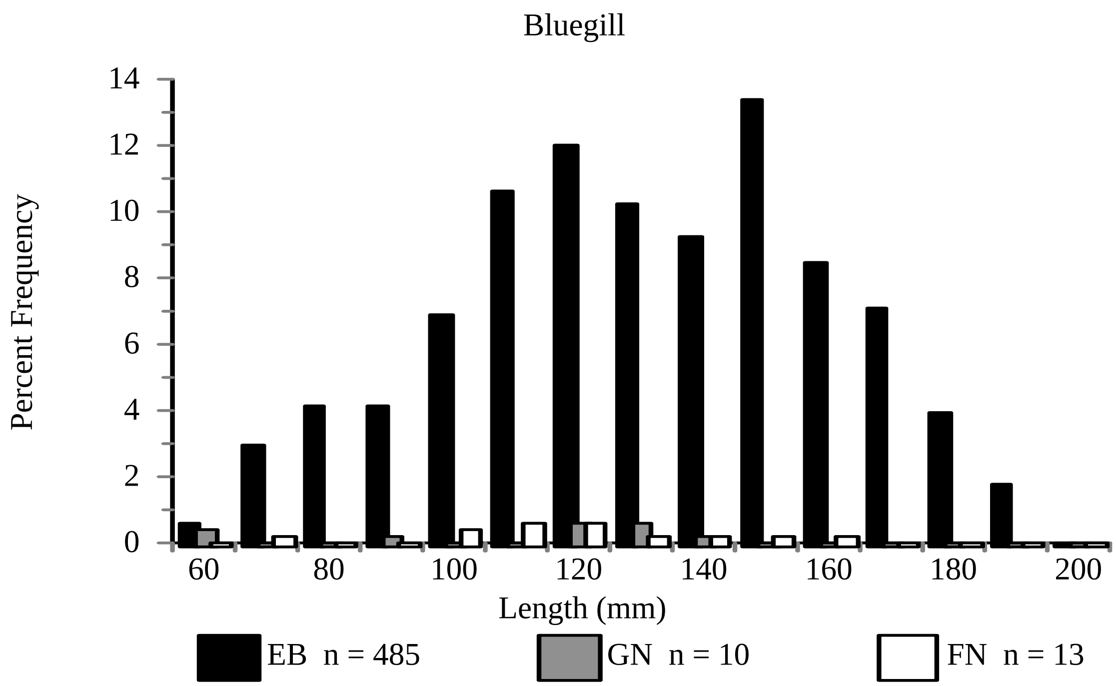

Figure 4. Length frequencies of bluegill sampled using a boat electrofisher (EB), gill nets (GN), and fyke nets (FN) on Hutchinson-Shiner Lake, October 2004

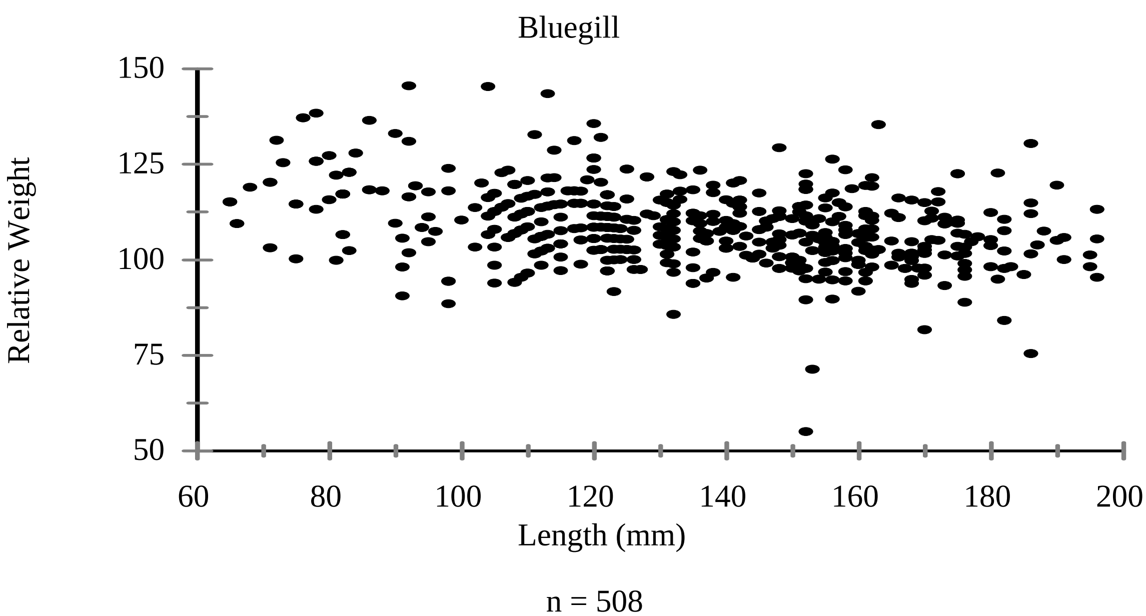

Figure 5. Relative weights for bluegill sampled at Hutchinson-Shiner Lake, October 2004, compared to the national average W_r = 100 (Anderson and Neumann 1996).

Pumpkinseed sunfish

A total of 82 pumpkinseed sunfish were collected during this survey. The majority of fish collected were age two; however, growth was below average for this year class (Table 8). Most pumpkinseed sunfish were captured with the boat electrofisher and the majority of fish were in the 5-6 inch range (Figure 6). Relative weights were above the national average for most fish indicating that food resources are not limiting this population. Pumpkinseed sunfish have increased three-fold since our 2001 survey; however, this is not a sizable population, and likely has little impact on other panfish populations.

Table 8. Age and growth of pumpkinseed sunfish captured at Hutchinson-Shiner Lake during October 2004. Shaded values are mean back-calculated lengths using the direct proportion method (Fletcher et al. 1993). Unshaded values are mean back-calculated lengths using Lee's modification of the direct proportion method (Carlander 1982).

		Mean length (mm) at age		
Year Class	# Fish		1	
2003	7	32.9		
		49.8		
2002	23	24.1	72.2	
		44.9	83.4	
2001	1	14.3	64.8	141.3
		45.7	80.5	146.2
Direct Proportion mean		23.8	68.5	141.3
Fraser Lee mean		45.7	83.3	146.2
WA State Average (DP)		23.6	72.1	101.6

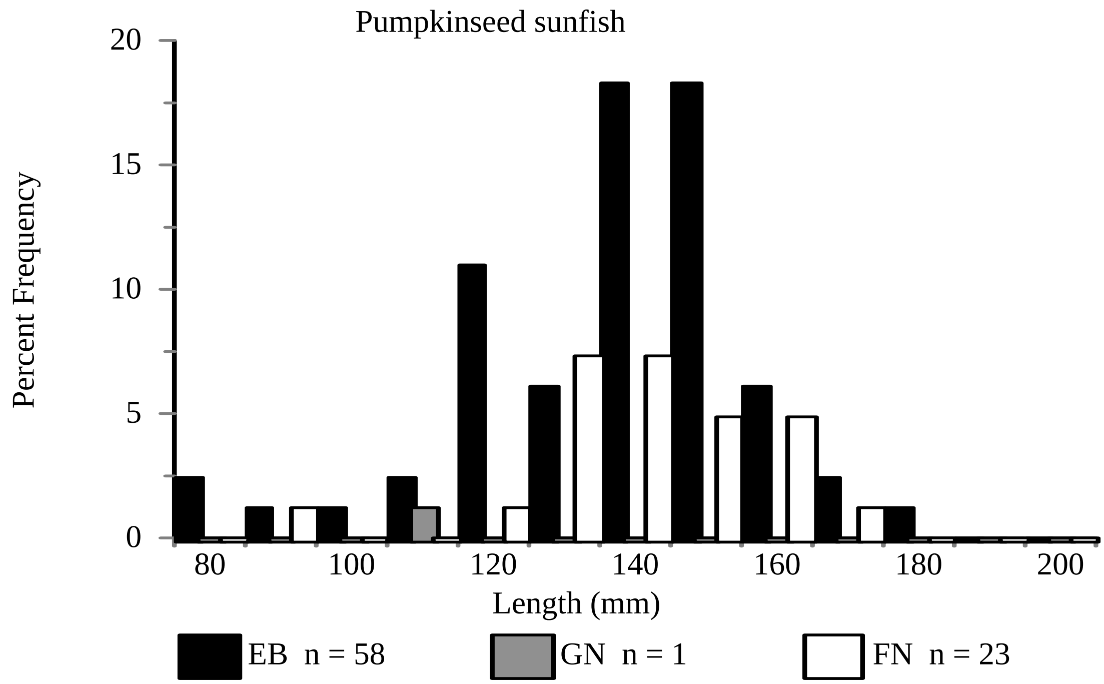

Figure 6. Length frequencies of pumpkinseed sunfish sampled using a boat electrofisher (EB), gill nets (GN), and fyke nets (FN) on Hutchinson Lake, October 2004.

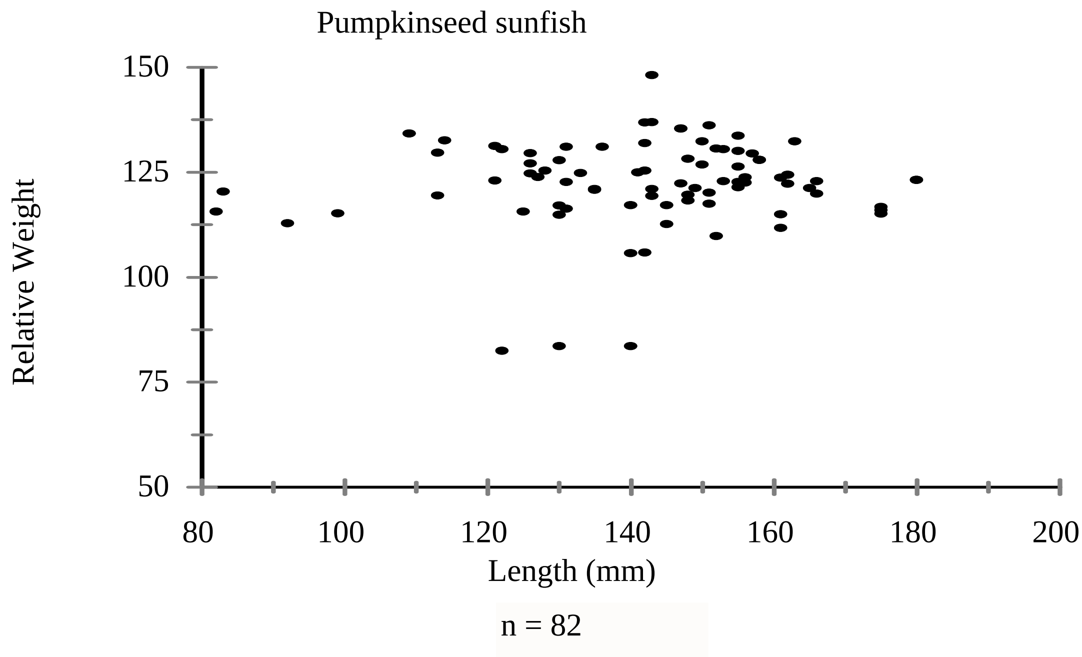

Figure 7. Relative weights for pumpkinseed sunfish sampled at Hutchinson-Shiner Lake, October 2004, compared to the national average $W_r = 100$ (Anderson and Neumann 1996).

Black crappie

Black crappie were found in low abundance (n = 27) during this survey, and no age-one fish were collected (Table 9). Growth was below the state average for black crappie at age 2 and above average for black crappie at age 3 and 4. Most black crappie collected were 6-7 inches long (160-185mm)(Figure 8), and relative weights were above the national average (Figure 9). The number of black crappie collected during this survey was similar to that collected in 2001, and is too small to allow for accurate data analysis. Approximately 13,800 black crappie were planted in Hutchinson and Shiner lakes between 1997-99 (Table 1). The majority of black crappie stocked were fry and may have suffered high predation by largemouth bass that were stocked as juveniles and adults during the same time period. Black crappie may be limited by competition with other panfish species as well as predation by bass and panfish, which will prey on black crappie YOY. Another factor that likely limits the number of black crappie in our samples is the sampling efficiency of our gear. We were unable to sample a portion of Hutchinson-Shiner Lake due to aquatic vegetation that limited boat travel and net dispersal. In addition, our boat electrofisher and fyke nets do not sample deep-water habitat effectively, which is a preferred habitat for black crappie in late summer and early fall.

Table 9. Age and growth of black crappie captured at Hutchinson-Shiner Lake during October 2004. Shaded values are mean back-calculated lengths using the direct proportion method (Fletcher et al. 1993). Unshaded values are mean back-calculated lengths using Lee's modification of the direct proportion method (Carlander 1982).

		Mean length (mm) at age			
Year Class	# Fish	1	2	3	4
2003	0				
2002	17	38.7	109.3		
		65.7	121.8		
2001	2	25.4	80.7	163.1	
		55.9	101.5	169.4	
2000	1	51.3	123.2	183.7	221.3
		78.7	139.9	191.3	223.3
Direct Proportion mean		38.5	104.4	173.4	221.3
Fraser Lee mean		65.4	120.6	176.7	223.3
WA State Average (DP)		46	111.2	156.7	183.4

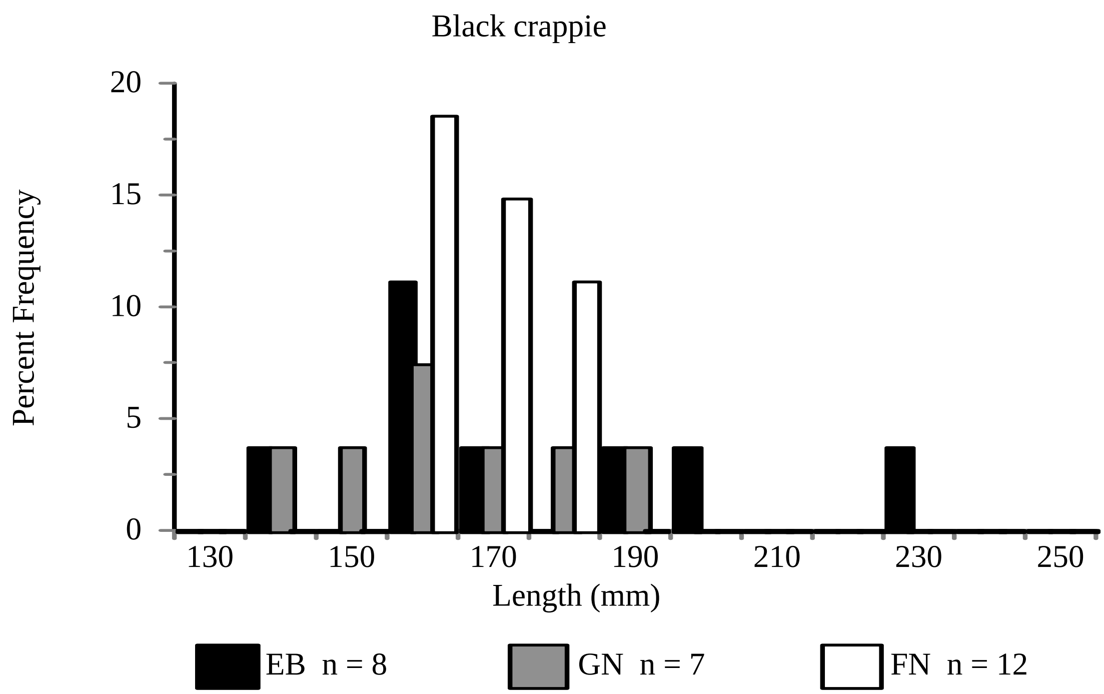

Figure 8. Length frequency of black crappie captured while using a boat electrofisher (EB), gill nets (GN), and fyke nets (FN) on Hutchinson-Shiner Lake, October 2004.

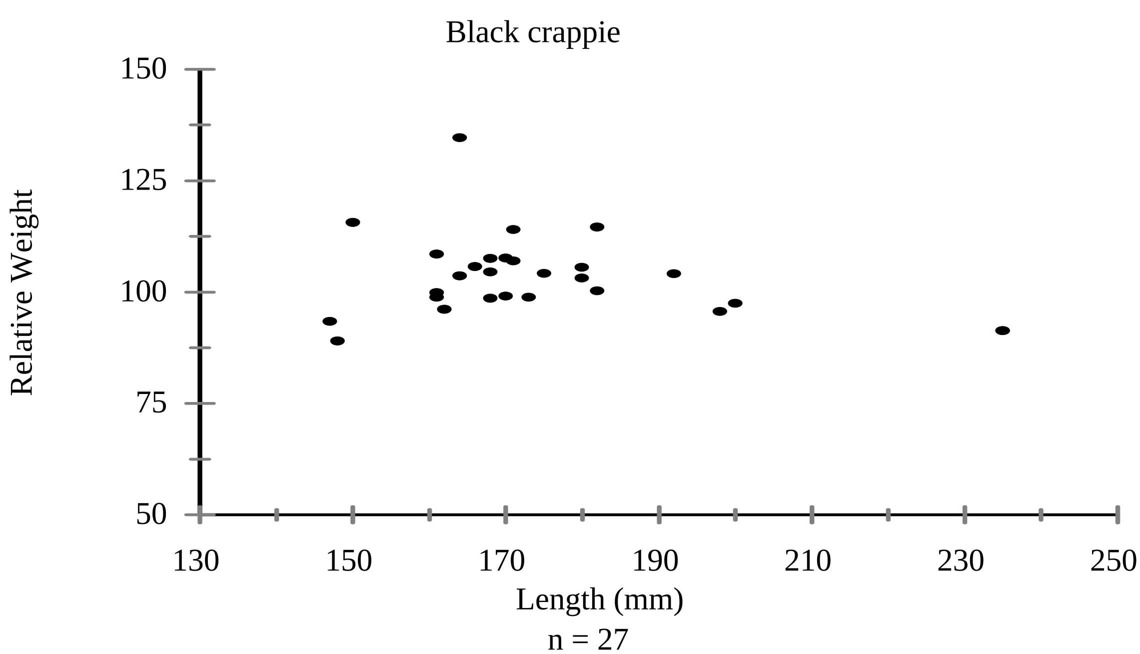

Figure 9. Relative weights for black crappie sampled at Hutchinson-Shiner Lake, October 2004, compared to the national average W_r = 100 (Anderson and Neumann 1996).

Largemouth bass

A total of 426 largemouth bass were collected during sampling efforts on Hutchinson-Shiner Lake in 2004. The majority of fish collected were age one to four and growth was well above the eastern Washington average (Table 10). Most largemouth bass were collected with the boat electrofisher and no bass were collected in fyke nets (Figure 9). There were very few largemouth bass collected that were within the protected 12 to 17 inch slot limit; however, there was a large number of harvestable size (230-300mm)(9-12 inches) largemouth bass collected in our samples (Figure 10). Within the next couple years, we may see sizable numbers of fish recruit into this protected slot. Largemouth bass less than stock length (200mm)(~8 inches), and preferred length largemouth bass (≥ 380mm)(15 inches) had average relative weights above the national average; whereas, largemouth bass in the stock and quality length ranges (200-379mm)(8-15 inches) had average relative weights below the national average (Figure 11).

Table 10. Age and growth of largemouth bass captured at Hutchinson-Shiner Lake during October 2004. Shaded values are mean back-calculated lengths using the direct proportion method (Fletcher et al. 1993). Unshaded values are mean back-calculated lengths using Lee's modification of the direct proportion method (Carlander 1982).

		Mean length (mm) at age							
Year Class	# Fish	1	2	3	4	5	6	7	8
2003	24	72.9							
		84.6							
2002	18	56.0	162.9						
		71.3	168.9						
2001	26	74.9	169.1	240					
		89.7	177.3	243.2					
2000	16	65.3	161.4	248.2	304.5				
		81.4	171.9	253.6	306.6				
1999	9	73.3	163.4	277.4	331.2	372.7			
		89.7	175.4	283.8	334.9	374.4			
1998	1	101.5	215.8	305.8	375.8	421.6	475.9		
		117.3	227	313.4	380.6	424.4	476.5		
1997	0								
1996	2	74.8	182.2	301.3	377.2	410.8	430.4	452.6	476.1
		91.8	194.8	309.1	381.9	414.2	433	454.3	476.8
Direct Proportion mean		74.1	175.8	274.5	347.2	401.7	453.2	452.6	476.1
Fraser Lee mean		83.9	175.0	256.8	323.7	385.2	447.5	454.3	476.8
Eastern WA Average (DP)		68.8	135.6	189.2	248.9	300.0	351.5	421.6	437.6

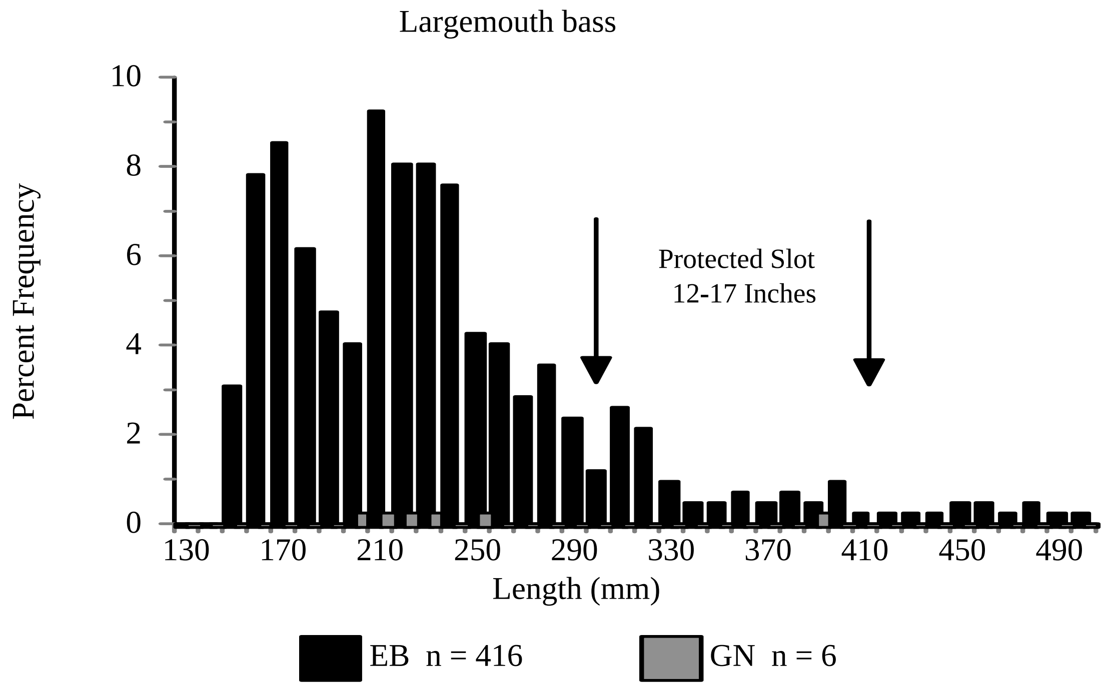

Figure 10. Length frequency of largemouth bass captured while using a boat electrofisher (EB) and gill nets (GN) on Hutchinson-Shiner Lake, October 2004.

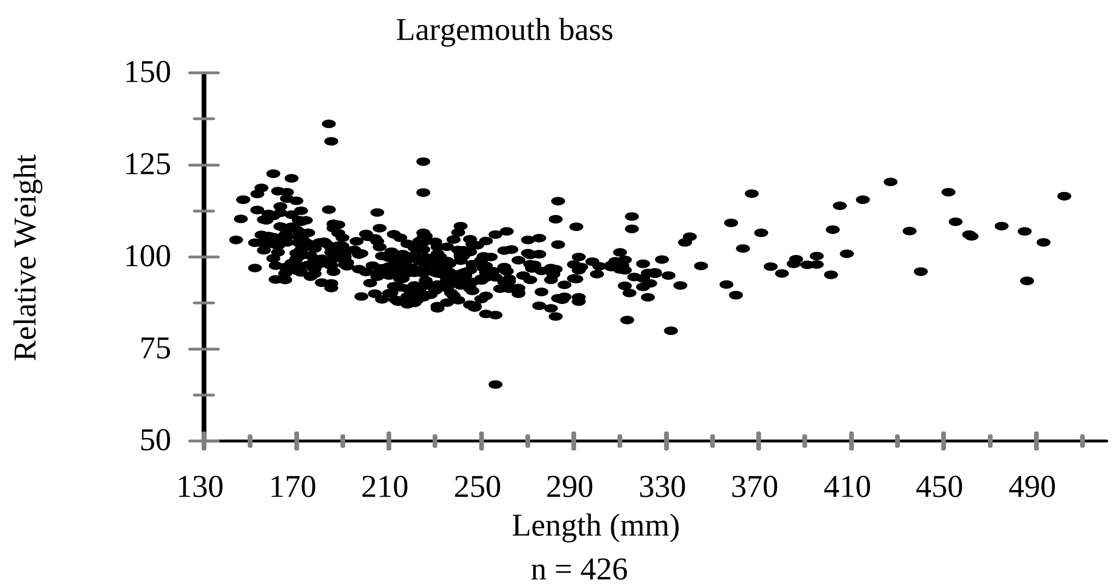

Figure 11. Relative weights for largemouth bass sampled at Hutchinson-Shiner Lake, October 2004, compared to the national average W_r = 100 (Anderson and Neumann 1996).

Summary and Management Options

Hutchinson-Shiner Lake is managed as a bluegill/bass lake. Our sampling indicated that fish community is out of balance and prey populations are not adequate to support the current population of largemouth bass. No creel surveys have been conducted on Hutchinson-Shiner Lake; however, WDFW enforcement officers indicate that most anglers target bluegill and very few bass are harvested. Anglers should be encouraged to target and harvest largemouth bass in order to reduce this population.

Bluegill was the most abundant species present in our samples. Growth of bluegill was below the Washington State average for all ages except age 5 fish and relative weights were above the national average. Bluegill have declined in our samples approximately 72 percent, yet PSDs remain similar to that seen in 2001. Approximately 35 percent of bluegill collected were at least 6 inches long and, despite lower catch rates, anglers should continue to enjoy quality fishing for this species.

Largemouth bass was second in abundance; growth rates were well above eastern Washington averages (Table 10), and relative weights were above average for preferred length bass as well as largemouth bass less than stock length. The largemouth bass population in Hutchinson-Shiner Lake was found to be similar to that found in 2001.

Despite rehabilitation efforts, yellow perch have established a significant population in Hutchinson-Shiner Lake and likely compete with bluegill and black crappie for food resources (zooplankton, insects, etc). Yellow perch exhibited high growth rates and there will likely be an adequate number of large yellow perch in this population to provide quality angling by 2005-2006.

Both Hutchinson and Shiner lakes were rehabilitated in March 1998, and subsequently stocked with largemouth bass, bluegill, black crappie, rainbow trout, and Lahontan cutthroat trout. At the time of this survey, rehabilitation efforts, combined with the fish barrier installed on Hayes Creek, appear to have been effective in preventing carp from entering the lake. Warmwater surveys should be conducted at regular intervals in order to monitor the fish community, and allow managers to make timely regulation and management changes.

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Glossary

Catch Per Unit Effort (CPUE): Is defined as the number of fish captured by a sampling method (i.e., electrofisher, gill nets, or fyke nets) divided by the amount of time sampled.

Confidence Interval (CI): Is defined as an estimated range of values that is likely to include an unknown population parameter with a percentage or degree of confidence.

Memorable Size: Is defined as fish anglers remember catching, and also identified as 59-64 percent of the world record length. Memorable length varies by species.

Preferred Size: Is defined as the size fish anglers preferred to catch when given a choice, and also identified as 45-55 percent of world record length. Preferred length varies by species.

Proportional Stock Density (PSD): Is defined as the number of quality length fish and larger, divided by the number of stock sized fish and larger, multiplied by 100.

Quality Length: Is defined as the length at which anglers begin keeping fish. Also identified as 36-41 percent of world record length. Quality length varies by species.

Relative Stock Density (RSD): Is defined as the number of fish of a specified length category (preferred, memorable, or trophy) and larger, divided by the number of stock length fish and larger, multiplied by 100.

Relative Stock Density of Preferred Fish (RSD-P): Is defined as the number of fish in the preferred size category and larger, divided by the number of stock length fish and larger, multiplied by 100.

Relative Stock Density of Memorable Fish (RSD-M): Is defined as the number of fish in the memorable size category and larger, divided by the number of stock length fish and larger, multiplied by 100.

Relative Stock Density of Trophy Fish (RSD-T): Is defined as the number of fish in the trophy size category and larger, divided by the number of stock length fish and larger, multiplied by 100.

Relative Weight (W_r): The comparison of the weight of a fish at a given size to the national average weight (W_r = 100) of fish of the same species and size.

Standard Weight (W_s): Is defined as a standard or average weight of a fish species at a given length determined by a national length-weight regression.

Stock Length: Is defined by the following: 1) approximate length of fish species at maturity, 2) the minimum length effectively sampled by traditional sampling gears, 3) minimum length of fish that provide recreational value, and 4) 20-26 percent of world record length. Stock length varies by species.

Total Length (TL): Length measurement from the anterior most part of the fish to the tip of the longest caudal (tail) fin ray (compressed).

Trophy Size: Minimum size fish worthy of acknowledgment, and also identified as 74-80 percent of world record length. Trophy length varies by species.