An Assessment of the Warmwater Fish Community in Rowland Lake, September 1999

by

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Abstract

Rowland Lake is an 87–acre water body located east of the town of White Salmon along the Columbia River in Klickitat County. State Highway 14 bisects the lake into a northern portion (34 acres) and a southern portion (53 acres). The northern portion of Rowland Lake was surveyed by a three–person crew on October 11 and 12, 1999. Multiple gear types were utilized to reduce bias associated with each sampling method. Numerically, largemouth bass and bluegill were the most abundant at 14.3 and 65.5%, respectively. However, bluegill and yellow bullhead comprised 62.5% of the biomass in the lake (40.1 and 20.4%, respectively). Judging from our results, Rowland Lake provides little angling opportunity for warmwater gamefish. Based on stock density indices, larger warmwater gamefish are few in number or nonexistent. According to length frequency distribution, it appears that yellow bullhead provide the best opportunity to catch stock and quality size fish. American shad were sampled from Rowland Lake which suggests that the culvert between the southern portion of the lake and the Columbia River allows for migration of fish. Before any management decisions are made we recommend that the southern portion of the lake receive a survey. Since no boat ramp exists, a method of launching a boat will have to be investigated. We recommend that the culvert between the southern portion of the lake and the Columbia River be investigated to determine if isolation from the river is feasible. Finally, we recommend that the yellow bullhead fishery receive some promotion for those anglers who fish for catfish.

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Introduction and Background

Rowland Lake is an 87–acre water body located in Klickitat County along the Columbia River just east of the town of White Salmon. State Highway 14 (Lewis and Clark Highway) divides Rowland into a northern portion (34 acres) and a southern portion (53 acres). The lakes are connected by a culvert under Highway 14. The southern portion of Rowland Lake is connected to the Columbia River by a culvert. In the 1960s, Rowland Lake was known as Duboise Lake named for the current owner who planned to use the lake as a commercial warmwater fish hatchery. The lake was renamed Rowland after the Washington Department of Game (WDFW) purchased the lake back from Duboise (John Weinhimer WDFW, personnel communication). There is one developed access site on the northern portion of Rowland Lake owned by WDFW and a small vehicle pull–off on the southern portion.

Rowland Lake is managed as a mixed–species water supporting both a warmwater and an opening day trout fishery (John Weinhimer WDFW, personal communication). Rowland Lake receives annual rainbow and brook trout plants to maintain the coldwater fishery. Warmwater gamefish, historically, have had liberal harvest regulations. It has only been ten years since the current statewide bass regulation (five fish, no more than three over 15 inches) was placed on the lake. Rowland has been rehabilitated once in its history in 1968 to eradicate warmwater fish to improve fishing for rainbow trout (Washington Department of Game, unpublished data).

Materials and Methods

Data Collection

The northern portion of Rowland Lake was surveyed by a three–person team on October 11 and 12, 1999. The southern portion of Rowland Lake was not investigated by the stock assessment team. 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 5.0GPP pulsator unit. The boat was fished using a pulsed DC current of 120 cycles/sec at 3 to 4 amps power. Experimental gill nets (45.7 m long x 2.4 m deep) were constructed of four sinking panels (two each at 7.6 m and 15.2 m long) of variable-size (1.3, 1.9, 2.5, and 5.1 cm stretch) monofilament mesh. Fyke (modified hoop) nets were constructed of five 1.2–m diameter hoops with two funnels, and a 2.4–m cod end (.6 cm nylon delta mesh). Attached to the mouth of the net were two 7.6–m wings and a 30.5–m 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–m 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 m/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 100% 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 to .6 m below the water surface, this sometimes would require shortening the lead. Gill nets were set overnight at two locations around the lake, whereas fyke nets were set overnight at two locations.
With the exception of sculpin (Cottidae), all fish captured were identified to the species level.

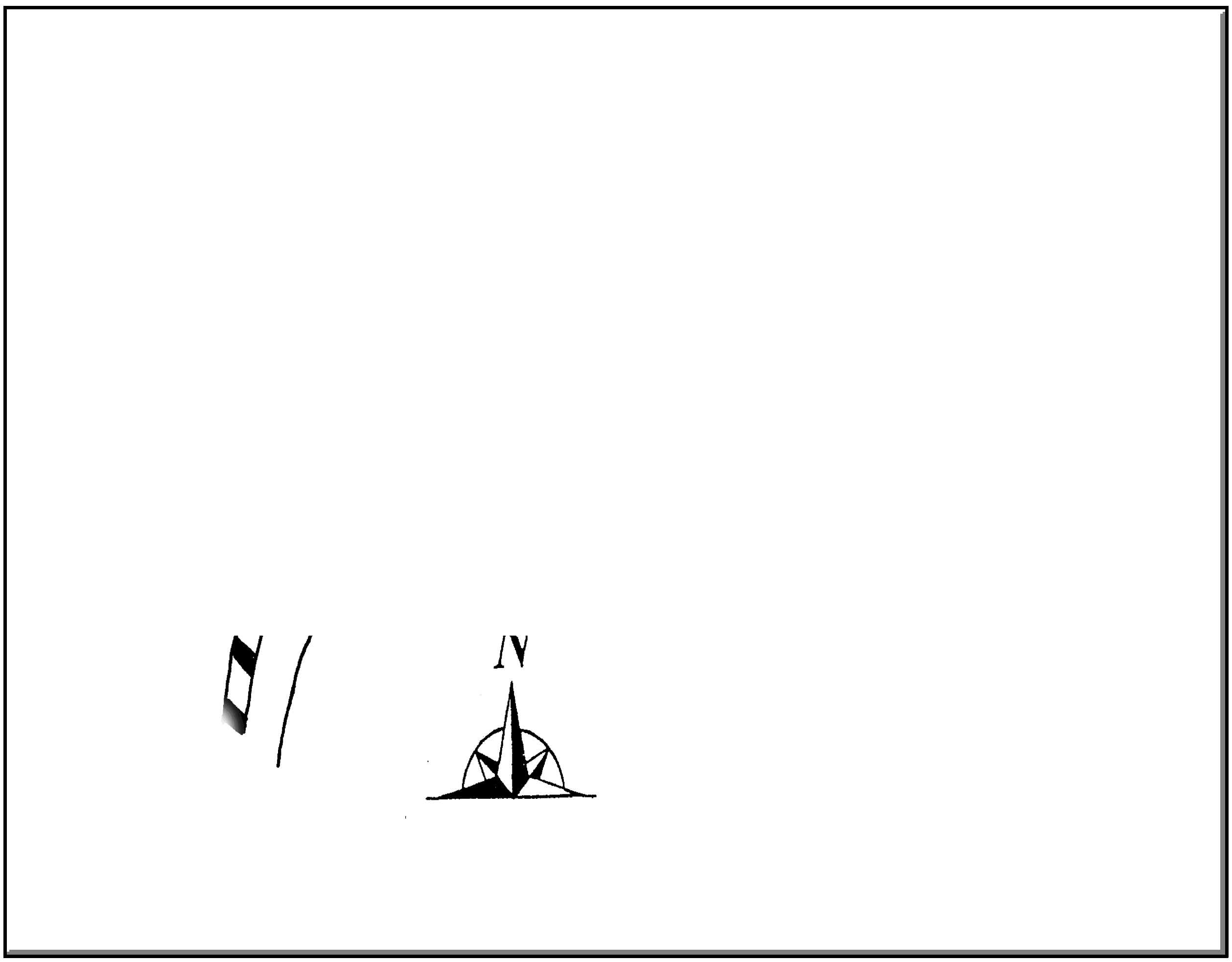

Figure 1. Map of Rowland Lake, Klickitat County.

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. Scales were taken from five individuals per size class, mounted, pressed, and aged using the Fraser-Lee method. Usually, members of the bullhead family (Ictaluridae) and non–game fish like carp (Cyprinidae) are not aged. However, during this survey, we removed spines from yellow bullhead for age determination.

Water quality data was collected during midday from one location on October 12, 1999. Using a Hydrolab® probe and digital recorder, dissolved oxygen, temperature, pH, and conductivity data was gathered in the littoral zone and in the deepest section of the lake at 1 m intervals through the water column. Secchi disk readings, used to measure transparency, were taken by the methods outlined by Wetzel (1983).

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. Young–of–year 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 (seconds). 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% 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 one 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 individuals of that species sampled.

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 Gabelhouse (1984). The indices are accompanied by an 80% 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 $W_r = W/W_s \times 100$, 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

Rowland Lake can be described as a small water body (34 acres) with relatively steep shorelines and a small area of littoral zone located on the north end of the lake near the boat launch. Maximum depth in Rowland Lake is 6 m. However, depth in the lake is influenced by discharge from the Dalles and Bonneville Dams on the Columbia River. The lake's shoreline development value is estimated at 1 to 1.5 describing it as nearly circular with no shoreline irregularities. The majority of the habitat in Rowland Lake is rip–rap and rock material, however, there are scattered patches of floating aquatic vegetation.

Water quality in Rowland Lake is within the limits for warmwater fish (Table 1). Rowland Lake is well mixed with no thermoclimes or stratification evident. Conductivity is higher than other lakes sampled during the fall season and are within optimal ranges for electrofishing (100-400 µs/cm) (Willis, 1998). The lake is relatively clear with secchi disk readings of greater than 2 m.

Table 1. Water quality measurements taken from Rowland Lake, October 1999.

Location	Depth (m)	Temp (C)	Ph	DO mg/l	Cond µs/cm	Secchi Disk (m)
Mid-Lake	Surface	17.1	10.8	9.7	135.6	2.25
	1	16.6	11.1	10.5	135.3	
	2	16.5	11.0	10.1	135.3	
	3	16.4	11.0	9.7	135.8	
	4	16.4	11.1	9.6	135.7	
	5	16.4	11.1	9.6	135.9	
	6	16.3	11.1	9.4	135.9	

Species Composition and Relative Abundance

In all, thirteen species of fish were sampled from Rowland Lake. Of those, largemouth bass (*Micropterus salmoides*) and bluegill (*Lepomis macrochirus*) were the most abundant numerically at 14.3 and 65.5%, respectively. However, bluegill and yellow bullhead accounted for 62.5% of the total biomass (42.1 and 20.4%, respectively). Following bass and bluegill in order of highest to lowest abundance (numerically) was yellow bullhead (*Ictalurus natalis*), pumpkinseed (*Lepomis gibbosus*), black crappie (*Pomoxis nigromaculatus*), sculpin spp., yellow perch (*Perca flavescens*), brown trout (*Salmo trutta*), goldfish (*Carassius auratus*), brown bullhead (*Ictalurus nebulosus*), cutthroat trout (*Oncorhynchus clarki*), American shad (*Alosa sapidissima*), and carp (*Cyprinus carpio*) (Table 2).

Table 2. Species composition by weight and number of fish sampled from Rowland Lake, October 1999.						
	Species Composition					
	by Weight		**by Number**		**Size Range (mm TL)**	
Species	**(kg)**	**(%w)**	**(#)**	**(%n)**	**Min**	**Max**
American shad	0.1	0.2	1	0.1	480	480
Brown bullhead	1.0	1.5	2	0.2	336	338
Black crappie	1.5	2.2	18	1.6	53	215
Bluegill	28.4	42.1	748	65.5	27	200
Brown trout	0.4	0.6	3	0.3	235	267
Sculpin	0.1	0.2	15	1.3	78	115
Common carp	7.9	11.7	1	0.1	850	850
Cutthroat trout	0.2	0.3	1	0.1	296	296
Goldfish	2.1	3.1	2	0.2	380	390
Largemouth bass	10.4	15.4	163	14.3	46	303
Pumpkinseed	1.5	2.2	65	5.7	72	174
Yellow bullhead	13.8	20.4	119	10.4	106	246
Yellow perch	0.1	0.1	4	0.4	71	175

Bluegill and pumpkinseed exhibited the highest catch per unit of effort (CPUE) during the survey at 610 fish/hour (± 84) and 46 fish/hour (± 19), respectively (Table 3). Overall, CPUEs for all species encountered during the survey were low. With the exception of yellow bullhead (48 fish/net night, ± 58), gill and trap nets were ineffective at capturing warmwater fish.

Table 3. Average catch per unit effort for fish sampled from Rowland Lake, October 1999.									
	Electrofishing			Gill Netting			Fyke Netting		
Species	(# / hour)	80% CI	Sample Sites	# /net night	80% CI	# net nights	#/net night	80% CI	# net nights
American shad	0	0	6	1	1	2	0	0	2
Brown bullhead	0	0	6	1	1	2	1	1	2
Black crappie	16	9	6	0	0	2	1	1	2
Bluegill	610	84	6	3	2	2	2	0	2
Brown trout	2	3	6	1	1	2	0	0	2
Sculpin spp.	13	5	6	0	0	2	0	0	2
Common carp	1	1	6	0	0	2	0	0	2
Cutthroat trout	1	1	6	0	0	2	0	0	2
Goldfish	2	2	6	0	0	2	0	0	2
Largemouth bass	15	5	6	0	0	2	0	0	2
Pumpkinseed	46	19	6	3	3	2	2	2	2
Yellow bullhead	4	5	6	48	58	2	9	11	2
Yellow perch	0	0	6	1	1	2	0	0	2

Summary by Species

Bluegill, (*Lepomis macrochirus*)

Although numerous, bluegill size structure is comprised of fish stock size and smaller (Figure 2). Bluegill PSD is 17 (± 2) which suggests few quality size fish exist and that the population is unbalanced (Willis, 1998) (Table 4). The number of quality size and larger bluegills may be underestimated due to the steep shorelines around Rowland Lake. As a result, bluegill may have been deeper in the water column where the electrofishing boat is less effective at sampling fish.

Bluegill condition is good with most individuals either at or above the national average (Figure 3). Bluegill growth is similar to the state average (Table 5). The bluegill sample is comprised primarily of age 2, 3, and 4–year old fish. Since growth is similar to the state average, bluegill should attain quality size (200 mm) by age 6.

Table 4. Stock density indices for fish sampled from Rowland Lake, October 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	16	13	11	0	0	0	0	0	0
Bluegill	620	17	2	< 1	< 1	0	0	0	0
Brown Trout	2	100	0	0	0	0	0	0	0
Largemouth Bass	15	13	11	0	0	0	0	0	0
Pumpkinseed	47	2	3	0	0	0	0	0	0
Yellow Bullhead	4	0	0	0	0	0	0	0	0

Table 5. Fraser-Lee back–calculated length at age of bluegill from Rowland Lake, October 1999.

		Mean Length at Age (mm)				
Year Class	**n**	**I**	**II**	**III**	**IV**	**V**
1998	8	40				
1997	22	49	91			
1996	13	59	94	123		
1995	18	61	101	130	151	
1994	4	55	104	136	163	181
Average		54	96	128	153	181
Direct Proportion		40	89	124	151	180
State Average		37	97	132	148	170

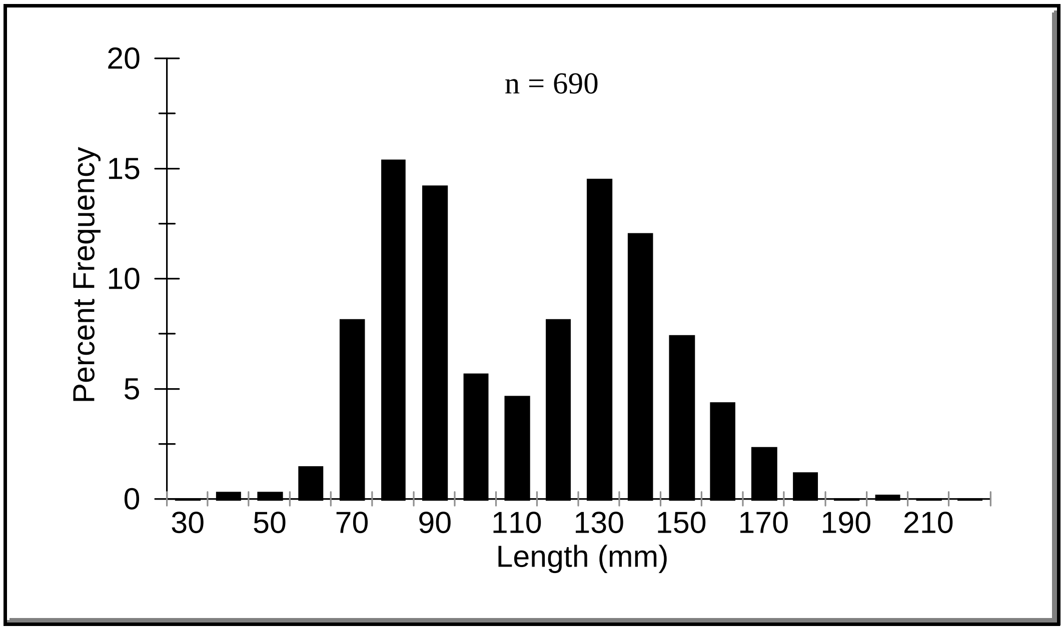

Figure 2. Electrofishing length frequency distribution of bluegill from Rowland Lake, October 1999.

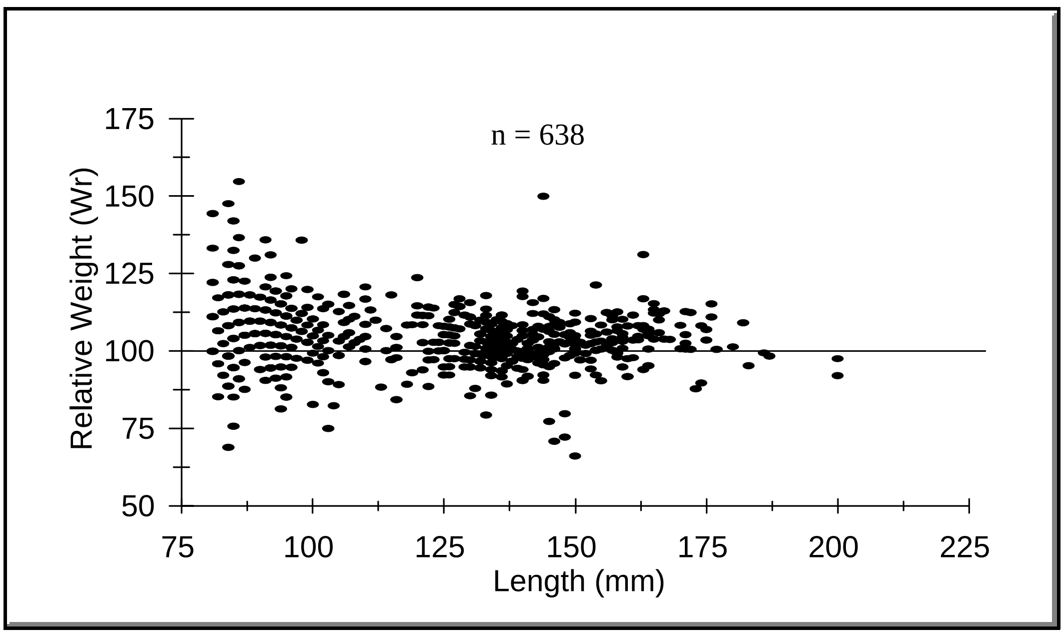

Figure 3. Condition (Wr), as compared to the national average (100), of bluegill from Rowland Lake, October 1999.

Yellow Bullhead, (*Ictalurus natalis*)

Yellow bullhead size structure is dominated by a strong year class of stock size fish (Figure 4). Gill and fyke nets captured the majority of the quality size yellow bullhead in our sample. Condition indices were not calculated because a relative weight formula does not exist for yellow bullhead. However, spines were removed from ten yellow bullhead and ages were determined for five fish. Ages ranged between 4 to 6 years and growth was comparable to yellow bullhead from Oklahoma until age 3 where growth slowed significantly (Wydoski and Whitney, 1979) (Table 6). Due to the small sample size (n = 1), the average length at age of an age 6 yellow bullhead in probably incorrect.

Table 6. Direct proportion back–calculated length at age of yellow bullhead from Rowland Lake, October 1999. Growth is compared to the average of four Oklahoma lakes listed in Fishes of Washington (Wydoski and Whitney, 1979)

Year Class	n	Mean Length at Age (mm)					
		I	II	III	IV	V	VI
1998	0	-					
1997	0	-	-				
1996	0	-	-	-			
1995	2	113	145	183	203		
1994	2	136	173	198	208	228	
1993	1	125	156	168	182	201	215
Average		125	158	186	201	219	215
OK Average		70	140	210	241	356	N/A

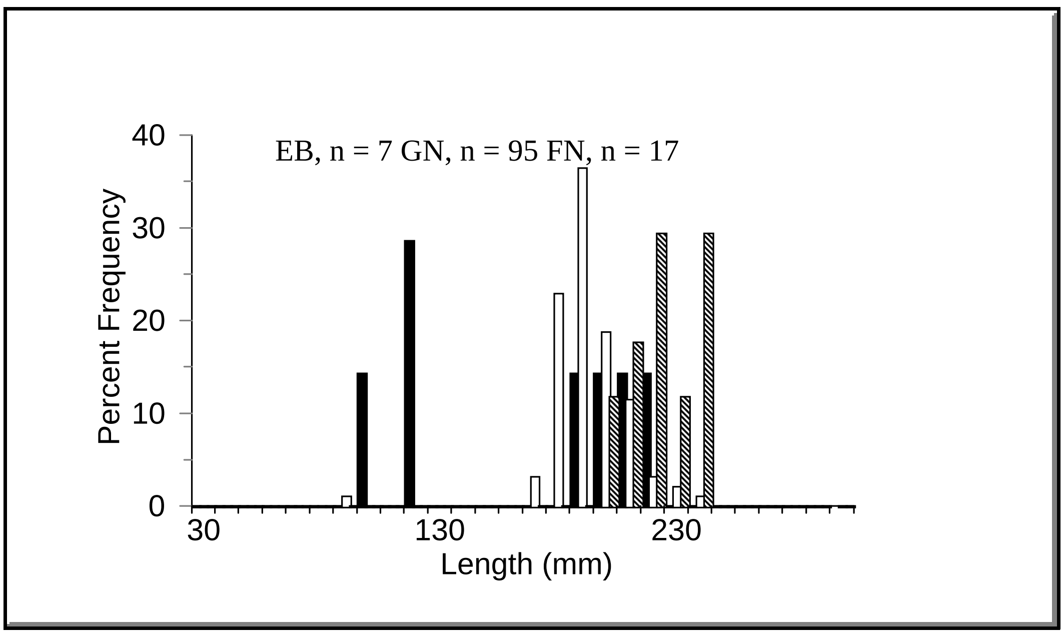

Figure 4. Electrofishing (dark bars), gill netting (light bars), and fyke netting (striped bars) length frequency distribution of yellow bullhead from Rowland Lake, October 1999.

Largemouth Bass, (*Micropterus salmoides*)

Largemouth bass size structure is comprised of fish smaller than stock size (130-180 mm) (Figure 5). Bass PSD is 13 (± 11) which suggest an unbalanced population with few quality size fish present in the lake (Table 4). The number of stock size and larger fish may be underestimated due to the steep shorelines around Rowland Lake. As a result, largemouth bass may have been deeper in the water column where the electrofishing boat is less effective at sampling fish.

Largemouth bass condition is poor with the majority of fish below the national average (Figure 6). Growth is below the state average for all age classes (Table 7). In the presence of twelve other fish species in Rowland Lake, sub-stock largemouth bass may be competing for similar food resources.

Table 7. Fraser-Lee back–calculated length at age of largemouth bass from Rowland Lake, October 1999.

		Mean Length at Age (mm)				
Year Class	**n**	**I**	**II**	**III**	**IV**	**V**
1998	2	85				
1997	17	87	145			
1996	13	84	132	169		
1995	9	74	132	187	231	
1994	3	84	126	180	218	251
Average		83	137	177	228	251
Direct Proportion		71	131	173	225	250
State Average		60	146	222	261	289

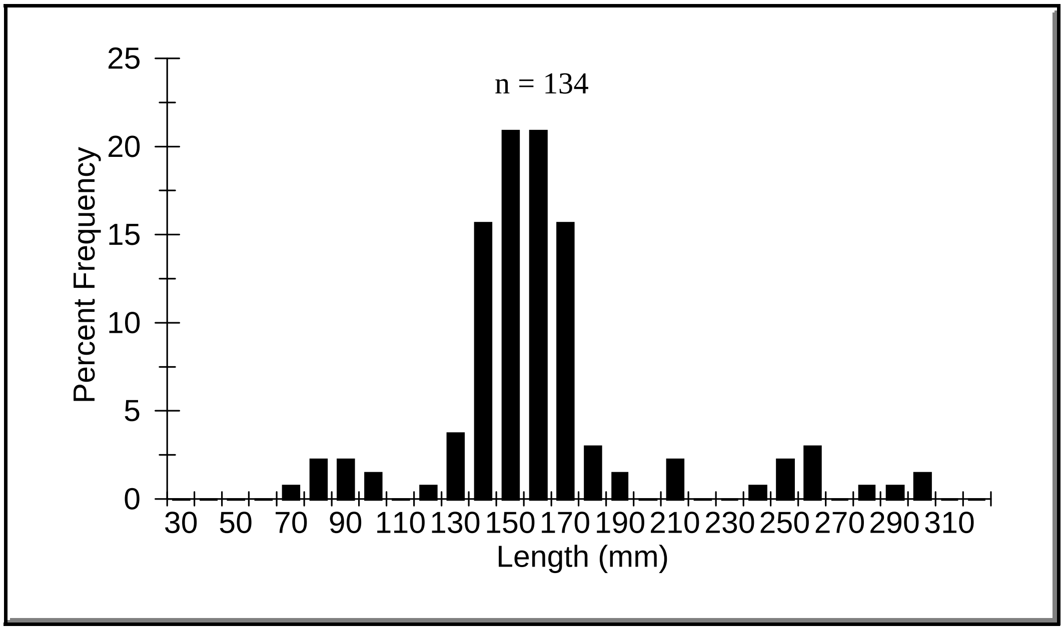

Figure 5. Electrofishing length frequency distribution of largemouth bass from Rowland Lake, October 1999.

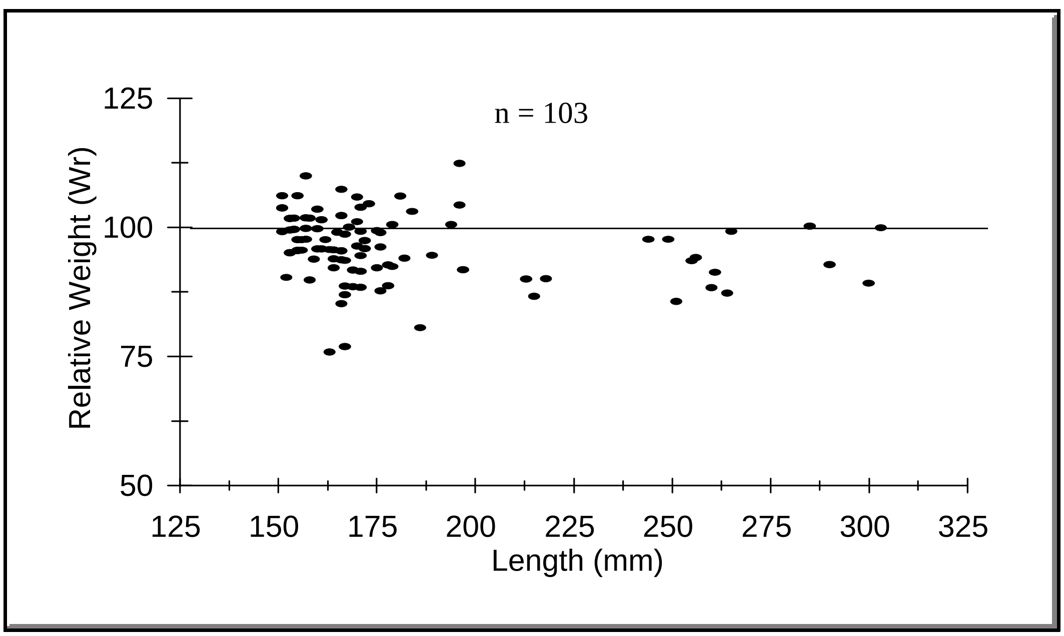

Figure 6. Condition (Wr), as compared to the national average (100), of largemouth bass from Rowland Lake, October 1999.

Common Carp, (*Cyprinus carpio*)

Only one carp was sampled from Rowland Lake, however this fish was 850 mm in length, 7900 g in weight, and accounted for nearly 12% of the biomass. Fortunately, carp do not appear to be numerous and are probably not impacting warmwater gamefish species.

Goldfish, (*Carassius auratus*)

Only two goldfish were sampled from Rowland Lake, however, these fish were quite large (380 mm and 390 mm). Fortunately, goldfish do not appear to be numerous and are probably not impacting warmwater gamefish species.

Pumpkinseed, (*Lepomis gibbosus*

Pumpkinseed size structure is composed of stock size fish (Figure 7). PSD is 2 (± 3) which further suggests that few quality size pumpkinseed exist in Rowland Lake (Table 4). In the presence of a dense bluegill population, space may be limiting pumpkinseed from expanding in the lake. However, knowing pumpkinseeds' tendency to overpopulate a lake and there relatively low importance in a fishery, keeping their numbers low benefits the more important species like largemouth bass.

Although pumpkinseed condition is higher than the national average (Figure 8), growth is below our state average (Table 8).

Table 8. Fraser-Lee back–calculated length at of pumpkinseed from Rowland Lake, October 1999.

		Mean Length at Age (mm)				
Year Class	**n**	**I**	**II**	**III**	**IV**	**V**
1998	3	43				
1997	3	44	75			
1996	13	52	74	94		
1995	4	46	66	94	111	
1994	1	44	77	109	117	132
Average		48	73	95	112	132
Direct Proportion		31	63	91	108	130
State Average		24	72	102	123	139

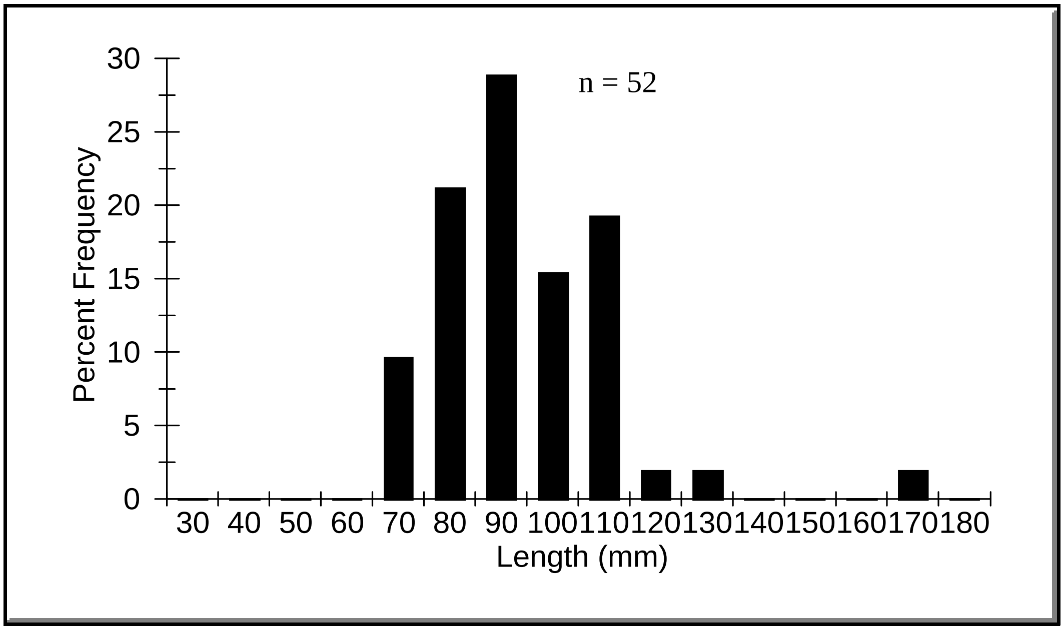

Figure 7. Electrofishing length frequency distribution of pumpkinseed from Rowland Lake, October 1999.

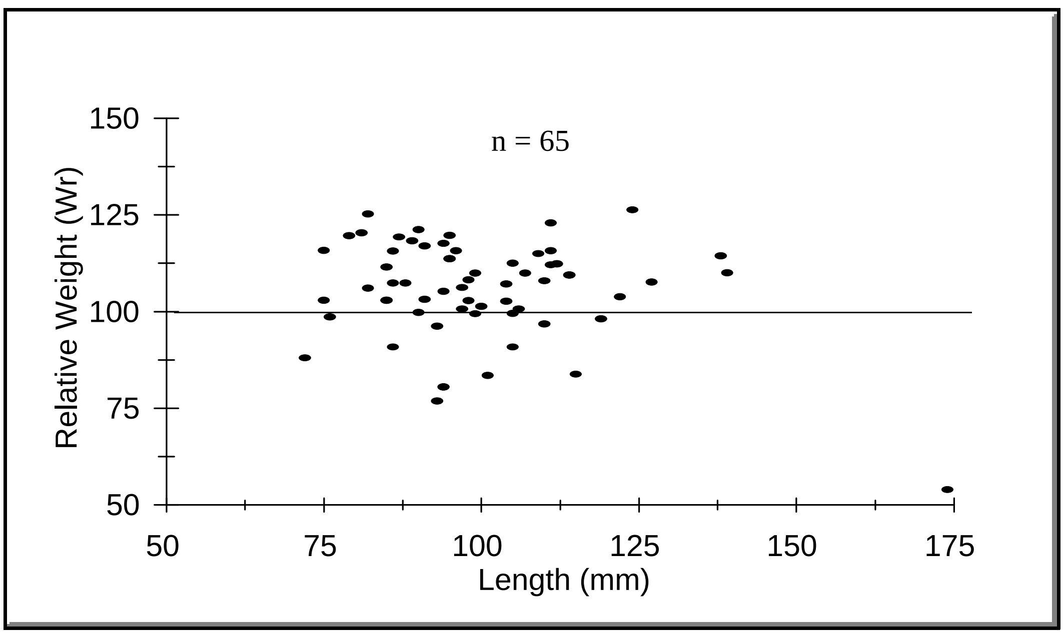

Figure 8. Condition (Wr), as compared to the national average (100), of pumpkinseed from Rowland Lake, October 1999.

Black Crappie, (*Pomoxis nigromaculatus*)

Too few black crappie were sampled during the survey (n = 18, CPUE = 16 fish/hr ± 9) to warrant any analysis. Of those fish captured, their lengths ranged from 53-215 mm. Black crappie condition is high with all individuals above the national average (105-120). Growth is below the state average (Table 9).

Table 9. Fraser-Lee back–calculated length at age of black crappie from Rowland Lake, October 1999.

		Mean Length at Age (mm)					
Year Class	**n**	**I**	**II**	**III**	**IV**	**V**	**VI**
1998	0	-					
1997	1	72	133				
1996	5	80	120	150			
1995	2	88	115	140	164		
1994	2	67	117	146	165	192	
1993	1	64	89	125	146	178	193
Average		77	117	145	161	187	193
Direct Proportion		52	103	137	154	184	190
State Average		46	111	157	183	220	224

Brown Bullhead, (*Ictalurus nebulosus*)

Too few brown bullhead were sampled during the survey (n = 2, CPUE = 1 fish/net night ± 1) to warrant any analysis. Of the two fish captured, their length were 336 mm and 338 mm. Condition and growth calculations were not performed for brown bullhead.

Brown Trout, (*Salmo trutta*)

Too few brown trout were sampled during the survey (n = 3, CPUE = 1 fish/hr ± 1) to warrant any analysis. Of those fish captured, their lengths ranged from 235-267 mm. Condition and growth calculations were not performed for brown trout.

Cutthroat Trout, (*Oncorhynchus clarki*)

Only one cutthroat trout was sampled during the survey. Its length was 296 mm and weighed 200 g. Condition and growth calculations were not performed for cutthroat trout.

Sculpin spp.

Too few sculpin were sampled during the survey (n = 15, CPUE = 13 fish/hr ± 5) to warrant any analysis. Condition indices, growth calculations, or keying fish to species was not performed for sculpin.

Yellow Perch, (*Perca flavescens*)

Too few yellow perch were sampled during the survey (n = 4, CPUE = 1 fish/net night ± 1) to warrant any analysis. Yellow perch condition was high with all individuals either at or above the national average. Only one perch was aged and found to be a two–year old with above average growth.

American Shad, (*Alosa sapidissima*)

Only one American shad was sampled during the survey. Its length was 480 mm and weighed 100 g. Condition and growth calculations were not performed for American Shad. The presence of shad suggests that the connection between the southern portion of Rowland Lake and the Columbia River is adequate for fish to move in and out of the lake.

Management Options

Judging from our results, the northern half of Rowland Lake appears to provide little opportunity to catch quality size warmwater gamefish. However, the northern half of the lake may not represent Rowland Lake as a whole. A better population of largemouth bass and panfish may exist in the southern half of the lake. The southern portion should be sampled before making management decisions.

The presence of American shad in Rowland Lake suggests that the culvert between the southern portion of the lake and the Columbia River is adequate for fish movement. So long as the culvert connecting the two water bodies exist, undesirable fish will continue to filter into Rowland Lake filling space that could be used by warmwater fish. If it can be determined that Rowland Lake is of no use to anadromous fish, we may wish to investigate the status of the culvert connecting the river to the southern lake. Blocking or screening of this culvert may provide a benefit to warmwater fish, while not negatively affecting lake levels.

Of the warmwater species sampled during the survey, yellow bullhead appear to offer the best opportunity for anglers. Yellow bullhead averaged between 180-200 mm with the opportunity to catch fish up to 250 mm. Anglers who target catfish should be directed towards Rowland Lake.

The following are management options that are in the best interest of the warmwater fishery in Rowland Lake.

1. Before any management decisions are made, the southern half of Rowland Lake needs to be surveyed. However, a means to launch a boat into the lake needs to be investigated.
2. Investigate the culvert between the Columbia River and the southern portion of the lake to determine if isolating Rowland Lake from the river is possible. If isolation from the river is possible, it will prevent the colonization of undesirable fish species, and may benefit the warmwater fishery.
3. Promote the yellow bullhead fishery in the lake for those anglers who fish for catfish.

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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).