

## **The Status of the Fish Community of Kangaroo Lake**

A summary of surveys conducted in 1995, with emphasis on walleye.

Fisheries surveys were conducted on Kangaroo Lake throughout the open water season of 1995. The primary objective of the study was to characterize and determine the status of walleye, historically the primary predator in the system. A secondary objective was to gather data on as many species as possible and identify changes to the fish community, if any, from the perspective of past survey information.

Initially, fyke nets were set at ice out, April 7, 1995, and were fished through April 24, 1995. These nets were used to capture as many fish of as many species as possible, to collect biological data on individuals of these species, and to assign each fish a mark (in this case the caudal fin "tail fin" was clipped). The marks are used to define population estimates which are developed statistically by the relationship of the number of recaptured fish bearing the fin clip to those that have no marks. In addition, scale samples were collected from all game fish species (walleye, smallmouth bass, northern pike). Scales can be used to age fish. With this information and length-frequency distributions for the species, the age structure of each population can be determined. Aging also allows for comparisons of growth rates of the species in Kangaroo Lake to other Wisconsin waters.

Soon after the fyke net surveys were completed electrofishing surveys were conducted on the lake. On each night of May 1 and June 5, 1995 the entire shoreline of the lake surveyed. Because the marked fish captured in the fyke nets have had time to mix within the general population of the lake, data collected during the course of the electrofishing sample can be used to verify the population estimates that were made from fyke net collected data, and act as second and independent estimator of those populations.

The final survey of the year was conducted on November 7, 1995, and was an electrofishing survey. The fall survey is used exclusively to determine abundance of juvenile walleye in the population. More than one run is usually done in the fall period but early ice conditions prevented further work.

### **Fyke Net Survey Results**

Nets were fished at nine locations along the shoreline of Kangaroo Lake between April 5-24, 1995. A total of 153 net nights of fishing effort occurred during the survey period. Table 1 summarizes the catch taken in the survey and compares its result to past assessments. CPE's (catch per unit of effort) are presented along with total numbers captured. The CPE allows for standardization of results between years because the amount of fishing effort (net nights) can vary between years.

A total of 1297 walleye were collected during the course of the assessment, second only in numbers to yellow perch at 9619. White sucker, rock bass, and bluegill followed in abundance at 1118, 1112, and 437, respectively. The other gamefish species, northern pike, smallmouth and largemouth bass numbered 151, 25, and 9, respectively.

Comparisons to other years indicate total walleye abundance lower than in 1983, similar to 1980, but significantly higher than in 1973. However, it should be noted that a substantial number of the walleye were juveniles less than 250 mm in length and that adult numbers appear closer to the 1973 level than any other year.

Northern pike abundance has almost doubled since 1980 but their are still much lower than in 1973. No clear trends are apparent with smallmouth and largemouth bass.

Panfish abundance has increased greatly. Yellow perch dominate the panfish community and are at an all time high level of abundance, as are rock bass, bluegill and pumpkinseed. One observation that may be significant is that smallmouth bass, rock bass, and bluegill ; all were at much lower levels when walleye abundance was at its highest in 1980. Even white sucker numbers, which are now three fold higher than in 1973, were suppressed during those years.

Population estimates derived from 1995 fyke net data are presented in Table 2 as are estimates available from previous years. Each block of information contains the population estimate (PE), followed by the 95% confidence interval for that estimate and the density of that species based on the surface area of Kangaroo Lake (1122.5 acres).

Walleye drop from second in abundance (CPE) to fourth on the basis of numbers per acre (2.40). For larger walleye greater than 250 mm, they are estimated at 1.04/acre. Yellow perch have the highest density (38.26/acre) followed by white sucker (4.51/acre) and rock bass (2.68). Bluegill fall behind walleye at 1.69/acre.

Similar historical data for species other than walleye, with few exceptions, does not exist. However, comparisons for walleye greater than 250 mm can be made. Walleye densities in 1995 are approximately 40% of what they were in 1983, 65% of levels in 1973. Although densities are roughly 55% of levels in 1980, the 1980 estimate was made on walleye 214mm and greater. This could have included many more fish between 214mm and 250mm and raised the estimates.

Table 3 summarizes length at age data the result of scale analysis of gamefish collected from the fyke net survey. Growth rates were compared to statewide averages for all gamefish ( Figures 1-3). The weighted mean for by sex for each age class was used to develop the average length at age for walleye and northern pike. In general growth rates meet or exceed the statewide averages.

For walleye, the age distribution by sex by numbers is shown in Figure 4. The same values depicted as a percent of the population are shown in Figure 5. The majority of the walleye population, over 85%, was composed of age three and younger individuals. Age of maturity begins at age three for males, and at age four for females.

### **Electrofishing Surveys**

Electrofishing surveys conducted on the nights of May 1 and June 5 were designed to obtain an independent estimate on the size of the walleye population. Younger walleye are not easily captured at this time and was reflected in the results (Table 4). However, the estimates for

walleye greater than 250mm and total walleye were similar, as were the estimates for white sucker and rockbass. The data suggests a high degree of confidence in these spring estimates.

Fall electrofishing produced 303 juvenile walleye ranging in size from 170mm-280mm (see length frequency charts, Appendix 1). One individual at 280mm was a two year old. The remaining 302 walleye were age one. No young of the year walleye from the 1995 year class were captured.

### **Conclusions**

The adult walleye population is lower now than in past years but falls well within expected ranges for a highly variable species. Natural reproduction continues to be good and these age groups will add to the adult population in future years. The low numbers of adults can be attributed to a series of poor years of reproduction or their numbers may be reduced do to angler harvest (walleye reach legal size, 381mm, between ages three and four). The cause can not be determined with out conducting a creel survey to estimate walleye harvest.

Low predator abundance may be responsible for the burgeoning panfish population. This can be looked at as a positive or negative depending on your favorite species.

While not of immediate concern the upward trend in white sucker should be followed. Their numbers, too, may diminish with higher predator numbers.

**Table 1. Summary of Fyke Net Surveys, Numbers Collected and (CPE) - Kangaroo Lake, 1973-1995**

SPECIES	APRIL 7-24, 1995 153 NET DAYS	APRIL 4-22, 1983 128 NET DAYS	APRIL 21-30, 1980 27 NET DAYS	MARCH 19-APRIL 5, 1973 76 NET DAYS
WALLEYE >250mm <250mm	1297 (8.48) 716 (4.68) 581 (3.80)	1498 (11.70)	234 (8.67)	193 (2.54)
NORTHERN PIKE	151 (0.99)	112 (0.89)	14 (0.52)	223 (2.93)
SMALLMOUTH BASS	25 (0.16)	7 (0.05)	11 (0.41)	2 (0.03)
LARGEMOUTH BASS	9 (0.06)	1 (0.01)		13 (0.17)
BOWFIN	30 (0.20)	13 (0.10)		10 (0.13)
ROCK BASS	1112 (7.27)	112 (0.88)	139 (5.15)	220 (2.89)
BLUEGILL	437 (2.86)	10 (0.08)	4 (0.15)	132 (1.74)
PUMPKINSEED	21 (0.14)			8 (0.11)
YELLOW PERCH	9619 (62.87)	2559 (19.99)		424 (5.58)
BLACK BULLHEAD		2 (0.02)		
LONGNOSE GAR	1 (0.01)		2 (0.07)	
WHITE SUCKER	1118 (7.31)	501 (3.91)	145 (5.37)	172 (2.26)
LONGNOSE SUCKER		1 (0.01)	101 (1.48)	
RAINBOW TROUT	7 (0.05)			3 (0.04)
BROWN TROUT	1 (0.01)			
BROOK TROUT		3 (0.02)	4 (0.15)	
CARP		1 (0.01)		

**Table 2. Population Estimates for the 1995 Fyke Net Survey and Estimates for Corresponding Fyke Net Surveys Conducted between 1973-1983.**

SPECIES	APRIL 7-24, 1995 153 NET DAYS FYKE NETS	APRIL 4-22, 1983 128 NET DAYS FYKE NETS	APRIL 21-30, 1980 27 NET DAYS FYKE NETS	MARCH 19-APRIL 5, 1973 76 NET DAYS FYKE NETS
WALLEYE	<p>PE=2695 &gt;150 mm 95% C.I. (2374-3058) 2.40/acre</p> <p>PE=1167 &gt;250 mm 95% C.I. (999-1362) 1.04/acre</p> <p>PE=1613 &lt;250 mm 95% C.I. (1999-2001) 1.44/acre</p>	<p>PE=3054 &gt;250 mm 95% C.I. (2698-3457) 2.72/acre</p>	<p>PE=2169 &gt;214 mm 95% C.I. (1197-3792) 1.93/acre</p>	<p>PE=1898 &gt;250 mm 95% C.I. (1050-4491) 1.60/acre</p>
NORTHERN PIKE	<p>PE=946 &gt;300 mm 95% C.I. (507-1934) .84/acre</p>			<p>PE=1257 &gt;240 mm 95% C.I. (757-2048) 1.12/acre</p>
ROCK BASS	<p>PE=3003 &gt;70 mm 95% C.I. (2544-3545) 2.68/acre</p>			
YELLOW PERCH	<p>PE=42957 &gt;120 mm 95% C.I. (39473-46747) 38.26/acre</p>	<p>PE=3920 &gt;100 mm 95% C.I. (3611-4255) 3.49/acre</p>		
WHITE SUCKER	<p>PE=5066 &gt;190 mm 95% C.I. (3917-6545) 4.51/acre</p>			
BLUEGILL	<p>PE=1899 &gt;70 mm 95% C.I. (1376-2702) 1.69/acre</p>			
BOWFIN	<p>PE=163 95% C.I. (49-295) 0.15/acre</p>			
PUMPKINSEED	<p>PE=40 95% C.I. (16-99) 0.04/acre</p>			

**Table 3.** Mean Length at Age (mm) for Selected Species Collected in Fyke Nets, Kangaroo Lake 1995.  
N is sample size, (size range), sd is standard deviation.

AGE CLASS

SPECIES	1	2	3	4	5	6	7	8	9
WALLEYE MALE			N=86 $\bar{X}$ =308 (280-340) sd.=10.7	N=20 $\bar{X}$ =384 (340-440) sd.=28.7	N=27 $\bar{X}$ =445 (410-490) sd.=17.4	N=22 $\bar{X}$ =457 (420-480) sd.=20.6	N=2 $\bar{X}$ =470 (450-490) sd.=28.3		
FEMALE			N=2 $\bar{X}$ =375 (310-440) sd.=91.9	N=1 $\bar{X}$ =450	N=20 $\bar{X}$ =458 (420-510) sd.=27.9	N=17 $\bar{X}$ =496 (420-590) sd.=49.5	N=17 $\bar{X}$ =529 (480-580) sd.=26.6	N=3 $\bar{X}$ =573 (570-580) sd.=5.8	N=1 $\bar{X}$ =560
UNKNOWN	N=45 $\bar{X}$ =175 (150-180) sd.=8.7	N=452 $\bar{X}$ =202 (190-240) sd.=8.8	N=323 $\bar{X}$ =305 (270-350) sd.=12	N=3 $\bar{X}$ =397 (390-400) sd.=5.7	N=3 $\bar{X}$ =460 (450-470) sd.=10.0	N=1 $\bar{X}$ =510			
SMALLMOUTH BASS	N=3 $\bar{X}$ =190 (180-200) sd.=10.0	N=4 $\bar{X}$ =198 (180-220) sd.=17.1	N=3 $\bar{X}$ =260 (250-280) sd.=17.3	N=8 $\bar{X}$ =324 (250-360) sd.=33.8	N=8 $\bar{X}$ =330 (310-360) sd.=20.0	N=1 $\bar{X}$ =400	N=1 $\bar{X}$ =420		
NORTHERN PIKE MALE		N=6 $\bar{X}$ =337 (300-370) sd.=28.0	N=25 $\bar{X}$ =457 (400-430) sd.=40.7	N=13 $\bar{X}$ =503 (480-540) sd.=22.9	N=5 $\bar{X}$ =540 (450-590) sd.=55.7	N=4 $\bar{X}$ =630 (620-640) sd.=8.2			
FEMALE			N=2 $\bar{X}$ =500 (450-550) sd.=70.7	N=15 $\bar{X}$ =533 (510-610) sd.=27.4	N=4 $\bar{X}$ =590 (560-650) sd.=42.4	N=4 $\bar{X}$ =665 (610-730) sd.=49.3	N=2 $\bar{X}$ =725 (710-740) sd.=21.2		N=1 $\bar{X}$ =970
UNKNOWN	N=4 $\bar{X}$ =303 (300-310) sd.=5.0	N=27 $\bar{X}$ =352 (320-390) sd.=20.6	N=4 $\bar{X}$ =458 (430-500) sd.=29.9	N=17 $\bar{X}$ =528 (470-570) sd.=32.5	N=7 $\bar{X}$ =619 (550-680) sd.=49.5	N=1 $\bar{X}$ =690	N=1 $\bar{X}$ =730		

**Table 4. Comparison of Fyke Net Estimated Densities vs Electrofishing Estimated Densities**

SPECIES	ELECTROFISHING # CAPTURED	ELECTOFISHING DENSITY EST.	FYKE NETTING DENSITY EST.
ALL WALLEYE	2648	2.36/ACRE	2.4/ACRE
WALLEYE >250mm	1414	1.26/ACRE	1.04/ACRE
WALLEYE <250mm	501	0.45/ACRE	1.44/ACRE
ROCK BASS	3435	3.06/ACRE	2.68/ACRE
WHITE SUCKER	6536	5.82/ACRE	4.51/ACRE

FIGURE 1.

# WALLEYE

STATEWIDE AVG. VS KANGAROO L.

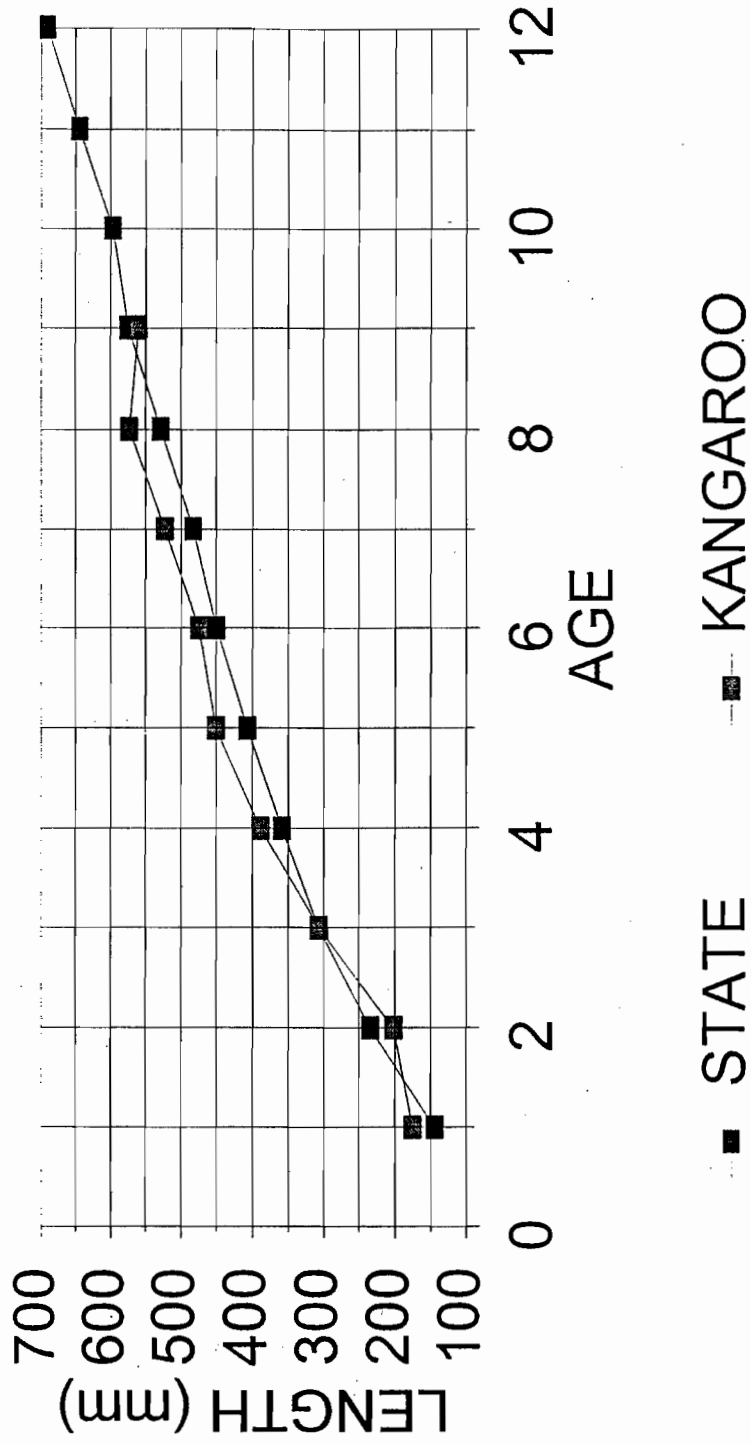




FIGURE 2.

# NORTHERN PIKE

STATEWIDE AVG. VS KANGAROO L.

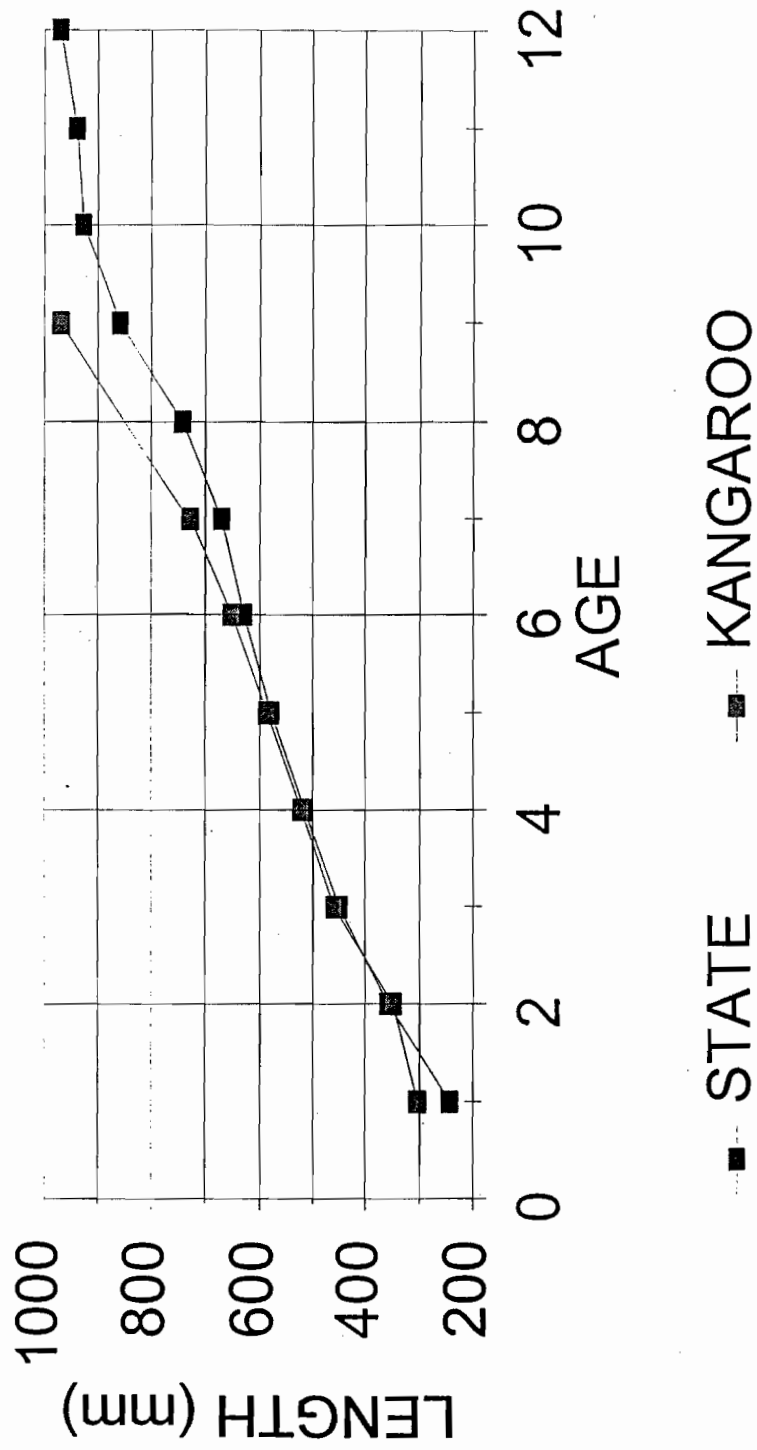


FIGURE 3.

# SMALLMOUTH BASS

STATEWIDE AVG. vs KANGAROO L.

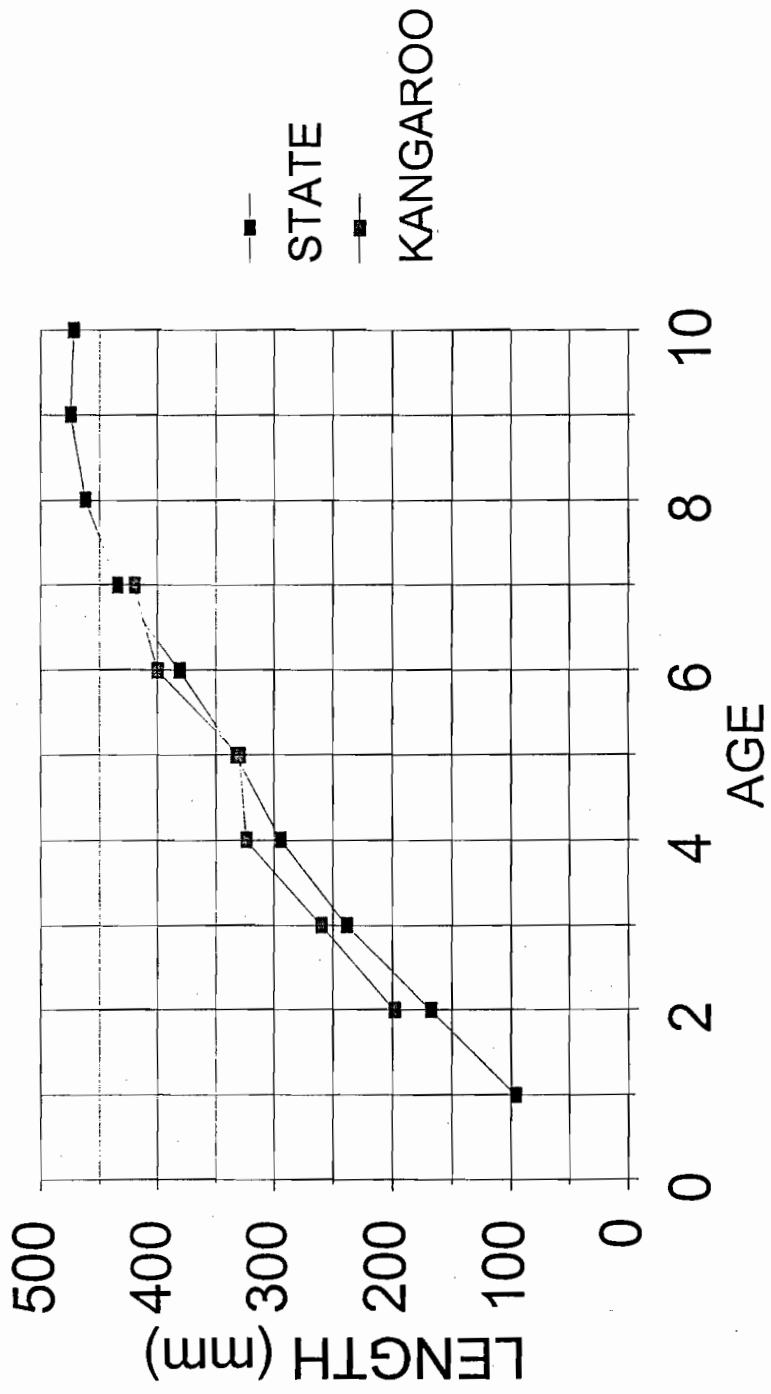


FIGURE 4.

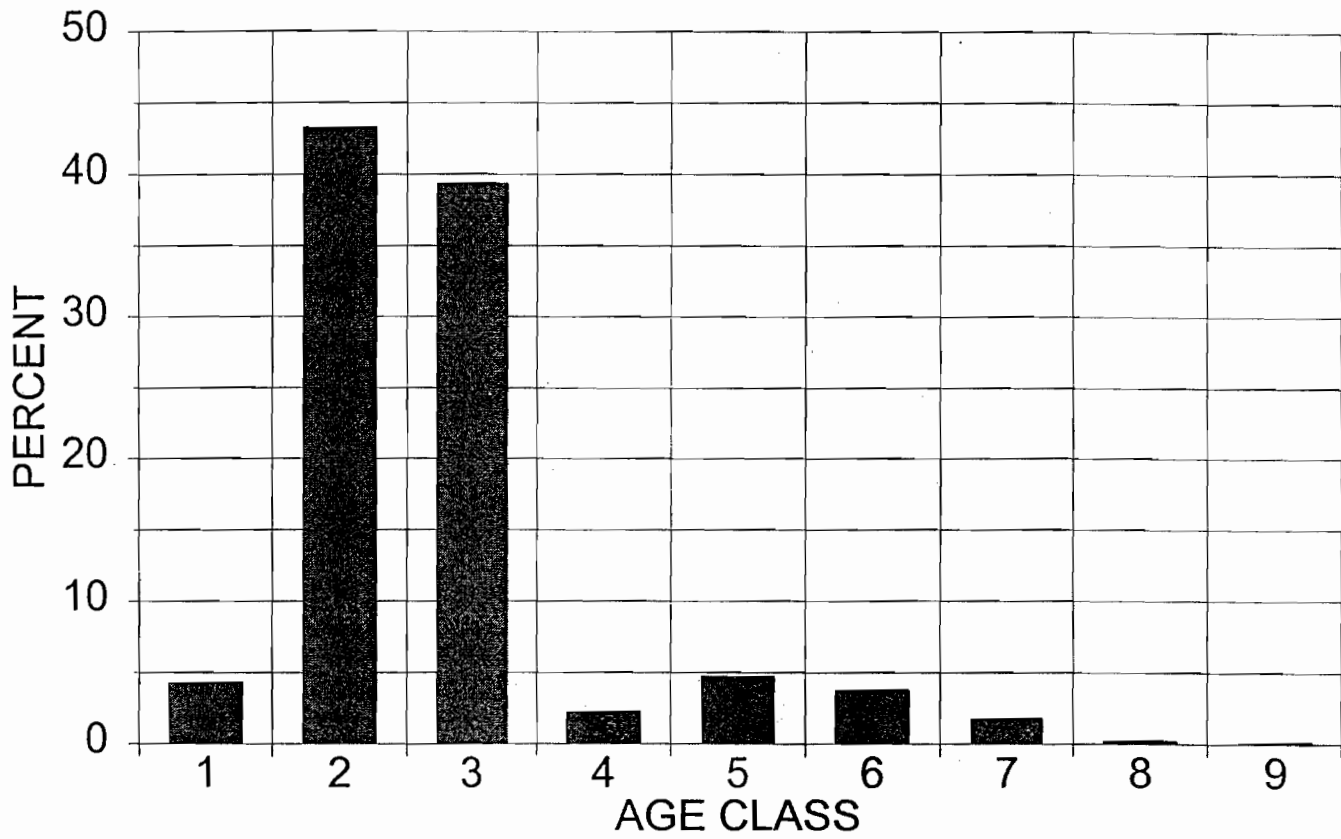
**WALLEYE AGE DISTRIBUTION**  
KANGAROO LAKE - 1995



FIGURE 5.

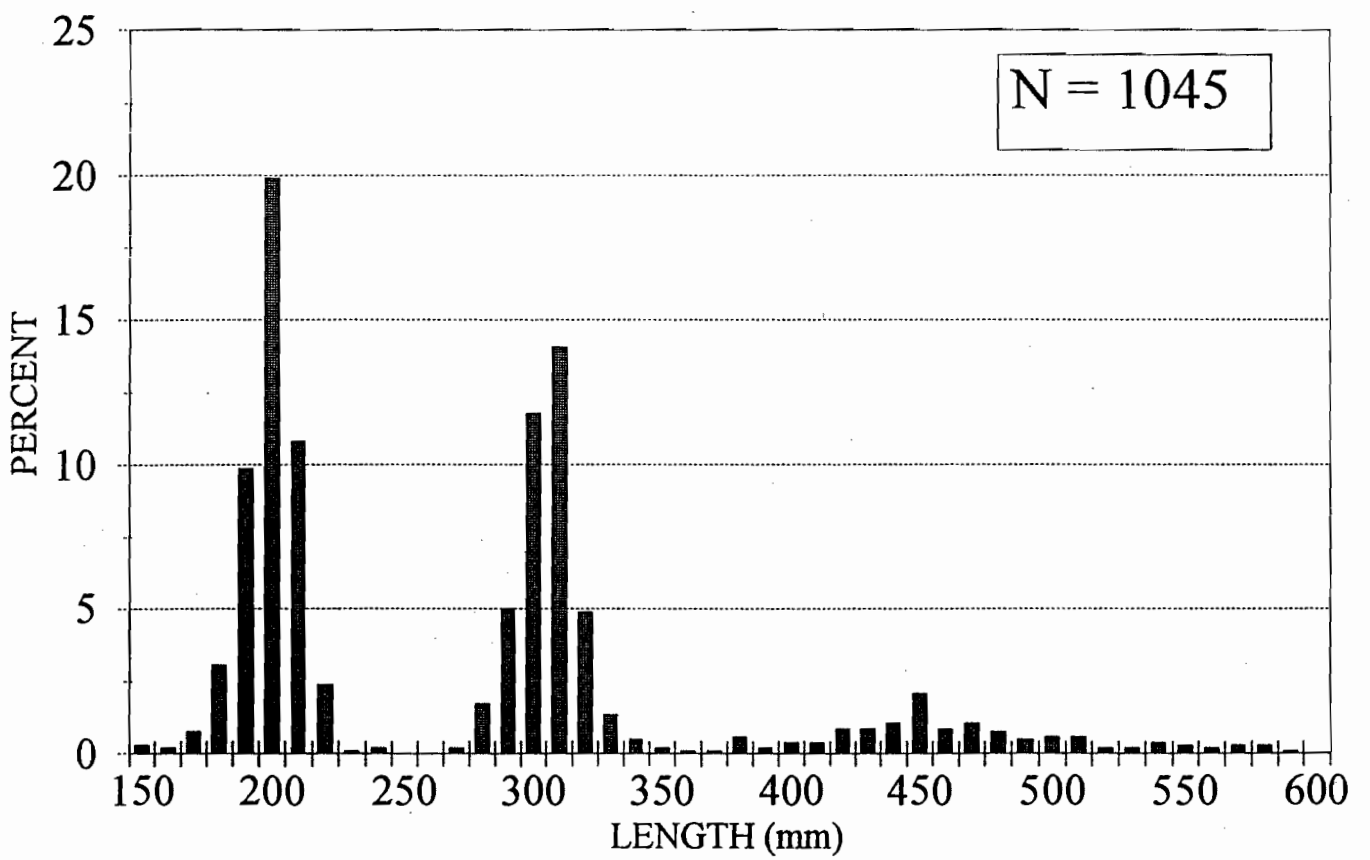
## WALLEYE AGE DISTRIBUTION

KANGAROO LAKE- 1995

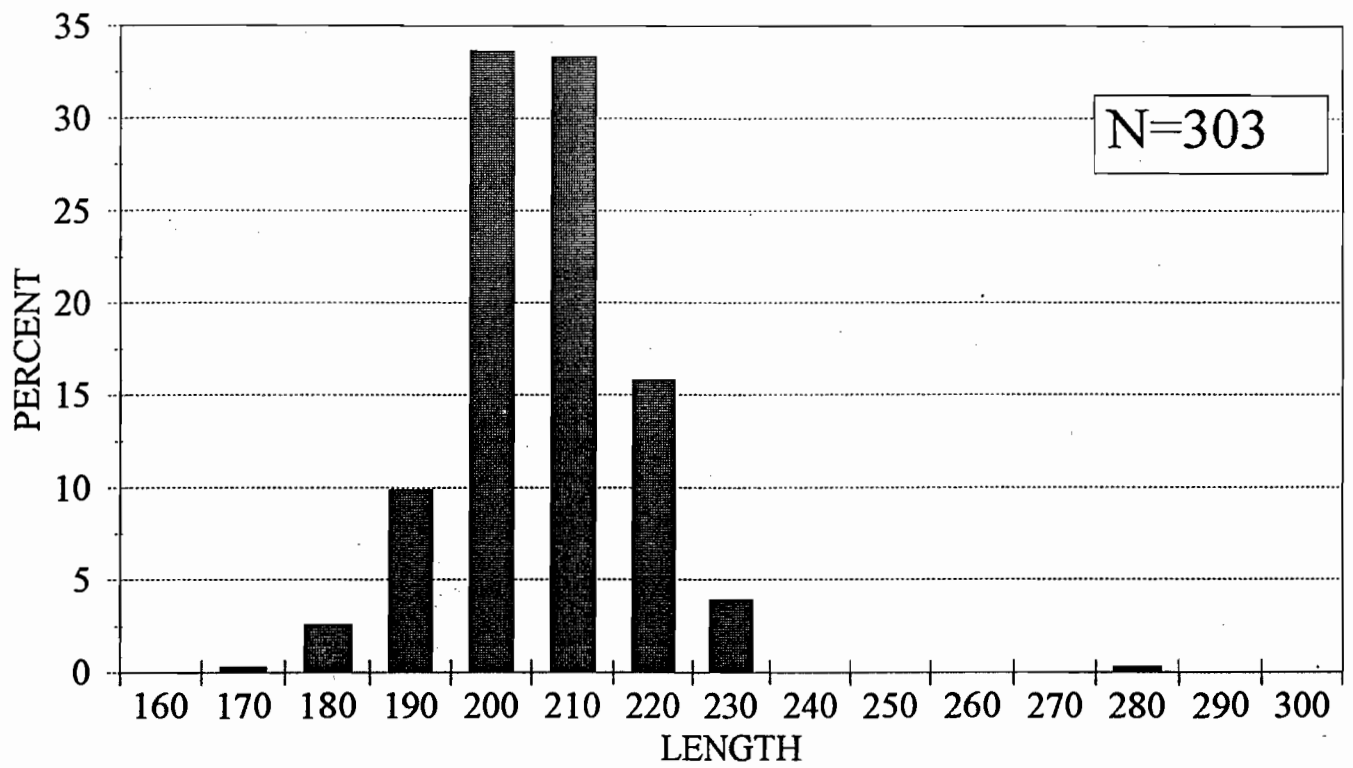


APPENDIX I.

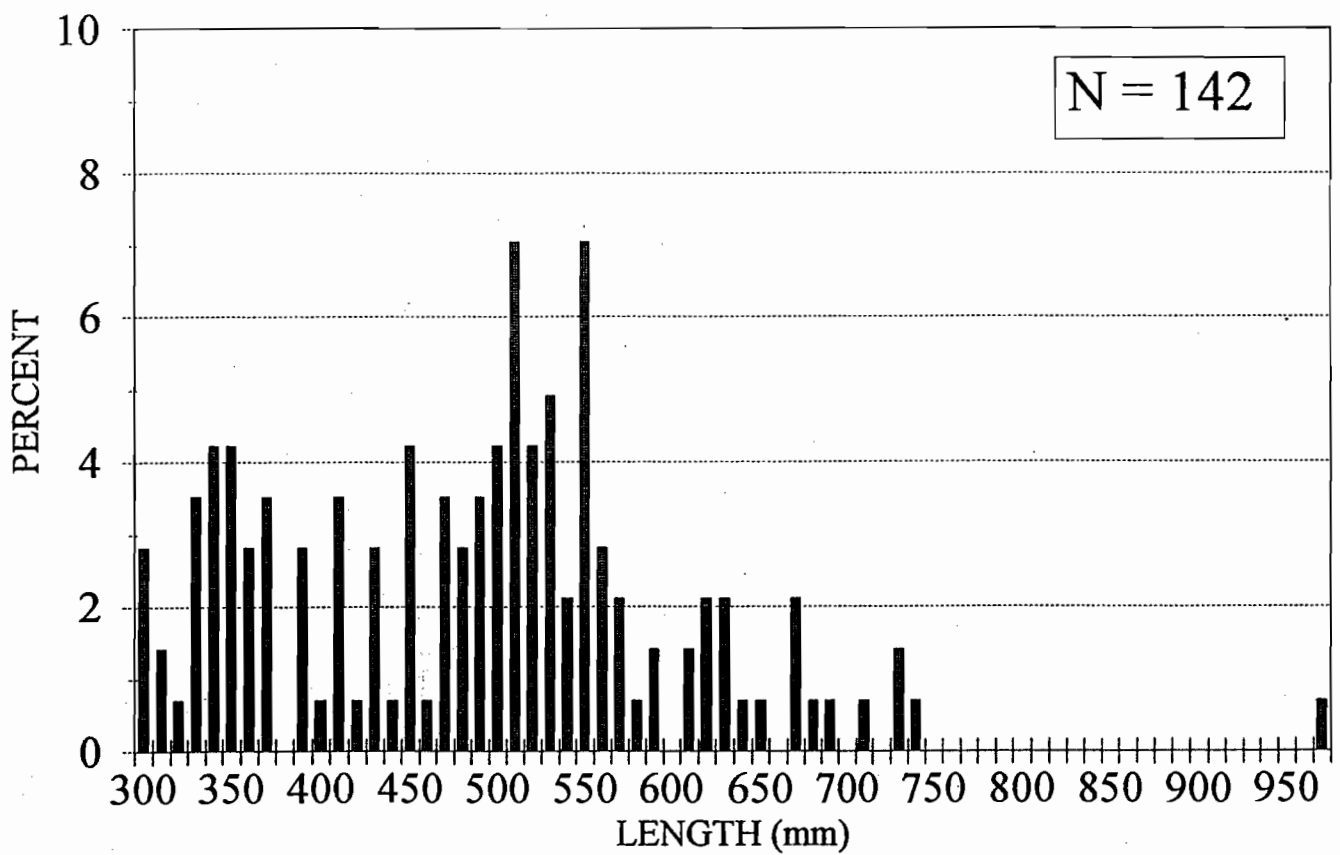
# SPRING 1995 KANGAROO LAKE WALLEYE LENGTH FREQUENCY



# FALL 1995 KANGAROO LAKE WALLEYE

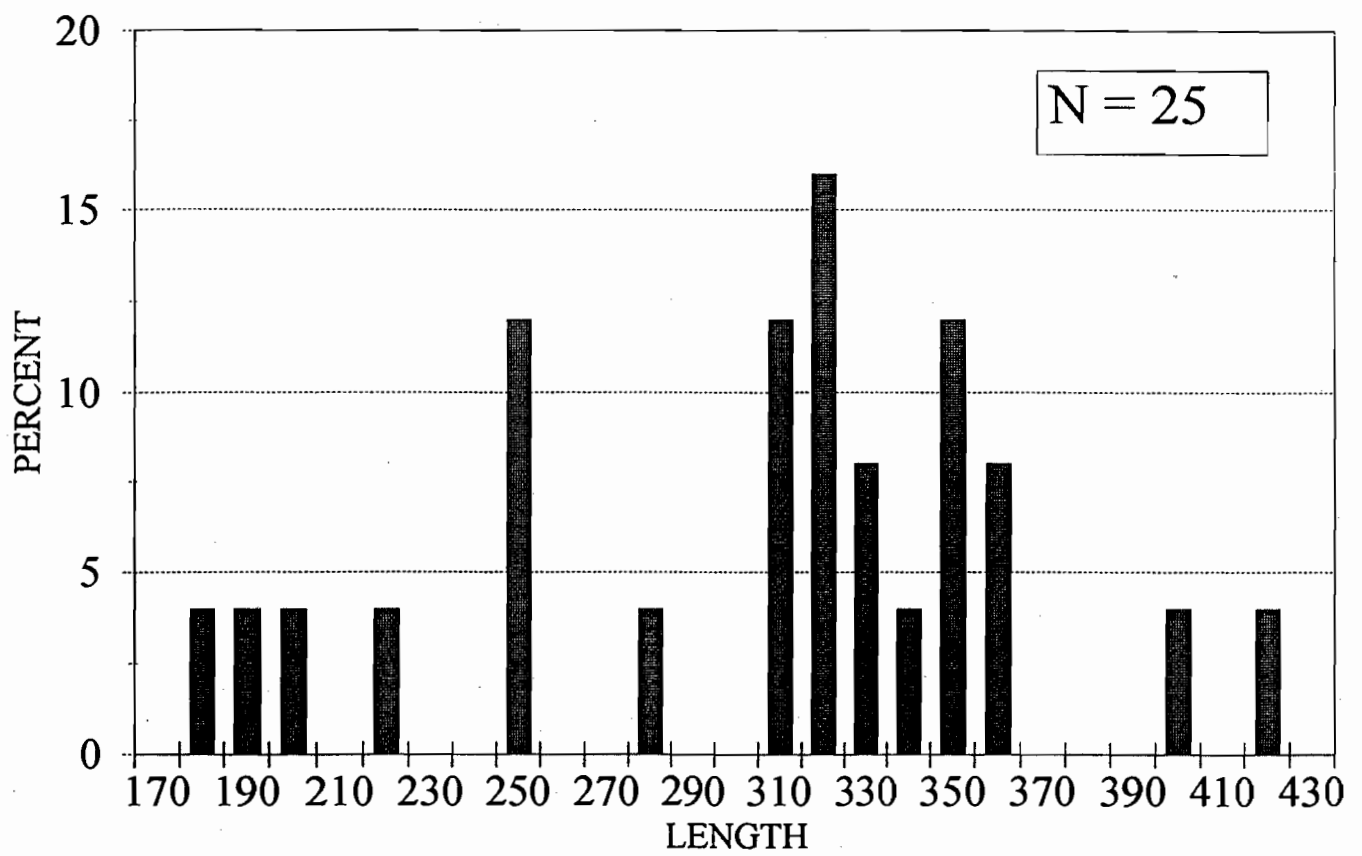


# SPRING 1995 KANGAROO LAKE NORTHERN PIKE LENGTH FREQUENCY

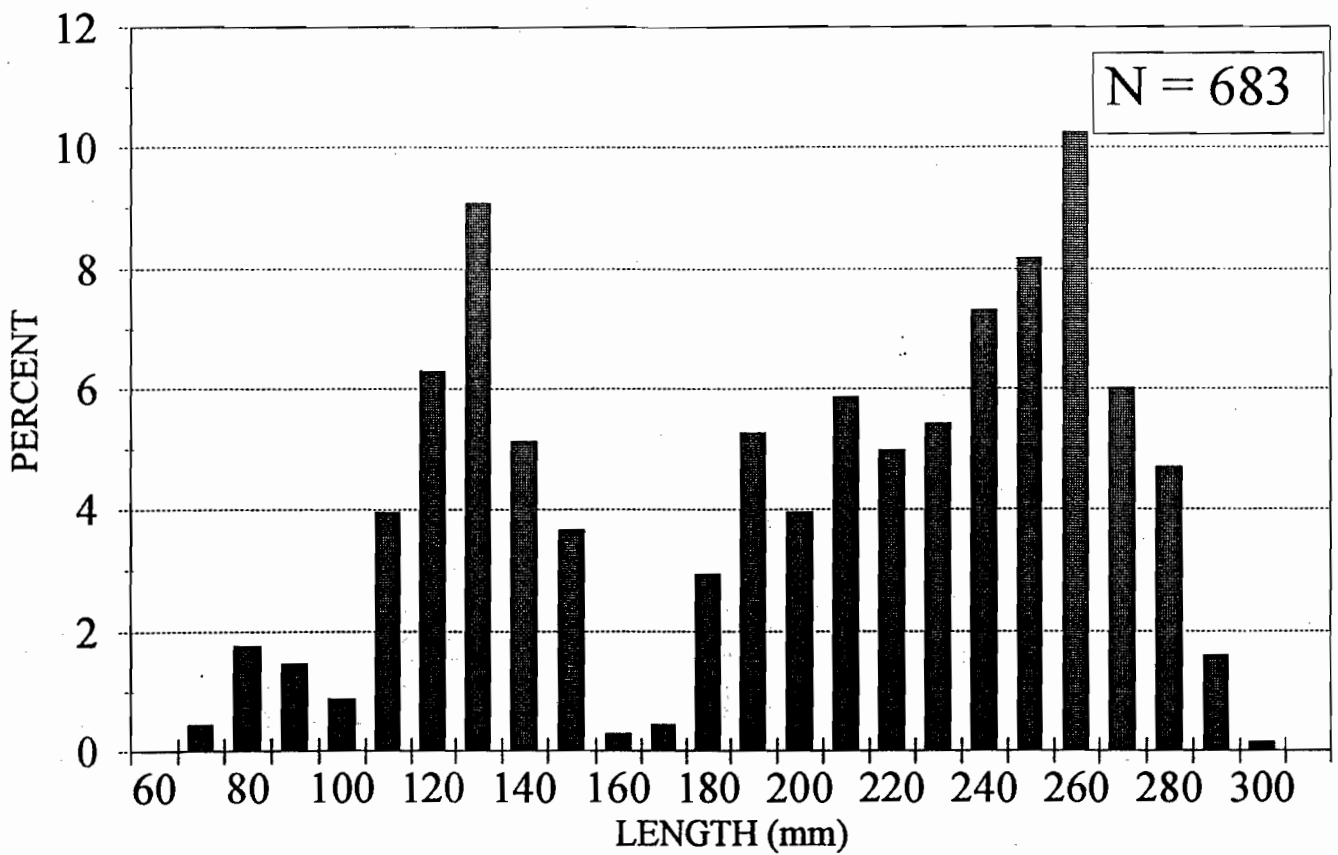




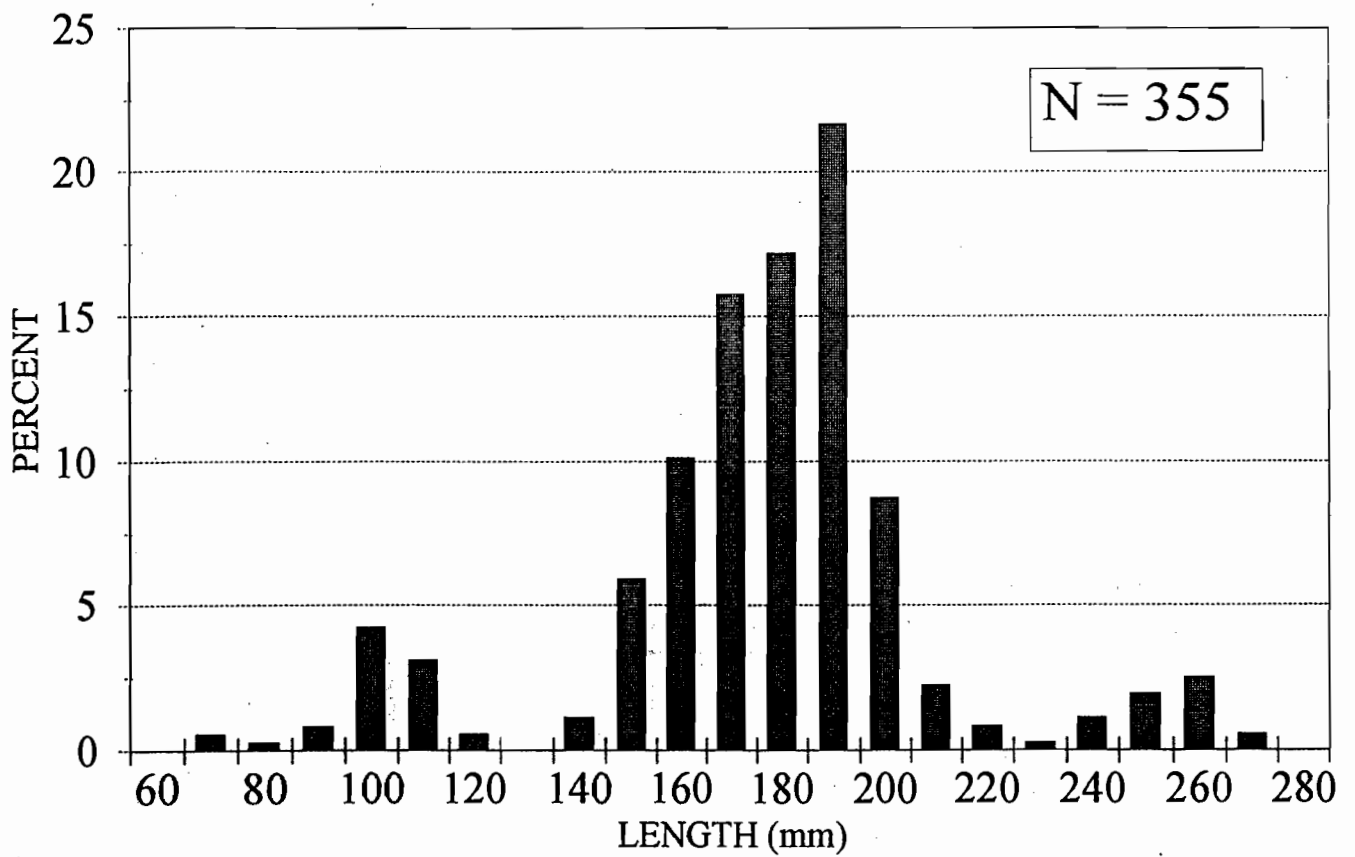
# SPRING 1995 KANGAROO LAKE SMALLMOUTH BASS LENGTH FREQUENCY



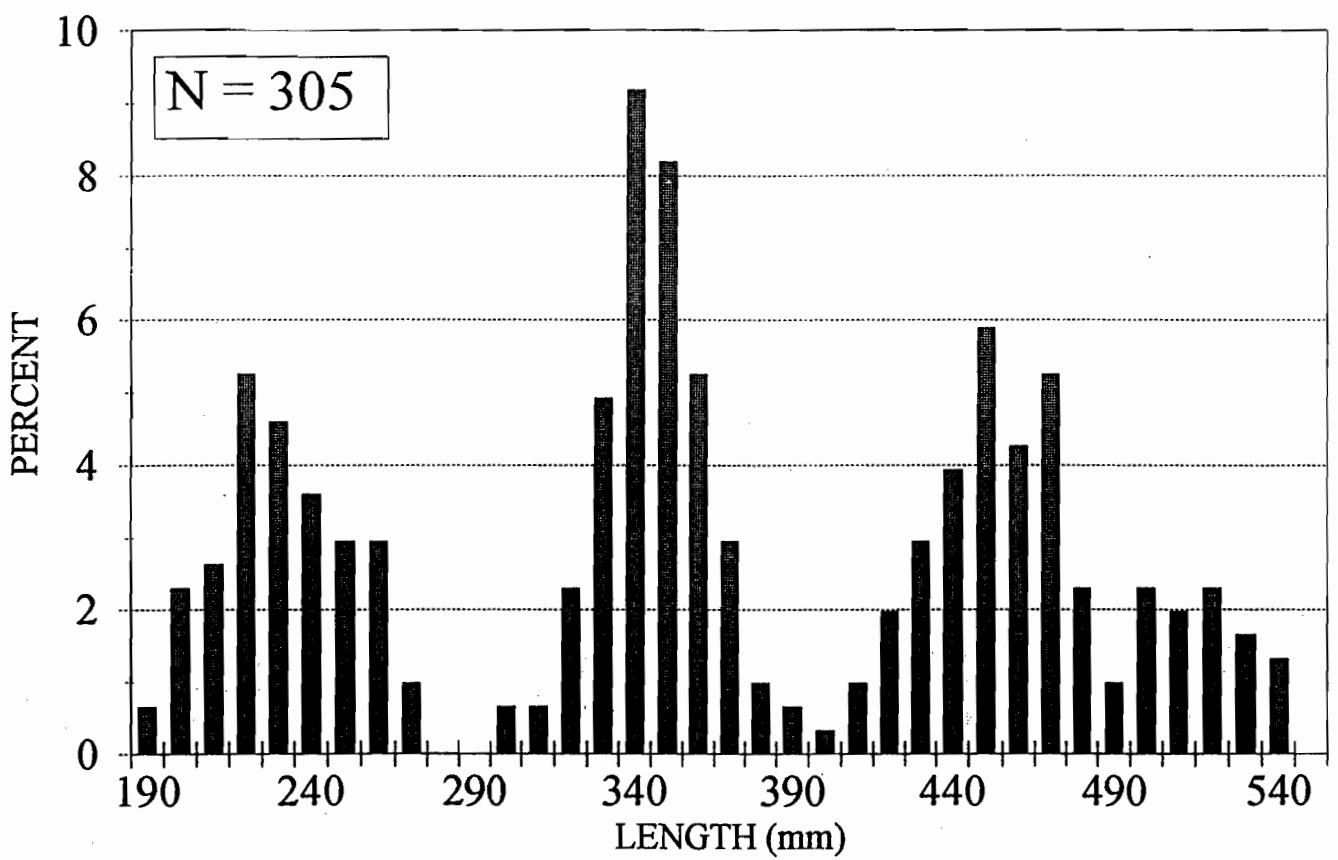
# SPRING 1995 KANGAROO LAKE ROCK BASS LENGTH FREQUENCY



# SPRING 1995 KANGAROO LAKE BLUEGILL LENGTH FREQUENCY



# SPRING 1995 KANGAROO LAKE WHITE SUCKER LENGTH FREQUENCY



# SPRING 1995 KANGAROO LAKE YELLOW PERCH LENGTH FREQUENCY

