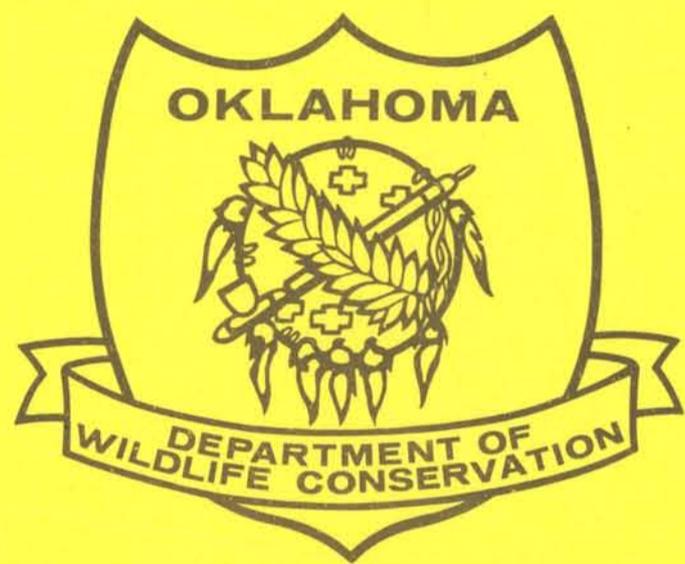


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PERFORMANCE REPORT  
RESEARCH PROJECT SEGMENT  
FEDERAL AID PROJECT F-36-R-4



EVALUATION OF FACTORS INFLUENCING YIELDS  
OF MICROPTERUS BASSES IN LARGE RESERVOIRS

JOB NO. 4

SPOTTED BASS RESEARCH

October 1, 1978 through September 30, 1979

*Ken Cook*

PERFORMANCE REPORT

State: OKLAHOMA

Project Number: F-36-R-4

Project Title: Evaluation of factors influencing yield of Micropterus basses in large reservoirs

Project Section: Research and Surveys

Job Number: IV

Job Title: Spotted Bass Research

Contract Period: From 1 October 1978 To: 30 September 1979

Program Narrative Objective No.: IV

Objective: To determine if the standing crop of Micropterus bass in a 2,266 hectare reservoir which supports heavy fishing pressure and an existing largemouth bass, Micropterus salmoides, population can be influenced through introduction of two-inch spotted bass, M. punctulatus, fingerlings when stocked at a rate of 100-200 fish per hectare.

I. Job Segment Objectives:

- A. Collect spotted bass for hatchery broodstock, spawn, raise fish to two-inch fingerling size and stock Lake Ellsworth at the rate of 100-200 fish per hectare.
- B. Conduct cove rotenone survey on two coves of Lake Ellsworth utilizing procedures outlined by Reservoir Committee, Southern Division, American Fisheries Society.
- C. Monitor survival and growth of spotted bass following stocking through shoreline seining and/or electrofishing.
- D. Monitor the contribution to the creel and changes in the yield of Micropterus bass as influenced by stocking through a random creel survey, biweekly concessionaire checks and bass tournament reports.
- E. Analyze data and prepare Performance Report.

II. Summary of Progress:

Culture of spotted bass fingerlings was conducted on the Durant State Fish Hatchery using standard culture techniques. On 15 August 1979 Lake Ellsworth was stocked with 1,001 spotted bass fingerlings which averaged 76 mm in total length.

Shoreline seining was conducted on 5 June 1979 to identify possible spotted bass reproductive success. A total of nine Age I spotted bass was collected. Their mean length was 121 mm. Two Age I largemouth bass were also collected, but no young of year of either species was collected.

On 3 July 1979 two spotted bass of 32 mm and 36 mm were collected by shoreline seining on the boat ramp where the original stocking was made. These fish were the first representatives of naturally produced spotted bass fingerlings to be collected. Additional seining at a total of ten sites yielded no further spotted bass fingerlings. A total of 22 young-of-year largemouth bass which averaged 40.2 mm was collected.

Forage fish including young-of-year gizzard shad (24), Mississippi silversides (198) and bluegill (72) were numerous in shoreline seining samples.

Electrofishing samples using pulsed D.C. were collected along rocky shoreline and riprap areas on Lake Ellsworth on 1 June 1979 and on 1 and 2 August 1979. A total of three hours actual electrofishing produced 19 spotted bass which ranged from 69 mm to 292 mm with a mean size of 170 mm. Fourteen were apparently Age I, and the remainder (5) were apparently Age II fish representing the initial stocking which was at a rate of less than three per hectare.

Two cove rotenone surveys were conducted 5 - 9 August 1979 at the standard coves used since initiation of the study in 1976. Results from the 1979 rotenone surveys are presented in Tables 1, 2 and 3. The combined data from the two coves indicated a largemouth bass standing crop of 6.442 kg/ha which was a decline from 16.2 kg/ha in 1978.

The gizzard shad standing crop estimate was 8761/ha which is similar

to estimates from 1978 (8929/ha), but is still considerably less than 1977 (87,430/ha).

Spotted bass appeared in Randall's cove, but not in Hasenback cove. A total of 21 was recovered from the 0.46 ha cove which contains gravel and/or rocky substrate. Three year classes are represented in this sample (Figure II). Eleven fish were young-of-year. Four were Age I and the remaining six were Age II.

Length frequency data calculated for gizzard shad indicated a larger proportion of the population comprised of young of-year than in past years (Figure I, Figure II). No changes in largemouth bass length frequencies are apparent (Figure I, Figure II).

A random creel survey was conducted during 1979 to determine parameters of the fishery at Lake Ellsworth. The lake supported a total of 169,025 angler-hours of fishing pressure (74.59 angler-h/ha) of which 19.7% was by those who sought black bass as their target species. A total of 5,036 bass was caught. Total harvest was 1.46 kg/ha at a rate of 0.11 bass/h.

No spotted bass catches were observed during the creel survey interviews, but several were verified by sport fishermen during concessionaire checks and bass tournaments. A bass tournament held in July reported a catch of 113 bass for 450 angler-hours of fishing. Average bass size was 0.626 kg for a catch rate of 0.25 bass with a weight of 0.185 kg for each angler-hour of fishing. Three spotted bass were reported by these same anglers, but none exceeded the minimum size limit (305 mm) for the tournament. Two spotted bass were caught by anglers during routine concessionaire checks.

### III. Significant Deviation:

Due to difficulties during culture and harvest only 1,001 finger-

ling spotted bass were available for stocking, but their average size was greater than in past years.

IV. Conclusions, Evaluations and Recommendations:

Stocking of spotted bass fingerlings into Lake Ellsworth at a rate of less than 3/ha produced a naturally spawned year class when the initially stocked fish were two years of age and approximately 250 mm in length.

Spotted bass from 1977, 1978 and 1979 year classes comprised approximately 22% of the total bass standing crop.

Major declines in biomass of most fish species especially large-mouth bass and gizzard shad have occurred since 1976 when this study was initiated, but these changes are believed to be due to a reduction in basic fertility of the water system brought about following an increased and stabilized water level in 1972. These large changes have masked any small effects that might have been realized by introduction of spotted bass.

The project should be terminated March 31, 1980 to allow completion of the on-going creel survey schedule and compilation and analysis of data for the final report.

V. Prepared by: Ken D. Cook  
Ken D. Cook, Fisheries Biologist

VI. Date: 12 December 1979

VII. Approved by: Harold Namminga  
Harold Namminga, D-J Coordinator

Cove	Randall's		Date of Survey			
	0.46 hectare		2 - 4 August 1979			
Surface Area of Cove	0.46 hectare		Percent Recovery of Marked Fish 84.7%			
Species Groups	Pick-up/acre		Expanded		Percent Occurance	
	No/acre	Wt/acre	No/acre	Wt/acre	Number	Weight
<u>Predatory Game Fish</u>						
Largemouth bass	187.0	6210	220.8	7331	2.2	5.3
Smallmouth bass						
Spotted bass	45.6	3135	53.8	3701	0.5	2.6
Striped bass						
White bass	47.9	7257	56.5	8568	0.6	6.1
White crappie	30.4	2143	35.9	2530	0.4	1.8
Black crappie	4.3	30	5.1	35	<0.1	<0.0
Walleye						
Northern pike						
Muskellunge						
Channel catfish	43.8	10474	51.7	12366	0.5	8.9
Blue catfish						
	359.0	29249	423.8	34531	4.2	24.7
<u>Non-Predatory Game Fish</u>						
Bluegill	1578.2	11557	1863.3	13645	18.5	9.8
Longear sunfish	257.0	3037	303.4	3586	3.0	2.6
Orangespotted sunfish						
Redear sunfish	13.0	520	15.4	614	0.1	0.4
Green sunfish	82.6	643	97.5	759	9.7	0.5
Hybrid Sunfish	13.0	2813	15.3	3321	0.1	2.4
Smallmouth	18.0	361	21.2	426	0.2	0.3
	1961.8	18931	2316.1	22351	22.9	16.0
<u>Non-Predatory Food Fish</u>						
Carp	18.0	698	21.2	824	0.2	0.6
Freshwater drum	15.2	2813	17.9	3321	0.2	2.4
Smallmouth buffalo						
Bigmouth buffalo						
River carpsucker						
Black bullhead	6.5	26	7.7	31	0.1	<0.1
Yellow bullhead						
Brown bullhead						
	39.7	3537	46.8	4176	0.5	3.0
<u>Predatory Food Fish</u>						
Flathead catfish	8.7	1102	10.3	1301	0.1	0.9
Longnose gar	2.2	54	2.6	64	<0.1	0.1
Shortnose gar						
Spotted gar						
	10.9	1156	12.9	1365	0.1	1.0
<u>Forage Fish</u>						
Gizzard shad	5100.0	62035	6021.2	73240	59.7	52.5
Threadfin shad						
Brook silversides						
Mississippi silversides	434.8	524	513.3	619	5.1	0.4
Perch	554.3	2560	654.4	3022	6.5	2.2
Amphibia	2.2	2	2.6	3	<0.1	0.0
G. shiner	54.3	191	64.1	225	0.6	0.2
Pimephales	19.6	33	23.1	39	0.2	<0.1
Phenacobius mirabilis	2.2	4	2.6	5	0.0	<0.1
Notropis	8.7	17	10.3	20	0.1	<0.1
	6176.1	65366	7291.6	77173	72.3	55.3
<b>TOTALS</b>	<b>8547.5</b>	<b>118239</b>	<b>10091.2</b>	<b>139596</b>		

Cove HasenbackDate of Survey 5 - 7 August 1979Surface Area of Cove 0.71 hectarePercent Recovery of Marked Fish 77.1%

Species Groups	Pick-up/ha		Expanded		Percent Occurance	
	No/ha	Wt/ha	No/ha	Wt/ha	Number	Weight
<u>Predatory Game Fish</u>						
Largemouth bass	215.5	4282	279.5	5554	1.8	1.8
Smallmouth bass						
Spotted bass						
Striped bass						
White bass						
White crappie	253.5	2565	328.8	3327	2.2	1.1
Black crappie	85.9	980	111.4	1271	0.7	0.4
Walleye						
Northern pike						
Muskellunge						
Channel catfish	119.7	3590	115.2	4656	1.0	1.5
Blue catfish						
	674.6	11417	874.9	14808	5.8	4.8
<u>Non-Predatory Game Fish</u>						
Bluegill	664.8	6454	826.3	8371	5.7	2.7
Longear sunfish	95.8	1842	124.2	2389	0.8	0.8
Orangespotted sunfish	288.8	1369	374.6	1776	2.5	0.6
Redear sunfish	8.5	225	11.0	292	0.1	0.1
Green sunfish	228.2	2213	296.0	2870	1.9	0.9
Rock bass						
Warmouth	224.0	2817	290.5	3654	1.9	1.2
	1510.1	14920	1958.1	19352	12.9	6.2
<u>Non-Predatory Food Fish</u>						
Carp	49.3	42635	63.9	55298	0.4	17.8
Freshwater drum	424.0	16259	550.0	21088	3.6	6.8
Smallmouth buffalo						
Bignmouth buffalo						
River carpsucker	5.6	1223	7.3	1586	0.1	0.5
Black bullhead	4.2	25	5.5	32	<0.1	<0.1
Yellow bullhead	1.4	56	1.8	73	<0.1	<0.1
Brown bullhead						
	484.5	60198	628.5	78077	4.1	25.1
<u>Predatory Food Fish</u>						
Flathead catfish	4.2	228	5.5	296	<0.1	0.1
Longnose gar	9.9	268	12.8	348	0.1	0.1
Shortnose gar						
Spotted gar	1.4	211	1.8	274	<0.1	0.1
	15.5	707	20.1	918	0.1	0.3
<u>Forage Fish</u>						
Gizzard shad	8867.6	152314	11501.4	197553	75.9	63.4
Threadfin shad						
Brook silversides						
Mississippi silversides	36.6	28	47.5	36	0.3	<0.1
Log Perch	2.8	7	3.6	9	<0.1	<0.1
Gambusia	21.1	23	27.4	30	0.2	<0.1
Pimephales spp.	14.1	23	18.2	30	0.1	<0.1
G Shiner	64.8	452	84.0	856	0.6	0.2
	9007.0	158247	11682.1	198244	77.0	63.7
TOTALS	11691.7	240089	15163.7	311399		

Cove Combination of two (Randall's & Hasenback) Date of Survey 2 - 7 August 1979

Surface Area of Cove 0.46 & 0.71 ha Percent Recovery of Marked Fish \_\_\_\_\_

Species Groups	Pick-up/acre		Expanded		Percent Occurance	
	No/acre	Wt/acre	No/acre	Wt/acre	Number	Weight
<u>Predatory Game Fish</u>						
Largemouth bass			250.1	6442	2.0	2.8
Smallmouth bass						
Spotted bass			26.9	1851	0.2	0.8
Striped bass						
White bass			28.2	5948	0.2	2.6
White crappie			182.4	2929	1.4	1.3
Black crappie			58.3	653	0.5	0.3
Walleye						
Northern pike						
Muskellunge						
Channel catfish			103.4	8511	0.8	3.8
Blue catfish						
			649.3	26334	5.1	11.6
<u>Non-Predatory Game Fish</u>						
Bluegill			1362.8	11008	10.8	4.9
Longear sunfish			213.5	2988	1.7	1.3
Orangespotted sunfish			187.3	888	1.5	0.4
Redear sunfish			13.2	453	0.1	0.2
Green sunfish			196.8	1814	1.6	0.8
Hybrid sunfish			7.6	1660	0.1	0.7
Mouth			155.8	2040	1.2	0.9
			2137.0	20851	16.9	9.2
<u>Non-Predatory Food Fish</u>						
Carp			42.6	28061	0.3	12.4
Freshwater drum			283.9	12204	2.2	5.4
Smallmouth buffalo						
Bignouth buffalo						
River carpsucker			3.6	793	0.1	0.4
Black bullhead			6.6	32	0.1	0.1
Yellow bullhead			0.9	36	0.1	0.1
Brown bullhead						
			337.6	41126	2.7	18.1
<u>Predatory Food Fish</u>						
Flathead catfish			7.9	799	0.1	0.4
Longnose gar			7.8	206	0.1	0.1
Shortnose gar						
Spotted gar			0.9	137	0.1	0.1
			16.6	1142	0.1	0.5
<u>Forage Fish</u>						
Gizzard shad			8761.3	135396	69.4	59.6
Threadfin shad						
Brook silversides						
Mississippi silversides			280.4	328	2.2	0.1
Perch			329.0	1515	2.6	0.7
Gambusia			15.0	17	0.1	0.1
Golden Shiner			74.0	406	0.6	0.2
Pimehpales spp			20.6	34	0.2	0.1
			9480.3	137696	75.1	60.6
<b>TOTALS</b>			12620.8	227149		



Figure I, Length frequency of fishes collected by Rotenone Lake Ellsworth (Hasenback cove) August 19 79

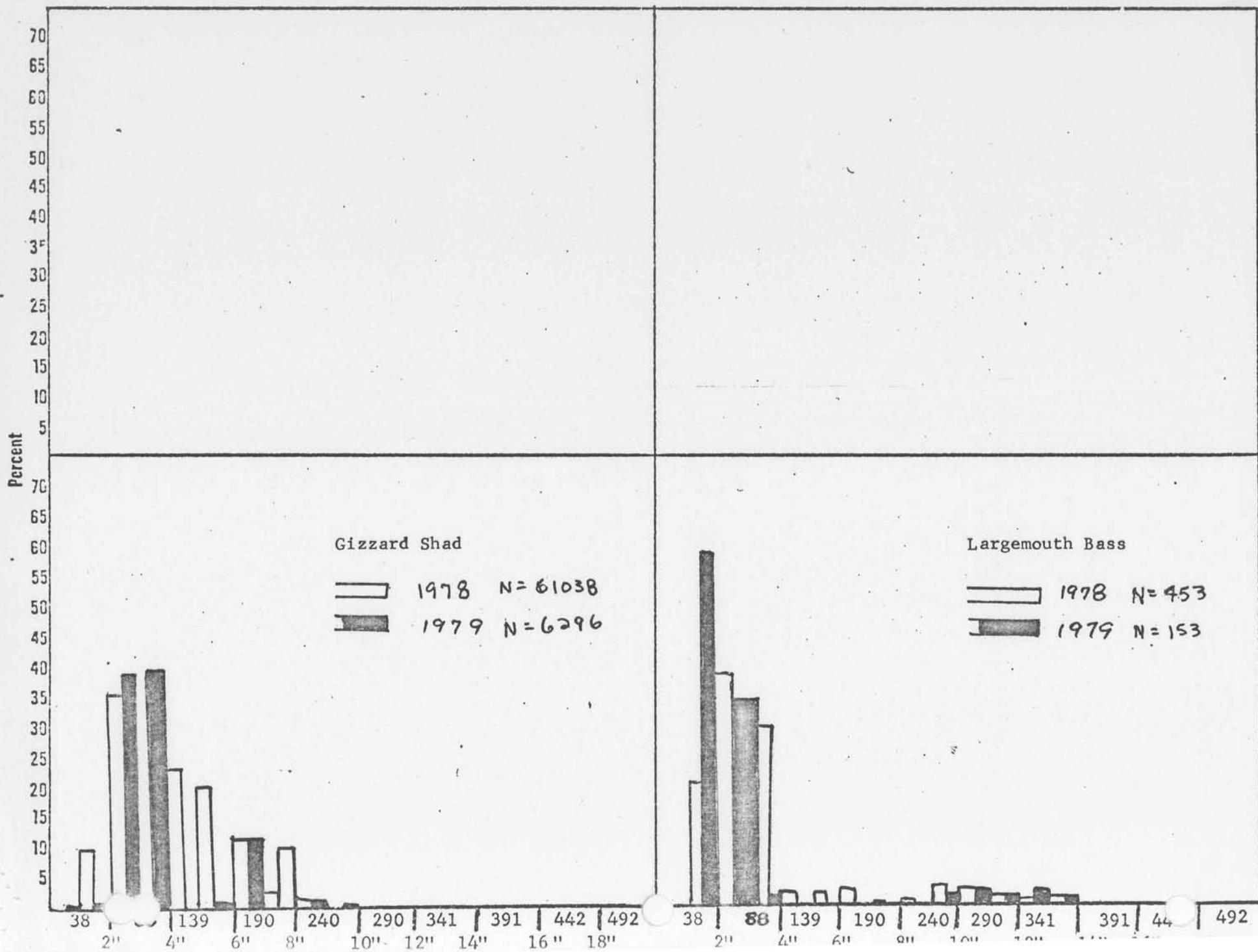




Figure II. Length frequency of fishes collected by Rotenone Lake Ellsworth (Randall's cove) August 1979

