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SPAWNING KOKANEE SALMON IN HIGGINS LAKE, ROSCOMMON COUNTY, MICHIGAN, IN NOVEMBER, 1973

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SUMMARY

About mid-November, 1973, various people reported seeing kokanee salmon (Oncorhynchus nerka [Walbaum]) spawning activity at several Higgins Lake locations. Two fyke nets were set on the 19th of November and pulled on the 20th. No fish of any kind were captured. Fifty-two kokanee were taken from spawning redds in the Conservation School inlet creek on the 20th of November, using backpack electro-fishing gear. Forty-nine more fish were taken from Big Creek spawning redds on the 26th using the same method. Spawning redds also were found again in 1973 along the lake shoreline (west side) in the vicinity of the Birch Lodge Resort.

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INTRODUCTION

There was no requirement for kokanee spawn to be taken from Higgins Lake fish in 1973. However, fish samples were taken for ageing purposes. Different reports indicated that kokanee were congregated in the Conservation School inlet stream, Big Creek, Cut River, and along the shoreline near the Birch Lodge Resort during the week November 12-16, 1973. Spawning kokanee were found at all of those locations except the Cut River.

METHODS

Two fyke nets were set on the 19th of November in approximately the same locations off the mouth of the Ralph A. MacMullan Conservation School inlet stream and in the lake near the west side public access site. No fish were taken in either net. The previous year trap nets rather than fyke nets were used, with the ends of the center leads perpendicular to the shore much further out in the lake. This may have been contributed to the absence of fish in 1973 net sets; however, there have been no fish moving in those two areas during the period the fyke nets were in the water.

After the nets were set, various areas of shoreline were checked by boat for kokanee spawning activity. Spawning activity was observed only at the shoreline near the Birch Lodge. In the same gravelly shoreline area as last year, there were about 10 to 12 redds on the 20th of November, and one male kokanee was seen cruising between two different ones. The Cut River and the adjacent lake shoreline were also checked. Reports had been received that kokanee were in these areas although none were observed and no redds were found.

After finding that the fyke nets did not capture any kokanee, backpack shockers were used to make a collection from the inlet creek near the Conservation School. A total of 52 kokanee were captured, measured, scale sampled, and returned to the creek. Of these, 29 were females and 23 were males. Lengths on the females ranged from 11.6 inches to 13.0 inches; males, 11.9 inches to 14.0 inches. Female average length was 12.2 inches; male, 12.9 inches. Table 1 contains the data tabulation.

In addition to capturing the fish sample, one redd from the Birch Lodge beach was dug up, put in a plastic bucket and brought back to the laboratory. There the material was searched for kokanee eggs. A total of 82 eggs were found; 46 live and 36 dead. The live eggs were cleared by immersion in a 5% solution of glacial acetic acid for a few minutes. Embryos could be seen in all of the live eggs.

They were not yet at the eyed state, but development was well along. It is highly likely that almost all of the eggs were alive when first dug up. Only 3 dead ones were seen when the redd was being dug up; others probably were killed during handling and transporting.

A more thorough visual inspection was made in the Conservation School creek and Big Creek on the 21st of November. Approximately 200 kokanee were in the Conservation School creek. Fish were found from the mouth to the headwaters, which is a distance of about 300 yards. About half of the fish were above the small dam, although the only redds above the dam were in the first 100 feet above. The remainder of the upper creek bed is covered with heavy silt and woody debris and does not appear to be a suitable spawning area. There were fish, however, at the very upper limit of this creek, including seven or eight dead ones. Approximately 25 redds were found in this stream with most of them being below the dam which was the stretch with the most gravel.

Big Creek was checked from its mouth, upstream to the US 27 expressway on the 21st. Heavy concentrations of kokanee were found wherever there was any gravel. As many as fifty could be counted at some of the better gravel areas; areas 8 to 10 feet long, the width of the stream. The length of the stream to the expressway is approximately one-half mile, and the average width is 10 to 12 feet. In all, an estimated 500 to 600 fish, and about 100 redds were seen. Both estimates are probably on the conservative side.

This section of Big Creek seems to be a suitable spawning area, and pairs of fish were seen spawning on the redds. Aggressive behavior between males was also seen; i.e. one male grabbing another's caudal or pectoral fins and shaking vigorously.

On the 26th of November, one of the Big Creek redds was dug up and brought back to the laboratory. Eleven live eggs and one dead one were found in the same amount of material as had been taken from the Birch Lodge beach earlier. The live eggs were not as well developed as were the Birch Lodge eggs. The embryos had not yet taken form. It is possible that the reason so few eggs were found in this redd is that the eggs were eaten by other fish.

While checking Big Creek, large numbers of small brook trout and splake were seen in the stream. A few were taken with the backpack shockers and all were engorged with kokanee eggs, as were a few small rainbows from the Conservation School creek.

A collection of forty-nine kokanee was also captured, measured, scale sampled, and returned to Big Creek. Males numbered 24; females, 25. Lengths on the females ranged from 10.5 to 12.3 inches; males, 11.4 to 13.5 inches. Average length for females was 11.5 inches; males, 12.4 inches. Table 1 contains the data tabulation. The collection was made on the 26th, and on that day as many fish were sighted as had been seen on the 21st. Several local residents reported seeing people with nets in the area and, undoubtedly, many were

taken illegally using nets, or even catching them by hand. There were many shallow spots where fish could be captured easily by hand.

RESULTS AND DISCUSSION

Both the number of fish and the number of redds found at three different locations indicate that at least some of the kokanee in Higgins Lake are spawning successfully. This supposition is further strengthened by having found live eggs in redds from both the lake and the streams. As a further check, three of the redds at the Birch Lodge beach have been marked with metal stakes and will be dug up later to see how successfully the fry develop.

The age of most of the fish, as determined from the scale samples, appears to be 4+. This means that naturally produced fry or newly planted kokanee fingerlings had to be in Higgins Lake in 1969. Any naturally produced fry would have had to have come from a fall, 1968, spawning run; and, in fact, an extensive amount of spawning activity was detected at various sites during that year. This year's run could not have originated from a 1969 plant since no plants were made in 1968 or 1969 and only about 36,000 fingerlings in 1970. The last large plant was made in 1967, 722,800 fish. If these were the fish that came back to spawn this year, their scales would have to indicate 6+. While it is possible that a mistake could have been made in the readings of 4+, since kokanee scales are difficult to age, it is not considered highly probable. The relatively small size of the fish also tends to indicate an age of 4+ rather than 6+.

A true age of either 4+ or 5+ would mean that this year's spawning kokanee salmon originated from natural reproduction, and this seems to be the most logical assumption regarding their origin. If the kokanee have become successfully established in Higgins Lake, surveys in the next few years should easily verify this fact.

TABLE 1 -- KOKANEE SALMON LENGTH DATA, HIGGINS LAKE (CONSERVATION SCHOOL CREEK AND BIG CREEK), FALL, 1973

Length	Conservation School Creek		Big Creek	
	Male	Female	Male	Female
10.5				1
10.6				1
10.7				
10.8				
10.9				1
11.0				2
11.1				
11.2				
11.3				2
11.4			1	2
11.5				2
11.6		3		2
11.7			1	
11.8		1	3	3
11.9	1	3		1
12.0		4	2	2
12.1		4	3	3
12.2		1	2	2
12.3		2	1	1
12.4	4	3	1	
12.5	2	1		
12.6		4	3	
12.7		2		
12.8			1	
12.9				
13.0	6	1	4	
13.1	5		1	
13.2	2			
13.3				
13.4	1			
13.5	1		1	
13.6				
13.7				
13.8				
13.9				
14.0	1			
Total	23	29	24	25
Average Length	12.9	12.2	12.4	11.5

Note: These sample collections were taken using backpack electro-shockers. The Conservation School Creek sample was taken November 20, 1973. The Big Creek sample was taken on November 26, 1973.