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A report of the Lake Claire goldeye fishery

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INTRODUCTION

A survey of the fishes of Lake Claire, Wood Buffalo Park, Alberta, was carried out by the Central Fisheries Research Station of the Fisheries Research Board of Canada during the summer of 1947. Analysis of the data obtained disclosed the presence of a large, unexploited population of goldeye, Amphiodon alosoides, in this area. Since the demand for goldeye is much greater than the current supply in Canada, a report of the survey findings coupled with a recommendation for a supervised commercial fishery in Lake Claire was prepared and presented to the National Parks Bureau in Ottawa in order that consideration could be given to the utilization of this potential resource.

After due deliberation by the Department of Mines and Resources, Department of Fisheries, and Department of Indian Affairs, permission was granted by the Minister of Mines and Resources to the McInnes Products Corporation Limited to take 250,000 pounds (round weight) of goldeye from Lake Claire and its adjacent waters during the 1948 season. Granting of the license was subject to a number of regulations, based on the original recommendations, which were accepted by the Licensee and preparations were made to establish the fishery.

METHODS AND EQUIPMENT

A temporary camp was set up on the Prairie River, which connects Lake Claire and Mamawi Lake, by the McInnes Company to act as a base for the goldeye fishery. The camp consisted of

quarters for company personnel, dock employees, and a Park Warden who was to supervise the fishery, a small commissary which carried food and fishing supplies for the fishermen, and a barge on which the catch was landed and handled. It was necessary to establish the camp about eight miles from the main fishing grounds as the fish were to be flown to a freezer barge at the mouth of the Athabasca River and suitable moorage for the aircraft was not available along the lake shore.

The fishermen were treaty Indians, the majority belonging to the Cree band. These men were chosen by the Indian Agent at Fort Chipewyan and were selected on their known merits. They moved to the lake with their families and set up camps along the Prairie River between the fish camp and Lake Claire. The men were supervised by the Park Warden, in whom the Indian Agent had vested authority, and he acted as mediator between the company and the fishermen when minor problems arose.

Chipewyan skiffs, powered with an assortment of outboard motors, were used in the fishery for the most part, although one man operated a much larger boat equipped with an inboard Easthope engine. The nets were visited each day when weather permitted, and in some instances, when the nets were set a considerable distance from the camp, the men camped out overnight and ran the nets several times before returning with their catch the following day. Most of the fish were cleaned in the skiffs on the way to the barge and were placed between layers of wet willow branches to protect them from the sun in the open boats.

The individual catches were weighed on arrival at the

barge and packed, by species, in special metal containers which carried 60 pounds of fish. These were stored in a screened shed until a plane load was available and then were flown approximately 35 miles to a barge equipped with a quick-freeze unit.

There the goldeye were rinsed in water and packed on metal trays which were placed in the freezer compartments. When the fish were thoroughly frozen, the trays were removed and the contents of each tray glazed as a unit. These units were tapped from the trays and packed in wax-lined cardboard cartons which held the contents of several trays. The cartons were stored at a holding temperature in a second freezer and transported by refrigerated barge up the Athabasca River to the rail head at Waterways, Alberta.

The marketable catch from the Lake Claire fishery consisted mainly of goldeye, along with an appreciable number of pike-perch or pickerel, Stizostedion vitreum, and pike, Esox lucius. The remainder of the catch, which included common suckers, Catostomus commersonii, northern suckers, Catostomus catostomus, burbot or marin, Lota maculosa, whitefish, Coregonus clupeaformis, flathead chub, Platygobio gracilis, and drowned or mutilated specimens of the three marketable species, was used by the fishermen for food and dog feed. Occasionally, the rough fish from one day's catch were flown to the Government Dog Camp, located about 15 miles away on the east shore of Mamawi Lake, to augment its supply of dog feed.

An advance survey was made in Lake Claire during the latter part of May by a field party from the Central Fisheries Research Station to obtain data on the availability and catch

composition of goldeye prior to the opening of commercial fishing, which could be compared with similar data obtained from occasional analyses of the commercial catch made throughout the fishing season. A record of the daily catch of all species was kept by a member of this field party who set up headquarters at the fish camp and was in attendance at the barge whenever a skiff returned. Information pertaining to the locality fished, number of nets fished, and type of set used was obtained from the fishermen through an interpreter who was employed as a dock hand.

Since the fishermen were all relatively inexperienced and unfamiliar with commercial fishing methods, the author discussed goldeye fishing with them through the interpreter pointing out the best areas to fish in the lake as determined from earlier surveys, the best method of setting nets, and gave a demonstration of the accepted method of cleaning and handling the fish.

CATCH STATISTICS

The first nets were set during the evening of June 4 and fishing continued until June 29, a period of 25 days. A total of 19 skiffs operated for various periods from 1 to 25 days during the season, with from 7 to 17 in operation on any one day, and an average of 12.5 for each day of fishing. The nets were set for 313 skiff-nights which included 39 two-night sets and two three-night sets where a skiff-night represents the nets fished from one skiff set for one night. A total of 176,810 yard-sets was made composed of 92,600 yard-sets of 3¾-inch mesh and 84,210 yard-sets of 4-inch mesh. Thus an average of 7,072 yards were set each night or ap-

proximately 566 yards per skiff per night.

The fishery produced a marketed catch of 85,342 pounds which was comprised of 63,469 pounds of goldeye, 14,020 pounds of suckers, 3,200 pounds of whitefish and 100 pounds of burbot.

The daily catch of goldeye per unit effort, based on the marketed dressed weights, ranged from 17.7 to 81.0 pounds per 100 yards per night and averaged 35.9 for the complete fishing period. The best catches were obtained early in the fishery and, in general, the daily catch fell off and levelled out during the latter part. The best individual catch was made by J. Kaskamin on June 25th when 400 yards of net produced 604 pounds of goldeye, or 151.0 pounds per 100 yards. The next best catch was made by S. Sepp on the first night of fishing when 500 yards produced 697 pounds, or 139.4 pounds per 100 yards. Both these catches were made in the northeast corner of the lake. J. Kaskamin also had the best sustained catch during the fishery. He fished for 20 nights with a total of 9,500 yards of net and caught 6,685 pounds of goldeye, or 70.4 pounds per 100 yards per night.

When the catch per unit effort from separate areas in the fishery was determined, it was found that the southwest corner, off Pointe de Roche, produced the best yield. A total of 1,800 yards of net was set in three nights and produced 1,217 pounds of goldeye, or 67.7 pounds per 100 yards per night. The northwest corner of Lake Claire had the greatest effort applied, and produced the next best sustained yield. Fishing was carried on there for 23 nights, and a total of 62,100 yards produced 26,410 pounds of goldeye for an average yield of 42.5 pounds per 100 yards per night.

A sample of 101 goldeye from 3¾-inch commercial nets fished by J. Wittago in the northeast corner of Lake Claire was analyzed on June 8. The age of the catch ranged from 7 to 13 years with 40.6 per cent composed of 9-year-old fish, and 81.2 per cent made up of 8-, 9-, and 10-year-old fish. The specimens averaged 13.2 inches in fork length, and 15.9 ounces in round weight. Ninety-two per cent of the catch was made up of mature fish. A second sample of 81 fish was analyzed on June 29th from the catch of J. Kaskamin. This also came from the northeast corner but the catch was taken in mixed 3¾- and 4-inch mesh. The ages ranged from 7 to 13 years with 45.7 per cent of the catch composed of 9-year-old fish, and 84.0 per cent of 8-, 9-, and 10-year-old fish. All these specimens were mature and averaged 13.6 inches in length and 19.2 ounces in weight. It is probable that the differences found in these two samples can be attributed to the difference in the size of nets used to obtain the samples.

From these data it is evident that the fishing intensity was not great enough to alter the goldeye population of Lake Claire in any way. A slight reduction in the age composition of the catch and in the average length and weight of specimens would have been expected in the sample taken at the end of the fishery as a normal result of exploiting this virgin population, and significant reductions would have been expected if the lake had been overexploited. It is impossible to predict what changes, if any, would have occurred if the 250,000 pound limit of goldeye had been taken, rather than only 30.8 per cent of this figure. Thus, there is no basis for a revision of the present limit.

DISCUSSION

Although the goldeye limit of 250,000 pounds (round weight) for Lake Claire was not approached during he 1948 season, the catch indicated that this figure could be reached without difficulty in the future. A total of 76,900 pounds of goldeye was taken by 12.5 skiffs, each fishing an average of 566 yards of net per night for 25 nights. Thus, the limit would have been approximated if the average catch per unit effort had remained the same, and if the same number of skiffs had fished 1,000 yards each per night for the stipulated season of 45 days.

The average catch per unit effort was considerably lower in the 1948 commercial fishery than had been anticipated from the results of the 1947 survey of Lake Claire. A number of factors which contributed to this discrepancy became apparent during the fishery and these will be discussed briefly under separate headlines.

(a) Inaccurate record of yards of net set. Lack of comprehension on the part of the fishermen as to why statistical records were being kept, and the language barrier which existed between the recorder and the fishermen made it difficult to arrive at an accurate figure for the total number of yards of net fished. It seemed to be easier for a man to say, "the same as yesterday", when questioned by the interpreter, than to figure out exactly what nets were in the water. Statements that one or two nets had been removed for cleaning or to dry were obtained very infrequently.

(b) Condition of nets. Few nets were issued during the season and many of the nets were in very poor condition at the cessation of fishing. Many nets were almost deviod of mesh and contributed only a small poundage of fish for the effort recorded. New nets

were not released by the licensee during the last week of fishing as it had been rumoured that the fishery would close and they did not wish to increase the fishermen's debt.

(c) Size of twine. The nets supplied were made of 50/6 twine for the most part whereas coarser twine of 30/6 was recommended from the original survey. The men found the finer twine difficult to handle and it broke up rapidly under adverse fishing conditions.

(d) Depth of nets. The original nets issued were 30 meshes deep, although 18 mesh nets had been recommended. These could not be set in the shallow shore areas, where the best goldeye fishing occurs, without causing considerable damage to the nets, and thus, most sets were made offshore where lower catches were obtained.

(e) Anchors. Suitable anchors were not available and nets were washed on shore, hopelessly tangled, or lost completely on several occasions when strong westerly winds prevailed.

(f) High water level. The high water levels which prevailed throughout the Lake Claire region in 1948 brought about extensive flooding of the low-lying shores. It is probable that many fish frequented these flooded sections and were unavailable to the fishermen, since nets could not be set over the shore vegetation.

(g) Inexperience. Few of the men had fished commercially prior to the 1948 season, and did not handle their nets as efficiently during this first season as would be expected in future years.

It is impossible to evaluate the importance of each of these factors but it is probable that they all contributed in a major or minor way to the reduction of the actual catch per unit effort

below the anticipated figure.

Although most of the catch from Lake Claire was handled rapidly and efficiently, a considerable poundage of tainted fish was found whrn the product was thawed out for processing in Winnipeg. A few minor changes in the method of handling the fresh fish which would improve the quality of the final product became apparent during the fishery.

(a) Cleaning and culling: Many soft and improperly cleaned fish were included in the shipments, especially during the first days of fishing. As the fishermen gained experience in handling methods, they culled their catch more carefully, cleaned the specimens properly, and protected the catch in their open boats from the sun and bilge water with wet willow branches.

(b) Ice: Goldeye soften rapidly after removal from the nets unless kept cool. Covering the catch with willow branches seemed satisfactory on short hauls but when sets were made at distances from the camp this was not sufficient to keep the goldeye firm. Thus small quantities of ice should be available for each skiff and used along with the willows to assure the good condition of the catches upon arrival at the barge.

(c) Overnight storage: Each day several trays of fish were held overnight in a wooden shed erected on the landing barge. This was necessitated through the return of occasional skiffs after dusk, and also through the fact that it was not profitable to fly the aircraft without a full load. Although small amounts of chipped ice were placed on the tops of the trays, the temperature within the shed was only slightly below the outside air temperature and not

low enough to hold the catch. The fish were warm on arrival and the ice placed on the trays melted rapidly. In addition, these metal containers were not supplied with a drainage opening and the bottom layer of fish was bathed in liquid until the following morning when the trays were emptied and re-iced. This difficulty could be overcome by placing the freezer barge on Lake Claire and assuring the immediate freezing of all catches.

If the operation at Lake Claire would not warrant this financially, then every effort should be made in future seasons to have the fishermen return at a set time and to fly all the fish to the freezer each day.

(d) Location of camp: It would be advantageous to locate the fish camp and landing barge in a more central location in subsequent years so that more fishing areas could be reached by the fishermen and the length of the hauls reduced. This would tend to increase the catch as well as improve the quality of the product.

The Indian fishermen worked diligently and travelled farther afield to find the best fishing grounds than had been expected, although in many cases their outboard motors were not dependable.

The fishery was an asset to them financially and kept them active at a time of year when normally there is no employment available. The families moved to the new campsites where their living conditions were improved. Food was obtained readily and their dogs thrived on the waste fish brought in each day. In general, the men seemed contented and eager to make a success of this new enterprise.

It is probable that a much better return will be obtained from the Lake Claire goldeye fishery in future years since the experience gained during the first season, both the licensee and by the fishermen, will lead to improved methods and better success.

REVIEW OF THE REGULATIONS

The regulations governing the fishery were satisfactory in general. However, there was some confusion at the lake concerning the interpretation of articles 4 and 9 . Article 4 states that "fish of species other than goldeye and whitefish..... and the amount of such fish required for the Government dog camp at Lake Mamawi shall be delivered to the camp.....". At the outset of fishing this was interpreted in the strictest sense by the Park Warden in attendance, and consequently pike and pike-perch, two species which the licensee wished to buy from the fishermen, were discarded. This unfortunate situation was remedied quickly in 1948, however, the article should be rewritten before the 1949 season opens so that the licensee is permitted to buy all species for which there is a market and thus increase the revenue from the fishery and reduce to a minimum the number of fish discarded.

Article 9 which reads, "the Licensee shall employ such Indians and half-breeds.....so that at least 75 per cent of the money paid out for wages or salaries.....shall be paid to Indians and half-breeds", also was misinterpreted. This was not applied in the strict sense as written but interpreted to include the fishermen who did not receive wages or salaries from the licensee. If the proper interpretation of this article is to include all those men participating in the fishery, then it should be reworded to state that fact.

From the standpoint of collecting catch statistics it is imperative that a man be employed and stationed at the barge to act as an interpreter. A statement to this effect should be added to article 9, or included as an additional article with the Indian Agent at Fort Chipewyan.

There was some feeling prevalent among the fishermen that the dates from "June 1 to July 15, inclusive" set out for the fishery in article 1, did not embrace the best possible summer period for fishing. If requests are made to alter these dates, there is no apparent reason why a change should not be made. The original dates were stipulated merely as a convenience for the fishermen, as weeds choke many of the fishing grounds by mid-summer as the water level recedes.

RECOMMENDATIONS

1. The nets supplied should not be more than 24 meshes deep and preferably only 18 meshes deep.

2. The nets should be made of coarse twine. Twine of 30/6 is suggested.

3. Suitable, heavy anchors should be available for all fishermen.

4. Ice should be available daily for all skiffs.

5. The catch should be more carefully culled to assure that only fresh fish reach the freezer.

6. The dressing operation should be carried out more carefully by most fishermen.

7. Partial catches should not be retained overnight at the lake. This could be remedied by having the freezer barge on the lake.

8. In order to shorten the hauls from the fishing areas, the landing barge and fish camp should be more centrally located.

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and companions during the investigation.

SUMMARY

1. Permission was granted by the Minister of Mines and Resources to the McInnes Products Corporation Limited to take 250,000 pounds (round weight) of goldeye from Lake Claire, Wood Buffalo Park, Alberta, between June 1 and July 15, 1948.

2. Treaty Indians, chosen by the Indian Agent at Fort Chipewyan, Alberta, participated in the fishery.

3. Fishing was carried on from June 5 to 29, inclusive, with an average of 12.5 skiffs each operating an average of 566 yards of mixed 3¾- and 4-inch-mesh nets per night.

4. Approximately 119,000 pounds of fish were removed from the lake, including 76,900 pounds of goldeye, 18,100 pounds of pike-perch, 12,300 pounds of northern pike, 8,400 pounds of northern and common suckers, 3,200 pounds of whitefish and 100 pounds of burbot.

5. There was no indication, based on analyses of the catch, that the fishery was being over-exploited or that any revision in the limit should be made.

6. The average catch per unit effort throughout the fishing season was lower than had been expected from earlier surveys. The factors which contributed to this included inaccurate record of the yards of net fished, condition of nets, depth of nets, size of twine, lack, of anchors, abnormal high water level and inexperience of the fishermen.

7. The catch was handled quickly and efficiently in general but it has been suggested that the catch should be cleaned

and culled more carefully, ice supplied to the skiffs, the complete catch transported to the freezer every day and the camp placed in a more central location on the lake to improve the quality of the product.

8. A few minor changes in the regulations have been suggested.

9. A list of recommendations for the fishery is included.

Table 1. Analysis of the marketable catch taken in the 1948 Lake Claire fishery sho the fishing effort, marketed poundage of goldeye, pike-perch and pike and availability of goldeye for each day.

Date	Number of skiffs operating	Number of yards of net lifted	Number of pounds marketed (dressed weight) Goldeye	Pike-perch	Pike	Total	Availability eye Marketed 100 yards per
June 5	8	3,800	2,593	343	291	3,227	68.
June 6	9	2,500	2,025	222	296	2,543	81.
June 7	10	6,500	3,180	720	570	4,470	48.
June 8	10	4,340	2,622	859	524	4,005	60.
June 9	7	3,740	1,006	203	197	1,406	26.
June 10	9	4,180	2,343	942	457	3,742	56.
June 11	13	6,800	2,688	507	390	3,585	39.
June 12	10	5,700	3,275	695	430	4,400	57.
June 13	11	5,100	2,259	760	301	3,320	44.
June 14	12	7,900	2,905	1,152	336	4,393	36.
June 15	11	5,700	2,515	577	406	3,498	44.1
June 16	14	6,150	2,783	609	411	3,803	45.
June 17	14	8,400	2,616	581	302	3,499	31.1
June 18	16	10,000	3,105	664	253	4,022	31.1
June 19	14	7,200	2,583	754	285	3,622	35.
June 20	15	8,500	2,207	1,024	290	3,521	26.0
June 21	17	9,300	2,475	619	202	3,296	26.6
June 22	16	11,600	3,388	688	352	4,428	29.2
June 23	16	5,600	2,331	431	200	2,962	41.6
June 24	17	15,300	4,720	462	443	5,625	30.8
June 25	17	8,600	2,833	279	280	3,392	32.9
June 26	15	9,700	2,291	357	272	2,920	23.6
June 27	10	7,500	1,328	80	65	1,473	17.7
June 28	10	2,000	522	51	78	651	26.1
June 29	12	10,700	2,876	441	222	3,539	26.9
Totals 25	313	176,810	63,469	14,020	7,853	85,342	35.9

Table 11. Analysis of the marketable catch taken in the 1948 Lake Claire fishery showing the fishing effort, landed poundage of goldeye, pike-perch and pike, and the average availability of goldeye for each fisherman.

Fisherman	Number of nights fished	Number of yards of net lifted	Number of pounds marketed (dressed weight)				Availability of goldeye Marketed pounds per 100 yards per night
			Goldeye	Pike-perch	Pike	Total	
J. Kaskamin	20	9,500	6,685	1,217	683	8,540	70.4
S. Shortman	25	11,800	6,109	492	1,124	7,725	51.8
Snowbird	25	14,410	5,549	1,038	636	7,223	38.5
C. Marten	23	12,600	5,760	635	694	7,089	45.7
F. Gibot	24	13,000	5,401	1,040	559	7,000	41.5
S. Sepp	24	11,200	4,018	1,957	350	6,325	35.9
J. Marten	25	12,600	3,613	1,249	589	5,451	28.7
J. Wittago	18	11,300	3,897	690	495	5,082	34.5
B. Vermillion	15	9,000	2,983	1,118	214	4,315	33.1
A. Ambel	16	6,700	2,802	944	365	4,111	41.8
J. Burke	14	10,100	3,350	64	366	3,780	33.2
A. Villebrun	9	7,200	2,745	303	387	3,435	38.1
A. Benoit	17	9,100	1,813	1,174	298	3,285	19.9
A. Simpson	15	16,700	2,293	571	161	3,025	13.7
Joe Tourangeau	12	5,600	2,139	490	286	2,915	38.2
A. Vermillion	11	6,000	1,706	880	204	2,790	28.4
B. Simpson	5	3,000	1,620	4	273	1,897	54.0
Jean Tourangeau	14	6,400	914	142	207	1,263	14.3
Ladourcoeur	1	600	72	12	7	91	12.0
Total	313	176,810	63,469	14,020	7,853	85,342	35.9

Table 111. Analysis of the unmarketable fish taken in the 1948 Lake Claire fishery showing the estimated number of specimens and round weight of each species.

	Goldeye	Pike-perch	Pike	Suckers	Whitefish	Burbot	Chub	Total
The number of specimens discarded at the barge (actual count)	1,028	251	153	3,484	1,589	56	2	6,563
The number of specimens discarded on the lake (estimated by fishermen)	700	50	31	692	316	11	0	1,800
Total number discarded	1,728	301	184	4,176	1,905	67	2	8,363
Average round weight in pounds per specimen as determined from test net catches	1.2	2.3	2.9	2.0	1.7	2.0	0.5	
Total estimated number of pounds discarded (round weight)	2,074	692	533	8,352	3,238	134	1	15,024

Table IV. Analysis of the goldeye catch from $3\frac{3}{4}$- and 4-inch mesh survey nets set prior to the fishing season at Lake Claire in 1948 and from commercial nets set at the beginning and end of the fishery showing the average length and weight, maturity and age composition of the catch.

	Survey nets		Commercial nets	
Date	May 30	May 28 to June 4	June 8	June 29
Size of mesh (inches)	$3\frac{3}{4}$	4	$3\frac{3}{4}$	$3\frac{3}{4}$ and 4
Number of goldeye	101	160	101	81
Average fork length in inches	14.0	14.4	13.2	13.6
Average round weight in ounces	18.5	19.9	15.9	19.2
Per cent of catch mature	99	100	92	100
Age range in years	7 to 13	8 to 13	7 to 13	7 to 13
Dominant age class	9	9	9	9
Percentage of catch composed of 9-year-old fish	43.6	36.3	40.6	45.7
Percentage of catch composed of 8-, 9- and 10-year-old fish	73.3	78.8	81.2	84.0

Figure 1. The daily availability of goldeye in pounds (dressed weight) per 100 yards of net per night during the 1948 Lake Claire fishery based on the marketable catch.

Figure 2. Outline map of Lake Claire showing the separate fishing areas. The figures in each section show the number of yards of net fished, the marketed poundage of goldeye (dressed weight) and the average availability of goldeye in marketed pounds per 100 yards per night respectively.