THE GOLDEYE FISHERY OF THE BIG SANDY LAKE AREA ONTARIO

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INTRODUCTION:

During the last few years a significant production of goldeye has resulted from the native fishery in the Sandy Lake Area of the Severn River located approximately 200 miles north northwest of Sioux Lookout, Ontario. Recently considerable interest in the management of the fishery has been shown by the Indian Affairs Branch of the Department of Citizenship and Immigration as well as the Ontario Department of Lands and Forests and arrangements were made to carry out a brief survey of the area during the latter part of September, 1953.

This report contains an analysis of the data obtained from the survey, a summary of available data obtained previously by other investigators and an account of the life history and behaviour of goldeye based on the author's findings in other Canadian waters where this species is taken commercially. Recommendations and suggestions for management of the Sandy Lake goldeye fishery are included and although these may form a valuable immediate guide it should be recognized that minor revision and modification may be necessary as detailed scientific information on this particular population becomes available.

LIFE HISTORY:

The goldeye (Amphiodon alosoides) is a narrow, deep-bodied silvery fish - shad-like in appearance - covered with large loose scales and characterized by a small mouth which contains many sharp teeth located in both jaws and on the tongue proper. It is found throughout the central portion of the North American continent ranging from Texas in the south to the Great Bear Lake region of the Mackenzie River drainage in the Northwest Territories in the north. It abounds in sections of the Mississippi drainage system in the United States and in the Athabaska and Saskatchewan River systems in Canada. Although it is found in Lake Abitibi, its occurrence in quantity in the Sandy Lake area represents the most easterly extension of its range in significant numbers known to date.

Habitat preference:

Throughout its geographical distribution this species is found almost exclusively in muddy waters and therefore it would be expected to find it confined to the central section of the Severn

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1. A report prepared for the Indian Affairs Branch of the Department of Citizenship and Immigration by Wm. M. Sprules of the Department of Fisheries, Ottawa.

River system which cuts through a clay belt. It is understood that the headwaters of the Severn River are clear and that tributaries in the lower reaches supply a large volume of clear, brown muskeg water which either dilutes the muddy main flow or causes the suspended particles to settle. The central section of the Severn River which contains Sandy and Finger Lakes as expansions of the main river does not appear to be as heavily laden with suspended particles as other rich goldeye areas such as Lake Claire and the Athabasca River delta in northern Alberta and the Saskatchewan River delta region in northern Manitoba. Although little exploratory fishing has been carried out in the Sandy Lake area knowledge of the habitat preference of goldeye indicates that the limited fishing effort anticipated should be confined to areas of maximum muddiness in order to insure maximum catch per unit of effort.

Goldeye are found most abundantly in the shallow shore regions of lakes in depths of from two to ten feet over firm mud or rock bottom and in eddies below rapids in large streams. Thus in lake fishing nets should be set as close to shore as bottom contours will allow. This presents certain hazards to the gear of course since in this zone violent wave action occurs and floating or sunken debris accumulates and will foul the nets. In running water areas the nets are generally tied to shore at the centre of large eddies and allowed to float freely moving backward and forward as the currents change. Since goldeye tend to move parallel to the shore in search of food the nets should be set at right angles to the shore and separated into several sets consisting of one or two standard nets joined together rather than as a single set of several nets extending out into deeper water.

In other areas where the habits of goldeye have been investigated, it has been found that two major migrations occur during the year. The first of these occurs during the late spring just at the time the ice cover disappears from the lakes and rivers. At this time there is a mass movement up the rivers and into shallow lake areas which is associated with spawning activities. The second mass movement occurs in the late summer when units of the population frequenting shallow confined lakes and bays move out of these areas where high temperatures prevail and stagnation may occur with a marked reduction in dissolved oxygen. This movement takes the fish out into a more suitable environment of deeper water or flowing water. Many shallow areas of the type described freeze to the bottom during severe winters and significant losses of stock would result if this late summer migration did not occur. It would seem probable that good catches could be made in the spring and early fall in the approaches to smaller lakes such as Opasquia and Angekum.

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Food and Feeding Habits:

Although goldeye fry feed on microscopic plants and animals (plankton) for several weeks after hatching in the late spring, the bulk of the diet of fingerling, juvenile and adult stages is made up of aquatic and terrestrial insects taken at the surface of the water. Goldeye stomachs have been found crammed with specific insects at times when these reach maximum abundance. Small fish are occasionally taken when these are available and it is of interest to observe that small northern pike, which frequent surface water layers during the summer months, are found most frequently in the stomachs. Mice are eaten occasionally by larger specimens and these too must be snapped from the surface.

Knowledge of the food utilized by goldeye coupled with observations on the depth distribution of fish caught in gill nets set at different depths show that nets will produce the largest catches when concentrated at the water's surface. In most areas experienced fishermen either remove alternate weights from the net or increase the number of floats in order to increase the buoyancy and insure that the net floats at the surface. Such procedure can only be followed during periods of open-water fishing and necessary modification of the method would be required during a winter fishery when the float line must be set sufficiently below the water's surface to prevent the net from freezing to the underside of the ice cover.

The active feeding periods coincide with peaks of aquatic insect emergence and mating flights over the water and closely follow major changes in light intensity, namely sundown and sunrise. During these hours the largest catches will be made by the nets since the fish are moving continuously in the shallow areas grasping insects from the surface and thus are more vulnerable to capture by the nets. Reduced feeding activity occurs throughout the hours of darkness and movement is at a minimum during the daylight hours. It has been found that nets set in the early evening and lifted early in the morning produce almost as many fish as those left in the water throughout a 24-hour period. Thus, in general, it is advantageous to run and lift the nets early in the morning and reset during the early evening. This is particularly true when strong summer winds prevail which make it difficult to fish the nets during the daytime when the winds reach a maximum and when serious damage may occur to nets set in shallow areas. By removing the nets during the day it is possible to reset during the calm of the evening and lift the nets before wave action becomes severe. Obviously there is little to be gained by following this procedure during periods of summer calm although cleaning and drying the nets at such regular intervals will tend to reduce the fishermen's operating costs.

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Spawning:

As has been indicated previously goldeye spawn in the early spring and are rather unique among freshwater fishes in that the eggs are semi-buoyant and thus are affected by currents and surface wave action much more than most fish eggs. In the Sandy Lake system it has been learned that a series of rapids and falls occurs a few miles below Sandy Lake on the Severn River. Below the falls there are apparently no muddy lakes along the tributary streams which flow from muskeg areas and thus it is improbable that successful spawning occurs below the falls to any significant degree. Some spawning may occur in river shallows along the Severn between the falls and Muskratdam Lake but here the accumulated inflow of muskeg water has reached a volume sufficient to significantly reduce the muddiness of the Severn and thus provide an unsuitable habitat for goldeye. Large quantities of goldeye are seen below the falls in the early spring when large catches are readily taken. It would seem that although a small resident goldeye population may exist in this section, it is more probable that eggs released above the falls are washed into the area along with some juveniles and adults. If the falls form an impassable barrier to upstream migration these individuals cannot contribute to the resident population above the falls and thus the spring accumulation of goldeye below the falls should be heavily fished using special gear such as dip nets. Use of such nets would ensure rapid capture of the stock and permit a more efficient return of small immature fish to the water. Since several year classes will be taken in this fishery in any one year, experience may show that it is economically feasible to fish the area only once every three or four years and thus elaborate plans for a permanent large scale operation should not be made at this time.

It is understood that the fishermen in the areaagreed among themselves not to fish during the height of goldeye spawning activity in the spring of 1953. This represents an intelligent approach to conservation which is encountered all too rarely in most commercial fishing districts and the fishermen and those responsible for their education are to be commended. In this particular instance it should not be necessary to formally prohibit fishing during the spawning period since this occurs during the spring when floating debris and poor fishing weather make it difficult to fish efficiently or economically. As a result successful spawning will occur in spite of concerted efforts to operate nets during the early spawning season. Experience in other areas has shown that it is economically wise to delay fishing activity until the spring flood recedes and floating debris has been deposited along the shores.

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Predators:

The most important predators which feed on goldeye include carnivorous fishes such as northern pike and pike perch (yellow pickerel) and certain fish-eating birds such as the cormorant and pelican. The importance of such predation in the control of goldeye populations is not known but it is improbable that it is a significant factor in large unrestricted water systems such as the Sandy Lake area. In areas where goldeye have been fished commercially for some time this species forms a relatively small part of the overall fish population and predation by pike is more frequent than in unexploited areas where goldeye is the most abundant species. An example of the latter condition exists at Lake Claire in northern Alberta where the expected predator-prey relationship is reversed and goldeye stomachs are found distended with small northern pike fingerlings during the summer period.

Since there is a strong possibility that the Sandy Lake goldeye fishery may become a selective fishery because of the biased market demand favouring production of this species an effort should be made to reduce the populations of northern pike and yellow pickerel each year proportionately to the reduction made in the goldeye population. This will result if other fish captured in the nets are not returned to the water but rather retained for shipment, if a suitable price is obtainable, or used locally as food or dog feed. There is a tendency for fishermen to "shake out" the less desirable species loosely caught in the nets when the nets are being run and thus reduce the effort required to clear the net. This practice should be discouraged and the fishermen advised of the possible effects of continued selective fishing.

Rate of Growth:

Information on the rate of growth of goldeye in the Sandy Lake area has been obtained through standard analyses of samples of the commercial catch. The first sample was taken during the late summer of 1950 and comprised two separate lots which were shipped from Sandy Lake to Erieau, Ontario, for analysis. Of necessity this sample was dressed prior to shipment and thus certain data such as sex and state of maturity could not be determined. The second sample was analysed at the lake in the fall of 1953 and was handled in the round state. The information obtained is summarized in Table I.

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TABLE I: Analysis of Samples of the Commercial Goldeye Catch Taken at Sandy Lake in 1950 and 1953.

	1950.	1953.
Total number of specimens	172	145
Location of Capture - Finger Lake	77	136
Sandy Lake	-	9
Mixed	95	-
Date of Capture	Aug. 13? & Sept. 8	Sept. 29
Gill net size (nylon)	3 3/4"	3 3/4"
Average fork length in inches	12.0	11.5
Average round weight in ounces	12.2*	10.7
Age range of sample	7 to 15	5 to 15
Dominant year class(es) in catch	9, 10, 11	9, 10, 11
% of sample comprised of dominant year class(es)	23.3, 61.6	26.5, 61.8
% of immature specimens in sample	-	20.7

* The average round weight was calculated in 1950 since the sample had been dressed prior to shipment.

The rate of growth of goldeye in the Sandy Lake area is very slow compared with data obtained from other areas. The most abundant year class in the 1953 sample was the ten-year old class and this averaged 11.8 inches in length and 11.2 ounces in weight. A sample of 346 five-year old goldeye taken from the Saskatchewan river in Manitoba in 1946 averaged 12.2 inches in length and 14.0 ounces in weight. Much better growth was recorded in Lake Claire, Alberta, as well, where a sample of ten-year old fish averaged 14.6 inches in length and 20.5 ounces in weight.

Although it is not possible to state definitely the factors responsible for the slow growth rate in Sandy Lake, it is probable that food and temperature play an important role. The lake is much deeper than other Canadian lakes where goldeye are taken in numbers and it would be expected that the average summer water temperature is relatively low. In addition the shoreline is characterized by extensive areas of bedrock and these areas would produce only small quantities of aquatic insects and other bottom organisms used for food.

Because of the slow rate of growth exhibited by this population at the present time it will be necessary to watch closely for any downward trend in the average size of fish comprising the catch from standard commercial nets. The catch at this time contains a

large number of fish eleven years old and older and it may be that continuation of the present fishing effort, or even an increase in the effort, will remove these older fish and show an improvement in the growth rate of younger fish. Such a condition has resulted in many new fisheries since the older specimens use a significant amount of the available food supply and grow at a slower rate than younger specimens.

A sample of approximately 100 pounds should be taken from the commercial catch two or three times during the year and the length, weight, state of maturity and age compared with previous samples in order to follow changes in catch composition and provide the necessary data on which to base regulations which will insure that the population is cropped safely and efficiently.

From the data available there is no reason to reduce the present quota of 120,000 pounds set for the Sandy Lake area. The approximate area of Finger, Sandy, Opasquia and Angekum Lakes along with the Severn River between Sandy Lake and the rapids amounts to 163,500 acres. Part of this area consists of relatively deep water of little value in producing goldeye and if an adjustment is made to allow for this condition, it is apparent that the present quota represents an annual production of about one pound of goldeye per acre.

This figure should provide a satisfactory margin of safety and no change in the quota is considered necessary at this time. Firm recommendations should be made at a later date when more detailed information on the productivity of the waters, rate of growth of goldeye and changes in catch composition and availability are available. It will be noted from Table I that both the average length and the average weight of the 1953 sample were lower than recorded from the 1950 sample. This is not considered significant since an effort was made to obtain all the specimens caught in a selected group of nets in 1953 and thus small specimens were included which would have been culled from the 1950 sample before the latter was shipped out for analysis. Further evidence of this fact is shown in the age range of the two samples since no five or six year old fish were recorded from the 1950 sample. Nevertheless, the fact remains that these isolated samples indicate that there has been a slight reduction in the average length and weight of the components of the catch during the three-year period and since the dominant year class in the 1950 sample was nine and that of the 1953 sample was ten, the need for additional data from samples taken at regular intervals is obvious.

The round weight of the 1950 sample was determined by utilizing a conversion factor which had been worked out for goldeye taken in the commercial fishery at Lake Claire, Alberta, namely, round weight = dressed weight x $\frac{100}{89.5}$. It had been found that 10.5 per cent

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of the round weight was lost in the cleaning operation which consisted of eviscerating the fish leaving the head, gills and scales intact. A check was made at Sandy Lake on 109 fish and it was found that the round weight of 75 pounds was reduced by 10.7 per cent to 67 pounds as a result of cleaning the sample.

State of Maturity:

No estimate of the percentage of the catch made up of immature specimens could be made from the 1950 sample since the specimens had been cleaned and the gonads removed prior to shipment. In 1953 it was found that 30 of the 145 specimens analysed were immature representing 20.7 per cent of the sample. This is not considered to be a dangerously high percentage of immature individuals in the catch and thus, for the present, the practice of using 3½ inch mesh nylon gill nets may be continued. As would be expected in such a slow growing population the age at which maturity is reached in this area is greater than in other areas where goldeye grow more rapidly. Although 22 of the 30 immature specimens were eight years old or younger the remainder appeared to belong to older year classes.

It would seem improbable that goldeye of such an age would not have reached maturity and it will be necessary to obtain additional data before the maturity relationships of this population can be compared with those of other areas.

Sex Ratio:

The 1953 sample consisted mainly of male individuals with 105 males and only 40 females comprising the sample. This unbalanced sex ratio is no doubt related to behaviour differences within the sexes associated with water temperature and other ecological conditions but larger samples would be required to confirm such conjecture. In 1950 the sample had been cleaned prior to analysis and thus the sex ratio could not be determined. It is possible to identify mature male goldeye since a lobe develops on the anal fin with the onset of maturity and this feature may be used to separate such individuals from mature females and immature specimens. Forty-three mature males were found in the 1950 sample and thus the remaining 129 goldeye were either females or immature specimens of either sex. Since males mature at an earlier age than females, it is improbable that more than a few immature males were included in the sample and thus it may be assumed that this sample contained a preponderance of females. Since the 1950 sample was taken about one month earlier than the 1953 sample, there is some indication that the sexes are significantly segregated during the late summer and fall in this area. Data obtained from other areas have shown a segregation of sexes prior to the spawning period with a more balanced sex ratio recorded from catches made during the late spring and early summer.

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Condition:

All the goldeye which have been analysed to date from the Sandy Lake fishery appeared to be in good condition with ample supplies of fat. This is a requisite of a palatable smoked product.

General Behaviour:

It is interesting to record that one of the good Indian fishermen contacted at Sandy Lake stated that his catches appeared to be smaller when he travelled to and from his nets using an outboard motor than when he paddled his freighter canoe. Similar indications have been noted in other areas and it may be that goldeye move out of areas where there is a considerable amount of motor traffic. The importance of this association should not be emphasized, particularly in a fishing area as extensive as Sandy Lake, but if additional information is obtained to substantiate the contention, consideration should be given to restricting the use of motors in selected areas. Such a restriction would not be a conservation measure but rather would allow the fishermen to receive better returns for the effort they apply.

THE COMMERCIAL FISHERY:

At the present time fishing in the Sandy Lake area is carried on by Indian residents of the area operating under three licenses issued by the Ontario Department of Lands and Forests. Each license carries a quota of 40,000 pounds and two of these are issued to the Indian Affairs Branch of the Department of Citizenship and Immigration while the third is issued to a local trader. Each license permits the use of 2,000 yards of gill net. The nets are operated in several small units so that most of the interested residents are able to participate in the fishery. Fishing is carried out from small boats including canoes, freighter canoes and skiffs in the summer, while the nets are set under the ice in the winter and the catch is transported to a central storage by means of sleds and other available types of transportation.

Gear:

Although this is exclusively a gill net fishery at present it may be that in the future a modified trap net will prove more effective and more economical to operate. Hoop nets operated in other areas have proved unsatisfactory for goldeye. Shallow water trawls and seines should be effective but such gear is expensive and requires large boats for its operation. Since this fishery is primarily to provide a small source of income to as large a number of local residents as possible it is considered inadvisable to experiment with

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more expensive types of gear and it is recommended that the lake fishery continue to operate as a gill net fishery. As has been indicated earlier in this report a dip net fishery may be developed below the rapids on the Severn River.

Catch Statistics:

In addition to goldeye, which comprise the bulk of the commercial production, pike perch (pickerel), northern pike, whitefish, sauger, perch and northern suckers are taken in significant quantities. Catch statistics from the area do not record the quantities of the last three species and it may be assumed that these are used locally for food and dog feed for the most part. Records available at the time this report was prepared indicate the following poundage for the years 1948 to 1952 inclusive:

Year	Goldeye	Pike Perch	Whitefish	Northern Pike
1948	26,000	-	-	-
1949	49,800	2,000	600	-
1950	84,068	1,667	-	-
1951	113,660	22,916	13,857	45
1952	91,494	29,277	1,060	-

The small production of northern pike is not indicative of the total catch but rather indicates that it was not profitable to transport the catch to Winnipeg for sale and thus the catch would be used locally. The goldeye production during the early part of 1953 was very low with only about 4,300 pounds taken to the end of July. Approximately 10,200 pounds were caught during August with good catches occurring in September. Abnormally high water conditions prevailed during the early season making it difficult to operate nets in shallow areas because of floating logs and debris.

Monthly production records maintained by the local representative of the Indian Affairs Branch show that in 1952 an average catch of approximately 5,100 pounds was produced under the two licenses operated for the months of January, February, March, June, July, August and September. The average monthly catch dropped to 1,300 pounds in April, October and November with no catch recorded in December. These months represent the period of break-up and freeze-up when travelling and fishing conditions are hazardous. The largest catch was made during the month of May when 21,800 pounds were taken representing 36 per cent of the total catch. Apparently most of this catch was made just below the rapids on the Severn River below Sandy Lake and thus is not representative of the catch that could be expected annually from the lake proper.

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Value:

Despite the relatively isolated location of this fishery and the high costs of transporting the catch to processing plants in Winnipeg, good prices have been paid for goldeye. In 1952 the fishermen received nine cents per pound for goldeye, five cents for pike perch and three cents for whitefish while in 1953 goldeye brought fifteen cents per pound and pike perch five cents per pound. In 1953 air freight from the lake to Riverton, Manitoba, was seventeen cents per pound and handling charges between Riverton and Winnipeg were three cents per pound. The dealer's profit is not known but if it is assumed that a profit was realized then it is apparent that the final processor can accept good quality goldeye in Winnipeg at something over 35 cents per pound under present market conditions.

The value of this fishery to the local residents is quite significant. At the current price to the fishermen of fifteen cents per pound a total of $12,000 could be realized annually if the total quota of 80,000 pounds authorized for the two licenses issued to the Indian Affairs Branch were taken. Every effort should be made to reach the quota each year and the Indians should be trained to participate in other phases of the operation, such as packing and transporting the catch in order to reduce costs.

Suggestions for Handling the catch:

Only minor handling problems are associated with the production of a high quality product during a winter fishery in northern latitudes since favourable water and air temperatures prevailing at this time reduce the amount of deterioration which will occur while the fish are in the nets after capture or during transportation from the fishing area to the central storage or shipping centre.

Certain precautions should be taken however since the product will bleach if frozen rapidly on the snow at sub-zero temperatures and rough handling will lead to broken fins. Goldeye are marketed and served whole and jagged broken fins detract from the appearance of the final product. To overcome these problems winter-caught fish should be carefully placed in boxes immediately after their removal from the nets and transported to the packing station in an unfrozen state if possible. To do this the fishermen would require heated shacks or cabooses on the lake since it would not be possible to move the catch to the packing station each day. When catches were received at a central storage these could then be properly frozen, glazed and packed as required.

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Since the winter production of goldeye from other areas is very low, it may be sound marketing procedure to forward a shipment of goldeye to the processing plants in Winnipeg once or twice during the winter season, either by Bombardier or tractor train. Experience will show whether consumer demand is strong enough to improve the market price sufficiently to warrant the added expense which will be incurred if more than one winter haul is made each year.

If the winter fishery is widely scattered a pick-up service should be provided to collect the catches from lake camps at regular intervals and transport them to the central storage unit. One or two Bombardiers should provide adequate service unless the fishing operations are very widespread in which case it may be necessary to establish "area" storage facilities. Alternate freezing and thawing causes mechanical damage to fish and a soft product of inferior quality results under such treatment. If the individual catches must be transported long distances by sled and dog team these are almost certain to freeze in an undesirable manner.

Since unreasonable thaws may occur during the winter holding period, resulting in heavy losses of the stored product through melting of the glaze and subsequent fusion of the mass contained in each storage unit, it is recommended that a mechanical freezer and cold storage unit be installed at the lake.

Far greater problems are posed by a summer fishery and many precautions must be taken if a high quality product is to result. Goldeye deteriorate very rapidly after death in warm water or air and thus all fishermen should be supplied with ample quantities of ice during the summer months. If possible ice should be carried in the boats when the nets are to be run and if ice cannot be carried, fresh green boughs should be taken along to cover the catch and protect it from the sun and fly damage. The practice of throwing fish onto the bottom of the boat should not be tolerated, since contamination from gasoline, oil and other substances will result. The nets should be run during the early morning hours before air and water temperatures rise. Drowned or other soft specimens should be culled immediately and not placed in the boxes with firm fish. The catch should be carefully cleaned as soon as possible, iced or re-iced and kept covered until transported to the central storage unit.

It is expected that fishing operations will be carried on over a considerable distance in the Sandy Lake area and thus consideration should be given to providing a regular summer pick-up service. An alternative to this suggestion would be the establishment of secondary holding facilities at strategic sites in the area but these would probably prove more expensive to operate than a boat of medium size and would not preclude the need for a boat.

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Many additional precautions must be taken when the product is being handled at the central storage unit. Here the catches of individual fishermen must be weighed, culled and packed. Care should be taken to handle the fish as little as possible and as carefully as possible. Sanitary containers should be provided for weighing the catch and the fish should not be left for long periods in closed metal containers where the bottom layers will soften quickly in the accumulated liquids. After culling and weighing, the catch should be chilled, packed, re-iced and stored at a constant temperature close to 32° F. Pressure on the bottom layers of packed fish should be minimized through the use of proper boxes and box supports within the tiers.

Installation of a mechanical refrigeration unit was recommended under the discussion of the winter fishery and it is obvious that its value would be even greater when considered in connection with the summer fishery. If such a unit were obtained it should be possible to hold the summer catch and take advantage of preferred transportation rates such as may occur on occasion when planes arrive in the area without pay loads back to centres such as Red Lake, Riverton, or Lac du Bonnet.

Without refrigeration it is necessary to move the catch as rapidly as possible and on occasion losses may occur as a result of prolonged periods of poor flying weather. At present the only means of summer transportation for the product from the lake is aircraft. In order to reduce the number of times the fish are rather ruggedly handled it is suggested that a suitable lightweight container should be developed for carrying fish in aircraft.

At this early and perhaps unproved stage in the development of the Sandy Lake goldeye fishery it does not seem advisable to seriously consider installation of processing equipment at the lake. Goldeye are lightly brined prior to smoking and an analine dye is added to the brine vats to impart the characteristic marketed colour to the product. A suitable smokehouse would not cost a great deal and local woods, such as willow would likely be found in sufficient quantity for an economical operation but in the writer's opinion the fishery should be proved on a sustained yield basis and experience gained in handling the raw product before money is expended and the increased responsibilities associated with preparation of the final product accepted.

All those concerned with the fishery including the fishermen, fish shed attendants and other handlers should be constantly advised that this product is very perishable and that it is being prepared as a luxury product for a discriminating buying public. Thus speed in getting the product to market, effective culling, proper handling, and sanitation at all stages in the operation are requisites of a successful enterprise. The product is not to be fed to dogs when

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it reaches its final destination and a goldeye-hungry consumer should not be forced, through limited supply, to accept something which is only good enough for dogs when compared with other food products available on the markets.

For the present the primary producer will not be responsible for preparation of the finished product but nevertheless he should make every effort to see that a product reaches the processor of such high quality that processing, even somewhat less than perfectly done, cannot effectively reduce the quality of the end product. In this way the fishery will gain in reputation and a firm foundation will be laid for consumer acceptance of the Sandy Lake product if processing should be attempted at the lake in the future.

Supervision:

Proper supervision of the fishery is of paramount importance if it is to be successful and fortunately such supervision is available in the person of Mr. E. Tripp. Mr. Tripp seems to be interested wholeheartedly in the project, familiar with the area, the fishery and the residents, and to have gained the respect of the local residents. He must form the liaison between fishermen and all other groups and must be prepared to act as an educational officer to illustrate the benefits of proper handling of the catch, advise the fishermen regarding accepted techniques in handling and caring for their nets, and be in a position to brief them on goldeye habits. The success of the fishery will depend primarily on the ability ofthis general supervisor.

ACKNOWLEDGEMENTS:

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SUMMARY:

From the small amount of data available at this time it would appear that an important goldeye fishery could be developed in the Sandy Lake area. Additional data on the size of the population, rate of growth, age at maturity, contribution of specific age classes to the commercial fishery and general behaviour of goldeye in this area should be obtained before recommending changes in present regulations. Necessary authority should be sought for the operation of a special dip net fishery at the falls below Sandy Lake on the Severn River in order to make use of the fish which may be obstructed at this site.

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Consideration should be given to the desirability of constructing a modern storage warehouse where the catch could be held under mechanical refrigeration. A pick-up service should be established to collect the catch from scattered lake camps at regular intervals during the winter and summer fishery and transport it to the storage centre. Every effort should be made to handle the catch carefully and in a sanitary manner in order that a top quality product will arrive in Winnipeg for processing. A processing plant to prepare the final smoked product at the lake should not be considered until the future of the fishery is assured and more experience has been gained.

Indian residents of the area should be encouraged to participate actively in all phases of the lake operation. The fishery should be closely supervised by a competent manager qualified to advise the fishermen regarding care of their equipment and modern methods of handling their catch.