No. 97 November 1968

RESOURCE MANAGEMENT REPORT

ONTARIO

DEPARTMENT OF LANDS AND FORESTS

HON. RENE BRUNELLE
Minister

G.H.U. BAYLY
Deputy Minister

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FISH AND WILDLIFE BRANCH

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MARKING MOOSE FOR MOVEMENT STUDIES

GERALDTON DISTRICT, 1968

by

W.J. Cook

Abstract

This year, between June 26 and July 7, sixty (60) moose were eartagged. Since 1962, 283 moose have been tagged. Sixteen of these 283 moose have been collared. The project is done in a 2287 square mile circle, circumscribing the Town of Geraldton. Thirty-seven moose with tags recovered averaged a lineal distance movement of 6.25 miles. Fewer calves were seen this year. Last year, 21.9% of the moose tagged were calves, whereas this figure dropped to 6.7% this year.

Weather conditions were poorer for tagging than in 1967. A Bell helicopter was used for 26 hours.

Moose collars made from a material called Darvex were used for the first time in an attempt to get a higher frequency of resightings of marked animals. Radio transmitters are recommended for more complete data on moose movements.

Purpose

A. Biological Considerations

To determine movements of moose for better management by considering:

1. Annual Mobility, e.g., extent of mobility throughout the year.
2. Seasonal Movements, e.g., what is the extent of mobility in each season.
3. Age-sex influences on mobility.
4. Movement by specific range, e.g., comparisons between heavily hunted and unhunted areas; comparison between cutover and virgin timber types.

B. Mechanical Considerations

To determine difficulties in the use of the Darvex collar and assess the efficiency of the collar in tracing movements.

Materials

Ear Tags

Cattle ear tags made by Ketchum Manufacturing Sales Ltd., Ottawa, Ontario, and special pliers for the application of these tags were used. The tags are approximately 3/8" wide and 1-1/2" long.

Collars

A material called Darvex was used to construct the collars. It is obtainable from Canada Industries Ltd., who import it from Britain. Cost of Darvex is $30.00 per 4' x 6' sheet of 1/8" thickness. A 3' x 4' sheet of 1/16" thickness is $11.20.

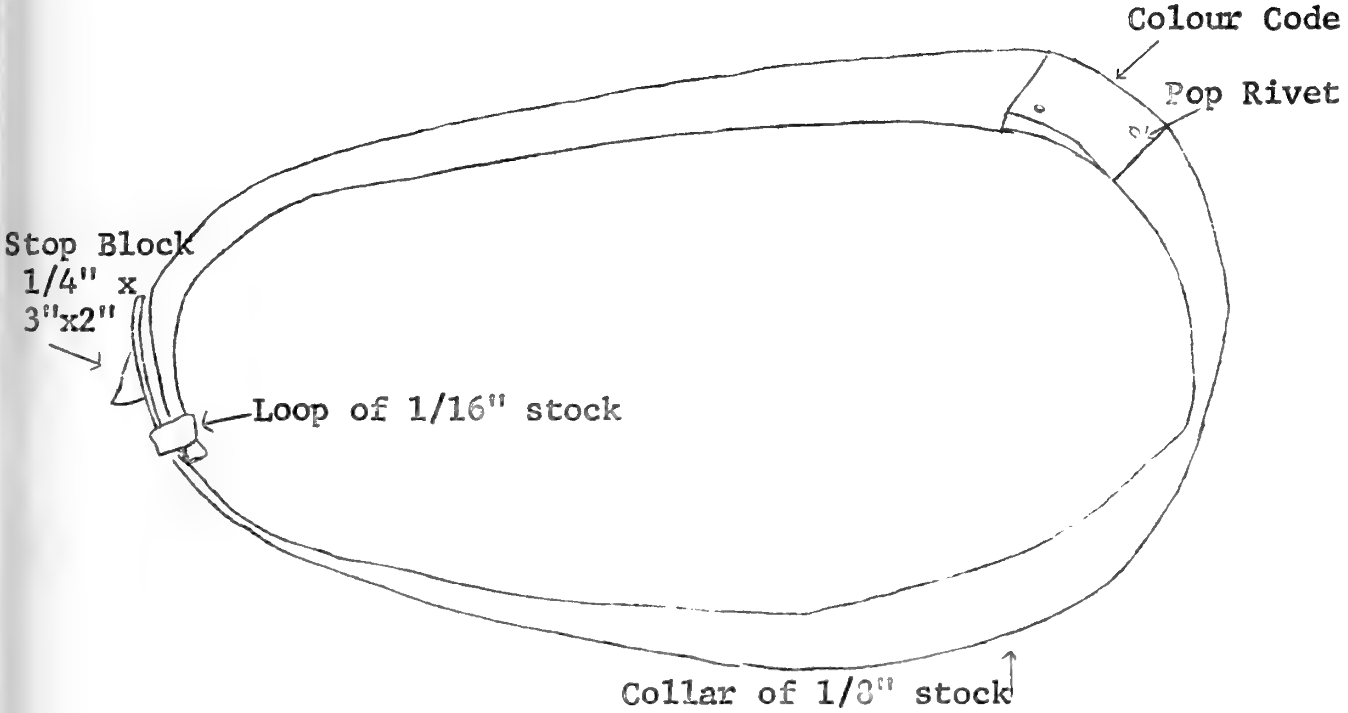
The 1/8" stock is used for the collar. It is cut into 4" wide strips, 40" long. Placing the Darvex in an oven at 220°F for 2-3 minutes makes it pliable. The material can then be shaped and held until cool enough to hold its form. A compressed ovoid shape was found most suitable to the shape of a moose neck. The collar should expand to 39" (the maximum measurement for a bull's neck from data received from Dr. H. Cumming). A stop block fastener is used, and this is attached with pop rivets. The loop to stop the block from returning is made of 1/16" stock, 3/4" wide and 8" long. Colour combinations and shapes were used to distinguish each marked animal. Each coded collar was also numbered to facilitate easier recording of rechecks. (See diagram of collar). Other materials included the essential maps, recording equipment and binoculars.

Method

Ear tags were fastened in the same manner as described in previous reports from this District. The same study area of 2287 square miles in a 30 mile radius of Geraldton was used. Flying was done between 0530 and 0800 and 1830 and 2100. An altitude of 500' - 700' was maintained while searching for moose. Binoculars were used to assist in locating moose.

Two different methods were used to affix the collars. Cows were easier to mark than bulls.

"DARVEX" MOOSE COLLAR



When collaring a cow, the collar is held with two hands spreading it open with the fastener on the top. The collar is looped over the nose and brought back to the neck and fastened. It is then turned 180° so that the colour code is on top.

When collaring a bull with large antlers, the collar must be placed straight down over the neck. It is then turned up, fastened, and turned back around to show the colour code.

Collars were put on moose in three types of areas.

(1) Areas readily accessible to man

(2) Areas closed to travelled air routes

(3) Inaccessible areas (abolished Nipigon-Onaman Game Preserve)

When moose had to be chased into the water, the pilot would try to approach from downwind because when they are frightened they will not enter the water downwind as readily as upwind.

Observations

Ear Tags

Sixty moose were eartagged this year. Since 1962, 283 have been tagged in the study area. Of the 60 tagged this year, 36.7% were bulls, 56.6% cows and 6.7% calves. Fifty-eight (58) moose were seen but not tagged. Of these, 39 were cows, 16 bulls and 3 calves. Sexing and aging was based on presence of antlers and size of animals.

Percentage of calves tagged dropped from 21.9% in 1967 to 6.7% this year.

Sixteen moose were tagged under CAVU weather conditions, fifteen under light cloud cover and sixteen under 10/10 cloud conditions. Temperature varied throughout the project but was mainly cold. High temperature and abundance of aquatic vegetation appear to be the main factors bringing moose to water.

Twenty-six of the sixty tagged had to be chased to the water. I believe this was the result of cool and fairly windy weather conditions.

Flies were noticed on only 3 moose that were tagged. Weather conditions and chasing moose to the water probably resulted in this observation.

A turbo-prop Beaver was used one night to try spotting for the helicopter. It was not deemed economical to use it further as it would only have required an extra few minutes to locate the moose seen by the Beaver crew.

There have been 37 ear-tagged moose recovered since 1962.

	Bulls	Cows	Calves
Percentage Recovered	54.1	43.2	2.7
Average distance shown in miles	6.1	6.3	1.5
Average retention period of tags	14 mos.	10 mos. 9 days	3 mos. 2 days

Collars

Sixteen collars were placed on moose. Fifteen were placed on moose tagged this year and one on a cow moose tagged in 1963. The cow had moved 3-1/2 miles north from where it was tagged.

Eleven collars were placed on females and five on males. Two collar bearing moose were sighted again during the project. One had moved 1/2 mile south after seven days, while the other was in the same location after six days.

Moose do not seem to try to discard the collar. A bull with large antlers tossed his rack violently as I tried to fasten the collar. All others were relatively easy to fasten. The collars are plainly visible to heights of 2,000 feet. The distinguishing codes must be viewed closer (200' to 300'). Pale colours such as yellow, are poor for coding. Dark colours naturally stand out best.

A search was made for a moose collared 12 hours previously. It proved unsuccessful.

A = Adult
Y = Yearling

MOOSE COLLARED 1968

Collar Number	Code	Sex	Age	Location - Type of Area	Date
1	Plain white	Cow	A	Kenogamisis L., accessible by car, 1 mi. from L&F Airbase on same lake	July 1/68
2	Yellow square on white	Cow	A	Sturgeon R., 9 mi. South of Camp 51	June 28/68
3	Green square on white	Bull	A	Sturgeon R., 9 mi. South of Camp 51	July 1/68
4	Black square on white	Cow	A	Eldee L., 3 mi. S. of L&F Geraldton Airbase	July 1/68
5	Yellow and Green squares on white	Cow	A	1 mi. S.W. of Eaton L., Old Game Preserve	July 2/68
6	Yellow and Black squares on white	Cow	A	1 mi. S.W. Kenogamisis L., (Heavy hunted area)	June 28/68
7	Green & Black squares on white	Cow	A	Goldfield L., 11 mi. S.W. of Geraldton (heavy hunted area)	June 30/68
8	Yellow, Green, Black on white	Bull	A	S. end of Wintering L., (heavy hunted)	July 3/68
9	(1) Yellow chevron	Cow	A	N. end Bliss L., Old Game Preserve	June 30/68
10	(1) Black chevron	Cow	A	Sturgeon R., 9 mi. S. of Camp 51	June 28/68
11	(1) Green chevron	Cow	A	Sturgeon R., 9 mi. S. of Camp 51	June 28/68
12	(2) Green chevrons	Cow	A	Marlene L., Heavy hunted area	July 8/68
13	(2) Black chevrons	Cow	A	Hedera L., (inaccessible area)	July 4/68
14	(1) Yellow diamond	Cow	Y	Eldee L., 3 mi. S. of L&F Geraldton Airbase	June 26/68
15	(1) Green diamond	Bull	A	1 mi. W. Wapoose L., (3 year burn)	July 4/68
16	(1) Black diamond	Bull	A	4 mi. W. Greta L., Old Game Preserve	July 4/68

Discussion

A. Biological Considerations

(1) Annual mobility -

The 37 recoveries suggest that annual mobility is high. The average distance from point tagged to point recovered over periods of up to five years is 6.25 miles. We should like to know where and how far they move in the interval and what factors influence this. With radio equipment, annual mobility could be determined. It appears that moose move randomly and not in a desired direction.

(2) Seasonal Movement -

We have learned little of seasonal movements from eartagging. Ear tag recoveries show only a straight line distance from point tagged to point recovered, usually over a great period of time. We must have a high frequency of rechecks throughout the same year to gain facts about seasonal mobility. We assume from observations on winter aerial moose counts and tagging operations that movement is not great in the winter and summer. Observations of tracks during the winter count and rechecks of tags during summer tagging suggest this.

Twenty-seven tag recoveries in October over a six year span result in an average lineal distance of 7.3 miles for these moose.

Nine winter recoveries show a decreased movement of 3.5 miles. This suggests that moose may move more in the fall (October) than in November and December. This is feasible due to heavy hunting pressure and travel by hunters in October. A comparison of seven moose tagged within 2 miles of the Goldfield Road and seven tagged in remote areas is interesting. The seven from the accessible area, when shot, showed an average lineal movement of 5.1 miles. The seven from remote areas were shot an average of 3.6 miles away from point of tagging. These observations suggest that there may be increased fall movement from natural causes, i.e. rutting, and that it is further increased by hunter activity.

(3) Age-Sex Influence on mobility -

We expect that males do move more than females. Tag recoveries have not shown any noticeable difference in movement though. A greater frequency of recoveries and radio equipment should facilitate a knowledgeable gain in this aspect of moose mobility.

(4) Assessing Movement by Specific Range -

To what extent is mobility affected by range type? It appears that moose travel more in accessible areas. This is influenced by:

1. activity from hunters, bushmen
2. areas where we obtain most recoveries

Theoretically, movement should be less because of greater food abundance, on past cutting operations. Hopefully, with radio equipment, we could determine extent of movement on specific range types and be able to make comparisons. We lack information on movement in remote areas. The only way we can get this information is by using radio transmitters.

The decreased number of calves seen is noteworthy. Did wet and cold weather at calving time have an effect on production, or was it simply that the calves were not seen? The percentage of calves sighted on the winter aerial survey will prove interesting.

Three collar recheck flights have been made with the Beaver aircraft. Airways have been notified of the presence of the collar-bearing moose. No moose with collars have been sighted to date.

Recommendation

1. I believe that ear tags should be discontinued, and collars and radio transmitters be utilized. Transmitters would be more efficient at tracking and cut down on helicopter time.

2. Brighter colours should be used for coding the collars.

3. We should apply as many collars as possible until we can utilize transmitters.

4. From first attempts at rechecks, it appears that a great deal of time must be spent in searching for the collars. I believe a helicopter would be best for these flights.

Summary

Ear tags were used on 60 moose this year.

Collars were used on 16 moose, 15 on moose tagged this year, and one on a previously tagged animal. This moose had been tagged

in 1963 and was 3.5 lineal miles to the north of the tagging location when collared this year.

Thirty-seven tags have been recovered from 283 tagged. This 37 show an average lineal distance of 6.25 miles from point tagged to point shot.

Only 6.7% of moose tagged were calves. Weather conditions were poor for tagging this year. Darvex collars were put on moose with relative ease. Flying time with a Bell helicopter totalled 26 hours.

It is recommended that we use radio transmitters.

Acknowledgements

I would like to thank Dr. Cumming who conceived the use of collars on moose. His interest and guidance is appreciated. I am also grateful to pilot John Busby for his enthusiastic attitude shown throughout the tagging project.

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KENORA DISTRICT WILD RICE HARVEST REPORT

1967

by
R.W. McGillivray

Abstract

Returns received from district wild rice buyers indicate that 456,046 pounds of wild rice was purchased in the Kenora District in 1967.

The average price received was $1.15 per pound giving a total value of $526,622.13 for this crop. A total of 596 pickers participated in the harvest and realized an average cash return of $883.59 for about 20 days of work.

Low and receding water levels were perhaps the biggest factor contributing to the success of this year's crop. However, it is now time to develop more constructive policies, management programs and legislation in order to maintain and develop this valuable resource to its fullest potential.

Introduction

Wild rice is one of our most valuable yet one of our least recognized natural resources. Little is known about wild rice although programs and studies are now being undertaken to answer some of the unknowns of this valuable plant. Wild rice was first introduced to the whitemen by the North American Indian as a finished product. It was necessary for the Indian to harvest and cure the rice before it could be bartered or sold. With the development of machines to process and cure wild rice, it is now possible for Indians to sell green rice to commercial buyers.

The price of wild rice is primarily controlled by the major companies which handle this product on the basis of availability and demand. Competition is usually keen between buyers. They control pickers by supplying them with canoes and in return the pickers sell their rice to them. In the past five years, green rice prices have ranged from an average of $0.22 a pound to a $1.15 a pound while

retail sale prices of $6.00 a pound or higher in Montreal and Texas.

The present Kenora District policies concerning the harvesting of wild rice are made under the authority of the Wild Rice Harvesting Act. The district is divided into ten Wild Rice Harvesting Areas. Each area is assigned to one or two Indian Bands who have exclusive rights to control the harvesting in the area. A $1.00 licence is issued for each of the 10 harvesting areas. This $10.00 constitutes the total revenue collected for the wild rice resource in the Kenora District. Each band is required to submit a list of pickers who are authorized to harvest rice under their area licence. In many cases these lists are inaccurate and incomplete.

Each band elects a committee which controls the harvest. This committee is responsible for establishing starting times, days of rest and number of pickers in each location. However, the lack of authoritative control over non-treaty Indians causes conflicts and, in some cases, loss of crops.

Harvesting of rice is carried out by a primitive method. Two persons operate in a canoe, one paddling in the bow while the other in the stern bends down the rice stocks with a tapered cedar stick about 30 inches in length and taps the rice kernels into the canoe with another stick. In a good picking area, two persons can harvest 200 to 300 pounds a day. The use of mechanical pickers which destroys some plants is frowned upon and is not allowed except under experimental conditions. Such machines are capable of harvesting 1000 pounds of rice per day.

The 1967 harvest began about August 27 and was completed by September 20. Data collected regarding amounts of rice harvested may not be absolute since buyers are not required to keep or submit accurate records. Figures which are volunteered sometimes conflict with those received from other representatives of the same company, however, it is our only source of information.

The 1967 Wild Rice Harvest

A total of 456,046 pounds of green rice valued at $526,622.13 was harvested in 1967. This is the second largest district wild rice crop recorded since 1960 and is the highest value ever received for a district crop. This year's crop exceeded last year's harvest by 417,090 pounds and $485,887.09.

An estimated 596 pickers participated in the harvest. They received an average of $1.15 per pound and realized an average individual earning of $883.59 for about 20 days of work.

Table I shows the 1967 wild rice harvest by Chief Ranger Divisions and amount of rice purchased by each buyer. Table II shows harvest of wild rice by the harvest areas and prices received by pickers in these areas. Table III compares the district wild rice harvest figures for the past seven years.

TABLE I

WILD RICE HARVEST BY CHIEF RANGER DIVISION - 1967

Buyer	No. Lbs. Green Rice Purchased	Aver. Price Paid Per Lb.	Value
DRYDEN DIVISION			
Besselt	33,993	$1.22	$41,471.46
Korzinski	5,000	1.22	6,100.00
Morison & Pitchenese	28,000	1.25	35,000.00
Finch	5,885	1.37	8,062.45
Green	8,888	1.10	9,776.80
Totals	81,766	1.23	$100,410.71
KENORA DIVISION			
M. Gaudry	18,509	0.90	16,658.10
Klatt	7,717	1.00	7,717.00
G. Gaudry	44,578	1.10	49,035.80
McDonald	15,920	1.00	15,920.00
Thor Fisheries	3,398	1.10	3,737.80
Hanson	2,571	0.87	2,236.77
Tolen	5,026	0.89	4,473.14
Hele	2,036	0.84	1,710.24
Dalseg	13,328	0.94	12,528.32
Kroeken	6,444	0.94	6,057.36
Kowbel	20,080	1.10	22,088.00
Hudson Bay Company	7,597	0.97	7,369.09
Shoal Lake Fisheries	225,000	1.22	274,500.00
Simpson	2,076	1.05	2,179.80
Totals	374,280	1.14	426,211.42
GRAND TOTAL	456,046 lbs.	1.15	526,622.13

TABLE II - AMOUNT OF RICE HARVESTED BY HARVESTING AREAS AND PRICE PAID TO PICKERS

W.R.H.A.	LOCATION	NO. LBS. AREA PRODUCED	AVE. PRICE PAID/LB.	TOTAL VALUE	NO. PICKERS	IND. AVE. INCOME
#1	White Dog	36,713	1.07	$28,532.91	90	$317.59
#2	Grassy Narrows	22,856	0.96	22,021.88	45	489.37
#3	Nil					
#4	Shoal Lake	225,000	1.22	274,500.00	140	1960.72
#5	Northwest Angle	22,610	1.06	24,005.63	24	1000.23
#6 & 7	Sabaskong Bay	27,434	1.00	27,434.00	))20)	517.46
	Big Island & Morson	18,509	1.00	18,509.00	))	
#8	Black River & Snake Bay	31,158	1.00	31,158.00	129)149	
#9	Eagle River & Eagle Lake	13,888	1.22	16,943.36	26	651.66
#10	Jones Lake	16,925	1.25	21,156.25	28	755.58
	Wabigoon - Dinorwic Lakes	47,875	1.22	58,407.50	64	912.61
	Rice Lake	3,078	1.26	3,903.60	30	130.12
TOTAL		456,046	1.15	526,622.13	596	883.59

TABLE III

COMPARISON OF WILD RICE HARVESTS SINCE 1960

Year	Total Rice Produced	Aver. Price/ Pound	Value
1960	350,156 lbs.	$0.39	136,560.84
1961	470,729 lbs.	0.22	105,915.02
1962	44,510 lbs.	0.49	22,032.45
1963	47,032 lbs.	0.38	17,816.58
1964	50,449 lbs.	0.40	20,398.46
1965	22,321 lbs.	0.52	11,603.14
1966	38,056 lbs.	1.07	40,735.04
1967	456,046 lbs.	1.15	526,622.13

Finished Rice

Of the 456,046 pounds of green rice harvested, 13,805 pounds were reported to have been cured in the district and retained for personal use or for sale as a finished product. A total of 13,500 pounds was finished by Messrs. Pitchenese and Morison in their small plant on the Wabigoon Indian Reserve. Mr. Pitchenese, a treaty Indian, and Mr. Morison, a non-Indian, for the past two years have sold all the rice they have purchased as finished rice. The rice that they are unable to finish themselves is sent to Manitoba to be finished at a cost of approximately $0.06 per pound. However, this year these men were able to finish all their own rice. The rice is then sold to buyers in Minnesota or through a co-operative in Manitoba for approximately $3.50 to $4.00 a pound.

The 28,000 pounds of green rice purchased at $1.25 per pound costs $35,000.00. The amount of finished rice recovered was 13,500 pounds. If the finished rice had a value of $3.50 per pound then the value of the rice purchased and processed by Messrs. Pitchenese and Morison was increased by $12,250.00 by being processed. However, this year, companies and co-operatives found it difficult to move wild rice to outlets at a wholesale price of $3.50 per pound. This could mean a loss of profit to these two men.

The original Indian method of curing rice was by drying the kernels in the sun on racks or blankets. It was then roasted in large tubs over an open fire of low heat continually stirring it until it was well dried. The rice was then put in a shallow rounded

depression or hole in the ground which was lined with birch bark or canvass and it was then pounded with the rounded end of a log to remove the chaff. In some cases, small children were given the job of stamping on the rice to accomplish this same result. After the chaff was removed, the rice was winnowed by placing it in shallow birch bark baskets or on a blanket and throwing it up into the wind. This separated the chaff from the rice. This method of curing produces short, broken kernel rice unlike that of the long commercially cured rice; however, it is said to contain more flavour.

The curing of rice by machines is much more scientific. The rice is first allowed to "heat" in bags; this gives the kernels the shiny black colour. This heating process is watched very carefully and at the right time the rice is put into the roaster or cooker to "cook" up to 30 minutes. This reduces the moisture content to a specific level which is usually determined by a metering instrument. The cooker is a round cylinder similar to a clother dryer which is rotated over gas heat. Some cookers have electric heat in the centre rather than on the outside.

The rice is immediately removed from the cooker and hulled. Hulling must be done within 17 minutes after cooking or moisture will be picked up by the hulls and make the hulling process more difficult. Hulling is done by a device similar to the cooker. It is a cylinder with rotating fins in the centre. The fins rotate beating the hulls off the kernels. When the rice is hulled, the hulls are separated from the kernels in a fanning mill. The rice can also be graded during this process by using different sized screens. In large operations the rice is graded and broken kernels are removed and used in by-products such as cereal, pancake and muffin mixes. It has been indicated that much profit in wild rice is obtained from these by-products.

Jones Lake

This area is located about 50 air miles south-east of Dryden on the Turtle River system. Although rice has been growing here for many years, it has been of a quantity and quality that made it uneconomical to harvest. However, this year with low water levels this area produced a substantial harvest of 16,925 pounds.

It is recommended that a rice management program be initiated on this area. Control of water levels at crucial times appears to be the best means of producing bumper rice crops. It would be a small matter to reconstruct the old logging dam and regulate the water level.

Conclusions

The success of the wild rice crop this year was felt to be due to recession of water levels in most of the wild rice locations. If it were possible to control these water levels at the critical times during the growth and ripening stages of the wild rice plants, a bumper crop could perhaps be produced every year, barring effects of the other elements such as weather.

Although the average income to the individual was substantial, it is felt that greater benefits could be derived from this resource through improved control and management planning.

The greatest market for wild rice is in the United States. Exporting of a finished quality product would provide more income for local people if they processed the rice instead of selling it in the green condition. This could be done by the formation of Indian co-operative wild rice picking and processing associations. The biggest single deterent factor in this industry is not money itself but rather excess due to unstable supply and purchase prices.

Future Management

In order to bring our program more into line with present conditions, proposals have been made to the district Indian bands to reduce the size of their harvesting areas. This will allow each band to retain all their present harvesting locations as well as other areas they wish to retain for the future. It will leave portions of the district available for Departmental or private management programs aimed at developing additional wild rice production.

It has been recommended that individual pickers be required to purchase licences to harvest rice in the Wild Rice Harvesting Areas. This will provide accurate figures as to the actual number of persons engaged in the harvest as well as increased revenue to the department.

Recommendations have also been made by the Regional Wild Rice Committee for legislation to provide for the licencing of buyers.

Acknowledgements

A vote of thanks is extended to those persons providing the information contained in this report, as well as to those who provided their criticisms of its writing.

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CREEL CENSUS REPORT

CHIBLOW-DENMAN LAKES, 1967

by
C.H. Olver

Abstract

The closure of Chiblow and Denman Lakes to fishing between October 15 and May 1 since 1956-57 dissatisfied many anglers, particularly in recent years when the closure of these lakes became quite a controversial subject. In an effort to resolve this dispute a creel census was conducted on Chiblow and Denman Lakes in 1967 to determine if the continued closure of these lakes to winter fishing was warranted.

The majority of people contacted on these lakes between early May and late September were lake trout fishermen (63 per cent). Smallmouth bass fishermen composed 19 per cent of the total and pleasure boaters 18 per cent.

Lake trout fishermen spent 14,161 hours to catch 3,454 lake trout. The average rate of success was 0.24 fish per man-hour. The harvest of 6,955 pounds of lake trout represented a yield of approximately 1.2 pounds per acre.

Lake trout aged 5 and 6 years composed the bulk of the observed catch (67 per cent). No hatchery planted lake trout were seen among the 587 fish examined.

Lake whitefish were caught by people who were angling for lake trout. Only 49 lake whitefish were estimated to have been caught - a figure which could be increased many times.

The estimated harvest of smallmouth bass was 953 fish weighing 578 pounds. The catch rate was 0.38 for boat fishermen and 0.14 for shore fishermen. Smallmouth bass aged 4, 5 and 6 years composed 88 per cent of the observed catch.

Introduction

Chiblow and Denman Lakes were originally closed to fishing between October 15 and May 1 inclusive in 1956-57 under Ontario Regulation 181/56. These lakes have remained closed annually between these dates by authority of Ontario Regulation 254/57.

The closure of these lakes has caused considerable controversy among some members of the angling public. A petition submitted in January of 1965 requested that these lakes, as well as Wakekobi Lake (Big Basswood) be reopened to ice fishing. A counter-petition signed by property owners and commercial operators on the three lakes was received in the summer of 1965. By November of 1965 the following organizations favoured the opening of the three lakes to winter fishing:

Fish Management Committee #6

Fish Management Committee #7

Elliot Lake Chamber of Commerce

Algoma Rod and Gun Club

Mississagi Valley Tourist Association

The East Algoma Tourist Outfitters Association and members of Fish Management Committee #8 were opposed to a change in current policy. The Thessalon Chamber of Commerce expressed no opinion. The Bruce Mines Chamber of Commerce felt it was the responsibility of the Department of Lands and Forests to decide and members of Fish Management Committee #9 voted to support the Department's decision.

A lake survey carried out on Chiblow and Denman Lakes in the summer of 1966 indicated the presence of adequate natural reproduction to support a lake trout sport fishery. As a result of the lake survey it was recommended that no further stocking of lake trout occur in these waters.

A reassessment of the current policy of winter closure was conducted on a biological basis during 1967 by means of a creel census. The primary objective of the creel census program was to determine if the present level of harvest of lake trout from Chiblow and Denman Lakes was sufficient to warrant continued winter closure, or whether the reopening of the lakes to winter fishing would be in the best interests of the management of the lake trout resource.

Methods

Denman Lake (1,450 acres) and Chiblow Lake (4,450 acres) are joined together by a narrow channel approximately 200 yards long by 30 yards wide (Figure 1). These two lakes are discussed as a single unit and have a combined surface acreage of 5,900 acres.

The approach used to estimate the fishing pressure, rate of success, and harvest of fish from a lake will be the subject of a separate report by C.H. Olver. The creel census on Chiblow-Denman Lakes was designed to run from May 6 to September 22. During this 140 day period Chiblow-Denman Lakes and Basswood Lake were sampled equally by one creel census clerk. As the creel census clerk worked a 6-day week, 60 working days were allotted to Chiblow-Denman Lakes and 60 days to Basswood Lake*. The creel census was carried out on 57 of the pre-selected 60 days. Sampling was not conducted on May 6, July 29 or September 7 because of servicing of the outboard motor or a Department motor vehicle.

Sampling intervals were mostly concentrated in 3-4 hour periods between 8 a.m. and 8 p.m. These intervals, shown in Appendix Table 18*, were assigned values between 0 and 9 and then the sampling intervals for each day were chosen from the table of random numbers. In order to assess the early morning and late evening angling pressure, sampling intervals from 6 a.m. to 8 a.m. and 8 p.m. to 2 a.m. were randomly selected for 8 of the 60 working days on Chiblow-Denman Lakes.

The fishing pressure or effort is expressed in terms of man-hours. A man-hour is defined as one person fishing with one line for one hour. The three components used to measure fishing pressure are:

(1) The average number of boats fishing for each species per day.

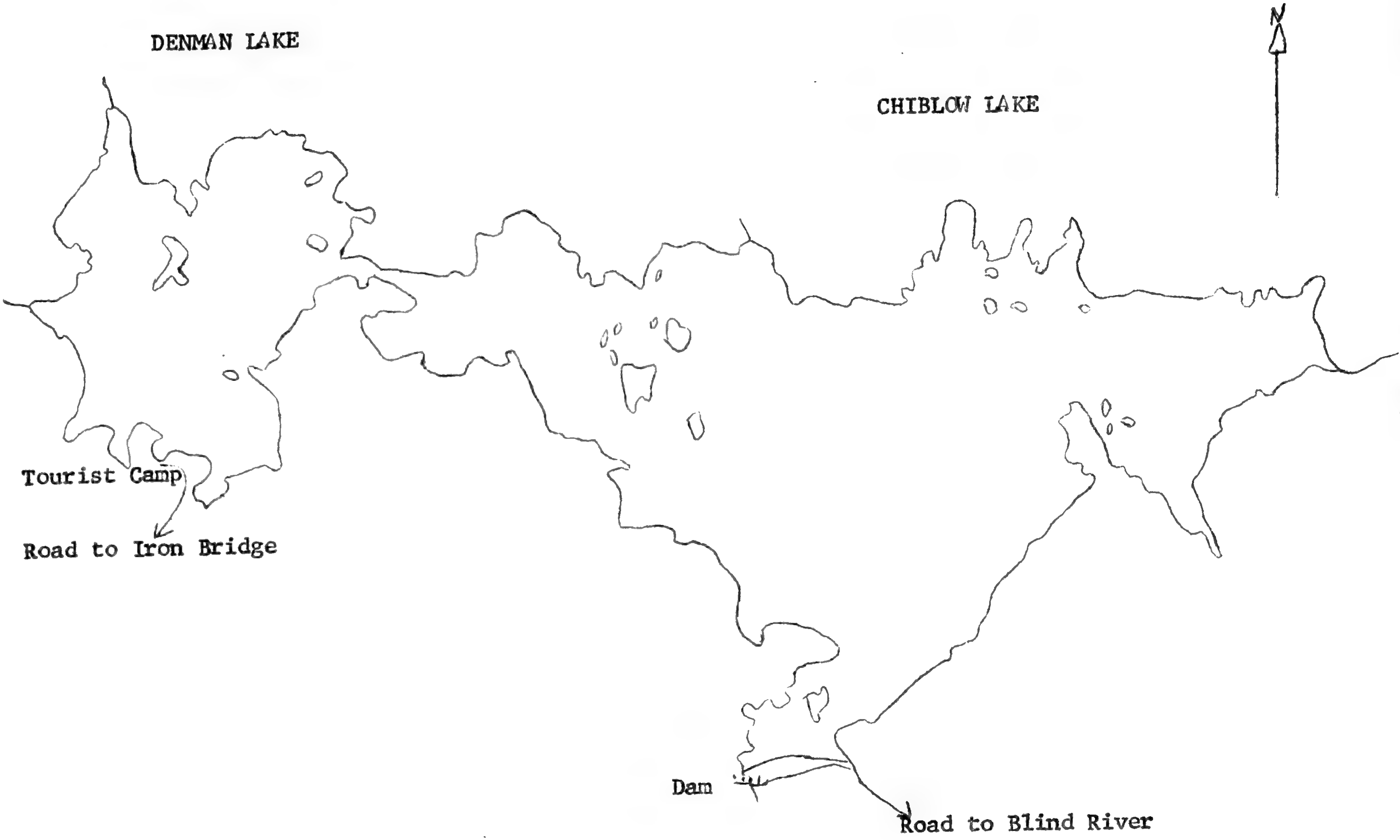
(2) The average number of fishermen per boat.

(3) The average number of hours fished per fisherman per completed trip.

The product of these statistics provided a daily estimate of the fishing pressure. Data for weekdays and weekends and holidays was analyzed separately because it was felt that if a substantial difference in the daily fishing pressure existed between such days, the data could not be combined safely to achieve a single monthly average. Also, a substantial difference in fishing pressure between

*See Unpublished Report in Fish and Wildlife Library for Appendix

Figure 1 - Map of Chiblow and Denman Lake



weekdays and weekends and holidays could affect the rate at which fish were caught and so influence the harvest estimates for each month. (Neither of these two assumptions were tested). The monthly estimate of fishing pressure was determined by multiplying the daily effort for weekdays and weekends and holidays by the number of weekdays and weekends and holidays in each month.

The rate of success or catch per unit-of-effort (C.U.E.) is defined as the number of fish caught and kept per man-hour of fishing. Data from completed trips and incomplete trips was analyzed separately. A Chi-square test (Snedecor, 1956) was used to compare C.U.E. data from completed and incomplete trips. If no significant difference existed between completed and incomplete trips, the data was combined. If a significant difference existed, only the completed trip C.U.E. data was utilized. As the yield of fish to the angler is a function of the effort expended in angling for the species and the rate at which fish are removed from the water, the harvest of fish is simply the product of the fishing pressure and the C.U.E. for weekdays and weekends and holidays for each month.

Data for fishing pressure, C.U.E. (weighted) and harvest were added for weekdays and weekends and holidays to provide monthly summaries, and the monthly summaries were added together to provide the season estimates. Although the creel census did not begin until May 6 and terminated on September 19, the May and September estimates were expanded to cover all days for these two months. As no creel census data was collected between October 1 and the close of the lake trout season on October 10, no estimates of fishing pressure, C.U.E. or harvest were available for this period of time.

Recreational Use of Chiblow-Denman Lakes, 1967

Approximately two-thirds of the persons on Chiblow-Denman Lakes between early May and late September were lake trout fishermen (Table 1). The percentage of lake trout fishermen declined steadily from a high of 100 per cent in May to a low of 24 per cent in August, then increased to 61 per cent in September.

As interest in the pursuit of lake trout diminished during July and August, the popularity of smallmouth bass fishing and pleasure boating increased accordingly. During August three times as many people enjcyed pleasure boating or smallmouth bass fishing than fished for lake trout. Some people were interviewed who had not fished in either lake, but instead had boated across the lake to fish for smallmouth bass in Demorest (Caribou) Lake. These people were not included in determining the activity of persons on Chiblow and Denman Lakes.

TABLE I - BOAT-OCCUPANT ACTIVITY FOR CHIBLOW-DENMAN LAKES, 1967

Month	Lake Trout		Smallmouth Bass*		Not Fishing		Fishing Other Lakes*		Monthly Totals	
	Boats	Anglers	Boats	Anglers	Boats	People	Boats	Anglers	Boats	People
May	139	340	0	0	0	0	0	0	139	340
% of Total	100.0	100.0	0.0	0.0	0.0	0.0			100.0	100.0
June	131	292	11	31	12	26	0	0	154	349
% of Total	85.1	83.7	7.1	8.9	7.8	7.4			100.0	100.0
July	87	161	39	105	32	79	9	28	158	345
% of Total	55.1	46.7	24.7	30.4	20.2	23.0			100.0	100.0
August	38	85	45	133	51	138	13	39	134	356
% of Total	28.4	23.9	33.6	37.3	38.0	38.8			100.0	100.0
September	53	113	16	31	15	41	2	6	84	185
% / Total	63.1	61.0	19.0	16.8	17.9	22.2			100.0	100.0
Grand Totals	448	991	111	300	110	284	24	73	669	1575
% / Grand Totals	67.0	62.9	16.5	19.1	16.5	18.0			100.0	100.0

* Smallmouth Bass angling season not open until June 24.

** Contacted at Biltons Camp. Anglers not included in monthly totals.

The Lake Trout Fishery

Angling Statistics

A summary of the lake trout boat fishery is presented in Table 2. A more detailed analysis of its components is given in Appendix* Tables 1 through 5. The estimated fishing pressure or effort was 14,161.2 man-hours. This represents a fishing intensity (man-hours of effort per surface acre) of 2.40.

The rate of success or catch per unit-of-effort (C.U.E.) was originally estimated to be 0.22 fish per man-hour. This seasonal average was undoubtedly greater but highly significant differences for C.U.E. values between completed and incomplete trips for May week days, May weekends, and June weekends prohibited the use of combining C.U.E. data for complete and incomplete trips for these time periods.

The C.U.E. values (Appendix Table 5) resulted in an estimated harvest of 2,684 lake trout. Fairly complete records kept by personnel from Bilton's Tourist Camp show that at least 3,400 lake trout were caught by their guests or by individuals using only some facilities of their camp such as a boat and/or outboard motor.

The C.U.E. values for incomplete trips for May week days, May weekends, and June weekends were 0.28, 0.19 and 0.27 respectively. If these figures were used to compute the harvest estimates for these three time periods, an estimated 770 more lake trout would have been caught. The season total would therefore be 3,454 lake trout and the revised C.U.E. would be 0.24. It is assumed that the low and probably false C.U.E. values used in the original harvest estimates for May week days, May weekends, and June weekends resulted in an underharvest of well over 700 fish. This situation would probably not have arisen if sufficient completed trip data had been collected during these time periods. The importance of a detailed analysis of C.U.E. data is apparent.

The revised harvest estimate of 3,454 lake trout produced a total of 6,955 pounds of fish for the sportsman. The yield of lake trout from Chiblow and Denman was 1.2 pounds per acre. This estimated harvest must be considered as an underestimate also as the difference between 3,454 and 3,400 fish leaves few lake trout attributed to the 24 cottage owners and their guests.

No anglers were observed fishing from the shore for lake trout. Some lake trout were probably caught by persons fishing while enjoying a shore lunch, but the number caught is negligible compared to the total estimate.

The average length of a completed fishing trip for each angler was 5.33 hours (5 hours and 20 minutes). Although the rate of success was quite high, 118 of 272 fishermen (43.4 per cent) who had completed their fishing for the day did not catch any fish. A highly significant difference existed between the average number of fish caught per fisherman for completed and incomplete trips. Complete trip fishermen averaged 1.17 fish per man, while fishermen with incomplete trips averaged only 0.78 fish per man.

TABLE 2 Summary of Angling Statistics of the Lake Trout Fishery from Chiblow-Denman Lakes, 1967

Month	Fishing Pressure (man-Hrs.)	C.U.E.	Harvest (nos.)	Av. Weight (lbs.)	Harvest (lbs.)	Pounds/ Acre
May	5,298.0	0.22	1,290	2.1	2,688.0	
June	3,788.0	0.23	863	1.9	1,672.1	
July	1,783.6	0.23	410	2.3	907.8	
August	1,113.6	0.24	263	1.9	510.0	
September	2,178.0	0.29	628	1.9	1,197.0	
Season Estimates	14,161.2	0.24	3,454	2.0	6,954.9	1.179

Age and Growth

The growth of lake trout in Chiblow and Denman Lakes is presented in Table 3. Since the fish were captured throughout most of the growing season, the average lengths and weights indicate growth at approximately the midpoint of the growing season. As most fish age IV did not appear in the angler's creel until late August or early September, the average length of age IV fish probably represents growth closer to the end of the growing season than at the midpoint.

The average total length of 521 lake trout was 18.4 inches and the average weight was 2.0 pounds. Total lengths ranged from 13.2 to 26.6 inches and weights varied between 0.6 and 6.8 pounds.

TABLE 3 Growth and Age Composition of Lake Trout from Chiblow-Denman Lakes, 1967

N = 226

	Age						
	IV	V	VI	VII	VIII	IX	X
Year Class	1963	1962	1961	1960	1959	1958	1957
Number in sample	26	77	75	27	11	8	2
Percentage Frequency	11.5	34.1	33.2	11.9	4.9	3.5	0.9
Av. total length (inch.)	15.5	17.0	18.7	20.9	23.0	24.9	25.4
Av. weight (pounds)	1.1	1.4	1.9	2.7	3.8	5.0	6.2

Age Composition of Angler-caught Lake Trout

The lake trout fishery in Chiblow-Denman Lakes in 1967 was primarily dependent on fish five and six years old (Table 3). These two age groups accounted for 67.3 per cent of the observed catch. It is apparent that a year class failure or two consecutive year class failures could affect the sport fishery severely. Age groups IV and VII were equally represented in the catch. However, the age VII fish were more abundant in the spring fishery and the age IV fish were more prevalent in the late summer and early fall fishery, probably as a result of recruitment through growth. Lake trout age eight and older composed only 9.3 per cent of the catch. Lake trout aging was done by the author.

Length Frequency Analysis

The length frequency distribution of angler-caught lake trout (Figure 2, Table 4) showed that in 1967 lake trout between 18.0 and 18.9 inches were fully vulnerable to the angling gear. The fishery was primarily composed of lake trout between 15.0 and 19.9 inches as 75.5 per cent of the lake trout caught occurred within this 5 inch length range. The length frequency distribution, coupled with a knowledge of the age composition of angler-caught lake trout in these lakes, substantiates the view that the lake trout fishery is dependent on only a few age groups and consequently a few year classes to support the sport fishery.

Figure 2 - Length-frequency distribution of lake trout from Chiblow-Denman Lakes, 1967

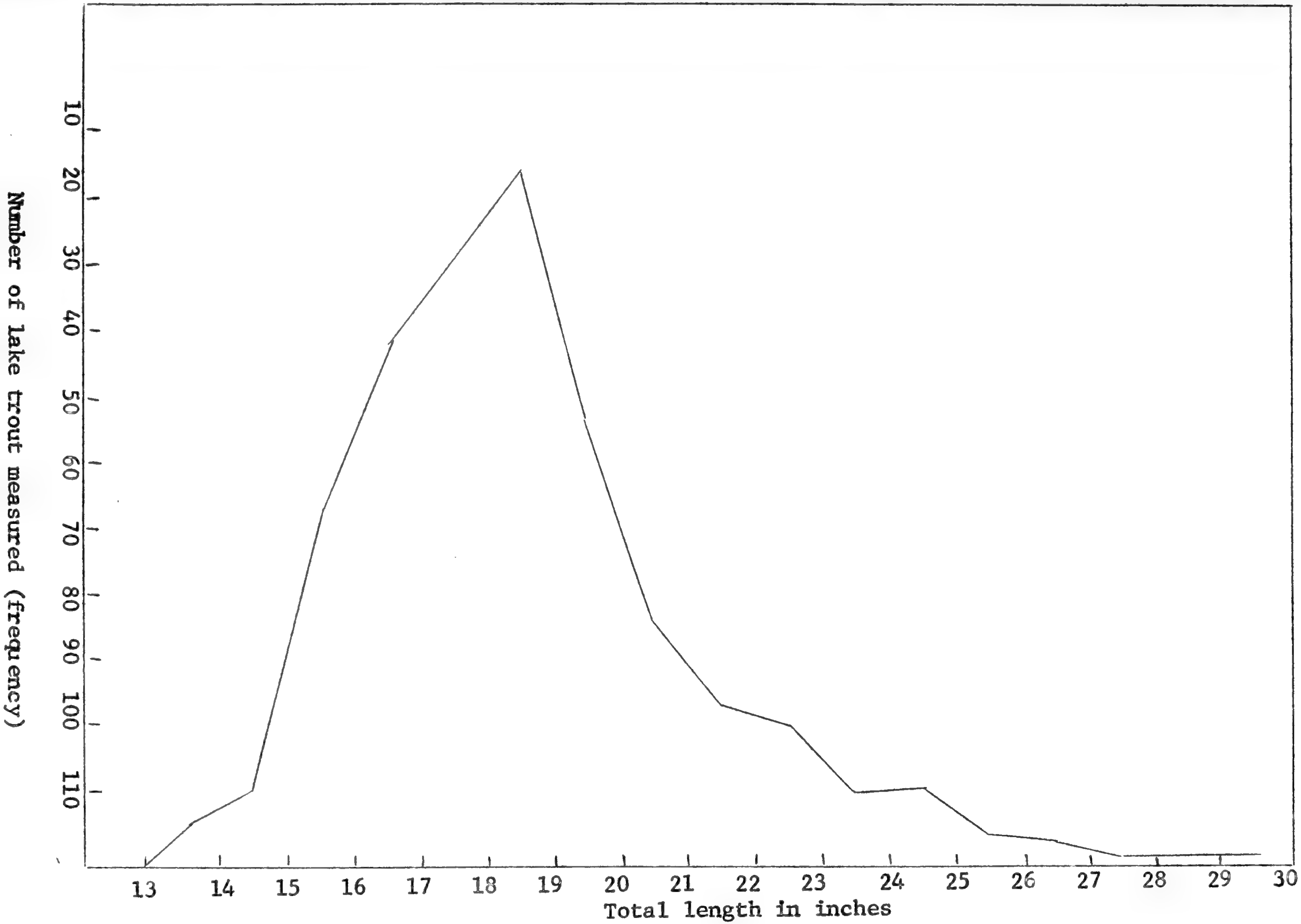


Table 4 Length-frequency distribution of angler-caught lake trout in Chiblow-Denman Lakes, 1967

	Total length in inches																		Not	
Month	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	Total	Measured	Total
May		3	14	25	30	51	21	15	8	10	2	1	3	-	-	-	1	184	10	194
June	2	3	14	15	22	19	15	9	5	4	4	3	1	-	1	-	-	117	36	153
July	3	3	-	12	6	9	10	4	5	3	3	1	-	1	-	1	-	61	9	70
August	-	-	6	5	3	2	2	3	1	2	-	1	-	1	-	-	-	26	4	30
September	-	1	18	21	30	24	19	6	5	2	1	5	-	1	-	-	-	133	7	140
Total	5	10	52	78	91	105	67	37	24	21	10	11	4	3	1	1	1	521	66	587
14 25	15												10							
Per cent of Total	2.9		10.0	15.0	17.5	20.1	12.9	7.1	4.6	4.0	1.9	2.1	1.9					100.0		

A comparison of the length frequency distribution for 1967 with that of future years may help to indicate what effect, if any, the fishing pressure and high rate of success (C.U.E.) has exerted on the lake trout population.

The Contribution of Hatchery Stocked Lake Trout to the Lake Trout Sport Fishery

The planting record of marked, hatchery-reared lake trout in Chiblow-Denman Lakes is as follows:

1958 - June 17	4,530 yearlings	Adipose clip
1962 - June 4	3,000 yearlings	Left ventral-adipose clip
1964 - May 30	4,000 yearlings	Right pectoral-adipose clip
1966 - June 17	11,000 yearlings	Left pectoral-right ventral clip

A total of 587 lake trout were examined by the creel census clerk. No marked fish were observed and thus it is assumed that hatchery lake trout did not contribute measurably to the lake trout sport fishery in 1967.

Methods of Successful Lake Trout Angling

Angling in Chiblow-Denman Lakes was almost entirely confined to trolling. Only two anglers who were still fishing for lake trout were contacted on the lake. The first still fisherman was not observed until August 8.

Trolling with a combination of an artificial lure and a minnow was the most popular method of lake trout fishing. A total of 666 lake trout were caught by the anglers who were interviewed and 537 of these fish were caught using an artificial lure and a minnow combination (Table 5).

TABLE 5 Summary of Angling Success for Lake Trout

From Chiblow-Denman Lakes, 1967

	Month					Totals
	May	June	July	Aug.	Sept.	
Trolling						
Artificial lure and minnow	179	151	40	47	120	537
Artificial lure	4	40	39	20	11	114
Minnow	9	4	0	0	0	13
Still fishing						
Minnow	0	0	0	1	1	2
Grand Total						666

Artificial lures captured 114 lake trout. Almost as many lake trout were captured with artificial lures as with a combination of an artificial lure and a minnow during the month of July. This probably does not reflect any real difference between the success of the two trolling methods, but rather reflects a scarcity of minnows for bait which forced more anglers than usual to rely on an artificial lure only.

The Lake Whitefish Fishery

As lake whitefish were caught by anglers engaged in lake trout fishing, it was not possible to ascribe a separate and distinct fishing effort to the whitefish fishery. The fishing pressure on whitefish was therefore considered to be equivalent to the calculated fishing pressure on lake trout.

Only ten whitefish were recorded during the creel census. The estimated harvest of whitefish for the period May 1 to September 30 was 49 fish weighing 83 pounds (Table 6).

Five whitefish were aged. Three were 10 years old, and the other two fish were age 7 and 11 respectively.

Table 6 Summary of Angling Statistics of the Lake Whitefish Fishery from Chiblow-Denman Lakes, 1967

Month	Number Kept	C.U.E.	Harvest (numbers)	Av. Weight (pounds)	Harvest (pounds)
May	0	0	0		
June	3	0.004	15		
July	3	0.008	16		
August	1	0.003	3		
September	3	0.007	15		
Season Estimates	10	0.007	49	1.7	83.3

The Smallmouth Bass Fishery

Angling Statistics

A summary of the smallmouth bass boat fishery (Table 7) shows that a calculated fishing pressure of 2,442.2 man-hours, coupled with a rate of success of 0.38 fish per man-hour, produced an estimated harvest of 922 fish weighing a total of 560 pounds.

Shore fishing for smallmouth bass was not as rewarding to the angler. The rate of success was only 0.14 and the harvest was estimated to have been only 31 fish. A more detailed analysis of the components of both the smallmouth bass boat fishery and shore fishery is presented in Appendix Tables* 7 to 11 and 13 to 17 respectively. The total harvest of smallmouth bass was estimated at 953 fish weighing 578 pounds.

Table 7 Summary of Angling Statistics of the Smallmouth Bass Boat Fishery from Chiblow-Denman Lakes, 1967

Month	Fishing Pressure (man-hrs.)	C.U.E.	Harvest (numbers)	Av. Weight (pounds)	Harvest (pounds)
June	319.3	0.14	37	0.8	27.7
July	781.1	0.43	361	0.6	216.6
August	1,008.8	0.43	431	0.6	253.9
September	333.0	0.29	93	0.7	61.7
Season Estimates	2,442.2	0.38	922	0.6	559.9

Table 8 Summary of Angling Statistics of the Smallmouth Bass

Shore Fishery from Chiblow-Denman Lakes, 1967

Month	Fishing Pressure (man-hrs.)	C.U.E.	Harvest (numbers)	Av. Weight (pounds)	Harvest (pounds)
June	28.0	0.22	6	0.6	3.6
July	146.1	0.05	9	0.6	5.4
August	57.6	0.27	16	0.6	9.6
September	48.0	0	0	0	0
Season Estimates	279.7	0.14	31	0.6	18.6

Many rock bass were caught by anglers fishing for smallmouth bass. Most rock bass were returned to the water and no attempt was made to estimate the harvest of rock bass from Chiblow-Denman Lakes.

Age and Growth

The growth rate of smallmouth bass in Chiblow-Denman Lakes (Table 9) is probably limited by the oligotrophic nature of these lakes. The average length of age V fish (8.4 inches) was less than that of the age IV fish (9.3 inches). It is assumed that the first year growth of the 1962 year class was retarded to the extent that these fish have had a poorer growth history than the 1963 year class of smallmouth bass.

The average length of 190 smallmouth bass was 10.3 inches and the average weight was 0.6 pounds. Total lengths varied from 6.4 to 17.3 inches and weights ranged from 0.1 to 2.7 pounds. Twenty one of the 190 bass samples (11.1 per cent) weighed 1.0 pound or more. Only 6 fish (3.2 per cent weighed more than 1.5 pounds.)

Table 9 Growth and Age Composition of Smallmouth Bass

N = 165 from Chiblow-Denman Lakes, 1967.

	Age							
	III	IV	V	VI	VII	VIII	IX	X
Year Class	1964	1963	1962	1961	1960	1959	1958	1957
Number in Sample	6	42	68	35	6	7	0	1
Percentage Frequency	3.6	25.4	41.2	21.2	3.6	4.2	0	0.6
Av. total length (inches)	7.1	9.3	8.4	10.7	12.9	13.7	0	17.3
Av. total weight (pounds)	0.2	0.4	0.5	0.7	1.1	1.3	0	2.7

Age Composition of Angler-Caught Smallmouth Bass

The smallmouth bass fishery during 1967 was primarily dependent on age groups IV, V and VI. These three age groups accounted for 87.8 per cent of the observed catch (Table 9).

Considerable concern was expressed by the tourist operators, many anglers, and the creel census clerk that the smallmouth bass did not spawn successfully in 1967. Many female bass, which were caught in late August, had retained their spawn.

Discussion

The most notable characteristics of the lake trout fishery were the exceptional rate of success (0.24) and a yield of approximately 1.2 pounds per acre. Most fishery scientists in Ontario accept the figure of 0.5 pounds per acre as a maximum yield which a lake trout resource can sustain annually. Long term records of Algonquin Park Lakes (Martin, 1967) showed that most lakes did not attain or maintain this value even when the lakes were open and closed to fishing on an alternate year basis.

It is possible that the excellent fishing for lake trout in Chiblow and Denman Lakes in 1967 was due to the presence of two strong year classes (1962, 1961) in the fishery. These fish were then 5 and 6 years old respectively. If these year classes continue to dominate the fishery in 1968, the 1968 catch would consist heavily of 6 and 7 year old fish. This will be determined by the 1968 creel census.

One of the most prominent features of lake trout fisheries in Algonquin Park lakes has been the extremely uneven success of year classes (Fry and Chapman, 1948). If a similar situation applies to Algoma lake trout lakes, it simply implies that man has no means of effective control over pronounced fluctuations in the numbers of lake trout available to the angler from year to year. The point of concern in the present study is whether spawning escapement was sufficient in 1967, despite the high yield of lake trout, to maintain an attractive fishery in the future. Not until lake trout of the 1967 year class begin to enter the fishery in 1971 as 4 year olds can this question begin to be answered.

Present knowledge suggests that the removal of lake trout from Chiblow-Denman Lakes in 1967 was in excess of that which the lake could sustain annually. The effect of excessive annual yields of lake trout would be a depressed or collapsed lake trout fishery. Therefore, it is concluded that it is in the best interests of the lake trout resource to maintain the annual closure of these lakes between October 15 and May 1. It may even be necessary to recommend more stringent regulations rather than a liberalization of the existing regulations.

Lake trout planted in 1958 (1957 year class) have largely passed through the fishery, but fish from the 1962 stocking (1961 year class) were 6 years old in 1967 and should have contributed measurably to the sport fishery, but none were observed in the angler's creel. Some of the lake trout planted in 1964 (1963 year class) were age IV in 1967 and could have appeared in the angler's catch, but again none were recorded. These fish should appear, if they are still present, in the 1968 and 1969 catches when they will be age V and VI respectively.

A few of the faster growing lake trout of the 1966 plant (1965 year class) could appear in the 1969 catch when they will be 4 years old. Theoretically, the 1966 plent should contribute substantially to the catch of lake trout in 1970 and 1971 when they will be age V and VI respectively. The creel census in future years will determine the extent to which hatchery-reared lake trout contributed to the harvest of lake trout from Chiblow and Denman Lakes.

Lake whitefish were essentially an unexploited resource in 1967. Lake surveys conducted on these lakes in 1966 (Albertini and Keith) showed the presence of a good lake whitefish population. In fact, more whitefish (289) were caught than lake trout (260). The whitefish averaged 1.5 and 1.7 pounds respectively from Chiblow Lake and Denman Lake. Maximum weights recorded were 2.2 pounds from Denman Lake and 3.5 pounds from Chiblow Lake. It is apparent that a lake

whitefish fishery could and should be established on Chiblow Lake (as well as a number of other District lakes). Preliminary efforts in this regard were begun last December in the form of a release to the local newspaper describing methods used to catch whitefish during the winter on Lake Simcoe. However, there was no response at all to the article which appeared in the paper. Open water angling for lake whitefish is also not a popular activity. Perhaps a new approach will have to be made to inform the public of the methods used to catch this desirable sport fish.

Manson (1968) observed that "many of the smallmouth bass failed to spawn this summer; eggs in a state of partial reabsorption were observed right up to the end of the census." If the contention is correct that smallmouth bass did not spawn successfully in 1967, then the 1967 year class will provide poor fishing in 1971, 1972, and 1973 when these fish will be 4, 5 and 6 years old respectively. The failure of the 1967 year class of smallmouth bass has already been predicted for South Bay, Manitoulin Island (C.A. Lewis, personal communication). As a result of the successful approach used at South Bay to predict the course of the smallmouth bass fishery, it is predicted that the 1967 year class of smallmouth bass from Chiblow-Denman Lakes will provide few fish to the angler in 1971, 1972 and 1973.

The randomized design of the creel census was designed to eliminate as much bias as possible by interviewing anglers throughout the length of the fishing day and under all weather conditions. By stratifying the sampling intervals it was possible to learn the characteristics of the fishermen and to identify the time periods which were most productive in terms of angler contact. The creel census clerk in his report (Manson, 1967) recommended a standard sampling day on Chiblow and Denman Lakes from 12 p.m. to 8 p.m. Most 6 a.m. to 8 a.m. and 8 p.m. to 2 a.m. sampling intervals were devoid of any angler contacts, and as most fishermen were just starting to fish after 8 a.m., the time period from 8 a.m. to 12 p.m. often did not yield much data, especially completed trip information. Much more complete trip information could be collected if the anglers were interviewed at the tourist camp on Denman Lake which serves as a point of entry to both lakes for about 90 per cent of the fishermen.

Water level fluctuations were to be recorded once a week but there was no gauge on the dam and consequently no readings were taken. However, it was obvious that water level fluctuations were anc can be held to a minimum or manipulated if desired.

Public access to Chiblow-Denman Lakes could be improved by providing boat launching and car parking facilities on Chiblow Lake in Scarfe Township on a suitable site where a small creek enters Chiblow Lake from Plump Lake. The present Forest Access Road to this location would also have to be improved and maintained.

Only one summer cottage is presently located on Chiblow Lake. The single commercial camp and the remaining 22 cottage sites are located on Denman Lake. The present "wilderness aspect" of fishing on Chiblow Lake could be maintained by restricting the development of summer resort properties on this lake.

Recommendations

(1) Chiblow and Denman Lakes should remain closed to winter fishing under Ontario Regulation 254/57.

(2) The creel census program should be continued on these lakes through 1972 in order to detect and document any changes, fluctuations, or trends in the fishery which indicate overfishing, and to assess the response of the lake trout fishery to the pressures exerted upon it. The continuation of the program will also allow the effectiveness of the stocking program to be assessed.

(3) An attempt should be made to encourage fishing for lake whitefish. Information concerning the methods of angling for this fish should be made available to the public.

(4) A standard eight hour creel census day should be employed on Chiblow-Denman Lakes. The approximate time period should be in the neighbourhood of 12 p.m. to 8 p.m.

(5) A boat count should be made each scheduled day but anglers should be interviewed at the commercial tourist camp in order to acquire as much complete trip data as possible.

(6) Boat launching and car parking facilities should be provided at Chiblow Lake.

(7) The aesthetic value of angling for lake trout should be preserved by restricting the development of summer resorts on Chiblow Lake.

Summary

(1) The major recreational use of Chiblow-Denman Lakes is lake trout fishing. Smallmouth bass fishing and pleasure boating assumed increasing importance during July and took precedence over the lake trout fishery during the month of August.

(2) The estimated fishing pressure on lake trout was 14,161.2 man-hours. The fishing intensity was 2.40 man-hours of effort per surface acre.

(3) The original C.U.E. estimate for the five month fishing season was 0.22 fish per man-hour and the original harvest estimate was 2,684 lake trout.

(4) Fish records kept by personnel from Bilton's tourist camp showed that at least 3,400 lake trout were caught by their guests. It was assumed, therefore, that the C.U.E. data for May weekdays, May weekends, and June weekends were not reliable. Incomplete C.U.E. data for these time periods were used instead and it was estimated that an additional 770 lake trout had been caught.

(5) The revised estimate of the lake trout harvest was 3,454 lake trout weighing 6,954.9 pounds. The actual harvest of lake trout was probably greater than the figures presented.

(6) The yield of lake trout was 1.179 pounds per acre.

(7) No anglers were observed fishing from the shore for lake trout.

(8) Lake trout fishermen averaged 5.33 hours per completed trip.

(9) Lake trout fishermen averaged 1.17 fish per man per completed trip.

(10) Angler-caught lake trout averaged 18.4 inches, total length, and 2.0 pounds.

(11) The lake trout fishery was primarily dependent on 5 and 6 year old fish. Fluctuations in year class strength could cause considerable annual fluctuations in the numbers of lake trout available to the sport fishery.

(12) No hatchery planted lake trout were recorded in the observed catch. The contribution of hatchery-reared lake trout to the sport fishery was negligible.

(13) Lake trout between 15.0 inches and 19.9 inches accounted for 75.5 per cent of the observed catch.

(14) Almost 100 per cent of the lake trout fishermen preferred to troll rather than still fish or cast. A combination of an artificial lure and a minnow accounted for 537 of the 666 lake trout recorded in the creel census.

(15) Lake whitefish are caught by anglers fishing for lake trout. The estimated harvest was 49 fish weighing 83.3 pounds.

(16) Boat-fishing pressure exerted on the smallmouth bass was estimated at 2,442.2 man-hours and the C.U.E. was 0.38 fish per man-hour.

(17) The estimated harvest was 922 bass weighing 560 pounds.

(18) The statistics for the smallmouth bass shore fishery were: fishing pressure - 279.7 man-hours; C.U.E. - 0.14 fish per man-hour; harvest - 31 fish weighing 18.6 pounds.

(19) The combined result of the smallmouth bass boat and shore fishery was a harvest of 953 fish weighing 578.5 pounds.

(20) The growth rate of smallmouth bass may be limited by the oligotrophic nature of Chiblow and Denman Lakes.

(21) The 1963 year class (age IV) of smallmouth bass exhibited a faster rate of growth than the 1962 year class (age V).

(22) Angler-caught smallmouth bass averaged 10.3 inches, total length, and 0.6 pounds.

(23) Smallmouth bass age 4, 5 and 6 accounted for 87.8 per cent of the observed catch.

(24) Smallmouth bass did not have a successful year for spawning in 1967. Angling for fish of the 1967 year class will be poor in 1971, 1972 and 1973.

(25) The lake trout fishery was characterized by an exceptional rate of success (0.24) and a high yield of 1.179 pounds per acre. Concern was expressed that this yield may have been in excess of what the lake could maintain on an annual basis.

Acknowledgements

Sincere appreciation is extended to the creel census clerk, Harald Manson, whose attitude, interest, and extra efforts assured the success of this project. The assistance and co-operation of personnel from Bilton's tourist camp on Denman Lake and the anglers themselves is gratefully acknowledged. Special thanks is due to J.B. Smith of the Department's Research Branch at South Bay, Manitoulin Island, who aged the smallmouth bass scales.

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