

FRESHWATER FISHERIES ADVISORY SERVICE

MARINE DEPARTMENT

INVESTIGATION REPORT

JOB NO. 62

ACCLIMATISATION SOCIETY DISTRICT: Southland

TITLE OF JOB: Freshwater Fisheries Survey Waituna Lagoon

OBJECTIVES: To obtain information on the spawning of Brown Trout in the lagoon and Tributaries, and make an estimate of the trout stock in the lagoon.

INTRODUCTION

This investigation was carried out in three visits April 1966 to June 1966, March 1967 and November 1970.

DESCRIPTION

Waituna Lagoon is situated on the coast approximately 12 miles south east of Invercargill. It is about 6½ miles long of irregular width and has a shoreline of approximately 21 miles. The water is shallow except for some deeper channels towards the outlet. Fig. 1 is a map of the area. There are three main tributaries; Waituna, Moffats and Currans Creeks. The drainage area is about 60,000 acres, mainly peat swamp with clumps of scrub and bush. As a result of this and the general nature of the lagoon's bottom (mud and sand) the water is always turbid. Large colonies of wildfowl and wading birds frequent the lagoon and surrounding wetlands. The outlet is sometimes closed to the sea by wave action on the shingle beach, (similar to Lake Ellesmere, Canterbury) otherwise the lagoon and tributaries are tidal.

Waituna Creek: This is the largest of the three tributaries with a normal flow of 60 cusecs (at the mouth). It flows into the western end of the lagoon. The bed is mainly fine gravel, sand and silt, the banks in most places are stable. In the middle and upper reaches of this stream the channel has been deepened by as much as 6' by draglines. This has caused a loss of much needed spawning gravel throughout the stream.

Moffats Creek: This stream is a smaller version of the Waituna Creek, the normal flow is about 20 cusecs. It enters the lagoon about $\frac{3}{4}$ mile to the east of Waituna Creek. The stream bed is of a similar nature to Waituna Creek.

Currans Creek: This stream drains a large area of swampland at the eastern end of the lagoon. It has a normal flow of about 20 cusecs but is much slower than the other streams. The bed is of fine gravel and mud and there is little spawning gravel available.

Land Development: There has been extensive work done by Catchment Board and Lands and Survey Department personnel over the past 20 years. Large areas of swamp have been drained and scrub and bush cleared from them prior to cultivation. Due to the nature of the surrounding countryside this has meant large deep drains, and consequently the tributaries have had to be deepened to improve the flow of water. This has meant the loss of spawning facilities, especially in Waituna Creek.

METHODS

Trapping: Two-way fish traps were constructed of treated timber and chain-mesh wire netting near the mouths of Waituna and Moffats creeks and about 1 mile up Currans creek.

Moffats creek trap and Waituna creek trap were in operation on 11th April and 16th April respectively. Due to adverse weather conditions and flooding Currans creek trap was not in operation until 30th April. All upstream fish were marked by

removing the adipose fin in Waituna Creek, the right ventral in Moffats Creek, and the left ventral in Currans Creek. The traps were checked and cleaned each day.

The area proved to be subject to heavy flooding however, and all traps were severely damaged and subsequently abandoned. The Moffats Creek trap on 30th May after 49 days trapping, the Currans Creek trap on 16th June after 40 days trapping, and the Waituna Creek trap on 20th June after 65 days trapping. Subsequently it was discovered that flood of the type experienced could be expected in the future and any future trapping would be in doubt.

Netting: In March 1967 gill netting was carried out when the lagoon was closed to the sea. Nylon monofilament nets were used with 2", 2 $\frac{5}{8}$ ", 3", 4" mesh. The nets were set from a boat and checked at regular intervals both day and night. All fish were clipped with various fin clip combinations to enable identification.

The lagoon was again netted during November 1970 with the same nets, however this time the lagoon was open to the sea and the large tidal flows and weed made netting difficult. All trout caught were tagged with spaghetti type tags.

Spawning Surveys: The information given was collected by officers of the Southland Acclimatisation Society in 1964 and 1970, using visual count method.

RESULTS

Trapping: 213 fish were caught in the Waituna creek trap, 6 fish in Moffats creek and 36 in Currans creek. Table 1 gives the number, lengths, weights and condition factors for all the brown trout caught in the three traps. The smallest was 2lb. 3oz., the largest 12lb. 8oz. Three of the fish appeared to be sea-run. All fish were in reasonable condition. Several eels and flounders were also caught. Because of the unstable nature of the beds and the large amounts of debris carried down the streams by flood waters, trapping here is probably not very

efficient. Fig. 2 shows the length frequency for brown trout males and females during the period, although at the entire run it is probably representative. Two predominant year groups was shown, these are presumed to be 4 year old (50 - 55 cms) and females at 6 years (65 - 70 cms).

Netting: A total of 21 fish were caught in the 1967 netting when the lagoon was closed to the sea. The largest fish was 7lb., the smallest 8oz. Table 2 gives numbers, lengths, weights and condition factors of the trout. Other fish caught were flounders, stargazers and mullet.

Only six fish were caught in the 1970 netting, when the lagoon was open to the sea. The largest fish caught was 5lb. 2oz., the smallest 5oz. Other fish caught were mullet and flounder. Some samples were obtained from anglers fishing the lagoon mouth. Table 3 gives the ages, lengths, weight and condition factors of these fish.

Food: A limited number of stomachs were examined from fish taken when the lagoon was open to the sea. It is obvious that at this period fish is the predominant food. See Table 4.

Spawning: Although extensive excavations have damaged some spawning areas, total redd numbers do not appear to have changed greatly between 1964 and 1970 as indicated in Table 5.

DISCUSSION

It appears that only a small number of fishermen regularly fish the area with reasonable success. Access and weather conditions prevent more usage of the area when more favourable water is available nearby (i.e. Mataura River). The checking of anglers has revealed that catch rates can be very low for inexperienced fishermen.

As the spawning potential, while not good, has remained relatively constant, the stock of fish appears to be in balance with the food supply. A larger population could be maintained, but it could effect the size of individual fish. The fish are

of good size, but not exceptionally so, on the average. This, plus the unique character of the lagoon, makes any major attempt to greatly augment the population a dangerous proposition. Any changes that would be successful would endanger the wetland itself, and be very expensive; considering the limited usage of the area no alterations should be attempted.

CONCLUSIONS

Although fish caught in the lagoon are of a reasonable size, only a small trout population exists. At present with the limitations on spawning and angler usage, no purpose would be achieved by releasing fry or yearling trout into the system.

In view of the unique wetland nature of Waituna Lagoon it should be preserved.

RECOMMENDATIONS

1. Efforts should be made to protect existing spawning areas.
2. No fish liberation should be made.

REFERENCES

Southland Acclimatisation Society annual reports 1964, 1965 and 1970.

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TABLE 1WAITUNA 1966 TRAPPING

<u>No. of Fish</u>	<u>Average Length</u>	<u>Average Weight</u>	<u>Average Condition Factor</u>
Males			
100	55.8 cms (22")	2281 grams (4lb. 13oz)	123 (44 Corbett)
Females			
155	60.2 cms (23 $\frac{3}{4}$ ")	3001 grams (6lb. 10oz.)	135 (49 Corbett)
Both			
25	58 cms (22 $\frac{3}{4}$ ")	2718 grams (6lb.)	130 (47 Corbett)

Southland Acclimatisation Society Creel Census 1964-65

71	40.5 cms (15.9")	2666 grams (5.9lbs.)	
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TABLE 2WAITUNA 1967 NETTING

<u>No. of Fish</u>	<u>Average Length</u>	<u>Average Weight</u>	<u>Average Condition Factor</u>
Males 10	44.8 (17 $\frac{3}{4}$ " cms.	1396 grams (3lb. 1oz.)	129 (47 Corbett)
Females 11	37.5cms (14 $\frac{3}{4}$ "	1083 grams (2lb. 6oz)	123 (44 Corbett)

TABLE 3

WAITUNA 1970 SCALE READINGS

<u>No. of Fish</u>	<u>Sex</u>	<u>Age</u>	<u>Average Weight</u>	<u>Average Length</u>	<u>Average Condition Factor</u>
3	?	2 years	250 gm.(9oz.)	25 cm. (9 $\frac{3}{4}$ "	158 (57 Corbett)
3	F	3 years	990 gm.(21b. 3oz.)	42 cm. (16 $\frac{1}{2}$ "	132 (48 Corbett)
1	M	3 years	800 gm.(11b. 12oz.)	40 cm. (15 $\frac{3}{4}$ "	125 (45 Corbett)
6	F	4 years	1820 gm.(41b. 1oz.)	53 cm. (20 $\frac{3}{4}$ "	120 (43 Corbett)
(3 had spawned in 3rd year)					
5	F	5 years	2230 gm.(41b. 15oz.)	56 cm. (22"	128 (46 Corbett)
5	M	5 years	2900 gm.(61b. 7oz.)	60 cm. (23 $\frac{1}{2}$ "	131 (47 Corbett)
(2 - 1 Male 1 Female - had spawned in fourth year)					
1	F	6 years	3000 gm.(61b. 10oz.)	66 cm. (26"	102 (37 Corbett)
2	M	6 years	2520 gm.(51b. 9oz.)	60 cm. (23 $\frac{1}{2}$ "	114 (41 Corbett)
(Both males had spawned in 3rd, 4th, and 5th years)					
2	M	7 years	2900 gm.(61b. 6oz.)	63 cm. (24 $\frac{3}{4}$ "	116 (42 Corbett)
(Both had spawned in 3rd, 4th, 5th and 6th years)					

TABLE 4 WAITUNA LAGOON NOVEMBER 1970

<u>No. of Fish</u>	<u>STOMACH SAMPLES</u> (No. of Stomachs containing)			
	<u>Anchovy</u>	<u>Smelt</u>	<u>Crab</u>	<u>Flounder</u>
18	12	5	1	2

14 of the stomachs were infected with nematode worms.

TABLE 5 SPAWNING SURVEYS

<u>Year</u>	<u>Currans Cr.</u>	<u>Moffat Cr.</u>	<u>Jordan Cr.</u>	<u>Marr Cr.</u>	<u>Waituna Cr.</u>
			<u>No. of Redds</u>		
1964	39	47	17	39	305
1970	31	6	101	17	297

Waituna Lagoon

10.

Fig 1



