FRESHWATER FISHERIES ADVISORY SERVICE

MARINE DEPARTMENT

INVESTIGATION REPORT

JOB NO. 20

ACCLIMATISATION SOCIETY DISTRICT: Ashburton

TITLE OF JOB: Investigation of Lake Heron, its tributaries and Outlet Stream.

OBJECTIVES: To determine the feasability of further stocking the lake with rainbow trout.

FINDINGS: This investigation was carried out during November and December 1959.

A. PHYSICAL FEATURES

Lake Heron lies in tussock country at a height of 2276 ft above sea level, 40 miles north west of Ashburton. The lake is approximately five miles long and is of irregular width. The water is generally shallow in most places, less than 20 ft but there are areas of much deeper water at the southern end.

The only tributaries of any note are Taylors Creek and Harrisons Bight Creek, but there are several very small creeks and one larger one where, however, most of the water seeps away through the shingle before the creek reaches the lake. Lake Heron is drained at the northern end by the Lake Stream, which is a tributary of the Rakaia River.

The ground surrounding the lake varies from flat marsh and gentle hills to very steep hills rising to a height of over 4000 ft. Vegetation consists mainly of reeds and matagouri with occasional willows.

(1) Harrisons Bight Creek

Entering the eastern arm of the lake, known as Harrisons Bight, this creek rises in springs and rapidly increases in size from a stream 2 ft wide and 1 to 2 ft deep until at the mouth it is about 12 ft in width. The bed is composed of stones and gravel and is very stable. The banks are stable, only a few inches high and are heavily overgrown with tussock, mountain daisy and rushes. Towards the headwaters the stream becomes entrenched to a depth of 2 or 3 ft.

(2) Taylors Creek

Taylors Creek flows into Lake Heron at the extreme south western corner. It is approximately three miles long and from 2 ft to 5 ft wide. The water flows in

continuous rapids over shallows of about 6" depth and small pools up to 2 ft in depth. The banks and bed are stable, the former being clothed in tussock, rushes, matagauri and broom. The bed which is composed of small rocks, stones, gravel and sand supports no weed growth, but there is a moderate growth of algae.

(3) Tin Shed Creek

This is a small stream flowing into Harrison's Bight about half-way along the southern shore. It is about half mile long and has its source in a small tarn. It also drains some springs situated about 300 yards from the mouth. Above the springs there is only a very small flow and it probably dries up at times when the tarn is low. The main part of the stream is stable, about 4 or 5 ft wide and varies in depth from 6" to 1 ft. The banks are tussock covered and the bed is composed of well consolidated gravel.

(4) Lake Stream

This is the outlet stream, and flows north westwards for ten miles to join the Rakaia River. Only the first four or five miles were examined closely and for the purpose of the survey it was divided into two sections. Section 1 extended from the lake to the confluence of the Cameron River and section 2 from the Cameron River to the Rakaia River.

Section 1 was the most stable of the two. The banks and bed were both completely stable, the banks being covered in tussock and willows. The bed is composed of fine gravel, well consolidated, and mud and sand, which often supports dense weed growth. Below the bridge the stream flows for about a mile through an artificial channel which was cut about four years ago to prevent flooding of the road during high water. This channel is approximately 6 to 8 feet in depth, is comparatively swift flowing and supports dense weed growth. The rest of the section varies in depth from a few inches to 5 or 6 ft in the pools and is from 10 to 20 yards wide.

Section 2, below the confluence of the Cameron, is not as stable as Section 1. The banks are up to 5 ft in height and are covered in tussock, pasture and scrub. They are eroding in places and there are occasional shingle beaches. The bed, which is loose and shifting, is composed of shingle, coarse sand and mud. About one and a half miles below the Cameron the Lake Stream flows through a swamp and is broken up into several channels.

B. NATIVE FISH

A fyke net was used to sample the native fish in the lake and was set for three and four nights in each of two positions. Rough weather and damage to the net by eels rendered other settings ineffective and caused the first

position to be abandoned after the third night. In seven nights trapping only eight eels and one bully were taken.

The bully population of the lake appeared to vary considerably from one area to another, and none were seen in some places, while many were seen in other areas. These were all small fish, not exceeding 1½" in length.

No smelt were taken in the fyke net in the conventional manner, that is, in the bag at the end of the leader. However, several smelt (*Retropinna* sp.) were accidentally gill-netted in the fine mesh of the fyke net wing.

Small numbers of bullies were observed in all the tributaries and the outlet stream. These were *Phylipnodon breviceps*. Some fry, believed to a *Galaxias* species (probably *G. paucispondylus*) were seen in Harrison's Bight Creek.

C. BOTTOM FAUNA

No plankton survey was conducted but large numbers of Cladocerans were observed drifting down Lake Stream. These would be suitable as smelt food. Bottom fauna samples were obtained from the lake by two methods, the Petersen Grab and the Surber Stream Sampler.

(1) Petersen Grab

A total of 91 samples were taken with the Petersen Grab. The method was to take a sample at intervals of one chain along a line at right-angles to the shore. Eleven series were taken, all from the eastern edge, and of these, seven extended to eight chains from the shore, three to seven chains and one to fourteen chains (see map).

The most common group of animals were the molluscs, which formed over 79% of the animals taken, and of these molluscs the small snail Potamopyrgus was the predominant species, forming 71% of the animals (see Table 1).

There was considerable variation in the number of animals taken in the individual samples. This differed according to the depth and the amount of weed in depths of 5 to 15 ft. Generally the population was high in the heavily weeded areas, and very low in some shallow areas where no weed grew. The average number of animals per sample was 109 but this ranged from two in shallow weedless water to about 450 at a depth of 10 feet. The average number of animals in varying depths is shown in Table 2. Weed growth was dense in most places to a depth of at least 20 ft and on the eastern shore the depth seldom exceeded 20 ft at eight chains. At the west side, however, at the southern end of the lake, there is a considerable increase in depth and very few animals would be present in that area. No samples were taken there, but sounding revealed no bottom at 70 ft a very short distance from the shore.

Although molluscs were the predominant animals, the gut contents of four fish which were examined did not include any molluscs. Trout are known to eat both Potamopyrgus and Corneocyclas extensively in other waters, however, and it is probable that they do so in Lake Heron.

(2) Surber Stream Sampler

This method was used only to collect samples from the lake edge in about 1 foot of water. A total of 43 samples were taken, all from the western edge and southern end, where the bottom consisted of either stones, shingle, sand or mud. The number of animals per sample ranged from nil to 341, the average number being 47. The most common animal was the larvae of the mayfly *Deleatidium* but over twenty different species of animal were found.

(3) Stream Samples

Bottom animals were also sampled in two of the spawning streams - Taylor's Creek and the Outlet Stream (Table 1). Six samples were taken from Taylor's Creek and these gave an average of 46 animals per sq. ft. which is a very light population, and may be due to the vast numbers of fingerling trout and trout fry which inhabit this creek.

Six samples were taken from each section of the Outlet Stream. Section 1 gave an average of 430 animals per sq. ft., predominantly mayfly larvae, which provided over 80% of the animals.

D. FISH STOCK

Brown trout and quinnat salmon were taken from the lake by gillnetting; rainbow trout from Taylor's Creek, where they were still spawning, by dip-netting; brown and rainbow from the Outlet Stream by rod and line.

Catches in the gill-net were extremely low, and this could have been due to the very cold south-east wind conditions prevailing at the time. On the other hand, the number of trout seen from the boat was generally low. Sometimes great numbers of trout were observed, particularly in the Harrison's Bight area, but often no fish at all would be seen in extremely clear water.

Twenty three brown trout were recorded, with an average condition factor on the Corbett scale of 41, which is good. The largest was a male fish of 23" x 5 lbs 10 oz, condition factor 46, and all but seven of these fish were over 18" long.

Only two quinnat salmon were recorded, with condition factors of 34 and 30 respectively. The stomachs of both these fish were examined, but one was empty and the other contained a very little unidentifiable matter.

Two rainbow trout, a male of 19½" x 2 lbs 12 oz and a female of 20" x 2 lb 14 oz were recorded from the Lake Stream. These gave condition factors of 37 and 36 respectively, which are not good, but probably due to the later spawning habits of rainbow trout. Two brown trout were also recorded from the Lake Stream. They were a female of 20½" x 3 lb 15 oz (condition factor 45) and a male of 21" x 4 lb 4 oz (condition factor 43).

Fingerling trout, fry, and some larger fish were observed in large numbers in Taylor's Creek, Harrison's Bight Creek and Tin Shed Creek. Spawning conditions in these creeks are limited by their small size, and in Taylor's Creek by a shortage of suitable gravel. However, the numbers of small fish seen would suggest that the fullest use is made of the room available. Trout fry were also observed in some quieter backwaters of the Outlet Stream.

CONCLUSIONS

There appears to be plenty of fish food in Lake Heron, but for some reason there are not as many small native fish as one would expect. The brown trout were in good condition, but the quinnat salmon were not. The rainbow trout were not in good condition, but may pick up later in the season.

Spawning conditions are limited but good. The streams used are stable, and being spring fed are likely to have a fairly constant temperature.

Rainbow trout fingerlings are present in the Outlet Stream and in Taylor's Creek, and it seems probable that they will eventually re-establish the lake population.

It is not recommended that liberations of rainbow trout be made.

Executed by: R. Boud
G.A. Eldon
Technical Field Officers

Supervised by: R.C. Watson
Fishery Officer

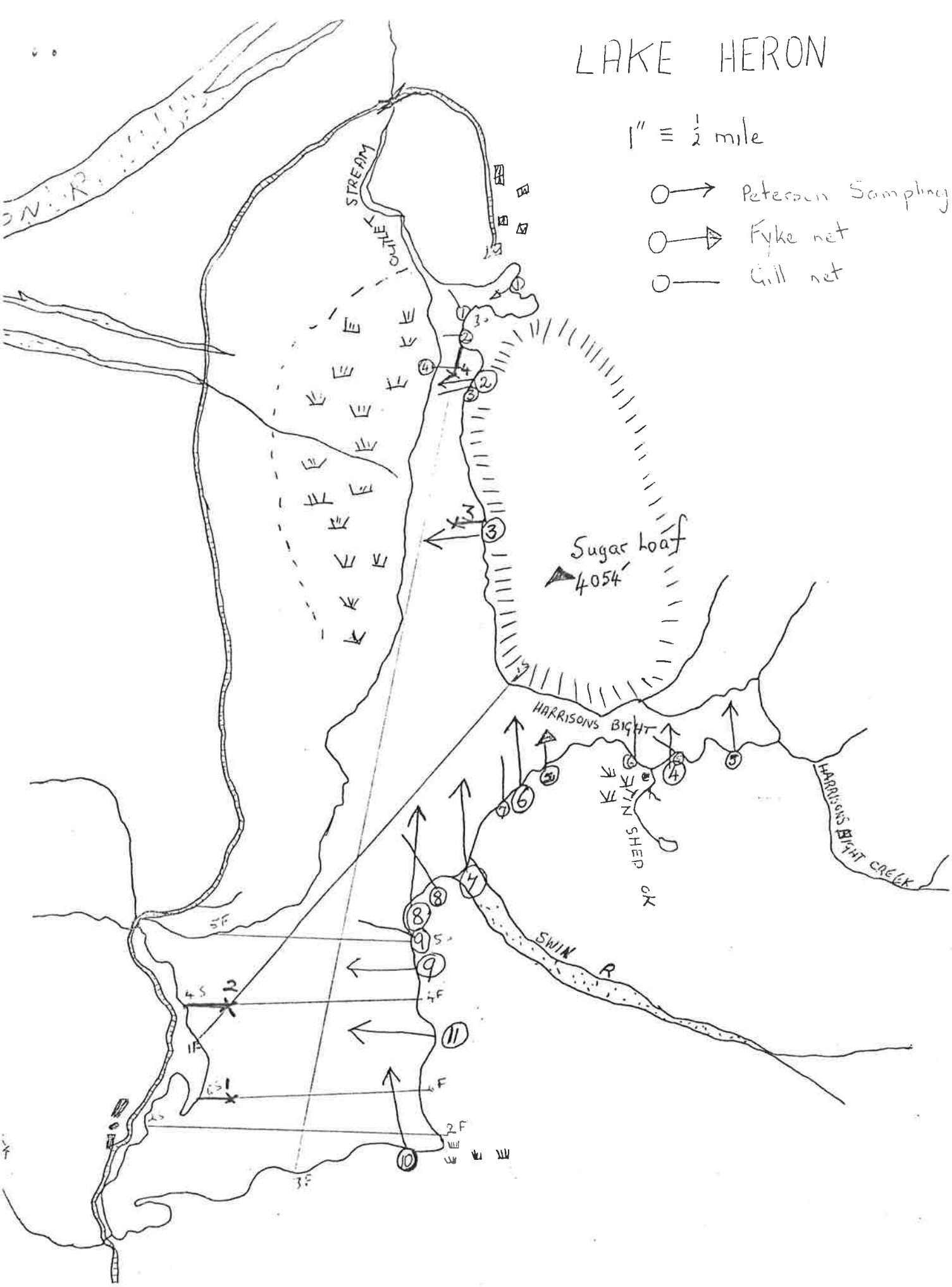
LAKE HERON
1" ≡ ½ mile
Peterson Sampling lines
Fyke net
Gill net
STREAM
OUTLET
Sugar Loaf
4054'
HARRISONS BIGHT
HARRISONS BIGHT CREEK
SWIN R
SHED CK

TABLE 1

Percentage of Animals found in different localities at Lake Heron.

	Caddis flies	Mayflies	Dragonflies	True flies	Molluscs	Worm	Others
Lake Shore Samples	7%	43%	1%	3%	26%	9%	11%
Lake Samples	1%	-	½%	16%	79½%	3%	-
Taylor's Stream	2%	25%	1%	4%	6%	35%	2%
Lake Stream Section 1	44%	6%	1%	1%	10%	38%	-
Lake Stream Section 2	9%	81%	1%	1%	-	4%	4%

TABLE 2

Average number of Animals per sq. ft. found at various depths in Lake Heron.

	Less than 6'	6-10'	11-15'	16-20'	more than 20'
Caddis fly larvae	0.58	0.35	0.29	0.08	0.18
Molluscs	52.71	133.74	107.57	48.00	45.28
Dragonfly larvae	0.79	0.43	0.14	0.08	0.36
Midge larvae	17.29	13.74	28.57	17.50	16.09
Worms*	1.08	8.96	2.00	5.58	0.18
Others	0.71	1.13	1.43	0.92	0.36
Total	73.17	158.35	140.00	71.66	62.45
No. of Samples	24	23	21	12	11

NOTE - ALL ORGANISMS EXCEPT THE WORMS CAN BE TAKEN AS FOOD BY THE TROUT STOCKS.