

FRESHWATER FISHERIES ADVISORY SERVICE

MARINE DEPARTMENT

INVESTIGATION REPORT

JOB NO. 65

ACCLIMATISATION SOCIETY DISTRICT : ASHBURTON

TITLE OF JOB : Salmon Trapping and Spawning Survey
of Glenariffe Stream (Rakaia River)

OBJECTIVES : (i) To determine the number and size of
the Quinnat spawning run into Glenariffe
Stream.

(ii) To obtain scale and otolith samples
for age and growth studies.

(iii) To conduct normal spawning surveys
for comparative purposes.

(iv) To assess the suitability of the
Glenariffe Stream for an annual trapping
programme.

INTRODUCTION

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METHODS

A survey was made of the system on 5 March, directly after the trap was put into operation. In the Main Stream, an underwater survey, using a snorkel and wet suit, was completed; with visual observations from the banks of the smaller streams, and to estimate the number of salmon present. At this stage 19 salmon were counted in the Main Stream, and 1 in the East Branch.

A few fish entered the trap from 10 March onwards, but it was well into April before any number ran. Towards the end of March (27.3.65) the Rakaia was flooded; and large shoals of salmon were seen to be moving into the clearer water from Glenariffe, but never moving far upstream.

Several modifications were made to the lead-in wing of the trap when it was seen that fish were having difficulty in finding the entrance. The wing was moved to a more acute angle and the bracing standards put on the upstream side. This kept the fish in deep swift water, where they had a "clean" run-in and had little difficulty in finding the trap entrance.

The holding pound was cleared of fish every morning and at other times whenever it was considered necessary. All salmon were weighed and measured and a percentage of the size range were tagged.

All brown trout were weighed and measured and the adipose fin removed.

It was found after a few days of trapping, one or two of the salmon were bearing marks of handling, i.e. glove marks were apparent on the skin, and two of them died within a few days, without spawning. After this, a mild solution of Potassium Permanganate was used to wash the gloves and aprons in before handling. This was found to be very effective, and no more mortalities through handling occurred. Occasionally some of the smaller fish were "gilled" between the slats of the holding pound, but most of them recovered.

FINDINGS

QUINNAT SALMON

Underwater Swimming : Underwater observations using a snorkel and wearing a wet suit, were carried out frequently by one of the officers. The area surveyed in this manner was usually from the trap downstream into the Rakaia. The distance covered varied from $\frac{1}{2}$ mile to 5 miles depending on river conditions. Many more fish were seen by this method than visual counts done from the banks, especially in the fast and turbid water of the Rakaia River.

Fish were seen to move away from the swimmer, sometimes going deep, but often coming around behind him. They did not

appear to be unduly frightened except on one occasion when several fish left the pool he was in and moved downstream.

The swimmer carried a small tally counter in each hand, but on occasions due to the speed he was travelling, could not press the plunger quickly enough to count all the fish seen. It is impossible to obtain an accurate count by this method when large numbers of fish are present, and it was estimated that about one third only were counted.

Underwater swimming was however, an excellent means of keep track of the movements of shoals of salmon in the Rakaia below Glenariffe Stream. It was also found to be a very efficient method of retrieving dead fish in the larger spawning streams. Table I gives the number of fish seen on underwater surveys.

Spawning : Spawning started in the area about 2/4/65, between then and 22/6/65 six visual surveys were carried out on the Glenariffe system, three of these were part of the annual spawning surveys reported on in Job No. 63 of the Technical Field Service. Apart from Glenariffe other areas were covered in the district. The results of all surveys are given on Table II.

The trap had a definite stopping effect on the migrants, and heavy superimposition of redds took place in the Glenariffe channel below the trap, and other streams in the Rakaia river-bed. This is not unusual when barriers are erected in front of spawning migrants, (Hobbs Fisheries Bulletin No. 9). Heavy superimposition also took place below the Hydro Station and in parts of the East and South branches above the trap.

Redds are very hard to distinguish in the system after 2 - 3 weeks because of a thick algal growth, which does not take long to establish itself on freshly dug gravel.

All the streams are fairly open to sunlight and being on the Southern side of the Rakaia River receive more hours sunshine per day than e.g. Hydra Waters on the Northern side.

Redds remain "fresh" for longer in the Hydra Waters, possibly because of this and the fact that the streams there are nearly covered over by snow-grass.

Table III has been compiled from data obtained from spawning surveys and known numbers of fish put through the trap. It would appear from this that visual counts of fish from the river banks are about 57% efficient. This should be borne in mind for future surveys of this nature.

Ova Counts : Ova counts were done on 12 salmon ranging in size from 65.2cm (3886gm) to 80.5cm (5698gm). Results are given in Table IV along with counts done on 9 spent fish.

Tagging : 145 male and 128 females were tagged with plastic spaghetti tags. The dead or dying fish were picked up later and the otoliths removed and put in separate phials for further examination in the laboratory.

Scale samples of the tagged fish could not be taken in most cases. Most of the salmon passing through the trap had few if any scales or mucus on the skin.

Table V gives results of tagging and recovery. A few more fish could have been recovered if the trap barrier had been left in for longer.

Age determines of the tagged fish will be reported upon in a separate paper.

Trapping : From 4 March until 18 June 1965, 2120 salmon and 145 Brown trout passed through the trap, 841 of the salmon were males and 1279 were females (1 : 1.5). Average length weight, condition factor and size ranges for salmon and trout are given on Table VI. The length frequency and the run and the weather in relation to the run are detailed on Figs I,

I and IIA, respectively.

Weather Conditions : Daily rainfall and air and water temperatures were taken and are incorporated in Table VII.

The run reached its peak on April 24 when 308 fish were put through the trap, nearly 0.8" of rain had fallen during the night and the stream was rising. There was no significant difference in the time of day the fish ran. The number of salmon put through in the mornings was 670 (32%) from noon till 7pm 660 (31%) and from 8pm till 1am 790 (37%). On 24 April when 308 fish went through 179 (58%) of these ran during the day.

BROWN TROUT

Brown Trout began coming into the trap on 24 March and 145 were trapped before the trap was dismantled on 18 June. 77 males and 68 females were caught, a ratio of 1 male to 0.9 females, suggesting that the run was unfinished. Fig III gives the length frequency of male, female and both sexes combined and the average lengths and weights are set out below:-

Average Length	Male	54.3	cm	}	51.4 cm (20.3 ins)
		8.			
	Female	48.1	cm		
Average Weight	Male	1860	gm	}	1695 gm (31b 12oz)
	Female	1508	gm		
Average Condition Factor	Male	111		}	113 (41 Corbett)
	Female	115			

Males were generally larger and heavier than females but the females were in better condition. Unlike the Salmon, Brown Trout came into the trap at night or on a fresh during the day. The run was not large, the greatest number recorded during any one day being 10.

DISCUSSION

Data compiled from Marine Department Annual Reports from 1925 - 46, covering netting in the Waimakariri River near the mouth and rod fishing in the Rakaia, is shown on Fig IV. The average weight of fish trapped at Glenariffe and was 11lb 6oz, the average weight of the fish netted ranged from 9.5lb (1939) to 13.3lb (1933). The netted fish would have been expected to be in better condition and larger than this. Few fresh fish passed through the trap; most were ripe and inclined to be "razor backed".

The size range of the rod-caught fish from the Waimakariri

River from 1932 - 35 are shown on Fig. V. These were obtained from scale samples taken then. Along-side the weight range are the weights for Rakaia River rod-caught fish for those years. As can be seen there is little difference in size between the two rivers.

Additional information obtained from sources such as the North Canterbury Acclimatisation Society Annual Reports, Marine Department, Fisheries Bulletin No. 12 and Birds, Beasts and Fishes by R.C. Lamb, has been included in figures IV and V.

The average weight for fish trapped at Highbank from 1953-58, varied from 7.1lb(1957) to 10.2lb (1955). In 1958 when 208 salmon were marketed the average weight was 7.8lb, the length 28.5 ins.

The Quinnat run into the Glenariffe system is large enough for continuing studies with over 2,000 quinnat being handled during the 1965 season.

CONCLUSIONS.

1. It has been said there has been a gradual decline in the size of fish over the years. Comparing these records with the trapping of 1965, this is not so. The average weight of 11lb 6oz at the trap, compares favourably with records of

netting and rod fishing on the Waimakariri and Rakaia rivers, between 1925 and 1958.

2. The run and size of the fish may be cyclic or depend on conditions at sea or in the spawning grounds. It is hoped that more detailed work can be done by installing a fry and adult trap to operate over a number of years, thereby learning much more about the behaviour of quinnat in this country.

3. The run into Glenariffe would have been much bigger, but the barrier had a stopping effect and heavy superimposition of redds occurred below the trap.

4. Underwater swimming is an excellent method for keeping track of the shoals of salmon in the Rakaia River and for the recovery of dead fish in the spawning streams.

5. Scale samples could not be taken because of the poor condition of the fish at the trap.

RECOMMENDATION

The Glenariffe Stream should be made an experimental area for the study of quinnat salmon.

REFERENCES

1. Freshwater Fisheries Advisory Service
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2. Hobbs D.F., Marine Department, Fisheries Bulletin,
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5. Allen K.R. and Cunningham B.T., Marine Department,
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Executed By.

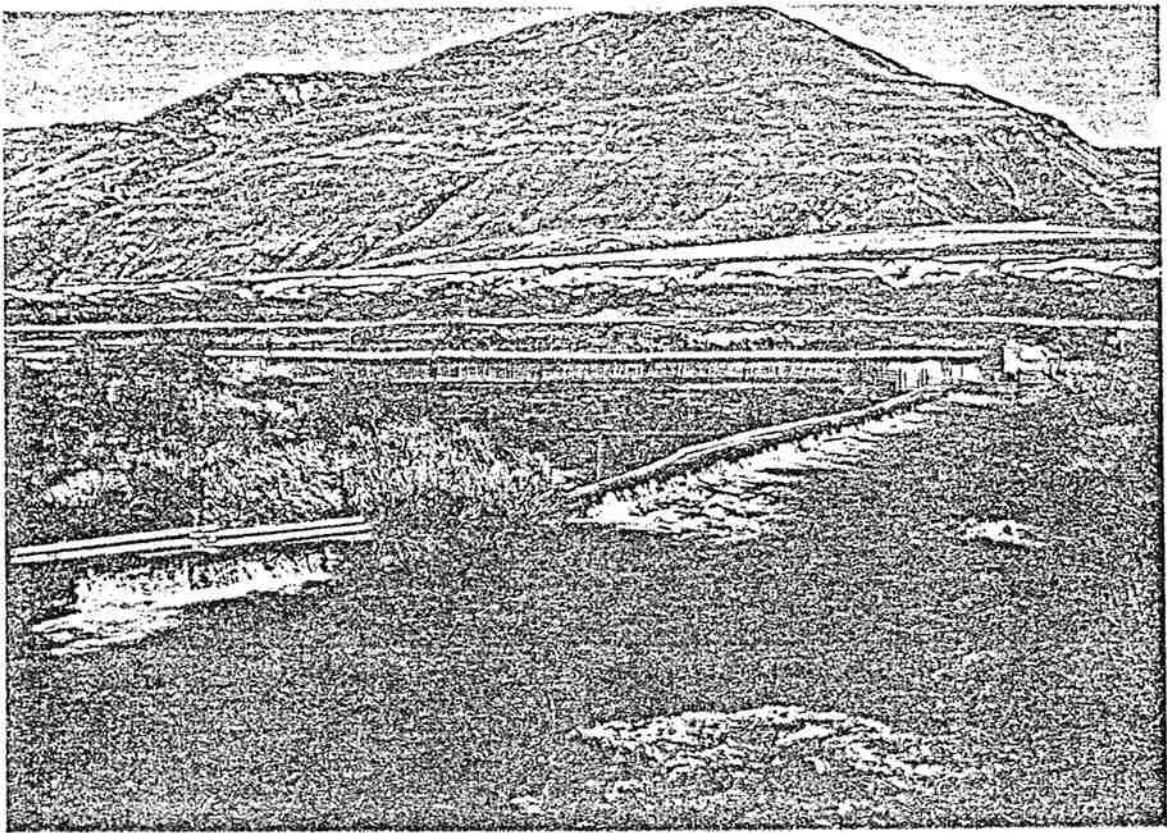
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E.J. Cudby

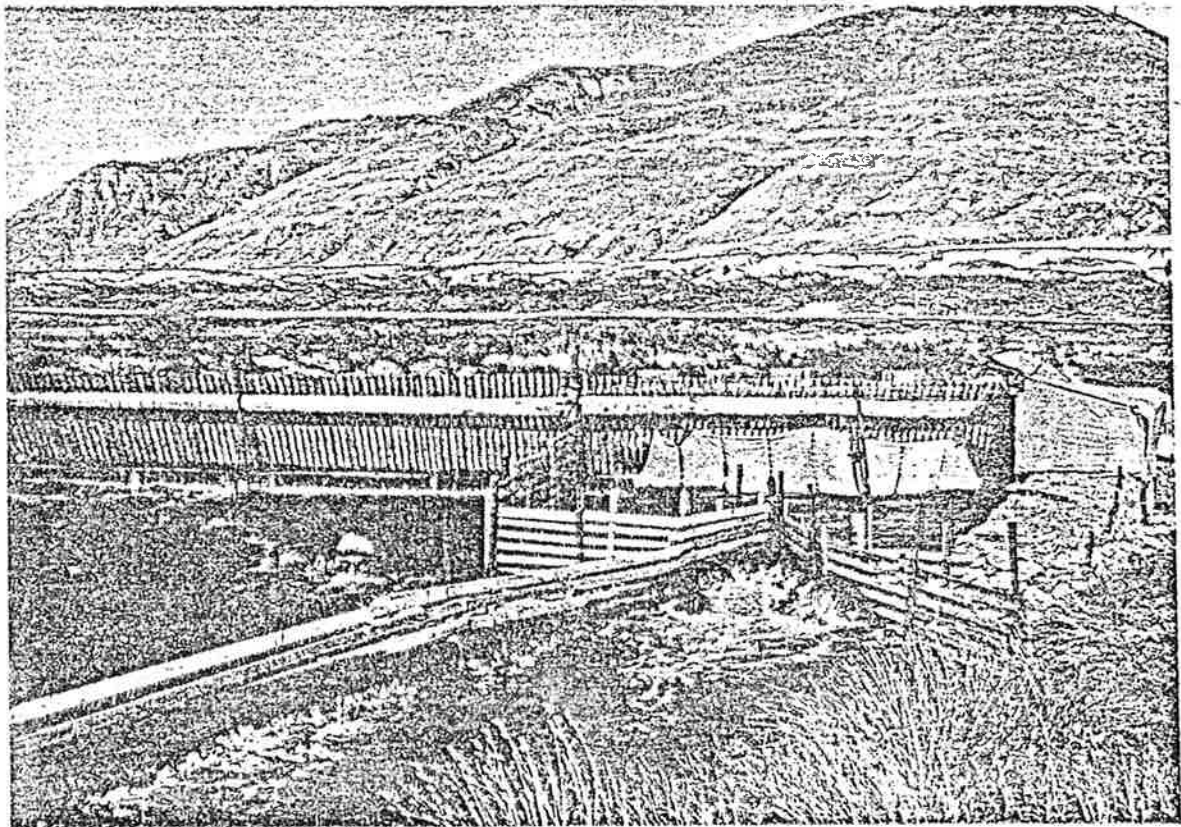
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GENERAL VIEW GLENARIFFE TRAP



CLOSE-UP TRAP ENTRANCE AND POUND