

FRESHWATER FISHERIES ADVISORY COUNCIL

MARINE DEPARTMENT

INVESTIGATION REPORT

JOB NO. 66

ACCLIMATISATION SOCIETY DISTRICT: Ashburton

TITLE OF JOB: Adult Salmon Trapping of the Glenariffe Stream  
(Rakaia River) 1966

- OBJECTIVES:
1. To determine the magnitude of the 1966 quinnat spawning run into Glenariffe Stream and relative size and condition of the fish.
  2. To compare all data collected with that of the previous year (1965) as a basis for future trapping.
  3. To obtain scale and otolith samples for age and growth studies.

INTRODUCTION

A two-way fish trap was constructed in Glenariffe Stream by officers of the Marine Department Technical Field Service in January and February 1966.

The upstream adult trap was completed by 10 February and operated until 12 July.

A downstream migrant sampling programme commenced in July and to facilitate this aspect of the programme it was necessary to remove the lead-in and pen of the upstream trap on 12 July although a few adult salmon arrived at the trap after this date. Results of the trapping programme will be discussed in a separate report at a later date.

## METHODS

The basic methods adopted for the handling of the fish were detailed in Job Report No. 65.

All salmon were weighed, measured and approximately 12% of the run was tagged with "spaghetti" tags. Otoliths were removed from dead or dying fish and placed in a 3% solution of trisodium orthophosphate; further preparation and examination has been accomplished, the results of which will be reported on in a separate paper by a different worker. Some scale samples obtained during tagging operations will be discussed in this latter report.

Any trout caught during the sampling period were weighed, measured and the adipose fin removed.

Rubber aprons and gloves used were washed in a mild solution of potassium permanganate prior to handling as this was found to be a very effective disinfectant last year. No mortalities occurred through handling throughout the course of the project.

## RESULTS

### QUINNAT SALMON (Oncorhynchus tshawytscha Walbaum)

#### Trapping

From 10 February until 12 July, 1,143 salmon passed through the trap, 556 of which were males and 577 females. The mean length, weight, condition factor for salmon are given in Table I. The length frequency relationship, the timing of the run, and the rain and weather relating to the run are detailed in Figs I, II and IIA respectively.

Records of 11 salmon were accidentally destroyed before copies could be made and these have been excluded from all tables and graphs of this report. Weather observations were made daily at 9 a.m. and the results are incorporated in Figs II and IIA.

The run reached its peak on 30 April when 121 fish were put through the trap, .07" of rain had fallen during the night and Glenariffe Stream was  $\frac{1}{2}$ " higher than usual, but the water was clear; the Rakaia River was in flood at this time.

In 1965 the run peak was reached on 24 April, or six days earlier in the season.

On 26 April this year 86 fish were put through the trap. Glenariffe Stream had risen  $3\frac{1}{2}$ " and was dirty after 1.9" of rain fell the previous night. At that stage hundreds of fish were in the pools below the trap and it was thought that they would move up on the "fresh" but the following day the count dropped to 18.

Of the 121 fish put through on 30 April, 62 (51%) ran during the afternoon and 47 (39%) between 6 p.m. and midnight.

As was observed last year, the trap did prohibit some migrants from entering the system. Again superimposition of redds took place below the trap and in the Glenariffe Channel of the Rakaia River bed, but not to the same magnitude as in previous years.

#### Tagging

143 salmon were tagged with "spaghetti" tags when scale samples were taken at the trap so that the same fish might be recovered later when past spawning and the otoliths compared to the scale readings.

The following table gives details of tagging and recovery.

Number of Salmon Tagged			Number of Tags Recovered		Tags, No Fish	Fish, No Tags
Males	Females	**	Males	Females		
71	68	4	18	35		
Total	143		53		3	7
			(37%)		(1.4%)	(4.8%)

\*\* Denotes records destroyed

No explanation is tendered for the low recovery rate of tagged fish. A trash barrier was in place the entire year; no fish can get past the trap undetected, and surveys for dead fish were carried out frequently.

The "spaghetti" type of tag was chosen because of its proven durability and ease of application, but with the recovery rate low it would be desirable to tag at least 25% of next year's migration so it will be necessary to speed up the entire handling procedure. Dart tags, although smaller and more difficult to see, should allow a great saving in time.

#### Spawning Surveys

Spawning started in the Glenariffe system about the end of March. Three visual surveys were carried out in the area which have been reported on in detail as Job No. 67 of the Technical Field Service.

Superimposition of redds occurred below the hydro dam as usual, but in other streams within the system spawning facilities were not fully utilised due to the small number of fish in the run as compared to previous years.

One important aspect of the trapping programme is the testing and evaluation of various sampling methods and in this regard the first visual survey results were compared to fish known to be in the system. On 11 May, 464 alive and dead salmon were counted by three men using normal survey techniques when 929 salmon were known to be present; 49.9% were observed and counted when many fish could be presumed to have deteriorated past recognition.

An underwater survey using a snorkel and wearing a wet suit was carried out once to count fish in the stream below the trap on 24 May when the main part of the run was over. Two divers covered approximately three quarters of a mile and with good visibility 40 salmon were counted, some of which were already spent. Divers were also employed on two different occasions to retrieve dead tagged fish in the spawning streams.

#### BROWN TROUT (Salmo trutta Linnaeus)

Brown trout appeared in the trap on 14 March and the run ended on 22 June. During this period 194 trout were captured, 122 being males and 72 females, a ratio of 1.6 males to 1 female. Details are shown in Fig. III.

All fish were in good condition and one male weighing 11 pounds was caught while the average weight was 3lbs 13 oz.

Of special interest is the fact 47 fish or 24% of the year's run had been fin-clipped at the trap last year, a fair indication of the homing instinct in brown trout.

One male rainbow trout (Salmo gairdneri) entered the trap on 1 June; it was 49.7 cm (19½"), weighed 1,361 gm (3lb), and the condition factor was 111 (40 on the Corbett scale).

DISCUSSION

As can be seen in Fig. I there has been a drop of nearly 47% in the number of fish running into Glenariffe this year, but there was a definite increase in the size of a proportion of the migrants.

In 1965 only one fish was over 9,000 gm (19.8lb) while in 1966, 144 (12.7%) of the run was over 9,000 gms.

Comparative measurements of 1965 and 1966 are set out below:

TABLE 1

	1965			1966		
	AV LENGTH	AV. WEIGHT	AV C/F	AV. LENGTH	AV. WEIGHT	AV C/F
Males	76.5cm	1588gm	113	78.4cm	6150gm	119
Females	75.4cm	5142gm	118	80.1cm	6667gm	127

The increase in average weight is 962gm (2lb 2oz) for males and 1525 gm (3lb 6oz) for females.

With the increased number of larger fish in 1966 it would have been expected for there to be a greater increase in average weight than is indicated. However there was also a greater number of smaller fish in 1966.

The number of fish under 60 cm in the 1965 run was 7: in 1966 88 (7.7%) of the run was under 60 cm in length. 84 of these were males and 4 were females. It is obvious that there is a different year class structure for the two years.

In Fig. II the runs for 1965 and 1966 have been arranged so as to standardise the time period for future comparisons. A 10 day period is used, so that although the peak of the 1966 run was 6 days later than in 1965, the apex comes within the same period for both years, i.e., 22 April to 1 May.

In previous annual Salmon Survey Reports it was recommended that a fish pass be put in at the hydro dam. This would have opened up another  $1\frac{1}{2}$  miles of spawning stream and, perhaps, cut out the heavy superimposition of redds which usually occurs below the dam. This has not been done but if done now would upset statistical methods being employed at the fry trap.

#### CONCLUSIONS

1. There was a 47% decrease in the number of fish which ran into Glenariffe in 1966, but on the whole the fish were much larger than the previous year, 144 (12.7%) of the run weighing over 9,000 gm (19.8lb).

There was an increase in the number of fish under 60cm in length, 84 males and 4 females = 88 fish (7.7%) of the run.

It is postulated that the age structure of the run differs from year to year.

2. There was no significant difference in the times of the run from last year.

3. The barrier again had a stopping effect and there was superimposition of redds below the trap: this appears to be unavoidable.

4. Tag returns were very poor considering that all the fish die and should be retrievable.

5. Scale samples are difficult to obtain because of the poor condition of the fish.

RECOMMENDATIONS

1. A more efficient tagging technique should be found, and a greater percentage of the run tagged.
2. Underwater swimming should be employed more frequently to track the shoals of fish in the Rakaia and to retrieve tagged fish in the spawning streams.
3. Minor modifications should be made to the upstream trap before next season. Both fry and adult traps will be operating at the same time, this creates a buildup of water between the traps, which in turn affects the screens of the fry trap. The lead-in wing and holding pen can easily be modified to get rid of this buildup of water, the upstream trap could then operate throughout the year if necessary.

Executed by: J.R. Galloway, Technical  
Field Officer

R.A. Dougherty, Technical  
Field Officer

S.J. Wing, Technical  
Field Officer

Supervised by: R.W. Little,  
Senior Fisheries Scientist



REFERENCES

Freshwater Fisheries Advisory Service Investigation  
Report No. 65

Freshwater Fisheries Advisory Service Investigation  
Report No. 67

Note: The recommendations of this report have all been  
considered and most implemented.

Issued March 1970

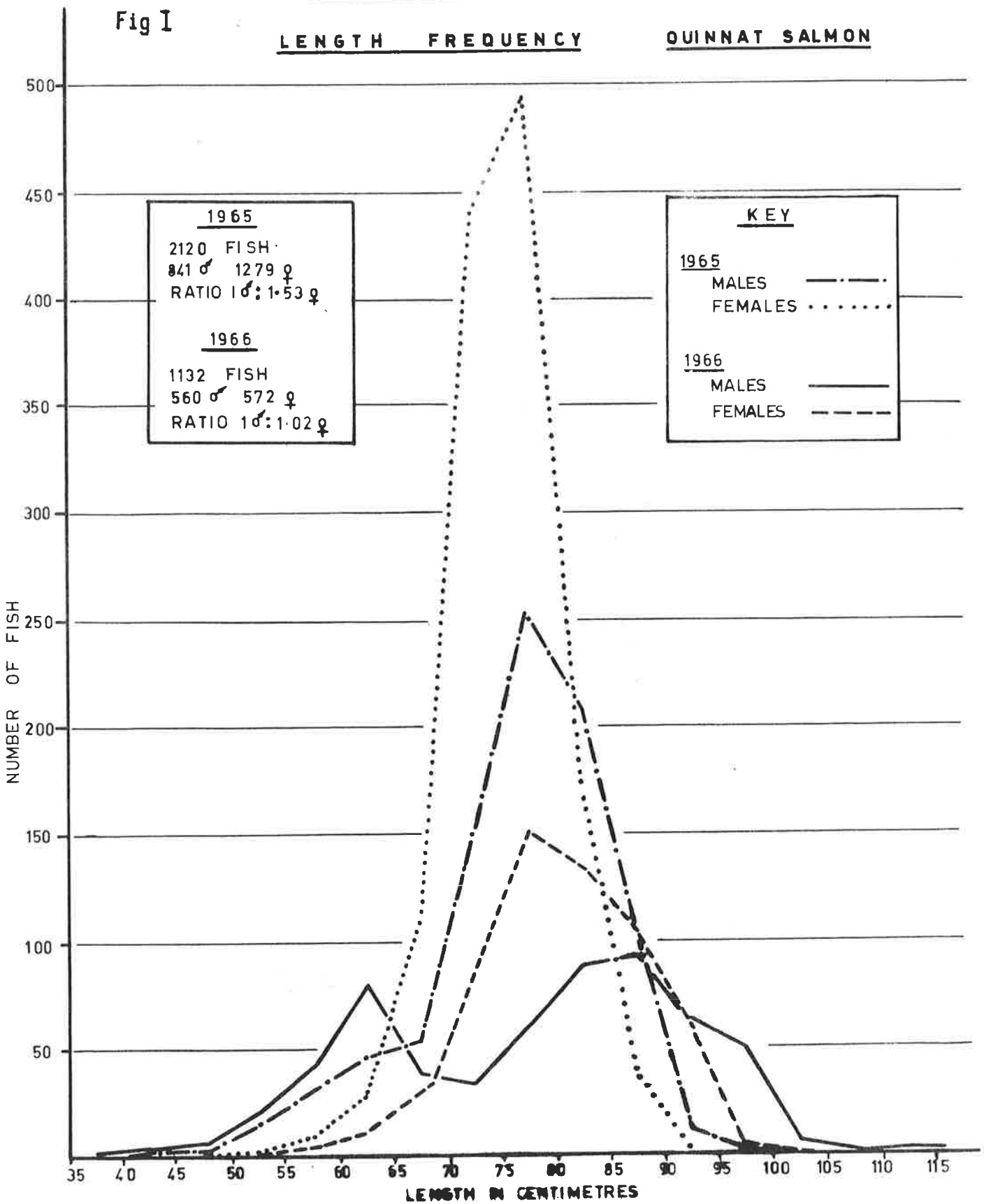


GLENARIFFE TRAP 1965 AND 1966

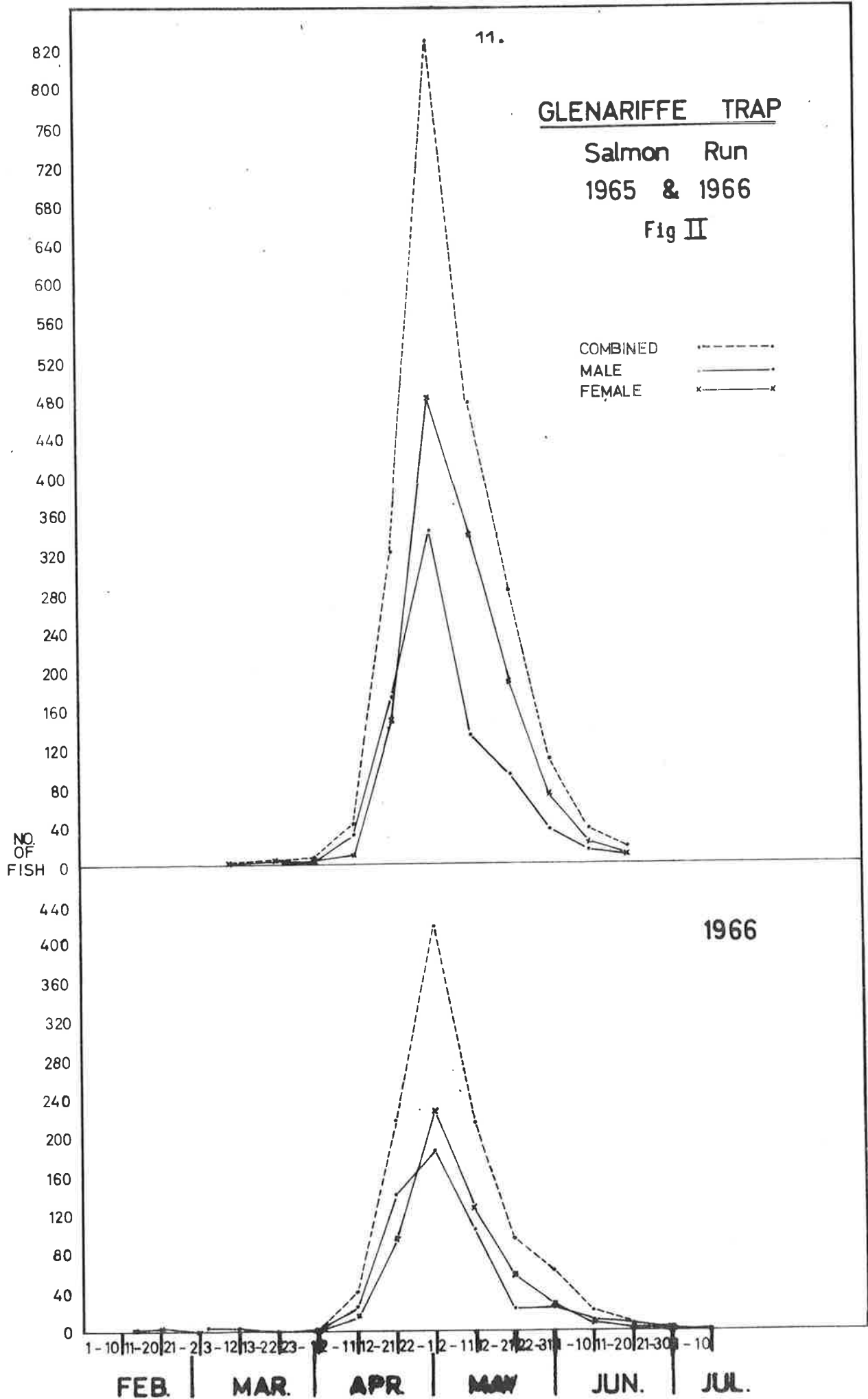
Fig I

LENGTH FREQUENCY

QUINNAT SALMON









# GLENARIFFE TRAP

Fig IIA

Average 10 DAILY temperature  
of air and water

Scale as Fig I

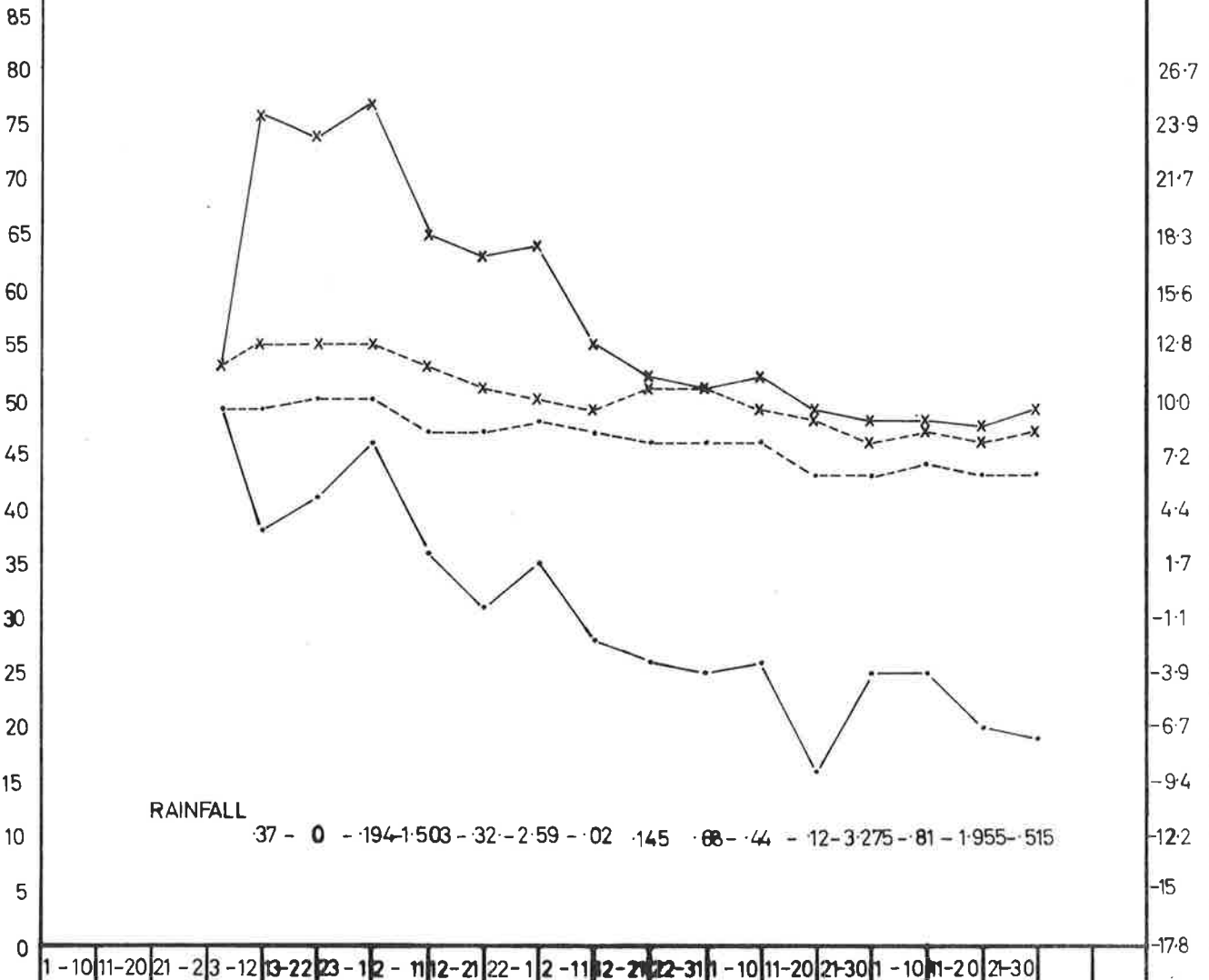
12.

AIR max min

WATER max min

°F

°C



1-10	11-20	21-23	3-12	13-22	23-31	1-11	12-21	22-31	1-10	11-20	21-30	1-10	11-20	21-30		
FEB			MAR			APR			MAY			JUN			JUL	





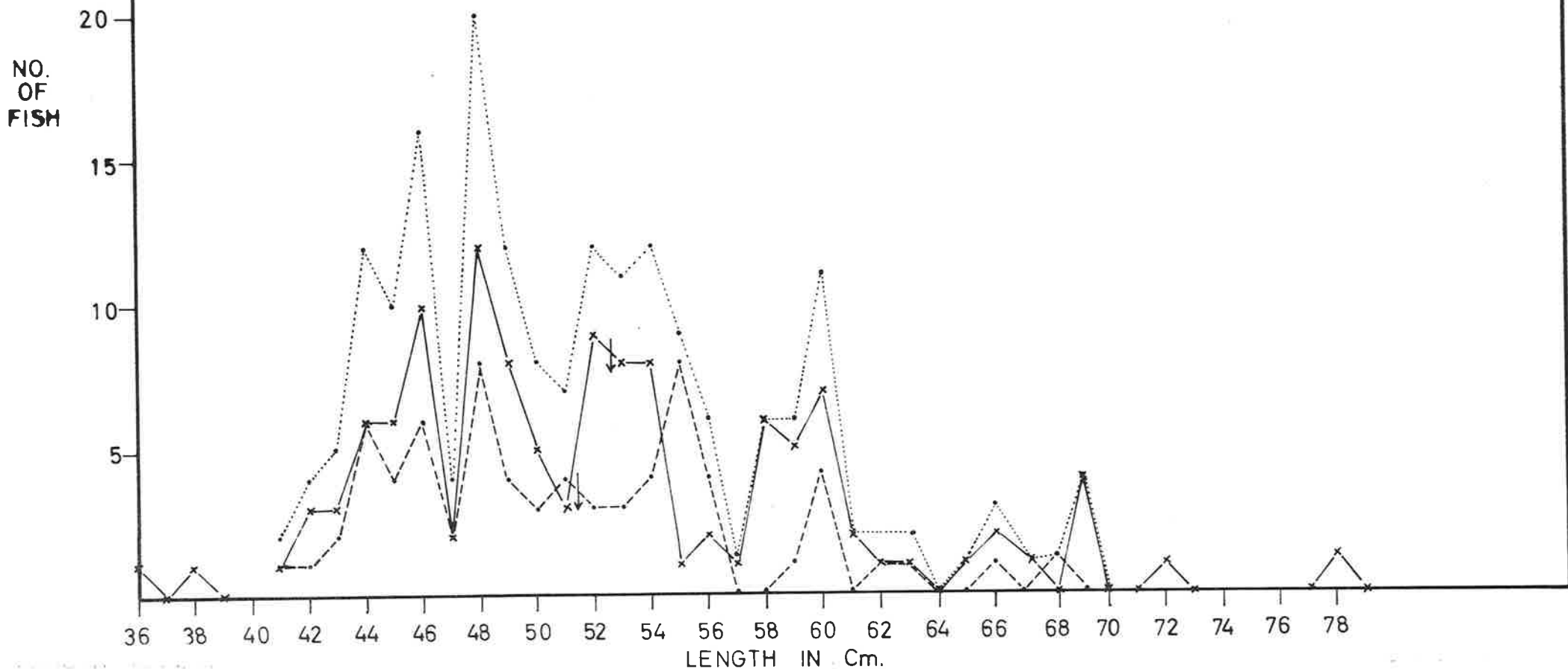
# GLENARIFFE TRAP 1966

13.

## Length Frequency Brown Trout

Fig III

122 Male x—x  
72 Female ·-·-·  
194 Total ······  
M : F  
1·6 : 1





III 111

Генеральный план  
 АТКОВОЙ СТОЯНКИ

ММ  
 СС  
 АА