

FRESHWATER FISHERIES ADVISORY SERVICE

MARINE DEPARTMENT

INVESTIGATION REPORT

JOB NO. 26

ACCLIMATISATION DISTRICT: Otago

TITLE: Mataura River Pollution Survey.

OBJECTIVES: To investigate the effects of pollution effluents on trout and trout food in the lower Mataura River.

INTRODUCTION

The field work was carried out in November 1960, May and November 1961, and January 1962, by R. Boud, technical field officer, and by E. Cudby, technical field officer, who took samples in April 1962. The data were analysed by R. Boud.

Eight sampling stations were established in the 32 miles (approximately) of river between Gore and Gorge Road. Station 1 at Otamita, 10 miles above Gore, was used as a control (Map 1).

METHODS

Bottom fauna samples were taken with a standard square-foot Surber sampler. Sampling was done in shallow waters. Visual observations were made of the trout and some trout were caught by angling.

DESCRIPTION

(a) Physical Features

The Mataura River, in the study area, is wide (channel varies between 120 and 240 feet), and generally deep (average 2 to 3 feet). Some pools were estimated at 6 to 8 feet deep. Hirsch (1958) records that summer flows are usually greater than 150 cusecs, with flows at other periods many times this. It is a stable river with consolidated banks covered with willows, pasture grasses and scrub. The bed is generally shingle and large stones, with areas of mud in the quiet backwaters. Outcrops of rock are evident between Gore and Wyndham.

(b) Sources of pollution

There are three main areas of pollution:

1. Gore - domestic sewage, abattoir wastes, a by-products factory and a fellmongery.
2. Mataura - domestic sewage, freezing works, non-chemical paper mill and dairy factory wastes.
3. Wyndham - domestic sewage and lactose powder factory wastes.

### OBSERVATIONS

#### (a) Gore

Visual evidence of pollution was not as obvious below Gore as at Mataura.

#### (b) Mataura

Close to the sources of effluent and some four miles downstream from Mataura various solids were observed floating in the water. These were fats and other organic particles, domestic sewage and refuse, particles of paper pulp. An oily scum was apparent on the water surface in the backwaters and where the river level had receded, a layer of fat was observed on the banks. Sampling below Mataura was frequently hindered by particles of fat and tissue clogging the meshes of the Surber sampler.

For almost two miles below Mataura the river bed was practically covered with a heavy brown algal growth. A greyish sludge persisted between the stones for some miles further. In January 1962, the river was at a low level; the water was a dirty yellow colour and gave off an offensive smell.

### FINDINGS

#### (a) Bottom fauna

The number of stations and samples are listed below:

<u>Station</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>8</u>	<u>9</u>	<u>10</u>
	21	21	21	20	22	12	23	20	12

Table 1 shows the average numbers per square foot of each organism found. The fauna is composed mainly of mayflies, caddis beetle larvae and the snail *Potamopyrgus*. Tubificid worms form a significant proportion of the fauna below Mataura.

#### (b) Trout

No intensive sampling of the trout population was done. Observations were made and some trout were caught by angling from Station 2 down to a  $\frac{1}{2}$  mile below Station 5.

## DISCUSSION

### (a) Bottom fauna

According to Hirsch (1958) the composition of the bottom fauna in a stony-bottomed stream can indicate the degree of pollution. Some animals tend to disappear from the fauna as pollution increases. In order of sensitivity the principal groups are:

1. Mayflies
2. Caddisflies
3. Beetles
4. Snails
5. Worms

Figures 1 and 2 show the average numbers per square foot of the pollution indicator organisms at each station.

Although some fluctuations in actual numbers recorded are apparent in Table 1, none of the most sensitive groups are absent from the samples. At Station 5 which is coincident with Hirsch's Station 5, mayflies were present, whereas he did not find them. Since the time of Hirsch's investigation, the freezing works have installed screens to prevent certain organic wastes entering the river.

### (b) Trout

Visual observation shows trout are to be found throughout the river, even in the most obviously polluted places. Angling catches confirm this.

### (c) Pollution

Evidence of pollution from several sources is obvious in the river. The effects of this pollution are aesthetically unpleasant, but to consider them detrimental to the trout fishery to the extent that the fishery is endangered or likely to become non-existent is a view which is not supported by the results of this investigation.

## CONCLUSIONS

1. The Mataura River is polluted by wastes from three main sources, Gore, Mataura and Wyndham.
2. The bottom fauna samples show that the groups likely to be affected by gross pollution are still present, although some variation in numbers does occur.
3. Trout were observed in all parts of the river, including the most obviously polluted areas.

4. The pollution observed is unpleasant to see and smell, and would detract from the aesthetic value of angling in certain places.
5. On the basis of the information collected, pollution in the Mataura cannot be regarded as having a seriously detrimental effect on the trout population.

#### RECOMMENDATIONS

The degree of pollution in the Mataura River should be regularly checked by

- (a) bottom fauna sampling
- (b) closer examination of the trout population.

Executed by:

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Technical Field Officers

#### REFERENCES

Hirsch, A. 1958. Biological Evaluation of Organic Pollution of New Zealand Streams. Pollution Advisory Council Publication No. 6. (Reprinted from New Zealand Journal Sci. Vol. 1 No. 4 December 1958).

Issued April 1965.

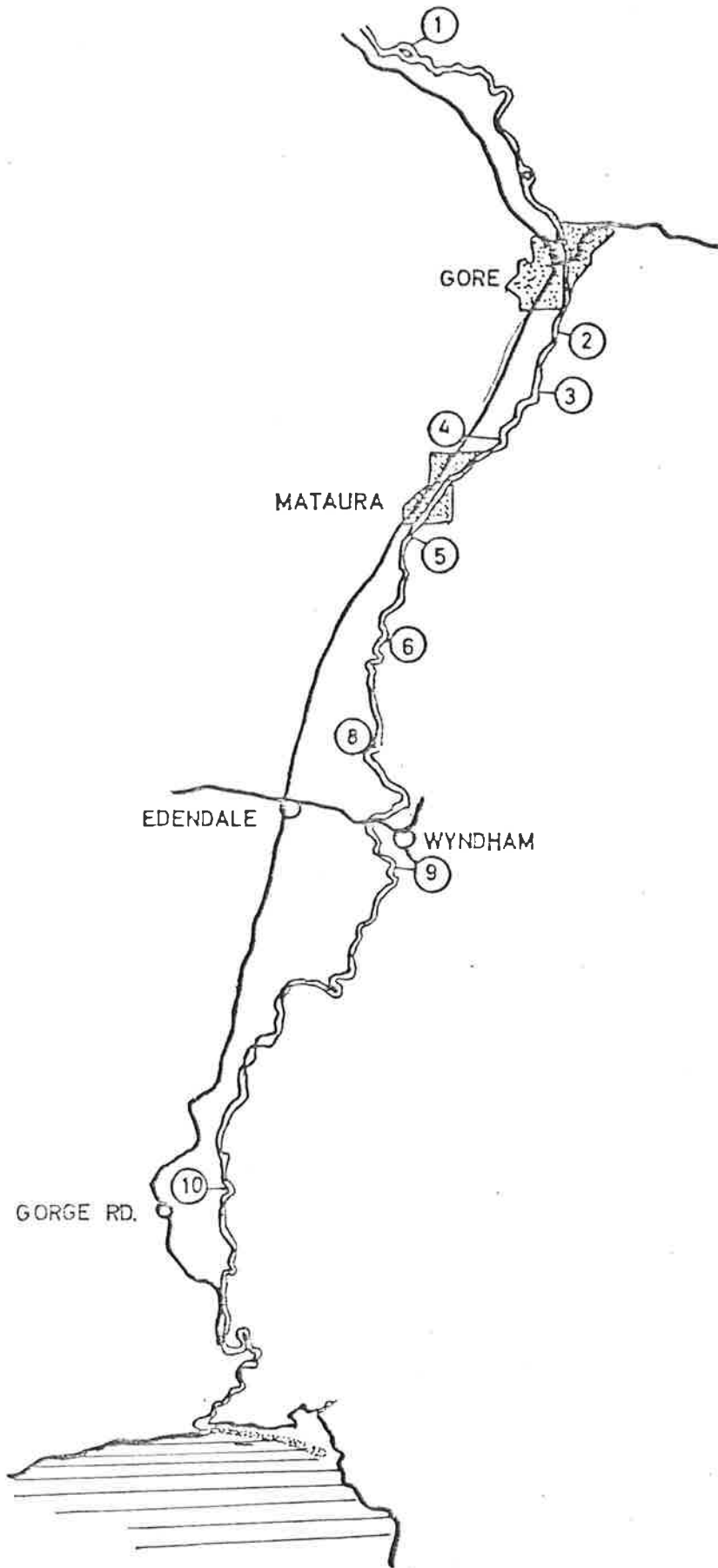
TABLE 1. Mataura River - average numbers of bottom fauna per square foot.

Group	Station									
	1	2	3	4	5	6	8	9	10	
Caddis	38.5	17.6	14.4	13.4	15.5	7.9	13.7	13.4	15.7	
Mayfly	114.5	102.2	102.0	103.2	109.0	112.6	51.1	52.7	36.9	
Beetles	143.6	109.7	42.4	75.3	96.7	108.1	32.0	45.4	32.3	
True flies	7.8	6.7	22.3	14.6	9.4	3.4	13.8	3.7	1.1	
Creeper	0.3	-0.1	0.5	-	-	-	-	-	-	
Snails	8.3	42.5	2.0	15.3	41.9	101.3	38.9	31.3	177.4	
Worms	4.1	10.0	6.5	12.1	146.6	46.2	163.2	114.4	93.3	
Total	317.1	288.7	190.1	233.9	419.0	379.5	312.7	257.9	356.6	

# MATAURA RIVER.

SAMPLING STATIONS

Scale - 1 Inch : 4 miles



# Fig.1. MATAURA RIVER.

Average numbers of bottom fauna/sq. ft.  
Oct. 1960 to May 1962

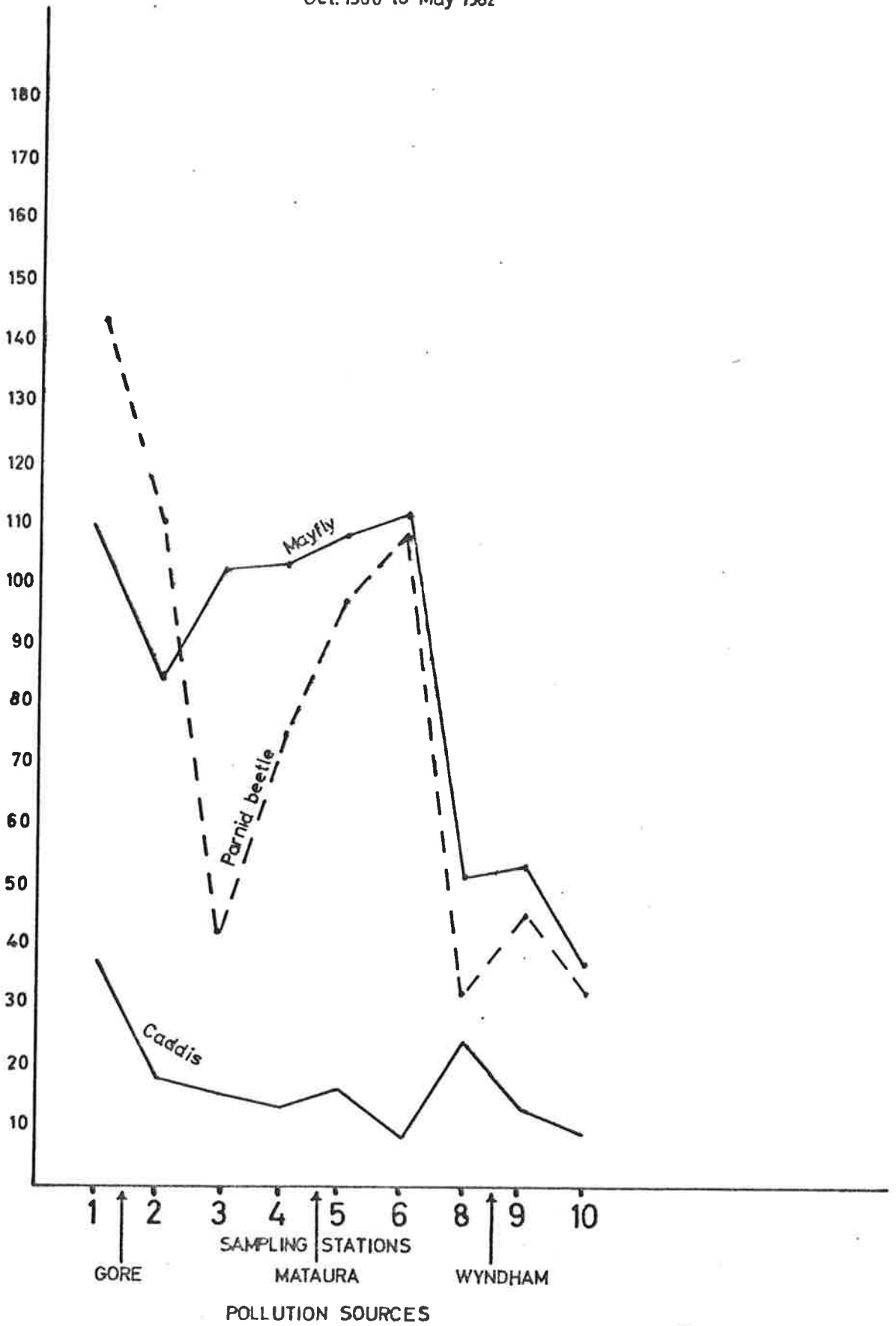
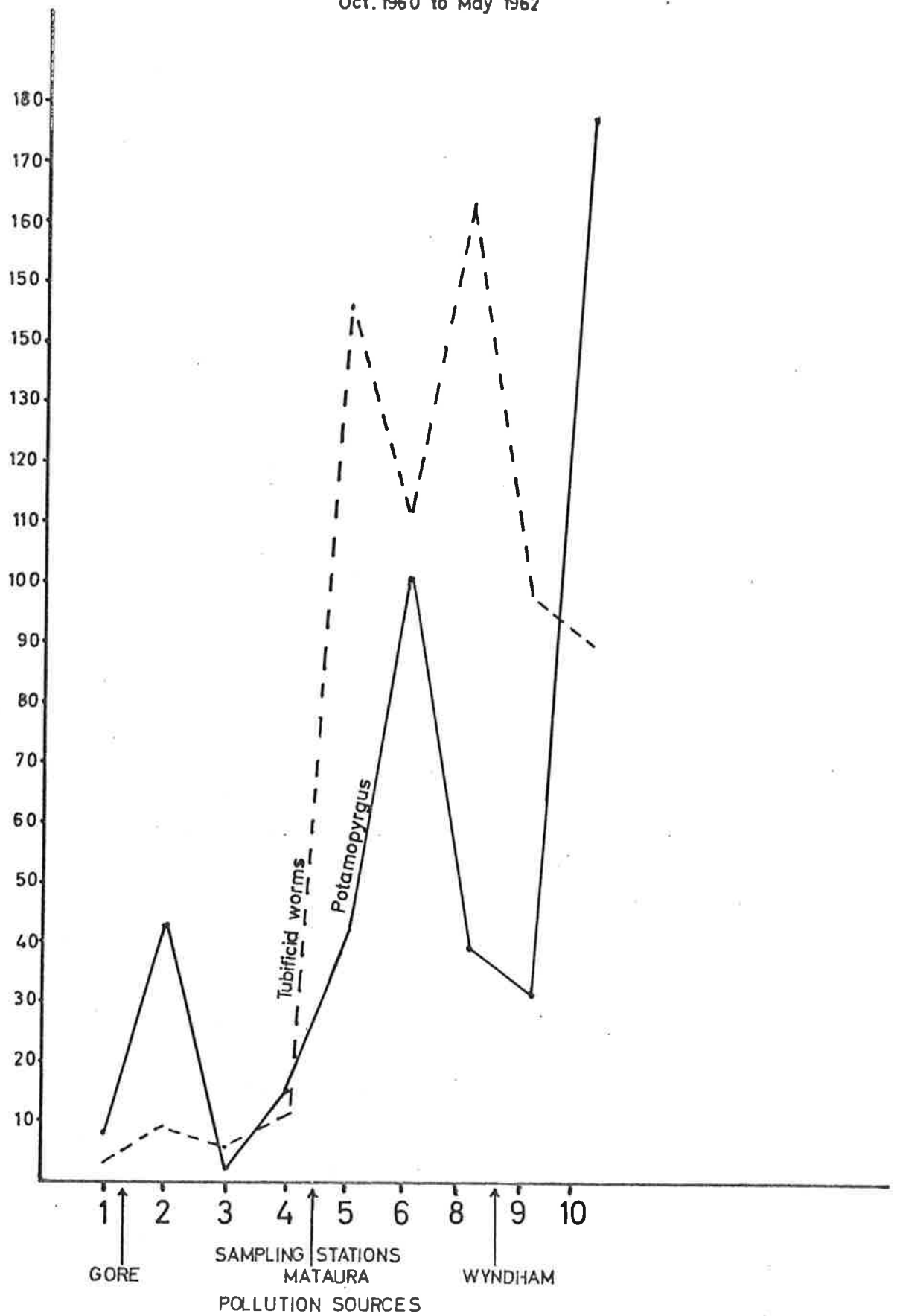


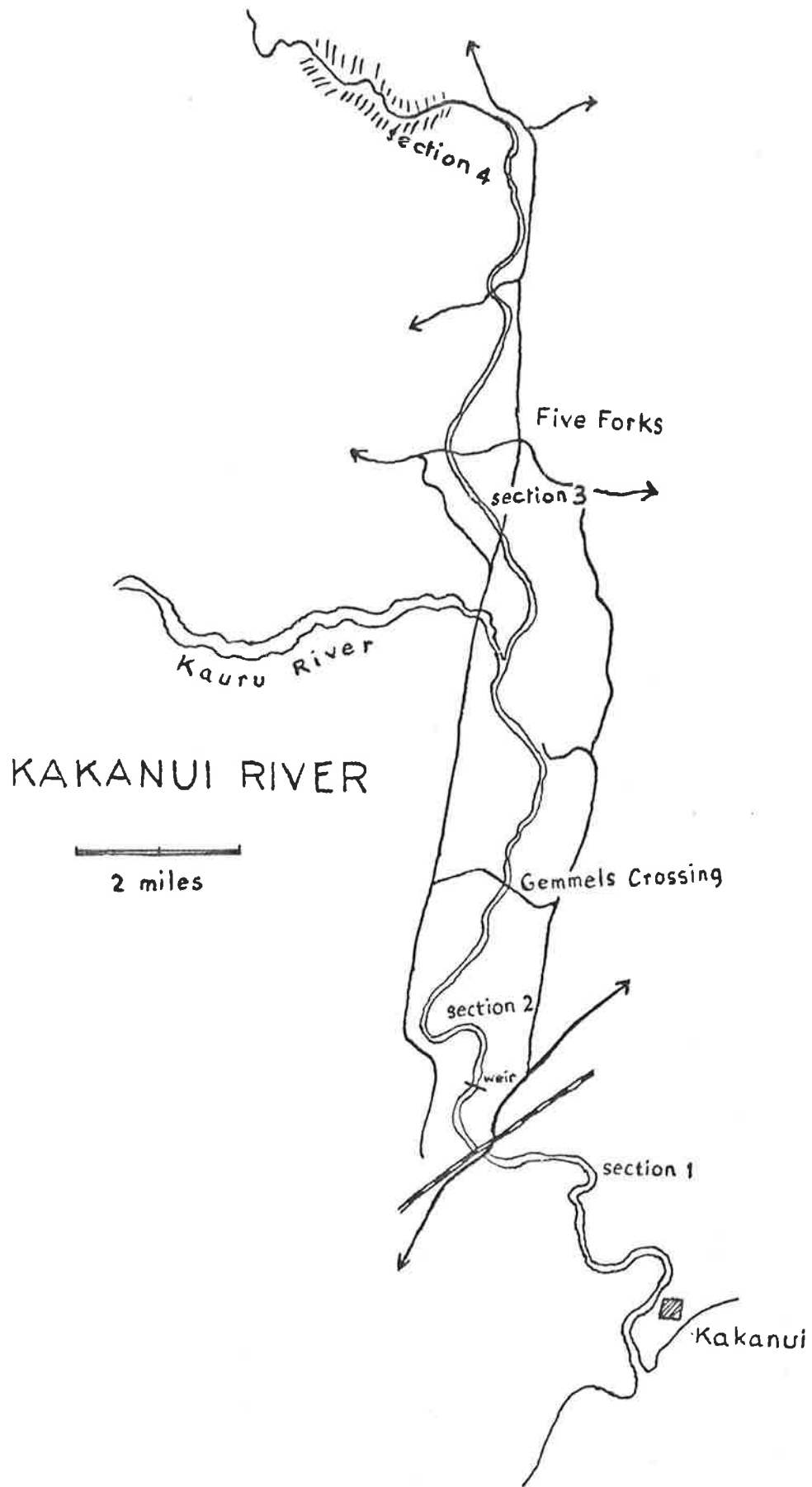
Fig. 2. MATAURA RIVER.

Average numbers bottom fauna/sq. ft.

Oct. 1960 to May 1962







# BROWN TROUT: LENGTH FREQUENCY

