FRESHWATER FISHERIES ADVISORY SERVICE

MARINE DEPARTMENT

INVESTIGATION REPORT

JOB NO. 41

ACCLIMATISATION SOCIETY DISTRICT: Southland

TITLE OF JOB: An investigation of the effects of drag lines on stream bottom fauna.

OBJECTIVES: To determine whether or not drag line operations used in obtaining road metal from the Oreti River bed have any adverse effects on stream bottom faun.

FINDINGS:

The field work for this job was carried out in December 1961. Bottom fauna samples were taken with a Surber sampler near three drag lines operating on the Oreti River (see map). At these three drag lines, series of samples were taken: above the drag line, immediately below it, and about ¼ mile below the drag line. The samples were taken at the drag line above the Wallacetown bridge, above the Oporo Railway bridge and at the Centre Bush Bridge. Thus, the sampling stations were situated above the lower, middle and upper reaches of the Oreti where drag lines operate. At Wallacetown there are five drag lines operating.

Station 1 was placed about half a mile below the lowest drag line (200 yards below the road bridge). Station 2 was placed 200 yards below the lowest drag line, and Station 3 about quarter of a mile above the top drag line (see map). Stations 4 to 9 were situated in similar positions with respect to the other two drag lines selected (see map).

At Wallacetown the river is comparatively slow-flowing and deep, with stable banks. The bed appears to be well consolidated and stable. The other two drag line stations (4-9) were situated in areas of comparative instability with a wide flood bed, eroding banks and loose bottom.

The following table gives a comparison of the average number of animals per square foot found at the drag lines studies. It can be noted that with the exception of Wallacetown the lowest number of animals was in the stations immediately below the drag lines. At Wallacetown the river bed, in many places, was thickly covered with silt, this containing large numbers of blood worms (chironomid larvae). If these larvae are subtracted the number of

animlas per square foot immediately below the Wallacetown drag lines would be 211.

DRAG LINES

	Stations 1, 2 & 3 Wallacetown	Stations 4, 5 & 6 Branxholme	Stations 7, 8 & 9 Centre Bush
Above drag line	203	209.2	173.5
Immediately below	248	138.2	125.5
¼ mile below	349.5	182	202

The Wallacetown area was the only place where heavy siltation of the river bed was noted. It is not certain whether this is due to the operation of the five drag lines in this area or whether it is due to natural deposition of flood water silt. It is in this area that natural silt deposition would occur as the river is slow flowing.

The samples were composed mainly of nymphs of the mayfly *Deleatidium* and larvae of the parnid beetle. The following table shows the percentage of each animal per square foot in the sample stations.

Drag Lines	Wallacetown			Branxholme			Centre Bush			
Station	1	2	3	4	5	6	7	8	9	
Hydropsyche	1	-	-	-	-	1	1	-	1	Trichoptera (caddis)
Hydrobiosis	-	-	-	-	1	1	-	1	-	
Hydroptilidae	1	1	1	1.1	1	-	1	-	1	
Olinga	1	-	-	1	1	1.8	1.2	1	1	
Pycnocentria	1	1	-	1.4	1	1.8	2.1	-	3.3	
Ameletus	1	1	1	-	-	-	-	-	1	Ephemeroptera (mayfly)
Deleatidium	54.1	23.2	51.9	68.5	59.0	69.9	66.6	58.6	64.7	
Parnid larvae	36.4	50.9	33.3	22.4	32.9	16.7	17.8	35.3	21.3	Coleoptera
Adults	3.1	1.0	10.1	5.6	4.7	5.5	6.8	4.5	7.3	
Chironomidae	1	13.1	1	1	1	-	-	-	1	Diptera
Simulidae	-	-	-	-	1	1.7	2.7	1	1	
Potamopyrgus	3.7	1	1	1	-	1.1	1	-	1	Mollusca
Tubificidae	1	10.1	2.9	-	-	1	1.2	-	-	Annaelida

There are several changes that can be noted from this table. There is an increase in Tubificids along with an increase in Parnid beetles, probably due to siltation (Station 2). Those stations immediately below the drag lines (2, 5,8) show an increase in parnid beetles and a decrease in mayflies. This is likely due to environmental changes caused by the drag lines. These changes are detrimental to trout, however, which only occurr immediately below the drag lines.

CONCLUSIONS

1. Although it may appear that the drag lines are damaging the bottom fauna in the Oreti River the data suggest only the immediate area is affected and there is a rapid recovery downstream, often in excess of the upstream numbers.

2. Evidence of siltation and the formation of sand bars downstream, due to drag line operation, exists. The effect of this upon trout is inconclusive. This problem is common through the South Island and should be examined in more detail at a future date.

3. Gravel washing along the banks was not investigated in this study and can be examined in the future (probably when 2 is studied).

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ORETI RIVER

Gravel Pits and Sampling Stations