FRESHWATER FISHERIES ADVISORY SERVICE.

MARINE DEPARTMENT

INVESTIGATION REPORT JOB NO. 39

ACCLIMATISATION SOCIETY DISTRICT: North Canterbury.

TITLE OF JOB: A survey of the Ashley River system.

OBJECTIVES: To determine the reasons for the small size and low numbers of trout in the Ashley River and tributaries.

This investigation was carried out in October, November 1961 and February-March 1962.

FINDINGS:

(a) Physical Features. The Ashley River rises in steep hill country north-west of Rangiora. The watershed has poor soil, and contains much soft sedimentary rock; these features and the rapid run-off of surface water tend to produce flash flooding and severe erosion. Vegetation is mainly tussock, with scrub and beech forest in the valleys.

The river follows a southerly course at first until reaching the Ashley Gorge, where it turns east, and flows in this direction until meeting the sea 1½ miles N.E. of Waikuku.

The greatest proportion of the course is through a wide, well defined flood bed, up to ¼ - ½ mile wide in places, but usually between 100 and 200 yards. The flow is swift with few pools or other cover, except where the river runs against a consolidated bank, a groyne, or tree, or under a bridge. The bed is composed of shingle, stones, sand and silt, and is unstable and liable to shift during floods, which seem to reach a height of 1 - 5 feet.

Banks are mainly unstable, and eroded to a considerable degree; where they are high, extensive slips have occurred. The last mile or two of the course is confined by stop banks.

The open valleys of the upper and lower portions of the river are separated by the gorges which are situated below the confluence with the Lillburn and Townshend Rivers (see map). Here the banks are steep, up to 50 feet high in the upper gorge, and 500 feet high in the lower, and are clothed in scrub, patches of second growth and beech. They are slipping into the river bed at some points. There is a fairly wide flood bed in places, especially in the upper gorge, and pools estimated at up to 6 - 8 feet deep. It was not possible to gain access to the lower gorge for detailed examination. Flow is rapid over a bed of stones, sand and rock outcrops.

There are seven major tributaries of the Ashley River (the Lillburn, Whistler, Townshend, Glentui, Garry, Okuku and Makerikeri Rivers). They are all similar physically to the Ashley. They rise in the same type of country, and flow at first through a gorge or narrow steep-sided valley, and then out onto a shingle flood bed, often 200 or 300 yards wide. Flow is generally rapid, with few pools, and the banks and bed are mostly unstable. At the time of the survey, none of these tributaries was more than 15 - 20 feet wide, and 8 inches to 10 inches deep, and most had dried up before their confluence with the Ashley.

Two other smaller but important tributaries, Duck and Bullock creeks, are more stable, even though they have considerable flood beds in some areas. The banks are eroding in places, though to a lesser degree than in the other rivers. Cover, in the form of pools, and undercut and fallen banks, is much more abundant. The banks are mostly covered in scrub, pasture grasses, willow, and other trees. Pools are up to 5 ft. - 6 ft. deep, in the lower, more confined reaches, and the bed is mostly shingle, with a mud covering in the more sluggish areas.

The general picture presented by the main tributaries is one of instability, with little or no cover for trout.

(b) Bottom Fauna. Square foot bottom fauna samples were taken throughout the Ashley system except in Duck Creek and the Whistler and Lillburn rivers. A total of 165 samples were collected.

Table I shows the numbers of each animal found in each river, and the percentage each animal comprised of the total numbers sampled. Table II shows the average number of animals per sq.ft. It will be seen that the nymphs of the mayfly (Deleatidium) and the larvae of the midge (Chiromidae) and sandfly (Simulidae) make up the bulk of the bottom fauna. These are generally swift water forms, and this can be correlated with the facts of the fast flow and general lack of pools of any extent. Other animals normally present in the bottom fauna are only sparsely distributed.

The Deleatidium and Chironomidae form important items of food, especially for smaller trout, and this may account for the good growth and condition of trout in the Ashley. It is not known whether or not the large numbers of Simulidae larvae are utilised to any extent. In the Horakiwi Stream a large proportion of the population of Simulidae larvae was eaten by young trout. However, the actual numbers eaten were low, because of the low number present in the bottom fauna. (Allen - Bull.10) It is therefore possible that where numbers of Simulid larvae are high, as in the Ashley, they would form an important item of food for young trout.

The general low density of the bottom fauna as indicated in Table II is typical of unstable streams of this nature.

(c) Trout Stock. Few trout were evident during the survey, and those that were seen were mainly small fish. However, several observations indicate that there is a higher population of fish in their first and second years, i.e. up to 12 ins., in the extensive open water areas, sufficient in number

to maintain the older groups. In most of the tributaries containing trout, only fingerlings were noted. The Whistler and Glentui Rivers seem to be devoid of trout and local information is that none have been seen in these rivers for 10 - 20 years.

The greatest numbers of fish caught by anglers are taken near the sea, from the bridge on the main road to the mouth. This is the only section of the river reasonably well confined (by stopbanks) and cover in the form of willows and pools is available.

Sampling of the fish population was carried out in February - Nov. 1962 using an electric fishing machine. Samples were taken mainly from areas of good cover in order to get a sufficient number of fish in the time available. No attempt was made to determine the population density owing to insufficient time and inadequate equipment.

Eight stations were fished from the gorge to within 1 mile of the sea (see map). A total of 191 Brown Trout were caught, of which 101 were tagged and released as follows:

Coldstream and Main Road bridge ... 47
Ensors 18
Ashley Gorge 36

Length Frequency Distribution.

Fingerlings were sparse in all the areas sampled; the highest numbers were found at the Garry River junction (Ensor's) and at the Ashley Gorge. The greatest concentration of 1 year + trout was at Ashley Gorge, and this is reflected in their smaller size. This concentration may be due to more stable cover, and the liberation of salvaged Selwyn River trout in this area. The length frequency distribution has been plotted, excluding large Ashley Gorge trout, in Fig. 1 and shows distinct groups of the 0+ and 1+ trout and a composite group of 2+ and older trout.

Growth Rates.

The growth rate was determined from the length frequency distribution, and is given below with comparative data.

	0+	1+	2+
Ashley River (March)	11.4 cm.	29.9 cm.	42.2 cm (Approx.)
Selwyn River (April 1961)	14.2 cm.	25.9 cm.	-
Horokiwi River Zone II (April)	14.0 cm.	27.0 cm.	33 cm.

It is apparent that growth rate is high in the Ashley River, and compares favourably with trout from other streams.

Condition.

The condition of the sample of trout from the Ashley compares favourably with trout from the Horokiwi, Doyleston Drain, and Waimakariri South Branch. Average C.F. is higher than in the three streams mentioned above. The figures for average C.F. are

1 year + - 46
2 years + - 43
Over 50 cm. - 42

It appears that, as is usual, condition drops slightly as the fish age. Between 50 and 60 cm a number of fish was in poor condition, probably because of non-recovery from spawning. The good condition supports the conclusion that the growth rate is high.

Trapping Results.

A trap was operated in the Ashley River just above the Rangiora road bridge from 25 April to 20 June 1960. A total of 67 Brown Trout were recorded, and 40 of these were tagged.

A sample of 5 was measured; these lengths ranged from 48 to 62 cm.(18.75" to 23.9 ins).

Recaptures of Tagged Fish.

During the 1960-1 angling season, 2 fish tagged at the above trap were recovered, and a further one was recovered during the 1961-2 season.

On 9th June 1960, 100 tagged Selwyn River trout were released at the Glentui River junction, and one of these was caught near the sea, over 20 miles downstream, during the 1960-1 angling season. One other was reported from Waipapa Bay, approximately 100 miles from the release point. No recaptures of these fish were reported in the 1961-2 season.

During the 1st two months of the 1962-3 season, four recaptures were reported from the Main Road Bridge area, where 47 takeable trout were tagged.

Mortality Rate.

Owing to the limited amount of electric fishing which could be done, the sample is not a very satisfactory estimate of the age composition of the stock, but, subject to this reservation, it indicates an annual mortality rate of about 40% from one year onwards. This is a somewhat lower figure than usual, and suggests a low rate of catch by anglers in this river, which is in agreement with the low rate of return of tagged fish by anglers.

Spawning Conditions.

Generally, spawning conditions are poor; the most extensive areas occur in the upper reaches of the Ashley from the Ashley Gorge Bridge, and continue intermittently to the concrete bridge over the Ashley in Lees Valley. Occasional patches of suitable gravel also occur in the tributaries. However, the spawning gravels are not as extensive as a stable river system of this size would require.

Discussion.

The Ashley River system is an unstable one, providing limited cover and food supplies for trout. A moderate resident population of trout is present, concentrated mainly in the more stable, confined lower reaches, and elsewhere in local areas of suitable cover. Observations made while sampling indicate that available cover is fully utilised by the resident population.

The growth rate is high, and the general condition of the trout is good, though the older, larger fish tend to be in poorer condition.

Further investigation is necessary to determine the extent of the spawning gravels, success of spawning, and whether further liberations of trout would increase the population to any extent.

Conclusions and Recommendations.

(1) Food supply, although sparse, is adequate to support the resident population in good condition at its present level, but it is uncertain whether it would be sufficient if the trout population was increased to any great extent.

(2) Some trout migrate to sea, and the larger fish found in the river are possibly such fish which have returned for spawning and then remained.

(3) Lack of adequate cover appears to limit the numbers of resident trout, particularly for the larger fish.

(4) Spawning gravels are sufficient to maintain the population at its present level.

(5) It is recommended that spawning surveys be conducted to determine the extent and success of spawning.

(6) It is recommended that large numbers of marked salvaged fish of known size should be released for two or three seasons, to determine whether or not any significant addition is made to the resident population. This should not be done until an effective spawning survey has been carried out.

Appendix I

LIST OF ELECTRIC FISHING STATIONS

Station	Section	Date
Smart Road 550 yards	(1)	22-23 February 1962
Smart Road 300 yards	(2)	27 February 1962
Bullock Creek 300 yards	(3)	29 February 1962
Ensor's Farm 600 yards	(4)	29 February 1962
Mairam Downs 600 yards	(5)	29 March 1962
Main North Rd Bridge 550 yards	(6)	29 March 1962
Ashley Gorge 450 yards	(7)	1 March 1962
Ashley Bridge - New Rlwy Bridge, abt 1 mile	(8)	30 March 1962

Executed by ..L.MCORE.....

Supervised by D.LANE.....

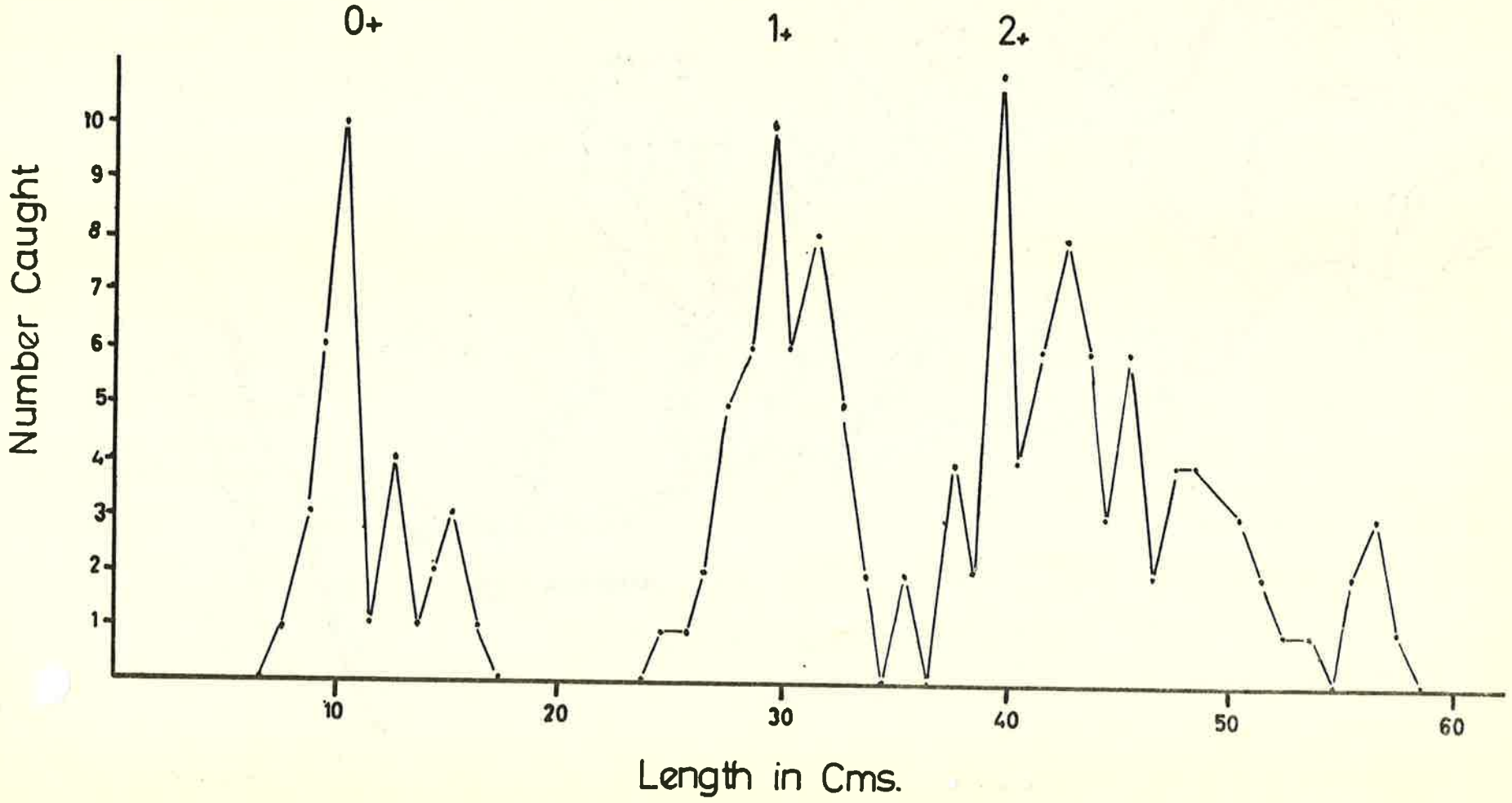
TABLE II - Average number of each animal/sq.ft.

RIVER		ASHLEY	TOWNSHEND	GLENTUI	GARRY	BULLOCK CREEK	OKUKU	GREY	KARETU	MAKERIKERI
TRICHOPTERA	Hydropsyche	1.1	0.3	-	1.0	1	0.5	0.05	0.1	0.5
	Hydrobiosis	0.1	0.1	0.5	1.5		0.7	1.0	1.4	
	Olinga	2.0	20.3	1.5	2.0	3.5	1.7	1.2	3.1	
	Pycnocentria	0.3	-	-			0.1		0.4	0.5
EPHEMEROPTERA	Coloburiscus	-	-	-			0.01			
	Ameletus	-	-	-			0.01		0.1	
	Atalophlebia	0.3	-	-		1	0.9	0.25	0.5	
	Deleatidium	22.3	6.0	25.5	30.0	30.25	17.7	29.2	10.8	20.0
PERLIDAE	Leptoperla	1.3	0.1	-	0.5		0.4			
	Stenoperla		-	-	1.0		0.01	0.05	0.1	
COLEOPTERA	Parnid lar.	0.9	2.3	1.5	1.0	2.5	1.0	1.1	1.2	
	" Im.	0.6	-	0.5	3.5	0.25	0.01	0.1	0.5	
DIPTERA	Chiromomidae	4.5	-	-	0.5	13.0	7.3	3.1	21.0	6.5
	Simulidae	3.2	1.3	12.5	51.0	94.0	4.9	9.7	74.3	53.0
NEUROPTERA	Archicauliodes		0.1				0.01	0.05		
ANNELIDA	Planaria									
	Oligochaeta	0.1			0.5		0.5	0.05		

TABLE I - NOS. of Bottom Animals/River

	RIVER	ASHLEY	TOWNSHEND	GLENTUI	GARRY	BULLOCK CREEK	OKUKU	GREY	KARETU	MAKERIKERI	Percentage of Total
TRICHOPTERA	Hydropsyche	88	2		2	4	22	1	1	1	1.6
	Hydrobiosis	11	1	1	3		28	20	14		1.1
	Olinga	163	122	3	4	14	67	24	31		5.6
	Pycnocentria	26					7		4	1	0.5
EPHEMERIDAE	Coloburiscus						1				0.1
	Ameletus						3		1		0.1
	Atalophlebia	29				4	36	5	5		1.1
	Deleatidium	1789	36	51	60	121	692	582	108	40	45.5
PERLIDAE	Leptoperla	105	1		1		16				1.6
	Stenoperla				2		1	1	1		0.1
COLEOPTERA	Parnid lar	77	14	3	1	10	40	22	12		2.3
	" im.	50		1	7	1	3	2	5		0.9
DIPTERA	Chironomidae	365			1	52	287	62	210	13	12.9
	Simuliidae	259	8	25	102	376	194	194	743	106	26.3
NEUROPTERA	Archicauliodes		1				1	1			0.1
MOLLUSCA	Potamopyrgus										Nil
ANNELIDA	Planaria										
	Oligochaeta	12			1		23	1			0.5
Total No. of animals		2974	185	84	184	582	1421	915	1135	161	7641
No. of samples		80	6	2	2	4	39	20	10	2	
Av/sq. ft.		37.2	30.8	42.0	92.0	145.5	36.5	45.7	113.5	80.5	

ASHLEY RIVER
Length Frequency
Feb-Mar 1962



ASHLEY RIVER SYSTEM