

A SURVEY OF THE BENTHIC INVERTEBRATES FROM THE FRESHWATER
VALLEY, STEWART ISLAND

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ABSTRACT

Species of benthic invertebrates collected from Freshwater Valley, Stewart Island are listed and their relative abundance is noted. Previously unpublished records of invertebrates from other freshwater habitats on the island are listed, and information is presented on the dominant vegetation of the area.

INTRODUCTION

Although some information is available on the freshwater invertebrates of several Sub-Antarctic islands (Wise 1973), little work has been done on the benthos of streams on Stewart Island. This report lists the freshwater invertebrates collected in parts of Freshwater River, and some of its small tributaries (25-28 August 1977) by members of the University of Canterbury Biological Society. Expedition members were Philip Bradfield, Tony Conner, Lindsey Conner, Chris De'ath, Judith Guy, Kevin Hackwell, Malcolm Nicolson, Peter Notman, Colin O'Donnell, Lynley Pierce, Greg Trought and Charles Ye.

STUDY AREA

Freshwater River is the largest stream on Stewart Island, and rises in the Mount Anglem highlands and Ruggedy Mountain area. In its lower reaches the stream meanders across Freshwater Valley, which comprises the greatest proportion of Stewart Island's flat land.

Stewart Island has a mild oceanic climate. Two meteorological stations within 10 km of the study area have mean annual rainfalls (1941-1970) of 1432 mm and 1455 mm (New Zealand Meteorological Service 1973). The study area is known geologically as the Paterson Inlet-Freshwater Valley depression, and is probably an erosional feature

along a fault-depressed zone (Watters *et al.* 1968). Extensive quaternary deposits of alluvium from stream aggradation, along with estuary and swamp deposits and wind-blown sand from the western beaches have filled what were previously straits between the west coast and Paterson Inlet. The soils of the area have been described as southern gley soils (New Zealand Soil Bureau 1963), with weakly acidic surface horizons (New Zealand Soil Bureau 1968).

Freshwater Valley is characterized by numerous low hummocks and ridges of sand resembling ancient dunes, interspersed with boggy areas resulting in a mosaic drainage pattern. The bogs are dominated by *Sphagnum cristatum*, *Gleichenia circinata*, *Calorophus minor*, *Juncus* sp., and *Leptocarpus simplex* (a remnant salt marsh plant). Also present are scattered, stunted manuka (*Leptospermum scoparium*) and *Dracophyllum longifolium* shrubs.

The dominant plant of the ancient dunes is manuka scrub, and other important species include *G. circinata*, *Pteridium esculentum*, *Lycopodium scariosum*, *D. longifolium* and *Cyathodes juniperina*.

METHODS

Benthic invertebrates were collected by the foot-kick method (Frost *et al.* 1971) using a 0.5 mm mesh stream net. Samples were sorted live and preserved in 5-10% formalin. Several samples were collected from each of the sites shown in Figure 1 along a transect from Freshwater Hut (167°53'15"E, 46°50'40"S) to the other side of Freshwater Valley (167°50'E, 46°46'S). Four of the sites sampled were in remnants of a drain cut through the narrow valley between Mason Bay and Freshwater Valley (Cockayne 1909).

Sampling sites encompassed a range of habitats from stagnant ponds to rapidly flowing (1 m/s) streams. Sandy substrates predominated throughout except for two ponds which had muddy silt bottoms and a small stony creek in the neighbouring forest. All samples were taken with the net held firmly on the stream bed in water less than 0.5 m deep. Tributaries sampled were 1-3 m wide, whereas Freshwater River, which was sampled at its margin, had a width of 20 m. Temperatures of running waters ranged from 5.5-8°C, whereas pond temperatures were 12°C. A feature of the small tributaries and the margin of Freshwater River was the presence of a considerable amount of debris (branches, twigs and leaves) which hindered drainage from the adjoining manuka scrub.

RESULTS AND DISCUSSION

Thirty-two species of invertebrates were collected from the streams (Table 1); a relatively low number considering the number of samples collected. The most abundant groups were Crustacea (particularly Amphipoda), and insect larvae. Of particular interest are the low numbers of individuals and species of caddisfly (Tricoptera)

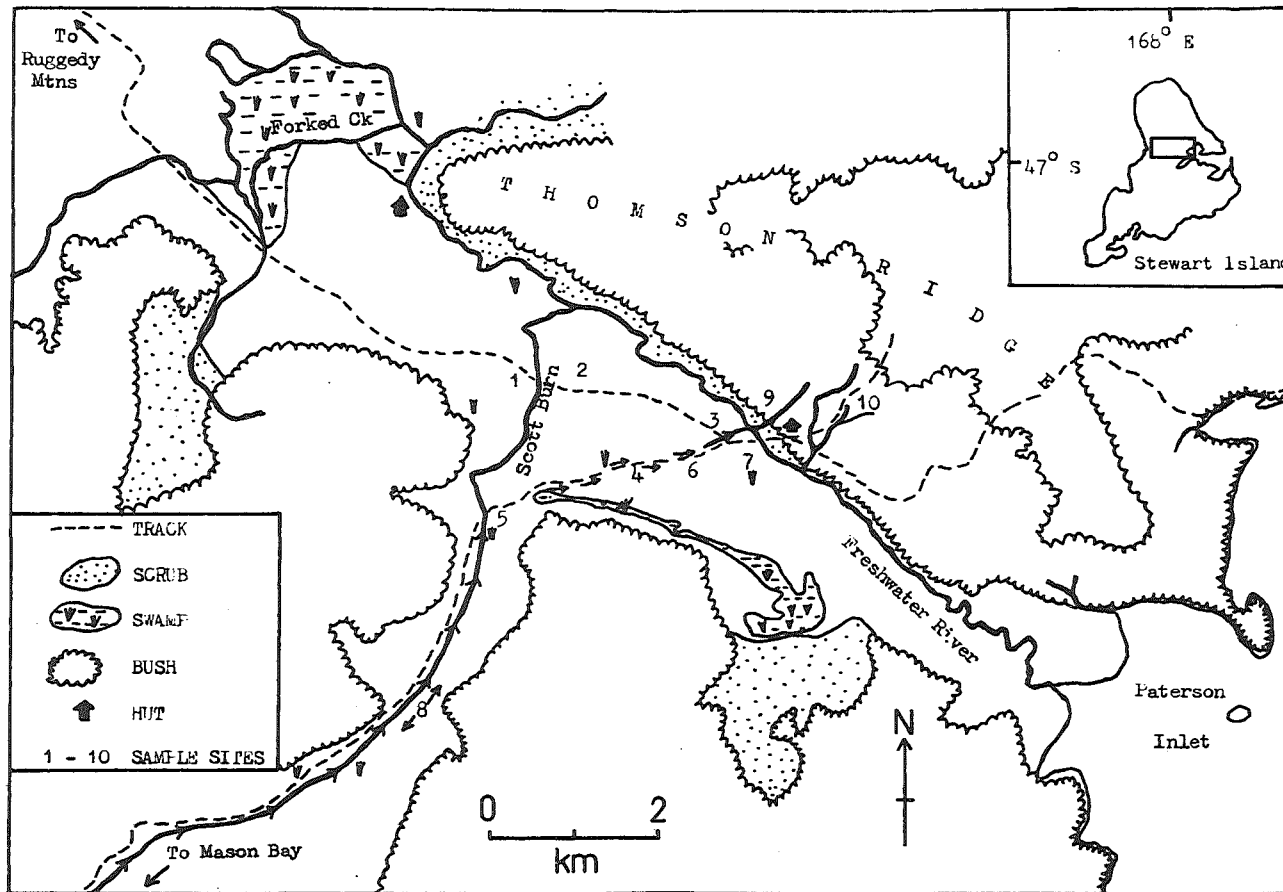


Fig. 1. Freshwater River Valley, Stewart Island, showing the sampling stations.

TABLE 1. BENTHIC INVERTEBRATES COLLECTED FROM FRESHWATER RIVER
CATCHMENT, STEWART ISLAND 25-28 AUGUST 1977.

	Relative abundance (i)	- rare
	(ii)	- common
	(iii)	- abundant
Oligochaeta		
F. Tubificidae		
<i>Telmatodrilus multiprostatatus</i>	(ii)	
<i>Limnodrilus hoffmeisteri</i>	(iii)	
F. Phreodrilidae		
<i>Phreodrilus</i> sp.	(ii)	
Mollusca		
Gastropoda		
F. Hydrobiidae		
<i>Potamopyrgus antipodarum</i>	(ii)	
Bivalva		
F. Sphaeriidae		
<i>Sphaerium novaezealandiae</i>	(i)	
Crustacea		
Amphipoda		
F. Eursiridae		
<i>Paracalliope</i> sp.	(i)	
<i>Paraleptaphopus caeruleus</i>	(i)	
F. Gammaridae		
<i>Phreatogammarus propinquus</i>	(i)	
F. Talitridae		
<i>Chiltonia</i> aff. <i>river-tonensis</i>	(i)	
Indeterminate species	(i)	
Isopoda		
F. Scyphidae		
<i>Styloniscus otakensis</i>	(i)	
Decapoda		
F. Atyidae		
<i>Paratya curvirostris</i>	(iii)	
Insecta		
Ephemeroptera		
F. Leptophlebiidae		
<i>Deleatidium</i> sp.A	(i)	
<i>Deleatidium</i> sp.B	(i)	
<i>Atalophlebioides</i> sp.	(i)	
Plecoptera		
F. Gripopterygidae		
<i>Zelandobius confusus</i>	(iii)	
<i>Zelandoperla fenestrata</i>	(i)	
F. Austroperlidae		
<i>Austroperla cyrene</i>	(i)	
Odonata		
F. Coenagrionidae		
<i>Austrolestes colenensis</i>	(i)	
<i>Xanthocnemis zealandica</i>	(i)	
F. Corduliidae		
<i>Procordulia smithi</i>	(i)	
Trichoptera		
F. Rhyacophilidae		
<i>Hydrobiosis parumbripennis</i>	(i)	
F. Sericostomatidae		
<i>Pycnocentria sylvestris</i>	(i)	
F. Philopotamidae		
<i>Hydrobiosella stenocerca</i>	(i)	(pupae only)
F. Leptoceridae		
<i>Hudsonema aliena</i>	(i)	
Diptera		
F. Ceratopogonidae		
Sp.A	(i)	
F. Chironomidae		
<i>Polypedilum</i> sp.	(iii)	
<i>Tanytarsus</i> sp. (?)	(ii)	
<i>Psectrotanyptus</i> sp.	(ii)	
<i>Smittia</i> sp. (?)	(ii)	
F. Empididae		
Sp. A	(i)	
F. Simuliidae		
<i>Austrosimulium australense</i>	(iii)	

and mayfly (Ephemeroptera) larvae, groups which characteristically are abundant in New Zealand streams. The scarcity of these groups and the low number of species recorded overall is probably due primarily to the sandy nature of the substrate at nearly all sampling sites. Other contributing factors may be the sluggish nature of the streams and the manuka scrub dominated vegetation nearby, which is not characteristic of New Zealand bush streams.

These data extend the known distributions of several species. The atyid shrimp *Paratya curvirostris* has been recorded from a number of streams in the South Island, including one near Invercargill (Carpenter 1976), but this is the first known record from Stewart Island. Carpenter reported that *P. curvirostris* typically inhabited the fringe of adventive macrophytes bordering streams, and in this study it was found predominantly in debris and scattered vegetation along stream edges.

Dumbleton (1973) recorded three species of blackfly from Stewart Island, but only *Austrosimulium australense*, which his records suggest is fairly scarce, was found during the present survey. Its larvae were plentiful in Freshwater Valley, particularly at sites in slow flowing water, which according to Dumbleton (1973) is their typical habitat.

Of the three species of stonefly found, two, *Austroperla cyrene* and *Zelandobius confusus* have been recorded also as nymphs by Winterbourn (1965) from a small forested stream at Butterfield, near Oban. The three Odonata species had also been collected from bogs and valley flats in the Rakeahua Valley in February 1968 by J.S. Dugdale (K.J.G. Deacon, unpublished compilation).

Mr A.G. McFarlane (Canterbury Museum) collected seven species of caddisfly from small streams running into

TABLE 2. CADDISFLIES COLLECTED BY MR A.G. MCFARLANE FROM SMALL STREAMS RUNNING INTO PATERSON INLET 10-17 JULY, 1968

Helicophidae	<i>Zelolessica</i> sp.
Helicopsychidae	<i>Helicopsyche</i> sp.
Leptoceridae	<i>Triplectides obsoleta</i>
Philopotamidae	<i>Hydrobiosella</i> (?) <i>tonela</i>
Polycentropodidae	<i>Polyplectropus</i> sp.
	<i>Hydrobiosis parumbripennis</i>
Rhyacophilidae	<i>Psilochorema</i> sp.

Paterson Inlet during July 1968 (Table 2). Several of these species typically are found in beech forest and open streams throughout the South Island. McFarlane reports that several species had morphological characteristics consistently different from those of mainland specimens, which suggests that little gene flow occurs between the populations.

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