

Gibsons Stream



Biological Habitat Assessment Survey

Summary Report

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INTRODUCTION

Gibsons Drain is a small waterway approximately 1km long, which flows into Janet Stewart Reserve by the Lower Styx Road. It has been recently restored (where it enters the Reserve) to a more natural state as part of the enhancement project underway at Janet Stewart Reserve.

SURVEY SITE

Site 1: Immediately downstream of Lower Styx Road

Grid reference: 825 495

Date surveyed: 19/12/96

REGIONAL FEATURES

Gibsons Drain has a relatively small, flat catchment which is predominantly rural. As such, the total area of impervious catchment is probably less than 5%. Annual rainfall in the area averages around 610 mm.

HYDROLOGY

Gibsons Drain is lowland-fed and is not known to be ephemeral.

RIPARIAN VEGETATION

With the enhancement work at Janet Stewart Reserve still in its early stages, vegetation cover where Gibsons Drain enters the reserve is minimal. There is no canopy at present and the bank vegetation is only just beginning to establish. In this state, the vegetation provides little shade or cover for instream life. Given time, however, the bank vegetation - which comprises native shrubs including flaxes, kowhai and various ferns - should provide good streamside cover.

BANK/CHANNEL ATTRIBUTES

The stream banks appear to be moderately stable, only small eroded areas being observed. Bank stability is aided by the placement of large boulders along the bank edges and also helps to provide cover and bank heterogeneity for stream inhabitants.

As a result of the enhancement work at the Reserve, Gibsons Drain now boasts a natural meander pattern with a great diversity of channel widths and depths. These features create a series of riffles and pools which, in turn, provide great variation in velocity through the stream in the Reserve. Such diversity in stream velocity is important as it meets the habitat requirements of a wide variety of aquatic life. Habitat heterogeneity is further aided by the presence of numerous large roughness elements, notably boulders, in the stream and along the bank edges.

SEDIMENTS/SUBSTRATE

Where it enters the reserve, Gibsons Drain has a relatively stable substrate, comprising a tightly packed assortment of particle sizes including boulders, cobbles and pebbles. There is, however, a notable accumulation of mud/silt in the slower flowing pool areas. Macrophytes are present but in relatively low densities, filamentous algae being the most abundant plant.

WATER QUALITY

Water clarity was fairly good, although slightly turbid in the slow flowing pool areas. No water odours or surface oils were noted. No point source pollution was visible either, although, with the absence of dense riparian cover, there is high potential for diffuse pollution to enter the stream via overland runoff.

BIOLOGICAL ASSESSMENT

Despite the fact that Gibsons Stream had the third highest taxonomic richness of all streams studied, there was an absence of significant numbers of Trichoptera (caddis-flies), Plecoptera (stone-flies) and Ephemeroptera (may-flies) at the study site (Fig. 1). This may be due to siltation within the pools, producing a habitat unsuitable for invertebrates preferring fast flowing stony substrates. . The study site was largely dominated by molluscs, having a community composition percentage of over 50% (Fig. 2).

One Coleoptera (beetle) larvae with an MCI score of five was found, but due to a low density it has little use in providing an indication of stream quality. A dipteran (fly) larvae identified as *Limonia* sp was also found. This has a MCI score of 6, indicating preference for relatively low polluted streams, but once again, emphasis could not be placed on its presence due to the low numbers found. There is little known about the ecology of many of these Dipteran larvae found and therefore they are of limited use in water quality work (Winterbourn 1981).

SUMMARY

The diverse array of native shrubs present along the stream banks, the degree of roughness in and along the channel and the variation in stream velocity and depth will in future provide a good habitat capable of meeting the requirements of a wide range of instream life. Due to the recent restoration of the area and a small study site it is hard to determine whether this area provides us with an accurate indication of the health of the entire stream. The recent disturbance due to the enhancement may still be impacting the stream inhabitants, therefore it would be important to re-survey this area in years to come in order to accurately record any improvement in invertebrate communities.

REFERENCES

- Mcfarlane, A.G. 1951: Caddis fly larvae (Trichoptera) of the family Rhyacophilidae. *Records of the Canterbury Museum* 5: 267-289
- Stark, J.D. 1993: Performance of the macroinvertebrate community index: effects of sampling method, sample replication, water depth, current velocity, and substratum on index values. *New Zealand Journal of Marine and Freshwater Research*. 27: 463-478
- Winterbourn, M.J. 1981: The use of aquatic invertebrates in studies of stream water quality. *Water and Soil Publication*. 22: 5-16
- Winterbourn, M.J.; Gregson, K.L.D. 1981. *Guide to the Aquatic Insects of New Zealand*. Bulletin of the Entomological Society of New Zealand 5, Auckland. 80p.

Table 1: Densities of invertebrates collected from five combined kicknet samples from one survey site along Gibsons Stream.

INVERTEBRATES	SITE NUMBER
	1
Acarina	11
Amphipoda	53
<i>Chironomus</i> sp	66
<i>Chironomus zealandicus</i>	90
Cladocera	188
Collembola	50
Copepoda	289
<i>Corynoneura</i> sp	86
Diamesinae	15
<i>Gyraulis corrina</i>	6
<i>Hydra</i> sp	3
Hydroptilidae (early instar)	7
<i>Limonia</i> sp	1
<i>Liodessus deflectus</i>	3
Muscidae	1
Nematoda	411
Odonata	1
Oligochaeta	775
Orthocladinae	552
Ostracoda	666
<i>Oxyethira albiceps</i>	17
<i>Physa</i> sp	88
<i>Potamopyrgus antipodarum</i>	3317
Psychodidae	2
<i>Sigara</i> sp	5
Sphaeriidae	83
Tanypodinae	35
<i>Tanytarsus vespertinus</i>	12

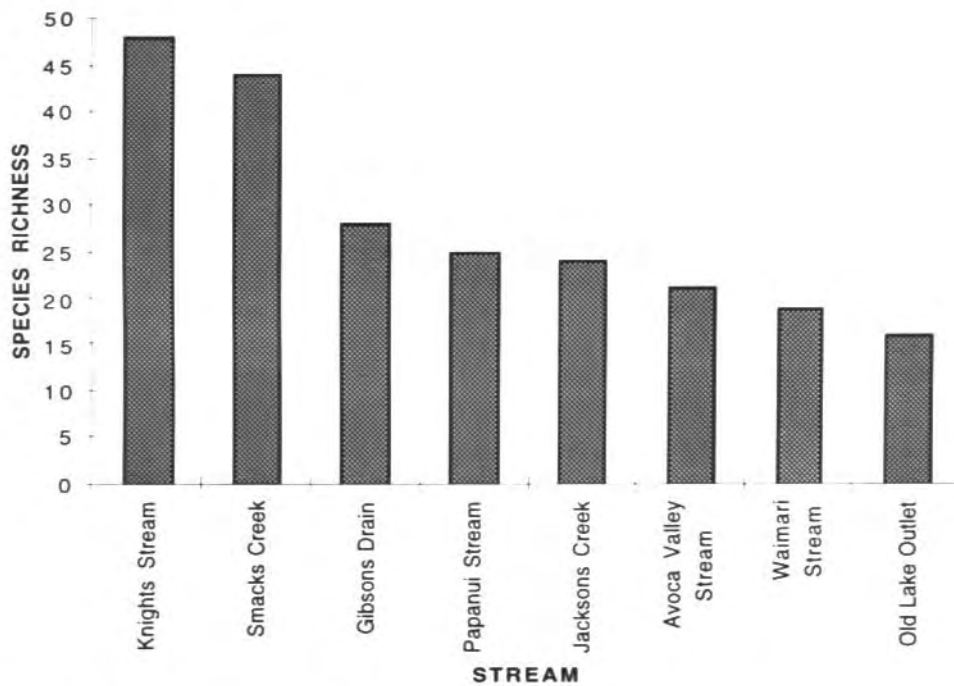


Figure 1: Taxonomic richness for kicknet samples collected from eight streams around Christchurch. The first three streams run through predominantly rural areas.

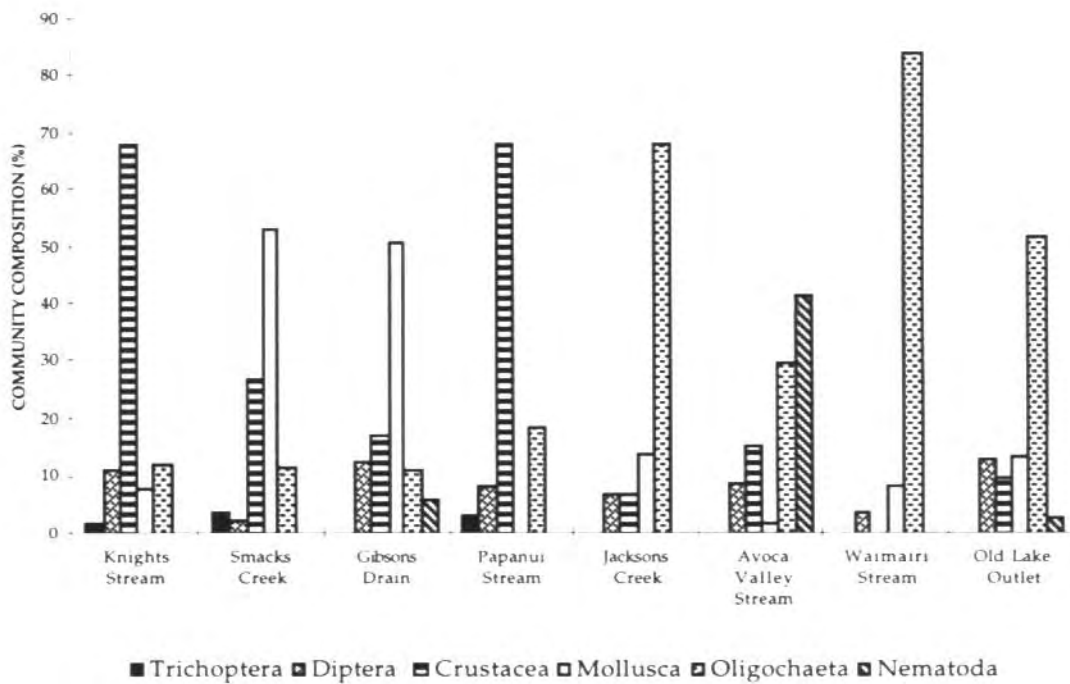


Figure 2: Percentage composition of invertebrate community by major groups from the combined sites in the eight study streams. Taxa shown only when greater than one percent of community composition. The first three streams run through predominantly rural areas.

**APPENDIX 1:
SPECIES COMPOSITION OF GIBSONS STREAM**

PHYLUM: MOLLUSCA

Class: Gastropoda

Potamopyrgus antipodarum

Physa sp

Gyraulis corrina

Class: Bivalva

Family: Sphaeriidae

PHYLUM: ANNELIDA

Class: Oligochaeta

PHYLUM NEMATODA

PHYLUM: ARTHROPODA

Class: Crustacea

Order: Amphipoda

Subclass: Cladocera

Subclass: Copepoda

Subclass: Ostracoda

Class: Insecta

Order: Odonata

Order: Hemiptera

Sigara sp

Order: Trichoptera (caddis-flies)

Hydroptilidae (early instar)

Oxyethira albiceps

Order: Diptera (two-winged flies)

Family: Tipulidae

Limonia sp

Family: Chironomidae

Tanypodinae

Diamesinae

Chironmus sp

Chironmus zealandicus

Tanytarsus vespertinus

Orthocladinae

Corynoneura sp

Family: Psychodidae

Family: Muscidae

Class: Arachnida

Order: Acarina (mites)

PHYLUM: COELENTERATA

Hydra sp