

# *Smacks Creek*



## *Biological Habitat Assessment Survey*

### Summary Report

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## **INTRODUCTION**

Located on the northern outskirts of Christchurch, Smacks Creek is one of many tributaries of the Styx River. It originates upstream of Wilkinsons Road and flows approximately 1.6km before entering the Styx River north-east of Husseys Road.

## **SURVEY SITES**

Four sites were surveyed:

**Site 1:** 74 Husseys Road, under trees downstream of a small wooden bridge

Grid reference: 772 493 Date surveyed: 23/1/97

**Site 2:** Timbermill, just off Gardiners Road

Grid reference: 768 496 Date surveyed: 21/1/97

**Site 3:** 353 Gardiners Road, in back garden

Grid reference: 767 494 Date surveyed: 21/1/97

**Site 4:** Farm paddock beside Harewood Crematorium, Wilkinsons Road

Grid reference: 765 491 Date surveyed: 24/1/97

## **REGIONAL FEATURES**

The Smacks Creek Catchment is relatively small in area and is predominantly rural, despite the presence of a small number of houses and a timbermill in the catchment. Part of the creek also flows through Willowbank Wildlife Reserve. Overall, the Smacks Creek Catchment would probably be less than 5% impervious.

Annual rainfall in the catchment region is around 630mm and maximum altitude about 22m ASL.

## **HYDROLOGY**

Smacks Creek is fed by a number of springs near the head of the Styx River. It is not known to be ephemeral, having a reasonable flow all year round.

## **RIPARIAN VEGETATION**

Both sites 1 and 3 had reasonable canopy cover, mainly in the form of exotic deciduous trees. In contrast, there was no canopy cover over the stream at site 3 and very little at site 4. As a result, the streambed at these sites receives no shade at all.

Streamside/bank vegetation cover was highly variable between sites. At site 1 it consisted of a mixture of native and exotic shrubs, including ferns, flaxes and grasses with many bank areas devoid of vegetation. While the ground cover at site 2 comprised solely of long grasses, their density provides a good riparian buffer. Site 3 had excellent streamside cover on the left bank, but considerably less on the right. Finally, at site 4, streamside cover was minimal, short grazed grasses being the predominant vegetation.

## **BANK/CHANNEL ATTRIBUTES**

Bank stability, like riparian vegetation, was highly variable between the sites surveyed. It was relatively good at sites 1 and 3, marginal at site 2 and extremely poor at site 4. Banks were undercut at the last two sites, with Site 4 having uprooted trees that had pulled the bank and surrounding soil out.

In terms of channel features, Smacks Creek has a pleasant natural meander pattern, this being particularly noticeable at site 1. Overall, however, there was little variation in stream width, depth or velocity with clear signs of stream channelisation at three of the four sites surveyed. While such a lack of channel heterogeneity is not beneficial to aquatic invertebrates living in the creek, its negative effects are somewhat compensated for by the presence of various roughness elements at sites 1, and 3, a dense cover of macrophytes at site 1 and undercut banks at sites 2 and 4. These features provide valuable habitat/cover for fish and invertebrates.

## **SEDIMENTS/SUBSTRATE**

The streambed had a reasonable cover of pebbles in many places and was fairly stable, although there was an accumulation of mud and silt at sites 1, 2 and 3. Bottom substrate cover is good, undercut banks, macrophytes and numerous roughness elements providing, as stated above, good habitat for instream life. With the exception of site 1, where macrophyte density is so great that the stream flow is obstructed, macrophytes are relatively scarce in the sites surveyed.

## **WATER QUALITY**

Water clarity was excellent at all four sites and no water odours or oils were detected. With the exception of site 1, there is potential for pollution to enter the stream, input drains/pipes being present at sites 2, 3 and 4.

## **BIOLOGICAL ASSESSMENT**

Smacks Creek has a very high taxonomic richness, being only slightly lower than that of Knights Stream (Fig. 2). It boasts a large range of Insecta, having representatives from six of the eleven families known in New Zealand. Like Gibsons Stream, the invertebrate community is dominated by molluscs by over 50% (Fig. 2). From Figure 2 it can be seen that the invertebrate community of Smacks Creek supports a greater percentage of Trichoptera larvae than Knights Stream. Knights Stream however, contains Trichoptera species with higher MQ scores and also boasts species from Plecoptera (stone-flies), and Zygoptera (damselflies) families, both of which are more pollution intolerant.

A large number of Trichoptera (Caddis-flies) were found in sites 2-3. This included the free living caddises, *Polypectropus* sp and *Psilochorema bidens*. Both of these genera have an MQ rating of 8, thus indicting an intolerance to pollution (Stark 1993). *Psilochorema* species are known to prefer either forested or open gravelly streams which have a stable substratum, not subject to scouring (McFarlane 1951). This is also true for *Hydrobiosis* species, which are also indicative of good quality streams, although their MCI rating of 5 is slightly lower. These caddis-flies are all predators, therefore their presence indicates a good food source,

illustrated by the high taxonomic richness. *Deleatidium* species were also recorded at site 1 and 3. This is the most widely distributed and abundant Ephemeroptera (may-fly) inhabiting stony streams in New Zealand (Winterbourn 1980). *Deleatidium* species seem to have broad habitat requirements but are limited by low oxygen levels associated with sedimentation buildup. Therefore their presence indicates a relatively stony substrate.

It can be seen that the number and species diversity decreases markedly in site 4 (Table 1). This may be due to a total lack of riparian vegetation (both canopy and bank), low water velocity and lack of channel heterogeneity, resulting in a less habitable environment for many stream dwellers. The presence of large quantities of algae may be a result of increased solar radiation and possible nutrient enrichment, both due to lack of any riparian vegetation.

At site 1 pukeko were also present.

## **SUMMARY**

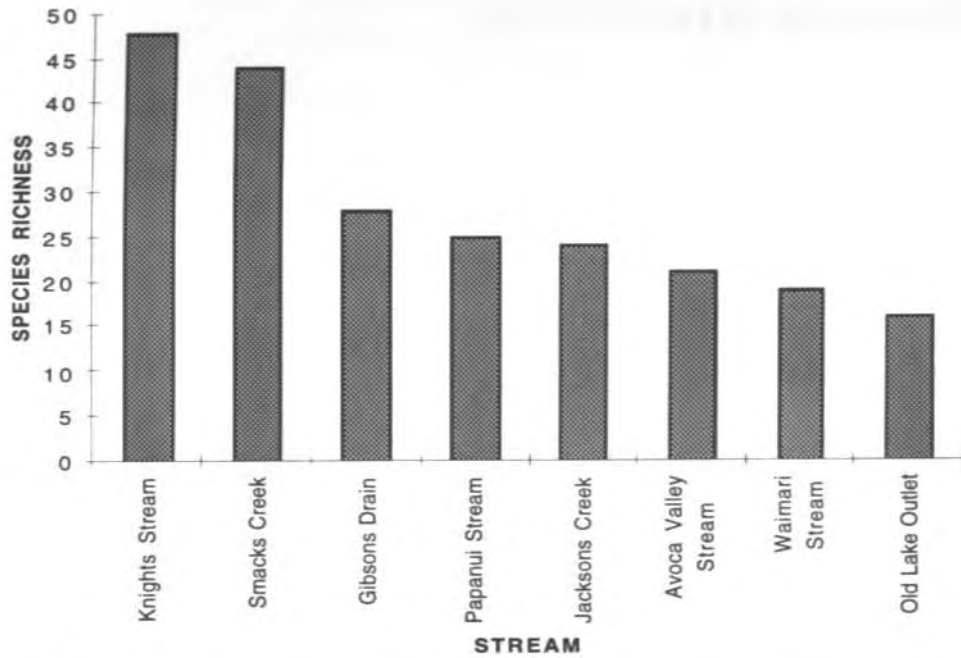
Smacks Creek appears to be one of Christchurch's more promising waterways, boasting a diverse array of invertebrates. Being located in a predominantly rural area, the creek has probably escaped much of the negative side effects usually associated with urbanisation. The marked decrease in invertebrate diversity between site 1 and 4 indicate the diverse effects of loss of riparian vegetation and stream heterogeneity. It is therefore of prime importance to preserve or further enhance this stream in order to prevent it from losing many of its stream inhabitants and value as a natural waterway.

## **REFERENCES**

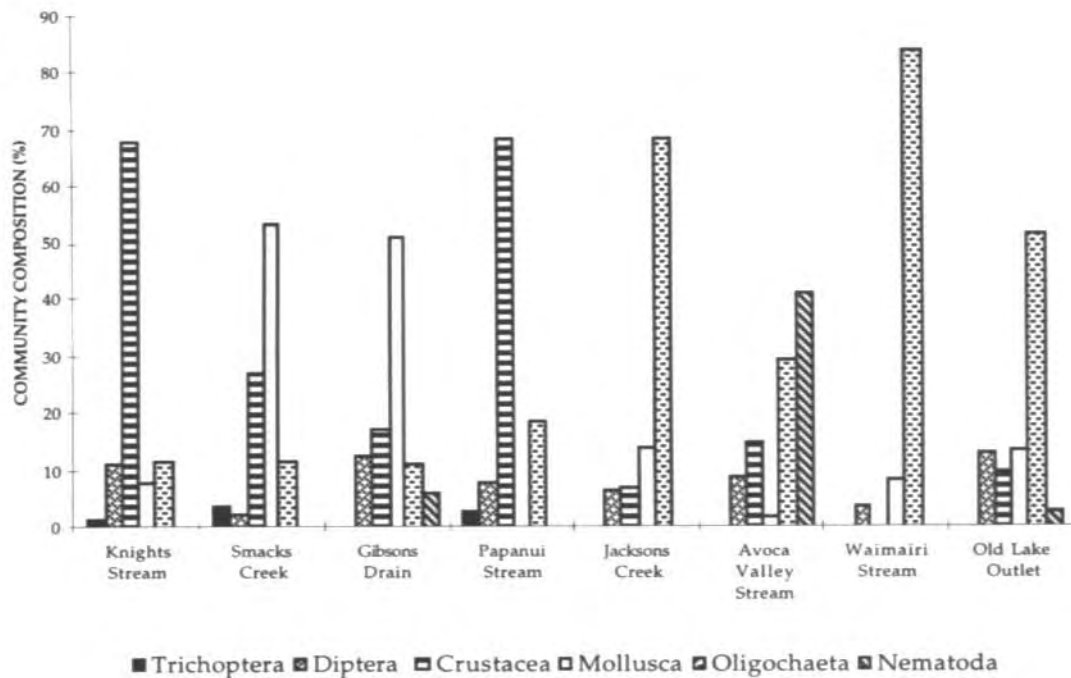
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**Table 1:** Densities of invertebrates collected from five combined kicknet samples from four survey sites along Smacks Creek.

INVERTEBRATES	SITE NUMBER				INVERTEBRATES	SITE NUMBER			
	1	2	3	4		1	2	3	4
Acarina	0	24	1	4	<i>Liodessus</i> sp	0	8	1	0
Amphipoda	14	8	0	60	<i>Microvelia</i> sp	0	0	1	0
<i>Austrosimulium</i>	4	4	1	0	Muscidae	0	6	5	0
<i>?Brachydeutera</i>	0	2	0	0	Nematoda	24	28	134	84
<i>Chironomus</i> sp	18	8	15	84	<i>Oecitis unicolor</i>	4	0	0	0
<i>Chironomus zealandicus</i>	16	14	3	112	Oligochaeta	1850	1904	1000	1576
Cladocera	1842	38	53	464	Orthocladinae	58	330	243	64
Collembola	26	6	0	0	Ostracoda	5060	2618	2148	2624
Copepoda	16	50	15	172	<i>Oxyethira albiceps</i>	48	620	1178	104
<i>Corynoneura</i> sp	34	6	8	4	Platyhelminthes	112	28	100	20
<i>Deleatidium</i> sp	4	0	2	0	<i>Polypedilum</i> sp	4	4	5	4
Diamasinae	24	62	11	0	<i>Polyplectropus</i> sp	14	*	3	0
<i>Ephydrella</i> sp	0	6	0	0	<i>Potamopyrgus antipodarum</i>	11706	6106	9280	580
Ephydriidae	0	4	0	0	<i>Psilochorema bidens</i>	4	2	0	0
<i>Gyralis corrina</i>	18	*	7	12	<i>Psilochorema</i> sp (early instar)	0	2	0	0
Hirudinea	0	0	0	12	<i>Pycnocentroides aureola</i>	0	10	2	0
<i>Hudsonema amabilis</i>	8	8	21	0	<i>Sigara</i> sp	0	0	0	4
<i>Hudsonema</i> sp (early instar)	6	8	10	0	Sphaeriidae	574	420	0	272
<i>Hydra</i> sp	88	14	9	20	Tanypodinae	112	10	7	44
<i>Hydrobiosis</i> sp (early instar)	2	8	1	0	<i>Tanytarsus vespertinus</i>	0	4	0	0
<i>Hydrobiosis parumbripennis</i>	0	4	0	0	Tanyteridae	0	0	0	*
<i>Limonia</i> sp	0	4	0	0	<i>Triplectides obsoleta</i>	0	*	0	0



**Figure 1:** Taxonomic richness for kicknet samples collected from eight study streams in 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. First three streams run through predominantly rural areas.

**APPENDIX 1:**  
**SPECIES COMPOSITION OF SMACKS CREEK**

**PHYLUM: MOLLUSCA**

**Class: Gastropoda**

*Potamopyrgus antipodarum*

*Gyraulis corrina*

**Class: Bivalva**

Family: Sphaeriidae

**PHYLUM: PLATHHELMINTHES**

**PHYLUM: ANNELIDA**

**Class: Oligochaeta**

**Class: Hirudenea**

**PHYLUM: NEMATODA**

**PHYLUM: ARTHROPODA**

**Class: Crustacea**

Order: Amphipoda

Subclass: Cladocera

Subclass: Copepoda

Subclass: Ostracoda

**Class: Insecta**

**Order Collembola**

**Order Ephemeroptera**

*Deleatidium* sp

**Order: Plecoptera**

*Zealandobius furcillatus*

**Order. Hemiptera**

*Microvelia* sp

*Sigara* sp

**Order Coleoptera**

*Liodessus* sp

**Order: Trichoptera (caddis-flies)**

*Oxyethira albkeps*

*Polyplectropus* sp

*Psilochorema bidens*

*Psilochorema* sp

*Hydrobiosis pammbripennis*

*Hydrobiosis* sp (early instar)

*Hudsonema amabilis*

*Hudsonema* sp

*Triplectides obsoleta*

*Pycnocentrodes aureola*

*Oecitis unicolor*

**Order Diptera** (two-winged flies)

- Family: Tipulidae  
*Limonia* sp
- Family: Simuliidae  
*Austrosimulium*
- Family: Chironomidae  
Tanypodinae  
Diamesinae  
*Chironmns* sp  
*Chironmus zealandicus*  
*Tanytarsus vespertinus*  
*Polypedilum* sp  
Orthocladinae  
*Corynoneura* sp
- Family: Tanyderidae
- Family: Empididae
- Family: Ephydriidae  
unidentified species  
*?Brachdeutera*  
*Ephydrella* sp
- Family: Muscidae

**Class: Arachnida**

**Order Acarina (mites)**

**PHYLUM: COELENTERATA**

*Hydra* sp