

## Minimum Flow Submission

### Trotters Creek

My name is Steven Dixon and I writing this submission regarding the minimum flow planned for Trotters creek. The creek has significant historical, recreational and ecological values which are held in very high regard by me and my family.

I support the proposed winter minimum flow of 35 liters a second and understand that the weir used to divert water into the storage pond is to be removed during winter and there will be no fish passage issues.

I oppose the proposed summer minimum flow of 8 liters a second for the following reasons:

1. The Trotters Creek management flows report clearly identifies that at least 20 liters a second is required to protect the 13 different fish species that are known to live within the stream. These species include giant kokopu, long finned eel, short finned eel, koaro, Canterbury galaxias, common bully, upland bully, giant bully, redfin bully, bluegill bully, lamprey, brown trout and inanga. In addition to these species, flounder also reside in mouth of the stream. Such high biodiversity should be given significant consideration and protection when setting a flow regime.
2. During dry years the creek can become low naturally during summer. The proposed minimum flow would compound the effect of these low flows and result in the stream being flat lined unnaturally for extended periods. This would result in algal blooms, high water temperatures and low oxygen levels.
3. Many of the native fish species that live in the creek have a sea going life cycle stage. It is vital that water abstraction does not result in the blockage of the stream mouth near the ocean which would prevent fish access to and from the sea.
4. Some of the white bait species such as inanga spawn in the lower part of the creek. Good water quality and flow levels are an important part of their spawning and juvenile habitat requirements.
5. The proposed level would not provide for adult trout passage during summer.
6. It has been estimated that a minimum flow of 20 liters a second would only impact on water abstraction on 4 days a year. We understand that there is 3.5 days of storage in the dam beside the creek. With a slight increase in storage a minimum flow of 20 liters a second would allow for water abstraction and protect the health of the stream at the same time.
7. Flat lining of the creek at 8 liters a second for extended periods would destroy the natural character of the stream.
8. The mean annual low flow of Trotters Creek has been estimated at 23 liters a second. The ORC has questioned this value after flow comparisons with other nearby rivers. Although the catchment area of Trotters creek may not be as large as the Shag or Waianakarua Rivers, the surface flows between pools in Trotters Creek can be greater than these rivers during a drought. This may be related to

localised weather patterns, the vegetation in the upper catchment and the geology of the stream bed.

9. The actual amount of water used for irrigation and the amount of water that has over flowed from the storage pond back into the creek is not known. When there is uncertainty about flow and abstraction levels the Council should take a precautionary approach when setting minimum flow levels to allow for hydrological estimate errors and ensure the protection of the environment.

Finally, the intrinsic, recreational and ecological values of Trotters Creek are important for many members of our local community and people from outside the area as well. A meaningful minimum flow is required to ensure that the abstraction of water does not jeopardize these values and the health of the stream. Any financial gains from irrigation of farmland by one member of the community will not benefit the greater community unless the health of the stream is protected the first instance.

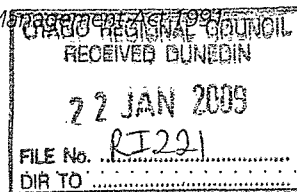
Yours Sincerely

Steven Dixon  
39 Kennedy Rd  
Dunedin  
Otago



**SUBMISSION FORM** <sup>B</sup>  
**Proposed Plan Change 12 ~~Water Allocation and Use~~**  
**to the Regional Plan: Water for Otago**

Form 5, Clause 6 of the First Schedule, Resource Management Act 1991



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Full name of submitter: MICHAEL RAMSAY

Name of organisation (if applicable):

Postal address: FLAT C, FLOOR 31, TOWER 12, PARK CENTRAL.

TSEUNG KWAN O, HONG KONG. Postcode:

Telephone: Fax:

Email: michaelramsay1226@yahoo.com Contact Person: MICHAEL RAMSAY

I wish  do not wish (circle preference) to be heard in support of my submission.

If others made a similar submission, I will consider presenting a joint case with them at a hearing.  
 (Cross out if you would not consider presenting a joint case).

Signature of submitter: Date: \_\_\_\_\_  
 (or person authorised to sign on behalf of person making submission).

Please note that all submissions are made available for public inspection.

**The parts of the proposed plan change that my submission relates to are:**

(Give clear references if possible e.g. reference number, policy x, rule y)

Item 6 in the proposed plan change is already covered in the existing  
 Regional water plan: clause 12.1.2.5

**My submission is:**

(Include whether you support, oppose, or wish to have amended the parts identified above, and give reasons)

- I oppose the proposed change noted as item 6.
- I neither support, nor oppose the remaining items, but reserve the right to do so after the next call for submissions at end of MARCH 2009.

I seek the following decision from the local authority:

(Give precise details e.g. changes you would like made)

I wish to see more specific details on the proposed changes. (e.g.) Defining actual minimum flows, and how these will be achieved, and who will be penalised, and via what rules process, should these minimum flows be breached. Especially as it will relate to surface water.

Fold

**SUBMISSIONS MUST BE RECEIVED BY 5.00 PM, MONDAY 9 MARCH 2009.**

Please fold and secure with a small piece of tape.

Fold

FreePost Authority ORC 1722



**Otago Regional Council**  
Private Bag 1954  
Dunedin 9054

Attention Policy Team



**SUBMISSION FORM**  
**Proposed Plan Change 1B Minimum Flows**

**to the Regional Plan: Water for Otago**

Form 5, Clause 6 of the First Schedule, Resource Management Act 1991.

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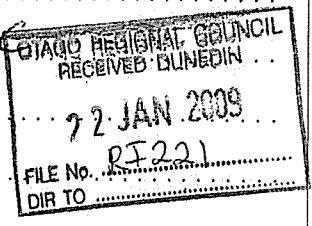
Full name of submitter: Prof P.D.R LINDSAY-SALMON

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Postal address: 30, Waiareka Valley Rd, RD17  
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Email: p.d.r.lindsay@clear.net.nz Contact Person: \_\_\_\_\_



I wish  do not wish (circle preference) to be heard in support of my submission.

If others made a similar submission, I will consider presenting a joint case with them at a hearing.  
(Cross out if you would not consider presenting a joint case).

Signature of submitter: [Signature] Date: Jan 21 2009  
(or person authorised to sign on behalf of person making submission).

**Please note that all submissions are made available for public inspection.**

**The parts of the proposed plan change that my submission relates to are:**

(Give clear references if possible e.g. reference number, policy x, rule y)

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**My submission is:**

(Include whether you support, oppose, or wish to have amended the parts identified above, and give reasons)

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I seek the following decision from the local authority:

(Give precise details e.g. changes you would like made)

What I would simply like to do is ask if the changes are necessary. Bearing in mind what irrigating land has done for California + the poor Murray River system in Australia I would like to see far more caution exercised, more testing and computer simulations done.

We already have a salt lake in the region does anyone know why + what is the likelihood of irrigation doing the same thing at sea level?

The visiting Australian Professor who spoke about making changes how to prevent future damage made sense. Can we ask that the ARC does exercise common sense and say no to further irrigation?

**SUBMISSIONS MUST BE RECEIVED BY 5.00 PM, MONDAY 9 MARCH 2009.**

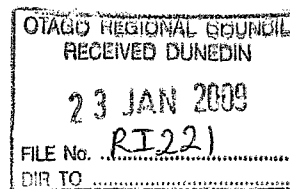
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Dunedin 9054

Attention Policy Team



Management Flows in Aquatic Ecosystems in Trotters Creek  
Minimum Flow Submission  
Trotters Creek

For reasons outlined below and in an appended species list of aquatic invertebrates present in Trotters Creek, I oppose the proposed summer minimum flow of 8 litres per second.

I was the Curator of Invertebrate Zoology at the Otago Museum from 1974-2000 and am now the Honorary Curator, Entomology, there. In September 1980, I made a survey of the invertebrate fauna of Trotters Creek in the gorge area, for a course there held on 27-28 September 1980 run by "Otago University Extension", the course being titled "A case study of an Otago Scenic Reserve."

I was very surprised by the unusually large number of invertebrate species present in Trotters Creek, and have appended my list to this submission (note that names will have changed since it was made in 1980).

In addition to those aquatic invertebrates, there were significant numbers of native fish including giant Kokopu, Canterbury Galaxias, common bully, upland bully, giant bully, redfin bully, bluegill bully, lamprey, and several others, as well as brown trout.

The high species diversity of aquatic invertebrates and vertebrates in Trotters Creek must be maintained and protected by not setting a harmful flow regime.

Because Trotters Creek becomes naturally low-flowing in dry summers, a proposed minimum flow would result in algal blooms, high water temperatures, low oxygen levels, and likely loss of species diversity.

Please note that not only is the area unusually rich in terrestrial native invertebrates as well, it is an area of endemism – species found nowhere else. E.g., the locally endemic "Mountain daisy" *Celmisia hookeri*, more or less confined to the Horse Range and conspicuous on the high ledges in Trotter's Gorge. A distinctive invertebrate fauna in the area seems to have resulted from an overlapping of Otago and Canterbury faunas and a unique element confined to the Trotters Creek catchment. (A distinguishable Central Otago and eastern Otago invertebrate fauna has its northern boundary roughly along the St. Bathans, Kakanui, and Horse Ranges, although further inland, it extends to the Waitaki River, while the South Canterbury fauna is bounded in the east by the same hills. There is a large carabid ground beetle fauna in the Trotters Creek catchment. Two species, a *Megadromus* and a *Holcaspis* species are found nowhere else, while *Megadromus haplopus* is restricted to the area around the eastern part of the Horse Range.

Thus Trotters Creek catchment supports a large number of localized plants and animals while Trotters Creek supports an unusually rich invertebrate and vertebrate aquatic fauna, which must be protected by not reducing the flow of water in Trotters Creek.

Yours sincerely,

*Anthony Harris 22 January 2009*

Anthony Harris.

1700

10.2 (1947) PMS

## CHARACTERISTICS OF THE TROTTERS GORGE INVERTEBRATE FAUNA

A distinctive Central and Eastern Otago invertebrate fauna has its northern boundary roughly along the St. Bathans, Kakanui, and Horse Ranges (although further inland, it extends to the Waitaki River), while the South Canterbury fauna is bounded in the south east by the same hills. This has resulted in Trotters Gorge having a distinctive fauna, comprised partly of overlapping Otago and Canterbury faunas, and a unique endemic element consisting of species restricted to the area around Trotters Gorge, and which may be autochthonous.\*

Many polytypic<sup>\*</sup> species have distinctive Central Otago and Canterbury populations. These break down in the vicinity of Trotters Gorge, and intermediate hybrid individuals with a combination of Otago and Canterbury characters occur there.

The spider wasp Priocnemis (Trichocurgus) carbonarius and an undescribed species<sup>(Now Priocnemis (Trichocurgus) (Crawi))</sup> provides a good example of this characteristic. Otago females of the first species have a small space between the eye and the base of the jaw (termed the "malar space"), while this area is large in Canterbury populations. The undescribed species shows the opposite condition, the malar space is large in Otago and small in Canterbury. Both species comprise mixed populations at Trotters Gorge with a complete range of intermediates.

Striking examples of the distinctiveness of Trotters Gorge insects occur among the flightless Carabid ground beetles. Two undescribed species, a Megadromus and a Holcaspis, are found nowhere else but Trotters Gorge, while Megadromus haplopus is restricted to the area around the eastern part of the Horse Range.



This List made September 1980

2

Tubificidae

Limnodrilus sp.

Naididae

Chaetogaster sp.

PHYLUM ECTOPROCTA (POLYZOA)

Gymnolaemata

Paludicella articulata (figs. 7, 8) Superficially resemble colonial Hydrozoa like Cordylophosa, but are much higher organisms. The tentacles are arranged in a row, and form a structure called a "lophophore".

PHYLUM MOLLUSCA (Shells and their allies). (Most of the species listed occur in front of the University hut.)

Gastropoda

Hydrobiidae

Potamopyrgus antipodarum (fig. 9, 10)

Lymnaeidae

Lymnaea tomoentosa (fig. 11)

Physidae

Gyrdulus kahuica (fig. 12, 13)

Physastra variabilis (fig. 14)

Bivalvia

Sphaeriidae

Sphaerium novaezelandiae (figs. 15, 16)

Pisidium (Rivulina) casertanum (fig. 17)

PHYLUM ARTHROPODA

Class. Crustacea

Ostracoda

Candonocypris candonites (fig. 18)

Candonocypris sp.

Herpetocypris pascheri (fig. 19)

Cladocera

Chydoriidae

Chydorus sp. (fig. 20)

Copepoda

Cyclopidae

Macrocylops sp. (fig. 21)

Amphipoda

Paracorophium excavatum (fig. 22)

Decapoda

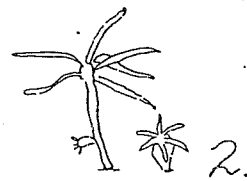
Paranephros zealandicus (fig. 23) Freshwater crayfish

List of Macroinvertebrate species collected in Trotters Stream near the Otago University Hut on 24th May, 1980 (illustrated and annotated).

PHYLUM PORIFERA (Sponges)

Spongillidae

Ephydatia kakahuensis (A freshwater sponge)



PHYLUM COELENTERATA (Hydras, jelly fish)

Chlorohydra viridissima (fig. 1, 2)

Cordylophora idacustris (fig.3)

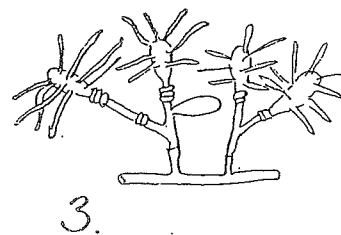
PHYLUM PLATYHELMINTHES (Flatworms)

Tricladida

Planariidae

Cura pinguis

Neppia sp.

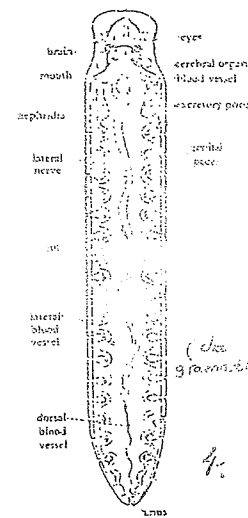


Rhabdocoela

Phaenocopa sp.

Mesostoma ehrenbergii

Rhabdocoela sp.



PHYLUM NEMERTEA (Proboscis worms)

Tetrastemmatidae

Prostoma sp. (fig. 4)

PHYLUM NEMATODA (Thread/round worms)

in det. (fig. 5)

PHYLUM ANNELIDA (segmented worms)

Hirudinae (leeches)

Glossiphoniidae

Placobdella maorica (fig. 6)

Oligochaeta (Annelids of the earthworm type)

Lumbricidae

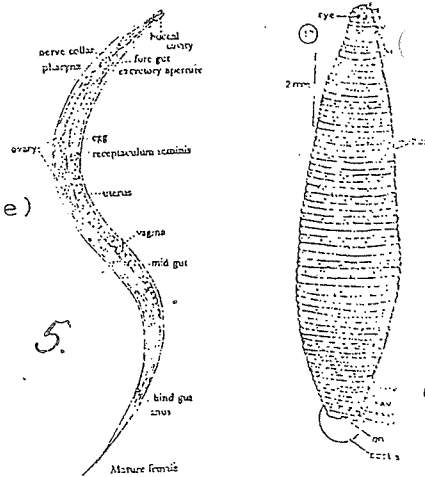
Eiseniella sp.

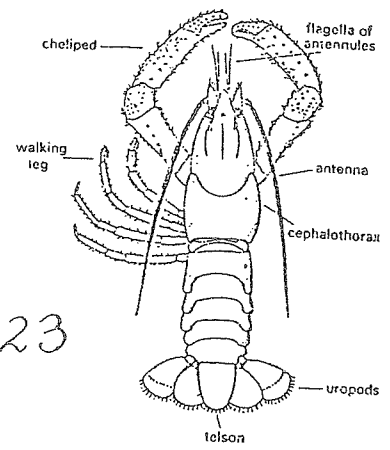
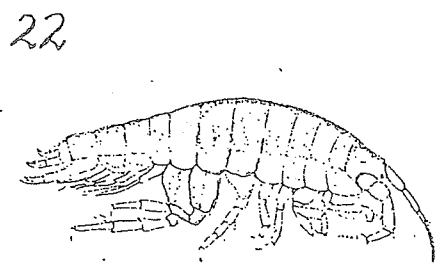
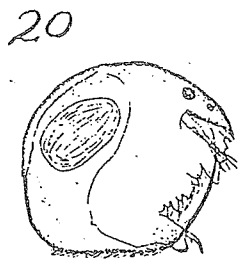
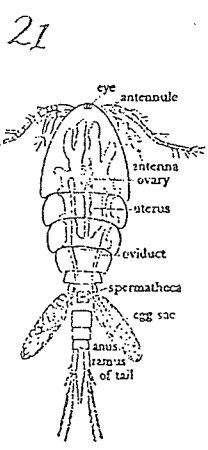
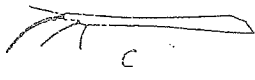
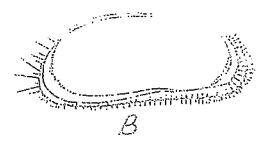
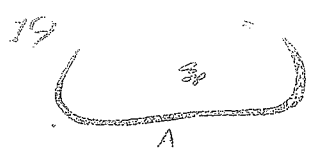
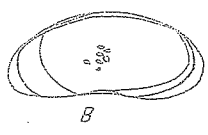
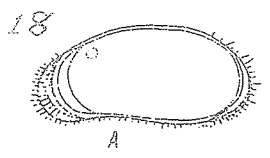
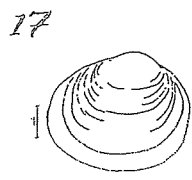
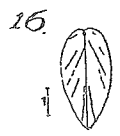
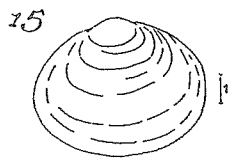
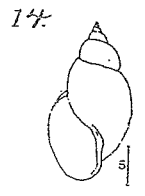
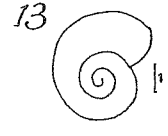
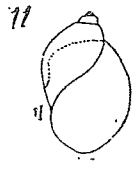
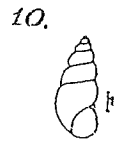
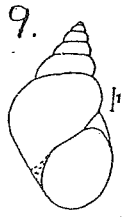
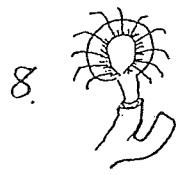
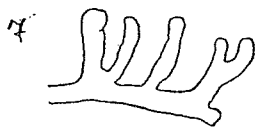
Lumbriculidae

Lumbriculus sp.

Phreodrilidae

Phreodrilus sp.





Class. Insecta (Insects)

O. EPHEMEROPTERA (Mayflies)

Siphonuridae

Nesameletus sp. (fig. 24) Small swimmer mayfly. (Smaller than Oniscigaster. Feathery tails.)

Oniscigaster sp. (fig. 25) Large swimmer mayfly. (Note the feathery tails. O.wakefieldi prefers quieter water, in which it swims.)

Ameletopsis sp. (fig. 26)

Coloburiscus sp. (fig. 27)

Siphlaenigmatidae

Siphlaenigma sp.

Leptophlebiidae

Zephlebia sp. a (fig. 28) (Larvae of all species of the genus Zephlebia have double gills. Both tarsal claws alike e.g. on fore tarsus) (c.f. Deleatidium which genus it resembles)

Z. sp. b

Z. sp. c

Deleatidium sp a. (fig. 29) (Most (but not all) Deleatidium larvae have single gills. Tarsal claws (e.g. of fore tarsus) dissimilar (not alike)

D. sp. b

D. sp. c

Atalophlebioides sp.

Ephemeridae

Ichthyotus sp. (fig. 30) Larvae are unusual in that they burrow in fine shingle, mud silt, gills feathery.

O. NEUROPTERA (Lacewing, Alderflies)

Archichauliodes diversus (fig. 31) (Dobsonfly, Alderfly) (The larva (black creeper) is very abundant in Trotters Stream, under rocks: (New Zealand's only freshwater neuropteran.)

O. ODONTATA (Dragonflies damselflies)

Anisoptera (Dragonflies)

Procordulia grayi (fig. 32) Gray's dragonfly.

Zygoptera (Damselflies)

Xanthocnemis zealandica (fig. 33) Red damselfly

Austrolestes colensonis (fig. 34) Large damselfly, (males blue, females green)

O. PLECOPTERA (Stoneflies)

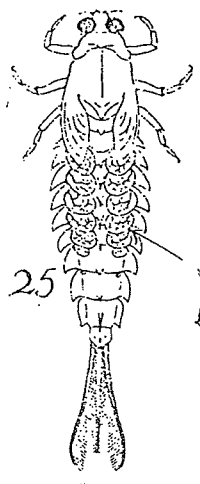
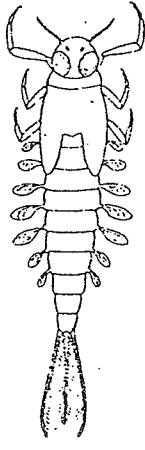
Eustheniidae

Stenoperla sp. (fig. 35)

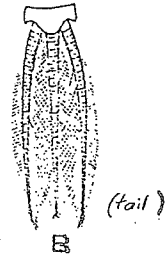
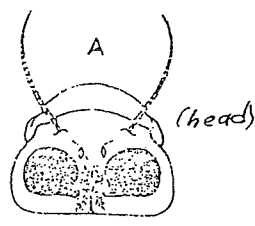
Austroperlidae

Austroperla sp.

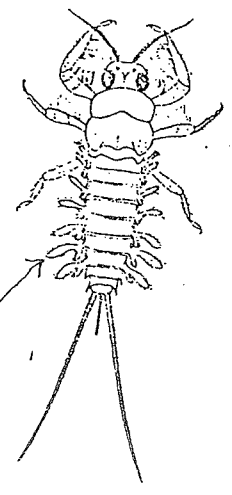
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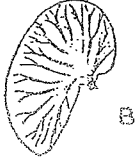
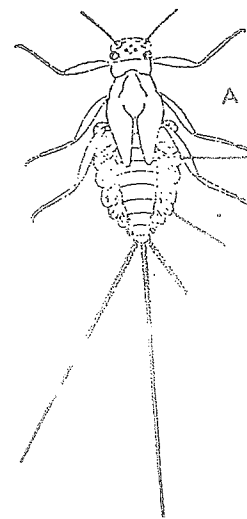
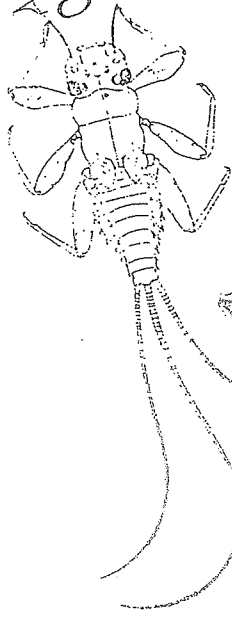
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24-gill



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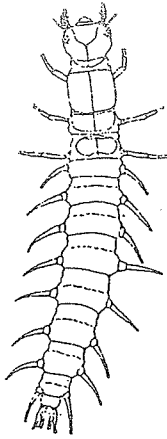
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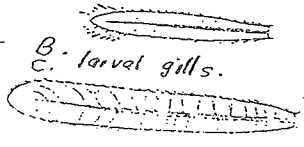
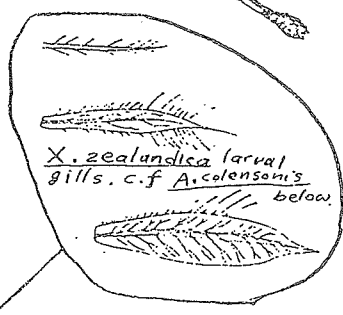
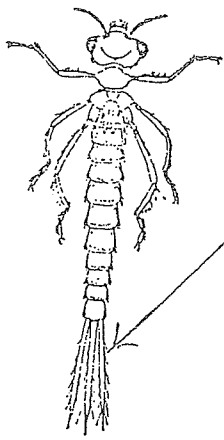
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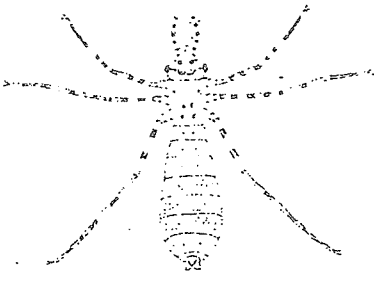
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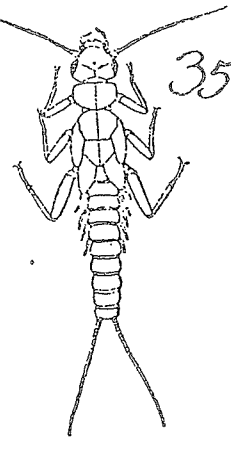
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35



Gripopterygidae

Megaleptoperla sp.

Acroperla sp.

Zelandoperla sp. (fig. 35)

Zelandobius sp.

Notonemoaridae

Halticoperla sp.

O. HEMIPTERA (True bugs)

Veriidae

Microvelia macgregori (fig. 36) Little water skater

Notonectidae

Anisops assimilis (fig. 37) Back-swimmer

Corixidae

Sigara arguta (fig. 38) Waterboatman

Hydrometra sp. (fig. 39) Water-measurer

O. COLEOPTERA (Beetles)

Dytiscidae (Carniverous waterbeetles)

Antiporus strigosulus (fig 40)

Liodesus deflectus

Rhantus pulrerosus (fig. 41)

Staphylinidae indet. (rove beetles)

Hydraenidae

Orchymandia sp. (fig. 42)

Helodidae (These beetles are very unusual in that the aquatic larvae have long, multi-segmented antennae. )

Cyphon sp. (fig. 43)

2 undescribed genera

Ptilodactylidae

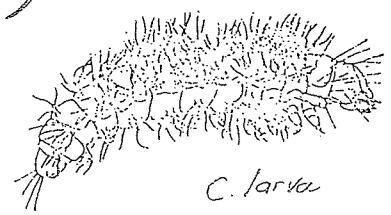
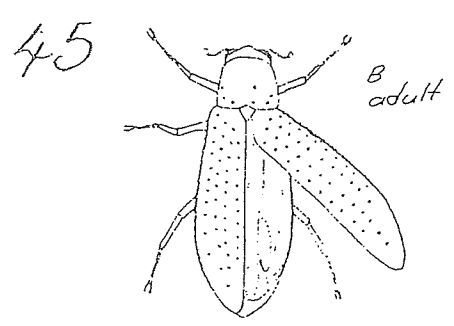
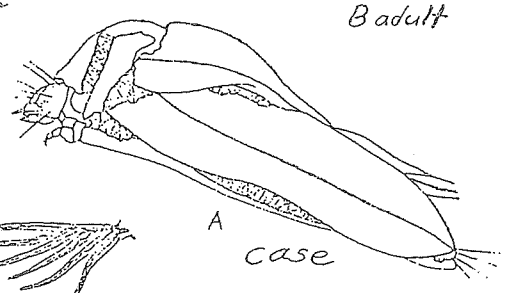
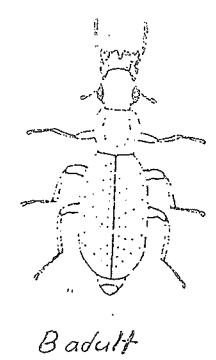
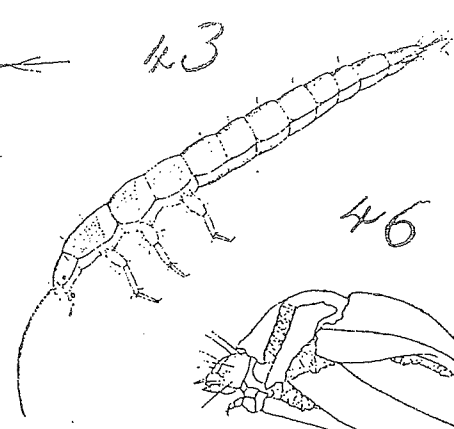
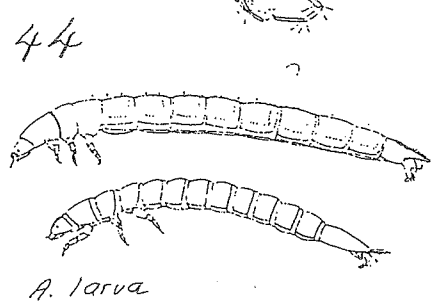
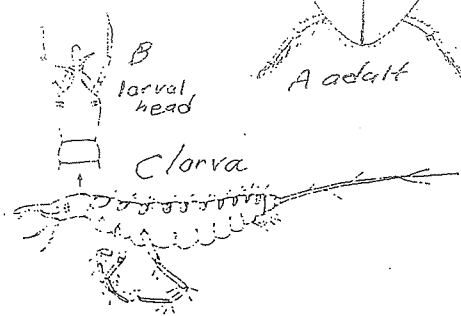
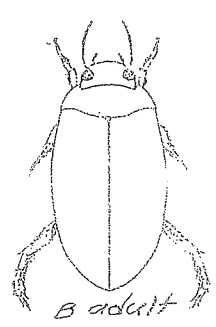
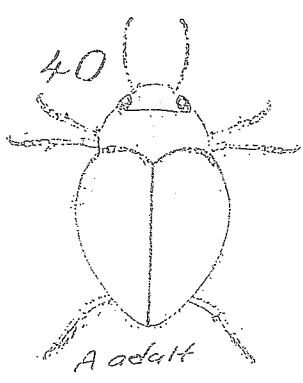
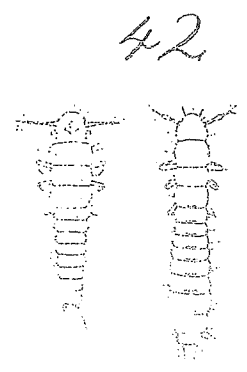
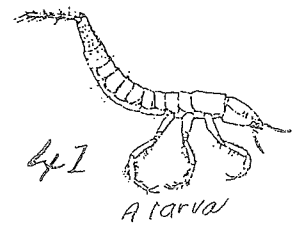
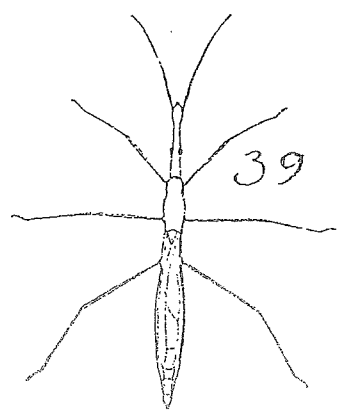
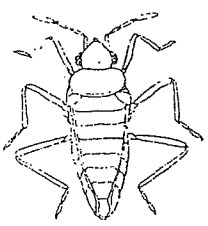
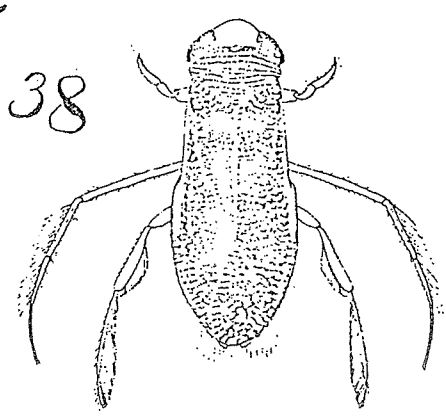
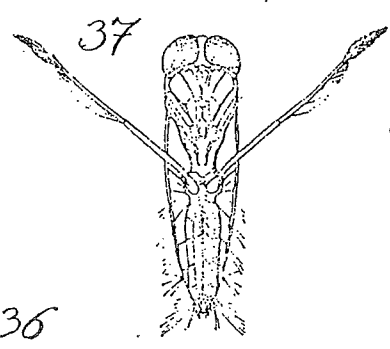
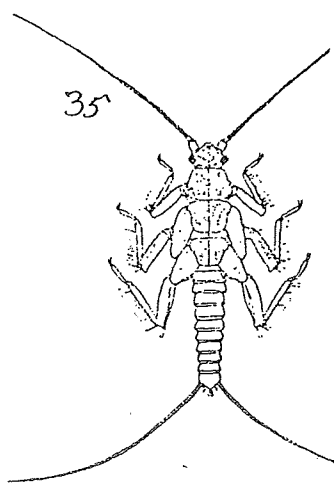
Byrrhocryptus sp. (fig. 44)

Elmidae

Hydora sp. (fig. 45)

O. LEPIDOPTERA (Butterflies and moths)

Nymphula nitens (Butler) (fig. 46) The pond moth. (Larvae only are aquatic, and breathe via gills. They live in underwater cases made of leaves joined with silk.)



0. TRICHOPTERA (Caddis flies)

Hydropsychidae (Larvae fish from nets; do not construct caves)

Aoteapsyche colonica (fig. 47)

Aoteapsyche tepoka

Polycentropodidae (Larvae spin nets and galleries; do not build cases)

Polyplectropus puerilis (fig. 48)

Philopotamidae (Larvae usually freeliving; do not build cases)

Dolophilodes (Hydrobiosella) Stenocerea (fig. 49)

Sericostomatidae (Larvae build conical, tapered, cases)

Pycnocentria eucta

Olinga feredayi (fig. 50)

Helicopsychidae (Larvae build spiral cases)

Helicopsyche albescens (fig. 51)(Case on underside of stones, e.g. in front of Trotters Gorge, University hut.)

Leptoceridae (larvae build conical, tapered cases)

Triphectides obsoleta (fig. 52)

Hudsonema aliena (fig. 53)

0. DIPTERA (True flies)

Tipulidae (fig. 54, 55). (Crane flies)

Limoniini indet.

Paralimnophora skusei (fig. 55)

Psychodidae (Moth flies)

Psychoda sp. (fig. 56)

Culicidae indet. (fig. 57) (Mosquitoes)

Dixidae indet. (fig. 58) (Dixa midges)(Live in backwaters.)

Chironomidae (fig. 59) (non-biting midges)

Tanypodinae indet.

Lobodiamesa sp.

Cricotopus sp.

Chironomus zealandicus

Polypedilum sp.

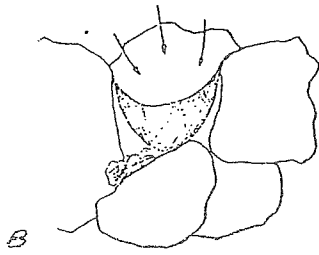
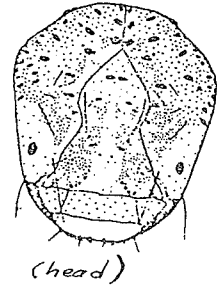
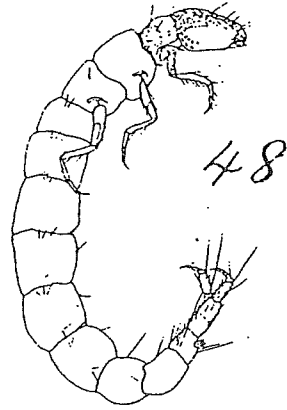
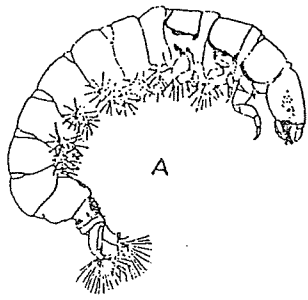
Ceratopogonidae ( 2 sp. in det) (fig. 60). (Biting midges)  
(Larvae occur in moss and algae in streams, are eel-like, and lash about.)

Simuliidae (sandflies)

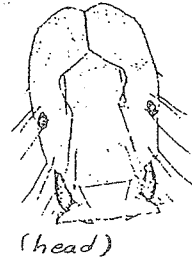
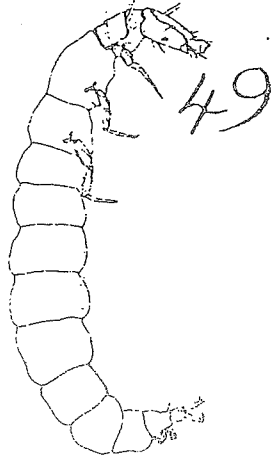
Austrosimulium sp.(fig. 61)



47



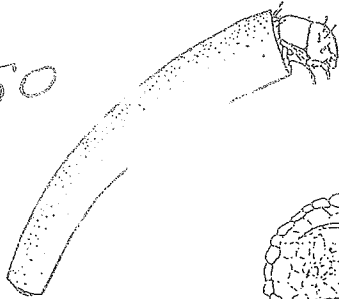
larva and its fishing net



52



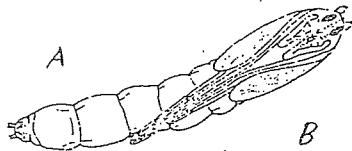
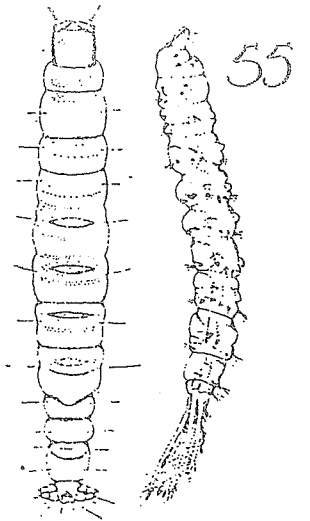
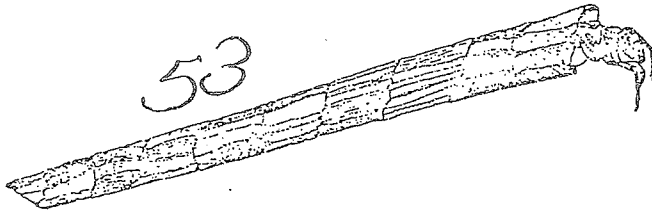
50



54

D

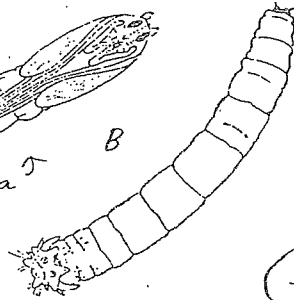
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54

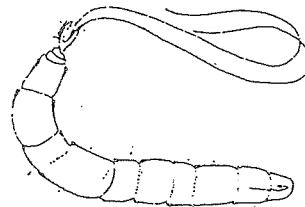
pupa

B



54

C



(Tipulid larvae)

(54-55: Tipulidae)

Tababidae indet. (fig. 62) (Gad flies) (Occur in backwater in front of University hut.)

Stratiomyidae (3 spp. indet) (fig. 63) (Solider flies) (Note the thick, leathery skin of the larva (or "leatherback"))

Syrphidae (indet) (fig. 64) (Hoverflies and drone flies) (Larvae often have a posterior siphon (e.g. the "rat-tailed maggot"))

Empididae (indet) (fig. 65)

Blepharoceridae (indet) (fig. 66) (net-wing midges, torrent flies) (Larvae have a row of ventral suckers. On stones in swiftly flowing water.)

Ephydriidae (indet)

Muscidae (indet) (fig. 67) (Houseflies) (Some species have aquatic larvae. One of these occurs in the sedges in front of the University hut.)

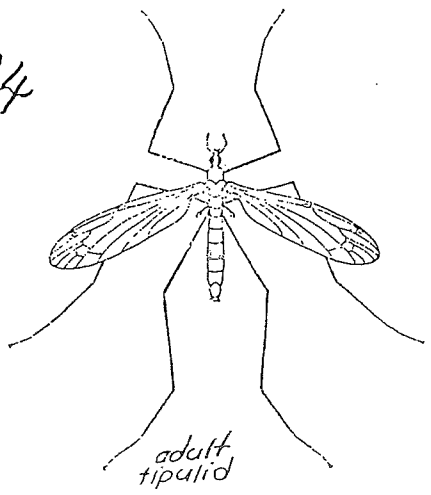
Class ARACHNIDA (Spiders and their allies)

Araneidae (True spiders)

Linyphiidae

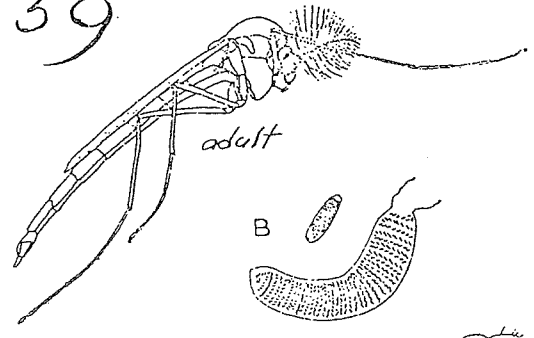
Mynoglenes titan \ This small spider spins its web

54

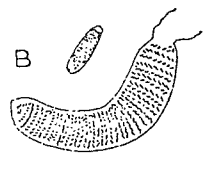


adult tipulid

59

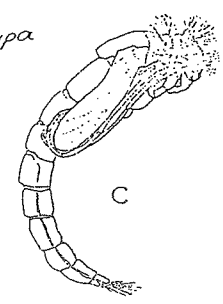


adult



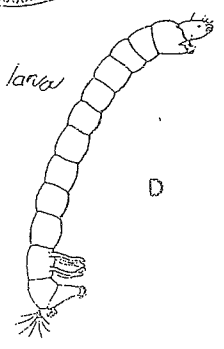
B

pupa



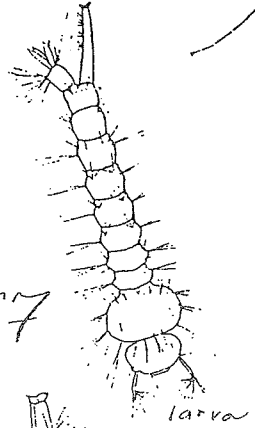
C

larva

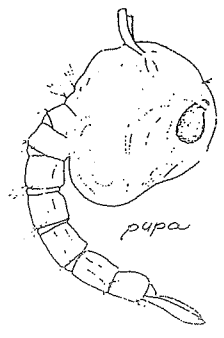


D

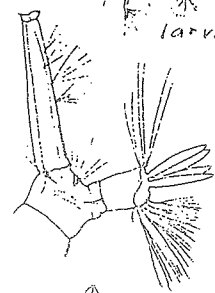
57



larva

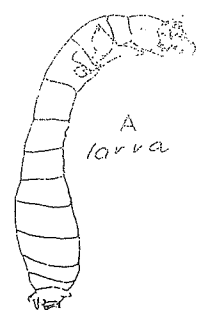


pupa

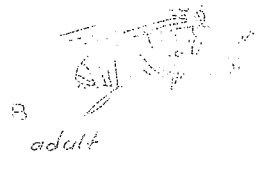


larval siphons

61



A larva

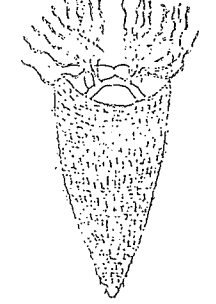


B adult



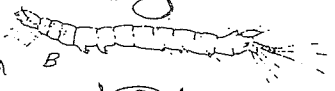
wing D

C pupa



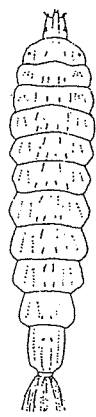
58

A

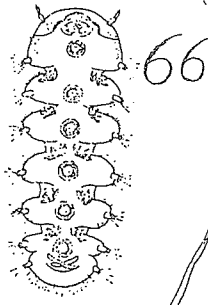


58

B

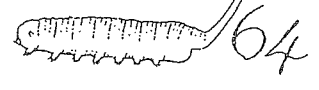


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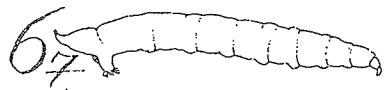


66

62

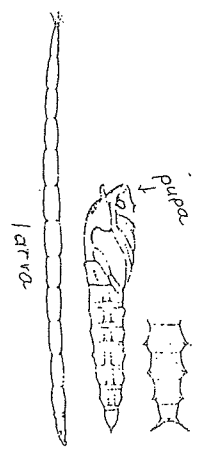


64



67

60



larva

pupa



SELECTED BIBLIOGRAPHY (over):

The following books and papers may be consulted for the identification of New Zealand stream invertebrates, and most of the will be available in the Trotter's Gorge hut.

---

(UPDATE)

The most useful general reference appeared a year after this list was written, viz.

Winterbourne, M.J., & Gregson, K.L.D. 1981. Guide to the Aaquatic insects of New Zealand. Bulletin of the Entomological Society of New Zealand 5:80p.

Ward, H.B., & Whipple, G.C. (Edition edited by Edmondson, W.T.) 1982 (reprint). Freshwater biology. Wiley, U.S.A. 1248.

## GENERAL

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- TOWNS, D.R. 1978. Some little known benthic insect taxa from a northern New Zealand river and its tributaries. N.Z. Entomol. 6 : 409 - 19.
- USINGER, R.L. 1956. Aquatic Insects of California. U of C Press (the best keys to families and sometimes lower taxa including many found in N.Z.)
- MERRITT, R.W. & CUMMINS, K.W. 1978. An Introduction to the Aquatic Insects of North America. Kendall/Hunt. (keys to families; not as useful as Usinger).

## OLIGOCHAETA

- BRINKHURST, R.O. 1971. The aquatic Oligochaeta known from Australia, New Zealand, Tasmania and adjacent islands. Univ. of Queensland Dept. of Zoology (8) : 99 - 128.
- BRINKHURST, R.O. & JAMIESON, B.G. 1971. The Aquatic Oligochaeta of the World. Oliver & Boyd.
- MARSHALL, J.W. 1975. A photographic guide to some freshwater Oligochaeta found in Canterbury streams. Mauri Ora 3 : 19 - 25.

## HIRUDINEA (leeches)

- MASON, J. 1974. Studies on the freshwater and terrestrial leeches of New Zealand - 1. Family Glossiphoniid Vaillant. J. Roy. Soc. N.Z. 4 : 327 - 43.

## MOLLUSCA

- WINTERBOURN, M.J. 1973. A guide to the freshwater Mollusca of New Zealand. Tuatara 20 : 141 - 59.

CRUSTACEA

CHAPMAN, M.A. & LEWIS, M.H. 1976. An Introduction to the Freshwater Crustacea of New Zealand. Collins.

INSECTA

Ephemeroptera (mayflies)

PHILLIPS, J.S. 1930. A revision of New Zealand Ephemeroptera. Parts 1 & 2. Trans. N.Z. Inst. 61 : 271 - 390. (still the basic reference; keys are useful to genera (not species) except for double-gilled Leptophlebiidae; Rallidens and Siphlaenigma were not known at this time).

PENNIKET, J.G. 1962. Notes on New Zealand Ephemeroptera III. A new family, genus and species. Rec. Canterbury Mus. 7 : 389 - 98. (Siphlaenigma) ;

PENNIKET, J.G. 1966. Notes on New Zealand Ephemeroptera IV. A new siphonurid subfamily : Rallidentinae Rec. Canterbury Mus. 8 : 163 - 175.

TOWNS, D.R. & PETERS, W.L. 1978. A revision of genus Atalophlebioides (Ephemeroptera ; Leptophlebiidae) N.Z. J. Zool. 5 : 407 - 14

TOWNS, D.R. & PETERS, W.L. 1979. Three new genera of Leptophlebiidae (Ephemeroptera) from New Zealand N.Z.J. Zool. 6 : 213 - 35.

PLECOPTERA (stoneflies)

McLELLAN, I.D. 1969. A revision of the genus Zelandobius (Plecoptera : Antartoperlinae). Trans. R. Soc. N.Z. Biol. Sci. 11 : 25 - 41.

McLELLAN, I.D. 1973. Revisions and new taxa in New Zealand Notonemouridae (Insecta ; Plecoptera). N.Z.J. Mar. Freshwat. Res. 6 : 469 - 81.

McLELLAN, I.D. 1977. New alpine and southern Plecoptera from New Zealand, and a new classification of the Gripopterygidae, N.Z.J. Zool. 4: 119 - 47.

ZWICK, P. 1979. Revision of the stonefly family Eustheniidae (Plecoptera), with emphasis on the fauna of the Australian region. Aquatic Insects 1 : 17 - 50.

TRICHOPTERA (caddisflies)

COWLEY, D.R. 1978. Studies on the larvae of New Zealand Trichoptera. N.Z.J. Zool. 5: 639 - 750.

McFARLANE, A.G. 1951. Caddis fly larvae (Trichoptera) of the family Rhyacophilidae. Rec. Canterbury Mus. 5 : 267 - 89.

McFARLANE, A.G. 1976. A Generic revision of New Zealand Hydropsychinae (Trichoptera). J.R. Soc. N.Z. 6 : 23 - 35.

DIPTERA (2-winged flies)

CRAIG, D.A. 1969. A taxonomic revision of New Zealand Blepharoceridae and the origin and evolution of the Australasian Blepharoceridae (Diptera: Nematocera). Trans. R. Soc. N.Z. Biol. Sci. 11 : 101 - 51.

DUMBLETON, L.J. 1973. The genus Austrosimulium Tonnoir (Diptera : Simuliidae) with particular reference to the New Zealand fauna. N.Z.J. Sci. 15 : 480 - 584

BRUNDIN, L. 1966. Transantarctic relationships and their significance, as evidenced by chironomid midges. With a monograph of the subfamilies Podonominae and Aphroteniinae and the austral Heptagyiae. Kung. Sv. Vet. Akad. Handl. (4) 11 : 1 - 472.

FORSYTH, D.J. 1971. Some New Zealand Chironomidae (Diptera). J.R. Soc. N.Z. 1 : 113 - 144.





SUBMISSION FORM Proposed Plan Change 1B Minimum Flows to the Regional Plan: Water for Otago

Form 5, Clause 6 of the First Schedule, Resource Management Act 1991.

OTAGO REGIONAL COUNCIL RECEIVED DUNEDIN 25 JAN 2009 DIR TO RE221

15

Office use only

Full name of submitter: LYN, EVAH Richards

Name of organisation (if applicable):

Postal address: 22 Craighall Crescent Wakari Dunedin Postcode: 9010

Telephone: Fax:

Email: Contact Person:

I wish /do not wish (circle preference) to be heard in support of my submission.

If others made a similar submission, I will consider presenting a joint case with them at a hearing. (Cross out if you would not consider presenting a joint case).

No appearance by me

Signature of submitter: L.E. Richards Date: 25/1/2009 (or person authorised to sign on behalf of person making submission).

Please note that all submissions are made available for public inspection.

The parts of the proposed plan change that my submission relates to are:

(Give clear references if possible e.g. reference number, policy x, rule y)

My submission is:

(Include whether you support, oppose, or wish to have amended the parts identified above, and give reasons)

Minimum flows need to rise in places higher.

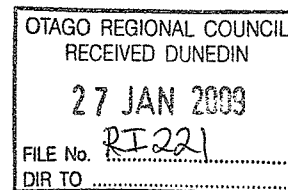
Build more water tanks for storing rain water.



**Sarah Valk**

16

**From:** M & J Hollis [mel.hollis@xtra.co.nz]  
**Sent:** Tuesday, 27 January 2009 08:55  
**To:** Policy Reply  
**Subject:** Trotters Creek!  
**Importance:** High



Good morning,

My name is **Melvyn (Mel) Hollis**, 63 Stirling Cres, Mosgiel, Dunedin 9024 – 489 5452

I understand that you are calling for submissions for or against a minimum flow for **Trotters Creek** of 8 litres per sec.

I **oppose** the setting of 8 litres per sec.

This ecosystem requires a more realistic minimum flow to maintain the aquatic creatures during the low flow summer period and from research studies I have recently viewed, the minimum flow should not be set at anything less than **20** litres per sec.

My personal opinion after travelling around this province is that subsequent councils over many years are allowing abstraction of far too much water out of our rivers and streams and it is high time that the ORC learnt to say "**No**" to continued requests for increased water abstractions!

I would strongly urge the ORC to re-evaluate the minimum flows for the Taieri, & Shag Rivers also, as they are all allowed to drop far to low during the summer period, which reflects disgracefully on current attitudes to the importance of our waterways for future generations.

I also believe that the ORC has sadly neglected responsibility towards the Waikouaiti River and it is high time that a realistic minimum flow was set for this waterway too!

Sincerely

Mel Hollis, Dunedin

27/01/2009





**SUBMISSION FORM**  
**Proposed Plan Change 1B Minimum Flows**  
**to the Regional Plan: Water for Otago**

Form 5, Clause 6 of the First Schedule, Resource Management Act 1991.

17

Office use only

Full name of submitter: Noel George Trewathan

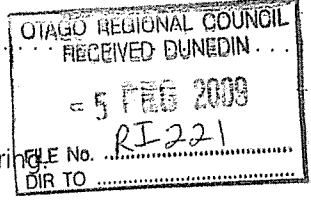
Name of organisation (if applicable): .....

Postal address: Lindisvale No 3RD Cromwell

Postcode: .....

Telephone: 03445 2864 Fax: 03 445 2865

Email: Trewathan@stra-co.nz Contact Person: .....



I wish / do not wish (circle preference) to be heard in support of my submission.

If others made a similar submission, I will consider presenting a joint case with them at a hearing. (Cross out if you would not consider presenting a joint case).

Signature of submitter: [Signature] Date: 24 Jan 09  
 (or person authorised to sign on behalf of person making submission).

Please note that all submissions are made available for public inspection.

**The parts of the proposed plan change that my submission relates to are:**

(Give clear references if possible e.g. reference number, policy x, rule y)

.....  
 .....  
 .....  
 .....  
 .....

**My submission is:**

(Include whether you support, oppose, or wish to have amended the parts identified above, and give reasons)

That the minimum flow can be set as low as zero where streams have been dry on occasions over the past 50yrs plus, as aquatic ecosystems and natural character have adapted.  
That the priority system is managed by local communities.





**I seek the following decision from the local authority:**

(Give precise details e.g. changes you would like made)

THE MINIMUM FLOW FROM OCTOBER - APRIL BE LIFTED TO 20 LITRES/SECOND.

Fold

**SUBMISSIONS MUST BE RECEIVED BY 5.00 PM, MONDAY 9 MARCH 2009.**

Please fold and secure with a small piece of tape.

Fold

FreePost Authority ORC 1722



**Otago Regional Council**  
Private Bag 1954  
Dunedin 9054

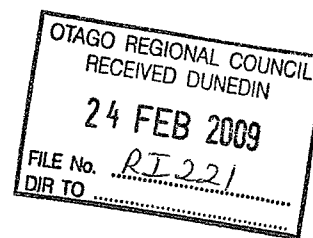
Attention Policy Team



**Sarah Valk**

19

**From:** Brian Turner [blturner@xtra.co.nz]  
**Sent:** Monday, 23 February 2009 16:35  
**To:** Policy Reply  
**Subject:** submission/Trotters Creek



### Minimum Flow Submission

### Trotters Creek

My name is Brian Turner. I live in Oturehua, Central Otago. I am a writer, poet, recreationalist and, in the eyes of many, a prominent interpreter of the nature and value of the southern environment. I've had a liking for Trotters Creek since my parents first took me there in the 1950s. As with a great many southern creeks, streams and rivers, I have seen it deteriorate over time, for reasons that must surely be all too familiar to staff and councilors of the ORC. So the question is, what are you going to do about helping stop the rot, and reverse it where possible?

When it comes to minimum flows they must be generous, not skimpy, marginal.

I support a winter minimum flow of 35 litres a second, 20 over summer, and ask that the weir used to divert water into the storage pond be removed during winter. Fish have to be able to get up and down the creek.

I believe someone has recommended a minimum summer flow of only 8 litres a second. That is outrageous. That would reduce the stream to a dribble of lukewarm piddle.

I have seen a draft of Mr Morgan Trotter's submission and declare my support for the points he makes and arguments he advances. They are sensible, informed, telling. Please heed them.

Brian Turner

Main Road

Oturehua

Central Otago 9339

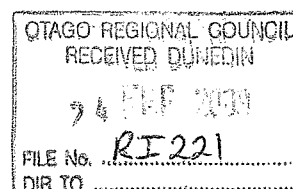
[blturner@xtra.co.nz](mailto:blturner@xtra.co.nz)



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Monday, 23 February 2009

Policy Team  
Otago Regional Council  
Private Bag 1954  
Dunedin 9054



Dear Sir/Madam

**Re: Trotters Creek Minimum Flow Submission**

My name is Richard John Fitzpatrick and I wish to make a personal submission in the matter of setting a minimum flow on Trotters Ck in North Otago. I have been a keen angler all of my life and have always had an interest in all facets of stream biology. I have also had over 10 years of professional involvement in stream surveys across Otago and Southland, including electric fishing, drift diving, angler surveys and habitat/water quality assessment. In that time I have studied many small streams similar to and including Trotters Ck.

**My Submission is that I oppose the setting of the summer minimum flow at 8 litres per second.**

**I would like to support a summer minimum flow of at least 20 litres per second and a winter minimum flow of at least 35 litres per second to protect the natural biodiversity present in Trotters Ck.**

My reasons for opposing this proposed minimum flow are as follows:

1. The regional council's own report (Management Flows for Aquatic Ecosystems in Trotters Creek, pp 14) recommends that a flow of 20 litres per second would be needed to protect the biodiversity in this stream. Therefore I believe it would be irresponsible to allow a minimum flow of any less than this figure.
2. In my experience, there are few streams with as many species of native and introduced fish as Trotters Ck. Many streams have historic records of various species of fish, but when you go and look nowadays many or even all of the recorded species are unable to be found. This can often be attributed to deterioration in habitat and/or water quality as a result of changing land use and/or intensification of existing use in the catchment. When I last surveyed Trotters Ck by electric fishing in 2007, I found at least 8 species of fish (I say at least 8 as some species of galaxid are difficult to distinguish in the field). On this occasion I was giving a demonstration for local iwi on some of the values in the stream. The abundance of fish was impressive and I believe that a more in depth inspection would have revealed even more diversity.
3. The mean annual low flow for Trotters Ck is estimated at 23 litres per second, therefore a flow of 8 litres per second would only occur naturally under severe

drought conditions. It would also be very rare for this to extend over a period of more than a few days or possibly weeks at a time under natural conditions. Fish are adapted to cope with these low flows from time to time, but populations are depleted and require good intervening seasons to rebuild. Setting such a low minimum flow would potentially see the equivalent of severe drought conditions imposed on the creek every summer for up to 7 months without respite. This in my opinion would have a severe negative impact on both the abundance of fish and the diversity of fish species in Trotters Ck.

I believe that the Regional Council has a responsibility to take a precautionary approach to setting minimum flows to protect important natural resources of the province for future generations to enjoy.

I wish to be heard in support of my submission.

Regards,

A handwritten signature in black ink, appearing to read 'R Fitzpatrick', written in a cursive style.

Richard Fitzpatrick. BSc.

Return Address:      Richard Fitzpatrick  
                                 PO Box 8076  
                                 Dunedin 9010