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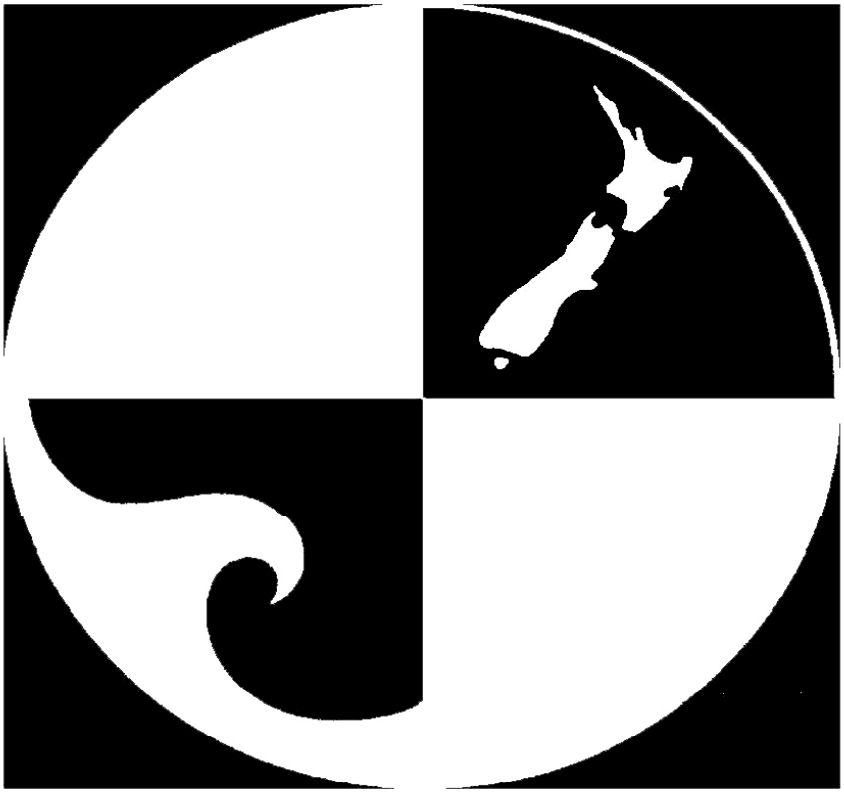


New Zealand Freshwater Sciences Society Newsletter

Number 40
April 2005

Contents

Editorial

Welcome to the first newsletter of the New Zealand Freshwater Sciences Society (and the 40th of the New Zealand Limnology Society)! In response to comments at the AGM, we thought it might be interesting to trial 2 newsletters this year. I thought it would be a good idea to vary the aim and content of each newsletter. The spring newsletter (around August) will most likely have a similar format to previous years and provide a summary of what everyone has been up to over the last year. The autumn newsletter (this one) focuses on more immediate items and aims to have a "newsy" feel to it. It's all a bit experimental but I hope you enjoy this first "go". Any comments or recommendations for future newsletters would be much appreciated. I'm really pleased with the effort that's been made to get contributions in for this newsletter – it's a difficult time of the year, with fieldwork dominating for many. Thanks very much. I think we've managed to capture a good cross-section of limnological news. Read on!!

Cheers
Ngaire

Presidents Corner

A busy time of year for any of us involved with field work!

Conference

Preparations are well advanced for this year's joint conference with the Ecological Society to be held in Nelson at the earlier time of 29th August to 2nd of September. You should soon receive information on what is happening from Trevor James and the team, so make sure you keep the time free.

Name Change

The change of our name to the New Zealand Freshwater Sciences Society is now officially accepted. Secretary/Treasurer Brian Sorrell has received advice that authorities such as Inland Revenue are relaxed about a change of 'trading' name, as the official name still remains. When new letterhead, complete with the old logo, has been received, we will advise the Royal Society. Our website should be changed to reflect the new name shortly.

Government's Freshwater Sustainable Development Programme of Action

Rob Davies-Colley made a sterling effort in putting together a submission on behalf of the Society to the Freshwater component of the Government's 'Sustainable Development Programme of Action', which was due in mid March. Thanks for your efforts Rob. No other members volunteered to assist with this important task. A copy of his work, with a few comments of mine, is available with this newsletter. Our major thrust is that the role of research is poorly defined and that there are areas where either research is required or where its application needs to be better targeted. This is in contrast to a view held by some policy makers and councils that many of the research issues are resolved. In many key areas like those defined in the programme such as instream flow and diffuse source pollution modelling, we have a great deal more work to do.

The Government is halfway through a 4 year programme, so there will likely be further opportunity for us to provide comment. I note the Hydrological Society has gone through a more open but difficult process to develop its position, by using its website to enable comments from the membership. I would be interested if our membership wished to have such a process if we are invited to provide comment in future.

Regards

Neil Deans
President
New Zealand Freshwater Sciences Society

Members News

Projects

National Database for Fauna and Flora of Freshwater Spring Habitats

Pepe Barquin is working with **Mike Scarsbrook** at NIWA on a DOC funded project developing a national database for fauna and flora of freshwater spring habitats. The overall aim of the project is to determine the biodiversity values of freshwater spring habitats, and to identify threats to the biota and provide recommendations for effective management of these habitats.

Springs from near Arthurs Pass (right) and Mt Ruapehu (left) Photos by Pepe Barquin

Solving Mysteries in Murky Depths

The ability to see underwater using mask and snorkel or more sophisticated diving apparatus revolutionised the study of aquatic environments for biologists. However one mystery has remained – what can be found in murky water environments? Cawthron now has the technology to see what lies beneath the most turbid of waters.

During March this year Cawthron was able to hire a dual-frequency identification sonar (DIDSON) while it has its own was being built in the United States. The sonar was used to locate large trout in the Waitaki River, so that depth and velocity readings could be made of their foraging habitat. These measurements were then used to fine tune computer models that predict the amount of trout habitat available relative to flow.

Underwater visibility in the Lower Waitaki River is rarely better than 2 metres. This does not allow a diver opportunity to observe a large trout feeding without disturbing it. With the DIDSON we were able to observe trout on their feeding stations up to 15 metres away. Even in New Zealand's clearest waters this feat would be difficult. The DIDSON gave us the added advantage of determining the precise location of the fish without disturbing it. Because of the distance we were able to keep between the fish and us, the fish were unaware of our presence and appeared to move around more than we have previously observed when diving in other rivers.

Coinciding with our Waitaki survey, we were also successful in using the DIDSON to assist the Police in locating the Army Unimog that disappeared into a treacherous section of the Kawarau Gorge, killing three of its occupants.

So how does this new technology work? DIDSON uses acoustic lenses to gather the echo produced by an object amongst 96 sonar beams and converts this to an almost video quality image. We are able to capture these video images on a laptop computer that is linked to the sonar device via a cable.

Cawthron will be operating its own DIDSON in May and will be making it and an operator available for hire to other organisations. (**Susie Wood**, Cawthron)

Trout and Fish Research at Cawthron

John Hayes, **Joe Hay** (both Cawthron) and their Alaskan colleagues have been concentrating on writing an overview paper and user guide of their modelling process that predicts flow related drift transport and net rate of energy intake by trout. The models predict spatially explicit drift density and carrying capacity for trout.

John, **Rowan Strickland** and **Aaron Quarterman** (Cawthron) have been studying habitat suitability for trout in large rivers. In addition to diving, this work has also involved trialling the DIDSON (see above article) that can be used for finding fish in turbid rivers.

Rowan has continued to apply his fish passage expertise to help clients and fish surmount obstacles to fish migration. As proof of customer satisfaction elvers were found by two NCC engineers to be using one of his modified culverts the day after it was constructed!

Macroinvertebrate Community Indices for Soft-bottomed Streams

John Stark (Cawthron Institute) and **John Maxted** (Auckland Regional Council) have recently developed biotic indices for soft-bottomed streams in the Auckland region, using an objective iterative process (developed originally by Bruce Chessman in Australia) for deriving taxon tolerance scores. A free PDF copy of the report is available from the authors.

The new indices perform better than the existing MCI etc. when applied to soft-bottomed streams. There is a wider range of index values permitting better discrimination between sites, stronger relationships with environmental variables known to influence macroinvertebrate communities, more accurate identification of severely degraded sites and greater sensitivity to disturbance within land-use classes.

We plan to publish this work, and to develop an objective process for assigning scores to additional taxa and to work towards nationalising the MCI-sb. Meantime, we encourage users to give the MCI-sb a go and let us know how you get on.

A report has been prepared and also includes preliminary SOE results using the new indices, and management implications that follow from the data. The importance of riparian management and the poor water quality in urban streams are identified as key management outcomes. The report is entitled "Macroinvertebrate community indices for soft-bottomed streams in the Auckland region and applications to SOE reporting". It was distributed to regional councils, science providers, and regional ecologists on 11 February 2005; requests for hard ($25) and electronic (free) copies of the report should be sent to john.maxted@arc.govt.nz.

Auckland Ephemeral Streams Project

The ARC and NIWA are in the second year of a 3 year research project looking at the extent, functions, and values of ephemeral streams. Preliminary results indicate that (1) there are extensive aquatic resources that do not appear on 1:50,000 scale topo maps, (2) the invertebrate communities are similar to perennial streams, particularly in native bush catchments and those in rural areas with good riparian protection, and (3) winter and summer differences in hydrology were less than expected. Research on contaminant retention and processing (nitrogen, sediment, faecal coliforms) is underway. We hope to present some of these results at Limsoc this year. For more information contact **Steph Parkyn** (NIWA) or **John Maxted** (ARC).

Biodiversity of an ephemeral stream.
Photo by Steph Parkyn

The Detection Calculator

Graham McBride, Mark Meleason and **Ryan Lea** (all NIWA) have developed the Detection Calculator. The ***Detection Calculator*** (to be accessible through the NIWA website http://www.niwa.co.nz/services/statistical/ by 1 April!) enables calculations to be made for various hypothesis tests: one-sided inferiority hypothesis, one-sided superiority hypothesis, two-sided point-null hypothesis (the most common hypotheses tested, we think often inappropriately), equivalence (proof-of-hazard), and inequivalence (proof-of safety). It calculates one of: the "detection probability", the sample size (i.e., number of samples), significance level, and "effect size", once the remaining items are specified. For the equivalence/inequivalence tests you also have to state the width of the "equivalence interval". It includes some explanatory material. Full details are available in McBride (2005, April). "Using Statistical Methods for Water Quality Management: Issues, Problems and Solutions". Wiley, New York.

Chironomid News

Eumadicole midges

Ian Boothroyd continues his research and interest in the midges (Chironomidae) of New Zealand. Over recent years he has collected from a variety of madicolous habitats - the thin films of water (sometimes referred to as hygropetric habitats) that occur in seepages over rocks, in waterfalls and splash zones in freshwater environments. These are habitats that are commonly overlooked and include the concrete channels of urban streams and the sinter terraces in geothermal fields. Several species can be found in these habitats ranging from commonly occurring *Paratrichocladius pluriserialis* to more adapted *Eukiefferiella* and *Stempellina* species. See Water & Atmosphere issue 13(1) for more information.

New species of Naonella

Ian Boothroyd has recently published a new description of a second *Naonella* species (*Naonella kimihia*) from New Zealand. Originally erected as a new genus by Ian in 1995, this genus was thought to be monotypic with one species, *N. forsythi*. Whereas *N. forsythi* is more commonly found in running waters, *N. kimihia* is typically found in clear standing waters, usually attached to introduced and indigenous plants. The full description can be found in New Zealand Entomologist 27: 11-15.

Management of Urban Streams

ARC have completed a technical framework for the assessment and management of urban streams that has been distributed to the local authorities (TAs) in the Auckland region. The report provides an approach for the TAs to classify and manage their urban streams to meet the requirements in the Regional Plan using various measures that include (1) catchment impervious cover and (2) stream channel type (e.g., natural, concrete, piped). The report also directs the TAs to identify management actions for each stream class. The report is entitled "Framework for the assessment and management of urban streams in the Auckland region", and can be downloaded from the ARC web site: http://www.arc.govt.nz/ARC/about-arc/publications/arc-technical-publications.cfm#231 (**John Maxted**, ARC)

Working with our communities for a better environment - Rotorua Lakes Projects

Much scientific investigation is centred on the remediation of the Rotorua lakes. Refer to http://www.envbop.govt.nz/Water/Lakes/Lakes.asp for 'lake action' community meeting minutes and 'technical reports' for consultant and in-house reports.

The first remedial work to be under way is a constructed wetland at Lake Okaro. This will intercept the inflowing streams reducing the external input of nutrients. A mesocosm study will be undertaken in the lake to assess various treatment options to lock nutrients in the sediments and reduce the impact of the internal load.

Consents will soon be lodged to construct a wall to divert the Ohau Channel from flowing into Lake Rotoiti. This single action will be sufficient to reduce the nutrient load on Lake Rotoiti and reduce the incidence of Blue-green algal blooms. Other engineering options are being considered to reduce the nutrient load on Lake Rotorua as urgent actions. Longer term land use changes are being considered by a working party of community groups developing an action plan for the remediation of Lake Rotorua. (**John MacIntosh**, EBOP)

Creatures from the Black Lagoon??

The Environmental Research team of the Auckland Regional Council got to do something a little different this February/March when staff assisted BiosecurityNZ and DoC with the execution of a search warrant at a West Auckland address to confirm the alleged presence of smooth marron. Apparently a child had found a large strange looking creature on the forecourt of the property a few weeks earlier, which after a few telephone calls, lead to MaF being informed. The subsequent search revealed 6 smooth marron and a healthy population of previously unrecorded gudgeon (*Gobio gobio*). Both population were eradicated the following day. Subsequent enquiries lead the team to a collection of ponds in South Kaipara and surveillance confirmed the presence of large numbers of smooth marron and gudgeon in a single pond. Following recommendations of the technical advisory group comprising **Bob McDowall**, **Gerry Closs**, **Lindsay Chadderton**, **Grant Barnes** and **Steve Pullan**, the pond was drained and treated with an initial addition of hydrated lime and a follow up of sulphate of ammonia. Earlier indications suggest the eradication has been successful, though we wait with fingers crossed for the next scheduled surveillance. (**Grant Barnes,** ARC)

New mudfish record for Auckland

Members of the Environmental Research team (ARC) discovered a healthy population of black mudfish in a wetland in the Tomarata district, east of Wellsford. This is the first official record of black mudfish for the Auckland Region. (**Grant Barnes,** ARC)

WONI update

It's been some time now since the LimSoc Conference and **Philippe Gerbeaux**(for the DOC WONI team) thought it would be a good time to update everybody on how the WONI Wetland project is progressing, with some information also on the WONI rivers and lakes projects that was passed on to him by Lindsay Chadderton.

- The work with Landcare Research has been going smoothly since November. The key objectives of the contract were to develop polygon layers for regions for which we had only centre points or a mix polygon and centre point information, to delineate sub-catchments for all wetland polygon in New Zealand, and to train several DOC GIS staff in the use EcoSat imagery for polygon growing. Eventually we plan to develop a single national wetland polygon layer regions using one consistent method (next year). Unfortunately we could not achieve this under the tight timeframe we're working with for WONI.
- We are also developing a 'national' (North and South Islands only) historic wetland layer based largely upon information from Land Resource Inventory (versions 1 and 2). As I had explained in my LimSoc presentation last December while not ideal (Minimum Mapping Unit too coarse) LRI is a key consistent and reliable national database that can be used for this kind of analysis. It's proving very challenging but we are getting there. The system has been developed through a pilot study completed for the West Coast region

with some additional checks carried out in other parts of New Zealand. We are using LUC classes, soils, drainage, vegetation, topos etc . The final historic layer is likely to contain 3 categories; category one: polygons that were wetlands; category 2: polygons with LUC classes not identified as limited by wetness (but rather by soil, erosion or climate) but were most certainly wetlands; category 3: polygons that contained wetlands but that we currently are unable to delineate precisely.

- I have also been working on developing wetland typology for both the historic and current layers being developed. This will use a set of rules and be applied to all delineated wetlands, and it will be as much as possible consistent with the classification scheme proposed by Johnson and Gerbeaux (2004).
- We are focusing solely on freshwater systems at this stage of the project because the reliability of the data for the coastal (and other) wetlands varies too much between regions. Also because WONI focuses very much on freshwater systems.
- Landcare Research has also been contracted to apply the typology, and develop a series of human pressure and condition measures for each current wetland polygon. These have been developed with input from the WONI Rivers team (Lindsay Chadderton and Derek Brown in particular) to ensure consistency. The project is being led by Dr Anne-Gaelle Ausseil and John Dymond from Landcare Research, Palmerston North.
- The last step will be to crunch the numbers and generate a draft list which is likely to occur around June/July, using the same principles as in the WONI Rivers project (within the same biogeographic framework etc.). This will only be a candidate list, and it should be used carefully, as we anticipate refining the typology, pressure and conditions measures etc, which will mean that the list will evolve. As for the WONI Rivers project, a report will be written up to accompany the list. We are slightly behind schedule but would hope that it was available for comments in the new financial year.
- A list of WONI lakes is being developed using similar systems, but is presently stalled due to problems with developing a suitable typology. This should be informed from the lakes environmental classification project being funded by the DOC Freshwater Classification project. The classification project is being carried out by NIWA under Mark Weatherhead with input from Clive Howard-Williams, John Clayton, Ton Snelder, Mary De-Winton, and Ian Hawes (NIWA), David Hamilton (Waikato University), and Carolyn Burns (Otago University). Lindsay Chadderton is the DOC contact for these projects. We hope that the lakes WONI list will be completed early in the new year as capacity allows.
- The WONI rivers report has been released for public comment. We would really value any technical comments and input into the design and methodology. Our apologies but we have not had the capacity or funding to allow what we would consider a proper roll out. Key staff have been tied up with the ongoing WONI workload, restructuring and the current FoRST round. The WONI rivers list is just a "Candidate list" only. We hope to be able to refine it further as we improve the typology (derived from a multivariate river classification) and improve our pressure, condition and threatened species data. We also hope to improve its spatial resolution, so that the analysis can be done at finer scales (tributaries or reach scales). However, we want to be able to do this together with all our external partners. We are committed to starting this process, and will reconvene an ongoing multi-agency project team to help design and build this project. (Lindsay is key contact for this work).

Central Otago Galaxid work continues

Marcus Simons, **Murray Neilson**, **Peter Ravenscroft** and **Simon Madill** (DOC, Otago Conservancy) continue to survey the distribution of threatened non-migratory galaxiids in Central Otago and undertake a recovery programme for the critically threatened lowland longjaw galaxiid (*Galaxias cobitinis*)in the Kauru River. Later work is to focus on identifying critical biological factors and ways to remove or mitigate threats. The Otago Regional Council has been supporting the work.

Invertebrate dynamics in intermittent streams

Summer-dry streams occur only where there is a particular combination of climate, topography and geology. Because this combination is uncommon in New Zealand, summer-dry streams so far have received little attention in this country. With a FRST Post-doctoral

fellowship I have begun a 2 year study to characterise the invertebrate fauna and community dynamics of summer-dry streams in central Hawkes Bay and Waiheke Island. The Hawkes Bay streams are larger with cobble beds, and represent a stream type found in only a few regions of New Zealand, such as Marlborough and the Canterbury Plains. The summer-dry streams on Waiheke Island are the top 100-200 m headwaters of perennial streams, therefore are smaller with clay beds. They represent the more common type of summer-dry reach in the North Island. This year, emphasis will be on describing the temporal development of the invertebrate community through the various phases of the hydroperiod - flow, isolated pools and total drought. An important dimension of the study is the use of refuges that invertebrates may use to survive the dry period. Thus, in Hawkes Bay, the development of the invertebrate community will be compared between streams with perennial headwaters and those without. In Hawkes Bay and Waiheke, the invertebrate faunal composition of streams surrounded by native forest (which may provide various forms of drought refuge) will be compared to that in streams surrounded by open pasture.

Left top and bottom: A summer-dry stream in Hawkes Bay on 2 March and on 31 March 2005, following heavy rains

Right: A summer-dry soft-bottom headwater stream on Waiheke Island, 17 March 2005.
Photos by Richard Storey

Preliminary results from Hawkes Bay indicate that after 2 weeks of flow, streams with perennial headwaters had a variety of aquatic insects, including mayflies (*Deleatidium*), caddisflies, chironomids, riffle beetles and late instar *Archichauliodes*. Those without perennial headwaters had only a few oligochaetes and an occasional dipteran larva.

Waiheke Island streams have not yet begun flowing, but leaf litter samples from dry streambeds contained living Potamopyrgus, Physa, ostracods, limpets, chironomids and bivalves. Leaf litter samples from other dry headwaters in the Hunuas and Waitakeres contained cased caddisflies (*Taraperla*), a stonefly (*Nesoperla*), chironomids and hydrophilid beetle larvae. (**Richard Storey**, Post-Doctoral Research Fellow, NIWA Hamilton)

Research awards/grants

Last year the Entomological Society of New Zealand made **Ian McLellan** a fellow of the society. Ian is still hard at work on NZ stoneflies and odd Diptera and has now completed a manuscript on a new *Notoperla* species (Plecoptera: Gripopterygidae), from Chile. A recent publication is Bradley J. Sinclair and Ian D. McLellan, 2004: Revision of the New Zealand species of *Hydropeza* Sinclair (Diptera:Empidoidea:Ragas-Group). *Invertebrate Systematics* 18: 627-647

Brian Smith has been awarded a NIWA Technical Training Award. Brian will spend time (April) in the USA with John Morse and Ollie Flint, sorting out the taxonomy of *Zelandoptila* (once and for all!!) (see article later also).

Aslan Wright-Stow has also been awarded a NIWA Technical Training Award to study groundwater systems at the University of Lyon 1 in France. The project will involve close interaction with Dr. Florian Malard, who is a world-leading groundwater ecology researcher, and is a Principal Investigator on the PASCALIS project. The visit to his lab in May this year,

will include direct involvement in sampling a range of groundwater habitats, and learning the protocols used in groundwater biodiversity assessment in Europe. In Europe, the importance of groundwater ecosystems, and the biodiversity values they hold, have been recognised for some time. The European Union is currently funding a long-term and large-scale research programme called PASCALIS (Protocols for the Assessment and Conservation of Aquatic Life in the Subsurface). A first step in this project, led by researchers at the University of Lyon, was the production of a full set of sampling protocols that provide the basis for consistent groundwater biodiversity assessment across regions. The technician development award will provide much-needed skills in operational use of various groundwater sampling equipment, and information on development of sampling equipment specific to biodiversity assessment for application in New Zealand. For further information contact Aslan (a.wright-stow@niwa.co.nz).

Ngaire Phillips has been awarded a Royal Society of New Zealand International Science and Technology Linkages Fund. She will be spending a month at the Université Claude Bernard Lyon 1 in France (April/May) working with Professor **Sylvain Dolédec** comparing the response of French and New Zealand macroinvertebrate species traits to different stressors. This collaboration is an extension of work Ngaire has been doing as part of her post-doctoral research with NIWA, where she has been concentrating on species trait responses to metals. Ngaire, Sylvain, **Mike Scarsbrook** and **Colin Townsend** have also recently submitted a paper to JNABS examining species trait responses to land-use in the Taieri catchment.

Organisations

DOC Science Publishing has survived a major divisional restructuring within the Department of Conservation, and is now known as *Science & Technical Publishing Section*, of the new *Research, Development & Improvement Division* of DOC. The team continues to do business as usual, i.e. mostly assess, edit and publish contract research reports for its *DOC Research & Development Series, DRDS* (formerly *DOC Science Internal Series, DSIS*), *Science for Conservation, SFC* monographs, *DOC Technical Series, DOCTS* handbooks and a variety of newsletters, factsheets and occasional *real books*. An example of the latter is the hugely successful *Wetlands types of NZ* by Peter Johnson and Philippe Gerbeaux. The free copies for members of LimSoc (now *FreshSSoc*) are now exhausted but the beautiful 184-page book is still available for purchase at the very reasonable price of $40 incl. GST. Order from science.publications@doc.govt.nz (**Jaap Jasperse**)

Ryder Consulting has expanded in the past year with the recruitment of **Ruth Goldsmith** (ex-Otago University) to join the freshwater and marine expertise of **Ben Ludgate**, G**reg Ryder** (manager) and **Brian Stewart**. Based in Dunedin, Ryder continue to be busy providing consultancy services mainly in the lower half of the South Island, but also increasingly further north. In addition to environmental effects assessment and monitoring of fish, invertebrate and periphyton communities they have recently become involved with algal community monitoring in water supplies and wastewaters, and the determination of minimum flow requirements using instream habitat assessment.

People

Kate McArthur has finished study and is now working for Fish & Game. She can be contacted at k.mcarthur@wellingtonfishgame.org.nz

Pepe Barquin has finished his PhD and is spending 4 months at NIWA in Hamilton working on a DOC-funded project on biodiversity of freshwater springs. He can be contacted at p.barquin@niwa.co.nz.

Susie Wood joined the Cawthron Freshwater Group at the beginning of March. Susie has recently completed her PhD study entitled "Bloom Forming and Toxic Cyanobacteria in New Zealand - *Species diversity, distribution, cyanotoxin production and accumulation of microcystins in selected freshwater organisms"* at Massey University (Wgtn) and Victoria University. The work forming the basis of this thesis has added considerably to the knowledge of species composition, changes in composition of cyanobacterial blooms,

cyanotoxin types, distribution and species responsible for cyanotoxin production and accumulation of cyanotoxin in selected freshwater organisms. Her study demonstrated that the prevalence of freshwater cyanotoxin-producing cyanobacteria is widespread in New Zealand waterbodies and these cyanotoxins can pose a potential health risk to both humans and animals either directly or indirectly. Comparison of her species data also showed marked changes in current bloom forming species to those of 15 years ago. Susie will continue her work on toxic and bloom forming cyanobacteria at Cawthron and plans to investigate new methods for the early detection of cyanobacterial booms and cyanotoxins. She can be contacted on Susie.Wood@cawthron.org.nz

Also joining Cawthron in March was **Kirsty Smith**. Kirsty is employed as a freshwater microalgae technician in the Phytoplankton Section of Lab Services at Cawthron. She is responsible for the analysis of freshwater phytoplankton and periphyton samples for a range of clients including regional councils, water supply authorities, the Ministry of Health and private companies. Kirsty has just completed her Masters study at Victoria University investigating how trophic interactions are promoting dominance by cyanobacteria in the Lower Karori Reservoir in Wellington. Kirsty can be contacted on Kirsty.Smith@cawthron.org.nz

Kit Rutherford is spending 2 years working with catchment modellers at CSIRO, Canberra, on the 'Water for a Healthy Country: Murray Basin' project. This is looking at what needs to be done to reverse the deterioration in river and floodplain ecosystem health, including the best use of the 500 GL/year (~5% of mean annual flow) that the government has allocated for environmental use in their '1st step' decision of 2003. The modelling is looking at floodplain inundation and the tradeoffs for floodplain ecosystems. Flooding means extra water for tress and wetlands, but there are potential disbenefits for salinity and deoxygenation (black water events). The biophysical modelling is also linked to economics in an attempt to quantify basin-wide water benefits. For more details contact kit.rutherford@csiro.au

Other news

Binding Problems - Freshwaters of New Zealand

This excellent book is now available. Comments to date are extremely favourable reflecting credit on the editors and authors. To date we have distributed close to 500 copies. However, there have been a number of faults arising from the binding. Problems we are now aware of include:

Chapters 7 to 11: Parts of chapters 7-9 are swapped with a block of parts of chapters 9-11. Some pages may be upside down.
Chapters 33 to 35: Part of this block is missing and duplicated with a block of parts of chapters 35 to 37.
Chapters 45, 46, part of glossary: Missing.

We have checked all copies passing over our work desk for faults known at any given time. However, some slipped through before we became aware of the first and later problems. **Please check your copy for any faults.** If you have a mis-bound copy please get in touch with us or return the copy and we will replace it. If you find any other binding fault, I would like to know about it as we will negotiate compensation with the printer.

Lindsay & Jan Rowe
admin@hydrologynz.org.nz

NZ Freshwater Sciences Society: Comments on Freshwater Sustainable Development Programme of Action Issues and Options Paper

Thursday, 7 April 2005

Water Programme of Action

Ministry for the Environment
PO Box 10 362
WELLINGTON

Dear Sir or Madam

SUBMISSION ON FRESHWATER SUSTAINABLE DEVELOPMENT PROGRAMME OF ACTION ISSUES AND OPTIONS PAPER

Please find following a submission to this process largely prepared by Dr Rob Davies-Colley on behalf of the New Zealand Freshwater Sciences Society (formerly known as the New Zealand Limnological Society)**.**

Please advise if there is any opportunity to be heard on this topic as we would consider attending if appropriate.

Yours faithfully

Neil Deans
President

Comments on the MfE Water Programme of Action

Background

The Freshwater Sciences Society (formerly known as the New Zealand Limnological Society) is a constituent society of the Royal Society of New Zealand. The Society has existed since 1968 to promote the research into freshwater environments and dissemination of this research into the community for better management of freshwater environments. The Society's membership of some 360 people includes a mixture of research scientists, managers of freshwater environments, students and retired members. A very large proportion of the research into freshwater science in New Zealand is undertaken by our members.

The Society has been a part of the Stakeholder reference group to assist in the development of this programme.

General Comments

The Freshwater Sciences Society (FWSS) welcomes the Water Programme of Action (WPA) and the increased profile it gives the crucial freshwater supply and quality issues that are arising in New Zealand. There are many useful pointers in the WPA towards issues for action (8 in all) and actions (13 in all) to address these issues.

However, although the FWSS support the intent of the WPA we have some doubts and concerns about the 'programme' as outlined in the public discussion paper. The following 9 points of criticism are not intended to be negative, but do point out some shortcomings of the public discussion document from the perspectives of our members.

1. **Non Point source (NPS) pollution.** The WPA does not give any clear direction on how to solve the problem of NPS (or 'diffuse') pollution. The very fact that the public discussion paper finds it necessary to *define* NPS pollution (on p 12) indicates that public understanding of this issue is limited in New Zealand, and we are far from a consensus about how to effectively address NPS pollution.

2. **Point source pollution.** Although the WPA (correctly in our view) recognises NPS pollution as a more important problem in New Zealand than point source pollution, it would be a mistake to infer that the point source pollution problem has been solved in New Zealand. Although there has been considerable 'clean-up' of point sources, much of the sewage and industrial treatment applies expensive, imported technology of dubious

sustainability that wastes valuable resources (nutrients, energy). For example, sewage oxidation ponds, which have served NZ well for many years, are increasingly being replaced by expensive, energy-intensive, mechanical treatment plants such as activated sludge systems, rather than improving the pond systems or retrofitting them for higher environmental performance and energy and nutrient recovery.

3. **Information, monitoring, and research.** In our view the WPA does not give sufficient recognition of the critical roles of information and monitoring (to assemble data underpinning information) and research on which to base management of water resources. We consider that the WPA should highlight the need for good, unbiased information and monitoring. As the RMA is effects based legislation, the Society is concerned that there is little reliable data nationally available to assess trends in the state of the freshwater environment, as last outlined in the 1997 State of the Environment Report. It is our observation, as well, that many freshwater environments are threatened by potentially unsustainable activities. The rate of change in use of some freshwater environments is unprecedented, particularly the use of water in drier parts of the country, and the intensification of land use in many areas. We call on the (central) government to increase funding of research on freshwaters, particularly on NPS pollution and mitigation and on more effective ways of developing ecologically sustainable flow or water level regimes for water bodies, including wetlands. Thus, although Action 13 calls for collaboration between government, scientists, and stakeholders, the freshwater science community that our society represents can't engage in "collaboration" unless funding is available for scientist's time. This could be a major 'action' under Action 5 where there is a call for central government to increase support for local government. Enhancing Maori participation (Action 10) implies more Maori interaction with researchers such as our members – which implies more funding for research.

4. **Riparian management.** The WPA does not recognise the importance of riparian management to attenuate pollutants from land (NPS pollution) and buffer water bodies from the adverse effects of land use on aquatic habitat and water quality. This is an unfortunate oversight, because riparian management has considerable potential to mitigate the damages from productive land use such as intensive cropping or pastoral grazing. It is also rather surprising, given the extent to which better riparian management has been identified and publicised in recent years as a means of allowing land uses without degrading freshwater environments.

5. **National Environmental Standards (NES).** The WPA mentions NES at several points, and promotes these (Action 2) as a response to the perceived need for environmental 'bottom lines'. However, it is not clear to us how defining environmental 'bottom lines' helps in controlling diffuse pollution – for which the rate-limiting-step is usually identifying sources (on land) rather than identifying a water quality issue. We think that rushing into developing NES might be a risky proposition, because the research has simply not been done on the effects of some aspects of water quality on some of our indigenous plants and animals in some environments. Furthermore, NES seem likely to stifle further innovation and research, because 'hard' numbers give an (often illusory) impression of certitude. The state-of-the-art is that not enough is known to formulate standards that will be adequate indefinitely to protect our flora and fauna from the action of pollutants in isolation (let alone in concert). On the other hand, we can accept that for some criteria which are well understood, such as the effects of pH or temperature on some organisms, or of pathogens or faecal contamination on humans, a national standard could be developed for application as appropriate in some areas. In each case, it is necessary to determine whether further research is required. If so, this should be undertaken as a matter of urgency.

6. **SOE reporting.** State of environment reporting is mentioned or implied in Action 12 (raising awareness…), and is a laudable goal. However, little thought appears to have been given to the *tools* needed for SoE reporting. As regards the state of water quality and aquatic ecosystem 'health', what we need are indexes that quantify the effects of multiple stressors and attributes of waters. Considerable work has been done to develop water

quality indices and macro-invertebrate community indices (of stream health), in New Zealand as elsewhere, and it is strange that the WPA makes no mention of such tools and the need for research to further their development. As indicated above, there is an urgent requirement that SOE monitoring be undertaken consistently across the country. Only then can national trends or even regional comparisons be made.

7. **Freshwater versus marine waters.** The WPA clearly focuses on freshwaters – indeed "Freshwater" is in the title of the public discussion paper. However, polluted freshwaters flow into coastal and estuarine marine waters causing a (literal) flow-on of adverse effects. Perhaps this is best illustrated by the problem of faecally polluted storm waters from rural and urban land uses causing contamination of shellfish in coastal waters – a problem that is increasingly putting marine farmers and land farmers in conflict in New Zealand. In our view, the WPA needs to acknowledge that most coastal water quality problems arise from inflow of contaminated freshwaters so that a 'fixed' demarcation of fresh versus marine waters should not be too rigid.

8. **Water quality versus water use.** Overall it is fair to say that the WPA addresses the problems of water use and allocation better than the (more multi-dimensional) problems of water quality and aquatic habitat. For example, some suggested actions such as trading water consents might be made to work for water takes, but may be overly simplistic for waste discharges or diffuse pollution (as suggested in Action 8). The state of knowledge of water quality and ecosystem health is not often as well developed or as quantitative as knowledge on water quantity.

9. **Methods of setting environmental flow regimes.** Despite a general view that flow setting is a more straightforward exercise, we still remain concerned about the variation in the use of methods to establish sustainable flow regimes as are applied across the country. Even the instream flow incremental methodology (IFIM), which is generally regarded as the most rigorous and scientifically defensible method of establishing flow regimes, is variously used and sometimes not used around the country. There is evident need for further evaluation and understanding of the methods of setting flows and the implications of alternative methods. Once again, this can be illuminated by further research in this area. The problem has not been entirely solved.

Thank you for the opportunity to provide this submission. If you are holding hearings we would appreciate being advised and would consider attending a hearing.

Yours faithfully

Dr Rob Davies-Colley **Neil Deans**
Member President
New Zealand Freshwater Sciences Society

Weblog

The New Zealand Limnological Society Website will be undergoing a transformation during the winter this year and emerging in the Spring as the Freshwater Sciences Society of New Zealand. While gradually shedding its old skin, the website needs input from you all to help meet the needs of the future society. The new website aims to celebrate the past years that have built such a strong society and reflect the ideas that you now have for the Freshwater Sciences Society.

So, please send me your ideas for things that you would like to see included in our website. We have an opportunity to highlight the history of our society with the upcoming 40th anniversary, and we now have two newsletters per year and the challenge of ways to best distribute them to the membership (possibly an email alert with clickable link to a page on the website?). Check out the old site and feel free to pass on any comments and suggestions.

There are limits to what we may be able to provide, but all suggestions will be respectfully considered!
http://limsoc.rsnz.org/

Cheers
Steph Parkyn
Webmistress - Freshwater Sciences Society of New Zealand.
s.parkyn@niwa.co.nz

Contributed items

Who's your daddy? A tale of an orphaned caddisfly

By **Brian Smith**, NIWA

The larvae and adults of the New Zealand caddisfly *Zelandoptila moselyi* have historically had an unstable relationship with taxonomists.

It all started back in 1924 when Tillyard described a small, female caddisfly, *Zelandoptila moselyi*, placing it within the microcaddis or purse caddis (Hydroptilidae), which at the time included *Oxyethira* and *Paroxyethira*. McFarlane (1956) erected the family Psychomyiidae in New Zealand to which he assigned the male and female of a new species he called *Zelomyia trulla*. It was however, some eight years later that McFarlane synonymised *Zelomyia* with *Zelandoptila* after realising he had described the same caddisfly as Tillyard, but retained his placement of *Zelandoptila* within Psychomyiidae.

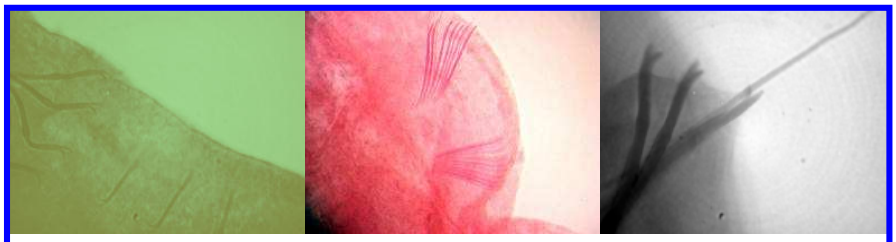
In 1958, Wise described New Zealand's only ecnomid, *Ecnomina zealandica*. Cowley (1976) later described an ecnomid-type larva as the juvenile of *E. zealandica*, based on the fact there was only one species of ecnomid known from New Zealand. However, recent work via pupal associations with adults has confirmed that Cowley mistakenly described the larva of *Z. moselyi*. Given what we know about the larvae of Ecnomidae (three sclerotised thoracic segments) and those of Psychomyiidae (pronotum only sclerotised), Cowley's placement of the larva in Ecnomidae would appear correct. If matters were not complicated enough, Wise's *E. zealandica* may in fact be more closely related to the Australian genus *Daternomina* than *Ecnomina* - although this is another story in itself.

In April I will travel to the United States, and work under the guidance of Dr Ollie Flint (Curator Emeritus, Smithsonian Institute, Washington, DC) and Dr John Morse (Professor of Entomology, Clemson University, South Carolina), two of the foremost experts on Ecnomidae and Psychomyiidae. I will begin an evaluation of the generic placement of *Zelandoptila*, and subsequently review the status of the Psychomyiidae in New Zealand. Preliminary evidence suggests that *Z. moselyi* should be transferred to the currently monotypic family, Ecnomidae. This would render Psychomyiidae redundant in New Zealand, thereby reducing the total number of trichopteran families present to 15.

A worm by any other name

By **Ngaire Phillips**, NIWA

Have you ever lain awake at night contemplating the differences between Naiidae and Tubificidae? Well your sleepless nights are over. **Brian Smith** passed on a recent discussion on the <FIT-LISTSERV@ecoanalysts.com> in which this exact issue was discussed. Turns out they're probably all part of the same group. However, there's a bit more to it than that. It seems that because Naididae were described earlier, it takes precedence over Tubificidae in terms of naming. However, as Tubificidae is a much larger family, it would be preferable to use this family name. Christer Erseus and colleagues have lodged an appeal to the International Commission of Zoological Nomenclature regarding naming rights but have heard nothing as yet. To add to the complications, recent work by 2 of Christers' PhD students suggests one genus within the Naididae (*Pristina*) may form a grouping of its own, not directly associated with Naididae. Christer suggests that suitable taxon names could then be Pristininae [=*Pristina/Pristinella* only] and Naidinae [all the other genera], i.e. they could be seen as two separate subfamilies within Tubificidae. However, all former naidids are still located WITHIN the former "tubificid subfamily Rhyacodrilinae", the whole classification of which must then be revised (split up) too! Clearly there's a bit of sorting out to do and the recommendation is currently to maintain the status quo.



Happy families? Setae of *Nais* (Naididae), *Aulodrilus* and *Tubifex* (Tubificidae)
Photos: N. Phillips/G. Croker

Further reading

Erseus, C., M. Kallersjo, M. Ekman, and R. Hovermoller. 2002. 18S rDNA phylogeny of the Tubificidae (Clitellata) and its constituent taxa: dismissal of the Naididae. Molecular Phylogenetics and Evolution 22(3), 414-422.

Erséus, C and Gustavsson, L (2002) A proposal to regard the former family Naididae as a subfamily within Tubificidae (Annelida, Clitellata). Hydrobiologia 485 (1): 253 – 256.

See also http://www.niwa.co.nz/rc/prog/freshbiodiversity/oligochaeta.pdf/view_pdf

Conferences

Upcoming Conferences

North American Benthological Society, "The abiotic template in flowing water", May 23 – 27, 2005, New Orleans. Joint Conference with the American Geophysical Union.

New Zealand Ecological Society/New Zealand Freshwater Sciences Society (see flyer below).

Combined Conference of the New Zealand Ecological Society & New Zealand Freshwater Sciences Society

Rutherford Hotel, Nelson

28th August – 1st September 2005

Registration Brochure & Forms Published End May

For Further Information
Sponsorship, Accommodation, Travel:
Ali Howard
Nelson Tourism Services
ali@nzdirect.co.nz ph. 03 546 6338

Programme Content:
Trevor James (Organising Committee Chairman)
Tasman District Council
Trevor.James@tdc.govt.nz ph. 03 544 8176

Come to sunny Nelson for the first combined conference of the **New Zealand Ecological Society & New Zealand Freshwater Sciences Society!**

The conference theme **Ecology at the Water's Edge** will link the interests of both societies, providing a focus on topics such as wetlands and the margins of rivers and lakes. The theme is also relevant to Nelson, a city at the water's edge. Note that papers will span a broad range of topics and cover terrestrial and marine ecosystems and species as well as freshwater/riparian environments.

We are expecting around 370 delegates to attend the meeting from a wide range of agencies including local government, universities, science providers, iwi, DoC, MfE, consultants and environmental agencies.

The conference will consist of plenary and technical sessions, conference dinner, field trips, conference mixer, AGM and poster session. This is a great opportunity to stay on & make the most of your trip & sample the great scenery and outdoor lifestyle of the Nelson Tasman region; not to mention the vineyards, cafes and restaurants!

Sunday 28th August	Monday 29th August	Tuesday 30th August	Wed 31st August	Thursday 1st September	Friday 2nd September
Ecological Society Student Day Public Seminar	Plenary & Concurrent Sessions. *Conference Mixer*	Plenary & Concurrent Sessions	Plenary & Concurrent Sessions. *Conference Dinner*	Field Trips	Extended Field Trip

Conference Report

Restoration of Degraded Ecosystems, New Zealand Limnological Society, Waiheke Island, November 2004

Limsoc in Auckland on Waiheke Island this past year was well attended and broke even on the budget. The weather cooperated for the field trips and informal discussions on the deck. Thanks again to everyone for helping to make it successful and fun. See you all in Nelson (Thanks to **John Maxted** for text and **Steph Parkyn**and **Max Gibbs**; montage by **Ngaire Phillips**).

A picture is worth a thousand words!

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