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**New Zealand
Freshwater Sciences Society
Newsletter**

**Number 45
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New Zealand Freshwater Sciences Society Newsletter No. 45

November 2007

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Introduction to the Society

The New Zealand Limnological Society was formed at a meeting in Christchurch in January 1968. It was renamed the New Zealand Freshwater Sciences Society¹ (NZFSS) in 2005 to reflect the broad interests of the membership. Its fundamental aims since inception have been to promote a common meeting ground for freshwater workers in New Zealand and to encourage and promote the exchange of news and views among them. In particular, a newsletter and a list of research workers and their interests is compiled and circulated at least once per year and an annual conference is held. The 2007 subscription is \$40.00 per annum (student/unwaged/retired persons rate is \$10.00 per annum; life membership is \$1000.00).

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¹ NZ Freshwater Sciences Society is the trading name of the New Zealand Limnological Society (Incorporated)

HONORARY LIFE MEMBERS:

Mr A.M.R. Burnet
 Dr V. Cassie Cooper
 Dr M.A. Chapman
 Dr G.R. Fish
 Dr E.A. Flint
 Dr D.J. Forsyth
 Dr R.M. McDowall
 Dr D. Scott
 Dr V.M. Stout
 Dr E. White
 Prof. Emeritus M.J. Winterbourn

PAST PRESIDENTS

1968-73	Dr V.M. Stout
1973-75	Dr M.A. Chapman
1975-76	Dr J.M.A. Brown
1976-78	Dr C.W. Burns
1978-80	Dr M.J. Winterbourn
1980-84	Dr B.T. Coffey
1984-88	Ms S.F. Davis
1988-92	Dr J.C. Ward
1992-96	Dr P. Ryan
1997-2000	Dr I.K. Boothroyd
2001-02	Dr J.S. Harding
2003-06	Mr N.A. Deans

PREVIOUS SECRETARY/TREASURERS

1968-73	Mr A.M.R Burnet
1973-76	Dr C.W. Burns
1976-78	Ms L.H. Tierney
	Ms S.F. Davis
1978-80	Dr B.T. Coffey
1980-82	Dr J.A. Robb
1982-84	Dr D. Forsyth
1984-86	Mr B. Biggs
1986-89	Dr I.W. Lineham
1990-92	Dr D. Rowe
1992-94	Dr J. Jasperse
1994-96	Dr I. Boothroyd
1996-98	Dr. K.J. Collier
1999-2000	Dr J.S. Harding

PREVIOUS EDITORS

1968-70	Dr M.A. Chapman
1970-72	Dr S.F. Mitchell
1972-75	Dr M.J. Winterbourn
1975-80	Dr T.K. Crosby
1980-82	Dr M.F. Beardsell
1982-85	Dr J.A. Robb
1986-88	Dr J.C. Ward
1988-89	Dr J.D. Stark
1989-2002	Ms J. Talbot
2002-2005	Dr M.J. Winterbourn

Editorial

Welcome to the 45th edition of the Freshwater Sciences Society Newsletter.

Thanks as always to all those who managed to get their contributions to me. I know it's not an easy task for the organisational coordinators to round up the science news of colleagues. It does seem that no matter how much notice is given, the deadline for contributions is hard to meet. I guess it's important to remember what the purpose of this newsletter is - to give society members the chance to tell other members about their science activities for the past year. If you're unable to attend the conference, then this is a pretty good way of informing a large number of people in one hit (we have around 350 members). So if you've not been able to contribute this time round, give some thought to doing so next time.

You'll find details of all members towards the back of the newsletter. **Please check to see we've got your latest contact and research details correct.** If you happen to notice an incorrect address of a colleague and have their new one, we'd really appreciate an update. Contact Brian Sorrell (b.sorrell@niwa.co.nz) with any changes. It's important that we maintain an up-to-date listing of all society members.

Happy reading and I look forward to seeing you all in Queenstown.

Ngairé Phillips

Newsletter Editor, New Zealand Freshwater Sciences Society

From the web

A revamp of the website is proposed for early next year. Feedback on the current website would be appreciated and can be discussed at the upcoming society AGM at the Queenstown conference.

Cheers,

David

President's comment

The last few months have seen some notable achievements and new developments for our Society. Firstly, congratulations to Prof Carolyn Burns for being awarded the Naumann-Thienemann Medal at the recent SIL Congress. Carolyn was awarded this honour for her outstanding studies on physiology and population dynamics of southern hemisphere zooplankton and food-web interactions, as well as her endeavor to conserve New Zealand lakes, and her service to SIL. The medal has been awarded annually since 1942, and she is the first New Zealander and only the second person in the southern hemisphere to receive it.

In addition, the work of some of our senior members has been recognised in a recent review of the most influential papers published in *Freshwater Biology* over the last 25 years. Amongst the most highly cited papers are studies carried out in New Zealand by Barry Biggs and Clive Howard-Williams. In fact of the 25 papers listed, 4 have NZFSS members as senior authors now that we can lay claim to Colin Townsend! If you wish to view this edition of *Freshwater Biology* it is available free on-line at www.blackwell-synergy.com/toc/fwb/52/v1.

In terms of new developments, an on-line forum has been launched to facilitate debate on topical issues among members, in response to discussions at the last AGM. Thanks to Marc Schallenberg for developing this and acting as moderator. After a slow start, as is common with new on-line fora, there has been an upsurge in activity over the last few weeks. I strongly encourage you to take part in debating the topics of interest to you (you can nominate to receive email alerts of new postings on these). Postings can be done anonymously if circumstances require it; all we ask is that individuals and institutions are respected and debates are constructive.

This forum also provides the opportunity for members to have direct input into Society matters; you may have noticed threads canvassing input on strategic directions for NZFSS (not a popular one I might add), and what you want to see on our website. More recently, I have posted a thread on memorable moments for the Society as part of our 40th anniversary commemorations. Some of these memories may crop up during the course of our upcoming conference in Queenstown where we will be formally commemorating the "Big 40" in association with the AGM at a business lunch. Ian Boothroyd and Neil Deans also have other initiatives underway to commemorate this milestone.

If you would like to discuss any Society matters directly, please feel free to contact me or one of the executive committee members. Your committee comprises Brian Sorrell, Marc Schallenberg, Neil Deans, Chris Arbuckle, David Burger and Ngaire Phillips. We have been having quarterly meetings, and I greatly value their collective wisdom in helping guide the Society through some difficult issues. Amongst the less difficult matters we have been dealing are venues for upcoming conferences. I'm pleased to advise that our 2009 conference will be in New Plymouth with Rosemary Miller as conference chair, and we are in discussions with other societies to assess options for joint conferences in 2009 and 2013. In the meantime, we have an exciting conference coming up in Queenstown with the Australian Society of Limnology. I look forward to seeing many of you there.

Kevin Collier

President

New Zealand Freshwater Sciences Society

Research News

Crown Research Institutes

Cawthron Institute

This year marks the end of an era at Cawthron with **John & Yvonne Stark** deciding to leave and pursue other interests. We wish them well. Fortunately, Cawthron still maintains a strong capability in stream invertebrate ecology via **Dean Olsen, Karen Shearer** and **Robin Holmes**. New staff arrivals during the year have included **Joanne Clapcott, Robin Holmes** and **Jeremy Wilkinson**.

Joanne Clapcott returns to New Zealand after a 12-year sojourn in Australia where she worked throughout the country on ecosystem processes and river health assessment. Joanne recently wrapped up her PhD at the University of Tasmania (The metabolic signature of small headwater streams: Natural variability and the response to forestry) and is keen to apply her knowledge in a NZ setting. Joanne's first challenge will be reacquainting herself with NZ freshwaters during fieldwork as part of a project on human pressure measures and river integrity.

Joe Hay has been continuing to work with Horizons Regional Council and Greater Wellington Regional Council on flow management projects, as well as being involved in some hydro-power feasibility studies. Joe, **Karen Shearer** and **John Hayes** have finished a study modelling the impacts of didymo on trout growth potential in the Mararoa and Oreti rivers, and presented the results at a MAF BNZ stakeholder group meeting. Along with **Dean Olsen** and **John Hayes**, Joe has also been preparing evidence on behalf of DoC and F&G for the upcoming Central Plains Water Enhancement irrigation scheme consent hearing.

John Hayes has been working on several consulting projects assessing effects on salmonids and angling in the lower Waitaki, Mokihinui, Arnold, Waimakariri, and Rakaia rivers, helping MfE develop a National Standard for Environmental Flows, and assisting other staff with a range of consulting projects for resource consents and regional plans. Once the pressure from these projects abates he is looking forward to concentrating on clearing a backlog of FRST and Fish and Game research over the remainder of the year. A new research highlight will be trialing Cawthron's DIDSON (an acoustic camera that can 'see' through dirty water) for monitoring trout abundance in turbid rivers. A recent publication highlight was a paper describing and testing process-based and bioenergetics models for assessing the effects of flow change on invertebrate drift and trout growth and abundance that he and a couple of Alaskan scientists developed a few years ago.

Robin Holmes joined Cawthron after completing his MSc at Otago University on land use effects on stream invertebrate communities. Robin's first week of work included a helicopter flight into a remote field work location, so it's going to be hard to match that every week.

Dean Olsen and **Susie Wood** have been delving into the murky world of the genetics of New Zealand's mayflies. Their work will address the phylogenetic relationships between NZ leptophlebiids, biogeographic patterns and (ultimately) aims to be a step in the direction of a rapid bioassessment tool (a "molecular MCI"). Dean also continues to work on a range of commercial projects including a freshwater survey of Molesworth Station for the Department of Conservation and is preparing evidence for the Central Plains Water hearing due for early 2008. He also prepared a quick guide to New Zealand water mites, on a subcontract to NIWA as part of a TFBIS-funded project.

Aaron Quarterman continues to provide technical support to the Coastal/Freshwater group at Cawthron.

Karen Shearer has had a busy year representing Nelson in hockey at the National Masters (oldies) tournament in Auckland and the National Senior (not quite as old) tournament in Christchurch. In between games and practices she has also been busy with freshwater monitoring-compliance projects around the country and environmental assessments for renewals of resource consents. Karen and **Dean Olsen** have been involved in an interesting baseline freshwater survey of the Molesworth Station - the largest farm in New Zealand managed by the Department of Conservation and Landcop Farming Ltd. The completion of a TFBIS funded project to collate and integrate Cawthrons' macroinvertebrate data into NIWA's FBIS database has also been a highlight for Karen. Karen is *still* working on defining size dependant settling velocities and re-entry rates of drifting invertebrates and presented some results from this work at the Ecohydraulics Conference held in Christchurch earlier this year.

Rowan Strickland is kept busy managing Cawthron's Coastal/Freshwater group, but still gets involved in various projects occasionally.

Jeremy Wilkinson joined Cawthron last December and has been beavering away at an update to the Nelson Freshwater State of the Environment Report, a review of temperature data in the Maitai River, a summary document on the water quality impacts of logging, and an update of the Nelson Freshwaters Classification. Jeremy arrived from Adelaide where he had recently completed reporting on coastal inputs of stormwater and waste-water for the Adelaide Coastal Waters Study; setup to investigate sea-grass decline. His last major output for South Australia was a Best Practice Framework for monitoring and evaluation of wetland and riverine ecosystems, which he says includes a stack of tools applicable to any environmental system. Jeremy's background is in environmental sciences and faecal indicator modelling (which he's applying to the ICM Programme), as well as, hydrochemistry and rainfall-runoff modelling.

Susie Wood is continuing work on her FRST funded postdoc in collaboration with **Prof Craig Cary**, **Prof. David Hamilton** and **Andreas Rueckert** (Waikato University). Their work to date has focused on developing molecular tools to understand cyanobacterial bloom dynamics and cyanotoxin production. Masters student **Matthew Prentice** (Waikato University), co-supervised by Susie, is applying these techniques to assess the spatial distribution and seasonal population dynamics of cyanobacteria in the Lower Karori Reservoir in Wgtn. Masters Student **Mark Health** (Victoria University) will begin work with Susie this summer.

In collaboration with co-supervisor **Ken Ryan (Victoria University)** and **Juliet Milne (Wgtn Regional Council)** they will be investigating species diversity of toxic benthic cyanobacteria in the Wellington region and their effect on ecosystem health.

Roger Young is currently planning field work for a project quantifying how remotely derived measures of human pressure (% native cover, predicted N loading and % impervious cover) link with a range of structural and functional indicators of freshwater ecosystem integrity. **Joanne Clapcott** and **Dean Olsen** will be assisting along with **Dave Kelly** and **Bruno David (DOC)**, **Mike Scarsbrook** and **John Leathwick (NIWA)**, **Russell Death (Massey)**, **Chris Arbuckle (ES)** and **Kevin Collier (Waikato Uni & EW)**. Good progress continues with the Integrated Catchment Management research programme. For example, work with **Ricky Olley** and **Gerry Closs (Otago University)** has shown the potential of using chemical analysis of fish otoliths to track migration patterns throughout river catchments, while work with **Kevin Collier** demonstrated the variability in responses of various river health indicators to a stressor gradient in the Motueka and Mangaokewa rivers. Roger presented this work at the European Freshwater Sciences symposium during a fantastic mid-winter excursion to the Basque Country and Sicily. A focus of the ICM programme over the next year will be showing how the lessons learnt and tools developed can be applied throughout the country. Roger continues to assist various councils with flow management, water quality and river health issues, and has also been involved in several commercial projects relating to the potential impacts of diverting water (and high quality seston) from lake outlet rivers.

Compiled by Roger Young

Landcare Research, Auckland

Stephen Moore is part of the urban team based at the Tamaki office of Landcare Research. His main areas of work are:

- assessing the effects of urban development on freshwater faunas in the Auckland Region,
- analysing freshwater invertebrate samples sent by clients from all over NZ,
- overseas contracts (he's been sampling streams in Brunei and Papua New Guinea during each of the last two years).

Stephen's 2007 PNG project was an assessment of the cave-fed Dape Creek located in pristine forest in the Southern Highlands. This assessment was completed prior to the establishment of an oil exploration drilling operation near the creek. This was a tropical rainforest version of the drilling-related surveys Stephen used to do during his Taranaki years. These overseas jobs are always steep learning curves and great photo opportunities:



Dape Creek in the Southern Highlands of PNG



Oilwell flares lighting up the PNG forest at night



A Dape Creek *Glossogobius*, not unlike NZ bullies



Agriocnemis damselflies common in PNG & Brunei

The steady supply of invertebrates from samples sent to Stephen from NZ and overseas has kept him locked away in the photomicroscope room for long periods. Example images from the NZ, Brunei and PNG invertebrate work can be seen on the Landcare Research web site www.landcareresearch.co.nz (search for "cd images" or "images of freshwater invertebrates").

Compiled by Stephen Moore

NIWA Christchurch

Don Jellyman periodically escapes bureaucracy to continue with research on freshwater eels. He was an invited speaker at the second international Conference on Diadromous Fishes in Halifax, Canada in June this year, where he presented a paper on using satellite-derived ocean surface current measurements to determine possible spawning locations for Australasian eels. The Te Waihora (Lake Ellesmere) programme is in its final year, and work on deriving customary measures of well-being is proceeding well; the eel stocks are in good shape, although present flounder populations are low reflecting intermittent lake openings. Don continues to work on hydro and irrigation developments, and eel stock assessments.

Scott Larned continues to administer NIWA's Water Allocation Programme, and dabbles in hyporheic ecology, eco-hydraulics, food-web modelling, water quality assessments and didymo ecology. After hours, Scott is developing two research networks with ecologists from Europe and North America. One network is focusing on Pacific Island streams, and the other on alluvial rivers in France, Italy and New Zealand. A sabbatical at Cemagref, France is coming soon, timed to coincide with the grape harvest.

Brian Sorrell continues to work on shallow lentic habitats of all types, including wetlands (projects on biodiversity, species-environment modelling, and nutrient cycling) and lakes (macrophyte collapse processes, thresholds for restoration, emergent vegetation nutrient cycling), as well as leading NIWA's Antarctic Aquatic Ecosystems Programme. Current Antarctic research addresses microbial productivity in shallow ponds and how it is controlled by the seasonal freezing and thawing cycle. He also continues to be heavily involved in consultancy work, especially on wetlands, and work this year has included restoration advice, advice on water level management, and recent work on thresholds for discharges and their effects for Regional Plans.

Bob Spigel has been modeling thermal stratification in a variety of monomictic lakes for a number of clients. The lakes range from large, deep reservoirs of short residence time with energetic inflows, to smaller natural lakes with very small inflows, no surface outlets and long residence times. Heat exchange with the atmosphere; water clarity and absorption of solar radiation with depth; and wind induced turbulent mixing dominate thermal structure in the longer-residence time lakes. But inflow and outflow dynamics can dominate stratification in the shorter-residence time reservoirs, depending on the location of the outlets.

Compiled by Brian Sorrell

NIWA Hamilton

Thomas Wilding has left NIWA to start a PhD in USA. He's working with Dr N. **LeRoy Poff** at Colorado State University (Fort Collins). He's looking at topics on stream ecosystems and effects of flow changes. There's plenty of flow changes around here you might say. Almost every river is dammed (kinda like NZ then?). They have tunnels drilled through the Rocky Mountains to get water from the "wet side" to the dry eastern plains. You'll be pleased to know that didymo (a resurgent native?) is causing headaches for sorting invertebrate samples.

John Quinn has continued his long-term studies on forestry effects on Coromandel streams and the sustainable land management project at Whatawhata. Findings from the 14 years of research and monitoring at Whangapoua Forest contributed to the Environment Court decision on appeals over forestry consents. The recent focus of the forestry studies has been on the impacts of harvest slash on dissolved oxygen and the factors influencing the magnitude and duration of thermal impacts of forest harvesting/replanting. John also continued working with the steering group on Te Awa O Waitao Restoration project that aims to learn more on how to merge western science and traditional Maori knowledge by supporting

the local people in their restoration project. This action research project commenced with Tauranga iwi (particularly Nga Potiki) who are applying riparian management to restore the lower part of the stream and monitoring sites throughout the catchment. With help from NZ Landcare Trust, the project has drawn in a group of landowners in the middle and upper catchment who plan to extend the restoration work upstream. John continues to enjoy his involvement with the diverse research activities and people in the Restoration of Aquatic Ecosystems Programme that he leads.

Aslan Wright-Stow has been working on a variety of projects including continuing research into the effects of exotic forestry harvesting with **John Quinn**. He is also continuing his work looking at the effects of CMA applied to the Desert Road and SW Central Plateau as a de-icing agent. He has been working with **Mike Scarsbrook** on spring and karst systems in the Waikato and in looking at the impacts of sedimentation in the Coromandel. He has also been working with **Steph Parkyn** on koura in Lake Taupo and the effects of Zeolite (Z2 - mineral used to deactivate nutrients) on benthic biota in Lake Okaro. Since becoming a scientific diver Aslan has worked on a range of marine and lakes projects.

Bob Wilcock has continued working on the 'Best Practice Dairying Catchments'. A series of papers describing stream health and water quality in relation to the dominant land use (dairy farming) has been produced in collaboration with colleagues in AgResearch culminating in a review of the land-water interactions in the five streams, key issues to be addressed and best management practices for resolving these issues. A study of greenhouse gas (CH₄ and N₂O) emissions from small rural streams, written in collaboration with **Brian Sorrell**, is now in press with *Water, Air, and Soil Pollution*. Bob will continue to work on evaluating the importance of managing waterways to reduce N₂O emissions in intensively farmed catchments.

NZFSA & MfE have obtained CDRP funding for a three-year research programme entitled: "Campylobacter in food and the environment: examining the link with public health". This task will be performed by the inter-agency Enteric Zoonotic Disease Research Modelling Group that **Graham McBride** chairs (with members drawn from ESR, Massey University, NIWA, NZFSA and MfE). Its challenging task brings together expertise on food contamination, health effects, veterinary science, catchment science and risk analysis. It is charged with developing a better understanding of the whole Campylobacter cycle, and to use that to identify mitigation measures that will be effective in lowering New Zealand's burden of campylobacteriosis.

In July **Brian Smith** was lucky enough to travel to Edinburgh to present at the Royal Society of Entomology conference. He has described the new species of *Oxyethira* caught earlier this year, as well as a previous undescribed species of *Aoteapsyche* commonly caught around the Waikato. This paper will be published in the upcoming issue of the Journal of Aquatic Insects. Brian has also been involved in the compilation of the latest additions to the NIWA 'Quick guide' series of freshwater invertebrate identification keys. There are 12 new guides available on the NIWA website with contributions from **Dean Olsen** (mites) and **Graham Fenwick** and **Anna John** (amphipods, copepods and isopods) as well as keys to common snails, adults and larvae of freshwater beetle families including more detailed guides to the genera

of adults and larvae of Dytiscidae and Hydrophilidae. All 'Quick guides' can be found at <http://www.niwa.co.nz/rc/prog/freshbiodiversity/tools#id>.

Rob Davies-Colley leads the 'Aquatic Pollution' Group at NIWA, Hamilton while continuing with research on numerous aspects of water quality and stream habitat. Research on the mobilisation of faecal contamination from livestock agriculture during floods has identified contrasting pathways of an important pathogen (*Campylobacter*) versus the standard faecal indicator (*E. coli*). The findings have been up-taken by modellers, and the work has extended to flume experiments on microbial uptake by stream sediments. Past work with **Mark Meleason** (ex-NIWA) and **Kit Rutherford** has been integrated in a modelling study of the time-course of recovery of stream shade, stream temperature regime, and stream wood, following riparian forest restoration (reported at the 2007 conference). Rob is working in Landcare Research's Integrated Catchment Management (ICM) research programme, notably with a study of water quality benefits of BMPs in the (dairy-dominated) Sherry Catchment. He has made a foray back into aquatic optics with a study of light attenuation in New Zealand rivers 'piggy-backed' on the national rivers water quality network, and an optical modelling study with **Chuck Gallegos** (Smithsonian Environmental Institute) of optically 'extreme' NZ lakes Pukaki and Tekapo *versus* Brunner and Hochstetter.

Richard Storey has recently finished his postdoc looking at the invertebrate ecology of intermittent streams, and is now continuing in a permanent position at NIWA as a freshwater scientist. The first publication from his intermittent streams work will shortly appear. Richard has also been looking at effects of urbanisation on streams in Waitakere City, using visual habitat assessment methods in a GIS geodatabase. This coming year he is hoping to divide his research time between modelling of intermittent streams, catchment nitrogen issues and ecology of karst systems (in **Mike Scarsbrook's** groundwater ecology programme).

Steph Parkyn has been back working with koura, this time helping to unravel the mysteries of their life in lakes by developing a bayesian belief network of all the factors affecting their abundance and dabbling in a new enzyme technique that allows her to determine secondary production in lake waters. She has also been using behavioural and fitness experiments to assess the health of translocated koura, working with **Chris Hickey**, **Glenys Croker**, and **Aslan Wright-Stow** on the Lake Okaro restoration project. Past work on the value of headwater streams has also landed her in court this year, appearing for ARC in the Long Bay structure plan case. Challenging work for the coming year includes developing a research plan for assessing the cumulative effects of the loss of small headwater streams. Steph continues to be the NIWA contact for Envirolink, a fund for Regional Councils to access help with resource management questions.

Ngairé Phillips continues to lead the Te Arawa lakes programme, which aims to develop a management plan for the lakes focused around non-commercial fisheries in conjunction with the Te Arawa Lakes Trust. The focus of the programme is on koura (see **Steph Parkyn's** contribution), kakahi (freshwater mussels), koaro (with **Dave Rowe**), smelt and tuna. The programme is in its final year and Ngairé will be presenting results on some of the kakahi work at Queenstown. She has also been successful (with **Erica Williams**, **Gail Tipa** and **Chris Hickey**) in securing funding from the NZ Health Research Council for a 3 year programme examining the issue of contaminants in traditional food sources. A particular highlight of the

year has been undertaking field experiments to examine resilience in stressed and unstressed estuarine cockle populations. The experiments combine physiological and population genetic approaches to examine the relative importance of adaptation vs acclimation in coping with additional stressors. She also expanded this idea to freshwaters using controlled lab experiments with the freshwater clam *Sphaerium novaezealandiae* and will be aiming to write up both experiments over the coming year. She continues her involvement in macroinvertebrates species traits and is currently working on a paper examining landuse impacts at broad spatial scales with **Sylvain Doledec**, **Mike Scarsbrook** and **Colin Townsend**.

Compiled by **Stephanie Parkyn**

Fish and Game New Zealand

Fish and Game NZ have been involved in or are contributing to the following freshwater research projects in 2007. These include:

The survival of *Didymosphenia geminata* in three rivers and associated spring-fed tributaries in the South Island of New Zealand, with **Stuart Sutherland**, **Maurice Rodway**, **Cathy Kilroy**, **Bill Jarvie** and **Graeme Hughes**. In this study we followed up on an observation that *Didymosphenia geminata* does not appear to thrive in spring-fed tributaries of affected rivers, even though the tributaries are periodically exposed to colonisation. This study investigated the effect of spring-fed creeks on the survival of *Didymosphenia geminata*. The decline in both proportions and estimated weight of viable *D. geminata* cells to extremely low levels in all the spring creek sites suggests that poor survival of *D. geminata* in spring-fed creeks may be a general phenomenon. However, no single variable common to the spring-fed creeks could be identified as being responsible for poor survival of *D. geminata*. A combination of factors is likely to be responsible for the observed declines.

An acoustic assessment of salmonids in large South Island lakes was also undertaken (**James G.**, **Stephanie Gauthier**, **Adam Dunford** and **Wilbert Knol**). It involved surveying 6 lakes - Coleridge, Benmore, Hawea, Wanaka, Wakatipu and Te Anau. This will be an ongoing project and will yield information about trout stocks in these important lakes. There will also be opportunities to improve the technology used over time to enhance our ability to monitor trout stocks in our large lakes. At present the reliability of detecting fish in shallow parts of the lakes is not high. Lack of detection in shallow water is a widely recognised problem and is not easy to solve. It is expected that there will be improvements in this area in the not too distant future.

Brown trout migration & recruitment patterns. A wildlife monitoring study using natural trace element and isotope markers (**Gabrielsson**, **Rasmus** and **Gerry Closs**). This research aims to track migration in brown trout in the upper Clutha River catchments using otolith trace element and isotopic composition of otolith as a natural tag of natal origin. This information can then be used to determine the main sources of spawning areas for trout from lakes or main stem rivers, identifying important recruitment areas and migration routes. Developing

and using this method will enable Fish & Game Councils to identify areas in need of special management or more protection, in a region that's experiencing rapid development.

Angler behaviour study (**Steven Beville**). The impact of changing fishery conditions across the various fishery types, e.g. lowland streams, mainstem rivers, backcountry rivers and high country lakes (in some regions e.g. North Canterbury) on angler participation and welfare (in other words fishery value) is not empirically known. However, knowledge of these "angler-behavioural-effects" could benefit managers tremendously as a budgetary tool to more efficiently direct resources for management, maintenance and enhancement of the fishery resource, and also as a defence for the protection/conservation of fisheries which are under threat of development. Particularly for key fisheries, which sustain high levels of usage. This project involves modelling angler behaviour, using this model to forecast angler behaviour given changes to fishery conditions and evaluating the impact to angler welfare resulting from such condition changes.

National Angler Survey (**Martin Unwin et al.**) The 2007/2008 National Angling Survey is the third in a series of surveys conducted by Fish and Game New Zealand (FGNZ), at intervals of 6-7 years. Its purpose is to estimate, for every lake and river in New Zealand, the total fishing effort expended during the 2007/2008 angling season. By collecting this information in a consistent format, successive surveys allow FGNZ managers to monitor usage of individual rivers, identify national and regional trends, and develop appropriate plans for managing the angling resource.

New Zealand trout population age and size structure assessments (**John Hayes and Maurice Rodway**). This project is designed to establish a national monitoring programme for quantitatively assessing the age and size distribution and growth rate of trout populations in New Zealand over time and space.

Improved management of salmonid fisheries and supporting ecosystems (**John Hayes**)

This is a FRST project that is also being supported financially and 'in kind' by Fish & Game New Zealand. It has recently been amalgamated with NIWA's Water Allocation Project.

The broad objectives that Fish and Game is supporting over 2007 - 2009 are:

- Predicting effects of flow change on salmonids
- Assessing the potential and limitations of existing bioenergetics equations for rainbow trout growth modelling in New Zealand lakes and rivers.
- Developing methods, using new acoustic camera technology (DIDSON), to count salmonids in turbid rivers.

Compiled by **Maurice Rodway**

Department of Conservation

National RD&I

Over the last few years the Department of Conservation has been directing the development of systematic conservation planning tools as part of the Government's Sustainable Water Program of Action and the Natural Heritage Management System (NHMS). The primary goal is identify the best remaining examples of the most distinctive and representative freshwater environments across New Zealand (also known as Waters Of National Importance) to prioritise future conservation management. At present DoC RD&I staff are managing a number of contracts covering 3 broad freshwater categories: Inland wetlands (**Sjaan Charteris**) Rivers (**Bruno David**) and Lakes (**David Kelly**). Feeding into this program is the Cross Departmental Research Pool (CDRP) funded DoC program led by **Dave Kelly** which is a collaborative effort between NIWA (**Brian Sorrel, Mike Scarsbrook**), Cawthron Institute, (**Roger Young**), Massey University (**Russell Death**), Otago University (**Marc Schallenberg**), Canterbury University (**Jon Harding**) and Environment Waikato (**Kevin Collier**) to explore indicators explaining gradients of human pressure across the landscape. The effect of a variety of factors such as landuse intensity, exotic fish presence/absence etc on ecosystem integrity is being investigated across lakes, rivers and wetlands throughout New Zealand. The CDRP is a FRST funded program.

Bruno David has secured some DoC innovation funding to explore along with **Nick Ling** at Waikato University, the pH tolerances of brown trout and to determine the feasibility of using low pH thresholds to repel trout in small streams that contain threatened non-migratory galaxiid species. Replicated laboratory trials have shown significant promise with brown trout exhibiting a strong avoidance response to even mildly acidic water in both static and flowing choice chamber trials. The small quantity of acid required and high sensitivity of brown trout suggest that this tool (following further development) could be used as a non-lethal alternative to rotenone in small flowing waterways where the goal is to protect significant instream biodiversity values. In other introduced fish work **Adam Daniel** (University of Waikato) is continuing his PhD work on tracking movements of koi carp through the lower Waikato river basin. 19 hydroacoustic receivers have been strategically deployed throughout the lower basin to remotely detect large scale basin wide movements of 51 implanted fish while a subset of 21 radiotagged fish will be used to examine fine scale movements and habitat use. The acoustic receiver array will be used in the future to also examine movements of other exotic species. Over the summer Adam has been testing tag retention in captive held koi carp and has experienced fairly high tag loss rates irrespective of the method used. He is now testing slow-release antibiotic implants to see if reduced post-surgical infection will result, which seems to be when most of the rejection occurs. Adam's project is a collaborative effort involving the Department of Conservation, Environment Waikato and Waikato University.

Sjaan Charteris is currently on secondment from her Canterbury freshwater role, doing **Natasha Grainger's** national freshwater advice, support and improvement role. Natasha is away on maternity leave and has had a beautiful son, Samuel who is doing great and keeping her entertained. In the national role, Sjaan has been continuing Natasha's work on managing a

variety of wetland contracts, providing advice and support to freshwater staff around the country, updating and maintaining national procedures and processes, and providing input into freshwater policy and legislation reviews.

Dave West returned to DOC as a freshwater scientist in June after completing his PhD at the University of Waikato and a year and half of a PostDoc at the Toxicology Centre at the University of Saskatchewan in Canada. Dave is now contributing to pest fish research including participation on the Invasive Animal Cooperative Research Centre (CRC) partnership with Australia and the Waikato University OBI. He is also on the advisory group for the Greens Wetland projects advising on methods available to monitor wetlands and environs.

Wendy Evans is working closely with DOC's lead conservancy for didymo. Canterbury Conservancy (**Anna Paltridge**) coordinates standards and brokers information on a range of operational work. The RD&I contribution is liaison with MAFBiosecurity during the transition from BNZ-led incursion management of didymo to multi-agency long term pest management of didymo. Research into effects of didymo and development of appropriate management responses is also being led by RD&I. Research topics include effects of didymo on the lowland longjaw galaxid, other native fish, braided river birds, and whio (blue duck). DOC intends to use a well established process, set up to assess animal pesticide techniques for use in DOC pest management operations, to assess Gemex as a possible tool for DOC to use for didymo management. The process consists of an expert panel, which looks across a number of aspects (effectiveness, effects on the environment, effects on non-targets, etc) and identifies information gaps and rules/performance standards for that technique. The information gaps are then filled by either commissioned research or monitoring of management operations. The rules and performance standards become the restrictions/standards within which any DOC operation using the technique is required to operate. The planned timing is early in 2008, to take advantage of further BNZ-commissioned studies into Gemex in 2007.

Tracie Dean has been back working on contract with RD&I to develop a strategic plan for the management of invasive freshwater fish. The plan, currently in draft stage, will outline pest-led and site-led approaches and will contain a wealth of background information on pest fish distribution, invasion phases and impacts. The plan is currently going through internal processes before a consultation phase. Future work to support the plan includes a range of research, tool development and process creation.

Finally a national DOC team made up of **Michel Dedual**, **Bruno David**, **Murray Neilson**, **Dave Kelly**, **Claire Graham** (policy), **Jim Nicholson** (policy) and **Scott Bagley** (policy) have been heavily involved in discussions and development of the National Environmental Standards (NES) around setting flows and levels for waterbodies across New Zealand. This work is still continuing.

Regional roundup

DoC - Taupo area

DOC Taupo Fishery has completed the second year of a PIT-tagging program of adult and juvenile rainbow trout in the Taupo and Otamangakau catchments. However, this year the

largest effort involving every staff member was spent preventing the introduction of *Didymo geminata* into the North Island. Numerous samples of trout have been collected for a large research project on trout genetics in collaboration with the Universities of Wellington and Montana. The fishery team has also completed an acoustic tracking experiment of juvenile trout in the Tongariro River. Finally, the team is part of an adaptive management work frame established by Genesis Energy Ltd. that also involves NIWA and Massey University. This project has been set up to explore the response of the aquatic ecosystem (periphyton, invertebrates, rainbow trout well being) of the Tongariro River to a flushing flow regime.

Additionally **Michel Dedual** has also been working with EBOP as member of a fishery panel to review the monitoring of the impacts of the Ohau Channel Diversion Wall in Lake Rotoiti on the smelt and trout fisheries. Michel has also presented findings of a trout thermoregulation experiment in Lake Taupo at a conference in Denmark and the impacts of the 1995-1996 Mount Ruapehu eruptions on the Taupo Trout Fishery at the American Fisheries Society annual meeting in San Francisco. In California Michel spent some time with the Californian Water Resources Control Board and several angler clubs to share experiences.

Nelson/Marlborough

Marlborough Conservancy of DOC has had a busy 12 months. Ongoing treatment of sites containing pest fish populations- mostly gambusia and rudd- continues. The invasive diatom didymo continues to spread in rivers in the region and is generating activity to survey, monitor and manage its spread. Protecting nationally important riverbed birds, native fish and trout has meant going in to bat seriously at the Environment Court and Special Tribunal level to protect the Gowan River and the Wairau River from proposed hydro development. Having the time to get out of hearings and from behind the computer to see some fish in the field has become increasingly difficult!. Running major cases in collaboration with Fish and Game to protect nationally important habitats has been very effective and efficient.

The Motueka pest fish team comprising **Ross Maley** and **Ivan Rogers** have rotenoned four tench sites and one gambusia site this year. Five more known tench sites remain and eradication of these sites is planned for autumn 2008. This will eradicate all known coarse fish populations left in the Nelson/Marlborough area.

Wellington

In mid April a pest fish eradication operation in the Whitby Lower Lake using cube root powder (rotenone) was undertaken for the first time in the Wellington region. The upper lake was fully drained and treated with hydrated lime in December 2005 to eradicate pest fish including koi carp, rudd, catfish and goldfish. These pest fish were also thought to occur in the lower lake in addition to gambusia, and other exotic fish including tench, perch and grass carp. Grass carp have been the only legal exotic fish release into the lakes. The Whitby Lower Lake has a total lake volume of 79,000 m³ and for the purpose of the operation it was drained to approximately 35,000 m³. This was to reduce the amount of cube root powder required, as well as minimise the suspended sediment caused by wind disturbance and water movement in shallow regions. 86kg of cube root powder was mixed into a slurry and then applied to the lake using fire pumps and hoses. Within 30 minutes of application small (~3cm) rudd, perch and goldfish starting appearing on the margins of the lake. These were followed by native eels and larger perch. Approximately two hours after application large tench

started air gulping at the surface. The tench and eels were recovered and put into aerated tanks to revive them for re-release into the lake once it was safe. The lakes will be designated a tench coarse fishing site. Dead fish continued to appear at the surface and along the margins of the lake four days after the application of cube root powder. Daily recovery of these fish was undertaken. Water quality measurements were taken at fixed intervals to monitor general water quality parameters as well as to determine the concentration of rotenone and the time it takes to break down to non-detectable levels. This operation has been a cooperative operation between the Department of Conservation, Porirua City Council and Fish & Game Wellington Region.

Canterbury

Scott Bowie is currently filling in for Sjaan at Canterbury Conservancy. Conservancy and area staff have been working hard to keep up with all the RMA applications facing the region e.g. Central Plains Water. They have also been heavily involved in the "Fish Screening" working party with ECAN, Fish & Game, Irrigation NZ and others. The main focus in the last year has been providing input into the creation of the "fish screening - good practice guidelines" document that NIWA have been contracted to produce incorporating information from a variety of sources including DOC's "Native fish requirements for water intakes in Canterbury" and Fish & Game equivalent for sports fish. Another project DOC have been working closely with ECAN on is the establishment of a regional Canterbury mudfish recovery group and associated mudfish week to promote the protection and restoration of this species. Staff have also been on the go creating catchment bibliographies for several of the major catchments in Canterbury to summarise the values and threats to the catchments that will help identify future work priorities. What's more, on a survey there was an exciting discovery of lowland longjaw galaxias (our most threatened native fish in New Zealand) in the Hakataramea that was thought previously to be extinct from this catchment. The non-migratory galaxiid recovery group (led by **Sjaan Charteris** and with representatives from throughout NZ) is continuing to make good progress on actions towards the recovery of some of our most threatened freshwater fish, and in the past year or so have had **Bob McDowall** (NIWA) looking into the status, distribution and identification of the *Galaxias vulgaris* species complex and **Jon Waters** (Otago University) investigating genetic differences between populations of upland and lowland longjaw galaxias.

West Coast

The West Coast presently has three rivers with Didymo, and DoC staff undertook substantial didymo awareness work over last summer including the employment of temporary rangers. More work in this area is planned to start soon. Area staff, including **Dave Eastwood**, have been undertaking their annual monitoring of selected sites with giant and shortjaw kokopu, dwarf galaxias and brown mudfish. New records of shortjaw kokopu and brown mudfish have been made in the last year. Also a dwarf galaxiid site in the Maruia Valley has been protected from trout by a fish barrier. Recent searches in the upper Maruia have failed to locate upland longjaw galaxias and alpine galaxias, despite historical records indicating they were formerly present there. **Darin Sutherland** has been spending a lot of time on hydro electric schemes which include Amythest Creek, Lake Rochfort, Arnold River, Waihapo and now the Mokihinui. The processing of the schemes has been challenging as each is unique (different

sizes, different stages of development when he came on board, new schemes vs additions to schemes vs re-consents, Doc land and non-Doc land etc). Thanks to some Opex fisheries money Darin has written a review on the whitebait fishery and from that work **Henk Stengs** from the Greymouth Area Office has undertaken a West Coast wide survey of known whitebait (specifically inanga) spawning sites. Site surveys included descriptions of sites, identification of threats and potential restoration work. A review of the sphagnum moss harvesting on the West Coast is also nearly finished with a representative analysis suggesting that most moss harvesting sites are well represented in the conservancy though some are in high land status areas or in significant wetlands and as such are likely to not be re-consented.

Southland

Once again **Emily Atkinson** and others from Southland have been very busy fighting to stop the spread of didymo with a strong focus on reducing the spread in Fiordland National Park. Controls put in place so far have helped with spread being minimal. Furthermore, NIWA's Gemex trial in the Princhester Creek was supported by Southland. The Awarua/Waituna wetlands complex is one of the wetlands awarded funding by the Green party, the main focus is on water quality of Waituna catchment, working with communities and key organisations, and developing tools for wetland management. The year one programme will look at gathering baseline data/inventory and establishing an advisory group. Also, in collaboration with iwi and NIWA; a research programme has been established to use otoliths to look at movement and residency times of longfinned eels in the Waiau system.

Otago

Murray Neilson and **Pete Ravenscroft** have been heavily involved in didymo issues, particularly in relation to the discovery of the organism in the Kakanui River, into which the Kauru River flows. The Kauru River contains the largest population of the nationally critically threatened native freshwater fish species, the lowland longjaw galaxias (*Galaxias cobitinis*) and considerable efforts have been (and continue to be) made to prevent the alga from spreading into the Kauru. These include closing the Kauru River to fishing, throughout its length, and closing the waters of the lower 6 km of the river (where the galaxiids are found) to entry. Murray has also been involved with the department's input to MFE's Sustainable Water Programme of Action, particularly in relation to the development of the National Environmental Standard on Environmental Flows. Pete and his team have also been active on other issues and have completed survey of another 400 plus new sites throughout the Otago region, along with the assessment of 30 plus barriers for the protection of non-migratory galaxiid populations. Annual monitoring at 35 long-term non-migratory galaxiid sites has also been completed, as has monthly monitoring at 3 lowland longjaw galaxiid sites on the Kauru River. The team also provided assistance to Canterbury Conservancy staff with the survey and monitoring programme in the McKenzie Basin.

Compiled by Bruno David

Consultancies

Golder Associates (New Zealand) Ltd.

Although Kingett Mitchell Ltd. has been one of the most enduring and longest-lived environmental consultancies within New Zealand, the company was purchased by a much larger organisation, Golder Associates in December 2006. The New Zealand operation, Golder Associates (New Zealand) Ltd. (or Golder for short) is now part of an international multi-disciplinary organisation with interests as diverse as geotechnical engineering, geochemistry, contaminated sites, air quality, acoustics, planning, and of course, ecology.

Ian Boothroyd, Richard Montgomerie, Greg Burrell, Richard Allibone, Scott Speed, Nick Carter, Katherine Muchna, Annabel Barnden and Leigh Anderson are all involved in freshwater activities at Golder, based in Auckland, Christchurch, Dunedin and Tauranga. **Ian Boothroyd** is the Team Leader of the ecological services (including marine and terrestrial ecology) and still finds some time for his research on the taxonomy and ecology of Chironomidae. The past year has seen Ian further develop his key to the New Zealand chironomid larval fauna, as well as continuing to collect and prepare descriptions of new species from around New Zealand. The focus of Ian's work has been the subfamily Orthocladiinae but he is also resolving some of the more problematic chironomid genera such as *Polypedilum* and the Tanypodinae. Understanding the effects of urbanisation on streams in Auckland and Wellington continues to be a significant focus of Ian's recent work and he has been working on pressure-state-response and other frameworks for sustainable urban environments. This work has led to other projects on urban sustainability. Other projects include assessments of effects of hydro-electric and wind power developments, residual flows, treated wastewater discharges, water abstractions and catchment management plans. Ian is now an accredited independent commissioner and sits on hearings that are involved with making decisions on applications for resource consents.

Ian is also involved in research into the ecology and food webs of geothermal ecosystems, and has completed his ISAT-funded research trip to Iceland where he has established a collaborative project on the ecology of geothermal ecosystems with the University of Iceland. Some members might recall that **Jon Olafsson** and **Gisli Gisslason** (both from Iceland) attended the Conference last year. Ian is also researching macroinvertebrate grazing on biofilms in streams in association with **Gillian Lewis** in the School of Biological Sciences at the University of Auckland.

Ian is also employed as a Senior Lecturer in the School of Geography and Environmental Science at the University of Auckland. He is responsible for teaching and research in the freshwater sciences and supervises a number of students (see University of Auckland).

Richard Montgomerie has now moved to Tauranga after being largely responsible for establishing our office in Christchurch. Richard has been involved in a number of consenting issues and is involved in many studies for the dairy industry and meatworks, and more recently the monitoring of gold-mining activities on the Coromandel Peninsula. Richard is also

responsible for project managing a multi-disciplinary investigation of a new and large mining project in Armenia.

Greg Burrell is based in our Christchurch office and much of his current work involves ecological assessments for irrigation and energy projects (hydro and wind), and assessing effects associated with residential developments. Greg has become increasingly involved with instream habitat assessments and modelling, and has recently completed a review of minimum flows for a number of South Canterbury streams for Environment Canterbury.

Scott Speed continues his range of interests including estuarine surveys and the impacts of mining on freshwater resources. In collaboration with Ian, Scott continues his work on the control of nuisance chironomids at a variety of locations throughout New Zealand. In particular, Scott has been involved in assisting Ian and other staff with new techniques for the control of nuisance midges and mosquitoes that have involved laboratory and field trials. Scott is also involved in water resources investigations in the Auckland and Waikato regions.

Nick Carter is based in our Auckland office and assists with a variety of project work around the country. Nick is involved in algal, habitat, invertebrate and fishery surveys. In particular He is involved in new and existing mining developments, assessments of effects of hydro-electric developments, assessments for residual flows, treated wastewater discharges and water abstractions. Nick is also frequently asked to assess the permanence (cf. intermittent) of waterways in the Auckland region.

Richard Allibone joined Golder last year and has returned to his former stomping grounds in Dunedin where he is based within our Dunedin office. Richard has been involved in a number of projects working in all parts of the country, including assisting DOC with some native fish management. In particular Richard is involved in irrigation and energy projects (hydro and wind).

Katherine Muchna assists Ian with his research work and is involved in many freshwater ecological surveys and has commenced a part-time MSc at the University of Auckland.

Annabel Barnden is a member of our Christchurch office, after working with us as a summer student. Annabel assists Greg with his project work but is increasingly involved in projects around the country.

Leigh Anderson is based in our Auckland office and assists Ian with his research work and is involved in freshwater and marine ecological surveys.

Compiled by Ian Boothroyd

Stark Environmental

John Stark resigned from his position at Cawthron Institute at the end of June 2007 and has established Stark Environmental Limited. John's wife **Yvonne** is a co-director of the company. John spent over 21 years at Cawthron establishing, growing, and managing the Marine and Freshwater Consulting Group for the first 13 years and as a member of the freshwater team in recent years. John is continuing to offer specialist freshwater ecological research and consulting primarily concerned with macroinvertebrates, biotic indices and biomonitoring, and will maintain his involvement with NIWA's Water Allocation FRST research programme until June 2009. At present he is working on papers examining the influence of season (with **Ngairi Phillips**, NIWA, Hamilton) and flow variability on biotic indices. Other projects undertaken since leaving Cawthron include biomonitoring at Kapuni, and presenting evidence on the consequences for macroinvertebrate communities in consent hearings for Meridian Energy's North Bank Tunnel Hydro-electric and Hunter Downs Irrigation Schemes. **Yvonne**, with over 26 years experience in this field, is providing a specialist freshwater macroinvertebrate sample processing service.

Compiled by John Stark

Private Consultants

Ian McLellan

I have a revision of Thaumaleidae (Diptera) and descriptions of new species of *Zelandobius* (Plecoptera) well under way. The New Zealand Stoneflies website being constructed by Steve Pawson and I is almost completed.

The XII International Conference on Ephemeroptera and the XVI International Symposium on Plecoptera will be at an International Joint Meeting at the State Museum of Natural History in Stuttgart, Germany, from 8-14 June 2008. See the following website:

<http://www.jointmeeting08.naturkundemuseum-bw.de/>

Regional Councils/Territorial Local Authorities

Auckland Regional Council (ARC)

Stream Ecological Valuation (SEV)

ARC recently hosted the 3rd SEV training workshop. The workshop was over-subscribed and there are plans to run additional courses to meet demand. Attendees included environmental consultants and regional and local council staff from around the country.

The SEV methodology is recommended as best practice in stream work consent applications since the 1st October 2007, although at this stage it will have no statutory power.

Riparian Extent Survey (RES)

The Monitoring and Research team are currently undertaking a survey of the riparian characteristics of the regions streams. The principle driver of the work is to provide information on the extent of stock exclusion from streams by riparian fencing. This information will feed into a review of sediment management by the Environmental Policy team.

To maximize the return of information for the sampling effort, we will record the presence of riparian vegetation and in-stream erosion simultaneously at 180 sites across the region.

Lake Ototoa

Lake Ototoa is considered to be the most pristine lake in the Auckland Region, with high ecological values including an almost entirely indigenous submerged vegetation. In March 2007, the alien plant Hornwort (*Ceratophyllum demersum*) was discovered in the lake for the first time and it is considered to pose a significant threat to the biodiversity and ecology of the lake.

A survey indicated that it was restricted to a single arm of the lake, which permitted management of the outbreak. Two barrier nets have been installed to isolate the affected arm from the remainder of the lake in an effort to control and eradicate the infestation. The affected area has subsequently been treated with the herbicide diquat to control the Hornwort. Surveillance of the lake is ongoing to monitor the distribution of the Hornwort and identify whether further herbicide application is required.

Ecobase

Ecobase is a powerful data management solution for storing and querying taxonomic and ecological data. Ecobase was commissioned by ARC and built by iQuest (Hamilton). The database is a secure repository for all our marine and freshwater ecological data. Ecobase offers a valuable application to a wide range of public and private organizations with large taxonomic and ecological datasets.

Staff Changes

Monitoring and Research have recently appointed 2 new freshwater ecologists. Martin Neale has joined us in June from the Centre for Ecology and Hydrology in the UK. Martin spent nearly 5 years at CEH after completing his PhD entitled "Measuring and classifying the ecological status of lakes using benthic macroinvertebrates" at the University of Ulster in Northern Ireland.

Graham Surrey joined the Monitoring and Research team in October. Graham has been working with the Pollution Control team within the ARC since completing his MSc entitled "The effects of land-use and human pressures on the twin stream catchment, West Auckland" at the University of Auckland.

Compiled by Martin Neale

Environment Canterbury (Ecan)

The Surface Water Resources and Ecosystems team at Environment Canterbury (Canterbury Regional Council) has undergone a period of growth and change in the last year with the creation of additional scientist and analyst positions and the replacement of some departing team members. The team continued to be managed for much of the year by **Ken Taylor** with **Kathleen Crisley** acting in Ken's position since July, when he moved upstairs to take up an acting role as Director of Investigations and Monitoring. **Taryn Wilks** (surface water analyst) and **Michele Widdowson** (surface water scientist) have joined the team, while **Mary Beech** has replaced **Rochelle Lavender** (permanent parental leave) as ecosystem health monitoring officer and **Graeme Clarke** has replaced **Zella Smith** as analyst/technician in the Timaru office. Those remaining are scientists **Adrian Meredith**, **Shirley Hayward** (surface waters) and **Lesley Bolton-Ritchie** (coastal waters), analyst **Robyn Croucher**, and technicians **Julie Edwards** and **Fay Farrant**.

Adrian Meredith continues to run the regional water quality monitoring programmes, regional stream health monitoring programmes, and investigations of 'living streams', and stream restoration programmes. These include a water quality monitoring network of 90 streams and rivers, a lakes network of 21 high country lakes, a region wide macroinvertebrate and habitat monitoring programme of 140+ sites (based loosely on USEPA Rapid Bioassessment Protocols), and investigations in catchments that are either degraded through intensified agricultural areas, or are the focus of community group activities. The water quality network has now been running for 15 years and the biological network for 8 years. New programmes initiated over this past year have been extending monitoring through the lower Waimakariri tributaries, Ellesmere tributaries, and streams in the Gerakldine/Peel Forest area. Investigations continue in the Waitaki catchment and inland Mackenzie Basin where there are widespread proposals for irrigation and intensification. A huge focus is the continued scoping or development of large scale irrigation schemes across the Canterbury Region.

Shirley Hayward continues to run monitoring and investigation programmes on Lakes Ellesmere (Te Waihora) and Forsyth (Te Wairewa) and their tributaries, programmes looking at irrigation effects in the Amuri basin, pesticide monitoring, and assessing issues such as EDC's (endocrine disrupting compounds), stormwater management, and flow issues in catchments such as the Waipara, Hurunui, Waiau and Pareora Rivers. Shirley also continues her interest in algae and periphyton and coordinates ECan's role in the ongoing 'Didymo' surveys and surveillance in the central South Island.

Michele Widdowson started with the team in July and has taken over management of the summer freshwater bathing beach monitoring programme. In addition, much of Michele's work in the coming months will involve providing scientific support to the Planning team, who are going through a series of hearings and variations on the proposed Natural Resources Regional Plan. She has an interest in urbanisation effects on water quality as well as general land use change, and is hoping to quickly come up to speed with the large range of issues facing water quality in the Canterbury region (see below).

Lesley Bolton-Ritchie continues to extend the marine component of our programmes, reviewing the coastal water quality and ecology monitoring programmes. She also maintains the marine bathing beach programme and deals with an increasing number of ocean outfall discharges in the region.

The ecological field and lab work was managed by **Susannah Vesey** over the 2006/07 summer and is now managed by **Mary Beech**. Fieldwork is still primarily conducted each summer by Canterbury University School of Biological Sciences students (last summer having included **Taryn Wilks, Angela Dean** and **Jared Arthur**). Mary is also involved in baseline and effectiveness monitoring of the Living Streams restoration programme.

Robyn Croucher continues to coordinate the Chatham Islands freshwater monitoring programme as part of Environment Canterbury's contract to supply regional council services to the Island. A baseline of 5 sampling trips have been conducted, a report has been produced and presented to Council, and a long term monitoring strategy developed in this novel environment. She has also been underway with a comprehensive review of the SOE surface water quality monitoring programme for Canterbury, and has been increasingly involved in reviewing the surface water quality data for mid Canterbury rivers (Ashburton, Cam and Waimakariri).

Taryn Wilks has stayed on following a summer of ecological field work and is now enjoying her time at ECan as surface water quality analyst. Taryn is involved in numerous surface water quality investigations and monitoring projects, for example, investigating periphyton growth and nutrient limitation in the Waitaki catchment. However, her primary role is to provide the scientists with comprehensive data analysis and scientific support for report writing.

Graeme Clarke started with the team in the Timaru office in May and has continued field work involved in the surface water monitoring programmes run by Adrian Meredith and Shirley Hayward. He will also help run the South Canterbury recreational water monitoring programme and the recently introduced marine sampling programme.

The year has been another one with continuing pressure on water resources for irrigation and on the state of rivers, streams, lakes and aquifers. The allocation of water resources in Canterbury remains a dominant theme with challenges to major strategies for management of the rivers and aquifers of the plains (which supply the lowland springfed streams). Proposed hydroelectric and irrigation schemes in the lower Waitaki catchment are challenging the recently operative Waitaki Water Allocation Plan, while applications for further large irrigation schemes in south, mid and central Canterbury continue to require evaluation. Integrated catchment management of water resources is becoming a key focus, with increasing need for understanding of surface and groundwater relationships and the effects of groundwater abstraction and allocation on surface water instream values. The team has provided input to the Regional Environment Report, due out soon, and plans to extend this analytical work to produce an updated technical overview report of the region's surface water quality and to develop region-specific water quality guidelines.

Compiled by **Adrian Meredith**

Environment Waikato (EW)

David Speirs has spent the last four years project managing a Policy Variation to the Waikato Regional Plan on Water allocation. This has been a hot topic which is getting hotter by the day, especially on the Waikato River where the tensions between water demand for hydro electricity generation, pasture irrigation and municipal supply are approaching those in Canterbury! The Variation has recently been through public notification process and is due to begin the public hearing process on 4 December (which is why David won't be at the conference this year - have fun). David is also the Strategic Outcome leader for the Inland Waters area within Environment Waikato and has had a busy 12 months justifying budgets and planning future expenditure. The next 6 months will be spent helping a largely new regional council come up to speed with the huge number of projects Environment Waikato has underway in this area. In addition to this David is currently managing the Environmental Program of Environment Waikato's River and Catchment Services Group with a focus on improving the overall environmental performance (and achieving some measurable environmental gains) of Environment Waikato in delivering its river flood management, land drainage and soil conservation functions. This includes development and implementation of an environmental plan, monitoring programs and managing two staff (Michelle and Keri) who do all the actual work.

Michelle Gibbs works in the River and Catchment Services environmental program and runs a number of projects aimed at improving Environment Waikato's environmental performance. Amongst her successes this year, Michelle has developed a number of environmental Best Practice Guidelines for use by our operational staff. These guidelines cover: Instream works such as gravel removal and structures, Vegetation management such as willow removal and riparian planting, Land Drainage and Drain maintenance and stream crossings (culverts bridges etc.). Michelle is now running a training program to ensure that all operational staff and contractors are up to speed with the expectations these guidelines create. The guidelines are all on Environment Waikato's website under our publications list.

Michelle is also managing a project called "biodiversity on scheme land" which aims at using the land Environment Waikato owns as part of its flood management schemes to carry out biodiversity enhancement work such as constructing tidal wetlands and enhancing forest fragments.

Keri Neilson (Lakes Management Officer) has been working on projects involving lake level setting, shallow lakes management plan development and shallow lakes restoration. She has also been working with **Kevin Collier** on a project developing biological indicators of lake health. In June a new weir was constructed at the outlet to Lake Mangakaware which involved increasing its minimum level by 15 cm to help to conserve the surrounding peat soils and important archaeological sites. There are a further nine peat lakes still requiring water level structures. Detailed surveys of the outlets to significant peat lakes have also commenced this year. The purpose of this work is to have baseline data with which to enforce the drainage rules in the operative Waikato Regional Plan. As part of the development of a lakes

management plan, a shallow lakes database has been built to hold all internal and some external lakes data. From here we plan to identify where further information on our lakes is required to assist with management decisions. The partners in the Waipa Peat Lakes and Wetlands Accord continue to make great progress by working together to restore these significant sites. Lakes such as Rotomanuka and Pataka South now have new buffers as a result of land acquisition by local council through sub-division, and through working with landowners to highlight the benefits of retiring strips of land around these lakes.

Kevin Collier is now working 4 days a week at Environment Waikato where he continues to co-ordinate contract work on stream and river ecology, and provide advice on consent issues. Along with **Mark Hamer** he recently completed a study on invertebrate faunas in the Waikato River repeating the work carried out 25 years ago by Mark Davenport, and the data now await analysis and write-up (along with a lot of other stuff). More data has been collected on the breakdown rates of wood as potential functional indicators across a range of aquatic habitat types, and the search continues for a simple and effective way to summarise macroinvertebrate condition metrics. **Mark Hamer** co-ordinated the SOE sampling of Waikato streams this summer, and will be participating in large river work around the region in the coming year. **Hannah Jones** has nearly finished the development of a stream macroinvertebrate database for the region that incorporates data from published and unpublished sources. **Amy McDonald** has been doing some work on restoration options for urban streams, but will be leaving shortly to rejoin the Department of Conservation.

Compiled by Kevin Collier

Greater Wellington Regional Council (GW)

Greater Wellington has been involved in a number of freshwater investigations and projects in recent months.

Alton Perrie recently completed a report on the state of water quality in our region's rivers and streams over 2003-2006. This is the first comprehensive assessment of water quality data since the introduction of a number of new sites to the Rivers SoE programme in September 2003. Alton has now moved onto writing a report on the results of five years of water quality and ecological monitoring conducted upstream and downstream of three pilot riparian rehabilitation areas.

Summer Warr returned to Greater Wellington earlier this year and took up the water quality scientist position left vacant as a result of **Juliet Milne's** move into the position of Environmental Science Team Leader. Summer recently completed a report on a water quality investigation in Hulls Creek, a highly modified tributary of the Hutt River. Hulls Creek is listed in Greater Wellington's Regional Policy Statement as being in need of enhancement (for water quality) but had not been investigated in any detail for about 8 years. Summer is also continuing with the development of an urban stream management strategy utilising data from ecological and habitat surveys of urban streams conducted by Kingett Mitchell over the last couple of years. The streams are to be categorised in terms of their ecological health, with

stream protection and rehabilitation strategies identified for each category. Current work has focused on:

- detailed mapping of the urban stream network using 5m digital terrain models;
- compilation of detailed impervious cover data for the region (a student from Victoria University is assisting with this); and
- identification of areas of future urban development where urban stream protection and management work is most needed.

In June - and again in October - **Alton Perrie** and **Summer Warr** presented at a small streams workshop organised by our Environmental Regulation Department. The workshop specifically targeted local councils and developers, with two key aims:

- (1) to improve understanding of key values and ecology of smaller streams in our region; and
- (2) to encourage good practices in minimising adverse environmental effects of activities, particularly in relation to works in streams and earthwork sites.

Barry Robertson (Wriggle Coastal Management Ltd), with assistance from **Alton Perrie**, recently spent a few days at Lake Onoke, a coastal lake on the south Wairarapa coast. Fieldwork involved the collection of depth and salinity measurements, along with an assessment of indicators of eutrophication and sedimentation. This information, along with a review of existing information on the lake will be used to confirm the major threats to water quality, with the view to determining an appropriate long-term monitoring programme.

Overseen by **Laura Watts**, instream flow assessments continue in high-priority catchments, in accordance with our *Framework for Instream Flow Assessment in the Wellington region* (completed last year). The information gathered will help in the review of our current water allocation policies in the Regional Freshwater Plan, due to commence in 2009/10. The investigations include: continuous water quality monitoring in a range of stream types, a WAIORA assessment of flow-temperature-dissolved oxygen relationships in the Otukura Stream, and, with assistance from **Joe Hay** and **John Hayes** (Cawthron), analysis of hydraulic habitat in the lower Ruamahanga River using RHYHABSIM. We are also in the process of developing a 'template' for assessing tangata whenua values associated with stream flow, in conjunction with Wairarapa iwi representatives. In addition, to more accurately measuring low flows in certain catchments, we have finished upgrading our flow monitoring stations on the Waipoua River, Parkvale Stream and Mangatarere Stream. This coming summer we plan to continue investigations into groundwater/surface water interactions in the Wairarapa by focusing on the losses from the Waiohine River and springflow in the Greytown area.

Murray McLea continues to oversee fish pass construction, with a fish pass constructed in the lower reaches of Hulls Creek in August. Like other fish passes that we have built in recent years, the fish pass was a joint exercise with a local care group. The Silverstream Care Group obtained funding from central government's Sustainable Management Fund, which

contributed significantly to the project. Greater Wellington applied for, and holds, the resource consent for the fish pass. We also managed the construction at the site.

Michelle Bird and **Megan Banks** of the Land Management Department are reviewing the delivery of the *Streams Alive* riparian programme. Under this programme, plants and weed control for streamside planting are available for landowners in 12 high value catchments. Landowners outside these catchments are eligible for advice only. The results of the review, which also includes a survey of landowners, will be used with **Alton Perrie's** pending report on the effects of our three riparian pilot projects on stream health to assess whether we need to change our approach.

Tim Park has begun a review of the *Wetland Incentives Programme* developed by **Melanie Dixon** in 2003. The review included a mail survey of all landowners who received help from the programme. Under the current programme landowners may apply for up to \$5,000 per property to protect the biodiversity of a wetland on their property. Council money can be spent on fencing or weed control or a combination as long as the landowner contributes half the cost of fencing.

Howard Markland worked with the city and district councils of the region and prepared a stormwater action plan that sets out agreed actions for each authority to take over the next financial year. This plan will be reviewed annually and new actions set. The actions so far fall mostly to Greater Wellington, but the intention is that it will set the direction for programmes to be proposed in Long Term Council Community Plans and gradually more programmes will gain more support. Since Howard's departure this programme is being minded by **Kirsten Forsyth**.

Compiled by Juliet Milne

Hawke's Bay Regional Council (HBRC)

Taharua River Targeted Investigation Study Monitoring of the Taharua River continues to show that nitrate nitrogen and turbidity concentrations continue to climb. While our routine biological monitoring of the river has failed to show any adverse effects on the aquatic communities of the river, anecdotal evidence suggests that major biological effects may be occurring on the Mohaka River mainstem. With this in mind we have embarked on a major study to try and determine what effects the Taharua River, Waipunga River and Ripia River water quality may be having on the benthic ecology of the Mohaka River. We retrieved our nutrient agar plates last week and a visual observation of these suggests that the Mohaka River is P limited. Chlorophyll a results are expected in the next couple of weeks. We have also been monitoring algal biomass on the river bed as well as quantitatively sampling macroinvertebrates. We intend to repeat all this work in summer to get an idea on the temporal extend of the impact (if any).

Didymosphenia geminata We have completed a draft regional Didymo Incursion Response Plan, many thanks to Taranaki Regional Council who were ahead of us with their plan, copy and paste is a wonderful thing. We have had 2 stakeholder meetings which have been very successful. We will have 12 delimiting sites monitored on a quarterly basis in our region for

Didymo as from November this year. We would like to add photographs of Didymo to our website at some stage so people can see how ugly our rivers could look in the event of an incursion.

Toxic algal blooms We recently had a training session with our district health board staff and compliance staff from HBRC on the procedures for monitoring toxic algal blooms. A report outlining roles and responsibilities was produced by **Anna Madarasaz-Smith** in May 2007.

Lake Trophic Level Monitoring We have completed our first years worth of monthly water quality monitoring of the western Kaweka Lake. A Lake SPI assessment conducted by NIWA indicates that the lake is in a near pristine condition, scoring slightly above that of Lake Waikaremoana.

Fish monitoring programme **Fiona Cameron** recently joined us as a field technician for our department, she will be involved with monitoring fish populations at 26 sites this financial year. She has also been involved with the development of a fish barrier monitoring programme.

Water Policy Development This year the policy and planning team have continued reviewing Council's stormwater and on-site wastewater disposal regional plan provisions. A Draft wastewater plan change has been prepared to date with further consultation being undertaken with interest groups. A draft stormwater plan change is not quite yet developed. It is likely that proposed plan changes will be notified in mid 2008.

Staff Changes

The past year has seen **Andrew Lamason** leave his position in the Water Quality/Ecology team and has been replaced by **Fiona Cameron**

Compiled by Brett Stansfield

Taranaki Regional Council (TRC)

State of Environment monitoring

TRC has a comprehensive State of Environment programme covering physico chemical, macroinvertebrate, periphyton, contact bathing water quality, groundwater levels and quality, hydrology and riparian management. This year, this involved monitoring 281 sites (noting that a single location may contain two or more sites to monitor different programmes) and 984 sampling runs, inspections and surveys.

Having gathered over 10 years of State of Environment water quality and macroinvertebrate community data, it was timely this year to examine any possible trends. TRC commissioned **John Stark** to develop a method to make sense of 10 years of macroinvertebrate data. The resulting report was entitled, *'An approach to the evaluation of temporal trends in Taranaki*

state of the environment macroinvertebrate data. TRC produced a further report entitled '*A discussion of trend analysis of State of Environment freshwater biological data of Taranaki*' which utilised the methodology developed to identify trends at specific sites.

The statistically significant trends were interpreted by adopting the 'best professional judgment' of a freshwater ecologist with knowledge of the region's rivers and streams. This resulted in '*An interpretation of the reasons for statistically significant temporal trends in macroinvertebrate (MCI) SEM data in the Taranaki region.*'

Conclusions drawn from these reports provided an encouraging picture of trends in water quality. In some cases specific events (e.g. improvements to point source discharges) accounted for positive trends. Physico chemical data gathered over the last 10 years was also subjected to trend analysis in a Council report entitled '*Trends in the quality of the surface waters of Taranaki*'. TRC has obtained the soft-ware package (STATISTICA) to trend other state of environment data.

While State of Environment results are written up in annual or biannual reports, TRC plans to collate all the monitoring work into its third 5 yearly report, to be launched in Spring 2008. This report will assess and evaluate the state of the environment monitoring undertaken over the past 12 years and provide information on the current state of the environment, environmental trends, pressures on those resources, reasons for the trends observed and the responses made by TRC and the community.

Freshwater Plan - interim review

The Regional Freshwater Plan for Taranaki was made operative in 2001. It is TRC's practice to undertake an interim review of the effectiveness and efficiency of regional plans half way through their statutory lifetime. This review will examine how the Plan has been used in managing water resources in Taranaki, examine the workability of the rules, as experienced by consents and inspectorate staff, and evaluate policies using data gathered for State of Environment monitoring and other information gathering processes.

Resource investigations

TRC has completed an investigation into the performance characteristics of farm dairy treatment ponds and aspects of their effects on water quality. The results validated the Council's guidelines for dairy treatment ponds and pointed to the need for further investigations into the cumulative nutrient loading of catchments from discharges from dairy ponds. The resulting report has been produced in two volumes: '*Dairy shed treatment pond discharges in Taranaki: A study and discussion of treatment pond performance, management and environmental effects*'.

The Council supports the dairying catchment water quality study being conducted by Agresearch and NIWA in the Waiokura stream catchment. While the study is ongoing, the project aims to establish baseline water quality under present farming conditions and land use intensity and to be positioned to be able to detect changes in water quality as better management practices are adopted by farmers.

Increasingly in Taranaki, landowners are opting to pipe small streams in a desire to increase pasture availability and decrease the need to fence and plant riparian margins. TRC is planning an investigation into this practice in order to better understand the ecological effects and possible cumulative impact of this farming practice.

TRC Freshwater Staff

Kimberley Hope, Scientific Officer, has returned from maternity leave to co-ordinate the State of Environment Programme and run a number of resource investigations. **Chris Fowles**, Scientific Officer Water Resources, leads various SEM projects and combined forces with **John Stark** on the macroinvertebrate trend analysis work. **Bart Jansma**, Scientific Officer Freshwater Biology, juggles fish pass investigations with periphyton SEM and investigations into effects of riparian restoration. **Ray Harris**, Technical Officer, is now newly trained in didymo DNA sampling. **Fiona Moore**, Scientific Officer Hydrology, leads the hydro team. Earlier this year, Fiona and Bart announced their engagement (and therefore should provide a unique approach to future IFIM assessments)!. **Rosemary Miller**, Policy Analyst, has recently joined the Council after 10 years working with DOC.

Compiled by Rosemary Miller, Kimberley Hope and Chris Fowles

Tasman District Council

Tasman Resource Management Plan (TRMP) We are intending to notify some variations to the allocation limits and zone boundaries for the Moutere Eastern Groundwater Zone- some extra water identified in resource investigations.

As part of the Moutere work, we reviewed our waiting list approach and found it wanting. We had originally thought to link the waiting list order with a resource consent application (which was then deferred by agreement under section 37). In practice, we didn't always get the applications in the right order, and some on the waiting list haven't yet applied and that results in conflict between the waiting list order and the RMA priority in time requirement.

So we have devised a new and exciting method -entry onto the list is now by registration and is linked with a prohibited activity rule that prevents applications unless you are in the right order on the list.

We are a little worried about the accelerating rate of new deep bores being drilled for domestic supply in the Moutere - because of drawdown issues and setback requirements each new bore reduces opportunities for new irrigation bores - and cause some reverse sensitivity issues. A large part of the Moutere is destined to have its own Council supplied reticulation - but rather than getting a bit tougher on the drilling of new bores for household supply, the Council decided it just meant they couldn't wait too long with their proposed scheme.

We have also notified "Interim Water Management Provisions for the Waimea Catchment" - droughts finally tested the limits we had set as proposed back in 2001 - and river flows didn't respond as the models had predicted. A review with a better model shows over-allocation in

most of the Waimea Zones. In the meantime, a water augmentation committee is carrying out feasibility studies for a dam on the Lee R- and if that works, the water needs of nearly everyone in the Plains will be met for quite some time to come. The interim provisions are a 'holding pattern until we have more certainty about the dam and avoid costly debates about a more appropriate allocation regime and more especially an appropriate low flow for the Waimea River.

We've started drafting the final chapter of our TRMP - covering Part 13 Activities in the Beds of Rivers and Lakes. The biggest issues will be managing the extraction of gravel from rivers (most are degrading river systems but alternative quarry based supplies are more expensive) and introducing some stock access/crossing provisions.

Works in the beds of waterways: Increasing Flood-Channel Capacity in an Ecologically-Friendly Way. With climate change causing revised estimates of flood flows, several waterways have been, and others are in line, for widening. Achieving both goals is relatively easy when you have engineers with a background in 'natural resource engineering' - for the other engineers detail, including Thalweg profiles, substrate composition and exact meander plan are being required for resource consent applications.

State of the Environment Monitoring:

River Water Quality: Programme revised 3 years ago continues on a quarterly basis during stable flows at 56 sites. We are considering some more flood-flow monitoring. One \$20k continuous WQ & flow monitoring site set up - modelled on the ARC formulation. Impact investigations have been undertaken at most sites where WQ issues have been identified.

Bathing Beach Monitoring programmes: Back up and running again after last summer's scaling back due to undertaking of sanitary surveys.

Lake Monitoring: No really at-risk lakes, so no monitoring.

Fish Survey Report Completed: Regional patterns of fish distribution becoming clearer. Will be able to start modelling fish presence/absence after a couple more surveys.

Stream Temperature: A major issue for Tasman according to monitoring and modelling data. Last summer we had 10 loggers deployed with 20 ready to go for next summer. Getting funding for shading appears to be difficult.

Didymosphenia geminata As for most of the SI, Didymo is spreading steadily in Tasman (now in Motueka & Takaka Rivers as well as Buller and many tribs including the Matakitaiki). Spread seems to have started from fishing spots or fords. 3 rangers to be employed over summer fulfilling an advocacy role.

Toxic algal blooms: None have occurred in recent years that we know of.

Stream rehabilitation: Several projects on the go, for example:

Aorere Catchment; Faecal bacteria discharge modelling has produced some interesting outputs but some focal parts of the dairy farming community are still defensive despite effects on marine farmers. A faecal source tracking project under way.

Motupipi Rv - a tier 2 Dairying and Clean Streams Accord catchment with some of the worst water quality for most of the wrong reasons, source to the sea approaches, catchment nutrient budgeting, likely affects on marine water quality,

Reservoir CK urban waterway project - innovative interpretive panels, campaign to shade the stream after discovering excessive temperatures (up to 29°C). walkways developments. One of the biggest problems is communication between departments.

Sherry Rv - catchment is nested in the Motueka ICM programme. Bridging cow crossings has reduced the E.coli load by 50% - now we are establishing farm plans with the goal of making the river 'swimmable'.

Fish passage - only one barrier removed in the last year. Investigations with student support continue to find more (193 in our region so far and only looked at 5% of the area) - likely to do a prioritisation of barriers for rehab over the next year .Trying to get a willing landowner for a tidal flapgate trial based on the fish-friendly options initiated by EBoP (not as easy as we thought. Variation to Tasman Resource Management Plan will be addressing existing and new structures for fish passage.

Estuarine rehabilitation: Several projects under way around the Waimea Inlet. One 'declaiming' a reclamation of the estuary, another restoring an unauthorised reclamation and another aiming to restore inanga spawning habitat where our engineers have wrecked havoc in the creek.

Staff Changes: Same old crew.

Compiled by Mary-Anne Baker and Trevor James

Horizons Regional Council Update

The One Plan: The technical background for the Proposed One Plan (Horizons 2nd generation combined Regional Plan and Policy Statement) has kept the Science Team and many research providers around the country busy for the last 12 months. Cross submissions will be completed before the end of the year and hearings planned for the New Year. Public consultation on the more contentious issues within the Plan is ongoing. The One Plan covers policies and rules for all activities, however, the main focus has been on the 'Big Four': Water Quality, Water Quantity, Hill Country Erosion and Loss of Biodiversity, so much of the science work underpinning the Plan has had a water related focus.

Water Allocation: **Raelene Hurndell** and **Jon Roygard** have prepared a water allocation framework for the management of surface water regionally. Building on the Water Management Zones (WMZ) project completed in 2006, the framework sets out a decision

support diagram for determining the level of information available for each catchment / WMZ and subsequently, the method to be used for setting allocation limits and minimum flows. Technical reports supporting this work are available on request.

Hurndell, R. (2007). Regional Water Allocation Framework Volume 1 & 2: Technical Report to Support Policy Development. Horizons Regional Council Report No. 2007/EXT/809 & 810.

Horizons Water Matters website <http://www.horizons.govt.nz/watermatters/> has had a facelift. This website presents daily catchment water use data, where water use restrictions are occurring and where non compliances occurred in the last 24 hours. More than 50% of the consented surface water allocation volume in the Horizons Region is being measured in near-real time and automated compliance checking occurs daily, we are on track to raise this to 80% by mid next year.

Water Quality: Always a contentious issue in our community. Water quality standards in the One Plan are proposed for every water management zone in combination with land use controls to reduce non-point source contamination from intensively farmed land (in waterways with severe nutrient enrichment). Work determining the values and standards for all water management zones in the Region to support the One Plan was completed in June by **Olivier Ausseil** and **Maree Clark**. Technical reports on the values and standards are available on request.

Ausseil, O. and Clark, M. 2007a: Recommended Water Quality Standards for the Manawatu-Wanganui Region: Technical report to support policy development. Horizons Regional Council Draft Report, June 2007.

Ausseil, O. and Clark, M. 2007b: Identifying Community Values to Guide Water Management in the Manawatu-Wanganui Region: Technical report to support policy development. Horizons Regional Council Report No. 2007/EXT/791.

Work on determining the N and P loads from point sources (and by inference non-point sources) at low flows has been completed by **Kate McArthur** and **Maree**. An outcome of this work was the development of a new discharge monitoring programme that takes audit samples and flow gaugings upstream downstream and within the effluent of all significant discharges in the Region at the same time as sampling for the SOE monitoring programme.

McArthur, K.J. and Clark, M. (2007). Nitrogen and Phosphorus Loads to Rivers in the Manawatu-Wanganui Region: An Analysis of Low Flow State. Technical Report to Support Policy Development. Horizons Regional Council Report No. 2007/EXT/733.

A framework for nutrient management by Kate and Jon, that includes identifying nutrient loads (both PS and NPS) in relation to flow deciles and water quality standards, is ongoing. Work on the upper Manawatu catchment is in final draft stages and all catchments that fall within the One Plan nutrient management rule, or are subject to significant point source discharges will be completed over the coming months. Reports will be available in the New Year. The major challenges in this work are:

Determining how the contributions of contaminants from PS and NPS should be managed to meet water quality standards?

How the cumulative effects of multiple point source discharges should be dealt with to meet water quality standards?

How the contribution of contaminants from point sources should be managed when the NPS contribution upstream of the discharge already exceeds water quality standards?

How should the management of these factors change with flow?

Another major ongoing water quality project is the development of an automatically updated website that displays current and past water quality data from SOE monitoring for the whole Region, in relation to water quality standards. This work will be presented by Jon and Kate at the Conference in December. Stage two of the website will be linked to the discharge monitoring programme and an automated compliance checking system.

The Non-Point Source Monster: Intensive Landuse and Highly Erodible Land

The One Plan proposes to limit contaminant losses to water from intensive farming systems in nutrient enriched catchments using an approach based on land use capability (LUC). The rule requires the development of a Farmer Applied Resource Management Strategy (FARM strategy), and at present Horizons, in conjunction Landcare, the SLURI group and other research providers around the country are completing several projects to support this approach. Some of these projects are investigating sources of phosphorus and providing recommendations to reduce P inputs to water from erodible land and intensive farming systems.

Aquatic Biodiversity: This year, Horizons have increased capacity to undertake our own sampling of invertebrates, fish and periphyton throughout the Region. One of the aims of the ongoing review of this programme is to better align the monitoring of aquatic biodiversity with other SOE programmes. This will be the first year that Horizons embarks on a targeted SOE fish monitoring programme. Further work is planned to identify significant fish barriers in the Manawatu 'fish desert' for removal with **Mike Joy**.

McArthur, K., Clark, M. and McGehan, J. (2007). Sites of Significance for Aquatic Biodiversity in the Manawatu-Wanganui Region: Technical Report to Support Policy Development. Horizons Regional Council Report No. 2007/EXT/794.

Staff Changes: The Horizons Water Team has lost Senior Water Quality Scientist **Olivier Ausseil** to his own consultancy business. **Maree Clark** has increased her responsibilities to take on an Environmental Scientist - Water position (formerly Research Associate), and **Carol Nicholson** has been employed as Research Associate to undertake the Aquatic Biodiversity monitoring programme whilst completing her Masters with **Mike Joy**. **Kate McArthur** and **Raelene Hurndell**, having made it through their first year with Horizons, continue in the water quality and quantity positions respectively, under the management of **Jon Roygard**.

Compiled by Kate McArthur

Universities

Massey University

Russell Death has spent much of 2007 exploring models to link biological communities and environmental pressure gradients. This has included work with **Mike Joy** and **Rob Buxton** on Bayesian Belief Networks to model fish and invertebrate communities and examining patterns of invertebrate communities with **Kevin Collier** along gradients of native forest in the Waikato. He was also invited to submit and present reviews on floods and low flows, respectively at symposia in Scotland and Italy. **Fiona Death** and **Caroline Chin** continue to manage projects and process samples that provide the raw material for Russell's papers and meet the consultancy requirements of the research group. Russell is also currently hosting **Leonard Sandin** from the Swedish University of Agriculture.

Rob Buxton has completed a Bayesian Belief Model (BBN) for fish communities of Waikato and is currently compiling data for a BBN on invertebrate communities in the Hawke's Bay and Horizons region.

Mike Joy continues to work on a variety of consultancy projects involving Artificial Intelligence modelling and fish, particularly demonstrating to Regional Councils and the general public how much lost fish habitat results from particular management decisions. His environmental advocacy also continues with his latest endeavour, a contribution on dairy farming and water quality in North & South. He has also been the premier overseas scientist at the Transylvania Ecology Society meeting (I understand now why he has so much trouble sleeping).

Ian Henderson is continuing taxonomic work on Trichoptera including the description of several new species.

Alex James has just handed in his PhD on the response of hyporheic and drift communities to reduced flows and is now on the look out for some real work.

Zoë Dewson was awarded her PhD earlier this year and has been working on several consultancy and research projects with **Kevin Collier** and **Russell Death**.

Jonathan Tonkin has refocused his PhD from work on the Tongariro Power Development scheme to looking at the effects of flow and productivity on stream food webs.

Arved Schwendel has joined us from Germany to conduct a PhD on reach scale hydrological determinants of invertebrate diversity.

Nicola Atkinson is working with **Mike Joy** for her Masters to examine the migration barriers to native fish populations in the Wellington region.

Manas Chakraborty is a Masters student testing the ability of FWENZ (Freshwater environments classification of New Zealand rivers) in defining an environmental classification

that maximises discrimination of spatial variation in pristine biodiversity patterns of New Zealand's rivers and streams.

Hannah Rainforth is a joint Massey and Victoria Masters student working with **Murray Williams** and **Russell Death**. She has been measuring the filtration rates of kākahi (freshwater mussels) under varying turbidity regimes to determine the ability of this species to tolerate suspended sediment.

Logan Brown has left the Massey research group for a job in the Department of Conservation, but is still writing up his Masters on the distribution of koura in the lower North Island.

Kasey Gordon has joined us from sunny Trinidad (not too different from Palmy) to carry out his Masters on the linkages between stream invertebrates and urban development, probably in Wellington.

Natasha Petrove is working with **Mike Joy** on the biology, distribution, captive breeding and potential reintroduction of brown mudfish.

Amber McEwan is conducting an exciting study on biotic interactions and microscale habitat use within a freshwater fish community using PIT tags combined with intensive monitoring in a forested stream containing eight resident native species and brown trout. The data expected to be generated will be of great value in enhancing understanding of freshwater fish community dynamics and habitat requirements as the data we currently use in management practice is inadequate.

Compiled by Russel Death

University of Canterbury

Freshwater Ecology Research Group (FERG)

Jon Harding has been continuing his research on the impacts of acid mine drainage on stream systems. Previous work has concentrated on issues on the West Coast but now the emphasis has shifted to investigating future mining impacts in Southland. Jon continues his interests in aquatic-terrestrial subsidies and has been studying spider predation on aquatic adults mediated by bridges and culverts in USA and NZ.

Angus McIntosh has been leading a research team looking at variations in food webs across stream and pond networks. This is focusing on the influence of ecosystem size on predator-prey interactions and incorporates studies of the influence of disturbance-related changes in size (i.e., flooding and drying) as well as the effects of channel size on trout-galaxiid interactions, trophic cascades, community composition and dispersal by fish and invertebrates. The work is centred around streams and ponds in the upper Waimakariri River system, but also includes studies at the Rocky Mountain Biological Laboratory and elsewhere

in the South Island. Other work includes an urban stream restoration and the ecology of endangered galaxiids, especially Canterbury mudfish.

Mike Winterbourn has been occupied with several projects including editing and proof-reading of the forthcoming book on the Natural History of Canterbury. On the research front he has completed a study of *Deleatidium* production in a glacial stream with **Sandy Milner** (University of Birmingham, UK) and associates and is re-examining the life history and production of *Deleatidium* and other invertebrates in the lower Selwyn River where he had studied them in 1971-72. Mike is also assisting Duncan Gray with his research on the invertebrate fauna of springs and groundwater fauna in New Zealand braided rivers.

Dev Niyogi has returned to New Zealand to work with Jon on the effects of mining on streams. Dev previously worked with **Colin Townsend** at University of Otago, and then worked in the USA as an assistant professor for several years. Dev's research focuses on ecosystem processes in streams, especially those under stress from human activities.

Jonathan Bray has gained a MSc for his studies of algae in streams affected by acid mine drainage. He is keen to find employment in which his scientific skills can be utilised. **Cathy Kilroy** is close to submitting her thesis for PhD. The diatoms of Bealey Tarns have been coaxed into revealing their secrets, some of which have significant implications for biogeography. **Faradina Merican** has embarked on her doctorate studies of the cyanobacteria in flowing waters of the Te Waihora catchment. A previously unrecognised diversity has been described and the next task is to research their distribution patterns. **Paul Broady** continues to teach algae, and other less important biota, in as many contexts as he can muster: lakes, oceans, Antarctica and in the fur of the three-toed sloth. **Amy Lagerstedt** has completed her study for MSc on survivability and colonisation potential of *Didymosphenia*

Scott Wissinger (Allegany College, Pennsylvania) visited this year as an Erskine Fellow. Scott pursues his interests in the responses of invertebrate populations in temporary and permanent ponds and lakes.

Tanya Blakely is currently completing her Ph.D. examining the importance of tree-holes for both terrestrial and aquatic fauna in mixed broadleaf-podocarp forest on the West Coast, New Zealand. Overseas, water-filled tree holes are important habitat for many aquatic vertebrate and invertebrate species, however, very little is known about these systems in New Zealand. As part of this research, Tanya has been investigating whether tree holes support unique communities, compared with similar habitats on the ground, and exploring how habitat size and location affect community structure. Her findings show that many aquatic insect species, predominately dipteran larvae, colonize artificial tree-hole containers very quickly. Habitat-size strongly influences these communities, which interestingly appear to prefer smaller rather than larger habitats. Furthermore, some species appear to be unique tree-hole dwelling fauna, which could be negatively affected by deforestation.

Duncan Gray (PhD) is currently working with Jon on two projects related to braided rivers and their associated floodplains. A national survey of braided rivers has been completed. Eleven rivers were included, and surveyed at six longitudinally arranged reaches. Invertebrate community patterns within the main channels and across the greater floodplain

are being investigated. Duncan is expanding on this survey by investigating food-web structure around the groundwater/surface water ecotone in braided river floodplains.

Michelle Greenwood has submitted her PhD on the effects of river flow on populations of a riparian fishing spider. She is currently writing papers from her thesis (and having a holiday!) while waiting for her oral.

Hamish Greig has been continuing his PhD on community organization and food web interactions in ponds across gradients of permanence and size in both the Canterbury high country and the Colorado Rocky Mountains. Hamish is using a combination of field surveys, assays and mesocosm experiments to investigate spatial variation in food web interactions between ponds across landscapes, and how these interactions change over time within ponds as they dry.

Having returned to UC after working with NIWA on all things didymo for 15 months, **Phil Jellyman** (PhD) and Angus have set about investigating the main drivers of fish community structure in stream ecosystems. Recent research has been focused on the importance of particular factors (e.g. disturbance) in structuring stream fish communities and how fish community composition changes with stream size. In the months ahead, their research will be targeting invertebrate communities and attempting to link fish and invertebrate data to explore whether there is a role for ecosystem-size in structuring stream food webs.

Amber Sinton (MSc) is investigating the benthic ecology of stock water races within the Canterbury Plains. Despite the substantial quantity of water races throughout the plains there is very little known about their ecology or the aquatic fauna which inhabit them. Amber's research will provide information on four aspects of stock water race systems: their physical and chemical characteristics, the diversity and structure of their freshwater communities, factors that might control benthic communities, and the importance of stock water races as dispersal pathways for freshwater fauna.

Helen Warburton (BSc hon) finished her Honours project on the effects of low river flow on invertebrate communities and predator-prey interactions last year. Currently she is working as a research assistant for the FERG group while writing papers from her Honours.

Amy Whitehead (PhD) has been using a 25 year dataset of whoio sightings to assess the relationship between the distribution of whoio and landscape-scale environmental predictors that characterise their riverine habitat. This model has been used to produce a spatially explicit prediction of the suitability of habitat for whoio for all New Zealand rivers. This will be followed up by intensive habitat mapping at a reach-scale of a number of rivers around New Zealand over the coming summer

Hannah Wood (MSc) is working on Te Waihora (Lake Ellesmere). It is a large, coastal, brackish lake that supports an important cultural, recreational and commercial fishery which depends on benthic communities. Since the Wahine Storm in 1968 which destroyed much of the aquatic emergent macrophytes, the lake has been turbid and phytoplankton dominated ever since. This has caused large spatial variation in the substrate and benthic invertebrate communities, and has also resulted in a complex food web, driven by two primary basal

resources; phytoplankton, and benthic algae and macrophytes. Findings of this study will provide a better understanding of the biological health of this system and improved management of Te Waihora.

Darragh Woodford (PhD) is focusing on the spatial interactions between introduced trout and native non-migratory galaxiids across high country riverscapes. He is currently investigating the roles that local habitat heterogeneity, flow-related disturbance and channel size play in mediating the predatory impacts of trout on galaxiids across a river network.

Compiled by Jon Harding

University of Otago

Freshwater Fish Ecology and Evolution

The 'freshwater fish' lab at Otago has seen some recent departures. **Esben Kristensen** completed his PhD on brown trout migration and movement in the Taieri River, and for his efforts was rewarded with a permanent job in the The National Environmental Research Institute, Denmark. **Tobias Bickel** also completed his PhD on the role of the invasive macrophyte *Lagarosiphon major* in Lake Dunstan. After a wait of several months involving endless security checks by Australian customs officials, Tobias was finally allowed into Australia to commence a post-doc at the University of New England. **Shannan Crow** completed his PhD on genetic, morphological and behavioural comparisons of two non-diadromous galaxiids, and is now with NIWA, Christchurch. **Quinn Cannon** completed his MSc on Banded kokopu movement and residency, and has returned to the USA to take up a research assistant position. **David Harris** also completed his MSc on food supply and brown trout distribution.

Despite the departures, there are still plenty of folks here keeping up the good work. Of the continuing PhD students, **Andy Hicks** continues to grind the otoliths of any unlucky fish that happens to come his way, finding plenty of non-diadromous fish in places where only diadromous fish were thought to swim; **Adrian Lill** spends his nights out sampling small Otago estuaries, and his days puzzling over whether they should be classified as intermittently open or intermittently closed; **Nicholas Dunn** has various non-diadromous galaxiids breeding happily in his garden enabling a detailed comparison of morphological and life-history variation in different hydrological environments; **Katrin Geist** has completed several arduous comparisons of fish and invertebrate communities in high alpine lakes with varying fish status and has lived to tell the tale. Of the MSc students, **Rasmus Gabrielsson** is tracking the movements of trout in the upper Clutha River basin, and is looking far more relaxed now that he has some data after a frenzied week at ANU analysing several 100 otoliths. **Jeff Vanderpham** is looking less relaxed as he hasn't got any data and is about to start on behavioural experiments examining interactions between common bully and perch. **Ricky Olley** is close to finishing his MSc on trout movement and recruitment in the Motueka River. **Gerry Closs** has been plotting and scheming on finding ways to study the impact of a new lake formed last week when half a mountain dropped into the Young River valley. The lake's 2km long and filling fast, and it'd be great to be in at the start of the succession. Of course, that's assuming the lake's still there by Christmas. Gerry is also planning a trip to Fiordland in

Feb to examine relationships between fiord productivity and the recruitment of diadromous fish to Fiordland streams.

New arrivals to the lab include PhD students **Leonie KÜcholl** who is continuing work on brown trout and food supply relationships, **Beate Biershenck** who will study mysid life history and movement in large river estuaries (we're considering mysids to be nominated as a sort of 'honorary' fish), and **Abbas Akbaripasand** who will examine interactions and coexistence between upland bully and trout.

Anyway, it's Friday afternoon and someone is murdering a lovely Scottish folk tune on the bagpipes outside my office window. Obviously, it's not possible to work any longer under such conditions, so time for the end-of-week beer.

Compiled by **Gerry Closs**

Lakes Group

Carolyn Burns continues her research with colleagues in the USA (**Michael Brett**, U of Washington) and Germany (**Doerthe Muller-Navarra**, U of Hamburg) on the use of fatty acids as trophic markers in lentic food webs, and with **Marc Schallenberg** on nutrient limitation of primary productivity. Carolyn and Marc attended the triennial congress of the International Society of Limnology held in Montreal in August (SIL2007) where they presented results of their research. In addition, Carolyn was honoured by the award of the Society's Naumann-Thienemann Medal for outstanding contributions to limnology, for her "outstanding studies on physiology and population dynamics of southern hemisphere zooplankton and food web interactions, as well as indefatigable and successful endeavour to conserve New Zealand's lakes and her service to SIL."

Marc has been working on a number of projects including i) catchment scale patterns of nutrient limitation from headwaters to the sea, ii) trace metal limitation of phytoplankton photosynthesis (with MSc student **Theresa Downs** and Carolyn), iii) groundwater influence on nutrient budget and phytoplankton growth in Lake Hayes (with MSc student **Tina Bayer**), iv) impacts of trout on indigenous lake foodwebs (with PhD student **Katrin Geist** and **Gerry Closs**), v) invertebrate ecology and dynamics in small estuaries (with PhD student **Adrian Lill** and **Gerry Closs**), vi) uses of palaeo-ecological methods to restore wetlands (with MSc Student **Rob Cadmus**), and vii) internal nutrient loading from sediments in shallow lakes (with MSc student **Daniel Thomas**).

Theses on topics ii, iii, vi, and vii are available and articles have also been submitted for publication, but are not yet in press.

In addition, Marc (with **Claudine Tyrrell**) completed a report for the Department of Conservation (Southland) on the risks to the aquatic flora of Waituna Lagoon, Southland. Marc (with **Scott Larned** of NIWAChristchurch) also completed a report for Environment Canterbury on algae-nutrient relationships in the Lake Ellesmere catchment. Marc has also

been a member of a team of researchers developing tools for assessing the ecological integrity of aquatic ecosystems (led by **Dave Kelly** of DoC, Christchurch).

Marc has also been busy giving presentations and advice to a number of groups including Environment Southland, the Waituna Landcare Group, the Lake Waihola Waipori Wetlands Society, the Otago Regional Council, the Selwyn Science Symposium and University of the Third Age. In addition, Marc was an expert reviewer for the IPCC (Intergovernmental Panel on Climate Change) Fourth Assessment Report, Chapter 11: Australia and New Zealand.

Ian Smith is starting an MSc. looking at aquatic impacts of agricultural nitrification inhibitors and **Tina Bayer** will be returning in 2008 to do a PhD tentatively titled, "Landscape-scale patterns in nutrient stimulation of algal productivity and aquatic microbial activity."

Compiled by **Marc Schallenberg**

Streams Group

Colin Townsend and **Christoph Matthaei** continue to lead a research team focussed on various aspects of stream ecology. A primary aim is to understand the individual and combined effects of multiple stressors on stream community structure and ecosystem functioning. They have been joined in this research area by PhD student **Annika Wagenhoff** (concentrating on interactions between nutrients and sediment cover on the bed) and MSc student **Jeremy Piggott** (who has added temperature to the list of stressors under investigation). Other PhD research is focusing on the risk to humans of *Giardia* from dairy calves and the ameliorating effect of riparian plants (**Cynthia Winkworth**), the combined effects of abiotic (physical disturbance) and biotic factors (fish predation) on stream communities (**Peter Herrmann**), the comparative effects on streams of organic, integrated and conventional farming in sheep/beef landscapes, with an emphasis on pesticides (**Francis Magbanua**), the downstream effects of patterns of land use in river main-stems and estuaries (**Antje Bierschenk**), and the potential of invasive salmonids to negatively influence native fish populations via changes to parasite-host dynamics (**Rachel Paterson**). **Robin Holmes** completed his MSc research on the consequences of repeated disturbance on stream communities (and now works at the Cawthron Institute) while **Andrew Sparrow's** ongoing MSc research deals with the impact of discharge variation on invertebrate communities above and below the waterline in a floodplain. **Antonia Liess** (previously University of Uppsala, Sweden) joined the team in October for a two-year Post-Doc investigating the individual and combined effects of nutrient enrichment, invertebrate grazing and light intensity on stream algal communities and periphyton C:N:P stoichiometry. **Katharina Lange** will do her MSc research on a topic related to Antonia's project. **Colin Townsend** is now so old that his work was recently formally recognized in two areas - 25 years as co-editor of *Freshwater Biology* was celebrated in Sicily in July, and in September the British Ecological Society awarded an Exceptional Lifetime Achievement Award for his Ecology textbook.

University of Waikato

Centre for Biodiversity and Ecology Research

David Hamilton has recently returned from a four month study leave at the Center for Limnology, University of Wisconsin. During this time he worked with colleagues from the Global Lake Ecological Observatory on applying ecological models to incoming monitoring data from GLEON network sites around the world. David also presented at the 30th International Limnology Association (SIL) in Montreal, and spent several weeks in China working with Nanjing Institute for Geography and Limnology, Chinese Academy of Sciences (NIGLAS) to implement a real-time monitoring system for Lake Taihu. **Liancong Luo** from NIGLAS has recently arrived in New Zealand to undertake a two-year post-doc at Waikato University on modelling Rotorua lakes.

David Burger has been based at Delft Hydraulics (The Netherlands) for the past year, where his recent research has focused on developing and trialing an algal bloom early warning model to forecast cyanobacterial scums in lakes. David also continues to write up his past research on Lake Rotorua, together with **David Hamilton**.

In July 2007, **Chris McBride** deployed the prototype monitoring buoy for Lake Rotorua. The buoy measures key meteorological and water quality parameters, transmitting to the web in real-time over the iQuest's HydroTel network. The data is available to view at <https://data.iquest.co.nz> using the "guest" log-in. Chris also built and installed the monitoring system for Lake Taihu, China, and has further stations planned for Lakes Rotoiti, Tarawera, and Waikaremoana.

Having completed the fieldwork for his PhD research, **Dennis Trolle** is busy dealing with the large volume of data he generated whilst sampling the bottom sediments of 12 Rotorua lakes. Dennis took several cores from each lake, analysing 2 cm vertical slices for 40 elements. He is also developing a dynamic sediment module for the 1-D model DYRESM-CAEDYM, which he will use for simulations of three New Zealand and three Danish lakes.

Deniz Özkundakci was heavily involved with the recent zeolite application on Lake Okaro, together with colleagues at SCION and NIWA. The comprehensive water quality and chemical monitoring dataset will be a core part of his PhD thesis. **Wendy Paul** has recently submitted a paper regarding her MSc research of the 2003 alum application to Lake Okaro, and is working on a second paper about bacteria and phytoplankton relationships in Lake Okaro.

Nina von Westernhagen (PhD) is continuing her analysis of Lake Rotoiti, including 3-D ecological modelling of the whole lake. **Joseph Butterworth** (MSc) has completed his year-long monitoring of Lake Rotokakahi and is now busy incorporating simulations of the kakahi (freshwater mussel) population into an ecological model of the lake. **Matthew Prentice** (MSc) has spent the year working on Karori Reservoir. He was involved with the fish removal effort earlier in the year, and is now using his water quality monitoring data for simulations using DYRESM-CAEDYM.

Brendan Hicks continues to lead the invasive fish programme of the University of Waikato's Outcome Based Investment (OBI) entitled "Restoring freshwater ecosystems and resurrecting indigenous lake biodiversity". Work continues on a number of projects supporting the Intermediate Outcome 2 "Pest fish management for lake biodiversity restoration". **Jeroen Brijs**, a recent MSc graduate, has begun work as a research assistant for this programme, assisting Brendan and **Nick Ling**. Brendan was instrumental in developing the University of Waikato's capability in laser ablation inductively coupled mass spectrometry (LA-ICP-MS) to evaluate otolith microchemistry. Brendan and **Craig Cary** have completed a major MAF Biosecurity New Zealand Project on early detection of didymo by genetic methods.

Adam Daniel, Brendan's PhD student, has tested implantation procedures and retention of dummy transmitters in koi carp. In tank trials at 20-24°C, 50% of transmitters were rejected. Transmitters were therefore surgically implanted at lower temperatures in autumn and winter. In March and April, 18 acoustic receiving stations were positioned in the Waikato River and its major tributaries. In May 2007, 51 koi were implanted with acoustic transmitters. In July 2007, 21 koi were implanted with radio transmitters. Adam has since contacted 19 of the 21 radio koi. Radio tracking from the air has been most successful, and boat tracking has also reliably found fish. The greatest distance moved by a radio transmitting koi was 60 km from Lake Whangape outlet to below Aka aka in three weeks. Acoustic koi have also been shown to move past receivers, moving distances of 10, 14, and 37 km. These distances exceed the majority of distances recorded by spaghetti tagged fish, which were mostly less than 10 km. Adam's work is collaborative with the department of Conservation (**Bruno David**) and Environment Waikato (EW).

Brenda Baillie, Brendan's PhD student, based at Ensis in Rotorua, continues her research into the effect of removal of large woody debris (LWD) on fish and invertebrates in the East Cape of the North Island. LWD removal had a profound effect on channel morphology, causing marked bed degradation and loss of pool-riffle structure. Brenda is currently evaluating the biotic responses.

Brendan's MSc students have been very active. **Matt Riceman** is well into his research tracking rainbow trout and common smelt movements between lakes Rotorua and Rotoiti in a study funded by Environment Bay of Plenty. He is using LA-ICP-MS to evaluate otolith microchemistry. **Ray Tana**, a recent Te Tipu Putaiao scholarship recipient, has investigated common bullies migrations in the Bay of Plenty through otolith microchemistry. **Jennifer Blair** is investigating koi carp spawning areas, also by LA-ICP-MS of otolith microchemistry. **Brenda Aldridge**, also a Te Tipu Putaiao scholarship recipient, is restoring giant kokopu populations in Hamilton's urban streams by releasing juveniles and adding structure to channels in a replicated experimental design.

In the field of remote sensing, **Mat Allan** (Brendan's MSc student), has developed a regression procedure for predicting chlorophyll *a* concentration, Secchi depth, and trophic lake index (TLI) for Rotorua lakes using Landsat 7 TM satellite images. **Salman Ashraf**, a space physicist from Pakistan and a PhD student of Brendan's, is using remote sensing. Also Mat Allan's and Salman's projects are collaborative with **Lars Brabyn** of the Department of Geography, University of Waikato. Salman's project is supported by EW.

Ian Hogg is involved in genetic analyses of a variety of aquatic and terrestrial invertebrates. Particular interests are the potential applications of DNA barcoding for the genetic identification of species resources. Current PhD students in this area include **Phil Ross** (working primarily on cockles) and **Matt Knox** working on estuarine and marine amphipods.

Kevin Collier is now working one day a week at the University of Waikato where he is doing some lecturing and developing studies in large river ecology. He has also been helping **Brenda Aldridge** out with her study of fish in Hamilton urban streams, and **Salman Ashraf** in developing remote sensing indicators of aquatic habitat quality. Kevin is also co-ordinating a national collaborative study of large rivers in association with a wide range of other research providers and regional councils. The field work for this project will involve sampling invertebrates and measuring functional indicators at five sites along a stressor gradient in each island.

Nick Ling leads the fish pheromone work associated with University of Waikato's OBI. Nick attended the British Fisheries Society symposium on invasive fish in Exeter in July and the 2nd international meeting on fish pheromones in Faro, Portugal, in September. **Emma Joss**, Nick's MSc student, is examining the release of putative pheromones from goldfish, rudd, catfish and carp following stimulation by gonadotropin injection. This is being done in association with a chemistry MSc student, **Cherie Boulton**, and **Merilyn Manley-Harris** from the Department of Chemistry. Emma is also examining whether these stimulated fish are attractive to conspecifics in the lab and in the wild.

Nick has also been involved with a major 3-year study of fish health associated with the phosphate sequestration trials in Lake Okareka. This work has now been continued to encompass the similar mineral application in Lake Okaro. This work has been undertaken in association with **Michael Landman** at Scion in Rotorua. Nick has also recently completed a study of metal accumulation in koura from the Te Arawa Lakes.

Natalie Bleackley, Nick's MSc student, is examining the influence of inland distance on diadromy and reproductive isolation in common bully in the Tarawera and Rangitaiki Rivers and an impact assessment of the Tarawera pulp and paper mills on bully reproduction.

Sean Taylor, Nick's MSc student, is evaluating histochemical identification and flow cytometric quantitation of blood cells of common native freshwater fish species. Both Natalie and Sean are working at Scion in Rotorua.

Grant Tempero, Nick's PhD student, is examining the ability of freshwater fish erythrocytes to respond to environmental factors like temperature and hypoxia; *in vivo* and *in vitro*. Rainbow trout erythrocytes produce at least 14 different haemoglobins but it is still unclear whether there is differential expression in response to changes in the cells' environment.

Ian Duggan has recently acquired a Marsden Fast Start to examine whether constructed water bodies facilitate invasions of passively dispersing freshwater organisms into New Zealand. This work follows on from work by his former MSc student, **Chris Banks**, who found calanoid copepod invaders in New Zealand to occur predominately (or exclusively) in

constructed waters. Ian is currently trying to publish a backlog of data from a variety of projects.

Compiled by Brendan Hicks

University of Auckland

School of Geography, Geology and Environmental Science

Ian Boothroyd is a part-time Senior Lecturer responsible for teaching and research in freshwater ecology and resource management. His research interests at the University include chironomid taxonomy, macroinvertebrate grazing of biofilms, ecology of geothermal ecosystems and frameworks for sustainable development. See news on Golder associates (New Zealand) Ltd. for further information.

Several students have completed their research theses over the past two years or so. **Graham Surrey** completed his MSc research on the pressure-state-response model for environmental monitoring based on restoration initiatives in Waitakere City. **Jessica Pacalioga** has completed her MSc research on the rate and influence of decay of mangrove leaves in established and newly formed mangrove forests. **Liza Inglis** explored the effectiveness of the River Environment Classification for use in Auckland streams, and looked at reach scale habitat differences. The uniqueness within and between geothermal ecosystems has been the focus of research by **Sylvia Hay**. Her work involved invertebrate community analyses as well as molecular analyses of *Chironomus* species from different geothermal ecosystems. **Erica Colley** looked at the relationship between bacterial, algal and macroinvertebrates colonisation of rock surfaces in streams. Her work also involved experiments on the feeding preferences of *Potamopyrgus antipodarum*. **Daniel Gulliver** has completed his research on the effects of rapidly changing landuse on streams of North Auckland, and **Parvati Prema** has researched the effectiveness of multi-purpose expectations from wetland restoration initiatives using triple-bottom line reporting.

David Aalbers was involved in a summer project looking at fragmentation of aquatic habitat in urban and peri-urban streams. In a separate summer project, **Kelly Booth** has been assisting Ian with his work on geothermal ecosystems by surveying the terrestrial invertebrate fauna associated with different geothermal ecosystems.

Several students have commenced projects on catchment ecology and river dynamics in a research co-operation between Ian and **Professor Gary Bailey** at the University. **Joanne Yee** has recently submitted her thesis on integrated catchment management frameworks with a focus on geomorphological factors; **Helen Reid** is looking at stream geomorphics and the influence they have on stream rehabilitation; and **Richard Mairs** is conducting his research on the fragmentation of riparian vegetation and associated geomorphic and instream habitat factors in urban and peri-urban streams.

There is a growing interest in understanding fish communities and fish populations in the Auckland region. **Peter Hancock** is the recipient of an ARC Student Partnership Programme Grant and is planning to undertake his studies on the benefit of riparian planting for the

feeding ecology of banded kokopu; **Bjarte Nygard** is looking at the population dynamics of mosquito fish at selected sites in the Auckland region; and **Ria Tiney** will be exploring the influence of large and small scale landuse and habitat factors on the distribution of fish communities in the Auckland region.

NorthTec (Northland Polytechnic)

Department of Applied & Environmental Sciences

Olly Ball (oball@northtec.ac.nz) and **Steve Pohe** (spohe@northtec.ac.nz) have continued their seasonal study of black mudfish distribution, habitat use, and pestfish/cattle impacts. This monitoring study is into its second year of data collection, with more investigative work involving pestfish/cattle impacts, Gee Minnow trap retention, and fish movements/biology, planned to commence in 2008/09. Some genetic work of the population is also under consideration.

Olly has continued his research studying the terrestrial invertebrate fauna of the Far North, with specific emphasis currently on identifying the distribution of the rare ground beetle *Mecodema* 'Te Paki'. Steve has continued his involvement in an assortment of Northland-based freshwater projects/surveys, with several new species' locality records including the discovery of a potentially new dragonfly species resident in New Zealand. Steve is also writing up his MAppSci thesis, in conjunction with the Auckland University of Technology, looking at the aquatic fauna (benthic and adult) of a small Northland east coast catchment.

Compiled by **Steve Pohe**

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Contributed Items

New Quick Identification Guides on the Web

Brian Smith, NIWA

NIWA continues to produce a range of paper and web-based guides, designed especially for identification of New Zealand's freshwater flora and fauna. Building on the successful NIWA 'Quick guide' pictorial identification key format there are 12 new guides available on the NIWA website. These include mites (Dean Olsen, Cawthron Institute) amphipods, copepods and isopods (Graham Fenwick and Anna John), common snails, adults and larvae of freshwater beetle families including more detailed guides to the genera of adults and larvae of Dytiscidae and Hydrophilidae (Brian Smith). All 'Quick guides' can be found at <http://www.niwa.co.nz/rc/prog/freshbiodiversity/tools#id>. These guides have been funded under the DOC TFBIS funding programme.

New species of caddisfly recorded in Hamilton City

Brian Smith, NIWA

Two males of *Oxyethira kirikiriroa* were caught in the vicinity of a small, muddy seepage in the Mangaiti Reserve in Hamilton City. Kirikiriroa is the name for the original Māori settlement now known as Hamilton, and also the stream name and catchment where the species was collected. The Mangaiti Reserve is the only known locality for this species, demonstrating the importance of urban streams and seepages, and the need to consider them in local conservation efforts and city biodiversity planning.



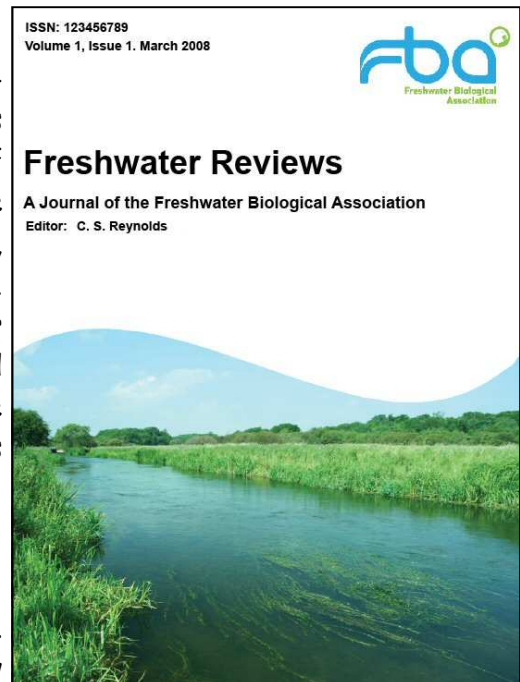
Freshwater Reviews

A Journal of the Freshwater Biological Association

Editor: Colin S. Reynolds

The FBA announces the publication of a new peer-reviewed Journal, *Freshwater Reviews*. Its intention is to provide comprehensive, authoritative reviews of topics in the freshwater sciences, written in a style that is accessible to a broad spectrum of academics, practitioners, administrators, teachers and students. These will include digests of key research which offer perspectives for those who may not be closely involved in the topic but who wish to keep abreast of the philosophical and practical developments of all aspects of our diverse science.

Freshwater Reviews will be published twice per year. Individual articles will be available online as a preview from Autumn 2007 and the first part of Volume 1 will be in print from March 2008. The Journal will be available through membership of the FBA and by subscription.



Call for Papers

Contributed reviews are invited immediately. These may cover any topic within freshwater sciences and their application. They should aim to be between 8000 and 12000 words in length, though shorter or longer articles will be considered. Members of the editorial board will be most impressed by topicality, accuracy and accessibility to non-specialists. Instructions for authors may be found at: www.fba.org.uk/journals

The Editor invites discussion from intending authors about the scope and style of their submissions. Email: creynolds@fba.org.uk

The Freshwater Biological Association: a partner of the European Federation for Freshwater Sciences

Upcoming conferences

Freshwater Sciences Society Conference, 2008: Back to Basics !

24-27th November 2008

Plymouth International Hotel

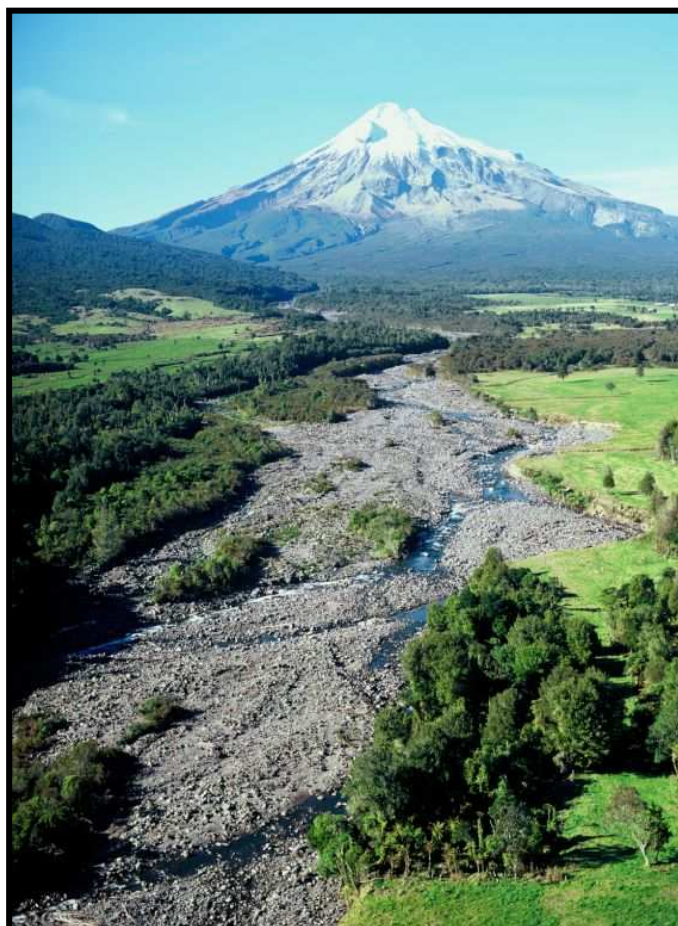
New Plymouth

Taranaki

Get ready for the 2008 Freshwater Science Society Conference where the focus will be on New Zealand freshwater scientists sharing New Zealand freshwater science. You get to influence the overall theme of the conference which will emerge once the programme is put together, so start planning your presentation now ! Taranaki is proud to host this conference and the organising committee is keen to showcase the province. Pack your region's colours for the 'Provincial and Proud' conference dinner to be held at the Yarrow rugby stadium.

Details will be posted on the Freshwater Sciences website, or contact Rosemary Miller (rosemary.miller@trc.govt.nz)

TARANAKI
like no other



S.I.L. 1987 Trust Fund Awards

The Society administers grants for overseas travel by young scientists and visits by overseas scientists through the SIL 1987 Trust Fund. The two grants are:

S.I.L. 1987 Trust Fund Travel Award

S.I.L. 1987 Trust Fund Guest Lecturer Award

S.I.L. 1987 Trust Fund Travel Award

Objective: To enable outstanding young scientists to attend overseas conferences, seminars or workshops, or to visit institutions to learn techniques, develop expertise, use equipment, collections or library facilities not available in New Zealand.

Eligibility: Applicants shall be New Zealand based members of the New Zealand Freshwater Sciences Society. Preference will be given to candidates less than 35 years of age, or who graduated in the previous 10 year period.

Previous awards: No person shall be ineligible for an award because of a previous award.

Applications: Applications shall be made on the electronic form available either on the website (<http://freshwater.rsnz.org>) or from the Secretary of the New Zealand Freshwater Sciences Society (b.sorrell@niwa.co.nz) by the date shown below.

Applicants will need to state their aims and objectives, submit a draft itinerary, supporting letters from relevant institutions, overseas contacts, a curriculum vitae, a list of publications, a draft budget showing other sources of financial support obtained or being sought, and name two referees.

Criteria: Applicants will be judged on the benefits that are likely to accrue to the candidate and limnological research in New Zealand as a result of the trip.

Reporting: The successful candidate will submit a trip report for publication in the Society's newsletter. Where appropriate, the successful candidate will also describe the work done during the trip at the next annual meeting of the Society.

Award: The award will cover the costs of travel (up to 100% for the grantee only) together with a contribution towards accommodation and living expenses up to \$2000.00 or such higher sum that may be determined by the Trustees.

Tenure: Such period/periods as the Committee thinks fit.

Frequency: The award may be made annually provided there are suitable candidates. The Committee may decide not to make an award in any particular year.

Closing date: Applications must be submitted to the Secretary/Treasurer by 1 November in any year for the following year.

S.I.L. 1987 Trust Fund Guest Lecturer Award

Objective: To provide financial support for visits to and/or within New Zealand by eminent overseas limnologists, whose visits will benefit New Zealand's limnological research community as a whole.

Eligibility: Candidates should be eminent in some field of limnological research and have the ability to make a contribution to limnological research in New Zealand.

Previous awards: No person shall be ineligible for an award because of a previous award.

Applications: Applications shall be made on the electronic form available either on the website (<http://freshwater.rsnz.org>) or from the Secretary of the New Zealand Freshwater Sciences Society (b.sorrell@niwa.co.nz) by the date shown below.

Nominations: Candidates must be nominated by a financial member of the NZFSS who will submit on their behalf a letter outlining the aims and objectives of the trip, a curriculum vitae, a list of publications, a draft itinerary, a draft budget showing other sources of finance if any, and the names of two referees.

Criteria: The candidates shall be judged on their eminence in the field of limnological research and their ability to make a contribution to New Zealand's limnological research community. Visitors will be expected to address the annual meeting of the NZFSS and to visit several New Zealand research institutions including universities.

Reporting: The successful candidate will submit a trip report for publication in the Society's newsletter.

Award: The award will cover the costs of travel (up to 100% for the grantee only) together with a contribution towards accommodation and living expenses up to \$2000.00 or such higher sum that may be determined by the Trustees. In determining the value of the award the Committee shall take into account the fact that overseas scientists are often better able to receive financial assistance than New Zealanders.

Tenure: Such period/periods as the Committee thinks fit.

Frequency: The award may be made annually provided there are suitable candidates. The Committee may decide not to make an award in any particular year.

Closing date: Applications must normally be submitted to the Secretary/Treasurer by 1 November in any year for the following financial year starting 1 July, although applications outside these times may be considered in special circumstances.

V.H. Jolly Student Travel Awards

NZFSS encourages student attendance at its conferences by supporting student travel through the V.H. Jolly Awards. The Awards are named in honour of the late Violet Hilary Jolly, a founder member of the Society and one of New Zealand's foremost pioneering limnologists, who was instrumental in encouraging and supporting student involvement in New Zealand limnology.

The criteria for the Awards are as follows:

- The Awards are solely for the purpose of supporting the travel expenses of students attending the annual conference of NZFSS.
- The Awards are restricted to full-time students who are financial members of the NZFSS, as defined in the Society constitution.
- Only those students who present either an oral paper or a poster paper at the conference for which an Award is sought are eligible.
- Students who are residents of the town where the conference is being held are not eligible.
- Students who are in receipt of other forms of travel support to attend the conference are not eligible.
- Students may apply for an Award in person by identifying themselves to the Secretary/Treasurer during the conference.
- The sum awarded shall be up to \$100.00 per student, and the funds available for Awards shall be half of the interest earned in the previous financial year on the Society's term deposit.
- In the event of the number of applications exceeding the available funds, the Secretary/Treasurer shall distribute the available Awards on the basis of the distance travelled to the conference.

NZ Freshwater Sciences Society Medal and Honorary Membership

Rules:

The New Zealand Freshwater Sciences Society Medal is for an outstanding contribution to our understanding and management of freshwaters by a member of the Society, with criteria for consideration of nominations as set out below.

Nominations for Medals are considered by the Awards Committee (currently comprising the President, Secretary-Treasurer, a SIL Trustee and two members elected at an AGM).

Honorary membership of the Society can be voted at a General Meeting of the Society, for those members who have performed significant service to the Society usually over a long period, on the recommendation of the Executive Committee as set out in the Society rules.

Criteria for the Medal:

Matters for consideration by the Awards Committee (not all need apply in any particular case and not in priority order):

- National or international recognition of research or management output
- Leadership in particular fresh or brackish water science field
- Quantum and quality of research or management output
- Contribution to education or public knowledge of freshwater science
- Contribution towards sustainable management of freshwater environments
- Contribution towards the conservation of one or more species, habitats or freshwater ecosystems

There would be an expectation that any members nominated and considered worthy of this elevated status would be recognised in an appropriate fashion, such as in an award ceremony at the annual conference, to which the person awarded would be invited at the Society's cost and expected to provide a presentation. Nominations would include relevant biographic information, a statement of the nominated person's specific outstanding contributions to freshwater science in New Zealand and letters of support from at least two members of the Society. Closing dates for nominations would be by 30 June of each year. There would be no expectation that any Award need be presented in any given year.

Criteria for Honorary Membership of the Society:

As is set out in the Constitution, persons considered eligible for honorary membership are recommended to a *General Meeting* of the Society by the *Executive Committee*. Criteria for the award would usually involve significant service to freshwater science and/or to the Society, usually over a lengthy period. It is recommended that any nominations for honorary membership could be received by the *Executive committee* from members at least two months prior to any *General Meeting* of the Society, to provide time for the *Committee* to consider these and make a recommendation to the *General Meeting* with adequate notice as required in the *Society Rules*.

SIL 1987 Trust Fund Report

Tanya Blakely, University of Canterbury

The 92nd Annual Meeting of The Ecological Society of America (ESA) was held in San Jose, California over five days in August 2007. This prestigious conference was held jointly with the 18th International Conference of the Society for Ecological Restoration (SER). I was very fortunate to obtain funding from the S.I.L. 1987 Trust Fund Travel Award to attend this meeting, which was my first international conference.

As always, the 2007 ESA meeting was well attended, with more than 3000 delegates from around the world, including many distinguished ecologists. The conference theme was "Ecological restoration in a changing world", and although many sessions were dedicated to this, there were a magnitude of others on topics as diverse as climate change, ecosystem functioning, pollination, invasion, soil ecology, habitat connectivity and fragmentation, food webs, wetland restoration, aquatic-terrestrial linkages, fire ecology and paleoecology to name just a few! So, this year's joint ESA/SER conference provided plenty of stimulation, with presentations on research from almost all ecosystems imaginable. Furthermore, with 20-30 concurrent sessions running daily for the duration of the conference, there was always an interesting presentation to attend.

The conference was opened by ESA Executive Director, Katherine McCarter and ESA President, Alan Covich. Alan Hastings, who was presented the 2007 ESA Robert MacArthur Award, then gave a wonderful and insightful opening plenary lecture on the importance of studying ecological principals and processes across different time scales, with an emphasis on including intermediate levels rather than just long- or short- term time scales. This splendid plenary lecture set the scene for the next 5 days of scientific presentations and organised sessions. However, the sheer size of the conference meant that some careful planning was necessary and as a result I was able to attend many interesting presentations. For example, Dianne Srivastava of University of British Columbia presented some very interesting findings on why habitat size affects predators more than prey in bromeliad insect communities. I thoroughly enjoyed her presentation, and her research was particularly relevant to my PhD work on aquatic insect communities inhabiting water-filled tree holes. I also attended many thought-provoking presentations that will no doubt prove useful in my coming years as an ecologist.

On the third day of the conference, I gave a 15 minute oral presentation on a section of my PhD research. I was included in the Forest canopy ecology session, whereby I discussed how habitat size and location affect aquatic insect community structure using water-filled tree holes as a model system. Recently, there has been a growing interest in water-filled tree holes and the aquatic fauna that inhabits them. However, much of this research has been conducted in tropical regions and the importance of this unique habitat in temperate areas is thus far largely unexplored. Although findings from tropical tree hole research have been presented at recent ESA meetings my study is the first of its kind in New Zealand, and I presented some new findings that many people in the audience were interested in. Thus, I feel that my presentation was a success, and I received some excellent feedback, much of which will greatly assist me whilst writing up over the next few months.

I am extremely grateful to the S.I.L 1987 Trust Fund for providing me with the opportunity to attend my first international conference. This funding provided me with a terrific opportunity to attend this most prestigious conference and allowed me to meet with some of the world's leading ecologists. I have been able to forge some valuable links within the international scientific community, which I am sure will greatly assist me in developing my career as an ecologist in both New Zealand and elsewhere in the world.

Minutes of the 39th Annual General Meeting of the New Zealand Limnological Society Inc. (2006)

The AGM was held at the Park Heritage Hotel, Rotorua. The meeting opened at 16.40 hrs, 28th November 2006.

Present: Neil Deans, President
Brian Sorrell, Secretary-treasurer
and 43 members

Apologies:

Ann Chapman, Mike Winterbourn.

Motion: That apologies be accepted. (Neil Deans/ Ian Boothroyd carried).

Minutes of the 38th AGM:

Matters arising from minutes:

These were dealt with under general business.

Motion: That minutes be accepted as a true and correct record of the 38th A.G.M. (B. Sorrell/Maureen Lewis carried)

President's report:

I am pleased to present my fourth report to the 39th Annual General Meeting at the conference of the New Zealand Freshwater Sciences Society, held in Rotorua on the 22nd of November 2006.

Finances and Membership

The Society is in a sound state. The report by our diligent Secretary/Treasurer, Brian Sorrell, shows our finances to be healthy, with assets of around \$70 000 and a small profit largely from sales of the 'Freshwaters of New Zealand'. Most of our turnover is related to conferences which last year returned a modest profit, similar to the recent years. Our membership of 370 is relatively stable, having had a modest increase over 5 years ago but similar to last year. We have noted that there is some turnover of members, but many are relatively long term in their commitment to the Society. Regrettably, once again, about a quarter of current members are behind in their renewal of subscriptions although apparently this is better progress than in recent years. It would greatly assist Brian to have more members' process their renewals on first receipt without needing to be reminded.

Preparations for the 40th Anniversary

Our 40th Anniversary is now only a year away. Some progress has been made towards preparation for this event, largely led by Ian Boothroyd, although more assistance would be gratefully received. Preparations have been made for interviews with Society members who may recount the Society's history and comment on its role and future.

Publications

"Freshwaters of New Zealand" sales have remained strong during the year, contributing some \$3800 to the bottom line profit, after major expenditure on printing the previous year.

Advice from the Entomological Society indicates that sales of the latest edition of the jointly produced standard macroinvertebrate identification text (Winterbourn, Gregson and Dolphin) have been brisk.

Ann Chapman and her colleagues have completed their revision of the Crustacean book which is shortly to be printed. I recommend thanks to Ann for her efforts in expediting this work.

Posters

Printing of the next of the series of posters on aquatic macrophytes is shortly to occur. This has been produced with contributions from the NIWA Hamilton aquatic plants team and coordinated by Dave Spiers. As I suggested last year, any offers to assist in the production of other possible posters, such as of birds, would be appreciated. Dave Spiers has offered to coordinate the production, but would welcome photos and assistance with the text, which is not an onerous task.

Society Awards

There have not been any applications for Society Awards this year. The Royal Society has also reviewed its requirements for awards, and has joined its Bronze and Silver Awards together. Members are reminded that nominations for any of these awards may be made by anyone, not just from members of the Society's executive committee. I am sure there are many members of the Society whose work is worthy of consideration for awards. Enquiries with several bodies which have their own Society Medals such as the ASL and Royal Society have narrowed the field of potential producers of our own medal, but this has yet to be undertaken.

Conferences

The 2006 Conference is held in Rotorua, a topical location given the prominence of freshwaters and freshwater issues in the area. David Hamilton has led a dedicated local committee which has produced a varied programme with a great deal of interesting speakers, especially the plenary presentations.

Chris Arbuckle is leading the committee for the proposed joint conference with ASL in Queenstown for 3rd - 7th December 2007. The venue of the Copthorne and Millennium Hotels has been booked, which can accommodate up to more than 500 if necessary. I wish to thank the Society for their support for my travel to the ASL conference in Albury in September to entice their members to join us in Queenstown. A few photos were sufficient to achieve the objective; the only complaints were that the conference was outside the ski season, which is probably a good thing!

No specific location has been confirmed for the 2008 conference which would usually be once again in the North Island. Members of the committee of the Hydrological Society have suggested a joint

conference with that Society in 2009, perhaps in Wellington. Any offers or suggestions for these conference locations would be gratefully received.

Newsletter

Ngairé Phillips has most competently managed the production of two Newsletters in the last year once again, with support and copy provided (sometimes with some coercion) from fellow Society members. My comments in the Newsletter have elicited some responses on what issues the Society should engage in publicly, as has some of the material expressing views on freshwater management in the most recent edition. This certainly raises questions of the role of the Society as a forum for ideas, not all of which would necessarily represent the views of the Society as a whole. As always, any material provided which meets with editorial requirements will be gratefully received.

Website

David Burger has willingly stepped up to operate the website, hosted by the Royal Society, found at <http://freshwater.rsnz.org/>. It is particularly pleasing to note that David has offered to continue in this role from cyberspace, since he has now returned to the Netherlands yet with this role is just as able to perform the task from the other side of the world. The website provides not only information about the Society but also upcoming conferences, Society Awards, publications including the newsletter, and useful links to other societies.

What should be on the website? Should we have a blog to deal with personal views on issues, should newsletters be available to non-members? The executive committee would welcome views on this topic.

National Issues

There has been less scope to involve the Society, as such, in national issues over the last 12 months. This is not because of a lack of national issues; quite the contrary, but because of a lack of invitations to engage in the process. Freshwater issues are appearing in the national media with increasing frequency. The latest is the release by the Government of three reports on the 21st of November, mainly produced by Society members, outlining trends in lake and river water quality and the increases in water allocated by regional councils in recent years. The Government announced an ambitious programme in March 2006 as the next stage of its 'Sustainable Development Programme of Action' for Freshwater management. Details of this can be found on the Ministry for the Environment website at <http://www.mfe.govt.nz/issues/water/prog-action/index.html>. A variety of tasks are being undertaken by officials and consultants, with only limited consultation with interested parties due to time constraints, as the Ministers for the Environment and of Agriculture and Forestry are expecting recommendations by early 2007. Some members of the Society are involved in various aspects of this programme, but there is no specific role for the Society in advising how to get the best use from the intellectual capital of the Society or its membership. I had offered to assist officials in ensuring that suitable range of expertise was considered for engagement. Management of freshwaters is to remain in the hands of regional councils. The programme includes, however, the drafting of National Policy Statements or National Environmental Standards on diverse topics such as managing the increasing demand for water; the means of measuring water taken for abstractive use; national environmental standards on the uses and values of waters; establishing criteria for nationally significant water bodies; methods of establishing flow and level regimes; methods of transferring water consents; methods of managing over-allocated catchments; developing methods for identifying and protecting natural character and biodiversity values; and consideration of methods to deal with nutrient, microbial and sediment contamination would be considered. This bold programme is being rushed in part due to the recognition of the significance and urgency of the issues. The question arises as to whether

we will have better managed freshwaters as a result. A further question for the Society is whether we could or should engage differently with this programme.

Public Good Funding for Freshwater Research

Last year in my report I raised the issue of a lack of any increase in public good science funding for freshwater, or indeed, any environmental research. I regret that I cannot advise any particular progress on this issue. It is ironic that the Government appears unable to make the connection between concerns increasingly raised by the public over the environment and the necessity of retaining the capacity to address those issues.

Relationship with other bodies

The Freshwater Sciences Society is but one of some 50 constituent societies of the Royal Society of New Zealand. It is an unusual relationship in that each Society is autonomous, but is represented nationally by the Royal Society. Indeed, our Society is well represented among the Council of the Royal Society, with Carolyn Burns as Academy President and Clive Howard-Williams as the recently elected Biological Sciences Electoral College representative. As President, I have attended gatherings of fellow society presidents called by the Royal Society each year. Chief Executive of the Royal Society, Steve Thompson, noted at the most recent such gathering in Auckland earlier this month that the relationship between the Royal Society and its constituent societies has matured somewhat.

There are several advantages to membership of the Royal Society, but we do pay a capitation fee to belong. My view is that we need to ensure that membership adds value for our Society. The most obvious is the hosting of our website. Our sister society in Australia, the ASL, pays a sum of more than A\$5000 for a commercial website host, many times more than our total capitation fee. We have sought and been granted funds administered by the Royal Society to support visiting speakers at our conferences. The Royal Society has now offered membership to any member of a constituent organisation at half price, without necessarily expecting a reciprocal arrangement from us. I can claim some credit for promoting this idea at last year's meeting of constituent Society Presidents. This represents good value for our members; if one wishes to be a member of the Royal Society anyway, it effectively makes our more modest membership free. We should not forget, however, that the principal value which the Royal Society can add is as advocate for the interests of scientists and science generally, which I believe is being well promoted now by them. If anyone wishes to know more about the Royal Society, their first contact could be with Clive or Carolyn.

Concluding Remarks

I would like to, once again, express my thanks to all the members of the Executive committee, particularly to Brian Sorrell, and to the other members who voluntarily assist to keep the Society functioning and provide services to its members. I am stepping down after four years at the helm. I have been proud to lead the Society and consider it to be in good heart. I wish the Society well and give my best wishes to the incoming President and offer to assist with one or two projects in the future if time permits.

I move from the Chair that this report be accepted.

Motion: That the President's report be accepted. *(Neil Deans/Carried)*.

Secretary/Treasurer's report:

Membership

Total membership at 6 November 2007 was 370.

Membership figures for the last four years are shown in Table 1 & 2. Total membership is similar to other years.

Approximately 45% of members have currently not paid 2006/07 subs. Typically, ca. 30% of members have not paid subs at the end of any given financial year.

There have been 31 new members joining since August 2005 (17 student/unwaged, 11 ordinary, and 3 corporate).

Table 1. Financial status of membership.

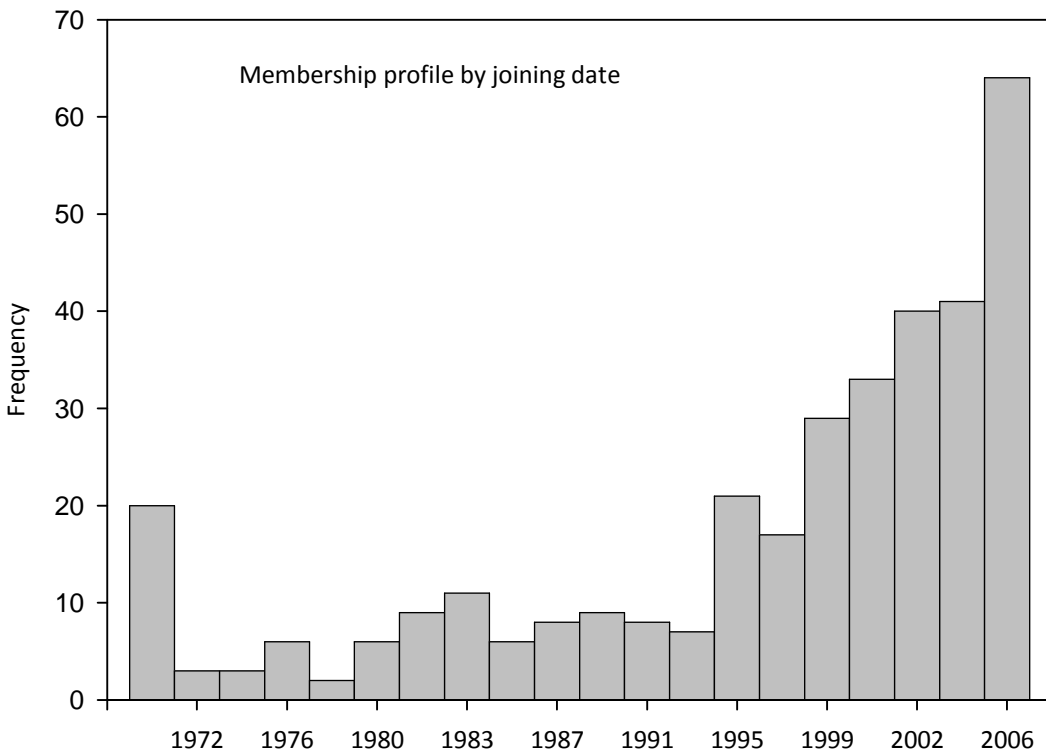
	2006	2005	2004	2003	2002
Members current:					
Paid	178	237	154	162	216
Unpaid	76	42	100	109	59
Members in arrears:					
1 yr	48	38	47	34	55
2 yr	28	20	24	12	-
3 yr	11	8	8	15	-
Other:					
Honorary	11	11	11	11	11
Life	3	1	1	-	-
Legal req.*	1	1	1	1	1
Societies	5	5	5	5	5
Libraries	9	9	9	9	9
Total	370	372	360	358	356

* Not a member

Table 2. Type of membership

	2006	2005	2004	2003	2002
Ordinary	244	260	252	249	251
Corporate	30	24	23	22	23
Honorary	11	11	11	11	11
Life	3	1	1	-	-
Unwaged/student	77	71	68	71	66
Other (Societies)	5	5	5	5	5

Fig 1. Histogram showing membership profile by joining date..



Finances:

- The accounts were audited by Stephen Dine of Brown Webb Richardson, Hastings.
- The Society continues in sound financial condition and is in a good position to continue supporting its aims. Our total assets (including equity in stock of unsold invertebrate and Freshwaters books) at 30 June 2006 was \$72,527.

- As of 30 September 2006, there are < 200 out of 1000 *FoNZ* copies in stock and we banked \$3766 as our share of *FoNZ* sales in 2005/06. Our share of sales of the Bulletin (old edition) was \$242 in 2005/06; sales of the revised edition are strong and our current share since publication is \$839.
- Our share of the profit of the 2005 joint Nelson conference was \$516.
- The main expenditure item was \$3675 for our share of printing of the new edition of the Bulletin. Newsletter printing this year was only \$526 c.f. \$1951 last year, reflecting our move to electronic publishing.
- We have one term deposit, the combined Jolly Fund, with \$41,244.63 at 1 November 2006. The Current Account at 1 November 2006 was at \$14,608.54.

I request that the Secretary-Treasurer's report be accepted.

Motion: That the Society Accounts for 2005/06 be accepted. (Brian Sorrell/Mike Scarsbrook-carried).

Motion: That the Auditor for the next financial year be Stephen Dine, Brown Webb Richardson Ltd., Hastings. (Brian Sorrell/Roger Young - carried).

SIL Trust report

The Treasurer reported on the large funds remaining in the Trust and the need to use these funds for the purpose intended. The Society's position that members overwhelmingly support the continuation of the Trust was re-iterated by the meeting and several members suggested continuing to augment the Trust funds with Society funds when revenue allowed it. The Executive and Trustees reminded members of the benefits of the fund and encouraged members to apply.

Publications

Posters: Dave Speirs thanked Tracey Edwards for providing text for the macrophyte poster and which has now been produced. He invited any members to volunteer to help on producing a new poster-suggesting birds or wetlands as a potential topic.

Invertebrate book: Mike Scarsbrook reported on sales of 20 copies over the last 12 months and that there are 120 copies remaining.

Freshwaters of NZ may possibly go into a re-printing.

The revised Entomological Bulletin has gone on sale and will contribute to future income.

Ann Chapman & Maureen Lewis have been working on the revised Crustacean book - this has been delayed because of Ann's illness but will ultimately be published through Manaaki Whenua Press.

Future Conferences

The President thanked David Hamilton and his team for organising a highly successful 2006 conference.

Chris Arbuckle reported on the 2007 Conference which will be held in Queenstown, jointly with the ASL on our four-year cycle. He reported on the composition of the conference committee, the venue (Millennium Hotel), dinner venue, and numerous field trip options.

A 2008 venue, scheduled for the North Island according to the Society's usual plan, has not been finalised but Taranaki has been suggested as a possibility.

Election of Limnological Society Officers

The following officers were nominated and duly elected:

President: Nominations Kevin Collier (*Jon Harding/Chris Arbuckle*).

Motion: Nominations close (Ian Boothroyd/Angus McIntosh carried)

Kevin Collier elected President unopposed.

Secretary/Treasurer: Nominations Brian Sorrell (*Ngairé Phillips/Ian Boothroyd*).

Motion: Nominations close (Greg Burrell/Steph Parkyn carried)

Brian Sorrell elected Secretary/Treasurer unopposed.

Committee Officers: Nominations Chris Arbuckle (*Carolyn Burns/Marc Schallenberg*), Marc Schallenberg (*Jon Harding/Mike Scarsbrook*)

Motion: Nominations close (Carolyn Burns/Greg Burrell carried)

Chris Arbuckle and Marc Schallenberg elected Committee Officers unopposed.

Newsletter editor: Ngairé Phillips (*David Hamilton/Roger Young*).

Motion: Nominations close (John Quinn/Kay Etheredge carried)

Ngairé Phillips elected Newsletter Editor unopposed.

S.I.L. Representatives: Nominations John Stark (*Paddy Ryan/Colin Townsend*), Mike Scarsbrook (*Steph Parkyn/Carolyn Burns*)

Motion: Nominations close (Ngairé Phillips/David Hamilton carried)

John Stark and Mike Scarsbrook elected S.I.L. Representatives unopposed.

David Burger continues as a co-opted member as website manager.

Motion: That Neil Deans be thanked for his period as President. (Kevin Collier - carried).

General Business

- **Members' Achievement Awards/Medal:** Neil Deans reported that production of the medals is underway.
- **40th Anniversary:** Ian Boothroyd called for reports and anecdotes for a members' book on the Society. Neil Deans reported that development of the oral history project is underway.
- **Society Policy on Freshwater Issues:** Questions were raised on what is appropriate to be expressed as opinions or in discussions. It was suggested that items in the newsletter that are opinions need to be identified as such and right of reply sought on controversial issues. It was noted that the Society needs to value its members opinions but that these need to be distinguished from material presented as facts. Several members' noted the Society's role to publicise matters of science fact, but suggested the Society should be avoiding commenting on legal and policy matters, especially individual cases. The broader issue of producing policy statements and who would produce and vet them was also discussed. The Editor was asked to develop guidelines for the newsletter and the Executive to consider guidelines for wider policy statements.
- Bob McDowell asked the Society to make appropriate expressions of condolences to Ann Chapman and Vida Stout in their illness.

Meeting closed 18.25 hrs.

Awards Presented at the NZFSS Conference: December, Rotorua, 2006.

SIL Trust prize for best Conference talk (\$500)

Amy Whitehead (Canterbury) - "The future of whio in Fiordland national park: Is linear stoat trapping sufficient to ensure persistence?"

SIL Trust prize for best Masters or Honours talk (\$150)

Helen Warburton (Canterbury) - "Mechanisms of low flow-induced community change: effects on invertebrate development and mortality"

SIL Trust prize for best poster (\$150)

Michelle Greenwood (Canterbury) - "Effects of disturbance extending across an ecosystem boundary alter cannibalism rates in a riparian spider"

Department of Conservation awards (\$150)

Darragh Woodford (Canterbury) - "Spatial interactions between trout and non-migratory galaxiids across riverscapes: the influence of position in the landscape"

Amy McDonald (Waikato) - "Translocation, habitat characterisation and rearing investigations of black mudfish"

Kingett Mitchell award for best applied talk (\$150)

Jonathon Bray (Canterbury) - "Algae and indicators of mine drainage impacts on the West Coast, South Island, New Zealand"

Kingett Mitchell award for best applied poster (\$150)

Lisa Pearson (Waikato) - "The significance of gas generation in the sediments of Lake Rotorua"

N Z Limnological Society (Inc.)

**Financial Statements
for the year ended 30 June 2006**

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N Z Limnological Society (Inc.)
Statement of Financial Performance
for the year ended 30 June 2006

	<i>Sch</i>	<i>This Year</i> \$	<i>2005</i>
Income			
Book Sales		3,151	2,100
Cost of Sales			
Opening Stock	16,071		16,071
Book Publishing Costs		16,071	16,071
Closing Stock	12,703		12,703
		3,368	3,368
Gross Profit/ (Loss)			
		(217)	(217)
Interest Received	1	2,338	7,729
Sundry Income	1	10,159	10,159
		12,480	17,671
Expenses			
Cash Expenses	1	7,494	10,372
Surplus of Income over Expenses transferred to Members Funds			
		4,986	5,819

This Statement is to be read in conjunction with the accompanying Notes

N Z Limnological Society (Inc.)
Statement of Movements in Members Funds
for the year ended 30 June 2006

	<i>This Year</i>	
	\$	
Credits for Year:		
Surplus of Income over Expenses for Year	4,986	
Credit for Year	<u>4,986</u>	
Opening Credit Balance	67,541	
Closing Credit Balance	<u><u>72,527</u></u>	

This Statement is to be read in conjunction with the accompanying Notes

N Z Limnological Society (Inc.)

Statement of Financial Position
as at 30 June 2006

	<i>This Year</i>
	<i>\$</i>
ASSETS	
Current Assets	
Bank of New Zealand Ltd	16,815
GST Refund	220
Accounts Receivable	3,000
Interest Accrued	1,159
Stock on Hand	<u>12,703</u>
	33,897
Investments	
Bank of New Zealand Ltd	
Term Deposit	39,714
	<u>73,611</u>
Total Assets	<u>73,611</u>
LIABILITIES	
Current Liabilities	
Subscriptions in Advance	1,084
	<u>1,084</u>
Total Liabilities	<u>1,084</u>
EXCESS ASSETS OVER LIABILITIES	<u>72,527</u>
MEMBERS FUNDS	72,527
	<u>72,527</u>

This Statement is to be read in conjunction with the accompanying notes

N Z Limnological Society (Inc.)

**Notes to the Financial Statements
for the year ended 30 June 2006**

A. Measurement Base

The accounting principles recognised as appropriate for the measurement and reporting of earnings and financial position on an historical cost basis have been used, with the exception of certain items for which specific accounting policies have been identified.

B. Specific Accounting Policies

(i) Differential Reporting

N Z Limnological Society (Inc.) qualifies for Differential Reporting as it is not publicly accountable and is not large as defined under the Framework for differential reporting. N Z Limnological Society (Inc.) has taken advantage of all available differential reporting exemptions.

(ii) Goods & Services Tax

These financial statements have been prepared on a GST exclusive basis.

(iii) Income Tax

No provision for Income Tax has been made as N Z Limnological Society (Inc.) has exempt status.

(iv) Inventories

Inventories are recognised at the lower of cost, determined on a first in first out basis, and net realisable value.

(v) Investments

Investments are carried at the lower of cost and net realisable value.

(vi) Receivables

Receivables are stated at their estimated realisable value. Bad debts are written off in the year in which they are identified.

C. Changes in Accounting Policies

There have been no changes in accounting policies. All policies have been applied on bases consistent with those used in previous years.

1. CONTINGENT LIABILITIES

At balance date there are no known contingent liabilities (2005:\$0). N Z Limnological Society (Inc.) has not granted any securities in respect of liabilities payable by any other party whatsoever.

2. SECURITIES AND GUARANTEES

There was no overdraft as at balance date nor was any facility arranged.

**AUDIT REPORT TO THE MEMBERS OF THE
NEW ZEALAND LIMNOLOGICAL SOCIETY INC**

We have audited the attached Financial Report. The Financial Report provides information about the past financial performance of the Society and its financial position as at 30 June 2006.

Committee Responsibilities

The Committee is responsible for the preparation of a Financial Report which fairly reflects the financial position of the Society as at 30 June 2006 and of the results of operations for the year ended 30 June 2006.

Auditors Responsibilities

It is our responsibility to express an independent opinion on the Financial Report presented by the Committee and report our opinion to you.

Basis of Opinion

An audit includes examining, on a test basis, evidence relevant to the amounts and disclosures in the Financial Report. It also includes assessing:

- the significant estimates and judgements made by the Committee in the preparation of the Financial Report, and
- whether the accounting policies are appropriate to the Society's circumstances, consistently applied and adequately disclosed.

We conducted our audit in accordance with generally accepted auditing standards in New Zealand except that our work was limited as explained below. We planned and performed our audit so as to obtain all the information and explanations which we considered necessary in order to provide us with sufficient evidence to give reasonable assurance that the Financial Report is free from material mis-statements, whether caused by fraud or error. In forming our opinion we also evaluated the overall adequacy of the presentation of information in the Financial Report.

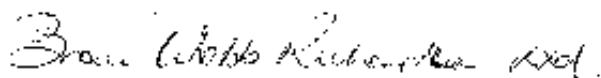
Other than in our capacity as auditors we have no relationship with or interests in the New Zealand Limnological Society Inc.

Qualified Opinion

Control over revenue prior to being recorded is limited and there are no practical audit procedures to determine the effect of this limited control. In this regard we have not obtained all the information and explanations that we have required.

In our opinion, except for adjustments that might have been found to be necessary had we been able to obtain sufficient evidence concerning the above-mentioned income, the attached Financial Report fairly reflects the results of operations for the year ended 30 June 2006 and the financial position of the Society as at 30 June 2006.

Our Audit Report was completed on 10 November 2006 and our qualified opinion is expressed as at that date.



BROWN WEBB RICHARDSON LIMITED
Hastings

Director: Stephen M Dine, Robyn J. Clapham, Roger Kaine, Jill
S M (General) Speeray, John T Springate, Trevor J Webb
Associate: Whit D Colmore



CHARTERED
ACCOUNTANTS

N.Z. Limnological Society (Inc.)

Financial Performance Schedule
for the year ended 30 June 2006

	<i>This Year</i>
	<i>\$</i>
Cash Expenses	
Bank Charges	182
Conference Registration	-
Postage	316
Print Printing - <i>Bulletin</i>	3,675
Printing Costs	
Newsletter	526
Royal Society Fund	595
SIL Trust Prizes	800
Student Awards	600
Travel - National	-
V H Jolly Memorial Fund	800
	<u>7,494</u>
Interest Received	
Bank of New Zealand Ltd	2,538
Sundry Income	
Subscriptions	6,331
Conference Income	1,052
Donations Received	934
SIL Trust Donations	1,600
Poster Sales	-
Entomological Society Bulletin	242
	<u>10,159</u>

This Statement is to be read in conjunction with the accompanying Notes

Membership List

Mrs Sue Adkins

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*Aquatic invertebrate ecology;
vertical distribution patterns;
shellfish bed regeneration*

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Dr Richard Allibone

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Freshwater conservation; ecology *fishes;*

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ecology; fluvial geomorphology;
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Woodlawn

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HAMILTON

Impact assessment of thermal power stations and hydro reservoirs; fish passes; fish migration; temperature effects on fish; fish feeding; chironomids

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Ecosystem Management

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AUSTRALIA

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General freshwater ecology

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Life history and distribution of crayfish (Paranephrops zealandicus) ; growth and behaviour of freshwater jelly fish (Craspedacusta sowerbii)

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HAMILTON

Zooplankton dynamics; nutrient cycling in lakes

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HAMILTON EAST

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New Zealand Freshwater Sciences Society



How do I join?

Print out the following details, fill in the boxes and mail to Secretary/Treasurer, Brian Sorrell, c/- NIWA, PO Box 8602, Riccarton, Christchurch, New Zealand. b.sorrell@niwa.co.nz

Title:.....**Surname:**.....

Initials:.....**First Name:**.....

Address:

Telephone: (main).....

(other).....

Fax:..... **Email:**.....

Membership type (corporate, waged, student, unwaged):

.....

Please fill out the following permissions:

I agree to the NZ Freshwater Sciences Society publishing my membership details.

Choose one: Yes No Please sign: _____

I give permission for my email address to be added to the NZFSS email mailing group

Choose one: Yes No Please sign: _____

My preferred format for receiving the NZFSS newsletters is as a:

Choose one: Electronic pdf Hard copy

Brief List of Your Professional Interests:

Payment:

Waged/Corporate \$40

Student \$10

Unwaged \$10

Royal Society of New Zealand Travel Grants* (optional) \$4

TOTAL AMOUNT....\$.....

Make cheques payable to "NZ Freshwater Sciences Society"

Payment by Credit Card:

Visa Mastercard (circle one)

Name on card:

Card no:.....

Expiry date:.....

Signature:.....

Send to:

Secretary/Treasurer Brian Sorrell, c/- NIWA, PO Box 8602, Riccarton, Christchurch, New Zealand. b.sorrell@niwa.co.nz

*used for overseas travel awards for beginning NZ scientists and administered by The Royal Society of New Zealand

Constitution

CONSTITUTION

The name of the Society shall be the New Zealand Limnological Society Incorporated.

Objectives: To establish effective liaison between all persons interested in any aspect of fresh and brackish water research in New Zealand, and to encourage and promote these interests.

3 Means of Attaining Objectives:

- (a) The establishment and maintenance of a register of all persons working in the appropriate fields in New Zealand, giving details of their current interests.

The holding of meetings and conferences to deliver scientific papers, and to discuss scientific topics.

Co-operation and affiliation with other scientific bodies when appropriate.

The production of a newsletter including information about the current interests of freshwater workers, and listing relevant new publications and other items of interest.

The distribution of the Newsletter to appropriate organisations in New Zealand and overseas.

4 Membership:

(a) The members of the Society shall be:

- 1 Ordinary members who shall be persons admitted to membership by the committee, and whose annual subscription as fixed from time to time shall be accepted by the Committee.
- 2 Unwaged Members who shall be any full-time student of a secondary or tertiary educational institution, and who shall pay such annual subscription as shall be fixed from time to time.
- 3 Honorary Members who may be elected at a general meeting on the recommendation of the Committee.
- 4 Life Members who shall be persons admitted to membership by the committee, and whose lifetime subscription shall be paid in advance as a single fee as fixed from time to time.

- (b) Newly elected members shall be notified by the Secretary of their election and sent a copy of the constitution.

- (c) Any member may resign by giving notice in writing to the Secretary, and paying all subscriptions due.
- (d) Any member shall notify the Secretary in writing of a change of address.
- (e) The Committee shall have the power to cancel membership in the case of conduct considered prejudicial to the Society.
- (f) All members are entitled to receive the Society's Newsletter free of charge.

5 Executive and Meetings:

- (a) There shall be an Executive Committee consisting of the President, the immediate Past President (ex officio), the Secretary-Treasurer, the Editor, and two (2) other members,
- (b) The Committee shall implement the Society's general business, and a simple majority shall decide all questions at Committee Meetings. If voting is equal, a motion is lost. A quorum at a Committee Meeting shall be three (3).
- (c) The officers shall be elected every two years, either at a General Meeting or by postal ballot as the existing Committee determine. The postal ballot shall be held before the end of the financial year, and if a General Meeting is not held, the committee shall have the power to scrutinize and count the votes, and declare the results.
- (d) The newly elected officers shall take office 1 month after their election.
- (e) Candidates for positions as officers shall be nominated at the General Meeting, or in writing signed by two other members, received by the Secretary before the time of such meetings, or by the 31st of August if a meeting is not held. Every candidate shall signify personally, or in writing his or her acceptance of nomination. The Committee shall have the power to co-opt members of the Society to fill any casual vacancies on the Committee.
- (f) The Executive Committee may summon a General Meeting or a General Meeting shall be summoned on receipt of a request signed by no fewer than ten (10) members entitled to vote. General Meetings shall be summoned by notice in writing, specifying the business to be considered, and notices shall be posted not less than fourteen (14) days prior to the proposed date.
- (g) At all General Meetings, ten (10) members entitled to vote shall constitute a quorum, and a simple majority shall carry a motion. Voting shall be on the voices, or by show of hands or by ballot at the discretion of the chairman, provided that, if any member so demand, voting shall be by ballot. The Chairman shall have a deliberative and a casting vote.
- (h) Votes of members. Each Member shall have one vote at a General Meeting, and each Affiliated Body shall have the right to appoint a delegate who shall have one vote at a General Meeting.

6 Finance:

- (a) Annual Subscription: shall be due on the 1st of July in each year and the amount shall be fixed at a General Meeting. Members whose subscriptions are not paid by the succeeding

30th of June shall be unfinancial and shall be liable to forfeit all benefits of membership. The financial year shall conclude on the 30th of June.

- (b) The funds of the Society shall be controlled by the Executive Committee and shall be banked in the name of the Society. Cheques and bills shall be signed by any one of the President or Secretary-Treasurer, and must be approved in writing by other members of the Executive Committee. The Society shall not have the power to borrow money.
- (c) Any income, benefit or advantage shall be applied to the charitable purposes of the Society as described in Sections 2 and 3 above.
- (d) No member of the Society, or any person associated with a member, shall participate in or materially influence any decision made by the Society in respect of the payment to or on behalf of that member or associated person of any income, benefit or advantage whatsoever.
- (e) Any such income paid shall be reasonable and relative to that which would be paid in an arm's length transaction (being the open market value).
- (f) The provisions and effect of clauses 6(c), 6(d) and 6(e) shall not be removed from this document and shall be included and implied into any document replacing this document.
- (g) Payment of accounts must first be approved by the Executive Committee. This may be done at a meeting or by mail, and items may be approved in advance for one financial year.
- (h) An Annual Report and Financial Statement shall be prepared and posted to members. The Financial Statement shall be audited by a person appointed at the previous General Meeting.

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Organisation:

- (a) The Secretary-Treasurer shall keep (i) a Minute Book containing full minutes of all meetings, and (ii) a Register with the names, addresses, professional interests and date of joining of all members.
- (b) Affiliated Bodies. Incorporated or unincorporated bodies, and other organisations approved by the Committee, may become affiliated with the Society on acceptance by the Committee, and on payment of such annual subscription as may be fixed from time to time.
- (c) Changes in the Constitution may be made only on a two-thirds majority of the votes polled, and this vote shall be conducted by letter.
- (d) No addition to or alteration or recession of the rules shall be approved if it affects the charitable objects, the personal benefit clauses, or the winding up clause, except as specified under clause 7(g) below.
- (e) The Common Seal of the Society shall be in the custody of the Secretary, who shall in pursuance of a resolution of the Committee to that effect, affix the same to all instruments requiring the same.
- (f) The Society shall not be wound up except on a two-thirds majority of a postal vote, but shall be dissolved in the event of the membership being fewer than five (5) persons. In the event of dissolution of the Society, its assets shall become the property of the Royal Society of New Zealand which shall dispose of the assets in accordance with the aims of the Society.
- (g) The provisions and effects of this clause 7(f) shall not be removed from this document and shall be included and implied into any document replacing this document, except that another organisation, which must be an Inland Revenue Department approved charitable organisation, may be named in place of the Royal Society of New Zealand.