New Zealand Freshwater Sciences Society Newsletter

Number 41
November 2005

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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 Society[1] (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 2005 subscription is $40.00 per annum (student/unwaged/retired persons rate is $10.00 per annum; life membership is $1000.00).

The committee for 2005-2007 is:

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

Editorial

Welcome to the 41st edition of the Freshwater Sciences Society Newsletter. It's a bumper edition this time around, as we've included last years' AGM minutes, along with awards results from the last 2 conferences. At the time of printing we were still awaiting the auditors report, so we've had to hold off including this years AGM minutes until the next newsletter.

Thanks 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 notice a few differences in this newsletter compared to previous issues. With the majority of members opting to receive their newsletter by email, I've included a few colour photos and graphics. Apologies to those who opted for the hard copy, which is printed in black and white. You can view the electronic version on our website. As always, comments and suggestions for improving the newsletter are always welcome.

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. 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.

Finally, a very big thankyou to Mike Winterbourn for his excellent proof-reading and editorial contributions – and his record turn-around time (1 day!).

Ngaire Phillips

Newsletter Editor, New Zealand Freshwater Sciences Society

Adult *Zephlebia* mayfly Photo Brian Smith

President's comment

At the AGM in my report, I raised my concerns over the process of Public Good Science Funding, which obviously struck a chord with many of the members present. After some discussion, the meeting resolved that, as a first for the Society, a media statement be released highlighting the Society's concerns about the effective reduction in funding for environmental research, despite the prominence of many major freshwater environmental issues and the public concern about these. The media statement was duly written with assistance from members of the Executive and released. It almost disappeared without trace, except for the Royal Society science news and amongst officials with interests in research. Disappeared, that is, until the spread of Didymo became such a widespread public concern.

Probably for the first time ever, freshwater scientists were being asked for, or making their opinions known about, a national media issue. Indeed, it may not have risen to prominence in the way it did or at that time if scientists had not made their views known. In this case the broad topic was freshwater biosecurity, with two specific angles. The first angle was the response of the primary agency concerned, namely Biosecurity New Zealand. I was asked my views on this topic on behalf of the Society and refused to make any comment. This was mainly because the Society does not have any particular views on this or most other such topics, or the means of developing such views, within the time frame necessary. I expect to be involved in any debrief or review of the management response in due course.

The other pertinent angle, however, was the extent of knowledge about *Didymosphenia geminata* and the role of science and scientists in advising on a course of action. Some freshwater scientists who are members of our Society were expressing their personal views publicly on the appropriateness of management actions and on what little is known about Didymo. Some of the statements made were expressed in strong language, which of course ensured they were reported. This is unfamiliar territory for most scientists. We are often uncomfortable about making strong public statements, for reasons associated with our professional uncertainties inherent in the scientific method, because of contractual obligations or to avoid upsetting funding agencies, or because we simply don't wish to enter the media frenzy.

Ironically, it is our natural reticence, which often means our views are overlooked. Some media commentators later dug out the Society's earlier media release and noted that the issues referred to were not unrelated. Whether we wanted it or not, the public profile of freshwater science was raised through this process. I believe that, overall, the views expressed by scientists made a positive contribution to the issue.

The message from this experience is that we will need to engage with the community in an active way in future, if necessary through the media. How we respond will influence not just ourselves as individuals but also our science and perhaps the Society. I would be interested in your view on whether we should think about this a bit more so as to be better prepared for next time.

Neil Deans, President, New Zealand Freshwater Sciences Society

Research news

Crown Research Institutes

Cawthron Institute

After being on maternity leave for a few months, **Anna Crowe** has now returned to work part-time. Anna helped with a review of Marlborough District Council's surface water quality monitoring programme and has also been investigating the causes of high conductivity and nitrate concentrations in a tributary of the Maitai River for the Nelson City Council.

Over the last year **Joe Hay** has been involved in a number of consulting and research projects. This work has ranged from application of both 1 and 2 dimensional approaches to habitat modelling, including instream flow assessments for a number of rivers in the Manawatu Region for Horizons Regional Council, to completion of a user manual for the suite of models to predict invertebrate drift dispersion and drift foraging trout energetics in relation to flow, developed by **John Hayes** and collaborators. Joe has continued with a study of the factors potentially limiting the trout population in a dairy impacted stream and has also been involved in a study of dwarf galaxias (*Galaxias divergens*) populations in seep-fed side-braids of the Wairau River, with a view to the possible impact of flow reduction associated with hydro development, for the Department of Conservation.

John Hayes has been continuing his research on trout bioenergetics models. Over the last year he and his colleagues from the University of Alaska, Fairbanks and the Bureau of Land Management Fairbanks completed an overview paper of their process-based model that links hydraulics, invertebrate drift transport and trout drift-foraging energetics to predict spatially explicit net rate of energy intake and carrying capacity. **Joe Hay** provided some much needed help to write a user manual on the models too. On the consulting front - John was involved in the Waitaki Water Allocation Board hearing giving evidence on flow requirements of salmon angling, and worked with Joe Hay on IFIM projects undertaken for Horizons' Water Plan. The onerous task of bid writing for the FRST Ecosystem funding round wasted much of his time as it did for many others in the science community last year.

In March 2005 John's long awaited book "The Artful Science of Trout Fishing", which he co-authored with **Les Hill**, was published by Canterbury University Press. If you are a trout fisher then you should already have a copy, but the book is more than just about trout fishing - it has content that will interest non-fishing freshwater ecologists and conservationists too.

Dean Olsen has recently joined the Freshwater team at Cawthron, having spent the last two years as a post-doctoral research associate at the University of Vermont's Rubenstein Ecosystem Science Lab conducting experiments on how agricultural pollutants can alter species interactions in streams.

Aaron Quarterman continues to provide technical assistance to Cawthron's freshwater group. A highlight over the last year has been trials of an acoustic camera, which can provide video-quality images out to 15m in turbid water.

Karen Shearer continues her work on defining size dependent settling velocities and re-entry rates of drifting invertebrates and hopes to have this work published soon! She is also heading a TFBIS project that will integrate much of Cawthron's historical macroinvertebrate data into NIWA's FBIS database. Karen continues to be involved with monitoring-compliance projects around the country and the supervision of macroinvertebrate sample processing in the freshwater laboratory.

Kirsty Smith has been working as a freshwater microalgae technician in the Microalgae Section of Lab Services at Cawthron. Kirsty has recently been appointed "Key Technical Personnel" under IANZ. The lab

has been busy promoting and expanding their freshwater microalgae services including assistance with the development of a cyanobacteria culture collection with **Susie Wood**.

John Stark has been involved in a range of commercial projects over the last year - particularly work for Meridian Energy on the Waitaki River, and a consent renewal for a small hydro-electric scheme on the Onekaka River in Golden Bay. Research on the effects of flow variability on biotic indices continues in conjunction with NIWA's Water Allocation FRST programme - a presentation on this was made at the 2005 NZFSS Conference in Nelson. In late 2004, a report, prepared in collaboration with **John Maxted** (ARC), proposed a new biotic index for soft-bottomed streams (MCI-sb). A major finding was that the MCI-sb performed much better than its semi-quantitative (SQMCI-sb) or quantitative (QMCI-sb) variants when applied to soft-bottomed streams - so much so that we do not recommend that the SQMCI-sb or QMCI-sb should be used. We plan to publish this work once an independent test of the performance of the new index has been completed using data from ARC's 2005 SoE monitoring programme. John remains hopeful that the continuing evolution of the PGSF will, one day, reduce the effort required to get research funding to meet the needs of Regional Council biologists and water managers.

Yvonne Stark continues her role in the laboratory processing invertebrate samples from around the country. Occasionally, she is allowed out into the field on sampling trips.

Rowan Strickland continues to manage Cawthron's Freshwater Group. Over the last year he has also written up a report summarising the results from an angler survey related to Fish & Game's experimental changes in access regulations for the Greenstone River. Rowan has also been involved with the purchase and use of an acoustic camera. Applications for the camera so far have included determining depth-velocity preferences for fish in turbid rivers and in locating submerged equipment/vehicles. Rowan is now using the acoustic camera to monitor and improve native fish passage through floodgates as part of the Motueka Integrated Catchment Management project.

Susie Wood has had an exciting year learning about hunting and fishing at morning and afternoon tea times. However, she has now managed to sway the conversation to bikes and has instituted compulsory bike-to-work days for the freshwater group. Susie continues to avoid giving conference practise talks, but this seems to be a successful strategy with a second placing for her talk at the New Zealand Water and Waste Association conference. Susie currently is continuing her research on New Zealand's toxic cyanobacteria species.

Roger Young's bird, complete with plastic bag wings, was a winner at the FSSOC Wearable Art awards

Roger Young is continuing to lead an SMF project on functional indicators of river ecosystem health. In conjunction with regional council staff, the techniques were trialled at 65 sites throughout the country. This work has led to considerable overseas interest and Roger was an invited speaker at the Plant Litter Processing in Freshwaters conference in Toulouse, which focussed on the results of a similar functional

indicators project in Europe. Roger has also been conducting a study of adult trout movement in the Motueka Catchment as part of the Integrated Catchment Management (ICM) project. Other ICM work has included some 2-D flow-habitat modelling studies with **Joe Hay** and involvement in a collaborative learning group with a range of stakeholders focussing on sediment sources, delivery and impacts on freshwater and coastal habitats. Roger reviewed the surface water quality monitoring programmes for the Marlborough District Council and Tasman District Council (TDC) and with **Trevor James** (TDC) produced a State of the Environment report summarising TDC's existing water quality and stream health information. Roger has also been involved with a water augmentation project in the Waimea Catchment and on aspects of the ecology of the Waitaki River for Meridian Energy. Bid writing helped to fill in the rest of Roger's year!!

Compiled by Roger Young

Landcare Research, Auckland

Stephen Moore works with Landcare Research at the Tamaki (Auckland) office. He shares a building with ninety Landcare and MAF staff, and six million invertebrates in the NZ Arthropod Collection. Stephen provides freshwater biological consultancy services including assessments of environmental effects relating to urban development, consent compliance biological monitoring, and analysis of freshwater invertebrate and periphyton samples. He is also involved in state of environment monitoring of tropical rainforest rivers in Brunei (Borneo) with MWH.

Stephen continues to build up his freshwater invertebrate and fish photo collections - invertebrate examples can be found on:

http://www.landcareresearch.co.nz/research/biodiversity/invertebratesprog/freshwater_invertsCD/index.asp

Stephen's happy to help with any queries relating to projects involving terrestrial biology. As the name suggests, Landcare Research has a wide range of expertise in land-based ecosystems.

Compiled by Stephen Moore

Aquatic invertebrate adaptation to UV (Photo by Stephen Moore)

NIWA Aquatic Plants Group

The NIWA Aquatic Plant Group has been busy recruiting future scientists with two babies arrived and another on the way (must be something in the water). Other difficult and painful processes have included FRST bidding and managing staff shortages.

John Clayton and staff have been busy with LakeSPI (Submerged Plant Indicator) assessments for a further 60+ lakes. John continued his involvement with contentious weed issues and management initiatives in Lake Wanaka, as well as similar problems in Lake Benmore. Methods for proactive surveillance and containment of aquatic weeds have been assessed and are being adopted by agencies under the guidance of **Paul Champion**. Paul has also been appointed to a Technical Advisory Group advising MAF policy on a wider range of biosecurity issues. **Rohan Wells** oversaw several large, multidisciplinary projects in North Island hydro lakes and water bodies in Northland. He continues to provide specialist advice on new and existing herbicides and to contribute to public dialogue on herbicide issues. **Paula Reeves** worked to facilitate the successful registration of Endothall, under the HASNO system, providing a new tool for submerged weed control. Paula also extended her wetland and riparian expertise and has developed new plant identification resources, including a low-risk guide for aquarium and pond plants with John and **Tracey Edwards**. Tracey and **Deborah Hofstra** have kept the impetus of several projects going while they have been on parental leave. Tracey's efforts culminated in the launch of web-reporting pages for the LakeSPI method for assessing lake condition. Deb concluded extensive genetic studies and presented evidence for diverse entities amongst our endemic quillworts at the International Botanical Congress in Vienna. **Aleki Taumoepeau** has continued the application of GPS/RTK/sonar technology to aquatic plant management, and has been the key fieldwork person in the group, as well as undergoing regular 'salt-water sterilisation' in other NIWA projects. **Fleur Matheson** investigated the ecological impacts of our worst aquatic weed, hornwort, and has published findings on sediment alteration. She also tailored a WQ monitoring protocol for the Northland lakes that complemented other ecological investigations. **Mary de Winton** has been updating lake vegetation records in NIWA's on-line database, FBIS, trying to work out some taxonomic puzzles within the charophyte group and also investigating ways to protect or restore submerged vegetation. **David Burnett** has completed experiments on temperature tolerances of a range of potential invasive plants and is making progress in the write-up for his PhD.

Compiled by Mary de Winton

NIWA Christchurch

Maurice Duncan is continuing his 2-D hydrodynamic modelling. A paper has been written by Ian Jowett and Maurice comparing instream habitat assessment using 1D and 2D hydraulic models within a braided reach of the Hurunui River, North Canterbury, as an example. Having finished flood plain inundation modelling of Westport he is now doing a similar study on the Clutha River flood plain from Balclutha downstream using the 2D hydrodynamic model "Hydro 2de". He also looks after a nationwide network of 50 telemetered soil moisture sites where soil moisture to a depth of 400 mm below the surface is monitored every 30 minutes. If anyone would like to use these data they should contact him. Just recently, Maurice has been organising a nationwide survey to search for the presence of the invasive diatom *Didymosphenia geminata* : over 500 sites were sampled in 3 weeks. At the time of writing Didymo had been found in one river from which it had not been reported, previously.

Don Jellyman is science leader of the freshwater fish group within NIWA, a position that inevitably involves more time in planning and oversight of research direction and less time in the field. The group's research on native fish has been reduced by the untimely loss of FRST funding, although some interim funding has been obtained, together with a new three-year study on the mahinga kai (customary food) of Waihora (Lake Ellesmere) - this latter study is a joint one with Ngai tahu , and follows on from an MFish

funded 2-year study of eel stocks in nearby Wairewa (Lake Forsyth). A joint study with the University of Tokyo using satellite tracking (pop-up) tags to track migrating longfin eels produced unexpected results when eels were found to undergo daily vertical movements of up to 900 m. Don has been heavily involved in work for electricity generators, and continues to complete work on his beloved eels as time allows.

Bob McDowall has spent quite a bit of this year looking at a fascinating array of fish fossils, in collaboration with geologists from GNS (**Liz Kennedy** and **Brent Alloway**) and Otago University (**Daphne Lee** and **Jon Lindqvist**). They included some more *Galaxias* fossils, some eleotrids and a couple of scales from several lower perciforms not otherwise known from New Zealand fresh waters. They could be related to Australian freshwater cods and basses, and all are from the Miocene of Central Otago. Several additional eleotrids and a couple of grayling fossils are from the Pleistocene inland from Gisborne. Bob has been looking at southern cool temperate and New Zealand biogeography at various spatial scales, and continuing to struggle with the taxonomy of the galaxiids of the eastern and southern South Island, with not a lot of success.

Bob Spigel has done some work on a simple hydraulic model of flows in the Waiau Arm of Lake Manapouri, to keep track of the age and source of water at any particular location in the Arm. The model uses flows recorded in the Mararoa River at Cliffs and the Waiau River at Manapouri Level Control structure tailwater, together with lake levels recorded at Supply Bay and data on Arm volume and cross-sections assembled and processed by Dr **Alan Hunt** of Maunsell Ltd (the original survey data was commissioned by Meridian Energy, and carried out by Works Consultancy Services in 1992 and Opus in 2000). The information on flows, water age and water source (Mararoa River or Lake Manapouri) produced by the model is helpful in trying to interpret water quality patterns in the Arm, and may prove to be a useful tool for management purposes.

Brian Sorrell continues working with **Bev Clarkson** at Landcare Research on biotic patterns in New Zealand wetland environments, and identifying responses of wetland plants to flooding regimes and nutrient supplies relevant to wetland restoration. Much of his time is now taken up with littoral zone ecology in lakes, including work with **Donna Sutherland** and **Bob Spigel** on hydrodynamic mixing, nutrient cycling and emergent macrophyte productivity in Lake Okareka, and the relationship between water quality and macrophyte collapse in lakes.

Compiled by Brian Sorrell

Don Jellyman takes his work seriously!

NIWA Hamilton

Bob Wilcock's Work in the Toenepi dairy catchment with an interagency group (The Toenepi Science Group) has led to water quality targets being set and individual farm plans being derived to meet these targets. The targets are aimed at meeting contact recreation criteria for the Piako River (downstream) and for protecting intrinsic habitat values for Toenepi Stream. Bob is also studying emissions of the greenhouse gas N_2O from rural streams. A series of papers describing land-water linkages in the Toenepi (Waikato), Bog Burn (Southland) and Waikakahi (Canterbury) catchments have been written.

Richard Storey is into the second year of his post-doc studying macroinvertebrate composition and colonisation dynamics of intermittent streams. Having sampled streams in the Waikato that never dry up and streams on Waiheke that hardly ever get wet, he has turned his attention to some large cobble-bed streams on the Ruataniwha Plains of Hawkes Bay. This summer he will look at the viability of dry season refuges for intermittent stream inhabitants in different land-use types.

Ngaire Phillips has been plugging away at her work on macroinvertebrate species traits. This work has shown, not only that species traits are as effective as traditional approaches in differentiating sites impacted by landuse and metals, but also are able to tell us something of the potential mechanisms of impact (including physiological, reproductive and behavioural mechanisms). A paper comparing species abundance and species trait approaches to differentiating sites subject to different land uses has been accepted (with **Sylvain Dolédec**, **Colin Townsend** and **Mike Scarsbrook**). She also spent a month in France working with Sylvain on a project comparing species traits responses to heavy metal contamination in New Zealand and France (and discovered metals aren't much of an issue in France!). Finally, she has completed her assessment of species trait responses to heavy metals in Coromandel streams (paper submitted). Further work over the next year will investigate the biogeographic stability of species traits responses to contaminants (landuse, again with Sylvain et al above and metals, with **Will Clements**, University of Colorado) by examining New Zealand-wide datasets. She's also working with **Kevin Collier** on comparing temporal trends in species metrics and species traits in the Waikato. In addition, she is leading a 3-year FRST project, which will develop a framework for sustainable management of traditional fisheries in lakes under the jurisdiction of the Te Arawa iwi in Rotorua. She's also going back to her genetics roots, and looking at the use of population genetics as a potential pollution monitoring tool.

Jim Cooke has recently been appointed Leader of the National Centre for Water Resources. He has still to find out what the role entails or where the centre actually is! Perhaps a well-informed NZFSS member could enlighten him. Jim continues to manage NIWA Australia, and leads a number of water quality-related projects.

Mike Scarsbrook is leading a new FRST programme on groundwater ecosystems. The programme will identify ecosystem structure in porous alluvial aquifers and karst systems. The porous aquifer research will identify the effects of fluctuating groundwater levels on biofilms and invertebrates, with research focused around the Selwyn and Lower Waimakariri rivers. Research in karst systems will assess biodiversity values and determine human impacts (e.g. land use, tourism) on systems around Waitomo, northwest Nelson and Westland. Mike has recently completed a report for the Department of Conservation on biodiversity values in coldwater springs. **Pepe Barquín** (ex. Massey University) and **Duncan Grey** (University of Canterbury) both made major contributions to this report. Mike is also continuing to work on water quality trends, and is particularly interested in the links between climate change and water quality.

Jacques Boubée is continuing to work on the downstream passage of eels at hydro dams and has been tracking migrant eels in Lake Manapouri with the assistance of Meridian Energy. With EW and EBOP, he is currently investigating the feasibility of and gain achieved by installing self-regulating tide/flood gates at

the heads of the many canals present in the Waikato and Bay of Plenty regions. With **Cindy Baker,** Jacques has been doing laboratory tests with different substrates on fish ramps, and with the assistance of OPUS and the ARC, hopes to perform field tests in the near future.

Dave Rowe is completing several research projects related to the impacts of pest fish on aquatic ecosystems and is tackling a number of resource consent issues related to potential impacts on trout in the Rotorua lakes. Other projects include the development of a stream ecosystem valuation methodology for the ARC and work with forest companies on the use of woody debris by banded kokopu. He has now taken over the role of group manager from **Ian Jowett,** so is more involved in staff management and science planning.

Shane Grayling has recently joined the fish team, and being a keen angler is already making an impact on the fish group's workload.

Cindy Baker is continuing research on chemical communication between fish. Projects include the use of pheromones (chemical signals between members of the same species) for control of invasive fish species, and determining whether pheromones released by lamprey larvae can be used to estimate the abundance of lamprey populations from samples of river water. Cindy is also working with **Jacques Boubée** on several fish passage projects and investigating movement/migration patterns of adult giant kokopu and banded kokopu in a restored stream.

The Freshwater Fish Database continues to be managed by **Jody Richardson**, who vetted and added over 1200 new entries last year, bringing the total number of records to well over 23,000. **Ian Jowett** released version 6.0 of the database assistant, and Jody prepared a comprehensive user guide to help users search the database and use the assistant program. With **Josh Smith**, Jody is conducting fish surveys of waterways subject to new flow regimes from anthropogenic activites to determine relationships between changes in the amount of physical habitat and fish populations. A fish restoration project has just begun on a Hamilton stream and involves most of the fish team. Activities this year will focus on assessing the current fish population and identifying areas that need improvement.

Making decisions of on how much water can be taken from a stream before aquatic ecosystems start to suffer is a contentious process that more people spend attacking than actually resolving. **Thomas Wilding** is working with regional councils, farmers and district councils to provide objective recommendations on minimum flow requirements.

Steph Parkyn is now in the final year of a three-year project investigating the spatial extent, natural values, and water quality properties of ephemeral or very, very, very small streams in the Auckland region. **John Maxted** (ARC) initiated this work, and the NIWA team includes **Thomas Wilding, Lucy McKergow, John Quinn**, and **Glenys Croker** among others. Steph is also getting to play with her favourite crayfish friends again in studies investigating koura habitat in streams and lakes. This year she is leading a project investigating the potential of using artificial habitat refuges for aquaculture in Lake Taupo. On the education front, she is helping to present workshops on water quality and farm intensification around the country with John Quinn. She has also been looking at the role of biofilms, and a stable isotope tracer experiment on nitrogen and carbon uptake and transfer in streams with **Tim Cox**, John Quinn and **Niall Broekhuizen** has been published recently.

Chris Tanner and **James Sukias** continue their work on treatment of diffuse pollution using wetlands and other natural filter systems. Some interesting work has been done with EBOP developing wetland treatment systems for lake inflows.

Aslan Wright-Stow has been working on a variety of projects including the continuing research into the effects of exotic forestry harvesting with **John Quinn**. Aslan is continuing his work on the effects of CMA as a de-icing agent applied to the Desert Road, and has been working on the impacts of a treated

waste-water discharge at Otorohanga. He had a technical training award to study for four weeks at the University of Lyon, France, and while there, developed skills in the use of various kinds of groundwater sampling equipment. Aslan has become a scientific diver and now has the opportunity to work on a range of marine and lakes projects.

Graham McBride has been working on zoonoses modelling, with emphasis on the role of environmental pathways for zoonotic pathogens. His book has recently been published (McBride, G.B. 2005. "Using Statistical Methods for Water Quality Management: Issues, Problems and Solutions", Wiley, New York).

John Quinn has started new work on conceptual models of the links between dairy farm activities and waterway values. This was piloted on lowland streams of the Hauraki plains (with the Toenepi Science group) and and is now being extended to contrasting catchments in the "best practice dairying catchments project" (supported by Dairy InSight). John, **Dave Rowe**, **Josh Smith** and **Paula Reeves** have completed the initial resource assessment phase of Te Awa O Waitao Restoration project with Landcare Trust and Tauranga iwi. The aim of this project is to learn more on how to merge western science and traditional Maori knowledge by supporting the local people in their restoration project. John worked with **Ian Kusabs, Chris Hickey, Steph Parkyn, and Willie Emery** to develop tau-koura as a monitoring tool (see www.niwascience.co.nz/maori/research/monitoring_koura/background). He has continued his work on forestry effects on stream habitat and biota with **Dave Rowe, Mark Meleason**, and **Aslan Wright-Stow** and has been involved in hearings on consents for pine forest harvesting on the Coromandel.

Rob Davies-Colley leads the 'Aquatic Pollution' Group at NIWA, Hamilton. He continues with research on aspects of water quality and habitat of streams and rivers, including faecal contamination and other impacts of livestock access, (with **John Nagels**, **Rebecca Stott** and others), stream shade modelling (with **Mark Meleason** and **Kit Rutherford**), aspects of channel morphology including large wood in streams (with Mark Meleason), and the benefits (to water quality and habitat) of livestock exclusion and riparian restoration efforts. A developing interest is the mobilisation of faecal contamination during floods as it affects, particularly, shellfish aquaculture in estuaries. Rob is working (with **Steph Parkyn** and others) on documenting the benefits of riparian fencing, planting and bridging by landowners using grants through Environment Waikato's 'Clean streams' fund. He also works on riparian aspects in Landcare Research's Integrated Catchment Management (ICM) research programme, centred on the Motueka River Catchment. He has recently begun a foray back into aquatic optics following reprinting (by Blackburn Press) of his 1993 book (with **Bill Vant** and **Dave Smith**, both ex-NIWA) "Colour and clarity of natural waters", beginning with a study of light attenuation in New Zealand rivers 'piggy-backed' on the national rivers water quality network. He also works on sustainable wastewater treatment "eco-technologies" such as ponds and wetlands.

Compiled by Stephanie Parkyn

Aslan Wright-Stow, John Nagels, and Stephanie Parkyn at the Nelson FSOOC dinner

Department of Conservation

Tongariro - Taupo Conservancy (Taupo Fishery Area team)

Since October 2004 the technical team of the Taupo Fishery has been involved in pioneer acoustic tracking work. In collaboration with a Canadian firm we have developed an innovative acoustic tag that obtained swimming depth and body temperature of adult rainbow trout, simultaneously. More than 2 million data points have been collected and Dr. **Michel Dedual** has been analyzing them to describe adult rainbow trout swimming behaviour and body temperature in Lake Taupo. Michel is also working on a large PIT-tagging project to estimate juvenile-to-adult rainbow trout survival in the Tongariro-Lake Taupo system. In 2004 he also carried out an experiment to estimate the mortality of juvenile trout passing through the turbine at the Hinemaiaia power station. Finally, Michel has been involved with micro satellite analysis of rainbow trout from different catchments in the Taupo area.

Michel presented the first results of the acoustic tracking experiment at the Sixth Conference on Fish Telemetry held in Portugal in June this year. He also discussed the challenges facing the Taupo Fishery at the Fourth World Recreational Fishing Conference in Norway. He was invited by the Swiss Institute of Fisheries Research to talk about the interactions between brown and rainbow trout, and by the Belgian Recreational Fishery Department to talk about the salmonid fisheries management.

Mark Venman has been working on a project investigating the diet preference and fat content of juvenile rainbow trout in the Tongariro River in association with Genesis, Massey University & NIWA. It is hoped that this project will help explore the relationship between flow variations, periphyton composition and density, invertebrate species composition and density and trout wellbeing.

Mark has also been involved in organising the 2005 Harvest Survey along with **Rob Hood** to estimate the annual trout harvest from the Taupo Fishery. This year-long assessment of angling harvest uses a stratified random sampling approach and direct field measurement of angling effort and catch along with aerial counts of anglers to estimate daily angling effort. Due to the high costs involved, such surveys are only conducted once every five years but are very important in helping to accurately estimate the annual harvest. The survey will run until July 2006.

Mark also published a paper with Michel in July 2005 on the movement and behaviour of rainbow trout tagged in the Tongariro during 2003 (see publications).

Glenn Maclean has been coordinating the review of the Taupo Sport Fishery Management Plan, which is now 10 years old. He has also been working with Genesis, Dr **Barry Biggs** and Dr **Russell Death** in a trial arising out of the TPD resource consent process to attempt to manipulate the periphyton community in the Tongariro using flushing flows. The long-term objective is to favour an invertebrate community dominated by mayflies, caddisflies and stoneflies, which will enable juvenile trout to grow faster and in turn have higher rates of survival.

Glenn has also overseen trials on fish passage undertaken by the Taupo Fishery Area on behalf of TrustPower Limited, both up and downstream past the Hinemaiaia HB dam, as part of resource consent requirements. A trap and transfer approach has been used successfully to enable adult trout to once again reach historical spawning streams upstream of the dam. Michel's turbine trial indicated the majority of juvenile trout passing downstream to the lake can be expected to survive this apparently perilous route.

Compiled by Michel Dedual

Fish and Game New Zealand

As usual, Fish and Game Council staff are involved in freshwater issues from one end of the country to the other. The recent infestations of *Didymosphenia geminata* (Didymo) was first found by Fish and Game staff in Nelson and Otago, respectively, while many Fish and Game staff have been involved in advising Biosecurity New Zealand on actions to take and assisting with surveys since.

Southland Fish and Game staff including **Maurice Rodway**, **Stu Sutherland** and **Bill Jarvie,** have been busy with Didymo in the Waiau and Mararoa and have also prepared the case for a Water Conservation Order application for the upper Oreti River, which was lodged earlier this year.

In Otago, **John Hollows** reports that the development of the Macraes Hatchery, run jointly by staff from Oceana Gold and Fish & Game, has been ongoing for the last year, with the hatchery now up and running. Growth rates of fish have exceeded expectations and some have already been released in public fishing reservoirs around Dunedin City. Investigation into public access to waterways is ongoing in Otago, and particularly in the central lakes area where there have been rapid changes in land tenure and associated losses of traditional public access points to waterways. New regulations have been introduced for the Greenstone/Caples River fisheries to limit the numbers of anglers encountered on the river. This approach to managing the back-country fishing has been received favourably by the majority of anglers, with many noting an improved back-country recreational fishing experience. Staff have been undertaking inventory-spawning surveys on many rivers as part of the continual updating of the spawning rivers database.

Mark Webb from Temuka reports on the release of 125 catchable sized salmon and a subsequent angler recapture experiment in the Ohau Canal in March 2005, which achieved a phenomenal 77% recapture rate. Forty-two percent of the fish were caught within 10 days, and indicates high angling pressure in Mackenzie Country hydro canals. The most surprising result was a somewhat battered fish caught after 40 days in the canal flowing into Lake Benmore, having survived transit through the Ohau C power station. Mark also modestly overlooked the enormous effort he and his Central South Island colleagues have put into issues associated with the Waitaki River and its future management over the last few years. **Jay Graybill** has also coordinated the South Island Canada Goose management plan review, which is shortly to be placed before Conservation Minister **Chris Carter**.

Davor Bejakovich from North Canterbury advised that their staff-operated salmon trap on the spawning tributary of the Poulter River trapped in excess of 500 spawning salmon. Trapping was part of the residence time research. Results of the study indicate average residence of 21.4 days. In the coming months FG North Canterbury staff will be occupied with gathering data needed to assess the impacts of the imminent Central Plains Water Ltd resource consent application to abstract 80 cumecs of water from the Rakaia and Waimakariri Rivers. The Rakaia and Waimakariri are both nationally significant recreational fisheries, with both featuring in the list of most visited rivers in the country. The Rakaia River is currently protected by a Water Conservation Order, which protects its outstanding natural character against over-abstraction. However, the Waimakariri River situation is quite different, with minimum flows (set by the Regional River Plan) that do not protect the small-medium sized freshes that provide the impetus for salmon migration and angler opportunity.

Dean Kelly from West Coast has been coordinating Didymo surveys, while his Manager **Chris Tonkin** has spent a considerable part of the whitebait season sampling whitebait for taste in South Westland. Trustpower proposals for new power schemes on the Arnold River are firming up.

Lawson Davey, **Rhys Barrier**, **Vaughan Lynn** and **Neil Deans** from the Top of the South have been flat out with hydro proposals in the Wairau and Gowan Rivers. The Gowan involves the first amendment to a Water Conservation Order. Lawson has also been assisting Cawthron Institute staff with brown trout

radiotracking in the Motueka River and monitoring the effects of a 30-year flood on juvenile trout production in the Rainy River, a tributary of the upper Motueka. The interesting result was that a 30-year flood, which mobilised and rearranged the bed of the river, had a similar effect on lowering juvenile trout numbers as the previous year's low flows. Rhys's biodiversity efforts are bearing fruit with extensive wetland developments now taking place associated with gravel extraction in the lower Motueka and soon the Waimea Rivers. Lawson's discovery of Didymo in the Buller set off the recent furore about its spread across various parts of the country.

Hawke's Bay's **Iain Maxwell,** and **Peter Taylor** from Wellington, have surveyed anglers in the southern part of the central North Island as to their preferences and motivations, particularly over future management of backcountry fisheries in these areas. While there are concerns over increased encounter rates with other anglers, there is mixed support for additional regulations to respond to this issue. **Peter Taylor** and **Allen Stancliff** have also surveyed anglers on what motivates them in their fishing in the Wellington and Taranaki regions, respectively.

Steve Smith, Manager of Eastern Region, has advised that a multitude of research is being undertaken on the fisheries of the Rotorua Lakes in conjunction with the University of Waikato lakes research, overseen by **Rob Pitkethley**. Various students are involved. A major issue is the effects of the Ohau Diversion Channel on migration and growth of smelt between Lakes Rotorua and Rotoiti. In addition, there is genetic assessment of the Lake Tarawera trout population to determine whether the current breeding programme is reducing genetic diversity of the rainbow trout populations. In addition, **Matt McDougall** has produced a massive evaluation of the historic banding data for gamebirds from a number of Fish and Game regions.

Ben Wilson from Auckland Waikato region has been continuing his work on the King Country river fisheries, and has tracked fish movement with data loggers. **Phil Teal** has picked up some new approaches towards management of the lower Waikato peat lakes, and is seeking to apply them in detailed investigations of habitat restoration.

Rudi Hoetjes from Northland reports on the liberation of 1000 brown trout into an artificial Whangarei District Council reservoir in May. On liberation they were 150 mm in length and by October were already 300 mm in length, so have a tremendous growth rate. In other lakes like the Kaiiwi the usual rainbow trout liberations have been carried out, and there has been ongoing liaison with the Department of Conservation into rainbow trout: gambusia: dwarf Inanga interactions. On the wetland front, Fish and Game are looking to create new wetlands in conjunction with other authorities, with several wetland enhancements likely.

Compiled by Neil Deans

Consultancies

Private Consultants

Ian McLellan (Westport) has two papers in press. One on two new *Notoperla* (Gripopterygidae) species from Argentina, and another describing the nymph of the NZ species *Spaniocercoides hudsoni* (Notonemouridae). He is continuing his work on other NZ Plecoptera, Thaumaleidae and Blephariceridae (Diptera).

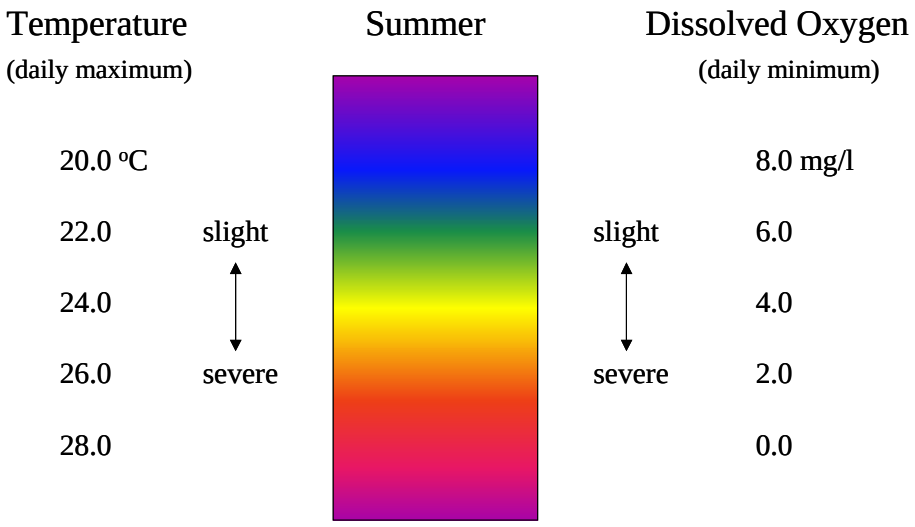
Regional Councils/Territorial Local Authorities

Auckland Regional Council (ARC)

Effects of ponds on water quality and biota

Research on ponds first presented at the joint Limsoc/ASL conference in Warrnambool, Australia has been published; Maxted, J.R., McCready, C.H., Scarsbrook, M.R. 2005. Effects of small ponds on stream water quality and macroinvertebrate communities. *New Zealand Journal of Marine and Freshwater Research* 39: 1069-1084. The abstract and paper can be accessed through the RSNZ web site at: http://www.rsnz.org/publish/nzjmfr/2005/087.php. Temperature and dissolved oxygen were major stressors in ponds and in streams below ponds in rural and native forest catchments. The temperature and dissolved oxygen effect thresholds used in the analysis were taken from published literature, and are illustrated in the following diagram.

Temperature and dissolved oxygen effect thresholds

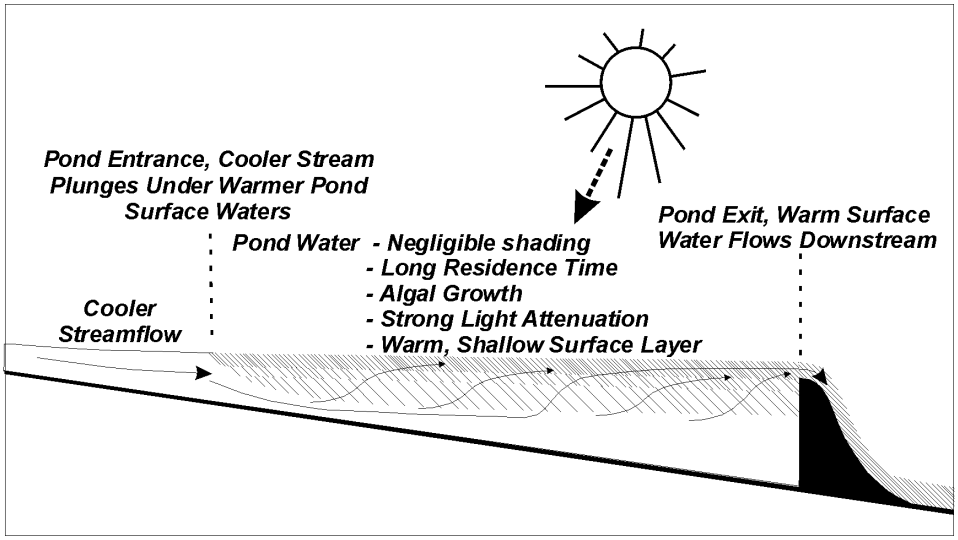


above **slight** - no adverse effects
below **slight** - beginning of adverse effects, generally reduced growth and reproduction
between **slight and severe** – variable effects depending on the species sensitivity, exposure history and presence of other stressors
below **severe** – mortality of sensitive species and some tolerant species

Dr. **Robert Spigel**, NIWA Christchurch, modelled the temperature flux through 3 of the ponds to gain insight into the mechanisms that contribute to elevated temperatures in small, shallow, on-line ponds. He produced the following summary of the mechanisms contributing to the heating of water in ponds (a more detailed description is available upon request). Initially, cool stream water plunges under warmer pond surface water as the stream enters the pond, as a result of the increased water density associated with cooler water temperature. As this inflow inserts itself at depth, it pushes the water above it upward, with the topmost layers forming the outflow over the dam crest. Incoming solar radiation, unhindered by any of the topographic or vegetation shading characteristic of the stream channel, is rapidly attenuated by dissolved and suspended substances in the pond water, thereby focusing the gain in thermal energy over a shallow depth and leading to a rapid rate of temperature rise, and hence a high daily maximum

temperature excess in the pond over that of the inflowing stream. It is this warm surface water that supplies water for the downstream flow.

Conceptual model of pond heating



For more information, contact John Maxted at john.maxted@arc.govt.nz.

Ephemeral streams

Preliminary results of research on ephemeral streams were presented at a special session of the Freshwater Sciences Society (FSS) annual meeting in Nelson. Information was presented by **John Maxted** on the policy context, by **Thomas Wilding** on the spatial extent in the Auckland region, and by **Stephanie Parkyn** on living resources including fish and invertebrates. Research on water quality processes through managed and unmanaged riparian areas adjacent to ephemeral streams will be completed this year, and a full report on all elements will be completed by June 2006. The talks are available for download from the FSS web site. For more information, contact the authors.

John Maxted returning to the USA

John Maxted will be leaving the ARC and returning to the USA; his last day at the ARC is 11 November. He will be lead scientist for the South Florida Water Management District in West Palm Beach, Florida; www.sfwmd.gov. A tough decision to leave the productive and friendly scientific community in New Zealand, but family and old friends have finally drawn him back. During his 6+ years in New Zealand, John helped to develop national protocols for macroinvertebrate sampling, introduced protocols for soft-bottom (SB) streams and quality control procedures, worked with Dr **John Stark** to develop an MCI for SB streams, progressed the scientific understanding, appreciation for, and management of small streams including ephemeral streams and headwater wetlands, conducted research on the extent and effects of small ponds on streams water quality and biota, helped to develop a method of valuation of small streams, and progressed riparian management in the Auckland region, including the development of regional protocols and training materials. John can be reached through the SFWMD web site or by contacting **Grant Barnes**, **Brent Evans** or **Chris Hatton** at the ARC.

Compiled by John Maxted

Environment Canterbury (Ecan)

The past year has been another busy one for the Environmental Quality Water Team at Environment Canterbury (Canterbury Regional Council). The team is managed by **Ken Taylor** and comprises scientists **Adrian Meredith**, **Shirley Hayward** (surface waters), **Lesley Bolton-Ritchie** (coastal waters) and **Carl Hanson** (groundwater), analyst **Robyn Croucher,** and technicians **Julie Edwards**, **Zella Smith, Rochelle Lavender** and **Fay Farrant**.

Adrian Meredith continues to run the regional water quality monitoring programmes, regional stream health monitoring programmes, and investigations of land use effects on water quality. These include a water quality monitoring network of 90 streams and rivers, a lakes network of 18 high country lakes, a region-wide macroinvertebrate and habitat monitoring programme of 140 sites based loosely on USEPA Rapid Bioassessment Protocols, and investigations in intensified agricultural areas and catchments. The water quality network has now been running for 13 years and the biological network for 6 years. New programmes initiated over this past year have been monitoring of inland (high country) lakes by helicopter over the summer/autumn. This has proven to be highly successful and very cost effective. ECan also gained the contract to provide Regional Council services to the Chatham Islands Council, and one part of this was designing and establishing a monitoring programme for the streams and lakes of the main Chatham Island. Two sampling trips were conducted in April and September 2005 and offered some interesting insights into this novel environment.

Malcolm Main resigned from ECan in January 2005 after having taken extended leave over most of 2004. After 17 years with the council he has left to pursue other interests from home, and we wish him well.

Shirley Hayward has been appointed water quality scientist to replace Malcolm. She has taken over his investigation and monitoring programmes for Lakes Ellesmere (Te Waihora) and Forsyth (Te Wairewa) and their tributaries, and is concerned with management of freshwater bathing beach monitoring programmes, pesticide monitoring, and assessing issues such as EDCs (endocrine disrupting compounds). Shirley also continues her interest in algae and periphyton, and has been coordinating ECan's role in the recent 'Didymo' surveys and surveillence in the central South Island.

Carl Hanson continues to run the regional groundwater monitoring and investigation programmes and provides support for groundwater quality issues. He has completed a review of the regional groundwater-

monitoring network. He also coordinates council involvement in the IRAP programme and other groundwater quality modelling initiatives.

Lesley Bolton-Ritchie continues to extend the marine component of our programmes, but in the 'fresher' area she has been monitoring the state of several lagoons and estuaries including the Avon Heathcote Estuary, Brooklands Lagoon, and Ashley Estuary, and getting herself and her team muddy in the process.

The ecological field and lab work is managed by **Rochelle Lavender** and conducted each summer by Canterbury University School of Biological Sciences (ex Zoology) students. The past year's students included **Amber Sinton, Matthew Thorne, Patricia Claypoole** and **Amanda Byrne**. Over summer 2004/05 **Melissa Anthony** managed the field programme while Rochelle was on parental leave.

The year has been another one with increasing public scrutiny of our freshwaters, and the state of rivers, streams, lakes and aquifers. The allocation of water resources in Canterbury has been a dominant theme with challenges to major strategies for management of the plains' rivers and aquifers, which supply the lowland spring-fed streams. The central government's Waitaki Water Allocation Plan process also required significant input, although the plan chose not to address water quality or ecological issues directly. Consideration and implementation of the plan therefore will raise a lot of environmental quality issues for us in the future. We have continued to produce overviews of the water quality and health of particular rivers and streams, particularly those that have been identified as degraded or priority catchments for remediation such as those in the Geraldine/Winchester/Temuka area, and in the MacKenzie Basin. Further 'Living Streams' catchments have been identified for further investigation. Other investigations have continued in the Amuri Basin, Ashburton lakes, and Lake Ellesmere.

Compiled by Adrian Meredith

Environment Waikato (EW)

Kevin Collier has been reviewing Environment Waikato's invertebrate monitoring programme, including developing a reference site network for wadeable streams, implementing a new sampling design based on REC class, zone and upstream landuse, and doing field work with **Johlene Kelly** over last summer. Kevin has also been conducting an analysis of spatial patterns and trends at sites that have been sampled for eight years or more, including testing the utility of a new multi-metric condition score. As part of this analysis he is working with **Ngaire Phillips** to investigate the correspondence between functional traits and conventional invertebrate community metrics. In addition, Kevin has been involved with **Roger Young** in testing the use of functional indicators for non-wadeable stream monitoring, and with **Mike Joy** in developing a predictive fish Index of Biological Integrity and testing for the effects of future landuse change and mitigation scenarios on this index. Over summer, Kevin participated in some electric boat fishing in the lower Waikato River and coordinated a study of invertebrate distribution there in relation to river zone and habitat type. He has also been involved in providing technical advice on various consent issues and giving evidence at hearings.

Rachel Kelleher started with Environment Waikato in January 2005. With the assistance of funding from the Waikato Catchment Ecological Enhancement Trust, she has been involved in contracting the University of Waikato to undertake an investigation into the potential for the removal of in-lake nutrients from the Waikato peat lakes. This work has involved reviewing current methods for removing sediment/nutrients from within lake systems and determining the appropriateness of their implementation in the Waikato Peat Lakes, and identifying the most suitable candidate lake(s) and/or areas within lake(s) for sediment/nutrient restoration and development of a methodology for a pilot trial for a selected site. Rachel has also completed investigations into the factors preventing vegetation re-establishment in one of the high priority peat lakes where vegetation has collapsed. Results have shown that vegetation can

establish if it is caged and protected from introduced fish species (catfish and rudd) but not in un-caged areas. Furthermore, when cages were removed once plants had become established the vegetation could not withstand pressure from the fish. In addition, Lake SPI assessments have been undertaken for 20 lakes throughout the region. Rachel is currently involved in undertaking an assessment of the riparian areas surrounding the regional lakes and navigable rivers to determine the proportion that are under legal protection and have public access. In conjunction with **Kevin Collier**, she is also testing the utility of littoral invertebrate communities as indicators of lake ecosystem health.

Johlene Kelly had a busy time over the 2004/05 summer season, co-ordinating state of the environment invertebrate sampling at about 140 sites in the Waikato region. The Regional Ecological Monitoring of Streams programme focused on many new sites this season and widened the collection of data to include more comprehensive habitat and macrophyte information. The ongoing survey of culverts in various districts within the region was enhanced by the addition of a student employed by the Waikato District Council to continue to collect data. Field collection has now been completed and a ranking system is being used to prioritise the culverts surveyed for remediation. Johlene returned recently from a 4-month voluntary stay on Raoul Island where she was involved with weed control.

David Spiers has taken on a new role as the Environmental Manager for the River and Catchment Services group of Environment Waikato. This group provides all of the Council's land drainage, soil conservation and flood protection services. The intention of the role is to develop and implement an environmental strategy for the group aimed at setting (and achieving) environmental best practice targets, maximising opportunities for biodiversity enhancement on land managed by the council for flood protection or drainage purposes, and providing support for the various environmental enhancement projects already underway at Environment Waikato such as Clean Streams and our soil conservation work. In June and July this year, he went on a 5-week study tour to the Netherlands, Ireland and England looking at the management of flood protection and land drainage systems. The focus of the tour was primarily around integrated catchment management, flood risk management and the implementation of European Union water and flood management initiatives. David is currently working with **Jacques Boubée** to establish a project looking into ways to minimise the environmental effects of flood gates within the Waikato region. In particular, they are focusing on floodgates, which also act to impede natural tidal fluctuations in protected waterways and hence impact on recruitment and spawning of native fish. This project should be relevant to all flood-gated systems throughout the country and David and Jacques would welcome any input or collaboration opportunities. Finally, with the return of **Johlene Kelly** from her recent off-shore adventure, David will be involved with completing the fish passage at culverts project started several years ago, and taking the findings to the various District Councils and Transit New Zealand.

Compiled by Kevin Collier

Kevin Collier's latest method for studying adult insects

Greater Wellington Regional Council (GW)

The primary focus of the 2004-05 year for Greater Wellington's resource science disciplines has been the preparation of GW's second State of the Environment report. This is a five-yearly exercise and information in this year's report – due for release in December – has been drawn from a range of technical reports. Preparation of the technical report for surface water quality and ecology, overseen by **Alton Perrie**, has been particularly challenging due to the nature of the monitoring programmes (historic design and subsequent changes) and the manner in which some data have been stored.

Juliet Milne started with Greater Wellington in late April and has been involved in both SoE reporting and stormwater projects. In May, a survey was undertaken of sediment contaminant concentrations at selected sites in 22 streams receiving storm-water discharges from one or a combination of industrial and residential sources. Although sediment sampling has been conducted in some streams previously, this is the first time a regional survey has been undertaken. Nearly one third of the streams sampled exceeded one or more of the high trigger levels of the interim ANZECC (2000) sediment quality guidelines. This information will be fed into the review of storm-water rules in our Regional Freshwater Plan.

Dr Ian Boothroyd (Kingett Mitchell) was contracted to make assessments of habitat and macroinvertebrate values in six urban streams in the Wairarapa. This completed his urban streams habitat assessments across the region. In all, Kingett Mitchell assessed about 70 sites in urban streams over the last three years. Their work will be used to review the policies in the Regional Freshwater Plan for activities like piping and channelling urban streams and their tributaries.

With the assistance of **Murray McLea, Dr Mike Joy** (Massey University) has developed a freshwater fish diversity index for the Wellington region, based on data collected over the last 20 years (over 500 records). The Index of Biotic Integrity (IBI) has been developed to help manage rivers in the region and will be a useful SoE reporting tool. The IBI can also be applied to a predictive model that can tell us which fish species are likely to occur in rivers of the region.

Summer Warr's report on the preliminary results of monitoring three riparian pilot projects (*Riparian management – what difference does it make?*) was published in June 2004 after she left for her OE. GW has monitored water quality and periphyton monthly, and macroinvertebrates, fish presence, channel shape and shade, annually, on sections of three streams since they were planted in 2001. The aim of the project is to see what benefits riparian planting has on water quality and aquatic habitat over time.

Laura Watts and **Raelene Hurndell** continued work on Water Allocation Plans (WAP) for streams and rivers in the region. The Mangatarere WAP was used for the proposed change to the Regional Freshwater Plan that introduced low flow policies for that stream. The hearings on the plan change should be early 2006. Our catchment priority list has been updated and work has started on plans for the Otakura Stream, the Taueru River and the Papawai and Parkvale Streams. Issues papers for the Otakura and Taueru are being prepared. To help develop these plans, Laura prepared *Framework for Instream Flow Assessment in the Wellington Region*.

Compiled by Juliet Milne

Hawke's Bay Regional Council (HBRC)

HBRC have been busy assisting with a number of research projects including Cawthron's Functional Indicators project and a NIWA post doc study on ephemeral streams.

After doing the necessary fieldwork for the functional indicators project, we have been testing the macro created by **Roger Young** to assess the health of other streams within our region. We look forward to further development of the model.

Richard Storey's ephemeral stream research has been providing some useful insight towards the biodiversity values of these streams within our region. A lot of insight is being gained with respect to aquatic macroinvertebrate recovery following a dry period.

One of our streams targeted for riparian enhancement was studied recently. The Waitahora Stream had a hot wire fence installed along some of its length in 1999. Since this time definite improvements to habitat have occurred, but the in-stream biological community has not improved. It could be that the scale of restoration (only 500m of stream length) has been inadequate to detect changes to in-stream biota. We plan to follow up with some electric fishing and spot-lighting surveys to see what fish are present amongst this improved habitat.

One key issue for HBRC at the moment is the development of strategies for all our natural resource monitoring programmes to ensure they deliver the right answers. There has been a lot of discussion between environmental monitoring, consents, compliance, engineering, planning and environmental education personnel to seek feedback on how our monitoring programmes can be improved.

Last season HBRC monitored 34 sites for fish as part of its State of the Environment monitoring programme. This year a further 20 will be monitored to strengthen our knowledge of fish distributions for which little information exists. This information will go into further developing the HBRC predictive fish model developed by **Mike Joy** from Massey University. Many thanks go to **Jody Richardson** for her fish database help.

Having evaluated our state of the environment water quality/ecology monitoring programme using the REC, the HBRC is now interested in validating the REC with respect to our hydrological monitoring sites. We want to evaluate the usefulness of the REC in being able to transfer hydrological information to catchments without continuous flow records, and to identify the similarity of instream values within REC classes. This is a multi year work programme and will be trialed on two catchments in the forthcoming year.

On the staff front, the water quality/ecology area has been strengthened by the recent employment of **Andrew Lamason**. Andrew will be responsible for fieldwork in many of the ecological and water quality programmes in association with our existing long-termer **Vickie Hansen**. **Geoff Wood** has been continuing his work into water allocation with IFIM surveys now complete on the lower and upper Tukituki. **Geoff** has also spent a bit of time in mediation as our proposed regional resources management plan goes through the last stages before becoming operative.

Compiled by Brett Stansfield

Northland Regional Council (NRC)

There have been several changes of staff at NRC in the last year. New staff includes **Kerry Webster**, **Nicola Bull** and **Katrina Hansen** as Environmental Monitoring Officers - water quality, **Emma Simpson** as Environmental Monitoring Officer – lakes, **Bruce Griffin** as Biodiversity officer and **Tanya Cook** has changed to Environmental Reporting Coordinator. The Northland Monitoring Forum, which has members from NRC, the Whangarei, Far North and Kaipara District Councils, Department of Conservation and Ministry for the Environment is becoming active again after being dormant for the last year.

NIWA and NRC staff carried out water quality and weed surveys of 65 lakes in Northland in November 2004 and March 2005, and a weed surveillance programme and water monitoring network is being set up for selected lakes based on their values and risks. A Lake Management Strategy for Northland is also being developed. Restoration and management work is continuing in Lake Omapere and its catchment jointly with the Lake Omapere Trustees, currently with funding from the Ministry for the Environment's

Sustainable Management Fund. Bruce Griffin was involved with the lake survey mentioned above, and is currently setting up a conditional monitoring programme for selected wetlands.

There has been the usual regional council consent compliance monitoring, environmental incident investigation and State of Environment monitoring in Northland. State of Environment monitoring includes the Freshwater Recreational Bathing Programme over summer, monthly water quality sampling at our River Water Quality Monitoring Network Sites and annual macroinvertebrate monitoring and stream habitat assessments at the same sites. It is hoped that the network can be expanded to include more sites, more biological monitoring and more targeted testing to identify land use effects such as sediment loadings in rainfall events, pesticide/herbicide testing at selected sites and heavy metals assessment at urban sites. Smaller projects being carried out include water quality and biological monitoring for the Otarao Integrated Catchment Management project and monitoring in the Whangaroa Harbour catchment to investigate the effects of land use on water quality in the harbour.

Compiled by Tanya Cook

Taranaki Regional Council (TRC)

Members of the scientific staff involved in Freshwater monitoring are **James Kitto**, **Maureen O'Rourke**, **Lorraine Smith**, **Kimberley Hope** and **Chris Fowles** (Scientific Officers), and **Peter Ashe** (Environmental Monitoring Manager), who continue to manage and/or participate in compliance monitoring of waterways that receive discharges from oil wells, municipal oxidation ponds, landfills, quarries and a wide range of industrial sites, or from which water is abstracted for irrigation, municipal water supplies and hydroelectric schemes. Increased oil/gas exploration in the past year has resulted in more extensive biomonitoring of these activities.

The biomonitoring component of these programmes concentrates on macroinvertebrate communities, using taxon richness, MCI, semi-quantitative MCI ($SQMCI_S$) and community composition to evaluate stream health. Field sampling, processing and quality control procedures closely follow the NZMWG Protocols (2001). Since the early 1980s, Council biologists have processed over 6500 macroinvertebrate samples from about 1000 sites. The Council also performs a microscopic check for undesirable heterotrophic growths in conjunction with macroinvertebrate sampling for consent compliance monitoring purposes where the consented activity has potential to promote such growths.

Instream habitat data are stored together with macroinvertebrate, periphyton and fish data in the Council's relational database. This database has also been used to enable comprehensive analyses to be made of taxon richness, MCI and $SQMCI_S$ distributions in the region, particularly in relation to altitude and the sub-regions of the area.

Major water abstractions are subject to biological monitoring programmes. Several electric fishing and spotlighting surveys are undertaken each year to assess the impacts of diversions, dams, weirs and fish-passes on fish distribution. Copies of all fish survey data are entered into the national database.

The Council recently updated its register of dams, weirs and other potential barriers to fish passage in Taranaki. The primary purpose of the register is to have all dams and weirs consented, while ensuring that passage for fish is provided. **Kimberley Hope** continues working towards this goal.

The Taranaki Regional Council continues to monitor sewage treatment pond system performance in the region with the monitoring programmes including analyses of pond phytoplankton composition.

The Council has also continued long-term monitoring of Lake Rotorangi, which, at 46 km in length, is the longest riverine lake in New Zealand. Trends in lake data have been the subject of two reviews as the data

record now extends over 19 years since establishment of the lake. The Council has also been involved with Trust Power Ltd in facilitating the passage of elvers over the Patea dam, an operation that involves a trapping and transfer system. On average about 500,000 elvers move into Lake Rotorangi each year. Similar trapping systems have been implemented at other hydroelectric power schemes in the region.

In response to submissions to the Proposed Freshwater Plan for Taranaki (which has been operative since 2001), a series of investigations has been conducted over recent years. A report collating the results of water quality investigations into the impacts of dairy pond system discharges, particularly toward the upper reaches of catchments, is nearly complete. These results are being evaluated in relation to rules in the TRC Regional Freshwater Plan.

State of the Environment monitoring (SEM) using physicochemical methods (11 sites) and macroinvertebrates (52 sites) began formally, ten years ago in Taranaki. The SEM programme provides an integrated assessment of Taranaki streams, particularly those that have received less attention in consent monitoring programmes. It also includes some monitoring of the effects of riparian planting, including the incorporation of a field assessment for periphyton cover on streambeds. Periphyton monitoring has been expanded to include the monitoring of nuisance growths at certain rivers around the region. The SEM programme also includes the assessment of bacteriological levels in relation to recently updated guideline standards for ten freshwater contact recreational sites: data have been forwarded to MfE in response to nationwide reporting requests. The Council's second State of the Environment Report covering the first five years of data collection was published in 2003. Data from both the macroinvertebrate faunal and physicochemical water quality programmes are currently being evaluated for trend detection purposes.

Riparian management initiatives are a focus of Council policies, with specific catchments such as those of the Waiwhakaiho River, Kaupokonui, Kapoaiaia, Katikara and Tawhiti streams targeted for extensive planting and state of the environment monitoring. Nevertheless, the new dairy industry Accord will target all catchments.

Compiled by Chris Fowles

Otago Regional Council (ORC)

Winter Drought keeps ORC Resource Science staff on their toes

An exceptionally dry winter in the Otago region kept farmers guessing, and ORC hydro staff preparing for a potential nasty summer drought. Parts of Otago were experiencing drought-like conditions by the end of August, with very little rainfall in coastal East Otago from Balclutha through to Oamaru. Soil moisture levels were approaching mid-summer levels, with irrigation already underway in many areas.

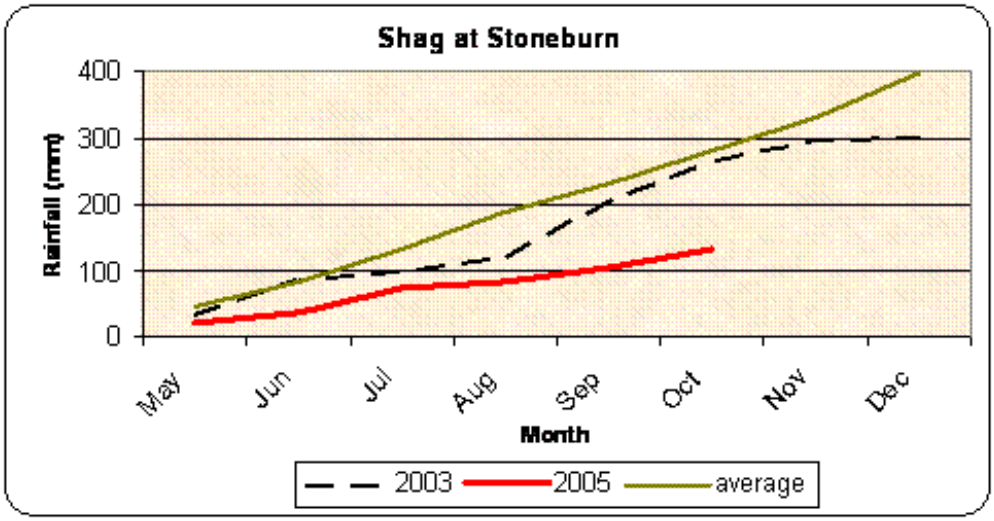


Figure 1 Cumulative rainfall totals in the Shag catchment in North Otago since May 150mm below normal

Less than 10mm of rain was recorded at most North Otago rain gauge sites in August, and this intensified the already dry conditions the area had experienced since May. River levels in the upper Kakanui dropped to one cumec by months end, less than a quarter of the normal August level. Groundwater levels also continued to drop, with 50% restrictions on irrigation takes likely to be enforced in the Deborah aquifer, if it falls below 128.3 metres as expected in October.

Didymospenia geminata (Didymo)

Biosecurity NZ are conducting a broad delimiting survey in New Zealand to detect whether *D. geminata* is present. Selected sites in Otago are being sampled and it is already known that *D. geminata* is present in the Von River, Hawea River and in the Clutha at Luggate.

The ORC intends to conduct monthly periphyton monitoring in the Clutha downstream of Luggate, in the Kawarau, and as we have a number of inter-catchment transfers from the Clutha River to other catchments via irrigation schemes, we are monitoring key flow distribution points, such as the Fraser River as well. A survey will be undertaken during summer 2005/6 to ensure the algal invasive front is mapped accurately.

Groundwater Allocation Plan

A draft Groundwater Allocation Plan for the Alexandra Basin report has been completed. This report lists a number of recommendations. Six options for groundwater allocation are discussed, with the preferred option being adoptive, integrated water management. Surface water allocation can be combined with up to 50% of rainfall recharge and water would be allocated regardless of its origin. For example, 50% of the 7-day mean annual low flow of surface waters could be added to 50% of rainfall recharge to get the initial total water allocation in a catchment. This is a simple and practical method that would initially suit most Central Otago catchments as surface and groundwater catchments appear to coincide. As more information becomes available through data collection and monitoring, a numerical groundwater model can be developed to serve as a basis for long-term water allocation.

This approach for adoptive and integrated water allocation is a departure from previous ORC thinking. Such departure is justified by the unique semi-arid climate and the groundwater balance dominated by surface water in the Alexandra Basin.

Compiled by Chris Arbuckle

Tasman District Council

Trevor James began at TDC in June 2004 as a Resource Scientist with primary responsibility for water quality and aquatic ecology after seven years working at West Coast Regional Council. Working with **Roger Young** on the 'State of the Environment' Report for water quality was great – the first comprehensive report on this topic for this region. A good start was made last summer on developing an inventory of barriers to fish passage. Dairy farming activities have been a major focus, and have included steering the Clean Streams Accord Action Plan for Tasman, and setting up catchment monitoring programmes in areas where there are significant water quality issues. After a long selection process of proprietary database software, Tasman District Council has now installed Hilltop (now 11 of 16 Councils use this database software). We hope to link this database to the web within the next year. With this software and a review of protocols and sites in the Surface Water Quality Monitoring Programme we look forward to a better quality output. The Motueka Integrated Catchment Management Project has accelerated the supply of useful information for making better resource management decisions and tools for community engagement.

Universities

Massey University

Pepe (Jose) Barquín submitted his PhD thesis in October 2004 and was examined in February 2005. In March he started working at NIWA for 4 months. He worked alongside **Mike Scarsbrook**, looking at the biodiversity of New Zealand springs, and evaluating what might be the best management and conservation practices for these ecosystems. This work produced a report (Scarsbrook M. R., Barquín J., Gray D. 2005. Biodiversity in New Zealand's coldwater springs. Client Report: HAM2005-086. NIWA, Hamilton, p 98), and a couple of papers that are in press. In July 2005 Pepe moved back to Santander in the north of Spain. He started a Post-doc at the University of Cantabria, where his group is involved with the application of the European Water Frame Directive in the region.

Mike Joy is continuing work on producing predictive fish bioassessment models for Southern Ireland, and New Zealand Regional Councils. Work is progressing on developing Artificial Neural Network (ANN) predictive models of fish distribution over New Zealand using the Freshwater Environments of New Zealand (FWENZ) and River Environment Classification (REC) variables. Regional Indices of Biotic Integrity (IBIs) have been developed for regional councils. In collaboration with **Kevin Collier** at Environment Waikato the predictive fish maps and IBI have been combined to model impacts of landuse changes on fish communities under various scenarios.

Mike is supervising a number of Masters and honours students in a diverse range of research areas including: non-migratory bully genetics and distribution, stream ecosystem processes, fish recruitment into dune-lakes, the impacts of forestry on streams, the ecological impacts of Japanese tourists, farmers' attitudes to environmental concerns, nesting success in the New Zealand robin, and skink distribution.

University of Canterbury

Freshwater Ecology Research Group (FERG)

Several students have completed their theses this year. **Hans Eikaas** (PhD) submitted his thesis relating GIS generated fish distributional data to broad-scale catchment land-use conditions. A novel aspect of Hans's study was the calculation of total river habitat available to large-bodied galaxiids once migratory and land cover limitations were taken into account. **Leanne O'Brien** (PhD) also completed her thesis on the ecology of Canterbury mudfish. Leanne's work indicated that current mudfish populations are frequently limited by predation from eels and other fish. **Annabel Barnden** (MSc) completed her comparative study on the effects of iron bacteria and metal precipitates on coal mine drainage streams. Annabel's work has shown marked differences in benthic communities in iron-precipitate compared to iron bacteria-dominated streams. Meanwhile, **Duncan Gray** (MSc) completed his research on springs in braided river systems. Duncan sampled a wide range of springs in the upper Waimakariri River and confirmed that spring complexes are areas of exceptionally high invertebrate diversity in braided riverscapes. **Paul Morris** (MSc) submitted his thesis on genetic variability of *Nesameletus*, *Aphrophila* and *Coloburiscus* at different spatial scales in four regions of the South Island. Paul found relatively high genetic variability in populations of all three insect genera. **Sarah Rickard** (MSc) completed her study on dairy farm riparian management in the Canterbury Plains. Sarah found that benthic communities in Canterbury dairy farms were in similar condition to those in streams in other Canterbury farming types.

Michelle Greenwood (PhD) continues her investigations on the aquatic spider *Dolomedes*, while **Hamish Greig** (PhD) prays for rain to fill his high country tarns. **Rebecca Eivers** (MSc) continues to make progress on her research into riparian buffer zones in plantation forest streams, and **Iain Fraser** (MSc) is busy setting up Malaise and sticky traps around forest fragments on Banks Peninsula. Several new students are about to commence their research. **Jonathan Bray** (MSc) will be working on algae in acid mine drainage streams on the West Coast, while **Simon Howard** (MSc) will be investigating fish recruitment in the Cass region. **Phil Jellyman** (shadow PhD) has been busy with various consulting projects. This year **Angus McIntosh** spent time at the Rocky Mountain Biological Laboratory in Colorado and continues to work on low flow and resource size questions in Canterbury. **Vida Stout** has been working on a book chapter for a new edition of the Natural History of Canterbury.

Mike Winterbourn is continuing to work up data obtained during the 15N release into Reservoir Bush Stream Cass (with **Jon Harding, Jennifer Tank** (University of Notre Dame) and **Lindsay Chadderton** (DoC)) in summer 2004-05. Dispersal of isotope labelled hydrobiosid caddisflies is a prime focus of the study, which is also examining predation on terrestrial adults of aquatic insects by riparian spiders. Mike has revised the Guide to Aquatic Insects of New Zealand and expects this updated edition to be published early in 2006. He is also assisting with the editing of a completely new Natural History of Canterbury that is scheduled to be published by Canterbury University Press in 2006.

Restoration of Okeover Stream

On-going restoration efforts have continued this year on the spring-fed Okeover Stream, which flows through the University of Canterbury campus. The restoration efforts are part of a joint partnership between the Christchurch City Council and University Facilities Management. The Freshwater Ecology Research Group (FERG) has been involved in monitoring for the last 6 years and has undertaken several targeted research projects in order to determine what factors might be limiting the ecological recovery of the stream. Releases of mayflies (*Deleatidium*), crayfish and Canterbury mudfish into the stream have had limited success, and highlight our need to gain a better understanding of stream processes in these urban streams.

Compiled by Jon Harding and Mike Winterbourn

Michelle Greenwood's passion for *Dolomedes* extends to her wardrobe!

University of Otago

Freshwater Fish Ecology and Evolution

Dr Gerry Closs was recently invited to the Murray-Darling Basin Commission Native Fish Strategy conference in Canberra, which produced two publications. Gerry presented a talk on native fish hierarchies at the joint New Zealand Freshwater Sciences Society (NZFSS) and New Zealand Ecological Society (NZES) conference in Nelson, 2005. Gerry is presently hosting **Dr Andrew Boulton** from Adelaide University, Australia, on a guest visit to the University of Otago. Andrew works on river-groundwater and hydrological exchanges in streams and is going to work with Gerry on varying rates of leaf pack decay in up-welling and down-welling zones of streams. Gerry will be on study leave for the first half of 2006 writing up various giant kokopu and trout migration papers.

Eric Hansen recently submitted the final draft of his PhD thesis on movement patterns of Giant kokopu (*Galaxias argentus*). Eric found evidence for dominance hierarchies and how the positioning of fish in pools related to flow, energy expenditure and invertebrate abundance.

Esben Kristensen is in the final year of his PhD research on brown trout (*Salmo trutta*) population dynamics. Esben is focusing on metapopulation structure and dynamics of brown trout, and how different populations respond to changes in environmental factors. The results so far indicate that brown trout populations in the Taieri River consist of two sub-populations (migratory and resident) with very different population dynamics. Environmental factors do not appear to be driving these differences, so Esben plans to look at the behavioural differences between individuals from these sub-populations. He also aims to examine the large-scale migration patterns of brown trout using otolith microchemistry. Esben presented a paper at the joint 2005 NZFSS-NZES conference and received the Fish and Game award for outstanding research on salmonids.

Tobias Bickel is also in his final year of his PhD on the role of *Lagarosiphon major* (Curly Oxygen Weed) in Lake Dunstan. Results so far indicate that the *L. major* beds harbour high abundances of macroinvertebrates and therefore appear to be a major feeding sites in the lake. Stable isotope analysis will be used to investigate how energy passes through the system from primary producers (epiphyton, macrophytes) to the top predator (trout) in the lake.

Shannan Crow is a PhD student working jointly with Dr Gerry Closs, Dr **Jonathan Waters** and Assoc. Prof. **Graham Wallis**. Shannan is working with two recently discovered native fish species in Southland (*Galaxias gollumoides* & *G.* 'southern'), examining their ecology, evolution and genetic structuring. Shannan analysed

the morphology of these two species and examined how it relates to the evolutionary theory of character displacement. He presented a paper on this topic at the 2005 NZFSS-NZES conference. Shannan also found evidence for habitat and diet partitioning between the two fish species and now wants to look at hybridization between sympatric populations.

Nicholas Dunn has recently shifted from Canterbury to start a PhD with Gerry looking at local adaptation in the *Galaxias vulgaris* complex in Southland, Otago and Canterbury. Nicholas aims to compare the morphology, behaviour and physiology of fish occurring in wetland and stream habitats.

Katrin Geist (PhD) is commencing a PhD examining the impacts of introduced brown trout on upland lake food webs,

Michael Pingram has just finished his MSc thesis on the impact of Gambusia on *Galaxias gracilis* (Dune Lake Galaxias) in the Kai iwi lakes.

Ricky Olley is completing an MSc on the migration of brown trout in the Motueka River. Work is currently on hold whilst the Centre for Trace Element Centre at Otago is set up, so in the meantime he is assisting Esben Kristensen with trace element analysis of eggs and otolith preparation.

David Harris (MSc) is examining the relationship between drift density & brown trout abundance, with initial results suggesting a link between drift density and trout abundance.

Quinn Cannon (MSc) is looking at residency and movement of banded kokopu in relation to habitat and food supply, with patterns suggesting interesting similarities and differences to giant kokopu. **Mark Hyrnkiw** (MSc) is looking at the ecology of the rare Longjaw Galaxias in the Kauru River. **Greg Larkin** (MSc) is looking at the role of hypoxia in influencing mysid activity and behaviour. **Ryan Ellery** (BSc Hons) examined the responses of common bully to decaying perch odour, and found that responses to it declined once the odour was more than 1 day old. **Matt Coogan** (Post Grad Dip) will commence a Post Grad Dip in 2006 examining brown and rainbow trout diets and energetics in Lakes Te Anau and Manapouri, using samples collected by Rick Stoffels.

Taieri and Southern Rivers Research Programme (TSRP)

The Department of Zoology's 'TSRP team' headed by **Colin Townsend** and **Christoph Matthaei** is currently engaged in the following research projects:

- The impact of multiple stressors on the ecology of streams in the catchment of the Taieri River
- Concepts of river health and its measurement
- The influence of physical disturbances on stream food webs

Our current FRST/NIWA-funded research in the Taieri River catchment involves an experimental manipulation of potential ecological stressors (fine sediment and nutrient inputs, water temperature and water abstraction). To simulate increased land use intensity we added nutrients and fine sediment to small streams from catchments grazed by sheep. This allowed us to see how well the streams maintained their ecosystem functions in response to these stressors. Most of the observed changes in leaf decay rates (an index of ecosystem functioning) were outside the range of natural variability at the regional scale, indicating that stream functioning may have been negatively affected by the manipulations.

In our latest experiment we investigated cumulative effects of fine sediment addition and nutrient enrichment on key stream ecosystem components (benthic invertebrates, algae and leaf decomposition rates). First results indicate that taxon richness of the algal community decreased and densities of

several pollution-tolerant algae increased with sediment addition, and that densities of some common algae decreased with increasing manipulation frequency.

Now that a year has passed since the beginning of this experiment, we will collect samples of invertebrates, algae and leaf packs from the study streams to assess recovery from our experiments. The aim of this follow-up study is to determine whether there are any "hysteresis effects" (long-term effects that are hard to reverse) of the nutrient and sediment additions.

Our research team also comprises a number of postgraduate students who are involved with the following research projects:

Peter Herrmann - (PhD) Effects of local disturbance history on the influence of different predators on stream benthic communities. Parts of this PhD project will be conducted in collaboration with **Michael Effenberger**, University of Munich, and **Carola Winkelmann**, University of Dresden, Germany. Michael and Carola will visit Dunedin from January to April 2006 and are going to conduct an experiment together with Peter. This experiment will investigate the interplay between predation, competition and disturbance history and will include measurements of physiological parameters related to invertebrate fitness.

Cynthia Winkworth - (PhD) Land-use conversion and Giardia in Otago rivers. Parts of this PhD project will be carried out in collaboration with AgResearch at Invermay, Mosgiel.

Robin Holmes - (MSc) Effects of repeated sediment addition and nutrient enrichment on stream invertebrate communities.

Cale Riddle - (BSc Hon) The effect of repeated nutrient and sediment addition on the algal community of Otago streams.

Kevin Sweeney - (BSc Hon) Indirect effects of brown trout, an introduced predator, on koura, a keystone species in New Zealand streams.

If you are interested in our latest publications or require any other information, please contact the TSRP manager, **Sebastian Uhlmann** (sebastian.uhlmann @stonebow.otago.ac.nz).

Compiled by Gerry Closs

University of Waikato

Centre for Biodiversity and Ecology Research

1. David Hamilton's patch

David Hamilton, together with **Brendan Hicks** and **Bruce Clarkson** received funding from FSRT to support an 'Outcome Based Investment' involving lake biodiversity and pest fish. David's component involves analysis of algal blooms and use of predictive models to assess land use impacts on lake water quality.

Wendy Paul has nearly completed her year-long sampling of Lake Okaro. She is investigating relationships between nitrogen water column properties such as stratification, pH and dissolved oxygen. Once she has completed her analyses she will be embarking on the task of writing her Masters thesis.

David Burger is writing the final papers of his PhD and is due to finish in October. He will then commence a one-year contract with Environment Bay of Plenty, based at Waikato University, to continue with modelling the Rotorua Lakes. David recently presented his findings at the 5th International Symposium on Shallow Lakes in The Netherlands and at the ASLO Summer Congress in Spain.

Amanda Baldwin is continuing investigations of algal dynamics in the Rotorua lakes. She is currently completing studies into nitrogen fixation in lakes Rotoiti and Tarawera, and investigations into algal movement through sedimentation and buoyancy.

Megan Bennett has collected water samples from a number of sites on lakes Rotorua and Rotoiti over the 2004-5 summer. She has begun molecular analyses on the blooms and is looking for the toxin-producing gene.

Nina Von Westernhagen has completed fieldwork to examine the distribution of phytoplankton biomass and production in Lake Rotoiti. She has taken time off to have a baby before embarking on the last phase of her study involving modelling of the lake.

Eloise Ryan submitted her PhD entitled "Phytoplankton dynamics in North Island lakes, New Zealand" in September 2005. She is currently working for the Center for Limnology at the University of Wisconsin and has developed a model that quantifies drivers of lake metabolism at fine temporal scales (i.e. 2 minute intervals). Eloise is returning to New Zealand in November for several weeks to continue collaborative work with David Hamilton on the GLEON project (see http://www.gleon.org/ for further information), which involves several of the Rotorua lakes.

Rossana Untaru completed her thesis "Geochemistry of trace elements in Lake Rotoiti" early in 2005 and is now doing a Ph.D. at the University of Wollongong.

Chris McBride has been working on modelling Lake Rotoiti with David Hamilton as part of an assessment of management options for the lake. Chris completed his M.Sc. thesis with Brendan Hicks on the use of stable isotopes to assess the trophic dynamics of Rotorua lakes.

Carolyn Faithful is about to complete an assessment of management options for shallow lakes in the Waikato region. Carolyn completed her Zoology Honours thesis on akinetes of cyanobacteria in lake sediments at Otago University.

2. Brendan Hicks and Co.

Brendan Hicks' role in the 'Outcome Based Investment' (see **David Hamilton** above) is to act as Programme Leader for the pest fish research. Brendan has refined removal population estimates of fish in non-wadeable habitats with the electrofishing boat. Mean capture efficiency at sites 50 to 1000 m long was 0.47±0.10 (± 95% CI) from 35 population estimates (Hicks et al. in press). A phylogenetic tree for New Zealand's bullies, derived from mtDNA with **Mark Stevens** of the Allan Wilson Centre, has been completed and is about to be submitted for publication.

Brenda Baillie is studying catchment-scale dynamics of woody debris and its biological implications for her PhD while still working for Ensis (formerly Forest Research Ltd).

David Klee has finished sample collection for his MSc research into depth-integrated isotopic signatures of the aquatic ecosystems in three Rotorua lakes.

Matt Osborne continues his MSc work with Brendan and Nick Ling into koi carp ecology, with 1,300 carp tagged. The 30 tags returned so far suggest that most koi remain close to the point of release. Some koi have retained tags for over 2 years, and have grown while at liberty, apparently unaffected by boat electrofishing as a capture method.

Dave West is writing his final paper for his PhD into fish health in the Waikato River. He takes up a post-doctoral position in Canada in Jan 2006.

Mark Willoughby is well into his MSc research, and is attempting to isolate and quantify seasonal and gender differences in cyprinol sulphate, a bile compound that is implicated as an aggregating pheromone.

Chi Shen (Joe) Yang is continuing his MSc investigations into distinguishing between common and Cran's bullies in the Waikato. Common bullies in the lower Waikato River can lack head pores, complicating identification. Joe has found that the ray counts of the second dorsal and anal fins separate Cran's and common bullies, successfully.

3. Ian Duggan continues to be haunted by his Canadian work on invasion risks by transoceanic shipping on the Great Lakes and Chesapeake Bay. Two of his students, **Sheree Balvert** and **Beth Fowler,** are nearing completion of their MSc theses. Sheree is investigating the general limnology and zooplankton of Weavers Lake, a newly filled lake that was formerly an open-cast coal mine in Huntly, while Beth is examining water quality problems and zooplankton ecology in the Hamilton Zoo ponds. Both have found some interesting zooplankton species not typically found in more traditionally studied habitats. Analyses are awaited. **Alex Hopkins** has several months to run on his MSc project, examining potential restoration measures for Lake Waikare. Over the last year Ian has collaborated with **Grant Barnes** from Auckland Regional Council examining the zooplankton of selected Auckland Regional Council lakes, and is currently working with **Michelle White** from Environment Southland examining zooplankton dynamics in Waituna lagoon.

4. Ian Hogg has returned from a sabbatical with Paul Hebert at the University of Guelph where he worked on the DNA "barcoding" of Arctic invertebrates. **Angela McGaughran** has completed her MSc thesis on the genetic diversity of NZ idoteid isopods and Antarctic springtails and mites. **Darin Sutherland** has completed his PhD and has submitted. **Matt Knox**, **Christy Brett** and **Beth Fowler** are now well into their MSc research projects.

5. Nick Ling has continued his Antarctic research. **Jim Bannon** has almost completed his PhD studying the influence of temperature and hypoxia on fish swimming ability. Nick is also supervising **Amy MacDonald** on a mudfish project. **Nick Shannon** continues his MSc at Forest Research, Rotorua, and is looking at compounds in pulp effluent responsible for masculinising fish. **Murray Smith** is completing his MSc at Forest Research on targeted proteomic analysis of vitellogenin in fish.

Compiled by Brendan Hicks

Victoria University

Margaret Harper is currently analysing diatoms in two marine cores from Windless Bight, Antarctica. She intends returning to writing up work on cores containing freshwater diatoms, including some from the Auckland Maar Lakes.

The University of Waikato created their own algal bloom at the FSSOC dinner this year

Freshwater Sciences Society Conference, Rotorua, 26 – 30 November 2006

The 2006 conference is being held in Rotorua, at the Park Heritage Hotel, from 26 to 30 November. This venue has been used several times by Society members who participated in symposia that have been held by the Lakes Water Quality Society. Interesting and varied field trips are planned, revolving around Rotorua's lakes, rivers and thermal areas. Suggestions for conference workshops and session topics are welcome and a combined session with the NZ Society of Soil Sciences (NZSSS) is planned. Contact: David Hamilton (d.hamilton@waikato.ac.nz).

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 freshwater science (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 financial year starting 1 July.

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.

SIL 1987 Trust Travel Award

David Burger, Waikato University

In June I was very fortunate to be able to attend the 5th International Symposium on the Ecology and Management of Shallow Lakes in The Netherlands, and the American Society for Limnology and Oceanography Summer Congress in Spain. This trip was made possible with assistance from the SIL Trust Fund Travel Award from the New Zealand Freshwater Sciences Society.

The Shallow Lakes congress is held every four years and aims to bring together scientists and lake managers focused on the management and restoration of shallow lakes. Holland was an ideal venue for the conference given that at least 16% of the country's total land area is covered by water and over 90% of all Dutch lakes are now heavily eutrophic. This years conference was attended by over 240 attendees, including two fellow Kiwis; Phil Teal from Fish and Game and John Ruck from Massey University. The conference venue was situated in a large nature reserve overlooking the River Vecht near Dalfsen, ninety minutes east of Amsterdam. With the conference centre, accommodation and social events all under the same roof, it was an excellent environment to get to interact with people, build future collaborations and discuss research ideas in a friendly environment.

This year's conference explored the theme "Shallow lakes in a changing world" and included keynote addresses by Brian Moss, Erik Jeppesen, Jeff Huisman and Martin Scheffer. The complexity and connectivity of shallow lake systems, critical nutrient loading, biomanipulation, and the effects of climate change on cyanobacterial populations and nutrient loading were all hot topics. I presented an oral paper, based on my PhD research, demonstrating how internal nutrient loads influence cyanobacterial blooms in Lake Rotorua. A selection of papers from the conference will be published in a special edition of the journal *Hydrobiologia* later this year.

Several workshops were also held during the week, including an excellent discussion on biomanipulation, which highlighted the importance of biomanipulation as an ongoing management tool rather than just a restoration tool. The conference also included a fieldtrip to Holland's largest lake, the Ijsselmeer.

The ASLO European summer meetings are held every five years and provide a unique opportunity to meet both European and American scientists at the same venue. This year's conference was the society's largest on record, with 2400 participants and over 800 oral presentations over a six-day period. The conference was held in Santiago de Compostela, a city famous for being the final destination of the pilgrimship *Camino de Santiago* (Way of Saint James). While the size of the conference was very large, most leading scientists from every field in limnology and oceanography attended, providing a very interesting scientific program. I also gave an oral presentation at this conference as part of a special session on the coupling of physical, chemical and biological processes in plankton dynamics.

I would like to express my thanks to the New Zealand Freshwater Sciences Society for giving me the opportunity to attend these conferences. The Shallow Lakes conference in particular was a truly excellent experience, and I strongly encourage anyone interested in the restoration and management of shallow lakes to attend their next congress in Uruguay in 2008. More information can be found at http://www.shallowlakes.net/congres/. I look forward to applying many of the research ideas and new knowledge gained on this trip to my own research on shallow lakes in New Zealand.

New Zealand Freshwater Sciences Society Medal and Honorary Membership

Rules:

1. *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.*
2. *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).*
3. *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.

Minutes of the 37th Annual General Meeting

of the New Zealand Limnological Society Inc. (2004)

The AGM was held at the Waiheke Island Resort. The meeting opened at 17.30 hrs, 2nd December 2004.

Present: Neil Deans, President

Brian Sorrell, Secretary-treasurer

and 51 members

Apologies: Ann Chapman, Lindsay Chadderton, David Hamilton, Mike Patrick, John Stark, Jonet Ward, Mike Winterbourn.

Motion: That apologies be accepted. *(Neil Deans/Colin Townsend carried).*

Minutes of the 36th AGM:

Matters arising from minutes:

- *Income Tax:* The treasurer reported that IRD approved the tax-free status of the Society in December 2003.
- *Freshwaters of New Zealand:* The president reported that the project has been completed and the Hydrology Society is handling sales, and thanked the large number of members involved as editors, authors and reviewers.
- *Fish and Invertebrate Posters:* Dave Speirs reported that 1500 copies were printed initially from Society funds and that a further 3500 copies were produced with the generous support of DoC, Auckland Regional Council and Tasman District Council. The next poster will feature aquatic plants and is being prepared with help from John Clayton and colleagues in the Aquatic Plants Group at NIWA. Dave invited members to suggest further ideas such as wildlife and birds.
- *Society Policy:* The President reported on the Executive discussion regarding Society Policy, in which it was felt that the Society should be in a position to represent the scientific consensus of its members in relation to freshwater issues, but that the production of policy documents that could be divisive or seen as environmental advocacy was not our role. The Executive was asked to consider this further and report back to the members. Carolyn Burns pointed out that as a constituent organisation of RSNZ, the Society does not need its own ethics policy, as it is linked to RSNZ ethics policy.
- *Member's achievement awards:* The President outlined ideas from the Executive on how the Society could honour scientific and other broader achievements of its members in freshwater sciences, and received general support of the concept from members. Members suggested such awards should not be made too often and should not overlap with achievements already recognised by RSNZ medals. Members were invited to contact Jon Harding, who will develop the ideas further, with comments and suggestions.
- *Fortieth anniversary:* Ian Boothroyd reported on three ideas for celebrating the Society's 40th anniversary – a book to capture the history of the Society, a special issue of NZJMFR, and a special

social function. Members raised the possibility of seeking special sponsorship for the event, and making video interviews with founding and senior members. Ian Boothroyd welcomed any further ideas and suggestions from members.

Motion: That minutes be accepted as a true and correct record of the 36th A.G.M. *(B. Sorrell/Mike Scarsbrook carried)*

President's report:

I am pleased to present my annual report to the Limnological Society for the 2004 year at the Annual Conference at Waiheke Island. I would like to acknowledge the contributions made by my fellow members of the Executive of the Society, who have been happy to undertake tasks or contribute on matters as required. Two members will be standing down; Dr Ian Boothroyd, who has made many contributions to the Society over the years, as a past President and long-serving member of the Executive; and John Maxted, who together with Ian has organised this year's conference and made a valuable contribution to the Executive this year. Other Executive members are standing again.

Membership

The membership remains at a similar level to the last several years, with a healthy mix of students and other members. It is somewhat disappointing to report, however, that about half the membership, at the time of writing, have yet to pay this year's subscription or are in arrears. At $40 each an ordinary membership is a modest cost to belong to a Society, which facilitates many advantages to its members and the wider community, many of which are summarised below.

Financial Statements

First, I would like once again to acknowledge the efforts made on our behalf by Brian Sorrell, our very efficient Secretary-Treasurer. Brian puts in a great deal of hard work, largely in his own time, from which we all benefit.

This financial year has seen the fruition of many projects, which have been in the pipeline for several years. We have transferred $10 000 to the SIL Trust (see below) to enable them to continue their work; have funded the production of posters and provided a considerable portion of the costs of student travel to last year's Australian conference. This, together with the contingent cost of our share of the production of the Freshwater Book and the absence of any conference profit since our conference was offshore, means our expenditure has considerably exceeded our income. It is clear, however, that this has been foreshadowed at previous AGMs, where decisions were made to invest our considerable assets in activities to further the Society's objectives. As we still have some $50 000 in reserves, I believe the Society to be both in a sound financial position and investing wisely in the future of limnology.

Freshwaters of New Zealand

I am very pleased to be able to promote this fine joint effort between our Society and the Hydrological Society. Particular thanks must go to our members Jon Harding and Brian Sorrell, who together with their hydrologist fellow editors Paul Mosley and Charles Pearson have put a great deal of hard work into what amounts to 'the state of our science'. In addition to their efforts, some 43 members are included amongst the authors, several of whom have contributed to more than one chapter and at least one has been involved with three. It has truly been a joint effort. It will have wide application in education and water resource management, so make sure you order your copy today.

Limnological Society Posters

Many thanks to David Spiers and Environment Waikato for getting these posters designed and printed with Society funds. They have proven so popular with schools that we have run out so and we have sought and received additional funding from the Department of Conservation, Auckland Regional Council and Tasman District Council for an additional print run. Another poster of aquatic plants is being prepared with help from NIWA.

Invertebrate Book

Some members will have a copy of this excellent publication, of which we still have some copies in stock. In order to make it available to more members, we are offering copies to members at the conference at half the usual price.

40th Anniversary

The 40th anniversary of the Society is fast approaching. Ian Boothroyd and Ann Chapman are considering producing a book to review the Society's history and look forward to our future. This will be discussed further at the AGM but should be supported by all those who have been involved with the development of the Society. We are fortunate to still be benefiting from the contributions of a number of founder members, whose input would be valued.

Society Name

A major item of business for the Executive this year has been consideration of the Society's name. At the suggestion of Ian Boothroyd, we have proposed a "trading" name change to "New Zealand Freshwater Sciences" which has been considered by the membership and is therefore proposed for consideration at this AGM. There is no change proposed to the Society's rules or logo.

Society Policy

The Executive was asked last year to investigate the appropriateness of developing policy to further the Society's objectives. As part of this, the policies of our sister organisations, such as the ASL and NABS were scrutinised. It soon became apparent that there were two types of policy: one relating to Society procedures, which were an extension of Society rules, and another relating to the Society taking a position on a particular matter of relevance to Society objectives. On discussing it with those familiar with the process undertaken by societies elsewhere, or similar science societies here, we became concerned that while the former type of policy was probably redundant, the latter was potentially divisive of the Society's membership. Alternatively, any "non-divisive" policy would likely be too general to have a particular effect, while being very time consuming. The Executive therefore opted not to take the matter any further at this stage. I would invite anyone who has any burning issues, which they consider should have Society policy on them to bring them to the attention of the Executive where they could be reconsidered.

Prizes for ordinary member presentations at conferences

The Executive was asked to consider this matter at last year's AGM. We have not given it much consideration, partly because it is part of the next item. We also considered that this might introduce an element of competition and judgement for ordinary members, which might be counterproductive to the normally informal, relaxed atmosphere which is characteristic of our conferences.

Recognition of contributions made by members

A matter considered from time to time and raised at the last AGM is the question as to whether, or in what way, we recognise contributions made by our members. A number of our members have received Royal Society Medals in recent years in recognition of their achievements according to the Royal Society criteria. There are some whose contribution to limnology or the Society may not have been recognised and

would not be eligible for Royal Society recognition. Many of our sister societies do recognise major contributions by members in some way. The Executive has not formed a final view on the matter, but welcomes comments. I suggest that we investigate this further and put a proposal for consideration at next year's AGM.

SIL Trust

The Society agreed last year at the AGM to provide a $10 000 sum to the SIL Trust to ensure it remains able to provide funds to support travel for members and visitors, where appropriate. One Travel Award was made in 2003/04 to Susie Wood for attending the International Conference on Toxic Cyanobacteria in Norway, and Susie has provided a detailed report on her trip in the latest Newsletter. We do not have an update on the SIL Trust's finances as their Secretary, Kit Rutherford, is overseas and unable to furnish us with an update in time for the AGM.

Membership of external organisations

The Limnological Society is one of the 60-odd constituent societies of the Royal Society of New Zealand. This gives us an opportunity to vote for a member of the Society Council, and an opportunity for our representative to meet annually and discuss matters of relevance to all those involved with science. It also provides some opportunities to make use of some of the facilities available to Royal Society members. We received some financial support, for example, for Dr Mike Barbour to attend and speak at the plenary session of this year's conference.

2003 Joint Annual Conference with Australian Society of Limnology, Warrnambool, Victoria, Australia

Our first offshore conference, organised ably by our ASL hosts, was held at the pleasant town of Warrnambool on the southeastern Victorian coast. A disappointment for a number of our members was the sudden cut off of registrations, limiting attendance of Limsoc members to about 40 out of the 250 or so delegates. Despite this, those who attended enjoyed the chance to meet and discuss limnological topics with our Australian colleagues. Although many of the problems are of a different nature and scale in Australia, the research and management approaches are often similar. We look forward to the opportunity to welcome our Australian colleagues to New Zealand in another 3 years.

2004 Annual Conference at Waiheke Island

Our second offshore conference is being held at the pleasant Waiheke Island Resort. It is being very well organised by John Maxted, Ian Boothroyd and Grant Barnes. About 165 delegates and some 84 presentations are programmed, with about a third of the presentations from students working in a wide variety of areas.

Proposed conferences

The 2005 conference has been planned for Nelson, jointly with the Ecological Society, with Trevor James leading the conference organisation. Suggestions for conference topics and/or plenary speakers would be welcomed. Due to difficulties in securing the only venue likely to be big enough to host the anticipated numbers likely to attend, the conference timing is set down for the week of 28 August to 1 September. The 2006 conference is pencilled in for Rotorua, with enthusiastic support from David Hamilton and local Rotorua members.

Government's 'Sustainable Development Programme of Action'

An external topic of major interest for freshwater science is the government's 'Sustainable Development Programme of Action', which will likely touch many of our members over the next year or two. One of the four themes is related specifically to freshwaters, with components investigating policy responses to issues, including dealing with diffuse source pollution, more efficient water allocation and methods for

determining waters of national importance. There is much of interest to limnologists. The Ministry for the Environment has invited the Society to have some involvement in the process. Undoubtedly we will all be interested in what emerges.

Conclusion

I am pleased to report that the Society is in good heart and is continuing to provide a variety of opportunities for members to further the freshwater sciences.

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 13 November 2004 was 360.

Membership figures for the last four years are shown in Tables 1 & 2. Total membership is similar to last year. Total numbers in arrears are similar to previous years and include 8 who will be deleted if they do not pay this year. A follow-up reminder will be sent to all unpaid/in arrears members early in the new calendar year.

There have been 22 new members joining since November 2003 (11 student/unwaged and 11 ordinary).

Table 1. Financial status of membership

	2004	2003	2002	2001	2000
Members current:					
Paid	154	162	216	219	144
Unpaid	100	109	59	127	48
Members in arrears:					
1 yr	47	34	55	-	80
2 yr	24	12	-	-	24
3 yr	8	15	-	-	18
Other:					
Honorary	11	11	11	11	9
Life	1	-	-	-	-
Legal req.*	1	1	1	1	1
Societies	5	5	5	2	2
Libraries	9	9	9	9	9
Total	**360**	**358**	**356**	**369**	**335**

* Not a member

Table 2. Type of membership

	2004	2003	2002	2001	2000
Ordinary	252	249	251	247	228
Corporate	23	22	23	27	25
Honorary	11	11	11	11	9
Life	1	-	-	-	-
Unwaged/student	68	71	66	82	71
Other (Societies)	5	5	5	2	2

Finances

- The accounts were audited by Stephen Dine of Brown Webb Richardson, Hastings.
- The Society embarked on the expenditure programme developed from the Shantytown 2002 AGM and hence ended the financial year with an operating deficit of $11588. This predominantly consisted of (i) transfer of $10000 from the Society funds to the SIL Trust Fund, (ii) $4444 used to support ten students for travel to the Australian conference, and (iii) $4322 for the freshwater resource posters produced by Dave Speirs
- I.R.D. finally approved our application for tax-free status after prolonged correspondence and negotiation, meaning that the Society is no longer liable for income tax – an important consideration given the higher tax requirements for incorporated than unincorporated Societies. They have nonetheless charged income tax and interest for the period during which they deliberated over the application as predicted last year, which is a significant proportion of this year's expenditure.
- Offsetting these expenditures was income from the invertebrate book ($2321 gross) and bulletin ($518) sales. Subscription payments (total $7010) are down on the previous year due to more unpaid members.
- There was no conference income (or loss) this year due to our participation in the ASL conference instead of holding one of our own.
- We have one term deposit, the combined Jolly Fund, with $35,909.52 at 1 November 2004. The Current Account as at 1 November 2004 was at $23,198.74
- The other major expenditure that will arise shortly is our contribution to *Freshwaters of New Zealand*, which is budgeted at $17500, although this will depend on negotiations between HydroSoc and Caxtons over the number of faulty books and sales between now and when this is finalised.
- It has been decided that as of the week of the conference, the invertebrate book cost will in future be discounted by 50%. 12 copies of the book were sold between 1/7/04 and the week of the conference – but as many copies were sold again in the week of the conference once the price was discounted.

Motion: That the Society Accounts for 2003/04 be accepted. *(Brian Sorrell/Carolyn Burns– carried).*

Motion: That the Auditor for the next financial year be Stephen Dine, Brown Webb Richardson Ltd., Hastings. *(Brian Sorrell/Maureen Lewis– carried).*

The meeting agreed that a gift of two bottles of wine should be made to Stephen as thanks for auditing this year's accounts.

SIL Trust report

The Treasurer was unable to attend and provide a report. A report will be provided for the next newsletter. The President noted that one award was made in 2003 to Susie Wood, and that the Awards Committee had determined to make one award in 2004/05 to David Burger for conference attendance in Europe in 2005.

Future Conferences

The President thanked Ian Boothroyd and John Maxted for organising a highly successful 2004 conference.

The 2005 Conference will be held in the Nelson, jointly with the Ecological Society. Trevor James is chairing a conference committee. The timing will have to be earlier than usual (28 August – 1 September) due to unavailability of a large enough venue at our usual time. It was noted that this may cause difficulties for Canterbury, Victoria and Massey staff to attend, although most postgraduate students should still be able to attend from these Universities.

David Hamilton has agreed to chair a committee to host the 2006 conference in Rotorua.

The 2007 Conference, scheduled for the South Island, is due to be another joint conference with ASL, and will also be the 40th anniversary conference.

Election of Limnological Society Officers

The following officers were nominated and duly elected:

- *President:* Nominations Neil Deans *(Dave Speirs/Mike Scarsbrook).*
- *Motion: Nominations close (Jon Harding/Carolyn Burns carried)*

Neil Deans elected President unopposed.

- *Secretary/Treasurer:* Nominations Brian Sorrell (*Neil Deans/Carolyn Burns).*
- *Motion: Nominations close (Roger Young/Mike Scarsbrook carried)*

Brian Sorrell elected Secretary/Treasurer unopposed.

- *Committee Officers:* Nominations Trevor James (*Neil Deans/Philippe Gerbeaux)*; Roger Young (*Angus McIntosh/Jon Harding)*
- *Motion: Nominations close (Carolyn Burns/Jon Harding carried)*

Trevor James and Roger Young elected Committee Officers unopposed.

- *Newsletter editor:* Mike Winterbourn (*Jon Harding/Neil Deans).*
- *Motion: Nominations close (Mike Scarsbrook/Steph Parkyn carried)*

Mike Winterbourn elected Newsletter Editor unopposed.

- *S.I.L. Representatives:* Nominations John Stark (*Maureen Lewis/Jon Harding)*; Mike Scarsbrook (*Carolyn Burns/Steph Parkyn)*
- *Motion: Nominations close (Philippe Gerbeaux/Maureen Lewis carried)*

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

Steph Parkyn continues as a co-opted member as website manager. David Hamilton was co-opted in the role of 2006 conference organiser.

Adoption of trading name

The Secretary reported that 80% of returns responded positively to the propositions on the adoption of a trading name in the referendum included in the last subs mailout. 155 of 358 members voted. Although in discussion it was noted that the proposed name did not include some topics such as brackish lakes, and could include topics we do not cover such as groundwater, it was felt the proposed name did reflect what we do overall. It was also noted that the new name would raise the profile of the society and link us more to international societies.

Motion: That the New Zealand Limnological Society adopts a trading name to better identify the purpose of the Society to the wider public, while retaining its existing name for constitutional, legal and similar purposes. *(Neil Deans/Thomas Wilding - carried).*

Motion: That this trading name be "New Zealand Freshwater Sciences Society". *(Neil Deans/Thomas Wilding - carried).*

General Business

- Newsletter Format: The President reported that Mike Winterbourn raised the issue of possible changes to the format, including having it as an electronic document, with hard copies produced only for members without electronic access, and more frequent production or at other times of the year. It was noted that newsletters on the website are currently not secure and this would raise privacy issues regarding membership details. The number of members willing to contribute or solicit contributions could be an obstacle to more frequent issues.

Meeting closed 18.30 hrs.

Conference prizes 2004

Awards presented at the NZ Limnological Society Conference: December, Waiheke Island, 2004.

SIL Trust prize for best Conference talk ($500)

Eloise Ryan (Waikato) - "Formation and dynamics of a diatom deep chlorophyll maximum in Lake Tarawera"

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

Paul Morris (Canterbury) - "Aerial dispersal patterns of three aquatic insect species"

SIL Trust prize for best poster ($150)

Tanya Blakely (Canterbury) - "Road culverts – unrecognised barriers to upstream caddisfly dispersal"

Department of Conservation awards ($150)

Phil Jellyman (Canterbury) - "Fry survival of alpine (*Galaxias paucispondylus*) and Canterbury (*G. vulgaris*) galaxiids"

Kate McArthur (Massey) - "Freshwater macroinvertebrate communities in the Manawatu-Wanganui Region**"**

Kingett Mitchell award for best applied talk ($150)

Zoe Dewson (Massey) - "Invertebrate community responses to experimental flow reductions"

Kingett Mitchell award for best applied poster ($150)

Sarah Rickard (Canterbury) - "The effects of land management practices on streams in Canterbury"

Conference Prizes, 2005

Awards presented at the joint NZES & NZFSS Conference: 28th August – 1ST September, Nelson, 2005.

NZES Awards

Te Tohu Taiao – Award for Ecological Excellence

Assoc. Prof. David Given – Botanical Services Curator @ Christchurch City Council.

Best Paper by a New Researcher - $500

Mike Joy – Massey University

Joy M.K. & Death R.G. (2004) Predictive modelling and spatial mapping of freshwater fish and decapod assemblages using GIS and neural networks. *Freshwater Biology*. Vol 49, 1036-1052.

Life Membership

Peter Williams – Landcare Research

Ecology in Action Award -$1000

Karen Denyer – Environment Waikato

Student Prizes

Best Student Paper Presented at the Conference - $500

Michelle Greenwood – University of Canterbury

Living on ecosystem boundaries: the impacts of floods on populations of a NZ fishing spider *Dolomedes aquaticus*.

Highly Commended Paper Presented at the Conference - $300

David Burger – University of Waikato

Nutrient Cycling in a eutrophic polymictic lake: quantifying sedimentation and bethic fluxes to assess internal nutrient loads.

Best Student Poster Presented at the Conference - $300

Rebecca Eivers – University of Canterbury

The response of stream invertebrates to riparian vegetation age and condition in exotic plantation forests.

Highly Commended Poster Presented at the Conference - $150

Arun Siva – Victoria University of Wellington

Long-term vegetation changes in Otari-Wiltons bush following possum control.

Best Honours or Masters Student - $150

Brendan Doody – What is coming up in the roses? Potential role of domestic gardens and the future of Riccarton Bush.

Sponsored Prizes

Best Paper on a Conservation Topic presented at the Conference

(Department of Conservation)

Jessica Costall – Massey University

Katipo spiders in Manawatu: population dynamics, monitoring techniques and habitat preferences.

Best paper on an Applied Research Topic.

(Kingett Mitchell Ltd)

Jointly awarded to:

Kate McAlpine – Department of Conservation.

Factors contributing to invasion success in the environmental weed *Berberis darwinii:* seed dispersal, germination and seedling establishment.

Liza Inglis – University of Auckland

The river environment classification and its application in the Auckland region.

Special Publications

New Zealand Microphycologists: Guide and Directory 2005

Vivienne Cassie Cooper, Landcare Research

Vivienne Cassie Cooper has compiled this guide and directory that profiles NZ microphycologists to give credit to the scientists who have devoted much time and effort into the study of microalgae and to stimulate further research in this area. Many of our colleagues are featured here!

It's available at http://limsoc.rsnz.org/NewZealandMicrophycologistsDirectory2005.pdf

Publications and theses

Department of Conservation

Venman MR, Dedual M (2005). Migratory behaviour of spawning rainbow trout (*Oncorhynchus mykiss*) in the Tongariro River, New Zealand, after habitat alteration. New Zealand Journal of Marine & Freshwater Research 39: 951-961.

Environment Waikato

Baillie, B.R; Collier, K.J.; Nagels, J. (2005). Effects of forest harvesting and woody debris removal on two Northland streams. New Zealand journal of marine and freshwater research 39: 1-15

Collier, K.J. (2005). Review of Environment Waikato's Regional Ecological Monitoring of Streams (REMS) Programme: Past Practices and Future Directions. Environment Waikato Technical Report TR05/48.

(http://www.ew.govt.nz/publications/technicalreports/documents/tr05-48.pdf).

Collier, K.J.; Kelly, J. (2005). Regional Guidelines for Ecological Assessments of Freshwater Environments: Macroinvertebrate Sampling in Wadeable Streams. Environment Waikato Technical Report TR05/02. (http://www.ew.govt.nz/publications/technicalreports/tr0502.htm).

Collier, K.J.; Kelly, J.; Haigh, A. (2005). Development of a Reference Site Network for Invertebrate Monitoring of Wadeable Streams in the Waikato. Environment Waikato Technical Report TR05/29. (http://www.ew.govt.nz/publications/technicalreports/documents/tr05-29.pdf).

Collier, K.J.; Smith, B.J. (2005). Effects of progressive catchment harvesting on stream invertebrates in two contrasting regions of New Zealand's North Island. Marine and freshwater research 56: 57-68.

Collier, K.J.; Smith, B.J. (In press). Distinctive aquatic invertebrate assemblages colonise rockface seepages in northern New Zealand. Biodiversity and Conservation.

Rowe, D.; Quinn, J.; Collier, K.; Hatton, C.; Joy, M.; Maxted, J.; Moore, S.; Parkyn, S. (2005). Ecological valuation: a method for scoring the ecological performance of perennial Auckland streams. NIWA client report HAM2004-073.

Smith, B.J.; Collier, K.J. (In press). Tolerances to diurnally-varying temperature for two species of adult aquatic insects from New Zealand. Environmental Entomology 34(4): 748-754.

Smith, P.J.; McVeagh, S.M.; Collier, K.J. (In press). Genetic diversity and historical population structure in the New Zealand mayfly *Acanthophlebia cruentata*. Freshwater Biology

Tasman District Council

James, TI. March (2005). Fish Passage in Tasman District. Tasman District Council report # R05006

James, TI. May (2005). Recreational Water Quality Summary Report, Summer 2004 / 2005. Tasman District Council Report # 05005.

Young, R., James, TI and Hay, J. June (2005). State of Surface Water Quality in Tasman District. Tasman District Council report # R05007. ISBN: 0-473-10060-6

James, TI. June (2005). Aorere to Puponga Dairy Farm Stream Survey. Tasman District Council report # 05009.

University of Waikato

Bailey, S.A., Duggan, I.C., Jenkins, P.T. & MacIsaac, H.J. (2005) Invertebrate resting stages in residual ballast sediment of transoceanic ships. Canadian Journal of Fisheries and Aquatic Sciences 62: 1090-1103.

Bailey, S.A., Duggan, I.C., van Overdijk, C.D.A., Johengen, T.H., Reid, D.F., & MacIsaac, H.J. (2004). Salinity tolerance of diapausing eggs of freshwater zooplankton. Freshwater Biology: 49: 286-295.

Bailey, S.A., Nandakumar, K., Duggan, I.C., van Overdijk, C.D.A., Johengen, T.H., Reid, D.F. & MacIsaac, H.J. (2005). *In situ* hatching of invertebrate diapausing eggs from ships' ballast sediment. Diversity and Distributions 11: 453-460

Daniels, C. B., Orgeig, S., Sullivan, L. C., Ling, N., Bennett, M. B., Schürch, S., Adalberto, L. V., Brauner, C. J. (2004). The Origin and Evolution of the Surfactant System in Fish: Insights into the Evolution of Lungs and Swim Bladders. Physiological and Biochemical Zoology *77*:732-749.

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Duggan, I.C., Rixon, C.A.M. & MacIsaac, H.J. (2006), Popularity and propagule pressure: determinants of invasion success in aquarium fish. Biological Invasions 8: 393-398.

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Duggan, Ian C., Barnes, Grant. (2005). Assessment of Trophic State Change in Selected Lakes of the Auckland Region Based on Rotifer Assemblages. CBER Contract Report No. 41, June 2005, prepared for Auckland Regional Council.

Ellis, Rosanne J., van den Heuvel, Michael R., Smith, Murray A., Ling, Nicholas. (2005). Effects of maternal versus direct exposure to pulp and paper mill effluent on rainbow trout early life stages. Journal of Toxicology and Environmental Health, Part A, 68, pp 369-387.

Ellis, Rosanne J., Van den Heuvel, Michael R., Stuthridge, Trevor R., Ling, Nicholas, Dietrich, Daniel R. (2004). Lack of Estrogenic and Endocrine Disrupting Effects in Juvenile Rainbow Trout Exposed to a New Zealand Pulp and Paper Mill Effluent. Pulp & Paper Mill Effluent Environmental Fate & Effects, Section 1: Fish Health Assessment, pp 67-77.

Gray, D.K., Bailey, S.A., Duggan, I.C. & MacIsaac, H.J. (2005). Viability of invertebrate diapausing eggs exposed to saltwater: implications for Great Lakes' ship ballast management. Biological Invasions 7: 531-539.

Hamilton, D. P., Hawes, I., and Davies-Colley, R. (2004). Physical and chemical characteristics of lake water. In: Freshwaters of New Zealand. N.Z Limnological and Hydrological Societies, pp 21.1-21.20.

Hicks, B. J., D. W. West, B. J. Barry, A. Markwitz, C. F. Baker, and C. P. Mitchell. (In press). Chronosequences of strontium in the otoliths of two New Zealand migratory freshwater fish, inanga (*Galaxias maculatus*) and koaro (*G. brevipinnis*). International Journal of Particle Induced X-ray Emission.

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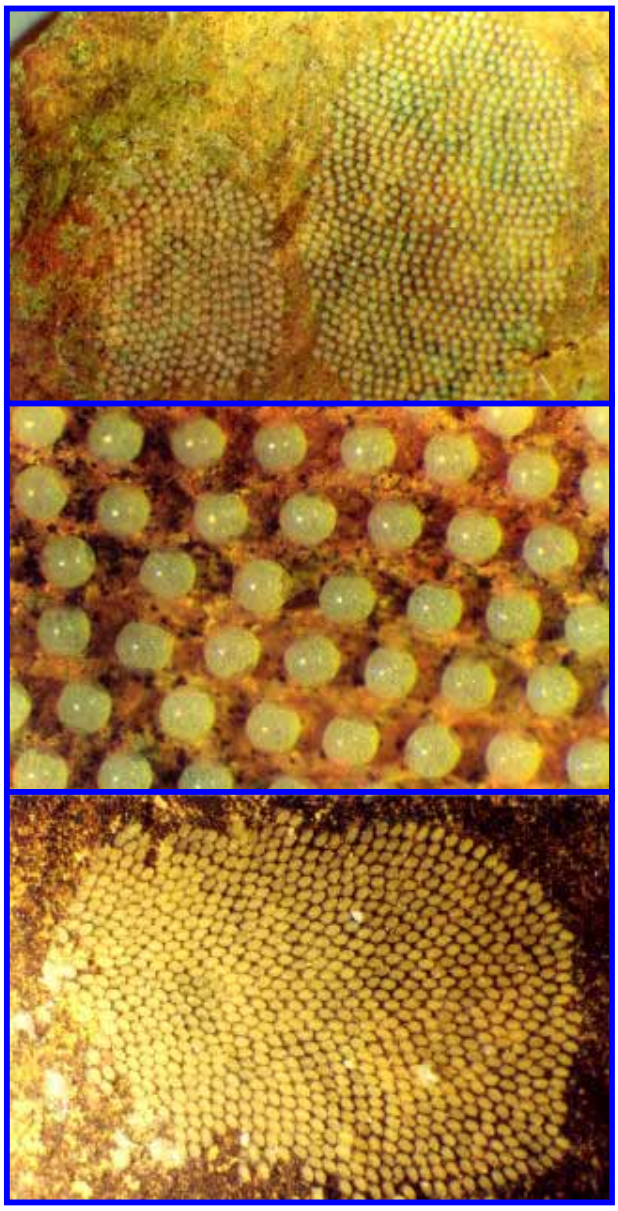

Caddisfly egg masses

New Zealand Freshwater Sciences Society

How do I join?

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

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

Constitution

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

2 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.

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

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

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

(e) 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.

7 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.