

New Zealand Freshwater Sciences Society Newsletter



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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 (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 a year and an annual conference is held. The 2010 subscription is \$40.00 per annum, or \$10 for students, the unwaged or retired persons.

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1976-78	Dr C.W. Burns
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1980-84	Dr B.T. Coffey
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1999-2000	Dr J.S. Harding

Previous editors

1968-70	Dr M.A. Chapman
1970-72	Dr S.F. Mitchell
1972-75	Dr M.J. Winterbourn
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Editorial

It seems to have been a big year for freshwater, with both positive and negative outcomes. Public awareness of and motivation to move on freshwater issues appears to be growing. In my own region, it was encouraging to see an incredibly strong response to Roger Young's report listing the Manawatū as one of the world's 'worst' monitored rivers. When scientific research is so often overlooked by mainstream media unless it has a novelty factor, the amount of coverage afforded to this report was heartening (even if that coverage was at times less than accurate). But even more encouraging was the public reaction and consequent developments. The report galvanised the region into action. In my daily wanderings I spoke with members of the public, often urban dwellers who don't necessarily have great contact with local streams, who were outraged at the report's findings and wanted to do something about it. The resulting forum of organisations from across the spectrum, from iwi, DOC, Horizons and the local council through to Federated Farmers, was something I do not believe could have resulted from anything other than a well-researched, evidence-based report that brought public awareness to the state of our rivers. And while not entirely successful in that Federated Farmers declined to sign the final accord, an agreement supported by a range of organisations who were previously working largely in isolation (and sometimes at odds to each other) still resulted.

Other positives include the Land and Water Forum process and the resulting report. While the report does have some gaps and left some of the 'too hard' questions in the basket, on the whole it represents a new way of working which looks like it may offer greater protection for our freshwaters. Taking a national approach certainly reduces the pressure on regional councils and the risk that businesses will play region off against region in a bid to get favourable consents. And having scientific representation at a table where parties are committed to listening to one another means our concerns are less likely to be written off as 'just the greenies whinging'. Congratulations to those involved and may the process continue so that issues not currently covered can be resolved.

On a not so positive note, there was the granting of resource consent to dam the Mōkihinui, and of course the sacking of the elected commissioners for Environment Canterbury. Those of you using the Society's discussion forum (<http://limsoc.rsnz.org/index.php/forum/s/>) will note that while the Ministry for the Environment did initially have potentially valid concerns about ECan's performance, there was a shift from an original desire to provide certainty for applicants on environmental limits through to a stated objective to free up water for irrigation – obviously a very different outcome. And with government looking to fund irrigation schemes in the region by 10-30%, the society and others concerned about freshwater ought to be worried.

Furthermore, the legislation for Canterbury greatly undermines Water Conservation Orders. As one society

member has pointed out, “Decisions on Water Conservation Orders will no longer be based on protection of values that are recognised as being nationally outstanding, but rather using a sustainable resource use framework where economic, environmental, cultural and social values are somehow weighed up and balanced. The balancing act will be performed by a group of government appointed commissioners charged with regional water management - and with no mandate to consider nationally outstanding values.” It hardly needs to be stated that these are deeply concerning changes.

All in all, it goes to show that advocacy from the scientific community on freshwater issues is not just important, it’s vital and can make the difference needed. We need to continue to push for the protection of our freshwaters with the passion and integrity that is characteristic of our society. On that note, it was wonderful to read what everyone has been up to over the last year, and to see that we are doing just that. I hope you enjoy reading about this too, and keep up the good work everyone.

**Hannah Rainforth,
Editor**

President’s piece

It has been an honour to serve as NZFSS President over the last four years. I hope some of the initiatives have moved the Society forward, advanced awareness of freshwater science generally, and also helped you individually as members. Hopefully there is greater understanding of the very real issue of workplace stress, regional conferences have helped raise the profile of freshwater science in the provinces, and our Society has a recognised voice on freshwater issues through the various submissions made. It was particularly gratifying for me to see the engagement of members with the submission on the National Policy Statement on Freshwater Management,

and it is a tribute to all who contributed that this submission was very highly regarded. The revised NPS incorporated many of the Society’s recommendations, and the executive committee subsequently conveyed the Society’s endorsement of the revision to the Minister. The urgent need for a national policy statement of freshwater was emphasised in the Land and Water Forum report, however it remains to be seen where this will go with the current government as we await a “fresh new start for freshwater”.

Representing everyone’s views in submissions is of course impossible, but the forum at least allows issues to be aired and debated, and it has served to highlight some important points. I hope the consultation undertaken through the forum, and also within the executive committee, to develop submissions on the Water Research

Strategy and the Schedule 4 Stocktake fairly represented the broad views of most of the membership – unfortunately there was not a long lead in time which did not allow debate at a conference. While the number of hits on various forum topics indicates someone is clearly watching, there is still not a lot of discussion from Society members (who can remain anonymous). I urge you to contribute to these debates where you can so we can use your knowledge to help develop objective analyses of issues and work through their implications for freshwater ecosystems.

In terms of acquiring knowledge to effectively manage freshwater ecosystems, you all continue to make important contributions. As more and more pressure is brought to bear on freshwater resources over the coming years, driven largely by economic agendas, the sound scientific information and new knowledge that you gather becomes even more important. A feature of our recent

conferences has been the great support by students who are the future of our Society and the next generation of freshwater scientists and managers. I'm very pleased to see them better represented and more involved in Society matters, and the future bodes well if we continue to work to keep students engaged. Of course, everyone is busy and work life balance is important to ensure we retain your expertise to make a difference in freshwater science over the long term. Don't forget to take time out and recharge. In the meantime, I hope to see many of you at the conference in Christchurch.

**Kevin Collier,
President**



He Maimai Aroha – Farewells

Don Forsyth (1931 – 2010)

by Mark James

Don Forsyth passed away on 11 March 2010. For those who don't know Don he was one of a special group of New Zealand limnologists with a strong interest in taxonomy as well as general ecology.

Don always had a love of animals and this led to a job at the Auckland Zoo. From there he moved to the Department of Agriculture where he worked at the Mangere sewage treatment ponds where developed his interest in chironomids and was soon looking for ways to “solve” their midge problems. He was then persuaded to go to Bristol University where he completed a PhD. When he returned to New Zealand he joined DSIR at Mt Albert and then in Lower Hutt before moving to Taupō in 1985 and the Ecology Division of DSIR as it was known then. Without moving office he worked for the DSIR Freshwater Division and then DSIR Marine and Freshwater.

At the DSIR in Taupō Don carried out extensive work on lake benthic ecology and zooplankton, including geothermal faunas, the effects of cyanobacteria

toxicity and fish predation. His real interest though was in chironomid taxonomy, describing at least three species and having one species named after him – *Naonella forsythi*. Unfortunately he retired and because of ill health was not able to complete a monograph with keys to the New Zealand species of chironomids. Throughout his working life Don was a

highly valued colleague and, to myself and many others, a mentor. Whether it was in the field, peering down a microscope or writing papers and reports, Don's experience was invaluable. Field trips were always entertaining whether he was diving into the water to retrieve glasses, looking for yet another messenger for the

sediment grab (having lost several already that day), chasing midges around the edge of the lake or releasing pigeons before heading home.

Don was very active in the Limnological Society as it was known then, where he served as Secretary-Treasurer from 1980-82 and was made an honorary life member. Don passed away at the Liston Heights Rest Home in Taupō on Thursday 11th March. Fortunately in the 3 years he spent at Liston Heights Don had a great view



across Lake Taupō from his room, a lake which was a special part of his life and one which he made a significant contribution to the understanding of its ecological and scientific wonders. A

fitting tribute would be to rewrite the Lake Taupō book which he and Clive Howard-Williams co-ordinated back in 1983, maybe one day.



Bob Pilgrim (1922 – 2010)

by Mike Winterbourn

Bob Pilgrim began his academic career at Canterbury College where his M.Sc. thesis completed in 1947 was imposingly entitled “Studies on a freshwater mussel belonging to the genus *Diplodon spix*: with special reference to its anatomy and histology and investigations on systematics, bionomics, growth rate, feeding, digestion, and some biochemical aspects”. Subsequently, he trained and worked as a physiologist, and on returning to Canterbury as a member of staff established Physiology as a teaching and research unit within the Department of Zoology. His own research encompassed studies of the stretch receptors of crustaceans, including hermit crabs and crayfish, and osmoregulatory and neurophysiological work on molluscs. His more compelling interests were in entomology and parasitology, which he combined for much of his career by studying ticks and lice in collaboration with Ricardo Palma (National Museum of NZ) and Terry

Galloway (University of Manitoba).

Bob’s most important freshwater research was the discovery of the aquatic larva of the scorpionfly *Nannochorista philpotti*, which he studied on and off near Cass for 14 years¹. This is the only New Zealand mecopteran and the only member of the order known to have an aquatic larva. He also found and drew attention to the aquatic larvae of primitive craneflies in the family Tanyderidae, some of which were common in tributaries of the Avon not far from his house. His penchant for the unusual and unexpected was epitomized by the opportunistic study he made on light



responses of a specimen of *Pelagohydra mirabilis*, a coelenterate he found on Sumner beach and only the third specimen known!

Bob was a great admirer of Professor Percival, his initial mentor at Canterbury College, and was responsible for placing a plaque to his memory on a glacial erratic (rock) at Cass. He continued to work in the Department of Zoology (later School of Biological Sciences) throughout his retirement and had almost completed a

major work on the external morphology of flea larvae when he died aged 88.

¹Pilgrim, R.L.C. 1962. The late larva and pupa of *Choristella philpotti* Tillyard (Mecoptera). *New Zealand Entomologist* 3 (1): 2.

¹Pilgrim, R.L.C. 1972. The aquatic larva and the pupa of *Choristella philpotti* Tillyard, 1917 (Mecoptera: Nannochoristidae). *Pacific Insects* 14: 151-168.



Bertha Allison (1916 - 2010)

by Mike Winterbourn

Bertha Allison was born in 1916 and did a Masters in Botany at the University of Canterbury. Her thesis "The ecology of *Celmisia spectabilis* with short notes on the anatomy of *Celmisia* species" was written in 1940. She was appointed to

the staff of the Biology Department of Canterbury College in 1946 and was promoted to senior lecturer in Zoology in 1965. Her early career was remarkable in that she held an academic teaching and research position while married and bringing up a young family at a time when this was far from accepted practice. Bertha's early papers were published under her maiden name of Nurse, and included the only study of our freshwater flatworms². She described four new species, *Spathula limnicola* and *S. fontinalis*, *Curtisia stagnalis* and *Dugesia montana* (= *Neppia montana*), the latter with two formally designated varieties. Her *C. stagnalis* is now considered to be *Cura pinguis*, which also occurs in Australia. In 1997 she described a third species of *Spathula* from Waikoropupū Springs³. Bertha developed a strong interest in the biology of parasites, taught advanced courses in parasitology and supervised the research of numerous Masters students.



They studied the life histories, ecology and taxonomy of a wide range of protozoans and trematodes parasitic in insects, fish, reptiles, gulls and penguins.

Following her retirement from the University of Canterbury Bertha held an honorary research position at the Canterbury Museum and from there published her description of *Spathula alba*.

²Nurse, F.R. 1950. Freshwater triclads new to the fauna of New Zealand. *Transactions of the royal Society of New Zealand* 78: 410-417.

³Allison, F.R. 1997. A new species of freshwater triclad, *Spathula alba* sp. nov. (Turbellaria, Tricladida). *Records of the Canterbury Museum* 11: 43-51.

Moe mai rā koutou e ngā tōtara haemata. Hōea ō koutou waka i ngā wai rērere o Tangaroa, rere atu rā kia tae atu ki te rua o Puanga, ki reira okioki ai i te okiokinga tangata, moe mai e.

Feature articles and opinion pieces

Collaboration Works

by Claire Nesus

It is important to recognise there are at least two different world views in Aotearoa and abroad on how freshwater and freshwater fisheries should and are managed. Iwi and Māori do not distinguish lakes, lagoons, rivers, swamps, freshwater species, their associated beds, or the adjoining land as separate. They are considered part of an undivided entity. Freshwater and freshwater fisheries were once regulated by kaitiaki and tohunga, whānau and hapū as they provided vital resources for pā and kāinga.

The environment in which we currently operate in is a stark contrast and iwi Māori have to navigate through a myriad of rules to undertake their responsibilities. Under the Resource Management Act 1991 (RMA) regional councils have the primary responsibility for managing water including decisions regarding allocation, use of water and discharges.

For freshwater fisheries the environment is different. Tuna for instance is in the quota management system and is managed by the Fisheries Act 1996 where the requirement is to hold a permit and quota and/or an annual catch entitlement. To undertake aquaculture relating to tuna a

license under the Freshwater Fish Farm Regulations 1993 is required as well as a resource consent under the RMA and the approval from the Minister of Conservation if you want to transfer wild eels to a fish growing-on facilities.

The conflicting positions of Māori and Pākehā can create a tension between these two world views as the imposition of a statutory regime has meant the interconnected Māori model of river, lakes, swamps, lagoons, river/lake beds and the adjoining land has been fragmented and replaced.

Given this is the environment in which we operate, however, how best can iwi Māori work to achieve their own aspirations for their freshwater resource? What is a pragmatic approach to ensure the protection, sustainability and enhancement of the freshwater environment?

A solution could be through leadership at the hapū or whānau level, being clear on the aspirations and making this environment work through collaboration, identifying research needs and information gaps. Whakakā Lake Trust is an example of this.

Their vision included restoration of their wetland, a secure economic future and provision for future generations. The project started in 1996 with the restoration of the natural flow of the main Rāhui River flowing from the Whakakā Lake and opening it back to the sea. It has not been without its challenges but Whakakā has worked tirelessly to restore the lake working collaboratively with central and local government agencies, non-government

organisations, science providers and other interest groups.

As a result there has been a rapid regeneration of the ecology of the lake and its environs. Whakakī has intertwined the traditional management with the scientific while working within the complex regulatory framework.

There are whānau and hapū groups that continue to protect and enhance their freshwater, freshwater species and the adjoining land regardless, recognising that

restoring habitats is the foundation upon which fisheries can develop. I recognise that this was not an easy undertaking on behalf of Whakakī or any other hapū or whānau seeking to realise their own aspirations and ensure their interests are protected. Yet this illustrates that a hapū or whānau working resolutely to achieve their vision of habitat protection and enhancement to ensure the restoration and sustainability of their waterways can do so within a complex environment.

Claire Nesus has a Masters in Marine Science and works as a Project Manager for Freshwater with Te Wai Māori Trust, working on policy, research and development, and operations. We asked Claire to provide an opinion piece on freshwater issues from a Māori perspective.

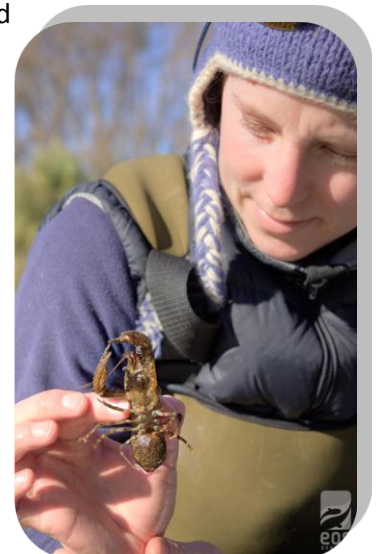
Attaining the impossible: Maintaining biodiversity in our urban streams

by Shelley McMurtrie

The glossy development brochures sell us the dream—meandering streams and lakes with crystal clear water and leaping fish, with your dream home and urban necessities mere metres away. Yet the reality is far from this utopia—stormwater run-off from the large impervious areas in urban catchments flows into our streams and causes their eventual demise. This decline in stream health and biodiversity is so globally

consistent it is now coined the ‘urban stream syndrome’.

With the discovery of a springfed rural drain supporting a nationally important native freshwater crayfish (kōura) population in an area of Rangiora planned for residential development, we had to consider ‘out of the box’ solutions for the Waimakariri District Council (WDC) in an attempt to avoid the seemingly inevitable ‘urban stream syndrome’. To have any hope of maintaining or even enhancing the biological integrity of this stream in the face of urban development we needed to deviate from the usual approach to the design and management of urban streams. As such, maintaining ecosystem processes had to take a more prominent role in the design and management process, rather than the more traditional approach of primarily designing for stormwater, channel



Getting up close with a kōura.
Photo: Shelley McMurtrie

stability, and landscaping amenities.

Ecosystem processes in the Rangiora springfed stream are driven by the presence of high numbers of native kōura, which through feeding and activity provide food and habitat to other animals in the system. As such the protection and enhancement of the kōura population is a core requirement for maintaining this unique springfed system. To improve conditions for the kōura, channel design for realigned sections was based on determining their optimal habitat; vertical earth banks for kōura burrows, lots of in-channel woody debris for food and cover, aquatic plants in more open areas for juvenile kōura habitat, and very stable flows. These features are not compatible with stormwater inputs (erosion and flooding being the eventual outcome), which cemented our decision to protect the integrity of the system by isolating it from the future stormwater network.

Biological interactions play an equally significant part in ecosystem functioning and so also require consideration in the design process. In particular, the success of a native fauna haven is dependent on protection from introduced predators; in

this case brown trout. The lack of any known fish barrier that excludes trout but allows the passage of other fish species has led us to design a structure that should prevent trout from swimming up while at the same time encourage the climbing skills of the native fish found in this



Electrofishing for kōura as part of the pre-restoration monitoring. Photo: Shelley McMurtrie



Kōura density in this springfed stream is unusually high – up to 23 per m². Photo: Shelley McMurtrie

stream (e.g., lamprey and eels).

A design process oriented around ecology certainly does not exclude the need for engineering and hydrological considerations. Indeed, in all aspects of the design process the synergy between ecological experts and engineering is central to success, with industry engineers providing the detailed design and construction plans that realise the ecologist's biological design requirements. In this instance the support of the WDC was also key, as without their support these more novel solutions could not be implemented.

Protection and enhancement of this unique springfed system in the face of urban development will be of benefit not only to this country's conservation of spring systems, but also to the future local urban community by providing residents 'on the doorstep' access to a piece of nature and iconic animals that most urban streams can no longer support. From an ecological aspect this project provides us with the opportunity to really see if maintaining a stream's ecological integrity is truly compatible with urbanisation in the long term. If we find this project successful it may well change the way we approach stormwater catchment management and may see us achieve the much lauded but rarely attained goal of maintaining biodiversity of our urban streams.

Shelley McMurtie established EOS Ecology with partner Erron after spending time working at both NIWA and the Christchurch City Council. Recognising the valuable role high-end research should play in the management of our natural systems, Shelley is driven to enhance our freshwater and estuary ecosystems for the benefit of our communities.



At this size, fingerling trout are no threat to kōura, but as they grow they will become effective kōura predators. Photo: Shelley McMurtie

The Ethics of Native Fishkeeping

by Stella McQueen

While writing my book, *The New Zealand Native Freshwater Aquarium*, I felt highly conflicted over the ethics of it: I was effectively encouraging people to take threatened native animals out of the wild to have as pets.

Eventually I came to two conclusions. One was that some people were keeping them anyway, and, without any resources available, each person winds up independently making the same mistakes. (Indeed I started writing it as I was frustrated at the lack of information available to me on keeping native fish). However much more importantly: native fish are fairly invisible to the general public, and ‘sacrificing’ a few individuals from wild populations for aquarium curiosities has huge benefits in

terms of public education and awareness of our native fish and freshwater ecosystems. This was most strongly brought home to me when a keen new native-fish-keeper looking for a koura showed on a forum just how disgusting (and koura-free) his local streams turned out to be. He simply hadn’t had a reason before to notice or care about his local streams.

In my book I encourage people to recreate natural habitats in their aquaria. Seeing the fish in natural-looking surroundings helps people recognise the importance of looking after our waterways. Watching bullies zip in and out from underneath rocks makes it immediately clear why sedimentation of rivers is a bad thing. Aquarium owners quickly learn that algae is the result of high nutrient levels, just like in our streams.

Another aspect to consider is how to reduce the effects of removing fish from wild populations. It is essential to remember that many of our native fish are in decline and to be aware of the local and regional statuses of the different species so as to not further deplete any at-risk populations. Taking only juveniles has much less of an impact on the population and they adjust much more readily to aquarium life.

There are also legal considerations to keep in mind – for example, fish must never be released into waterbodies without a permit, even if it is back to the place they came from.

In the end, habitat degradation and loss are the greatest current threats to our native fish fauna. Bringing some species out into the open as aquarium fish raises not only the profile of the species, but also of the importance of conserving their freshwater habitats.



A male redfin bully at home in his tank. Photo: Stella McQueen

Stella McQueen, who is studying for her MSc at Massey University, has long kept native fish and has a raft of aquaria at her home in Palmerston North.

The Control of Aquatic Weeds in Farm Dams

By Ingleby Cox

The OECD Environmental Performance Review of New Zealand 2007 draws attention to the low standard of freshwater in New Zealand, and the difficulty of limiting diffuse pollution of surface waters. Water quality in rivers and lakes has declined in regions dominated by pastoral farming, where high nutrient inputs and microbiological contamination destabilize natural ecosystems and pose risks to human health. This does not reflect well on our reputation as a 'clean green' tourist destination, or as the producer of high quality agricultural products for export.

The improvement of water systems may be tackled in a variety of ways, including

restriction of industrial and agricultural pollution, and preventing and reversing eutrophication.

Agricultural pollution occurs when the livestock have access to water bodies, or when nitrogen from the dung and urine washes into rivers and dams, or when soluble and mobile fertilisers are used to excess. This may be controlled to some degree by reducing stocking intensity, fencing off streams and dams and having vegetation at the edge of the water to filter out sediment and soluble pollutants, and limiting the application of fertiliser.

Excess levels of nutrients in the water can result in strong aquatic weed growth, and in extreme situations (as in Lake Ōmāpere, Northland) they may become eutrophic, with very low oxygen levels, the development of anaerobic algal blooms, and cyanobacteria.

Attempts may be made to control aquatic weeds by a variety of methods. These include bottom lining, mechanical clearance, habitat manipulation, chemical herbicides, the use of suction, and the use of fish. Which method (or combination of methods) is most economic, most effective,

and most environmentally appropriate depends on the circumstances of each particular case.

Sediment will build up on the black plastic sheet used in bottom lining, providing a substrate for weed growth. Pond linings may also tear or disintegrate in some circumstances. Mechanical clearance is expensive, and has a number of disadvantages such as increasing the size of drains and disturbing silt.

Habitat manipulation by changing the level of dams is not always possible if the water is required for year-round stock watering. Chemical control with diquat (Reglone®) can be effective if used according to the NIWA recommendations when it will do little harm to the native aquatics and benthic fauna, but is expensive and requires repeat applications every six months. It is also hazardous to the operator. Suction to remove the weeds and the nutrient-laden sediment on which they grow is expensive, and requires specialized equipment.

Grass carp eat macrophytes and are effective control agents. They consume the weed growth resulting from the nutrient enriched water, and have the potential to eliminate exotic pest weeds. Balance is needed so the fish control but do not eliminate the water weeds. Their metabolism slows at the colder part of the year, when the growth of the weeds is also at a low level. As they grow bigger they eat more weed, and it may be necessary to either feed them with grass clippings, or to de-stock and replace them with smaller fish.

When the fish eat the weeds 55% of the weed is locked up in their growth, and 45% released back into the water. If the fish are removed from the water the nutrients, (which cause the initial excessive growth of the weeds), are removed too, thus lessening the problem of weed growth in the future. Fish have to be netted to remove them from the water. They may be eaten locally, or there is a potential market for these fish among the Asian Community in Auckland.

Permits are required to transport, hold and use the fish for food for commercial use.

Silver carp live on algal blooms and phyto-plankton, and are important in the removal of cyanotoxins which can pose a health risk to both animals and humans. Their efficacy is not as well proven as that of grass carp removing macro flora.

Carp have been present in New Zealand since 1966, when they were introduced by Auckland University, and were used by MAF for experimental weed control. They appear to have caused no problems here, or in the 60 or so other countries into which they have been introduced. They do not damage the habitat for other native aquatic life. They cannot breed in the wild even if they were to escape.

In my opinion, questions arise as to their status after such a long period with no obvious problems. Should they continue to be classified as 'restricted' after 42 years of 'experimental' use? Would it not be sensible to allow them to be more easily available to farmers to use as an environmentally sustainable weed control option? Farmers would purchase fish at their own expense, and introduce them into farm dams which are not connected to existing river systems and have outlets protected by wire netting. This could turn the problem of the eutrophication of the farm water supplies leading to poor or dangerous stock water into an opportunity to keep the water clean, have fish to eat and the resources to buy more small fish.

It is not envisaged that all controls should be removed, but introducing a simpler process – more like the issuing of Game Licenses. Fish and Game (or DOC) could inspect the facilities, and then authorize the farmer to buy a certain number of fish. As they grow bigger they will consume more weed, and eventually could eat themselves out of house and home. This would be the time to harvest some of them, which could be eaten or sold.

They need names that would distance them from the notorious and noxious koi carp. 'White amur' is already used in many parts of the world, and would give a good positive identity and an easily memorized name for *Ctenopharyngodon idella* or grass carp which eat macro aquatic weeds. *Hypophthalmichthys molitrix* or Silver carp which eat algal blooms and phytoplankton could be simplified to 'Silver amur'. Names which have been suggested by Māori are 'amure'. This links in with the snapper which is 'tamure'.

Hornwort (*Ceratophyllum demersum*), which is becoming an increasingly significant problem weed in Northland waterways would be controlled by 'white amur'.

These ideas are being passed in front of people in the Ministry of Fisheries, the Regional Council, Fish and Game and DOC. Other people who have the chance to have input into the granting of consents at present are the local iwi, neighbours and the general public, and they should be consulted too.

Your comments and advice about the next step to remove the restricted classification of these fish are welcome.

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Ingleby Coxe is a past member of NZFSS. A graduate of Massey, the Open Polytech and Lincoln, she is a passionate farm forester who loves experimenting with various trial plantings. She enjoys passing on her learning to other farm foresters and the local community.

An Ethical Society

By Jon Harding

At the last AGM meeting the members briefly discussed the idea of developing and introducing a code of ethics or principles for the membership. A number of professional societies have these. The Royal Society, for example, has developed an extensive code of ethics which our society could adopt.

One purpose of a formal code might be to explicitly state the expectations of professional conduct of the Society's members. However, the adoption of a Code

might also imply the need for some mechanism to deal with complaints or potentially serious breaches of the code. There has been a recent example of this in the Royal Society where a "Fellow" has been subjected to disciplinary action due to falsifications in a Marsden Grant.

The following is a list of typical principles we might choose to adopt, modified from ESA's code.

Members will:

1. Offer professional advice and guidance only on those subjects in which they are informed and qualified through professional training or experience.
2. Not plagiarize in verbal or written communication, and make every effort to avoid misrepresentation.
3. Not fabricate, falsify, or suppress results, deliberately misrepresent research findings, or otherwise commit scientific fraud.
4. Conduct their research so as to avoid or minimize adverse environmental effects of their presence and activities.
5. Not discriminate against others, in the course of their work on the basis of gender, sexual orientation, marital status, creed, religion, race, color, national origin, age, economic status, disability, or organizational affiliation.
6. Not practice or condone harassment in any form in any professional context.
7. In communications, clearly differentiate facts, opinions, and hypotheses.
8. Not seek employment, grants, or gain, nor attempt to injure the reputation or professional opportunities of another scientist by false, biased, or undocumented claims, by offers of gifts or favors, or by any other malicious action.

Questions arising out of this that would be helpful for the membership to consider:

- Do you believe that the Society needs to adopt a code of ethics?
- What do you see as the main purposes of such a code?
- How might complaints about breaches of the code by individuals be dealt with?

A Discussion group is available on the Society's forum. Please feel free to contribute your views. There will be also be a poll conducted at the 2010 Conference in Christchurch. Specific views can also be made directly to Jon Harding (jon.harding@canterbury.ac.nz).

Student News

By Kristy Hogsden

It was great to meet so many of you last year at the conference in Whangarei. Conferences provide a great opportunity for us to showcase our work and to meet other students and perhaps future supervisors or colleagues. This year's conference will include a few new student events we thought you should know about. There will be a student–mentor lunch to provide you with an opportunity to meet with a professional or an academic and discuss your career aspirations and/or research interests. If you are not sure who you would like to lunch with or what you would talk about, don't worry! All mentors will be linked with a topic, for example, how to get a job in consulting or going overseas to do a post doc. You will be able to sign up at the registration desk when you arrive at the conference. We'll also have a Pub & Quiz night – a fun night out at the Running Bull pub in Christchurch. Take this chance to get to know students from other universities and test your general knowledge skills. Good food, good beer, and good fun! You may have also heard that the NZFSS is offering a new award for the best student paper published in freshwater sciences in the year preceding the conference. This is your chance to be the first winner of this award. For more information and to see if you are eligible check out details on the NZFSS website (<http://limsoc.rsnz.org/index.php/students/>).

I am always happy to hear from you. Let me know if you have any questions, concerns, or suggestions related to student involvement in the society. You can contact me at: kristy.hogsden@pg.canterbury.ac.nz or 03 364 2987 ext. 7070.



Photo: Ian Reeves

Chironomid News

by Ian Boothroyd

New genera and species have been added to the New Zealand chironomid fauna list in recent years; these are briefly outlined below. In addition a review of *Eukiefferiella* is anticipated, and a chironomid larval key is almost complete.

New Tanpodinae genus record

The larva of a new species of Tanypod, *Monopelopia* Fittkau 1962 has been figured and described by Blakely et al. (2010). This species was found in artificial water-filled containers attached to red beech trees, and the genus is known to inhabit small, boggy and often acid waters including dystrophic ponds and lakes. *Monopelopia* belongs to the tribe Pentaneurini and brings to four the number of genera known to this tribe of tanypods in New Zealand (*Ablabesmyia* Johannsen, *Larsia* Fittkau, *Monopelopia* Fittkau and *Zavrelimyia* Fittkau).

Commensal chironomid revealed

Commensalism is common amongst chironomids and New Zealand has several species that make use of hosts amongst the Ephemeroptera, sponges and Diptera. One previously described species of commensal chironomid, *Dactylocladius commensalis* was described from adult material by Tonnoir in 1923. The type specimen has not been recovered and the taxon is therefore of uncertain identity and has been treated as a nomen dubium for taxonomic purposes. Using fresh material Cranston 2007 has renamed the taxon *Tonnoirocladius commensalis* (Tonnoir, 1923) and shown how it is closely related to certain austral Orthoclaadiinae; *Kaniwhaniwhanus* Boothroyd, *Botryocladus* Cranston &

Edward, *Pirara* Boothroyd & Cranston, and especially *Naonella* Boothroyd. *Tonnoirocladius* is found commensal with the blepharocerid dipteran larva *Neocrupira* Lamb in cool fast flowing mountain streams.

Trans-Tasman Anzacladius Cranston

A new genus of Orthoclaadiinae named *Anzacladius* Cranston has been described by Cranston (2009). *Anzacladius kiwi* has been described from both North and South islands of New Zealand, along with two new species from Australia, *A. numbat* and *A. kangaroo*. Phylogenetic studies indicate a close relationship with *Naonella* Boothroyd. *A. kiwi* is known from both lotic and lentic environments.

Austral Stictocladus

Stictocladus Edwards was first described as a subgenus of *Spaniotoma* from adult material collected in Patagonia. Now recognised as a distinct genus, two species, *S. lacuniferis* (Freeman) and *S. pictus* (Freeman), occur in New Zealand. Cranston & Saether (2010) present an updated diagnosis of the genus and describe the Australian and New Zealand species. The New Zealand species appear to be hyporheic.

Review of Eukiefferiella

Several other descriptions of new genera and species are underway by Ian Boothroyd. Amongst these descriptions will be new species of the orthoclad genus *Eukiefferiella* Thienemann. Currently three species of *Eukiefferiella* are known from mainland New Zealand and the Antarctic Islands; four more species will be added to that list.

Key to larval genera of Chironomidae

Ian Boothroyd has almost finished his identification guide to the larval genera of New Zealand Chironomidae. The key with line illustrations will include the new genera outlined above, as well as existing and as yet undescribed larval types.

References cited

Blakely, T.J., Cranston, P.S., Winterbourn, M.J. 2010. Container-inhabiting *Monopelopia* larvae (Diptera: Chironomidae: Tanypodinae) newly recorded in New Zealand. *New Zealand Entomologist* 33: 38-42.

Cranston, P.S. 2007: The identity of *Dactylocladius commensalis* (Diptera: Chironomidae) revealed. *Aquatic Insects* 29: 103 – 114.

Cranston, P.S. 2009: A new genus of trans-Tasman midge: *Anzacladius* gen. n. (Diptera: Chironomidae: Orthoclaadiinae). *Australian journal of entomology*, 48: 130-139.

Cranston, P.S., Saether, O. 2010: Australasian *Stictocladus* Edwards (Diptera: Chironomidae) diagnosed and described. *Australian Journal of Entomology* 49: 126-144.

Macroinvertebrate Taxonomic Fair at the Freshwater Sciences Conference

Got any unusual specimens? Anything you want a second (or first) opinion on? Bring them along to the Conference!

We will be running a **Macroinvertebrate Taxonomic Fair during the Poster session at the conference. At the Fair we will have a group of experts who can have look at your weird, wonderful or just unknown specimens. We will also have examples of many rare species, new species and the latest in name changes.**

Bug of the year – Anisopodidae

by Stephen Moore

This odd dipteran has appeared in several recent stream invertebrate samples from around the North Island. At first glance it appears chironomid-like, given the general body and head shape. However, the lack of prolegs and some head characteristics are more like features of the Ceratopogonidae. This larva has hair-fringed lobes on the posterior segment, and some ceratopogonids have posterior lobes.

Images taken with the Landcare Research Automontage photomicroscope system were emailed around several dipteran experts in New Zealand, Australia, Canada and the USA. Different experts made very tentative suggestions that this was a chironomid, ceratopogonid, or an odd psychodid, but eventually a USA dipteran guru suggested the Anisopodidae (“wood gnats”). The prominent mouthbrushes, five-lobed posterior segment, head capsule being membranous postero-ventrally, setose labrum, and oblique rotation of mandibles all point to the anisopodids. A quick Google search found images of a very similar looking larva in the genus *Sylvicola* (known to occur in NZ). Once this suggestion was made, all experts agreed the images were consistent with this family.

Anisopodids belong to the suborder Nematocera, along with the chironomids, ceratopogonids, craneflies and mosquitoes. Most nematocerans are truly aquatic, but anisopodid larvae are probably only semi-aquatic, living along stream margins in moist, decaying plant matter. Stream invertebrate sampling involving jabbing or sweeping nets under stream bank vegetation could easily collect moist decaying vegetation including anisopodids. The specimen photographed was found in a bush-covered stream sample from the Coromandel.



Research News

Aquanet Consulting Ltd

The last twelve months have been very busy indeed for **Olivier Ausseil**, with a wide array of projects. In late 2009, he undertook a review of Environment Southland's State of the Environment (SoE) water quality and aquatic ecosystems monitoring programmes. Environment Southland's Regional Freshwater Plan is now fully operative and a particular focus of this work was to rationalise the location of monitoring sites to ensure that the data collected is able to inform essential regional council processes such as SoE reporting, but also policy development, regional plan effectiveness monitoring and plan implementation.

In March this year, Olivier conducted a caging study upstream and downstream of a discharge of treated fellmongery effluent to the Manawatū River. The setup involved out-of-river containers, continuously fed with pumped river water, with smaller enclosures containing *Potamopyrgus* snails and *Paratya curvirostris* freshwater shrimps.

Hawke's Bay Regional Council asked Olivier to develop a ranking system for discharges of contaminants to land and water to define S36 administrative charges on resource consent holders. He is also currently undertaking a review of all information available on stormwater discharges and their effects on the receiving environment, the aim being to produce a "state of knowledge" report to inform policy development.

He is putting the final touches to a report commissioned by Greater Wellington Regional Council, analysing the nutrient status of the region's rivers and streams, based on regional SoE data. This report is being prepared as part of a series of technical reports to inform and support the development of the region's second generation plan. Within the same series of technical reports, he will be producing a bunch of reports making recommendations for water quality "targets" to protect a range of stream and river values.



Experimental setup used for the Manawatū River caging study. Photo: Olivier Ausseil

He was also asked to peer-review a few technical reports, including Greater Wellington's Mangatarere water quality



Shrimps (*Paratya curvirostris*). Photo: Olivier Ausseil

investigation and Environment Southland's SoE water quality report *Our Health*.

There is a lot to report on the resource consents front, where Olivier has acted on behalf of consenting authorities, applicants and submitters on a number of consent applications for discharges of wastewater, urban and industrial stormwater and windfarms. In July this year he ran a training workshop for Horizons science staff on the technical assessment of resource consents. Finally, Olivier got his Hearing Commissioner's ticket in March this year – a very useful course, highly recommended for anyone acting as an expert witness.

Auckland Regional Council (ARC)

State of the Auckland Region report 2010

For the best part of the last two years the above report has been virtually all-consuming for the Monitoring and Research Group at ARC. The report was publicly released in March 2010 and follows an internationally recognised state of the environment model; the report defines the drivers of environmental change (namely human activity), the pressures these activities place on the environment, the state of the region's natural resources and how they are faring under the pressures, and ARC's responses.

The full breadth of ARC's environmental monitoring work has been used in the preparation of this report and it is the leading resource on the state of the region's air, land, freshwater and marine resources. It substantially updates and increases our shared understanding of the state of the environment and is available from ARC's website. In conjunction with the release of the report, a new website was launched to provide an up-to-date internet platform for ARC's monitoring data (<http://monitorauckland.arc.govt.nz>).

The BCI (Bacterial Community Index)

This project aims to test and then develop a method for assessing river health using the bacterial component of biofilms. It was an unsuccessful Envirolink application in 2009, but 7 Councils have collectively funded the work after an inspiring presentation by Gavin Lear (University of Auckland) at the 2009 Freshwater Sciences conference. The project has been progressing well, with 246 sites sampled by the 7 participating Councils and analysis being conducted by the team at the University of Auckland.

Ecosystem metabolism

ARC has contracted Cawthron to analyse, interpret and review the data that has been collected from a network of 13 continuous oxygen sensors that have been deployed since 2003.

Impervious surfaces

ARC has contracted Landcare Research to provide an assessment of the region's impervious surfaces using satellite imagery. This will serve to improve the understanding of the effects of this pressure on the environment and how it has changed over time.

The Supercity

With the creation of the Supercity, ARC ceases to exist. Its work is being subsumed into the new Auckland Council. As a result of this restructure, the review and development of ARC's statutory documents is on

hold. The impact of this restructure on freshwater monitoring and research in Auckland is uncertain, but should become clear shortly.

Bay of Plenty Regional Council

Water Sustainability Strategy (western Bay of Plenty)

The Strategy has been developed to address the future demand for water in the western Bay of Plenty sub-region for domestic, agricultural and horticultural use. Developed with territorial land authorities, industry groups, interest groups, local growers and tangata whenua, the Strategy has three key outcomes:

1. collect and share good information
2. balance water demand and supply (ie smarter collection, storage and use of water)
3. encourage and support effective relationships – we need to work together (ie establish Water User Groups) to enable shared knowledge and responsibility for water.

Operative Regional Water and Land Plan

There were a number of changes to and developments with our regional plan, including:

- all new groundwater bores now require resource consent
- nutrient capping on the Lake Ōkaro & Lake Ōkareka Catchment has been withdrawn
- a review found that nutrient capping and nutrient reduction in catchments in the Rotorua Lakes areas is needed
- a number of issues regarding water quantity and allocation have been identified, including current limitations of provisions for consent processing and a lack of certainty as to what is required of water users
- SOE monitoring for the rivers water quality has been reported using trend analysis tools using the NIWA TRENDS software and lakes reporting has been completed using the Trophic Level Index national protocol.

Instream minimum flow requirements

We are currently evaluating how environmental flows should be determined, with work being conducted on the flows needed for “non-ecological values” ie recreational, landscape and cultural values so that these elements can be included in the Regional Plan.

Treaty settlements

The Ngāti Manawa treaty settlement was ratified in December 2009 and includes Statutory Acknowledgements for the Rangitaiki, Whirinaki, Horomanga and Wheao Rivers. The settlement also provides a framework for co-management of the Rangitaiki River starting with the establishment of a water forum comprising representatives from Council, Ngāti Manawa, other river iwi and river users.

Consents

It has been a busy time for consents and scientific staff, with major applications being received and going to hearings. These include the Tarawera Pulp and Paper Mills discharge consents for which **Stephen Park** has done light and water clarity studies and well as ecological surveys. Waste water treatment plant consents and Comprehensive Stormwater Catchment consents are also being evaluated and providing challenges for staff.

Groundwater evaluations

Groundwater Evaluations have largely been completed for the western Bay of Plenty. We are looking at adding exploratory bores to major aquifers and adding two lysimeter stations to research recharge. Ground water evaluation for the lower Rangitaiki Plains has been completed in parallel with Whakatāne District Council (under the Community Irrigation Fund).

Exploratory drilling of Ōpōtiki Plain gravel aquifers will soon occur. Continued development of a Tarawera groundwater model will be supplemented by drilling of four sites to provide groundwater flow and quality information.

Freshwater ecology and water quality

Matt Bloxham and the LakeSPI and weed surveillance teams have discovered a large hornwort incursion in Lake Ōkātina. A lake cordon placed in Lake Rotomā, which is hornwort-free, appears to be working well and further cordons are planned to reduce the spread.

Matt has also been busy with a kōaro restoration programme in some of the Rotorua streams where the populations are on their last fins. His team have been developing a trout barrier that will limit trout extent in kōaro habitat. Whitebait spawning site restoration has also been occurring in some reaches in the Eastern Bay. There has been some focus on looking at turning rock riprap into spawning grounds.

Rotorua Lakes Programme

A monitoring buoy is planned for Lake Rotoehu and, like the three other buoys deployed in Rotorua Lakes, will be equipped with temperature, dissolved oxygen and chlorophyll-a sensors. A trial on harvesting of wild algae from the Ōhau Channel, the outflow of the eutrophic Lake Rotorua, has just been completed using Aquaflow harvest technology. Modelling work in conjunction with the University of Waikato continues on the Ōhau Channel wall to determine the impact on water level changes, as the lake outlet flood gates require consent renewal. A trial is being set up to test sediment capping of a variety of phosphorus adsorption products. University of Waikato will also be undertaking some modelling work on the impact of aeration in some Rotorua Lakes.

The GIS nutrient model ROTAN has now been calibrated to provide nutrient inputs to Lake Rotorua for various land uses according to time scale. The initial work has looked at four key scenarios ranging from zero land-use change, or existing, through to up to 350 tonnes of nitrogen removed from the catchment.

A de-nitrification trial is being implemented at Tikitere, including a pilot bark de-nitrification bed to reduce the N-load of the ammonium-rich outflow from the Tikitere geothermal field to the lake.

Cawthron Institute

The River Doctor

Roger Young hit the headlines during last year's conference with revelations about the health of the Manawatū River. He's spent plenty of time during the rest of the year trying to get the facts of this story more clearly presented in the media, and at the Proposed One Plan hearing on behalf of Horizons Regional Council. Roger has also continued his involvement with the Integrated Catchment Management (ICM) research. A workshop celebrating 10 years of the ICM programme was held in April and attracted a large number of delegates from throughout the country. Papers from some of the ICM work are being

prepared for a special issue of the New Zealand Journal of Marine and Freshwater Research that will come out next year. Roger has enjoyed working with **John Quinn** and **Mal Green** on FRST proposals relating to Aquatic Ecosystem Rehabilitation and Cumulative Impacts of Stressors and is looking forward to some exciting collaboration. He has also been working with **Joanne Clapcott** on stressor gradient work and the Envirolink Sedimentation Tools project, **Kati Doehring** and **Martin Neale** on rates of ecosystem metabolism in Auckland streams, Kati and **Trevor James** on a review of TDC's surface water quality data, and Kati and **Mike Thompson** on relationships between flow and DO dynamics in spring-fed streams.

In-stream flows in Rainy River

John Hayes is continuing research in the Rainy River on the effects of flow variation on juvenile brown trout. He has been writing up FRST and Fish and Game funded research on rainbow trout flow requirements and bio-energetic models (together with **Joe Hay** and **Iain Maxwell**). He also collaborated with NIWA, writing proposals for the latest FRST ecosystem funding rounds and gave evidence for the Wairau hydro power development environment court appeal hearing and the Mōkihinui hydro power development resource consent hearing. John has also been involved with the Central Plains Water irrigation scheme. Last but not least, John attended the 'International Symposium for Advances in Population Ecology of Stream Salmonids' in Spain (May 2010) and said it was one of the best conferences he has been to. Our greatest thanks go to "Mademoiselle GARMIN", as John called his hired navigation system, who so effortlessly helped John to find his way around Europe and finally back home.

Joe Hay has spent most of the last year assisting regional councils (including Greater Wellington, Horizons, and Environment Southland) with advice on in-stream flow requirements to maintain habitat and fisheries. He presented evidence at Horizons' One Plan hearing, contributed to a feasibility study for a proposal to augment flow in the Wairoa/Waimea River system (and irrigation on the Waimea Plains) through construction of a water storage reservoir in the Lee River, and assisted Nelson City Council with a project to restore fish passage in a local stream feeding from a catchment with a community-initiated wildlife sanctuary.

Water allocation from A to Z

Other than trying to stop a 'bush' fire burning down his house in January, **Dean Olsen** spent most of the last 12 months preparing and giving evidence for the Wairau, Arnold, Upper Waitaki and Nevis hearings. In between, his research mainly focused on the ongoing study about juvenile trout at the Rainy River and on FRST funded water allocation issues.



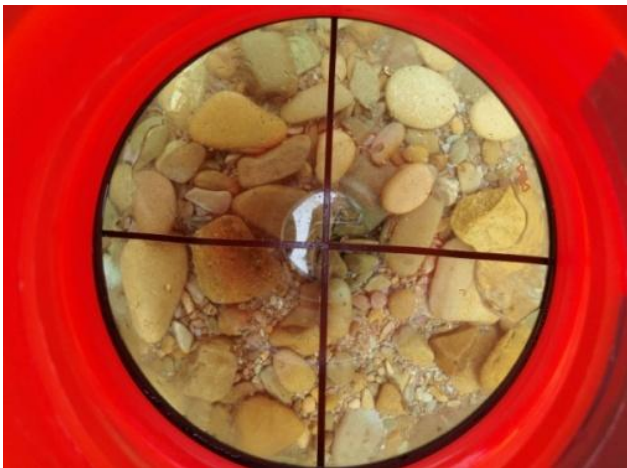
Water allocation issues even at home: Dean's daring attempt to save his house from a fire in January.

The group is growing...

One of **Joanne Clapcott's** major achievements over the last year was the safe arrival of her son Fergus in April. On the work front, Joanne has been working closely with Roger, **Eric Goodwin**, **John Leathwick** and **Dave Kelly** on additional outputs from the CDRP (Cross Departmental Research Pool) project on



Kati Doehring using the periphyton viewer (one of the five sediment protocol methods) to assess fine particle sedimentation. Photo: Joanne Clapcott



A viewer's perspective. Photo: Kati Doehring

human stressor gradients and river integrity. Predicted reference conditions for a wide range of river integrity indicators (water quality, MCI, and functional indicators) are now available for all river segments in the country. This work has already been applied in the Wellington Region with **Summer Warr**. Joanne is also working with **Scott Tiegs** from Oakland University on an international meta-analysis of cotton breakdown rates in streams, with the aim of standardizing the material used for river health assessments. **Emily Benson**, Joanne's MSc student at the University of Alaska, has just completed her thesis on ecosystem metabolism and invertebrate communities in the Chena River. Jo has also been working with a bunch of others on an Envirolink Tools project relating to sedimentation and in-stream values. Regional Councils have been busy trialing a range of protocols over the summer that could be used to assess sedimentation on river beds. Standard protocols and guidelines on what the measurements mean in terms of in-stream values will be developed later next year.

Our group recently grew even bigger with the arrival of **Robin Holmes'** child. Work wise, Robin has been intensively involved with the PIT-tagging of 1000 juvenile trout in the Rainy River to assess the movement and mortality rates in relation to flow. Robin will be occupied with this project most of next year as tracking and monitoring of these trout will

occur over a full year.

And the group is still growing ...

Kati Doehring joined Cawthron in December 2009 after completing her MSc at the University of Canterbury. She has synthesized research on the suitability of Dual-Frequency Identification Sonar (DIDSON) to monitor whitebait movement at tidegates and assisted Roger Young and Joanne Clapcott with a wide range of projects, including the Envirolink Sedimentation Tools project and water quality related consulting for Tasman District, Auckland Regional and Greater Wellington Regional Councils.

Only a month after Kati joined the Freshwater Group, **Iain Maxwell** decided to leave his Hawke's Bay Fish & Game manager position behind to join us as a freshwater ecologist. He'll be mostly working together with John Hayes and Joe Hay on water allocation and fishery related projects.

Aaron Quarterman continues to assess the capability of DIDSON for mobile fish counts as an alternative to drift diving in large and/or turbid rivers. Aaron was also involved with setting up the PIT-tag station at the Rainy River.



“There was one!” Iain Maxwell and Aaron Quarterman look out for big fish in the Motueka River with the DIDSON cataraft.

Go Karen Go!

Karen Shearer (gold medal winner) has been involved in a variety of research this year, which has made a nice contrast to freshwater monitoring and compliance projects. She is currently working with Hawke’s Bay Regional Council and Hawke’s Bay Fish & Game investigating the effects of dairy farming on invertebrate drift and trout growth in the Mohaka and Taharua Rivers. Some of this work was presented at last year’s NZFSS conference in Whangarei. Karen has also been working with John Hayes and Dean Olsen on FRST-funded research seeking to better define how changes in flow affect the availability of habitat for trout and invertebrates. This work will help to fill in some of the gaps that currently exist for water flow managers trying to set environmental flows for rivers and streams. On a different note, Karen has continued to enjoy playing hockey and this year made the NZ masters team for her (young) age group. They beat the Aussies in a trans-Tasman tournament played in Australia. Yessssss!

Are there any toxic algae in Antarctica?

Susie Wood had the good fortune to spend an entire month in never-ending-daylight in Antarctica characterising the freshwater microbial communities of ice and rock based freshwater systems in several of Antarctica’s Dry Valleys. She also continues to work on a number of cyanobacteria/algae related projects including a joint project with **Ngairi Philips** (NIWA) aimed at characterizing the benthic algae/cyanobacteria of the Te Arawa Lakes, and joint projects with **Mark Heath** and **Ken Ryan** (Victoria University) and **Francine Smith** and **Sally Gaw** (University of Canterbury) investigating parameters causing benthic cyanobacterial blooms in rivers and variable regulating toxin production. Susie was also involved in the national guidelines for managing cyanobacteria in recreational waters.

Department of Conservation

Once again **Emily Funnell** has found that she has had wet feet for most of the year with a lot of her time being dedicated to the Awarua Waituna wetlands. She has been working on two key projects: One has been with **Hugh Robertson** monitoring the health and vulnerability of the macrophytes in Waituna Lagoon, and the other has been working with **Andy Hicks** from Otago University to understand the recruitment dynamics of giant kōkopu in the Waituna catchment. Andy has also been working on establishing a larval fish monitoring programme, and will continue work with the department for another season.

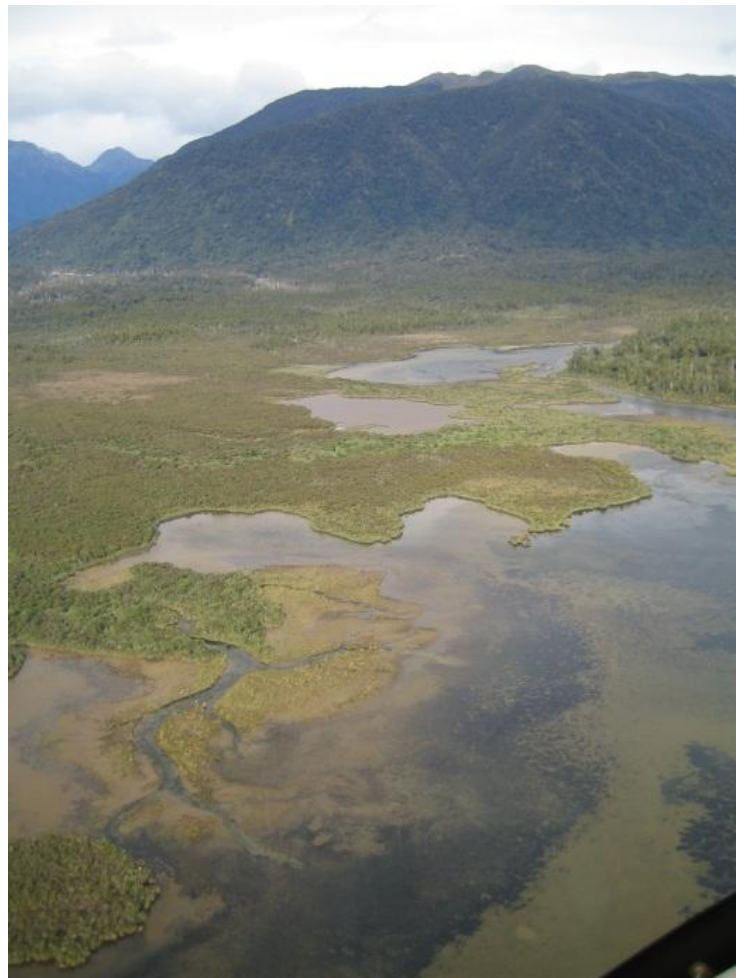
When Emily hasn't been stuck in the bog she has been advocating for the protection of freshwater fish and their habitat through the RMA and concessions process. A highlight of the year for Emily has been a trip into the Big Bay / Pyke area to carry out a rapid inventory of the freshwater habitat. She found that it is a spectacular area with some amazing swamp sequences.

Murray Neilson has been deep in policy, advocacy and RMA work. He twice presented evidence to a Special Tribunal established to hear Fish and Game's successful application to vary the Kawarau Water Conservation Order, to prevent damming of the Nevis River. He presented evidence at Otago Regional Council's hearings on their proposed changes to the Regional Plan: Water and is involved in RMA appeals against one of Otago Regional Council's plan changes and the grant of a consent to an irrigation company.

Murray has been assisting National Office's Policy Division with environmental flows and water policy issues, as well as the freshwater fisheries jurisdictional review.

Murray is currently running a series of community workshops with Otago Regional Council around setting minimum flows for a selection of Otago rivers. If that wasn't enough to keep him on his toes, Murray has also been working with the Upper Taieri Water Resource Management Group, a community water resource user group which is looking at water allocation and environmental flows issues to succeed mining privileges and deemed permits when these run out in 2021.

Murray took part in the Beaumont Station Tenure Review survey and assisted the Coastal Otago Area Office with a MesoHABSIM survey of the Kauru River. Murray benefitted from advice directly from the developer of this method, Dr Piotr Parasiewicz, who recently visited NZ and presented a workshop in Napier.



Waiuna Lagoon and swamp associations. Photo E. Funnell (DOC)

Pete Ravenscroft completed an assessment and report of inanga spawning habitat on the Mata-au Branch of the Clutha River on behalf of Contact Energy and is now assisting with the drafting of the lowland longjaw galaxias 'Management Plan'. After a recent invasion of trout into Nessing Stream in Canterbury, Pete has written up a trout removal plan in an attempt to protect the population of lowland longjaw galaxias in the vicinity. This follows the Fraser Stream spring trout removal operation, which has proven a huge success. Pete has been working on the translocation of lowland longjaws galaxias in the Waianakarua River and took part in the MesoHABSIM survey of the Kauru River with Murray Neilson. Pete has also been helping investigate the ecological drivers of didymo as part of a two year study of the Kākānui River.

Daniel Jack recently completed a distribution and abundance survey of the alpine galaxias, *Galaxias aff. paucispondylus* "Manuherikia", with the assistance of Central Otago Area staff. He is investigating the demise of Clutha flathead galaxias populations in the Lindis River catchment and looking into the viability of within-catchment transfers, with the assistance of Wanaka staff. Daniel has been conducting the annual population monitoring of *Galaxias vulgaris* and assisting Raukapuka staff with a survey of upland longjaw galaxias distribution and abundance in the upper Rangatata River tributaries. He continues to monitor lowland longjaw galaxias in the Kāuru and Kākānui Rivers.

Darin Sutherland has just completed a fish survey in Lakes Wahapo and Mapourika and their tributaries and is comparing the biodiversity and abundances of fish there. Darin assessed the affects of various hydro schemes, particularly the two proposed for the Stockton plateau. RMA and concession process work continues, including being an expert witness for a hearing on river mouth openings and providing assistance for the Department's appeal on rules regarding wetlands in the area.

A recent survey in the Repo Valley showed good numbers of brown mudfish in wetlands and streams throughout the area. Repo Valley is the highest altitude site known for brown mudfish. Darin has also been successfully PIT tagging giant kōkopu in a Lake Brunner tributary.



Lake Mapourika. Photo D. Sutherland (DOC).

Hugh Robertson continues work on the Arawai Kākāriki wetland projects, and recently visited the Ashburton Basin to assess wetland condition and ecosystem services, and Waituna Lagoon to look at macrophytes. He is developing tools to report on the ecological character of Ramsar sites.

Amy MacDonald has been involved in a number of freshwater advocacy and awareness programmes this year, including a three day long virtual wetland fieldtrip with the online education provider LEARNZ. Over 90 classrooms from around NZ enrolled in the fieldtrip, and learnt all about wetland conservation through videos, audio conferences between students and experts, and online activities. Amy also coordinated a rotenone operation to eradicate koi carp from two irrigation ponds on a Northland golf course. Gaining the required resource consent, planning the work amongst some extreme weather patterns, and having to collect dead fish that have surfaced 14 days after the treatment has been interesting, challenging and smelly. This is the first rotenone operation to be carried out in Northland so has been a big learning curve and great achievement.

Jane Goodman finished her secondment to the freshwater section of Research and Development in mid-June with **Natasha Grainger** returning from maternity leave. Jane was working on improvements to the Aquatic Life Transfer process with the Policy and Legal teams, as well as other DOC Freshwater specialists. She has also been involved with the development of a survey and monitoring toolbox supporting Conservancy and Area staff by helping to answer interesting and ‘sticky’ questions, as well as carrying out freshwater fish survey training with Ngā Whenua Rāhui staff on the East Cape. Jane has recently taken up the position of Technical Support Officer in the Waikato Conservancy.



Travis Wetland mudfish release.

Sjaan Bowie has returned from parental leave and been involved in several key pieces of work including processing a number of aquatic species transfers to new locations, running a workshop on freshwater fish identification in Canterbury and using the NZFFD, undertaking monitoring of lowland longjaw galaxias sites, providing advice and input into a number of planning proposals and issues facing Canterbury, and working towards completion of some key strategic documents with other staff and agencies, for example the Lowland Longjaw Galaxias Management Plan.

DOC Canterbury staff have had some great gains for conservation including: successfully transferring Canterbury mudfish into what is hoped will be a new freshwater location for this species at Travis Wetland; establishing a barrier and removing trout in a key threatened non-migratory galaxiid location with a resulting dramatic increase in both bignose galaxias and lowland longjaw galaxias numbers; finding bignose galaxias in the Hakataramea Catchment and consequently extending the current known range of this species; discovering a nationally endangered aquatic liverwort while undertaking pest fish work; continuing to make progress on completion of catchment bibliographies for our major catchments in Canterbury, and undertaking surveys to determine the current distribution of upland longjaw galaxias in the upper Rangitata catchment and freshwater mussels within the O Tū Whare Kai streams to gain information to better manage and protect these species in the long term.



Ricciocarpos natans.

Helen McCaughan continues to work on managing the pest fish threat in Canterbury. Monitoring of all eradicated populations has shown no remnant beasties. On a more interesting note, whilst searching in waterways for pest fish she found a nationally endangered free-floating liverwort (*Ricciocarpos natans*) at a new site. This made an exciting change from the usual selection of weeds and pests recorded. Another interesting project has been assisting **Anita Spencer** with the translocation of a small population of the endangered Canterbury mudfish from an unprotected area to a new site – Travis Wetland, a Christchurch City Council restoration area. The City Council and Travis Wetland Trust also contributed to this and will be involved in ongoing monitoring.

Philippe Gerbeaux is pleased to report he has completely eased back into living under a temperate climate – although he misses Fiji a lot! Activities have been focussing mainly on the coordination of didymo research, participation in the Biosecurity NZ Didymo Long-Term Management Steering Group and Biosecurity Science Group, helping with the DOC Ecosystem Prioritization project (with a focus on wetlands), tidying up some of the WONI/FENZ wetland work (which has now been accepted for publication in *Freshwater Biology*), helping the West Coast Conservancy as an expert witness in an appeal to the Environment Court on rules for wetlands in the Regional Land and Riverbed Management Plan, and on-going contributions as the Oceania regional networker to the work of the Ramsar Scientific and Technical Review Panel.

Rebecca Lander has been enjoying processing grass carp transfer applications, participating in the RMA process, and discussing the practicalities and legalities of kōura and eel rearing with local iwi. She has managed to get out of the office occasionally to learn more about waterways and their inhabitants around the East Coast, to investigate kōaro in the Rotorua Lakes and to search tirelessly for inanga eggs in both newly created and historical spawning areas.

Before leaving the department, **Mike Lake** was largely bogged down with a myriad of resource consent applications. In between RMA work, Mike pulled together mudfish data from around the country into a single database.

David West has made lots of new friends in Wellington, some of whom even work for other organisations. He has been spending lots of time working with **John Leathwick**, who recently left NIWA to join the DOC team, to get FENZ (Freshwater Ecosystems of New Zealand) ready for public use. He has found time to play with some giant kōkopu on the West Coast and has been working on the removal of small brown trout from upper tributaries of Zealandia (formerly the Karori Wildlife Sanctuary).

When not working on some of the lake modelling parts of the FENZ tools, **David Kelly** has been getting out onto some of the braided rivers in Canterbury. Dave has started a project looking at



Where David Kelly gets to play – stunning scenery.

changes in invertebrate and fish productivity related to major flow diversions on the Rakaia, Opihi, and Ashburton Rivers, given the pressure for greater irrigation storage from these rivers. He is also finishing up a few papers on flow management for native fish and wrybill.

Martin Rutledge has been assisting Top of the South councils with fish surveys, which have added new location records for native fish including lamprey, giant kōkopu, dwarf galaxias and northern flathead galaxias. He is also involved with fish projects in Nelson's Brook Sanctuary Stream, progressively improving fish passage and fish habitat as part of this flagship project. A recent drift diving survey in the Mātakitaki River revealed an awesome population of big trout-courtesy of the mouse resource. This and other fieldwork has provided a welcome relief from resource consent work, including a hydroscheme proposal for Lake Mātiri.

Like Martin, **Nadine Bott** has been heavily involved in the RMA process, advocating for the protection of freshwater habitat and species. While working with Nadine, **Amber McEwan** developed a freshwater monitoring protocol for the Project Kākā 1080 Operation in Tararua Forest Park. There has been great interest in grass carp transfers and Nadine has been working with applicants on these, as well as assisting National Office with reviewing transfer guidelines.

Michel Dedual has been working on several exciting projects including an ongoing Taupō trout genetics make-up study done in collaboration with Victoria and Montana Universities, a bioenergetic modelling of trout in Taupō, done in collaboration with the Cawthron Institute and the University of Washington, and a study in collaboration with GNS on stable isotopes signature in trout and their prey in Taupō. He also used calcein to mass mark juvenile trout, and presented evidence at hearing on flow regime downstream of the Patea Dam and in the lower Waitaki. Last November Michel was invited by the French Office National des Eaux et Milieux Aquatiques (ONEMA) to recommend flow regimes for the reintroduction of Atlantic salmon. At the moment Michel is representing the Taupō Fishery interests in the debate about trout farming in New Zealand.

Logan Brown left the Department in May to become an Environmental Scientist/Water Quality for Horizons Regional Council. He will be sorely missed, although his pointy shoes are still occasionally seen in the Whanganui office, as he continues to work for the Department on the Patea Dam consents process. He will be replaced by **Rosemary Miller**, who returns to her old position after a few years away working for Taranaki Regional Council and the Ministry for the Environment. In Wellington, Milena Palka has come on board as the new Technical Support Officer, which will offer some great opportunities as the position covers waters from the Head of the Fish, right up to the Hawke's Bay and even across to the Chatham Islands.

Environment Canterbury

Adrian Meredith has recently relinquished the management of water quality monitoring programmes in order to take over the suite of water quality investigation programmes previously managed by **Shirley Hayward**, and to take an overall mentoring role with the water quality team. The investigation projects are being re-evaluated to allow greater team involvement and tighter control of objectives and targets. Focus is still on Lakes Ellesmere (Te Waihora) and Forsyth (Te Wairewa) and their tributaries, programmes looking at irrigation effects in the Amuri basin, and assessing flow issues in catchments such as the Waipara, Hurunui, Waiau and Pareora Rivers. There will also be an increasing emphasis on

measuring and understanding mass loads of contaminants to the coastal environment, particularly focusing on Pegasus Bay.

Since joining the team, **David Kelly** has reviewed and assisted development of nutrient management approaches for the Amuri basin as a planning tool for Canterbury. He is now commencing a review of the regional monitoring programmes, focussing initially on the regional rivers monitoring programme components. David will also take over management of the suite of water quality monitoring programmes. Another challenge will be picking up monitoring of algae and periphyton issues, which also includes coordinating ECan's role in the ongoing didymo surveys and surveillance in the central South Island. Toxic algae continues to be an issue in both rivers and lakes.

Michele Stevenson runs the summer freshwater bathing beach monitoring programme. Michele remains heavily involved in ECan's Improving Urban Waterway Health programme of work. Investigations into contaminant sources to key tributaries of the Heathcote River and a pilot faecal source tracking study in the Avon River were completed last year and similar contaminant source studies on tributaries of the Avon River are planned for the future. Stormwater management issues are an interest of Michele's and work in this area includes liaison with Christchurch City Council as they advance through their programme of developing Integrated Catchment Management Plans for stormwater. Michele is also taking over projects relating to technical monitoring support (baseline and effectiveness monitoring) of community programmes such as 'Living Streams', Integrated Catchment Management initiatives and environmental enhancement.

Lesley Bolton-Ritchie manages the marine component of our programmes and continues to expand the coastal water quality and ecology monitoring programmes. She also maintains the marine bathing beach programme and deals with an increasing number of ocean outfall discharges in the region, as well as applications for other activities in the coastal zone.

Mary Beech manages the ecosystem health programmes and the ecological field and lab work. Fieldwork is still primarily conducted each summer by Canterbury University School of Biological Sciences students (last summer having included **Josh van Vianen, Patrick Lees, Kimberley Roberts, and Hayley Stoddart**). Mary is also involved in baseline and effectiveness monitoring of the Living Streams restoration programme. Mary has been actively involved in the ENVIROLINK sedimentation methods project including trialling methods of measuring sedimentation in streams and rivers throughout the region as accumulation of fine sediment is a significant issue in Canterbury, particularly in low-gradient spring-fed streams. Mary is also scoping programmes looking at fish passage issues in Canterbury.

Robyn Croucher continues to coordinate and run the Chatham Islands freshwater and lagoon monitoring and investigations programme as part of Environment Canterbury's contract to supply regional council services to the Island. Robyn is also involved in surface water quality investigations and monitoring projects for the mid and north Canterbury region.

Taryn Wilks is involved in numerous surface water quality investigations and monitoring projects, for example, investigating periphyton growth and nutrient limitation in the Hurunui and upper Ashburton catchments and involvement in the high country lakes monitoring programme. Taryn is now also underway with her Masters thesis at the University of Canterbury looking at how lake level fluctuation and salinity influence the food web structure of Lake Ellesmere/Te Waihora.

Graeme Clarke represents the team in the Timaru office and undertakes a considerable amount of field work as part of the surface water monitoring programmes. He also runs the recreational water monitoring programme in the southern part of the region, the marine sampling programme and periphyton monitoring in South Canterbury.

This past year has been both exciting and unsettling, with major political and legislative changes for Environment Canterbury and the region, but also fundamental new strategic directions (see below), all triggered by the continuing pressure on water resources for irrigation and on the state of rivers, streams, lakes and aquifers. The allocation of water resources in Canterbury remains a dominant theme with challenges to major strategies for management of the rivers and aquifers of the plains (which supply the lowland springfed streams). The team is in the process of completing analytical work to produce an updated technical overview report of the region's surface water quality. A significant piece of work over the past two years has been reviewing and refining the water quality objectives and standards in the proposed Natural Resources Regional Plan (Canterbury's Regional Plan – see below).

Political changes

On May 1st the 14 Environment Canterbury councillors were replaced by 7 government appointed commissioners who are acting in place of the council until October 2013 at the latest. Under the legislation passed by central government the commissioners act as the council so that the Canterbury Regional Council still exists, just with commissioners acting in the governance role rather than elected councillors. The legislation allowing this step has also provided the commissioners with greater powers relating to Water Conservation Orders (WCO), moratoria, and reduced ability to appeal planning decisions.

Canterbury Water Management Strategy (CWMS)

The non-statutory CWMS has finished its consultation phase and is starting to be implemented via a water executive run by **David Horn** (ex Solid Energy, West Coast Regional Council, ORC). The visions and principles of the CWMS have been enshrined in the legislation for Environment Canterbury. The key changes identified by the CWMS are:

- a shift from effects-based management of individual consents to integrated management based on water management zones;
- management of the cumulative effects of water abstraction and land use intensification;
- water allocation decisions that address sustainable environmental limits and climate variability;
- actions to protect and restore freshwater biodiversity, amenity values and natural character.

The ten proposed water management zones and “zone committees” are designed to deliver on the targets of the CWMS. The targets are set across 9 different areas: drinking water quality; irrigated land area; energy security and efficiency; ecosystem health/biodiversity; water use efficiency; kaitiakitanga; contribution to regional and national economies; natural character of braided rivers; and recreation and amenity opportunities.

Proposed Natural Resources Regional Plan (NRRP)

The hearings for the land and water chapters of the proposed NRRP concluded in 2009, with decisions released in October of this year. With the government-appointed commissioners in place there has been pressure to get the plan operative. This may be more rapid, as plan decisions in Canterbury can now no longer be appealed to the Environment Court and only to the High Court on points of law.

EOS Ecology

EOS Ecology now has two permanent scientists (**Shelley McMurtrie** and **Alex James**) while our ever-busy invertebrate lab is overseen by **Amber Sinton**. Since undergoing a major rebranding last year including a brand new website (www.eosecology.co.nz) the staff at EOS Ecology have been busy with a range of freshwater and estuary projects.

Our recent and ongoing work includes:

- Providing ecological advice to aid the design of a major potential stormwater treatment system and waterway realignment on the outskirts of Christchurch.
- Protecting and enhancing a springed stream with high densities of kōura undergoing urbanisation, by using novel stormwater drainage solutions, waterway channel design, and design of a trout barrier.
- A major investigation into sources of sediment into Cashmere Stream (a tributary of the Heathcote River in Christchurch).
- Field surveys and invertebrate identification for State of the Environment work and an array of research projects.
- Writing and publishing a book on freshwater fish of Banks Peninsula for the Banks Peninsula Conservation Trust, and an Avon-Heathcote Estuary/Ihutai field guide for the Avon-Heathcote Estuary Ihutai Trust (AHEIT).
- Continuing our long-term Christchurch-wide invertebrate and habitat monitoring programme.
- Monitoring of food species from around the Avon-Heathcote Estuary/Ihutai and rivers (including eels, mullet, flounder, shellfish, shrimp, and whitebait) to assess their safety for consumption.
- Continuing our yearly monitoring of estuary environments, and commencing a more detailed study of Christchurch's McCormacks Bay intertidal area.



Alex and Nick setting a fyke net in the Heathcote River.
Photo: Shelley McMurtrie



EOS ecologists get muddy while undertaking a survey at McCormacks Bay. Photo: Shelley McMurtrie

Shelley McMurtrie is heavily involved in coordinating and fundraising for the trans-disciplinary Bicentennial Expedition to Campbell Island this summer, where she and **Alex James** will study the freshwater environment of this isolated sub-Antarctic island. **Shelley** has also been involved in the organisation of the 2010 NZFSS conference. Meanwhile **Amber Sinton** has been hard at work developing in-house invertebrate keys and keeping up with our expanding invertebrate reference collection.

FBA

David Le Cren has been officially retired from the Freshwater Biological Association ('FBA') in the UK for 27 years and has recently moved to his natal New Zealand. He is now trying to put on paper his memories of a career in the FBA (not for publication but as a record), with comments on why he thinks the FBA was a successful research institute. The FBA is now only a membership society that runs courses and meetings, provides information, and tries to maintain its fine library and archives of material and data. Only a little primary research is now done, but several of its retired staff continue writing – such as John Lund, Jack Talling, & Liz Haworth. Many of the FBA's past staff are now working in the the UK's Natural Environment Research Council's 'Centre for Ecology and Hydrology'.

Fish and Game

Life in the South

Zane Moss and **Maurice Rodway** have continued to monitor trout populations in Southland by drift diving, spawning surveys and through analysing growth rates using otoliths. Trout in the Oreti and Aparima Rivers appear to be growing at close to optimal rates, unlike trout growth in Lake Te Anau or the Mataura River (Figs. 1 and 2). Southland continues to have water quality issues, especially in the Mataura River. Point source discharges are improving, but this is being overridden by increased contamination from diffuse sources associated with land use intensification. The Environment Southland State of Environment Report is due out early 2011, but Fish and Game has concerns as to the amount and effectiveness of state of the environment monitoring.

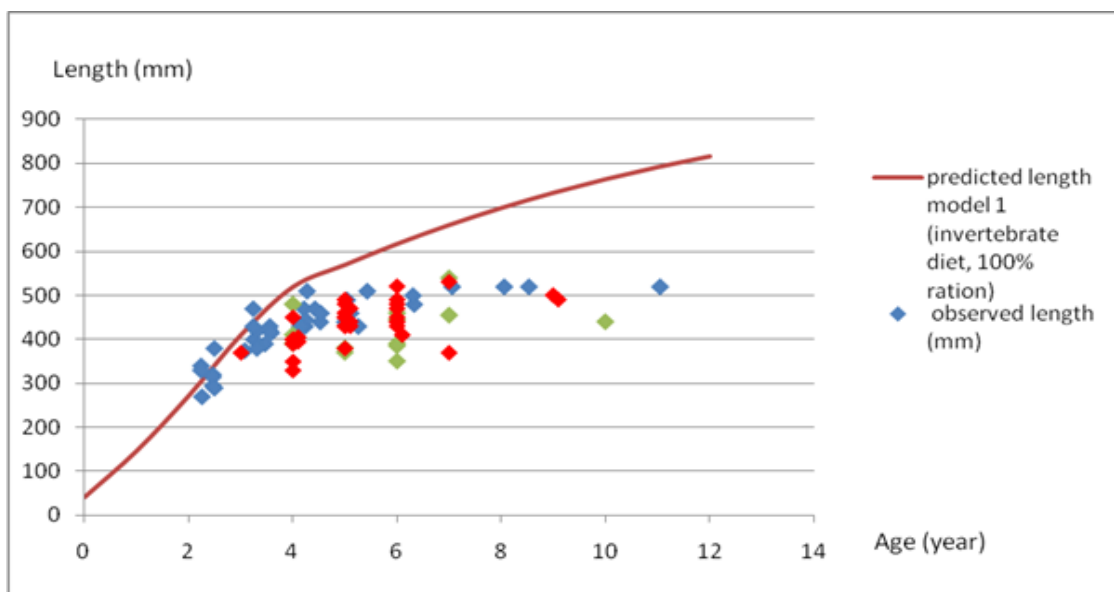


Figure 1. Predicted vs Observed growth rates of trout in the Mataura River

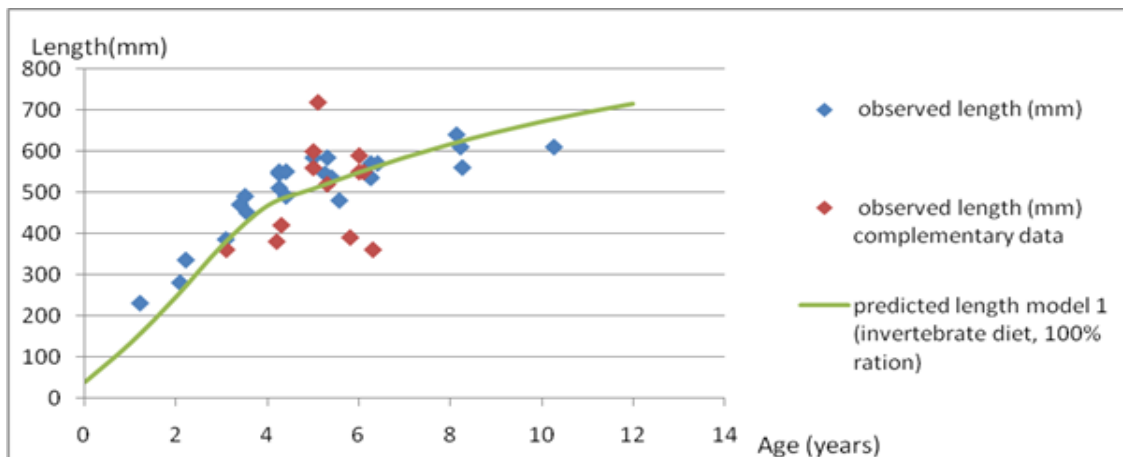


Figure 2. Predicted vs Observed growth rates of trout in the Oreti River

The Southland team have found that didymo presence in the lower Waiau River seems to be reducing the numbers of medium-sized trout. This is particularly disappointing after numbers previously increased when flows were restored to 16 cumecs (Fig 3).

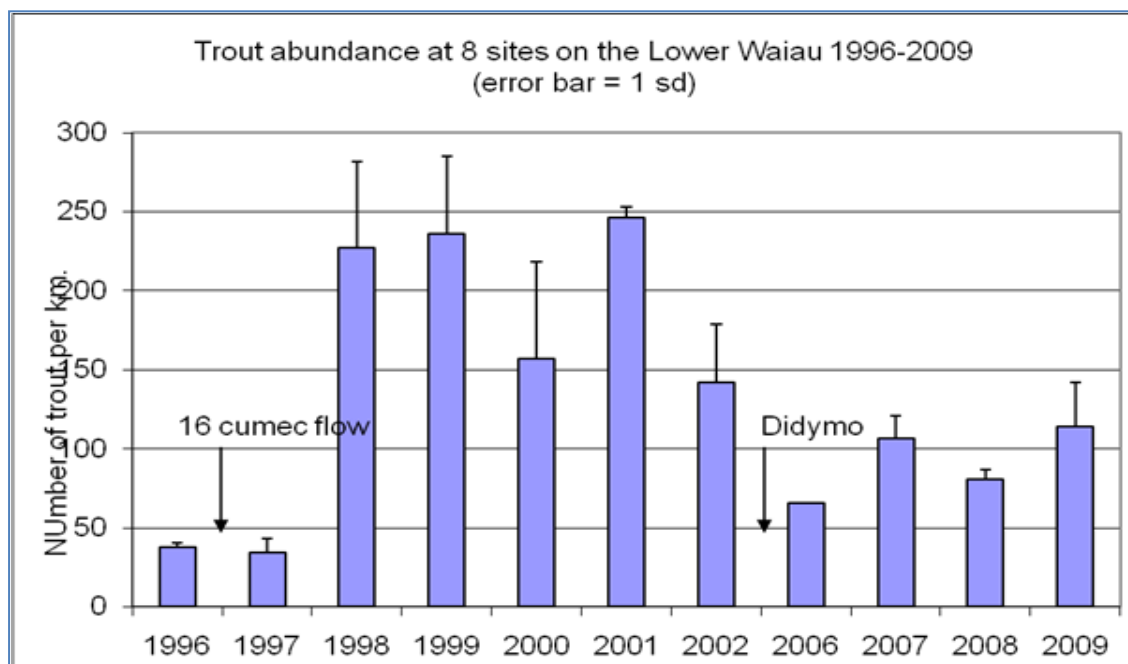


Figure 3. Changes in trout abundance as measured by drift diving in the lower Waiau River, Southland, following flow increases (1996) and the arrival of didymo (2003).

John Hollows and the Otago Fish and Game office have been involved with Otago Regional Council in detailed monitoring of water quality in the Pomahaka River catchment. In Central Otago there is concern some minimum flows are being set during near-drought events. Regionally significant wetlands continue to be lost to land development. There are also concerns over the time required to get a plan change operative given the rate of destruction and whether action will be taken to achieve protection from activities such as ploughing, even if drainage is not specifically occurring. This appears to be a common concern in many regions.

Nevis River Water Conservation Order

The Minister's Special Tribunal has recognised Gollum (or Smeagol) galaxias as outstanding from Fish and Game and Whitewater NZ's water conservation order amendment application. This is now under appeal by Pioneer Energy due to the damming prohibition and may be appealed by Fish and Game and Whitewater NZ due to a failure to recognise angling and kayaking amenity. The Department of Conservation was not involved in the case, but is considering whether it should defend protection for this critically endangered species.

Takitakitoa Wetland

Takitakitoa Wetland comprises 80 hectares of what is at present a low-lying, rush-covered valley floor in the lower Taieri River downstream of Henley. Otago Fish and Game has acquired some 60 ha of the wetland over a 20 year period, with a small area held by a Māori Trust. Staff are developing plans to restore a presently drained wetland back to its natural state. While the ultimate aim is to create open water for gamebird hunting, the project is likely to improve and create habitat for a wide range of other species such as galaxiids and eels too.

Salmon Fishery Enhancement Project

Contact Energy and Fish and Game have been working to improve the sports fishery and habitat of the Clutha/Mata-au River below the Roxburgh Dam. The long-term aim of the project is to increase the annual run of salmon in the River to 5000 fish. In June of this year 30,000 salmon were released into the river, with another 80,000 due next year. All fish have been fin clipped with the aim of distinguishing between hatchery reared and wild stock fish. Information from captured fish will aid in identifying future habitat mitigation projects. Fish & Game is also working with Otago University to investigate life history traits and population connectivity between the landlocked Chinook salmon populations in the Lakes District and the small but persistent residual sea run Chinook salmon population in the lower Clutha River. It has for a long time been speculated that the remnant anadromous Chinook population below the Roxburgh dam is largely being maintained by a spillover from the landlocked salmon populations in Lakes Wanaka, Hawea and possibly Wakatipu. However, it is only now with the development of otolith micro chemical analysis techniques that researchers and fisheries managers are really able to investigate at what level population and source-sink dynamics impact the recruitment of sea run salmon in the lower Clutha. Besides source-sink dynamics, it's also hoped that if any significant key recruitment areas for wild salmon below the Roxburgh dam exist these may be revealed. The majority of costs associated with this study have been funded by Contact Energy.

Otolith validation work

Fish & Game NZ and The Clutha Fisheries Trust are co-funding experimental research into factors impacting the formation and stability of unique chemical trace element and isotopic tags in Salmonid otoliths. These experiments are part of a larger research project at Otago University that is aimed at developing and validating suitable and useful techniques and models for analyzing information based on chemical analysis from otolith.

Pressures on all sides

Devon Christensen of the Central South Island office remains concerned about farm management plans in the lower Waitaki not being put into resource consent conditions, and that adaptive management proposals in the area do not have effects-based criteria or reversibility provisions. Fish and Game

continues to operate its 'Salmon in Schools' programme, where school children rear fish and learn about their life cycle, habitat and feeding requirements, both in an aquarium and subsequently on release into streams in salmon rivers.

Dean Kelly and the West Coast team are dealing with seven hydro schemes at different stages in the consent process. The regional council is struggling with assessing these applications, and recently concerns were expressed by the Environment Court over the conditions set for the proposed Arnold scheme. Little baseline data is collected, making adaptive management approaches almost impossible to implement. Land use intensification in the Lake Brunner catchment is threatening the lake's future but it is difficult to control those land uses after the development has occurred. Some restrictions on stock access to water is being considered.

Tony Hawker of North Canterbury has found that the Ecan Act introduced early in 2010 has had an impact on the Hurunui Water Conservation Order application and may open up the Rakaia Water Conservation Order to review, but without the scrutiny of the Environment Court. The Canterbury Strategic Water Study is investigating several large scale water storage irrigation proposals, but is supposed to also consider restoration of waters where appropriate. Most of the funding is going towards storage investigations with smaller amounts going towards restoration or biodiversity. Fish and Game has appealed the Central Plains irrigation reticulation proposal on the grounds that fish screening is not sufficiently certain.

In the Nelson/Marlborough region, **Neil Deans** and team are tied up with RMA work including an application by TrustPower to abstract water from the Wairau River over a 50 km reach, a review of the Branch River power scheme, with particular interest in the adequacy of minimum flows and the fish pass. Fish and Game, in conjunction with the Cawthron Institute, has PIT tagged several hundred juvenile trout in the Rainy River, an upper tributary of the Motueka River. Movements of these juveniles are being monitored with mobile and fixed PIT tag receivers in association with high and low flow events. So far there has been little juvenile trout movement. Fish and Game has been working with Tasman and Marlborough District Councils to trial the river evaluation system RIVAS, which looks at values for habitat, recreation, irrigation, etc. They have also been working closely with Tasman District Council on State of the Environment monitoring. Staff have found large numbers of very large trout in the Mātakitaki River after a beech mast and consequent explosion in rodent populations. This site is a preferred option for a dam and proposed hydroelectric power scheme by Network Tasman.

The NZ Gamebird Habitat Trust commissioned consultants Wildlands to undertake an assessment of the most suitable wetlands in the country for enhancement. The Fish and Game Para wetland in Marlborough was ranked most highly in the country, which should result in further financial assistance with the enhancement project, provided the local District Council does not seek to undertake further drainage activities in the river, which would impact on the wetland.

Wellington staff **Corina Jordan** and **Phil Teal** have been up to their necks in Horizons One Plan hearings this year, and with the decisions just released in August, they have been equally busy in the last few months considering whether or not appeals may be warranted. In particular, improving water quality through land use



Para Wetland – the highest ranked in the county for enhancement opportunity. The ultimate aim is elimination of willows and restoration of flax cabbage tree and kahikatea swampland.

management is a major issue, as is consideration of new methods of wastewater treatment by Masterton by the Homebush irrigation consortium.

The development of a co-governance process between seven iwi and seven councils within the Greater Wellington region is looking at the revision of the regional plan. A grouping of DOC, regional council and iwi considering future management of Lake Wairarapa is a matter of concern given the specific exclusion of Fish and Game from that group. As a landowner, administrator of adjacent wetlands and the statutory body which applied for existing the Water Conservation Order which has ensured that the lake still exists (it was to be drained under a catchment board polder scheme in the 1980s), Fish and Game remains mystified as to how its exclusion will achieve good future lake management. This is in stark contrast to a similar Statutory Advisory Group established by Environment Canterbury for the only other lake having a water conservation order, Te Waihora in Canterbury.

Allen Stancliff in Taranaki continues to work on TrustPower's Patea hydro scheme, although the end seems to be in sight. Issues include the adequacy of the minimum flows and ramping rates which allow changes in flow from less than 2 cumecs to 70 cumecs without ramping these flow fluctuations, and associated changes in dissolved oxygen levels drawn from the stratified lake upstream. IFIM methodology has not been used, but hydrological assessments including RVA have suggested higher minimum flows which are difficult to achieve given plumbing constraints of the scheme.



Coalfields Road project on the edge of the Whangamarino wetland

In Hawke's Bay, **Pete McIntosh** and team have been working to identify storage dam sites in the region, and to review local irrigation schemes, while **Eben Herbert** in the Eastern region has seen some considerable local wetland developments.

In Auckland and Waikato, **David Klee** and team are contemplating the new co-management regime for the Waikato River, its tributaries and wetlands. There is some concern that Fish and Game wetland enhancement projects might be put in jeopardy by rules which make development to improve wildlife or fisheries habitat potentially unable to proceed if any indigenous plant might be affected, even if the plants in question are not rare.

Enhancement projects on both Fish and Game and DOC administered lands in the Whangamarino Wetland continue, with Wildlands consultants currently aiding in the development of a monitoring regime for the Eastern Whangamarino project. Fish and Game has been working with DOC to develop new bittern monitoring protocols in the wetland.

In Northland, **Rudi Hoetjes** has found that two big floods in succession created problems for fish spawning and retention. This was followed by the worst drought on record, which has caused many streams to simply dry up. A Fonterra dairy factory discharge application into a tributary of the Wairoa River has resulted in agreement to control water temperatures and improve water quality, while on the other hand a Fonterra model farm is having major problems with washing and water usage resulting in periods of high saturation and the need for holding ponds. Fish and Game is about to commence the Hikurangi project, utilising backwaters and isolated river loops as potential wetlands for enhancement.

Neil Deans, Bryce Johnson and the New Zealand Fish and Game Council have been busy with considerable involvement in the Land and Water Forum, a collaborative governance project to try to achieve better and more effective freshwater management. One of the main outcomes is the

recommendation to Environment Minister Dr Nick Smith to proceed with the National Policy Statement on Freshwater, as reported back by the Board of Inquiry with some minor modifications, as a matter of urgency. The Forum's report is available at http://www.landandwater.org.nz/land_and_water_forum_report.pdf and will be considered for public feedback at 15 meetings across the country in the next few months.

Freeman Environmental Ltd

Controlling cumulative water quality effects

Mike Freeman has been involved in a range of Resource Management Act processes involving water quality, including assisting Environment Canterbury as a Section 42A reporting officer advising on cumulative water quality issues relating to the proposed irrigation developments in the Upper Waitaki catchment. A key part of that process has involved reviewing proposed nutrient loading and water quality management mechanisms, and identifying a possible water quality trigger response approach to ensure that water quality objectives are achieved.

Golder Associates (New Zealand) Ltd

Ian Boothroyd, Greg Burrell, Richard Allibone, Nick Carter, Duncan Gray, Katherine Muchna, Anna Wilkes and **Annabel Barnden** are all involved in freshwater activities at Golder, based in Auckland, Christchurch and Dunedin. **Ian Boothroyd** continues to lead the Ecology Team at Golder (also including marine and terrestrial ecology) where he is involved in a variety of projects including assessing impacts of renewable energy projects (e.g., windfarms, geothermal), land development, new roading projects and urban development. Ian has a particular interest in urban catchment management through the application of integrated catchment management plans and other frameworks. Ian is regularly called upon to provide expert testimony at hearings and in the Environment Court and recently presented on this topic at the Resource Management Law Association annual conference. Ian is now an accredited independent commissioner and sits on hearings that are involved with making decisions on applications for resource consents.

Ian still finds some time for his research on the taxonomy and ecology of Chironomidae. The past year has seen Ian further develop his key to the New Zealand chironomid larval fauna, as well as continuing to collect and prepare descriptions of new species from around New Zealand. The focus of Ian's work has been the subfamily Orthocladiinae but Ian is also describing a number of new species from geothermal ecosystems, coastal environments and small forest streams. Ian also continues his research into the ecology and food webs of geothermal ecosystems, and continues his liaison with the University of Iceland. Ian is also researching macroinvertebrate grazing on biofilms in streams in association with Gillian Lewis in the School of Biological Sciences at the University of Auckland.

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

Richard Allibone is based within our Dunedin office. Richard has been involved in a number of projects working in all parts of the country, including assisting DOC with some native fish management. In particular Richard is involved in irrigation and energy projects (hydro and windfarms). Richard is chair of the New Zealand Threatened Fish Committee who have recently published their findings and a new threat status of native fish in the NZJMF. Richard continues his work on biodiversity and species recovery programmes.

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

Duncan Gray has recently joined Golder after completing his PhD on the 'Ecological connectivity in braided river-scapes' at the University of Canterbury. Duncan will be involved in a number of projects, in particular assisting Richard and Greg with their low flow assessment projects.

Anna Wilkes is based in the Christchurch office where she acts as the office manager and is involved in a variety of projects involving stormwater management, urban catchment management and wastewater consents compliance.

Katherine Muchna assists Ian with his research work and is involved in many freshwater ecological surveys and has recently completed her MSc on reptiles at the University of Auckland.

Annabel Barnden is a member of our Christchurch office where she assists Greg with his project work but is increasingly involved in projects around the country.

Greater Wellington Regional Council

State of the Environment (SoE) monitoring

Annual macroinvertebrate and periphyton sampling was completed shortly after Easter for our 55 SoE river and stream sites. During this year's sampling – which was a challenge given the patchy summer weather – **Alton Perrie** and **Summer Warr** also trialled the proposed new national protocol for measuring instream sedimentation and at a number of sites biofilm samples were taken to contribute to the ARC-led research project looking to establish new rapid assessment indicators of stream health. Some of the urban stream biofilm samples were also analysed for heavy metal content as part of our investigations programme into stormwater effects on aquatic environments. **Juliet Milne** has been overseeing the stormwater investigations programme.



Summer Warr trials one of the possible new national sedimentation assessments in Porirua Stream. Photo: Juliet Milne

Recreational water quality monitoring and toxic cyanobacteria

The wet summer this year meant that problems with benthic cyanobacteria (*Phormidium* spp.) weren't as severe as in previous years. The worst affected recreational river was the Waipoua River in Masterton where high risk signs were put up from Colombo Road downstream in mid January. Unfortunately a dog died on 22 February after coming into contact with algae in the river at Bentley Street. Following this Masterton District Council put up further warning signs at all public access points along the Waipoua River because the river flows through central Masterton. Medium risk signs were put up along the lower reaches of the Waikanae River (Kapiti) at the start of February and along the lower reaches of the Hutt River in mid February in response to moderate cover of blue-green algal cover being recorded during weekly field assessments. No toxic algae related dog deaths were reported from these rivers.

Water quality and ecological investigations/projects

- Coordinated by **Juliet Milne**, our targeted investigation of water quality in the Mangatarere catchment in Carterton has been completed and we will soon be releasing a report on the soil, groundwater and surface water quality results. Water quality in the lower reaches of the Mangatarere Stream is amongst the poorest in rivers and streams in the Wellington region, particularly in terms of dissolved nutrient concentrations. The catchment is subject to multiple stressors, including water abstraction and reduced flows in summer, intensive land use (dairy farming and a large piggery) and the discharge of treated wastewater from Carterton township.
- Funding has been provided to a Massey University MSc student to further progress our understanding of the ecological effects associated with routine flood protection works in the region's rivers. This work follows on from an earlier study by **Alton Perrie** which looked at the effects of significant channel realignment in the Waingawa River.

- In August, we started monthly water quality sampling in Lake Waitawa on the Kapiti Coast and Lake Onoke in south Wairarapa. No substantial work has been done to date in either lake. Lake Onoke is an estuarine environment and, as such, is an important component of the lower Ruamahanga River system. Sediment and benthic fauna samples were also collected from this lake in late January.



Alton Perrie (left) and Gary Stephenson stockpile sediment and benthic fauna samples from Lake Onoke earlier this year.

- **Richard Storey (NIWA)** has been assisting **Summer Warr** to assess the ecological values of intermittently flowing streams in the Wellington region. Although the wet summer in the Wellington region did not provide ideal conditions for the study of intermittent streams, field work was completed at six sites. Macroinvertebrate surveys and assessment of flow characteristics were carried out in October and followed up with a further assessment of flow characteristics in early April. This project will be reported on in the next couple of months. Intermittent streams are under significant pressure from infilling and piping during development; information on their ecological values will help us to provide more appropriate protection for them. For this reason, Richard was also asked to run a Stream Ecological Valuation (SEV) training course for consultant ecologists and regional council staff. The course is the first step in encouraging use of the SEV as part of ecological assessments for resource consent applications in the Wellington region.

Ecological objectives and water quality standards

Summer Warr and **Alton Perrie** have been working away on ecological objectives and water quality standards for the second-generation Regional Freshwater Plan. The work includes:

- Finalisation of river classes based around the FWENZ classification.
- Detailed analysis of macroinvertebrate data from our River SoE programme, with the aim of identifying the best macroinvertebrate metrics to use, reference conditions for each main river class in the region and how these metrics respond to environmental gradients. **Joanne Clapcott** and **Dean Olsen (Cawthron)** have conducted the analysis which will be used to set objectives for macroinvertebrate community health. Similar work is being undertaken internally to set objectives for periphyton and fish indicators.
- Analysis of flow records to estimate average accrual periods for River SoE monitoring sites. These flow estimates will feed into development of nutrient guidelines for the main river types in the Wellington region. **Olivier Ausseil** (Aquanet) is assisting in developing these guidelines.



Collecting field measurements in the Tauherenikau River, Featherston.

Instream flow assessments

With a review of our Regional Freshwater Plan underway, **Mike Thompson** has been continuing our instream flow assessment programme. The information gathered will help in the review of the water allocation and minimum flow policies. Several studies on Wairarapa waterways were completed in 2009, including a RHYHABSIM-based instream flow assessment of the Waiohine River and minimum flow assessments for two spring-fed streams with high abstraction pressure (the Papawai and Otakura Streams).

This summer, generalised habitat assessments have been completed on two further rivers, the Tauherenikau River in the Wairarapa and the Otaki River on the Kapiti Coast. In a more general piece of work, **Joe Hay** (Cawthron) is reporting on the application of instream flow assessment methods for waterways that have not yet been reviewed. The report recommendations are based on a comparison of historical hydrological analysis, IFIM and generalised habitat assessment results for various waterways in the Wellington region. **Roger Young** (Cawthron) is also assisting with our instream flow work, investigating the relationship between dissolved oxygen and flow in a number of lowland Wairarapa streams for which continuous data have been collected.

Related to the instream flow programme, **Caleb Royal** (Ohau Plants Ltd) has been engaged to undertake an assessment of cultural values for Wairarapa waterways. This assessment will be based on targeted consultation with whānau, hapū and iwi members on specific waterways and will extend, where possible, to providing advice to council on the amount of water required to maintain and enhance cultural values identified.

Groundwater/surface water interaction project

Brydon Hughes (Liquid Earth Ltd) is assisting us with defining potential groundwater/surface water “interaction zones” for the Wellington region. This work, which is needed to support the Regional Freshwater Plan review, is initially focusing on the Wairarapa Valley, and is being run in conjunction with Phase 3 of our Wairarapa groundwater resource investigation.

Wetland hydrology

Little is known regarding the hydrology of wetlands in the Wellington region and the effect of nearby water abstraction on these wetlands. This information is important to ensure that suitable water allocation regimes are set up and adverse effects of consented water takes on wetlands can be better identified and managed. In addition to the wetland and hydrological monitoring currently taking place in the Te Hapua wetland system on the Kapiti Coast, ten other significant wetlands in the Wellington region identified as being under hydrological stress were assessed for hydrological drivers, water quality, ecology and indicators and sources of stress. Gaining more information about the hydrology of and stressors on important representative wetlands in the region will assist in decision-making for future

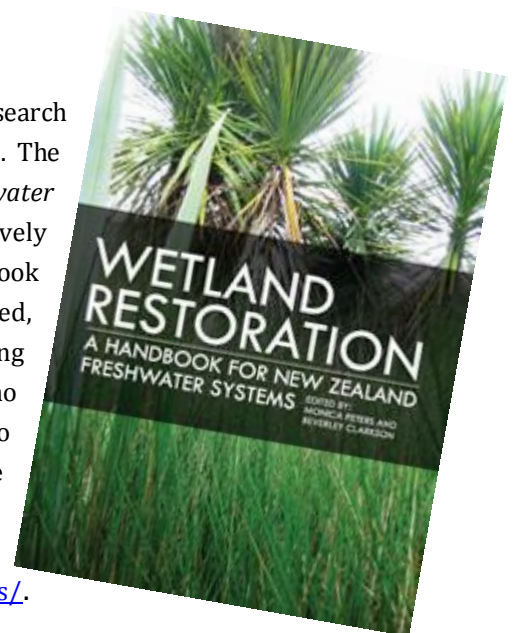
hydrological monitoring of wetlands. Information gained will also be fed into the next generation Regional Freshwater Plan.

Staff changes

Mike Thompson (formerly of MfE) has come in on a 12-month fixed-term contract as a Senior Environmental Scientist (Hydrology) to cover for **Laura Keenan** who is on parental leave. **Doug McAlister** (Senior Environmental Scientist – Groundwater) has recently moved on, returning to a consultancy role in Brisbane, Australia.

Landcare Research

A team of wetland experts, including **Bev Clarkson** of Landcare Research has produced a handbook on wetland restoration in New Zealand. The book, *Wetland Restoration: A Handbook for New Zealand Freshwater Systems*, brings together expertise from specialists and groups actively engaged in restoring wetlands throughout the country. The handbook builds on regionally-based restoration guides and provides a detailed, comprehensive ecosystem approach toward understanding, protecting and enhancing our remaining wetlands. It is targeted at those who plan to make, and those who already are making, a difference to improving wetlands. It is written in a way that can easily be understood and, more importantly, acted on. The book can be purchased from Manaaki Whenua Press or downloads are available from <http://www.landcareresearch.co.nz/services/biocons/wetlands/>.



Stephen Moore continues to spend much of each year analysing freshwater invertebrate samples from all over New Zealand, mostly for regional councils and environmental consultants. He continues to photograph every invertebrate group he finds, using the Landcare Research Automontage photomicroscope system. Amongst the more interesting taxa recently photographed were specimens from such exotic places as Singapore and Nigeria. Stephen's collection of New Zealand freshwater invertebrate images continues to grow, resulting in frequent updates to his CD of NZ freshwater invertebrate images:

http://www.landcareresearch.co.nz/research/biosystematics/invertebrates/freshwater_invertsCD/

Tong Somdee, an international PhD student from Thailand, was working on “Biodegradation of cyanobacterial hepatotoxins [Dha⁷]MC-LR and MC-LR by natural aquatic bacteria” at Massey University under the supervision of Dr John Ruck and Associate Professor Rachel Page and the support of Cawthron. Tong was awarded his doctorate in May of this year. He has returned to the University of Khon Kaen in Thailand to resume his lectureship in microbiology, extending his work on toxic cyanobacteria. At present Tong, John and Rachel are working on the publication of several papers from his exciting PhD study. Tong isolated a unique *Sphingomonas* bacterium from Lake Rotoiti that was able to degrade microcystins (MCs), both [Dha⁷]MC-LR and MC-LR. Tong characterized the bacterium and examined the metabolic mechanisms present in the bacteria for microcystin degradation. Tong also used a small scale biofilm bioreactor for testing the effectiveness of the bacteria for microcystin degradation or/and remediation.



Lake Horowhenua, *Microcystis aeruginosa* bloom. Photo: John Ruck

Mike Joy has been on study leave in Eastern Europe for 3 months, doing some teaching at a University in Transylvania, Romania. While there he spent time checking out some clean streams and rivers in Romania and Bulgaria where the hills are still forested and the land farmed sustainably like it has been for thousands of years. Back in NZ he has a few manuscripts on fish distribution and trends slowly getting closer to submission, as well as articles for newspapers. He has finally started work with Bruno David on an Envirolink project initially suggested 10 years ago to come up with fish sampling protocols for wadeable streams nationally.



Engineered site in the Tauherenikau River, Wairarapa. Note substrate pushed up into willows, top right, reducing backwater habitat. Photo: Josh Markham

Josh Markham is undertaking an MSc, and is surveying upstream and downstream of engineered river sites throughout the Wairarapa Region to determine the effects of flood protection work on habitat heterogeneity, periphyton biomass, macroinvertebrate and native fish communities.

Stella McQueen began her MSc in Ecology at Massey this year. She will be investigating the importance of gabion baskets as habitat for native fish communities, and how the rock size within gabions and the amount of habitat available in streams affects this. **Russell Death** has been working on a project in

collaboration with Professor Timo Muotka and his colleagues from Finland looking at Beta diversity patterns in invertebrate, fish and diatom communities that have been collected from “pristine” areas along the length of New Zealand. Interestingly it shows the reverse pattern to that predicted. Unfortunately Russell does not know why. Russell has also been re-examining some of the data he and Pepe Barquin collected on springs from around New Zealand under the framework of metacommunity theory and neutral models. Two new areas of research include branching out into research with Wellington Fish and Game on the linkages between flood control engineering and declining trout populations in our region, and a FRST funded project with Ecological Economics Research New Zealand and local iwi on Integrated Freshwater Solutions to clean up the Manawatū.



Redfin Bully (*Gobiomorphus huttoni*) from a non engineered site in the upper Waingawa River, Wairarapa. Photo: Josh Markham,

NIWA

John Quinn developed a new FRST programme on Aquatic Rehabilitation in collaboration with Otago and Canterbury Universities, Cawthron Institute, iwi partners (notably **Ian Kusabs** and Associates, and **Gail Tipa** and Associates) and a variety of end user collaborators. This has been funded for 6 years. He was also involved in the interdisciplinary team preparing the Waikato River independent Scoping Study advising on options for the “river cleanup” and presentation of evidence on water quality issues to Horizons’ One Plan hearings. His work on developing BBNs to better target onfarm and riparian mitigations to meet community values in intensively managed farm catchments was work presented at several fora and this approach is contributing to ECan’s Land use and water quality project based in the Hurunui/Culverden Basin. John has been working with **David Reid** and colleagues on factors influencing medium-term responses of stream invertebrate communities to logging pressures, using both conventional structural attributes and trait analysis.

Graham McBride, Sandy Elliott and Sharleen Harper, alongside a team from ESR and Massey University, have put the finishing touches to a three-year project funded by the CDRP (Cross Departmental Research Pool) on "Campylobacter in food and the environment: examining the link with public health". This has involved attempting to marry many different types of food, veterinary and environmental models to produce recommendations on effective ways to reduce the rate of this zoonotic disease (for which the reported rate in New Zealand is very high). Details will be released in due course.

Rob Davies-Colley (NIWA Hamilton) has been leading the preparation of a review article (now in submission with *Journal of the American Water Resources Association*) commemorating two decades of NZ's National Rivers Water Quality Network (NRWQN) for which he is NIWA's scientific spokesperson. In September, he attended the (very interesting and enjoyable) International Water Association (IWA) specialist group conference on diffuse pollution and eutrophication in Quebec City, Canada – one year out from the



Bob Wilcock's example of wetland use to remedy diffuse pollution.

next international conference which will be in Rotorua, New Zealand. (For details of the NZ conference – for which Rob is co-chair – see www.dipcon2011.org). He is currently starting up new FRST research projects, including one on sediment quality, looking at ecological and optical effects of fine sediment that do not necessarily correlate with its mass concentration, and another on SoE reporting of water quality. He continues research on aspects of microbial water quality and stream-riparian habitat.

Bob Wilcock continues to work on aspects of sustainable dairying in the "Best practice dairying catchments" project. He has also been studying a riparian protected headwater wetland in the Waikato "best practice" catchment (Toenepi) where much of the dissolved constituents entering the wetland are converted to particulate forms and trapped or retained. Bob presented the findings of this study, recently, at the International Water Association Diffuse Pollution conference (DIPCON 2010) in Quebec, 12-15 September 2010.

Aslan Wright-Stow has continued working on the long-term impacts of exotic forestry harvesting on streams in the Coromandel with **John Quinn**. John and Aslan have also started a project on the East Cape to determine whether upstream harvest impacts can be detected on downstream unharvested streams in Torere Forest. He continues his work on the impacts of calcium magnesium acetate (CMA) for highway deicing applied to the Desert Road, and roads in the South

West Central Plateau and Hawke's Bay regions. He has also continued to work on a range of marine and lakes projects in his capacity as a scientific diver.

Ngairé Phillips continues work in the FRST programme on the ecology of customary fisheries in the Rotorua (Te Arawa) lakes. Interesting results are already starting to emerge on toxicity of cyanobacterial toxins to kōura and kākahi (led by **Sue Clearwater** and **Susie Wood**, Cawthron), as well as on the composition of benthic algal mats (with **Mary de Winton** and **Susie Wood**). She is currently writing papers from her recently completed "Estuarine Ecodiagnostics FRST programme", with a paper on adaptive capacity of cockles pre-exposed to contaminants in review. She has also been continuing her research into the genetic basis to tolerance and recovery from metal contamination in freshwater clams and cockles, with one paper published (*Aquatic Toxicology*) and another in preparation. Ngairé also continues leading the Health Research Council funded programme on contaminants in traditional foods. This is producing some really useful data on safe human consumption rates for fish and invertebrate species in the Rotorua and Temuka areas, which provide valuable guidance to local management and health agencies. The rates have been developed using a quantitative risk assessment process. She also maintains her interest in invertebrate species traits, mainly through collaborative efforts.

Over the past year, **David Reid** has been involved in analysing and writing up long-term datasets on the effects of forest harvesting on benthic macroinvertebrate communities, collected over 17 years in the Coromandel Peninsula. A paper has been published from this work (see the publications list), and the data is being further analysed to determine whether species traits provide additional information about the susceptibility of macroinvertebrates to the multiple impacts that occur in harvested catchments. David has also been involved in several other research projects looking at impacts of sedimentation on streams, and has written a manuscript on cave and spring communities around Waitomo. Under the new FRST-funded Aquatic Rehabilitation programme David will be conducting studies on trajectories of recovery for stream communities after restoration of riparian vegetation, and limits on recovery imposed by dispersal abilities and habitat preferences of invertebrates at different stages of their lifecycles.

Piet Verburg is the lead author of a report on the water quality of NZ lakes for MfE. He published a paper showing that the atmospheric boundary layer in low latitude lakes is often unstable, which enhances fluxes of heat, greenhouse gases and the loss of water by evaporation. A paper was published in *L&O* on the physics of climate warming effect on deep lakes. Another study found that in large lakes convective- and density-driven circulation can override wind-driven circulation, and can result in a circulation with surface currents against the direction of the wind, transporting heat from one side of the lake to the other. He is examining the oxygen balance in the hypolimnion of Lake Taupō, to try to explain the seasonal rate of hypolimnetic oxygen consumption. He also lead a project on horizontal diel migration of zooplankton in lakes Rotoiti and Rotoma (with **David Reid** and **Karen Robinson**), and carried out a project on biomagnification of mercury in food webs in BOP lakes along a range of trophic state (with **Ngairé Phillips** and **Chris Hickey**). Mercury in these lakes is very high: in trout it is 20 times the recommended maximum.

Cathy Kilroy continues her work with didymo, with more experimental work planned at the flume facility on the Waitaki River (with Max Bothwell, Environment Canada). The first publication from their series of experiments will be published shortly in *Freshwater Biology* (showing that

didymo forms blooms even if its cell-division rates are phosphorus-limited). Currently, Cathy is providing advice to various parties in Chile, who are responding to the first reports of didymo blooms in rivers in Chilean Patagonia. Other work has included more on periphyton in general, especially biomass–nutrient–flow relationships (e.g. some interesting data analysis on the fine dataset collected in 2009 by Horizons Regional Council, in collaboration with **Carol Nicholson**, **Kate McArthur** and **Jon Roygard**, and with input from **Barry Biggs**). She is looking forward to more on this topic, and also looking forward more work on algae in wetlands.

Alastair Suren has been traveling the country with **Janine Wech** sampling lowland wetlands in a wide range of environments. He has since been involved with Janine, **John Stark** and **Paul Lambert** in processing a multitude of samples, and developing a wetland Macroinvertebrate Community Index. Funding for this was from a mix of FRST, DOC, TFBIS and regional councils. Tolerance scores for invertebrate taxa found in South Island wetlands has now been developed, as has a manuscript outlining the creation of the wetland MCI. He has also been working with **Cathy Kilroy** in determining relationships between wetland condition (assessed using landscape based methods) and algal and invertebrate communities. Finally, he has found time to write up some of the other wetland work he has been involved with over the years, including investigating temporal variability of invertebrate communities, and determining the effect of hydraulic restoration on wetland invertebrates.

Alastair has also been working with **MS Srinivasan** and Janine Wech in determining the fate of 1080 in catchments following aerial drops just prior to heavy rain. They camped by a small stream in a catchment where 1080 was aerially applied and collected water samples hourly for 24 h following the commencement of rain. Only a small amount of 1080 (0.1 ppb) was detected, only for 1 h after the start of rainfall, suggesting contamination of streams by 1080 is unlikely. His other commercial work included Janine Wech, **Maurice Duncan** and **Jenni Gadd** where they worked with Beca and the Kapiti Coast District Council in exploring a number of options for the water supply in the area. Finally, he has been involved in gaining feedback on NIWA's FBIS database system from a variety of potential end users in order to see how this system can be improved so that more people can use it, and have access to more data as it is entered into FBIS.

Michelle Greenwood is working on a 2 year post-doc with NIWA, funded by the Rutherford Foundation, Royal Society of New Zealand. She is currently in her first field summer investigating aquatic and terrestrial invertebrate communities in the upper Waimakariri River. Specifically she will determine the relative strength of cross-ecosystem predator-prey linkages in different aged floodplain habitats, with the aim to investigate how terrestrial invertebrates are affected by habitat changes associated with changing flow regimes. **Sophie Goodall**, a third year BSc student from the University of Birmingham is helping with the research, as well as conducting her own short research project.

Scott Larned was successful in securing NIWA's bid for a FRST-funded Environmental Flows research programme in July, which is fully funded for six years. The Environmental Flows Programme (EFP) succeeds the 2003-2010 Water Allocation Programme. The scope of research in EFP ranges from river ecosystem modelling to flow requirements for Māori values to groundwater ecology. Research partners include Cawthron, Tipa and Associates, ESR, University of Canterbury, Department of Conservation, Fish and Game, Environment Canterbury, and Hawke's Bay Regional

Council. Scott is leading the EFP research team, and the groundwater ecology work within EFP. In addition to EFP work, Scott is completing some hyporheic ecology studies, didymo experiments, and participating in the Ministry for the Environment-sponsored review of the Australia-New Zealand water quality guidelines with **Ton Snelder**.

Eels and bullies – how do they get along?

Peter Robinson has been hosted by NIWA as a Royal Society Teaching Fellow this year and has been working on a project assisting **Don Jellyman** and **Shannan Crow** investigate the relationship between longfin eels and common bullies. Treatments were carried out in aquaria to see what behaviours bullies displayed in the presence of apex predators (ie longfin eels). Peter has enjoyed discovering about the work of scientists and is looking forward to sharing his new knowledge with his pupils and colleagues when he returns to his school next year.

Doug Booker has been undertaking research on eco-hydraulics and environmental flow setting, specifically in relation to generalisation of habitat-flow relationships and hydrological statistics. Doug is leader of the River Eco-hydrology objective of NIWA's FRST Environmental Flows Programme.

JoAnna Lessard is beginning her second field season studying the ecohydrology of macrophyte dominated lowland streams in Canterbury. She and NIWA Hydrodynamasist David Plew were successful in winning a second year of Capability Funding to continue their work looking at the relationships of macrophyte growth and coverage on transient storage and dispersion in nutrient rich springs

Eric Graynoth is investigating the efficiency of day and night time electric fishing with **Marty Bonnett** and **Don Jellyman**. Further studies in the Waipara River and a small tributary of Lake Ellesmere confirmed that

daytime electric fishing efficiency was lower than has been previously recorded, especially for small fish, and that repeated fishing during both the day and night is needed to accurately determine fish densities using depletion techniques. He is also investigating mixed effects and other statistical models for the prediction of eel densities in rivers (with **Doug Booker**) as well as advising on the environmental effects of various power development schemes.

Laura Drummond has been busy working as database administrator for the NZ Freshwater fish database, checking and entering records as well as processing requests for data from users. Records are regularly added with a total of nearly 30,000 records presently in the database. She is also involved with sediment and macro algae sampling of the Avon Heathcote Estuary, and creating a database for data and information on the Estuary remediation study. She has been collaborating with scientists from Cemagref (France), looking at how natural variations in immersion and emersion



Eric Graynoth, Marty Bonnett, Peter Robinson & Joanna Lessard fishing the Waipara.

affect breakdown and invertebrate colonization of leaf litter in drying scour pools. Currently she is finishing off writing her Master's thesis on emergence success and community change in drying scour pool habitats.

Maurice Duncan presented hydrological evidence on behalf of Environment Canterbury (ECan) to the Central Plains Water Enhancement Scheme Hearings and assisted the Commissioners with formulating consent conditions. Maurice is presenting evidence for the Royal Forest and Bird Protection Society at an Environment Court hearing for a resource consent to take irrigation water from the lower Conway River that occasionally becomes ephemeral. Maurice completed a project assessing the effects of dairy farming on nutrient exports to Lake Brunner. He has also analysed on-farm irrigation records to assess irrigation efficiency. He has revised 2D hydrodynamic modelling studies of potential flooding from the Buller River in Westport and in Christchurch from the Heathcote River. For ECan, Maurice assessed the effect of afforestation of grassland on mean and low flows for Canterbury catchments sensitive to land-use change.

Don Jellyman has continued with some research on freshwater eels, although much time has been taken up with involvement with power company and irrigation clients. The Lake Manapōuri migrant eel tracking (with **Jacques Boubée**, NIWA, Hamilton, and **James Holloway**, Meridian Energy Ltd) has provided some interesting results – the objectives of this work are to prevent as many eels as possible from entering the power station (as this is fatal), and recommend a suitable discharge regime at the natural outlet to facilitate eel passage. By using arrays of acoustic receivers at the lake outlet (and in front of the power station intake), we have been able to derive some 3D tracks of tagged eels and look for opportunities to intercept them. Together with **Shannan Crow** and Japanese collaborators, Don is also involved in studying the microchemistry of eel otoliths as a means of determining life history strategies.

Ton Snelder, Deborah Ballantine, Doug Booker, Martin Unwin and **JoAnna Lessard** have completed an updated assessment of national river water quality for the Ministry for the Environment. This involved collating regional council river water quality data at long term monitoring sites and analysing this for trends over the last 10 years, as well as spatial patterns in water quality at the National scale.

Ton and **Ned Norton** have been involved with the Land and Water Forum, where their past work on better implementation of water management under the RMA is of interest. Ned has also been involved in assessing current nutrient loads and options for nutrient load limits in the Hurunui catchment with **David Kelly** (Environment Canterbury).

Stark Environmental Limited

John and **Yvonne Stark** established Stark Environmental Limited (SEL) in June 2007 and have been offering specialist freshwater ecological research and consulting services (primarily concerned with macroinvertebrates, biotic indices and biomonitoring) and undertaking macroinvertebrate sample

processing for three years. Stark Environmental Limited employs up to three experienced part-time staff to assist Yvonne with sample processing when the work load demands.

John and **Ngairé Phillips** (NIWA) have published a paper on flow variability on biotic indices under a subcontract to NIWA's Water Allocation FRST research programme. John is working with **Alastair Suren** (NIWA) developing biotic indices for South Island wetlands with funding from DOC and Envirolink (West Coast Regional Council and Environment Southland), with additional support from Environment Southland and Environment Canterbury.

Taranaki Regional Council

Resource investigation into small streams

Increasingly in Taranaki, landowners are opting to pipe small streams in a desire to increase pasture availability and decrease the need to fence and plant riparian margins. Taranaki Regional Council has completed an investigation into this practice in order to better understand the ecological effects and possible cumulative impact of this farming practice. An analysis of aerial photos was undertaken over the summer comparing aerial photos of 2001 with those taken in 2007. This indicated that the amount of stream piping is considerably more than that being consented, although a significant proportion of this is historical piping. Utilising this data and recording any new stream loss through the consenting process has been investigated, particularly through the use of GIS. The appropriateness of the Regional Freshwater Plan rules in relation to stream modification and effects on biodiversity have also been assessed. A report entitled *Small Stream Modification in Taranaki: An assessment of the ecological and hydrological values of small streams, the cumulative extent and ecological effects of modification, and implications for policy and practice* was produced, and included 19 recommendations. The study identified an acceleration in stream modification. It has not investigated in depth whether this is a new emerging long term trend or a 'blip' driven by very specific and short term factors, and therefore most likely to dissipate. It concluded that further work is needed within these and other areas, for the Council and the regional community to make fully informed and well considered decisions on policies, objectives and targets around small stream modification.

SHAP

Stream habitat assessments have begun at all biomonitoring State of the Environment sites using the recently published protocols. All sites will be addressed over a three to five year cycle and the sediment protocols are also being implemented in the process. These data will be utilized alongside state of the environment biological monitoring results in the consideration of trend interpretation.

Don't swim with the ducks

Taranaki Regional Council, in conjunction with the Cawthron Institute, has just completed an investigation into the sources of faecal bacteria in the small coastal Waimoku Stream which meanders its way across the “Blue Flag” Oakura Beach, to the west of New Plymouth. This stream is often used by children as it is shallow, warm, and easy to access. It seldom meets contact recreational standards and was labeled the “worst” monitored stream (bacteriologically) in NZ in a recent MfE assessment of contact recreational sites. TRC surveys of the entire catchment in the 1990s and 2000s identified issues with wildfowl (mainly pūkeko and ducks), particularly in the well planted riparian margins of the catchment. Sampling and marker identification techniques during the first half of the summer recreational period confirmed that the major contribution to the high bacteriological numbers (in excess of 1000 E. coli/100 mls) originated from wildfowl. Signage to this effect will be displayed by Health Authorities on site, the birds will be left un-molested, but the public will also be encouraged not to treat the birds as pets! In addition, the local authority will undertake to maintain a stream channel directly across the beach and away from the main coastal bathing site. The marker investigations could prove valuable for the monitoring of other sites where elevated bacteriological levels are causes for concern from time to time, eg Waitara River and small coastal streams near New Plymouth city.



Ideal pukeko habitat in the riparian vegetation of the Waimoku Stream. Photo: TRC

TRC Staff Movements

Rosemary Miller, who kept a watchful eye on the freshwater plan and was a leading player in the production of our recent State of the Environment Monitoring (SEM) report, has returned to the Department of Conservation via a stint at the Ministry for the Environment. She is replaced by **Angela Lenz**. **Kimberley Hope**, who coordinated the State of Environment Programme, has also changed camps and gone to New Plymouth District Council.

Of those remaining, Monitoring Manager **Keith Brodie** continues to be responsible for the behaviour and performance of the Scientific Officers and staff. **Chris Fowles** has been leading various SEM projects and performing biological macroinvertebrate and other consent monitoring. **Bart Jansma** has been juggling fish pass investigations with periphyton SEM and investigations into effects of riparian restoration and hydroelectric power scheme consent monitoring. **Ray Harris** gathers the samples for several SEM programmes and **Fiona Jansma** leads the hydro team and has returned to work (thankfully) after Bart-induced maternity leave.

Infrastructure-related projects

Liza Inglis, Erica Colley and Sara Howarth have undertaken a number of Stream Ecological Valuations around the Auckland region including developing environmental compensation plans and riparian planting plans for various projects (with input from **Graham Ussher** on the latter). The team (including **Caleb Sjardin**) has been involved in environmental assessment and monitoring for large roading projects, as well as assessing the effects of residual flows and recreational flow releases downstream of water supply and hydro lakes.

Fish 'trap and haul'

Liza and **Peter Roan** have been developing and implementing a trap and haul program for Watercare Services Limited (Watercare) water supply dams in the Waitakere and Hunua ranges. Over the course of the 2009-2010 migration season, trial traps have been set up at five dams to assess location, catch rate, ramp set up and water supply. Juvenile fish captured are then moved upstream above the dams. Large nets have been deployed within the dams to catch migrant adult eels which are then moved downstream below the dams. During 2010 permanent traps are being constructed and trialled along with the development of procedures for Watercare to operate the traps successfully in the future.

Biosecurity

Following on from previous didymo risk assessment projects for hydropower facilities, **Erica Colley** and **Brett Ogilvie** have been working (in collaboration with **Susie Woods** and **Barrie Forrest** from Cawthron) on a didymo vector control project for the NZ Defence Force. Challenges have included figuring out how to decontaminate Unimog trucks and armoured vehicles in the field!



Erica Colley collecting a macroinvertebrate sample as part of a Stream Ecological Assessment. Photo: Sara Howarth

Hamilton Urban Streams

Dean Miller has been overseeing fish pass construction works on a major on-line stormwater lake development in north Hamilton. The project has also included rescuing and transferring juvenile and adult giant kōkopu from the former stream bed along with the design of urban stream fish habitat enhancement works in the form of engineered woody debris weirs and log overhangs. Dean is working with Hamilton's Mangakōtukutuku Stream Care Group on similar urban stream fish habitat enhancement features as well as ecologically sensitive engineering works for addressing stream bank erosion.

Further afield

Brett and Liza (along with hydrologist **David Leong**) have been working on environmental aspects of hydropower and irrigation dam projects on the White and Blue Nile in Uganda and Ethiopia respectively. The Ethiopia project included developing a PHABSIM model for a tributary (including habitat suitability curves for *Labeobarbus* – a barbel) to assess the effects of changes in discharge on habitat availability. Brett also continues to help **David Hamilton** and **Ian Hogg** in his role as Honorary Lecturer at Waikato University.



Liza Inglis holding an eel at Waitakere Dam. Photograph taken by a Watercare Caretaker.

University of Canterbury

It's been another busy year for the University of Canterbury's Freshwater Ecology Research Group (FERG). **Angus McIntosh** is finishing off research work from Colorado on the effects of flood disturbance on the strength of trophic interactions, and is also heavily involved in two New Zealand-based research projects. He continues to serve as the Mackenzie Foundation Chair in Freshwater Ecology and is heading up a large project funded by the Mackenzie Foundation aimed at enhancing the effectiveness of riparian management (see the description of this project below). Angus is also working with **Pete McHugh** and **Ross Thompson** on a Marsden funded project to investigate the effects of habitat compression on food web dynamics.

In 2009 **Jon Harding** was heavily involved with the Board of Inquiry on the National Policy Statement on Freshwater Management. The Board finally submitted its report in February 2010. Jon is also continuing research on the effects of acid mine drainage on stream ecosystems (with **Kristy**

Hogsden) and working with **Tanya Blakely** to develop 'SingScore', a macroinvertebrate biotic index for assessing the health of Singapore's running waters. In conjunction with **Mike Winterbourn** and **Esther Clews** (National University of Singapore) they have published *An illustrated guide to the freshwater macroinvertebrates of Singapore*, which has some fabulous photographs taken by **Stephen Moore** (Landcare Research).

Post-doc **Pete McHugh** is continuing his research on spatially compressed food webs, focusing on community composition in drying streams. He recently completed a field study on the effects of flooding disturbances on stream invertebrate communities.

A new post-doc, **Jonathon (Jon) O'Brien**, joined FERG to lead the Mackenzie project. Jon's current focus is on the effect of riparian management on stream nutrient cycling. This past summer he conducted a broad-scale stream survey of land use and riparian gradients on stream ecosystems across Canterbury. Also participating in this project were two new post-graduate students: **Elizabeth Graham** (PhD student) who is researching the effects of nutrient enrichment on stream food webs and the changes in trophic structure and linkages in response to gradients of land use and riparian management and **Teresa Burrell** (MSc student) who is looking at stream metabolism across gradients of riparian management and stream size. **Frank Burdon**, a continuing PhD student on the Mackenzie project, is currently processing invertebrate samples to further his investigation into the impact of sediment deposition on community structure and function in agricultural streams. A recent vacation in Hong Kong, with a diversion into tropical streams, helped to alleviate eyes tired of seeing *Potamopyrgus*, but he is strictly back to business now with a review article in preparation, ongoing lab processing and the working up of results from several sources. **Hannah Franklin** is finishing up her MSc investigating spatial patterns in stream water chemistry in agricultural catchments.

Kristy Hogsden continues her PhD work on food webs in west coast streams impacted by acid mine drainage. She is currently planning lab and field experiments to assess how changes in structure affect energy flow through these food webs. Out on the Banks Peninsula, **Simon Stewart** (MSc student) is developing a method for analysing the $\delta^{15}\text{N}$ and $\delta^{18}\text{O}$ signature of nitrate using



Kristy Hogsden electricfishing on the west coast.

denitrifying bacteria. He plans to use this method to identify the relative contribution of various land-uses to a mixed land-use catchment's total nitrate budget and study how isotope signatures are affected by position within the catchment and biogeochemical processing. **Jonathan Bray** (PhD student) is researching the effects of, and the abiotic controls on, *Didymosphenia geminata* across the south island. The current scope of his PhD is to establish the physicochemical preferences/controls of this non-indigenous invasive in lotic ecosystems, for colonisation, growth and blooming. **Danladi Umar**, a PhD student from Nigeria, is studying how varying land use affects stream communities, particularly benthic macroinvertebrates, in Nigerian highland tropical streams. In the Mackenzie Basin,

Simon Howard (PhD student) is investigating how flow regime and other habitat parameters interact to affect populations of threatened pencil galaxiids. He is currently conducting a spatial survey of fish populations in streams with differing flow regimes, while quantifying the mesohabitat composition of those streams, to determine where galaxiids occur in stream networks. He intends to couple the spatial survey with subsequent temporal surveys to assess how galaxiid populations are affected by changes in flow over time.

Several other FERG students are nearing completion of their projects. **Rebecca Campbell** is finishing her PhD research on spatial patterns of invertebrate communities using a connected stream network approach. Her work investigated which distance measurement best relates to functional spatial processes for both larval and adult invertebrate communities and whether communities change over time in their spatial pattern in stream networks. She also studied the relative importance for spatial (regional) and local habitat community controls and how this relates to network-scale variables such as disturbance, the level of branching, and the effects of isolation and position in the stream network in influencing invertebrate community structure. **Phil Jellyman** is nearing completion of his PhD on stream size- and disturbance-related effects on the structure of stream fish communities. **Duncan Gray** has submitted his PhD thesis entitled "Ecological connectivity in braided riverscapes" and is now working on a macro-invertebrate index for Acid Mine Drainage impacted streams on the West Coast with Jon Harding. **Jarred Arthur** has been hard at work on his master's thesis on the effects of upstream forest fragmentation and riparian mechanisms on downstream pastoral macroinvertebrate communities. Jarred's research focused on the environmental variables which drive shifts in community structure. **Troy Watson** has been writing up his master's thesis on aquatic life across cave ecotones, while **Taryn Wilks** (MSc student) has been beavering away at her research on the influence of lake-level fluctuation and salinity on community structure in Lake Ellesmere/Te Waihora.

Recent FERG graduates include **Darragh Woodford**, who completed his PhD on "Riverscape-mediated effects of introduced trout on non-diadromous galaxiid fishes in New Zealand"



Simon Howard recording habitat data along the Ahuriri River

and is now back in South Africa pursuing options for postdocs and working on projects involving invasive fishes. His first paper on his NZ research has recently been published in *Ecological Applications*, and he has several more in the pipeline. **Amy Whitehead** finished her PhD entitled, "Tools for managing threatened species: improving the effectiveness of whio conservation", and has since secured a postdoc at the University of Queensland to research the conservation of the Ross Sea ecosystem. Amy has papers from her PhD out in *Austral Ecology* and *Biological Conservation*, with a few more to come also. **Kati Doehring** completed her master's thesis on the effects of urbanisation of streams on whitebait migration upstream, and is now working in Nelson for Cawthron.

FERG has also welcomed a few new (or returning) members. **Steve Pohe** moved down from the North Island to join FERG, but continues his work on Northland stream invertebrates and the *Tramea* dragonfly, as well as a long-term investigation of black mudfish habitat usage and population dynamics with NorthTec colleague **Olly Ball**. At Canterbury, he is working with **Jon Harding** and **Mike Winterbourn** to develop a study of mayfly biology. **Helen Warburton** has returned to Canterbury to begin a PhD investigating food web stability. She plans to look at how the pattern of interaction strengths in stream food webs affect their stability, and whether body size can be used to estimate interaction strength. Additionally, she is going to study how potential perturbations such as increased temperature or changes in predator biomass may affect the patterning of interaction strengths and ultimately food web stability, using both an experimental and modeling approach. **Milen Marinov**, an entomologist from Bulgaria, has also joined the group as a technician and continues his own research. Milen has a great passion for dragonfly studies; his particular interests are the evolution, phylogeny and phylogeography of the Pacific Odonata. He has established and maintains a database containing published records on dragonfly fauna, taxonomy, ecology, biology and molecular information.

Waikato University



Toni Johnston prepares to sample rip-rap in the Waikato River. Photo: Kevin Collier

Lots of lake work

David Hamilton has been editing a special issue of *Hydrobiologia* with **Michael Landman**, entitled *Lake restoration: An experimental ecosystem approach for eutrophication control*, which contains a series of papers that describe the application of a modified zeolite for nutrient control in Lake Ōkaro (Rotorua). **Dennis Trolle** has completed his PhD on sediment nutrient dynamics and lake restoration, and has returned to Denmark to take up a position with the National Environmental Research Institute. **Deniz Özkundakci** has completed his PhD thesis on the restoration of Lake Ōkaro. He has taken up a post-doc

position at the University of Waikato to continue with his lake restoration research. **Nina Von Westernhagen** has been hard at work on her PhD thesis on Lake Rotoiti (North Island) and recently had a paper accepted by *Hydrobiologia* on temporal and spatial variations of phytoplankton productivity in Lake Rotoiti. Two students have recently commenced PhD studies in the LERNZ group: **Jonathan Abell** is investigating the fate and transport of nutrients and sediments entering Lake Rotorua in storm flows and **Rebecca Eivers** is examining Silt-trap/wetland treatment systems on Waikato peat lakes. **Austin Zhang** has returned to China after completing his MSc thesis on short-term fluctuations in water quality in Lake Rotorua. **Mat Allan** is processing lots of remote sensing images as part of his PhD thesis investigating water quality in the Rotorua lakes. He has recently had a paper accepted by the International Journal of Remote Sensing on "Landsat remote sensing of chlorophyll a concentrations in central North Island lakes of New Zealand". **Bernard Simmonds** is halfway through his MSc thesis on use of flow cytometry for examining phytoplankton composition in Lake Ōkaro and has been working alongside **Marie Dennis** (Scion) who is examining the role of viruses in phytoplankton losses, co-supervised by **Susie Wood** (Cawthron). **Denise Bruesewitz** has returned to the USA after a two-year post-doc at the University of Waikato investigating denitrification in the Rotorua lakes. **Chris McBride** has been very busy deploying and servicing real-time lake monitoring buoys, with a recent deployment in a reservoir in Singapore. **Wendy Paul** has been busy with a Waikato shallow lake health indicators project through Environment Waikato and visited Scotland in June 2010 where she participated in a phytoplankton taxonomy workshop. **Joseph Butterworth** is working jointly across the University of Waikato, NIWA and Environment BOP, on aspects ranging from water quality to fisheries. He has been assisting **Ian Kusabs** in his PhD study which has been focused on the tau as a traditional sampling technique for kōura in the Rotorua lakes.

... and plenty on rivers too

Kevin Collier has been co-ordinating the publication of a book on the Waikato River: *The Waters of the Waikato: Ecology of New Zealand's longest river* (see flyer in this newsletter) which has involved several authors from the Centre for Biodiversity and Ecology Research. Kevin has also been involved with studies on the Waikato River by members of the large rivers group (see <http://www.lernz.co.nz/largerivers.html>), including **Melanie Ginders** who is investigating the ecological role of side-arms and their implications for river restoration and **Toni Johnston** who is investigating the effects of willows and riprap on fish and macroinvertebrates. Toni's research is intended to provide information on the effects of willows and riprap on invertebrates, fish and habitat in a large river and help inform future bank stabilisation management decisions. Limited information means the effects of



Michael Pingram collects the seston from the Waikato River for stable isotope analysis.
Photo: Kevin Collier

current river management techniques involving the removal of willow and the addition of riprap are unclear. Toni is comparing three sites each with four bank types including willow, riprap, beach and a mixture of willow and riprap. Physical habitat conditions will be assessed in relation to different river flows, including velocity, depth, wetted habitat, chainage and substrate. Assessment of fish populations is being carried out with the aid of boat electrofishing, Gee Minnow trapping and spotlighting. Invertebrate populations will be measured quarterly, for seasonal comparison, by kick netting. **Michael Pingram** is investigating lower river food-webs and their relationship with habitat complexity. He is currently investigating longitudinal and seasonal change in stable isotope values and the importance of selected basal resources to food webs between the Karapiro Dam and Akaaka. He has also been using a biofish instrument (a multi-sensor, boat-towed device) to characterise selected physical and chemical variables down the length of his study area, a continuous stretch of river approximately 140 kms in length, a process that takes around three days. Michael will use these to construct food web diagrams, elucidate trophic interactions and determine the contributions of potential carbon sources to this large river food web. Kevin has also been working with **Konrad Gorski**, a post-doctoral fellow from Poland who has studied fish communities on the Volga River in Russia. Amongst other things, Konrad will be advancing the development of an ecological model for the Waikato River and assembling data to reconstruct an historical template for the river environment.

Mostly cold stuff

Nicholas Demetras has recently completed his MSc on the population genetic structure of Antarctic springtails and mites and is now working as lab manager in the Pacific Biosystematics Research Lab (PBRL). Nick oversees the day to day activities in the lab as well as contributing to the FRST funded Freshwater Restoration work. **Ian Hogg** continues to split his time between New Zealand aquatic and Antarctic terrestrial work. Most of his efforts in the aquatic realm are directed at contributing to the FRST-funded restoration work and to the International Barcode of Life Initiative (iBOL). This latter

work involves a multinational effort building and testing a global database of mitochondrial DNA sequences to enable the rapid and routine identification of species. Recent work has included the NZ caddisflies with **Brian Smith** and the NZ and Australian zooplankton with **Ian Duggan** and **Jonathan Banks**.

It's the little things

This year **Ian Duggan** has been writing up his Marsden funded work on how constructed waters facilitate invasions, which he worked on with MSc students **Claire Taylor** and **Samantha Parkes**. They have recently completed their theses. A paper on invasion risks from "incidental fauna" in the aquarium trade by Ian, presented in part at the

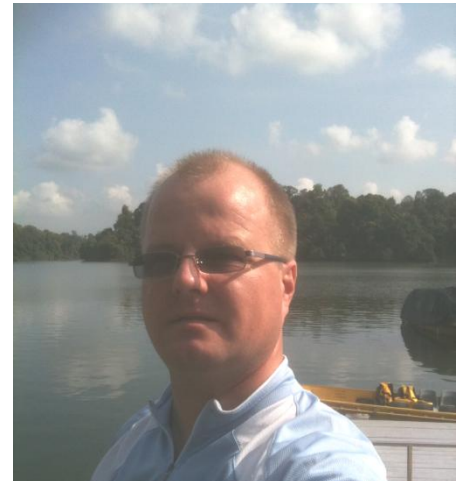


Side-arm survey 8 – Melany Ginders and Warwick sampling side-arms in the Waikato River. Photo: Kevin Collier

NZFSS conference a couple of years ago, has now been published in *Biological Invasions*. Also recently published was a genetic analysis of the Japanese copepod invader *Sinodiaptomus valkanovi*, with **Wataru Makino** of Tohoku University and **Matt Knox**. They found that the known New Zealand populations originated from the north of the main island of Japan, and likely constituted only a single introduction event into New Zealand. Finally, he has also recently published work on the effects of marine intrusions on zooplankton in Waituna Lagoon with **Michelle White** (ex-Environment Southland). **Brenda Baillie** is progressing with a PhD, supervised by **Brendan Hicks**, on the role of wood in forested streams.

Hans Eikaas

Hans Eikaas is currently working as Assistant Director of the Catchment and Waterways Department, The Public Utilities Board, Singapore. During the past few years, Hans started a range of projects dealing with the ecological and biological parts of Singapore's waterways, including the development of macroinvertebrate indices for reservoirs as well as waterways. The reservoir macroinvertebrate project was done in collaboration with the National University of Singapore and the waterways one was in collaboration with University of Canterbury. Both of these indices are now part of the routine water quality monitoring programme in Singapore. Additionally, Hans is running a programme dealing with broad-based biodiversity in Singapore's reservoirs. This is also a joining programme with the National University of Singapore.



Hans Eikaas on field work in the Upper Peirce Reservoir, Singapore

Rob McColl

Rob McColl retired from DOC Science & Research Unit in 2005. He currently is a member of the Wellington & Hawke's Bay Conservation Board and is active in shaping the Board's freshwater and coastal statutory advocacy submissions, the pressure for which appears, sadly, to be increasing. Rob chairs a research advisory committee for Waikato University's Freshwater OBI "Lake Ecosystem Restoration New Zealand" and does occasional consultant work.

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Awards

V.H. Jolly Student Travel Awards

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

The criteria for the Awards are as follows

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

NZ Freshwater Sciences Society Medal and Honorary Membership

Rules

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 additional members of the Society at least one of whom is not employed by the same organisation. Closing dates for nominations are 30 June of each year. There would be no expectation that any Award need be presented in any given year. It is recommended that nominations are made without prior knowledge of the nominee.

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.

S.I.L. 1987 Trust Fund Awards

The Society administers grants for overseas travel by young scientists and visits by overseas scientists through the S.I.L. 1987 Trust Fund. The two grants are the **S.I.L. 1987 Trust Fund Travel Award** and the **S.I.L. 1987 Trust Fund Guest Lecturer Award**.

S.I.L. 1987 Trust Fund Travel Award

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

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

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

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

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

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

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

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

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

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

Closing date: Applications must be submitted to the Secretary/Treasurer by 30 November in any year for travel the following year. All material (including letters of support from referees) must be submitted electronically as pdfs or Word documents to the Secretary/Treasurer. Material received only as hard copy cannot be considered.

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.

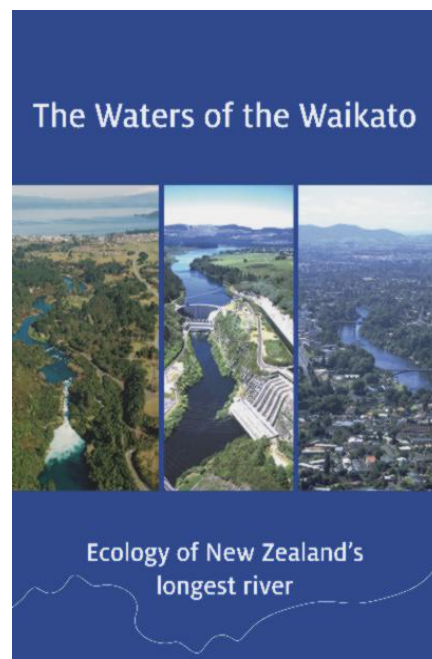
Tenure: Such period/periods as the Committee thinks fit.

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 be submitted to the Secretary/Treasurer by 30 November in any year for Guest Lecturers proposed for the following year's conference. All material (including letters of support from referees) must be submitted electronically to the Secretary/Treasurer as pdfs or Word documents. Material received only as hard copy cannot be considered.

New Book:

- 308 pages
- 20-page colour spread
- 48 contributing authors
- 15 chapters covering geography, flows, temperature, sediment, water quality, plankton, invertebrates, fish, birds, lowland lakes, floodplains & wetlands



Edited by:

Kevin Collier, David Hamilton, Bill Vant & Clive Howard-Williams

Published by:

Environment Waikato and CBER (The University of Waikato)

The Waters of the Waikato: Ecology of New Zealand's Longest River is a case study of an iconic New Zealand river. It is of great cultural and spiritual significance, has considerable economic and recreational value, and provides a place to live for a wide variety of plants and animals. This book tells a story of this river's physical and chemical environment and the life it supports, from the turbulent blue waters at the outlet of New Zealand's largest lake down to the tidal waters of the river delta. It is a contemporary synthesis of current scientific knowledge of this river, and will provide a reference for river managers, policy makers, students and the interested public.

**Price: \$49 including postage in NZ
(postage for overseas delivery extra)**

Available from:

The Librarian, Environment Waikato, PO Box 4010, Hamilton East, Hamilton.
Email library@ew.govt.nz or see www.ew.govt.nz Publications

Announcing a new book:

The New Zealand Native Freshwater Aquarium

by Stella McQueen

Our native fish have been too long 'out of sight, out of mind' and this book aims to help bring these fish into the open. The fish become more tangible in live displays and act as advocates for freshwater conservation.

Native fish are easy to keep and are an interesting alternative to exotic aquarium species.

This book:

Discusses the species most suitable for the home aquarium, with a strong focus on conservation and ethical fishkeeping.

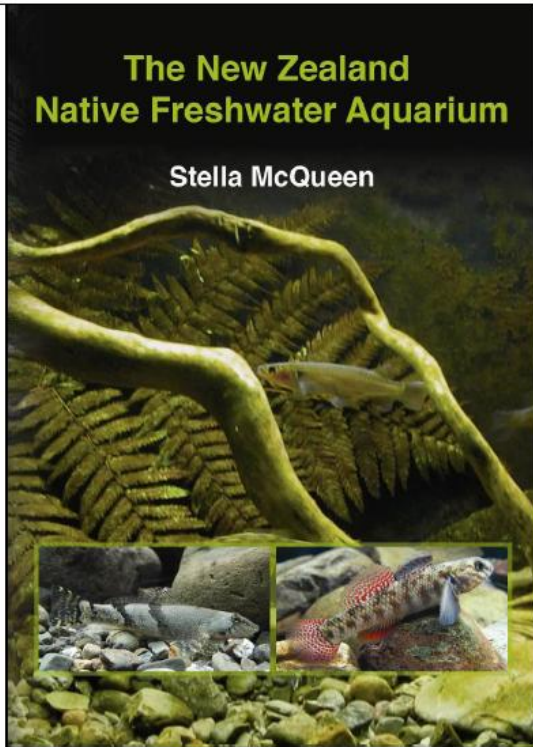
Includes detailed information on how to find, catch and look after native fish, with tips on how to identify different species.

Provides an understanding of the fish in their natural environments, and how to create an attractive aquarium that reflects these habitats.

For scientists, fish keepers and the generally curious alike.

The New Zealand Native Freshwater Aquarium

Stella McQueen



Will be available for purchase or order at the NZFSS Conference in November

or contact the author
nznativefish@gmail.com

Rotorua. New Zealand. 18 - 23 September 2011
www.dipcon2011.org

15th International Conference
of the IWA Diffuse Pollution Specialist Group

Diffuse Pollution & Eutrophication



An international conference on diffuse pollution (pollution from land use) will be held in Rotorua New Zealand, from 18-23 September 2011.

This conference of the International Water Association (IWA) Specialist Group on Diffuse Pollution and Eutrophication (dubbed DIPCON2011) will be held in tandem with the conference of the IWA Health-related Water Microbiology specialist group.

A special joint session on "Microbial diffuse pollution" will be held on Tuesday 20 September.

The conference is expected to be of particular interest to resource managers in regional councils and central government, and to scientists, engineers, planners, lawyers, economists and other professionals engaged in researching or controlling pollution.

For more information, please visit the conference website: www.dipcon2011.org

Contacts: Rob Davies-Colley (NIWA; co-chair), Jim Cooke (Diffuse Sources Ltd; co-chair), Lea Boodee (onCue; event manager).

Major Sponsor



Conference Themes

- A. Diffuse microbial pollution (special joint session with HRWM Group)
- B. Agricultural diffuse pollution
- C. Nutrients and Eutrophication issues (Sources, controls, effects)
- D. Urban pollution and transport effects
- E. Sediment pollution (sources, controls, effects)
- F. Groundwater/surface water interactions
- G. Economics, Policies, and Education to control diffuse pollution
- H. Integrated catchment management (ICM)
- I. Indigenous knowledge and diffuse pollution management in small island states
- J. Mining issues, heavy metals, and emerging contaminants

Key Dates

- 1. Abstracts Open: October 2010
- 2. Registrations Open: October 2010
- 3. Abstract Submission Deadline: March 15th 2011
- 4. Notification of Acceptance: May 15th, 2011
- 5. Early Bird Registration Deadline: June 1st, 2011
- 6. Full Paper Submission Deadline: June 30th, 2011
- 7. Diffuse Pollution IWA Conference: Sept. 18th – 23rd, 2011

Minutes and reports

Minutes of the 42nd Annual General Meeting of the New Zealand Limnological Society Inc. (Trading as NZ Freshwater Sciences Society)

The AGM was held at Forum North, Whangarei. The meeting opened at 5.30pm, 25th November 2009.

Present: Kevin Collier, President, Brian Sorrell, Secretary-Treasurer and 47 members

1. Apologies

Sandy Milner, John Stark, Jonet Ward, Vivienne Cassie-Cooper, Hannah Rainforth.

Motion: That apologies be accepted. (*Chris Arbuckle/Neil Deans carried*).

2. Minutes of the 41st AGM

Matters arising from minutes: Dealt with under general business.

Motion: That minutes be accepted as a true and correct record of the 41st AGM. (*B. Sorrell/Carolyn Burns carried*)

3. President's Report

This year was tinged with sadness with the passing of one of our founding members, Ann Chapman, and the death of Jim Bannon who studied at Waikato University and was an enthusiastic ambassador for freshwater science. Ann's 40-year contribution to freshwater ecology and her passion for the subject to the end should be inspirational to all of us. Ann was actively writing up earlier work when she died – her revision of the book *An Introduction to the Freshwater Crustacea of New Zealand*, with Maureen Lewis, will be an enduring legacy. The previous version stood the test of time, and is still widely used over 30 years after its publication. The text for the book revision is currently with Trevor Crosby of Manaaki Whenua Press, and once he receives the final contribution from Maureen, Trevor will be sending it to Mike Winterbourn who has kindly agreed to act as reviewer. We hope to see this book published before too long.

This year we have seen some new communication developments with the launching of our new website and forum. I think you will agree that Wendy Paul has done a fantastic job bringing the NZFSS website into the 21st century, and keeping it updated and engaging. Thanks also to Jay Piggott and Marc Schallenberg for providing input into the design. It pays to keep an eye on the website to stay up-to-date with issues and events. The forum continues to be under-utilised, but now that we have the website and forum linked there is the opportunity to use the forum and our bulletin board as our primary means of communication and phase out the yahoogroups email. I would urge you all to register for the forum to engage in discussions or just keep in touch with what is happening. Hannah Rainforth produced an

excellent newsletter this year, and there may be some opportunity in the future to present some of this content on the website.

On Society matters, we were pleased this year to welcome Kristy Hogsden to the NZFSS executive as the student representative. Kristy has initiated an award for the best student paper which will be offered for the first time in 2010 – any volunteers to sponsor the cash prize would be most welcome. We look forward, through the student representative, to better meeting the needs of student members who are after all the future of our Society. Thanks also to Janine Wech for efficiently handling the Secretary-Treasurer responsibilities in Brian Sorrell’s absence, and Chris Arbuckle for co-ordinating strategic conference sponsorship on behalf of the Society. Rudi Hoetjes, Steve Pohe, Amy McDonald and Emma Simpson have done a fantastic job along with Sian Potts and HydroSoc representatives in organising this conference. Bringing freshwater to the regions is an important part of getting the message across, and to be able to do this jointly with our HydroSoc colleagues provides added benefits for us all.

During the course of the year, there were further developments with the National Policy Statement on Freshwater Management. Oral submissions were heard a few months ago, and my thanks to Neil Deans for presenting on behalf of the Society in my absence overseas. By all accounts, the NZFSS submission was highly regarded by the commissioners who considered it the most helpful submission received. This is a tribute to the ideas and dedication of all those who contributed to the workshop and forum discussions that formed the basis of our submission. This year I also made a submission on behalf of the Society on the Water Research Strategy which was being used to underpin future research directions and sadly lacked an ecological focus. We need to be vigilant of the changes in freshwater management and funding that are currently occurring at a rapid pace, to ensure that ecological issues are maintained at the forefront and are not circumvented by economic imperatives. I draw your attention to the New Zealand Freshwater Management Forum scheduled for February next year supported by the newly formed Water NZ, the NZ Business Council for Sustainable Development, and Irrigation NZ. If you get the opportunity, please go along to reinforce the sole ecological voice from NZFSS talking on ecological issues.

I move from the Chair that this report be accepted. *(Kevin Collier/Carried).*

4. Secretary Treasurer’s Report

Membership

Total membership at 10 November 2009 was 439.

Table 1. Financial status of membership.

	2009	2008	2007	2006	2005
Members current:					
Paid	172	89†	252	178	237
Unpaid	163	202	44	76	42
Members in arrears:					
1 yr	36	37	37	48	38

2 yr	39	36	2	28	20
3 yr	-	2	-	11	8
Other:					
Honorary	11	11	11	11	11
Life	3	3	3	3	1
Legal req.*	1	1	1	1	1
Societies	5	5	5	5	5
Libraries	9	9	9	9	9
Total	439	395	364	370	372

* Not a member

† Not comparable with other years due to Visa processing problems in 2007/08.

Table 2. Type of membership

	2009	2008	2007	2006	2005
Ordinary	294	263	235	244	260
Corporate	28	31	32	30	24
Honorary	11	11	11	11	11
Life	3	3	3	3	1
Unwaged/student	98	82	78	77	71
Other (Societies)	5	5	5	5	5

Finances

Our new on-line banking system has streamlined the banking and saved time considerably, and is operating smoothly. We have been steadily recovering the subscriptions after the Visa banking problems during 2007/08.

The accounts were audited by Brown Web Richardson Ltd, Hastings.

The Society continues in sound financial condition and is in a good position to continue supporting its aims. Our total assets (including equity in stock of unsold Bulletin and Freshwaters books) at 30 June 2009 were \$88,709. Expenditure was exceeded by income by \$8734. This profit was mainly supported by our subscriptions income, which returned to around its usual value (\$8004) now that our Visa banking problems have been resolved. Other main income items for this financial year were net profit of \$1232 from sales of Freshwaters of NZ and the Bulletin, and \$2998 interest on our bank accounts.

The conference continues to dominate our finances. The penalty fees from Queenstown 2007 (\$3369) were paid during 2008/09 and therefore conference expenditure is higher than in most other years (total conference expenditure of \$10,017). Despite this, our conference activities maintained a modest excess (\$1710) of income over expenditure. Due to the timing of payments of deposits, profits and penalties from different conferences, income and expenditure from individual conferences continue to appear in different financial years, making direct comparisons difficult.

The other major expenditure item in 2008/09 was \$2831 for the new website design. One point of note is that, with most members receiving their newsletters electronically, our printing costs are now very low.

We have one term deposit, the combined Jolly Fund, with \$48,595 at 30 June 2009. The Current Account at 30 June 2009 was at \$28,967.

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

Motion: That the Society accounts for 2008/09 be accepted (Brian Sorrell/Kit Rutherford-carried).

Motion: That the Auditor for the next financial year be Brown Webb Richardson Ltd., Hastings. (Brian Sorrell/Angus McIntosh – carried).

5. S.I.L 1987 Trust Fund

Annual Report for 2008-2009

Tabled by Kit Rutherford (Treasurer, S.I.L. Trust).

Charities Commission

We are now registered with the Charities Commission. Annual Return submitted on 30th September 2009 – no problems.

Investments

We have still not fully recovered from the share market crash of early 2009. We are ~\$1,000 down on where we were this time last year, despite having made no awards last year.

SIL 1987 Trust
Annual Accounts 2008-2009
Start date 30th September 2008
End date 30th September 2009

	Account number	Number of units	Unit price	
Statement of Accounts as at 17th September 2008				
17/10/2008 BNZ Ready Money	02 0343 0048153 000			\$38.21
30/09/2008 International Equity Trust	1633996	12611.9114	\$1.9127	\$24,122.80
NZ Strategic Bond Trust	1633996	8638.8395	\$1.6523	\$14,273.95
Total	1633996			\$38,396.76
20/05/2009 International Equity Trust	1633996	12611.9114	\$1.5055	\$18,987.23
NZ Strategic Bond Trust	1633996	8638.8395	\$1.6545	\$14,292.96
Total	1633996			\$33,280.19
5/08/2009 International Equity Trust	1633996	12611.9114	\$1.8165	\$22,909.54
NZ Strategic Bond Trust	1633996	8638.8395	\$1.6637	\$14,372.44
NZ Strategic Bond Trust	1633996	0		-\$14,372.44
NZ Bond Trust	811896	12.39018	\$1,159.9864	\$14,372.44
Total				\$37,281.98
17/10/2009	02 0343 0048153 000			-\$0.19
Nett dividends				-\$1,114.78

Notes

- 1 The value of investments decreased because of volatile sharemarkets
- 2 No travel awards were made by the Trust during this reporting period
- 3 There was no expenditure apart from bank fees
- 4 These accounts are unaudited

Signed



21st September 2009

James Christopher Rutherford
Treasurer

Kit Rutherford noted that with the passing of Ann Chapman it would be advisable to elect a new trustee in 2010.

Motion: That the Society transfer \$10000 of Society funds to the S.I.L. Trust (*Jon Harding/David Hamilton - carried*).

6. Publications and communications

Webmaster's Report: Wendy Paul reported that the revised website was up and running, and noted that there are currently 270 members on the group email and only 18 users of the forum. The benefits of simplifying communication by abandoning the group email and focusing more on the forum were discussed.

Motion: That the Society abandon Yahoogroups and use the Forum for communication in future. (*Wendy Paul/Janine Wech – carried*).

Newsletter: The President congratulated the new Editor, Hannah Rainforth (*in absentia*) on a fine 2009 newsletter.

Posters: The President reported that there are fewer than 1000 of each of the existing posters remaining and that demand is now levelling off. He requested members to consider volunteering for producing an algal poster as the next in the series. Chris Arbuckle noted the use of posters in Enviroschools and suggested members should advertise their availability more widely. The meeting expressed thanks to Dave Speirs again for the poster initiative.

Crustacean book: Kevin Collier reported that the final material is now with Maureen Lewis, to be reviewed by Mike Winterbourn. Publication at Manaaki Whenua Press is still planned, provided an appropriate business plan can be agreed with Trevor Crosby. Carolyn Burns queried whether having the book published online as an e-book would be possible, as it would greatly assist people using it for species identification. The President agreed to investigate this option, suggesting that an online pdf one year after publication may be feasible.

7. Future Conferences

Jon Harding reported on the 2010 Christchurch conference, which will have 'Freshwater Solutions' as the theme. The venue will be Chateau on the Park, and current ideas include opportunities for breakout sessions as well as field trips.

The President reported on discussions with ASL for the scheduled joint 2011 conference in Australia, and that he is currently discussing with Fran Sheldon (ASL) about timing in September to fit with the River Symposium in Brisbane. It was noted that September remains a problem for students and staff of NZ universities as it is during semester time. Angus McIntosh supported the quality of the joint conferences but expressed concern for this problem to be resolved. Kate McArthur noted the value of linking this to the Rivers Symposium for Council members, and Adrian Meredith also noted that September was a good month for conference attendance for Council staff.

Options for 2012 and 2013 include Taupō with the planned Lake Taupō symposium, and possible joint meetings with the Australian Society for Fish Biology and NZ Marine Sciences Society.

Motion: The Society supports the need for a joint conference with NZMSS. (*Chris Arbuckle/Roger Young – carried*). Gerry Closs to follow up.

Jon Harding reminded the Society of the need to have conferences in centres readily accessible to most members. John Quinn noted that Brisbane was very accessible and inexpensive from most NZ centres.

8. General Business:

IWA Diffuse Pollution Conference: Rob Davies-Colley drew members' attention to the 2011 conference of the International Water Association Specialist Group on Diffuse Pollution, which will be held in Rotorua, and encouraged members to attend.

Student Paper Award: Kristy Hodgson explained the initiative of the Society encouraging students to publish their research by having a student paper award of \$500. The meeting expressed strong support for the idea, and Carolyn Burns offered to help draft the criteria. Members were asked to help by exploring options for a sponsor.

Motion: The Society agrees to a student paper award, starting in 2010. *(Kristy Hodgson/Gerry Closs – carried).*

Professional Code of Ethics: The President raised the concept of the Society exploring the options of a code of ethics for freshwater scientists. Members raised issues regarding who would be qualified to judge compliance with such a code, what criteria could be used to judge whether a member is complying, and what action would be taken against a member found not to comply. The related question of what professional obligation a membership of NZFSS actually carries was also raised. Potential benefits of such a code noted were the value of a set of standards that set aspirations for Society members to follow, and the public relations benefits of a Society carrying such standards. Carolyn Burns reminded the meeting that NZFSS is a constituent society of RSNZ, which does have such a code, available on their website. Jon Harding and Gerry Closs agreed to explore the idea further and report back to the Executive.

Freshwater Report Card: Marc Schallenberg raised the idea of the Society putting together an annual report card on the status of fresh water in New Zealand. Several members supported the idea and Neil Deans suggested it should become a Forum topic. Kevin Collier noted that this could overlap with MfE's statutory responsibilities and Chris Arbuckle noted that SoE reports are downloadable from the MfE website.

S.I.L. Representative: Carolyn Burns announced that she has stepped down as New Zealand's representative to S.I.L. after thirty years' service, and that the NZ members of S.I.L. have elected David Hamilton as the new NZ representative to S.I.L. The meeting duly congratulated David on his election, who thanked Carolyn for her thirty years of service, and noted that she had also been S.I.L. President during her tenure. David also invited members to consider increasing their attendance at S.I.L. congresses.

David Le Cren thanked all the Executive members for their service on behalf of the Society.

The meeting closed at 7.10 pm.

New Zealand Freshwater Sciences Society

How do I join?



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

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

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

Address:

Telephone: (main).....
(other).....

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

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

Please fill out the following permissions:

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

Choose one: Yes No Please sign: _____

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

Choose one: Yes No Please sign: _____

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

Choose one: Electronic pdf Hard copy

Brief List of Your Professional Interests:

Payment:

Waged/Corporate \$40

Student \$10

Unwaged \$10

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

TOTAL AMOUNT \$.....

Make cheques payable to "NZ Freshwater Sciences Society"

Payment by Credit Card:

Visa Mastercard (circle one)

Name on card:

Card no:.....

Expiry date:.....

Signature:.....

Send to:

Secretary/Treasurer Brian Sorrell, c/- NIWA, PO Box 8602, Riccarton, Christchurch, New Zealand.
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*used for overseas travel awards for beginning NZ scientists and administered by The Royal Society of New Zealand

New Zealand Freshwater Sciences Society 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.

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