manatiaki kōawa

rivers GROUP

A joint technical interest group of IPENZ & Water NZ

INSIDE THIS ISSUE

NEWSLETTER

Issue 16 | December 2016

FROM THE CHAIR

Kyle Christensen

WELCOME to Issue 16 of the Rivers Groups Newsletter, "Flow", our fourth and final for 2016.

In this message from the Chair I'm going to provide a wrap up for the year and also talk about how we have gone in achieving our five objectives.

Starting with Objective 1 - To facilitate cross-disciplinary interaction between individuals, communities and professionals involved in catchment management, flood risk management and river management throughout New Zealand. I talked about that in the last newsletter and I think we are doing well in achieving this with combined events this year with the NZ Hydrological Society, IPENZ, Water NZ Stormwater Group, Water NZ Modelling Group, Royal Society, NZ Planning Institute, NZ Institute of Surveyors NZ Institute of Landscape Architects and the Engineers Australia's National Committee on Water Engineering. There is the opportunity in the current members survey https://www.surveymonkey.com/r/CZN59P6 to highlight other groups you think we should be more closely aligned with.
Objective 2 - To promote best practice, leadership and the sharing of technical knowledge in all aspects of catchment management, including flood risk management, river restoration and river engineering throughout urban and rural environments in New Zealand. As well as the more informal afterwork events (Tauranga, Wellington x 3, Palmerston North x 2, Christchurch) we have held full day training workshops in River Management and Culvert Design. There is the desire to do run more of these events particularly in areas where we haven't got to this year (Hawkes Bay, Nelson/Marlborough & Otago).

Objective 3 - To support and promote relevant science and research in river and catchment management and to disseminate that information among professionals, academics, decision makers and the general public. Over the past 2 years we have provided $24,000 to support research in river and catchment management. The results from the previous years research will start to become available from early next year and will be shared via the newsletter as well as web based links to more detailed reports.

To maintain this level of support for research we will need to continue running well supported events and increase our membership base.

Objective 4 - To promote and facilitate input into local and central government policies, strategies, standards and programmes affecting catchment and river management. I think we have fallen short in achieving this objective with very little to show other than some input into the Rainfall/Runoff Guidelines funding application to Treasury which was declined and some early scoping of the possibility for a National Freeboard Guidance document. This will be a definite focus for next year.

Objective 5 - To assist in the integration of the principles of the Treaty of Waitangi in best practice river management. Again I don't consider we have shown any real success in achieving this objective and improvements need to be made next year.

Overall I think we have done reasonably well recognising the limitations of being a group where people give up their spare time to make events happen and pull together information for sharing in newsletters and other forums. I would encourage you all to complete the membership survey so when the committee meets for its annual face to face meeting in February we know what the priorities are for members. With this feedback we can ensure that focus is directed into the right areas to achieve the most value for members.

I wish you all the very best for the festive season and look forward to seeing you at a Rivers Group event in the the New Year.

Kyle Christensen
Chairman

THE FUTURE OF FLOOD HAZARD MAPPING

Mark Hooker,[1] Ben Fountain,[2]
[1] Greater Wellington Regional Council, [2] Wellington Water

In the world of flood risk management we rely heavily on maps. Maps can be powerful communication tools breaking down the barriers of terminology, uncertainty and complexity. We use maps for a wide range of tasks like implementing planning controls on land use and new development. We use them to inform the public of hazards and empower the community to help manage the risks. Flood hazard maps are also important tools to plan for emergencies as well as develop engineering interventions. Over the last 15 years the hydraulic modelling that often forms the basis for the maps has evolved enormously. This has been driven by a combination of widespread collection of LiDAR, advances in modelling software and techniques, and ready access to vast computer processing power. However the way we map and communicate the flood hazard modelling information has often not kept step with these advances. This is beginning to change and there is a recognised need for our mapping and communication techniques to evolve.

There are five main drivers behind this change:

- The last two decades has seen a tightening and strengthening of building consent processes and standards. As a result of this flood hazards are now a major influence in what, where and how you can build on your flood prone property. This has greatly increased the demand for detailed and accurate flood hazard information.
- There is a trend in the New Zealand insurance market towards insurance premiums and policies that reflect the specific hazards at the site. Insurance companies are requesting flood hazard information and property owners/buyers are more aware of it.
- The need to adapt to climate change is driving a greater emphasis on sustainable development and appropriate use of flood prone land.
- Increased public awareness of council
- processes and challenges to hazard mapping or planning (often motivated by perceived threats to property values or development opportunities).
- The ongoing shift towards risk based, rather than level of service based, management of flooding.

Broadly flood risk is managed in three ways; through emergency preparedness and response, planning controls for new development, and infrastructure (natural and constructed). With the advances in hydraulic modelling and GIS processing we can more effectively than ever utilise flood maps in each of these risk management approaches. From experience around New Zealand the authors have found the following mapping approaches and techniques to be helpful.

Flood zone maps used for the implementation of planning rules and policies are not very useful for informing the other two flood risk management approaches. Often consultation with the community is driven by a district planning process and a common approach is to present only flood zone planning maps. This is an opportunity lost and often leads to a lack of belief in the maps as the detail of the flood behaviour is not represented. It is possible to first achieve understanding and acceptance of the flood hazard outside the planning processes. A traditional approach is to focus on a particular design event for mapping such as a 1% AEP event including an allowance for the changing climate. However, those who have lived in a catchment for some time are likely to have valuable experience of how the catchment responds to heavy rain. A map that resembles their experience can be a very useful tool when engaging with the community. Using a combination of model results and flood observations, maps can be developed of a real event in recent memory or a number of design events including more frequent events such as the 10% AEP flood. Maps for engaging with the community should represent flooding depths and extents without the addition of freeboard. This can be a useful tool for talking about flood behaviour such as blockages, the impact of fences or buildings on overland flow paths as well as model limitations.

An independent peer review of the hydrological and hydraulic model used to develop the flood maps is another important way to build trust and defendability in the results. Increasingly we are finding that this is expected or demanded by members of the community.

Freeboard does not need to be a contentious issue. For engineering structures such as flood walls or detention ponds a conservative freeboard to manage uncertainty is a long-accepted principle. However for flood mapping, especially maps for planning purposes, a different approach to freeboard is needed. Rather than managing uncertainty, freeboard for flood maps is best conceived of as managing known risks that are not represented in the hydrological and hydraulic modelling. Events such as sump blockages, bed level changes or vehicle generated waves are almost certain to occur during a flood and it is appropriate to represent the impact of these on flood levels with a freeboard allowance.

An approach that seeks to minimise the freeboard allowance is recommended. This can be achieved by including a reasonable combination of likely events into the base model such as high tides, common locations of intake or culvert blockages, gravel build-ups at changes of grade. This means that these likely events will only have an impact in their area of influence. Further quantification of an appropriate freeboard allowance can be gained through sensitivity analysis. This is particularly useful for catchment wide variations to the design model runs, such as the storm occurring in the catchment with wet antecedent conditions. This approach of minimising the freeboard allowance is seen as being more credible by the community. We also recommend representing the freeboard as a different colour to the base model results – this transparency removes some of the mystery of freeboard and makes the (less extensive) base model results more believable.
One of the most effective mechanisms for reducing flood risk is avoidance of the hazard. District planning controls that prevent the disruption of overland flowpaths, enforce building setbacks from streams and keep new floor levels elevated above the hazard of inundation rely on maps to identify these hazard zones. The Auckland unitary plan has made a significant change to the traditional district planning approach by only including the rules in the district plan and not the maps. This makes it much easier to update the maps as new areas are modelled; changes are made in the catchment or as a result of advances in modelling and mapping techniques. This approach is an effective way to address the lag between the rapid advances in modelling and mapping, and the review and update of District Plan maps.

Maps are powerful tools and there is plenty of opportunity to use them more effectively in flood risk management. The trajectory that the mapping and communication of flood hazards and risks is heading on can be summarised as follows:

- greater detail, accuracy, transparency, accessibility and frequency of updates
- more variety in the way that hazards are communicated through the maps.

20-21 JUNE 2015 MAJOR LOWER WHANGANUI FLOOD- DETERMINATION OF SIZE, FREQUENCY AND OTHER CHARACTERISTICS

Blackwood P.L,[1] Jon Bell,[2]

[1] Horizons Regional Council, [2] Horizons Regional Council

During 19 to 21 June 2015 the western area of the Manawatu-Wanganui Region experienced a very major rainfall event. This resulted in flood frequencies close to or exceeding 1% AEP (1 in 100 year) in several rivers. Substantial flooding occurred through the City of Wanganui, with water flooding numerous houses
reaching depths of up to 2 metres in some. The Lower Whanganui River peaked at a stage of 21.975 metres and flow of 4755 cumecs or 1.18% AEP (1 in 85 year) at the Te Rewa gauge. This flow is understood to be the second highest flood flow ever recorded in the North Island – behind only the famous Mohaka Flood flow of 1938, estimated at 225,000 cusecs (6370 cumecs).
In the lower reaches this flood was characterised by well above normal tributary flows. These were due to high rainfalls occurring upon wet a
ntecedent conditions, with the 48 hour rainfalls exceeding 1% AEP frequency for almost the entire area downstream of Te Rewa (refer Figure 1).
The final blow was a significant heavy burst of rain near the tail of the storm.

This paper presents:

1. The revised flood frequency at Te Rewa;
2. The possible influence of the Interdecadal Pacific Oscillation (IPO),with nine out of the top ten floods during the period 1957 to 2015 occurring in the negative phase;
3. The estimation of ungauged tributary flows;
4. The size of the June 2015 flood at Wanganui City, being 5150 cumecs being 0.77% AEP (1 in 130 years) at the City Bridge;
5. The determination of the appropriate tributary flows to be included in the design flood hydraulic model; and
6. Commentary on aspects of flood levels attained, including particularly the mitigating impact of mouth scour on lower river levels.

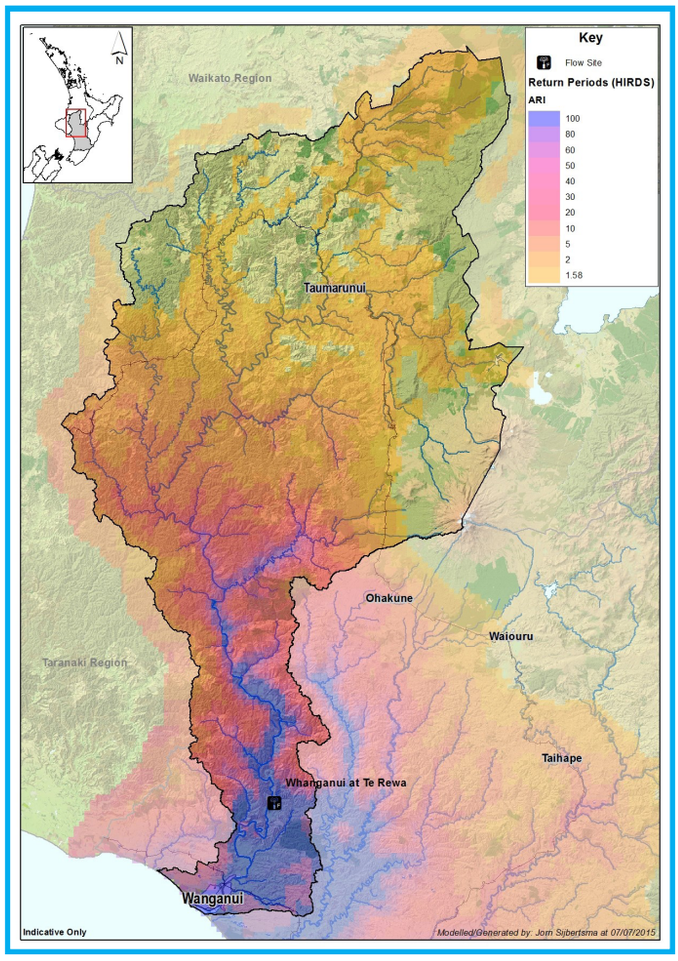

Figure 1: Whanganui Catchment 48 Hour Rainfall Frequencies June 2015 Storm

CONSTRUCTION OF AN IMPACT PLATE GEOPHONE TO RECORD SEDIMENT MOVEMENT IN NEW ZEALAND GRAVEL-BED RIVERS

Neverman, A.J.,[1] Fuller,I.C.,[1] Death, R.G.,1 Procter, J.N.,[1] Singh, R.,[1]
[1] Innovative River Solutions, Institute of Agriculture and Environment, Massey University, Palmerston North, New Zealand

AIMS

Gravel-bed rivers are a significant feature in the New Zealand landscape and a focal point for many issues surrounding water, infrastructure and the environment. Bedload transport is a key process in gravel-bed rivers as a driver of erosion and deposition which have implications for infrastructure development in and around rivers. Bedload transport is also significant for many other instream processes, particularly as a control on habitat structure and aquatic community composition (Death and Winterbourn, 1995, Death, 2002, Schwendel et al., 2010). Understanding bedload transport should therefore be a high priority for effective management of New Zealand rivers; both for maintaining ecological health and reducing impacts on infrastructure. Despite decades of research the accurate predication and quantification of bedload transport still eludes scientists. The inability to record bedload transport in natural channels at suitable spatio-temporal resolutions has been a significant limiting factor in this pursuit. Geophone based impact plates are seeing increasing use in bedload transport studies and as monitoring tools (e.g. Downs et al., 2016, Rickenmann et al., 2014, Tsakiris et al., 2014, Rickenmann et al., 2012). However, many of the impact sensors in the literature either require permanent support structures for installation (Rickenmann et al., 2012), or are installed in paving slabs at relatively stable sites (Downs et al., 2016). These installation methods limit the application of geophones in dynamic gravel-bed rivers, such as those found in New Zealand, as many sites of interest lack permeant structures or are too dynamic for installation of geophones in paving slabs which would simply become buried or removed.

This paper demonstrates the development of a novel installation method for impact plate geophones in New Zealand's relatively high-energy, dynamic gravel-bed rivers, which anchors the impact plate without permanent support structures. Results from a pilot test of the installation method in the Pohangina River, New Zealand are provided to support the viability of this novel installation.

METHOD

In order to install the geophones in remote, dynamic gravel-bed rivers where permanent concrete structures are not available a new installation system was developed and tested in the Pohangina River, Manawatu, New Zealand. An impact plate (Figure 1) 750 mm long by 500 mm wide was constructed with an enclosure on one end to house a velocity sensor. A 10 Hz geophone was bolted underneath the impact plate. 2 m long, 25 mm diameter steel rods where driven into the substrate in the wetted channel to which the impact plate was secured. Power and data transmission cables were run along 8 mm galvanised chain to a custom made data logger and 12 v battery mounted on the floodplain.

RESULTS

The impact plate was installed on 29th August, 2015 during flows of 13 m3/s. Mean flow for the site between 1969 and 2005 was 17 m3/s (Table 1). After 1 year of installation the impact plate has withstood 4 days where the maximum flow exceeded 100 m3/s, and one peak flow of 307 m3/s. FRE3 for the site during the installation period was 46, showing the installation withstood 46 days where flows exceed 30 m3/s. The installation has also withstood ~300 mm of vertical drop in the bed without needing any alterations.

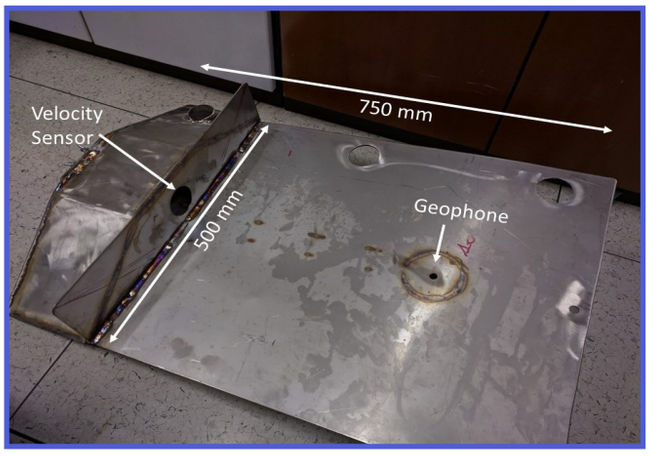

Figure 1. The impact plate used in this study prior to installation in the field.

Table 1. Flow statistics for the Pohangina River at the study site.

Flow Statistic	June 1969 to August 2005 (Henderson & Dettrich, 2007) (m3/s)	August 2015 to August 2016 (m3/s)
Mean	17.214	17.835
Median	10.012	10.253
3x Median	30.036	30.759
MAF	489.99	-
Maximum	1109.1	306.953
FRE3	12.528	46

Acknowledgements
We would like to thank Horizons Regional Council for providing expertise, data, and funding for this research. We would also like to thank Dave Reid from ESL for developing and constructing the data logger used in this project.

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CONTESTABLE FUNDS 2015 PROGRESS REPORTS

Aquatic weed (macrophyte) management trials to reduce flooding risk to agricultural land in lowland Canterbury drains

Katie Collins, University of Canterbury

To assist with my PhD work the IPENZ Rivers Group awarded me a Student Research Grant to help cover the costs of setting up a shading trial.

Aquatic macrophytes are plants that grow in or near water such as watercress and oxygen weed. They can provide important functions in freshwater ecosystems, however, in summer months these plants can grow excessively to the point where they cause a chain of negative impacts on the functioning and ecology of waterways.
For example, conveyance of excess water is the primary function of agricultural drains in lowland Canterbury. To be effective, waterways must drain water efficiently and quickly. When excessive weed growth occurs in summer, macrophytes often severely limit drainage, causing flooding to adjacent productive farm land. Management typically involves mechanical clearance with a bank-side digger to excavate plants from channels which is costly and ecologically damaging to aquatic biota and the waterway ecosystem.

As part of my PhD at the University of Canterbury, I am testing alternative tools to find a solution to weed management that benefits both the drainage function and ecological health of these systems. One tool we are testing is the use of shade to control macrophyte growth. From research done in summer 2014-15, I found that partial shading over the waterway's edge enhanced macrophyte growth, by providing protection and creating a comfortable microclimate. However, when shading extended across the waterway channel, macrophyte growth was significantly reduced with a 70% reduction in light. Anecdotal evidence had suggested that 90% light reduction would be required to achieve control.

This led us to question the reduction in light intensity that is required to control different macrophyte species and help reduce the need for management intervention and flooding to adjacent paddocks. With funding from the IPENZ Student Research Grant, I set up a shading experiment with 25 x 5 m shade tunnels along an agricultural waterway in October 2015. Different commercial shade cloth intensities were used to create a gradient of shading from 0-100% and measurements of plant growth were taken monthly over the past year.

My results to date show that higher levels of shading (> 70%) are clearly achieving macrophyte control. The threshold of light reduction required differs between species, and has not yet been determined for all species. In addition, the growth of some species is stunted as light is reduced.
We will continue to monitor this experiment over the 2016-17 summer.

These tunnels are simulating the light reduction that would be provided by shading from riparian planting. A better understanding of the light thresholds required for achieving control will increase our understanding of how to manage macrophytes while also ensuring ecosystem health and drain functions can be achieved.
At the moment, riparian and macrophyte management is being undertaken in the absence of this information; knowing the shade threshold required will allow more informed decisions to be made in future.

Looking down the experimental reach of tunnels set up. Comparison of macrophyte growth between four different shade intensities.

100%

75%

15%

Control (no shade)

SEDIMENT TRAP, TWO-STAGE DITCH AND INSTREAM BIOREACTOR PROOF OF CONCEPT DEMONSTRATION SITE IN CANTERBURY

Project Partners:
Mark McDonald (Private landowner & farmer, Red Cow Farms, Ltd.)
Canterbury Waterway Rehabilitation Experiment, University of Canterbury (PhD student Brandon Goeller, Postdoctoral Fellow Dr. Catherine Febria, PIs: Profs. Jon Harding & Angus McIntosh,)
Dr. Meg Devane (ESR)

When trying to address water quality and sediment problems across small agricultural drains in Canterbury, we need not look further than the South Island's big rivers and surrounding floodplain for solutions. Floodplains are natural levees in the landscape that receive floodwaters and sediments while also supporting biodiversity and other ecological functions. Plants and trees along the riparian margin carry out nutrient cycling processes including removing nitrates from the water.

Through funding through the IPENZ Public project grant, a partnerships was struck between the University of Canterbury's Canterbury Waterway Rehabilitation Experiment (CAREX), Red Cow Farms, crown-research institute ESR, to install a combination of in-stream tools for mitigating nutrients, sediment and fecal coliform bacteria. CAREX has already been monitoring a one-kilometre stretch of the waterway and the riparian margins at Red Cow Farm since 2013 and will continue until 2018.

Farmer and landowner Mark McDonald had spent the last ten years converting riparian land and implementing sustainable farm practices to accommodate generously planted riparin margins. ESR has been taking spot measurements for human health indicators such as fecal coliform bacteria since 2014.

In Canterbury waterways, many lowland waterways are connected to open 'drains' embedded across intensive agricultural land and surface water flow is carefully managed in order to support irrigation and fertilization needs. Controlled flow of irrigation water and use of pivot irrigation lead to sporadic excess irrigation water to downstream waterbodies that mimic flashy flood events that also introduce very high levels of sediment, phosphate and nitrate into drains and rivers.

The IPENZ grant allowed for the group to rework a problem drain on the farm property that was experiencing flashy high-sediment and high-nutrient events associated with race course water. CAREX saw this as an opportunity to install some in-stream solutions to improve water quality, and brought ESR into the fold to investigate the potential responses in mitigating fecal coliform bacteria. In November 2011, the new drain was dug and we installed a sediment trap, a two-stage channel, and an in-stream bioreactor (Photos).

The sediment trap allows for sediments (which preferentially bind with phosphates and fecal coliform bacteria) to settle out. Any further flow would then travel down two-stage channel, which features floodplain-like levels to trap further sediments and encourage nitrogen removal to occur on the levees. Finally, any in-stream nitrogen could be converted to inert nitrogen gas when interacting with the in-stream bioreactor. Wells were installed to allow ongoing monitoring of the project and the performance of the tools are still being evaluated. As it is an intermittently-flowing drain, we hope to have further flood events throughout the next few seasons to help understand the effectiveness of each tool, as well as on-the-ground information about installation.

This partnership has relevant applications to water management issues throughout the region but also to agricultural waterways throughout the country. We conducted this trial to test previously-untested tools in Canterbury as a proof-of-concept for further applications across the region and NZ.

By working together and through this grant, the work would not have been possible.

Photo 1: Artificial two-stage channel in a newly-constructed drain. The floodplain levels were set to allow for floodwaters to surpass onto the banks where sediments could settle out. Grass and tussock plants on the floodplain bench enable further nutrient cycling.

Photo 2: In-stream denitrification bioreactor. Woodchips line the bottom of the new drain to encourage nitrogen removal via denitrification. Monitoring wells were also installed to allow for ongoing monitoring within the bioreactor.

Photo 3: Two-stage channel in June 2016 after grasses and plants have grown.

STUDENT EVENTS

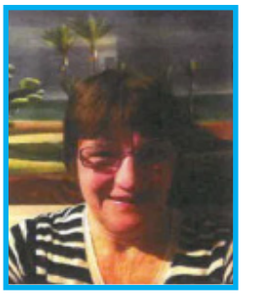
CANTERBURY STUDENT EVENT: WATERWAYS CENTRE POST GRAD SYMPOSIUM

New Zealand's whitebait fishery: a mixed bag of species and sizes
Mark Yungnickel

It is believed that inanga (Galaxias macu/atus) make up the vast majority of New Zealand's whitebait catch, with the remaining four species (kaaro, G. brevipinnis, banded kokopu, G. fasciatus, giant kokopu, G. argenteus, and shortjaw kokopu, G. postvectis) making up a variable, but much smaller component. This belief is based on the last widespread study of the composition of New Zealand's whitebait catch completed by McDowall in the 1960s.
Four of the five whitebait species are now ranked as 'declining or nationally vulnerable' due to bottlenecks in their life history. However, we have little current knowledge of the species composition of migratory shoals, or any temporal and spatial shifts in the make-up of the whitebait catch. We completed a nationwide study of the composition of the whitebait fishery within and outside the 2015 whitebaiting season.
Over 500 samples of whitebait were collected by whitebaiters on 96 rivers in 14 regions throughout New Zealand. Results of this study, including spatial and temporal differences in species composition and morphology, will be discussed together with whether the whitebait fishery has changed in the last 50 years.

Research/career interest:
Freshwater, marine and terrestrial ecology, stream rehabilitation, environmental monitoring, New Zealand freshwater fish.

Designing an integrated water quality monitoring programme for Te Waihora/Lake Ellesmere
Val McMillan



Monitoring is essential to the management of almost any activity, such as running a business or managing environment change. Unless we monitor progress, and react according to the results, little improvement can be achieved. Monitoring allows for more informed decisions, and wiser management.
Te Waihora/Lake Ellesmere has a special place in the economy, culture and environment of Canterbury. As an ICOLL (intermittently opened and closed lake or lagoon), it has its own unique set of 'issues' and challenges but like all shallow coastal lakes, it is affected by the historic and current land use in the catchment it serves. The Selwyn catchment is intensively developed and there are a large number of stakeholders with an interest in the lake and its future quality.
This research aims to design an over-arching robust monitoring programme with the specific objective of identifying key water quality changes over time. The monitoring programme will build on existing discrete monitoring or survey programmes undertaken by different. stakeholder groups, but will identify a new framework to address current knowledge gaps and provide for greater economic efficiencies. The programme will target water quality parameters strongly linked to the anticipated outcomes of current improvement initiatives being undertaken for Te Waihora.

Research/career interest:
Water quality in Canterbury

REGIONAL EVENTS

TALK ENVIRONMENT
SEPTEMBER 2016, WELLINGTON

The NZ Institute of Landscape Architects held a novel event in September that brought landscape architects, planners, engineers, urban designers, surveyors and other students and professionals in Wellington. The Rivers Group was keen to get on board with an event that promised drinks, nibbles, an interesting speaker and dancing!

Dr Jeffrey Wakefield presented on his experiences as a lead consultant involved in the response to the 2010 Gulf of Mexico oil spill. I found his presentation particularly interesting for its focus on some less obvious lessons learned, such as developing an initial response that is easily scaled up, and the personal impact of spending so much time away from home.

The Rivers Group was well represented on the dance floor towards the end of the night (with the notable absence of the Chair) and everyone I spoke with thought the event format was a success and worth repeating.

Hutt City Herald Wednesday October 19, 2016 5

NZILA representatives, Steve Dunn (left) and Michael Wright (right) Peter Gilberd (Cashmere volunteer, second from left), Bruce Patterson, and Cashmere Home residents, Therese Shields and Shirley Thomas, with a cheque for their planting programme.

Celebrating the environment

By Sharnahea Wilson

The capital city's first dance party for environmental professionals went off without a hitch, while raising money for a good cause in the process.

"Talk Environment' was held at The Boatshed on Wellington's Waterfront at the end of last month and was a night of celebration for architects, urban designers, engineers, scientists and other professionals working in the environment.

The event on September 23 was organised by several organisations, including the New Zealand Institute of Landscape Architects (NZILA) and sponsorship was provided by companies Peter Fell, Aco, Firth and Cardno.

Money raised from the evening was donated to The Seton Nossiter Park Working Group, for further restoration of the park, which took Peter Gilberd and Bruce Patterson of the group by surprise.

"Out of the blue, we received an email from Michael Wright from NZILA, offering a donation to our group," Chair of the group Bruce said.

Peter agreed and said "that's what was so nice about it, we had no idea".

He said the money would help support the work done on the nurseries at the Cashmere Home and the Cashmere Heights Home.

The residents at these two hospital-level residential homes grow 400 trees each year, many of which are planted in the park.

"This is a really good cause. The residents get to propagate the seeds and watch the plants grow – It's a neat activity."

The Seton Nossiter Park Working Group, with support from the community, has planted several thousand trees in the park, complementing the restoration efforts of the Wellington City Council and Greater Wellington Regional Council, Peter said.

The keynote speaker on the night of 'Talk Environment' was Dr Jeffrey Wakefield who shared his experiences as one of 800 environmental professionals to help with the clean-up of the Gulf of Mexico oil spill disaster in 2010.

Attendees then enjoyed a night of dancing and networking at what was the first of a new annual event.

WORKSHOPS

The Rivers Group facilitated two workshops for members this year

RIVERS GROUP - RIVER MANAGEMENT WORKSHOP & FIELD TRIP

The River Managers' workshop was held in Wellington on the 29th and 30th September. It was well attended with 53 members registering and taking part in the workshop along with the field trip on the Friday.

River Managers workshop field trip – Otaki river management case study

CULVERT DESIGN WORKSHOP

The Culvert Design workshop was held at Auckland University on October 18th . Again the workshop was fully subscribed with 45 members taking the opportunity to upskill on the various facets of culvert design including fish passage elements and climate change considerations.

Another culvert workshop is provisionally being scheduled later in 2017 and being held at Canterbury University.

RIVERS GROUP ANNUAL CONFERENCE 2016

REVIEW BY JO HOYLE

This year the Rivers Group annual symposium was held in Queenstown on 29th November to 2nd December. This was a joint conference with the New Zealand Hydrological Society (NZHS) and Engineers Australia Hydrology and Water Resources (HWRS) and was the first time a joint event of these three groups has been held. This presented an excellent opportunity for colleagues with common interests to meet and share their knowledge, experience and research. The conference theme this year was "Water, Infrastructure and the Environment", a highly appropriate theme considering the challenges we all face in a world with increasing demands for water, and a pressing need to manage the effects of water infrastructure on the environment, as well as taking into account changing community values, perceptions and expectations.

The conference was a great success with around 400 delegates enjoying an engaging three days of presentations, including over 230 papers and over 20 posters, as well as three excellent keynote addresses and a Munro Oration.

The first keynote was from Peter Goodwin, President of the International Association for Hydro-Environmental Engineering and Research (IAHR). This keynote discussed the need to balance water supply reliability and ecosystem restoration using the example of the San Francisco Bay-Delta in California.

The second keynote address was from Jen Crawford, a Partner at Anderson Lloyd with 20 years of experience in resource management and environmental law. This keynote address was titled "The problem with ponds" and considered several examples of large scale water storage and augmentation projects in New Zealand, looking back over the years at some of the lessons learned, and identified common themes faced by proponents, local communities and decision makers.

The third keynote was given by Rory Nathan, Associate Professor of Hydrology and Water Resources at the University of Melbourne. This talk presented sophisticated techniques for assessing natural hydrologic variability and the impact of this variability on design flood flows and levels.

The Munro Oration is a tradition at the HWRS Symposium, established in 1978 in recognition of the outstanding contribution made by the late Professor Crawford Munro to the science and practice of hydrology and water resources engineering in Australia. This year's Munro Oration was given by Blair Fitzharris, Emeritus Professor at the Department of Geography, University of Otago. Dr Fitzharris reflected on his experience of important issues in the science of climate and water over the past 50 years. The three days of presentations at the conference were then followed by a day of field trips, allowing attendees to relax and soak up the beautiful scenery in and around Queenstown.

A special thanks to all of the high calibre speakers that presented over during the conference, as well as the all of the others that contributed to the success of this event. A special thank you to our sponsors who are essential in ensuring these events are enjoyable and affordable – NIWA, Aqualinc, Anderson Lloyd, Tonkin & Taylor, eWater Solutions, ESR, Envco, Water Modelling Solutions, Lincoln Agritech and Golder Associates.

Short abstracts, extended abstracts and full papers that featured during the conference are available at the following link http://nzhs2016.cloudaccess.host/

We hope we will see you at next year's conference.

COMING YOUR WAY IN 2017...

- Membership Survey. The Rivers Group committee is seeking your feedback on our group.
- Committee face-to-face meeting in February to plan and finalise 2017 activities, any ideas, please feed to your friendly committee member.
- Culvert Workshop Christchurch October 2017 (to be confirmed).
- Annual Conference Hamilton, see preliminary flyer below.

RIVERS GROUP ANNUAL CONFERENCE 2017

ADVANCE NOTICE

Some of you will be just unpacking your bags from this year's conference in Queenstown but planning is already underway for next year's conference in Hamilton.
This will be a fantastic event which is being run in conjunction with the NZ Freshwater Sciences Society and the International Society for River Science, so start planning the paper you are going to present now!

For further information click on link below:
http://eepurl.com/cowMSD

NZ FRESHWATER SCIENCES SOCIETY ANNUAL CONFERENCE

19-24 November 2017 | Hamilton, New Zealand

In association with the 5th Biennial Symposium of the International Society for River Science (ISRS) and IPENZ/Water NZ Rivers Group Annual Meeting.
In partnership with the Waikato River Authority (WRA)

WELCOME

We are pleased to invite you to the 2017 New Zealand Freshwater Sciences Society (NZFSS) Annual Conference, in association with the 5th Biennial Symposium of the International Society for River Science (ISRS) and the annual meeting of IPENZ/Water NZ Rivers Group. These Conferences are being held at Claudelands Events Centre in Hamilton from 19-24 November 2017, in partnership with the Waikato River Authority (WRA).

CONFERENCE THEME

"Integrating multiple values"

Working rivers provide a range of goods and services that are important for biodiversity, ecological functions and human use. Balancing these multiple needs is a key challenge for water resource managers, and achieving outcomes that satisfy growing human demands while protecting environmental values is extremely difficult. This conference will provide a forum for sharing scientific and environmental knowledge underpinning management of rivers for multiple goals.

CALL FOR ABSTRACTS NOW OPEN

Authors are invited to submit oral and poster abstracts under the following sub-themes:

- Environmental indicators and monitoring
- Freshwater restoration
- Community ecology and biological interactions
- Traditional knowledge
- Environmental flows and Ecohydraulics
- Floodplain interactions
- Ecological resilience
- Bioengineering and biomanipulation
- Connectivity
- Water quality

Abstract submissions close 30 April 2017.
Submit your abstract online at www.imav2017.com

WHO SHOULD ATTEND?

The conference is targeted for a multidisciplinary audience of 300-500 delegates from the physical, natural and socio-economic sciences, as well as those who manage, create policy for and use riverine resources and their associated aquatic environments.

CONFERENCE FORMAT

The conference will include plenary speaker presentations as well as special and general contributed sessions, poster displays, a diverse array of exhibits, networking functions, and field trips that showcase New Zealand's unique river environments and attractions.

KEY DATES

- Special Session Nominations Close 30 NOV 2016
- Abstracts Open 1 DEC 2016, Abstracts Close 30 APRIL 2017
- Registration Opens 1 MARCH 2017
- Early-bird Registration Close 15 SEPTEMBER 2017

FOR FURTHER INFORMATION
www.imav2017.com
Or Contact On-Cue Conferences
Phone: +64 3546 6330 // lea@on-cue.co.nz