Manatiaki Kōawa
rivers GROUP
A joint technical interest group of IPENZ & Water NZ

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FROM THE CHAIR

Mark Pennington, Chairman of the Rivers Group

Welcome to the latest edition of Flow, the newsletter of the Rivers Group. It's been a while since our last one, but things are now in position to hopefully deliver these to you on a more regular basis. I hope that you find the articles in this edition are of interest and that they cater for your interests in rivers.

You will notice that, following on from last year's symposium, the Rivers Group has been gifted a Māori name, *manatiaki kōawa*. Please read on for background and significance of this.

I am pleased to announce that planning for our annual symposium is fairly well advanced. This year we will hold this in Rotorua on 12 November. The day will be made up of interesting presentations by selected speakers on a variety of rivers topics, with the theme of "Friend and Foe". We will also hold a field trip on the following day, which at this stage promises some interest and excitement and the opportunity to really get wet in one of our prized rivers. The dates have been selected to run immediately before the joint NZSOLD/ANCOLD conference in Rotorua, giving delegates the option to attend both events if they wish.

In a new initiative for the Rivers Group symposium, we propose to invite poster papers from our members. These will be displayed at the symposium venue, and each presenter will be given the opportunity to briefly introduce his/her poster during a targeted session in the symposium. We hope that this provides great diversity in material to be presented, and that it stimulates active inter-disciplinary discussion.

As usual, sponsorship opportunities for the symposium will be made available, and will be communicated to members via separate correspondence. We have some revised sponsorship packages that will deliver great value to our sponsors in terms of exposure and profile. Please watch your inboxes for further details, or feel free to contact any of the committee if you need further information.

Please visit our website when you get the chance; this has recently been updated. As always feel free to contact your committee with ideas of possible initiatives for the Rivers Group. We will keep you regularly updated via this newsletter, via our website and via email correspondence. In the meantime, enjoy the articles and keep warm. ≈

RIVERS GROUP ADOPTS ITS MĀORI NAME

Lee Rauhina-August | Pouhono ā Iwi – Te Hunga Whiriwhiri
GREATER WELLINGTON REGIONAL COUNCIL

Mana Whenua of the Wellington region have supported the Rivers Group since its inception and have had speakers and cultural support at the launch and Rivers Group symposiums in both Hamilton and Wellington. Recently we were offered the opportunity for Mana Whenua to gift the Rivers Group with a Māori name, which on behalf of you our members we happily accepted.

When Mana Whenua reflected on the group and its purpose they considered a number of factors in choosing an appropriate name including:

- a focus on rivers, streams and waterways,
- our role as kaitiaki or custodians/guardians,
- as a Treaty partner the inclusion of a Māori name will demonstrate the Rivers Group commitment to the Treaty of Waitangi and to partnership with Māori, and
- that the name would be aspirational, valued and used by all Rivers Group members.

This name is not a direct translation of 'The Rivers Group' but defines our role as discussed.

Rivers Group – Manatiaki Kōawa

Anō ahau he rimu mānu no te awa - I am as drifting reeds of the river (this is a Whakataukī, a proverb that binds the intention & work together)

Manatiaki Kōawa – Guardians of the Waterways. The tikanga or protocols associated with the gifting of this name asks us to be proud of its inclusion which acknowledges our unique partnership under the Treaty of Waitangi , to use it with respect, understand what it means and to enjoy it. ≈

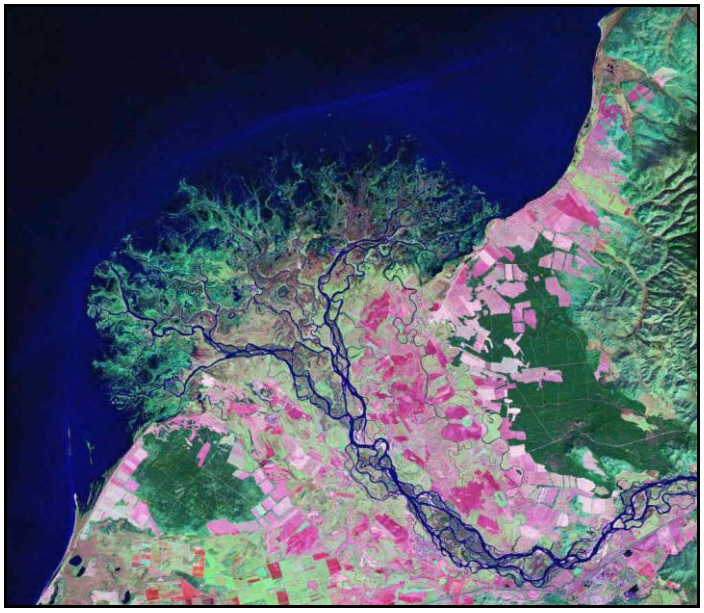
ONLINE RESOURCE IN SEDIMENT TRANSPORT

An eBook by Gary Parker

Gary Parker is a geology professor at University of Illinois who joined their faculty of the Environmental Hydrology and Hydraulic Engineering group back in 2005.

His vast experience in River Morphodynamics has led him to develop a generous e-book filled with lectures, code, documents, and video clips relating to sediment mechanics within rivers. To add the e-book to your personal library, you can access it through the following link:

http://hydrolab.illinois.edu/people/parkerg/morphodynamics_e-book.htm?q=people/parkerg/morphodynamics_e-book.htm



Sediment Deposition forming the Selenga River Delta at Lake Baikal, Russia (Image from NASA MrSID website)

To read more about Dr. Parker and his work, visit the website at:

http://cee.illinois.edu/people/parkerg ≈

"EXTRA! EXTRA! WEST COAST BRIDGE WASHES OUT!" … or did it?

South Island's transport started 2013 in a pinch when the SH6 crossing over Westland's Wanganui River was cut off for the first week of the year… but was it really a "bridge" failure?

The single lane bridge that spans the Wanganui is a composite steel beam and concrete deck superstructure that was built in 1963. The bridge is situated immediately downstream of where the river exits the high country, thus allowing for a narrower crossing of the floodplain. Even at this narrowed location, the potential floodplain is near 1*km* wide and the structure itself – supported by reinforced concrete piers and abutments founded on driven, raked steel piles – spans 334*m* across active river channel.

In 2009 a NZTA national waterway risk screening study identified some of the Wanganui Bridge piers as vulnerable to scour due to shallow pile embedment. This led to the spending of $1.0 million in 2010 to underpin four of the potentially vulnerable bridge piers – work that proved its value earlier this year.

Wanganui Bridge piers in December 2008 looking upstream prior to pier-underpinning works

The West Coast began 2013 under fairly wet conditions. A recorder in a nearby catchment at Ivory Glacier measured 254*mm* of rain over 24*hrs* and 588*mm* over 48*hrs* during the first two days of the year. It's difficult to say what return-period this equated to in the Wanganui as there's no permanent flow recorder or consistent history of measured flows for this river. Snow melt would have also contributed to large flows and a subsequent report from DOC indicated that a naturally formed dam had burst somewhere upstream the Evans River, sending an additional surge of debris and flood waters downstream into the Wanganui. A photo from a significant event in December 1995 offers some contrast with this recent January 2013 event in the two images at the top of the following page.

Wanganui Bridge looking downstream during a large flood in December 1995 (Photograph by M Shearer, WCRC Engineer)

During the January 2013 event the river's shear forces were hard against the true right side of the river. This progressively eroded away the bridge approach leaving the eastern abutment exposed and unsupported; ultimately resulting in its failure. The recently underpinned piers withstood the hydraulic forces of this event with no signs of significant damage after flood waters receded. A survey of the bridge following the event confirmed no vertical settlement or lateral deflection had resulted. It is believed that the underpinning work ultimately saved the bridge from being damaged during the January 2013 event, making the recovery possible in a much shorter time than would have otherwise been the case.

High flows following the January 2013 flood event limited the extent of work that could be carried out in the waterway. However, once levels had dropped enough and flows were diverted, rock and fill material was placed promptly, with the road being re-opened to full Class 1 traffic on Monday 7th January. Rock armouring was placed to ensure the eastern abutment and guide bank are protected from similar scour during any significant future event. Prior to re-opening, the bridge was inspected by a senior bridge engineer and the eastern abutment was proof loaded to confirm that it still had adequate bearing capacity to safely support Class 1 vehicle loading.

Wanganui Bridge looking west after the pier-underpinning work in 2010 and just prior to the abutment washout in January 2013

To sum it up, the "bridge" did not wash out but rather the right abutment lost its surrounding armour resulting in only it washing away. So… a transit superstructure was once again exposed to New Zealand's powerful environmental conditions, but through engineering investigation, foresight, and preventative maintenance along with the prompt action of NZTA, contractors, and consultants, the disruption of a major national route was kept to within a week's time frame – something everyone involved can be pleased with. ≈

Reinstating the true-right abutment of the Wanganui Bridge following the January 2013 washout

NEW ZEALAND SCIENTIST PRESENTS AT EUROPEAN GEOSCIENCE UNION – GENERAL ASSEMBLY 2013

IPENZ Rivers Group committee member Jo Hoyle travelled to Vienna in early April to present a paper on the relationship between geomorphology and the abundance of algae on the beds of rivers in the Horizons Region.

The assembly was well attended with over 11,000 scientists from 95 countries participating. To find out more about Jo's contribution to this important event check out her abstract below.

Relating river geomorphology to the abundance of periphyton in New Zealand rivers
Jo Hoyle, Murray Hicks, and Cathy Kilroy

Aquatic plants (including both periphyton and macrophytes) are a natural component of stream and river systems. However, abundant growth of instream plants can have detrimental impacts on the values of rivers. For example, periphyton in rivers provides basal resources for food webs and provides an important ecological service by removing dissolved nutrients and contaminants from the water column. However, high abundance of periphyton can have negative effects on habitat quality, water chemistry and biodiversity, and can reduce recreation and aesthetic values. The abundance of periphyton in rivers is influenced by a number of factors, but two key factors can be directly influenced by human activities: flow regimes and nutrient concentrations. Establishing quantitative relationships between periphyton abundance and these factors has proven to be difficult but remains an urgent priority due to the need to manage the ecological impacts of water abstraction and eutrophication of rivers worldwide. This need is particularly strong in New Zealand, where there is increasing demand for water for industry, power generation and agriculture. However, we currently have limited ability to predict the effects of changes in the mid-range flow regime on the presence/absence, abundance and composition of aquatic plants. Current water allocation limits are based on simple flow statistics, such as multiples of the median flow, but these are regional averages and can be quite unreliable on a site-specific basis. This stems largely from our limited ability to transform flow data into ecologically meaningful physical processes that directly affect plants (e.g., drag, abrasion, bed movement). The research we will present examines whether geomorphic variables, such as frequency of bed movement, are useful co-predictors in periphyton abundance-flow relationships. We collected topographic survey data and bed sediment data for 20 study reaches in the Manawatu-Wanganui region of New Zealand which have at least 3 years of flow, nutrient concentration and periphyton biomass data (laboratory measures of chlorophyll a and metrics derived from visual assessments). For each reach we set up a 1-d hydraulic model and established relationships between discharge and a number of hydraulic and geomorphic variables, including the discharge required to mobilise the bed sediment. These were then related to the flow and periphyton monitoring records to examine the strength of relationships. ≈

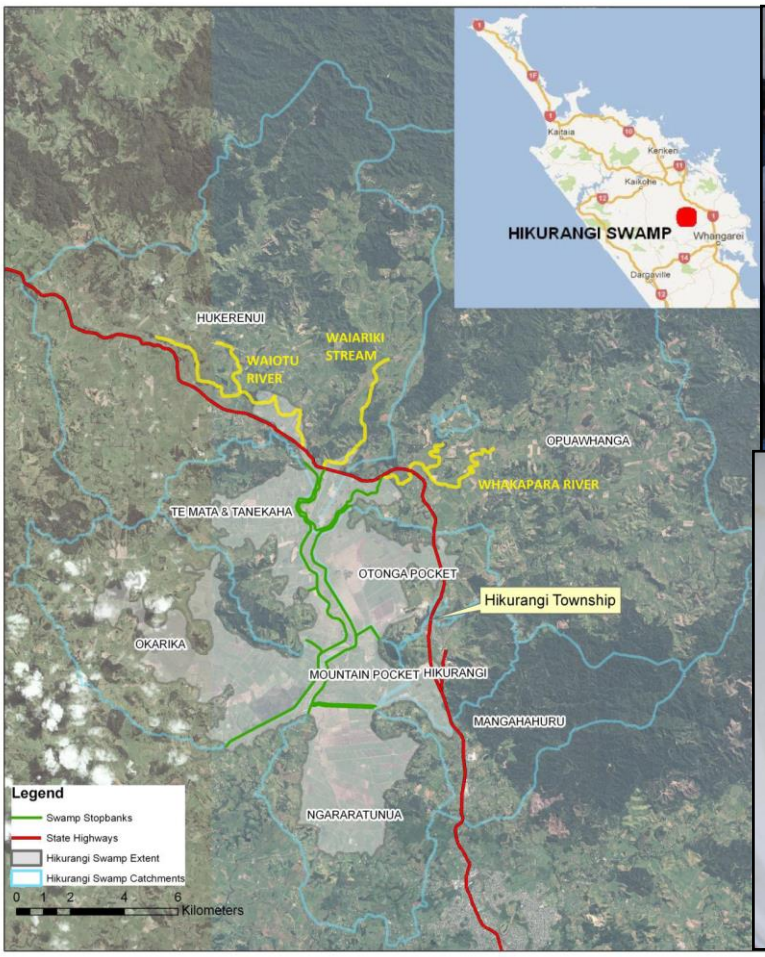
MANAGING FISH PASSAGE IN THE HIKURANGI SWAMP LAND DRAINAGE AND FLOOD PROTECTION SCHEME

Conal Summers, Whangarei District Council

Hikurangi Swamp Scheme is a land drainage and flood protection scheme managed by Whangarei District Council, providing protection to 5,600 ha of low-lying pastoral farmland within a catchment of 55,000 ha. The scheme was progressively implemented over the last century with major stopbanks and pump stations being installed in the 1970's, and has extensively modified what was one of the largest wetlands in the southern hemisphere. This has resulted in major impacts on the eel fishery which is of significant cultural and historic importance for local landlocked iwi as well as a commercial source.

Eel Drying Racks (courtesy of Dick Shepard)

Significant barriers exist to both upstream elver passage and downstream migrant passage, with evidence of eel mortality through deoxygenation of impounded waters and pump stations. Whangarei District Council is examining mitigative measures for improving fish passage and habitat by implementing or trialling a range of options. These include electric barriers, modified gravity discharges and



Scheme Location, Catchments, Stopbanks & Flood Extents

Elver Capture at Wairua Power Station

screen sizing, and (in conjunction with NIWA) a tag and release programme to determine mortality rates through pump stations.

Dependent on the outcome of trials, measures will be implemented across the Hikurangi Swamp Scheme over the next 6- 12 months. ≈

JULY 29-30, 2013 WELLINGTON

The 3rd Freshwater Infrastructure & Irrigation Conference informs the audience of investment and planning as well as a strong focus on real world projects.

Key speakers include:

- ≈ Federated Farmers
- ≈ Irrigation New Zealand
- ≈ Hawkes Bay Regional Council
- ≈ Greater Wellington Regional Council
- ≈ NZ Council for Infrastructure Development
- ≈ Environmental Protection Authority
- ≈ Effelton Irrigation Scheme
- ≈ Barrhill Chertsey Irrigation Scheme
- ≈ AL Resources
- ≈ Tarras Water
- ≈ DLA Phillips Fox
- ≈ Hexagon

To register visit:

http://www.conferenz.co.nz/conferences/freshwater-infrastructure-irrigation-conference ≈

ARE WE IGNORING THE COST OF WATER IN OUR FOOD SUPPLY CHAINS?

Professor Tony Allan
Kings College, London

Thursday, June 27, 2013
6 – 7:30 pm
Drinks and nibbles 6 – 6:30 pm
C3 Lecture Theatre,
University of Canterbury
Christchurch

The Waterways Centre for Freshwater Management and Irrigation New Zealand are proud to host Professor Tony Allan on his visit to Christchurch. Recipient of the 2008 Stockholm Water Prize (the “Nobel Prize of Water”),

Professor Allan developed the concept of virtual water to describe global stability in water dependent commodity trade.

Professor Allan is currently looking at why accounting systems in food supply chains are dangerously blind to the cost of water. His presentation will delve into these questions, and whether society can sustainably manage the water resources on which food security depends. Further details on Professor's Allan research and awards are available here.

All are welcome to this free event; drinks and nibbles provided, parking available free on campus. A map showing parking and location of the lecture theatre are available here, as well as a printable flyer. To RSVP or for more information, email suellen.knopick@canterbury.ac.nz, phone 03 364 2330. ≈

WHAT'S HAPPENING WITH YOUR GROUP

Manatiaki Kōawa rivers GROUP
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Your Rivers Group has recently been busy with change and developments. Firstly, the committee's dedicated members have been expanded to include some new members from across the country. The committee is well balanced across both North and South Island so communication and contact is just around the corner… or slightly past the corner. For info on your new representation check out the committee section at:

http://www.ipenz.org.nz/riversgroup/Committee.cfm

Taking communication even further the Rivers Group is now running a group on LinkedIn, which can be found here.

LinkedIn

Finally, with the success of the 2012 Rivers Group Symposium the committee is excited about and well underway with organizing this year's symposium to be held in Rotarua this coming November 12. The theme this year will be:

FRIEND & FOE:
The resources and hazards of our rivers

For more information on registration and sponsorship check out the Rivers Group web page. ≈