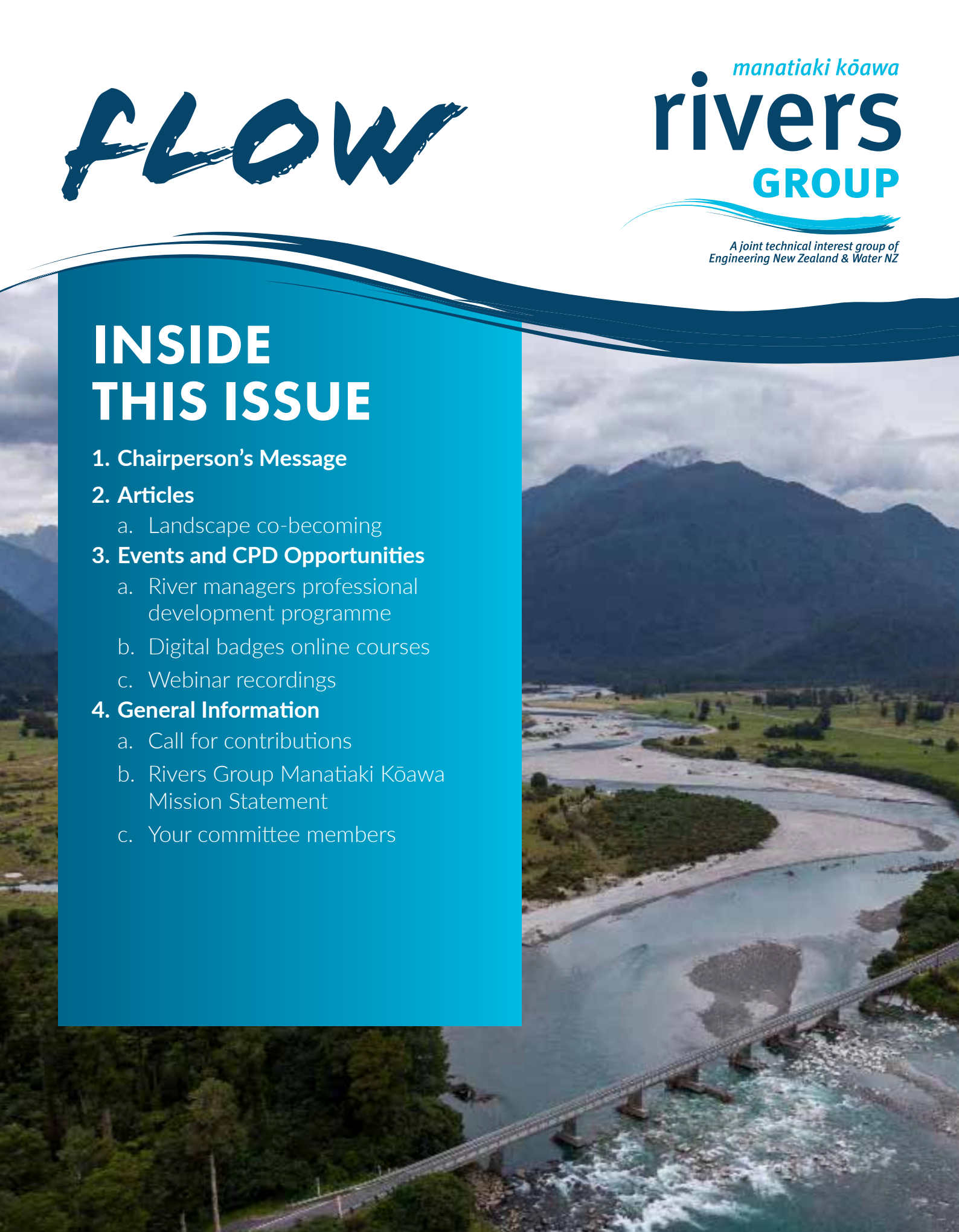
# flow

manatiaki kōawa
rivers
GROUP

*A joint technical interest group of Engineering New Zealand & Water NZ*

# INSIDE THIS ISSUE





## NEWSLETTER

Issue 38 | February 2023

# FROM THE CHAIR

*Hamish Smith*

Kia ora koutou

Welcome to 2023, and there is plenty on the agenda for the Rivers Group. 2022 began with significant flooding around the country in Westport and ex-tropical cyclone Dovi close behind. This year has begun with the upper north island, and Aotearoa's largest city experiencing record breaking and widespread flash flooding. At the time of writing, more severe weather is forecast, and the response is ongoing. Just before we issued this FLOW, I had to update the article as ex-TC Gabrielle delivered further devastation to many parts of the North Island, with damage especially severe in Tairāwhiti and Hawkes Bay. Stay safe to all folks affected and especially our members and their families. Thank you to all the workers and volunteers involved in working through the response and recovery. Please take care of yourselves.

As I take up a stint as chair, I'd like to salute the hard work of our previous chair Selene Conn, who's positivity, can-do attitude, and self-deprecating sense of humour (sometimes you're a bit hard on yourself, Selene) is a driving force behind the committee. Selene is staying on the committee which I'm very grateful for, and we are joined by Shaun McCracken, and Verity Kirstein from ECan. A big thanks to Phil Wallace who has stepped down for plugging away at the finance role for many years without any complaints!

Thanks so much to all our members for supporting us last year, and thanks to all who were able to attend and participate in our largest ever conference held in the Hutt Valley at the end of last year. The organising committee led by Amanda Death did a wonderful job, and thanks so much to all our international and New Zealand speakers. Recordings of presentations should be up in the Members Section of our website shortly.

The River Managers group (a Regional Council Managers group) is sponsoring a plethora of professional development content that we'll be promoting this year. These opportunities are listed on our website, the River Managers Resilient Rivers website, and Engineering New Zealand websites. Please make the most of these.

We called our adaptations during Covid, the 'new normal', but it should be clear now that adaptation to significant climatic events is still the old 'new normal'. They will continue to happen and more frequently. We should expect the status quo to not be fit to meet them. NZ Rivers Group must press on with its mission of sharing knowledge and using science to make better decisions on how we live alongside our rivers. This must include integrated management of the river environment, promote science-based policy, and uphold the principles of the Treaty of Waitangi.

The membership at our conference was keen for the committee to advocate for policy and programmes to encourage 'making room for rivers'. It seems clear that enhanced river environments will likely have multiple benefits in adapting to the changing environment. Non-structural approaches to climate adaptation will be key to coping with increased storminess and droughts. Improved national direction flood risk management, planning, and emergency response, readiness and awareness programmes, and new processes for forecasting and warning will be key undertakings. UN Secretary-General António Guterres announced in March 2022 that "Within the next five years, everyone on Earth should be protected by early warning systems against increasingly extreme weather and climate change." There is a lot of work to do, but there is plenty of examples from NZ and overseas for our community to learn and innovate upon.

Another storm is brewing at the start of 2023, and that is the substantial volume of central government legislation open for submission. As summarised in our end of year roundup email last year, Rivers Group volunteers are intending on making short submissions where we believe our input can improve this legislation. We'll also consider submitting in support of the submissions of similar groups like WaterNZ where these align with our mission and values. The committee will retain oversight of submissions, and these will only be made by a quorum of committee members. We'll keep you up to date on our work on these, and we're happy for offers of help from our members.

Finally, the Rivers Group committee has become concerned with the struggle of NZ Earth Science courses to stay funded. Professionals with these skills are crucial to muti-disciplinary approaches to looking after our rivers and flood risk management. I'm keen to see the Rivers Group make a clear position statement on education needs in the industry (with the support of the River Managers, and WaterNZ).

One more thing, we need your help! If you are able and willing, please consider contributing articles to our newsletter, ideas for events, or just reposting or commenting on our LinkedIn and Facebook pages. Email us at rivers.group@engineeringnz.org.

*Hamish Smith*
*Chair*

# LANDSCAPE CO-BECOMING: A TOOL FOR TRANS-EPISTEMOLOGICAL GEOMORPHOLOGY RESEARCH

*Clare Wilkinson*
*School of Earth and Environment, University of Canterbury, now at Tonkin + Taylor, Christchurch, NZ*

*The following text is adapted from an abstract submitted to the Rivers Group 2023 Annual Conference, sharing the results of a doctoral study completed at the University of Canterbury.*

Indigenous knowledge systems across the globe hold detailed understandings of landscape processes. Such knowledge is practical and applied, and has endured through generations. Despite strong links to understanding and relating to Earth's surface, Indigenous knowledge systems remain largely underrepresented in the field of geomorphology.

The research I undertook for my doctoral studies aimed to promote and encourage the interweaving of multiple knowledge systems to better understand Earth's dynamic surface and peoples' relationships with it. He Awa Whiria, a braided rivers framework for bicultural research, was applied to weave fluvial geomorphology and mātauranga Māori to better hear the story of Tūtae Putaputa/the Conway River's response to the 2016 Mw 7.8 Kaikōura earthquake. In this earthquake event, over 12 M m3 of landslide sediment was released from hillslopes in the Tūtae Putaputa/Conway River catchment. The sediment – and the cascading effects of coseismic sedimentation – has had impacts on the surrounding landscapes, both physical and cultural. Applying the He Awa Whiria approach allowed findings from fluvial geomorphology methods of sediment tracing (geochemical tracing of sands and physical tracing of cobbles) to be woven with perspectives of landscape change from individuals from different Māori iwi to better understand timescales over which landscapes heal following major disturbances. Timescales of sediment mobilisation, as well as intergenerational cultural knowledge of sustainability, adaptability, reciprocity, and connection, indicate that understandings of landscape evolution may require more information that what can be gleaned from either body of knowledge – i.e., science or Indigenous knowledge – alone. By weaving together lessons from Tūtae Putaputa and from individuals from different iwi, a trans-epistemologically informed landscape evolution concept was developed. This concept—here termed landscape co-becoming—built upon formerly established concepts from sociogeomorphology and ethnogeomorphology and explores the interconnectedness of landscapes and all that inhabit them, including people and rivers. The landscape co-becoming concept represents an intricate tapestry of theories and methods present in geomorphology, social-ecological systems theory, understandings of ecosystem services, critical geographies, and Indigenous knowledge (Figure 1). It aims to provide a tool that can weave both nature-based kinship relationships (informed by Indigenous knowledge systems) and connectivity of physical systems (informed by science) together from the outset. The distinction of including both Indigenous knowledge and science in the concept of landscape co-becoming from the beginning is key for its application – landscape co-becoming has been informed by both knowledge systems since its conception, rather than being a pre-existing concept that has subsequently created space to include another epistemology.

Landscape co-becoming has the potential to be a useable and useful tool in geomorphology, especially in Aotearoa New Zealand, where government policies relating to partnership with Māori, environmental management, and disaster risk reduction influence the work that researchers and professionals do every day. It is becoming increasingly important that industry and universities find ways to enable and empower Indigenous knowledge, and landscape co-becoming may be one tool that could contribute towards this goal.

*Continued...*

In Aotearoa New Zealand, a place with numerous drivers of landscape change, having a tool to evaluate potential landscape change within a bi- or multi-cultural worldview will become increasingly important as the world becomes increasingly dynamic and unpredictable. The concept of landscape co-becoming was the result of an exploration of existing frameworks and multiple knowledge epistemologies, and aims to offer a tool that may be used to better understand the behaviour of dynamic landscapes in Aotearoa New Zealand, and to help us Þnd connection to those landscapes.

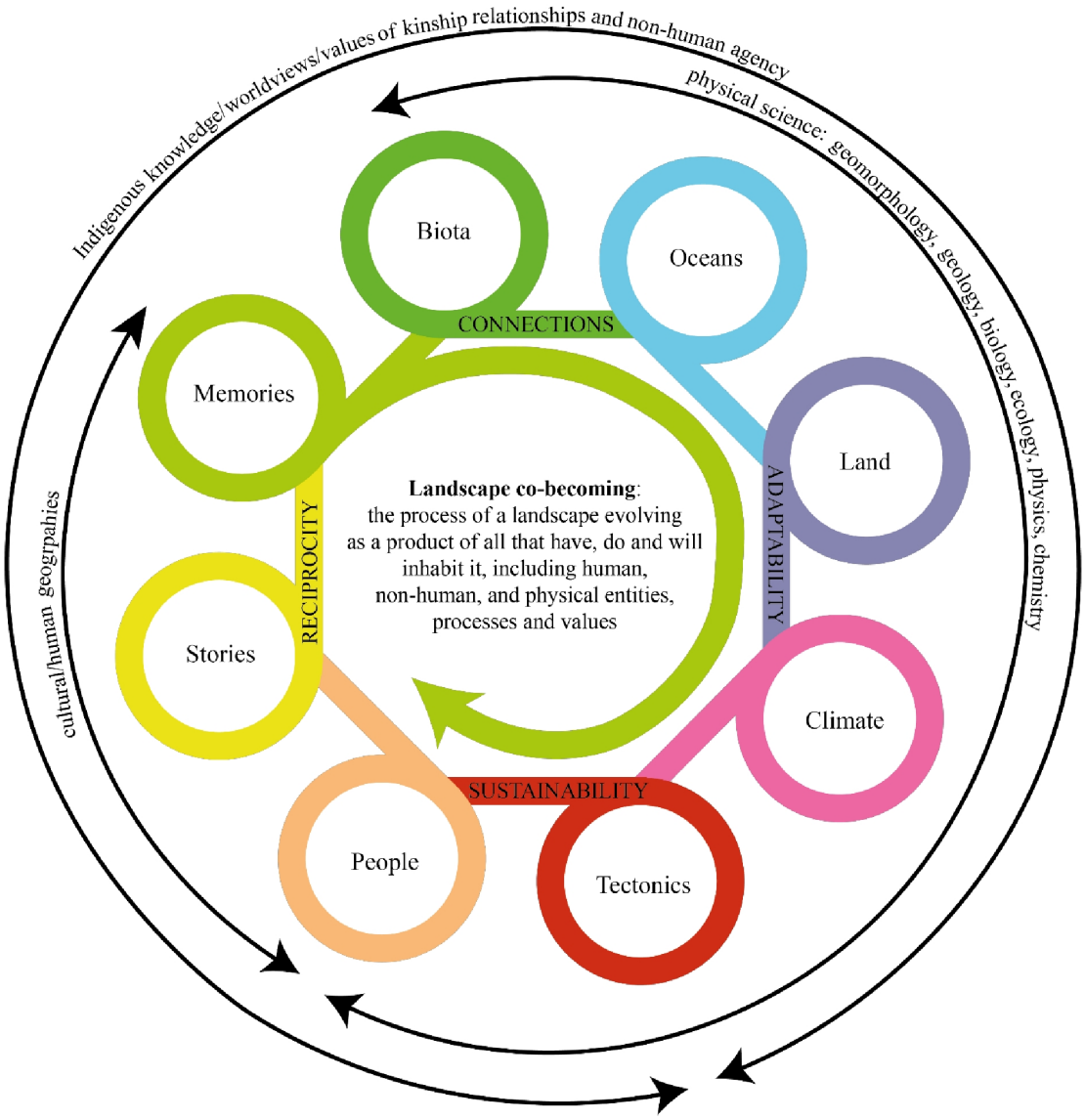



*Figure 1: Landscape co-becoming as a conceptual process framework. Curved arrows indicate the spread of topics pertinent to, or typically explored in, the different ways of studying Earth's surface, identified by the text corresponding with each arrow. Sourced from: Wilkinson, C., 2021, Landscape responses to major disturbances: a braided mātauranga Māori and geomorphological study, Doctoral Thesis, University of Canterbury, Christchurch, NZ, 265 p.*

# RIVER MANAGERS PROFESSIONAL DEVELOPMENT PROGRAMME

This programme has been designed to identify a framework to raise awareness, learning and development pathways and ultimately drive recruitment and attraction strategies to assure river management expertise for the future

For more information and to register: https://www.resilientrivers.nz/development-programme

***FLOOD HYDROLOGY WORKSHOP***

| | |
|---|---|
| Date & Time | Monday 6th March 2023<br>Full day workshop<br>ECAN, Christchurch<br>**Registration closes February 27th** |
| Cost | $600.00<br>Council Staff – $200.00 discount<br>Rivers Group Members - 10% discount<br>Please mention discount when making the booking. |
| Presenters | David Leong \| Technical Director, Hydrology & Hydraulics, Tonkin + Taylor |
| Outline | Part A. Overview<br>1. What is flood hydrology, and its applications?<br>2. Flood probability and risk concepts explained<br>3. What are the approaches for flood estimation? [Probabilistic e.g., flood frequency analysis, versus Deterministic viz. rainfall-runoff modelling]<br>4. Their pros and cons and when to use each<br>5. Uncertainty and reliability<br>Part B. Flood Frequency Analysis (FFA)<br>1. Review of practices in NZ, Australia and elsewhere<br>2. Elements of FFA process<br>3. Inclusion of historic data in FFA (pre-modern records)<br>4. Climate change adjustment<br>5. Practical aspects and worked examples<br>Part C. Rainfall – Runoff Modelling<br>1. Review of practices in NZ, Australia and elsewhere<br>2. Continuous versus single event simulation, distributed versus lumped models<br>3. Developing design rainstorms<br>4. Model calibration approaches<br>5. Worked examples<br>Part D. Wrap-up<br>1. Summary<br>2. Q & A<br>3. Additional resources/learning |

***LOWLAND DRAINAGE OPERATIONS AND RIPARIAN MANAGEMENT - Field Trip***

| | |
|---|---|
| Date & Time | Monday 3 April 2023<br>8.00am – 5.30pm<br>Tauranga |
| Cost | $500.00<br>Council Staff – $200.00 discount<br>Rivers Group Members - 10% discount<br>Please mention discount when making the booking. |
| Outline | Develop an understanding of lowland drainage and pumping systems operations and management, with a selection of drainage riparian best practice and water quality enhancement works. The field trip will incorporate a range of common drainage maintenance methods with discussion around water quality issues, environmental guidelines, best practice riparian management, habitat restoration and water quality treatment via constructed wetlands.<br><br>The field trip will be most beneficial to practitioners involved with drainage system maintenance and operations and there will be good opportunities to share experiences and lessons learned from other areas.<br><br>The field trip will take place around the Te Puke – Maketū area (Bay of Plenty) and comprise a range of operational, land management, cultural and science presenters to explore contemporary drain waterway management that is sympathetic to indigenous fish species (mainly inanga and tuna), terrestrial birdlife and cultural values.<br><br>Bay of Plenty (like many other regions in NZ) has had many thousands of hectares of wetland/saltmarsh areas historically drained to create valuable farmland. This field trip/seminar will look at how stakeholders are working together to enhance the waterways (including artificial and modified watercourses) to maximise their potential for restoring water quality and habitat for indigenous species.<br><br>Key Themes:<br>• Drainage maintenance methods<br>• Drain riparian practice<br>• Native fish passage & habitat<br>• Environmental guidelines<br>• Cultural perspectives<br>• Constructed wetlands<br>• Wildfowl habitat |

***STRATEGIC OVERVIEW OF RIVERS & CATCHMENTS: GEOMORPHOLOGY & RIVER MANAGEMENT***

| | |
|---|---|
| Date & Time | 2-day workshop – Wellington<br>Tuesday 30 May & Wednesday 31 May 2023<br>Day one: classroom<br>Day two: field trip, Waikanae |
| Cost | Cost – $900.00<br>Council Staff – $200.00 discount<br>Rivers Group - 10% discount<br>Please mention discount when making the booking |
| Presenters | Ian Fuller, Gary Brierley, Jon Tunnicliffe |
| Outline | **Key Learning Objectives/Outcomes**<br><br>Familiarity with key principles in fluvial geomorphology and their application to various river management situations (e.g., catchment (and regional) planning, sediment flux issues, relation to flood hazards).<br><br>**Key themes**<br>• Management issues for which geomorphic insight is fundamental<br>• Spatial Dimensions of geomorphologically-informed river management<br>• Temporal dimensions of geomorphologically-informed river management<br>• Processes of geomorphic river adjustment<br>• Evolutionary trajectory of rivers (and recovery potential)<br>• Geomorphology and river health (condition)<br>• Geomorphic relations to Māori conceptualisations of rivers<br>• How geomorphology can support river management (indicative only – set up follow up specialist courses) |

***TOOLS IN FLUVIAL GEOMORPHOLOGY WORKSHOP***

| | |
|---|---|
| Date & Time | Thursday 1 June 2023<br>Wellington<br>Full-day, 8-hour workshop |
| Cost | $600.00<br>Council Staff – $200.00 discount<br>Rivers Group Members - 10% discount<br>Please mention discount when making the booking. |
| Presenters | Ian Fuller, Gary Brierley, Jon Tunnicliffe |
| Outline | **Key learning outcomes**<br><br>Familiarity with a series of tools useful for geomorphic analysis in river systems.<br><br>NB: Please note this workshop introduces these tools by way of demonstration and does not provide technical specialist instruction.<br><br>**Key themes**<br>• Conceptual principles: The River Styles Framework<br>• Leveraging LiDAR and SfM surveys to map rivers' physical habitat mosaic<br>• Manual and automated mapping approaches for channel, floodplains, and riparian areas<br>• Geomorphic Change Detection and NCI (Natural Character Index)<br>• Sediment transport principles<br>• 1D and 2D approaches to river morphodynamics<br>• Network-scale considerations: Geomorphic hotspots<br>• Mapping catchment connectivity<br><br>An overview of readily available Toolkits in Aotearoa New Zealand<br>• LIDAR<br>• REC |

# WEBINAR RECORDINGS

## Cultural and Environmental Values
*September 2022*

Te Tiriti o Waitangi (the Treaty of Waitangi): meanings, principles, and importance for contemporary river management in Aotearoa

*Presented by Dr Meg Parsons*


The NPS-FM and Te Mana o te Wai (Te Ao Māori & River Ecosystem Management)

*Presented by Linda Te Aho*


Navigating towards Te mana o te Wai

*Presented by Linda Te Aho*


Mana Whenua Statements (cultural impact assessment)

*Presented by Julian Williams*

# WEBINAR RECORDINGS

## River Legislation Series

***Mike Doesburg and Imogen Edwards***
***November 2022***

Part 1 covers understanding local government law relevant to flood control and drainage maintenance activities.


Part 2 covers common pitfalls when navigating this complex area of law and policy.


Part 3 will be a whistlestop tour through the relevant documents, but will leave attendees with an understanding of key issues for river management


Part 4 focus' on the changes the Bills bring and what that means for practitioners with an interest in rivers.

# CALL FOR CONTRIBUTIONS

For our newsletter FLOW we are always looking for articles from our membership. Please consider submitting an article, case study, update or notice for the next issue of FLOW.

| Issue | # | Deadline for contributions |
|---|---|---|
| June 2023 issue | #39 | Monday, 15 May 2023 |
| September 2023 issue | #40 | Monday, 14 August 2023 |
| December 2023 issue | #41 | Monday, 13 November 2023 |

Please format your contribution as follows:

- Length of 500 – 1500 words, in Microsoft word format (Articles should include name of the author(s), affiliation, titles and section headings and illustrations are strongly encouraged)
- Attach images in jpg (file size 300KB-1MB) and at high-resolution separately
- Provide credits and captions for your images

If you have articles which are longer, please email us.

Please email rivers.groups@engineeringnz.org to submit your FLOW contributions. We look forward to receiving your contribution.

# RIVERS GROUP MANATIAKI KŌAWA MISSION STATEMENT

The New Zealand Rivers Group Manatiaki Kōawa was formed in 2009 to provide a forum for 'Working together to promote good river management'. It is a place for people with an interest in rivers, flood risk management and the operational and environmental issues of catchments and river systems to come together.

We currently have over 300 members, and promote a multi-disciplinary approach to river management, reflecting cultural and societal diversity in an integrated and holistic manner. Our membership reflects this, with our members coming from a wide range of river management, science and engineering, and planning backgrounds - working as consultants, or in local, regional and central government, research institutes and universities.

New members can sign up here riversgroup.org.nz/joining-the-rivers-group/.

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