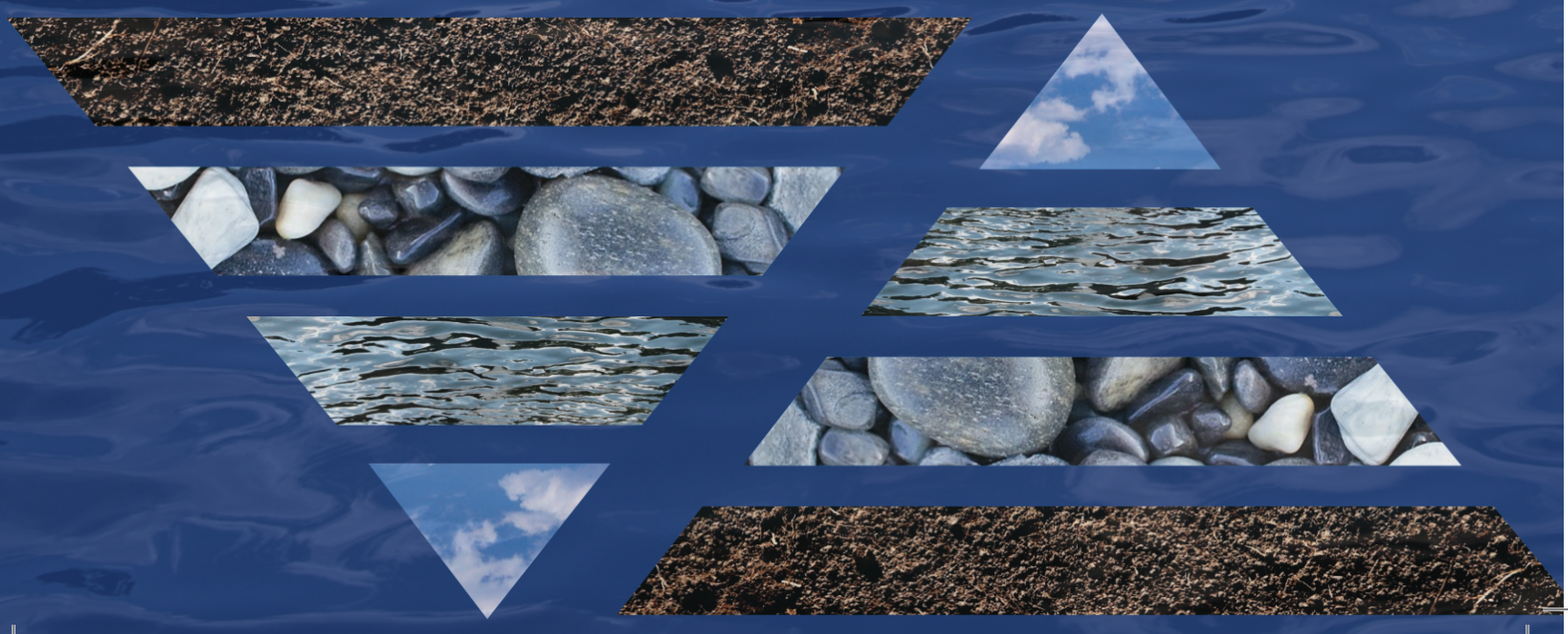
NZ Hydrological Society

Annual Conference

FROM DATA KNOWLEDGE

1 - 4 December 2015
Hamilton



AQUALINC

WATER FOR LIFE
through world-class management

Aqualinc is a leading New Zealand water management consultancy. We work closely with primary industries and government agencies to achieve world-class water and nutrient management, demonstrating our passion and expertise through pioneering scientific and engineering research, developing and applying smart technology, and providing independent consultancy services.

Services we provide include...

GROUNDWATER

New Zealand's economic growth relies on a steady supply of high quality groundwater. Our team is one of New Zealand's most experienced providers of specialist services in groundwater allocation management, aquifer testing and well development, and groundwater quality protection.

IRRIGATION

Through our independent irrigation development and irrigation management services we aim to ensure that our client's irrigation activities are profitable, environmentally sustainable and fully compliant with the relevant operating licenses and industry codes of practice. We protect our independence by not supplying irrigation hardware or product endorsements.

RESOURCE CONSENTS

Whether it's a consent for a small groundwater supply, for a large take of river water, for the land-based treatment of effluent from a dairy farm, or even for diffuse nutrient discharge from a proposed farming operation, Aqualinc can handle them all. We have assisted clients with over 1,000 consent applications.

FARM ENVIRONMENT PLANS

Farm environment plans are rapidly becoming an accepted method for formally setting out how a farm will be managed for profit and within specified environmental constraints. Aqualinc has the breadth of expertise and depth of experience required to develop, review and audit farm environment plans to meet Good Management Practice standards, and higher.

EFFLUENT MANAGEMENT

From carrying out thorough investigations of proposed sites, monitoring nutrient balances and testing groundwater quality, the Aqualinc team has the knowledge and expertise to design the most effective land-based effluent treatment system for your land.

WATER MANAGEMENT

Catchments, rivers and groundwater systems have a wide range of stakeholders, meaning changes made to benefit one water or land user may often have a negative impact on another. At Aqualinc, we use measured data with sophisticated modelling technology to help our clients predict the impacts of proposed changes so they can explore options, identify the best and manage water quality and quantity in their region more effectively.

If you need help or advice in any of these areas, please call

Aqualinc Research Ltd / Christchurch 03 964 6521 / Ashburton 03 307 6680 / Hamilton 07 858 4851

www.aqualinc.com

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President Welcome

It is my pleasure to welcome everyone to Hamilton for the annual New Zealand Hydrological Society Conference. The conference theme this year is: "From Data to Knowledge". Data is a key to virtually all of our hydrological work. This conference provides a great opportunity to see how integration/interpretation of the data leads to knowledge of the related water resources. The gathering is also a great opportunity for hydrological colleagues to be able to meet and share their knowledge, experience and research.

An interesting range of pre-conference workshops has also been organised for Hamilton. The overall enthusiasm shown for the conference is reflected in the large number of papers and posters submitted for the technical programme. The diversity and quality of the papers highlight the strength, depth and scope of the work in the hydrological sciences. An excellent range of keynote/plenary speakers have also been confirmed and I will like to encourage you all to attend these sessions. I am personally looking forward to hearing the many great papers on offer and look forward to the ensuing stimulating discussions.

Thank you to all the sponsors for the ongoing support of our Society's conference and the Society itself. The organising Committee supported by the symposium organiser's On-Cue have put in some hard work since early 2015 to make this event possible, a big thank you for all your efforts. I wish everyone a great conference, and hope your stay in Hamilton will be enjoyable and memorable. I am looking forward to the opportunity to meet as many of you as possible.

Joseph Thomas
President NZHS

Conference Welcome

On behalf of the Organising Committee I have great pleasure in welcoming you to the 2015 NZ Hydrological Society Annual Conference here at the University of Waikato in Hamilton. Thank you to all the delegates who are presenting – we have over 130 presentations – obviously it is your presentations that make our society's annual conference so successful.

I am sure you will enjoy the social programme set for you, including the ice breaker at Gothenburg restaurant down on the banks of the Waikato River and our conference dinner held at Hamilton Gardens. I recommend you arrive early to the dinner so you have time to walk around the many themed gardens (a bus will be leaving the Novotel, Alma St, Hamilton at 6.15pm). I'm sure these events will provide excellent opportunities to network and catch up with colleagues and engage with our sponsors.

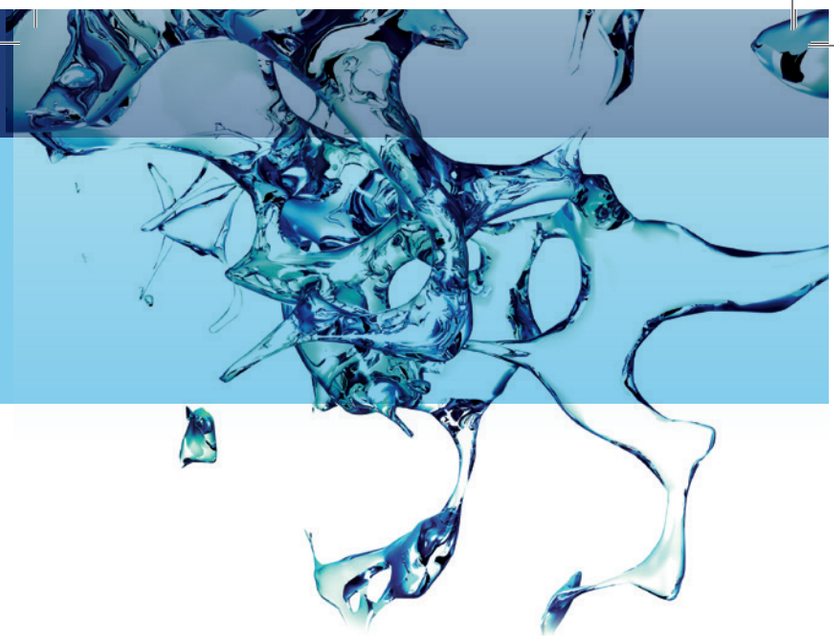
I would like to thank our many sponsors, without your support it would be very difficult to run our annual conference. Please support our sponsors and visit their trade stands during the week.

Finally, I would like to thank the organising committee including OnCue. Our meetings were always succinct with everyone focused on the task at hand, making the organising process relatively stress free and even enjoyable, especially when we were undertaking background research at Gothenburg. I recommend that if future conferences come to a town near you that you think about volunteering to help as it is a great way to be part of our society.

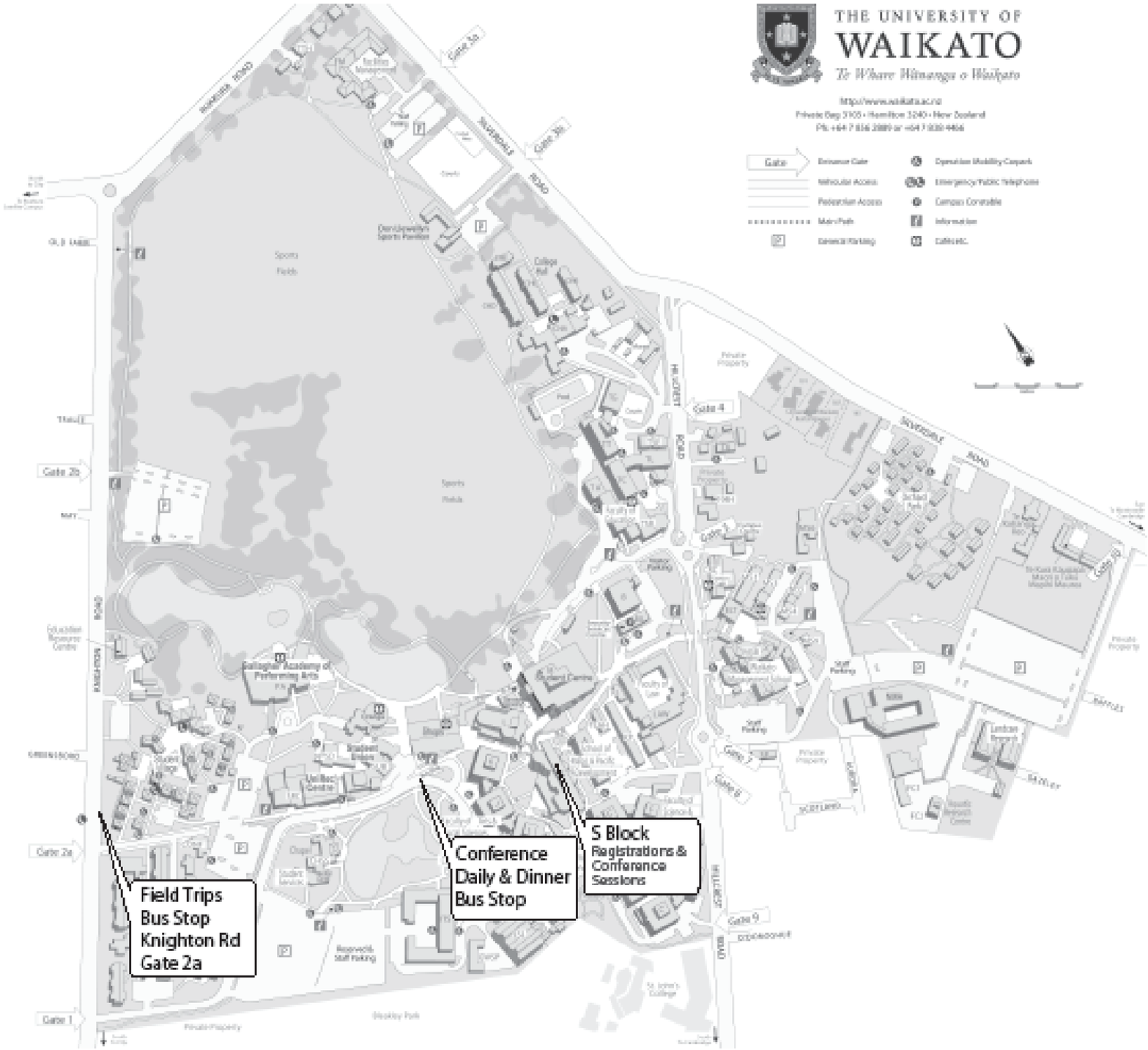
Have an enjoyable week,

Ed
2015 Conference Chair

Clare Houlbrooke - Golder Associates
Roland Stenger - Lincoln Agritech
Earl Bardsley - University of Waikato
Channa Rajanayaka – Aqualinc Research
Medihah Bardsley - Khatep Associates
David Payne – Mighty River Power
Dave Campbell – Waikato Regional Council



University of Waikato Map



General Information

Registration Desk

If you require any assistance throughout the conference please see the conference organisers at the Registration Desk in S Block.

The Registration Desk will open on Tuesday at 8:00am, Wednesday 8:00am and Thursday 8:00am.
The Conference Notice Board will be placed at the Registration Desk and will be used to display conference information, programme changes, announcements and messages. Please check the board regularly.

Name Badges

Delegates are requested to wear their name badges to all sessions and social functions. Committee members will be wearing dark blue lanyards and Student helpers will be wearing green lanyards, please ask them for directions and local knowledge.

Cell Phones

Please ensure that cell phones and/or pagers are turned off, or silent, during all presentations.

Parking

On campus parking is available, but please be sure to use only the parks labelled General Parking. Enter the University grounds at Gate 1 on Knighton Road.

The biggest parking areas are via Gates 1 and 10 and there is also other General Parking available from Gates 2a, 2b, 3a and 3b.

Street parking in the Hillcrest Rd area should not be a major problem during December, when this conference is taking place, although it is generally restricted to two hours.

Contact Number

For assistance please call Tracy on 021 164 7820

Meals

Morning, afternoon teas and lunch will be served in S Block.

On Friday 4 December, lunch packs will be provided for the field trips. These will be placed on the coaches ready for departure. If you have informed us of your special dietary requirements your lunch pack will be labelled for you.

If you have advised us of your special dietary requirements, these have been forwarded to the caterers at University of Waikato. For morning tea and afternoon tea breaks, these will be available on a separate table individually marked in S Block.

At the Conference Dinner, please make yourself known to the waiting staff and they will make the necessary arrangements for your special meal. If you have any dietary requirements that we are not aware of, please see the Conference Organisers at the Registration Desk on arrival at the conference.

Please note: food and drink may not be taken into lecture theatres.

No Smoking

The University of Waikato Hamilton campus is now a totally Smokefree environment. We hope you will help us with this new policy and please refrain from smoking anywhere on the University's Hamilton Campus, and encourage those around you not to smoke.

Internet

Delegates will need to connect to the "lightwire" WiFi network on their mobile device.

To do this open a web browser (some mobile devices might do this automatically when it detects the network requires additional login details) and go to https://prepay.lightwire.co.nz

The delegates can then log in with the username and password:
username: nzhs@lightwire.co.nz
password: nzhs2015

Groundwaters of New Zealand - FOR SALE

Bring cash to purchase your copy of Groundwaters of New Zealand Michael R Rosen & Paul A White (Editors) 2001These books will be available at the conference registration desk for the new price of $35 including GST. Original price was $99.

Session Chairs

Please can all session chairs be in their room at least 10 minutes prior to the start of the session. Please ensure that you are familiar with the microphones and the lectern equipment so that you can advise your presenters. It is very important that talks are only allowed their allotted time so that talks start and finish on time and so delegates can move between sessions to hear different talks.

Loading Your Presentation

- Please load your presentation with the conference team – IN ROOM S1.03, ON THE LEFT, UPSTAIRS
- To ensure the smooth running of the programme all presentations must be loaded at least one session prior to presentation

Time

- The allocated time for your talk is 15 minutes plus 2-3 minutes for discussion and questions.
- Due to the tight time frame, we emphasis the importance of starting and finishing on time. Session chairs will be instructed to ensure that you do not go over your allocated time.
- There will be a 5 minute and a 2 minute flash card to indicate that you need to wrap it up.
- Speakers are required to sit in the front of the room (for fast changeover of speakers).

Poster Presentations

- Velcro dots will be pinned on the poster boards, please put your poster up on any board before mid-day on Tuesday

"SNAPSHOT" POSTER SESSION

ALL poster presenters have to prepare a 1-2 minute overview of their research.
ALL poster presenters have to be standing next to their poster during the video presentations beginning at the start of the poster session.
Audience on the other hand, can be in S1.04 where the "snapshot" presentations will be screened live (we are also hoping to record the session). There will be time after "snap-shot" presentations for mingling and asking questions. What do I say?
Well, you could introduce yourself, your research aims, your main findings, or even ask for advice. It's your minute, make the most of it!
For students, the "snapshot" will be assessed as part of student prize judging.

Bus Timetable

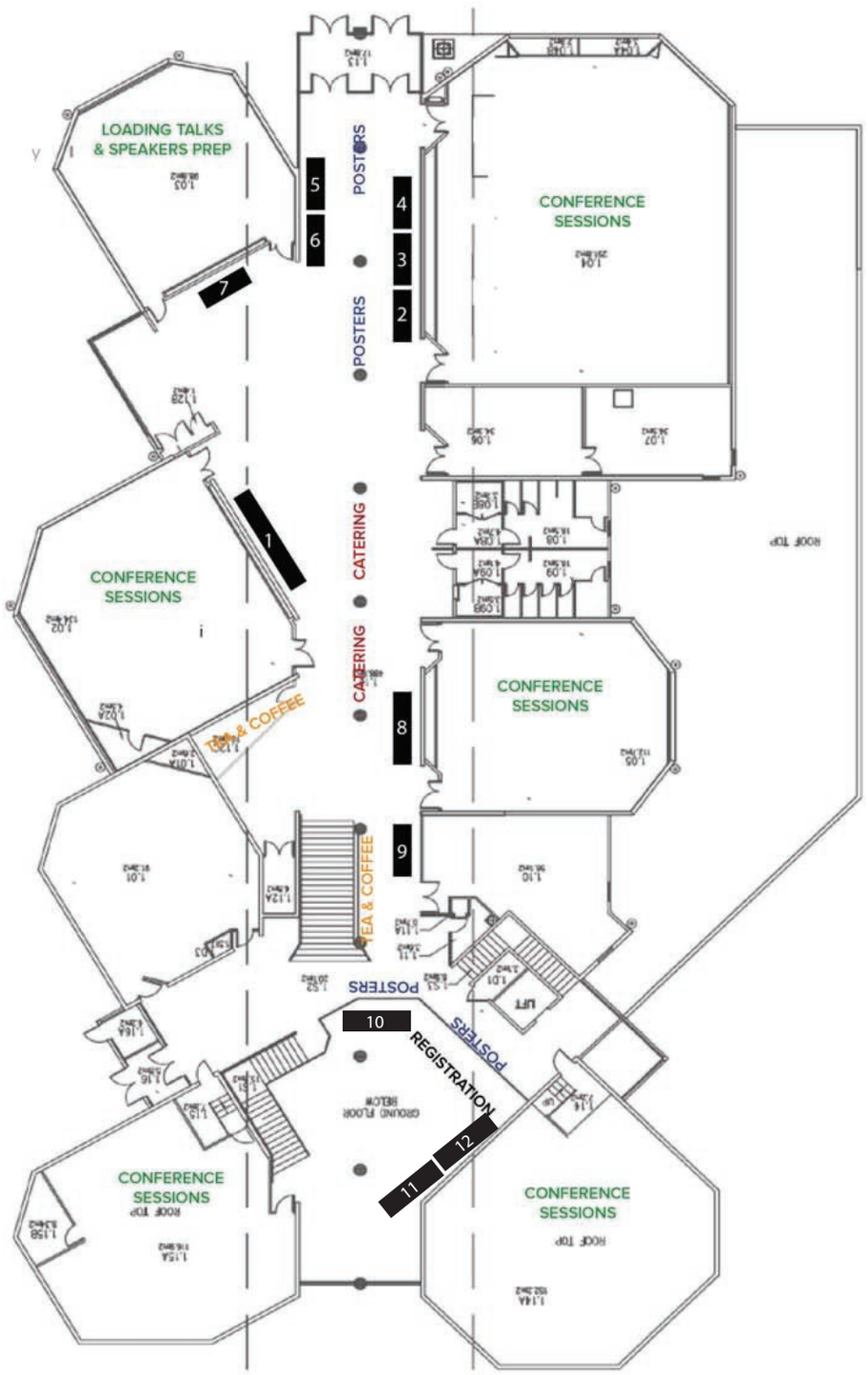
Date	Depart	Departure point	Arrive	Arrival point	Stops
Tues 1 Dec	7.45am	Novotel - Alma St	8.05am	Bus stop Gate 1 niversity of Waikato	1.Novotel 2. end of Victoria St (by old baths), 3. Bella Vista, Richmond St., 4. Manhattan Lodge, 218 Grey St
	5.00pm	University of Waikato	5.20pm	Novotel	1. Manhattan Lodge, 2.Bella Vista 3. end Victoria St 4. Novotel
Wed 2 Dec	8.00am	Novotel - Alma St	8.20am	Bus stop Gate 1 University of Waikato	1.Novotel 2. end of Victoria St (by old baths), 3. Bella Vista, Richmond St., 4. Manhattan Lodge, 218 Grey St
	6.10pm	University of Waikato	6.30pm	Novotel	1. Manhattan Lodge, 2.Bella Vista 3. end Victoria St 4. Novotel
Thurs 3 Dec	8.00am	Novotel - Alma St	8.20am	Bus stop Gate 1 University of Waikato	1.Novotel 2. end of Victoria St (by old baths), 3. Bella Vista, Richmond St., 4. Manhattan Lodge, 218 Grey St
	4.20pm	University of Waikato	4.40pm	Novotel	1. Manhattan Lodge, 2.Bella Vista 3. end Victoria St 4. Novotel
	6.15pm	Novotel - Alma St	6.30	Hamilton Gardens	
	10.30pm	Hamilton Gardens	10.45pm	Novotel	as requested
	12.00	Hamilton Gardens	12.15pm	Novotel	as requested
Friday 4 Dec	8.30am	Field Trip 1 - Wetland	3.30pm	as per schedule	
	8.30am	Field Trip 2 - Hydro	5.30pm	as per schedule	

Exhibitors floor plan - S Block

1. NIWA
2. Aqualinc Research Ltd
3. HyQuest Solutions
4. Geotechnics

5&6. Thermo Fisher Scientific

7. Envco Global
8. DHI (and aquarepublica)
9. Waikato Regional Council
10. Drillforce
11. GNS Science
12. Aquatic Informatics



Social Functions

WELCOME FUNCTION - GOTHENBURG,

Tuesday 1st December: 6pm – 8pm

Gothenburg
21 Grantham Street,
Hamilton

This will be an opportunity to mix & mingle with others attending the conference.
Some beverages and canapes supplied. Entrance is included with all full registrations, drink tickets will be available on arrival at the venue.

CONFERENCE DINNER - HAMILTON GARDENS,

Thursday 3rd December 6.30pm – midnight

Bus departs Novotel Tainui at 6.15pm

DINNER THEME: The conference dinner will be held at the beautiful, award winning Hamilton Gardens. This has inspired the dinner theme for this year's conference, which is:
Garden Party: anything (garden related) goes! Come as your favourite garden, gardener, flower or vegetable…. floral shirts allowed.

The dinner will be held at the Hamilton Gardens Pavilion, located in the centre of the Gardens.
Hamilton Gardens is located between the bank of the Waikato River and State Highway 1. Entrance is by pre-purchased ticket only. If you have purchased a dinner ticket with your registration you will find a dinner ticket in your name tag.

The buses will depart the gardens at 10.30pm and midnight.

Keynote Speakers

Dr. David McCall - Tuesday 1 Dec 9.00am - 9.45am

Dr David McCall is the General Manager of Research and Development at DairyNZ

David joined Dexcel (now DairyNZ) as development and economics manager in 2007. His professional training is in agricultural economics and management, with a PhD in the area from Massey University. He was a farm systems scientist at AgResearch until 1998 and then spent eight years in business development and managing technology company start-ups and investments for Celentis Ltd.

Tipa Mahuta - Wednesday 2 Dec 8.30am - 9.20am

Tipa Mahuta: Tipa is in her third term as a member of Te Kauhanganui. Her background is in education, policy and research and she has held a number of governance roles for a range of entities including the Waikato Conservation Board, past director of TGH and Te Reo Irirangi o Tainui. Tipa is a passionate advocate for rangatahi-centred development and provides mentoring and coaching to support this kaupapa. She is the current Deputy Chair of the Waikato Regional Council.

Prof. Bruce Clarkson - Thursday 3 Dec 8.30am - 9.20am

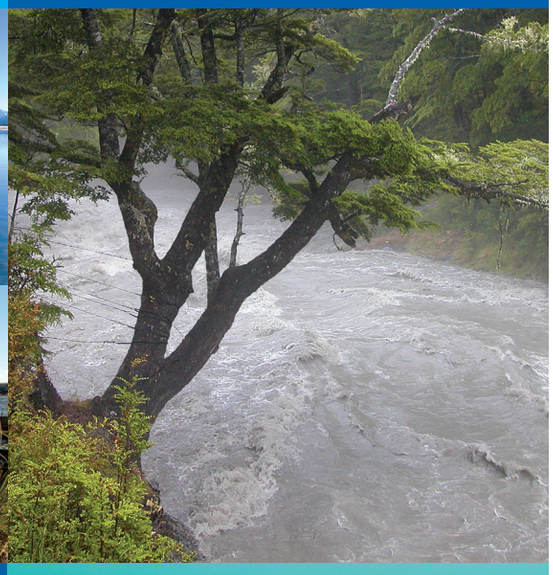
Professor Bruce Clarkson is currently Deputy Vice Chancellor Research at the University of Waikato. He has authored some 95 publications on various aspects of the systematics, ecology and restoration of New Zealand native plants and vegetation. Throughout his career he has applied his research, often working alongside community groups, to assist in the protection and restoration of native plant communities and ecosystems. Locally his research has supported Hamilton gully restoration initiatives and the Waiwhakareke Natural Heritage Park project near Hamilton Zoo. In 2005, together with Dr Wren Green, he carried out a review of progress on the New Zealand Biodiversity Strategy, and in 2006 he was awarded the Loder Cup, New Zealand's premier conservation award. From 2005 to 2012 he led a government-funded research programme considering the best methods to restore indigenous biodiversity in cities. Last year he was seconded from the University of Waikato as Interim Director of New Zealand's Biological Heritage National Science Challenge to lead the initial set-up phase of the Challenge.

World-class science supporting your water management goals

NIWA provides tailored research, tools and expertise to aid the effective management of New Zealand's precious freshwater resources and environments.

NIWA
Taihoro Nukurangi

Ask us about our purpose-built tools and services.



We can help you:

- assess the impacts of existing and proposed water and catchment land uses
- protect waterways from pollutants, and invasive fish and plants
- lift the efficiency, sustainability and productivity of agricultural and other water-dependent businesses
- restore waterway ecosystem health.

We achieve this using technical and natural solutions designed to:

- monitor, record and control the use, availability and quality of water
- identify the sources and reduce the impacts of pollutants
- forecast rainfall, soil moisture and river flow and their impacts on irrigation and fertiliser need, and flood and drought risk
- predict the effects of climate variability and change, and land-use change
- overcome barriers to aquatic restoration.

www.niwa.co.nz/freshwater-and-estuaries

enquiries@niwa.co.nz

Field Trips - Friday 4 Dec

1. Lower Waikato River flood scheme and Whangamarino Wetland tour

Departs Novotel Tainui Hotel at 8.30am sharp

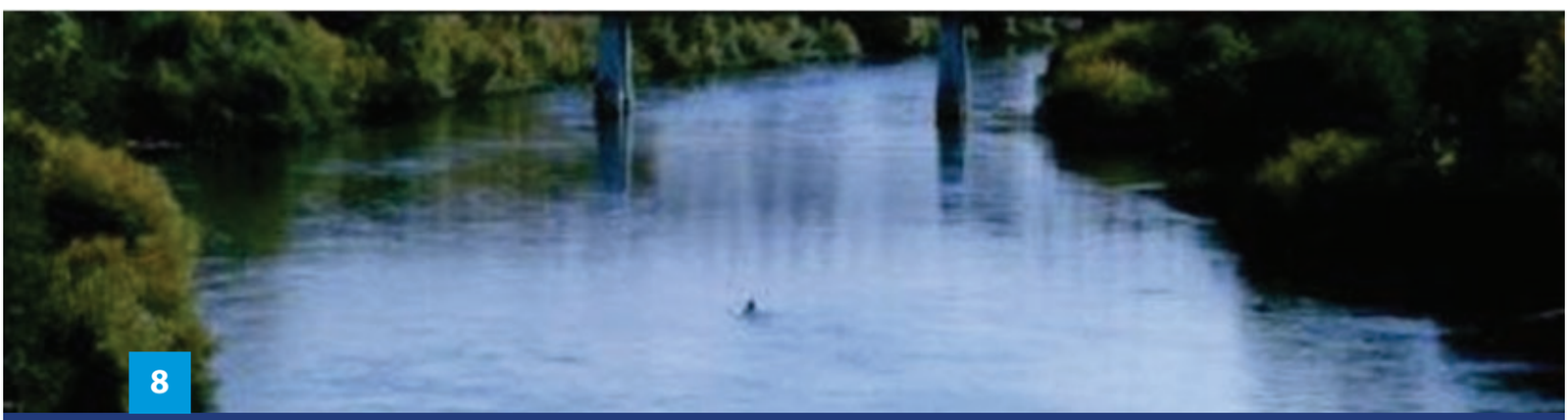
The Lower Waikato River Flood scheme was developed in the 1950's in response to a number of large floods. The scheme includes 242 km of flood banks, 249 flood gates and 60 pumping stations. This field trip will head north from Hamilton and visit the section of the scheme which includes the Rangiriri Spillway across SH1 and the canals and control gates which manipulate the hydrology of the Whangamarino Wetland and Lake Waikare. The Whangamarino Wetland is a 7000 ha mosaic of swamps, fens and peatbogs, and is internationally recognised for its ecology, having Ramsar status. The tour will focus on the conflicts of maintaining both a flood scheme and the ecology of the Whangamarino Wetland and Lake Waikare.
The tour will be a part day leaving at 8:30 and returning by 3:30 pm to Hamilton and then on to Hamilton airport. A pack lunch is provided.

2. Waikato River Hydro Tour

Departs Novotel Tainui Hotel at 8.30am sharp

This field trip will head south from Hamilton visiting two of Mighty River Power's hydro stations: Karapiro and Arapuni. The trip includes views from a swing bridge across the Waikato River and excellent sluice gate viewing down in the bowels of a dam. You will also have an opportunity to understand various uses of the river and reservoirs, and see the international rowing facility at Lake Karapiro. In addition, there will be a presentation on the current Waikato regional plan change "Healthy Rivers: Plan for Change" and associated technical work.
The Waikato River hydro electricity scheme consists of 8 dams (Aratiatia, Ohakuri, Atiamuri, Whakamaru, Maraetai, Waipapa, Arapuni and Karapiro) and nine power stations These were constructed between 1929 and 1971. The power scheme begins at Lake Taupo, which has control gates to regulate the flow of water into the river. Once released through the gates it takes over 18 hours for the water to flow to the last power station at Karapiro. Approximately 4000 gigawatt hours (GWh) of electricity is generated annually by the scheme, which is around 13% of New Zealand's total electrical generating capacity.
The trip will be a full day leaving by 8:30 and returning by 4.30 pm stopping via Hamilton Airport.

Please note there will be some walking involved in this trip, so bring a jacket in case of bad weather and you will need to wear covered shoes to access parts of the tour. A pack lunch is provided.



Programme

Tuesday 1 December			
Registration Desk open from 8.00am in S Block (downstairs)			
OPENING CEREMONY			
8.30am	**Official Opening - Paula Southgate WRC Chairperson**		
	Welcome - NZHS President, Committee Chairperson, KRWA President		
9.00 - 9.45am	**Keynote Speaker: S1.04 David McCall - Dairy NZ**		
Location	**S1.01**	**S1.05**	**S1.04**
Theme	**Climate**	**Transport and Transformation of Contaminants**	**Soil / Vadose Zone Hydrology**
Session Chair	Simon Woodward	Fouad Alkhaier	Shailesh Singh
10.00am-10.20am	Analysing trends in climate projections for monthly maximum sub-daily precipitation across Tasmania **Brown, Katherine**	2014 National survey of pesticides in groundwater **Close, Murray**	Hydrophobicity - a concern for hydrological modelling? **Mueller, Karin**
10.20am-10.40am	Estimating potential evapotranspiration over snow tussock grassland in Central Otago **Isaacs, Florence**	The life and times of the Burwood landfill, Christchurch **Thorpe, Hugh**	Tile drainage: potential research demands and opportunities **Shokri, Ali**
10.40am - 11.00am	**Morning Tea - Kindly Sponsored by Lincoln Agritech**		
Theme	**Irrigation**	**Transport and Transformation of Contaminants**	**Water Quantity / Water Quality Interactions**
Session Chair	Dennis Jamieson	Magali Moreau	Chris Daughney
11.00am-11.20am	What does optimising the system capacities for irrigation system achieve? **Rajanayaka, Channa**	Artificial turf fields - An emerging urban stormwater issue? **Clayton, Ed**	Hydrochemistry as an independent groundwater age tracer - case study: the Lower Hutt groundwater zone **Beyer, Monique**
11.20am-11.40am	Using climate data to predict soil moisture for wastewater irrigation scheme modelling **Woodhouse, Chris**	The assessment, remediation and management of a tce plume in fractured rock on a multi-stage CBD development site, Melbourne Australia **Cussins, Tony**	Quantifying the concentration and sources of dissolved carbon from forested and grassland mountain catchments, Southern Alps, New Zealand **Diack, Emily**
11.40am-12.00pm	Wairarapa water use project - water demand and supply **Knappstein, Dewi**	Coastal fringe groundwater: considerations for environmental monitoring well design, coastal discharge sampling & coastal chemistry assessment **Perwick, Aslan**	Preliminary investigation into the effects of partial clear-felling of pinus radiata on water quality: a case from the Glendhu experimental catchment **Bright, Christina**
12.00-12.20pm	Modelling effects of varying irrigation water allocations on farm production, profit and nitrogen losses **Fenemor, Andrew**	Solute and stable isotopic ratios of fog, rain, surface and soil waters at Timber Creek, Central Otago. **Trevelyan, Alice**	Coastal infiltration pond - How much water can it supply? **Rabbitte, Susan**
12.20pm-1.20pm	**Lunch**		
Location	**S1.01**	**S1.05**	**S1.04**
Theme	**Flood Management**	**Transport and Transformation of Contaminants**	**Managing to Limits: Water Quantity**
Session Chair	Roddy Henderson	Greg Barkle	Peter Davidson
1.20pm-1.40pm	Evaluating flood mitigation options using GIS automation **Ferguson, Reuben**	Transport and fate of nitrogen in the Lower Rangitikei catchment **Collins, Stephen**	Learning by doing: the targeted stream augmentation project **Painter, Brett**
1.40pm-2.00pm	Flood forecasting review Temuka 2015 **Martin, Adam**	Investigating how soil drainage class affects the redox status of shallow groundwater **Clague, Juliet**	Surface water allocation in the Horizons region - consented versus actual water use **Binsted, Stacey**
2.00pm-2.20pm	Mitigating flooding and low lake levels at Wanaka through the use of pumped storage **Taylor, Malcolm**	Controlled drainage - does it work? **McKergow, Lucy**	NPSFM 2014 – Surface water accounting system **Brown, Edmund**
2.20pm-2.40pm	Flood risk mapping, flood management, and development control in the UK **Rodda, Harvey**	The distribution of nitrogen lag and loss in Waikato catchment groundwater **Hadfield, John**	Lake Rotorua catchment boundary relevant to Bay of Plenty Regional Council's water and land management policies **White, Paul**
2.40pm-3.00pm	Flood frequency analysis for Canterbury rivers: supplementing the systemic record with historic and regional flood data **Steel, Kate**	Modelling heterogeneous aquifers for robust aquifer management decisions **Moore, Catherine**	Water use: Perceptions, semantics and science **Collins, Daniel**

3.00 - 3.30pm	Afternoon Tea		
Theme	**Flood Management**	**Transport and Transformation of Contaminants**	**Surface Water Hydrology**
Session Chair	Doug Booker	Roland Stenger	Jan Diettrich
3.30-3.50pm	Potential climate change Impact on flood risk across New Zealand **Zammit, Christian**	Using indicator organisms to predict pathogen transport. Is it too good to be true? **Murray Close**	National hydrological model testing, Part I: need and test procedures **Booker, Doug**
3.50-4.10pm	How to track a sediment slug: morphological modelling of the Upper Waipa river **Hoyle, Jo**	A preliminary model to account for hydrogeologic influences on spatial nitrogen attenuation capacity and land-based nitrogen loads to rivers in the Manawatu river catchment **Elwan, Ahmed**	National hydrological model testing, Part II: Results and interpretation **McMillan, Hilary**
4.10pm-4.30pm	Old data gives knowledge for flood control **Smart, Graeme**	Variability in hydrogeochemical conditions in shallow groundwater in the Manawatu river catchment and implications for denitrification potential **Rivas, Aldrin**	Acheron diversion enhancements **Palmer, Lennie**
4.30pm-4.50pm	An updated regional flood frequency method for New Zealand **Henderson, Roddy**	NPS 2014, Digging through the database; turning existing data into a what if tool **Kees, Lawrence**	Developing a statistical model for predicting 18O and 2H ratios of rivers in the South Island headwaters **Mager, Sarah**
6.00pm-8.00pm	**Welcome Function - Gothenburg, Hamilton City**		

Wednesday 2 December

8.30am-9.20am	**Plenary Session: S1.04 Tipa Mahuta, Waikato Regional Council**		
9.20am-9.30am	**Housekeeping and Health and Safety**		
Location	**S1.01**	**S1.05**	**S1.04**
Theme	**General Hydrology**	**Groundwater / Surface Water Connectivity**	**Catchment-scale Water and Contaminant Fluxes**
Session Chair	Helen Rutter	Peter Davidson	MS Srinivasan
9.30-9.50am	The experiences of Maori who have negotiated an allocation of water - is it recognition of rights and interests? **Tipa, Gail**	Towards modelling Wairau river - aquifer exchange flux dymanics: data integration and upscaling **Wöhling, Thomas**	Transpiration of pasture colonised by woody shrub Discaria toumatou in Canterbury, New Zealand **Dudley, Bruce**
9.50-10.10am	Uncertainty in modelling groundwater flow paths based on head data alone: the Waihora hillslope, Taupo **Woodward, Simon**	Changing groundwater age and source during drought conditions and connections between surface water and groundwater in the Lower Wairau Valley **Morgenstern, Uwe**	Evapotranspiration from irrigated landscapes across New Zealand **Graham, Scott**
10.10-10.30am	Inter comparison of experimental catchment data and hydrological modelling **Singh, Shailesh**	How well are two and three component tracer hydrograph separations simulated by baseflow separation methods? **Stewart, Michael**	Low spatial and inter-annual variability in evaporation from an intensively grazed temperate pasture system Pronger, Jack
10.30-11.00am	**Morning Tea**		
Location	**S1.01**	**S1.05**	**S1.04**
Theme	**General Hydrology**	**Groundwater / Surface Water Connectivity**	**Catchment-scale Water and Contaminant Fluxes**
Session Chair	Daniel Collins	Murray Close	Jens Rekker
11.00-11.20am	Applications of bivariate frequency analysis to drought studies **Tae-Woong, Kim**	Hydrochemistry and water dating for characterisation of Southland's regional groundwater-surface water system **Daughney, Chris**	Challenges in national scale groundwater quality and quantity modelling **Beyer, Monique**
11.20-11.40am		Radon as a tool for measuring groundwater/surface water interaction in gravel-bed rivers **Martindale, Heather**	Modelling the movement of leachate from a marlborough vineyard draining through the soil to groundwater and re-emerging as spring flow **Davidson, Peter**
11.40-12.00pm	Climate change impact assessment on water resource over the East Asia monsoon region **Bae D.**	Groundwater movement around the Waimakariri river **Steffens, Carl**	Groundwater and nutrient discharges in the greater Lake Tarawera catchment **Toews, Mike**
12.00-12.20pm	Reliability, resilience and vulnerability of freshwater systems **Collins, Daniel**	Nation-wide gridded baseflow from recharge and groundwater models **Westerhoff, Rogier**	Can isotope tools rapidly fill gaps in knowledge of nitrate sources and sinks needed for water quality policy? **Baisden, Troy**
12.20-1.20pm	**Lunch**		
Location	**S1.01**	**S1.05**	**S1.04**
Theme	**General Hydrology**	**Groundwater / Surface Water Connectivity**	**Catchment-scale Water and Contaminant Fluxes**
Session Chair	Hilary McMillan	Clint Rissmann	Channa Rajanayaka
1.20pm-1.40pm	Snow storage estimation for the Opuha Dam catchment **Kerr, Tim**	Update on Poverty Bay managed aquifer recharge pilot trial **Houlbrooke, Clare**	Development of a regional steady-state groundwater flow model loosely-coupled to surface water for the Southland region **Rawlinson, Zara**
1.40pm-2.00pm	Hydrological assessment and water balance for a swamp in the tropics **Blyth, James**	Managed aquifer recharge in the Poverty Bay Flats **Hampton, George**	Development of a regional steady state surface water model loosely coupled to steady state groundwater flow model for Southland **Zammit, Christian**

2.00pm-2.20pm	Earth2Observe: Global earth observation for integrated water resources assessment, New Zealand case study. **Westerhoff, Rogier**	Extrapolation of gaining and losing properties to ungauged reaches for implementation into CHEs **Diettrich, Jan**	Uncertainty of catchment nitrate flux estimates calculated using the "streamgem" approach with monthly monitoring data **Woodward, Simon**
2.20pm-2.40pm	Monitoring hapua outlet morphology **Measures, Richard**	Sensitivity analysis of a one dimentional heat transport model in the Ngongotaha stream, New Zealand **Moridnejad, Maryam**	Hurunui River catchment nitrate nitrogen dynamics examined using continuous concentration monitoring **Rekker, Jens**
2.40pm-3.00pm	Estimating stage-discharge rating shifts due to river bed scour-fill during floods **Le Coz, Jérôme**	Modelling surface water-groundwater interaction within NIWA's national hydrologic modelling framework **Yang, Jing**	Regional groundwater flow dynamics in the Horizons Region **Morgenstern, Uwe**
3.00pm-3.30pm	**Afternoon Tea**		
Theme	**General Hydrology**	**Groundwater / Surface Water Connectivity**	**Managing to Limits: Water Quality**
Session Chair	Harvey Rodda	Christian Zammit	John Hadfield
3.30pm-3.50pm	Hinds Catchment managed aquifer recharge (MAR) pilot project **Cockburn, Catherine**	Concurrent continuous monitoring versus spot gaugings **Leong, David**	Tracking the pathways of groundwater contamination using synthetic DNA tracers **Pang, Liping**
3.50pm-4.10pm	Shifts in hydrological regimes and low flow statistics in the Waikato region of New Zealand **Jenkins, Bevan**	Low flow modelling to detect rating pertubations **Macky, Graham**	Precipitation and soil zone controls the hydrochemical evolution of Southland's ground and surface waters **Rissmann, Clint**
4.10pm-4.30pm	Assessment of economic and environmental advantages of a seasonal pumped storage scheme (Onslow, Central Otago) **Majeed, Mohammed**	Peat lake water level setting and groundwater interaction **Brown, Edmund**	Characterisation of geogenic organic compounds in water associated with natural gas production **Taulis, Mauricio**
4.30pm-4.50pm	Deriving water resources indicators at the basin scale from global hydrological and land surface models **Werner, Micha**	Groundwater residence times and chemistry of the Pukekohe and Bombay basalt aquifers **van der Raaij, Rob**	Predicting suspended sediment rating curves **Hicks, Murray**
5.00pm-6.00pm	**NZHS AGM - S1.04**		
Thursday 3 December			
8.30-9.20am	**Plenary: S1.04 Bruce Clarkson: University of Waikato**		
9.20-9.30am	**Housekeeping and Health and Safety**		
Location	**S1.01**	**S1.05**	**S1.04**
Theme	**Monitoring and Data Management**	**Flood Management**	**Collaborative Water Management**
Session Chair	Tim Kerr	Graeme Smart	Andrew Fenemor
9.30-9.50am	Stream monitoring by community groups – great for education, but can the data be used? **Wright-Stow, Aslan**	Calibration of models for design of flood mitigation measures at Kopu, Thames **MacMurray, Hugh**	Māori Values and Attributes: An approach for implementing the NPS-FM **Robb, Mahuru**
9.50-10.10am	Improving the temporal and spatial resolution of data to increase knowledge on bedload transport in gravel-bed rivers **Neverman, Andrew**	Rainfall and runoff guidelines **Pfahlert, John**	Co-innovation and water management: Learnings from a case study **Srinivasan, M.S.**
10.10-10.30am	Identifying small-scale wetlands using orthophotos, satellite imagery and LiDAR **Uuemaa, Evelyn**		From data to decision-making: applying the data-wisdom continuum to collaborative freshwater management **Rouse, Helen**
10.30am-11.00am	**Morning Tea**		
Location	**S1.01**	**S1.05**	**S1.04**
Theme	**Monitoring and Data Management**	**Aquifer Hydrology**	**Collaborative Water Management**
Session Chair	Doug Booker	Cath Moore	Andrew Fenemor
11.00-11.20am	NZ Groundwaters state and trend update for the 2004-2013 period **Moreau, Magali**	Investigation of offshore coastal discharge in the Waimakariri zone, Canterbury **Etheridge, Zeb**	A new and better way of doing environmental trend analyses? **McBride, Graham**
11.20-11.40am	Uncertainty analysis of stage-discharge rating curves: comparison of two distinct approaches **Le Coz, Jérôme**	Supporting groundwater model optimization with highly parameterized simulation of land surface recharge **Alkhaier, Fouad**	18 months in a leaky boat - lessons from crossing the Waitaki **Shaw, Helen**
11.40-12.00pm	Towards an interactive internet-enabled MODFLOW Model for the Ohau and Waikawa Catchments, Horowhenua **Kmoch, Alexander**	Hydrogeology of the Te Wai Unuroa O Wairaka Spring **Berry, Sean**	Ka Tu Te Taniwha Ka Ora Te Tangata: improving our understanding of freshwater resources in the Awahou catchment, Lake Rotorua **Lovett, Abigail**
12.00pm-1.00pm	**Poster Session**		

1.00-1.40pm	Lunch		
Location	**S1.01**	**S1.05**	**S1.04**
Theme	**Monitoring and Data Management / General Hydrology**	**Aquifer Hydrology**	**Collaborative Water Management**
Session Chair	Murray Hicks	Paul White	Andrew Fenemor
1.40-2.00pm		The Canterbury Plains Aquifer – a single aquifer **Hanson, Carl**	Water Wheel diagrams - online **Kerr, Tim**
2.00-2.20pm	National hydrologic instrument: Showcase the Netherlands **Verhagen, Floris**	Hydrogeological effects in Central New Zealand from large (M>5.8) earthquakes **Weaver, Konrad**	New Zealand's National-level environmental reporting framework **King, James**
2.20-2.40pm	Infrastructure and hydrology: improving the relationship and learning from the results **Jamieson, Dennis**	Step testing to assess changes in aquifer properties as a result of the Darfield 2010 earthquake **Rutter, Helen**	The integration of economic, social and biophysical models to manage freshwater resources **Samarasinghe, Oshadhi**
2.40-3.00pm	Modelling bank dynamics in gravel-bed braided rivers **Stecca, Guglielmo**	Long-term hydrogeological effects on the Canterbury Plains aquifer system from the Darfield 2010 earthquake **Rutter, Helen**	A method for incorporating cultural values into flow management decisions **Booker, Doug**
3.00-3.20pm	RFID tracking of individual bedload cobbles down a steep alluvial fan, Westland, New Zealand. **McGill-Brown, Matt**	Predicting hydraulic properties through measurement of spectral induced polarization (SIP) **Ingham, Malcolm**	Orchestra conductor or player? Contributing technical information in collaborative water planning processes **Fenemor, Andrew**
3.20pm-3.50pm	Afternoon Tea		
3.50pm - 4.10pm		**Conference Closing**	
6.30pm-12.00am	**Conference Dinner - Hamilton Gardens (bus leaves Novotel Hamilton at 6.15pm) Theme: Garden Party**		
	Friday 4 December		
8.30am	**Field Trips - depart Novotel Hamilton at 8.30am**		

ORAL ABSTRACTS

POSTER ABSTRACTS

Attendee List

Last Name	First Name	Organisation
Adams	Dr Keith	University of Auckland
Alkhaier	Fouad	ECan
Baalousha	Husam	Qatar Environment and Energy Research Institute
Baisden	Troy	GNS Science
Baker	Tim	Jacobs NZ Ltd
Bardsley	Medihah	Khatep Associates
Barkle	Greg	Aqualinc Research
Benavidez	Bianca	Victoria University of Wellington
Berry	Sean	Geotechnical Engineering Ltd T/a Soil & Rock Consultants
Beyer	Monique	Victoria University of Wellington and GNS Science
Binsted	Stacey	Horizons Regional Council
Blyth	James	Jacobs
Booker	Doug	NIWA
Bright	Christina	University of Otago
Brown	Ed	WRC
Burger	David	DairyNZ
Cameron	Stewart	GNS Science
Campbell	Dave	University of Waikato
Carruth	David	Hawkes Bay Regional Council
Carter	Rochelle	Bay of Plenty Regional Council
Clague	Juliet	Lincoln Agritech
Clark	Dan	Environment Canterbury
Clayton	Ed	ClaytonFordham Ltd
Close	Murray	ESR
Clunie	Dougal	SMEC
Cockburn	Catherine	Golder Associates (NZ) Limited
Collins	Daniel	NIWA
Collins	Stephen	Massey University
Dabral	Salomi	University of Auckland
Daughney	Chris	GNS Science
Davidson	Peter	Marlborough District Council
Diack	Emily	University of Otago
Diettrich	Jan	NIWA
Dudley	Bruce	NIWA
Ede	Mike	Marlborough District Council
Elliotte	Dianne	Environment Southland
Elwan	Ahmed	Massey University
Etheridge	Zeb	Environment Canterbury
Fenemor	Andrew	Landcare Research
Ferguson	Reuben	Morphum Environmental
Friedel	Mike	GNS Science
Gordon	Dougall	Hawke's Bay Regional Council

Graham	Scott	NIWA
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Hampton	George	University of Waikato
Hansford	John	Tonkin + Taylor
Hanson	Carl	Environment Canterbury
Hao	Tingting	University of Auckland
Harvey	Jane	Taranaki Regional Council
Henderson	Roddy	NIWA
Heron	Casie	Environment Southland
Hicks	Murray	NIWA
Hitchcock	Michelle	Trustpower
Houlbrooke	Clare	Golder Associates (NZ) Ltd
Hoyle	Jo	NIWA
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Jenkins	Bevan	Waikato Regional Council
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Kees	Lawrence	Environment Southland
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King	John	Geotechnics Ltd
King	Nick	Engeo
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Lepot	Mathieu	TU Delft
Lester	Andrew	Watercare
Lovett	Abigail	GNS Science
Lunzer	Erich	Genesis Energy
Macky	Graham	DHI New Zealand
MacMurray	Hugh	Barnett & MacMurray Ltd
Mager	Sarah	University of Otago
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McKergow	Lucy	NIWA
McMillan	Hilary	NIWA

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Palmer	Lennie	Trustpower
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Rodda	Harvey	Hydro-GIS Ltd
Rouse	Helen	NIWA
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Samaratunga	Andy	Auckland Council
Scholes	Paul	Bay of Plenty Regional Council
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Steffens	Carl	Pattle Delamore Partners
Stenger	Roland	Lincoln Agritech Ltd
Stewart	Michael	Aquifer Dynamics & GNS Science
Sturgeon	Catherine	Jacobs
Tanner	Chris	NIWA
Taulis	Mauricio	JACOBS
Taylor	Malcolm	Waikato University
Thomas	Joseph	Tasman District Council
Thompson	Mike	Greater Wellington Regional Council
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Toews	Mike	GNS Science
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Trompetter	Vanessa	GNS Science

Tschritter	Conny	GNS Science
Van Der Raaij	Rob	GNS Science
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Wallace	Philip	DHI Water & Environment
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Werner	Micha	UNESCO-IHE
West	Peter	Blue Duck Design Ltd
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White	Paul	GNS Science
Williams	Huw	ENGEO
Williamson	Jon	Williamson Water Advisory
Wöhling	Thomas	Dresden University of Technology / Lincoln Agritech Ltd.
Woodward	Simon	Lincoln Agritech Ltd
Wright-Stow	Aslan	NIWA
Yang	Jing	NIWA
Zammit	Christian	NIWA
Zhang	Jin R	GNS Science

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