Amuri irrigators scoop river award

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Farming Leaders | Group developing a future vision

On our farm at Levels in South Canterbury we have just completed our first audit of our Farm Environmental Plan (FEP). Our FEP is important not just as a ‘live’ planning tool but also important for accountability. We are doing what we said we would and achieving Good Management Practice. This is where all farmers should be regardless of land use and is our commitment to improving water quality and minimising our impact on the environment. Many if not all irrigated properties in New Zealand now require a FEP and its great that the irrigation community is leading the uptake of such a valuable tool.

The recent hot summer has highlighted the importance of improving water quality. The first place our girls want to head when the temperature hits 25C+ is the local river or beach. We are making progress in some regions but we still have a long way to go.

As farmers we must all accept our role in addressing the impacts our farming systems have had and have on our environment. I am sure I am not the only farmer that is frustrated by the fact that the farming opportunities and practices that we were so excited about 10–15 years ago have had such unintended consequences. Let’s now move on and address it.

Improving water quality is a complex issue and catchment specific. In terms of irrigation, the big impacts on water quality are ensuring our water takes are leaving enough water in our rivers and aquifers (this is why water storage is such an important component of modern irrigation) and efficient water use. Efficient water use is all about only applying what our plants require, minimising drainage and therefore nutrients being leached.

Land use has a huge impact beyond water applied on water quality and is the reason why IrrigationNZ and all the primary sectors are working together to address this. This is being done through the Farming Leaders Group (FLG) involving all food and fibre industries Chairs or Chief Executives. Water quality is an immediate focus, with a work program currently being developed. This is not about reinventing the huge amount of good work being done in all sectors, but documenting these activities so we can identify gaps, facilitate additional work streams where required, and most importantly share progress or otherwise with all New Zealanders.

In mid-February this group had their second meeting with our new government – the Prime Minister, Ministers for the Primary Industry, Regional Development, Environment and Finance – to reaffirm the purpose of the FLG and discuss proposed outcomes. The government are very keen to work with the agricultural sector to achieve our common aspirations around water and land and were engaging and positive about the way forward. Leadership, water quality, climate change, biosecurity and a shared New Zealand brand or vision were the hot topics.

The Minister for Agriculture, Hon Damien O’Connor, has challenged the FLG with developing a ‘Vision for Agriculture’. This is a great opportunity and we are now working through our first draft which will be taken back to all industry groups for endorsement before presenting it to the Minister. This will be the first time I can recollect that all our food and fibre sectors have come together and agreed on a common vision and targets. Clearly this needs to be backed up by action which will only be achieved through all sectors taking ownership.

Are we as farmers up for change? We must be. We have already seen significant investments in upgrading irrigation and farming systems and the motivation is pretty simple – our family livelihoods and those of our staff, surrounding communities and wider regions depend on it. We want all Kiwis to be proud of what we do, to champion our food and produce and to work with us in ensuring we all share from the unique opportunities in New Zealand while looking after our natural resources.

With so much change afoot it is timely that IrrigationNZ revisits the organisation’s priorities and strategy going forward. We have sought our members and wider stakeholders feedback on this. Thank you to those of you have taken the time to be part of this process. We will be coming back to you all for further input once our new strategy has taken shape.

Nicky Hyslop, Chairwoman, IrrigationNZ
After a quiet few months following the election and the New Year break, in February the new government charged the Land and Water Forum with a challenging task – which also provides some insight into their future plans.

Environment Minister David Parker and Agriculture Minister Damien O’Connor have asked the Forum (which IrrigationNZ is part of) to provide the Government with advice by the end of May on:

- more detailed consideration on the Government’s priority of avoiding further degradation of water quality, in particular on interim limits and other measures to ‘hold the line’; and
- whether there is a consensus view on how best to allocate nutrient and sediment loads by catchment, while recognising fairness between existing capital investment and underdeveloped land, and meeting bottom lines, and how this can be implemented without having the same underlying debate in each region.

These are really complex topics to provide advice on and there are no easy solutions to either issue.

The first topic has been covered by several previous recommendations made by the Land and Water Forum.

Options explored have included setting ‘interim limits’ or ‘default national limits’. Both would be challenging to do given the unique nature of each catchment. Setting interim limits can often require as much effort as setting long term limits, and setting default national limits would inevitably end up with the ‘holding the line’ limits being too crude or restrictive.

Making changes to the National Policy Statement to require regional councils to have regard to the impacts of any new consent on the ‘life supporting capacity of fresh water’ is regard to the impacts of any new consent on the ‘life supporting capacity of fresh water’ is

IrrigationNZ

Chief Executive

Andrew Curtis

Chief Executive

Update on Land and Water Forum

The logical approach to address this task would be to first understand which areas of New Zealand are subject to future development pressure – where in New Zealand is ‘holding the line’ still an issue? Then, based on this, look at appropriate interventions for these areas, which may be legislation based or may use other mechanisms. Future government policy needs to be sophisticated if we are to successfully address water quality without hamstringing the dynamic and innovative nature of New Zealand agriculture.

For allocating nutrient and sediment loads, there’s no one size fits all approach – and no national quick fix. If there was a simple solution, it would have been found years ago! Allocating nutrients requires either a measurement or modelling approach. Measurement is still not feasible, and while OVERSEER is useful for modelling nutrient losses on dairy farms, on arable or horticultural land its use still has many challenges. This makes it difficult to adopt property based nutrient discharge limits at this point in time. Successfully addressing sediment issues requires a focus on where the sediment has been generated from and then taking actions to directly address this – erosion control or better managing winter stock grazing practices are examples of this.

In our view, the way forward for both nutrient and sediment, until the modelling becomes ‘robust enough’ or measurement becomes feasible, is to focus on being clear about what needs to be done, allocating individual and collective responsibilities at the sub-catchment level that directly relate to the water quality outcomes required, and then following this up to ensure action is taken. The establishment of farmer collectives has been shown to be the most effective way to implement this approach – locals coming together to own the issues, find solutions and self-manage their implementation. Farm environment plans are also key – individual farmers identifying the risks their management poses to the environment, implementing actions to address these alongside being held accountable through independent audits.

To inform the forum about the benefits of this approach, IrrigationNZ is helping to pull together a discussion paper on the key role of farmer groups and farm environment plans in improving water quality and allocation issues. This will draw on real life examples of how this is actually working. It would be fair to say we’re over the ethereal and often nonsensical nutrient allocation debate!

A range of primary sector organisations, including IrrigationNZ, Federated Farmers and others have also been working to develop a Good Farming Practice Actions for Water Quality document. This is currently a draft but is expected to be released later this year. The document contains an industry commitment to Farm Environment Plans alongside a list of Good Farming Practices. If farmers and growers adopt those actions that are relevant to them, it would help improve water quality.

The forum’s tasks and the election campaign are an indication that there will be many changes ahead for irrigators, with new environmental regulations and rules likely.

In mid-April we’re hosting our biennial conference in Alexandra. It’s a great opportunity to preview the latest irrigation technology to help you meet whatever challenges are ahead as well as getting an insight into future policy and trends in irrigation. Our previous conferences have been well attended with a good mix of farmers, service industry professionals, academics, local and central government representatives coming along. I hope to see you there!

Andrew Curtis

Chief Executive

IrrigationNZ
Agricultural businesses continue to drive forward, looking for smarter ways to use land and water resources by diversifying their farm practices within tight environmental and community expectations.

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MORE IRRIGATION DESIGNERS IN TRAINING
Our third irrigation system design course got underway in January at Lincoln with 12 participants. One participant is Sam Franklin of WaterForce. “Late last year WaterForce gave me the opportunity to undertake the IrrigationNZ Certificate in Irrigation System Design. I could not turn down this opportunity to further my knowledge base. The course covers a range of irrigation subjects at a high level that are all very important to understand when designing an efficient irrigation system. The course is a mix of in-class lectures from experienced industry leaders and travelling to farms to listen to farmers and learn the practical side of irrigation design,” he says.

Rassie Erasmus of Sustainable Water is also part of the course. “Water is a precious commodity that should be utilised properly for a sustainable future. The design course is a good way to ensure designers offer the best possible solutions to our clients while giving us credibility within the irrigation industry,” he says.

WE’VE BEEN TRAINING IRRIGATORS TO BE MORE EFFICIENT
We’ve had a busy spring and summer hosting a range of training sessions for irrigators – over 400 people have taken part in training over this period. We visited new locations with training sessions in the Bay of Plenty and Hastings seeing a good turnout. We also visited Canterbury, Otago, Tasman, Marlborough, Wairarapa, and Manawatu-Wanganui to carry out training.

MEETING WITH THE PRIME MINISTER
IrrigationNZ Chair Nicky Hyslop joined other farming leaders to meet with new Prime Minister Jacinda Ardern in February to discuss how they can work together to achieve improvements to water and address issues such as climate change and biosecurity. You can read more about the visit in Nicky’s column on page 4 in this issue.

CONGRATULATIONS TO OUR INNOVATION AWARDS FINALISTS
Three finalists have been named for our Innovation in Irrigation Awards – Waitaki Irrigators Collective who produced a water race safety video, Aqualinc who entered their GeoRural GIS Database, and Rainer Irrigation who entered their Vibra Screen dairy effluent separator which makes it easier to apply effluent through centre pivot irrigators.

Pictured is IrrigationNZ’s Business Development Manager Lauren Colgan and Gavin Briggs of Rainer Irrigation with their Vibra Screen.

WE’RE LOOKING FORWARD TO OUR CONFERENCE
Preparations are under way for our 2018 Conference in Central Otago. We have some exciting speakers and tours lined up in the region, and there’s plenty of walks, wineries, adventure activities and scenery for you to enjoy if you want to extend your visit. Register today at www.irrigationnz.co.nz/conference-2018
Our view from South Africa in recent months, as you can imagine, has been somewhat dismal in many respects: given the severe drought in the Western Cape, with the Eastern Cape and the Northern Cape provinces also declared drought regions during February by national government.

The effects of the drought and water crisis on our shores has been devastating, particularly in agriculture. The agricultural sector in the Western Cape, well-known for its wine sector, has reported a loss of 50,000 seasonal worker jobs and severe cashflow challenges on many farms, as farms make do with the water they have and are reporting strain from higher than usual overheads.

National government, in its recently announced budget for 2018/2019, has announced R6 billion (approximately $703 million New Zealand dollars) for drought relief and related infrastructure.

The Western Cape is, understandably, worried about the consequences of the water crisis on its multibillion rand tourism sector – Cape Town is frequently voted one of the world’s favourite cities.

Bath plugs in hotels and homes have been confiscated, and a shower in Cape Town must be 45 seconds, maximum. Swimming pools are covered in a very hot Cape summer, and swimming in a pool is banned – pools are to be used as emergency dams if need be. There is a limit of 50 litres of potable water a day per person. Most tourists rather gamely adhere “like a local” to the instructions posted in hotel rooms – timer on for 45 seconds, put your soap on, switch on the shower, leap in and leap out. Many of the five-star hotels in the city have installed their own desalination plants.

There is a major demand for groundwater professionals. There is a constant rumbling of borehole equipment in the suburbs of Cape Town and a six week wait at present for rainwater tanks in the Western Cape. Only online orders at the big retailers are accepted, to ensure fairness.

Cape Town has numerous underwater springs, most famously the one at Newlands. Indeed, Cape Town was once known as “Sweet Waters”, a place that the original inhabitants used to bring their cattle to be watered at the springs of Table Mountain.

This Newlands spring is used for making beer (435 million litres a year is the brewery’s capacity) by South African Breweries (SAB). However, these days Newlands is most famous as a source of water for the public. After an altercation between eager water collectors in January, a 25 litre per person limit has been imposed on the amount of water Capetonians can collect from the Newlands Spring.

In a brilliant gesture in a gloomy situation, farmers stepped in to the Day Zero crisis in February to massively bolster water supply in the Western Cape system. The city of Cape Town announced “Day Zero” in January – saying that if consumption was to continue at 2017 levels, the taps would run dry on April 21. However, in February the Groenland Water Users’ Association community in Elgin and Grabouw – a apple and pear growing area – announced they would share their excess water with the Western Cape water system.

They would share between 7.5 million and 10 million cubic metres of water from their private dam Eikenhof with the Western Cape water system. This generous sharing resulted in “Day Zero” being pushed back to July 9.

The release of this water started in February, into the Palmiet River, eventually to reach the Steenbras Dam.

The farmers in Elgin had managed to have an excess of water due to efficient irrigation and excellent management of irrigation water, proactive use of scheduling and constant dissemination of information on water saving from the association to users. Good maintenance is also part of the community’s excellent capability of conserving irrigation water.

Closing off on a high note – SABI was delighted to hold our annual award ceremony in early 2018 for our top performing school learners in the Western Cape. It seemed apt to applaud our top young irrigation learners, given that such skills are more vital than ever in our country. The Western Cape government sponsors some of the schools, and our SABI Irrigation Wise Academy has also attracted private sponsors in our Adopt-a-School initiative. This all bodes well for growing a healthy irrigation sector in South Africa.

Now if only the South African Super Rugby franchises can also pull their act together for the 2018 season, there really would be something to celebrate!
Riparian strips – what does the science say and what do you need?

By Nick Pyke, FAR.

Riparian strips, also known as setback strips or buffers, are used to improve water quality and biodiversity, either by reducing the risk of sediment and phosphorus entering a waterway through surface runoff, or by shading waterways to reduce algal blooms and provide conditions suited to instream biodiversity.

Many councils have introduced regulations limiting agricultural activities around waterways, but there is no consistent approach and the rules vary greatly between regions. Common sense suggests that factors such as weather patterns, slope, soil type, cultivation management and plant species should be considered when determining the most effective setback width for any particular farm, or part of a farm, however, very little scientific data is available on this subject and most councils stipulate a fixed setback width.

To address this issue, FAR, supported by the Sustainable Farming Fund, has initiated a research project called Good Management Practices for Setback Strips on Cropping Farms. The project will investigate the effective use of setbacks on cultivated land to mitigate sediment and phosphorus loss to waterways. It will incorporate regional trials testing a range of setback widths on different slopes to measure their effectiveness in filtering runoff water. The use of perennial wheat as a setback plant will also be investigated. Perennial wheat is used for erosion control elsewhere in the world. Its benefits include providing constant ground cover and harvestable grain to offset the loss of productivity associated with the setback.

The aim of this project is develop reliable data which will encourage regional councils to be more flexible in their rule making and allow farmers to design setback systems to match the physical characteristics of their farms. Cropping farmers are more likely to positively adopt setback rules once they see the numbers to support the effectiveness of the widths being enforced and they know that the research has been specifically focused on cropping systems.

**EFFECTIVE RIPARIAN PLANTING**

Riparian strips can be effective at reducing contaminant flow to streams, but it is important to determine the purpose of the riparian strip prior to planting and then select the species, width and management of the strip relative to the site. Here are some key points to keep in mind when planning a planting:

- The four main contaminants entering waterways from farmland are nitrogen, phosphorus, sediment and faecal matter, with sediment being the largest source of phosphorus.
- Strips as narrow as 0.6m can reduce the amount of sediment entering streams by up to 91% as long as the slope is not too great. The best strips are considered to be tall, dense grasses planted perpendicular adjacent to the stream on relatively flat paddocks. These grass strips have been shown to be more effective than forest, native or wetland riparian strips at preventing sediment from entering the streams.
- The greater the slope, the larger the area needed to trap the sediment. Research has shown that even on slopes of 10% (quite steep and unlikely to be cultivated) a 0.6m wide grass strip can reduce soil loss by 63% to 85%, depending on the cultivation practice on the surrounding land.
- Other research has shown that a wider strip of 9.1m was only 85% effective and that there was no significant increase in effectiveness in riparian strips wider than that.
- Most riparian strips will eventually become inefficient due to nutrient saturation. Research has shown a marked drop in nutrients entering streams in the early years after a riparian strip has been established while the nutrient demand of the new young plantings is high. However, once the soil in the riparian strip reaches phosphate saturation, the phosphorus must be removed by harvesting vegetation from the area.
- Slow growing native plants may be good for shading streams, but will not help a great deal with phosphate uptake and will provide limited reduction of sediment run-off.
- Nitrogen cannot be effectively trapped by a small riparian strip. This is because it is easily leached into the water through sub-surface drainage. Riparian strips would have to be between 20–30m wide to reliably prevent nitrogen from entering streams.
- Grazing stock near streams can result not only in high applications of urine (nitrogen) and faeces (phosphate) into streams, but it also in erosion of banks.
- Erosion can be significantly reduced by ensuring a dense plant population along banks.

Riparian planting projects can become community events, like this one in the Wairarapa.
Good on You...
SWE

IrrigationNZ is introducing a regular feature in our magazine where we can recognise the work of our members who are taking steps to improve environmental outcomes. We want to recognise individual farmers, schemes, irrigation service companies and other members for their good work by saying Good on You!

In this edition we are recognising SWE which has recently become one of a small number of New Zealand businesses which is carboNZero certified.

SWE (formerly known as Southern Water Engineering) has now been certified as having an effective net zero carbon footprint. SWE Managing Director, Stephen Leitch, is thrilled with the achievement, which he says is part of the company’s ongoing quest “to do the right thing” by our team, our clients, our community, and our environment.”

One of the ways SWE has reduced their carbon footprint was through the purchase of two electric bikes, which are currently used by Leitch, and Dean Marshall (SWE Business Development Manager). Consequently, Leitch and Marshall have drastically reduced their use of company cars and travelled over 4,500 kilometres by electric bike since they were bought in 2017.

“We work, live and play in Marlborough. We want to make it a better place for our staff, our clients and our future generations,” Leitch says.

If you’ve recently done something which benefits the environment and would like to share with irrigators please email magazine@irrigationnz.co.nz with your story (and a photo). If you’re on the land you might want to share some work you’ve undertaken like native planting, fencing off waterways, a personal achievement, or the completion of training by a staff member which benefits the environment. Irrigation schemes, service companies and other members are also invited to celebrate their achievements.
IrrigationNZ website changes affect you

We have now made some web resources on our website, www.irrigationnz.co.nz, only accessible to IrrigationNZ members. This is being done so we can launch a new online training system in spring for members and their employees. We also want to encourage new members to join, rather than accessing resources for free.

If you are an IrrigationNZ member, to access some resources you will need to use the red login tab, then enter your email. If you don’t have a password you will need to create one. You can click on the green dashboard tab to see information relevant to you, like tickets to training events you have purchased, and your contact details (which you can update online). You will need to be logged in to access member only training pricing.

There are some IrrigationNZ members who are shareholders of schemes which are members of IrrigationNZ. If you are a shareholder of a member scheme, you are an IrrigationNZ member. However we do not have all shareholders email addresses. Schemes who are IrrigationNZ members are listed on our website under the ‘Knowledge Resources’ tab under the ‘Irrigation Scheme and User Groups Info’ option. A number of irrigation service companies also have some staff who IrrigationNZ doesn’t have contact email addresses for.

If you want to check if you are an IrrigationNZ member you can email admin@irrigationnz.co.nz or phone 03 341 2225. If you are part of a member scheme or company but we don’t have your email address we can record this in our system and this will allow you to access our online member-only resources. New members are always welcome to join us to access our resources. To join IrrigationNZ visit our website, or if you need assistance please contact us on 03 341 2225.

IN BRIEF

NEW BUSINESS DEVELOPMENT MANAGER JOINS INZ

We are pleased to welcome Lauren Colgan as our new Business Development Manager. Lauren’s role will involve strengthening IrrigationNZ’s partnerships, creating sponsorship opportunities, and improving the value of member benefits. Lauren is originally from Christchurch and is returning to Canterbury after living in Auckland where she worked in sales and client relationship management. She has connections to farming and says she is looking forward to a new and challenging role.
Training and testing helps avocado grower improve water use

For Bay of Plenty avocado grower John Bowen, irrigation testing and the opportunity to attend a training session hosted by IrrigationNZ, provided an opportunity to review how he operates his irrigation systems and some ideas for future changes he can implement at his property.

John Bowen and his wife Mary own Mountview Orchard – a three hectare orchard in the Bay of Plenty with around 500 avocado trees. The property is located near Aongatete (between Katikati and Bethlehem). They brought the property in 2004, but spent time living in the United States between 2007 and 2015. Microsprinklers are installed under the avocado trees.

John says since their return from the US, they have experienced relatively wet summers. “We hadn’t used the irrigation systems a lot over the past two summers – we had only needed to use them one or two times over the summer and because they hadn’t had much use, we hadn’t spent a lot of time looking at how our system was working or how it was being used.”

Mature avocados require minimal irrigation but cannot be allowed to become stressed as the trees carry both mature fruit, young crops and are setting budwood.

John says the main challenge he had with his irrigation system was that with regular pruning and ongoing orchard activity, it was easy for damage to the system to occur. Checks were carried out after pruning to look for leaks or cuts to the irrigation system.

In late January and early February 2018, IrrigationNZ undertook three irrigation training sessions in the Bay of Plenty, funded by Bay of Plenty Regional Council. The days were tailored to three groups – dairy farmers, avocado growers and kiwifruit growers. DairyNZ, Avocados NZ and NZ Kiwifruit Growers Inc assisted with promoting and organising the training events.

The days were a mix of classroom and hands-on learning to collect performance data in the field. Topics covered were soil moisture monitoring, irrigation scheduling, system performance assessment and maintenance.

At the training sessions, participants were surveyed around how they were using irrigation and whether they had gained anything from the sessions. Four irrigation systems were also tested by IrrigationNZ. This data was provided to the Bay of Plenty Regional Council who were interested in getting an indication of how irrigation was being used in the region.

The avocado training session took place at the Bowen’s property and IrrigationNZ undertook testing on two of their microsprinkler systems.

One system was new (further planting had been carried out in December 2017) and had only been installed two months earlier. It was operating on an area of the orchard with a steep slope. Despite this challenge, the sprinkler was operating with a good uniformity of distribution of 0.88 (within the expected range of 0.85–0.95). The sprinklers were found to be distributing 35 litres per hour, rather than the 25 litres per hour that John had expected. It is relatively common for new systems to perform somewhat differently to what is expected and this result highlights

Mountview Orchard in the Bay of Plenty has around 500 avocado trees.
Irrigation and groundwater: lessons from the Hinds-Rangitata plain

Contributed by Will Dench, Dr Leanne Morgan and Professor Jenny Webster-Brown, Waterways Centre for Freshwater Management.

Irrigation practices on the Hinds-Rangitata Plain in Canterbury have changed in the past decade from primarily border dyke irrigation to spray irrigation. Will Dench, a Masters student with the Waterways Centre for Freshwater Management at the University of Canterbury, has researched the impact of this land use change on groundwater hydrology in the region. The project was funded by the MHV Water.

The study compared Hinds-Rangitata Plain groundwater levels and chemistry obtained during the 2016/2017 irrigation season (i.e. under predominately spray type irrigation) with data from a similar groundwater study carried out in 2006 under predominantly border dyke irrigation. Additionally, a climate analysis was conducted to determine the degree to which climate might influence observed changes in hydrology.

Two major groundwater level surveys were conducted over the course of the study; one in September 2016, prior to the irrigation season, and one in mid-February 2017, during the irrigation season. Two groundwater level surfaces were developed from these surveys and compared to results from the 2006 study.

A groundwater and surface water sampling program was carried out over the period of August 2016 to June 2017. Each site was tested for nitrate and dissolved reactive phosphate concentration, as well as the stable isotopic composition of oxygen, hydrogen and carbon. The nitrate values in groundwater were compared to those obtained in the 2006 study.

Results of the study suggest the change of irrigation practise has a long-term impact on water levels and groundwater volume on the Hinds-Rangitata Plain.

Border-dyke irrigation from the Mayfield-Hinds Irrigation Scheme (MHIS) was shown to cause artificially high groundwater levels between the early 1980’s and mid 2000’s. The decline in groundwater levels that follows this artificial high coincides with major improvements to MHIS irrigation efficiencies.

Groundwater depletion of 23.87 gigalitres (GL) per year was calculated between 2006 and 2017 and illustrates part of a longer term downward trend in Hinds-Rangitata Plain groundwater levels.

Stable isotopes in groundwater captured during the 2016/2017 irrigation season indicate a system principally sourced from local precipitation with little evidence of recharge from alpine derived irrigation water (i.e., MHIS water). In comparison, groundwater samples from the 2005/2006 irrigation season indicate a groundwater source that includes recharge from irrigation water.

Outcomes from the project suggest it is likely that border-dyke systems in the Hinds-Rangitata Plain did provide a localised and regional dilution effect to the groundwater system that is not occurring under spray type irrigation.

Will Dench will provide a short presentation on this research at IrrigationNZ’s 2018 Conference in Alexandra in our Technologies and Initiatives for Efficient Irrigation presentation on Thursday 19 April. Fourteen other research topics will also be profiled through short presentations.

Will Dench.
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Precision irrigation helps reduce nutrient losses

A recent New Zealand study has shown that using precision irrigation on an Otago dairy farm can lead to major reductions in nitrogen and phosphorus leaching compared to uniform rate irrigation.

Internationally, there are relatively few comparisons of nutrient losses from precision irrigation as compared to uniform rate irrigation, and only one previous study has been carried out of an intensively grazed pastoral system which only measured nitrogen loss.

Reducing nutrient losses is now a major challenge for New Zealand farmers and growers, with some regions introducing rules requiring future reductions in leaching, and other regions considering introducing similar requirements in the future.

Professor Richard McDowell carried out a six year study of a dairy farm near Ranfurly in Central Otago which found that nutrient losses using variable rate irrigation (a form of precision irrigation) were 80–85% less on average than using uniform rate irrigation.

Central Otago receives little rainfall, with the farm where testing occurred only receiving 370mm on average per year. Monitoring at the site began in 2010. At that time the farm supported 3.3 cows per hectare over a 255 hectare area. A centre pivot irrigation system was in use, applying water at a rate of approximately 14mm per hour to an average depth of 24mm every three days from October until April. Uniform rate irrigation supplemented the low rainfall with an extra 550–680mm of water per year.

Soil mapping was undertaken to identify the soil types and water holding capacity of zones on the farm where it was intended that variable rate irrigation would be trialled in the future. From May 2013, variable rate irrigation (VRI) began to be used.

Variable rate irrigation systems apply water based on a soil mapping and soil monitoring, allow for different amounts of water to be applied to different areas based on targeted needs.

During the trial period of 2013–2016, rainfall was lower than in the previous three years. However, after accounting for less rainfall, drainage was still substantially reduced under the variable rate irrigation as compared to uniform irrigation. This also resulted in less nitrogen and phosphorus being lost.

Professor McDowell says that although reduced, there was still nitrogen and phosphorus being lost and that he would like to see further research carried out on the additional advances that could be made if precision irrigation was turned into precision fertigation.

“If appropriate sensors were installed to get feedback on crop requirements and the latest weather forecasting systems were used to avoid unintended drainage then nutrients could be applied as needed on a day-to-day basis.”

“I would like to see sensors installed in pastures to provide, for example, nitrogen concentration readings. This would give farmers information on how much to apply through their irrigators, which would reduce the likelihood of too many nutrients being applied.”

Professor McDowell says that the trial shows that for properties with highly variable soil using variable rate irrigation has the potential to significantly reduce nutrient discharge and increase profitability.

IrrigationNZ Chief Executive Andrew Curtis says the research is exciting and could be important in helping farmers reduce their nitrogen and phosphorus losses.

“For farmers interested in seeing if precision irrigation could help reduce their nutrient losses the first step would be to map the soil on their property to see if it is variable or consistent. For properties with different soil types using variable rate irrigation is worth investigating further.”

The research project was funded by the Ministry for Business, Innovation and Employment as part of the Our Land and Water National Science Challenge, with assistance from the Otago Regional Council.

A variable rate irrigation system in operation.
Amuri Irrigation Company had a momentous year in 2017 – completing a project in October to replace 106km of open water races with 131km of pipes to transport water to local farms.

In November, the Pahau River, which runs through the scheme area won the Most Improved River Award at the New Zealand River Awards, recognising over a decade’s worth of work undertaken by local irrigators to improve the river’s health.

PLANNING FOR SCHEME MODERNISATION AND EXPANSION

The scheme was developed in the 1970s and previously covered around 22,000 hectares in North Canterbury, drawing water from the Waiau and Hurunui Rivers.

North Canterbury is known to many as one of New Zealand’s hottest and driest areas, having suffered through four years of devastating drought from 2013–2017.

“Water is the lifeblood of our district and community and I would hate to think what the community would look like without it, after watching our dryland farmers suffer through the last few years of severe drought,” says Amuri Irrigation Chair David Croft.

Recognising the opportunity to modernise and expand the scheme, in February 2016 95% of shareholders voted to replace the water race network with a piped network at a cost of $85 million. The open water race network which had been in place resulted in around 30% of water being lost due to leakage and operational bywash.

The reduction in demand for water would also allow the scheme area to be expanded to cover an extra 5,860 hectares, with the expanded area using the same amount of water. The offer for new shares was fully subscribed by new and existing shareholders, bringing the total number of farms covered by the scheme to around 130. Under the expanded scheme area, 24,000 hectares would be supplied from the new piped network with 4,000 hectares supplied from existing races.

Construction of the new piped network started in September 2016.

Still in the midst of a major drought, a further challenge hit the North Canterbury community in November 2016 when a magnitude 7.8 earthquake struck the region. The scheme was lucky to escape without damage to its infrastructure. However as a result of the quake the scheme design had to be reviewed and adjusted to account for changed ground levels.

Construction of the scheme was completed in the spring of 2017, with Monadelphous undertaking the pipe supply and installation work.

Four main pipelines form the scheme – three from the Waiau River and one from the Hurunui River. Due to natural ground level fall from the west to the east of the Amuri Plain water can be provided at pressure to shareholders in western side of the Basin. Booster pumping is required at the western end of the Amuri Plain to provide adequate pressure. Previously, water was delivered at zero pressure through the water race network. By piping the scheme, peak pumping load has been reduced from 9 megawatts to 5 megawatts. Existing irrigators have reduced energy use by 80%. While the new irrigation area creates a small increase in power demand, the overall energy use is significantly lower.

Amuri Irrigation Company is setting an example of how irrigation schemes can be modernised while at the same time achieving environmental improvements and supporting local communities.
The scheme pipes also have capacity to deliver water for hydroelectric power generation, which is an option the scheme is looking at for the future.

To improve water use efficiency, over 20,000 hectares of the scheme area had already been converted from border dyke irrigation to more efficient spray irrigation in the decade before the recent works, with over $100 million spent on farms in that modernisation process. While the pipe network installation work was underway, the last 1,500 hectares of border dyke irrigation in the scheme area was required to be converted to spray irrigation.

Looking to the future, Amuri Irrigation Company plans to continue making improvements.

“As part of the pipe upgrade, the Waiau and Balmoral schemes have become integrated which sets the platform for the next capital expenditure project: piping our smallest scheme, and for future investment in storage and hydropower generation,” says Andrew Barton, Amuri Irrigation Company’s CEO.

IRRIGATORS WORK TO IMPROVE THE PAHAU RIVER

The shift from border dyke to spray irrigation has also been key to the success of irrigators efforts to improve their local river.

In 2001, an algal bloom was found in the Hurunui River and Environment Canterbury identified that the problem originated in the Pahau River, which flows into the Hurunui. Farmers who were part of the Amuri Irrigation Company formed the Pahau Enhancement Group.

Their first objective was to reduce the amount of run-off water from farms containing phosphorus, sediment and E.coli, in order to improve the river. Some farmers chose to convert to spray irrigation while others decided to develop ponds to capture and recycle irrigation water. Alongside these changes a range of other work was undertaken by farmers including riparian plantings and fencing off waterways from stock.

Amuri Irrigation built on this work and established the Amuri Irrigation Environmental Collective in 2013. All scheme members are required to be part of the collective and must complete farm environment plans. The collective has provided support to help develop the plans as well as education opportunities for farmers, such as field days. Irrigation efficiency training has also been provided in partnership with IrrigationNZ.

Analysis work on the Hurunui River and its tributaries has shown that between 2005 to 2017, nitrogen loads from the Amuri Basin during the irrigation season (October to March) have been trending down. Phosphorous loads are also strongly trending down. This reduction has been achieved despite a 50% increase in the dairy platform area over the same period. The trends for phosphorus loads are attributed to the reduction in border dyke wipe off water which was the main phosphorus source from Amuri Basin and median annual loads are now three to four times lower than in 2001 to 2006.

However, it was reduction in E.coli which saw the work undertaken by Amuri farmers receive national recognition.

Each year, rivers are judged on one of four key water quality indicators to determine the winners of the national River Awards. In 2017 the indicator was E.coli. The most improved river is determined by an independent judging panel from three research institutions using a statistical analysis of monitoring data from LAWA.

The Pahau River was named Most Improved River at the awards, based on data showing there had been a 15.6% year on year trend reduction in E.coli levels over the previous ten years.

The awards are organised by the Cawthron Foundation. Foundation chairman Dr Morgan Williams said a shift to more precise irrigation and better management practices had brought about the improvement in E.coli levels.

While more efficient irrigation has vastly improved E.coli levels, the reduction in drainage from irrigated land when efficiency improves also increases the risk of higher nutrient concentrations in drainage. Amuri Irrigation continues to work with farmers through the collective to reduce nutrient loss from farms.

“We know that improving water quality is a long-term project and we will continue to work with our shareholders, Environment Canterbury and the community to improve the water quality in our local rivers,” says David Croft, Amuri Irrigation Company Chair.

SCHEME BENEFITS TO THE WIDER COMMUNITY

As well as making a commitment to improving water quality, the scheme operates a community grants fund. Two funding rounds operate per year with funding available to assist local sporting, recreational or social activities. In 2017, funding was provided to a range of groups including the Amuri Squash Club and Waiau Rugby Club who are using the funds to repair their clubrooms following the November 2016 earthquake.

As part of the piping project, strategically located fire hydrants were included to provide water for firefighting when needed.

Andrew Barton, Amuri Irrigation Company’s CEO said that the original scheme did not provide water to all farms in the Culverden and Rotherham communities.

“Driving past irrigated neighbouring farms amplified the impact of recent drought conditions for dryland farmers. The expansion of the scheme gave ten previously dryland farms the opportunity to join the scheme. The pipe upgrade now provides the opportunity of irrigation to everyone in the Culverden and Rotherham communities and removes a historic divide has united the farmers,” he says.

For Chairman David Croft, having access to irrigation has made a huge difference for their community. “Water has transformed what was an area of farming land where rabbits had to bring a cut lunch into the salad bowl of North Canterbury.”

The Waiau Pony Club was one of the recipients of Amuri Irrigation’s community fund.

The Pahau River Enhancement Group pick up the Most Improved River Award in 2017.
Let’s talk irrigator insurance
By Geoff Hardacre, Canterbury Area Manager, FMG.

There’s a good reason why FMG has over 130 mobile rural specialists travelling up and down thousands of driveways every year and that’s because some of the best quality conversations happen on farm.

When making decisions around protecting some of your biggest assets, like your irrigators, we believe there is added value in having these conversations face to face. Gaining a first-hand look at your business, not only helps deliver the best cover, but it also means we can pass on specialist risk advice and illustrate how to apply it directly on your farm. What’s more, it is also a prime opportunity for you to get your insurance questions answered.

Here are some questions we often get asked about irrigators.

**What kind of cover do you have for irrigators and how do you calculate their worth?**
We can cover the physical loss or damage of your travelling or stationary irrigator, including tyres, pumps, switchboards and other machinery that you use to operate it. In addition, in understanding your entire farming operation, we recommend other specialist products to work alongside your irrigator cover.

We offer nominated replacement, or present day value on irrigators under ten years old, and a depreciation factor is applied for older models. When it comes to making a claim, we will pay to get your irrigator repaired, (including reasonable freight charges and sourcing new parts), replace it, or pay you the present day value up to the amount shown on the certificate.

Cost of national irrigator claims – Last five years by loss cause. [Source: FMG]

<table>
<thead>
<tr>
<th>Loss Cause</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>Impact - Hit something</td>
<td>$4,000,000</td>
</tr>
<tr>
<td>Impact - Something hit R</td>
<td>$6,000,000</td>
</tr>
<tr>
<td>Mechanical or structural failure</td>
<td>$8,000,000</td>
</tr>
<tr>
<td>Terrain</td>
<td>$10,000,000</td>
</tr>
<tr>
<td>Damage while being moved/towed</td>
<td>$12,000,000</td>
</tr>
<tr>
<td>Other</td>
<td>$15,000,000</td>
</tr>
</tbody>
</table>

On calculating worth, the span and corner arms are individually valued, alongside factors such as age and condition.

**Who is responsible while irrigators are being delivered and installed?**
The point at which the responsibility of an asset, such as an irrigator, transfers from the installation company to the farm owner very much depends on the contract that exists between the two parties.

We recommend that the contract should always be in writing clearly stipulating what insurance the irrigator firm covers, as well as outline when ownership officially transfers to the farm owner. If there is no written contract covering this we recommend you at least address this point and who is responsible for insurance in writing with the seller.

**What types of irrigator damage do you see most?**
Wind damage is by far the biggest factor we see for irrigators, we’ve paid over $4.7 million in wind claims over the past five years.

Given this, a core piece of advice we recommend is the Point, Park and Anchor method. When high winds are forecast, Point the irrigator into the prevailing wind, Park it there until the winds dissipate and Anchor it down by tying and protecting any moving parts.

We also see our fair share of impact claims; irrigators hitting or running into farm bikes, vehicles, trailers and implements, or the spans getting caught in trees or shelter belts while being towed. Ensuring new workers on farm are fully trained in awareness also makes a huge difference.

Another common finding is under-estimating how much growth there has been since the last time the irrigator was run and not making note of any new power poles or fences that may have been installed. While it may sound minor, we recommend farmers walk the path and check the paddock before flicking the switch to help prevent impact accidents.

**What are other farmers doing to help reduce their irrigator risks?**
Preparedness is pivotal when thinking about irrigation risks. Due to the long-term effect and potential impact on cash flow of losing irrigation at critical times of the year, we are seeing a lot more investment into loss prevention techniques, particularly around weather monitoring and wind prediction.

In particular, numerous FMG clients have adopted a method of using a dedicated wind prediction app called ‘PredictWind’, followed by a set plan of ‘Point, Park, Anchor’ when the forecast reaches a certain threshold. During the September 2013 storms we had a client who lost 19 spans and since adopting this technique has not had a single loss.

Geoff Hardacre is a FMG Area Manager in Canterbury and would be happy to put you in contact with one of our rural specialists in your area to discuss the above further. Get in touch at geoff.hardacre@fmg.co.nz
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OUTLOOK SUMMARY
March–May 2018 temperatures are forecast to be above average for all regions of New Zealand with high confidence (60 to 70% chance). As autumn progresses however, frosts may occur from time to time in cooler locations.

For March–May 2018, rainfall totals are forecast to be above normal in the North Island and in the north of the South Island (45 to 50% chance) and about equally likely to be near normal (35 to 40% chance) or above normal (35 to 40% chance) in the west and east of the South Island.

March–May 2018 soil moisture levels and river flows are forecast to be above normal (45 to 55% chance) in the north and west of the North Island and the north and east of the South Island. In the east of the North Island and the west of the South Island, soil moisture levels and river flows for the March–May 2018 period are about equally likely to be near normal (35 to 40% chance) or above normal (35 to 40% chance).

REGIONAL PREDICTIONS FOR THE MARCH–MAY 2018 SEASON:

Northland, Auckland, Waikato, Bay of Plenty
- Temperatures are very likely to be above average (70% chance).
- Rainfall totals are most likely to be in the above normal range (50% chance).
- Soil moisture levels and river flows are most likely to be in the above normal range (50 to 55% chance).

Central North Island, Taranaki, Whanganui, Manawatu, Wellington
- Temperatures are very likely to be above average (70% chance).
- Rainfall totals, soil moisture levels and river flows are all most likely to be near normal (40% chance) or above normal (35% chance).

Tasman, Nelson, Marlborough, Buller
- Temperatures are very likely to be above average (70% chance).
- Rainfall totals, soil moisture levels and river flows are all most likely to be above normal (45 to 50% chance).

Gisborne, Hawke’s Bay, Wairarapa
- Temperatures are very likely to be above average (70% chance).
- Rainfall totals are most likely to be above normal (45% chance).
- Soil moisture levels and river flows are equally likely to be in the above normal range (40% chance) or near normal range (40% chance).

West Coast, alps and foothills, inland Otago, Southland
- Temperatures are very likely to be above average (60% chance).
- Rainfall totals, soil moisture levels and river flows are all about equally likely to be near normal (40% chance) or above normal (35% chance).

Coastal Canterbury, east Otago
- Temperatures are very likely to be above average (70% chance).
- Rainfall totals are about equally likely to be in the above normal range (40% chance) or near normal range (35% chance).
- Soil moisture levels and river flows are most likely to be in the above normal range (55% chance).

OVERVIEW
Weak La Niña conditions continued in the tropical Pacific during February 2018, but the current state of the Ocean – Atmosphere system in the Equatorial Pacific indicates that it is now reaching its decay phase. Below average sea surface temperatures (SSTs) remained present in the central and eastern equatorial Pacific Ocean but weakened compared to January 2018. Moderate cooler than average subsurface ocean waters are still present in the eastern Pacific, but warmer than normal ocean waters have intensified in the western Pacific and spread further eastward. The trade winds have been variable over the
past few months, and so has the Southern Oscillation Index (SOI) which is currently on the El Niño side of neutral (preliminary value for February 2018 is −0.85); both indicate a decoupling between the ocean and the atmosphere.

The consensus from international models is for the tropical Pacific to rapidly transition to an ENSO-neutral state over the next three-month period (69% chance over March–May 2018). ENSO-neutral remains the most likely outcome over the winter season (June–August 2018), and a transition towards El Niño becomes increasingly likely thereafter (45% chance for El Niño conditions to emerge over the September–November 2018 period).

With La Niña’s influence waning over the next three month period, New Zealand’s regional climate over March – May 2018 is expected to be driven by the warmer than average ocean waters that are present around the country, in the Tasman Sea, and in the Southwest Pacific Ocean, which will influence surface air temperatures and the likelihood of significant rainfall events.

For March–May 2018, the atmospheric circulation around New Zealand is forecast to be characterised by lower than normal atmospheric pressure northwest of the country, extending over parts of New Zealand, unsettled conditions especially for the North Island, and weak northeasterly quarter flow anomalies. This pressure pattern, in concert with the anomalously warm ocean waters around the country, is expected to be associated with warmer than average temperatures, and above normal rainfall – notably for the North Island.

NOTES ON PROBABILITIES
In the absence of any forecast guidance there would be an equal likelihood (33% chance) of the outcome being in any one of the three categories – above average, near average, and below average. Forecast information from local and global guidance models is used to indicate the deviation from equal chance expected for the coming three-month period.

This is an extract of the Seasonal Climate Outlook published by NIWA.
A perfect storm is brewing for New Zealand’s supply of healthy fresh fruit and vegetables that could see us unable to feed our growing population with domestically grown produce, a recent report from Horticulture New Zealand says.

In releasing the report, "New Zealand domestic vegetable production: the growing story," Horticulture New Zealand chief executive Mike Chapman says it is time to take stock and develop a national food security strategy.

“Our research shows that New Zealanders not only want to know where their fruit and vegetables come from, they want to buy New Zealand grown. This report looks at the factors that will impact security of supply. Our current consumption levels of fresh produce show that net production is already below what is required for domestic consumption, meaning we can expect food shortages if we can’t get that balance of supply from imports,” Chapman says.

“Prime fruit and vegetable growing land is being squeezed by rapid growth in towns and cities and high demand for new housing. Changes in weather patterns and extreme unseasonal weather events are becoming more frequent and damaging, impacting the supply and, consequently, the price of fresh, healthy food.

“Things are changing fast, so we need to look closely at our domestic food supply and be sure that town, city and regional planning decisions are seen in the context of impacting the whole of New Zealand’s food supply.”

The report looks at domestic vegetable supply, particularly of what would be considered staple vegetables, to examine all the factors that go into getting these vegetables from the field to the plate. It examines the challenges to supply, through to what is driving demand and price.

“Information and evidence are required to enable good decisions about New Zealand’s domestic food supply and we are keen to engage the new government with our call for a national food security strategy,” Chapman says.

“Domestic supply is not being viewed as a national system, with identified strengths and weaknesses, to give New Zealanders continued access to all the fresh fruit and vegetables they need in the future. Local, district and regional decision-making doesn’t look beyond its borders. While this is appropriate in the context of their planning, consideration is not given to national food supply when land is zoned for housing, or when water is allocated.

“We need to future-proof the resources required to supply food to our growing population, and this report looks at this with the backdrop of global megatrends, including rapidly changing consumer demands, growing populations, urbanisation and the impact of life-style blocks on horticulture, emerging technology and the emphasis on sustainability.

THE IMPORTANCE OF WATER FOR VEGETABLE PRODUCTION

Horticulture New Zealand sees the key constraints to growth in horticultural production as being access to land and water. Of the 5.5 percent of land appropriate for vegetable production in New Zealand, roughly 10% of this land has been subdivided for lifestyle blocks in the past 15 years.

Water is used throughout the horticultural supply chain; from growing the plants, to frost fighting (e.g. some fruits), and washing and processing for market. For crops that are grown above ground – such as lettuce, broccoli, cauliflower and cabbage – the quality of water is also critical in terms of food safety.

Competition for versatile land for housing, the availability of highly reliable water sources, and water quality are all factors which may limit our ability to be able to grow enough vegetables to meet future demand. Irrigation schemes such as the Waimea Community Dam, which is proposed in the Tasman region, will provide growers with a continuous and reliable water source year round. By securing a reliable water supply, such schemes provide the potential – and confidence – to grow New Zealand’s wider horticultural production.

Diversification of land offers a buffer against unpredictable markets, in other sectors such as dairy or livestock production, which in turn benefits the rural community and the economy. At the other end of the scale, some regions are facing a future of potential water...
scarcity. Pukekohe is a key region for vegetable production, which sources its irrigation needs from groundwater and from the Waikato River. There is competition for water from the river from municipal and industrial users, and with increasing pressure on the water resource, the ability for growers to maintain a reliable supply of water for irrigation and processing can be compromised. This, along with pressure from urbanisation, means the ability of the region to grow its horticultural area is severely limited.

Under the Resource Management Act, water is generally allocated on a first-in-first-served basis. Water for food production is competing with all other uses of water other than an individual’s reasonable domestic needs or for stock drinking water which is provided for. Horticulture New Zealand would like to see priority given to water used for food production.

To read a copy of the full report visit www.hortnz.co.nz
Diverse entries recognised in Irrigation Innovation Awards

A water-race safety video for children, a GIS Database system helping farmers to meet environmental requirements and a new effluent screen which allows effluent to be more easily applied via centre pivot irrigators have been named as finalists in IrrigationNZ’s Irrigation Innovation Awards for 2018.

*Be Water-Race Safe* is a video for school age children developed by the Waitaki Irrigators Collective. Some of the Collective’s member schemes operate open water-races in areas of the Waitaki and Waimate districts, which supply water for irrigation, stock, town supply, and industry.

“Irrigation races can seem inviting to children to swim in and we wanted to educate children on the potential dangers while they are at primary school before they reach an age when they might be more inclined to carry out risky behaviour,” says Elizabeth Soal of the Waitaki Irrigators Collective.

The animated video has been shown to 2,000 children from 21 schools in North Otago and South Canterbury. The Collective also engaged a water safety expert to talk to 400 local school children about what to do if they find themselves in trouble in water. The advice, along with the water-race safety video, was delivered to children at the Waitaki Clued-Up Kids programme, an annual two-day event where children receive safety messages on a range of topics like fire and gun safety, and civil defence. Waitaki has a significant number of lakes and rivers used for recreation, so the advice could be applied in a range of situations. Children tested before and after watching the water safety video showed improved awareness of the dangers of water-races.

Aqualinc were also finalists in the Innovation Awards for their GeoRural GIS Database System. The system is widely used by farmers and irrigation schemes for developing and managing farm environment plans and for a range of other purposes.

The system is cloud-based and uses a range of GIS functions. It incorporates comprehensive elevation survey data, climate, hydrology, soil and consent data and aerial photos. It has less dependency on internet speed than most geo-based software and allows for intermittent internet access. Slow internet speeds or internet blackspots are an issue in many rural areas.

Regional Councils in Canterbury, Hawkes Bay, Manuwatu-Wanganui and Otago all require farm environment plans to be developed for some types of land use. The plans cover how farms will manage and reduce their environmental impacts including issues like fencing off waterways, protecting native vegetation, reducing nutrient discharge and managing effluent.

“The system has a lot of data which makes the process of developing a farm environment plan much easier for farmers. GIS is a great way to visualise and share data. The system ensures that information is retained in one location which will be available long-term to farmers,” says Ayaka Kashima of Aqualinc.

To date, the majority of farm environment plans developed in Canterbury have used the GeoRural system. The system is also being used to help manage nutrient loads in the Hurunui Catchment, and has support from major stakeholders.

Rainer Irrigation’s Vibra Screen is the third finalist in the awards. The screen removes solids larger than 1mm which allows solids and liquid to be separated in effluent, with the liquid able to be recycled in centre pivot irrigators to fertilise pasture.

Applying effluent through centre pivot irrigators allows for a larger area to be covered and for more consistent application than via travelling irrigators. Technology does exist currently allowing for effluent to be applied through centre pivot irrigators but it can be problematic, with blockages often creating issues.

Mid Canterbury dairy farmer Peter Holmes is one farmer who has used the new system on his property which has 1,550 cows and two dairy sheds.

“The system works pretty well. Being able to spread effluent through the pivots means it can be spread over a larger area and it’s a lot less staff time and hassle than the travelling irrigator system we used to use. Once its applied we get good grass growth,” he says.

Fourteen applications were received for the awards. The award winner will be announced at IrrigationNZ’s 2018 Conference held in Alexandra in April.

The Irrigation Innovation Award is sponsored by Southern Wide Real Estate and has a prize of $2,500.
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Grown with Irrigation

Over summer we have been highlighting the important role irrigation plays in growing food in New Zealand. Over the past few months many areas of New Zealand experienced record-breaking dry spells, coupled with periods of heavy rain and flooding. Without irrigation, many regions could have experienced food shortages or major price rises.

We shared a short animated video on how irrigation helps grow a wide variety of food in New Zealand and invited urban audiences to let us know what their favourite foods grown with irrigation were. We got a wide range of responses – “Beetroot, broccoli pumpkin, tomatoes, strawberries, nectarines, well most fruit and veges are my favourite,” said Kim. Penny said, “Nectarines, gold kiwifruit, boysenberries and ice cream!” while Sam said pies which have ingredients grown with irrigation.

We shared the poster (pictured) on Facebook and Twitter. To date our Facebook posts about food have reached 24,000 people and been liked nearly 300 times.

Thanks to the farmers and growers who have also shared photos of food they have grown with irrigation, such as Nick and Michelle Ward of Temuka who use irrigation to grow onions, and vegetable seed crops such as radish and spinach, along with wheat and barley. Nick is pictured with an onion crop.

Grown with Irrigation

Irrigation helps ensure we have access to high quality, reliable food whatever the weather. It helps grow yummy, healthy, local food we enjoy every day!

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**DINE WITH SUPER CARS!**
We are excited to announce that our 2018 Conference dinner venue is Highlands Motorsport Park. Dinner guests will be able to see a range of rare cars like an Aston Martin Vulcan (the only one in the Southern Hemisphere), the Benetton F1 car Michael Schumacher drove, a Ghost Rolls Royce, and many more. The Highlands Motorsport Park Museum has a range of prestigious cars and motorbikes valued at $25 million.

This dinner is sponsored by Downer.

There are a limited number of tickets so book now by contacting us at irrigation nz@avenues.co.nz or on 04 473 8044.

**JOIN A TOUR OF CENTRAL OTAGO**
Conference participants can join a tour of pastoral farms, vineyards or orchards in Central Otago. The tours are sponsored by AWS Legal.

The winery tour includes wine tasting and will look at the issues around growing in the world’s southernmost wine growing region. It will visit a range of vineyards including Bendigo Station. The station covers 12,000 hectares. The property is now known for its merino wool, vineyards and historic reserves. Irrigation has been crucial in allowing the property to diversify into growing grapes. Bendigo is also famous as the home of Shrek the sheep who managed to avoid being shorn for six years. The orchard tour will visit a number of properties growing summer fruit. It will also visit the newly developed Dairy Creek irrigation scheme area – a joint venture between local farmers and Pioneer Energy. There is significant potential for new horticulture to be developed in this area.
SEE THE LATEST IRRIGATION TECHNOLOGY IN CENTRAL OTAGO

The Conference will feature an expo with over 50 exhibitors showcasing the latest irrigation technologies and services. It will also include short presentations on a range of new technologies and research designed to help farmers use water more efficiently, save time and money and meet new environmental standards.

The Conference is held every two years, and the 2016 Conference held in Oamaru had over 400 attendees.

“The Conference is a great opportunity to catch up with other farmers and growers from across New Zealand,” says IrrigationNZ Chief Executive, Andrew Curtis. “We have an exciting range of local tours planned, a panel discussion on how to address key issues irrigators have raised, a diverse range of speakers as well as the irrigation expo and social functions to attend.”

Local and international experts will present their views on a range of topics at the conference. A range of new research including how soils change under irrigation, the efficiency of border dyke irrigation, dam safety for irrigation ponds, on farm water storage, and soil and crop sensing technologies will be presented in short 15 minute updates.

The Conference attracts irrigation service industry representatives, farm advisors, academics, council and government representatives as well as farmers.

Over the summer of 2017/18, many areas of New Zealand, including Otago, experienced some of their driest conditions on record. Where irrigation was available, it played an important role in keeping local fruit and vegetables, bread, wine, meat and dairy in local supermarkets. With climate change bringing more frequent droughts, as well as more intense and changeable rainfall patterns across New Zealand, irrigation is likely to become even more important for reliable food production in the future.

OTAGO LEADS THE WAY IN COOPERATIVE WATER MANAGEMENT

“We have chosen Central Otago for our 2018 Conference as irrigation has played an important role in the district’s past and because it also provides an interesting example of how water rights could be negotiated in the future which the rest of New Zealand could learn much from,” says IrrigationNZ Chief Executive Andrew Curtis.

The history of irrigation in Central Otago is intimately linked to the region’s Gold Rush. Rights to take and use water were originally issued from the 1860s and linked to mining, but were later used for irrigation. The original permits issued for water use were renewable forever. In the depression the government funded irrigation expansion, such as the Falls Dam scheme, as public works projects, with more infrastructure developed from the 1950s to the 1980s.

Central Otago is driest region in New Zealand, yet also home to some of our best produce, including wine, cherries, and summer fruit as well as pastoral farming. Farming, horticulture and viticulture are a vital part of the district’s economy and rely on irrigation.

Historical water permits linked to mining expire in 2021 under the Resource Management Act. Otago is now at a crossroads with the amount of water available for irrigation expected to reduce in the future. Representatives from the Kyeburn and Manuherikia will talk about how they are working together as farmer collectives to come up with innovative solutions to meet requirements under the new consenting system.

HOW CAN WE MEET KEY CHALLENGES FACING IRRIGATORS?

Irrigators are facing a challenging new environment in 2018. Following a heated election campaign where a water tax was proposed, but not introduced, a new government took office made up of three parties with differing views towards agriculture and irrigation.

A range of panellists will discuss the key challenges and opportunities ahead for the industry. The discussion will help set the direction for the industry for the next five years.

Panellists will also discuss a future vision for the irrigation sector operating under a new government with moderator RadioNZ Morning Report presenter Guyon Espiner. The audience will be invited to participate in the discussion. Come long and have your say, and help form a strategy for irrigation.
SMART Showcase
Showcasing our industry and its SMART tips and tools this year we introduce irrigators to new technologies and management initiatives! The expo will host three shows over the course of the conference each containing quick-fire presentations from exhibitors.

Social functions

AWS LEGAL WELCOME FUNCTION
The AWS Legal Welcome Function will be held on the evening of Tuesday 17 April, from 5.30pm–7.30pm at the Conference Expo. If you do go on one of the AWS Legal Pre-Conference Tours during the day the buses will return you to the Expo and you are welcome to attend the Welcome Function and have a drink with friends and colleagues, new and old. If you arrive in Alexandra on Tuesday evening come and join us at the Welcome Function.

DOWNER CONFERENCE DINNER
Don’t miss the Downer Conference Dinner on the evening of Wednesday 18 April. The Conference Dinner will be held at Highlands Motorsport Park where guests will be able to view their Museum collection of rare and prestigious cars and enjoy a fantastic evening of food, wine and entertainment. What better way to relax after your first full day at the Conference! Tickets are an additional cost to all registration types this year.

There are a limited number of tickets so book now by contacting us at irrigationnz@avenues.co.nz or on 04 473 8044.

IRRICON DELEGATE BREAKFAST
The Irricon Delegate Breakfast is being held on the morning of Thursday 19 April from 8.00am to 9.30am. Wake up with this networking breakfast and get set for the final day of Conference kicked off with a talk from Felicity Turner from The Yield.

Register now to attend
Discounts for IrrigationNZ members are available. Places are also limited on the popular local tours so early booking is recommended.
Day registration options are also available.
For accommodation and registration information visit www.irrigationnz.co.nz/conference-2018

CONFERENCE LOCATION AND CONTACT DETAILS
This year IrrigationNZ is bringing their national Conference to Alexandra, Central Otago. The Conference venue is going to be held at Dunstan High School and the 58 site exhibition will held at the school.

For all conference enquiries please contact:
Email: irrigationnz@avenues.co.nz
Phone: 04 473 8044
www.irrigationnz.co.nz/conference-2018

CONFERENCE ACCOMMODATION STILL AVAILABLE
Alexandra is nestled in a large basin at the junction of two rivers, the Manuherikia and the mighty Clutha Matau.

Surrounded by a distinctive ‘moonscape’ of rocky tors and stark high county Alexandra is part of Central Otago or ‘Central’ by those that know it well. Central Otago is New Zealand’s most inland region and has a rich history spanning early Maori, pioneering farmers and a gold rush. Many heritage buildings of stacked Central Otago stone are still standing from the late nineteenth century. Today farming, horticulture and viticulture play important roles in the region’s economy. April is a wonderful time to visit the weather is settled and autumn colours are on display.

There are a range of accommodation options and pricing to suit all needs. Please contact the Central Otago I-site to book your accommodation early.

Email: visitorcentre@codc.govt.nz
Phone: 03 262 7999

WITH THANKS TO PRINCIPAL PARTNERS
# Conference Schedule

## Tuesday 17 April

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.30am</td>
<td>CONFERENCE AND PRE-CONFERENCE TOUR REGISTRATION</td>
</tr>
<tr>
<td>Various start times</td>
<td>AWS LEGAL – PRE-CONFERENCE TOURS</td>
</tr>
<tr>
<td></td>
<td>The pre-conference tours are back for 2018. Central Otago has a diverse range of irrigated land uses.</td>
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<tr>
<td></td>
<td><strong>Tour 1 – 9am start</strong></td>
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<tr>
<td></td>
<td>Pastoral farming in the Manuherikia Valley and the Maniototo, including the Falls Dam. Tour includes multiple stops and a drive through landscapes made famous by artist Graham Sydney.</td>
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<tr>
<td></td>
<td><strong>Tour 2 – 10am start</strong></td>
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<tr>
<td></td>
<td>Wine-growing in the world’s southernmost region. Tour includes wine tasting, and a visit to the historic Bendigo Station.</td>
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<tr>
<td></td>
<td><strong>Tour 3 – Midday start</strong></td>
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<tr>
<td></td>
<td>See the wide variety of summer fruit grown in Otago and visit 45 South where they pick and pack their own produce.</td>
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<tr>
<td></td>
<td><em>All tours start from the conference venue at Dunstan High School returning for the Welcome Function in the Exhibition Marque.</em></td>
</tr>
<tr>
<td>3.30pm–5.30pm</td>
<td>CONFERENCE EXHIBITION OPEN</td>
</tr>
<tr>
<td>5.30pm–7.30pm</td>
<td>AWS LEGAL – WELCOME FUNCTION</td>
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</tbody>
</table>
### Wednesday 18 April

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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</thead>
<tbody>
<tr>
<td>7.30am</td>
<td>REGISTRATION DESK OPENS</td>
</tr>
<tr>
<td>7.30am–5.00pm</td>
<td>CONFERENCE EXHIBITION OPEN</td>
</tr>
<tr>
<td>7.30am–8.30am</td>
<td>WELCOME COFFEE</td>
</tr>
<tr>
<td>8.30am–9.00am</td>
<td>CONFERENCE WELCOME &amp; OPENING</td>
</tr>
<tr>
<td></td>
<td>1. Kāi Tahu</td>
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<td></td>
<td>2. IrrigationNZ Chairwoman – Nicky Hyslop</td>
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<tr>
<td></td>
<td>3. Central Otago District Council Mayor – Tim Cadogan</td>
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<tr>
<td>9.00am–10.00am</td>
<td>THE CENTRAL OTAGO STORY</td>
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<tr>
<td></td>
<td>1. <strong>Gold Mining:</strong> The origin of Otago’s water races – Terry Davis (Otago Goldfields Heritage Trust)</td>
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<td></td>
<td>2. <strong>The First Wave of Irrigation:</strong> The depression years and soldier settlements – Gary Kelliher</td>
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<tr>
<td></td>
<td>3. <strong>The Second Wave of Irrigation:</strong> Government scheme building and privatisation – Gavin Herlihy</td>
</tr>
<tr>
<td>10.00am–10.30am</td>
<td>MORNING TEA</td>
</tr>
<tr>
<td>10.30am–12.00pm</td>
<td>IRRIGATOR COLLECTIVES FOR CATCHMENT MANAGEMENT</td>
</tr>
<tr>
<td></td>
<td>1. A national and regional perspective on the role of user groups and collectives for successful water management – MFE (speaker to be confirmed), and Marian Weaver (Otago Regional Council)</td>
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<tr>
<td></td>
<td>2. The Kyeburn Story: Replacing individual deemed permits with a global consent to manage allocations and implement rationing during times of low flow alongside environmental monitoring and improving river ecosystems – Susie McKeague, Hamish McKenzie</td>
</tr>
<tr>
<td></td>
<td>3. The Manuherikia Story: Replacing deemed permits, ageing infrastructure and the introduction of river low flows and nutrient management expectations through a coordinated catchment approach – Allan Kane and Kate Scott (Landpro)</td>
</tr>
<tr>
<td>12.00pm–1.00pm</td>
<td>LUNCH</td>
</tr>
<tr>
<td>1.00pm–3.30pm</td>
<td>IRRIGATION IN 2025 – DEVELOPING A VISION FOR THE IRRIGATION SECTOR</td>
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<tr>
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<td>Moderator: Guyon Espiner</td>
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<td></td>
<td>Panel Guests:</td>
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<td></td>
<td><strong>Community</strong> – Tim Cadogan (Central Otago District Council)</td>
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<td></td>
<td><strong>Next Generation Irrigator</strong> – Ryan O’Sullivan (Nuffield Scholar)</td>
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<td></td>
<td><strong>Economic</strong> – Con Williams (ANZ)</td>
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<td></td>
<td><strong>Environmental</strong> – Alison Dewes (Pamu Farms – Environment Head)</td>
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<td></td>
<td><strong>Infrastructure and Irrigation</strong> – Fraser Jonker (CEO, Pioneer Energy Limited)</td>
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<td></td>
<td><strong>Cultural</strong> – Professor Jacinta Ruru (Otago University)</td>
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<tr>
<td></td>
<td><em>Audience interaction via conference app and roving microphone</em></td>
</tr>
<tr>
<td>3.30pm–4.00pm</td>
<td>AFTERNOON TEA</td>
</tr>
<tr>
<td>4.00pm–4.45pm</td>
<td>KEYNOTE</td>
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<tr>
<td></td>
<td><strong>How Does Irrigation in New Zealand Stack Up Internationally?</strong></td>
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<tr>
<td></td>
<td>– Stuart Styles (Irrigation Training and Research Centre, Cal Poly State University)</td>
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<tr>
<td>7.00pm</td>
<td>DOWNER – CONFERENCE DINNER (HIGHLANDS MOTORSPORT PARK)</td>
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</tbody>
</table>

**WITH THANKS TO PRINCIPAL PARTNERS**

[WaterForce] [anderson lloyd] [Pioneer energy] [ANZ]
Thursday 19 April

7.30am REGISTRATION DESK OPENS

7.30am—4.30pm CONFERENCE EXHIBITION OPEN

8.00am—8.45am BREAKFAST KEYNOTE
Digital Ag Transformation: From hype to reality
— Felicity Turner (The Yield)

9.00am—10.00am KEYNOTE
Visualising Data: Is this the key to technology uptake in the agriculture sector? — Ian Taylor (Animation Research Ltd)

10.00am—10.30am MORNING TEA

TECHNOLOGIES AND INITIATIVES FOR EFFICIENT IRRIGATION

<table>
<thead>
<tr>
<th>TIME</th>
<th>SESSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.30am–10.45am</td>
<td>The nitrate ticking time bomb — Helen Rutter (Aqualinc Research Ltd)</td>
</tr>
<tr>
<td>10.50am–11.10am</td>
<td>How soils change under irrigation — Sam Carrick (Landcare Research)</td>
</tr>
<tr>
<td>11.15am–11.30am</td>
<td>Smart irrigation and water Stewardship — Elizabeth Soal (Waitaki Irrigators Collective)</td>
</tr>
<tr>
<td>11.35am–11.45am</td>
<td>Deficit irrigation in Overseer and its impact on predicted N loss at a catchment level — Brian Ellwood (Lowe Environmental Impact)</td>
</tr>
<tr>
<td>11.50am–12.05pm</td>
<td>Irrigation conversion and groundwater (lessons from Hinds-Rangitata) — William Dench (Waterways Centre for Freshwater Management, University of Canterbury)</td>
</tr>
<tr>
<td>12.05pm–12.45pm</td>
<td>LUNCH</td>
</tr>
<tr>
<td>12.45pm–1.15pm</td>
<td>IRRIGATION IN 2025: A STRATEGY FOR THE IRRIGATION SECTOR — Andrew Curtis (IrrigationNZ)</td>
</tr>
<tr>
<td>1.15pm–1.30pm</td>
<td>CONFERENCE CLOSING — Nicky Hylsop (IrrigationNZ chairwoman)</td>
</tr>
<tr>
<td>1.30pm–2.30pm</td>
<td>IRRIGATION SCHEME ROUND TABLE Facilitated discussion following an update by individual schemes — the challenges and opportunities.</td>
</tr>
</tbody>
</table>

WITH THANKS TO PRINCIPAL PARTNERS
HOW DOES NEW ZEALAND PERFORM NOW AND HOW WILL IRRIGATION EVOLVE IN THE FUTURE?

Felicity Turner of Innovative Australian AgTech business The Yield will talk about how we can meet the world’s requirement to provide 60 percent more food by 2050 to feed its growing population using new technology to transform farming.

Stuart Styles, the Director of the Irrigation Training and Research Center from San Luis, California, is an internationally recognised expert in water management. Stuart has toured New Zealand looking at how we use irrigation. He will talk about how our irrigation practices and regulatory regime compares to the rest of the world, covering areas New Zealand performs well in and what we could learn from overseas experience.

Winner of the Creative sector of the World Class New Zealander of the Year Awards in 2012, Ian Taylor has used visual data in a range of settings including developing screen graphics to help Kiwis follow America’s Cup race progress. He will talk about how developments in visual data could be used on the farm.

SPEAKER PROFILES

FELICITY TURNER

With a diverse entrepreneurial background, Felicity thrives on creating transformative digital technologies and delivering an memorable product experience for customers. Responsible for Sales, Marketing, Support and Services at The Yield, Felicity works with top tier irrigated crop growers to ensure our existing products solve real on-farm challenges, while collaborating with growers in scoping and developing new products.

IAN TAYLOR

Ian holds an LLB from the University of Otago, and was inducted into the New Zealand Hi-Tech Hall of Fame in 2009. In 2010 he was named North & South magazine’s New Zealander of the Year. In the same year he was awarded an Honorary Fellowship of the New Zealand Computer Society, the top honour of the ICT sector in New Zealand. He was named a Companion of the NZ Order of Merit in the 2012 New Year Honours for services to television and business and won the Creative sector of the World Class New Zealander Awards in the same year. In 2013 Ian was also named Outstanding Maori Business Leader of the Year.

Ian deals in data and has made his mark through his ability to produce images allowing a picture to be created and a story to be told. A wonderful example of this is the work he has done using data from America’s cup boats to produce outstanding graphics that enabled all Kiwis to become engaged with this sport. We ask Ian what’s possible for agriculture and horticulture with all the data now flowing off New Zealand farms, orchards and vineyards. How might it provide support for decision making for farmers and growers and what could it mean for the wider rural-urban conversation on the use of water?

DR STUART STYLES

Stuart Styles is the Director of the Irrigation Training and Research Centre (ITRC) at Cal Poly San Luis Obispo, and is also a Professor in the Cal Poly Bio Resource and Agricultural Engineering Department. He teaches water resources classes for Cal Poly and numerous short courses for irrigation professionals through the ITRC. His current research interests include flow measurement technologies, irrigation system performance and irrigation modernisation. Dr Styles has three decades of field experience in irrigation as a consultant and engineer. He is a Registered Civil Engineer in California with degrees from Cal Poly and a Doctorate in Engineering from UC Davis, California. Dr Styles has worked on strawberry research for the last five years. He has done extensive work looking at the impact of salinity and reduced water applications on strawberry transplants.

GUYON ESPINER

Guyon Espiner has been a leading journalist in print, television and radio for more than 20 years. He has an intimate knowledge of politics, having spent 14 years covering Parliament, mostly for Television New Zealand, where he was Political Editor. Moving to Auckland in 2012 Espiner worked for TV3, firstly as an investigative reporter for 60 Minutes and then launched two current affairs programmes, which he also co-presented: Third Degree and The Vote. In 2014 he switched to radio becoming co-host of Radio New Zealand’s Morning Report. In 2017 Espiner worked with Tim Watkin to produce The 9th Floor, a podcast and video series of interviews with five former New Zealand Prime Ministers, which was also released as a book. He has a certificate in governance from the Institute of Directors and is learning Te Reo Maori. Espiner is also a keen runner, finishing 18 competitive marathons. He lives in Mt Eden with his wife Emma and daughter Nico.

WITH THANKS TO PRINCIPAL PARTNERS
Explore Central Otago – A World of Difference

IrrigationNZ is excited to bring our 2018 conference to Alexandra. The Central Otago region is rich in irrigation history and clearly demonstrates the benefits irrigation brings to communities. Fresh food, jobs, improved river flows and recreational opportunities have all been outcomes from on-going investment in water infrastructure.

Central Otago offers lots of activities for everyone to enjoy and autumn is the most scenic time to visit. The IrrigationNZ Conference coincides with the April school holidays, so why not make the trip a chance for a family holiday?

Activities you can take part in include: cycling, wine tasting, boat cruises, 4WD tours, scenic flights, jet boating, gold panning, sports cars, curling, and lots more.

Central Otago i-Sites have expert local knowledge and offer free itinerary planning and activity booking. For more information visit www.centralotagonz.com, phone 03 262 7999 or email visitorcentre@codc.govt.nz.

Recommended activities you can try in Central Otago are:

**CYCLE CENTRAL OTAGO – OUR PLACE, YOUR PACE**

Central Otago boasts three of New Zealand’s best trails: the Otago Central Rail Trail, the original great ride; Roxburgh Gorge Trail, a unique one day trail complete with a jet boat ride; and Clutha Gold Trail, a journey of discovery along the mighty Clutha Mata-au river. Day and multi-day trips including bike hire, accommodation, and transport are available.

For a more challenging ride, hire a bike and discover the single track trails at Flat Top Hill near Alexandra or Naseby Forest. Guided and unguided options are available.

**HIGHLANDS MOTORSPORT PARK – EXPERIENCE THE EXCEPTIONAL**

A truly international five-star facility, the Highlands Motorsport Park boasts multiple options to experience the racetrack at speed in McLarens to Porsches. It is also home to the best outdoor go-kart circuit in the southern hemisphere, a safari dirt buggy adventure complete with 18 foot dinosaurs and safari animals, and a national motorsport museum.

**GOLF – TEE OFF**

Central Otago’s golf courses are as varied as they are challenging. Best of all – they are uncrowded.

**DISCOVER LIVING HERITAGE**

Take a step back in time and explore our rich history, whether it’s exploring the goldfields, museums or quaint townships. You’ll feel the sense of timelessness.

**WINE TASTING**

Indulge yourself in a premium Central Otago wine at one of the many wineries or cellar doors. Guided, self-drive, walking and cycling tours are available.

**CURLING – FUN FOR EVERYONE**

Try the age-old Scottish sporting tradition of curling at the International Curling Rink in Naseby. Available year round and suitable for all ages and abilities.

Conference programme and activity photos courtesy of Tourism Central Otago.
Monitoring and control solutions you can rely on.

Whether you want to remotely manage a storage pond, a pump station or a thousand property off-takes, we have a solution for you. And with our software you can start simple and build to a complete scheme management solution by adding water ordering, demand management, delivery automation and water use accounting modules.

Contact us today to find out why New Zealand’s major irrigation schemes rely on Rubicon Water.
Managing water resources: setting environmental flows

In the second article in our series on understanding New Zealand’s rivers, NIWA Scientist Dr Doug Brooker talks about setting environmental flows. Dr Brooker specialises in hydro-ecological modelling.

Water abstraction from streams and rivers for human use is increasing globally. Fresh water is a finite resource, even within a temperate climate like New Zealand. Intensification of agriculture, expansion of industry, urban development and hydroelectric demand have all put pressure on water resources. A deterioration in water quality and changes in river flow can have adverse effects on river plants and animals. When we consider the substantial proportion of freshwater species endemic to New Zealand currently in decline or at risk of extinction, the need for protecting their habitats becomes clear.

With demand for water resources continuing to grow, there is much debate on how to best manage that resource. The economic and social benefits of abstraction need to be balanced against potential negative impacts on river ecosystems, cultural values and recreation.

RIVER FLOW AND ECOLOGY

New Zealand has very diverse freshwater environments shaped by geology, topography, vegetation and climate, as discussed in NIWA’s article Living Waters in the summer 2017/18 issue of IrrigationNZ News. Environmental conditions can vary dramatically within one river catchment let alone within a region or across regions. River flow also differs over time, potentially changing from flood to low flow between seasons. Many rivers in the South Island flow from mountain headwaters, where winter snow melts in spring and summer and flow goes up. Conversely, most rivers in the North Island are more rainfall than snow-fed, and the arrival of spring with higher temperatures causes flow to fall. It would therefore be quite wrong to assume all rivers in New Zealand follow the same flow patterns.

Ecological and evolutionary processes that shape biodiversity in rivers are influenced by historical flow patterns. Changes in river flow affect channel shapes, sediment transport, water quality and temperature, and as a result, habitat for resident organisms. Water abstraction from streams and rivers has considerable potential to alter flow regimes, with knock-on effects on freshwater biodiversity. Maintaining flow patterns is therefore a vital component in the protection of river ecology. But how do we continue to use water while safeguarding our environment?

VALUES

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>VALUES</th>
<th>ATTRIBUTES</th>
<th>OBJECTIVES</th>
<th>LIMITS</th>
<th>METHODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Things related to rivers that are important</td>
<td>Help identify</td>
<td>Help choose</td>
<td>Help set</td>
<td>Help determine</td>
<td>Measure put in place to ensure limits and objectives are met</td>
</tr>
<tr>
<td>Fishing, mahinga kai, biodiversity, no nuisance algae blooms</td>
<td>Provide for</td>
<td>Help achieve</td>
<td>Help meet</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Low flows, seasonal patterns, flushing flows

Flow in February is always above x, there are at least y flushing events per year

Minimum flows, total allocations, seasonal restrictions

Granting of consents, consent conditions

New Zealand’s rivers are iconic. Photo: Shannan Crow, NIWA.
MANAGING WATER RESOURCES
Managing water resource use should, ideally, be based on scientifically defensible tools within a transparent process that enables communities to work through the issues together and achieve clear outcomes. The National Policy Statement for Freshwater Management emphasises the importance of identifying local community and tangata whenua values. It states that limits on the maximum use of water resources must be set to avoid over-allocation. Limits should provide clarity regarding water availability while also ensuring protection of social, cultural and environmental values.

Regional councils are required to use water management plans to establish measurable freshwater objectives and enforceable water resource use limits for all bodies of fresh water. Freshwater objectives can be statements of what will be achieved or desired environmental outcomes. They may relate to both water quality and water quantity. They can also be expressed at different scales; anywhere between the regional level or for a specific part of a water body, depending on what is appropriate for a given objective and resulting resource use limit.

For example, the council, iwi and community might agree that an important value for their local river is that it has “permanently flowing water.” The attribute needed to achieve this would be a minimum flow rate. A freshwater objective for that management zone could then be “the river does not run dry due to human interference.” In this deliberately extreme example a resulting water resource use limit would be a minimum flow rate sufficiently greater than zero to maintain permanent flow. A method to ensure the objective is met would be to impose conditions on consents that no abstraction occurs when flows are below the minimum flow rate.

WATER QUANTITY LIMITS
The National Policy Statement for Freshwater Management states that water quantity limits for flowing water must comprise at least a minimum flow (the flow below which no further water is to be taken) and a total allocation (the maximum rate of abstraction summed across upstream abstractions). Enforcement of these limits requires either full or partial restriction of abstractions at lower flows. A change in either the minimum flow or the total allocation involves a three-way trade-off between:

a) minimising impact on community agreed in-stream values;

b) ensuring adequate reliability of water supply; and

c) the volume of water that can be abstracted.

Minimising alteration of natural river flows always comes at the expense of either reduced reliability of supply or the volume of water abstracted. Increasing abstracted volumes always comes at the expense of more alteration of river flows and reduced reliability of supply.

Limits must account for the cumulative effects of all water takes, whether by consented or permitted activities (e.g. livestock watering), land uses that may change water yield (e.g. forestry) and the foreseeable impacts of climate change. However, as yet there are no prescriptive guidelines describing how water quantity limits should be calculated. It depends on the detail of the freshwater objective for a water body. So what factors inform decisions on appropriate minimum flows and total allocations?

IDENTIFYING FLOW-ECOLOGY RELATIONSHIPS
Successful implementation of the National Policy Statement for Freshwater Management requires the identification of those water attributes that need to be managed to achieve freshwater objectives. In this respect, river flow is often viewed as a ‘master variable’ because it influences so many aspects of river ecosystems.

Research in New Zealand has indicated that many aspects of flow regimes are ecologically relevant, particularly for invertebrates (which provide food for fish and birds) and for the probability of occurrence of various fish species. Ideally, relationships would be underpinned by theory, quantified using a robust statistical approach and future...
data collection used to refine and improve accuracy. However, due to the complexity of environmental systems and sparseness of flow-ecology data, predictive relationships will not be available for all values at all locations in all situations. In addition, uncertainties in the relationships between river flows and freshwater values can be large, particularly for ecological attributes such as the abundance of fish, invertebrates and algae.

**QUANTIFYING RIVER FLOW**

Information from many indicators needs to be distilled to describe natural flow regimes, assess flow alteration scenarios or set environmental flow standards. There is no global definition for which hydrological measures should be used to characterise flow regimes, partly because there are such significant differences between rivers; in total flow ranges, in frequency and timing of fluctuations, and in the ecological effects of flow regimes. The same flow regime in contrasting landscape settings may lead to very different looking rivers with diverse ecological characteristics. However, the mean annual low flow and variation in annual low flow are both important measures. Variation in annual low flow is of interest because, in a natural situation, it can be used to characterise the range of conditions experienced by organisms living in the river. The long-term mean annual low flow is useful when comparing flow alteration scenarios or flow regimes from different sites within the same management zone. Measures of monthly mean flow give a good insight into seasonal patterns in rivers. Frequency of flushing flows is also an important aspect of the flow regime because high flow events that exceed threshold levels are needed to remove nuisance algae, flush fine sediment and maintain channel form. Flow duration curves represent the proportion of time that any given flow in a river is exceeded. They are useful for identifying hydrological alteration and also reliability of supply in terms of the shut-off and partial restrictions of abstractions.

These hydrological indices are often calculated from daily flow time-series data. Observed flow time-series are only available from gauging stations, although computer models have been used to estimate flows at ungauged sites across New Zealand. For most hydrological indices it is possible to compute a value for each year of record and subsequently calculate inter-annual variation. NIWA has recently made a large amount of information related to environmental flows publicly viewable via its NZ River Maps webapp. Estimated spatial patterns in hydrology, ecology, sediment, water quality and potential flow depletion from consented takes are available for each river reach across New Zealand. See https://shiny.niwa.co.nz/nzrivermaps.

**ESTIMATION METHODS**

A third consideration for setting environmental flow limits is the level of certainty required when estimating the relationship between water attributes and freshwater objectives. In management zones where the degree of hydrological alteration from proposed water takes is relatively small, a straightforward low-cost method may be acceptable. Historical flow methods are the simplest, easiest and cheapest to apply. They use historical flow records to set rules of thumb, usually for minimum flows, such as a minimum flow value expressed as a percentage of mean annual low flow (MALF). These methods can also be used to set water quantity limits when there is inadequate knowledge or lack of data on flow-ecology relationships. Limiting the total rate of abstraction to be a small proportion of the
flow ensures minimal alteration to the natural flow regime.

Extra field data and more complex modeling methods may offer greater certainty around ecological responses to river flow and allow for more efficient allocation of water resources. These should be employed when community agreed values are particularly sensitive or the proposed degree of hydrological alteration is large. Hydraulic-based methods provide information on the physical characteristics of a river, specifically channel shape and water velocity. They can assess the degree to which conditions are suitable or the rate at which food is delivered. Their strength is that they quantify the change in habitat caused by changes to the flow regime, which helps the evaluation of flow requirements for freshwater species. Applying these models in a river reach involves considerable field effort and experience. Even if they are available, uncertainty remains in understanding how populations of fish or other aquatic life will respond. Improved data collection methods and more complex models are currently being developed that will help describe the effects of changes to flow regimes on fish, invertebrates and algae.

**FINAL THOUGHTS**

One interpretation of the logic behind the National Policy Statement for Freshwater Management is that river flow, or particular aspects of river flow, should not be considered as values themselves. They are supporting elements to be managed in order to meet objectives that aim to maintain community agreed values. Although we do know a lot more about the ecological effects of altering river flow than we did just ten years ago, it is still not feasible to state categorically that a given minimum flow and total allocation limit will ensure a desired outcome. With continued uncertainty over the dynamics of river ecosystems, and the effects of future climate and land cover change added to the mix, it is also possible that freshwater values may be stressed by additional controlling factors other than levels of abstraction. Ongoing research at NIWA aims to explore some of these issues, helping to support regional councils in their decision-making processes.
REGIONAL REPORTS

HUNTER DOWNS SCHEME GAINS SUPPORT
The Hunter Downs Water Board of Directors confirmed in December that they had the shareholder support needed to proceed with the $110 million scheme.

The scheme will cover 12,000 hectares of land between Waimate and Timaru. It is forecast to result in an increase in output of $830 million per year in South Canterbury and create 1,840 jobs in the region.

Crown Irrigation Investments Ltd has agreed to provide the project with $70 million in term debt funding, but one of the conditions was that the company needed an uptake of 7,000 water shares.

With farmer subscriptions along with the support of businessman Gary Rooney and his company, the Rooney Group, which had the contract to build the scheme and purchase some remaining shares, the scheme has been able to reach the 7,000 share target.

The scheme now needs to lodge an augmentation consent, which will be subject to consultation. It is currently working with Crown Irrigation Investment Limited, Rooney Group, Morven Glenavy Irrigation, shareholders and other key stakeholders to finalise the details of the scheme.

The scheme plans to use alpine water from the Waitaki River. The Waitaki River has one of New Zealand’s most reliable river flows.

The development of the scheme is supported by Timaru and Waimate District Councils, although they are not financially investing in the project.

The scheme would provide reliable alpine water for the southern part of the Orair-Temuka-Opihi-Pareora (OTOP) zone, particularly in Pareora. If water from the Waitaki replaces existing takes from the Pareora, it could improve flows to that river, which often experiences low flows in dry weather summer.

“This decision is landscape-changing for our region, both for the community and the environment through, amongst other things, the ability to augment the Wainono Lagoon and to take pressure off our smaller waterways,” said Hunter Downs Irrigation Limited chair­man Andrew Fraser when announcing the decision to proceed with the scheme.

WAIRARAPA WATER UPDATE
A project to look at adding around 30,000 hectares of irrigated land area within the Wairarapa, as well as providing water for township and supplementing river flows, has been underway for the past six years. This can be done in three stages of approximately 10,000 hectares.

The project is also looking at providing water to Masterton, Carterton and other Wairarapa towns.

The project has the potential to address several environmental and community issues including shifting existing water users from surface or groundwater to stored water, leaving more water in rivers. Several rivers in the region with high community/ cultural value are currently degraded. Urban townships already have water restrictions in place most summers and these would need to become more restrictive if water storage isn’t available.

Information on the effects of climate change indicates that the Wairarapa region will be one degree warmer and 5% drier by 2040. More droughts may limit pasture production and crop growth but allow for new opportunities – like high value crops, horticulture and new businesses. However a reliable water supply is needed for these activities.

The project has completed pre-feasibility work which included investigating two possible dam sites at Black Creek and Tividale near Masterton. Work to date indicates...
that the project is financially viable. The investigations undertaken have been jointly funded by Crown Irrigation Investments Limited and Greater Wellington Regional Council. Funding is in place until August 2018 currently.

In late 2017, Wairarapa Water Ltd was established. The establishment of the company will allow it to raise shares from water users in the future. The formation was overseen by an independent group made up of farming and business professionals and is chaired by Tim Lusk, former CE of Meridian Energy and current director of the Environmental Protection Agency.

More council and community engagement around the environmental and community effects of the project is planned in 2018. Wairarapa Water Ltd is planning to seek expressions of interest in the scheme in mid-2018, and look at raising equity in late 2018. If there is sufficient support for the scheme, consenting, design and financing work would occur in 2019 and 2020, with construction planned for 2021 or later.

The scheme sees the establishment of the $1 billion regional development fund as positive, as there is strong evidence the scheme would generate significant economic benefits and build regional resilience.

HURUNUI WATER PROJECT UPDATE

The Hurunui Water Project (HWP) is an irrigation company owned by farmer-shareholders in the Hurunui District of North Canterbury. Its primary aim is to provide farmer and community resilience against the frequently long and debilitating droughts suffered by the district. The project has a Command Area of 43,000 hectares within the Waipara and Hurunui catchments of which approximately 21,000 hectares is planned to be irrigated.

Against a backdrop of increasing compliance and environmental regulation the scheme has, over the last two years moved from the Waitohi River-based storage and dams model to a large on-plains storage and piped scheme using mainly high-flow Hurunui River water to fill its storage pond.

As well as significantly reducing environmental impacts, this model has been shown, during a robust feasibility design and value engineering process in collaboration with Rooney Group’s (HWP’s ECI partner) engineering company, to be the most cost-effective method to provide storage and deliver irrigation water to the HWP’s farmer-shareholder base.

A recent survey conducted by HWP, found the majority of its farmer-shareholders within both the Hurunui and Waipara catchments planned to continue their current land-use, generally sheep and beef farming, but increase their business’ resilience through diversification for example small seed and feed crops.

Other significant shareholders in the company include MainPower – the local electricity lines company, David Teece, Amuri Irrigation Company and Ngāi Tahu.

The project has a contract in place with Crown Irrigation Investments Limited to provide grant funding until late 2018, to conclude feasibility work. It is working to have a debt funding facility in place by that time to fund scheme construction. A Product Disclosure Statement is planned for release to shareholders in June 2018.

MANUHERIKIA IRRIGATORS FORM NEW COMPANY

The use of water within the Manuherikia Catchment is largely authorised by historic mining privileges, known as deemed permits. Deemed Permits are due to expire in 2021, with permit holders needing to obtain a resource consent for water use after that date.

The Manuherikia Catchment is considered by the Otago Regional Council to be over-allocated. In the future the volume of water which deemed permit holders are currently authorised to take will need to decrease.

A strategy group was formed to look at options around using water storage to compensate for this reduction in water reliability.

The Falls Dam was identified as a location where additional water storage could be developed. Existing large Ida Valley storages (Greenland, Manorburn and Poolburn reservoirs) were also considered as locations that could be developed.

Consultation on these options indicated there was enough support for 12,500 hectares to be irrigated. Increasing the water storage capacity of the Falls Dam is the proposed option, with a six metre increase in dam height needed to service the expanded irrigation area.

The strategy group has recently established Manuherikia Water Limited. The new company is currently working through the issues associated with amalgamating the four existing irrigation companies into one organisation and looking at the technical issues around raising the height of the dam.

It is also developing a financial model to show the viability of the project. The current phase of investigations has been jointly funded by farmers and CIIIL. The company is planning to develop a Product Disclosure Statement for release later this year.

WAIMEA SHARE OFFER OPENS

Waimea Irrigators Limited publicly released a Product Disclosure Statement for the scheme in early February. The Product Disclosure Statement is an offer to buy water shares.

The share offer is the result of 17 years of work, with farmers and growers coming together with Councils, DOC, Iwi and Fish and Game after the drought of 2001 with the aim of safeguarding the region from the effects of future droughts.

The construction of the Waimea Community Dam is proposed to provide a long-term reliable water supply for irrigators on the Waimea Plains and urban residents. The project would also provide minimum flows in the Waimea River.

WIL is expecting to contribute $38.6 million to the construction of the Dam and is aiming to have 3,000 shares committed before the offer close date of 22 March 2018. To reach their goal, WIL has asked more than a dozen irrigators to become Ambassadors and talk to their fellow irrigators to assist with the process of learning about the offer.

A commitment of 3,000 shares will enable WIL to move forward to fund its portion of the Waimea Community Dam. The share price is $5,500, which is in line with what WIL has been communicating to irrigators for months.

“Irrigators have been saying since 2001 that they need a permanent solution to this water supply problem,” Waimea Irrigators Ltd Project Manager Natasha Berkett says. “With the increase in extreme weather events that we’re seeing – the dryer dries and the wetter wets – we must work within the natural system we have to maintain our region’s agricultural foundation while we manage growth and improve our river’s environment. The Dam is a unique opportunity for us to solve all of these issues, with a shared cost structure.”

For information about the project visit www.waimeairrigators.co.nz
Informing and refining irrigation decision making

The Irrigation Insight programme provides dairy farmers with the knowledge, tools and confidence to better manage irrigation, precisely applying the water needed – where, when and how much.

Irrigation Insight is a joint industry-Crown Research Institute research and extension programme funded by the Ministry of Business, Innovation and Employment (MBIE) to examine the ease and effectiveness of using improved weather forecast and drainage estimations for on-farm water management on irrigated dairy farms. The programme aims to support dairy farmers in moving away from a ‘just in case’ or ‘just in time’ scheduling towards an irrigation approach that accounts for both current demand and future supply.

The five-year programme, started in October 2016, focuses on environmental, social and economic aspects of irrigation management.

Programme lead and NIWA Hydrologist Dr MS Srinivasan says this being done by working with a collective of industry and farmer stakeholders.

“Our project will quantify the economic and environmental benefits of improved water use efficiency from integrating high-resolution weather forecast data with on-farm irrigation scheduling decisions. It also aims to translate data and findings into beneficial tools and knowledge for dairy farmer use throughout New Zealand.”

Led by NIWA, in collaboration with DairyNZ, Fonterra, AgResearch and IrrigationNZ, the programme builds on NIWA’s earlier pilot work in Canterbury.

“Environmentally we want to reduce instances of drainage and leaching from over irrigation; economically we are looking to reduce the on-farm costs associated with irrigation management,” says Dr Srinivasan.

“Importantly, we focus on saving farmers’ time spent on making irrigation decisions, without compromising on the effectiveness of decisions made.”

The programme has four inter-linked components:

1. **ON-FARM DECISION SUPPORT TOOLS TESTED ON TEN FARMS**

Each of the ten irrigated Canterbury dairy farms will be provided with a farm-specific water balance model of current irrigation demand and future water supply that combines data from on-farm monitoring with state-of-the-art weather forecasting.

**On-farm technology**

One irrigated paddock on each pilot farm has been equipped with a profile soil water sensor and rain gauge. The profile soil water sensor is designed to measure soil water at 10cm increments over a depth of 80cm of soil profile, allowing the simultaneous monitoring of irrigation demands at the root zone (top 40cm) and potential occurrence of drainage and leaching below the root zone. The rain gauge measures both rainfall and irrigation. Data from these instruments are telemetered in near-real time and combined with NIWA’s up-to-date, high-resolution weather forecast to present the farmer a snapshot of past, current and future soil water demands as well as forecast rainfall, evaporation and soil water.

**State-of-the-art forecasting**

Weather forecasts are provided by NIWA’s state-of-the-art weather prediction systems. This will include forecasts from a large domain model that accurately describe the evolution of weather systems that affect New Zealand, and a high-resolution terrain-resolving model that forecasts rainfall, temperature and wind. These place-specific forecasts include estimates of the reliability of the predictions and are bias-corrected using locally collected weather data.

2. **UNDERSTANDING THROUGH ECONOMIC MODELLING**

The programme’s economics component will use modelled and actual data from each pilot.
farm to understand how farm management changes in response to improved soil water and weather forecast information. The aim is to help farmers understand the economic impacts of irrigation management choices to enable better, more informed decisions. It will capture changes in cash costs (e.g. electricity), changes in pasture growth owing to soil water conditions (spanning from too wet to too dry) changes in irrigation and the cost of water and nutrients lost below the root zone.

3. FEEDBACK LOOPS FOR REAL-LIFE FIT
The programme will also test that the irrigation solutions identified are a good fit for the farmer and farm system, as well as the irrigation scheme and regulatory authority. The effectiveness of these proposed solutions in saving farmers’ time for water management with an increased ability to make better, more informed decisions will be examined. The social component involves interviews and workshops with farmers and other relevant stakeholders (industry, regulators, researchers) throughout the programme to ensure understanding of the real-life application and will contribute to the design of more useful tools and practices.

4. FINDINGS SHARED THROUGH A KNOWLEDGE EXCHANGE
Project progress and the development of new knowledge and tools will be shared through a variety of communication channels, including a programme website. This will include the development of educational and training programmes to encourage the sharing of knowledge as well as providing the basis for wider discussion.

We will also be working with industry partners to share our findings and to ensure that farmers have clear, science-based messaging and that knowledge resources are not duplicated.

Find out more about the programme at www.irrigationinsight.co.nz which will be launched in April 2018. If you would like to stay up-to-date with the programme sign-up for the regular e-newsletter in the news section of the website.
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Transpower is reminding irrigators of the need to take care when operating irrigation equipment near power lines after an irrigator caused a power outage and created a safety incident recently in South Canterbury.

On 12 February 2018, a pivot irrigator in Waimate was being commissioned near a 110kV Transpower overhead transmission line. The irrigator was moved by the farmer at 7am. The farmer was unaware that part of the irrigator was sitting directly under the line. The current through the line increased during the day, along with the air temperature causing the transmission line to sag closer to the irrigator. By around 11.40am it was close enough (300mm) to cause a flashover, trip the circuit, create serious safety hazards for anything connected to the irrigator, and cause a local power outage.

“Had anybody been touching the irrigator or the path through which the excess current was felt they would have been seriously burnt or electrocuted. Fortunately, no people or animals were hurt, but the incident highlights the importance of keeping well clear of transmission lines with mobile equipment,” says Murray Aitken, Service Delivery Manager, from Transpower.

SAFE CLEARANCE DISTANCES
Although it is designed to meet all safety specifications and standards, there are inherent risks associated with high voltage electricity infrastructure. Electricity at high voltages can arc through the air even without direct contact.

“The Waimate incident shows that transmission line wires (or conductors) are not always in the same place. During the day they can increase and decrease in height from the ground depending on air temperature and current. They can also move from side to side in strong winds. The more distance between supporting towers, the greater this swing can be. Unlike most mobile equipment, irrigators operate without someone on site to supervise them, so farmers need to plan to avoid a worst-case scenario,” Murray says.

The New Zealand Electrical Code of Practice 34 (NZECP34) specifies up to a 6 metre clearance for people getting close to conductors and as irrigators can be serviced by workers scaling them, it’s important to cater for that potential.

It can be hard to judge the distance from a transmission line – particularly taking into account the sag that might be expected on the line at any time when an unsupervised irrigator might move underneath. Transpower is advising farmers to contact them for assistance as they can provide information on where the conductors will sag to at peak operating conditions (ie the worst-case scenario). They can also provide on the ground advice on your irrigator setup and how to avoid any issues in different conditions.

The Electrical Code of Practice has important rules relating to excavation around the supporting structures of transmission lines, like poles and towers. For example, the distance between any excavation greater than 300mm deep (e.g. pivot irrigator foundation and pump house) and a transmission tower must be further than 6 metres from the visible tower foundation – unless prior written consent is obtained from Transpower. As the rules are quite technical, Transpower has information available on its website (www.transpower.co.nz search ‘irrigation’) which provides guidance around irrigation and the code of practice requirements. Irrigators can also contact Transpower directly for advice.

HOW CAN IRRIGATORS BE OPERATED SAFELY AROUND POWER LINES?
Risks can be managed through taking care in installing and operating irrigation systems. Some things to consider when installing and operating irrigation systems are:

• long irrigation systems, where practical, should be operated at right angles to the transmission line
• where possible, avoid locating the pivot point of a pivot irrigator within 20 metres of a tower and maintain at least 6 metres from the irrigator to the wires (check with Transpower to get the worst-case line sag confirmed)
• where layout alternatives are available, a maximum separation from transmission lines is recommended
• when relocating, assembling or disassembling of irrigators, care needs to be taken so that pipes or long metal parts are carried in a horizontal position, especially around power lines
• you should adjust the irrigator nozzles so the jets of water do not hit the conductors or the tower steelwork – direct spraying could cause a flashover and can corrode the tower structure.

You can contact Transpower on 0508 526 369 (0508 Landowner) for more information. Information about activities and development near National Grid lines is also online at www.transpower.co.nz.
New Irrigation Company Exemption Notice fails to deliver on promise

By David Goodman, Partner, Anderson Lloyd.


The Irrigation Companies Exemption Notice is along similar lines to the earlier Small Co-operatives Exemption Notice but extends to “Irrigation Companies” which are not co-operative companies. The definition of “Irrigation Company” under the Irrigation Companies Exemption Notice is “a company, other than a co-operative company... whose principal activity is managing and operating, under co-operative principles, infrastructure to effect irrigation.”

The Irrigation Companies Exemption Notice firstly sets out technical exemptions that apply to all Irrigation Companies and aligns the Product Disclosure Statement (PDS) disclosure requirements under the regulations with the specific nature of irrigation companies. Secondly, and more significantly, there is an exemption from the requirement to have a full PDS for small irrigation companies. The latter exemption is potentially very helpful, but unfortunately the $5,000 cap severely limits the applicability of the exemption. I discuss this further below, but first I deal with exemptions that have general applicability to irrigation companies.

Every irrigation company is exempt from the requirements in clauses 5 (What is this?) and 12 (Key risks affecting this investment) of Schedule 3 of the Regulations which deals with the content of a Product Disclosure Statement (PDS). The exemption provides for alternative wording for clauses 5 and 12 and, while helpful, there is no real reduction in compliance obligations. There is a further exemption from clause 20 which deals with the requirement to set out in a table a list of the substantial shareholders and relevant interests held by directors and senior managers in the PDS. This is a useful exemption and there is no substitute wording required.

Irrigation companies are exempt from the requirement to disclose certain financial information that may not be particularly relevant to irrigation companies given their cost recovery nature such as EBITDA, NPAT and dividends. The exemptions come with conditions around alternative information and there is not real reduction in the disclosure or compliance requirements. In addition, there is an exemption to Regulation 38 (key financial metrics for offer), but this relates to quoted shares and is of limited application to irrigation companies.

Of much greater significance are the exemptions available to irrigation companies that meet the $5,000 threshold. These irrigation companies are exempt from Part 3 of the Act (Disclosure of offers) and the requirement to issue a PDS. Instead, the irrigation company can issue a much reduced form of the document set out in Schedule 2 together with a “warning.”

The warning states, amongst other things, that “The exemption recognises that shares in these Irrigation Companies are, for the shareholders, more like a membership than an investment.”

The exemption from the requirement to issue a full PDS is therefore targeted at very small irrigation companies. The practical reality is that very few (if any) irrigation companies issue less than $5,000 worth of paid out capital to their members. The average water share in an irrigation company is over $5,000 in value for one share alone. There may be some small horticulturally based irrigation schemes that qualify, but I have yet to meet one.

Lastly, there is an exemption to Part 7 of the Act (Financial reporting) if revenue (i.e. water charges) is less than $2,000,000 per annum. The main advantage here is the ability to avoid the requirement to have audited accounts and to avoid the costs associated with these audits. This is a more useful threshold and may be of assistance to smaller schemes struggling with audit costs.

In conclusion, the Irrigation Companies Exemption Notice, while containing some useful exemptions of general applicability to irrigation companies by making various clauses of PDS’s more relevant to irrigation companies does not reduce compliance obligations, rather only adjusts these obligations. There is also a useful exemption in respect of financial reporting. The main prize, being the exemption from the requirement to issue a PDS in favour of a reduced offer document, is of very limited application.

The great majority of irrigation companies (if not all) will have to issue a full PDS or rely on the typical exclusions under the Financial Markets Conduct Act 2013 including, in particular, the “Large Person” exclusion and the “Small Companies” exclusion to issue shares. There is a strong argument to increase the current $5,000 threshold to a more realistic level.
IrrigationNZ is working on a new project designed to make training opportunities more accessible and to encourage the adoption of best practice by irrigators.

“Our aim is to develop online learning opportunities to make training available to a wider range of irrigators, and to identify and address issues which are creating a barrier to people adopting irrigation good management practice,” says IrrigationNZ’s Commercial Manager, Charlotte Butler.

The project is called Smart tips and tools and is being funded by a Sustainable Farming Fund grant from the Ministry for Primary Industries, and a range of primary sector partners and regional councils.

The first stage of the project has recently been completed and involved undertaking a range of farmer and grower interviews to help identify what barriers exist to prevent people from adopting irrigation good practice. The key comments from these surveys were that:

• there is a lack of trusted independent advisors
• the service industry is more focused on sales than service, and some industry members have an inadequate understanding of new environmental requirements
• some irrigators have a limited understanding of their system’s performance or how to schedule their irrigation applications
• most irrigators recognise the benefits of change and the need for change but often reject new approaches and technologies due to a lack of support
• productivity gains and operation cost reductions provide significant incentives for change but confidence that change will work well and there will be adequate support is lacking
• the capital investment required to make changes can be a barrier, particularly when there is uncertainty about future regulations.

The feedback provided by irrigators will be used to identify actions which could help address these issues. IrrigationNZ is planning to pilot actions over a two year period with groups of irrigators to see if they can help improve the uptake of good management practice.

The other aspect of the project is the development of an online learning system for irrigators.

“Currently there are a number of barriers to people participating in training including distance from training locations, problems getting time off the farm, or the difficulty of training a number of staff,” says Charlotte.

“By offering online training options to IrrigationNZ members people will be able to access training when they want, and complete the training when it suits them.”

The first module of the online training system is expected to be operating this spring and will cover irrigation scheduling, which will include soil, climate, plant water use, water budgeting and soil moisture monitoring. It’s planned that more modules will be added in 2019 and 2020 covering irrigation operation, performance assessment and developing irrigation.

Once modules are completed there is the option to take a short quiz to receive a certificate of completion. This provides evidence of training for farm environment plans and can also be used in CVs to show that training on irrigation has been undertaken.
IRRIGATION EVENTS AND TRAINING

Irrigation events and training

FERTIGATION MASTER CLASS – HELP SET BEST PRACTICE IN FERTIGATION
A two-day workshop will be held in Lincoln on 11–12 April 2018 for irrigators and irrigation service industry professionals on fertigation. This is a unique opportunity to both inform yourself about best practice in fertigation and help develop a resource for irrigators with guidance on successful fertigation, good management practice advice and resources.

The event will enable irrigators and their service industries to be part of this best practice resource which may inform any future regulations around fertigation equipment and practice.

We are delighted to have international water and irrigation expert Stuart Styles with us to present sections of the class. Stuart is the Director of the Irrigation Training and Research Centre at Cal Poly in California. He has three decades of field experience in water and irrigation.

The class will cover:

• Looking at two different scenarios (horticultural and broadacre) – why carry out fertigation? What are the costs and benefits? Fertigation and chemigation, scale and crop considerations (with Stuart Styles).
• Regulation – what backflow prevention requirements are necessary? What is my risk profile and what implications does this have?
• Design and installation for drip micro and greenhouse, broadacre spray, solid set/traveller. Design considerations including permanent versus mobile, controllers, mixing units, filtration and flushing.
• Operation and maintenance – dilution and run times – crop specific examples. Flushing and system constraints.
• Products – what is best for different scenarios, advice on mixing.

Presentations will be followed by a chance for everyone to ask questions and discuss how ideas could be applied.

A farm field trip is also part of the programme, with a dinner included on Wednesday 11 April. The course cost is $650 plus GST. To register visit www.irrigationnz.co.nz/events

NZ CERTIFICATE IN IRRIGATION MANAGEMENT
We are also offering a New Zealand Certificate in Irrigation Management. This Level 4 NZQA course is suitable for those who have completed the irrigation operator and manager training and want to be able to oversee the management of irrigation systems. The certificate takes seven months over the irrigation season. You will need to have access to an irrigated property for on-farm assignments as part of the course. A modular course is part of the Certificate and will be held on 3 and 4 October 2018 at Lincoln. Registrations close 3 September, visit www.irrigationnz.co.nz/events.

NEW IRRIGATION ENGINEERING APPRENTICESHIP PLANNED
IrrigationNZ is working towards offering a new training option to provide a career pathway for people wanting to become an irrigation service technician or to develop their skills in this area. This new four-year irrigation engineering apprenticeship programme is being developed by IrrigationNZ, and is currently lodged with NZQA for approval.

The apprenticeship programme is being planned as a mix of block courses, e-learning modules and on the job training. Apprentices need to be employed with a company which carries out irrigation servicing. IrrigationNZ can help match people with employers if they are not currently employed in the industry. To find out more about the apprenticeship please contact Charlotte on 027 357 3140 or email cbutler@irrigationnz.co.nz.

WATER METER MASTER CLASS AND VERIFICATION TRAINING
IrrigationNZ is looking at hosting a Water Meter Master Class over winter. The class would cover telemetry installation, servicing requirements and data processing. It would also look to establish more clarity around roles and responsibilities and what protocols to follow when problems occur. This will include conversations around improving communication and service/re-seller agreements. The Master Class would help further develop the IrrigationNZ New Zealand Water Measurement Code of Practice that Blue Tick companies must follow.

We are also looking at hosting a water meter verification training day in the central North Island and the central South Island this autumn or winter. This day would assist those who are completing the water meter verification workbook. If you are interested in participating in a water meter verification training day or a Water Meter Master Class please contact Vicky on 027 570 4122 or email vbloomer@irrigationnz.co.nz.

IRRIGATION DESIGN COURSE UNDERWAY
Our third irrigation system design course got underway in January at Lincoln. Twelve participants have joined the course in 2018.

Students work through designing systems from beginning to end, starting with identifying customer needs, environmental impact, integrating technologies then designing an highly efficient irrigation system.

We plan to run another design course starting in January 2019. The 18-month qualification is suitable for those who work in the irrigation industry and involves on the job assignments as well as attendance at modular training sessions. See www.irrigationnz.co.nz/events for details.

UPCOMING EVENTS
11–12 April Fertigation Master Class, Lincoln
17–19 April IrrigationNZ Conference, Alexandra
3–4 October NZ Certificate in Irrigation Management, Lincoln

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The challenge climate change represents also represents the greatest opportunity we have to upgrade our economy to one that is more productive, higher-value, higher-tech, and higher-wage than the economy we have at the moment.

Starting the economic transition now will give New Zealand businesses and farmers a competitive advantage in meeting new demand in global markets. In normal language: People overseas want to buy the things that New Zealand makes that are bona fide clean and green. And they want to learn from countries like New Zealand who already have experience with wind and geothermal electricity generation.

On the flipside, the evidence tells us the longer we wait to make changes, the harder it will be and the more it will cost. And we will have given away the first-mover advantage to other countries. We’ll be buying technology and products from them, rather than selling to them.

Change is already happening – and it’s good... in transport, energy, agriculture — in virtually every sector of the economy — new technologies and ways of doing things are demonstrating that we can become more productive, profitable, and competitive at the same time as dramatically reducing pollution.

The environmental science is clear that we have to make changes to protect the things about our ways of life that we hold dear, and the economic case stacks up that we should. I see climate change as a once-in-a-generation opportunity to reinvent parts of our economy and society for the better. That’s why I’m optimistic.

— James Shaw, Minister for Climate Change.
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