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WINTER 2020

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IRRIGATION NEW ZEALAND

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Adjusting to the new normal

As we learn to live our new "normal" under the COVID-19 alert levels, we are experiencing some extraordinary times in terms of weather.

Parts of the North Island, including Auckland and the Hawke's Bay, are under severe drought conditions. Water restrictions are in place in Auckland, which is very unusual as we head into winter.

In the Hawke's Bay, months of below-normal rainfall means that soil moisture conditions are extremely low, aquifers are not being recharged, and farmers and growers are under enormous stress.

Our thoughts are with those affected communities and families in this extremely challenging time.

Situations like this are likely to occur more frequently in the future under climate change. It is critical that we take action as a country at a national level to plan and invest in water infrastructure, and not just for rural users.

We have been working closely with the other peak water sector organisations, Water New Zealand and Infrastructure New Zealand, to speak together to the Government on the need for an overarching water strategy and planning for the country. We consider this to be critical to enable New Zealand to ensure that freshwater outcomes can be met – for communities, for the environment, for the economy, and for our cultural wellbeing.

> "... we will continue to speak on behalf of our members as the parties form their respective policies around water, the primary sector, and the environment in the lead-up to the election."

IrrigationNZ works hard to advocate for policies that support the wise use and management of water for sustainable food and fibre production. 2020 is still set to be an election year and we will continue to speak on behalf of our members as the parties form their respective policies around water, the primary sector, and the environment in the lead-up to the election.

All the best and I hope to see you soon.

Elizabeth Soal
Chief Executive, IrrigationNZ

Making the most of change

It is a lovely sunny afternoon here in South Canterbury as I write my piece for the winter edition of our magazine.

New Zealand has just entered Level 2 of its COVID-19 response. I spent my time in lockdown on our farm in Geraldine. Having a farm-sized bubble meant having freedom and space, and that was rather liberating. I took advantage of it much more than I normally would. It has been wonderful not having to rush everywhere – a tank of fuel lasted me six weeks. I have enjoyed the time with my family. My teenage girls accepted very quickly that they were going to be at home for the forseeable future, and therefore, did not fight it (or each other), and we had a great time together. And, with not having to travel everywhere, I am the most caught up on work than I have been for a long time, both farm-wise and consulting-wise, and that is a great feeling.

For IrrigationNZ it has been a trying time. Our 2020 conference was a victim of COVID-19, and that has meant a change of strategic direction for the organisation.

The last eight weeks have certainly highlighted the food and fibre sector's importance to New Zealand. As an essential service, our growers and producers worked hard to keep the supply of food to our supermarkets going strong. It was a privilege to be able to do so when so many other industries were doing it tough, and for this, we are truly grateful. It has also highlighted the need for the sector to be more resilient. We are good at growing and producing food, but there are still barriers to us being able to do it no matter what. Access to water is one of those barriers, and the water storage conversation is finally starting to gain traction at a national level. Our chief executive Elizabeth Soal has been instrumental in leading this conversation, with support from all our other primary industry groups. While we do not know yet what the infrastructure spend in the latest budget is designated for, water storage is certainly being promoted as a key area where some of these funds should go. IrrigationNZ will continue to advocate strongly for this with influencers and decision-makers.

But for now, sit back, relax and enjoy all that the magazine has to offer.

"The last eight weeks have certainly highlighted the food and fibre sectors importance to New Zealand. As an essential service, our growers and producers worked hard to keep the supply of food to our supermarkets going strong."

Keri Johnston
Chair of IrrigationNZ

IrrigationNZ: out & about

Out and about has been different for us all recently; with getting out and about not being possible for a large part of April and May. However, IrrigationNZ has adapted to working from home and we have enjoyed getting back into the swing of things.

WANAKA A&P SHOW

For the second time IrrigationNZ attended the annual Wanaka A&P show held over two days from 13–14 of March. Set on the picturesque backdrop of Lake Wanaka it was a great chance to catch up with the Central Otago irrigation community as well as educate the wider community about irrigation and water use. We were lucky enough to have our sponsors Heartland Potato Chips, and Barker's of Geraldine products to give away. Both of which are grown with irrigation.

PRIMARY INDUSTRIES CONNECTIONS

IrrigationNZ Chief Executive Elizabeth Soal visited Nelson in early March to attend the Ministry for Primary Industries "Primary Industries Connections" event, attended by senior MPI officials and Minister Damien O'Connor. While there, she visited the Waimea Community Dam which is currently under construction and is the largest water infrastructure project to be constructed in New Zealand for many years. A great example of multi-benefit infrastructure – providing water for community supplies as well as for irrigation.

BRINGING TOGETHER OUR MEMBERS AND OFFICIALS TO HELP INFORM GOVERNMENT POLICY

In early March IrrigationNZ Chief Executive Elizabeth Soal hosted Ministry of Business, Innovation and Employment (MBIE) officials and visited irrigation schemes throughout Canterbury in relation to the proposed Dam Safety Regulations, to help investigate what these regulations could mean for dam and race operators on the ground. They visited Mayfield Hinds Valetta Water (MHV) near Ashburton and the Central Plains Water (CPW) intake on the Rakaia river near Hororata, as well as meeting with the Loburn Irrigation Company.

Plans for water storage

View from Here with Shane Jones, Minister for Forestry, Infrastructure and Regional Economic Development.

As part of my role as the 'Champion of the Regions', I also champion the importance of water storage to the Coalition Government, and will continue to do so as long as I am the Minister of Regional Economic Development.

Water storage can be a contentious area for a Government that is balancing growth in the regions and improving water quality outcomes. However, it is a testimony to our Coalition Government that we have successfully agreed a series of water principles that is supported by all parties. This has allowed investment in water storage to take place through the Provincial Growth Fund (PGF). Our most significant investments are in Northland and Hawke's Bay, two regions known for their water shortages, not least during the current drought.

Achieving agreement to water storage in a Coalition context requires a good understanding of what matters to each of our parties – similar to the process that happens at a local level when trying to find projects that a wide cross-section of the community can sign up to. As a result, we focus on a specific set of water storage opportunities which have a set of benefits that go beyond economic gains – although these are definitely still of importance. The PRG's investment principles for water investment include:

- A focus on bringing reliable water to under developed Māori land
- A focus on community schemes rather than large scale corporate schemes
- An absolute bottom line of no environmental degradation, with the focus being on environmental enhancements as much as economic outcomes.

To date, determining which projects to support in the regions has been on a case by case approach. I have worked with my colleagues to find the sweet spot for investing in water storage for communities that might otherwise miss out. Supporting Māori undeveloped land is a real focus of the PGF, given the potential economic and social development that is possible for regions if this land becomes productive. This will involve support for development on the land, access to water and facilitating partnerships with potential co-investors to bring crops and orchards into production on the land. An example of one of our smaller projects the PGF has supported is small scale water storage for high-value horticulture in the far eastern Bay of Plenty area of Raukokore.

In other areas where we are investing, I recognise that there are parts of the country where water is the number one challenge for the region as a whole. In regions like Wairarapa, the single biggest impact on productivity and regional prosperity is access to reliable water. To ensure political and community support for this sort of investment, it must be done in a way that enhances, not degrades the environment, and doesn't lead to further dairy intensification.

So far we have invested roughly $80 million in a range of projects across the country, including small scale water storage, managed aquifer recharge, aquifer mapping, and regional strategies. As the sector will be aware, I have looked at what funds within the PGF can be repurposed to directly respond to the impacts of COVID-19. This includes funding for infrastructure, and I will commit part of this funding being used for further investment in water storage. The special Resource Management Act provisions being progressed by the Coalition Government will enable us to accelerate water storage projects through the RMA process over the next few months where these can get underway as part of the economic recovery. I am keen to hear from anyone who has any shovel-ready projects that meet the PGF investment principles above.

To contact the minister in relation to this see www.growregions.govt.nz/get-funding

The challenges of water for irrigation in Colorado

By Gary Kennedy, Mancos Water Conservancy District, Mancos, USA.

Working for the Mancos Water Conservancy District (MWCD) has been my pleasure for nearly 30 years. I began working for the District in 1990 but I wasn't the first in my family to work in the water field. My grandfather was a state water commissioner and my great uncle was the second superintendent of MWCD in the beginning of the 1960s into the 1970s. Both were from Mancos. I am the fifth superintendent for this water district.

Every year is a water allocation guessing game. At our May meeting we set our water allotment at 48 percent due to lack of run-off even though the snowfall was average but a good rain event could change that and allow a 100 percent allotment.

Homesteads for ranching and farming were started in the 1880s; followed by miners, loggers, and settlers. Nestled in the foothills of the San Juan mountains of southwest Colorado, our small valley, approximate population 3,250 people with 13,000 acres of irrigable lands, relies on snowpack for its domestic and irrigation water source. The valley elevation is 7,028 feet (2,142 m) making a short growing system; one mountain peaks over 13,237 feet (4,035 m). We intercept water from the Mancos drainage, off the San Juan mountain range on its way to the mighty Colorado River in order to pursue agricultural ventures.

Jackson Gulch Reservoir, the largest of four reservoirs, an off-river reservoir, was authorised in the 1940s (completed in 1949) to augment the Mancos River once the snow melt has stopped mid-July through September. The 258 cubic feet per second canal starts at the West Mancos River about 2.5 miles above the reservoir, runs along a canyon wall delivering water to the 10,000-acre reservoir. Flows start on 1 March and continue to run through mid-May at which time the river is turned back into its channel to deliver run-off to valley irrigators. We supply 252 irrigation water users for close to 8,250 acres of irrigable land. Main crops are grass hay, grass/alfalfa mix hay, wheat, and grain (partly dry land) and pasture for cattle and horses. Much of the hay is sold to dairy farms, horse ranches and stockyards. There are three domestic water entities which the reservoir supplies and/or supplements. The project is funded through a local district tax and water fees paid by irrigation water users.

The United States authorised construction of the reservoir through creation of the MWCD due to an appeal of valley landowners. An appointed board of directors representing five divisions within the district meets monthly to make financial and operational decisions.

I am the sole employee which means I am superintendent, project and office manager, dam tender, water master, maintenance worker, equipment operator and labourer. I also operate the hydropower plant that was installed in 1995 which provides 260 Kwh, an additional income stream. The project is overseen by the Bureau of Reclamation; MWCD is responsible for operations and maintenance.

EMERGENCIES/PROBLEMS

After construction of the canal system, several large rocks dislodged from the hill above and have torn through a section of the concrete flume. Since then rock mitigation above the canal along the canyon is standard practice. Landslides above and below the canal are also problematic, some years more than others. In 1996 a landslide took out 500 ft of the inlet canal during a fall rain event prompting an emergency repair before snow moved in.

Shortly thereafter, the District created a plan to rehabilitate the entire 50+ year old canal structure beginning with the inlet canal. The final engineer report estimated USD$8.1 million for total project and canal rehabilitation. We broke the report down into priority sections and started to research funding.

The Jackson Gulch Reservoir canal diversion on the West Mancos River.

CHALLENGES

As a local irrigation district, operating and maintaining a federal project dealing with the bureaucracy, federal administration changes; constantly responding to their new and "improved" policies, coming to grips with current, mandated regulations and restrictions for a 70+ year old project. Now, on top of changing environmental issues are historic preservation issues headaches. The historic mandates are now coming close to interfering with our day-to-day operations.

Another challenge was the original authorisation of the project. Projects authorised under the Water Conservations and Utilization Act are exempt from most Bureau of Reclamation laws and mandates. However, current federal personnel neither know nor understand what the law states or what projects fall under its purview. Therefore, we are constantly a) protesting their mandates; and b) educating them on their own policies.

Keeping in mind that the project is owned by the United States government and represented by the Bureau of Reclamation, our district is 100 percent liable for the project. Bureau of Reclamation requires us to do 100 percent of the repairs at our cost. When it came to rehabilitation, we thought it might be in their best interest to help fund the rehabilitation. We were wrong. The fact remains it is a federally owned project, so our next step was to personally and directly reach out to Congress for funding. It took four years, but our persistence paid off and we were appropriated a substantial sum that along with our cost share allowed us to begin to reshape, pipe, and line the priority sections of the inlet canal. In addition, we gained authorisation for the federal government to cover 65 percent of the total cost. In the end, we believe the rehabilitation of the canal saved it from imminent failure.

Having regrouped from the inlet canal completion, we are once again reviewing the engineered plan and considering the next steps to take. In the interim however, new layers of bureaucracy and redundant regulations are creating more hoops to jump through, complicating the process and adding to the cost. This has not discouraged our determination to continue to rehabilitate the project, but it does cause delay for finalisation beyond what we had anticipated. The project will be 75 years old in 2025; it is our hope it will be in like new condition by then. In addition, through careful planning, working 'in house', and coordination with private enterprises, we will be able to keep the entire cost well below the original 8.1 million-dollar amount.

FUTURE PROJECTIONS

Agriculture continues to dominate the valley. However, current day newcomers prefer small tracts of land on which to pursue their agricultural endeavours partly due to the cost of land with irrigation water and partly due to the inability to maintain a larger tract of land. As this is the situation throughout the western United States, the larger tracts are being broken into smaller and smaller tracts. The irrigation water allotted to those tracts is often insufficient for certain agricultural pursuits. In addition, there is now more time required to track the water and educate the new users.

Colorado agreed by vote to allow legal use of marijuana three years ago. The large warehouses in our valley that were used for other types of business, as well as a couple of new buildings, are now raising marijuana plants. This has created quite a head scratcher for Colorado, the other states that have also legalised the growth and sale of marijuana, and the federal government. The federal government has yet to legalise the growth and sale of recreational marijuana and is limited on the approval of medical marijuana. Therefore, federal projects are not allowed to provide water to marijuana growers for irrigation. However, there is no structure in place to police where irrigation water is used once it leaves the reservoir and ditch system so the gray area has yet to be resolved. Add to that, hemp has now been approved as a crop in Colorado, a highly experimental and expensive venture at this time.

At the time of this writing, the entire world is on stay-at-home or quarantine for the COVID-19 virus. Since it is the beginning of the growing season, it is difficult to estimate how this will affect agriculture in our valley. State-wide the livestock auction houses have been limited and/or shut down as a result of the virus which has delayed the annual livestock market thereby driving down the cost for the producer. On the other hand, our area has a limited number of livestock meat packing houses which are recently experiencing a large demand to process livestock in anticipation of a possible shortage.

The Jackson Gulch canal box flume.

The mouth of the Jackson Gulch inlet canal box flume (609m long) capacity 258 cfs (cubic feet per second).

With water rights come many demands: irrigation, storage, domestic use, recreation, endangered species, wetlands, power production, fish passage and water for stock and wildlife. In addition, we have instream flows, water availability task, sustainability, rain harvesting, source water management, water shed management, salinity control, demand management, transcontinental diversions, and drought resilience. With so many demands on/for water, our finite water resources are being stretched to their limits. As agricultural water providers/users, we are in this together whether we are in the United States, New Zealand or around the world. So, from a small portion of Colorado, we tip our hat to all who help sustain the world!

Water infrastructure delivery through our COVID-19 recovery

By John Mackie, Acting Chief Executive Water New Zealand and Elizabeth Soal IrrigationNZ CEO.

Water infrastructure is crucial in New Zealand for so many reasons. For creating resilience in times of climate change, supporting the environment by enhancing river flows and creating climates for aquatic life, for cultural and recreational purposes, for drinking water for rural and urban and communities and also for growing food and fibre for both Aotearoa and the world. Although COVID-19 has had detrimental effects on communities and the economy it has heightened the importance of having reliable access to water to grow food and fibre. Coupled with the Hawke's Bay drought – which has been one of the driest years for the region on record and the recognition that these extreme climatic conditions are likely to be become more common in future shines the light on how important sustainable access to water is. New Zealand needs to be able to capture water and store it in periods of high rainfall to use it in times of drought.

Three decades on from the dis-establishment of the Ministry of Works and Development, there are renewed calls for a similar Crown entity to be established to assist in the economic recovery of the nation, as we enter the recovery phase of the COVID-19 pandemic.

The focus is on the health and wellbeing of New Zealanders and creating jobs for those displaced as a result of the crisis – in addition to creating and upgrading much needed core infrastructure.

While it is true that our current generation owes a debt of gratitude to the Ministry of Works and it's the predecessor, the Public Works Department, for the core infrastructure we now rely on including transport, power and water schemes, many are cautious for a back to the future approach of establishing a state owned infrastructure department.

When the call went out to the industry from the Infrastructure Minister on 1 April (2020) seeking "shovel ready' infrastructure projects over $10 million that could be mobilised within six months, a wave of anticipation swept across the country. Both private and public sector organisations have submitted many hundreds of projects valued in the billions of dollars. The Government has received a lot of feedback on the proposal and submissions from a variety of public and private sector organisations. This is not surprising as this pandemic has presented us with a once in a generation opportunity to prudently invest in resilient water infrastructure to create sustainable outcomes across the four wellbeings.

During April a joint submission was made by a collaboration of not-for-profit organisations, commending the Government on their efforts to date and recommending a means by which the objectives of both the Infrastructure Industry Reference Group programme and the water services regulatory reforms could be aided.

The focus is on the health and wellbeing of New Zealanders and creating jobs for those displaced as a result of the crisis – in addition to creating and upgrading much needed core infrastructure.

In this submission, Infrastructure New Zealand, Water New Zealand, IrrigationNZ, the Quake Centre and the Institute of Public Works Engineering Australasia (IPWEA NZ) jointly urged the Government to seize the opportunity to improve the performance of the water sector to create sustainable outcomes through the delivery of this programme. They also consider that this programme of work needs to be effectively co-ordinated, funded and delivered for it to be successful.

A COLLABORATIVE APPROACH

The opportunity is broader than just the Three Waters. Te Mana o te Wai, Our Freshwater 2020 and the Living Standards Framework all recognise the importance of healthy sustainable water systems.

The distinction between rural and urban water services is becoming less clear, as climate change impacts the traditional weather patterns and increases the importance of water storage. During the droughts this year,

Ross Creek Reservoir near Dunedin. The Ross Creek Dam project is the city's Security of Supply project to ensure the city has reliable water supply. *(Photo: Caswell Images)*

many communities could not access fresh drinking water due to the lack of storage, while other communities had an abundance of water and some with significant flooding. By working collaboratively, the group sees the benefit of large water infrastructure programmes, including the establishment of large water storage facilities, which can benefit New Zealand and New Zealanders with sustainable access to water for:

- safe and drought resilient drinking water for communities,
- reliable supplies during periods of flood, when run of river supplies are compromised,
- •rovision of environmental flows to enhance eco-system health,
- the ability to re-allocate water in fully allocated or over allocated catchments, which will particularly important in enabling development of Maori land that currently cannot access water,
- water for horticulture, land use flexibility, and growing our food supply,
- capability for small and micro-hydro schemes to power remote areas with green energy,
- recreational use that support wellbeing and,
- managed aquifer recharge to restore the quality of accessible groundwater and reducing legacy nitrate problems.

The group considered that the recovery from the COVID-19 global pandemic, which also triggered a National Civil Defence Emergency and placed the country in an unprecedented lockdown, requires an equally comprehensive recovery plan as we have seen in previous national emergencies.

The letter advocated for the immediate establishment of an infrastructure alliance.

Alliances of this sort, leveraging accelerated Resource Management Act, Public Works Act, procurement and community consolation regimes, produced award winning results in the Kaikoura and Christchurch earthquakes.

Immediate work in the water space could be focused on employment-incentive renewals, growth projects, planned maintenance, riparian planting and flood protection, which are 'no regrets' investments. Previous alliances have had strong independent governance and have included representation from both owner (Crown and councils) and non-owner participants.

Immediate work in the water space could be focused on employment-incentive renewals, growth projects, planned maintenance, riparian planting and flood protection, which are 'no regrets' investments.

Integrating mana whenua (tribal territorial rights) representation and embedding the values of Te Mana Wai into new arrangements will be an essential element of any new alliance model in order to rapidly co-design and deliver our new water infrastructure.

Although this year's 'Budget 2020' was executed and presented under the exceptional circumstances created by COVID-19 IrrigationNZ believes it was a missed opportunity for water investment.

Strategic water storage in key regions could aid a post-COVID recovery which focuses on protecting jobs, creating new ones, achieving positive environmental outcomes, and contributing to climate change targets.

IrrigationNZ will continue to talk to the Government about how this can be done utilising the $20 billion unallocated funding, and the $3.2 billion infrastructure contingency fund.

The development and delivery of a significant infrastructure programme could be a defining moment in the history of our nation, provided we do it properly.

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The importance of irrigation in feeding the nation

IRRIGATION NEW ZEALAND CHAMPION

Growing up, market gardening was not the career path one Canterbury grower thought he would head down; however, it has proven successful both inside and outside the farm gates.

Allen Lim is the owner of Jade Garden, a vegetable growing business in Central Canterbury.

Mr Lim grew up in Oamaru, where his parents were market gardeners. He then went on to study mechanical engineering at Canterbury University and then worked for three years at the Honda Assembly plant in Nelson.

His then girlfriend (and now wife) Joanna got a job in Wellington as a lawyer. Mr Lim followed her and worked as part of a mining venture, giving him a taste of running his own business.

The pair then went travelling before returning to New Zealand. They decided to settle in Christchurch to be near family where they purchased a 10 hectare block between Rolleston and Lincoln, which spurred the beginning of Mr Lim's market gardening career.

"I thought market gardening and vegetable growing was simple, but it definitely wasn't, especially when you're trying to meet market demand at a large scale with continuity of supply.

His business, called Jade Garden, began in 2003 and has since grown from 10 hectares to 110, and grows a wide range of vegetables all year round.

Mr Lim said in Chinese culture being a market gardener was seen as a low status occupation.

"In the early days, my parents and especially my late Grandma used to think I wasted my education and were a bit disappointed … however seeing that my knowledge in engineering was transferable to vegetable growing, and now that they can see I have capable staff helping me – they fully approve."

Mr Lim started with Shanghai Pak Choy, also known as Bok Choy. At the same time of starting his business he and his wife were also starting a family and he said it meant a lot of working in the dark.

"I remember one time being out around midnight in the middle of winter with my head lamp on cutting Pak Choy, it was so cold the plants started to freeze and they were so hard to cut … those days are a good reminder of how far we've come and how hard it can be to start your own business."

"One of the reasons I wanted to get into it was for the flexibility so I could spend time with my family."

> "We need irrigation to keep up with demand, just because it doesn't rain doesn't mean people stop needing vegetables, in order to have food security irrigation is essential."

Mr Lim soon realised he needed a staff member and planted more vegetables to accommodate for a full-time role, he soon needed a second member and as he increased his range of vegetables so did his staff numbers.

He grew common crops such as cabbages, leeks, spring onions to more unusual ones such as globe artichokes, khol rabi and daikons.

As well as expanding his growing land around Lincoln and Rolleston, in 2018 Mr Lim took over a cucumber farm in North Canterbury with business partner Robert Lindsay.

Between the two businesses 30 staff were employed and more in the summer period.

He got great satisfaction from seeing good

produce grown at his property and then on supermarket shelves.

Sales went through Countdown, Foodstuffs, MG Marketing, Turners and Growers and other wholesalers.

Mr Lim said one of the key components to success of growing produce was having reliable access to water.

"We need irrigation to keep up with demand, just because it doesn't rain doesn't mean people stop needing vegetables, in order to have food security irrigation is essential."

"The supermarkets rely on us growers to keep their shelves full everyday, so you can't rely on the weather to do that. This year has been so dry and is a good example of what I'm talking about, there is no way we could've grown vegetables this year without irrigation."

All vegetables were irrigated from bore water either by spray boom or K-Line. Although K-Line is not seen as the most efficient form of irrigation Mr Lim said they are used because it is gentle on vegetable crops and not affected by wind changes which suits their farming systems of watering multiple small areas at once. The cucumber farm was undercover and was irrigated by drip irrigation.

On the mid Canterbury property, they had installed their own small storage pond, to be a buffer to help store a couple days of irrigation. When things go dry every crop needs water, with a small flow rate it sometimes does not meet demand for crops however, the storage pond helps prevent that.

Each vegetable crop had different watering needs depending on the plant variety, stage of growth, soil moisture, and even the weather.

"Because we are competing with other growers and the produce is going into supermarkets, we must have them looking right in terms of colour, texture, taste and size.

"With the size specification, we have to be careful with our nutrient input and watering, too much or too little will result in oversize or under size in a number of crops, and can significantly affect our marketable yield."

As Mr Lim's business had grown so had the mounting external compliance pressures."

"Compliance is the biggest challenge for us … we have to monitor our environmental footprint the same way other types of farms do."

> "Water management itself isn't complicated but when you throw in self-interest, different perspectives, economics and politics, that's what makes it complicated."

Mr Lim is passionate about the outdoors and enjoyed camping and hiking and spending time in the natural environment which made him even more mindful of looking after water. This coupled with his concerns and knowledge as a market gardener have led him to be involved beyond the farm gate.

Mr Lim applied and was selected in 2014 as a community representative on Environment Canterbury's Selwyn Waihora Zone Committee, one of ten covering Canterbury.

The Selwyn Waihora Zone was classified as a 'red zone' catchment. Where strict water quality out comes, and nitrate leaching targets had to be met. Dairy Farmers were to decrease leaching by 30 percent, arable farmers 7 percent and vegetable grower's 5 percent.

Mr Lim said it exposed him to the complexities of water management.

"Water management itself isn't complicated but when you throw in self-interest, different perspectives, economics and politics, that's what makes it complicated."

Cucumbers.

"No matter how good a business is, you can only change so many things in any one year because of the finite amount of money a business can make and spend."

Through his active involvement with the zone committee and horticulture Mr Lim was selected to be on the Freshwater Leaders group in 2018.

The group acted as a sounding board for the policy proposals for the Essential Freshwater Programme.

Mr Lim also had several other roles including being on the Vegetables New Zealand Board.

He said this was a great way to be involved

Irrigation is one of the most important aspects for Jade Garden.

with decision making and what influences the industry.

"These roles were a great way to learn from each other and share knowledge."

As well being involved with environmental work outside his business, Mr Lim also took great care on his own farms – and has had a lot of productivity and efficiency gains thanks to trialling different things.

As an example they band their fertilisers, so they were dropped directly on the lines of crop as opposed to right across the paddock – this meant they were putting on slightly less fertiliser and growing more.

Although he was a slightly sceptical about the environmental gain as they had to drive up and down the paddock five to eight times more in order to cover the same area.

"It's hard to know what the best thing to do is sometimes, people have to take everything into account when thinking about the environment."

They also recognised the soil was every bit as important as water, as there was only so many elite soils in the right climatic zone to grow vegetables. Taking time to put organic matter back into the ground by continuously increasing areas of cover crop was a crucial aspect to maintaining soil condition.

Mr Lim checks a healthy leek crop.

Although there were a lot of challenges with being a vegetable grower Mr Lim said this made for one of the enjoyable parts as well.

"You're always problem solving and never stop learning, I do like the challenges especially those involved with growing the business."

As an essential service during the COVID-19 lockdown Mr Lim said they were still operating and in fact they had more produce than normal going out the gates.

"It goes to show how important water is, as in times of crisis we need to feed people and without irrigation we couldn't do that."

Environment, efficiency, and education at Kaiwaiwai Dairies

Remaining profitable, being environmentally friendly, and educating people about good farming practices is key for one Wairarapa dairy farm.

Kaiwaiwai Dairies Ltd (KDL) is located just south of Masterton. The farm operation is a 325 hectare milking platform as well as 330 hectare leasehold for young stock winter grazing and supplement feeding. The farm milks 900 cows, which are milked on a split-calving calendar, meaning they can supply fresh milk all year round. Total stock including replacement bulls is 1,400.

It is owned by six shareholders all with farming backgrounds but some also in earth moving, science, engineering, accounting and consultancy.

Neville Fisher and Aidan Bichan are two of these shareholders, both with a passion for farming for the future, as well as educating people about it.

The farm was converted from sheep and beef to dairy between 1992–95. The shareholders purchased it in 2005, at which time it wasn't irrigated.

After going through consenting processes and utilising an existing 45m bore, the farm has been irrigated since 2017 and Mr Bichan said they have never looked back.

"It's integral to our farming operation … now we're still learning all the time about the best way to use it."

They have now been irrigating for just over three full years.

"We are really starting to see the benefits now," Mr Bichan said.

Three pivot irrigators were installed, one a full circle with variable rate irrigation (VRI), the second a three quarter arc and the third a half circle also with VRI.

Kaiwaiwai Dairies has invested in VRI in order to best use their water.

For example, farm laneways are kept dry which both saves water and reduces track maintenance. Wetter areas in paddocks can have less water applied and crops can be managed around their water needs.

"It's really valuable, it means we can use water efficiently where we need it when we need it," Mr Fisher said. "Water can't go where it shouldn't go."

The farm requires clean water for milk cooling and washing the plant, milk silo and milk harvest area, but the yard and feedpad are washed using recycled water.

"On average, each dairy farm uses 70 litres of clean water per cow in the dairy shed, we have reduced this to 36 litres per cow, and are looking to reduce this further."

This recycled water is used several times through the flood wash system before being irrigated to pasture. Effluent can be stored for three months or more and is then injected into the pivots using the VRI to meet consent conditions (requiring setback from boundaries and waterways).

"On average, each dairy farm uses 70 litres of clean water per cow in the dairy shed, we have reduced this to 36 litres per cow, and are looking to reduce this further."

The farm was also home to an established constructed wetland in which they moderated water quality through.

Kaiwaiwai Dairies, dairy farm shareholders Aidan Bichan (left) and Neville Fisher in front of one of their main pivots which utilises a VRI system.

Edgar at milking time in the Kaiwaiwai dairy farms 44 bail rotary milking shed.

"This heavily moderated system allows us to analyse what we're doing as well as educating other farmers about what works and what doesn't," Mr Fisher said.

The installation and establishment of their constructed wetland provided ongoing learnings and sparked an interest to educate others about what they were doing on their farm.

KDL has taken part in the Fonterra Open Gates day since 2017, initially with 186 visitors and now with 1,200 registrations (although attendance last year was down due to poor weather in Wellington). The day showcases farming to the predominantly urban visitors with tree planting, product sampling, milking and calf feeding demonstrations and Q&A sessions.

"It's the ability to have those conversations, that's why we want to get our story out directly to the public," Mr Bichan said.

"Dairy farming can sometimes be looked at through a very negative lens and we're helping to change that."

As well as this they have often host open days to showcase their work and the wetland, which they plan on continuing to do more and more of.

Checking the system.

Mr Bichan said being just out of Wellington they were in the perfect place to allow people from different backgrounds experience farming first hand.

"There is a lot of amazing work being done on farms around New Zealand … we can't expect people to know this if we don't give them the opportunity to see what we do. We're proud of the industry and we want to educate visitors so they can feel the same way."

Mr Fisher and Mr Bichan both agreed they want to continue to educate people in the future.

"It's not just about educating people who are also farmers, it's about educating people about where their food and fibre comes from, telling the good story."

CHAMPIONS SERIES

Not your usual wetland

A lifetime interest in birds, plants, and farming sparked one Wairarapa dairy farmer to create a different type of wetland.

Vern Brasell stands in front of the Kaiwaiwai Dairies constructed wetland, a passion for the environment and farming has resulted in an effective project.

Mr Brasell is a shareholder in Kaiwaiwai Dairies Ltd, a dairy farm in the Wairarapa.

He grew up in the area and has been involved in dairy farming all his life. However, his interest for plants and birds was sparked from a young age due to his parents, being dairy farmers themselves and being interested in how farming impacted the environment.

"I like eating cheese and I want to know that it's coming from a good place."

Mr Brasell first got the idea to create a wetland in 2014, it was then constructed in September of that year.

What was previously a wet 0.75 ha of rushes and pasture is now a booming wetland. Earthworks transformed the wet area to an avenue for water from an open farm drain to provide a permanent and controlled flow into the wetland. Once it leaves the wetland it re-joins the farm drain.

Twenty-five percent of the $55,000 construction cost was paid by the land-owners, the rest by a diverse group of funders, predominantly the Government's Fresh start for Fresh Water fund. Ongoing funding comes from the farm business but also Greater Wellington Regional Council, DairyNZ, Landcorp, National Institute of Water and Atmospheric Research (NIWA), and a Sustainable Farming Funding grant.

The design was unique in that it actually compromises of three separate wetlands providing a serpentine flow path of water down six metre wide bays. These bays run back and forth across the area to slow down the water flow and maximise residence time and water treatment. The wetland is well vegetated to give good dispersion and even flow through the majority of the wetland to minimise channelisation or dead zones. Aquatic plants including raupo (*Typha orientalis*), Lake clubrush (*Scoenoplectus tabernaemontaii*) and Cutty grass (*carex geminate*) were planted in the wetland which has a depth of 300mm.

It was a big job to construct a wetland as opposed to plan one around an established waterway, however Mr Brasell saw the advantages of it by being able to monitor in-flow and outflow.

"This way we can see what the wetland is actually achieving."

Mr Brasell said over the years the wetland had always been maintained including weed management, pest management and the plants were also irrigated during dry periods.

In November 2015, the farm won a Morgan Foundation award for the wetland.

In late autumn 2017 additional works were carried out to better govern water flow to the wetland with the installation of a weir complete with fish pass and a gauge on the outflow.

The weir was installed so that flow to the wetland could be maintained through the year. A remote monitoring system was also installed to alert when the flow was too low.

To gauge its performance, inlet and outlet water samples have been taken at monthly intervals since March 2015. These samples have

Birds nesting in the wetland, which not only improves water quality but also promotes biodiversity. Nesting birds include pukeko, harrier hawks, and ducks.

been analysed for turbidity, total suspended soils (TSS), total organic carbon (TOC), nitrogen (N), and phosphorus (P).

Numerous reports have shown water quality had improved after flowing through the wetland.

On average 665kg N per year was removed from the farm output over three years from January 2016 to March 2019.

Mr Brasell said this was significant as the farm average (as calculated by overseer) was 16kg N/ha/yr or 6320kg N in total. The wetland effectively reduced losses from the farm by more than 10%. Inflow rates from nitrate concentrations from the farm drain tended to peak in June–July and reduced as summer approached.

A recent report by the NIWA stated that total N removal at Kaiwaiwai dairies was higher than most other New Zealand constructed wetlands.

Monitoring the wetland has also shown total phosphorus removal was similar, in that 14.3% was removed during the same time period.

Mr Brasell said it has been very rewarding to watch the wetland grow and monitor what was happening to the water.

"We have learnt so much from this."

"We have responsibilities as farmers to look after the environment and this has been a great opportunity to learn."

"Farm drainage can often be overlooked as an opportunity to restore something and enhance the environment."

Mr Brasell said he was planning on doing some additional planting of aquatic plants to further enhance the performance of the wetland. Water quality monitoring may be increased to better understand how constructed wetlands function and how they could be used to improve water quality leaving the farm.

Now semi-retired, Mr Brasell assisted day-to-day running of the farm and maintaining and monitoring the wetland but also did work beyond the farm gates.

"My passion hasn't died. I'm still learning and want my learning to help the industry."

He has attended green house gas conferences, been involved with dairy environment planning and was also a climate change ambassador.

"I'm interested in the impact farming has on the environment I think it's important you demonstrate you add value to your products."

Mr Brasell had a few tips for people wanting to create wetlands on their own farms.

"Obviously the wetland we have created is quite big and was a lot of work however you can carry out much smaller projects on your farm and have similar results."

He said the first step was to just do it.

"Analyse the hotspots on the property … workout where the best drain is and where the worst drain is and work out why and you can do something small to get started."

It was important to seek advice on what plants are best to grow dependent on your area.

"Really this wetland is the last thing we do on the farm … it's the last attempt to minimising any negative environmental impacts. There's so much to do to stop water quality being harmed before it gets to the wetland."

Vern walks through the wetland, which now, at about six years old, has well established plants.

More than an apple of the eye for a Wairarapa pair

The Wairarapa may not be considered a fruit-growing region however, on the banks of the Ruamahanga River lies an impressive orchard.

JR's Orchards Ltd grows apples and pears, and is owned and operated by business partners Jamiee Burns and John Vanvliet, in Greytown, about an hour north of Wellington.

Together the couple purchased the orchard in 2003, which was previously a sheep and beef farm until 1989.

Together they created the ECCO brand which stood for environmentally friendly and sustainable, consistent quality, crunchy and juicy fresh fruit, orcharding traditions and innovation.

Both Ms Burns and Mr Vanvliet had experience in orcharding before purchasing the property, however not at such a large scale.

The orchard is now home to 135 hectares of apple and pear trees, approximately 86,000 trees, a number which has grown significantly since they began. Being fully integrated meant they grew packed and exported all their own produce.

When they started there was an old packhouse however it had nothing in it, "we re-created it and made it our own."

"We sort of didn't know how large scale we would become, we had to grow the production that's what had to happen, and we knew that."

Ms Burns said each year they packed around 7000 tonnes of apples and pears, which all went to export, mainly to Asia, Europe, UK and the Middle East.

New Zealand grows four percent of the world's apples and pears, "which is a lot of apples really".

"New Zealand distributes 25 million cartons of apples a year and we don't have enough people to eat them all … it goes out of the gate and overseas."

JR's is the Wairarapa region's only export apple and pear orchard and packhouse, and they utilised being so close to the Wellington port Ms Burns said.

They grew a range of varieties of apples including Royal Gala, NZ Rose, Braeburn and pears.

In 2007 the pair decided to invest in netting cover for their orchard.

Between 2007 and 2009 they installed netting over 50ha of trees and have since established another 30ha – now a total of 80ha were under cover.

Business partners John Vanvliet and Jamiee Burns of JR's Orchards Ltd (JRS).

Of the 135ha orchard about 80ha is covered in netting.

"We don't take our water for granted it's so, so important for not only us to grow produce but the community as a whole and it's important it's reliable for the future."

"It was a huge investment for us but, now it means we can have a consistent, bigger, better, cleaner crop."

"It has paid off in the long run."

The netting had also been a great investment to enhance efficiencies when it came to their irrigation systems, due to less transpiration which allowed for better root structure and ultimately a healthier tree.

Within the area of their orchard, there were two very different soil types.

Some of the property was Greytown silt loam and the rest was Papawai sandy loam which meant the irrigation system was half border dyke and half sprinkler irrigation, to accommodate these different soil types.

The orchard used personal bore water, and some diverted out of the Papawai Stream, wth surplus water was diverted back into the Ruamahanga River.

Ms Burns said they irrigated when they needed to depending on the conditions.

"If you over-water the trees they die if you under-water them they die … unlike other crops, you can buy in supplements for them whereas the only thing we have is water … you never want the trees to be under stress."

"We closely monitor our weather station on our property as well as soil moisture monitors which we have 14 of, so we know when to irrigate."

Ms Burns said "If we didn't have water we simply could not grow apples and pears."

They key components to their business were sun, water, people and transport. Taking away any of these was detrimental to their business she said.

Although they currently had a reliable water source, Ms Burns said with the way the climate was going this could change in the future, and she supported the Wairarapa Water Ltd (WWL) water storage project which received more Government funding in January this year.

"We don't take our water for granted it's so, so important for not only us to grow produce but the community as a whole and it's important it's reliable for the future."

During harvest time from March till May, with fruit being shipped until July, the orchard and packhouse was a hive of activity.

Ms Burns said during this time staff numbers went from 26 permanent staff to over 140.

"We employ everyone and also work with MSD (Ministry of Social Development) and MOJ (Ministry of Justice) to employ people who may struggle to get jobs, we also have staff quarters so they can be accommodated on site."

Like any other farming or growing operations, JRs had to monitor their environmental footprint which was in front of mind for them and Ms Burns said their environmental policies were highly important.

"We try our best to do our bit for the environment … people want to know their fruit has come from a good place and we're passionate about that," Ms Burns said.

Over the years they have won several awards for their good environmental practices. They first entered the Greater Wellington Ballance Farm Environment Awards in 2009 when they won the Gallagher Innovation Award for the installation of the crop protection netting. They entered again in 2015 where they won three category prizes. This included the Massey University Innovation Award, which recognises farmers and farming families who develop or embrace new technologies and systems and have an established record of advancing farm or orchard practices for improved results.

Both Ms Burns and Mr Vanvliet were passionate about growing fruit "if we weren't, we couldn't do it," Ms Burns said.

"We both work well together, and both have our areas of expertise."

Like any business they had their challenges. In the past weather had been one of them but, after installing the netting the risk of harmful weather on the fruit had significantly decreased.

"There's always highs and lows and the market can fluctuate a lot from year to year which is challenging … Government policies can also be a challenge for us such as trade agreements because we export all of our fruit overseas."

In the near future, Ms Burns said they planned to keep running their orchard and continue to improve their environmental targets, but in the long future, she said they might sell up.

"We love it here and we get so much satisfaction from producing a good product, but we have achieved what we wanted to."

The COVID-19 lockdown came at a busy time for the orchard – however, Ms Burns said it was easy to adapt as staff could easily apply social distancing and they also installed screens in their packhouses.

As for their fruit she said it was a bit of a challenge however it had been an opportunity to adapt to different markets.

"Average wholesalers are buying for hotels and the likes however, with these large-scale places being closed different clientele were buying products such as fruit being sent directly to houses … selling it in 3 kilogram bags instead of 18."

"There's not the volume, people aren't eating fruit in the airport lounges, but the pricing is still good it's just coming from different places, luckily we are able to supply both big and small markets."

The much-anticipated Essential Freshwater reform – and what it means for you

In 2018 the Government announced its plan to restore New Zealand's freshwater with objectives to: stop further degradation of New Zealand's freshwater sources, reverse past damage to bring New Zealand's freshwater resources and ecosystems to a healthy state within a generation, and address water allocation issues having regard to all interests including Māori and existing and potential users.

The *Action for Healthy Waterways* discussion document was released in September 2019 and was met with some angst. Public meetings were held throughout September and submissions were made before the end of October 2019. The Ministry for the Environment (MFE) received more than 17,000 submissions on the discussion document.

IrrigationNZ consulted widely with members in the development of our submission and the input from farmers, growers and irrigation industry experts was invaluable. IrrigationNZ also engaged the services of a freshwater ecologist and specialist RMA lawyer to give us expert advice on the submission.

Submissions were reviewed by an independent panel, which then made recommendations to the Ministers for the Environment and Primary Industries.

The Cabinet decisions on this tranche of freshwater reforms were announced late last month (May 2020).

IrrigationNZ was pleased to see that the Government listened to the farming sector on many aspects, however the implications remain significant.

There is a lot of complexity in this large-scale reform and it will have cost and operational impacts on irrigators.

IrrigationNZ Chief Executive Elizabeth Soal said the implications of the package will need to be carefully worked through for irrigation schemes and individual irrigators. We will work with our members to assist them.

RESTRICTIONS ON IRRIGATION TONED DOWN

"It is positive to note that the restrictions on irrigation development have eased from what was, effectively, a complete moratorium. Blanket irrigation development restrictions now do not apply to horticulture or crop producers, but only to increasing irrigation on dairy farms by more than ten hectares, or conversions of farms into dairying.

"However, our preference does remain for restrictions to apply to the effects of an activity, rather than the activity itself.

FARM ENVIRONMENTAL PLANS WAY FORWARD

"The government has also adopted IrrigationNZ's recommendation that compulsory, auditable Farm Environment Plans with a freshwater management module be rolled out using a phased approach, targeting at-risk catchments in the first instance.

"The irrigation sector has been a leader in implementing farm environment plans and we know they are an effective means for improving practices and environmental outcomes across the farming system.

REAL TIME WATER TAKES REPORTING

"We also support water users undertaking real-time reporting of water use to councils.

"Many irrigators and irrigation schemes have already installed equipment to transmit data directly to councils. This allows councils to monitor compliance with resource consent conditions, it helps farmers and growers better understand their water use, and it is critical for water allocation decisions.

"This is going to be even more important under climate change to ensure our communities are resilient and our waterways healthy. We are pleased the Government has adopted this, which IrrigationNZ submitted in support of, and we look forward to engaging further with the Ministry for the Environment as the regulations themselves are developed.

THE DREADED DIN

"And following outcry from many parts of the agricultural sector, including us, the government will not set national bottom lines for DIN and DRP – at least in the interim.

CONCLUSION

"The COVID-19 crisis has demonstrated how critical the food and fibre sectors are for our economy, but also for feeding ourselves. Aotearoa New Zealand leads the world in its farming sustainability and innovation, so we must strike a balance between regulating practice and allowing for innovation.

"Freshwater is critical for Aotearoa New Zealand – for people, for biodiversity, for cultural values, and for enabling us to produce food and fibre for our wellbeing.

"As a sector, irrigators are willing to play our part and will work with the government to strike a balance and get things right," concluded Ms Soal.

WHAT HAPPENS NEXT?

The suite of policies for the Action for Healthy Waterways package will be implemented through three mechanisms.

First is through changes to the National Policy Statement for Freshwater Management (NPSFM). The NPSFM sits underneath the Resource Management Act (RMA) and directs local authorities to implement certain objectives and policies within their regional plans and regional policy statements over time.

The first NPSFM was promulgated in 2011 and this required regional authorities to implement water quality and quantity limits. It has since been replaced and amended, and now includes national bottom lines for water quality and a national objectives framework.

The second mechanism is the development of new National Environmental Standards (NES) which will have more immediate effect. Thirdly are regulations under section 360 of the RMA that allow the government to regulate at a national level certain activities and aspects of environmental management.

These decisions are final and have been approved by Cabinet. There are no further submission processes on the broad policies. However, some specific regulations are still to be drafted, and there will be consultation with stakeholder groups (for instance in relation to the requirements for mandatory farm plans with freshwater modules). IrrigationNZ will continue to work with central and regional government throughout these processes and will keep our members and the wider community informed.

Action for Healthy Waterways

KEY POLICIES AND TIMELINE – MAY 2020


GOVERNMENT PROCESS


NATIONAL ENVIRONMENTAL STANDARDS


RESOURCE MANAGEMENT ACT AMENDMENT


NATIONAL POLICY STATEMENT FOR FRESH-WATER MANAGEMENT


SECTION 360 REGULATIONS

	NAME	DETAILS	DATES
	Draft National Policy Statement for Freshwater Management, National Environmental Standards, and Section 360 regulations	To be presented to Cabinet for consideration	**July 2020.**
	New National Policy Statement for Freshwater Management, to include changes from current NPS	Enabling councils to maintain water quality attributes below national bottom lines to "secure the benefits" of the existing structures in the Waikato, Tongariro, Waitaki, Manapouri, and Clutha hydro schemes. Clarification of what "limits" are, how they will be expressed in plans etc. Water quantity limits must be linked to ecosystem health outcomes. Territorial authorities required to manage effects of urban land development on freshwater bodies and coastal marine environment. Clarification of what Te Mana o Te Wai means and how it is to be implemented, both nationally and regionally. Councils required to actively involve tangata whenua in council processes for policy and plan development and decision-making. New *compulsory* value for mahinga kai that must be included in regional policies and plans. Amendments to ensure regional authorities manage all aspects of ecosystem health (not just water quality and quantity), i.e.: • Water quality • Water quantity • Physical habitat • Aquatic life • Ecosystem functioning New attributes with national bottom lines: • Macroinvertebrates • Submerged plants in lakes • Dissolved oxygen • Suspended sediment • Deposited sediment • *E. coli* at swimming sites during the bathing season New attributes without national bottom lines: • Fish species • Ecosystem metabolism • Dissolved reactive phosphorous	**July 2020 for the development of NPSFM** – regional councils must then implement through new or amended planning instruments (see dates below).
	New attribute limit for nitrate toxicity	Existing national bottom lines for nitrate and ammonia toxicity attributes will be strengthened to protect 95% of species from toxic effects. **For nitrate this is a national bottom line of 2.4 mg/L.** Exceptions to this will be allowed in specific areas of the Pukekohe and Lake Horowhenua catchments, due to contribution to national food security (vegetable production).	

	NAME	DETAILS	DATES
	Stopping further loss of natural wetlands and streams	Technical standards, methods, and requirements for activities affecting streams and wetlands will be prescribed. This will include vegetation clearance, earthworks (including for drainage), and changes to water levels. Includes surrounding vicinity. Resource consents will be required for most of these activities.	From date regulations come into force – **mid 2020**.
	Preserving connectivity of fish habitat	Minimum design standards for new weirs and culverts to provide for fish passage. Passive flap gates will be a non-complying activity. Regional councils will be required to gain information on current structures and adopt work programmes to address barriers to fish migration.	From date regulations come into force – **mid 2020**.
	Restrictions on intensification	Resource consents required for: • land-use change of more than 10 ha to dairy • land-use change of more than 10 ha from woody vegetation or forestry to pastoral farming • increases in irrigated pasture for dairy farming above 10 ha • increase in winter forage cropping area above annual highest 2014/15 – 2018/19 • increase in dairy support activities above highest annual 2014/15 – 2018/19	Restrictions apply **until 31 December 2024**. Applicable resource consents cannot extend beyond **31 December 2030**.
	Cap on fertiliser application	National maximum of synthetic nitrogen fertilizer application of 190kg N/ha/yr for dairy, dairy support, sheep, beef, deer farming. Dairy farmers must report applied weight to councils.	From **July 2021**.
	National bottom line for dissolved inorganic nitrogen (DIN)	Review as to whether there should be a national bottom line for DIN.	**July 2021**.
	Feedlots and stock holding areas	All feedlots to require resource consents. Permeability standards, effluent controls, and siting rules for feedlots and stock-holding areas.	Applicable from **winter 2021**.
	Intensive winter grazing	Thresholds in place for intensive winter grazing of forage crop: • size: less than 50ha or 10% of ppty (whichever is larger) • setback: minimum of five metres • slope: ave. slope of paddock 10 degrees or less. If thresholds not met, resource consent required.	Applicable from **winter 2021**.
	Mandatory and enforceable freshwater modules of farm plans	These will be required for the following land-uses: • pastoral farming totalling 20ha or more • arable farming totalling 20ha or more • horticulture totalling 5ha or more • an agricultural purpose prescribed in the regulations (not yet determined) • any combination of the above uses totalling 20 ha or more.	Specific regulations for the FW-FP process and requirements is yet to be determined. Will be developed through consultation with various stakeholders over 12-18 months after passage of Resource Management Amendment Bill.
	Real-time measuring and reporting of data on water use	Water users with consents to take water over 5 litres per second will be required to: • measure water use every 15 minutes • provide electronic records to councils daily. Regulations have not yet been drafted.	Will be phased in after the regulations are passed: • two years to comply for takes of more than 20 l/s • four years to comply for takes between 10 and 20 l/s • six years for takes between 5 and 10 l/s.
	Stock exclusion	Minimum setback of three metres from bed of waterbody, unless existing permanent fence or riparian planting that excludes stock (at time regulation is made). Applies to rivers more than one metre wide and land is less than or equal to 10 degrees in slope.	**1 July 2023** for: • dairy cattle and pigs from lakes and rivers • cattle, pigs, and deer from regional or district identified wetlands • cattle and deer from rivers and lakes where stock feeding on fodder crops or break feeding, or on pasture irrigated in last 12 months.

Continued over…

Action for Healthy Waterways – Key policies and timeline – Continued

NAME	DETAILS	DATES
Nitrogen attributes of NPSFM	Review of nitrogen management systems. If no reduction in synthetic nitrogen fertiliser across the country, further input controls will be considered.	**1 July 2025** for: • dairy support cattle, beef cattle, and deer from lakes and rivers • cattle, pigs, and deer from regionally identified wetlands for new NPSFM values.
Stock exclusion	Minimum setback of three metres from bed of waterbody, unless existing permanent fence or riparian planting that excludes stock (at time regulation is made). Applies to rivers more than one metre wide and land is less than or equal to 10 degrees in slope.	**July 2020**.
Regional authority planning	Regional authorities must notify regional planning documents to implement the new NPSFM.	By **31 December 2024**.
Regional authority planning	Regional authorities must have made final decisions on regional planning documents to implement the new NPSFM.	By **31 December 2026** or 31 December 2027 if post-notified process extended under law.
Water allocation	New allocation framework and Maori rights and interests addressed.	Unknown.

Irrigation Leader

Are you in the U.S. irrigation market?

Irrigation Leader magazine is mailed to each of the nearly 700 irrigation districts that provide water to over 10 million acres in the 17 western states. We are always looking for new irrigation technology and businesses to write about. See our current and all past magazine issues on our website at www.irrigationleadermagazine.com.

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IRRIGATION NEW ZEALAND CHAMPION

Terrific turf and a passion to match

The saying of finding a job you love and you will never work a day in your life holds true with the turf manager of New Zealand's largest stadium.

Blair Christiansen is the turf manager of Eden Park. He and his six staff, more in the busy summer season, are responsible for all things turf on both the Number One field and the neighbouring Outer Oval.

Mr Christiansen had always been interested in turf management from a young age being a keen sportsman playing golf, cricket, and rugby.

After leaving school he went on to complete a golf course greenkeeping apprenticeship at Mangawhai Golf Club in Northland and finished two trade certificates, both in sports turf and golf course management. After this, he managed cricket pitches in Auckland for four years then began work at Eden Park in January 2000.

Between 2003 and 2006 Mr Christiansen did a brief stint with the New Zealand Sports Turf Institute as an advisor before returning to Eden Park in 2006.

"It's a great career, there's always been an evolution of roles and continual learning. You'll be faced with challenges due to conditions often outside your control but this career is genuinely satisfying."

Eden Park operates as a statutory not-for-profit corporate, registered as a charitable trust, and has 32 staff. It began as a cricket ground in 1903. Eden Park became the primary venue for major summer and winter sport in Auckland when in 1913, the owner Auckland Cricket leased winter use of the ground to Auckland Rugby.

The stadium successfully hosts sell-out crowds of up to 50,000 on match days and hosts more than 1,000 non-match day functions per year. Eden Park recently submitted a resource consent application to host up to six concerts a year in future which received 94 percent support from the public.

With the main sports played on the field being cricket and rugby, Mr Christiansen said his team is always aiming to achieve high-quality outcomes for the players which need to be delivered differently every time.

Heading into a cricket match Mr Christiansen said they tended to "lean the field out" four to five days leading into an event, so if rain occurs on game day the field can soak up any precipitation which is particularly important for cricket.

"The surface moisture levels vary for different codes. There is a lot of detail in the planning for each game day at the Park."

Mr Christiansen said in a lot of ways his role was similar to farming, he was always thinking about the weather and what is next. "In Auckland the weather conditions are never the same two days in a row so you've got to prepare well but be ready to problem solve.

Eden Park Turf Manager Blair Christiansen, enjoying day-to-day work of keeping the field performing its best.

The performance of the field is critical and appearance isn't necessarily everything."

He said irrigation was one of the most important inputs to the fields between October and April, especially given the recent summer was one of the driest on record.

"Managing the irrigation is life or death for our turf. The field is a living stage. If we didn't have irrigation the fields would provide a low-quality surface which would not allow the wide-ranging content we host at Eden Park throughout the year."

Irrigation management is delivered by a Stratus II Rainbird control system. The Number One field has 98 pop-up sprinklers and the Outer Oval has 68. The sprinklers can be operated remotely via multiple mobile devices. This system allows for the combination of evapotranspiration rates with crop factors to provide millimetre-perfect irrigation applications.

"The Number One field has many micro-climates and in some areas that are heavily shaded we adjust our irrigation accordingly to ensure uniform moisture levels and a consistent field-wide growing environment.

"Both fields have full sand profiles which means high infiltration rates. It's vital to maintain plant health through managed irrigation. In summer, the turf can be easily stressed and once in this condition it can be difficult to recover with a busy multi-code schedule."

Controlled release granular fertilisers are applied approximately every seven to eight weeks. Often in the summer fertiliser applications are washed in using the irrigation system. Due to the age of the existing field (17 years) and a bustling event calendar, Eden Park will likely be resurfaced in late 2020. A replacement field was being grown offsite at the stadium's turf farm and will be transported to the venue. The new hybrid field is a combination of 5% synthetic fibres and living plants.

"The irrigation management at the turf farm is even more crucial due to the very shallow 50-millimetre sand profile. Continual moisture monitoring combined with regular wetting agent applications and precise irrigation ensures this field will be in perfect condition when it arrives at Eden Park."

Eden Park also captures rainfall water on the stadium's South Stand roof which is utilised for landscape irrigation around other areas of the Park including gardens.

Mr Christiansen says he is privileged to prepare Eden Park's surface for some of the country's most revered sporting clashes. This includes both domestic and international rugby, cricket and rugby league, A-league football, and of course "All Blacks matches, which are always pretty special."

Irrigation in action on the number one Eden Park field, water management was constantly being adjusted to match the conditions and upcoming events.

However, he said one of his career highlights was when Eden Park hosted four of the 2015 Cricket World Cup games including the semi-final, New Zealand versus South Africa. Grant Elliott managed to hit a six off the second to last ball which propelled the Black Caps into the Cricket World Cup final for the first time ever.

This March the inaugural 'Codes of Auckland' event was scheduled at Eden Park where an NRL rugby league match was to be played and the field then swiftly transformed by Mr Christiansen's team to allow a Super Rugby match to commence moments later.

During the COVID-19 lockdown turf management was deemed non-essential for the initial two weeks. Mr Christiansen said the longest the turf had ever been left unattended was just two days – not 18 as ended up being the case!

"The turf is a bit like a small child who is always pushing the boundaries to try and get away."

"Managing the irrigation is life or death for our turf. The field is a living stage. If we didn't have irrigation the fields would provide a low-quality surface which would not allow the wide-ranging content we host at Eden Park throughout the year."

When turf management could resume Mr Christiansen said it was a big job to return the turf to its usual standard.

"The greatest challenges of this job usually end up becoming some of the most satisfying elements of the role. We're constantly tasked with delivering the outcome on time and to several stakeholders' individual requirements."

Mr Christiansen says his job was done, if just for a moment, when he could sit back and witness some of New Zealand's most memorable sporting moments on the turf at Eden Park.

Farming and visual design working together

Having a passion for visual story telling, farming and the environment, sparked a Taranaki farmer and graphic designer with the idea to develop an easier way to explain on-farm tasks.

Gemma Adams and her husband Terry have been dairy farming together for 12 years and currently 50/50 share milk in Hawera.

Growing up Ms Adams had always been a visual learner and struggled with learning associated with reading and writing.

"For a lot of my life, I had wished I was better at reading and writing, when I was at school, I found things like dancing and sports came to me a lot easier."

Gemma is passionate about making farming environments safer and more user friendly through her business VizLink.

> "Sometimes if you have someone tell you 'I want that fence put up in paddock 12' – you can be left still feeling like you don't know how to do a simple task, however having it on a map from a pull off a piece of paper can save time and mistakes."

Ms Adams went on to study graphic design at University and it was not until then that she discovered she had dyslexia.

"Having things visually explained to me is a lot easier."

After her on-farm experiences of working with her husband and staff, she found that verbal instruction often was not enough.

"Trying to explain or understand simple tasks can often be difficult especially when people perceive things differently and a farm owner or manager knows a property much better than a staff member."

She began developing whiteboards and checklists, signs, and maps to communicate with staff provide instruction and better organise a workday. These tools proved successful not only improving efficiency and on-farm safety but also people's confidence to carry out jobs on their own.

This sparked Ms Adams to form her business Vizlink which started operation three years ago. It now offers visual communication tools to farmers around the country, including drone mapping, whiteboard and pad maps personalised to every farming business, which can include individualised names and symbols, and much more.

"Sometimes if you have someone tell you 'I want that fence put up in paddock 12' – you can be left still feeling like you don't know how to do a simple task, however having it on a map from a pull off a piece of paper can save time and mistakes."

Environmental aspects were becoming more and more important Ms Adams said, and having all the waterways, and irrigation systems displayed on the maps was good for keeping a record of tasks happening near waterways.

Combining her passions for the agriculture industry and graphic design has been a great achievement for Ms Adams and she said she thoroughly enjoyed it, however, running her own business came with its challenges.

"We had just bought our property, had large debt, and had two young kids so I wanted to be able to add value to our farming business, so that often meant some really late nights in the office after the kids had gone to bed."

"You always have doubt … I just had to do it and now the hard work has paid off I feel like we are just starting to climb the mountain."

Starting her own business, she realised that it was not as easy as she thought it and her advice to others was to make mistakes and just keep putting one foot in front of the other.

"I get a lot of job satisfaction knowing I am making people's lives easier."

Assisting her, she has a crew made up of graphic designers and communication specialists.

Gemma and her two children Maddie (7) and Brock (5).

IRRIGATION NZ
CONFERENCE AND EXPO

WATER FOR LIFE
April 2020, Christchurch

The conference that nearly was!

Like many other events around New Zealand and the world, our 2020 'Water for Life' Conference was cancelled due to the circumstances of the COVID-19 coronavirus pandemic. These are circumstances which we have never experienced before and will likely influence the way we navigate aspects of day-to-day life for years to come. We made the decision not to hold our event due to our concern over the potential risks to people's health. This was the best decision to make as the situation escalated rapidly in the following days and our Conference, which was set to be from 7–9 April, would have fallen during the Level Four lockdown period.

Being unable to host the Conference was disappointing after months of planning and it has financial implications for our organisation however, we are looking at the positives from this change.

Although, the future of large events is currently unclear we do hope to be able to host an IrrigationNZ gathering within the foreseeable future. In what capacity remains unknown but the extra time allows us to adapt to the new 'normal' and plan for perhaps an even better event.

In the meantime, we have created a 'Video Series' where those who were meant to be speaking at the Conference have provided some commentary for us. We have shared this through our social channels, they can be found on both Irrigation New Zealand Inc Facebook page and our IrrigationNZ YouTube Channel.

Beck and Caul

We would like to acknowledge the amazing work done by our event managers at Beck and Caul. It is a big job to organise an event and take into account both big details and small and we appreciate the work that went into the careful planning of these in the lead up to our Conference.

BECK & CAUL
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Look for our video series on the IrrigationNZ social channels:

fb.com/IrrigationNewZealand

YouTube: Irrigation NZ

IRRIGATION NZ
CONFERENCE AND EXPO

WATER FOR LIFE
April 2020, Christchurch

The conference that nearly was!

Water for Life – Conference 2020 theme

Our 'Water for Life' theme for our 2020 Conference reflected on IrrigationNZ's holistic view of water management in New Zealand. Although our name has the word irrigation in it, our sectors means so much more than that. Our focus is to work with farmers, growers, industry experts, and community members throughout the country who are more knowledgeable than ever about our water and the effects of how we manage it. Water gives us life, and regardless of what background you are from and what your experience is with it everyone has an emotional attachment to water. This is a theme that is reflected in all the work we do. That is why it is so important for us to bring everyone together and created a united vision on what the best ways to look after and utilise one of our most precious resources is.

Although we were unable to host this event, we are remaining active by putting our hand up to take part in discussions involved with all things water and work with decision-makers and other leaders. We seek to ensure irrigation remains an integral part of New Zealand's wellbeing, through the wise use and management of water for sustainable food and fibre production.

Awards

We were excited to be presenting our Innovation Award, sponsored by Ballance Agri Nutrients, at the Conference. The award is to celebrate, encourage and promote innovation, and the positive things being undertaken in our communities and because of irrigation. We were also going to present our Ron Cocks award which goes to someone who has made significant contribution to irrigation in New Zealand. The recipients of these awards will still be recognised in the future; however, we are yet to determine in what capacity. Thank you to all those who took the time to enter.

To our sponsors, exhibitors and attendees

As a not-for-profit membership organisation IrrigationNZ relies on support from others. Thank you to all our sponsors, exhibitors and attendees for their generous contribution to be involved with our event. Without yours and our members ongoing support we would not be able to operate. The knowledge available from you is invaluable and we hope to get the opportunity to bring you all together soon. Please see the following pages to view the full list of those who supported our 2020 Water for Life Conference (that nearly was).

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Outdoor Access live streaming site above the Rangitata Gorge in Canterbury.

Water in real time

Being able to see weather conditions of lakes and rivers from the comfort of your living room is now a possibility.

Brett Colgan from Ashburton, Canterbury has always been a passionate fisherman and had always had this great idea of live streaming waterways so people can check safety and weather conditions before even leaving home. It is now a reality after he started his business, Outdoor Access in late February this year.

Mr Colgan whose day job was for Midlands Seeds working in international sales, said it was very rewarding finally being able to turn his great idea into a reality.

"You can often be sitting at home wanting to get out and do something and then you get there and it's blowing a freezing cold southerly and its too dangerous to do any activities, this way you can check the conditions before you even leave home."

Currently, there were 14 sites set up around Canterbury, the Mackenzie, and North Otago but, Mr Colgan said there were plans to move into other areas.

"We've just started small but, we hope to get into more areas in the near future, we currently focus on recreation but, we hope to expand into other areas of expertise."

Mr Colgan said starting up the business was not as simple as just putting cameras up, and it was a two-year process before the website was launched.

"We had to work with regional and local councils as well as Fish and Game to make sure we were meeting all the rules, we also talked to farmers and locals to make sure we were getting a fair representation of the different lakes and rivers not just putting them anywhere."

The camera sites were located on both public and private land.

"It was great to work with farmers who allowed us to set up the sites on their land, some really genuine people who were interested in helping us start out our adventure."

The video sites are fully self-sufficient from 100 percent solar power, and in the summer would operate for almost 24 hours however, currently, they ran between 5am and 5pm due to daylight hours.

Mr Colgan said everyone had a different opinion on freshwater in New Zealand and everyone experienced it in different ways, and he hoped this would encourage people to get out and enjoy it.

"Freshwater is important for all of us, I'd really encourage people to get out and enjoy it and create their own experiences from it, and I hope this also makes it safer to do so."

He said one of the biggest challenges of starting Outdoor Access was that it was a whole new industry and there was nothing to compare it to.

"It's a brand-new industry, banks had nothing to compare against, so I had to prove it's worth."

Users must pay a small fee to get be able to access the live streaming.

Founders and directors of Outdoor Access (from left) Nigel Cromie, Brett Colgan, Bruce Alexander.

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New chairman for Ballance board – Duncan Coull

Ballance Agri-Nutrients Limited Chairman David Peacocke, is stepping down as a Director in September 2020 at the Annual Shareholders Meeting (ASM). Duncan Coull has been elected as the new Chairman by the Board of Directors taking up the post after the ASM. We caught up with Mr Coull to learn more about him and what he hopes to achieve in his new role.

What are your roles outside of Ballance?
This industry has been great for me and my family. I'm a second-generation farmer, now dairy farming in Ōtorohanga milking 650 cows with my wife Julie and our two sons.

When my wife and I were first starting out we benefited from the time that others put into leadership and governance positions – they are the reason the industry is so well positioned today. That's why I think it's really important to give back and put yourself forward for leadership roles.

I'm currently the Chair of Ōtorohanga District Development Board and Chair of various advisory boards in the agriculture and building industry and the former chair of Fonterra Shareholders Council. I'm also a farm supervision and advisory consultant in the Waikato. I'm passionate about the cooperative model, member owned and led, and will keep supporting it to make sure that our future generation of farmers receive the same support my family did.

When did you first become interested in the agriculture industry – and specifically agri nutrients?
Having grown up on a small dairy farm in Taranaki, I have always had a strong affinity with the land, the opportunities and freedom it provides to those that apply themselves and a great environment to live in and raise my family.

A key principle of farming and growing is that for the land to take care of us we must take even greater great care of our farm systems. It is a simple equation, what you put in is what you get out – healthy soil combined with water and a good climate provides the basis for healthy plants, crops and animals.

My interest in agri nutrients stems from this guiding principle as does my passion for the Ballance cooperative model. For generations cooperatives have provided products, support and advice to enable us to continue to farm based on this key principle.

"A key principle of farming and growing is that for the land to take care of us we must take even greater great care of our farm systems."

What will your new role as chairman involve and what do you want to achieve?
The chairman's role is one of facilitation, allowing strong debate on issues, driving a consensus view and a cohesive team. The other aspect of facilitation is having a strong working relationship with the CEO built on trust to support and guide to enable value creation for our shareholders.

In terms of achievement, for the business it comes down to our ability to continue to deliver value to our shareholders (farmers and growers), adapting to their needs. From a governance perspective, it is to ensure the cooperative performs well, so that we are able to provide a platform for continued service, growth and success for generations to come.

During your time with Ballance how have you seen the company's purpose and work change/evolve such as the use of fertiliser?
As a relatively new member of the Ballance Board, an early observation that I was encouraged by was the clear sense of purpose that the cooperative has and how this has driven a strong cohesive culture throughout the organisation.

My other observation is that the business has evolved alongside its core nutrient function to become an enabler. Consumers and community expectations are aligned with our own drive to do the right thing with respect to sustainable practice. Ballance, in my view, will need to continue to develop tools and products to enable our shareholders to meet their own and other expectations around sustainable operating models.

What do you think is important about irrigation and water use in New Zealand?
The effects of climate change, and people's own personal beliefs around it, will influence the way they invest in their farm system to maintain soil health and moisture. However, water and nutrients will always be important factors of healthy feed and crops. The sustainable use of both are big issues we need to grapple with and one of our greatest opportunities. Investment in irrigation schemes that encourage sustainable land and water use will play an important role in long-term food supply.

Stepping into the role after what has been a very uncertain time – what is going to be important?
The primary sector is an important leader in supporting the economic recovery of our nation. Through the supply of nutrients and advice, Ballance will work with our shareholders to secure New Zealand's future in the global food economy.

Ballance needs to have the confidence to invest for the future in our people, innovation and infrastructure to ensure we remain relevant to the needs of our shareholders through the uncertainty of the months ahead and beyond.

Public perceptions of the food and fibre industry

It is clear that building a more sustainable food system that improves land and water quality will take behavioural changes from everyone.

Dr James Turner, leader of the Our Land and Water National Science Challenge, recently led a research survey investigating public perceptions about food and fibre production in New Zealand.

Dr Turner said simply overwhelming farmers and growers with criticism contributes to an 'us vs them' narrative and limits their ability to evaluate evidence, think long-term and be part of positive change.

Dr James Turner.

"Instead, there needs to be widespread public reconnection to the wider agri-food and fibre system which all citizens are a part of and have influence over. To quote Wendell Berry "eating is an agricultural act". The story we tell ourselves about our food and farming needs to evolve from the simplistic 'urban-rural divide' and towards a more sophisticated understanding of the pressures on farmers and how customer, industry and policy power can be redirected to support farmers make positive changes."

The attitudinal survey of visitors at Open Farms, a nationwide Open Farm day in March (2020) that saw more than 3,500 Kiwis visit 45 farms, yielded four key insights:

1. On-farm experiences build urban-rural trust and support for sustainable farming.

Visitors rated their farm day experience at 4.4/5 and 91 percent will visit a farm again next year. That is a very positive baseline to work from said Dr James Turner. "After their experience, visitors also reported feeling more connected to farmers and more positive about the environmental sustainability of farming. Seventy two percent left feeling more likely to buy food direct from a farmer and 64 percent were more willing to pay a premium for sustainably grown food. These results suggest on-farm experiences can be a useful tool for building producer-customer connection in the future".

2. Criticism of farming is not about farmers; it is about practices.

The research suggested farmers are valued and seen as 'part of the solution' in achieving sustainability. For example, 60 percent of respondents believe that buying New Zealand grown food or directly from a farmer is the most effective way they can support sustainable farming. Farmers were also cited as the group that can make the largest difference to the quality of New Zealand's waterways.

Respondents did express concern that some conventional farming practices are not sustainable and should change, including synthetic fertiliser use, corporate farm ownership and certain land uses in particular areas. Visitors also referenced practices like carbon sequestration, regenerative farming and 'Brand NZ' as opportunities. The level of technical interest was surprising and supported by the fact that 'science in farming' was the top-rated highlight of the Open Farms day 28 percent, followed by meeting the animals at 25 percent, and meet a farmer at 16 percent.

Dr Turner suggests that the data "represents a more nuanced understanding of criticism of farming – grounded in supporting farmers transition to more sustainable practices. The level of technical interest demonstrated by respondents also presents educational and marketing opportunities across consumer-friendly concepts like regenerative farming or carbon sequestration."

3. To support sustainable farming, buy direct from farmers.

The data point to a demand for local wholefood. Sixty-four percent of respondents have adopted more environmentally conscious shopping habits and of those, 36 percent were seeking out non-packaged wholefood, 25 percent were buying local or direct from a farmer and 23 percent had reduced meat and dairy.

"The data suggest that Kiwis could be willing to pay more for locally grown food to support farmers shift to more sustainable practices" said Dr Turner.

Open Farms – an opportunity to experience farm life pictured are visitors with Paterangi Jersey Cows near Hamilton.

4. Agreement on the environmental priority – get stock out of our waterways.

Of the respondents, 43 percent believed excluding stock from waterways was the most effective way to protect New Zealand lakes and rivers – followed by reducing fertiliser use at 34 percent, tree planting at 31 percent and land use diversification at 29 percent. This matched the industry focus, demonstrated by findings from the 2019 Survey of Rural Decision Makers that 81 percent of farmers actively exclude stock from waterways and 77 percent are managing fertiliser use.

Also of interest were farmer hosts' positive rating of the Open Farms experience (4.4/5) and the disparity in self-ratings in understanding of kaitiakitanga – 5.4/7 for farmer hosts and 3.6/7 for visitors.

Dr Turner said the data contributed to our understanding of an emerging food system based on close customer connection, sustainable practices and high-value products.

"At Our Land and Water, we are researching a theme called 'Capacity for Transition' – understanding what perception and behavioural shifts need to happen for New Zealand to transition to a more sustainable future. It is about having well informed public debates, understanding our collective responsibility and removing social barriers to change. The Open Farms project and resulting survey contributes to this".

The findings were compiled from a post-event visitor survey of 322 respondents of which 82 percent lived in an urban setting, a host farmer survey 26 respondents and qualitative phone interviews.

IrrigationNZ staff update:

Last month we farewelled our North Island Technical Project Manager Kate Jefferd who has been at IrrigationNZ since August 2019, on maternity cover for current manager Vicky Bloomer. Kate has been a valued member of our team and has done a great job of representing IrrigationNZ in the North Island. She has also worked on several projects including Smart Tools and Tips and contributed a great depth of knowledge to our National Policy Statement for Freshwater Management submission thanks to her expertise around water metering and telemetry.

Spotlight on the service industry

With more emphasis on irrigation efficiency than ever before, choosing an Accredited Irrigation Design company is an easy way to ensure the irrigation system you install meets both regulatory and industry performance benchmarks. Accredited design companies have industry trained professionals and excellent product knowledge to ensure every drop counts.

An Accredited organisation has agreed that they design fit for purpose systems for clients in accordance with the Design Code of Practice for Piped Irrigation Systems in New Zealand and the Design Standards for Piped Irrigation Systems in New Zealand. IrrigationNZ Accreditation Ltd also has a complaints procedure. Should anyone complain that a company has not met the standards, IrrigationNZ Accreditation Ltd can undertake an investigation and remove or suspend their accreditation if need be.

The companies become accredited by applying and submitting their designs for assessment to IrrigationNZ Accreditation Ltd to ensure they can meet the requirements; we also require them to have suitable insurances and quality management systems in place. Every two years they must reapply for accreditation which allows us to undertake an audit of their design standards, systems and processes. The idea was worked on from 2013 and the first company became accredited in 2014.

We caught up with some of the experts from our five accredited design companies.

LUCY BOREHAM – CARRFIELDS

What is your job role and what does it involve?

I am the projects and service manager based in Alexandra but cover much of Central Otago, it is a great place to work. After the design has been done I look after and liaise with contractors and developers to create irrigation systems, as well as the service side which involves making sure anything that needs fixed during the season is fixed and then during the off season, winter checking and maintaining pumps, servicing pivots and the likes.

When did you first become interested in the agriculture industry and how did you get into the irrigation industry?

I grew up in Central Otago and have always been interested in it and have witnessed how much irrigation has changed systems for the better. I have been working in horticulture since 2005, starting in a stone fruit orchard, cherries, apricots etc. Pruning planting, picking, packing, thinning and supervising roles. I then went on to study Horticulture at Otago Polytechnic in 2011. I then worked in plant propagation and plant nursery management. I had an accident and hurt my back and had to have a less physical job. That was when I came to Carrfields two years ago. It is a great industry to be a part of. It is very rewarding when you see work that you have done being used every day.

How have you seen irrigation change?

The biggest change I have seen is the advancement of technology, specifically VRI (variable rate irrigation). It is amazing how you can get the exact rate of water on the ground when you need it. Such as, if you have an orchard you can run different zones from home. The technology is awesome, and you can share info at the click of a button.

How has COVID-19 impacted your job and the company you work for?

It has made me more aware of different regulations within a workplace including personal hygiene and the regulations around it. It has made us much more aware of communication and the awareness we need to have of where we have been and who we have seen. It will change the way we work everyday going forward, even when things are back to normal.

What is your least favourite chore?

Washing. Hanging, drying, folding… the whole process.

If you could be an animal what would it be?

Dolphin.

What have you learnt in the last week?

Coffee tables are not made of coffee and steam rollers don't roll steam!

MATTHEW HANCOX – RAINER

What is your job role and what does it involve?

I am responsible for irrigation sales and design for the South Island based in Ashburton.

When did you first become interested in the agriculture industry and how did you get into the irrigation industry?

I was brought up on farms in the south of the South Island, so farming has always been an interest of mine. I first started working in the forestry and then logging industry before I started working in the irrigation industry in 2004, where I was installing equipment such as pumps. Since then I have moved through the ranks and learnt more and more before having the job I have now. It is a great industry to learn as you work. I will admit I struggled with schoolwork so starting out doing something hands on was good. I enjoy the challenge of making everything work as it should be for the end user.

How have you seen irrigation change?

When I first started there were roto-rainers going out the door all the time but that has since switched to centre pivots, however, that is not to say there is not a place for roto-rainers anymore. There's been a change from farmers and growers getting water from individual wells to more collaborative schemes. The work we do has changed a lot.

How has COVID-19 impacted your job and the company you work for?

COVID-19 has made it tough and interesting – like it has for many people's work. It is amazing how change affects things and the way people do things. A positive for us to take from it is it has shed light on the importance of irrigation to grow food. We need a lot of food and irrigation is a key factor in that.

What is your least favourite chore?
Picking up dog poo.

If you could be an animal what would it be?
A hunting dog.

What have you learnt in the last week?
When you have a slow internet connection it makes working remotely very difficult.

MIKE HOLLAND – PGG TIMARU

What is your job role and what does it involve?
I am the service manager for PGG Wrightson Water based in Timaru, we cover the broad South Canterbury, North Otago and Mackenzie areas. I am the central point of contact and coordination for service tasks for our customers. I also spend time inspecting and assisting with field-based servicing and repairs. There is a lot of variety. I get a kick out of helping people find solutions to make their business more efficient and productive

When did you first become interested in the agriculture industry and how did you get into the irrigation industry?
I grew up on a farm, so agriculture was always an interest of mine, as well as engineering. As a school leaver I took an opportunity in irrigation as I saw it to be a combination of both. I started out as a labourer in 2011 and after 12 months started my apprenticeship as a mechanical engineer. In 2013 I started working for PGG where I finished my apprenticeship and worked to become the manager in 2018.

How have you seen irrigation change?
I think the environmental and compliance side of things is where I have noticed the biggest change. The industry's gotten a lot more knowledgeable about water and what effects it. The biggest change would be from both farmers, growers and industry's mentality about it. It is great to see our customers actively trying to minimise their effects environmentally. We have had to become more specialised to accommodate this, there are a lot of pressures on our customers and we need to be able to help them specifically and effectively. On-farm efficiency is continually improving.

How has COVID-19 impacted your job and the company you work for?
It has affected certain parts. In level four we were able to work as an essential service for dairy, stock and house water, also effluent. However, once we got back to level three, we were able to work more like normal, a lot of the work we do is isolated anyway. It has given us a good opportunity to build on our standards and procedures to protect our staff and those of our customers.

What is your least favourite chore?
Paperwork.

If you could be an animal what would it be?
Dog.

What have you learnt in the last week?
That we touch so many surfaces that other people have touched. Because of COVID-19 and our procedures I am now consciously recognising all the touch points.

DON HUNT – WATERFORCE

What is your job role and what does it involve?
I am an irrigation design engineer based in Ohoka, North Canterbury. My job involves sales, and design of new projects whether they be water supply, pump systems or irrigation systems. I also assist the service side of the business.

When did you first become interested in the agriculture industry and how did you get into the irrigation industry?
I have been involved in the agricultural industry for many years now. I grew up on farms in Nelson and got my first job in 1976 on a farm which was one of the earlier farms to have drip irrigation which I helped develop and learned a lot. I then went on to study Agricultural Science at Massey University before I went overseas. I then spent several years working on irrigated properties in Australia, Canada and the UK.

> "Farmers are not credited sufficiently for how much they care about their environment, after all their businesses rely on the environment."

How have you seen irrigation change?
Well, in the 40 years I have been involved with irrigation I have witnessed enormous change. I have seen changes in land use, huge arable, dairying and horticultural diversification as well as rapid development of the technology involved with irrigation. Irrigation was often flood or gravity fed, with portable equipment, and now is often computerised and operated from a smartphone. Water has unlocked tremendous potential in our country. It has allowed us to export a large quantity of good quality products as well as feeding our own country. However, you do have to take the good with the bad and irrigation has presented its challenges. Farmers are not credited sufficiently for how much they care about their environment, after all their businesses rely on the environment.

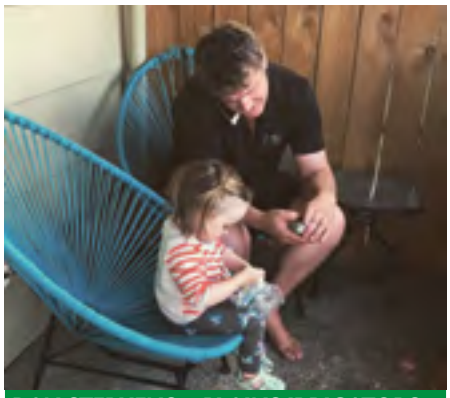
How has COVID-19 impacted your job and the company you work for?
I, like every New Zealander, has been affected in many ways by COVID-19. It has increased our appreciation for health and previous ability to travel freely. Many New Zealanders have uncertainty about their future employment. I look forward to being able to interact with other people normally again.

What is your least favourite chore?
I struggle when it is my day to cook!

If you could be an animal what would it be?
An eagle. I could get from A to B quick, and keep an "eagle eye" on things!

What have you learnt in the last week?
I have learnt to be more tolerant, as these difficult times have shown everyone deals with stress differently.

Continued over...



DAN STEPHENS – PLAINS IRRIGATORS

What is your job role and what does it involve?
I am involved with general management from organising people and contracts to marketing. I also still do some field work, mainly with VRI which I enjoy as it hands on. I also do some technical training.

When did you first become interested in the agriculture industry and how did you get into the irrigation industry?
I grew up farming throughout the South Island. While I was at school, I worked building pivots in the school holidays, this was during some of the early development of irrigation in Canterbury. After finishing school, I went on to study at Otago University but soon came back to being involved with irrigation when I started to work with pivot crews putting in mainlines as well as stock water. In mid-2002 I had a back injury and had to do less physical work, and this was when I took the chance to up skill my sales skills and learnt how to design irrigation systems. I have since continued to improve my knowledge to do with irrigation.

How have you seen irrigation change?
The biggest change I have seen is the education of growers and farmers. The thought that goes into what you're putting on and when is valuable and technical. This is largely thanks to research and VRI which is something I am very interested in as well – it is an amazing remote management tool which has been a game changer for water use.

How has COVID-19 impacted your job and the company you work for?
Like everyone we had a bit of a shutdown period and everyone got sent home, but we made it work. It has improved our understanding of communicating on a regular basis.

> "The biggest change I have seen is the education of growers and farmers. The thought that goes into what your putting on and when is valuable and technical."

It has been a very long irrigating season due to such a dry summer. Due to the shutdown period and the fact that irrigators are getting turned off a lot later this year – hopefully it doesn't cause a bottleneck in servicing during the winter, but that's a challenge we will work on when we get to it.

What is your least favourite chore?
Doing the dishes.

If you could be an animal what would it be?
A hunting dog.

What have you learnt in the last week?
That we do not need fast food as much as we think we do. When it comes down to it famous people are irrelevant, COVID-19 has proven how important everyday people and what they do is.

Science for the greater good

Dr Jenny Webster-Brown will be the next director of Our Land and Water National Science Challenge, stepping into the role as previous director Ken Taylor retired on 29 May. We caught up with Dr Webster-Brown who has a passion for New Zealand's land and water and discovering the best way we can use and support it.

When did you first ever become interested in the natural environment?
I grew up in Northland and, as the daughter of a keen tramper, was introduced to our wonderful outdoor environment at a young age. I have continued to access and enjoy our wilderness and waterways throughout my life and, after studying geology and chemistry at the University of Otago followed by a Ph.D. in geochemistry at the University of Western Australia in Perth, I was keen to use my science to help protect the quality of these environments. I was studying in the late 70s and early 80s, during the time when the environmental impacts of human activity were being recognised and widely published for the first time. I saw this becoming a very important field of science and, keen to have a career that could make a positive difference, I specialised in water quality research.

What were your previous roles, how did you enjoy them and what did you learn?
After completing my studies I went on to work for the DSIR in Wellington, and then ESR in Auckland, before joining the University of Auckland for twelve years, where I taught environmental science, environmental geochemistry and water quality. My research focussed on the impacts of mining and geothermal development on freshwater systems in New Zealand, and on meltwater chemistry in Antarctica. I enjoyed the problem-solving nature of my research – finding out why and how chemicals and contaminants move about and affect the health of waterways. I also very much enjoyed teaching and training students to join the next generation of environmental stewards. In 2009, I moved to Canterbury to become the inaugural director of the Waterways Centre for Freshwater Management, a teaching and research centre jointly run by both University of Canterbury and Lincoln University.

How have you seen environmental knowledge and management change in the time you have been working in this space?
Yes indeed – it is a very different world to when I first joined the workforce! When I began my research in New Zealand, monitoring data for freshwaters was sparse and, when it was available, it was not widely shared. Thanks to the ongoing efforts of many scientists across the research, regulatory and education sectors, and to great advancements in technology, we can now access comprehensive, high quality data for many different environments – and it is readily available to everyone. Data sharing is really helping us to understand and to progress solutions for some of the more wicked environmental problems. I have also seen environmental science become a mainstream career choice and a way to usefully apply scientific knowledge.

Dr Webster-Brown measuring water quality in streams of the Waimea catchment near Nelson, in 2019 following the forestry fires.

What do you hope to achieve in your new role?
The Our Land and Water (OLW) National Science Challenge has a key part to play in changing how we derive value from our land, while not devaluing our waterways. I hope to see the good science which is being funded through the challenge, translated into a real, lasting change for New Zealand; one which enables us to use land and water in the most valuable and sustainable ways possible. OLW's emphasis is on changing farming practises, because this is a very dominant land use in this country, but we can certainly reflect on our urban and industrial land use and consumer practices too. We are all in this together after all. I believe we have much of the knowledge and many of the tools we need now, but not the consensus we need on a vision for the future. I hope that the Te Ao Māori concept (Māori worldview) that lies at the heart of the OLW challenge will provide the foundation for that vision, and encourage more people down that pathway to more efficient and sustainable use of our precious natural resources.

Where do you see the future of freshwater management in New Zealand going?
In some ways, COVID-19 has changed the landscape with regard to the agriculture industry, making the general public more aware of where their food comes from and restoring a little mana to famers. I would like to think we can build on this to reduce the antagonism that too often exists between rural and urban communities, particularly when it comes to respective water use and pollution. A mutual understanding and commitment to improving New Zealand's environmental would be great to see, and would be the first step to better freshwater management in the future Well communicated, good science can certainly help develop the common ground required.

How do soils behave under irrigation?

There has been an understanding by farmers that soils change under irrigation but, without numbers, how can this idea be proven? Well a recent study added some data to this belief.

Veronica Penny has always been interested in soil science.

"When I was a teenager, I knew I wanted to be involved with agricultural research."

Ms Penny is now a Soil Physics Technician at Manaaki Whenua – Landcare Research. She first completed a Bachelor's Degree in Agricultural Science followed by a Master's Degree in Natural Resources Management and Ecological Engineering, at Lincoln University and the University of Natural Resources and Life Sciences in Vienna, Austria. She has also worked on farms in New Zealand and abroad.

Veronica Penny.

Being from a rural background, the connection and relevance of her work was always a focus for her. She said as good as we do things, there was always a way to do them better.

"If we can take the way we do things and find out ways we can do it even better… that's what I strive to achieve."

There has been a 94 percent increase in irrigated agricultural land in New Zealand between 2002 and 2017, with 64 percent of New Zealand's irrigated agricultural land in Canterbury. It is important to understand how these changes in management may be impacting our soil resource. Based on their on farm experience, farmers across Canterbury have wanted scientists to work with them to help quantify how their soils are behaving under irrigation.

A project looking at the effect of irrigation on soil was funded by the Ministry for Primary Industries' Sustainable Farming Fund. The project was led by a collaboration between Ms Penny and fellow Manaaki

Veronica carrying out work testing Canterbury soils.

Whenua – Landcare Research Soil Scientist Sam Carrick, co-led with Federated Farmers, the AgriBusiness Group and IrrigationNZ. The project first began in 2017 and has run for three years, sampling sites across the Canterbury region.

Ms Penny said the main purpose of the project was to get some numbers around whether the soil water holding capacity changes under irrigated pasture, by measuring the soil physical properties across a range of soil types and irrigation systems throughout the Canterbury region.

The research examined 48 paired sites. A paired site is two sites with different treatments that together are a single site; they are a pair. Each paired site for this project has an irrigated area that was sampled and a dry area that was sampled in the same paddock; together they are one paired site across Canterbury, with each paired site consisting of a paddock that was partially irrigated and partially dry land but under the same grazing and pasture management. The sites were selected to include a range of soil types, irrigation durations and stock types. Soils were sampled in 10cm increments down to 60cm depth.

Ms Penny said the results showed no major difference between soil types, irrigation duration or land use (dairy vs non-dairy).

The overall findings showed that total available water capacity increased under irrigated soils compared to dryland soils. However, some of this benefit is partially off-set by compaction, by compressing the larger pores to more small pores, which are harder for plants to extract water from. "The influence of reduced pore size is the readily available component of the water holding capacity can be lower under irrigated compared with dryland pastures, while the 'semi-available' component is greater, which is less efficient for plants to use".

Sampling in progress on a stony Canterbury soil.

Ms Penny said the evidence shows that soil physical attributes can improve under irrigation but currently this potential is not being fully realised; there is potential for greater benefits.

"Irrigation does change soils and increases the amount of water available. However, under different management it could be further improved."

Ms Penny said in regard to nitrate leaching this research was also useful.

"Benefits from knowledge of increased water holding capacity of soil include improved irrigation scheduling and more accurate environmental reporting around reduced nutrient leaching". However, the decrease in readily available water capacity has practical on farm implications, as this is the soil water zone that farmers work within in regard to irrigation management. Less readily available water capacity means farmers are having to irrigate more frequently.

Carrying out the practical side of the research was one of the favourite parts of Ms Penny's job.

"I love doing the field work, getting out there digging holes and getting my hands dirty. I also get a lot of satisfaction from being able to help people find solutions to the challenges they are facing"

"Interacting with the farmers is great as well and they all have an impressive amount of knowledge of their land. They are out there on their land every day and can tell you exactly how their soils behave and respond to their changes in management… this is very valuable when you are a researcher working with land you aren't familiar with."

She said the project was currently in the wrapping up stages, but she hoped to continue the research in the future. The next challenge for farmers and scientists is to work together to optimise farm management practices to reduce compaction under irrigation. Different management practices may include optimising how long farmers need to wait before they put the cows back in the paddock after irrigating.

Seasonal climate outlook June–August 2020

Sheep moving to greener pastures after snowfall.
(Photo: ©mychillybin.co.nz/William Connell)

OUTLOOK SUMMARY

ENSO-neutral conditions continued during May. The Southern Oscillation Index (SOI) was neutral and central Pacific sea surface temperatures (SSTs) were near average for the time of year. Oceanic ENSO-neutral conditions will very likely persist (71 percent chance) over the next three months. The long-standing climate drivers that have contributed to dryness over much of New Zealand are expected to influence our weather for at least the first half of the winter season. Climate drivers may evolve late in winter or during spring with the potential for an Indian Ocean Dipole (IOD) event and oceanic La Niña conditions, which could cause a change in temperature and rainfall patterns.

Although more westerly winds than normal are expected, the change in climate drivers could lead to periodic easterly quarter winds, particularly later in the winter season. June–August 2020 air pressure is forecast to be higher than normal to the north of, and sometimes over New Zealand. During periods of high pressure, especially during June, cold, frosty mornings are likely in typically colder locations.

Air temperatures are most likely to be above average in the east of the South Island and about equally likely to be near average or above average in all other regions.

Rainfall is most likely to be below normal in the east of both islands, near normal in the west and north of the South Island, and about equally likely to be near normal or below normal in the north and west of the North Island.

June–August 2020 air temperatures are most likely to be above average (50 percent chance) in the east of the South Island and about equally likely to near average (40 percent) or above average (40–45 percent chance) in all other regions.

REGIONAL PREDICTIONS FOR JUNE TO AUGUST 2020

Probabilities are assigned in three categories: above average, near average, and below average.

Northland, Auckland, Waikato, Bay of Plenty

- Temperatures are about equally likely to be near average (40 percent chance) or above average (45 percent chance).
- Rainfall totals are about equally likely to be near normal (40 percent chance) or below normal (45 percent chance).
- Soil moisture levels and river flows are most likely to be below normal (50 percent chance).

Central North Island, Taranaki, Whanganui, Manawatu, Wellington

- Temperatures are about equally likely to be near average (40 percent chance) or above average (45 percent chance).
- Rainfall totals are equally likely to be near normal (40 percent chance) or below normal (40 percent chance).
- Soil moisture levels and river flows are equally likely to be near normal (40 percent chance) or below normal (40 percent chance).

Gisborne, Hawke's Bay, Wairarapa

- Temperatures are about equally likely to be near average (40 percent Rainfall totals are most likely to be below normal (50 percent chance).
- Soil moisture levels and river flows are about equally likely to be near normal (40 percent chance) or below normal (45 percent chance).

Tasman, Nelson, Marlborough, Buller

- Temperatures are equally likely to be near average (40 percent chance) or above average (40 percent chance).
- Rainfall totals are most likely to be near normal (45 percent chance).
- Soil moisture levels and river flows are most likely to be near normal (45 percent chance).

West Coast, Alps and foothills, inland Otago, Southland

- Temperatures are equally likely to be near average (40 percent chance) or above average (40 percent chance).
- Rainfall totals are most likely to be near normal (45 percent chance).
- Soil moisture levels and river flows are most likely to be near normal (45 percent chance).

Coastal Canterbury, east Otago

- Temperatures are most likely to be above average (50 percent chance).
- Rainfall totals are most likely to be below normal (50 percent chance).
- Soil moisture levels and river flows are most likely to be below normal (45 percent chance).

This is an extract of the Seasonal Climate Outlook published by NIWA.

You can never see too many sunsets. Capturing the last of the day is Ian Fowler, a pivot irrigator looks magnificent in an autumn sunset. *(Photo: Brittany Fowler Photography)*

At as young as ten years old Brittany Fowler became passionate about photography.

"My Dad used to be a photographer which was also handy because it meant I already had a camera to play with, I love capturing photos and looking back on them in a few years they bring memories to life," she said.

Miss Fowler snapped the above photo of her neighbours irrigator in Laurinston, Rakaia. Her father Ian Fowler is in the picture. "Dads trying to get a photo, but phone quality doesn't quite capture it as well."

Miss Fowler who was also an eager horse rider turned her passion for equestrian and photography into a business in 2015 when she started Brittany Fowler Photography. She runs this alongside studying a Bachelor of Agriculture Science and Lincoln University.

"I usually photograph horse competitions throughout the year when I am not competing myself. Just getting out there and doing has helped it become successful... I enjoy agriculture and taking rural pictures out in the country is where I love to be. "

Grazing and soil: timing matters

Previous research has shown that grazing a soil while it is too wet will damage the soil structure and lead to compaction. What we don't know is how wet is too wet, and how quickly the soil recovers?

Virginia Hogan, a Lincoln University Environmental Science student, spent this summer looking at the influence that a single grazing event has on soil macroporosity and infiltration, and how that soil recovers over the grazing cycle.

Miss Hogan was awarded a summer scholarship funded by IrrigationNZ and Manaaki Whenua – Landcare Research to undertake this research, which took place at the Lincoln University Research Dairy Farm.

This trial was associated with the three-year project *'The Effect of Irrigation on Soil Water Holding Properties'*, funded by MPI's Sustainable Farming Fund and run in collaboration with Federated Farmers.

Miss Hogan took soil measurements on farm, measuring infiltration rate and collecting intact soil cores along a transect in a paddock.

These measurements were taken immediately prior to grazing, immediately after grazing and every three to four days until the paddock was grazed again.

Soil water content was also measured prior to sampling, to account for its influence on soil behaviour. She then took the soil cores back to the lab where she measured the amount of water they held between saturation and field capacity, and their porosity.

This experiment was repeated two times over summer, in between which Miss Hogan managed to fit in a trip to America and Europe. She directed 22 New Zealand High School graduates as part of the New Zealand United Nations Youth Global Development Tour, visiting agencies such as the World Food Programme and the OECD, to discuss selected goals under the 2030 United Nations Sustainable Development Goals. Miss Hogan hopes to use the information that she learned to encourage greater individual action through holistic discussion and approaches, that can be scaled to meet local community needs. Upon her return to New Zealand, she was straight back in the field to get another round of measurements done before resuming her university studies.

This was reinforced by a corresponding increase in bulk density between pre- and post-grazing measurements, which returned to pre-grazing levels before the next grazing.

These results, however, are only from one round of sampling so only show the response of the soil from one particular grazing event (results from sampling round two have been delayed by the COVID-19 lockdown).

Measuring soil infiltration rate.

Collection of an intact soil core.

The single trial was not replicated enough to necessarily represent a general pattern that will happen everywhere or give a statistically significant result but is a good indication of what we may expect to occur.

This summer project was a preliminary trial for further research looking into grazing management under irrigation. Manaaki Whenua – Landcare Research will be bidding for funding to research with farmers the combined effects of irrigation and grazing management.

They hope to be able to identify how long a soil needs to be allowed to drain after irrigating before it is safe to graze while having minimal impact on soil structure. They aim to be able to inform best management practice by being able to say X soil needs to drain for Y time before grazing, to reduce the risk of compacting the soil under heavy stock or machinery.

Miss Hogan's work also highlighted the need to take the grazing cycle into account when carrying out soil structure and porosity measurements.

Samples collected prior to grazing may tell a different story to samples collected immediately post-grazing and thus last grazing date is important information that ought to be recorded when collecting soil samples or doing soil structural assessments.

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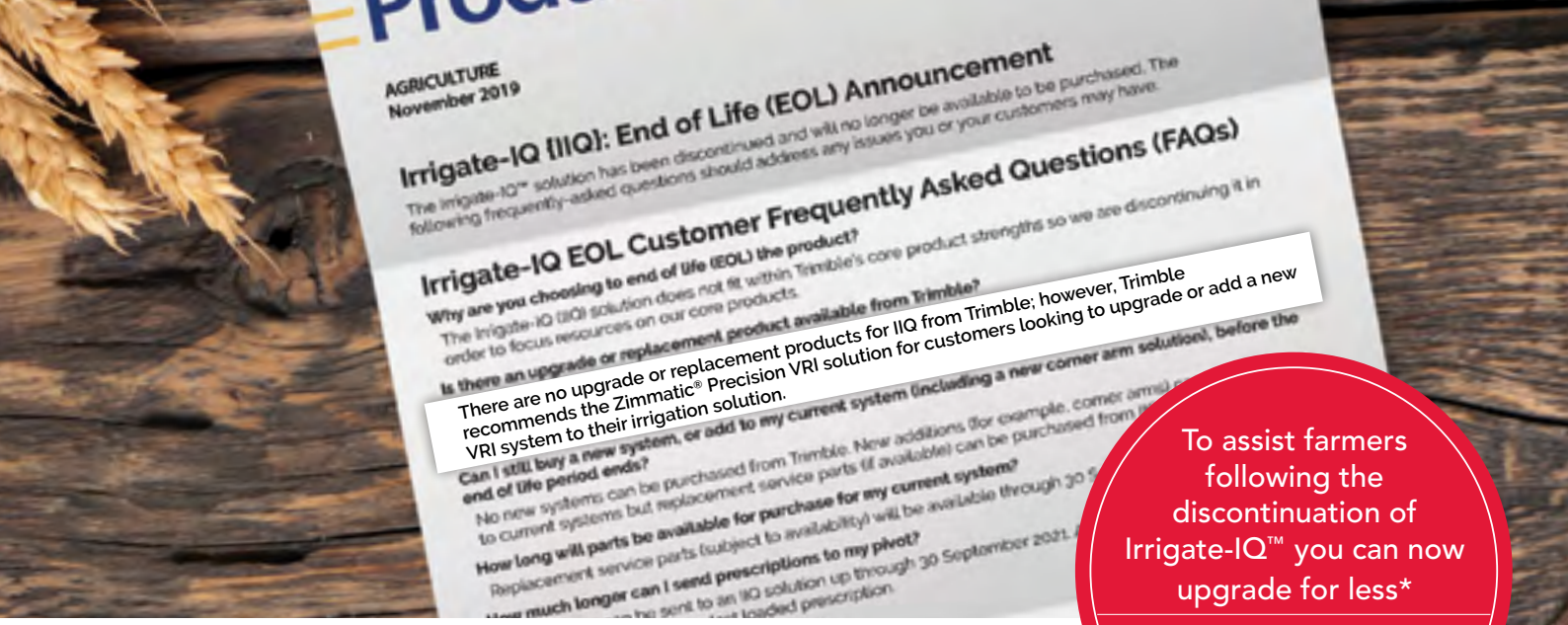

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