



## Keeping tabs on paradise

In each issue of **Waterlines**, we sit down with one team at ORC to learn a bit more about what they do and why they do it. For this issue, we spoke to the adventurous Environmental Monitoring team.

If you've ever come across someone in high-vis, standing knee-deep in the icy cold water of a remote Otago waterway and wielding some unfamiliar gadget, or towing a kayak from a helicopter against rushing water, or downloading data from an air quality station – you may have witnessed the work of ORC's Environmental Monitoring team.

Comprising 20 members, the Environmental Monitoring team is broadly responsible for collecting all manner of crucial data from around Otago, on river flows, lake and groundwater levels, rainfall, air quality, water quality, and more. All up, the team manages 273 monitoring sites around Otago, made up of 169 State of the Environment sites and 104 project-specific sites.

The data from these sites is essential to the operation of many other ORC functions, including consenting and

policymaking, science and strategy, and natural hazards and engineering.

Manager Eike Breitbarth says the environmental measures his team monitors are growing.

“Water level and flow information is often seen as the bread and butter of our work, but our water quality work is crucial to the public as well, and will expand over the upcoming years. Our biodiversity work includes fish species and is currently being developed further. Monitoring programs for climate and coastal monitoring, as well as a soil monitoring network, are also being developed, so we are making some big advances in our understanding in different dimensions of Otago's environment.”

The Environmental Monitoring team is at its busiest during flood events, where up to date and accurate data on rainfall and

river flows may be crucial for civil defence decision-making.

“A lot of our work is essential for public safety and decision making by Civil Defence,” Eike tells us.

“Our hydrographic data, together with information from MetService, feeds into flood protection modelling. A lot of people don't realise that a complex network of monitoring sites sits behind the information they get on river flows and rainfall, and that network is maintained and monitored by our team.”

Asked his favourite part of working in Environmental Monitoring, Eike answers without hesitation: “The team itself, that's my favourite part of the job – a highly skilled, hard-working group of people who share a good sense of humour and are simply great to work with.” **Continued on page 4.**



## Chair's column

Kia ora, welcome to the winter issue of *Waterlines*, Otago Regional Council's rural newsletter.

ORC have just adopted our Long-term Plan for the next ten years, which sets out an ambitious programme of work in environmental management.

Over 560 groups and individuals took the opportunity to have their say on the draft plan during the consultation period in April and May, and nearly 100 also spoke at hearings in Dunedin, Queenstown, and online.

Your feedback on how quickly we should accelerate our work to manage pests, how to balance the overall budget, and how we should spread the cost of remediating Lake Hayes was very valuable, and we changed our point of view on Lake Hayes as a result.

Thank you to everyone who had their say on our Long-term Plan, we really appreciate you taking the time to engage with the draft and lodge a submission. And now we need your help again as we consult on our new Regional Policy Statement.

The Regional Policy Statement is the overarching policy document to manage Otago's resources. It directs Councils and resource users on the outcomes to be achieved for resource management.

Well-managed natural and physical resources provide for Otago's social, economic, cultural, and environmental wellbeing; for our community health and safety; and for the livelihood of future generations. In a nutshell, the Regional Policy Statement establishes what we want for Otago, what's stopping us from achieving this, and how we will solve those problems.

The Regional Policy Statement is different from many of the other plans ORC develop, like the Air Plan or Water Plan, because it doesn't contain any rules but informs our regional plans, and our territorial authorities must give effect to it in their own planning frameworks.

If you're interested in the future management of natural and physical resources in Otago, I'd encourage you to check out the proposed Regional Policy Statement and let us know what you think. To find out more, view the proposed Regional Policy Statement, and make a submission, visit our website at [www.orc.govt.nz/rps](http://www.orc.govt.nz/rps). Consultation is open now, and runs until Friday, 3 September.

We hope you're keeping warm and safe over the winter - here's to the days getting longer again. Remember to check out our guidance on wood burning to ensure you get the most out of your fire and reduce its impacts on air quality, at [www.orc.govt.nz/burn-dry-breathe-easy](http://www.orc.govt.nz/burn-dry-breathe-easy).

Kā mihi,  
Andrew Noone,  
Chair, Otago Regional Council

## Slick teamwork on display



Many hands made for light work at an oil spill exercise in late-April, where staff from around the organisation and the region came together to test their skills with our equipment.

Oil spills can wreak havoc on coastal marine ecosystems, and it's one of ORC's responsibilities to respond urgently when and where they occur in Otago.

There can be many complicating factors during a real oil spill, so regular drills are an important way to keep the team up to speed with the spill response equipment.

It was a chilly day at Macandrew Bay on the Otago Harbour, but on-scene commander and Harbourmaster Steve Rushbrook had the team in ship-shape to rescue "wildlife" (which was simulated during the event with local produce), deploy the equipment needed to contain a spill, and plan for the aftermath of the immediate response.

# Wallabies in the crosshairs



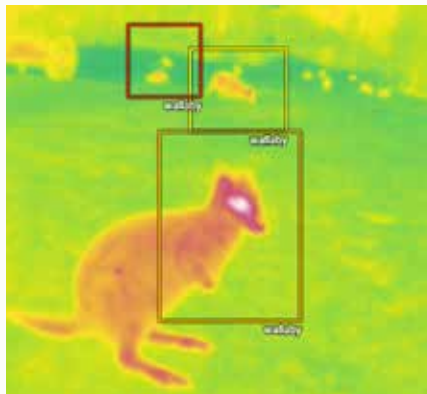
Heliventures and Trap and Trigger contractors with a female wallaby killed in the Kakanui Mountains in June. The wallaby was shot from a helicopter equipped with thermal camera technology during a daytime flight.

## The war against wallabies is warming up in Otago, as ORC takes new steps to keep the invasive pests from establishing in our region.

Bennett's wallabies are categorised in Otago's Regional Pest Management Plan under an eradication programme, meaning ORC aims to reduce their numbers to zero in the short or medium term. They were introduced to South Canterbury in 1874, and became a significant pest in the area by the 1940s. Wallabies have the potential to significantly impact on our economy and local biodiversity values and become a burden for future generations, should feral populations become established.

With support from Biosecurity New Zealand's National Wallaby Eradication Programme, an enhanced programme of surveillance, control, and public awareness is now underway in Otago. Funding of \$373,000 from the national programme essentially doubled the operational budget for wallaby management in Otago this year, enabling more proactive groundwork and education over a wider area.

Significant ground-based surveillance is focused on parts of Otago nearer the border with South Canterbury, such as the Kakanui Mountains, the Hawkdun Range, and the Lindis/Hawea area. Beyond the border, other areas to be targeted include



**Thermal photograph with AI identification of wallabies.**

parts of the Maniototo, the Dunstan Range, and the Macraes area in East Otago.

ORC's wallaby programme involves targeted surveillance of areas where wallabies have previously been destroyed; using cameras in 'dispersal pathways' where they could be entering Otago; helicopter search and destroy methods with a thermal camera; ground-based operations using firearms, dogs, poison, drones, and thermal night shooting; and increased communications with local land occupiers.

Looking ahead, ORC is also advancing new technologies, such as an artificial intelligence thermal camera with the aim of developing a new wallaby control tool. This project aims to expand existing detection technology to automatically detect wallabies where they exist in low numbers. Cameras can be deployed in remote field locations with the possibility of real-time notification when they are triggered by a passing wallaby.

Ultimately, finding and destroying wallabies in low numbers over the vast expanse of the Otago back country – while challenging – is critical to preventing them from becoming established.

Due to the difficult nature of finding wallabies in low numbers amidst remote terrain, public assistance in identifying and managing the pests is essential to the eradication programme. If you see or kill a wallaby, report it online at [www.reportwallabies.nz](http://www.reportwallabies.nz), or directly to ORC by calling 0800 474 082.

Further information on wallabies can be found on the ORC website, at [www.orc.govt.nz/wallabies](http://www.orc.govt.nz/wallabies).

## Get to know the Environmental Monitoring team



ORC's Environmental Monitoring team at a recent team day in Dunedin.

**Continued from cover.** One member of the Environmental Monitoring team, senior environmental technician Lauren Hunter, is dedicated to all things air quality. Her workday involves regular checks on air quality telemetry, to make sure the monitors in seven towns and cities around Otago are functioning as intended, and to remedy any problems that the equipment might throw up.



“There’s also monthly maintenance on all monitors, to make sure they are performing properly and to clean certain parts that could affect data collection,” Lauren tells us.

“It’s really important that we understand the quality of the air we’re breathing, because poor air quality can have detrimental impacts on our health. Monitoring air quality in Otago gives us an idea of how it changes within each day, seasonally, and over the years. For instance, we know air quality gets worse in certain towns in the winter evenings, when people get home and light the fire.

“Having this understanding of how air quality changes over time helps us to know where and when interventions are needed to improve air quality,” Lauren said.

### Out and about

Environmental Technicians Emily Olson and Jono Young are focused on a different natural resource in Otago: water. A field day for these two means travelling to some of the most remote and picturesque corners of the region to perform maintenance on rain gauges, or measure flow rates in rivers and tributaries.

Emily and Jono cover the area from Cromwell to the Main Divide at Otago’s western boundary.

“All of our monitoring sites constantly need to be maintained, surveyed and

expanded upon; there’s always something across the monitoring network that needs to be done,” Emily explains.

“Our monitoring sites also provide the public with live rainfall and river flow data that is used mainly for flood warning, irrigation, and recreational purposes. We’re improving the way the public can access all of the data we collect, so I’m excited for it to be used for so much more, especially research and educational purposes, in the future.”

Jono enjoys seeing a side of Otago that most tourists don’t get to see.

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**“Not many people get to see Otago from the perspective that we do. Visiting remote areas and seeing popular sights from the perspective of the river, the change of view can bring out little secret gems that people just don’t notice.”**

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Emily tells us her favourite monitoring site to visit is the Young River, north of Lake

Wānaka, but it's tricky to pick just one: "I love them all. If I had to choose it would be the Young, it always reminds me how I honoured I am to do my job."

People are often surprised to learn what the monitoring team are up to when they're out in the field.

"Most people, when they see me standing in a river, they think I'm fishing or panning for gold," says Jono. "It can be hard to get my friends and family to get their heads around my job as well; they don't really understand how much information we collect and what it's used for. They just see photos from the parts of Otago I get to visit."

Visiting Otago's most beautiful untouched waterways can have its downsides though, especially around this time of year.

"Standing in the rivers during stream gaugings can get pretty cold in the winter," Emily tells us.

"The water temperatures dip below 5°C, gauging can take up to 35 minutes, and you have to stand as still as possible while recording. Ironically, it's one of the most pleasant parts of the job any other time in the year!"

If you're thinking a job in the Environmental Monitoring team sounds pretty sweet – well, you'd be right, but there's some very specific training you'll need to go through first.

"Learning how to exit a helicopter upside-down, underwater, and in the dark is probably the most exciting thing I've picked up over the years," says Emily.

Yes, you read that right.

"Everyone that does flood gauging from a helicopter on the Environmental Monitoring team has to go through helicopter underwater evacuation training every two years," she explains.

"So, they lower the simulator down facing up at first to get you used to exiting it underwater, then they pull a pin on it that allows it to roll upside-down when it hits the water. You practice unbuckling yourself and others, opening the doors from all different locations, and then they hand out blacked out goggles to make it more realistic for night landings and murky water.

"It's such an amazing training tool, I had no idea this was a thing until I worked here and absolutely loved it!"



**Environmental Technician Emily Olson at the Stoney Creek rain gauge, above Lake Wānaka.**



**River gauging from a helicopter during high flows in December 2019.**



**Before they can undertake river gauging from a helicopter, members of the Environmental Monitoring team undergo Helicopter Underwater Escape Training, which simulates escaping a submerged helicopter in different scenarios.**

# ECO Fund – Wakatipu Reforestation Trust



Volunteers with the Wakatipu Reforestation Trust during a planting day near Lake Hayes in April.

**ORC’s ECO Fund (short for “Environment, Community, Otago”) supports community-driven projects that protect, enhance, and promote Otago’s environment. \$250,000 per year is distributed to projects big and small, for both shovel time and administrative support.**

One recipient of ECO Fund support is the Wakatipu Reforestation Trust (WRT), whose ambitious vision is to “protect and restore the native biodiversity of the Wakatipu Basin through revegetation projects, collaboration, education and advocacy.”

The Trust’s volunteer-run Community Nursery (established in 2014) is currently growing 10,000 native plants per year from seeds sourced from local vegetation. To date, through community planting days, WRT has planted over 55,000 native plants on public land in more than 30 sites around the Wakatipu Basin. Their “keystone” sites are thriving examples of biodiversity restoration: as they become more established, they provide food and habitat for native insects, invertebrates, and birds.

During April and May, the Trust hosted four native planting days with volunteers. On the biggest day – despite the rain and cold – 80 volunteers helped to mark the incredible milestone of having planted 50,000 native trees since planting began in 2015. Thanks to their work, the once broom-infested site along the Queenstown



**The Wakatipu Reforestation Trust runs bi-annual planting days in Spring and Autumn, and no experience is needed to join the fun.**

Trail is rapidly transforming into a thriving grey shrublands ecosystem.

The ECO Fund has enabled WRT to develop and launch their “Educate for Nature – Nurturing Environmental Stewardship” program. Educate for Nature delivers

hands-on educational opportunities that support and encourage our community to value ecological sustainability, while aiming to inspire and motivate young leaders to embrace kaitiakitanga (stewardship) of place. The program’s



**By planting natives from eco-sourced seeds, the Trust is working to gradually restore the natural biodiversity of the Wakatipu Basin.**

three pillars focus on schools, adults, and community groups.

Educate for Nature is delivered by Education & Outreach Officer Jo Smith and Nursery Manager Barbara Horrell, whose work is 50% funded by the ECO Fund. Through this program, WRT hopes to give all 3,500 schoolchildren across Wakatipu a chance to engage in protecting and restoring their native environment.

To get involved in the Trust's community nursery, pitch in at planting days, or to help out with site maintenance, visit their website, [www.wrtqt.org.nz](http://www.wrtqt.org.nz). No experience is necessary, and volunteering is a great way to pick up a range of skills for their own backyards.

To find out more about the ECO Fund, visit [www.orc.govt.nz/ECOFund](http://www.orc.govt.nz/ECOFund).



# Water quality in Otago's lakes, rivers and aquifers



The Shotover River at McLeods Bluff.

## Earlier this year, ORC completed two comprehensive state of the environment reports on the quality of lake and river water and groundwater in Otago.

The first report outlines the states and trends of water quality throughout Otago's lakes and rivers, covering a 20-year period from 2000 to 2020. It analyses 10 water quality variables and indicators relative to nationwide targets at over 120 monitoring sites in Otago: 110 river sites, and 22 sites and depths at nine lakes.

General Manager Strategy, Policy and Science Gwyneth Elsum said the information in the report was valuable for ORC and the wider community, as it updates our knowledge of water quality across Otago.

"This report largely reflects the patterns we have seen in the past, which tell us that water quality is best in the headwaters and at higher elevations, but it suffers at sites in smaller, low-elevation streams that drain pastoral or urban catchments.

"That spatial pattern of water quality in Otago will inform the development of our

new Land and Water Regional Plan, which divides the region by catchment into freshwater management units, meaning we can set rules and objectives to protect the values specific to each part of the Otago.

"This information will also support ORC and the community to implement other water quality improvement initiatives," Ms Elsum said.

The report does not analyse the drivers for water degradation trends, due to the lack of detailed information that ORC currently holds on land use and land management changes at a local or catchment scale; this is likely to be addressed in the upcoming Land and Water Regional Plan.

You can review this report and other technical reports on our website: [www.orc.govt.nz/technical-reports](http://www.orc.govt.nz/technical-reports)

### Groundwater quality

Groundwater is water that has soaked and infiltrated deep in the ground through spaces and cracks in the soil, sand, and rock and pools in geological formations called aquifers.

Groundwater can be extracted from aquifers through bores or wells using surface or submersible pumps for agricultural and industrial purposes or for drinking water; it can also flow freely back to the surface as springs, seeps or wetlands.

The 2021 state of the environment groundwater report is the first of its kind for Otago and provides baseline information on a region-wide scale about the state of groundwater in Otago, combining data and analysis from 54 bores, dating back over thirty years in some cases.





**Groundwater can flow freely to the surface in springs and wetlands.**

Ms Elsum said the report highlighted that water quality issues varied greatly within the region.

“Groundwater quality was particularly degraded in parts of the Lower Clutha and North Otago areas, and was better in the Upper Clutha and Queenstown Lakes areas.

“E. coli accounted for the majority of poor results in the Lower Waitaki and Lower Taieri, nitrate concentrations were highest in North Otago and the Lower Clutha, and dissolved arsenic was detected primarily in the Upper Clutha, Queenstown Lakes, and Central Otago areas – likely derived from schist in the underlying geology,” she said.

“A majority of the monitoring bores – 75% – recorded elevated levels of E. coli above drinking water standards at some point in their monitoring history. While most of these recordings were not persistent, regular exceedances were found at bores in the Lower Taieri and Lower Waitaki areas.

“Not all of these bores are used for drinking water – with some used for monitoring, irrigation, and farm use. However, this consolidated overview of groundwater quality is a pertinent reminder that those on private drinking water supplies should test their bore water regularly and take steps to keep their bore head secure to avoid contamination,” Ms Elsum said.

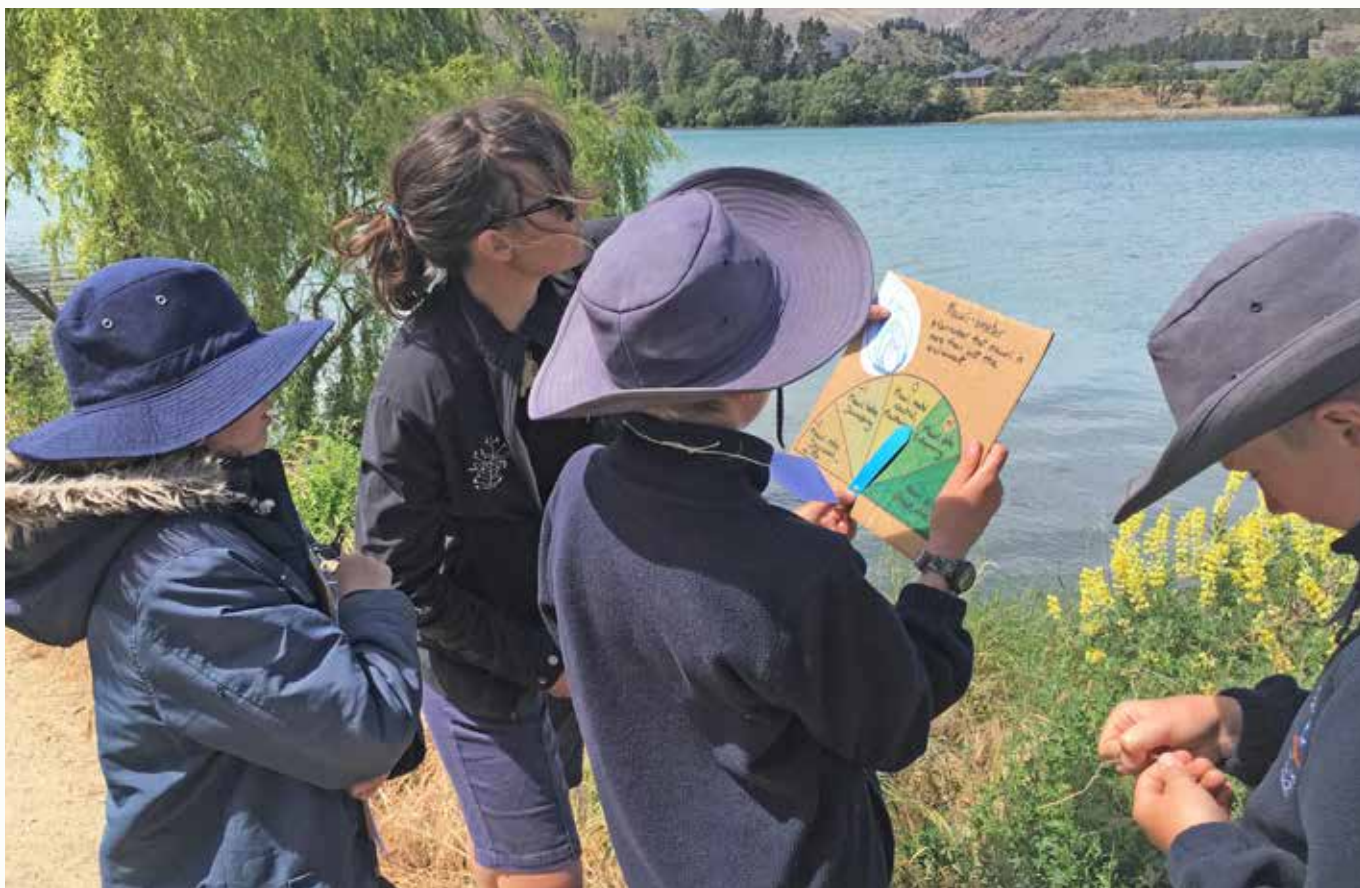
In March 2021, ORC, Queenstown Lakes District Council and the Southern District Health Board held a public meeting for private water suppliers covering agency responsibilities and answered questions for private water suppliers. Incoming Chief Executive for the new water regulator Taumata Arowai also presented. This was filmed and can be viewed on the ORC website.

To access the State of the Environment Groundwater quality report, a bore specification guide for drillers and private suppliers, and to watch the recording of the public meeting, head to our website [www.orc.govt.nz/groundwater](http://www.orc.govt.nz/groundwater)



**Sampling Lake Wānaka at Roys Bay looking towards Mt Alta.**

# What our rivers are saying to us



Primary school students during a Central Otago and Queenstown Lakes Enviroschools hui, working out how to use the "Mauri Meter".

Many schools across Otago are learning how to assess water quality and taking action to look after their local waterways. Students are passionate about water.

They like to swim, fish, and go boating on their local waterways. Many Enviroschools students live on farms or orchards and understand how important healthy waterways are to their families.

At the end of 2020, we held an Enviroschools hui for Central Otago and Queenstown Lakes primary students where we asked students to explore the question: "If the river had its own voice, what would it be saying to us?"

To get them thinking about what our rivers might be saying to us, we got students to identify their favourite river place in Otago.

We did an activity that shows that only 0.0003% of the water in the world (including ice, snow and sea water) is available for us to drink. We did a big brainstorm of all of the ways we had used water that morning.

Then the students were introduced to the concept of mauri, which describes the essential quality and vitality of a being or entity. Kepa Morgan has developed a "Mauri Meter" – a continuum from where the mauri is exhausted (mauri moe, mauri noho) to where the mauri is vibrant and at its fullest potential to support life (mauri tu, mauri ora).

We explored the old part of Cromwell and looked at how the river has changed over time. The students brought their Mauri Metres and discussed how our actions have affected the mauri of this water body.

Back at the hall, students listed all the things that happened to their river from the source to the sea and wrote the story they thought their river might tell us.



Students writing stories about what they think their river might say to us.

# All about groundwater



Groundwater is a precious resource that forms an important part of the water (hydrological) cycle. It is water that has soaked deep into the ground through spaces and cracks in the soil, sand, and rock. It is stored in geological formations called aquifers.

Groundwater can be extracted from aquifers through bores or wells using surface or submersible pumps. The main uses for groundwater in Otago are irrigation, industry, drinking, and stock water.

Groundwater can also significantly impact the quality, quantity, and ecology of surface water bodies that are connected to groundwater (such as rivers, lakes, springs, seeps, and wetlands). Although groundwater is largely underground and 'out of sight', it's important to monitor and protect the quality and quantity of this resource.

## Protecting your borehead

Although groundwater can provide a good source of water supply, poor bore security can serve as a pathway for contamination into aquifers (for example, when contaminants enter through the bore casing or cap). This poses a significant risk to water quality and human health.

It's important that boreheads are properly secured and the area around them is kept clean and tidy. Proper borehead security includes using a concrete apron, ensuring the bore casing is in good condition, elevating the borehead above ground level, installing backflow preventers to avoid siphoning of contaminants into the bore, and excluding stock and removing all rubbish and hazardous material from the borehead area.

The best way to check for potential water quality issues is to collect a water sample and have this tested by an independently accredited IANZ laboratory, which you can find at <https://drinkingwater.esr.cri.nz/>

Visit the ORC Groundwater webpage for more information and advice about taking water from a private bore,  
[www.orc.govt.nz/groundwater](http://www.orc.govt.nz/groundwater)



## Air quality tips for winter

ORC's advice is to only burn dry, seasoned wood. That means buying your wood in spring or summer so that it can be dried and then burned in the following winter.

If you are only buying your wood now, check to see whether the wood is actually dry. To check that the wood is dry:

### Look

What colour is the wood? Dry wood should be a dull colour while wet wood will have more colour.

### Feel

Is the wood heavy? Dry wood should be light, whereas wet wood will be heavy.

### Listen

Bang two pieces of wood together and listen to the sound they make. If the sound is hollow, then the wood is dry. If not, the wood is still wet.

Where possible, consider using cleaner energy for home heating, such as heat pumps and pellet fires.



The new stock truck effluent disposal site at Tarras is now operational.



Compliance flights at the start of winter showed farmers were preparing well for the colder months.

## In Brief

### ***New effluent disposal site***

Otago's newest stock truck effluent disposal site is now open for business. The new site, on the right-hand side of SH8 when approaching Tarras, is the ninth in Otago's network, making it easier for stock trucks to keep the region's roads clean and safe.

### ***Water metering data due 31 July***

Do you have a water consent? Your water metering records are due on 31 July. If you're not sure how to get the right information, or want to know more about water metering, visit: [www.orc.govt.nz/water-metering](http://www.orc.govt.nz/water-metering).

### ***Long-term Plan adopted***

ORC's Long-term Plan for 2021-31 took effect on 1 July. Thank you to everyone who made a submission on the draft plan and who attended the hearings in May. We received over 560 submissions, which gave Councillors a lot to consider in deliberations for the final plan.

### ***Regional Policy Statement open for consultation***

The Regional Policy Statement is an important document for planners in the Otago Regional Council, and in local city and district councils. ORC's proposed Regional Policy Statement is open for consultation until Friday, 3 September.

To find out more, view the draft, or submit on the Regional Policy Statement, visit [www.orc.govt.nz/rps](http://www.orc.govt.nz/rps).

### ***Winter Grazing preparation positive***

ORC's compliance team are undertaking flyovers to monitor land use practices over winter. The first set of flights in late-May showed signs of good preparation for intensive winter grazing, and relatively few risks to follow up on the ground.

Anyone needing advice about environmental farming practices can contact the ORC Rural Liaison Team on 0800 474 082 or email [rural@orc.govt.nz](mailto:rural@orc.govt.nz).



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