

Rural Otago's water update

Waterlines



Summer 2017



The Clutha River/Mata-au at Alexandra

Clutha River/Mata-au: from mountains to sea

Meandering to the ocean from its start deep in the alps, the mighty Clutha River/Mata-au has shaped our region for centuries. We want you to tell us why you love this iconic Otago river so we can protect and manage it for future generations.

Whether its calmness reflects the stunning surroundings or its raging torrent expresses its strength, the Clutha River/Mata-au demands attention.

This celebrated river has drawn us in, captivating us so much we've built communities along its banks and lake edges.

We use it for fun and relaxation, exercise, and creative inspiration. It supports industry and businesses through providing water for crops and electricity. It also supports life because we draw drinking water for humans and animals. This majestic river also brings people to Otago.

The Clutha River/Mata-au is much-loved, and we want you to take the time to step back and reflect on what this river means to you

as an individual, and also to our communities and region.

Values differ from person to person. Because of this, hearing and understanding what the Clutha River/Mata-au means to people allows us to protect it so our grandchildren and their grandchildren can continue to enjoy the river and all it has to offer.

What is it that grabs you? Is it the stunning beauty of its weather-matching moods? The recreational options it provides? How about the sustenance for your crops or animals, or the electricity it gives us? Or perhaps it's the cultural history and spiritual connections that link you to this beautiful river?

Starting last month and continuing throughout December, ORC staff

are following the Clutha River/Mata-au from its pristine lakes to the Pacific Ocean to learn what you value about the river and what it means to you and your family, to your business, and to your future.

We want to ensure the amount of water in the Clutha River/Mata-au is maintained into the future so we can continue to provide for the environmental, cultural, social, and economic needs of our communities and the wider region.

Take a journey with us and the Clutha River/Mata-au.

Check out our website at www.orc.govt.nz/clutha to be inspired by our video, and give online feedback about what you hold important about the Clutha River/Mata-au.

Got questions? Contact us on 0800 474 0827 or email clutha@orc.govt.nz



Hejlea dairy farm wins water quality award

One of the reasons Ben and Tanya Davie entered the Ballance Farm Environment Awards was to show that dairy farming doesn't deserve a bad reputation.

It paid off when they won the Otago Regional Council Quality Water Management Award earlier this year.

Ben and Tanya entered the awards at the last minute after some encouragement from their bank, and saw it as a good way to benchmark their dairy operation.

The short notice meant they didn't have time to modify their operation for the judging, so it was a very authentic entry that showcased their everyday farming procedures at Hejlea Dairy Farm in Clydevale.

"In a way it was good we didn't have time to change anything. We're passionate about what we do so we were able to present how we normally manage the business," Ben said.

"The feedback from the awards was great because it gave us useful information we could use.

It was a good opportunity to get free advice from a range of professionals.

"Winning the award was unexpected but we're proud we won it, especially because we're dairy farmers and many people blame dairy farmers for poor water quality," he said.

The farm borders the Pomahaka River, with tributaries and tile drains that run into the river. Ben and Tanya often ask themselves if they are doing their bit to look after the water.

"I used to swim in the creek as a kid," Ben said, "but I'm not sure I would let my kids swim in it. Maybe at certain times of the year, but we want the kids to be able to swim in it all the time without worrying."

As members of the Pomahaka Water Care Group, they regularly test their water and have put the

property forward for a case study that the group is initiating around the effectiveness of wetlands and sediment traps.

They look after the water by applying nitrogen little and often to ensure it is taken up. This not only stops it ending up in the Pomahaka River, but also means they are not wasting money. Ben applies the fertiliser himself so he can manage the rate and placement of application closely.

Ben and Tanya have a good relationship with farm owners Raymond and Claire, and love discussing development with them.

"Often sharemilkers don't have a real connection with a place, but we feel a responsibility to look after it," Ben said.

He and Tanya appreciate the quality of the infrastructure, and operate a stop/go notification

system in the dairy shed so everyone knows when conditions are suitable for irrigation, given soil moisture and weather.



Since moving to the farm six years ago they have increased the production without increasing stock numbers, and are also fine-tuning having lighter animals that don't have the same impact on the land as heavier ones.

Ben and Tanya love the farming life and feel it's a good place to raise their four children. Off farm they compete at South Island horse shows, and the silverware and ribbons in their home shows how successful they are. Thankfully the show season fits nicely around the dairy calendar.

They found entering the Ballance Farm Environment Awards nerve-racking because they had to present themselves when they'd prefer to stay in the crowd, but they're pleased they took the plunge.

Entries for the 2018 Ballance Farm Environment Awards have now closed. ORC is on the judging panel and can't wait to see the awesome initiatives people are taking to make sure we have Good Water in Otago.



What's in a stream?

If you get a knock on your door over summer or autumn, it could be from someone wanting access to a stream or river on your property.

The Fish & Flow portal on our website has considerable information about what lives in Otago's waterways, but there are some gaps in our data. Almost 80 sites where water is taken from have little or no information about the fauna in the river.



Fish & Flow Info

This information is needed as part of preparing a consent application to renew a water permit to take water from a stream or river.

ORC is hiring fish experts to survey the sites where information is lacking so we can fill the gaps in our portal.

Many of these sites must be accessed through private land, so if you are approached by a fish survey person working for ORC over the next four to six months, please give them access. You will be able to use the information they gain when renewing your water permit.

Thanks for your cooperation.



What's up in the Waiwera?

We recently put together a report that looks at water quality in the Waiwera River. Sadly, it doesn't paint a pretty picture.

The river details:

- The Waiwera River flows in a northerly direction.
- It starts in the Wisp Range and feeds into the Clutha River/Mata-au, downstream of Clydevale in South Otago.
- The river is fed by rainfall of up to 1400mm per annum in the Kaihiku Ranges, while the lower catchment receives lower levels of rainfall (<700mm per annum).

What we found:

- Water in the Waiwera catchment shows high concentrations of nutrients and bacteria that generally exceed the environmental limits in the Water Plan.
- Of the 13 monitoring sites in the catchment, ten exceeded the limits for bacteria and six exceeded the limits for turbidity (how cloudy the water is). These results are unusually

high for rivers and streams in Otago.

- The level of nutrients is high enough to cause prolific algae growth.
- There have been dramatic reductions in the number and diversity of macroinvertebrate and fish populations, particularly in the mainstem of the Waiwera River. An accumulation of fine sediment is the most likely cause.



Waiwera at Hillfoot Rd

The land details:

Most farming in the lower Waiwera catchment takes place on poorly drained soils, and is only viable thanks to artificial drainage networks (tile drains). These drains convey water to the nearest waterway.

Do we know what's causing the problems in the catchment?

- There is a significant amount of sediment entering the tributaries of the Waiwera. This is most likely caused by stock using tributaries as a drinking water source. The sediment smothers the habitat of invertebrates (fish food), causing the declining fishery of the Waiwera and tributaries.
- As in most agricultural landscapes, there is a

seasonal variation in nitrogen in both the upper and lower catchment. This indicates indirect losses of nutrients associated with farming activities, such as applying effluent during the summer-autumn period, followed by leaching of nitrogen during the subsequent winter-spring drainage period.

- The Clinton oxidation pond discharge to the Kuriwao Stream, downstream of Clinton, is responsible for the sharp increase in concentrations of nutrients in the Kuriwao Stream.

Is there any good news?

The concentration of total phosphorus declined significantly between 2006 and 2017.

While the level is still too high, it's good to see it coming down.

Can anything be done to turn it around?

We hope so! We all want Good Water in Otago, so have a look at your farming practices and see if you can make any changes.

Here's some tips to get you started:

- Don't irrigate over tile drains
- Fence waterways to keep stock out, cattle in particular
- Use reticulated stock water
- Plant the riparian margins

We held a meeting recently to chat with the community about these results, and Craig Simpson from NZ Landcare Trust talked about good management practices and ways farmers can work together to reduce sediment getting into the waterways. For more information go to: **www.landcare.org.nz**

Forestry company falling for the fish



Michael Wallace, Heavyweight Hire

Trees themselves don't have much of an impact on water quality but if harvesting and replanting aren't managed well, the resulting sediment can cause problems if it reaches waterways.

Sediment can kill fish by blocking their gills and filling up their habitat, and it can also block light that's needed for the algae to grow that they feed on.

ORC sponsors the Forestry Environmental Management Excellence award at the Southern Wood Council Forestry Awards. Heavyweight Hire, who was the 2017 winner, operates in an area of the Glendhu Forest that not only has numerous waterways to contend with, but also historic water races and other features protected by Heritage New Zealand.

Heavyweight Hire director Michael Wallace is proud of the award, and said the crew members had big smiles on their faces when they found out they had won.

"We see environmental awareness as being like health and safety. Every person who enters the forest

gets a health and safety briefing, and also an induction to outline the environmental risks. It's part of the daily work plan and I'm proud of how well the guys have taken it on board," he said.

"Rayonier also need credit because they educated us on the environmental aspects of the Glendhu Forest."

Michael says the biggest risk for forestry is sediment in waterways, and the company takes daily measures to make sure this doesn't happen.

"We have a map of the water races and creeks, so we can plan how we'll cross them and make sure sediment is kept out of them. If needed we put in cut-outs to divert water, and every day we monitor the tracks to make sure there's no runoff that could reach waterways," he said.

Staff often have to think outside the square to get trees harvested without damaging water races or harming the environment. While it sometimes adds to the production time, Michael says it's worth it because "Once the damage is done it can't be undone."

Heavyweight Hire has learned tricks such as cutting tracks under water races, and temporarily piping creeks then laying logs over it like a bridge, which allows them to get other logs out without damaging waterways.

"We always restore the area once we've harvested it. There are rules to follow and it's not difficult," Michael said.

The team of 12 was "stoked" to win the award, and while the award has Heavyweight Hire on it, Michael said it's the guys working in Glendhu Forest who earned it.

EAST OTAGO FIELD DAYS



We had a fun two days at the East Otago Field Days in October.

Alongside the usual enquiries about rates and water quality, wallabies were a popular topic. ORC Environmental Monitoring Officer Simon Stevenson answered questions and gave insight into sightings, behaviours and the use of technology in tracking wallabies (he's also training his dog to track them but we'll share that story another time).

A map showing wallaby sightings and killings proved popular and people were unpleasantly surprised to see the numbers of this pest in Otago.

Simon also was keen to spread the message that if you see a wallaby, please report your sightings to us on **0800 474 082** so we can follow it up.



Lake snow (*Lindavia Intermedia*)



Dr Phil Novis, Dr Marc Schallenberg and Dr Adam Uytendaal

Love your lake – what’s the verdict on lake snow?

Lake snow is a sticky mass that floats in the water and has been found in Lakes Wanaka, Hawea and Wakatipu, as well as other lakes around New Zealand.

It causes issues for people using the water because it sticks to everything and clogs filters. In short, while it’s harmless, it’s a nuisance.

ORC funded research to find out if lake snow (*Lindavia Intermedia*) is a recent invader to NZ lakes. Dr Phil Novis from Landcare Research was the scientist who investigated the lake snow. It was an uphill battle at times because so little is known about it both in NZ and globally.

He presented his report at a public meeting in Wanaka in October, alongside Dr Adam Uytendaal, a freshwater scientist at ORC, and Dr Marc Schallenberg from the University of Otago.

They did a fabulous job breaking down the science so it was understandable.

The results:

- It’s more than likely lake snow is an invasive species and was brought into NZ

- The lake snow in NZ is genetically identical to lake snow found in a lake in Washington State, USA

What we still don’t know:

- When it arrived (our educated guess is in the early 2000s)
- How we can fix it

What will happen next?

We need to find out more about it.

- We will continue to monitor our lakes on a monthly basis
- ORC will fund more research
- Core samples will be taken from lakes affected by lake snow to see if we can find out when it came to NZ
- We will investigate other examples of lake snow in NZ and globally
- The University of Otago will fund more research (1 year programme)
- Research will be carried out into lake snow and fish populations

- The Ministry of Business, Innovation and Employment will fund research (5 year programme)
- We will determine the environmental history of 380 lakes in NZ through sediment coring
- We will investigate technologies for field-based measurement of lake snow

What does this mean?

There is a lot more we need to learn about lake snow, and unfortunately there are no quick fixes.

What can you do to help?

Check, Clean, Dry. Help stop the spread of lake snow and other freshwater pests such as didymo and lagarosiphon.

Tell us when you encounter lake snow. This will help us find out where it has the biggest impact on people enjoying the lakes. It’s as easy as going to www.orc.govt.nz, clicking on the ‘Submit’ button on the home page, and then the Citizen Science link.

Science in the Shag



Drilling and installation of the groundwater monitoring sites/bore holes



ORC Environmental Monitoring Officer Malcolm Allan measures water flow in the Shag River/Waihemo

The Shag River/Waihemo catchment is special. At 550km² it's modest in size by Otago standards, but it's huge in terms of significance.

History

The area was settled by early Maori, with the river mouth yielding important archaeological evidence of Kai Tahu lifestyles dating back to the 12th century. The area remains culturally significant to Maori.

Industry

Extractive industries have been prevalent in the Shag/Waihemo valley over time, including coal, lime and gold mining. New Zealand's largest gold mine, Macraes, is in the headwaters of the catchment, and forestry is also widespread.

Water from the Shag River/Waihemo enables a variety of land uses and primary production, such as sheep/beef, cropping and horticulture. There is no dairy farming in the catchment.

Aquatic life

The river provides significant spawning habitat for inanga and trout, as well as rare fish like the Taieri flathead galaxias, koaro and lamprey. The river produces a high diversity of invertebrates in its middle reaches that support 16 species of fish and two species of freshwater crayfish.

Recreation

People use the river for swimming, boating, whitebaiting, and fishing. It's a popular waterway!

Water flow

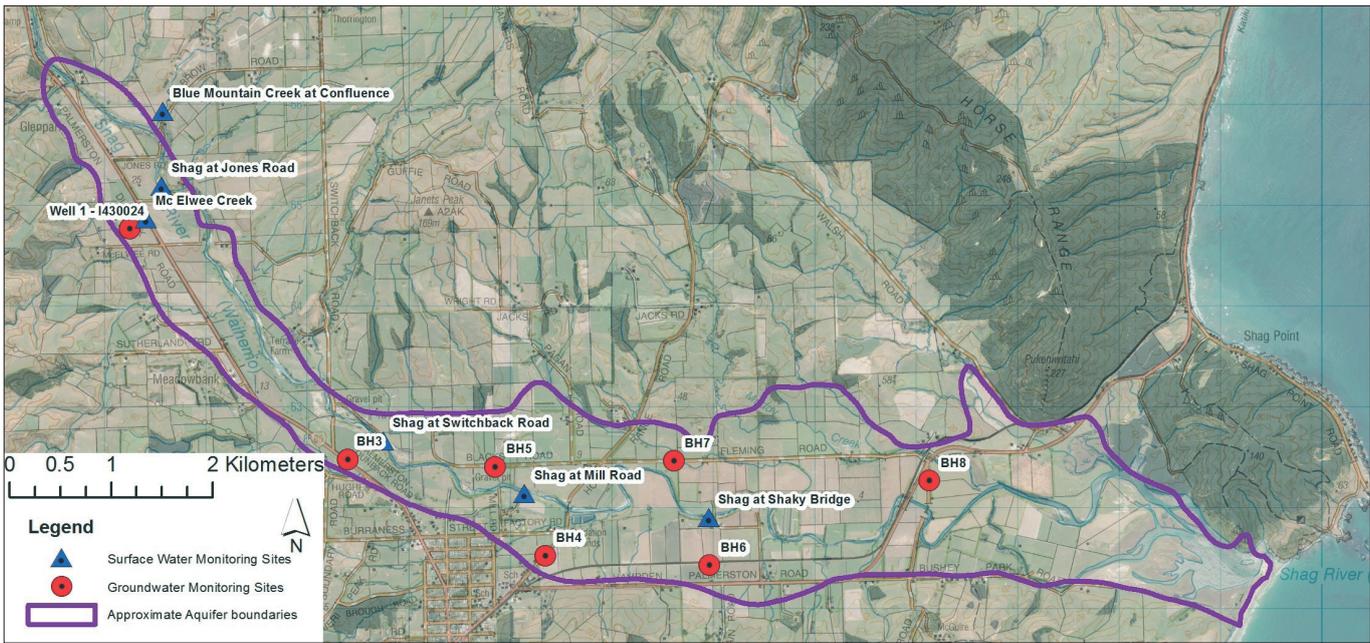
The river can have very low flows during the summer months, and in some spots may dry up completely. It's Maori name, Waihemo, provides an explanation for this: Wai = water, hemo = to go to ground. Scientists have known

for years that the river interacts strongly with groundwater in several locations along the river. During low flows the river will literally run underground in places.

Water quality

Overall, the river has good water quality. However, in the early 2000s ORC water testing showed up elevated concentrations of *E. coli* and nitrogen in the lower reaches. In 2013, thanks to the efforts of local landowners fencing their waterways and excluding stock, *E. coli* concentrations reduced and the river won a national environmental award for 'most improved' river for *E. coli*.

However nitrogen is still elevated, and this has implications for excess algal growth in the lower reaches and the estuary in particular, where algal blooms



Programme monitoring sites

could threaten the sensitive estuarine environment.

In 2014 the Otago Water Plan sought to tackle nitrogen by imposing a nitrogen sensitive zone on most of the flat land surrounding the lower reaches of the river. Over the Shag River/Waihemo Aquifer there is a permitted nitrogen leaching rate of up to 20 kgN/ha/yr. This rate is modelled using a computer programme called OVERSEER.

Science projects

ORC has initiated two interrelated science investigations to make sure the nitrogen leaching threshold is right. One study will look at how the ground water and surface water interact, and what influence this has on nutrient concentrations in the Shag River/Waihemo and in the estuary.

The second study will create a baseline level of knowledge about the estuary and explore how changing nutrient levels may affect its health.

Ultimately, the combined studies should show whether the current nitrogen leaching threshold of 20 kgN/ha/yr is appropriate to protect the interconnected water

bodies (aquifer, Shag River/Waihemo and estuary).

Data is already being collected by ORC scientists, who are taking water samples in the Shag River/Waihemo and in ground water. Nitrate concentrations are also continuously monitored at three sites between Craig Road and State Highway 1.

In addition to this, groundwater and river levels are recorded, and estuary ecological monitoring is being carried out between 2017 and 2019.

Radon sampling (for the science brains!)

A study earlier this year involved Radon sampling. Radon is a soluble, colourless, radioactive gas. It is naturally abundant in ground water and is also present in most rocks and soils. Radon degasses when it enters a river system, so if a high concentration of Radon is found in surface water, it can indicate a groundwater discharge. The results have helped us to determine the places where groundwater is discharging to the Shag River/Waihemo. This information will be combined with other data so we can get a

full picture of what's happening, where, and why.

When will we have the results?

Monitoring began in July-August 2017 and will continue until August 2018, and into 2019 for the estuary study.

OVERSEER budgets will also be carried out to understand the current level of nitrogen loss in the catchment.

Once we have all the data it will be analysed, and a hydraulic model developed that will simulate the interactions of ground water and surface water and the movement of nitrates between the different systems. This process takes some time, but we expect the final report to be completed around June 2019.

The community

We held a meeting recently to talk with the community, including land owners who have kindly allowed us to drill bores on their land to help with the study. We'll keep you up to date as the study progresses.

A day in the life of...



ORC environmental officer Tracey Diack



Wetlands play an important role in water quality because they filter sediment and nutrients. They also regulate water levels by soaking up water in wet weather and releasing it slowly in dry conditions. Lisa Gloag joined ORC environmental monitoring officer Tracey Diack on some wetland inspections on the Otago Peninsula.

For those of you who regularly read this article you'll be aware that I'm prone to mishap, from not having enough muscle to push water through a syringe, to thankfully avoiding sea sickness, to filling my gumboots with icy water. It was poor Tracey who suffered a fall from grace this time, but more on that soon.

Tracey's main role at ORC is to inspect Regionally Significant Wetlands throughout Otago. She's been in this role for a year, after seven years at ORC in other positions including consent admin and a stint in the data team.

I was given the role of co-pilot after Tracey mentioned she's directionally-challenged, which meant she was no better off with me in the passenger seat. But only

one wrong turn later we made it to our first destination, which was a coastal wetland in Hoopers Inlet out the back of the Peninsula.

With gumboots on and the tide out, we wandered off to inspect the wetland. And that's where it all went wrong for Tracey. It's funny how a section of sand can be hard in one spot (where I was walking), and another spot less than half a metre away can suddenly act like quicksand.

I had the best of intentions to rescue Tracey after she got stuck, but was laughing too hard at her demise to be able to help straight away. Several minutes and some complicated moves later, which involved Tracey standing on my feet in her socks while I pulled her gumboots out of the sand while

trying not to fall over, she was safely on solid(ish) ground.

With her socks mainly dry and safely inside her gumboots again, we completed the inspection.

There are 170 Regionally Significant Wetlands in Otago, and Tracey has been tasked with inspecting all of them as part of a five-year programme. Some will be inspected every year and others less frequently, depending on where they are. It turns out that some regionally significant wetlands are even more significant than others.

The inspections involve Tracey making sure all the wetland rules are adhered to, such as stock not causing damage to the wetland, and vegetation being natural to the environment. She also makes a



A Regionally Significant Wetland on the Otago Peninsula

note of the wildlife she observes so she can compare the information between inspections.

With around 90% of New Zealand's wetlands being cleared and drained in the last 150 years, it's good to see an increasing number of land owners realising their value and restoring them. Aside from the water quality benefits they provide, they're also great for biodiversity by attracting birds, fish and insects.

Tracey's physical wetland inspections often follow a desk-top assessment back in the office. She's also ventured into the sky to inspect them because some of the larger ones are best viewed from above. A few on-ground visits came about from this, when stock causing damage to the wetland was observed.

Tracey loves the variety her job offers and the mix of desk-based and field-based work that goes with it. It suits her Bachelor of Science in geography nicely. When

she's not at work she's planning her next holiday with her husband, or curled up on the couch with a good book. She's also a keen photographer, which comes in handy because her job involves taking photos of the wetlands for the files.

Some of her beautiful photography is in our new wetlands brochure. If you want a copy of this please email me at water@orc.govt.nz and we'll get one posted to you.

What makes a wetland regionally significant? Wetlands with specific values such as a habitat for rare or threatened species, a high diversity of indigenous flora and fauna, or valued by Kai Tahu, are considered to be regionally significant. For a full list of values and to find out if you have one on your property go to our website at www.orc.govt.nz and search for 'regionally significant wetlands'.



A sticky situation for Tracey

What's up at ORC?



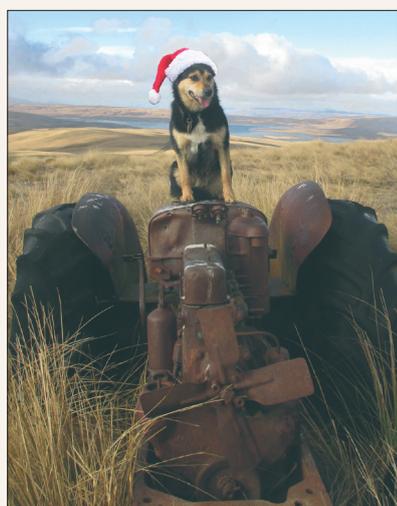
A new pest plan for Otago

We're writing a new pest plan so we can Protect our Patch. The pest plan will outline what plants and animals will have rules around how they are managed. We held a workshop with key stakeholders at the end of October and sought public feedback during November. Don't worry if you missed out on this as there will be another chance to have your say when the plan is notified for public submissions around the middle of 2018.



See pollution? Give us a call

If you see pollution to air, water or land, please call our pollution hotline on 0800 800 033. Otago covers a large area, so we rely on the public to let us know if they see something that will harm the environment. Please report pollution to us as soon as you see it because it's hard for us to track the source of the pollution if we can't get there straight away. Calls will be dealt with in complete confidence. We had 1410 calls to the pollution hotline during the 2015/16 financial year and it's great to see people taking action to look after our beautiful region.



Happy holidays!

On behalf of all the staff at Otago Regional Council, we wish you and yours a very happy holiday. We will be closed between Christmas and New Year, but our pollution hotline will still be operational. We hope you have time off planned to relax, unwind, and enjoy all that beautiful Otago has to offer.

*Have you signed up for **On-Stream** yet?*

We have a monthly e-newsletter that keeps you up to date with what's happening around Otago.

Email us to sign up: water@orc.govt.nz



Want another way to keep up to date with what's happening in our region?

You can "Like" Otago Regional Council on Facebook for regular articles and tidbits.



70 Stafford St Private Bag 1954 Dunedin 9054
Phone 03 474 0827 Freephone 0800 474 082 Pollution Hotline 0800 800 033
www.orc.govt.nz
Enquiries: info@orc.govt.nz

