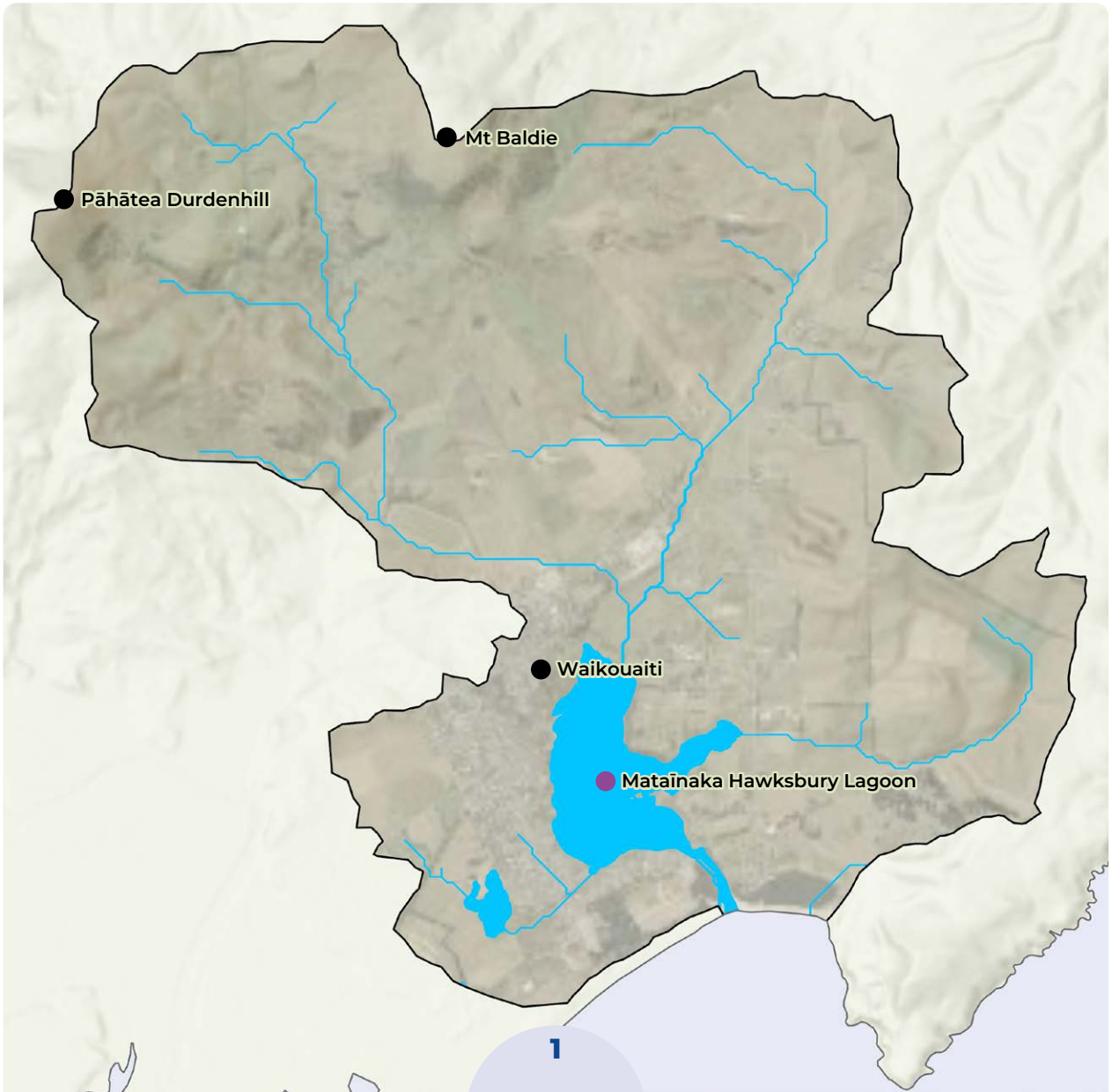
Water Quality in the Waipaku Post Office Creek Catchment

East Otago Catchment Group

WAIPAKU POST OFFICE CREEK CATCHMENT

This factsheet summarises what is known about water quality and ecological health in the Waipaku Post Office Creek catchment – from the headwaters between Pāhātea Durden Hill and Mt Baldie, through Waikouaiti township and into Mataīnaka Hawksbury Lagoon at the coast. It is based on a desktop review of available data and research, including community water quality sampling by the East Otago Catchment Group (EOCG) in 2024/25 and field observations from February 2026. The factsheet is intended to help landowners and the community understand what is happening in this small but sensitive catchment, and where action matters most.



What shapes water quality here

Waipaku Post Office Creek drains a small catchment of around 16 km² in East Otago, defined by two volcanic cones – Pāhātea Durden Hill (444 m) and Mt Baldie (312 m). The creek descends steeply from these headwaters through rolling downlands to the coastal floodplain, passing under SH1 through Waikouaiti township and the Racecourse – where an eastern arm joins it – before flowing into Mataīnaka Hawksbury Lagoon.

The steep, short catchment makes the creek and lagoon prone to flash flooding. A significant proportion of soils are susceptible to erosion. In the lower reaches, poorly-drained soils remove nitrogen through denitrification – but crack in dry summers, creating bypass pathways that move water and nutrients rapidly into the creek. Once saturated in wet weather, the soils generate rapid overland flow that delivers sediment, nutrients and *E. coli* straight to the creek. The lagoon only opens and flushes significantly during large rain events – the same events that deliver the biggest pulses of sediment and nutrients from the catchment.

The steeply descending catchment means that when it rains hard, water – and everything in it – moves fast. Slowing the flow across paddocks and in swales and gullies before it reaches the creek is the single most important thing landowners can do for the health of the creek and lagoon.

Land use is predominantly pastoral grazing of sheep, deer, cattle and horses, with urban land use around Waikouaiti township and the lagoon. Flow is low and seasonal – the headwaters were completely dry in late Feb 2026, while the lower tidal reaches near the Racecourse were turbid and near-stagnant.

Mataīnaka Hawksbury Lagoon – a sensitive receiving environment

Mataīnaka Hawksbury Lagoon is the catchment's receiving environment – where everything from upstream ultimately arrives. Mataīnaka means 'the nursery of the īnaka (galaxid)' and the lagoon holds deep cultural significance for Kāi Tahu as an important mahika kai (traditional food-gathering) area.

Like Andersons Lagoon to the north, Mataīnaka Hawksbury Lagoon is an intermittently closed estuary: the mouth opens only occasionally after high rainfall or tidal events, or through mechanical intervention by the Otago Regional Council (ORC) to manage flood risk.


Poaka / pied stilt © Paul Sorrell

This limited flushing means sediment, nutrients and algae accumulate in the lagoon rather than flushing to sea.

The lagoon has been significantly modified and reduced in extent – now spanning around 52 hectares, about two-thirds of its original extent, with two causeways that greatly restrict water movement. It is managed as a DOC Wildlife Reserve with day-to-day oversight by local residents and Friends of the Hawksbury Lagoon, and is recognised as a regionally significant wetland with high bird and fish diversity. A fishing reserve (Fenton) for Kati Huirapa Runaka ki Puketeraki sits within the Lagoon. However, despite Mataīnaka Hawksbury Lagoon also sitting within the East Otago Taiāpure, the beneficiaries of this reserve do not practice their customary activities, due to concerns regarding water quality and food safety.

How healthy is the Waipaku Post Office Creek system?

No long-term monitoring exists of the creek itself. However, the East Otago Catchment Group – with Kāti Huirapa Rūnaka ki Puketeraki and Waikouaiti Primary School students – carried out six rounds of water quality sampling at three lower-catchment sites between July 2024 and April 2025. Key findings:

- **Dissolved oxygen concentrations were low** (below 50% saturation) on some occasions, especially in the lower, slow-moving reaches. When combined with warm temperatures in summer, these conditions could become stressful for some aquatic life.
- **Turbidity**, an indicator of suspended sediment, was high at times and the lower reaches often look very murky.
- **Nitrate-nitrogen concentrations were low**, which is encouraging. Although total nitrogen concentrations are higher, most of this nitrogen is in organic forms that are not immediately available to plants, and poorly-drained lower-reach soils likely remove much of what does enter the water through denitrification. However, because nitrogen is the key nutrient in this system that limits plant growth, even small inputs reaching the lagoon – particularly storm pulses that are rich in nitrogen and bypass denitrification – can fuel algal growth.
- **Plant available phosphorus** (dissolved reactive phosphorus, DRP) concentrations were higher than nitrate-N and made up a much larger proportion of the total phosphorus pool, particularly after dry weather. Worth watching given the lagoon's already elevated nutrient status.


Tuna / Longfin eel © Shaun Lee

- *E. coli* concentrations were typical of many low-intensity rural catchments – mostly around levels where care should be taken around contact recreation. One high result (1,200 *E. coli* / 100mL) at Glasgow Street followed a rainfall event, consistent with overland runoff.

- Invertebrate community health is predicted to be 'poor', with modelled macroinvertebrate health community health index (MCI) scores likely in the low 80s.

- Native fish are present, with encouraging results from eDNA sampling in November 2024. Strong signals were returned for common bully, longfin eel / tuna, īnaka and banded kōkopu at all three lower reach sites, and shortfin eel was also detected. Longfin eel and kōura were detected further up the catchment. eDNA detects presence rather than counting individuals, but the range of species and strength of signals is a positive sign – and these are taoka species of significant ecological and cultural value worth protecting.

Mataīnaka Hawksbury Lagoon

The lagoon has been studied more extensively and intermittently than the creek itself, and the picture it paints is one of a system under significant stress:

- The lagoon is highly turbid and nutrient-enriched (eutrophic). Its characteristically green, cloudy water reflects high concentrations of suspended algae. While the lagoon recorded the highest algal activity (measured as chlorophyll-a) of 17 intermittently closed estuaries in Otago some 15 years ago, more recent work commissioned by the ORC suggests that water clarity has improved in parts of the lagoon, though the upper lagoon and Waipaku areas remain more turbid.

- Dissolved oxygen levels have been recorded as low as 2.4 mg/L on multiple occasions – low enough to stress fish and other aquatic life, especially in summer when water temperatures can also be high.

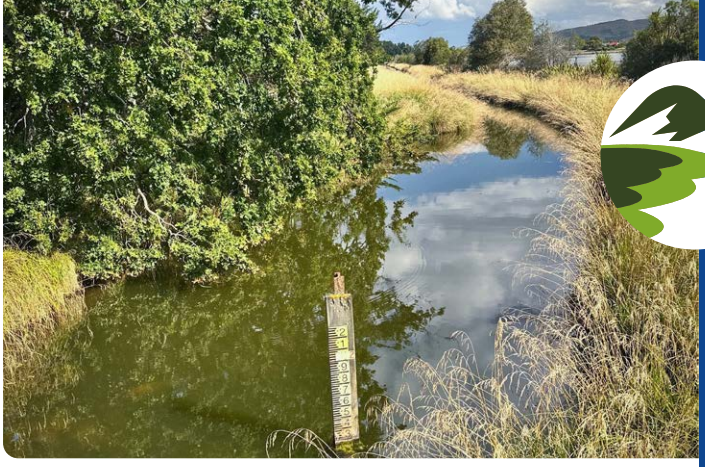
- Organic-rich, oxygen-depleted mud has accumulated on the lagoon bed over decades – and almost none of it leaves owing to infrequent tidal flushing. Under low-oxygen conditions this sediment can release nutrients, especially phosphorus, back into the water, fuelling further algal growth even without fresh catchment inputs. Wind and tidal currents resuspend it, creating a cycle that is difficult to break. Every load of sediment entering from the catchment adds to this legacy. The high nutrient loading of lagoon water is considered to accelerate midge reproduction; midge clouds are a frequent complaint of Waikouaiti residents especially those living close to the lagoon. Reducing inputs won't quickly reverse existing conditions – but it can stop the problem worsening.

- Despite the lagoon's degraded state, it provides important habitat for a wide range of waterbirds. Species recorded include royal spoonbill, black-billed gull, Caspian tern, variable oystercatcher, white heron, eastern falcon, and pied stilt – several of which are nationally threatened or at risk. More common waterfowl including New Zealand shoveler, paradise shelduck, grey teal, and black swan are also present, and several species breed at the site. The lagoon and its connected tidal reaches also support tuna/eels, īnaka and other native galaxiids, which need to travel between freshwater and the sea to complete their lifecycle.

Is river health getting better or worse?

For the creek, we don't know – there isn't enough monitoring history. The recent sampling carried out by the East Otago Catchment Group in partnership with Kāti Huirapa Rūnaka ki Puketeraki and Waikouaiti School offers an important first picture of water quality conditions.

For Hawksbury Lagoon, the picture is clearer – and concerning. The lagoon has been in a degraded state for some time. It contains a substantial store of soft, nutrient-rich muddy sediments that, together with restricted flushing, promote ongoing cycles of algal growth and oxygen depletion. A 2023 assessment of Otago's intermittently closed estuaries identified Hawksbury as one of five high-priority estuaries not currently monitored by ORC.



How are contaminants getting into the water?

Understanding how contaminants reach the creek helps target action in the right places. This is a small, steep, responsive catchment – when it rains hard, water moves fast:

- **Sediment** enters the water during rainfall – picked up as overland flow moves across paddocks and through swales and gullies, carrying soil into the creek and ultimately the lagoon. Bank erosion during high flows adds to this. The hilly and undulating terrain and erosion-prone soils mean this catchment is particularly vulnerable.

- **Nitrogen** enters mainly through leaching from free-draining soils and soils that crack in dry summers, creating fast bypass pathways. In winter, the same poorly drained soils saturate quickly under stock, increasing overland flow. The lower reaches likely naturally remove much of this through denitrification – but during storms, fast overland delivers pulses of nitrogen that are rapidly delivered to the creek and, from there, into the lagoon.

- ***E. coli*** **(faecal) contamination** comes from stock with access to waterways, overland flow during rainfall, and waterfowl around the lagoon. Concentrations are highest during and after rain – when the water is most likely to exceed safe limits for contact recreation.

Actions you can take to help water quality

In a small, steep catchment like this, actions by landowners and residents can make a real difference. The key priorities: slow the flow, protect waterways, and keep nutrients on farm.

- Walk your property during or after heavy rain to find critical source areas (CSAs) – swales, gullies and low spots where water runs toward the creek. Long grass and rank vegetation here slows the flow and traps sediment. Check steep tracks, culverts and gateways too – small cut-offs and boards at crossings reduce runoff into the creek.

- Constructed wetlands, ponds and stream re-meandering can be highly effective in a steep, flash-flood-prone catchment like this one – but work in or near a waterway requires careful planning around resource consent and fish passage. Talk to the EOCG or ORC before starting.

- Keep stock out of the creek and drains – even small or intermittent ones – and away from springs and wet areas in the upper catchment. Fencing with rank grass along stream edges reduces sediment and *E. coli* entering the water...

In the lower reaches, bankside shade is especially important – it reduces water temperatures and improves cover for longfin eel and īnanga.

- Plant along stream margins and near the lagoon – even short sections – reduces bank erosion, filters runoff, provides shade and improves habitat for native fish.
- Manage winter grazing on vulnerable soils, as this is the highest-risk period for sediment and nutrient loss. Maintain 5 m setbacks from waterways, avoid planting crop in swales, and check paddocks in wet weather for areas where water gathers before leaving the property.
- In Waikouaiti, what goes onto roads, driveways and gardens during rain can end up in the creek and lagoon. Dispose of garden chemicals, paint and household waste carefully – not down drains or on the roadside. Wash vehicles down on grassed or gravel surfaces to prevent oils, heavy metals and detergents from entering the stormwater system.
- Pick up dog waste and horse poo near waterways and keep drains clear of rubbish.

Small improvements each year add up to significant benefits. In a catchment this size and this steep, every action counts.

Get to know your creek – and the lagoon

One of the most valuable things in a catchment with limited monitoring history is people who know what's normal – and can spot when something has changed. The monitoring already carried out by the East Otago Catchment Group is a great example of this.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- Visit Hawksbury Lagoon at different times of year and note what you observe – water colour and clarity, algae levels, smell, bird activity. Changes over time are informative even without formal measurement.
- Community-based water quality monitoring kits are available through the EOCG – a simple, low-cost way to start building a picture of stream health in your small creeks. Talk to Steph about getting started.
- Report anything unusual to the ORC or the catchment group – unexpected discharges, fish deaths, or sudden changes in water colour or smell.
- Consider getting involved with the Friends of Hawksbury Lagoon, which coordinates voluntary monitoring and enhancement work around the lagoon.

Keep a record of your efforts

It can be useful to take photos of the actions you implement, not only as a record but also a way to reflect on what's worked well and where you might do things differently next time. Consider using farming software (like Resolution or FarmIQ) to link actions to map locations.

Record actions such as:

- length and location of new fencing
- culverts and stock crossings installed
- number, area and width of new plantings
- detainment bunds and wetlands installed.

More information

This factsheet draws on the following sources:

- Milne J. (2026). Waipaku/Post Office Creek, East Otago – summary of information on water quality and ecological health. Memo for the East Otago Catchment Group, 18 May 2026. Traverse Environmental Ltd.
- Schallenberg M. (2023; 2024). Otago's intermittently closed estuaries: assessment and monitoring framework. Hydrosphere Research reports for ORC.
- The Hawksbury Lagoon website (**hawksburylagoon.org.nz**) has a wide range of information from history, to news and reports. The following two reports below can be found on this website:
- MacTavish D, Mitchell R. (2013). Water management options plan. Irricon Consulting, Dunedin.
- Foote N. (2016). Environmental and biological characteristics of East Otago estuaries along a gradient of marine connectivity. Unpublished MSc thesis, University of Otago.

For more information on farm planning and good management practices to improve freshwater outcomes, see:

- Beef + Lamb New Zealand Knowledge Hub: **beeflambnz.com/knowledge-hub**
- Otago Regional Council Farmers Guide: **orc.govt.nz/consents-and-compliance/the-farmers-guide**
- NZ Landcare Trust (good management practices): **https://bit.ly/4mJiZNL**
- Our Land and Water (Farm Management resources): **https://bit.ly/42KBiJi**

To find out more about the East Otago Catchment Group and how they are supporting farmers and the programmes they are running please visit: **www.eocg.org.nz**

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