Our Water Quality

Join us in improving water quality in Thomsons Creek. With your help and a few practical, low-cost (or even no-cost) actions, we can make a real difference.

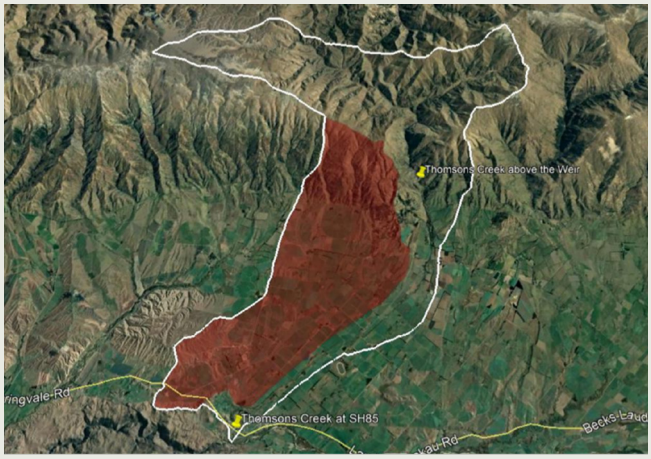
Thomsons Catchment at a Glance

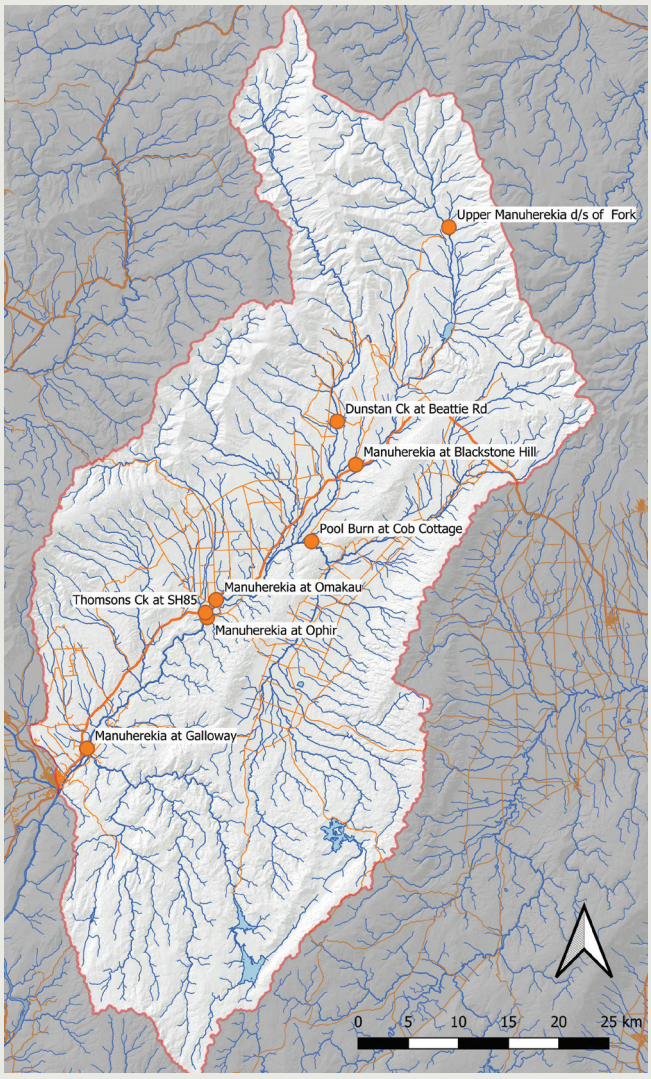
- The creek begins in the Dunstan Mountains and connects with the sluice channel sub-catchment near Omakau, which spans most of the valley floor. It's part of the Manuherekia catchment.
- This area reflects a history of gold mining that disrupted soils and waterways.
- The hill country is extensively farmed and the valley floor is intensively irrigated (mostly by efficient pivot or k-line irrigation).
- The semi-arid soils are productive but consist of fine sediments that can easily be carried into creeks.
- Central Otago is the driest region of New Zealand, receiving less than 400 mm of rainfall annually. When rainfall does occur, it can arrive in heavy downpours that may only affect parts of the catchment. It's not unusual for Thomsons Creek to flood at least once a year.
- Our catchment has cold winters and hot, dry summers. Ophir is known for its extreme weather conditions, including record-low temperatures. In 1995, Ophir recorded a temperature of -21.6°C, which was the coldest temperature ever recorded in New Zealand at the time.
- Water quality in the catchment is under stress, particularly in terms of clarity and Dissolved Reactive Phosphorus (DRP), primarily due to sediment movement and *E.coli* (faecal bacteria). Key contributors likely include overland paddock flow carrying naturally fine semi-arid soils, runoff from rural roads, streambank erosion, and gravel shifts during floods.

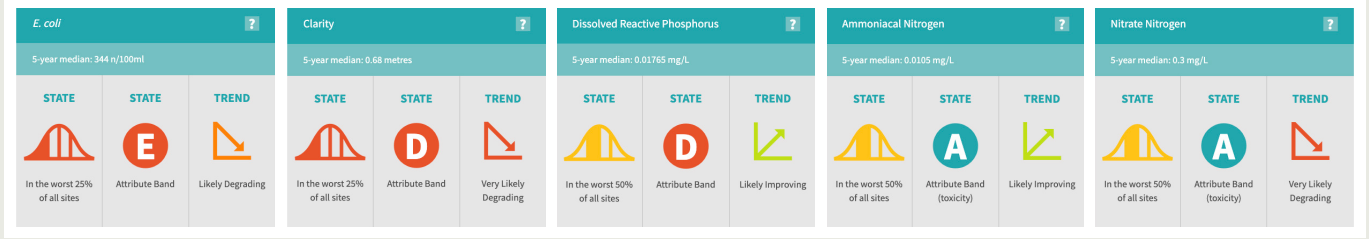
What we know about Thomsons Creek water quality

Water quality in the upper reaches of the Manuherekia, including the tributaries right around the catchment, is good. These areas have low concentrations of nitrogen and phosphorus and support healthy macroinvertebrate populations, suggesting a stable aquatic ecosystem. However, water quality deteriorates in parts of the catchment valley. Monitoring at three sites reveals poor water quality, highlighting the need for targeted actions to improve these areas.

Thomsons Creek, monitored monthly at SH85 by Otago Regional Council, has good nitrogen levels against national standards (an "A" grade on the LAWA website). However, one form of nitrogen, NNN, may be degrading, warranting attention to maintain its A grade. While nitrogen levels are currently good, the degrading trend means ongoing attention is needed to prevent further decline. The creek receives an E grade for *E. coli* and a D grade for clarity and DRP **(lawa.org.nz)**.







What's the impact of sediment, *E. coli*, and Phosphorus on Thomsons Creek?

- **Nutrients (phosphorus and nitrogen):** Excessive nutrients in the creek can lead to algae and weed overgrowth, such as watercress. This can deplete oxygen levels at night due to respiration (as the algae are not producing oxygen via photosynthesis), which harms fish and sensitive macroinvertebrates. It can also choke creeks with vegetation, impeding water flow.
- **Fine sediments:** Sediments clog creek gravels and cobbles, reducing habitats for fish and their invertebrate prey. Once fine sediment exceeds 30% of the creek bed, it significantly impacts aquatic life and the bugs they eat. Sediment in the water also reduces clarity, making it harder for fish to find food.
- ***E. coli:*** It's an indicator of pathogens from animal, bird or human faeces. High *E. coli* levels pose health risks for drinking water and recreational activities, affecting both humans and animals.

What happens when Thomsons Creek water flows into the Manuherekia River?

Sediment, *E. coli* and nutrients are elevated in the Manuherekia River, downstream of where Thomsons Creek joins it. Thomsons Creek inflows contribute to these results.

However, not all these impacts originate from rural land. Research shows that the Omakau sewage treatment plant may be substantially contributing to sediment, nutrient and *E. coli* levels in the Manuherekia River downstream of Thomsons Creek (Ophir (Hudson & Shelley 2019, Hickey & Olsen 2020).

The Central Otago District Council (CODC) is exploring options for improvement.

It's important that we all do our bit to reduce contaminants from rural land in the Thomsons catchment and support better water quality in the wider Manuherekia catchment.

Manuherekia River immediately downstream of Thomsons Creek.
Photo by Dr Dean Olsen

Positive Progress in the Thomsons Catchment

There are already many great initiatives underway!

- **Wetland construction:** The farmer-led Thomsons Catchment Project has built a wetland at the bottom of the sluice channel to help reduce sediment, phosphorus, and *E. coli* leaving the catchment.
- **On-farm improvements:** Landowners have implemented extensive measures such as fencing, grass setbacks along creeks, riparian planting, and effective winter, soil and irrigation management.
- **Environmental farm plans:** Many farmers have created and acted on environmental farm plans, taking proactive steps to protect the catchment's ecosystem. Plenty of action to be proud of!

These efforts reflect the community's commitment to positive change. But there's still some work to be done to improve the water quality E and D grades around *E. coli*, clarity and phosphorus. Tackling these issues at their source is the most effective strategy.

How you can help improve Thomsons Creek water quality

Your actions can make a significant difference. Modelling conducted by the ORC science team demonstrates that if everyone adopts good on-farm practices, we may have a good chance of improving water quality enough to achieve the draft plan targets. While many positive practices are already in place, it's essential to identify any "hotspots" on your property where phosphorus, sediment and *E. coli* from animal waste may be washed into the creek. This contamination often occurs when water flows across paddocks into creeks, or during activities near or in the creek.

Top tip:

Monitor water flow in wet conditions: Rain often exacerbates nutrient and sediment runoff. During rainfall, observe your property to spot water flow paths that carry phosphorus, sediment and *E. coli* into creeks. Once in the creek, they can stay in the water system for days, weeks or months.

There are some easy, practical fixes to reduce runoff:

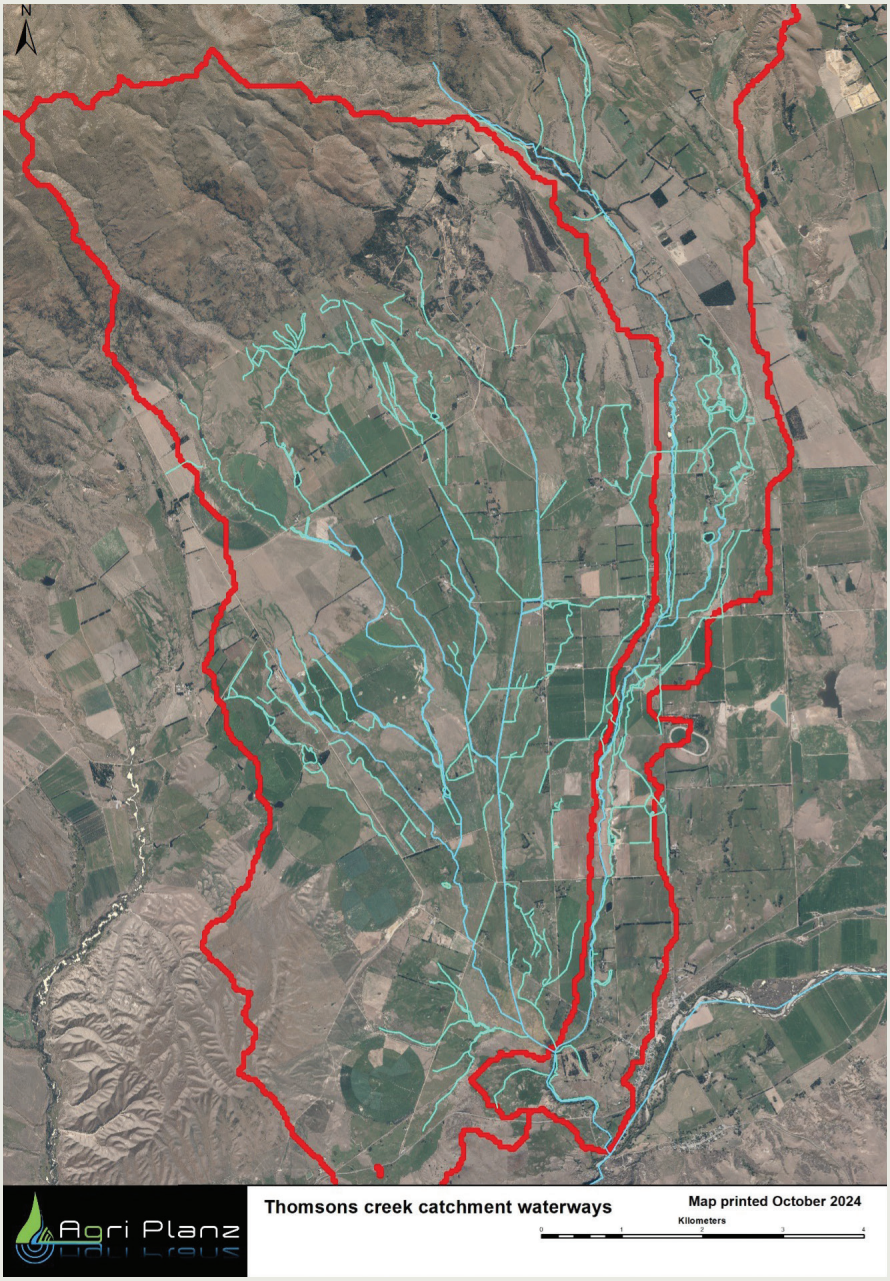
- **Check gullies and swales:** Is there anything you can do to “slow water flows” and help nutrients and sediment settle back into your paddocks, rather than being washed into the creek?
- **Keep stock out of waterways:** Preventing stock from entering waterways reduces faecal contamination and eliminates pugging damage. Ungrazed grass buffers help keep sediment and nutrients from entering the creek.
- **Eliminate irrigation runoff:** Ensure irrigation systems don’t contribute to runoff into creeks.
- **Winter management:** Plan and conduct careful winter grazing to reduce sediment runoff.
- **Grass buffers:** Install decent grass buffers next to waterways and in swales when establishing crops to capture runoff.
- **Culvert maintenance:** Ensure culverts at stock crossings are properly maintained.
- **Smart cultivation practices:** When cultivating, ensure there are grass buffers around waterways. Avoid cultivating swales that link to waterways and consider using minimum tillage techniques to reduce wind erosion and runoff during rain events.

By taking these steps, everyone can do their bit to improve water quality across Thomsons Creek.

These images illustrate common strategies for reducing overland flow into creeks.

Photo by Danette McKeow

Sediment trap to capture road runoff, retiring wet swales improving stock management and reducing overland flow, planting bottom end of gully to soak up nutrients and slow flow.



THOMSONS PROJECT

Where can I get advice and help?

YOU CAN GET GUIDANCE AND ADDITIONAL INFORMATION FROM

Department of Conservation: **Chris Kavazos**

Otago Regional Council: **Pete Ravenscroft**

Thomsons Project Manager: **Nicola McGrouther**

To find out more about the Thomsons Catchment Project, follow us on Facebook at **www.facebook.com/ThomsonsCatchmentProject**

Or visit **www.mcg.org.nz/thomsons-project** for copies of our fish barrier, perched culvert and galaxias planting factsheets.