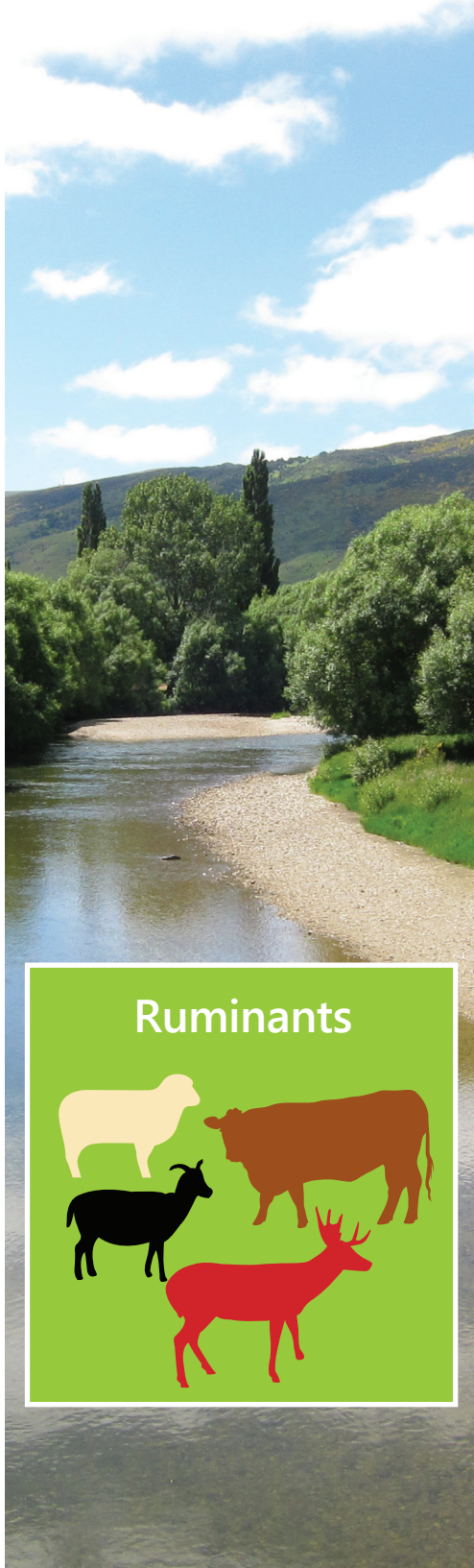




Learn more about the environment and find out what Environment Southland's scientists are up to.

Monitoring Faecal Contaminants in Southland's Rivers & Streams

A pilot study for a new faecal testing tool



Faecal contamination of Southland's rivers and streams poses a health risk for livestock and people who come into contact with or collect kai (food) from contaminated water.

The term 'faecal contamination' refers to a range of disease-causing micro-organisms (called pathogens) such as viruses, bacteria and protozoa. It is too expensive and time consuming to test for all pathogens in our waterways. Instead we focus on testing for indicator bacteria, faecal coliforms and *E.coli* as part of our State of the Environment river monitoring and summer bathing monitoring programme.

Trialling a new faecal testing tool

If unusually high levels of indicator bacteria are found there may be a need to identify the source of faecal contamination. Scientists use specific tests we call 'Faecal Source Tracking' (FST) tools to trace waste back to a specific source.

Until recently scientists could only test to see if contamination came from people, ruminants, wild fowl, or plant break down, which didn't give us a complete 'picture'. Previously, ruminants were classed together in our testing results, however we now have a new test that can identify ruminant sources specific to sheep (ovine) or cattle (bovine).

Where does faecal contamination come from?

The main sources of faecal contamination in Southland's waterways are agricultural runoff, residential, municipal (town and city), agricultural or industrial wastewater. However, in order to help make decisions about how to better look after our streams and rivers, Environment Southland needs to better understand where faecal contaminants are coming from. Then we can make decisions about the best way to minimise their impacts on our waterways.

Building a better picture for Southland

Scientists wanted to test the new 'sheep FST tool' in Southland as a pilot study. We tested 11 rivers known to be contaminated by faecal waste, located in catchments with dairying, sheep farms and urban land use (see map). To get a better picture of what's happening with faecal contamination in our waterways we also looked at:

- Sediment size in the river bed – for example, fine silt, sand or gravel. Sediments in streams and rivers 'pick up' contaminants as they move through the landscape. We wanted to find out if some sediment types 'hold' or store contaminants more than others.
- *E.coli* concentrations in water and sediment. *E.coli* is an 'indicator' bacteria. Although they may not make you sick themselves, these bacteria tend to indicate the presence of other disease-causing pathogens.



What we found

Tests showed that all 11 rivers sampled contained faecal contamination from sheep. One site also had human contamination and three also had contamination from cows.

Human faecal contamination and high concentrations of *E.coli* were found in the Otepunui Creek in Invercargill. This indicates that urban wastewater is entering the Otepunui.

Faecal contamination from cows was found in Waituna Creek, Tussock Creek and the Sandstone Stream. These catchments have a relatively high number of dairy farms. These sites also had *E.coli* levels that have often exceeded Regional Water Plan guidelines in the past.

All river samples tested positive for sheep faecal contamination. This indicates that sheep farming could be a major source of faecal pollution in many of Southland's waterways. We found high levels of faecal contamination from sheep in Waituna Creek and the Waikawa River. The least was found in Tussock Creek and Otepunui Creek.

E. coli results in sediment

The highest concentration of *E.coli* in sediment was found in the Waikawa River at Waikawa. Here the sediment is dominated by fine sand, which suggests that fine sediment washed down from the surrounding catchment may be a source of *E.coli*. Interestingly, *E.coli* levels in the river water at time of sampling were at an acceptable level for contact recreation. However, if sediment is disturbed by recreational use such as swimming, the *E.coli* stored in the sediment could be released into the water, elevating concentrations to a higher risk level.

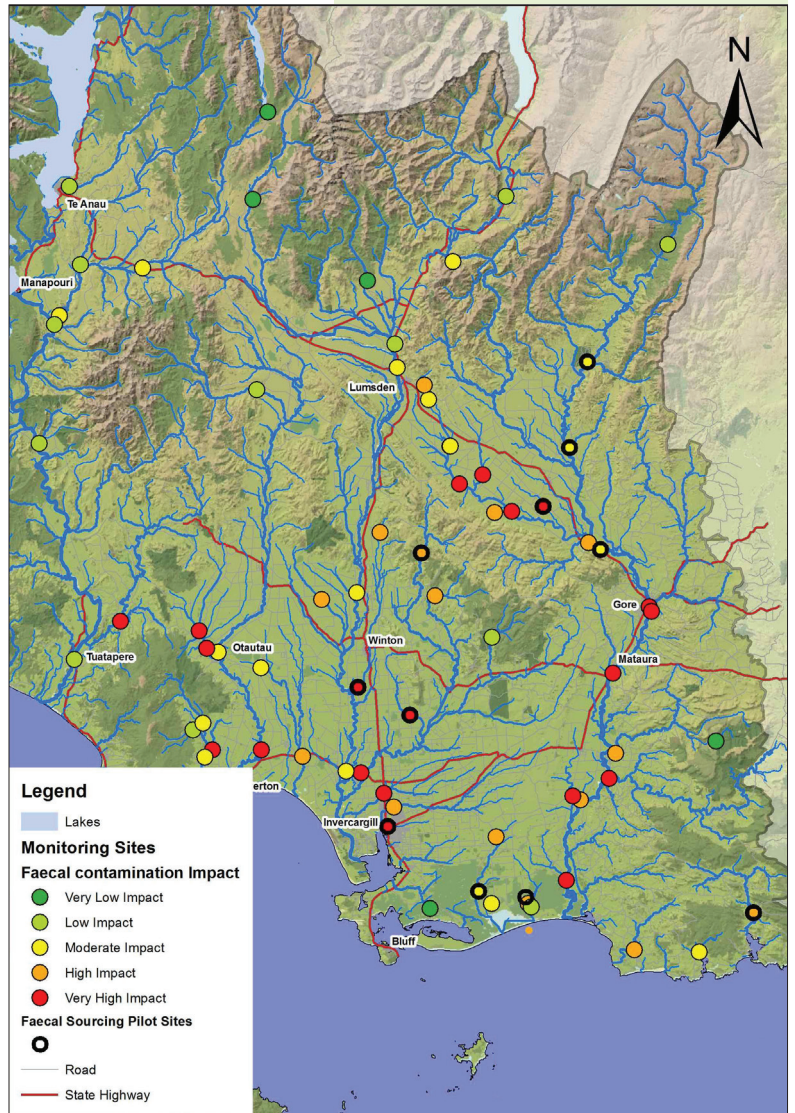
What does this mean for us?

Results from this study show that faecal contamination comes from a variety of land uses in Southland, from urban to agricultural. Results also suggest that good farm management practices are needed across all farm types to protect our rivers, e.g. protecting streams from stock access and implementing good riparian management. A well-managed riparian margin, including a strip of dense long grasses parallel to the river, can filter out contaminants such as animal waste and sediment that are carried by overland flow. This helps to protect waterways from faecal contamination – keeping them safe for us to enjoy.

What next?

Improvements in Faecal Source Tracking techniques mean Environment Southland scientists are better able to understand where faecal contamination in our waterways is coming from. Using this information, Environment Southland can better target information and management actions for good land management.

.....
*For further information, or to read the **Faecal Source Investigations in Selected Southland Waterways** report, go to www.es.govt.nz.*
.....



A pilot study is a small-scale research project that allows scientists to refine their ideas and techniques before committing to a full-scale study. They are often used to validate methods, or used for practical/cost reasons. Results from a pilot study are indicative only.

ENVIRONMENT SOUTHLAND

Cnr North Road & Price St
Private Bag 90116, Invercargill
Phone: 03 211-5115
0800 76 88 45 (Southland only)
Email: service@es.govt.nz
Website: www.es.govt.nz

November 2014