

Physiographic zone: Riverine

Southland's physiographic zones allow us to better understand why we have variations in water quality in different areas. We've divided Southland into nine different zones according to factors such as soil type, geology and topography. Through them we can target solutions to higher risk areas as opposed to a region-wide, generalised approach.

Understanding your zone

Each zone is different in the way contaminants build up and move through the soil, areas of groundwater, and into our streams and rivers. Physiographic zones allow us to target advice and management strategies to keep farm nutrients on the farm and out of waterways.

The Physiographics of Southland project was developed as part of *Water and Land 2020 & Beyond* so we can better understand:

- where our water comes from
- how water moves through the landscape
- why we have differences in water quality across the region

What does 'Riverine' mean?

The Riverine zone refers to areas adjacent to the main rivers and streams in Southland.

It extends beyond the riparian margin to include floodplains and low elevation terraces.

These areas are strongly influenced by runoff from the Alpine zone.

Key features of the Riverine zone

- Located in northern inland basins and along margins of main rivers to the coast.
- Mostly flat to undulating land located on alluvial terraces and floodplains adjacent to main rivers.
- Steeper slopes occur in headwater areas where this zone extends towards Alpine areas.
- Low denitrifying potential in soils and aquifers.

Water source and movement:

- Main rivers are fed by Alpine zone water, particularly as snow melts during spring.
- Water sourced from a mixture of the Alpine zone and soil water drainage from land adjacent to main rivers and streams.
- Soil water drains quickly through shallow, stony soils to underlying shallow aquifers.
- Aquifers are highly connected to main rivers with water flowing between them in a relatively short space of time.
- Recharge from alpine rivers dilutes local land surface recharge.

Contaminant movement

The Riverine zone receives water from two main sources:

1. The Alpine zone, which has a diluting effect.
2. Intercepting aquifers, which potentially carry contaminants.

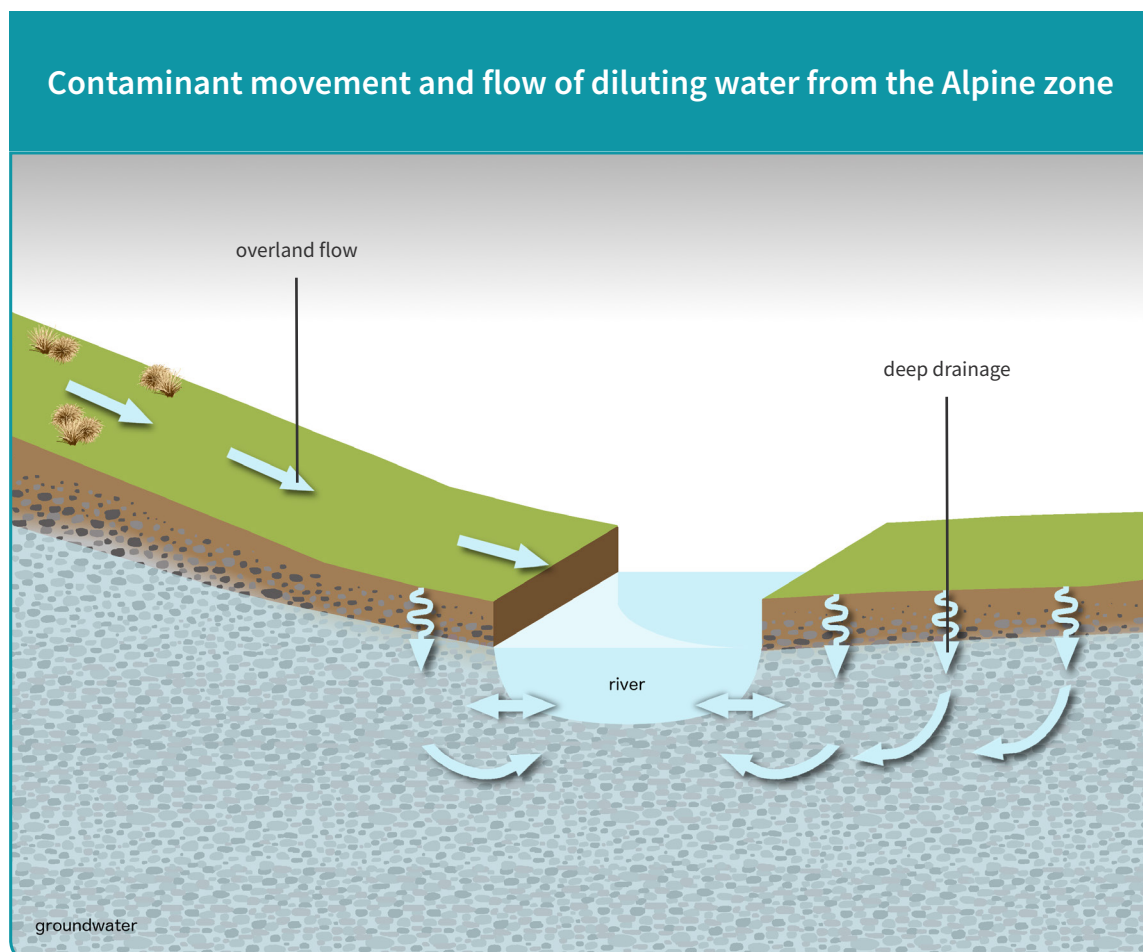
River water quality is best closest to alpine areas, where contaminants in rivers and aquifers are diluted by large volumes of pristine alpine water. Water quality declines in downstream areas due to the cumulative discharge of contaminants from surrounding lowland areas.

Soils in the Riverine zone are well-drained with little risk of waterlogging or overland flow. However, there is a severe risk of nitrogen leaching down to aquifers. As rivers make their way down to the coast, the amount of groundwater intercepted increases, which increases the risk of receiving contaminants.

Contaminant concentrations are unlikely to build up in the aquifers themselves due to extensive mixing with river water. However, they can contribute high nitrogen loads to intercepting rivers, which then flow to receiving environments such as lakes, estuaries and lagoons.

What does this mean for water quality?

- ✓ Rivers and aquifers are diluted by pristine water coming from the Alpine zone.
- ✓ Contamination from phosphorus, sediment and microbes is generally low.
- ✗ Aquifers can contribute nitrogen to intercepting rivers.
- ✗ Contaminants flow with rivers to coastal estuaries and lagoons.



- Streams in parts of this zone with increased slope are at risk of receiving high levels of nitrogen, phosphorus, sediment and microbes from overland flow. In flatter areas, nitrogen leaching to groundwater via deep drainage is the main contaminant pathway. Aquifers in this zone are highly connected to rivers with water flowing quickly between them.

Improving Southland's water quality

The following good management practices are applicable to all physiographic zones in Southland:

- Capture nutrients, sediment and microbes in wetlands and sediment traps
- Nutrient management
- Riparian management
- Effluent management

Good management in the Riverine zone

In addition to the above, good management in the Riverine zone includes measures for reducing the effects of deep drainage, and overland flow.

Reduce the effects of deep drainage of nitrogen by:

- Reducing the accumulation of surplus nitrogen in the soil, particularly during autumn and winter

Reduce the effects of overland flow by:

- Protecting soil structure, particularly in gullies and near stream areas
- Managing critical source areas (CSA)
- Reducing phosphorus use or loss

Physiographic zones and the Southland Water and Land Plan

Environment Southland has developed a proposed Southland Water and Land Plan, using the science behind the physiographic zones to inform the plan and provide a tailored approach to particular issues that have been identified for each zone.

The main aim of the plan is to introduce new methods that help to halt any further decline in water quality by managing activities that we know adversely affect the quality of Southland's freshwater – such as land use intensification, wintering and stock in waterways. A key focus of the changes is to shift all land owners towards good management practices in ways that will give the best gains for maintaining water quality.

Further information

For more information about physiographic zones and good management practices contact Environment Southland. Phone 0800 76 88 45 or email service@es.govt.nz. You can also find out more about the Physiographics of Southland and your zone on our website, www.es.govt.nz.

What zone is your property in? View our map online: <http://bit.ly/waterandlandmaps>



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