

Physiographic zone: Central Plains

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 'Central Plains' mean?

The Central Plains zone includes areas of clay-rich soils found in the central parts of the Southland Plains.

These soils can crack extensively during summer as they dry out, and swell when wet in winter and early spring, becoming poorly drained.

Key features of the Central Plains zone

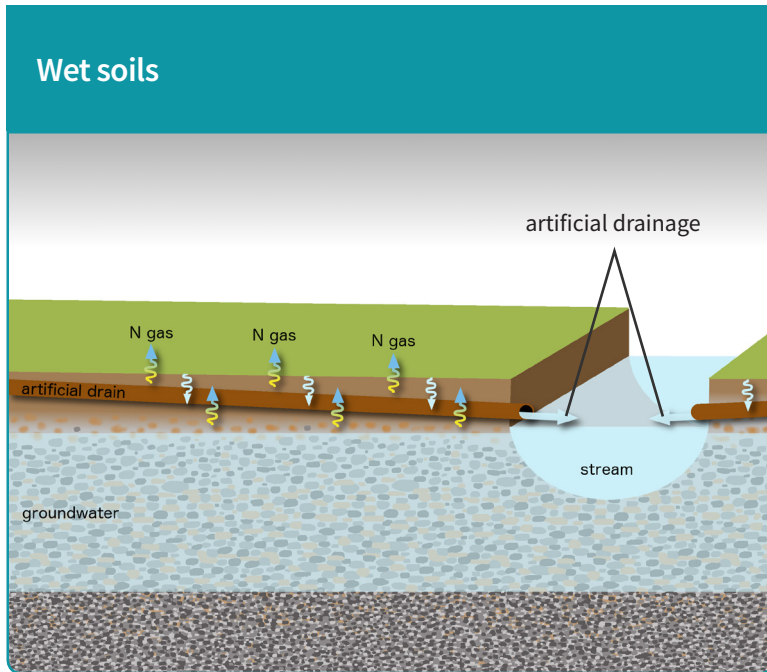
- Clay-rich soils that shrink and crack when dry and swell when wet.
- Wet soils - prone to waterlogging, resulting in an extensive artificial drainage network (mole and tile drains).
- Dry soils - prone to shrinking and cracking, allowing drainage to bypass the soil to the underlying aquifer.
- Central areas of the Southland Plains, including the Heddon Bush, Drummond and Isla Bank areas.
- Dense network of small streams fed by artificial drain network.

Water source and movement

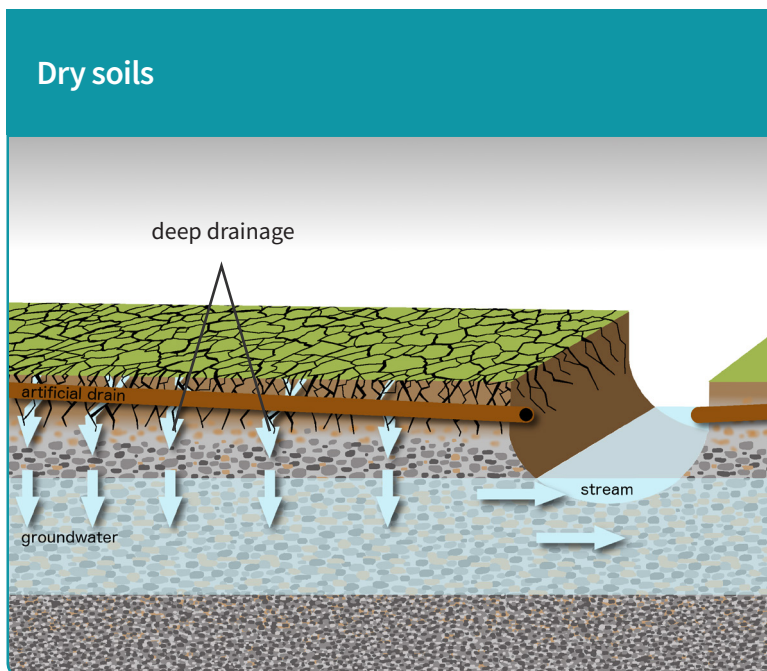
- Underlying gravels host an extensive 'unconfined' aquifer system.
- A dense network of streams flow through this zone.
- Streams and aquifers are not diluted or 'flushed' by a major river.
- Drainage patterns to waterways for this zone vary depending on whether soils are wet or dry:
- Wet soils – water mainly flows via artificial drains into nearby streams.
- Dry soils – rainfall drains rapidly through soil cracks to underlying aquifers.

Contaminant movement

Aquifers and streams in this zone are prone to contaminant build-up as they don't experience dilution by a major river. Patterns for contaminant loss to aquifers and streams vary depending on whether soils are wet or dry.



- ▶ Wet soils: This zone has an extensive artificial drainage network to help manage waterlogging. During heavy or prolonged rainfall, contaminants move quickly via artificial drains to streams. Note that some denitrification does occur in the soil but this does not offset the amount of nitrogen lost through drains.



- ▶ Dry soils: Clay minerals in the soil shrink as soils dry, resulting in the opening of cracks and fissures. During summer rain, water and contaminants move rapidly from the land surface, through the soil to underlying groundwater. Contaminants in shallow aquifers also make their way to streams, adding to their contamination load.

What does this mean for water quality?

✓ Under the right conditions, soils have some ability to remove nitrogen (denitrify).

✗ When soils are wet, contaminants (including nutrients, sediment and microbes) can potentially be lost rapidly to rivers and streams via artificial drainage.

✗ When soils are dry, cracks allow nitrogen to move rapidly through the soil to underlying aquifers.

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 Central Plains zone

In addition to the above, good management in the Central Plains zone includes measures for reducing the effects of artificial drainage and deep drainage.

Reduce the effects of artificial drainage by:

- Protecting soil structure, particularly in gullies and near stream areas
- Reducing phosphorus use and loss
- Reducing the accumulation of surplus nitrogen in the soil, particularly during autumn and winter
- Avoiding preferential flow of effluent through drains
- Capturing contaminants at drainage outflows

Reduce the effects of deep drainage by:

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

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>.

The Central Plains zone describes clay-rich soils found in the central areas of the Southland Plains.