ENVIRONMENT SOUTHLAND
FACTSHEET

WATER AND LAND 2020 & BEYOND

Physiographic zone: Peat Wetlands

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 'Peat Wetlands' mean?

Peat is formed from the partly rotted remains of wetland plants.

Peat accumulates in areas where there is a naturally high water table, above poorly permeable rock.

Peat soils are extremely acidic and have high levels of organic matter. They require extensive drainage in order to support agriculture.

Key features of the Peat Wetlands zone

- Mainly lowland coastal areas, and some isolated sub-alpine areas.
- Low-lying flat land.
- Much of this zone was wetland before being developed, with wetland remnants still remaining in some areas.
- Extremely acidic soils.
- High soil and aquifer denitrification potential.

Water source and movement

- Very high water table and shallow aquifers that flow into nearby streams.
- Peat soils are prone to waterlogging, and will often have a seasonal water table that sits close to the ground surface. This results in seasonal (or sometimes permanent) ponding and overland flow to nearby streams.
- Extensive artificial drainage (open channels and tile drains) that flow to nearby streams where land has been developed for agricultural use.
- Streams rise rapidly in response to heavy rainfall during winter and early spring when soils are wet.
- In coastal areas, surface water and groundwater discharge often occurs into lagoons, estuaries and coastal lakes.

Contaminant movement

A key feature of this zone is the highly fluctuating water table, which can extend up to the land surface during wet winter months. When the water table is high, streams are at risk of receiving high levels of contaminants via overland flow. When the water table is lower, streams receive contaminants via the extensive artificial drainage system.

Soils and aquifers in this zone are mainly made up of organic material, making them very good at removing nitrogen (via a process called denitrification). Therefore, nitrogen build-up is not an issue for aquifers in this zone. However, a lack of silt and clay and the highly acidic property of peat soils mean that phosphorus is poorly retained and easily leached to water. Areas where peat is more fibrous have high levels of microbes reaching surface water.

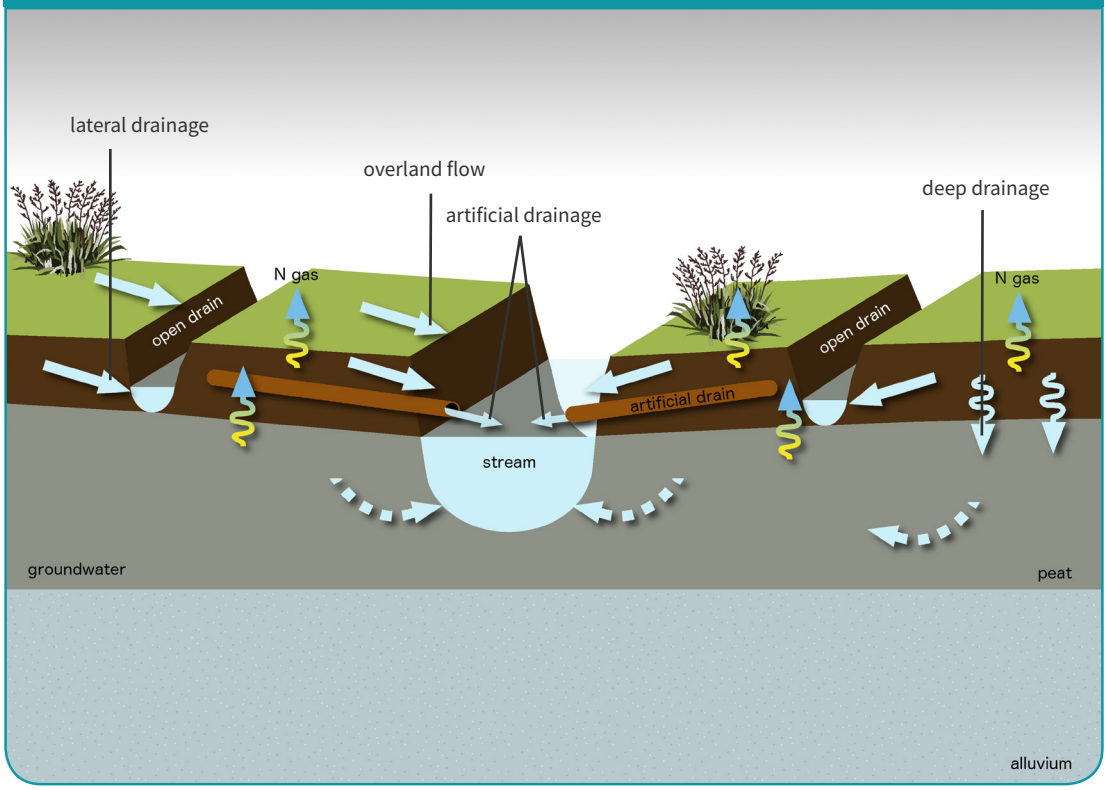
What does this mean for water quality?

√ Low nitrogen accumulation due to the high denitrifying ability of peat soils and aquifers.

X Phosphorus loss is high, as it's poorly retained and leaches easily through the soil.

X Contaminant loss via artificial drains occurs following heavy rainfall or when the water table is near the surface.

Contaminant movement when the water table is high



Streams in this zone are at risk of receiving high levels of nitrogen, phosphorus, sediment and microbes from overland flow and artificial drainage. Lateral drainage through the soil zone and deep drainage are key transport pathways for phosphorus and microbes.

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 Peat Wetlands zone

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

Reduce the effects of deep drainage of phosphorus and microbes by:

- Reducing phosphorus use or loss
- Reducing the transport of microbes

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

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

Physiographic zones and the Southland Water and Land Plan

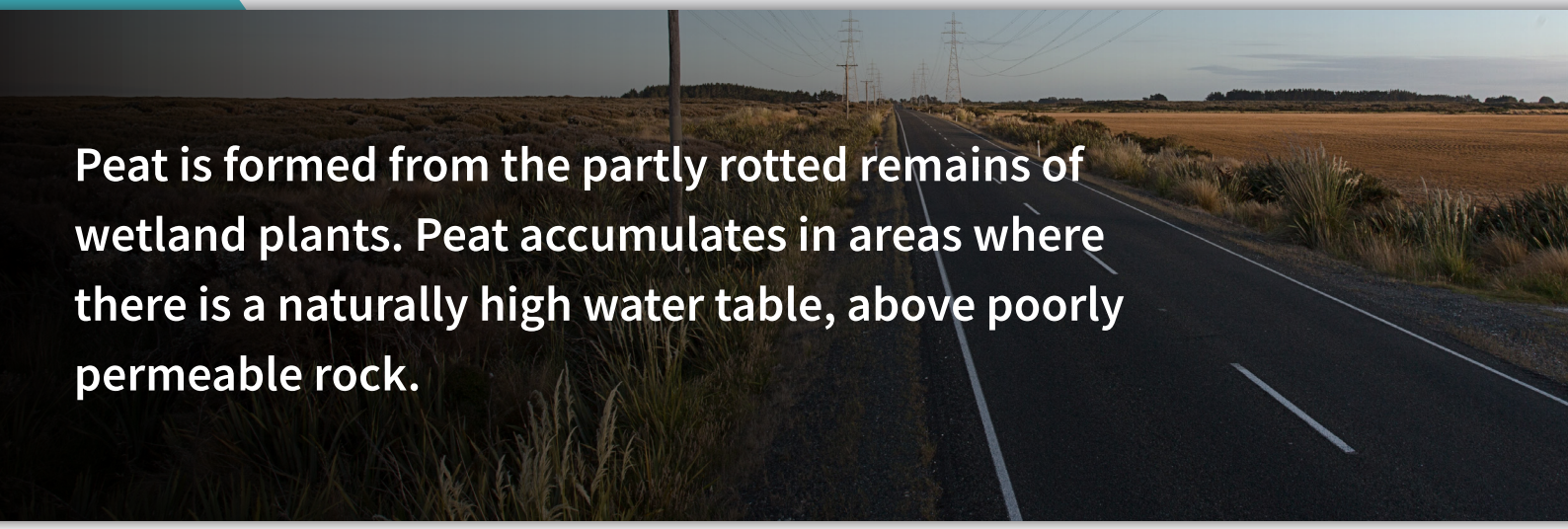
Environment Southland has developed a proposed Southland Water and Land Plan, using the science behind the physiographic zones to inform the plan and provide a tailored approach to particular issues that have been identified for each zone.

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.



Peat is formed from the partly rotted remains of wetland plants. Peat accumulates in areas where there is a naturally high water table, above poorly permeable rock.

environment SOUTHLAND REGIONAL COUNCIL
Te Taiao Tonga

Post: Private Bag 90116, Invercargill 9840 | Deliver: Cnr North Road and Price Street, Invercargill
Phone: 0800 76 88 45 | Email: service@es.govt.nz | Online: www.es.govt.nz