



# Science summary: Catlins Freshwater Management Unit



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## Introduction

The Catlins Freshwater Management Unit (FMU) is located along the southern coast of Otago and contains many unmodified river, coastal and estuarine ecosystems, including an extensive spread of indigenous land cover. The landscape is made up of low ridges running in a north-west/southeast direction which supports the native forest and high-producing grasslands.

Land use in the Catlins includes sheep farming, sheep and beef, and minor dairy grazing and forestry activity, which mostly occurs in the valleys and hill country. The Catlins FMU is sparsely populated with urban areas making up 0.1% of land cover. Approximately 1000 people live in the Catlins. The largest urban centres in the FMU are Kaka Point and Owaka, with about 300 people each.



## Soil and land

The dominant soil orders in the Catlin FMU are brown soils and podzols. Brown soils occur where the land cover comprises exotic grasslands for farming, because their moderate structure and drainage makes them suitable for cultivation. Podzols occur where there is a combination of acid leaf litter and high rainfall, so mainly in areas of indigenous forest. They have low natural fertility and root growth is limited, and as such they require fertiliser if used for grassland farming.

## Water Quantity

Water use requirements in the Catlins FMU are relatively low compared with water availability, as rainfall is high and evapotranspiration is low. As a result, calculating naturalised flows for water use allocation is unnecessary, and observed flows can be used instead.

ORC monitors the flow of two river sites in the FMU: the Catlins and Owaka Rivers, whilst hydrological modelling provides flow estimates for the remaining catchments. The majority of water use occurs within the Puerua River and Owaka River catchments, with water mainly used for rural supply and dairy sheds. Water use compared to availability is the highest in the Puerua River catchment.

## Water Quality

The Catlins FMU is expected to have good water quality due to the intact nature of the headwaters and native vegetation, however cleared valleys allow intensive farming activities and there are indicators of degraded water quality for some monitored parameters. ORC monitors the water quality and ecology of rivers and streams. The combined results provide an indication of state of a river or stream.

Of the four rivers monitored by ORC in the Catlins FMU (Catlins River, Owaka River, MacLennan River and the Tahakopa), suspended fine sediment and *E. coli* results didn't meet the national bottom line according to the National Policy Statement for Freshwater Management (2020) in the Owaka and Tahakopa sites. These sites are categorised as degraded overall.

Trend analysis results for the Catlins River are mixed, depending on the time period for the trend: the 20-year trend indicate high likelihood of degrading water quality for most attributes, while the 10-year trend indicates likely improvements for many of the attributes.

## Groundwater

Groundwater in most of the Catlins FMU is hosted in fractured rock. This differs from most of Otago, where groundwater is mainly found in alluvial deposits. However, groundwater in the Puerua catchment is found in alluvium of the Lower Clutha delta.

Groundwater use in the Catlins is generally low, with only 20 completed bores in the FMU, which are used for community supply, stock, domestic supply, and industry. There are only five current consents to take groundwater in the FMU. The rates of take are low, which further indicates the low use of groundwater in the FMU.

## Biodiversity

The Catlins FMU has extensive freshwater biodiversity values, including rare and threatened ecosystems and species. Rare and vulnerable ecosystems include ephemeral wetlands, dune slacks, estuaries, lake margins and wetlands. These types of ecosystems contribute a

lot to national biodiversity by having rare and threatened species; however, they are often threatened by land use change and invasive alien species. Although rare and vulnerable ecosystems are particularly sensitive environments to human activity, little is usually known about their extent and condition, including in the Catlins FMU.

The Catlins FMU has a diverse range of native freshwater fish, invertebrates, birds, plants, and a bat that depend on freshwater ecosystems. The nineteen native freshwater fish include two eels, five bullies, four migratory galaxias (whitebait), lamprey, smelt, torrentfish, estuarine triplefin, black flounder, and three non-migratory galaxias. The threatened freshwater fishes are non-migratory galaxias and the lamprey. Freshwater invertebrates include freshwater crayfish, freshwater mussels, and shrimp.

A high proportion of native birds depend on freshwater ecosystems, either as permanently or transient (migratory) populations. Threatened birds include Australasian bittern, black stilt, and black-billed gulls. Many plants are freshwater-dependent, including the threatened heart-leaved kohuhu. The introduced sports fishes found are brown trout and perch. Information is often missing at a species level, particularly for freshwater invertebrates, non-vascular plants, and algae. Many native freshwater species are under threat and continue to decline.

## Estuaries

Estuaries are highly productive ecosystems but are extremely sensitive to human activity. The Catlins FMU contains four estuaries: Waipati/Chaslands Estuary, Tautuku River Estuary, Tahakopa Estuary, and the Catlins River Estuary. The Catlins River Estuary is the most affected by human activity and experiences nuisance algal growth, increased sedimentation and poor sediment oxidation predominately in the upper estuary compared to the other three estuaries which are located in less-modified catchments.

The Catlin's FMU contains some of Otago's more unmodified estuaries such as the Tautuku and Waipati/Chaslands estuary which are predominantly fringed by native forest, containing a natural transition between the estuary to dunes/salt marsh/wetland into native forest and have low mud content. While there are good examples of more "natural" estuarine systems, impacts from sedimentation and nutrients can accumulate degrading these sensitive receiving environments.



# Map or Plan Page

