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## Land Use Change – Environmental Impacts

*Poor water quality in lowland streams and rivers in Southland has been linked to the rapid intensification of land use. Scientific studies have shown that soil and water quality is strongly linked to land use and land management practices.*

Today's economic conditions have led to the development of many areas of farmland once thought of as being 'marginal' for agriculture. In some areas this may include developing areas of unprotected shrubland (scrub) or wetland. The clearance of marginal land for agriculture puts increasing pressure on the landscape in terms of soil and water quality.

### Soils – no longer a limiting factor

Agricultural development in Southland was once limited by the presence of suitable soil types. Intensive farming, with high stocking rates, tended to be located in areas with the best soils with good rainfall. However, new land development techniques and higher land prices have seen previously unsuitable soils now used for intensive pasture. This is particularly prevalent in low-lying parts of the region.

Scientists at Environment Southland are looking at the link between land use (such as intensive agriculture) and the suitability of land for that use.

### Land Use Capability (LUC) Classes

Land can be divided into 'classes' depending on its suitability for different land uses. The Land Use Capability (LUC) assessment ranks land according to its long-term productive ability. Class 1 land is highly suitable for agriculture, while Class 7 or 8 land is better suited for conservation. To avoid negative effects on the environment it's important that land use is suitable for its class.

Farming and forestry can seriously impact the environment if managed poorly. Therefore, it's important to know what LUC class they occupy in the landscape.

73% of all Class 1-3 land is occupied by intensive sheep, beef and deer farming.

### Land Use and LUC Classes

In Southland, we've estimated that 73% of all Class 1-3 land is occupied by intensive sheep/beef/deer farming. A further 22% is occupied by dairy farms. This tells us that even though Southland has undergone a recent dairy 'boom', nearly three quarters of our most suitable land is still used by sheep/beef/deer farms. A similar pattern can still be found in Class 4-5 land, with about three quarters of it in sheep/beef/deer farming. Land in Class 6 and above is predominantly in conservation land.



- Land occupied by *sheep and beef farms* in Southland has fallen from **96%** in 1992 to **80%** in 2011.
- The net area of *dairy farms* in the region has doubled since 2000 to cover over **195,000** ha.

Despite a large increase in dairying, land used for sheep, beef and deer farming still dominates the Southland landscape with forestry occupying a comparatively small area. The following describes different land uses and their potential impacts on the environment.

## Cropping

Arable crops have declined in the region from 50,000 ha in the early 1900s to less than 10,000 ha in 2011. Horticultural crops occupy less than 1000 ha of land in Southland.

In total it is estimated that Southland grew between 54,000-64,000 ha of crops in the 2010-11 season. Cropland can contribute large amounts of nitrogen, phosphorous and sediment to the environment if not managed properly. In particular, winter cropping has been identified as a high nitrogen loss practice in the region.

## Deer farming

Deer farming covers approximately 27,000 ha in Southland. Deer are known to significantly affect water quality and soil stability through behaviours such as fence walking and wallowing. Therefore, good riparian management is key to protecting waterways on deer farms.

## Forestry

Since 1990, plantation forestry in Southland has significantly expanded. In 2011 there were 91,000 ha of forestry in the region, of which 84,000 ha are recognised as plantation forestry. Significant sedimentation issues can arise from poorly-managed forestry operations. Water yields can also be impacted.

## Sheep and beef

Sheep and beef farming has traditionally been the cornerstone of Southland's agricultural economy. However, land occupied by sheep and beef farms has fallen from 96% of farmland in 1992, to 80% of farmland in 2011, reflecting a decline in stock numbers. This decline has been a result of the rapid expansion in dairying across the region.

Although sheep numbers have been declining, sheep and beef farms have been increasing their stocking rates at an individual farm level. It is this intensification that has the most potential to cause environmental degradation.

## Dairy expansion across Southland

The expansion of dairying (and dairy support) since 1990 is the biggest land use change Southland has experienced since the deregulation of the agricultural sector in the early 1980s. This is reflected both in dairy stock numbers and the hectares of land dairying now occupies in Southland.

Before the recent dairy 'boom' started in Southland, dairy farms were located in areas that were recognised as being the most suitable. These older dairy farms were located on

the lower Southland Plains, mainly around Edendale, the site of the only milk processing plant in Southland at the time. Soils in these areas are heavier, receive regular rainfall and are highly productive, making them more suitable for dairying. There were only a few scattered farms elsewhere around the central and western Southland plains.

By 2000, dairy farms were being developed in areas not traditionally considered for dairying, such as the Waimea Plains, upper Aparima, mid Waiiau and Castlerock – Five Rivers regions (see Figure 1). Many of these areas have shallower soils and lower rainfall. Dairying in these areas is only viable because of higher milk solid prices (compared to pre-1990) and the use of irrigation to maintain grass growth.

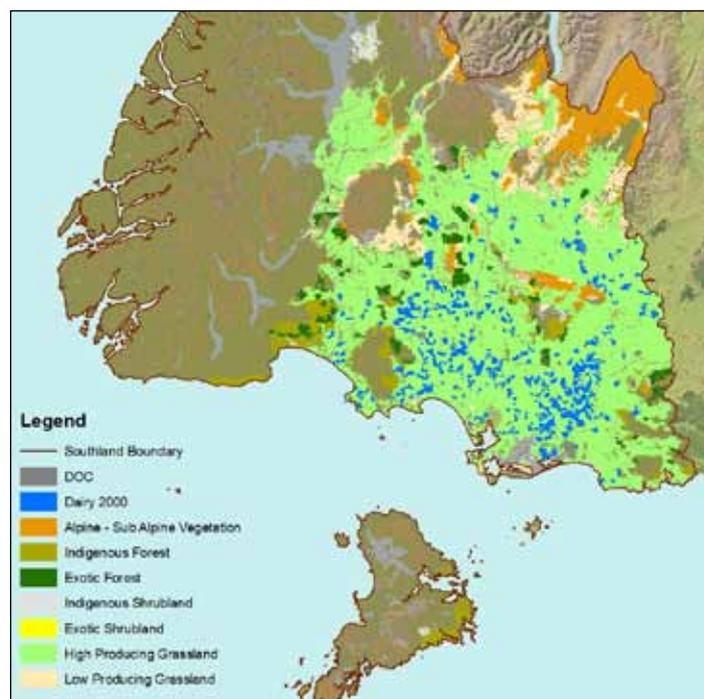


Figure 1: Land Use in Southland 1999/2000

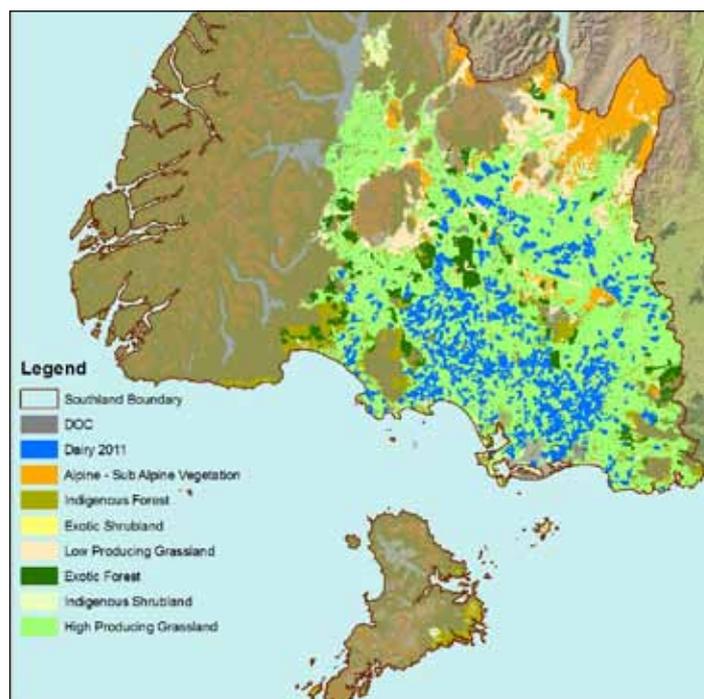


Figure 2: Land Use in Southland 2010/11

By 2011, the net area of dairy farms in the region had doubled since 2000 to cover over 195,000 ha (see Figure 2). Today, dairying is well-established across many parts of lowland Southland. Areas of expansion beyond current dairy areas are limited to the outer limits of Southland's low-lying areas with several new farms in the Catlins and upper reaches of the major river systems in Southland.

Potential areas of expansion are in the Te Anau basin and further into the upper reaches of the major river catchments in Southland.

## Environmental impacts of dairying

The expansion in dairying has led to areas of land previously deemed unsuitable now being converted to dairy farms. In these areas, soil type and Land Use Class make it difficult to farm in a sustainable way. Significant investment is needed to mitigate ongoing environmental effects.

In the last decade, the increased environmental impacts of dairying has resulted in significant changes in the way regional councils manage land use and intensification associated with the expansion of the dairy industry. Southland is no exception, with poor water quality in our lowland rivers and streams being linked with the rapid intensification of land use in the region.

## Where to from here?

The negative effects on soil, air and water quality associated with land use changes within the Southland region have been of concern to Environment Southland and the wider public.

By better understanding how land use has changed in Southland and where change has occurred, scientists can better understand the complexities of environmental degradation across the region.

A next step involves more detailed research about nutrient loss relating to different land use activities. This will allow us to understand and manage Southland's land and water resources more effectively.

Significant investment is needed to mitigate ongoing environmental effects from dairy expansion in Southland.

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*For further information, or to read the **Land Use Change in the Southland Region** report, go to [www.es.govt.nz](http://www.es.govt.nz)*  
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