

This Information Sheet describes the *typical average properties* of the specified soil. It is essentially a summary of information obtained from one or more profiles of this soil that were examined and described during the Topoclimate survey or previous surveys. It has been prepared in good faith by trained staff within time and budgetary limits. However, no responsibility or liability can be taken for the accuracy of the information and interpretations. Advice should be sought from soil and landuse experts before making landuse decisions on individual farms and paddocks. The characteristics of the soil at a specific location may differ in some details from those described here.  
No warranties are expressed or implied unless stated.

## Soil name: **Athol**

### Overview

Athol soils occupy about 1960 ha on terraces and downlands in northern Southland and west Otago. They are formed in deep loess derived from greywacke and schist rocks. They are deep, silty, poorly drained soils with a degraded fragipan that restricts water drainage. At present they are used for pastoral grazing for sheep, dairy and deer, with occasional cropping. Regular rainfall occurs but in some summers soil may be seasonally dry.

### Physical properties

Athol soils have a moderately deep to deep rooting depth, depending on the degree to which the fragipan has degraded. The soils are poorly drained, with slow permeability in the subsoil. Textures are loamy silt to light silt loams. Topsoil clay content is 15–25%. Moderately deep phases have gravel between 45 and 90cm depth.



*Athol profile*

### Fertility properties

Topsoil organic matter levels are 3–6%; P-retention values 20–30% and pH moderate (high 5s). Subsoil pH values tend to decrease down the profile. Cation exchange values are low and base saturation values moderate to low. Available calcium, magnesium and potassium levels tend to be low. Soil reserves of phosphorus and sulphur are also low. Micronutrient levels are generally adequate although boron responses in brassics and molybdenum responses in legumes can be expected.

### Associated and similar soils

Some soils that commonly occur in association with Athol soils are:

- Jacobstown: poorly drained soil formed in alluvium; on floodplains with high groundwater
- Arthurton: imperfectly drained Brown soil that is associated with Pallic soils of northern Southland and west Otago.
- Benio: shallow soil formed in old weathered gravely alluvium

Some soils that have similar properties to Athol soils are:

- Waikoikoi: poorly drained, perch-gley soil due to a fragipan
- Glenure: poorly drained gley soil on terraces, fans and downlands; has no perch-gley features within 90cm depth
- Warepa: imperfectly drained equivalent of the Waikoikoi soil
- Hokonui: has clayey textures, and formed in mixed loess and alluvium on fans from the Hokonui Hills

## Sustainable management indicators

**Note:** the vulnerability ratings given in the table below are generalised and should not be taken as absolutes for this soil type in all situations. The actual risk depends on the environmental and management conditions prevailing at a particular place and time. Specialist advice should be sought before making management decisions that may have environmental impacts. Where vulnerability ratings of Moderate to Very severe are indicated, advice may be sought from Environment Southland or a farm management consultant.

Vulnerability factor	Rating	Vulnerability compared to other Southland soils
<b>Structural compaction</b>	very severe	These soils have a very severe vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the poor drainage, low clay and P-retention values.
<b>Nutrient leaching</b>	slight	These soils have a slight vulnerability to leaching to groundwater. This rating reflects the poor drainage, slow permeability and moderately high plant available water.
<b>Topsoil erodibility by water</b>	severe	Due to the low clay and organic matter content, topsoil erodibility in these soils is severe. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
<b>Organic matter loss</b>	minimal	Vulnerability to long-term decline in soil organic matter levels is partly dependent on soil properties, and highly dependent on management practices (e.g., crop residue management and cultivation practices).
<b>Waterlogging</b>	severe	These soils have a severe vulnerability to waterlogging during wet periods. This rating reflects the slow permeability of the subsoil and poor drainage.

## General landuse versatility ratings

**Note:** The versatility ratings in the table below are indicative of the major limitations for semi-intensive to intensive land use. These ratings differ from those used in the past in that sustainability factors are incorporated in the classification. Refer to the Topoclimate district soil map or property soil map to determine which of the soil symbols listed below are applicable, then check the versatility ratings for that symbol in the appropriate table.

### AtU1 (Athol undulating deep)

### AtU2 (Athol undulating moderately deep)

Versatility evaluation for soil AtU1, AtU2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Inadequate aeration during wet periods; vulnerability to topsoil structural degradation by cultivation and compaction.
Arable	Limited	Inadequate aeration during wet periods; vulnerability to topsoil structural degradation by cultivation and compaction.
Intensive pasture	Limited	Vulnerability to topsoil structural degradation by cultivation and compaction; risk of short-term waterlogging after heavy rain.
Forestry	Limited	Inadequate aeration during wet periods; vulnerability to topsoil structural degradation by cultivation and compaction.

**AtR1 (Athol rolling deep):** as above, but rolling slopes are a limitation for arable landuse.

**AtH2 (Athol hilly moderately deep):** unsuitable for non-arable horticulture and arable landuses due to hilly slopes. Intensive pasture landuse is limited by vulnerability to erosion by water, and hilly slopes. The rating and limitations for forestry are as above.

### Management practices that may improve soil versatility

- Careful management after heavy rain and wet periods will reduce the impact of short-term waterlogging. Intensive stocking, cultivation and heavy vehicular traffic should be minimised during these periods.
- Installation and maintenance of subsurface mole and tile drains will reduce the risk of short-term waterlogging.