

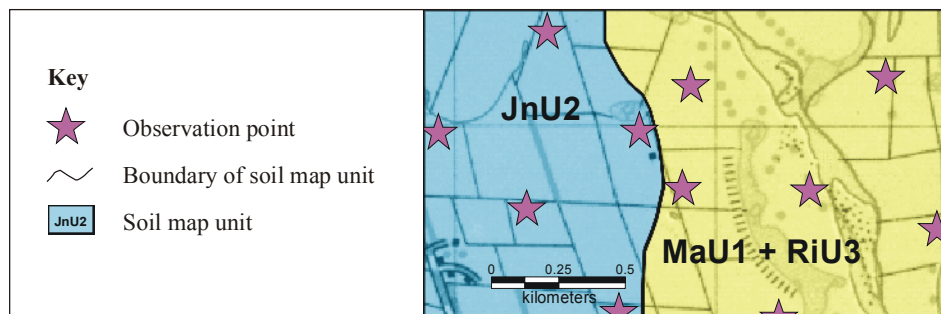
## Soil maps explained

The Topoclimate Survey of Southland and South Otago covered approximately 825,000 hectares of the intensively farmed land of the region. The more extensively farmed hill country, major forestry areas, and conservation lands were excluded from the survey. The results of the survey were published as a series of 36 district maps at a scale of 1:50,000. This scale is capable of identifying significant soil variations at the farm level, which is sufficient for most land users. It is more detailed than any previous surveys of Southland, although some intensive surveys have been carried out previously on small portions of the region.

To present the information on this website, the district soil maps have been joined as one seamless layer and displayed against different backgrounds appropriate to the scale of the view you are looking at.

## Soil information collected

The soil survey teams studied variation in soil properties across the land. Observations were recorded at each point and similar points were grouped in a soil map unit. The density of these observations is illustrated in Figure 1.



*Figure 1: Density of observation points for soil maps*

Soils on some landforms, such as river flats, are variable and occur in complex patterns. When this occurs, soils are grouped together, e.g., MaU1 + RiU3. The dominant soil is listed first, with additional soil(s) following if they occur in at least 15% of the soil map unit.

Soils in map units may need to be further separated depending on the proposed intensity of land use. A Global Positioning System (GPS) was used to accurately record the position of every observation point, so they can be easily revisited for more detailed mapping.

For each soil identified on the soil map, soil pits were dug and the profiles described and photographed. Each soil was also sampled for laboratory analysis, to measure physical and chemical properties. The location of each of these profile pits is marked on the web version of the maps by a purple triangle, thus: ▲

The main soil physical properties measured were: texture, structure, stoniness, wetness, depth to parent material, potential rooting depth.

The main soil chemical properties measured were: pH, phosphate retention, organic matter, base saturation, cation exchange capacity.

Information on additional soil properties is also available. A comprehensive database of each soil and its properties has been compiled for use by landowners and managers. This database can be accessed through Crops for Southland.

## Interpreting soil symbols

The abbreviated soil symbols used on Topoclimate soil maps have three components. The first two letters (e.g., Wq) represent the soil name and can be identified by reference to the legend of soils arranged by landform on the printed map sheets. On the Web version this information is contained in a PDF document called “Soil Type and Rating Codes”. The capital letter in the middle (U, R, H or S) denotes the slope or topography of the land and the number at the end (3, 2 or 1) denotes the depth of the soil profile. In some cases there is an additional suffix that denotes an associate or “variant”.

**For example:** WqU1 = Waikoikoi, undulating, deep  
 Wq = Waikoikoi  
 U = undulating  
 1 = deep

Symbol	Slope phase	Slope
U	Undulating	0–7°
R	Rolling	8–15°
H	Hilly	16–25°
S	Steep	26°+

Symbol	Depth phase	Depth of soil to bedrock/gravel
3	Shallow	0–45 cm
2	Moderately deep	45–90 cm
1	Deep	90+ cm

### Associates

vc = clayey variant	vl = loamy variant
vf = floodplain variant	vm = mineral subsoil variant
vg = gravelly subsoil variant	vo = peaty subsoil variant
vh = humose subsoil variant	vr = recent variant
vi = imperfectly drained variant	vw = raw variant
vj = argillic variant	U = undifferentiated

## Using the soil information

The Topoclimate survey studied the soil to a depth of one metre, as soil properties to this depth have significant influence on most land uses. Soil information to this depth can be used to assess a soil’s suitability for specific land uses.

Knowledge of soil properties can reduce or avoid the risk to farm productivity from soil-related problems such as waterlogging, compaction, declining animal performance and poor crop yields. There is no such thing as a poor soil, just poor knowledge of its capabilities. Key properties have been identified for each Southland soil, an example of this is shown in Figure 2.



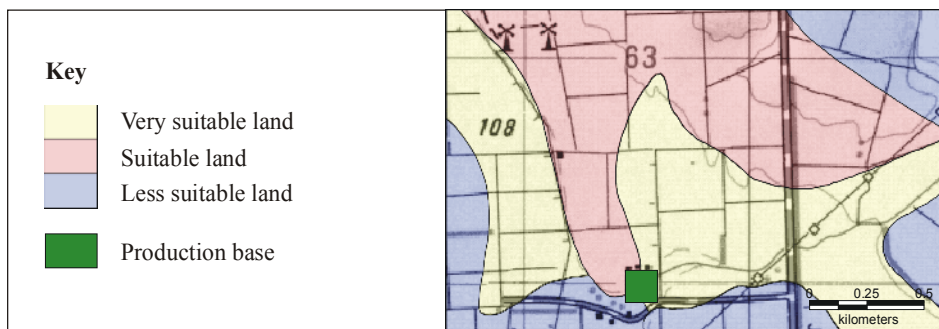
### Key soil properties

- Moderately acid pH and medium natural fertility.
- The key property is the presence of a dense subsoil fragipan, which impedes roots. This perches water and causes poor drainage. The fragipan limits the potential rooting depth to between 40 and 60cm.
- The fragipan means the soil has slow permeability
- The soil has weak structure, and a high vulnerability to structural degradation from intensive cultivation and high stocking rates.
- Poor drainage and a fragipan are limiting factors to the land use versatility of this soil.

*Figure 2: Key properties of a common Southland soil*

The success of land use decisions relies on the integration of soil information with other knowledge bases, such as climate and crop information. Integration of the soil information means it can be easily interpreted for specific land uses.

For example, a flower company would like to lease more land for production. They contact Crops for Southland to identify areas of suitable land. Their requirements are that the soil is stone-free, well drained and has a low clay content. Crops for Southland's soil database can be searched to identify and map the location of the soils that match these specifications. The flower grower is most interested in the suitability of soils adjacent to their production base, as shown in Figure 3.



*Figure 3: Interpreting the suitability of soils for flower production*

## Mapping conventions

On the original Topoclimate soil maps, published in printed form, colours are used to distinguish soil groups (e.g. browns for Brown soils, blues for Gley soils, greens for Pallic soils, etc.). A grayscale topographic map was used as the background.

Faithful reproduction of these colours via the Web is not possible because every computer monitor displays a different color space. Furthermore, the coloured topographic maps used for the background tend to interfere with the overlaid colours.