

Mature volcanic soils

Soil types in this group

- Piroa clay – PF, PFH*
- Pukekaroro clay loam steepeland soil – POS
- Pukenamu silt loam – PM, PMH*

*The H denotes the hill variant of this soil type, which occurs on slopes over 20° and has a shallower profile.

This fact sheet uses NZ Soil Bureau map series soil type names and abbreviations.



Pukekaroro clay loam steepeland (POS) soil profile

Features of mature volcanic soils

- These soils formed from soft white volcanic ash, pumice and weathered dacite volcanic rock. These are all acidic or silica-rich volcanic rocks
- They are part of the Maungarei soil suite
- These soils sit on steep slopes (POS) and rolling hills (PF, PFH)
- These pale soils contain little or no iron and aluminium and range from sticky yellow clays to moderately podzolised soils
- They are less naturally fertile than some other volcanic soils
- Land cleared of bush can be very susceptible to slip, sheet and gully erosion, due to unconsolidated subsoil
- These soils are highly dispersive and release substantial amounts of sediment to waterways and harbours
- Where roads have been cut into these soils, roadside drains and culvert outfalls quickly scour down through the soft material
- Given the steepness, low fertility and risk of erosion, existing native forest should be retained or where woody vegetation has been removed, soil conservation trees are recommended
- Easier contoured Piroa clay in pasture has wetness and low fertility issues

Structure and drainage management

Issues	Management tips
Overstocking and pugging cause soil surface sealing and increased runoff	Managing winter grazing to reduce pugging damage could include matching stock class to soil types or conditions
Soils over-lie very soft, loose white ash, pumice and soft weathered dacite material. This is extremely susceptible to gully erosion if exposed	Earthworks exposing unconsolidated subsoils need to be carefully managed
Weathering and leaching has reduced soil particle strength, making these mature soils more dispersive when wet and trampled by livestock	Retain native vegetation on steeper slopes or alternatively retire steeper land

Erosion control

Erosion risks	Soil type	Specific problems	Possible solutions
Slip erosion (severe)	All mature volcanic soils	Steep slopes are very prone to slip erosion if cleared of bush	Consider retiring very steep or marginal pastoral land from grazing if pastoral returns are poor and / or weed invasion is a problem
Sheet erosion (severe)	All mature volcanic soils	Pasture cover does not keep topsoil in place on steep land slopes	Maintain native forest cover where it exists Plant suitable soil conservation trees on moderate slopes still in pasture
Gully erosion (severe)	All mature volcanic soils	Drains & culverts scour very quickly through soft rock, destabilising slopes and undermining road stability	Construct roads and tracks only where absolutely necessary, and site them carefully Seek advice about armouring drains and culvert outfalls to prevent erosion



Pukekaroro clay stepland soils (POS) on Parihaka

Nutrient management

Soil type	Nutrient status	Management strategies
All mature volcanic soils	These soils lack aluminium and iron, and therefore do not fix phosphate strongly	Little and often applications of fertiliser are recommended on these low fertility soils because whatever is applied will be available to plants, because it is not fixed. Seek advice from your fertiliser consultant and vet for nutrient requirements
All mature volcanic soils	These soils are naturally acidic which inhibits plant growth	Soils require lime to raise pH levels, but ensure application rates are based on soil test results
All mature volcanic soils	Naturally less fertile than other volcanic soils, but they do respond to fertiliser and lime	These soils have low fertility. On steep land they are unsuited to pasture, and are best kept in scrub, pine forest or native bush

Drainage classes

Soil symbol	Full name	Drainage class
MAUNGAREI SUITE Basement rock: volcanic dacite, rhyolite and/or granodiorite		
POS	Pukekaroro clay loam steep land soil	2 \Rightarrow 1 - Imperfectly to poorly drained
PF, PFH*	Piroa clay	1 - Poorly drained
PM, PMH*	Pukenamu silt loam	1 - Poorly drained

Northland soil factsheet series

- Northland's climate, topography, historic vegetation and mixed geology have combined to form a complex pattern of soils across the region. There are over 320 soil types in Northland. Other regions in New Zealand average only 20 soil types per region.
- The information in this fact sheet is based on a 1:50,000 mapping scale. Therefore, it is not specific to individual farms or properties. However, it may help you to understand general features and management options for recent alluvial soils.
- Knowing your soils' capabilities and limitations is the key to sustainable production in Northland. Northland Regional Council (NRC) land management advisors are available to work with landowners to provide free soil conservation advice, plans and maps specific to your property.
- Regular soil tests are recommended. If you are concerned about your soil structure or health, the Visual Soil Assessment test could be useful. Contact the land management advisors at Northland Regional Council for more information.
- Further background information about the processes that have formed these soils can be found here: www.nrc.govt.nz/soilfactsheets

Contact a land management advisor on
0800 002 004 or visit www.nrc.govt.nz/land