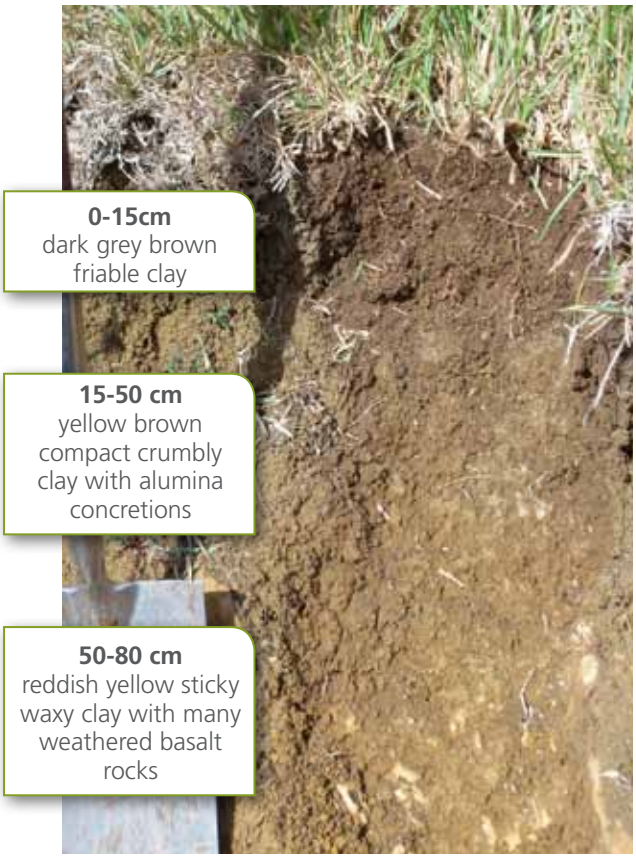
Mature basalt volcanic soils

Soil types in this group

- Kerikeri friable clay – (KE)
- Kerikeri friable clay with large boulders – (KEb)
- Matarau friable clay – (MC, MCH*)
- Matarau friable clay with large boulders - (MCb)
- Ruatangata friable clay - (RT)
- Ruatangata friable clay with large boulders – (RTb)
- Tikipunga friable clay – (TG)
- Waiotu friable clay - (YO,YOH*)
- Waiotu friable clay with large boulders – (YOb)

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

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



Waiotu friable clay (YO, YOH) soil profile

Features of mature basalt volcanic soils

- These soils formed on basalt lava low in silica and rich in iron and aluminium
- They are part of the Kiripaka soil suite
- Also known as brown loams they appear around the edges of the older lava flows and on steeper slopes
- They are classic volcanic soils suitable to both orchards and market gardening
- All mature basalt volcanic soils are generally free draining, requiring few drainage structure improvements
- Some soils have boulders created as a result of long periods of erosion on the edges of old basalt flows, causing them to fracture and become rounded due to weathering processes
- These soils are moderately to strongly weathered and are moderately to strongly leached

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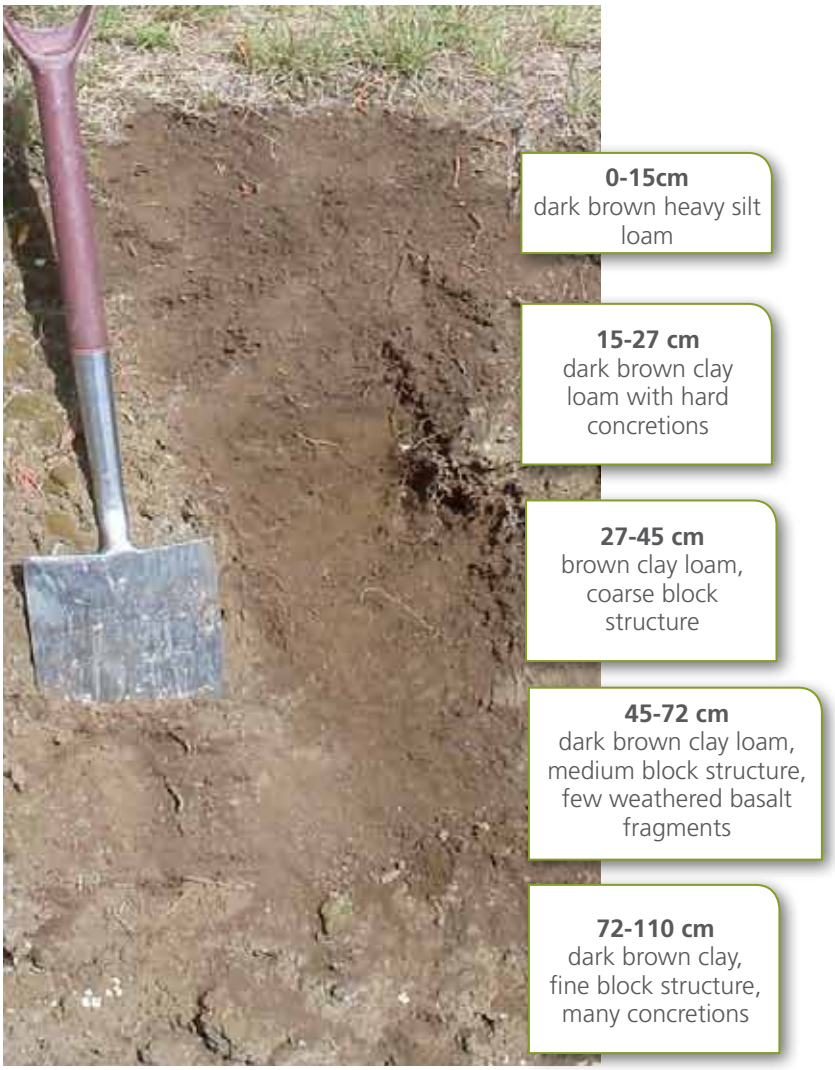
Structure and drainage management

Issues	Management tips
These soils are friable and granular (nutty) on top (horizon A) with an accumulation of clay at depth They have a clay texture, but have only low plasticity, making them 'brittle' and easily destroyed by over-cultivation or compaction when dry	Year-round cultivation is possible where soils are free draining To avoid compaction, soils should be allowed to dry after rain for a few days before running heavy equipment over them
Cultivation pans and surface compaction are common problems	Shallow ripping shatters cultivation pans/surface compaction and aerates soils, maintaining structure and reducing fungal root diseases
Topsoils can become a fine powdery surface layer known as a 'dust mulch' that seals the surface, repelling water and increasing runoff	Careful crop-pasture-crop rotations retain topsoil structure
Because they are generally free draining, they are drought prone Subsoil conditions restrict plant root depth which increases drought susceptibility However, in some places drying of the topsoils is so marked in summer that high intensity summer rainstorms can remove large amounts of sediment-bound phosphate into the waterways	Well managed grazing will protect soil surfaces from drying and consequently improve soil permeability of water Retaining good crop or pasture cover is important

Nutrient management

Soil type	Nutrient status	Management strategies
All mature basalt volcanic soils	Friable, but infertile topsoils sit over subsoils containing ironstone, aluminium and manganese nodules; at low pH, free iron and aluminium fix phosphate and other elements and create a hostile environment for plant roots	Cropping and grazing rotations should be aimed at building organic matter High concentrations of aluminium and iron can be managed with adequate applications of lime and phosphate
All mature basalt volcanic soils	Applied nitrogen, potassium and sulphur leach out of soils rapidly	Effluent and/or fertiliser should be applied little and often to reduce risk of leaching losses

Waiotu (YO) and Ruatangata (RT) soils near Ōkaihau



Kerikeri friable clay (KE) soil profile

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Erosion control

Erosion risks	Soil type	Specific problems	Possible solutions
Shallow slipping	Rolling hill country soil variants	Slipping is often associated with seepage areas at the heads of gullies Exposed subsoils are difficult to revegetate because of toxic levels of free iron, manganese and aluminium Slips occur because of more pronounced leaching and extremely friable granular topsoil	Manage water discharge and flow from higher elevations Plant and cultivate on the contour For longer slopes use shallow grassed water diversion channels at intervals down the slope
Sheet erosion	All mature basalt volcanic soils	Friable or granular topsoil can be washed away in sheets, losing organic matter and damaging crops Runoff from higher ground increases the problem, as does the formation of water-repellent 'dust mulch' surface sealing from compaction or over-cultivation	Using sediment traps in frequently or continuously cropped areas is recommended Exclusion of stock from revegetated areas is essential for recovery Open plant poplars where groundwater is surfacing to control slipping
Rill erosion	All mature basalt volcanic soils	Water runoff from compacted land above runs downslope, gouging channels or rills into topsoils Rills become deeper over time Bare, cropped soils are especially susceptible to rill erosion Exposed subsoils are very hard to revegetate and will continue to erode from rills to gullies	Fence bush enclaves in gully heads to allow ground cover to regenerate and hold soils in place Mulching exposed subsoils with organic material and applying lime prior to planting will assist revegetation where erosion has occurred

Drainage classes

Soil symbol	Full name	Drainage class
KIRIPAKA SUITE Basement rock: volcanic basalt lava flows		
MCb	Matarau friable clay with large boulders	5⇌4 - Somewhat excessively to well drained
TG	Tikipunga friable clay	5⇌1 - Somewhat excessively to poorly drained
YOb	Waiotu friable clay with large boulders	4 - Well drained
MC, MCH	Matarau friable clay	4 - Well drained
KE	Kerikeri friable clay	4 - Well drained
KEb	Kerikeri friable clay with large boulders	4 - Well drained
YO, YOH	Waiotu friable clay	4⇌3 - Well to moderately drained
RT	Ruatangata friable clay	4⇌3 - Well to moderately drained
RTb	Ruatangata friable clay with large boulders	4⇌3 - Well to moderately 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**