Tasmanian Viticultural Soils And Geology

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There are seven geographically distinct regions producing wines in Tasmania. These are: the North West; Tamar Valley; North East; East Coast; Huon Valley and D'Entrecasteaux Channel; Coal Valley and the Derwent Valley. These regions are outlined on the geological map presented. The geological materials and soils used for viticulture in these regions are discussed below.

SOILS AND GEOLOGY

Ordovician to Devonian Sedimentary Rocks (510-380 Myr)
During the Ordovician to Devonian Tasmania was part of the super continent of Gondwana. Sediments eroded from the super continent were deposited in ocean basins off the Gondwanan coast. They formed the 'Mathinna Beds' of north east Tasmania and comprise metamorphosed sandstones and siltstones. The soils developed on these materials are quite varied. Those used for viticulture are duplex soils: typically Bleached Brown Chromosols with acid soil profiles and compact clay subsoils.

Permian Sedimentary Rocks (286-245 Myr)
During the Permian the earth suffered under a cold, glacial climate. Tillites, conglomerates, shallow marine mudstones and calcareous sediments were deposited in the Tasmanian region. Two distinct soils derived from Permian sediments are utilised for viticulture;
1) acidic soils having sandy loam topsoils and bleached hardsetting layers cover mottled, blocky structured, yellow and mottled clay subsoils (Acidic Kandosol or Brown Kurosol).
2) small areas of calcareous mudstone and limestones occur within the Permian sequence on which the much loved "Terra Rossa" soils have developed.
These two soils form in rolling hill country.

Triassic Sedimentary Rocks (245-235 Myr)
Uplift in the north and west during the early Triassic period led to braided streams flowing south east across Tasmania. These rivers deposited sands on top of the Permian marine mudstones and siltstones. Both the Permian and Triassic sediments form a southerly plunging layer through the landscape of south east Tasmania. Many vineyards have been developed on these materials. The two key soils developed are:
1) on siliceous sandstones, sandy loam, acidic topsoils cap yellowish-brown, neutral, clayey subsoils. These "podzolic" soils have restricted subsoil drainage (Brown Chromosols and Brown Sodosols) and develop in cooler, moister areas.
2) on micaceous sandstones in drier warmer sites shallow soils form with brown, sandy clay loam topsoils over brown to reddish brown, firm blocky clays (Red/Brown Dermosols and Chromosols).

Jurassic Dolerite (175-160 Myr)
As the Australian continent tore away from Antarctica, Tasmania lay at the hinge point. Large volumes of basic magma were intruded as dolerite sills during the mid Jurassic due to these intercontinental stresses. Dolerite now forms a resistant layer over the eastern half of the island. It strongly controls landform, forming most of the hill tops and plateaux.

A range of soils similar to those on basalt develop on dolerite. The deep well structured, reddish brown Red Ferrosols are quite rare. The key soils utilised are:
1) black, alkaline, cracking clay soils (Black Vertosols) which develop in depressions and lower landscape positions;
2) shallow, stony neutral, brown soils with friable clay subsoils on sunny aspects higher in the landscape (Brown Dermosols)
3) sandy loam topsoils over olive brown clay subsoil soils - "duplex" (Brown Chromosols) typically on more southerly aspects and at higher and moister elevations.
Soils 1) and 2) are most favoured for viticulture production.

Tertiary Basalt (65-2 Myr)
During the Tertiary, basins formed in the Tasmanian landscape as a result of crustal stresses associated with the separation of Antarctica and the New Zealand sub continent. These valleys and basins, separated by hard dolerite ridges, filled with sediments and lava during the Tertiary. Volcanic eruptions were concentrated along the fault lines which formed the basins. From these basaltic lavas form Tasmania's most prized agricultural soils. Three important types of basaltic soil are successfully utilised for viticulture:
1) deep, reddish brown, well structured, acidic light clay soils (Red Ferrosols) which are common in the north west and north east of the state;
2) black, alkaline, cracking clay soils with calcareous subsoils (Black Vertosols) which occur on foot and toe slopes and
3) shallow, stony, brown neutral, clay loam soils (Brown Dermosols) in midslope positions.

Tertiary Sediments (65-2 Myr)
The basins which developed as the New Zealand subcontinent moved westward include the Coal Valley, Derwent Valley, Huon Valley and Tamar Valley. These valleys filled with clayey sediments during the early Tertiary and a range of duplex soils have developed on them.
The key soils utilised are acidic duplex soils (sandy loam topsoils over clay subsoils) developed on the sloping sections of the Tamar Valley and parts of the Coal Valley (Brown Chromosols). Some isolated areas of black cracking clays in lower landscape positions are associated with these materials (Black Vertosols).

Quaternary Windblown sands (<2 Myr)
Young windblown sands, colluvium and gravels have developed during and following the Pleistocene Ice Ages. The key soils utilised are soils developed on inland and coastal windblown dune sands:
1) siliceous sands produce acidic and leached soils which are underlain by a dark brown "coffee rock" which retains water and nutrients (Podosol),
2) weakly leached, neutral, brown, friable soils on recent windblown sands which may accumulate carbonate in the subsoil (Brown Dermosol). These are free draining, deep and warm soils.

Conclusion
The soils under greatest viticultural development in Tasmania and appearing to offer the most potential are the brown and red soils developed from both dolerite and basalt. The brown soils on dolerite offer stony, shallow, free draining and warm soils suitable for long warm ripening and have great potential. The brown soils from both sandstone and windblown sands also appear to be highly suitable because of free drainage and warmth. Soils on deeply weathered Tertiary clays and soils on steeper sunny aspects above the Permian rocks also offer potential.

Brown Dermosol
at
Macquarie Plains
Derwent Valley
on
Windblown sand (Qp)
found on
Sand dunes and sand sheets bordering major rivers

Deep sandy profile $CaCO_3$ in subsoil, good drainage and nutrient status

Shallow Brown Dermosols also form on Triassic sandstone and dolerite on sunny aspects

Podosol
at
Meadowbank
Derwent Valley
on
Windblown sand (Qd)
found on
Dunes and sand sheets associated with Triassic sandstone and leached coastal sand dunes

Deep loose bleached sand over coffee rock. Acidic reaction trend droughty, upper profile, low nutrient status

Brown Dermosol
at
Rosevears
Tamar Valley
on
Basalt colluvium (Tb)
found on
Mid and foot slopes

Friable, neutral, clay loam on clay subsoil, moderate nutrient status

Shallow Brown Dermosols also form on Triassic sandstone and dolerite on sunny aspects

Red Ferrosol
at
Pipers River
North East
on
Tertiary basalt (deeply weathered) (Tb)
found on
Basalt plateau and rolling slopes

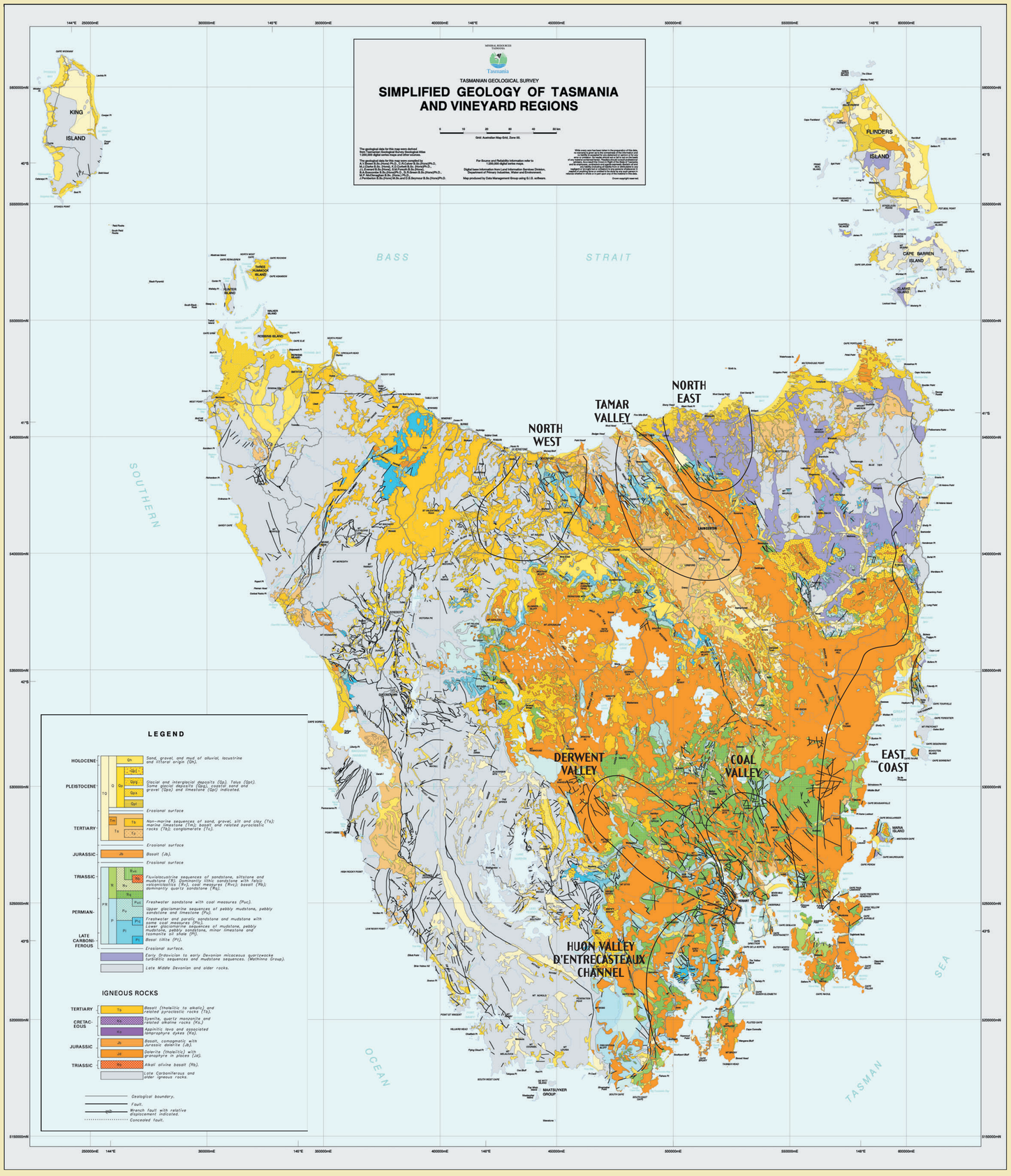
Acidic, deep, friable clay loam grading to clay, free drainage, moderate and high nutrient status

Bleached Brown Chromosol
at
Relbia
Tamar Valley
on
Tertiary sediments (Ts)
found on
Rolling to moderate midslopes

Acidic, duplex, sandy clay loams over heavy clays, moderate to imperfect drainage

Brown Sodosol
at
Meadowbank
Derwent Valley
on
Triassic sandstone (Rq)
found on
Rolling slopes

Sandy loams over prismatic structured clays on sandstone rock



Brown Chromosol
at
Triabunna
East Coast
on
Jurassic dolerite (Jd)
found on
Mid and footslopes

Dark brown sandy clay loams over blocky heavy clays, moderate to imperfect drainage

Brown Dermosol
at
Tea Tree
Coal Valley
on
Jurassic dolerite (Jd)
found on
Midslopes - shoulder slopes

Shallow and stony profiles. Friable, free draining, neutral, gradational soils with clay loam texture

Brown Dermosols also form on Triassic sandstone, windblown sands and basalt

Black Vertosol
at
Cambridge
Coal Valley
on
Dolerite colluvium (Jd)
found on
Toe slopes and footslopes

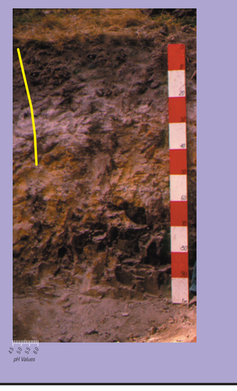
Black, cracking alkaline clay with high nutrient status, high water holding capacity

Acidic Grey Kandosol
at
Exeter
Tamar Valley
on
Permian mudstone (Pu)
found on
Gentle slopes

Acid, imperfectly drained mottled, silty clay soil
Friable upper profile, massive lower subsoil

Bleached Grey Kurosol
at
Glengarry
Tamar Valley
on
Permian mudstone (Pu)
found on
Gently undulating slopes

Duplex soil with very acidic clay subsoil, imperfect drainage



Bleached Brown Chromosol
at
Lebrina
North East
on
Mathina sandstone (Odq)
found on
Footslopes

Acidic duplex soil with bleached layer on compact clays

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