STK St. Kitts Land System

Undulating low hills in the Tableland - St. Kitts - Stockwell area

Area: 76.2 km^2

Annual rainfall: 400 – 500 mm average

Geology: The land system is formed mainly on metamorphosed rocks of the Pepuarta, Tarcowie and Ulupa Formations. Main rock types are metasandstones, phyllites and schists. In the east are small areas of Cambrian age rocks, mainly Angaston marble and Mt. Terrible metasandstone. There are significant areas of locally derived sedimentary wash deposits on lower slope outwash fans and in drainage depressions. These are mainly medium to fine grained. Most rocks and sediments are mantled by secondary carbonates as fine segregations, or sometimes as rubble or hard sheet rock (calcrete).

Topography: The St. Kitts Land System comprises dissected rises and low hills with well defined and generally eroded water courses. Slopes are mostly between 3 and 10%, but there are steeper slopes up to 30% associated with either incised water courses or resistant sandstone ridges. Rocky outcrop is sporadic and generally confined to steeper slopes.

Elevation: 520 m in the north east to 300 m in the south west

Relief: Maximum relief is 50 m

Soils: The characteristic soils are texture contrast loam over red clay. Clays vary from coarsely structured and dispersive to well structured and friable. Less common soils are moderately shallow to shallow loams over bedrock.

Main soils

D1 Hard loam over red clay on rock - common (rises)
D7 Hard sandy loam over dispersive red clay on rock - common (rises)
L1 Shallow stony loam - limited (rises)
D3 Hard sandy loam over dispersive red clay - limited (outwash fans)
D2 Hard loam over red well structured clay - limited (outwash fans)

Minor soils

C2 Gradational loam over calcareous rock - rises
A2 Shallow calcareous loam - rises
E3/E2 Brown / red cracking clay - rises
B2 Shallow calcareous loam over calcrete - rises

Main features: The dominant features of the St. Kitts Land System are its topography of undulating to moderately steep low hills separated by eroded water courses, and its characteristic hard sandy loam soils. Although moderately deep and with reasonable natural fertility, most soils are poorly structured and highly erodible. Low infiltration rates, reduced waterholding capacity and patchy emergence and crop growth are likely. The combination of high soil erodibility and moderate slopes results in high erosion potential, and there is widespread evidence of erosion damage from inappropriate management practices in the past.

Soil Landscape Unit summary: 11 Soil Landscape Units (SLUs) mapped in the St. Kitts Land System

SLU	% of area	Main features #
ALC ALp	4.5 1.3	Ridges and gullies formed on metasandstones. **ALC** Ridges from 20 to 50 m high with slopes of 15-30%, 20% or more surface sandstone and 5-10% outcropping rock. **ALp** Steep, eroded dissection slopes with variable rock outcrop and branching gullies. Main soils: hard sandy loam over dispersive red clay on rock - **D7** (E) and shallow stony loam - **L1** (E). The ridges are non arable but suitable for grazing, although they are very exposed. The eroded gullies are fragile, and protection from further damage is the main management issue.
DHB DHC DHH DHI	0.8 1.6 56.0 12.1	Rises and low hills formed on metasandstones and phyllites. **DHB** Low rises with slopes of less than 3%. **DHC** Undulating rises and low hills with slopes of 3-10% and relief of up to 50 m. Water courses are well defined and generally stable. There is sporadic surface stone but rarely more than 10%. Rock outcrop is negligible. **DHH** Undulating rises and low hills with slopes of 3-10% and relief of up to 50 m. Water course erosion is widespread and severe in places. There is sporadic surface stone but rarely more than 10%. Rock outcrop is negligible. **DHI** Moderately steep slopes of 10-20% with up to 10% rocky outcrop and 10-20% surface sandstone. Water courses are commonly eroded. Main soils: hard loam over red clay on rock - **D1** (E) and hard sandy loam over dispersive red clay on rock - **D7** (E), with shallow stony loam - **L1** (L), gradational loam over calcareous rock - **C2** (M) and brown /red cracking clay - **E3/E2** (M). Deeper texture contrast soils, **D2** and **D3** (L) occur on lower slopes. This land is arable except for watercourses and rocky areas in **DHI**. The soils are mostly moderately deep with reasonable inherent fertility. Their main limitation is poor structure of surface soils and, in the case of D7/D3, subsoils as well. Most surface soils have a high fine sand content, causing them to set hard. This condition reduces infiltration, resulting in excessive runoff and associated erosion, difficulties in effective working, patchy emergence and early crop growth, and reduced water storage capacity. Poorly structured dispersive subsoils exacerbate these problems by causing sub surface waterlogging and impaired root growth. Erosion control and conservation management to improve soil structure are needed on this land.
EMC	4.5	Rises to 20 m high with slopes of 4-12% formed on interbedded marbles and related calcareous rocks, and metamorphosed sandstones. There is up to 20% surface sandstone, quartzite and marble. Main soils: calcareous loam -**A2** (E), gradational loam over calcareous rock - **C2** (E) and hard sandy loam over dispersive red clay on rock - **D7** (C), with shallow stony loam - **L1** (M) and shallow calcareous loam over calcrete - **B2** (M). The soils formed on calcareous rocks are well structured, well drained and moderately fertile, but often very shallow, with moisture holding capacity the main limitation to crop growth. The D7 soils, formed on the non calcareous quartzitic rocks, are deeper but poorly structured, with hard setting surfaces and dispersive subsoils. These conditions cause excessive runoff, low infiltration and restricted root growth.
ETI	4.9	Irregular rises and low hills to 40 m high with slopes of 10-20% formed on metamorphosed sandstones of the Mt. Terrible Formation. There is extensive rocky outcrop (up to 20%), up to 20% surface quartzite and sandstone, and eroded water courses. Main soils: shallow stony loam - **L1** (E) and hard loam over red clay on rock - **D1** (E) with hard sandy loam over dispersive red clay on rock - **D7** (L). This land is semi arable. Some slopes are too steep for regular cropping, and others are too rocky. Many soils are shallow, have low moisture holding capacity and generate high run off volumes which contribute to downslope erosion.

JGG JGH JGJ	3.8 5.3 5.2	Outwash fans and drainage depressions formed on medium to fine grained alluvium. **JGG** Fans with slopes of 1-3% and eroded water courses. **JGH** Fans with slopes of 3-6% and eroded water courses. **JGJ** Drainage depressions and creek flats with eroded water courses. Main soils: hard sandy loam over dispersive red clay - **D3** (V) and hard loam over well structured red clay - **D2** (E). These soils are moderately fertile and deep but invariably have hard setting surfaces and most have dispersive subsoils. Consequently they have low infiltration rates, are difficult to work and prevent even emergence and optimum root growth. Dispersive subsoils cause perched water table development resulting in subsurface waterlogging. The soils are highly erodible, so excessive run off is likely to cause erosion. Conservation surface management and gypsum will help overcome these problems.

PROPORTION codes assigned to soils within Soil Landscape Units (SLU):

(D) Dominant in extent (>90% of SLU)
(V) Very extensive in extent (60–90% of SLU)
(E) Extensive in extent (30–60% of SLU)
(C) Common in extent (20–30% of SLU)
(L) Limited in extent (10–20% of SLU)
(M) Minor in extent (<10% of SLU)

Detailed soil profile descriptions:

A2 Shallow calcareous loam (Paralithic Calcic / Lithocalcic Calcarosol)
10 - 25 cm gravelly calcareous loam becoming more calcareous (sometimes rubbly) with depth over marble, limestone or calcreted rock at 35 cm.

B2 Shallow calcareous loam over calcrete (Petrocalcic, Lithocalcic Calcarosol)
Medium thickness calcareous loam with abundant rubble from about 15 cm, over calcreted basement rock.

C2 Gradational loam over calcareous rock (Hypercalcic, Red Dermosol)
15 - 40 cm loam grading to a well structured red clay loam to clay over limestone, calcreted rock or soft carbonate in rock fissures at 45 cm.

D1 Hard loam over friable red clay on rock (Calcic, Red Chromosol)
10 - 40 cm hard sandstone gravelly loam to fine sandy loam, abruptly overlying well structured red clay, calcareous from 50 cm (25% of profiles have no carbonate), and grading to weathering phyllite from 70 cm.

D2 Hard loam over red well structured clay (Calcic, Red Chromosol)
15 - 50 cm hard loam to sandy loam abruptly overlying a well structured red clay, calcareous from 75 cm, continuing below 100 cm.

D3 Hard sandy loam over dispersive red clay (Calcic, Red Sodosol)
10 - 45 cm hard sandy loam abruptly overlying a coarsely structured dispersive red clay, calcareous from 70 cm, continuing below 100 cm.

D7 Hard sandy loam over dispersive red clay on rock (Calcic, Red Sodosol)
10 - 40 cm hard sandstone gravelly sandy loam abruptly overlying a coarsely structured dispersive red clay calcareous from 65 cm, grading to weathering metasandstone from 95 cm.

E3/E2 Brown / red cracking clay (Brown / Red Vertosol)
Dark brown strongly structured seasonally cracking clay becoming more clayey, coarser structured and calcareous with depth.

L1 Shallow stony loam (Paralithic, Leptic Tenosol)
25 - 40 cm stony loamy sand to loam directly overlying sandstone, phyllite or limestone.

Further information: DEWNR Soil and Land Program