

POP Point Pass Land System

Outwash fans and flats between Eudunda and Robertstown

Area: 145.8 km²

Annual rainfall: 325 – 450 mm average

Geology: The land system is formed on fine grained outwash sediments derived mainly from erosion of materials from the Eudunda Escarpment to the west. There are limited areas formed on basement rock (mainly in the north). Rocks are mainly fine grained members of the Saddleworth and Mintaro Formations, with minor quartzite veins. In places, they are capped by silcreted Tertiary sediments. All sediments and rocks are mantled by carbonates of aeolian origin which are commonly cemented into rubbly and sometimes sheet forms.

Topography: The Point Pass Land System is an alluvial valley flanked by the abrupt Eudunda Escarpment on the western side and by a more subdued range to the east. Gently inclined outwash fans abut the rising ground on both sides and grade to a very gently undulating valley floor in the centre. Towards the north is the internally draining depression of Robertstown Lagoon, fed by Brady Creek flowing in from the north. South of the lagoon, all water courses converge at a gap in the eastern range where they flow out of the system in a single stream. On the northern edge, where basement rocks are closer to the surface, the gently inclined valley floor gives way to undulating rises.

Elevation: 430 m on basement rock rises in the north west to 300 m at the gap in the eastern range.

Relief: Maximum relief is 50 m (basement rock rises) in the north, but generally less than 20 m.

Soils: The Main soils: sandy loam over red clay and calcareous loam.

Main soils

D2 Sandy loam to loam over well structured red clay - extensive (throughout)

D3 Sandy loam over dispersive red clay - limited (throughout)

A6 Deep calcareous loam - limited (alluvial flats)

Minor soils

A4 Rubbly calcareous loam - throughout.

A2 Shallow calcareous loam - basement rock rises

C3 Gradational clay loam - throughout

D1 Shallow loam over red clay - rises

B2 Shallow loam over calcrete - rocky rises

L1 Shallow stony sandy loam - rocky rises

A3 Moderately calcareous loam - alluvial flats

B6 Loam over red clay on calcrete - flats

Main features: The Point Pass Land System is almost entirely flat to gently sloping and is mostly arable, exceptions being some minor saline flats, parts of the Robertstown Lagoon and isolated stony rises. The soils can be grouped into two broad categories. The more common soils are sandy loam to loam texture contrast types which are deep and inherently fertile, but which have poorly structured, quartz gravelly surfaces. The other main type is a calcareous loam, with favourable physical characteristics, but limited by sub-optimal moisture holding capacity (depending on depth to and nature of carbonate layer), and high pH.



Soil Landscape Unit summary: 18 Soil Landscape Units (SLUs) mapped in the Point Pass Land System:

SLU	% of area	Main features #
DYB	3.1	Complex of low rises formed on basement rock, and gently sloping outwash fans formed on locally derived alluvium. Slopes range from 3-10%. Watercourses are sporadically eroded. Main soils: <u>shallow loam over red clay</u> - D1 (C) and <u>shallow calcareous loam</u> - A2 (C) on rises, with <u>loam over well structured red clay</u> - D2 (C) and <u>gradational clay loam</u> - C3 (L) on fans. Limited water holding capacity and hard setting surfaces are variable limitations on rises, but on the fans the soils are deep and fertile with favourable subsoil structure, although surface soils tend to set hard affecting infiltration, workability and emergence.
EFB EFG	0.1 1.6	Very low rises formed on basement rock, protruding through alluvial sediments of broad outwash fans. Slopes are less than 2%. EFB Low rises without watercourses. EFG Low rises with weakly defined and sporadically eroded watercourses. Main soils: <u>shallow calcareous loam</u> - A2 (V) with <u>shallow loam over red clay</u> - D1 (C). These soils are shallow to moderately deep, the shallower types being prone to moisture deficit. Surface soils may set hard.
EHB	11.4	Undulating rises formed on fine grained rocks of the Saddleworth and Mintaro Formations. Slopes are mostly in the 3-8% range, and relief usually less than 30 m, but occasionally up to 50 m. The underlying rocks are capped in places by calcrete (10-20% of the area). This land is very stony. Elsewhere, there is minor rock outcrop and variable surface stone. There is minor watercourse erosion. Main soils: <u>shallow calcareous loam</u> - A2 (E) with <u>shallow loam over red clay</u> - D1 (L) and <u>shallow stony sandy loam</u> - L1 (L). On calcreted areas, <u>shallow loam over calcrete</u> - B2 (L) is predominant. These slopes are 80-90% arable – rocky outcrop, calcrete caps and shallow stony soils being the main restriction. Soil depth is limiting in places elsewhere, and erosion potential is significant throughout.
EVc	1.5	Undulating to moderately steep rises formed on siltstones and tillites with slopes of 5-15%. Upper slopes are commonly very rocky (non arable) due to either basement outcrop or calcrete caps. Watercourse erosion is severe in places. Main soils: <u>shallow calcareous loam</u> - A2 (E) and <u>shallow stony sandy loam</u> - L1 (E) with <u>shallow loam over calcrete</u> - B2 (L). This land is semi arable due to moderate slopes, shallow soils and surface rock and stone.
EZB	2.5	Complex of undulating rises formed on basement siltstones and fine sandstones (partly calcrete capped), and outwash fans formed on locally derived alluvium. Slopes range from 3-10%. Main soils on rises: <u>shallow calcareous loam</u> - A2 (L) and <u>shallow loam over red clay</u> - D1 (L) with <u>shallow stony sandy loam</u> - L1 (M) and <u>shallow loam over calcrete</u> - B2 (M). On fans, Main soils: <u>rubbly calcareous loam</u> - A4 (L) and <u>deep calcareous loam</u> - A6 (L) with <u>gradational clay loam</u> - C3 (M) and <u>loam over well structured red clay</u> - D2 (M). This land is about 90% arable (calcrete and shallow soils over rock are excluded). Limitations to production include variable soil depth, poor surface structure on all but calcareous soil types and erosion potential.
HJC	1.5	Rises to 20 m high with slopes of 3-7% formed on mixed deeply weathered basement rocks, Tertiary sandstones and clays. There is up to 20% surface quartzite, silcrete and calcrete. Main soils: <u>sandy loam to loam over well structured OR dispersive red clay</u> - D2/D3 (E), with <u>gradational clay loam</u> - C3 (C), <u>rubbly calcareous loam</u> - A4 (C) and <u>loam over red clay on calcrete</u> - B6 (M). These soils have variable depth (depending on underlying material), causing erratic moisture holding properties. Hard setting surfaces and imperfect root growth conditions are the other main limitations. Some areas are too stony for cropping.
JCB	1.2	Outwash fans with slopes of 1-2% formed on gritty clay sediments. Main soils: <u>loam over well structured red clay</u> - D2 (E) and <u>gradational clay loam</u> - C3 (E). These soils are deep and fertile with favourable subsoil structure, although surface soils tend to set hard affecting infiltration, workability and emergence.



JDA	6.0	Outwash fans and flats formed on clayey alluvium.
JDB	38.0	JDA Flats with slopes of less than 2%.
JDE	0.7	JDB Fans with slopes of 2-4% with up to 10% surface quartzite (or calcrete on low rises).
JDJ	1.0	JDE Drainage depressions.
JDT	1.3	JDJ Drainage depressions with eroded water courses.
JDoo	2.8	JDT Marginally saline flats with slope of less than 1%. JDoo Drainage depressions with severely eroded water courses and up to 10% of the surface affected by scalding. Main soils: <u>sandy loam to loam over well structured OR dispersive red clay</u> - D2/D3 (V), with <u>deep calcareous loam</u> - A6 (L), <u>gradational clay loam</u> - C3 (L), <u>moderately calcareous loam</u> - A3 (M), and <u>rubbly calcareous loam</u> - A4 (L) on low rises. These soils are deep and moderately fertile but most have hard setting surfaces which tend to shed water and impede uniform emergence and root growth. Workability and implement wear are affected by the hard surface soils and quartzite fragments both on the surface and in the soil. Erosion potential is moderately low, but run off from adjacent steeper slopes must be controlled. The flats of JDT are generally not arable due to moderate levels of salinity.
JYC	1.4	Footslope complex of outwash fans formed on alluvium and low rises formed on basement rock. Slopes are 4-10% and there is 2-10% surface stone. Main soils: <u>sandy loam to loam over well structured OR dispersive red clay</u> - D2/D3 (E), with <u>deep calcareous loam</u> - A6 (L) and <u>gradational clay loam</u> - C3 (M) on fans, and <u>shallow calcareous loam</u> - A2 (L) and <u>rubbly calcareous loam</u> - A4 (L) on rises. This land is fully arable with moderately deep soils limited mainly by poorly structured surfaces. These tend to shed water (increasing erosion potential), reduce waterholding capacity and affect emergence.
KHA	22.6	Very gently undulating flats with slopes of less than 2% formed on fine grained alluvium. There is variable surface calcrete stone, up to 10%, with up to 20% on very low rises. Main soils: <u>rubbly calcareous loam</u> - A4 (E) and <u>sandy loam to loam over well structured OR dispersive red clay</u> - D2/D3 (E), with <u>deep calcareous loam</u> - A6 (L), <u>moderately calcareous loam</u> - A3 (M), <u>gradational clay loam</u> - C3 (M) and <u>loam over red clay on calcrete</u> - B6 (M). There are two distinctive soil classes on these flats. The calcareous soils have good physical characteristics, but are often shallow over rubble (limiting moisture availability) and being calcareous throughout, may suffer from induced nutrient deficiencies. The texture contrast soils on the other hand, are moderately fertile and deep, but have hard setting surfaces, affecting water infiltration and root growth. Subsoil salt levels are low to moderate.
VFB	1.1	Depression in Robertstown Lagoon with shrub cover of samphire, blackbush and lignum. Main soil: <u>rubbly calcareous loam</u> - A4 (D). This land is marginally saline and subject to inundation and is only used for grazing of shrubs.
VGA	2.2	Flats of Robertstown Lagoon. Main soils: <u>deep calcareous loam</u> - A6 (E) and <u>gradational clay loam</u> - C3 (E). These soils are deep and moderately fertile, but marginally saline in places and subject to inundation in wet years. The land is generally arable.

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

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



Detailed soil profile descriptions:

- A2** Shallow calcareous loam (Paralithic, Hypercalcic Calcarosol)
5 - 10 cm calcareous loam becoming more clayey and calcareous at depth with a Class III A carbonate layer from 35 cm grading to weathering rock at 50 cm.
- A3** Moderately calcareous loam (Regolithic, / Pedal Calcic Calcarosol)
Calcareous loam to clay loam grading to a highly calcareous well structured clay, with limited fine carbonate segregations, over alluvium.
- A4** Rubbly calcareous loam (Regolithic, Lithocalcic / Supracalcic Calcarosol)
15 - 25 cm calcareous loam to clay loam overlying rubbly Class III C or III B carbonate becoming less rubbly with depth grading to very highly calcareous light clay.
- A6** Deep calcareous loam (Regolithic, Hypercalcic Calcarosol)
5 - 10 cm calcareous loam becoming more clayey and calcareous at depth with a Class I carbonate layer from 35 cm grading to clayey alluvium at 80 cm.
- B2** Shallow loam over calcrete (Petrocalcic Calcarosol)
Up to 50 cm calcareous sandy loam to loam with variable rubbly carbonate, overlying calcreted basement rock.
- B6** Loam over red clay on calcrete (Petrocalcic, Red Chromosol)
20 - 30 cm hard loam over a well structured red clay with a calcrete pan within 50 cm.
- C3** Gradational clay loam (Calcic, Red Dermosol)
10 - 40 cm clay loam to loam grading to a well structured red to brown light clay with soft or occasionally rubbly carbonate from 50 cm on alluvium.
- D1** Shallow loam over red clay (Hypercalcic, Red Chromosol)
15 - 40 cm hard quartz gravelly sandy loam to clay loam abruptly overlying a well structured red clay, calcareous from 45 cm grading to weathering basement rock at 80 cm.
- D2** Loam over well structured red clay (Hypercalcic, Red Chromosol)
15 - 40 cm hard quartzite gravelly fine sandy loam to clay loam abruptly overlying a well structured red clay with soft or occasionally rubbly carbonate from 45 cm.
- D3** Sandy loam over dispersive red clay (Hypercalcic, Red Sodosol)
15 - 40 cm hard quartzite gravelly fine sandy loam to loam abruptly overlying a coarsely structured and dispersive red clay, with soft or occasionally rubbly carbonate from 45 cm.
- L1** Shallow stony sandy loam (Lithic, Leptic Tenosol / Rudosol)
10 - 30 cm stony sandy loam to loam directly overlying basement rock.

Further information: [DEWNR Soil and Land Program](#)

