

PRH Parham Land System

Coastal and near coastal flats between Saint Kilda and Port Wakefield

Area: 197.1 km²

Annual rainfall: 325 – 400 mm average

Geology: The land system is underlain by a variety of materials deposited in coastal or near coastal environments. The bulk of the area is formed over clayey sediments probably deposited in lagoons or shallow marine conditions. The clays are characterized by accumulations of soft and crystalline gypsum. In better drained areas away from the coast they are red, but as watertables approach the surface with decreasing elevation, the clays become mottled. Substantial areas of the clays, especially on the inland side of the system are overlain by a hard calcrete cap. Recent red windblown sand has been deposited over the clays and calcrete in discrete dune formations. Adjacent to the coast are modern coastal sand dunes and associated shell grit beds. There are minor gypsum deposits around old lakebeds.

Topography: The Parham Land System is flat to very gently undulating. The most common element of the land surface is a complex of samphire (+/- saltbush) flats and bare salt pans. Very low stony benches are common in the east and north. Low linear sand dunes with a southeast - northwest orientation occur sporadically along the eastern edge. Low coastal sand hills and associated shell grit flats are common in the west (parallel to the coast). Mangroves occur sporadically in the tidal zone.

Elevation: 5 - 15 m on the eastern side to 0 m in the west

Relief: Less than 5 m

Main soils: Characteristic soils include saline swampy profiles, shelly and siliceous sands and calcareous loams.

Main soils

- N2** Saline swamp soil
- B2** Rubbly calcareous sandy loam over sheet calcrete on low stony benches
- H1a** Shell sand on coastal sandhills and rises

Minor soils

Flats

- A5** Rubbly calcareous sandy loam over clay
- A6** Calcareous loam
- C4** Gradational red loam
- H1b** Shell grit

Stony rises

- A4** Rubbly calcareous sandy loam
- B3/B6** Sandy loam over sandy clay loam on calcrete

Non stony rises

- A8** Gypsic clay loam on lunettes
- H2** Drift sand on low sand dunes



Main features: The Parham Land System is low rainfall coastal or near coastal land characterized by soils which are either shallow and stony, marginally to highly saline, or sandy and very infertile. Productive potential is consequently low throughout, and some areas such as sand hills and samphire flats are fragile areas which need careful grazing management for their protection. The stony flats are extensively cropped, but shallow soil depth and high alkalinity are major limitations. The samphire flats and saltpans usually have a watertable within a metre of the surface. These soils often contain sulfidic-like materials but acid sulfate potential is generally low due to high soil carbonate concentrations. The soils of the mangrove swamps however are sulfidic and are at risk of developing acid sulfate conditions if they are drained.

Soil Landscape Unit summary: 15 Soil Landscape Units (SLUs) mapped in Parham Land System:

SLU	% of area	Main features #
QMA QMK	5.5 14.4	<p>Stony flats and very low benches formed over sheet and rubbly calcrete of the Ripon / Bakara Formation.</p> <p>QMA Low flat topped benches with 20-50% surface calcrete.</p> <p>QMK Very gently undulating flats with about 10% swampy depressions, occasional low sandy rises and 20% or more surface calcrete stone.</p> <p>Main soils: <u>rubbly calcareous sandy loam over sheet calcrete</u> - B2 (V) and <u>rubbly calcareous sandy loam</u> - A4 (E), with <u>rubbly calcareous sandy loam over clay</u> - A5 (M), <u>sandy loam over sandy clay loam on calcrete</u> - B3/B6 (M) and <u>saline swamp soil</u> - N2 (M) in swampy depressions. The productive potential of this land is severely limited by shallow soil depth and associated low waterholding capacity. However, most of the land is cropped, indicating some potential for plant roots to extract moisture through crevices and cracks in the calcrete cap.</p>
QQA	0.9	<p>Very gently undulating flats formed on sheet or rubbly calcrete with 10-20% low shell sand rises. Main soils: <u>rubbly calcareous sandy loam over sheet calcrete</u> - B2 (E) and <u>rubbly calcareous sandy loam over clay</u> - A5 (E) with <u>shell sand</u> - H1a (L) on rises. The productive potential of this land is severely limited by shallow soil depth and associated low water holding capacity.</p>
U-C UYT	0.5 2.5	<p>Dunes of non coastal red siliceous sand.</p> <p>U-C Isolated linear dunes.</p> <p>UYT Complex of low sand dunes and marginally to highly saline swales.</p> <p>Main soils: Dunes: <u>Drift sand</u> - H2 with <u>sandy loam over sandy clay loam on calcrete</u> - B3/B6 where sand has blown away. Swales: Soils as for VIC.</p> <p>These areas have been severely eroded in the past, creating a hummocky land surface, and erosion control is a key aspect of management. The dune soils are infertile, have low productive potential, and are generally unsuitable for cropping.</p>
VIC	4.0	<p>Samphire and saltbush flats formed on gypseous clays.</p> <p>Main soils: <u>calcareous loam</u> - A6 (E), <u>rubbly calcareous sandy loam over clay</u> - A5 (E) and <u>gradational red loam</u> - C4 (E). These flats are too saline for cropping and are used for light grazing.</p>
VJF	1.6	<p>Complex of marginally saline flats, saltpans and gypsic lunettes formed on marine / lagoonal clays with soft and crystalline gypsum accumulations.</p> <p>Main soils: <u>calcareous loam</u> - A6 (C), <u>rubbly calcareous sandy loam over clay</u> - A5 (L) and <u>gradational red loam</u> - C4 (L) on flats, <u>gypsic clay loam</u> - A8 (L) on lunettes and <u>saline swamp soil</u> - N2 (C) on salt pans. This land is mostly too saline for any uses other than light grazing.</p>
WGK	3.2	<p>Low sand ridges with about 20% shell grit flats and minor swamps.</p> <p>Main soils: <u>shell sand</u> - H1a (V) with <u>shell grit</u> - H1b (C) and <u>saline swamp soil</u> - N2 (M). These ridges have no agricultural value, but are widely used for coastal residential purposes.</p>
WLU	6.1	<p>Shell grit flats with 10-20% low sand ridges.</p> <p>Main soils: <u>shell grit</u> - H1b (V), with <u>shell sand</u> - H1a (L) on rises and <u>saline swamp soil</u> - N2 (L) in depressions. Flats have no agricultural value, but there is some commercial shell grit extraction.</p>
WM-	9.0	Tidal flats with mangroves. Soils are likely to be sulfidic and potentially acid sulfate.
WO-	2.1	<p>Samphire and saltbush flats.</p> <p>Main soils: <u>saline swamp soil</u> - N2 (V) and <u>wet calcareous loam</u> - A6 (C).</p>



WQ-	35.8	Complex of samphire flats and bare saltpans. Main soil: <u>saline swamp soil</u> - N2 (D). These flats are too saline and wet for any rural uses other than controlled light grazing. Water tables are usually within a metre of the surface. Acid sulfate conditions may develop if these areas are drained, but the risk is small due to the high ratio of neutralizing calcareous soil relative to sulfidic-like material.
WR-	1.3	Complex of low coastal sandhills, shell grit beds and saline mud flats. Soils: <u>shell sand</u> - H1a (E) on sandhills, <u>shell grit</u> - H1b (E) on shell grit beds, and <u>saline swamp soil</u> - N2 (E) on mud flats. This land has no agricultural value.
WT-	11.4	Intertidal mud flats usually inland of the mangrove fringe. Tidal channels which cut across the flats are commonly fringed by mangroves. The rest of the flats are covered by samphire. Soils may contain sulfidic-like materials but acid sulfate potential is low due to their high carbonate content. The land has no agricultural value.
WZ-	1.7	Tidal mud flats with occasional low sandy rises and mangrove lined channels on the seaward margins. Vegetation is predominantly samphire with extensive bare areas. Soils contain sulfidic-like materials but acid sulfate potential is generally low due to their high carbonate content.

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

(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:

- A4** Rubbly calcareous sandy loam (Regolithic, Lithocalcic Calcarosol)
15 - 30 cm calcareous sandy loam over Class III C rubble, grading to very highly calcareous sandy loam to sandy clay loam
- A5** Rubbly calcareous sandy loam over clay (Regolithic, Lithocalcic / Supracalcic Calcarosol)
10 - 25 cm calcareous sandy loam over a rubbly Class III C or III B carbonate layer becoming less rubbly with depth grading to a brown and red mottled gypsic clay usually below 100 cm.
- A6** Calcareous loam (Calcic / Hypercalcic Calcarosol)
10 - 20 cm calcareous loam to clay loam becoming more clayey and calcareous with depth grading to a reddish clay with crystalline gypsum. Common on flats.
- A8** Gypsic clay loam (Gypsic, Calcic Calcarosol)
10 - 15 cm brown clay loam (usually calcareous) becoming more clayey and calcareous with depth over a grey brown clay with gypsum from 50 cm. Extensive on lunettes.
- B2** Rubbly calcareous sandy loam over sheet calcrete (Petrocalcic Calcarosol)
Calcareous sandy loam, usually rubbly from 10 cm over sheet or impenetrable rubbly calcrete at 25 cm.
- B3/B6** Sandy loam over sandy clay loam on calcrete (Petrocalcic, Leptic Tenosol / Petrocalcic, Red Chromosol)
15 - 25 cm non calcareous sandy loam, sometimes with a thin red sandy clay loam subsoil, over calcrete at about 30 cm.
- H1a** Shell sand (Shelly Rudosol / Calcarosol)
More than 100 cm shelly coarse sand, with or without soft secondary carbonate accumulations. Dominant on coastal sand ridges.
- H1b** Shell grit (Shelly Rudosol)
More than 100 cm coarse shell grit, often with a water table within a metre. Dominant on shell grit flats.



- H2** Drift sand (Petrocalcic, Calcic Calcarosol / Petrocalcic, Red-Orthic Tenoso)
Up to 100 cm red siliceous sand (calcareous or non calcareous) usually with a weak clay build up at depth overlying sheet or rubbly calcrete. Erosion has caused extreme variation in thickness to calcrete. Extensive on the SE-NW sand ridges.
- C4** Gradational red loam (Calcic, Red Dermosol)
10 cm loam to clay loam grading to a strongly structured red clay, calcareous and with gypsum crystals from 30 cm, continuing below 100 cm. Common on flats.
- N2** Saline swamp soil (Hypersalic Hydrosol)
10 - 20 cm calcareous sandy loam to clay loam over a brown very highly calcareous clay loam (often with a rubbly calcrete pan at 25 cm) grading to a saturated grey, brown and yellow mottled clay from 50 cm. Extensive in swamps and salt / samphire flats.

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

