

NEB Nepean Bay Land System

Low-lying coastal/tidal flats with a few low sandy beach ridges. Bordered by the sea to the north and east; by escarpment slopes to the south; and slightly raised arable plains to the west.

Area: 24.6 km²

Annual rainfall: 495 – 510 mm average

Geology: The southern/eastern, and very northern part of this land system consists of recent sand deposits (St. Kilda Formation sandy deposits). The sand is siliceous sand, or a mixture of siliceous sand and shell fragments. Often fine gravelly quartz fragments occur with the sand. These deposits are in the form of low beach ridges (the Semaphore Sand member of the St. Kilda Formation), sandy flats, and wet/saline sandy depressions.

Clayey alluvial/tidal deposits occupy most of the western part of this system (St. Kilda Formation muddy deposits).

A saline drainage depression of recent alluvium (Pooraka Formation), derived from adjacent slopes and low hills is included in this system. This alluvium consists of sandy to loamy topsoils overlying clayey sediments.

Topography: Coastal and tidal flats. Sandy flats, beach ridges, stranded beach ridges, and wet/saline depressions occur. Saline and muddy inter-tidal, supra-tidal (rarely inundated by tides), and extra-tidal (above present tidal advances) flats occur, usually with samphire and/or sea barley grass vegetation. Highly saline tidal and other drainage channels occur in these areas. A salinized drainage depression, draining the adjacent slopes, 'disappears' into the coastal flats.

Elevation: A significant proportion of the area can be inundated by tidal waters. Elevation varies from below the high water mark to just under 10 m above sea level at the base of the adjacent southern slopes. Average elevation is about 2 - 5m.

Relief: Less than 10 m

Main Soils:

Deep Sands:

H3 Deep siliceous sand

H2a-N2a Siliceous sand over sand with shell fragments

H2b-H1 Calcareous siliceous sand with shell fragments

Clay Loamy to Clayey Gradational Soils:

M4-N2b Clay loamy to clayey swamp soil

Texture Contrast Soils:

F2-F1 Sandy loam over sodic clay

Main Features: This land system is low-lying and mostly non-arable due to salinity levels. Only some of the sand flats are arable, but these areas have infertile soils, have a high to moderate wind erosion risk, and have a saline watertable not far below the surface.



Soil Landscape Unit summary: Nepean Bay Land System (NEB)

SLU	% of area	Main features #
JRT	3.1	Semi-arable to non-arable, alluvial drainage depression with 10-50% saline seepage (4*s). Main soils: <u>sandy loam over sodic clay</u> F2-F1 (<i>Grey-Brown Sodosol</i>).
WFE	0.6	Non-arable to semi-arable, sand spreads and low beach ridges with shell fragments. Main soils: <u>calcareous siliceous sand with shell fragments</u> H2b-H1 (<i>Calcarosol</i>). WFE - low beach ridges (1-2s) WFS - sand spreads (2-3s)
WFS	4.2	
WDE	5.0	Non-arable to semi-arable, sandy flats, depressions and low beach ridges. Main soils: <u>deep siliceous sand</u> on low beach ridges, most flats, and in some depressions H3 (<i>Basic Tenosol</i>); and <u>siliceous sand over sand with shell fragments</u> on some flats and in some depressions H2a-N2a (<i>Calcareous Tenosol-Hydrosol</i>); and <u>calcareous siliceous sand with shell fragments</u> in some depressions H2b-H1 (<i>Calcarosol</i>). WDE - low beach ridges (1s) WDQ - sandy flat (2-3s) WDS - marginally saline to saline sandy depression (4-5s) WDR - saline to highly saline sandy depression (5-7s)
WDQ	26.1	
WDS	3.4	
WDR	4.2	
W-E	0.5	Non-arable, sand spreads deposited on unrelated sediments (1s). Main soils: deep siliceous sands H3 (<i>Basic Tenosol</i>); overlying older soils, probably sodic texture contrast soils.
WR-	0.3	Non-arable, sandy coastal swamp flat, with some low sandy beach ridges (7s). Main soils: <u>deep siliceous sand</u> in swamp flats and on beach ridges H3 (<i>Basic Tenosol</i>); and possibly with some <u>siliceous sand over sand with shell fragments</u> in some swamp flats H2a-N2a (<i>Calcareous Tenosol-Hydrosol</i>).
WN-	4.2	Non-arable, extra-tidal flat, with sea barley grass (5s). Generally these areas are out of reach of present day tides. Main soils: <u>sandy loam over sodic clay</u> on some flats F2-F1 (<i>Grey-Brown Sodosol</i>); and <u>clay loamy to clayey swamp soil</u> on some flats M4-N2b (<i>Grey-Brown Sodosol-Hydrosol-Dermosol</i>).
WO-	10.5	Non-arable, supra-tidal flat, with samphire and sea barley grass (7s). Possibly inundated occasionally by big tides. Main soils: <u>clay loamy to clayey swamp soil</u> in channels, depressions, and some flats M4-N2b (<i>Grey-Brown Sodosol-Hydrosol-Dermosol</i>); and <u>sandy loam over sodic clay</u> on some flats F2-F1 (<i>Grey-Brown Sodosol</i>).
WQ-	2.9	Non-arable, inter-tidal to supra-tidal flat, with bare saline areas, samphire, and some patches of sea barley grass (7-8s), with a few low sandy beach ridges. Highly saline interface between inter-tidal area and raised non-tidal or extra-tidal areas beyond. Main soils: <u>clay loamy to clayey swamp soil</u> N2b (<i>Grey-Brown Hydrosol</i>); and <u>calcareous siliceous sand with shell fragments</u> on low beach ridges H2b-H1 (<i>Calcarosol-Rudosol</i>).
WT-	16.5	Non-arable, inter-tidal samphire flat (7s/7w). Main soils: <u>clay loamy to clayey swamp soil</u> N2b (<i>Grey-Brown Hydrosol</i>); with a few <u>siliceous sands over sand with shell fragments</u> N2a (<i>Calcareous Hydrosol</i>).
ZA-	5.7	Non-arable, saline plains, usually covered by sea barley grass (5s). Main soils: <u>sandy loam over sodic clay</u> F2-F1 (<i>Grey-Brown Sodosol</i>). Some soils have clay loamy topsoils (M4).
ZB-	12.7	Non-arable, highly saline plains, with around 50% bare/samphire covered saline drainage lines or saline patches, the rest is covered by sea barley grass (7-5s). Probably an old tidal area which is now beyond the reach of present tides. Main soils: <u>clay loamy to clayey swamp soil</u> in channels and depressions M4-N2b (<i>Grey-Brown Sodosol-Hydrosol-Dermosol</i>); and <u>sandy loam over sodic clay</u> on grassed flats F2-F1 (<i>Grey-Brown Sodosol</i>).

2-1e, 3w, 2y, etc) describe the predominant soil and land conditions, and their range, found in Soil Landscape Units. The number '1' reflects minimal limitation, while increasing numbers reflect increasing limitation. Letters correspond to the type of attribute:

a - wind erosion e - water erosion f - flooding g - gullyng
r - surface rockiness s - salinity w - waterlogging y - exposure



Detailed soil profile descriptions:**Main Soils:***Deep Sands:*

- H3** Deep siliceous sand (*Basic Tenosol*). Medium thickness to very thick grey-brown to black loamy sand to light sandy loam, over bleached sand, on light yellow-brown sand. Surface layers can be quite organic. Soils can contain fine gravelly quartz fragments. These deep sands often overlie shelly sediments. Flats, beach ridges, and some depressions.
- H2a-N2a** Siliceous sand over sand with shell fragments (*Calcareous Tenosol-Hydrosol*). Medium thickness grey-brown to black loamy sand to light sandy loam to organic rich loam, often with a bleached sandy layer; overlying calcareous sand with shell fragments. Sometimes fine gravelly quartz fragments occur as well. Flats and depressions. Depressions can be very wet, giving rise to wet soils (Hydrosols).
- H2b-H1** Calcareous siliceous sand with shell fragments (*Calcarosol-Rudosol*). Calcareous grey-brown to black loamy sand, over light grey to yellow-brown loamy sand which is often highly calcareous. Shell fragments either occur throughout, or else only in subsoil layers. Some fine gravelly quartz fragments can occur. These soils are usually dominantly siliceous sand, especially in the surface layers. Flats, depressions, and some beach ridges. These deposits are the result of recent sedimentation, and so often have only the most 'rudimentary' evidence of soil development (Rudosols).

Clay Loamy to Clayey Gradational Soils:

- M4-N2b** Clay loamy to clayey swamp soil (*Grey Sodosol-Hydrosol-Dermosol*). Medium thickness to thick grey-brown clay loam to clay over grey, olive-brown, or olive sodic clay. Sometimes there is a bleached layer of sandy loam or sand above the sodic clay. Underlying sediments can be sandy loam, sandy clay loam, clay, or sometimes sand. Sometimes underlying sediments are calcareous. Tidal and drainage channels, tidal flats, samphire swamps, and saline flats.

Texture Contrast Soils:

- F2-F1** Sandy loam over sodic clay (*Grey-Brown Sodosol*). Medium thickness to thick light sandy loam, sandy loam, or light sandy clay loam over grey or yellow-brown sodic clay. Sometimes the lower subsoil is calcareous. Alluvial drainage areas and saline flats.

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

