

# LHA Lower Harriet Land System

A highly dissected plateau. This is part of the lower elevation southern section of the Kangaroo Island Plateau. The system is bordered to the west by sandier and wetter plateau areas; to the south by the non arable coastal dune and dune core area around Little Sahara; to the southeast by the part of the Lake Ada Basin where the lower reaches of the Eleanor River and Wittow Creek converge; to the east, on the other side of Wittow Creek, is a similar highly dissected plateau area; and to the north lies a highly dissected part of the higher elevation central section of the Kangaroo Island Plateau. The system is named after the Harriet River, the lower section of which is found in the very southwest of this system.

**Area:** 109.4 km<sup>2</sup>

**Annual rainfall:** 570 – 720 mm average

**Geology:** The system is dominated by Pliocene-Quaternary age colluvium consisting of mottled brown clays, often capped with ironstone gravel (especially on plateau surfaces), and overlain by loamy topsoil. These clays are underlain by early Cambrian age Kanmantoo Group meta-sandstones (with small areas of softer phyllite(?) in the south). On many slopes, underlying weathered rock is shallower than one metre. Rock exposures occur on the steeper slopes in creek gullies. Quaternary age alluvium, consisting of grey and brown clays overlain by sandy or loamy topsoils occur in the more sluggishly drained sections of drainage depressions, especially the upper reaches. Recent alluvium of sands and loams over grey clay occurs in the low lying lower reaches of various rivers.

**Topography:** A highly dissected plateau area. Sloping land dominates the remnant plateau surfaces. Drainage is to the sea through the mouths of the Eleanor and Harriet Rivers into Vivonne Bay; southeast and southward via numerous creeks and tributaries. Drainage lines include the main parts of Wittow Creek, Rainy Creek, and Camp Creek which join the Eleanor River, and Two Wheel Creek which joins the Harriet River, and the lower Harriet itself. Slopes vary from less than 1% on much of the plateau surface, to over 80% on the steeper slopes of the Harriet River gorge. On the arable slopes and plateau surfaces, slopes typically range from 0 to 10%. There is a lagoonal depression in the very north east of the system.

**Elevation:** From sea level in the south, to 100 m in the north. Plateau surfaces are typically from 50 to 70 m elevation.

**Relief:** From 60 m in the Harriet River gorge to less than 10 m on some of the larger plateau surface areas. Typically from 10 to 30 m.

**Main soils:**

<b>J2</b>	<u>Ironstone soil</u>
<b>K4-K2</b>	<u>Loams over clay on weathered rock</u>
<b>F2-F1-G4-G3</b>	<u>Loams to sands over clay</u>

**Minor soils:**

<b>J3</b>	<u>Shallow soil on ferricrete</u>
<b>M1</b>	<u>Deep sandy loams</u>
<b>L1</b>	<u>Shallow loams on rock</u>



**Main features:**

Arable plateau surfaces and slopes with non-arable drainage lines. Topsoils are mostly loamy, while a few sandy areas occur. The main soils are loams over clay with ironstone gravel, and loams over clay often over weathered rock. Areas of stony soils occur, mostly on the slopes adjacent to drainage lines. Fertility is reduced by ironstone gravel due to the 'fixation' of phosphorus. The clayey subsoils are usually sodic and relatively impermeable, resulting in seasonal waterlogging in many soils over winter and spring. Acidic conditions regularly occur in topsoils and subsoils. Patches of saline seepage occur, mostly along drainage depressions.

Most of the patches of saline land presently visible along drainage lines, were mapped in the late 1940s by Northcote. Therefore, it seems that the post war clearing of native vegetation has not resulted in a significant increase of saline seepage along drainage lines: and it follows that there probably has not been a significant rise in the saline groundwater level over this land system area in this time?

**Soil Landscape Unit summary:** Lower Harriet Land System (LHA)

SLU	% of area	Main features #
APm	4.3	<p>Non-arable creek gullies: mostly with shallow soils formed on weathered rock.</p> <p>Main soils: stony <u>loams over clay on weathered rock</u> – sandy loams and loams over clay on weathering rock, mostly meta-sandstone <b>K4-K2</b> (<i>Brown Sodosol on weathered rock</i>). With <u>shallow loams on rock</u> <b>L1</b> (<i>shallow Tenosol on rock</i>); <u>loams over clay</u> – sandy loams and loams over sodic clay <b>F2-F1</b> (<i>Brown-Grey Sodosol</i>); and approximately 5% <u>deep sandy loams</u> along drainage lines <b>M1</b> (<i>deep loamy Tenosol</i>).</p> <p><b>APm</b> – creek gorges of the Harriet River and Two Camp Creek (relief from 20 to 50m, slopes 10-80%, 6e, 5g*, 3°s-2°s, 4-5w)</p> <p>Summary: non-arable due to the steepness of slopes, and the shallow stony and wet nature of most soils.</p>
CEB CEC CED CEL CELw CEM CEZ CEZw	3.8 17.7 0.4 6.9 0.5 3.7 0.1 0.5	<p>Slopes and plateau surfaces with the majority of soils formed on weathered rock.</p> <p>Main soils: <u>loams over clay on weathered rock</u> - sandy loams over sodic clays, which are often stony <b>K4</b> (<i>Brown Sodosol on weathered rock</i>). Often with some areas of deeper sandy loams over sodic clay, especially in depressions and on lower slopes – <u>loams over clay</u> <b>F2-F1</b> (<i>Brown Sodosol</i>); and some areas with ironstone gravel, especially on upper slopes – <u>ironstone soil</u> <b>J2</b> (<i>Ferric Brown Sodosol</i>).</p> <p><b>CEB</b> – slopes (1-4%, 2e, 3-2w, 2-1s)  <b>CEC</b> – slopes (4-12%, 3-4e, 3w, 2-1s)  <b>CED</b> – semi arable, steeper slopes (8-20%, 4-3e, 4w, 2s)  <b>CEL</b> – slopes with raised subsoil salinity levels (1-4%, 2e, 3w, 3-2s)  <b>CELw</b> – wetter slopes with raised subsoil salinity levels (1-4%, 2e, 4w, 3-2s)  <b>CEM</b> – slopes with raised subsoil salinity levels (4-10%, 3e, 3-4w, 3-2s)  <b>CEZ</b> – plateau surfaces (0-2%, 1e, 3-2w, 2-1s). Typically with a greater proportion of ironstone soils.  <b>CEZw</b> – wetter plateau surfaces (0-1%, 1e, 4w, 2-1s). Typically with a greater proportion of ironstone soils.</p> <p>Summary: mostly arable slopes between plateau surfaces and the steeper and/or wetter non arable slopes adjacent to drainage lines, with impermeable clayey subsoils, and some stony areas. Underlying rock is usually meta-sandstone; however a few areas underlain by softer phyllite(?) occur in the south of the system.</p>



CFD CFE CFT	0.4 10.0 1.9	<p>Slopes and gullies with stony soils.</p> <p>Main soils: <u>loams over clay on weathered rock</u> - sandy loams over sodic clays, which are usually stony <b>K4</b> (<i>Brown Sodosol on weathered rock</i>). With and approximately 5-10% <u>deep sandy loams</u> along drainage lines <b>M1</b> (<i>deep loamy Tenosol</i>).</p> <p><b>CFD</b> – semi arable and wetter lower slopes (8-20%, 4e, 4w, 2-1s)  <b>CFE</b> – drainage depressions: consisting of slopes (especially lower slopes), and drainage lines typically with about 2% saline land (0-20%, 4-5w, 3°s-3+s, 4e)  <b>CFT</b> – drainage depressions: consisting of lower slopes, and drainage lines with 10-50% saline land (0-20%, 5w, 3*s, 4e)</p> <p>Summary: mostly non arable stony lower slopes and drainage lines. Typically wet and stony; often with patches of saline land along drainage lines.</p>
FOB FOC FOK FOL	4.9 0.6 0.1 4.5	<p>Slopes off plateau surface with ironstone soils.</p> <p>Main soils: <u>ironstone soil J2</u> (<i>Ferric Brown Sodosol-Chromosol</i>). With <u>loams over clay F2-F1</u> (<i>Brown-Grey Sodosol</i>), and some soils formed on weathered rock - <u>loams over clay on weathered rock K4-K2</u> (<i>Brown Sodosol on weathered rock</i>).</p> <p><b>FOB</b> – slopes (1-4%, 2-3e, 3w, 2-1s)  <b>FOC</b> – slopes (3-10%, 3-2e, 3-2w, 2-1s)  <b>FOK</b> – plain with areas of raised subsoil salinity levels (0-2%, 1e, 3w, 3-2s)  <b>FOL</b> – slopes with areas of raised subsoil salinity levels (1-4%, 2-3e, 4-3w, 3-2s).</p> <p>Summary: areas dominated by ironstone soils with relatively impermeable clayey subsoils. Infertility and seasonal waterlogging are the main limitations.</p>
FXB FXZ FXZa FXZw	1.9 24.2 0.2 6.7	<p>Plateau surfaces with ironstone soils; some with ferricrete.</p> <p>Main soils: <u>ironstone soil J2</u> (<i>Ferric Brown Sodosol-Chromosol</i>). With <u>shallow soil on ferricrete J3</u> (<i>Petroferric Tenosol</i>)</p> <p><b>FXB</b> – slight slopes, with minor drainage lines (1-2.5%, 2-1e, 3-4w, 2-1s, 2g)  <b>FXZ</b> – plateau surfaces (0-1.5%, 3-4w, 2-1s)  <b>FXZa</b> – plateau surface with sandier soils (0-1, 2-3w, 2-1s, 1e)  <b>FXZw</b> – wetter plateau surfaces, some with areas of raised subsoil salinity (0-1%, 4w, 2s).  Shallow soils on ferricrete are less likely to be encountered in these areas.</p> <p>Summary: plateau surfaces dominated by soils with ironstone gravel and/or ferricrete. Infertility and seasonal waterlogging are the main limitations. Patches of shallow soils with ferricrete boulders occur.</p>
PnE PnO PnU	0.2 1.8 1.7	<p>Drainage depressions</p> <p>Main soils: <u>loams to sands over clay</u> – sandy loams or sands over sodic clay, along drainage lines <b>F2-F1-G4-G3</b> (<i>Grey-Brown Sodosol</i>). With some stony texture contrast soils formed on weathered rock on lower slopes - <u>loams over clay on weathered rock K4</u> (<i>Brown Sodosol on weathered rock</i>). And possibly with some <u>deep sandy loams</u> along drainage lines <b>M1</b> (<i>deep loamy Tenosol</i>)</p> <p><b>PnE</b> – upper drainage depression (related to 'Xo' and 'FXZw' land units) (5w, 2s, 2-3e). Some ironstone soils may occur.  <b>PnO</b> – drainage depressions: drainage lines with patches of raised salinity, and some lower slope areas (slopes mostly from 0-10%, 5w, 3+s, 3-2e)  <b>PnU</b> – drainage depressions: drainage lines with 10-50% saline land, and some lower slope areas (slopes mostly from 0-10%, 5w, 4*s, 3-2e)</p> <p>Summary: sluggish drainage depressions, wet and prone to flooding, often saline. Typically upper reaches of creeks and rivers.</p>



Xo-	0.2	<p>Small waterlogged depression or swampy creek headwater on plateau surface. Main soils: medium thickness to very thick sandy loams or sands over grey, or sometimes brown sodic clay – <u>loams to sands over clay</u> <b>F2-F1-G3-G4</b> (<i>Grey-Brown Sodosol</i>).</p> <p><b>Xo-</b> – seasonally waterlogged/ swampy depression (5w, 2s). Non saline or only slightly saline.</p> <p>Summary: usually closed depressions limited by wetness.</p>
XVU XVX	1.4 0.8	<p>Drainage depression and flats. Main soils: <u>loams over clay</u> - sandy loams, loams, and even clay loams over sodic clay <b>F2-F1</b> (<i>Brown-Grey Sodosol</i>). With some <u>deep sandy loams</u> in the drainage depression <b>M1</b> (<i>deep loamy Tenosol</i>). Minor areas of texture contrast soils on weathered rock on steep and wet lower slopes - <u>loams over clay on weathered rock</u> <b>K4-K2</b> (<i>Brown Sodosol on weathered rock</i>).</p> <p><b>XVU</b> – lower Harriet River: with drainage depressions, adjacent flats, marginally saline swamps near the mouth of the Harriet River, and some sloping tributaries with patches of saline land (Overall 3s*, 5-4w. Drainage depression: 3s, 5w, 2e; swamps: 4s, 7w; flats: 3s, 4w; sloping tributaries: 4+s, 4w, 3e)</p> <p><b>XVX</b> – lower Eleanor River and Camp creek Flat: with saline and swampy drainage depressions, marginally saline flats, and some sloping tributaries. (4+s, 5-4w)</p> <p>Summary: the area is largely non arable due to being flood prone, marginally saline and wet.</p>
ZA-	0.1	<p>Saline drainage depressions. Main soils: <u>loams over clay</u> – sandy loams over sodic clay, along drainage lines <b>F2-F1</b> (<i>Grey Sodosol</i>).</p> <p><b>ZA-</b> – saline drainage depressions (slopes from 2-5%, 5w, 5-4s, 3e)</p> <p>Summary: non arable saline and wet drainage depression; prone to flooding.</p>
ZP- ZQ-	0.2 0.2	<p>Lagoonal depressions. Main soils: wet texture contrast soils; with sandy or possibly sandy loam topsoil with a bleached subsurface layer, over sodic clay – <u>sands to loams over clay</u> <b>G4-G3-F2-F1</b> (<i>Grey-Brown Sodosol</i>)</p> <p><b>ZP-</b> – lagoonal depression; slightly elevated in comparison to 'ZQ' (3-2s) <b>ZQ-</b> – marginally saline to saline lagoons, subject to seasonal flooding (4-3s)</p> <p>Summary: depressions prone to seasonal flooding</p>

# Classes in the 'Soil Landscape Unit summary' table (eg. 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:**

- J2** Ironstone soil (*Ferric Brown Sodosol-Chromosol*). Medium thickness sandy loam or loam topsoil with ironstone gravel, occasionally with a bleached subsurface layer; over yellow-brown or olive-brown mottled clay; which is underlain by deeply weathered and highly mottled clay. Sometimes there is a transitional layer of clay loam with ironstone gravel between the topsoil and subsoil. Topsoils are usually acidic; subsoils acidic, strongly acidic, or neutral; while deeply weathered clayey substrates are strongly acidic to acidic. Found on plateau surfaces and on some slopes, especially very gentle upper slopes.
- K4-K2** Loams over clay on weathered rock (*Brown Sodosol on weathered rock*). Medium thickness to thin topsoil: consisting of thin grey-brown or brown sandy loam or loam surface soil, and a subsurface layer (if present) of sandy loam (occasionally clay loam or sand) which is sometimes bleached. Topsoils often contain some quartz, meta-sandstone, phyllite(?), and/or ironstone fragments: topsoils can be quite stony on steeper slopes. Underlying this is a yellow-brown, olive-brown, or occasionally red-brown clayey subsoil with a few mottles, which is usually sodic and dispersive in its upper part. Soil pHs are usually acidic. Weathered rock occurs at a depth of less than one metre. Usually overlying meta-sandstone, occasionally phyllite(?). Mostly found on slopes.
- F2-F1-G4-G3** Loams to sands over clay (*Brown-Grey Sodosol*). Medium thickness to very thick sandy loams, or sometimes sands (or can be clay loams or silty loams on some river flats), often with a bleached subsurface layer; over mottled grey, olive, olive-brown, or yellow-brown sodic clay. Very thick topsoils are often sandy and usually bleached: occasionally such soils have a thin to medium thickness layer of ironstone overlying the clay subsoil. Soil pHs are neutral to acidic. Found in drainage depressions/flats and lagoons, and possibly on some lower slopes.

**Minor soils:**

- J3** Shallow soil on ferricrete (*Petroferric Tenosol*). Shallow sands and sandy loams with a bleached subsurface layer overlying ferricrete (bouldery or cemented nodular ironstone). The ferricrete is usually underlain by ironstone gravel; with mottled grey or brown clayey substrate below this. The upper layer of the clayey substrate is usually sodic and dispersive. Soil pHs are neutral to acidic. Found on plateau surfaces; often with bouldery ironstone strewn on the land surface.
- M1** Deep sandy loams (*deep loamy Tenosol*). Deep sandy loams, usually with a bleached subsurface layer, underlain by rock or a clayey substrate. Recent alluvium found along drainage lines.
- L1** Shallow loams on rock (*shallow Tenosol on rock*). Shallow brown sandy loam to loam on weathered rock. Often with many rock fragments. Usually overlying meta-sandstone. Found on steeper slopes in creek gullies.

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

