

DIA Diamond Lake Land System

Low lying land of the Diamond Lake depression between Everard and Whitwarta

Area: 45.9 km²

Annual rainfall: 350 – 365 mm average

Geology: A range of geological materials underlies the system. Along the eastern margins are Tertiary age clays and mudstones and through the central part are sediments laid down under lacustrine or shallow marine conditions during times of high sea level. These materials have been largely covered by calcareous aeolian sediments of the Woorinen Formation which have mostly hardened into calcretes. These occur throughout the system. Exposure of the lacustrine/marine sediments in salinas has resulted in extensive gypsum redeposition in the central and southern areas. In the north are isolated dunes formed in Recent siliceous drift sand.

Topography: The Diamond Lake Land System is a shallow drainage depression linking the Magpie Creek - Everard Plains system with the River Wakefield. Down the central part of the system is a string of salt pans, samphire flats and salt lakes (notably Diamond Lake), forming a water course. Adjacent to the central depression are gently undulating rises up to 10 m high with slopes of 2-3%. Bordering the eastern edges of the larger saline depressions are gypseous lunettes. Occasional low linear sand dunes occur in the north.

Elevation: 60 m in the north to 40 m in the south

Relief: Less than 10 m

Soils: Shallow stony calcareous soils are predominant on the higher ground. Wet saline soils and gypsum-rich loams dominate the salt lake / saline flats sections of the System.

Main soils

- A4** Rubbly calcareous loam - extensive (rises)
- N2** Wet saline soil - limited (swamps and salt/samphire flats)
- B3** Gradational sandy loam over calcrete - limited (stony rises)
- A8** Calcareous loam over gypsum - limited (gypsum rises)
- B2** Calcareous sandy loam over calcrete - limited (rises in the north)

Minor soils

- D3** Loam over dispersive red clay - rises along the eastern side
- H2** Deep sand - isolated sand dunes

Main features: The Diamond Lake Land System is a saline discharge depression dominated by saline soils in lower lying areas and calcareous soils on rising ground. Most rises have shallow rubbly soils which are arable but on which productivity is limited by restricted moisture holding capacity, stoniness and lime induced nutrient deficiencies. Along the eastern side are limited areas of loamy texture contrast soils (neutral in the surface). These have better fertility and moisture retention characteristics than the rubbly soils. Rises adjacent to salt flats are often gypseous. These soils are deep, but calcareous and with fine sandy to silty textures resulting in low fertility and waterholding capacity. Salinity and high soil boron levels are potential problems on all low lying ground.



Soil Landscape Unit summary: 11 Soil Landscape Units (SLUs) mapped in the Diamond Lake Land System:

SLU	% of area	Main features #
QHA	5.5	Low flat topped calcrete benches with 20-50% surface calcrete stone. Main soils: <u>calcareous sandy loam over calcrete</u> - B2 (V) with <u>rubbly calcareous loam</u> - A4 (C). These soils are moderately shallow and rubbly so moisture holding capacity is the biggest limiting factor. All soils are calcareous throughout - this may induce nutrient deficiencies.
RAP	26.2	Very gently undulating low lying flats formed on calcreted lake bed sediments. There are 5-10% saline depressions where the underlying saline water table is near or at the surface. There is up to 20% surface calcrete stone, with some heavier outcrops in places. Main soils: <u>gradational sandy loam over calcrete</u> - B3 (E) and <u>rubbly calcareous loam</u> - A4 (E) with <u>calcareous sandy loam over calcrete</u> - B2 (L). These soils are moderately shallow and rubbly, so moisture holding capacity is the main limitation. Salinity, particularly in lower lying areas is moderately high.
SOL SOQ	27.1 4.1	Rises formed on mixed sediments (including old gypsum deposits and Tertiary? mudstones), capped by rubbly Woorinen Formation carbonates. SOL Gently undulating rises with slopes of 2-3% and minor (less than 5%) saline depressions. SOQ Complex of 50% gently undulating rises, 35% moderately saline flats and 15% highly saline depressions. Main soils: <u>rubbly calcareous loam</u> - A4 (E) and <u>loam over dispersive red clay</u> - D3 (L) with <u>gradational sandy loam over calcrete</u> - B3 (L). <u>Wet saline soil</u> - N2 (L) dominates the saline depressions. Except for the saline flats the land is arable with soils generally moderately deep, although mostly alkaline with marginal fertility. Subsoil salinity (and probably boron) levels are moderate to high.
U-C	2.3	Isolated low linear sand dunes. Main soil is <u>deep sand</u> - H2 (D). These dunes are infertile and unstable. They have been severely eroded in the past and require stabilization. They have little agricultural value.
XMM	1.8	Wet saline section of the Wakefield River at the point where it meets the Diamond Lake overflow. This is not arable but has value for grazing of salt tolerant pastures. River Wakefield flats, downstream of Balaklava. XMM Saline flat of an abandoned river channel. Main soil: <u>gradational black silty clay loam</u> - M2 . These soils are deep and fertile and generally better structured than the redder less clayey soils on the upstream flats (XJJ). The flats are subject to flooding.
ZB-	3.7	Complex of samphire flats and bare salt pans. Main soil: <u>wet saline soil</u> - N2 (D). This land is highly saline with little agricultural value apart from light grazing.
ZH-	5.6	Complex of marginally saline (E) and highly saline flats (E), & Diamond Lake (L) - salt lake. Main soil: <u>wet saline soil</u> - N2 (D). Salinity, waterlogging and inundation restrict agricultural land use to light grazing.
ZI-	3.6	Complex of about 80% gypsum rises and 20% salt pans and saline flats. Main soils: <u>calcareous loam over gypsum</u> - A8 (E) on rises, <u>rubbly calcareous loam</u> - A4 (C) on lower slopes and <u>wet saline soil</u> - N2 (L) in salt flats. This land has features in common with ZL- and ZK-.
ZK-	9.9	Complex of about 50% salt flats and 50% calcrete rises. Main soils: <u>wet saline soil</u> - N2 (E) in salt flats, and <u>rubbly calcareous loam</u> - A4 (C) and <u>calcareous sandy loam over calcrete</u> - B2 (L) on rises. The rises have shallow alkaline soils with limitations due to restricted moisture holding capacity, stoniness and lime induced nutrient deficiencies. Larger parcels are arable. The salt flats have little agricultural value other than light grazing.
ZL-	10.2	Low rises and lunettes formed on gypseous deposits. The rises are less than 5 m high with slopes of 2-8%. Main soil: <u>calcareous loam over gypsum</u> - A8 (D). These soils are deep and well drained but with moderately high salinity (due to the gypsum) and low fertility. They are susceptible to wind erosion.



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 loam (Regolithic, Lithocalcic / Supracalcic Calcarosol)
10 - 25 cm calcareous loam to clay loam becoming more calcareous with depth over Class III B or III C rubble at 30 cm, grading to a highly calcareous clay loam to light clay (sometimes gypseous) continuing below 100 cm.
- A8** Calcareous loam over gypsum (Gypsic Calcarosol)
15 - 30 cm calcareous silty loam to loam grading to a very highly calcareous light brown loam to clay loam over gypseous silt from 60 cm.
- B2** Calcareous sandy loam over calcrete (Petrocalcic Calcarosol)
10 - 15 cm calcareous sandy loam to sandy clay loam, rubbly in the subsurface over sheet calcrete at 25 cm.
- B3** Gradational sandy loam over calcrete (Petrocalcic, Red Kandosol)
10 - 20 cm sandy loam grading to a massive red sandy clay loam over rubbly or sheet calcrete at 35 cm.
- D3** Loam over dispersive red clay (Hypercalcic, Red Sodosol)
10 - 20 cm loam to clay loam abruptly overlying a coarsely structured dispersive red clay, calcareous from 35 cm grading to grey and brown clay or soft mudstone at 55 cm.
- H2** Deep sand (Calcic Calcarosol / Calcareous, Arenic / Regolithic, Red-Orthic Tenosol)
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 variation in thickness to calcrete.
- N2** Wet saline soil (Calcarosolic, Hypersalic Hydrosol)
10 - 20 cm calcareous sandy loam to clay loam over a brown very highly calcareous clay loam with a rubbly calcrete pan at 25 cm grading to a saturated grey, brown and yellow mottled clay from 50 cm.

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

