STL Salt Lagoon Land System

Low-lying plains with numerous lagoons and some salinized land. The system is bordered by an old beach ridge to the south and east; slopes running down from a plateau area to the north; plains with lagoons to the west; and remnant calcreted dunes in the extreme south-west. The land system is split in the middle by a south-west to north-east running old beach ridge and lunette rise. The system is named after the large lagoon in the north of this land system.

Area: 40 km^2

Annual rainfall: 500 - 550 mm average

Geology: Much of this low-lying system is underlain by Tertiary age Hallett Cove Limestone. There are many lagoons with Holocene age lacustrine marl sediments: and other significant areas of older Pleistocene age lacustrine clayey sediments. Some flats and drainage depression areas of recent alluvia occur where the Bugga Bugga Creek flows into Salt Lagoon. There are some minor lunette areas: and a few remnants of Pleistocene age lowest member (oldest) Bridgewater Formation calcreted calcarenite areas. *Clayey sediments underlie the vast majority of soils*. An area in the north-east of this system consists of Pliocene-Quaternary age colluvial sediments of clay with an ironstone gravel capping. This colluvium is derived from weathered Cambrian age Kanmantoo Group meta-sediments. There are a few Holocene age small sand deposits have been derived from adjacent sandy surface soils and dry lagoonal surfaces.

Topography: Low-lying level to gently undulating plains with lagoonal depressions. Salinization has occurred in small flats, depressions and a drainage line in the north-east of the land system. There are some calcreted remnants on small low rises: and some small areas of low sand dunes. A depression area with calcrete occurs in the south-west of the land system. Slopes are generally around 0-1%. Some very short slopes of 3-5% occur around lagoonal depressions. The main drainage into the system comes from the north via the Bugga Bugga Creek which has its beginnings just to the west of American River; and there is some minor drainage into the land system from a short drainage line in the extreme north-east of the system.

Elevation: Typically 10 - 20m. From less than 10 m to 40 m in the extreme north-east

Relief: Less than 10m. Typically 0 - 5m

Major Soil:

G3-G4	Sand over sodic clay

Minor Soils:

N2	Saline soils
B7-B3	Shallow soil on calcrete
I1-H3	Very thick sands
J2-J1	Ironstone soil

Main Features: Arable, semi-arable and non-arable areas. Topsoils are mostly sandy. Mostly soils with sandy topsoil over sodic clay subsoil. Saline areas are common. Lagoons, saline flats and depressions, and a few marginally saline areas occur. Sandy topsoils pose a wind erosion risk and are naturally infertile. Drainage is poor due to low relief and relatively impermeable subsoils.

Soil Landscape Unit summary: Salt Lagoon Land System (STL)

SLU	% of area	Main features #
MqA MqB MqE	1.9 0.4 0.7	Semi-arable calcreted depressions, plains and low rises with shallow soils; with some deeper sand over sodic clay subsoils. Main soils: shallow soil on calcrete - shallow to very shallow sandy topsoil over sandy clay loam or sometimes clayey subsoil on calcrete **B7**-**B3** (*Petrocalcic Chromosol-Tenosol*). With 10-30% medium to very thick sandy topsoil over sodic clay **G3**-**G4** (*Brown Sodosol*). **MqA** – gently undulating plains (Ie). **MqB** – slopes/low rises (slopes 3%, II-Ie). **Mqe** – depression with <10% saline seepage (IIIs). Summary: the majority of soils are shallow and rocky (calcareted calcarenite), and so have low waterholding capacities. Other soils have low fertility bleached sandy topsoils and sodic clayey subsoils. Waterlogging and saline seepage are issues in the depression area.
MpA MpB	0.3 0.7	Semi-arable calcreted plains and low rises. Main soil: shallow soil on calcrete - shallow sandy topsoil over sandy clay loam subsoil on calcrete **B7** (*Petrocalcic Chromosol*). With 0-10% sand over sodic clay on 'non-calcreted' flats **G3**-**G4** (*Brown Sodosol*). **MpA** – plain (Ie). **MpB** – slopes/low rises (slopes 2-3%, II-Ie). Includes 0-15% non-calcreted flats. Summary: soils are shallow and rocky (calcreted calcarenite), and so have low waterholding capacities. Waterlogging occurs in some areas.
FGT	3.3	Semi-arable depression with medium thickness to thick sandy topsoil, usually with ironstone gravel, over sodic clay. Plateau outwash area: low-lying area with salinized drainage lines adjacent to slopes running down from plateau surfaces. Main soil: ironstone soil - medium to thick sandy topsoil with ironstone gravel over sodic clay **J2**-**J1** (*Ferric Brown Sodosol*). **FGT** – depression with 10-50% salinized drainage areas (4-3*s). 30% of the area is a salinized drainage area. Summary: the main issues are reduced fertility due to bleached sandy topsoils and ironstone gravel, saline seepage, waterlogging, and related sodic subsoils.
OZK OZD	0.7 0.5	Semi-arable to non-arable sand deposits. Recent quartz sand deposits, with dunes mostly running NW-SE, with a minor jumbled deposit and two dunes running N-S in the south-west of the system. Main soil: very thick sands - deep to moderate depth bleached sand **I1**-**H3** (*Podosol-Tenosol*). **OZK** – hummocky sand deposits. **OZD** – low linear and jumbled dunes (<5m). Summary: infertile sandy soils, with high wind erosion risk and strong water repellence, and relatively low waterholding capacity.
OXK	0.5	Semi-arable to non-arable sand deposits; with some sand over clay areas. Recent quartz sand deposits. Main soils: very thick sands – deep to moderate bleached sand **I1**-**H3** (*Podosol-Tenosol*). With 10-30% sand over sodic clay - thick to medium thickness sand over sodic clay **G3**-**G4** (*Brown Sodosol*). **OXK** - sand spreads and hummocky sand deposits. Summary: mostly infertile sandy soils, with high wind erosion risk and strong water repellence, and relatively low waterholding capacity. Other soils have low fertility bleached sandy topsoils and sodic clayey subsoils
PbA PbL PbO PbU PbLz	5.9 0.5 38.4 1.0 0.2	Mostly arable plains, slopes and depressions with thick, and some medium thickness, sandy topsoil. The broad depression areas have small saline depressions which are mapped-out where possible. Main soils: sand over sodic clay - thick, with medium thickness, sandy topsoil over sodic clay **G3**-**G4** (*Brown Sodosol*). With 0-5% shallow soil on calcrete - shallow to very shallow soil on calcrete **B7**-**B3** (*Petrocalcic Chromosol-Tenosol*). 0-1% small marginally saline to saline depression areas: sand over sodic clay **G3**-**G4** (*Brown*-Grey *Sodosol*). **PbA** – plains (Ie). **PbL** – slopes with <10% saline seepage (slopes 3%, II-Ie, III-IIs).

		PbO – depression with <10% saline seepage (IIIs). Includes approx. 1% marginally saline to saline depressions. **PbU** – depression with marginal salinity (IVs). **PbLz** – slopes with <10% saline seepage and >5% scalding (slopes 2-3%, IIe, IIIs). This area is 50% scalded: leaving thin loamy topsoil over clay loam with some ironstone nodules on mottled clay. Summary: waterlogging is an issue in many areas, subsoils are sodic, fertility is reduced due to bleached sandy topsoils, and many areas have raised subsoil salinity levels or saline seepage at the soil surface.
PcKk PcB PcK PcU	6.0 0.5 4.6 0.4	Mostly arable plains, slopes and depressions with thick to medium thickness sandy topsoil; and some calcreted areas with shallow soils. Main soils: Thick, with some medium thickness sandy topsoil over a sodic clay subsoil **G3**-**G4** (*Brown Sodosol*). With 10-30% shallow soil on calcrete - shallow to very shallow soil on calcrete **B7**-**B3** (*Petrocalcic Chromosol-Tenosol*). Thick with some medium thickness topsoils: **PcKk** – plain with <10% saline seepage (IIs). With approximately 2% very thick sands - deep to moderate depth bleached sand on low sand dunes (<2m) **I1**-**H3** (*Podosol-Tenosol*). Medium thickness with some thick topsoils: **PcB** – slopes (3%, IIe). **PcK** – plain with <10% saline seepage (IIs). **PcU** – depression with marginal salinity (IV-IIIs). Summary: the main issues are reduced fertility due to bleached sandy topsoils, some waterlogging, and raised subsoil salinity levels or saline seepage at the surface. Also some areas have shallow and rocky soils with low waterholding capacity.
PdA PdK	0.5 1.2	Mostly arable to semi-arable plains with thick sandy topsoil; and some sand deposits. Main soils: sand over sodic clay - thick sandy topsoil **G3** (*Brown Sodosol*). With 10-30% very thick sands - deep to moderate depth bleached sand **I1**-**H3** (*Podosol-Tenosol*). **PdA** – plains/'vague' lunette. **PdK** – plains with <10% saline seepage (IIs). Summary: the main issues are reduced fertility due to bleached sandy topsoils, some waterlogging, and wind erosion risk. In addition the deeper sandy soils are infertile, have high wind erosion risk and strong water repellence, and relatively low waterholding capacity.
ZA- ZB-	5.2 4.6	**ZA-** – non-arable saline flats, slight depressions and drainage areas (Vs). Mostly covered with salt tolerant grasses and samphire and some bare patches. Main soils: sand over sodic clay on most flats **G4**-**G3** (*Brown*-Grey *Sodosol*). With shallow soil on calcrete on some flats **B7**-**B3** (*Petrocalcic Chromosol-Tenosol*). **ZB-** – non-arable saline depressions and drainage areas (VIIs). Mostly covered with samphire or bare ground and some areas of salt tolerant grass. Main soil: saline soils - sand over sodic clay **N2** (*Grey-Brown Sodosol-Hydrosol*). Summary: non-arable salinized land.
ZX- ZQ- ZR- ZS- ZU-	5.7 2.3 1.6 3.9 8.7	Lagoonal depressions and lunettes. Main lagoonal soils: saline soils - sandy topsoils over clay or marl, mostly calcareous throughout **N2** (*Hydrosol-Sodosol*). Salt Lagoon itself has sandy to light sandy loam surface sediments with shelly layers (Hydrosol). Lunettes: very thick sands **I1**-**H3** (*Podosol-Tenosol*). With some shallow soil on calcrete **B7**-**B3** (*Petrocalcic Chromosol-Tenosol*). **ZX-** – lagoons with 10-20% low calcreted and sandy lunettes (<5m, VIIs). Lunettes often occur within lagoon margins. Lagoon area has samphire covered and bare areas. **ZQ-** – lagoon or lagoon edge with low sandy lunettes: usually with melaleucas (<5m, Vs) **ZR-** – lagoon: bare ground and samphire; sometimes submerged (VIIs). **ZS-** – lagoon: mostly bare ground; often submerged (VIIIs). **ZU-** – lagoon: bare ground; usually submerged (VIIIs). Salt Lagoon itself. Summary: lagoons which are subject to seasonal inundation to varying degrees.

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 - gullying
r - surface rockiness	s - salinity	w - waterlogging	y – exposure

Detailed soil profile descriptions:

Major Soil:

G3-**G4** Sand over sodic clay (*Brown Sodosol*). Thick to medium thickness, some even very thick, sand to loamy sand with a bleached sub-surface layer; over yellow-brown to olive-brown sodic clay with some olive and maybe red mottles. Occasionally ironstone nodules occur in the layer above the clay. Sometimes there is fine carbonate in the lower subsoil. Found on plains, depressions and slopes.

Minor Soils:

N2 Saline soils (*Grey-Brown Sodosol-Hydrosol*). Sandy topsoil, overlying sodic olive-brown to grey clay with grey mottles, or else overlying marl. The soil is sometimes calcareous throughout and has abundant fine carbonate at depth. Salt Lagoon itself has calcareous sandy to light sandy loam soil with shelly layers. Found in lagoons and saline depressions.

B7-**B3** Shallow soil on calcrete (*Petrocalcic Chromosol-Tenosol*). Shallow sandy topsoil over yellow-brown sandy clay loam or sometimes sandy loam; on calcrete. Sometimes the layer above the calcrete is mostly calcrete fragments. Occasionally the layer above the calcrete is highly calcareous. Found on low rises, plains, depressions and calcreted lunettes

I1-**H3** Very thick sands (*Podosol-Tenosol*). Deep to moderate depth neutral to acid loamy sand. This soil includes a bleached sub-surface layer sometimes with some ironstone nodules; overlying a sandy subsoil usually with accumulations of iron and organic compounds. Underlain by clayey substrate or occasionally calcrete. Found on sand spreads, hummocky sand deposits and sandy lunetes.

J2-**J1** Ironstone soil (*Ferric Brown Sodosol*). Medium thickness to thick, acid to neutral sandy topsoil with a bleached sub-surface layer and ironstone gravel; over orange-brown usually sodic clay with some olive mottles. Found in depression area.

Further information: DEWNR Soil and Land Program