

# Sodium toxicity (depth to toxic layer)

**High sodicity is one of the characteristics linked to the strong marine influence on many southern South Australian soils**

**Sodium toxicity** occurs mostly in the drier parts of southern South Australia where there is a very high level of deep subsoil sodicity (i.e. exchangeable sodium percentage (ESP) exceeding 25). This generally occurs at depths of between 50 and 100 cm, sometimes shallower. These conditions are invariably associated with high pH, moderate salinity and often high boron concentrations, all of which are natural features of these soils. They are not necessarily associated with poor soil structure. There is some evidence to suggest that these high levels of sodicity are toxic to some plants, particularly horticultural species. If there are toxic effects, it is reasonable to assume that in some years, the sodicity is preventing optimum water use efficiency, and could therefore be contributing to rising watertables. In practice, neither gypsum nor any other ameliorant will have any significant effect on these soils, due to the very high rates required and the difficulty of incorporation to the required depth. The use of plants with sodium tolerance is one solution. This implies cultivar selection focussed on sodium tolerance or the use of naturally occurring plants with sodium tolerance.

## Land assessment in southern South Australia

Estimates of ESP are based on extrapolation of laboratory analyses between similar soil materials and soil types.

Soil properties can vary across the landscape in a subtle or dramatic fashion. [Mapping at a regional scale](#) is not able to display this level of variability, however proportions of each *Sodium toxicity (depth to toxic layer)* class (e.g. TNAD1, TNAD2, etc.) have been estimated for each map unit.

Further information can be found in [Assessing Agricultural Land](#) (Maschmedt 2002).



Poorly structured sodic subsoil from 15 cm over sodium toxic clay (exchangeable sodium percentage of 51) from 35 cm

## Area statistics

Depth to sodium toxicity (exchangeable sodium percentage >25)	Area	Cleared land	Class*
None present or deeper than 100 cm	56.06%	52.28%	TNAD1
50–100 cm	33.01%	35.41%	TNAD2
25–50 cm	7.43%	9.08%	TNAD3
10–25 cm	0.82%	0.70%	TNAD4
Less than 10 cm	1.26%	0.83%	TNAD5
Not applicable	1.43%	1.70%	TNADX
<b>TOTAL HECTARES</b>	<b>15,765,460</b>	<b>10,439,300</b>	

\* The letters 'TNAD' denotes classes that are specific to *Sodium toxicity (depth to toxic layer)*

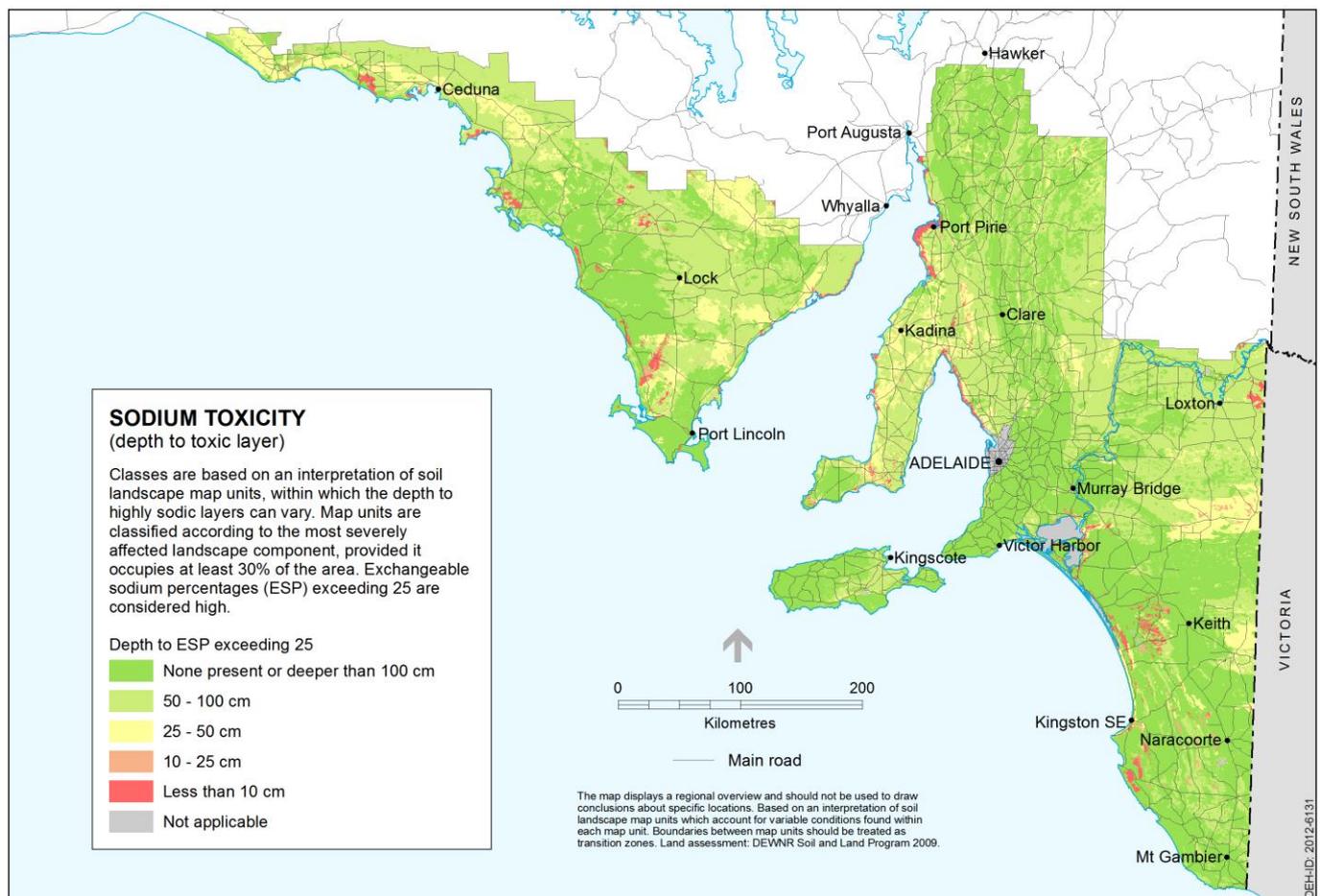


## Displaying data in soil maps

Soil and land attribute maps display a simplified version of the underlying data. Mapping classes are based on an interpretation of soil landscape map units within which the depth to highly sodic layers can vary. Each map unit component is assessed according to the estimated average depth to toxic sodium (ESP exceeding 25). Legend categories are determined by highlighting the most severely affected landscape component, provided it occupies at least 30% of the area of the map unit.



Saline land with near-surface sodium toxicity



## Further information

- View data on [NatureMaps](#) (→ Soils)
- Read the [metadata](#) for this layer
- Read more about [soil attribute mapping](#)
- Contact [Mapland](#)

Download from Enviro Data SA:

- [Statewide map](#) and [spatial dataset](#)
- [Assessing Agricultural Lands](#) (Maschmedt 2002)
- Soils of Southern SA book [Part 1](#) and [Part 2](#)



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