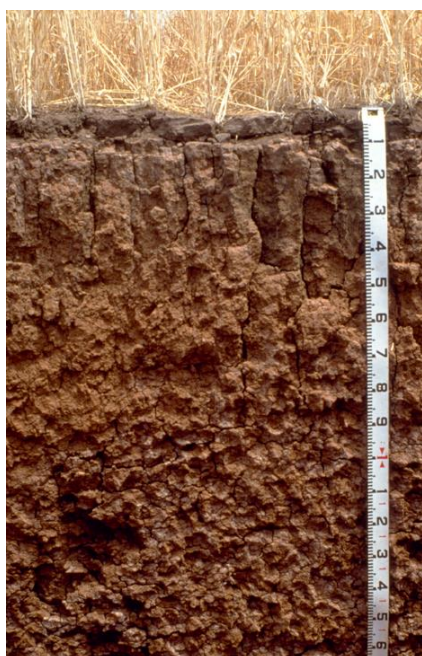


Boron toxicity (depth to toxic layer)

Along with common salt and carbonates, most boron has accumulated in soils via airborne deposition



Toxic levels of boron (36 mg/kg) from 10 cm depth necessitate tolerant cereal varieties

Boron toxicity affects many agricultural plants. Boron is an essential trace element which occurs naturally in most soils. High concentrations of boron tend to occur where marine sediments have influenced soil formation (e.g. wind-blown deposits from exposed sea floor sediments). Because boron salts are slightly soluble, they are leached out of the rootzone in higher rainfall areas. However, in lower rainfall areas or where impermeable subsoil clay layers prevent leaching, boron concentrations can be high.

Work by CSIRO has established that concentrations of more than 15 mg/kg are toxic to cereals. Other work suggests that the tolerance of horticultural crops is significantly lower. The shallower the depth to toxic levels, the greater the loss in productivity. Toxic effects are more marked in dry seasons when roots penetrate deeper into the soil. Excess boron cannot be removed from soil or treated in any way under dryland farming conditions. Accidental or deliberate breeding for boron tolerance has produced a range of cultivars which are appropriate for affected soils.

Land assessment in southern South Australia

This assessment is intended to highlight areas where boron toxicity may affect plant growth, at least in some seasons. Assessments are made from soil test results and extrapolation between similar soil materials and environments.

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 *Boron toxicity (depth to toxic layer)* class (e.g. TBD1, TBD2, etc.) have been estimated for each map unit.

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

Area statistics

Depth to boron concentrations exceeding 15 mg/kg	Area	Cleared land	Class*
None present or deeper than 100 cm	67.05%	62.84%	TBD1
50–100 cm	24.49%	27.76%	TBD2
25–50 cm	5.07%	6.22%	TBD3
10–25 cm	0.85%	0.77%	TBD4
Less than 10 cm	1.12%	0.71%	TBD5
Not applicable	1.43%	1.70%	TBDX
TOTAL HECTARES	15,765,460	10,439,300	

* The letters 'TBD' denotes classes that are specific to *Boron toxicity (depth to toxic layer)*

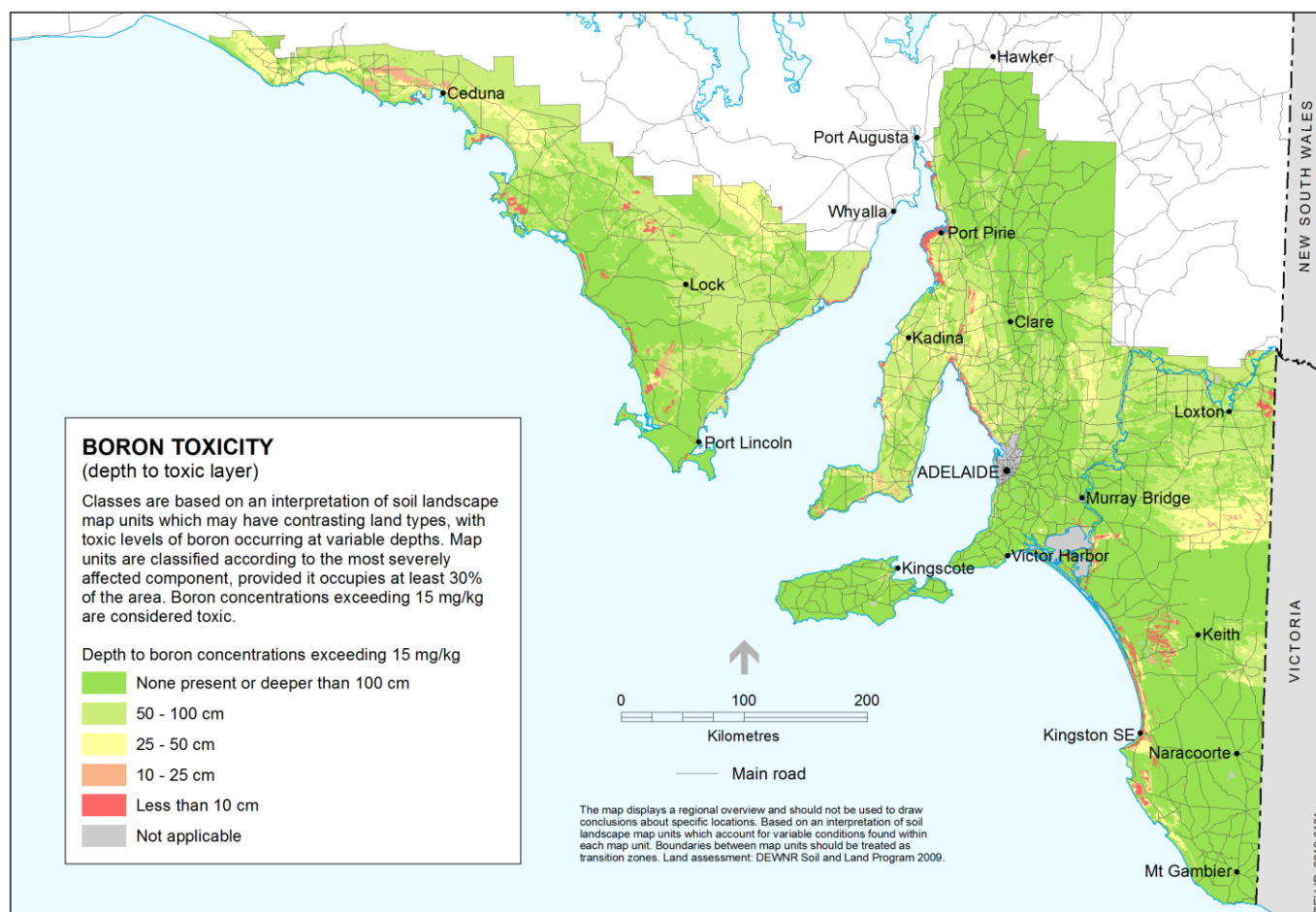


Displaying data in soil maps

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 which may have contrasting land types, and toxic levels of boron occurring at variable depths. Map unit components are assessed according to the average estimated depth to toxic boron (i.e. concentrations exceeding 15 mg/kg). Legend categories are determined by rating the most severely affected landscape component within each map unit, provided it occupies at least 30% of the map unit area.



Foliar symptoms of boron 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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