

# Boron toxicity (proportion of land affected)

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

**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.



Toxic boron levels (22 mg/kg from 15 cm) restrict root growth

## 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 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 (proportion of land affected)* class (e.g. TBP1, TBP2, etc.) have been estimated for each map unit.

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

## Area statistics

Land affected by boron toxicity (>15 mg/kg extractable boron shallower than 100 cm)	Area	Cleared land	Class*
Land not affected by boron toxicity	67.05%	62.84%	TBP1
Land affected by boron toxicity	31.52%	35.46%	TBP2
Not applicable	1.43%	1.70%	TBPX
TOTAL HECTARES	15,765,460	10,439,300	

\* The letters 'TBP' denotes classes that are specific to *Boron toxicity (proportion of land affected)*

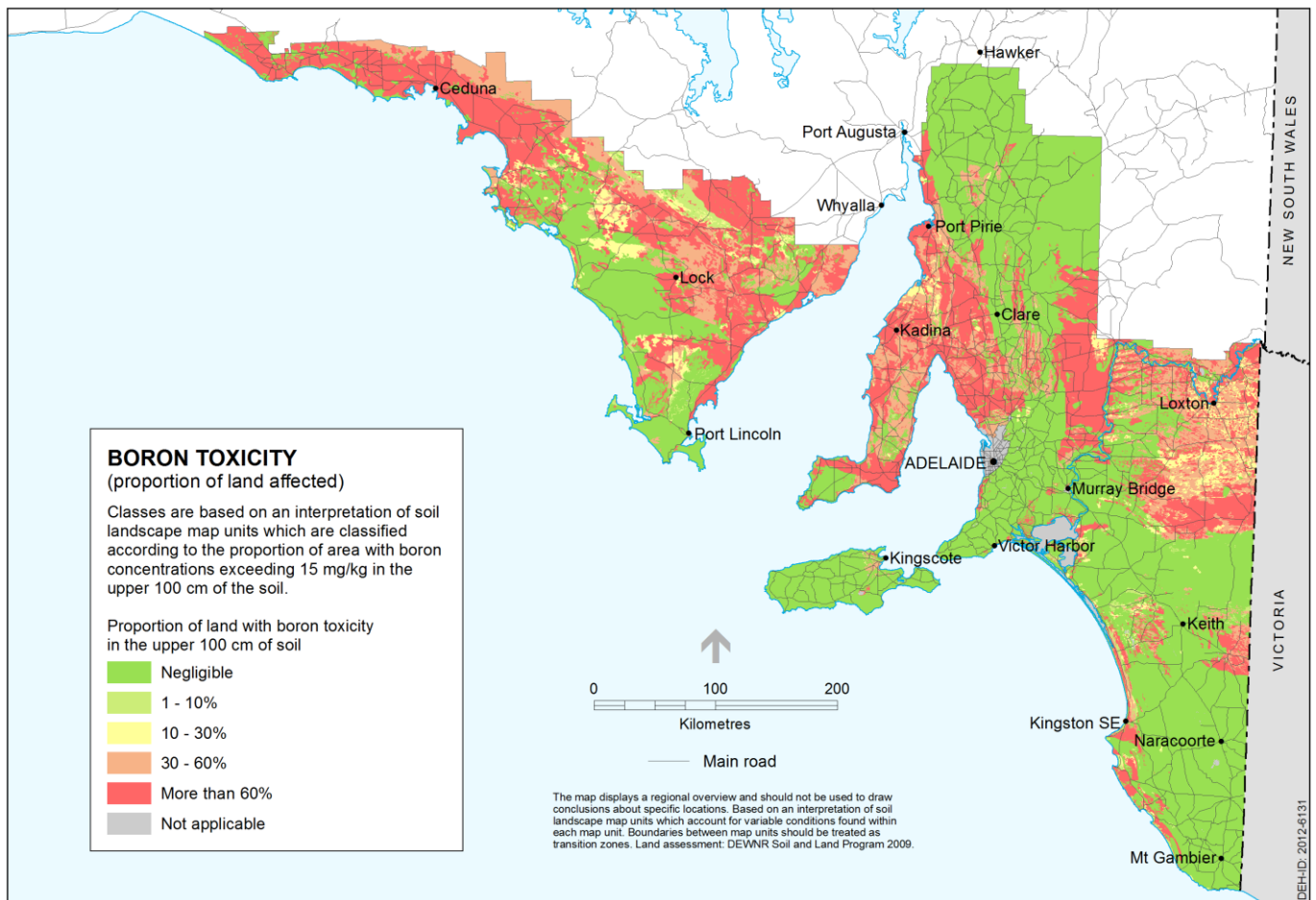


**Displaying data in soil maps**

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. Each map unit component is assessed according to the average estimated depth to toxic boron (i.e. concentrations exceeding 15 mg/kg). Legend categories are then based on the proportion of each map unit where this occurs within the upper 100 cm of soil.



Land affected by 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](#)



This work is licensed under the Creative Commons Attribution 4.0 International License.

To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>

© Crown in right of the State of South Australia, through the Department of Environment, Water and Natural Resources 2016. Last updated June 2016.

