

Acid sulfate soil potential

Poorly managed coastal development can cause severe environmental contamination where acid sulfate soils are present

Acid sulfate soil potential indicates the potential for sulfidic sediments, which, when disturbed, are capable of releasing toxic acid and heavy metals into the environment. Acid sulfate soils occur naturally in waterlogged areas in the presence of iron, sulfide and organic material. They are found in coastal (particularly tidal mud flats) and inland freshwater or saline areas. These soils are harmless if they remain saturated with water. However if exposed to air through excavation or drainage, they react with oxygen to form sulfuric acid. Highly acidic leachates which include heavy metals can then be released from the soil matrix. Specialised analyses can be done to confirm the presence of sulfidic materials. As a general rule, any land with a shallow watertable and a source of sulfur (e.g. seawater, gypsum or pyrite minerals) is considered at risk. Observations of rapid pH drop as a sample dries out also provide strong evidence.

Land assessment in southern South Australia

In this regional assessment, sulfidic soils have been identified using the following indicator properties:

- **At least** the lower part of the soil profile is saturated for most of the year
- **And** land occurs within a geological formation containing pyrite bands
- **Or** near surface watertables are highly saline (more than 10,000 mg/kg dissolved salts)
- **Or** there are gypsum deposits in the landscape (e.g. gypseous hummocks or lunettes around salt lakes/pans)
- **Or** gypsum segregations (crystals or soft flakes) occur in the soil profile.

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 *Acid sulfate soil potential* class (e.g. J1, J4, etc.; see table below) have been estimated for each map unit.

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



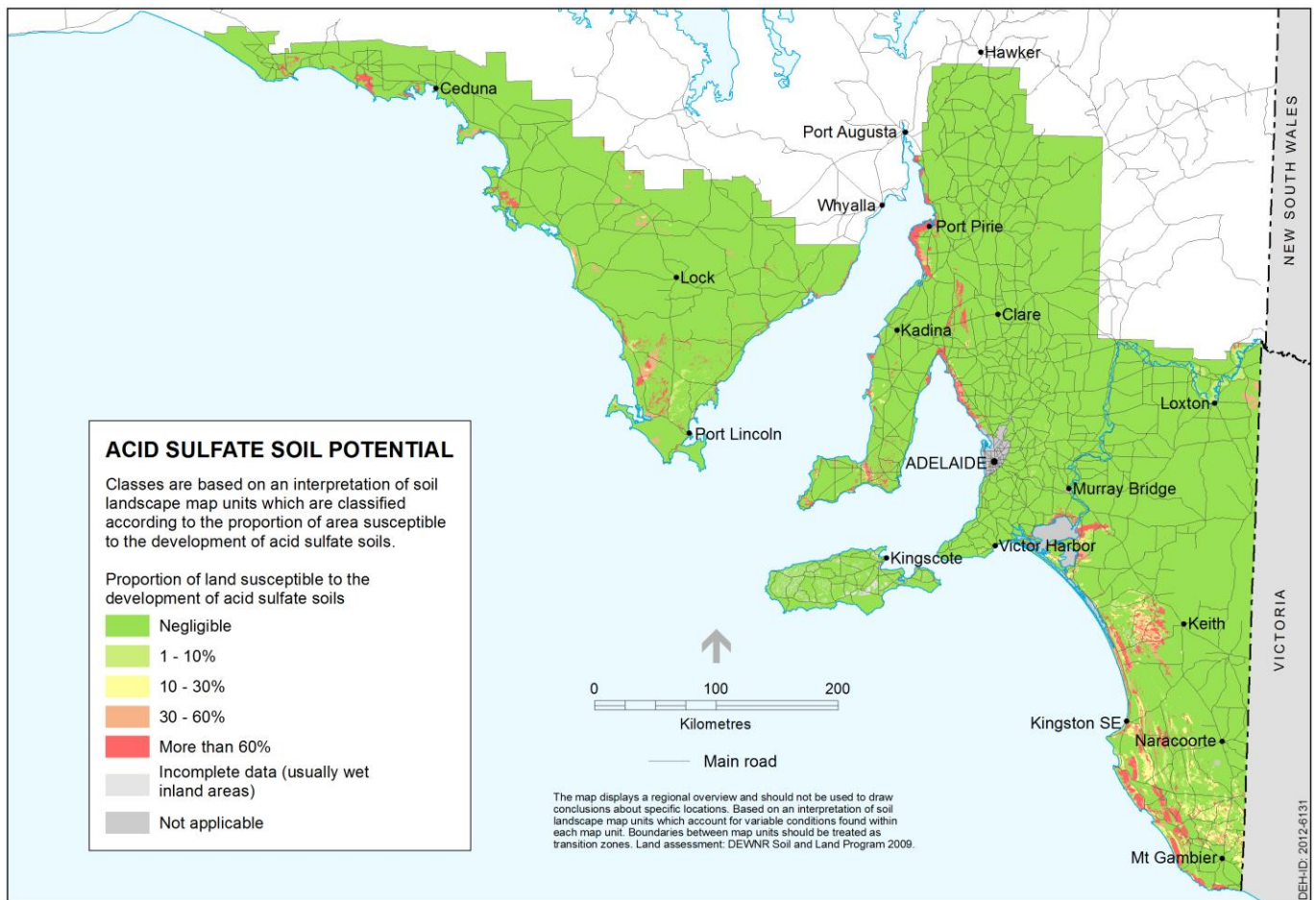
Coastal samphire flat underlain by sulfidic sediments

Area statistics

Potential for development of acid sulfate soil	Area	Cleared land	Class *
Negligible	94.51%	94.63%	J1
Potential for localised (patchy) development	0.31%	0.25%	J4
Potential for more than 50% of land to be affected	3.59%	3.32%	J5
Incomplete data (usually wet inland areas)	0.30%	0.20%	J0
Not applicable	1.29%	1.60%	JX
TOTAL HECTARES	15,765,460	10,439,300	

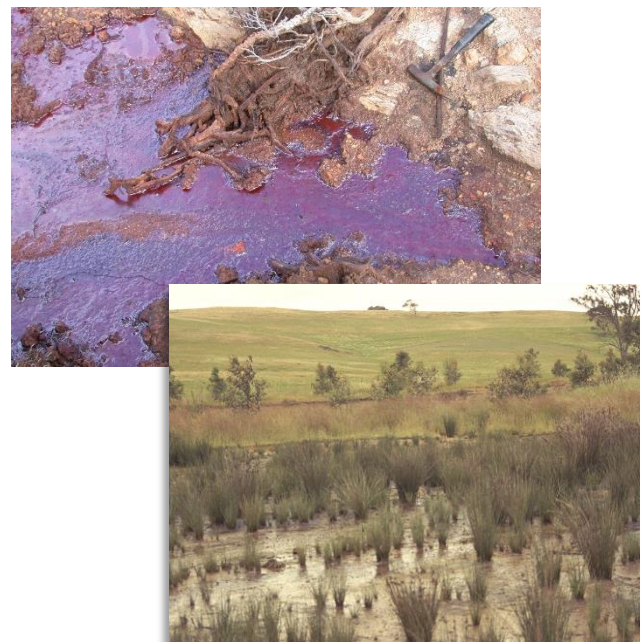
* The letter 'J' denotes classes that are specific to *Acid sulfate soil potential*





Displaying data in soil maps

Soil and land attribute maps display a simplified version of underlying data. Mapping classes are based on an interpretation of soil landscape map units which are classified according to the overall proportion of area susceptible to the development of acid sulfate soils. An extra category covers inland wet areas where knowledge is incomplete regarding the potential for acid sulfate soil development after draining.



Inland acid sulfate soils are characterised by waterlogging, red and black boggy soils, formation of hard pans, shiny oil-like surface layers and, following disturbance, acid soil pH and acidic leachates

Further information

- View data on [NatureMaps](#) (→ Soils)
- Read the [metadata](#) for this layer
- Read more about [soil attribute mapping](#)
- Contact [Mapland](#)
- [Atlas of Australian Acid Sulfate Soils \(CSIRO\)](#)
- EPA (Water quality program) [Acid sulfate soils](#)
- Geoscience Australia [Acid sulfate soils](#)
- Victoria Resources Online [animation](#)

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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