

# THE SOILS OF SOUTHERN SOUTH AUSTRALIA

## Summary of Major Soil Groups<sup>1</sup>



South Australia has considerable soil diversity. Its long geological and climatic history has produced a vast range of soils with diverse properties. These soils support agricultural, horticultural, viticultural, forestry and pastoral enterprises as well as the State's natural biodiversity.

Variations in conditions under which soils have formed have brought about the wide range of soil properties present in southern South Australia. Most soil variation can be attributed to five dominant factors:

1. Parent material – in South Australia, main parent materials are ancient basement rocks, a range of younger, often unconsolidated sediments laid down by wind and water, and older soils.
2. Climate – climatic conditions affect the rate of physical, chemical and biological soil forming processes. Past climates have led to extensive deposition of wind or waterborne sediments within which a distinctive range of soil types has formed. Climatic factors affecting soil formation are rainfall, wind, wetting and drying, temperature, streams and floodwaters, and lakes, lagoons and marine environments.
3. Topography – the position of a soil in the landscape influences different rates of erosion and deposition, drainage, and leaching. Soil depth is determined predominantly by position in the landscape.
4. Biological influences – soil organisms, plants, growing season, nature of organic matter and other factors that affect the proliferation of soil organisms.
5. Time – the longer soil materials are acted upon by soil-forming processes, the more weathered, leached and infertile they become. Australia is geologically very stable and has not experienced mountain-building, glaciation, or widespread and frequent flooding for many millions of years so no unweathered, reactive materials from newly exposed rock have been widely deposited in more recent geological times.

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<sup>1</sup> Summarised from: Hall, J.A.S, Maschmedt, D.J and Billing N.B. (Bruce) (2009) *The Soils of Southern South Australia*. The South Australian Land and Soil Book Series, Volume 1; Geological Survey of South Australia, Bulletin 56, Volume 1. Department of Water, Land and Biodiversity Conservation, Government of South Australia.

In South Australia, parent material is the most significant single determinant of soil properties.

Fifteen groups of soils have been identified, based on their most significant profile features by Hall, Maschmedt and Billing (2009) and their distribution in biophysical regions of southern South Australia (figure 1).

They are:

1. Calcareous Soils
2. Shallow Soils on Calcrete or Limestone
3. Gradational Soils with Highly Calcareous Lower Subsoil
4. Hard Red-Brown Texture-Contrast Soils with Alkaline Subsoil
5. Cracking Clay Soils
6. Deep Loamy Texture-Contrast Soils with Brown or Dark Subsoil
7. Sand over Clay Soils
8. Deep Sands
9. Highly Leached Sands
10. Ironstone Soils
11. Shallow to Moderately Deep Acidic Soils on Rock
12. Shallow Soils on Rock
13. Deep Uniform to Gradational Soils
14. Wet Soils
15. Volcanic Ash Soils

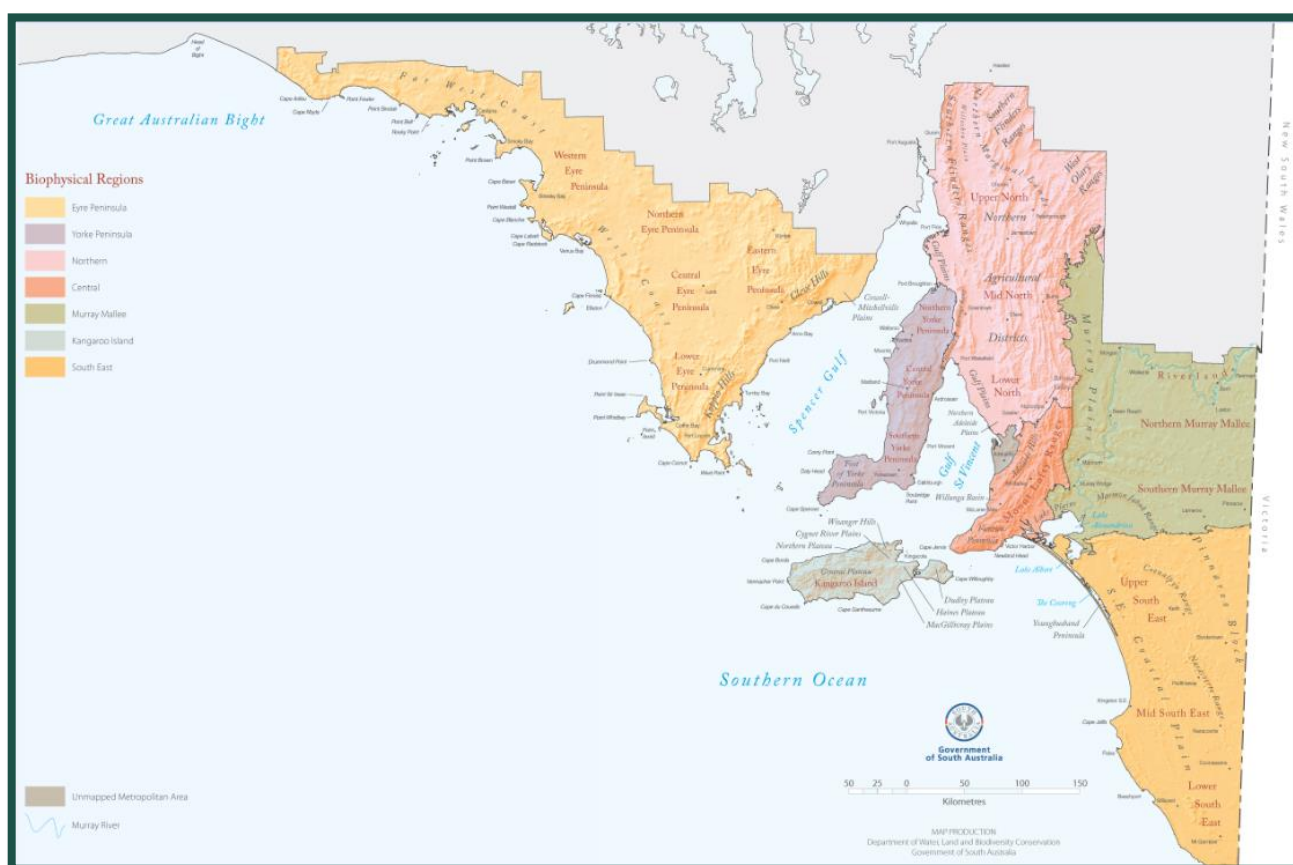
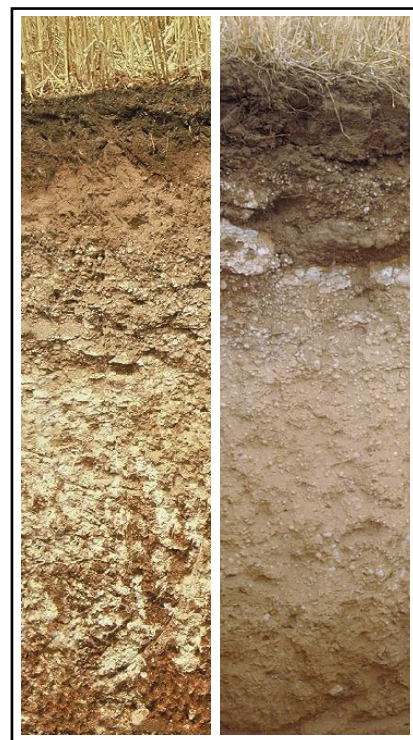


Figure 1. Biophysical Regions of Southern South Australia

## Calcareous Soils

- Calcareous throughout; presence of variable amounts of fine carbonate in profile
- Surface is alkaline; subsoils alkaline to very alkaline
- Often contain hard carbonate segregations; rubbly subsoil layers common
- Fine carbonate and associated alkalinity restrict availability of certain plant nutrients
- Very common in < 400 mm annual average rainfall areas
- Mostly used broadacre crop / pasture rotations
- Some used for irrigated crops
- Used for low-density sheep grazing in pastoral areas

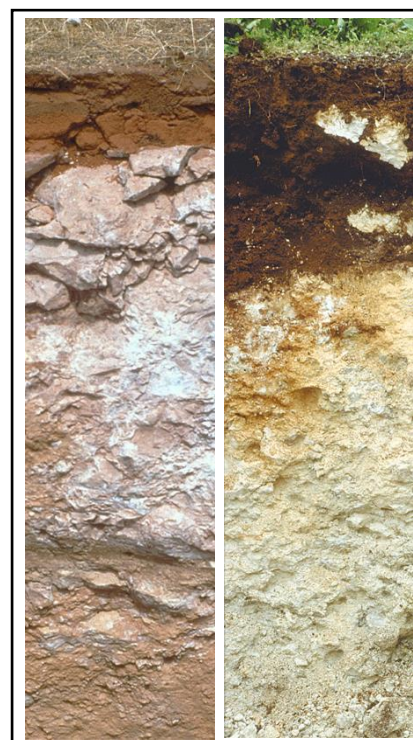


Area of interest	Hectares	% of area
Southern SA	3,681,700	23.4
Biophysical Regions		
Central	13,480	2.2
Kangaroo Island	6,620	1.5
Northern	915,820	28.4
South East	42,420	1.4
Murray Mallee	737,570	25.4
Yorke Peninsula	263,090	32.7
Eyre Peninsula	1,702,730	36.6

Calcareous Soils	Indicative surface fine carbonate content	Usual surface texture	Typical subsoil texture	Typical internal drainage	Typical depth to toxic levels of boron	Inherent fertility	Erodibility (wind)
<i>highly calcareous sandy loam</i>	40%	loamy to sandy	loamy	excessive to good	>75 cm	low	moderate to moderately high
<i>calcareous loam on rock</i>	8%	loamy to clay loamy	loamy to clay loamy	good	none	moderately low	moderately low to moderate
<i>moderately calcareous loam</i>	3%	loamy to clay loamy	clay loamy to clayey	good to moderate	> 100 cm	moderate	low to moderately low
<i>calcareous loam</i>	8%	loamy to clay loamy	loamy to light clayey	good to excessive	> 100 cm	moderately low	moderately low to moderate
<i>calcareous loam on clay</i>	8%	loamy to clay loamy	loamy to light clayey	moderate	50-100 cm	moderately low to moderate	moderately low to moderate
<i>calcareous gradational clay loam</i>	5%	loamy to light clayey	clayey	imperfect	25-75 cm	moderate	low to moderately low
<i>calcareous clay loam on marl</i>	3%	clay loamy to clayey	clayey	imperfect	none	high	low
<i>gypseous calcareous loam</i>	20%	loamy to clay loamy	loamy to clayey	good to moderate	10-50 cm	low to moderately low	moderate to moderately low

## Shallow Soils on Calcrete or Limestone

- Restricted waterholding capacity caused by hard carbonate layer at 50 cm or less
- Very shallow and very rubbly profiles common
- Generally slightly acidic to alkaline, occasionally subsoils are strongly alkaline
- Many calcareous throughout
- Some dominantly composed of fine carbonate
- Used for broadacre cropping, pastures, irrigated horticulture and viticulture.



Area of interest	Hectares	% of area
Southern SA	3,101,400	19.7
Biophysical Regions		
Central	11,680	1.9
Kangaroo Island	56,750	12.9
Northern	62,040	1.9
South East	835,060	27.5
Murray Mallee	667,420	23.0
Yorke Peninsula	292,660	36.4
Eyre Peninsula	1,175,760	25.2

Shallow Soils on Calcrete or Limestone	Surface Soil		Subsoil (where present)			Internal drainage
	Texture	Condition	Texture	Condition	Colour	
<i>shallow highly calcareous sandy loam on calcrete</i>	sandy to loamy	friable	sandy to loamy	friable	grey to brown	excessive to good
<i>shallow calcareous loam on calcrete</i>	loamy to clay loamy	friable to hardsetting	loamy to clay loamy	friable	grey to brown	good to moderate
<i>shallow sandy loam on calcrete</i>	loamy	hardsetting to friable	loamy to clay loamy	friable to hard	brown to red	good to moderate
<i>shallow red loam on limestone</i>	loamy to clayey	friable	loamy to clayey	well structured	red	good to moderate
<i>shallow dark clay loam on limestone</i>	clay loamy to loamy	friable	clay loamy to clayey	well structured	grey to black	imperfect
<i>shallow loam over red clay on calcrete</i>	loamy to clay loamy	hardsetting to friable	clayey	friable to hard	red	moderate
<i>shallow sand over clay on calcrete</i>	sandy	friable	clay loamy to clayey	hard; often coarsely structured	yellow to red	moderate to imperfect
<i>shallow sand on calcrete</i>	sandy	friable	sandy	friable	pale brown	excessive
<i>shallow clay loam over brown or dark clay on calcrete</i>	loamy to clay loamy	hardsetting	clayey	hard; sometimes coarsely structured	brown to dark	imperfect

## Gradational Soils with Highly Calcareous Lower Subsoil

- Sandy loam to clayey surfaces grading to more finely textured subsoils
- Usually abundant accumulations of fine carbonate middle to lower subsoil
- Most well structured and highly fertile
- Surface soils slightly acidic to alkaline; subsoils alkaline to strongly alkaline
- Includes some of SA's most inherently fertile and productive soil
- Predominantly used for broadacre cropping

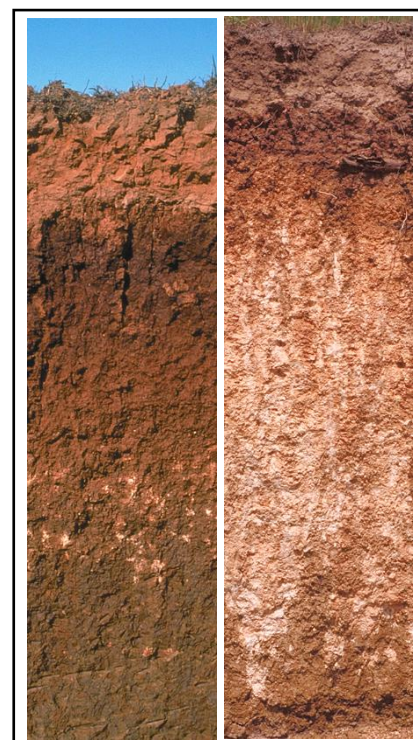


Area of interest	Hectares	% of area
Southern SA	690,900	4.4
<b>Biophysical Regions</b>		
Central	13,280	2.1
Kangaroo Island	3,080	0.7
Northern	396,020	12.3
South East	30,420	1.0
Murray Mallee	187,450	6.5
Yorke Peninsula	22,880	2.8
Eyre Peninsula	37,730	0.8

Gradational Soils with Highly Calcareous Lower Subsoil	Surface Soil		Subsoil				Effective soil depth
	Most common texture	Typical physical condition	Typical texture	Typical physical condition	Colour	Typical depth to unfavourable chemical conditions	
<i>gradational sandy loam</i>	sandy loam	friable	sandy loam to sandy light clay	friable: massive to weak structure	red to brown	> 50 cm	moderate
<i>gradational loam on rock</i>	clay loam to loam	well structured to firm	clay to clay loam	well structured	red to brown	none	moderate to shallow
<i>friable gradational clay loam</i>	clay loam to clay	well structured to firm	clay	well structured	red	> 100 cm	deep to moderate
<i>hard gradational clay loam</i>	clay to clay loam	hardsetting	clay	coarsely structured	red	> 50 cm	moderate
<i>dark gradational clay loam</i>	clay to clay loam	well structured to firm	clay	well structured	dark	> 100 cm	deep to moderate

## Hard Red-Brown Texture-Contrast Soils with Alkaline Subsoil

- Abrupt break between topsoil and subsoil; subsoil has significantly higher clay content
- Topsoil textures mostly loamy sand, sandy loam, loam or sandy clay loam
- Subsoils mostly red and clayey
- Surface soils neutral, acid, or occasionally alkaline; pH increases with depth
- Middle to lower subsoils usually contain an accumulation of fine carbonate
- Poor surface structure common; potential for water erosion often high
- Inherent fertility moderate to high, primarily dependent on clay and organic matter content
- High productive potential for wide range of field and horticultural crops



Area of interest	Hectares	% of area
Southern SA	1,637,500	10.4
<b>Biophysical Regions</b>		
Central	49,250	7.9
Kangaroo Island	3,600	0.8
Northern	988,020	30.6
South East	45,570	1.5
Murray Mallee	148,390	5.1
Yorke Peninsula	50,630	6.3
Eyre Peninsula	352,080	7.6

Hard Red-Brown Texture-Contrast Soils with Alkaline Subsoil	Topsoil			Subsoil			Effective Soil Depth
	Usual texture	Typical condition	Usual thickness	Usual texture	Typical structure	Colour	
<i>loam over clay on rock</i>	loam	hardsetting to firm	10-30 cm	clay	intermediate to good	red or brown	shallow to moderate
<i>loam over red clay</i>	loam	hardsetting to soft	10-40 cm	clay	intermediate to good	red	moderate to deep
<i>loam over poorly structured red clay</i>	sandy loam	hardsetting	5-30 cm	clay	poor; often dispersive	red	moderate
<i>loam over pedaric red clay</i>	loam to clay loam	surface crust or flake	0-30 cm	clay	good: crumbly (pedaric)	red	moderate
<i>hard loamy sand over red clay</i>	loamy sand to light sandy loam	hardsetting to firm	5-30 cm	sandy clay	poor: coarse or massive; very hard	red	moderate to deep
<i>ironstone gravelly sandy loam over red clay</i>	sandy loam	hardsetting to firm	10-30 cm	clay	intermediate to good	red	moderate to deep
<i>loam over poorly structured clay on rock</i>	sandy loam	hardsetting	5-30 cm	clay	poor; often dispersive	red or brown	shallow to moderate

# Cracking Clay Soils

- Uniformly textured and clayey throughout
- Exhibit shrink-swell behaviour
- Crack deeply and extensively on drying
- Surface soils commonly alkaline but neutral and acidic forms occur
- pH usually increases with depth
- surface physical condition ranges from self-mulching to hard setting
- high to very high inherent fertility
- used for broadacre cropping, pastures and viticulture

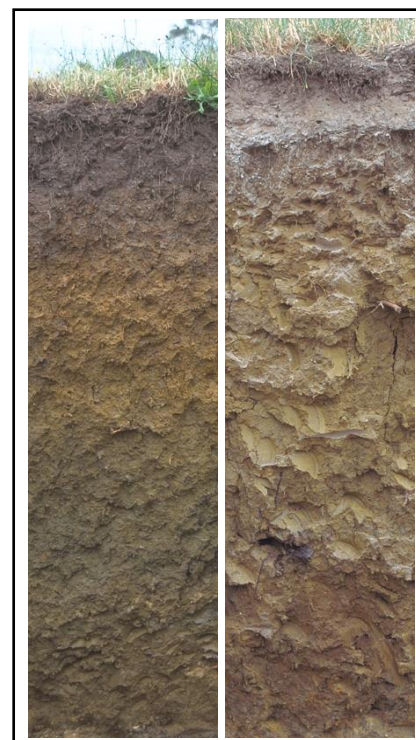


Area of interest	Hectares	% of area
Southern SA	209,300	1.3
<b>Biophysical Regions</b>		
Central	9,030	1.5
Kangaroo Island	4,110	0.9
Northern	72,150	2.2
South East	73,900	2.4
Murray Mallee	44,310	1.5
Yorke Peninsula	2,020	0.3
Eyre Peninsula	3,740	0.1

Cracking Clay Soils	Topsoil internal drainage	Plant available waterholding capacity	Typical surface physical condition	Subsoil	
				Colour	Depth to toxic layer
<i>black cracking clay</i>	moderate to imperfect	> 120 mm	self-mulching	black	> 80 cm
<i>red cracking clay</i>	imperfect	80-150 mm	pedal	red to red-brown	30-100 cm
<i>brown or grey cracking clay</i>	imperfect	< 100 mm	pedal to massive-coarse	brown, grey, greenish	10-80 cm

## Deep Loamy Texture-Contrast Soils with Brown or Dark Subsoil

- Texture contrast; abrupt boundary between topsoil and subsoil
- Topsoil textures mostly loam, sandy loam, sandy clay loam or clay loam
- Subsoils usually brown or dark coloured and clayey
- Surface soils neutral to acidic; pH often increases with depth
- Subsoil accumulations of fine carbonate are common
- Seasonal waterlogging can be problem because of poorly structured subsoil
- Significant in most high rainfall areas where productive potential is high



Area of interest	Hectares	% of area
Southern SA	427,100	2.7
<b>Biophysical Regions</b>		
Central	73,500	11.8
Kangaroo Island	52,470	11.9
Northern	22,980	0.7
South East	136,470	4.5
Murray Mallee	89,110	3.1
Yorke Peninsula	0	0.0
Eyre Peninsula	52,610	1.1

Deep Loamy Texture-Contrast Soils with Brown or Dark Subsoil	Topsoil	Subsoil
<i>loam over brown or dark clay</i>	Variant with intermediate subsoil structure: mostly sandy loam, loam or clay loam, occasionally sandy clay loam or loamy sand; often more than 30 cm thick; generally lacks a bleached subsurface layer  Variant with poorly structured subsoils; mostly sandy loam, also sandy clay loam or loamy sand, occasionally loam or clay loam; more than 30 cm thick; generally with a bleached subsurface layer.	Variant with intermediate subsoil structure; usually moderate blocky structure  Variant with poorly structured subsoil: coarse prismatic, blocky or columnar structure at a depth of more than 30 cm; often dispersive.
<i>sandy loam over poorly structured brown or dark clay</i>	Mostly sandy loam, also sandy clay loam or loamy sand, occasionally loam or clay loam; 30 cm or less thick; generally with a bleached subsurface layer.	Poorly structured: coarse prismatic, blocky or columnar structure at a depth of 30 cm or less; often dispersive.



## Sand over Clay Soils

- Abrupt boundary between topsoil and subsoil; predominantly texture-contrast
- Topsoils sandy; subsoils mostly clay loamy or clayey
- Sandy topsoils have low to very low nutrient retention capacity; prone to water repellence, wind erosion and acidification
- Topsoils mostly neutral to strongly acidic; pH often increases with depth
- Clay rich subsoils may boost fertility levels
- Subsoils often poorly structured causing restrictions to root growth and seasonal waterlogging
- Can be productive for rain-fed cropping in low to moderate rainfall areas, especially where topsoils thick and subsoils clayey or clay loamy
- Widely used for broadacre cropping, high-rainfall pasture and irrigated horticulture



Area of interest	Hectares	% of area
Southern SA	1,403,000	8.9
<b>Biophysical Regions</b>		
Central	55,900	9.0
Kangaroo Island	30,770	7.0
Northern	25,870	0.8
South East	720,090	23.7
Murray Mallee	241,680	8.3
Yorke Peninsula	38,640	4.8
Eyre Peninsula	290,000	6.2

Sand over Clay Soils	Topsoil			Subsoil			Usual extent of leaching
	Typical thickness	Nature of subsurface layer	Typical pH	Typical structure	Predominant texture	Usual PH (upper to lower subsoil)	
<i>sand over sandy clay loam</i>	20-80 cm	not bleached	slightly acid to alkaline	intermediate (massive to weak)	sandy clay loam	alkaline to strongly alkaline	moderate
<i>bleached sand over sandy clay loam</i>	30-80 cm	bleached	acidic to neutral	intermediate (massive to weak)	sandy clay loam	acidic to strongly alkaline	high
<i>thick sand over clay</i>	30-80 cm	bleached	acidic to neutral	intermediate to poor	clay	acidic to strongly alkaline	high
<i>sand over poorly structured clay</i>	5-30 cm	usually bleached	acidic to alkaline	poor	clay	alkaline to strongly alkaline	moderate to high
<i>sand over acidic clay</i>	20-60 cm	bleached	acidic to strongly acidic	intermediate to poor	clay	acidic to strongly acidic	very high

## Deep Sands

- Sandy throughout
- Low nutrient retention capacity
- Prone to water repellence
- Often high to extreme potential for wind erosion
- Non-calcareous types prone to acidification
- Calcareous types affected by carbonate-induced deficiencies
- Often difficult dryland cropping soils; can have high potential for irrigated use



Area of interest	Hectares	% of area
Southern SA	2,204,300	14.0
Biophysical Regions		
Central	1,330	2.6
Kangaroo Island	33,340	7.6
Northern	47,870	1.5
South East	676,870	22.3
Murray Mallee	621,740	21.4
Yorke Peninsula	103,710	12.9
Eyre Peninsula	704,430	15.1

Deep Sands Soils	Dominant particles	Surface fine carbonate	Typical surface pH	Bleached layer	Extent of leaching	Typical subsoil colour
<i>carbonate sand</i>	carbonate sand	>50%	alkaline	no	slight	light grey, pale brown, yellow
<i>siliceous sand</i>	siliceous sand	0-50%	slightly acidic to alkaline	no	moderate	pale brown, red, yellow
<i>bleached siliceous sand</i>	siliceous sand	0%	acidic to neutral	no	high	pale brown, yellow

## Highly Leached Sands

- Extreme variants of deep sands
- Strongly bleached sub-surface layers
- Dark or strongly coloured subsoil accumulations of organic, aluminium and / or iron compounds
- Strongly acidic to acidic throughout
- Inherently deficient in most nutrients
- Generally difficult agricultural soils; better-drained types suited to deep-rooted species e.g. radiata pine



Area of interest	Hectares	% of area
Southern SA	128,300	0.8
<b>Biophysical Regions</b>		
Central	4,360	.07
Kangaroo Island	6,920	1.6
Northern	0	0.0
South East	116,980	3.9
Murray Mallee	0	0.0
Yorke Peninsula	0	0.0
Eyre Peninsula	0	0.0

Highly Leached Sands	Drainage	Subsoil
<i>highly leached sand</i>	rapid to imperfect	Subsoil accumulations dominated by iron compounds with weak and irregular development of organic accumulations; usually bright to moderate colours and loose to firm consistence.
<i>wet highly leached sand</i>	imperfect to poor	Subsoil accumulations dominated by organic-aluminium compounds, or mixed iron and organic-aluminium compounds; typically dark or dull colours and firm to cemented consistence.

## Ironstone Soils

- Ironstone gravel present in profile, usually in subsurface layer
- A few are underlain at shallow depth by ferricrete and do not contain ironstone gravel
- Topsoils usually loamy, sometimes sandy; subsoils predominantly brown to yellow and clayey
- Profiles often acidic to strongly acidic throughout; some have alkaline middle to lower subsoils
- Inherent fertility often low, especially in high rainfall areas
- All types subject to phosphorus fixation
- Seasonal waterlogging common
- Predominantly located in areas of favourable climate where productive potential high

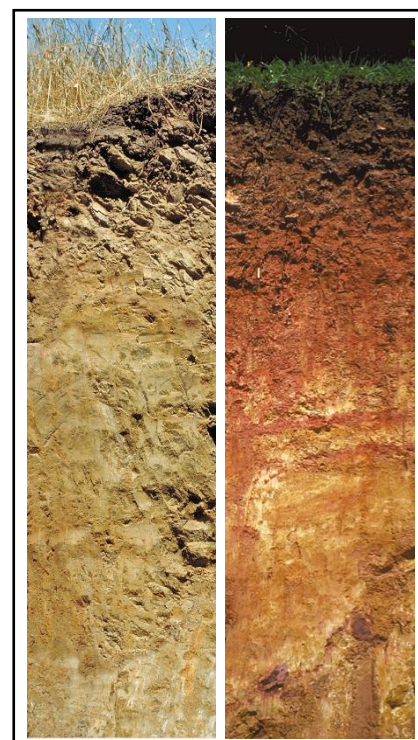


Area of interest	Hectares	% of area
Southern SA	222,300	1.4
Biophysical Regions		
Central	16,330	2.6
Kangaroo Island	115,770	26.2
Northern	4,390	0.1
South East	0	0.0
Murray Mallee	26	0.0
Yorke Peninsula	0	0.0
Eyre Peninsula	85,790	1.8

Ironstone Soils	Dominant type of ironstone	Subsoil			Effective soil depth
		Upper subsoil pH	Mid-lower subsoil pH	Nutrient retention capacity	
<i>ironstone soil with alkaline lower subsoil</i>	ironstone gravel	acidic to neutral	alkaline to strongly alkaline	moderately low	50-100 cm
<i>ironstone soil</i>	ironstone gravel	acidic to strongly acidic	acidic to strongly acidic	low	30-80 cm
<i>shallow soil on ferricrete</i>	ferricrete: predominantly cemented ironstone gravel	acidic to strongly acidic	acidic to strongly acidic	very low	< 50 cm

## Shallow to Moderately Deep Acidic Soils on Rock

- Usually acidic to strongly acidic throughout
- Soft to hard bedrock present at base of profile, within 1 metre's depth
- Topsoil textures range from loamy sand to clay loam; subsoils more finely textured
- Inherent fertility mostly dependent on surface texture: clay loamy surface soils moderately fertile, sandier surface soils prone to range of nutrient deficiencies
- Most highly susceptible to acidification
- Often significant potential for water erosion
- Deeper and loamier types valuable agricultural and horticultural soils due to inherent fertility, waterholding capacity and drainage



Area of interest	Hectares	% of area
Southern SA	360,000	2.3
<b>Biophysical Regions</b>		
Central	206,360	33.2
Kangaroo Island	86,290	19.5
Northern	52,670	1.6
South East	0	0
Murray Mallee	0	0
Yorke Peninsula	0	0
Eyre Peninsula	14,730	0.3

Shallow to Moderately Deep Acidic Soils on Rock	Surface soil		Texture profile	Subsoil			Typical plant - available waterholding capacity
	Most common texture	Typical physical condition		Most common colour	Usual texture	Typical structure	
<i>acidic gradational loam on rock</i>	loam to clay loam	firm to hardsetting	gradational	brown to reddish brown	clay to clay loam	intermediate to good	80-150 mm
<i>acidic loam over clay on rock</i>	loam to clay loam	hardsetting to firm	texture-contrast	red to reddish brown	clay	intermediate to good	100-150 mm
<i>acidic sandy loam over red clay on rock</i>	sandy loam to loamy sand	firm to hardsetting	texture-contrast	red	clay	poor to intermediate	50-100 mm
<i>acidic sandy loam over brown or grey clay on rock</i>	sandy loam to loamy sand	firm to soft	texture-contrast	yellowish brown	clay	intermediate	40-100 mm
<i>acidic gradational sandy loam on rock</i>	sandy loam	firm	gradational	brown to dark coloured	sandy-silty loam to light clay	intermediate (usually massive)	around 50 mm

## Shallow Soils on Rock

- Weak profile development
- Shallow depth (< 50 cm)
- Underlain by basement rock
- Often stony
- Textures range from loamy sand to clay loam
- Mostly found in hilly districts
- Productivity and land used limited by shallow depth and often steep rocky terrain
- Livestock grazing is main agricultural land use
- Underlies many areas of remnant native vegetation

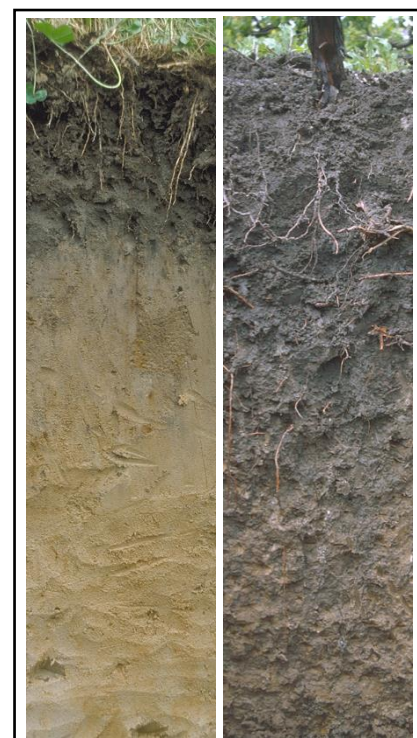


Area of interest	Hectares	% of area
Southern SA	612,200	3.9
<b>Biophysical Regions</b>		
Central	108,040	17.4
Kangaroo Island	13,550	3.1
Northern	391,800	12.1
South East	1,090	0.0
Murray Mallee	2,590	0.1
Yorke Peninsula	120	0.0
Eyre Peninsula	95,030	2.0

Shallow soil on rock	Typical soil texture	Plant-available waterholding capacity
<i>shallow soil on rock</i>	sandy loam, loam, clay loam, silty loam or loamy sand	low to very low (<40 mm)

## Deep Uniform to Gradational Soils

- Gradational to uniform texture profiles
- Moderate to no subsoil fine carbonate content
- Surface textures range from loamy sand to clay
- Grade through profile to more finely textured subsoil
- Surface soils usually slightly alkaline to acidic; pH often increases with depth
- Predominantly formed from alluvial sediments
- Generally occur in low-lying areas in or near hilly areas, often on creek flats
- More finely textured soils have high inherent fertility and productive potential
- Sandy types can be highly productive due to fertility of parent material of recent alluvium
- High potential for dryland cropping, irrigated horticulture or permanent pasture

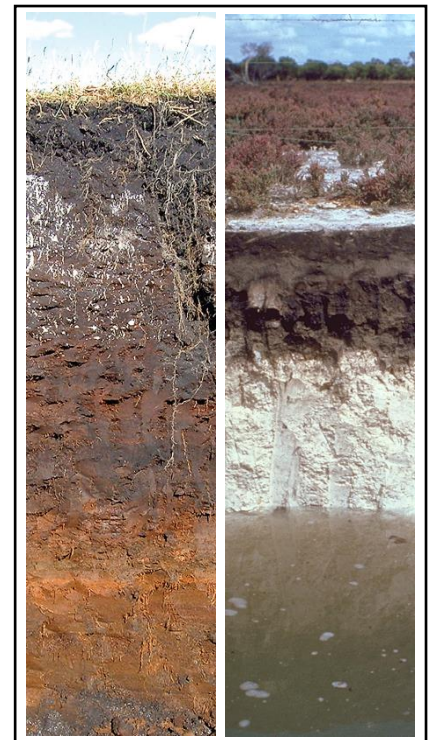


Area of interest	Hectares	% of area
Southern SA	234,200	1.5
Biophysical Regions		
Central	26,640	4.3
Kangaroo Island	13,270	3.0
Northern	101,090	3.1
South East	48,690	1.6
Murray Mallee	22,250	0.8
Yorke Peninsula	0	0.0
Eyre Peninsula	22,260	0.5

Deep uniform to gradational soils	Gravel or stone content	Surface soil		Subsoil		
		Typical texture	Physical condition	Usual colour	Typical texture	Physical condition
<i>deep sandy loam</i>	nil to moderate	sandy loam, loamy sand	friable	brown, dark or red	sandy loam to sandy light clay	friable to hard
<i>deep friable gradational clay loam</i>	variable	clay loam, clay	well structured	black, brown or red	clay	good to intermediate structure
<i>deep gravelly soil</i>	abundant	sandy to silty loam, loamy sand	friable to hardsetting	brown	sandy to silty loam, sandy clay loam, loamy sand	friable to hard
<i>deep hard gradational sandy loam</i>	variable	sandy loam to clay	hardsetting	brown or red	clay	poorly structured

# Wet Soils

- Affected by prolonged wetness
- Peats, saline and freshwater swamp soils
- Inundation a factor in most areas
- Occur in low-lying, poorly to very poorly drained areas: tidal flats, salt pans, old lagoon and lake floors, lake margins, closed depressions, valley floors and drainage depressions
- Alkaline soils associated with coastal, lower rainfall, saline environments, closed depressions; acidic soils mostly occur in higher rainfall environments
- Acid sulfate soils can develop across all rainfall zones when wet soils containing sulfide materials are exposed to air during drying, drainage or excavation
- Drainage required for useful production
- Saline types difficult to reclaim
- Often associated with areas of significant biological diversity e.g. wetlands



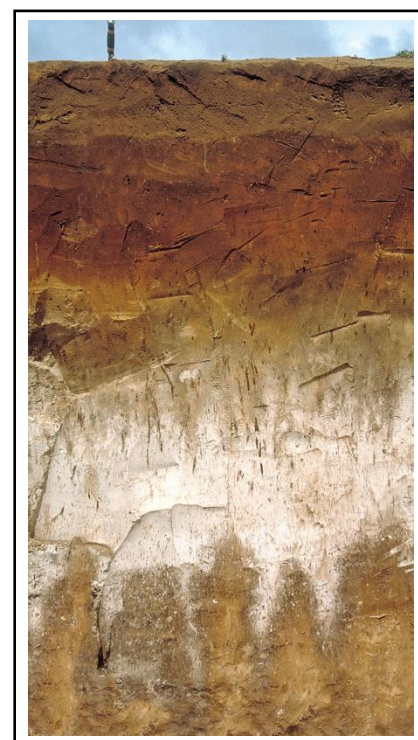
Area of interest	Hectares	% of area
Southern SA	431,500	2.7
<b>Biophysical Regions</b>		
Central	4,340	0.7
Kangaroo Island	9,520	2.2
Northern	52,700	1.6
South East	188,200	6.2
Murray Mallee	31,570	1.1
Yorke Peninsula	24,560	3.1
Eyre Peninsula	120,570	2.6

Wet soils	Organic matter levels	Salinity levels	Predominant drainage
<i>Peat</i>	Profile dominated by organic matter	low to moderately high	poor to very poor
<i>Saline soil</i>	Surface soil: high to low Subsoil: low	high to extreme	poor to very poor
<i>Wet soil</i>	Surface soil: usually high Subsoil: low	low to moderately high	poor to very poor



# Volcanic Ash Soils

- Formed in ash deposits from volcanic eruptions
- Ash overlies range of older soils
- Soils entirely formed from ash predominantly loamy and cinnamon-coloured; slightly alkaline to slightly acidic surface soils and slight increase in pH with depth
- Soils with ash-rich upper layers and buried-soil layers can be more acidic with depth
- Ash has high inherent fertility, particularly high amounts of phosphorus
- Occur exclusively in Lower South East
- Highly productive and excellent potential for rain-fed and irrigated use



Area of interest	Hectares	% of area
Southern SA	15,900	0.1
<b>Biophysical Regions</b>		
Central	0	0.0
Kangaroo Island	0	0.0
Northern	0	0.0
South East	15,850	0.5
Murray Mallee	0	0.0
Yorke Peninsula	0	0.0
Eyre Peninsula	0	0.0

Volcanic ash soils	Typical surface soil	Typical subsoils formed from ash	Nature of underlying materials
<i>volcanic ash soil</i>	loamy to clay loamy, dark coloured, friable, organic-rich	Younger volcanics: dark, cinnamon-coloured, friable, gritty sandy loam to clay loam  Older volcanics: dark, reddish brown to brownish red, friable, gritty clay loam to clay	Cemented basaltic ash (tuff); buried soil; clay derived from weathered ash; calcreted limestone or calcarenite; or basaltic rock

## Preferred way to cite this information sheet

Department for Environment and Water (2021). The Soils of Southern South Australia - Summary of Major Soil Groups.  
<https://data.environment.sa.gov.au/Land/Land-Resources/> (insert date web page accessed)



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