LANDSCAPE SOUTH AUSTRALIA HILLS AND FLEURIEU

Healthy soil on grazing properties

Action Plan template

STEP 1 Map soil types

1a - Assess soil information

A range of land and soil attributes have been mapped across South Australia's agricultural zone. These map layers are available to view for free using NatureMaps and can be a useful resource to learn more about soils on your property.

Open NatureMaps: www.naturemaps.sa.gov.au

Find your farm; it is easiest to type your address into the 'find address or location' search. The physical features (topographic) map is standard background, you can change this to imagery (aerial image). Zoom to show the full extent of your farm.

Overlay the contour layer to recognise landforms. Take time to look at slopes, ridges, valleys, plains and natural drainage lines and ensure these are marked on your property map.

Use the 'Query' function and for 'Data Source' select "Land Systems"; 'Map Area' select "Current Extent"; then select 'Search'.

A list of the Land Systems that are found on the current extent of the map will be shown. You can hover over these to check they are relevant for your farm. Click the 'Land System Report' to open a pdf file that shows more information for that Land System which includes information on soils.

You can create a new query and look at 'Soils (soil type)' to gain further insight.

Record your findings in this table:

Location/paddock ref	From mapping data layers	
	Land System	**Soil type/s**
Example: Dam paddock	CLA (Clarendon)	Loam over brown or dark clay

Whilst this broad information is good, it is important to take the time to go out in the paddock and dig a hole to take a deeper look.

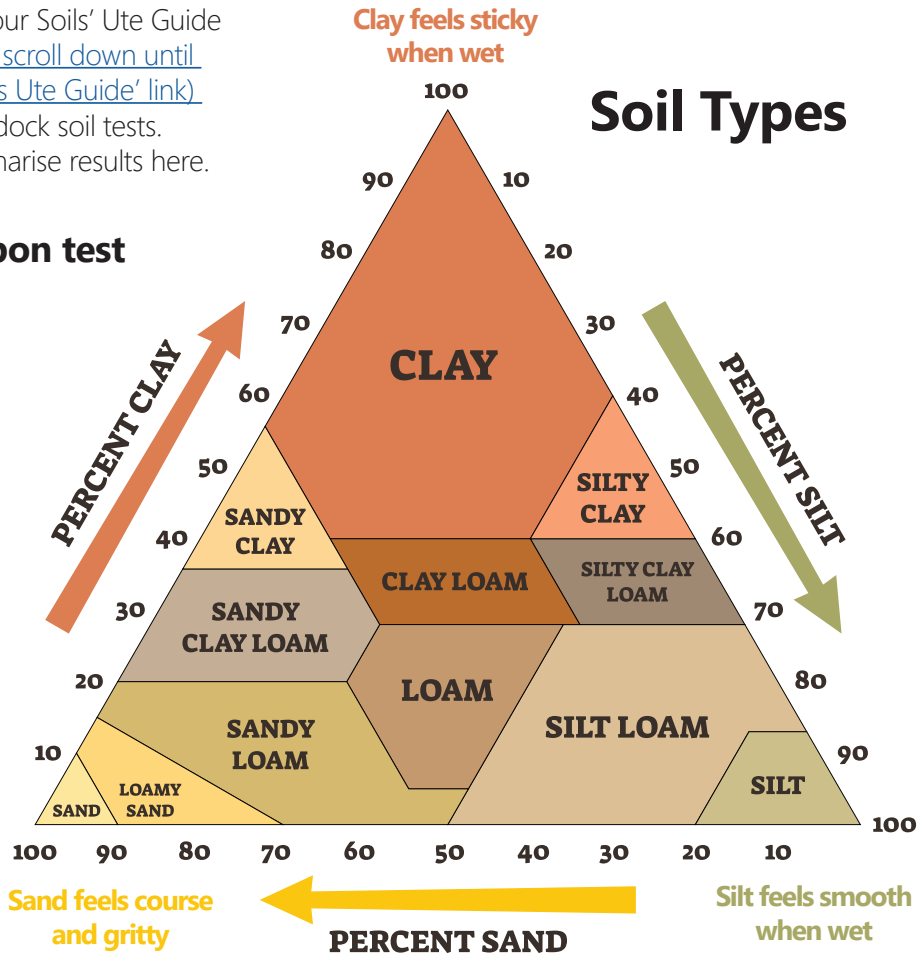
STEP 2 Understand your soil

Grab a copy of the 'Knowing Your Soils' Ute Guide (Access it here: Soil Testing and scroll down until you find the 'Knowing your Soils Ute Guide' link) and implement the simple paddock soil tests. Record your findings and summarise results here.

2a - Soil texture – ribbon test

Soil texture will not change over time (without long-term intervention); however, you may find variability across your property. Assess soil texture in both topsoil and subsoil, and record findings. Common soil textures include:

- Sand
- Sandy Loam
- Loam or Sandy Loam
- Clay
- Sandy Clay Loam
- Clay Loam
- Silty Clay Loam



Location / Paddock	0-5 cm topsoil	5-20 cm subsoil
Example: Dam paddock	Loamy sand	Sandy clay loam

2b - Physical properties

Test	Average rating across property from Knowing Your Soils Ute Guide			For tests that rated poorly, identify possible causes		
	Good	Fair	Poor	Soil health	Soil constraint	Management practice
Groundcover percentage	☐	☐	☐	☐ Lack of plant diversity ☐ Other:	☐ Soil compaction ☐ Erosion ☐ Shading ☐ Other:	☐ Grazing management ☐ Trampling (when wet) ☐ Soil disturbance ☐ Tillage ☐ Other:
Weed cover percentage	☐	☐	☐	☐ Lack of groundcover ☐ Other:	☐ Other:	☐ Soil disturbance ☐ Other:
Leaf colour **confirm if soil or leaf analysis*	☐	☐	☐	☐ Low organic matter ☐ Nutrient deficiencies* ☐ Soil borne pathogens/disease ☐ Other:	☐ Waterlogging ☐ pH ☐ Other:	☐ Other:
Root development	☐	☐	☐	☐ Soil-borne pathogens ☐ Nutrients deficiencies* ☐ Root-feeding nematodes/insects Other:	☐ Soil compaction ☐ pH ☐ Poor soil structure ☐ Other:	☐ Loss of topsoil ☐ Other:
Water repellence	☐	☐	☐	☐ Resultant from decomposition of organic matter ☐ Other:	☐ Sandy soil natural property ☐ Other:	☐ Other:
Topsoil colour	☐	☐	☐	☐ Sparse organic litter on soil surface ☐ Low organic matter ☐ Other:	☐ Other:	☐ Other:
Soil compaction	☐	☐	☐	☐ Low organic matter ☐ Other:	☐ Soil type ☐ Wet soil ☐ Other:	☐ Vehicles/equipment movement ☐ Livestock movement ☐ Tillage ☐ Other:
Soil slaking at 5cm depth	☐	☐	☐	☐ Low organic matter ☐ Lack of soil macro-organisms (eg earthworms) ☐ Other:	☐ pH - acidity ☐ Sodic soils ☐ Soil compaction ☐ Other:	☐ Loss of topsoil ☐ Tillage ☐ Other:
Soil dispersion at 5cm	☐	☐	☐	☐ High salt irrigation water ☐ Other:	☐ Rising groundwater and water tables ☐ Excess sodium build-up (climatic conditions) ☐ Other:	☐ Other:
Soil dispersion at 20cm	☐	☐	☐	☐ High salt irrigation water ☐ Other:	☐ Rising groundwater and water tables ☐ Excess sodium build-up (climatic conditions) ☐ Other:	☐ Other:
Water infiltration	☐	☐	☐	☐ Surface crusting ☐ Lack of soil macro-organisms (eg earthworms) ☐ Other:	☐ Naturally high clay content ☐ Poor soil structure ☐ Soil compaction ☐ Other:	☐ Loss of topsoil ☐ Other:

2c - Chemical properties

Test	Average rating across property from Knowing Your Soils Ute Guide			For tests that rated poorly, identify possible causes		
	Good	Fair	Poor	Soil health	Soil constraint	Management practice
Topsoil pH	☐	☐	☐	☐ Shallow topsoil ☐ Low organic matter ☐ Excess nitrogen accumulation (overload), unused nitrogen ☐ Other:	☐ Poor drainage ☐ Other:	☐ Other
Subsoil pH	☐	☐	☐	☐ Excess nitrogen accumulation (overload), unused nitrogen ☐ Other:	☐ Poor drainage ☐ Other:	☐ Other

2d - Biological properties

Test	Average rating across property from Knowing Your Soils Ute Guide			For tests that rated poorly, identify possible causes		
	Good	Fair	Poor	Soil health	Soil constraint	Management practice
Soil organism count	☐	☐	☐	☐ Sparse organic litter on soil surface ☐ Low organic matter ☐ Other:	☐ Low pH < 5 ☐ High pH > 8 ☐ Soil structure - lack of soil spaces and channels ☐ Other:	☐ Insecticide use ☐ Cumulative chemicals (eg copper) ☐ Tillage ☐ Other:
Earthworm count	☐	☐	☐	☐ Sparse organic litter on soil surface ☐ Low organic matter ☐ Other:	☐ Low pH < 5 ☐ High pH > 8 ☐ Soil structure - lack of soil spaces and channels ☐ Other:	☐ Insecticide use ☐ Cumulative chemicals (eg copper) ☐ Tillage ☐ Other:

Laboratory analysis of soils can be completed to further fill any gaps in information. See fact sheet – Soil Sampling for Lab Testing: https://cdn.environment.sa.gov.au/landscape/docs/hf/Soil-sampling-for-labs-fact-sheet.pdf

It may also be beneficial to seek plant leaf/tissue analysis to assist diagnosis and help identify solutions to address nutrient deficiencies. See fact sheet – plant sampling for agriculture, a guide: Fertcare-Plant-Sampling-Guide_reduced.pdf

2e - Map soils

With the above information at hand, map the soils on your property, the more detailed the better.

STEP 3 Know your soil management needs

3a Soil health

Identify soil health concerns and their extent; refer to information collected in the previous step and the 'Care for Soils Guide'.

	Confirmed				Notes
	Location / Paddock	Priority to address			
		High	Med	Low	
Lack of groundcover		☐	☐	☐	
Lack of plant diversity		☐	☐	☐	
Soil disturbance		☐	☐	☐	
Shallow topsoil / loss of topsoil		☐	☐	☐	
Surface crusting		☐	☐	☐	
Low organic matter		☐	☐	☐	
Sparse organic litter on soil surface		☐	☐	☐	
Rising groundwater and water table		☐	☐	☐	
Nutrient deficiencies		☐	☐	☐	
Excessive nutrient accumulation (overload)		☐	☐	☐	
Lack of soil micro-organisms (eg protozoa, bacteria, fungi, etc)		☐	☐	☐	
Lack of soil macro-organisms (eg worms, beetles, etc)		☐	☐	☐	
Presence of soil borne pathogens/disease		☐	☐	☐	
Root feeding nematodes/insects		☐	☐	☐	

3b Soil constraints

Identify soil constraints and their extent; refer to information collected at the previous step and the 'Care for Soils Guide'.

	Confirmed				Notes
	Location / Paddock	Priority to address			
		High	Med	Low	
Soil compaction		☐	☐	☐	
Soil structural stability		☐	☐	☐	
Salinity		☐	☐	☐	
Soil erosion		☐	☐	☐	
Soil acidity		☐	☐	☐	
Non-wetting soils		☐	☐	☐	
Waterlogging		☐	☐	☐	

3c Management practices

Identify management practices for improvement and their extent.

	Confirmed				Notes
	Location / Paddock	Priority to address			
		High	Med	Low	
Grazing management		☐	☐	☐	
Tillage		☐	☐	☐	
Livestock/machinery movements		☐	☐	☐	
Fertiliser application/s		☐	☐	☐	
Pesticide, insecticide, fungicide application/s		☐	☐	☐	
Herbicide application/s		☐	☐	☐	

Update your property soil map as needed.

STEP 4 Take action to care for your paddocks

Identify management actions that you are already doing, would like to do better, or would like to introduce in the management of your property. Refer to the 'Care for Soils Guide' (page 14-17) for more detail on the possible management actions.

4a Care for soil health

	List Pddocks		
	Already doing	Would like to do better	Would like to implement
Rotational grazing	☐	☐	☐
Control traffic/livestock	☐	☐	☐
Organic inputs	☐	☐	☐
Appropriately manage nutrient applications	☐	☐	☐
Reduce/remove chemical inputs	☐	☐	☐
Mulching	☐	☐	☐
Cover cropping	☐	☐	☐
Intercropping	☐	☐	☐
Increase plant diversity	☐	☐	☐

4b Manage soil constraints

	Management action	When to implement	Where (paddock/s) to implement
Soil compaction			
Soil structural stability			
Salinity			
Soil erosion			
Soil acidity			
Non-wetting soils			
Waterlogging			

STEP 5 Monitor your results

What is the desired outcome in caring for soils on your property? The answer to this question will help to determine what you should measure and monitor. Refer to the 'Care for Soils Guide' for ideas.

What to measure	Where	How to measure	Frequency	Timing	By whom
What do you need to measure to assess success?	*It may not be possible to monitor all areas, select areas that are the highest priority*				

Following monitoring and evaluation, review priorities and decide how you need to update your plan and schedule for the following year.