fact sheet

Land Soils and Agriculture

BURDEKIN DRY TROPICS NRM
Sustaining our resources

Natural Resource Management

Salinity and Sustainable Land Management

Case Study No 3 – Lamington Park

Landholder	Julie and Les Clark
Location	Woodstock, South of Townsville
Rainfall	910 mm
Property size	600 ha
Enterprises	Cattle

Julie and Les Clarke's family have been grazing cattle in the Gulf for five generations. They're using the new property at Woodstock to fatten cattle or graze cull heifers before going to market.

The property was heavily grazed by the previous owner and some paddocks are showing signs of dryland salinity.

R Preston 2006

Les Clarke and his daughter Julie bought this small property at Woodstock in 2004 to fatten cattle or cull heifers from their Gulf property.

Pastures recover from overgrazing

When Les and Julie bought the first block of their property in 2004, many of their paddocks were devoid of grass.

"There weren't even any grass tussocks," said Les.

One of their top paddocks gives a good idea of that clearing.

"About 15 years ago someone poisoned everything," said Les.

"It was crazy because this paddock has a lot of potential," said Julie.

"So we let it all go to seed before we brought the cattle back," said Les.

Now the paddock is mostly grass covered and it's thicker than before. This year a lot of Secca has come back with the other grasses – a good indication that the pasture is beginning to recover.

Trees contribute to pasture ecology

Even though some graziers are concerned about competition between trees and grasses, Les and Julie have noticed that trees can also have a beneficial effect on pastures.

"You've got to have your trees for mulch. When you look around the area of a tree, you can see that's where your best grasses grow," said Les.

R Preston 2006

When they moved onto the property three years ago, many of the trees had been poisoned and there was almost no grass cover. With good seasons and light grazing, the country is generally recovering well.

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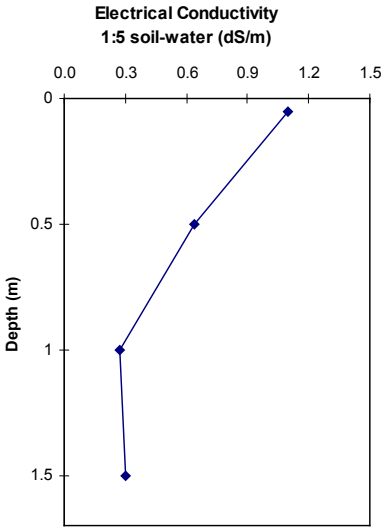
A salty patch

One of their paddocks has symptoms of dryland salinity. It seems that the salinity problems in this paddock are related to the historical management of the property.

Overgrazing, poisoning of the tree cover and erosion has resulted in the loss of top soil and the development of salinity in parts of this paddock.

The soils have a natural tendency to set hard and the lack of vegetation and soil organic matter would have reduced water infiltration. Without cover water evaporates directly from the soil surface, causing salts to concentrate there. This can be seen in the graph below where electrical conductivity (salt) is highest in the surface. With saline hard setting soils it is very difficult to re-establish with grass.



Testing of the saline area found that salt levels were elevated in the surface.

Parts of the salty paddock now have some button grass and a few other plants, even though there was absolutely no vegetation there in the first couple of years after Les and Julie bought the property.

In this paddock, the combination of tree clearing, hard grazing and the soils themselves have all contributed to these salinity problems.

Salinity identification and investigation

Salinity can often be identified using visual indicators, such as soil condition, the types of grasses or weeds present and landscape position (see table below). To confirm the presence of salinity it may also be necessary to conduct other tests, including the construction of groundwater observation bores or conducting tests of soil and/or water salinity.

To confirm the presence of salinity it may be necessary to test the soil for salinity.

Salinity indicators

Soil indicators	• Soil is bare or 'scalded' and prone to erosion; • Soil is permanently damp or waterlogged or remains damp well into the dry season; • White crusts or salt crystals form on the soil surface when it becomes dry or the soil surface becomes 'fluffy'; • Gleying (bluish-grey sticky clay) is present, carbonate nodules, or iron and manganese concretions or staining • Livestock preferentially graze in such areas, sometimes disturbing the soil
Vegetation indicators	• Failure of salt-sensitive pasture and crop species to germinate or thrive, reduced production; • Change in pasture composition, with known salt-tolerant species increasingly abundant (e.g. salt couch, button grass); • Decline and death of older trees, sometimes while younger trees survive.
Landscape indicators	• Reduced pasture, damp ground and/ or scalding: • upstream of areas where surface water and groundwater flow from a small catchment area is constricted; • along the break of slope between mid and lower slope areas or between foothills and floodplains; • in low-lying areas and along drainage lines.

The soil (a Dermosol) was described to 1.5 metres and conductivity measurements were taken to measure salt content (refer to graph).

The figure below shows the results of salt load measurements using a portable ground conductivity meter (EM31) (right). It can highlight the location and levels of salt in the landscape identifying saline areas. In the example below the highest salt reading (in red) were from the scalded areas towards the bottom of the gentle slope.

The salt-affected paddock can be clearly seen in this image because of its low grass and tree cover. Measurements of electrical conductivity taken across the paddock confirm the higher concentration of salt in the surface soils in this paddock. The red line segments indicate higher salt loads, and green segments indicate lower salt loads.

Future management

The salty paddock seems to be slowly recovering. Julie and Les let it rebuild grass cover for a couple of years before moving any cattle in. Even now it is only grazed for relatively short periods and is spelled during the wet season.

In addition to conservative grazing of the paddock, Julie and Les came up with the idea of spreading bands of hay across the paddock.

The hay would help a pasture become re-established. It would help water to infiltrate, provide a source of seed and mulch that would prevent evaporation.

It is also likely that there will be some recovery of trees cover as a result of natural regeneration and coppice regrowth.

It is important to appreciate that this paddock is a relatively small part of the property, maybe 8 ha or so, and is not necessarily Julie and Les' biggest priority.

The conservative management that they are applying is helping the grass to spread out across the paddock and improving ground cover. Managing grass cover and allowing trees back into parts of the landscape will help minimise the risk of salinity.

Over time, Julie and Les' grazing management will improve the condition of the soil and may eventually enable them to rehabilitate the salty site.

Using a portable ground conductivity meter (EM31) to measure salt load.

Key Points

- Some parts of the property are predisposed to salinity because of salt stored in the landscape and seasonal watertables.
- The removal of trees and grasses has allowed water tables to rise and salt to concentrate at the soil surface.
- Rotational grazing and wet season spelling have allowed annual grasses and some pioneer perennial grasses to re-establish in salt-affected areas.
- These practices will also assist with the build-up of perennial grass cover across the landscape, reduce groundwater recharge and limit the likelihood of further salinity outbreaks. Allowing trees back into the landscape is also an important to minimise salinity risk.

The BDTNRM Dryland Salinity Project was funded by the Australian and Queensland Government as part of the National Action Plan for Salinity and Water Quality. The final report is available at BDTNRMs website or contact BDTNRM for further information.

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