

fact sheet

Land Soils and Agriculture



Salinity and Sustainable Land Management

Case Study No 4 – Lakeview

Landholder	George Bredden
Location	West of Charters Towers
Rainfall	670 mm
Property size	20,250 ha
Enterprises	Cattle

George Bredden and his family moved to Lakeview in 1971 when the property was a virgin block. Since then over 95% of the property has pulled to make way for pastures and a grazing herd of around 1500 head of breeding females. The property is in wattle and ironbark country.

Improvements to carrying capacity

"When my family took over the property there were no improvements in the way of tree clearing or anything. Water infrastructure was just about nil. Since then we've run a lot of reticulated water supplies through – almost 70km of poly piping, cleared timber and fenced it up so we can rotate our stock around," said George.

George has also sown about 2 tonne of Buffel and Verano seed, and over 2 tonne of Secca to improve his pastures. The whole property would have some improved pastures. George estimates that timber control and pasture improvement has just about doubled the carrying capacity of the property.

Rotational grazing

About 6 years ago George moved to a rotational grazing system.

"I continually rotate my main breeder herd around through 16 paddocks. My weaners rotate around 4 paddocks, as they come off. And my steers have got 3 paddocks to rotate through."

"We're maintaining more ground cover with rotational grazing" he said.

Even though the improved pasture conditions means George would be able to carry more stock, he hasn't tried to push it, and has kept his stocking rate at the same level overall.



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When George moved to the property he noticed the salty land by the lake but didn't know what caused it.

Salty patches around the Lake

There are patches of salinity on Lakeview near Lake Powlathanga. George first noticed them around 30 years ago when he first came to the property.

The signs of salinity are fairly easy to pick up.

"The top surface of the patches I have come across get really very floury and very powdery. The only main bits of grass you'll get will be marine couch – they can take the salt".

"It mainly occurs where the sand overlays the clay coming in onto the lake. It seeps out there from season to season, depending on the rainfall.

If there is an heavy rainfall incident, you generally won't see it that year. But if you get a light season and the water just seeps out, then it will come to the surface a little bit," George said.

"It's been here for a long time, but it doesn't seem to be getting any worse or any better," he said.



Australian Government



Queensland Government

What causes salinity to develop?

The outbreaks of salinity on George's place occur in an arc around the northern and north-western edge of Lake Powlathanga.

That flatter country near the lake is at the end of a long and gentle slope, and has quite shallow water tables. Because the water tables are shallow, water evaporates and concentrates salt at the surface (see figure below).

How do you identify salinity?

Salinity can often be identified by visual indicators of soils, vegetation and landscape position (see next page). 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.

Back up towards the hill, as water table deepens and the soil becomes fresher, you have other pasture species such as *Eurochloa* and *Aristida* (wiregrass) creeping in.

The figure below shows the results of salt load measurements using a portable ground conductivity meter (EM31) (over page). 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.

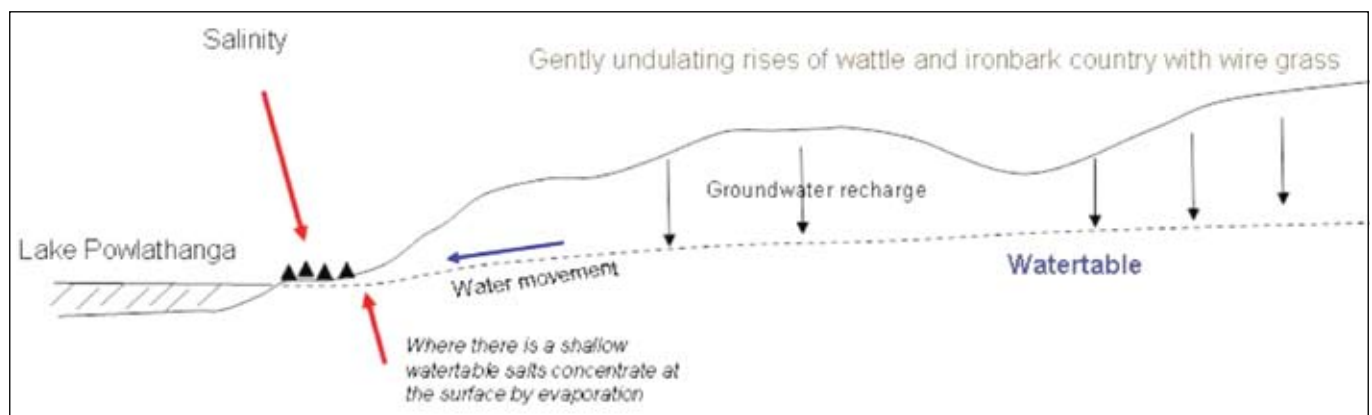
Salinity indicators

- 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

- 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.

- 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.

Shallow watertables cause salinity to occur at the edge of the lake.



In some places near the lake, the salinity outbreaks appear to be quite severe.



Patches of salinity can be seen at the edge of pastures on the north west edge of Lake Powlathanga. High salt loads (orange and red lines) occur in flatter areas on the lake margins.

Management of these saline areas

The salinity patches may have been exacerbated by clearing, but it seems to be contained by the slope of the hill and the lake itself.



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Salty patches of bare ground or with marine couch occur at the edges of the lake. Vegetation above these lower slopes are unaffected by the shallow water tables and salinity.

The lake itself appears to be very healthy and does not appear at all to be threatened by the salinity (refer to photograph).



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Lake Powlathanga supports a variety of wildlife

Continued use of rotational grazing, maintaining ground cover and wet season spelling will encourage grasses to re-establish in salt-affected areas. It would also reduce groundwater recharge and lower the risk of further salinity.

Key Points

- Some parts of the property are predisposed to develop salinity. The most obvious example is along the edge of Lake Powlathanga.
- These areas are predisposed to the development of salinity because of salt storage in the landscape, and because of natural constraints on water drainage due to topography, changes in soil texture and changes in slope.
- The natural salinity hazard has been activated in places through clearing and grazing pressure which has increased the amount of water moving through parts of the landscape and removed surface cover.
- Rotational grazing and wet season spelling allow the development of better pastures which will leak less water and therefore lower the salinity risk.
- Allowing trees back into parts of the upper catchment will reduce the risk of salinity.

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.