

Dryland Salinity Management in the Coorong and Districts

Introduction

Dryland salinity is a major form of land degradation in the Coorong & Districts Coastal Plain (CP), currently affecting some 57 000 ha. It limits conventional agriculture, damages structures such as buildings, roads and fences, degrades native vegetation and raises salinity levels in both surface and underground water supplies.

There are several reasons why land managers are often slow to respond to dryland salinity:

- the symptoms usually develop slowly
- the effect can only be reversed slowly
- the source of the salinity is often on someone else's property
- the cost of correction might exceed the benefits.

This Fact Sheet is a summary of a more comprehensive review of the south western Murray Basin prepared by Chris Henschke of PIRSA. He shows that in general salinity is best managed by communities taking a collective approach and using an integrated suite of appropriate strategies.

General Principles

To control dryland salinity we must find a balance between the rainfall which enters the ground and that which leaves by run-off, evaporation and transpiration from plants. If these components are not in balance, the excess water will drain down into the groundwater (*recharge*) where it can dissolve salts from weathered rock material. If that water later finds its way back to the surface somewhere else in the landscape (*discharge*), the salt comes with it. When the water evaporates, the salt remains.

There are two groundwater systems influencing the Coastal Plain - an unconfined aquifer which is recharged locally and a deeper confined regional aquifer which is recharged in western Victoria. Much of the area is characterised by deep sand over clay which, when cleared of deep rooted vegetation, allows rapid recharge of the local unconfined aquifer. This in turn applies greater pressure to the confined aquifer which then leaks upwards in places. The result is that there are now large areas of dryland salinity associated with the shallow saline groundwater.

The jumbled dune system with landlocked saline depressions requires an emphasis on recharge reduction to arrest and possibly reverse the rising trend of the watertable.

Management Options

Forestry and Tree Planting

Trees and perennial shrubs generally have deep roots and are capable of intercepting the recharge. There are several options for this course of action and there may be other benefits aside from salinity control (eg. stock shade and shelter, commercial timber, honey, biodiversity and protection against wind erosion).

Trees can be planted in the recharge zone, usually high in the landscape. The roots might not reach the groundwater but they intercept much of the rainfall before the groundwater is recharged. Trees usually grow well in this 'fresh water' environment although establishment from seed can be difficult, particularly on non-wetting sands. Clay spreading greatly assists this process.

Tagasaste is a proven option for well drained sites such as dunes, and properly managed it can provide useful fodder. Be aware that its very adaptability to these sites makes it a serious potential weed in remnant vegetation, particularly if it is allowed to grow too big to be grazed or harvested.

Break of slope is often a suitable site for tree planting. Soils usually have reasonable depth, roots can reach the watertable which should not be excessively salty, and the area often marks a change of land class and so a change of land use.

Planting in discharge zones is generally not recommended since trees will seldom grow well and probably do little to lower the watertable. However salinity levels on the CP generally permit planting around discharge sites, and salt tolerant species (eg *Melaleuca halimifolium*) can cause a local groundwater drawdown.

Remnant Vegetation

There is practically no recharge under good quality remnant vegetation. It is far more economical to conserve remnant vegetation with its understory than to have to revegetate a cleared site.

Perennial Pastures

Perennial pastures have deeper root systems than annuals and so provide another approach to lowering watertables. These offer the additional benefits of productive grazing and good ground cover. Veldt and primrose are probably the most enduring of the introduced perennial grasses and relatively easy to establish. However, they are of limited economic value, particularly with wool and cattle prices depressed. Furthermore, the effectiveness of perennial grasses for recharge control is diminished when they are grazed, which somewhat defeats their purpose.

Lucerne is an excellent crop for recharge control and is splendid fodder. It requires very good drainage and careful management but generally lends itself well to conditions on the Coastal Plain..

Saltland Agronomy

Tall wheat grass and puccinellia are tolerant of salinity levels often encountered on the CP. They provide good stock feed, excellent ground cover, and they reduce saline runoff. However, they must be carefully managed to deliver these results. Puccinellia seed can be harvested profitably from suitable sites.

Saltbush has a role to play on well drained sites, however it too must also be carefully managed.

High water-use crops

Crops which make maximum use of available moisture will not only optimise yield, they will also contribute to the reduction of recharge. This becomes an even greater priority in areas where continuous cropping is practised. Programs such as TOPCROP™ will assist farmers to reach this goal.

Drains

Drainage is not an option on the CP with the jumbled dunes and the landlocked salinised areas.

Groundwater Pumping

Whilst this can be used to arrest saline water discharge, it is rarely cost effective. Furthermore, there are few opportunities to dispose of the saline water.

Making it Happen

Salinity pays no respect to property boundaries. By its very nature the symptom (discharge) often appears some distance from the problem (recharge). This highlights the importance of a catchment approach where all stakeholders are involved in developing and implementing the solution and which will generally involve several of the above strategies.

To control dryland salinity, a range of land use and management changes are generally needed. These changes should be implemented as part of a Property Management Plan which is consistent with the Local Action Plan. This ensures that the program suits the landholder's unique combination of human and natural resources, enterprises and financial situation.

Further Reading: (Available from the Meningie District Council office)

Henschke CJ (1997) Dryland salinity management in the south western Murray Basin. (PIRSA Tech Rept 256)

Resources Available to Landholders to Assist in the Management of Dryland Salinity in the Coorong & Districts

The Top Ten Publications for Landholders

The following is my list of the ten most useful and readable pieces of information on salinity, water balance, saltland agronomy and revegetation in the Coorong district. If you know of something I have missed, please let

me know.

1. **Coorong & Districts Draft Local Action Plan** - (Everything you want to know about the natural resource issues in your district; the causes of salinity; what you can do to control salinity; the help that is available) - from Graham Gates; LAP Project Officer, Meningie PH 85751008
2. **Dryland Salinity Management in the South Western Murray Basin** - *C Henschke* (Technical report which summarises in 31 pages the region, the causes of salinity, management options and the tools and resources needed for planning) - PIRSA Murray Bridge office 85356400
3. **Coorong & Districts Soil Conservation Board District Plan** - (A review of the natural resource issues in the region, including the causes and effects of salinity) - from Graham Gates or a soil board member
4. **Dryland Salinity - the catchment approach** - *Tim Herrmann & Chris Henschke* (20 single page black & white fact sheets covering the 20 main issues of dryland salinity: what causes it; how to manage it; etc - the nice thing about these is that the money has been spent on getting quality information into a readable form) - PIRSA mb office 85356400
5. **Dryland Salinity** - *John Francis et al* (8 booklets which cover in a readable manner the causes of salinity; monitoring; managing, etc - although from NSW they have info which is still very applicable to SA) - Bruce Munday ph & fax 08 85 387075 or view at PIRSA mb office
6. **Spotting Soil Salting - A Victorian field guide to salt indicator plants** - *Matters & Bozon* (A great little pocket book with excellent colour photos and descriptions of about 50 plants that tell you what you probably don't want to know. Many of the plants are relevant to SA. A pamphlet "Indicators of Dryland Salinity in the South East" is also useful but there are less plants and the photos are not as well reproduced) - Bruce Munday 85387075 or view at PIRSA mb office
7. **Puccinellia - Perennial Sweet Grass** - *T Herrmann & N Booth* (5 case studies and technical notes on establishment and management of pucci) - Graham Gates 85751008
8. **Direct seeding of native trees and shrubs in low rainfall areas and on non-wetting sands of the Murray Mallee.** - *D Hein, A Knight, P Beale* (Useful fact sheet based on work done in difficult paddock situations) - State Tree Centre ph 08 82078767
9. **Establishing trees and shrubs on saline seeps** - *T Dooley* (Planting on saline seeps is only one component of an integrated approach to lowering watertables. However, it does have a role and this booklet clearly outlines species selection, site preparation and establishment) - State Tree Centre 08 82078767
10. **(a) Success with Dryland Lucerne** - *M Stanley & R Christinat* (A great manual which outlines all the steps for the successful establishment and management of dryland lucerne. Costs \$30, but well worth it. If only all manuals were as good as this one!) - PIRSA mb office 85356400
(b) Dryland lucerne - getting it right every time - *PIRSA Bulletin 4/97 Agdex 137/20* (A guide to establishing and managing productive lucerne pastures in the 300 - 450 mm rainfall regions. Written specifically for the Upper SE and Murray Mallee; includes case studies) - PIRSA mb office 85356400

Top Dozen Human Resources for Landholders

The following are agency people trained in an aspect of dryland salinity management or local land managers with special skills based on recent experience. As well, several farmers in the USE have particular expertise in various aspects of salinity management - revegetation, saltland agronomy, perennial pastures, lucerne, etc. Graham Gates, the Ag Bureau or the Coorong & Districts Soil Board will direct you to the appropriate person.

The Coorong & Districts Local Action Plan has funding for on-ground works aimed at addressing dryland salinity. Interested? - speak to Graham Gates (8775 1008).

Saltland agronomy

Graham Gates (LAP Project Officer, Meningie, 8575 1008) Graham has had 10 years experience with dryland agronomy at Tintinara and as project officer he has had a good overview of what others in the district have had success with.

Trevor Dooley (PIRSA, Nuriootpa, 8568 6415) Trevor is agronomist with the Catchments back in Balance project

Kate Morris (PIRSA, Keith 8755 3166) Kate is an agronomist working across this part of the Murray Darling Basin

Commercial seed production & sales

Graham Gates (8575 1008)

Revegetation

Bernadette Lawson (PIRSA Keith 8755 3166) and Zita Stokes (PIRSA, Struan 8767 67419) - revegetation officers who have advised numerous landholders across the USE and the SE.

Mig and Peter Brookman (Keith 8756 5019) - landholder/contractors who have completed hundreds of kilometres of direct seeding in the USE

Fodder crops

Kate Morris (PIRSA, Keith 8755 3166)

Tom Davidson (PIRSA, Murray Bridge 8535 6400)

TOPCROP™

Tom Davidson (PIRSA Murray Bridge 8535 6400)

Ground water

Steve Barnett (PIRSA, Adelaide 8274 7583)

Chris Henschke (PIRSA,Nuriootpa 8568 6415)

Dryland lucerne

Tom Davidson (PIRSA, Murray Bridge 8535 6400)

Kate Morris (PIRSA, Keith 8755 3166)

Property management planning

Richard Williams (PIRSA, Murray Bridge 8535 6400)

Regional planning

Graham Gates & Jem Tesariero (Project Officers for Coorong & Districts LAP 8575 1008)

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