

Catchment planning for salinity management in the Northern and Yorke Region of SA

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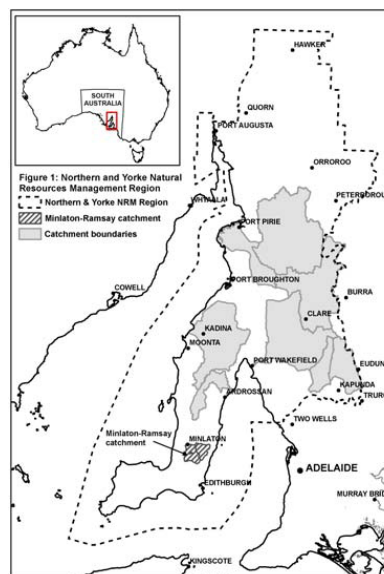
Introduction

In Australia, strategic management for 'groundwaterdriven' salinity is undertaken at many scales - local, regional, state and national. At each level, priorities for salinity management are determined by the extent and severity of salinity, salinity risk to key assets and the ability to manage that risk.

Australia's regional Natural Resource Management (NRM) organisations have the responsibility for integrated natural resource management at the regional scale, where the priority of salinity is considered in relation to other natural resource issues.

Northern and Yorke Region

The Northern and Yorke (N&Y) region is one of eight Natural Resources Management (NRM) regions in South Australia. It covers approximately 3.5 million hectares, extending from near Kapunda in the south to Hawker in the north, including all of the Yorke Peninsula. The region also extends off-shore incorporating parts of the Spencer Gulf, Gulf St Vincent and Investigator Strait (Figure 1).



This is one of the State's most productive regions with significant natural resource assets and supports a population of more than 95,000 people.

The N&Y NRM Board and the former Northern and Yorke Agricultural District Integrated Natural Resource Management Committee Inc. identified secondary salinity as a threat to the region's natural resource assets including land, native vegetation, groundwater and surface water, and man-made assets such as roads, culverts and buildings (N&Y INRM Committee Inc. 2003).

The National Land and Water Resources Audit (Barnett SR 2000) estimated that there were 10,000 hectares of primary salinity (in the form of salt marshes and salt lakes, mainly on the Yorke Peninsula) and 30,000 hectares of secondary salinity in the region. Secondary salinity was predicted to increase significantly by the year 2050 if groundwater continued to rise and if no preventative action was taken.

The National Action Plan for Salinity and Water Quality (NAP SWQ) identified the region as a priority area for action.

The Northern and Yorke NRM Board has developed and implemented a strategic approach to salinity management based on an overarching regional plan, detailed catchment plans and provision of targeted financial and technical support based on those plans.

Methodology

Regional prioritisation of catchments

A regional plan was prepared by Dooley *et al.* (2001) which prioritised the major surface water catchments and sub-catchments in the region. A simple matrix system was used to match the surface water catchments against a range of criteria such as the extent and risk of saltland, salinity risk to assets, the potential effectiveness of salinity management options, and the environmental and socioeconomic impact of salinity. A simple scoring system helped to rank each catchment.

Salinity management planning

Salinity management plans for the catchments and sub-catchments were prepared in order of priority. Since 2003, nine salinity management plans have been prepared for ensuring on-ground works funded through the NAP SWQ. The catchments and sub-catchments are outlined in Figure 1.

All information in relation to salinity for each catchment was reviewed and interpreted. Local knowledge and information was gained from landholders and the community. GIS maps (and statistics) for soil land systems, salt affected areas, salinity risk and recharge potential were produced (PIRSA Land Information 2001).

Salinity management plans outlined the biophysical description of the catchment, catchment hydrogeology, current status of dryland salinity and salinity risk, reviewed the options for managing salinity and identified the natural resource and man-made assets under threat. The plan outlined priority actions and priority areas to manage dryland salinity.

The resultant on-ground actions were grouped into one of three strategic approaches: recharge reduction (establishment of perennial plants, clay spreading on sands); living with salt (saltland agronomy) and engineering (enhancement of surface drainage).

Landholder engagement and on-ground works

Once plans were produced, financial and technical support was then directed towards these catchments. Funding was sourced through the NAP SWQ and the Natural Heritage Trust (NHT).

Incentive payments were provided for various on-ground activities such as clay spreading, surface drains, establishment of perennial plants (e.g. lucerne, native vegetation) and protection of remnant vegetation as an encouragement for landholders to undertake and complete the works. For those landholders who were willing to undertake the work regardless of what assistance was offered, the incentives acted as a reward and encouragement for continued stewardship. Many of the activities funded for salinity management also had multiple natural resource benefits such as maximising water utilisation, erosion control and biodiversity conservation.

The incentive payments for on-ground activities were based on the public portion of the public-private benefit and were generally between 20-50% of the total cost of the activity.

The program incorporated 'one on one' assistance from technical advisers as a sequential step in landholder's transition from education and awareness to the adoption phase.

All the proposed activities submitted by landholders were assessed by a technical panel for validity. The projects were then forwarded to the local community steering committee to build local ownership of the works and gain endorsement. On completion of the approved on-ground works, they were then inspected by technical advisers who then recommended payment for the landholders from the N&Y Board.

In a number of catchments, landholder participation in on-ground works was initially slow, due in part to the combined influence of a number of reasons. These included: not recognising the problem of salinity; a series of dry seasons which slowed the spread of salinity and reduced landholders concern about the problem; cost of works; a reluctance to establish perennials on productive cropping country, and landholders on recharge areas being removed from problems in the discharge areas.

These reasons created a challenge to implement the works and spend the allocated funds but as landholders became more aware of the issues and the range of opportunities available, the uptake of financial incentives for on-ground works steadily increased.

Monitoring and evaluation

Monitoring and evaluation was an important component of the salinity catchment planning process. Salinity benchmarking and monitoring strategies were prepared for each catchment to provide baseline data and methodologies for monitoring salinity.

Landholders were encouraged to monitor and evaluate their on-ground works and to assess the extent of salinity over time. A number of observation wells had been installed in various

catchments and new networks of observation wells have been installed to monitor groundwater depth and water quality. The wells have been monitored periodically and the information downloaded onto the DWLBC Obswell web-site. In some focus catchments EM surveys have been carried out to map the extent and severity of saltland.

Monitoring is also essential to evaluate the progress towards the N&Y NRM Board's targets.

Case study Minlaton – Ramsay catchment

The Minlaton-Ramsay catchment (24,000 hectares) on the southern Yorke Peninsula was the first catchment planned (2003) for the management of salinity. This was rated as a high priority catchment in the region due to the extent and risk of salinity and the impact of salinity on the environmental and socio-economic status of the catchment.

The expanding effect of salinity was having an adverse impact on agricultural productivity, land and water ecosystems, surface and groundwater quality and infrastructure. Many of the lagoons that contained fresh water have now become saline. As at 2001, there were 1,270 hectares of land affected by salinity of which 475 hectares was primary salinity (salt lakes) and 795 hectares was secondary salinity (PIRSA Land Information 2001).

An area of cultural and natural significance, east of the township of Minlaton, was experiencing rising groundwater due to stormwater run-off from the township. In this area there is a population of river red gums (*Eucalyptus camaldulensis* var. *camaldulensis*), which is the only provenance on the Yorke Peninsula and is under stress. Moore and Ciganovic (1999) indicated that the accelerated decline of these gums is possibly due to rising groundwater and salinity.

The salinity management plan prepared by Harding *et al.* (2003) was used to prioritise and target areas for on-ground works to have the greatest effect on reducing the spread of salt. In 2003, the N&Y NRM Board received funding for a pilot on-ground works project through the NAP SWQ.

Landholders, community groups, District Council of Yorke Peninsula and clay spreading contractors were all engaged through educational workshops, field days and mail outs to provide an awareness of the plan and to help generate greater uptake of on-ground activities. The District Council was instrumental in cleaning out culverts, regrading surface drains and carrying out general earthworks consistent with the plan.

The problem of stormwater from Minlaton was beyond the scope of the on-ground works program but the catchment plan and the community supported the recommendations by Moore and Ciganovic (2002) to divert stormwater away from the 'high valued assets' site into an engineered storage facility. The site could then be planted with perennial vegetation to lower the water tables and allow natural regeneration of the river red gums to occur.

The incentive payments for completed works including surface drainage, clay spreading, Lucerne establishment, revegetation, fencing saline areas and fencing remnant vegetation was in the order of \$120k. Most of the funds were directed towards constructing surface drains and recharge reduction in high priority areas. The plan helped to shift the focus from 'fixing' the problem in discharge areas to focusing on the recharge areas. More than 12km of surface drains were constructed in a high priority area to remove excess surface water and reduce the problems of waterlogging and flooding which was resulting in recharge to groundwater and causing water tables to rise.

The effectiveness of works will be monitored through a series of observation wells but they have not been in long enough to detect any changes. The use of EM surveys have been carried out to monitor changes of the extent and severity of salinity over time.

Results and discussion

A strategic approach to salinity management planning has enabled the N&Y NRM Board to focus on high priority catchments. This has allowed the Board and the community to gain a better understanding of the process of salinity within the catchment, to assess the options for the management of salinity and identify priority target areas.

Having a more strategic focus and providing incentive payments as part of the delivery

mechanism has helped to encourage landholders to implement and accelerate on-ground works for salinity management in more appropriate areas. It has resulted in investment in areas that had little investment in the past and there has been a greater effort directed towards the cause of the problem i.e. aimed at reducing recharge rather than trying to fix the effects. On-ground works in catchments has varied with most of the work done in the Minlaton-Ramsay catchment.

Monitoring and evaluation has been an important component of the planning process but it will be a while before any changes will be detected.

Conclusions

A framework has been put into place which has allowed the N&Y Board to strategically tackle salinity problems within the region. It has allowed the Board to focus on high priority catchments, direct resources to the most appropriate areas and helped to meet the Board's action targets. Landholders have had a better understanding of salinity and many have adopted salinity management practices as part of their farming business. The adoption of a catchment approach to salinity management has also helped to contribute to integrated NRM outcomes.

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