

Know-how to tackle salinity for:

- CATCHMENTS
- POLICY

Catchment classification for salinity management

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BACKGROUND—WHAT WE WANTED TO KNOW

Catchment classification is a rigorous attempt to bring about informed decision-making for salinity management.

The catchment classification framework allows consideration of potential management strategies based upon knowledge of the physical landscape processes affecting salinity in different regions. It is a way of ordering understanding at national to local scales and enables existing information to be used to target funds and resources effectively for further investigations and management.

Case study catchments include Kamarooka (Victoria) and parts of Wanilla (SA) and Kyeamba Creek (NSW).

OUTCOMES—WHAT WE NOW KNOW

The key success factor for salinity management over the next decade will be the extent to which planners are able to integrate and support cross-discipline knowledge in formulating and delivering strategies for key groundwater flow systems. These must be sufficiently robust to provide greater certainty for stakeholders at all levels.

The options for effective management of dryland salinity vary in sympathy with soils, climate, geology and geomorphology. The response of a groundwater system to salinity management will depend largely upon factors such as aquifer permeability (ability for groundwater to move readily through the system), hydraulic gradient (the slope of groundwater system providing the impetus for flow) and the scale at which the system functions. Scale and responsiveness issues exert great influence over what can and cannot be achieved in a given timeframe. In some large flow systems and some slowly permeable local systems, salinity benefits accruing from biological management of recharge may not be realised for many decades. Other options such as engineering or living with salt may be more appropriate.

Specific results from the project are:

- In general, smaller flow systems have the greatest potential for remediation on a 20-year time-frame. Changes required are mainly through adoption of biological methods, although the scale of change is very large. Recharge reduction would be most effective through improved farming systems in elevated parts of the landscape.
- Larger scale flow systems generally have higher conductivity and more throughput of water, making the balance between filling and draining more complex and site specific. Such systems are more amenable to engineering solutions than exclusively biological recharge reduction. Local responses in these catchments may be rapid, although may take 20 to 50 years for full effect. Catchments in this category include the South Loddon Plain in Victoria and Billabong Creek, NSW.

NDSP TechNote

- Some relatively unresponsive or complicated catchments defy simple solutions in any reasonable time-frame. The low-lying areas in the Wanilla catchment (SA Eyre Peninsula) are an example where even conversion to a native state would not eliminate salinity and waterlogging. In the Axe Creek catchment (Victoria) there is so much complexity in the nature and configuration of the aquifer that an overall catchment solution seems unlikely within a realistic time-frame.
- Transferring understanding from well-documented catchments such as the case studies from this project (see web-site <http://audit.ea.gov.au/ANRA/land/docs/national/>) to poorly documented catchments can be very useful in planning.
- At the national scale, the 1:5,000,000 map and documentation developed under the National Land and Water Resources Audit communicates broad understanding of different processes operating in different parts of the country. It illustrates that no single solution applies everywhere.
- The development of a 1:2,000,000 map for the Murray–Darling Basin provides more detailed insight into the nature of groundwater flow systems and management and policy implications for salinity management in eastern Australia. Arguably, the greatest gains arising from development of the groundwater flow systems framework have arisen from applications at the regional 1:250,000 scale in support of catchment planning for salinity management.
- The next step is to further develop the tools whereby the framework can be better deployed below the 1:100,000 scale to facilitate more informed management decisions at sub-catchment and paddock level.

WANT TO KNOW MORE?

A number of on-line resources hold information about catchment classification, including:

- Catchment Classification and the Murray–Darling Basin Tools project web-sites—www.ndsp.gov.au
- National Land & Water Resources Audit: www.nlwra.gov.au

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