

# Salinity Management Program

The report *Salinity - a situation statement for WA* (1996) noted that more than a third of the State's divertible water resources were brackish or saline, and no longer suitable for drinking, while a further 16% were of marginal quality. In addition, with stream salt loads likely to increase five-fold over the next 50 years, many rivers and wetlands are at risk of becoming irreversibly saline unless significant action is undertaken.

Ensuring sufficient drinking-quality water for future community needs is an important aspect of salinity management in Western Australia but the Department of Environment also supports activities addressing the impacts of salinity on rivers, wetlands and riparian zones.

The Department's Salinity Management Program has seven major components:

- Water Resource Recovery Catchments*
- Drainage and water management*
- Support and Advice for Salinity Management*
- Engineering Evaluation Initiative*
- Salinity Investment Framework*
- Salinity Program management and coordination*
- Stream salinity monitoring and evaluation*



## Strategic approach

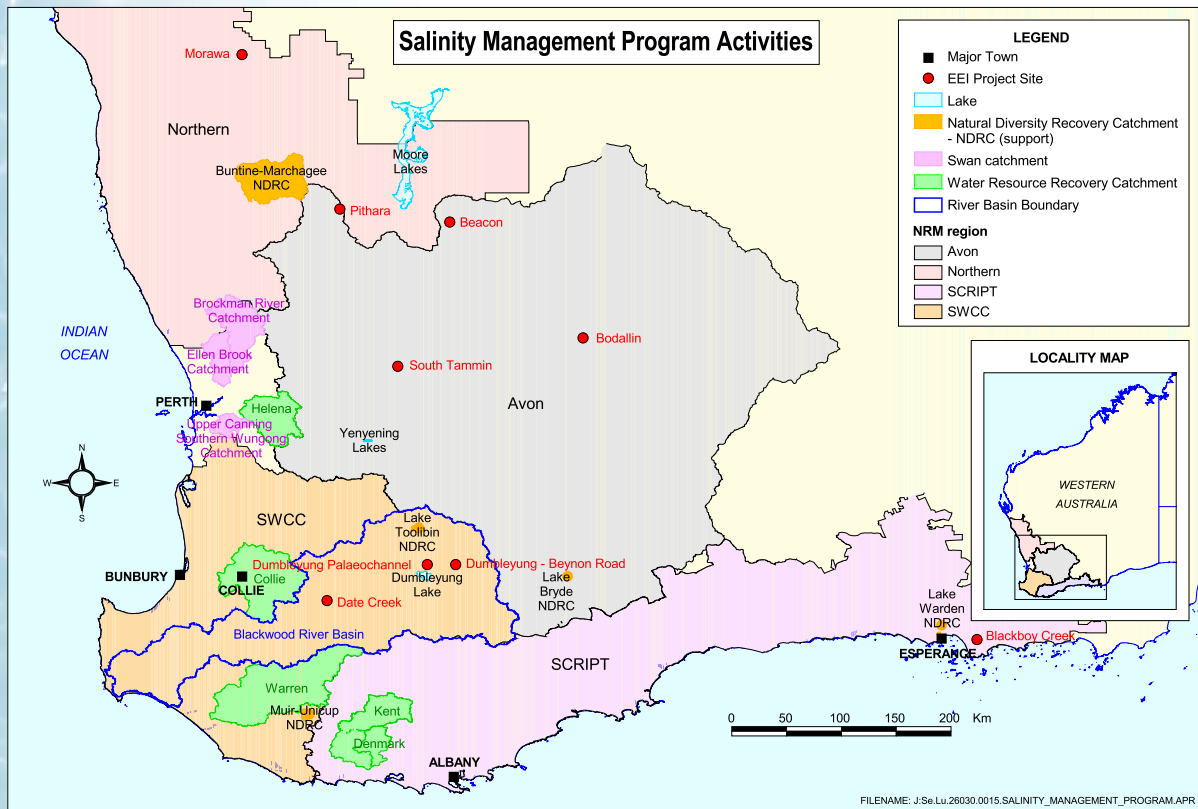
The Department of Environment (DoE) Salinity Management Program builds on a program previously coordinated by the Water and Rivers Commission.

Its main focus is one of the goals of the State Salinity Strategy (2000):

*To protect and restore the key water resources to ensure salinity levels are kept to a level that permits safe, potable water supplies in perpetuity.*

Important aspects of the Department's approach are the following:

- Delivery is through highly focussed strategic programs, such as the *Water Resource Recovery Catchment (WRRC) program* as well as more general support and advice for regional NRM groups and for drilling, arterial and small catchment drainage, and input to state-wide clearing regulation and water salinity monitoring.
- The targeted approach is expected to achieve results sooner and with more dramatic outcomes than if efforts and funds are spread more thinly resulting in slow and insignificant or imperceptible salinity improvements.
- The foundation is the need to find solutions with big enough effects on catchment water balances to meet salinity targets.
- To ensure that solutions take into account economic, social and environmental impacts, both engineering and vegetative approaches for salinity recovery or containment are considered.
- Working in partnership with catchment groups, local communities, other government agencies, industry, local government and Recovery Teams are central to achieving good salinity outcomes.
- The Department's Salinity Management Program also supports other government salinity projects, investigates the impacts of bauxite mining and rehabilitation, models catchments, supports Land Monitor 2, coordinates R & D and manages land for salinity control.



## Water Resource Recovery Catchment (WRRC) Program

This program is the primary focus of the Department's Salinity Management Program.

The 1996 Salinity Action Plan identified the Helena, Collie, Warren, Denmark and Kent rivers as current or potential future water sources for the south-west region expected to deteriorate beyond recovery without active management and so designated the upper parts of their catchments as Water Resource Recovery Catchments. These five catchments have been a major part of the State's water resource salinity management strategies since they were established as clearing-controlled catchments in the late 1970s.

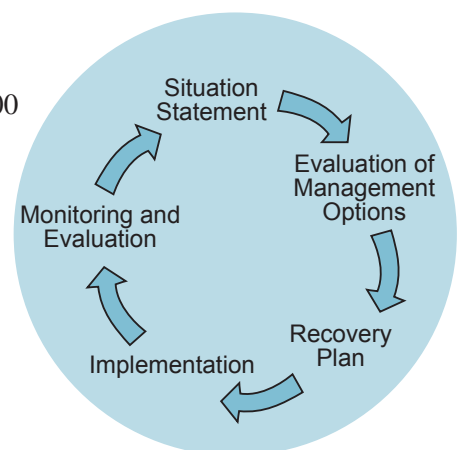
### Objectives

- To maintain or reduce the stream salinity concentrations to potable (drinkable) levels within the five key catchments. The targets are 500 mg/L TDS measured at the current or potential damsites by 2015 in Collie, by 2020 in Denmark, and by 2030 in Kent and Warren. Water in the Helena River is currently fresh at the damsite.
- To adopt an effective partnership approach with other state government agencies, NRM groups, local government, industry, research institutions, local community groups and catchment landholders to achieve the goals.

### Progress/Outcomes

The Department adopted an targeted investment approach for each Water Resource Recovery Catchment:

- Salinity Situation Statement — a study that identifies current and predicted salinity levels, estimates how long before salinity returns to potable levels and salt is leached from soil profiles, and evaluates hydrological impacts of salinity management/recovery options. The Collie report was published in 2001 and the Denmark report in March 2004.



- Evaluation of Management Options — defines technical aspects of management options identified in the salinity situation statement, and evaluates the economic, social and environmental aspects in consultation with key stakeholders.



- Recovery Plan — identifies the major components of the option(s) selected for implementation, develops an implementation strategy, and identifies funding sources.

- Implementation — coordinates

‘on-ground’ planning and implementation. The following are significant activities of the Water and Rivers Commission and Department of Environment since 1998.

- Established Collie, Warren and Kent–Denmark Recovery Teams to drive management and adoption.
- Regional staff and Recovery Teams prepared catchment/water management property plans and designs, and identified priority actions. More than 90% of interested farmers in the Kent catchment have completed plans for salinity management implementation works.
- Established landholder liaison and stakeholder links and communications plans through the regions.
- Together with the Forest Products Commission fostered a New Eucalypt Sawlog Industry (NESI) program which established 680 hectares of eucalypt sawlogs in the Warren and Kent Catchments between 2000 and 2002.
- Commissioned a pilot groundwater pumping system in the East Collie catchment area.
- Developed and distributed information for water and catchment management to landholders and other community members. The modelling outputs for management options with the potential to achieve the water quality targets have been presented to the Recovery Teams.
- Staff and Recovery Teams involved in more than 50 stakeholder presentations and meetings in the consultative process to assess the feasibility of Collie Recovery management options.
- Set up water management demonstrations in subcatchments of the Collie and Warren rivers.
- Implemented on-ground cost-sharing through the Department’s regional salinity coordinators (see table).

- Monitoring and Evaluation — monitors the main rivers and major subcatchments of the Water Resource Recovery Catchments and assesses their status and trends.

<b>Cost-shared salinity management works by landholders (1998–2003)</b>	<b>Collie</b>	<b>Warren</b>	<b>Kent/Denmark</b>
Fencing (km)	46	216	274
Revegetation (ha)	104	394	905
Sawlogs (ha)	-	227	361
Perennial pasture (ha)	284	885	661
Drainage/surface water management (km)	16	23	142
Summer forage (ha)	-	-	90
Stock crossings	-	-	26
<i>Number of landholders involved</i>	<i>15</i>	<i>53</i>	<i>65</i>
<i>Number of agreements signed</i>	<i>40</i>	<i>117</i>	<i>92</i>

## Drainage and water management

Evaluating water management at a regional scale to reduce the uncertainty about the use of deep and arterial drainage is the purpose of this component. It includes a major drainage project at Dumbleyung.

There is considerable uncertainty about the effects that deep drains in major valley floors may have on agricultural production; on communities with the likelihood of increased flooding; on the environment with increased flows and acidity; and on infrastructure such as towns, roads and rail. Deep drainage is seen by many land managers as an effective tool to mitigate the effects of salinity. Approximately 1000 kilometres of drains are being constructed each year so it is very important to reduce uncertainties before we can start constructing large integrated drainage schemes.

The Department is also adding to the EEI by additional investment in understanding the downstream impacts of drainage.

### Objectives

- To evaluate engineering options and to improve their use in managing dryland salinity for economic, social and environmental benefit through:
  - ✓ improved siting, design and cost-benefit analysis
  - ✓ safe disposal of discharge waters
  - ✓ implementing works within a regional drainage context.
- To build the capacity for the Department of Environment to respond to proposals for rural drainage in accordance with the inter-agency Memorandum of Understanding.

### Progress/Outcomes

- Developed and implemented Dumbleyung Strategic Water Management project.
- Developed a management plan for Yenyening Lakes in conjunction with the Department of Conservation and Land Management and Yenyening Lakes Management Committee.
- Provided advice on drainage proposal assessment to the Department of Agriculture.

## Support and advice for salinity management

Providing technical advice and support to other State Salinity Strategy projects including Lakes Toolibin and Muir – Unicup, and Rural Towns work is the purpose of this component.

### Objective

- To provide technical advice and support to implement other Departmental and external projects outlined in the Salinity Strategy

### Progress/Outcomes

- Providing technical advice, reports, plans and maps for CALM's Natural Diversity Recovery Catchments and other areas in the south-west region including Lakes Toolibin, Bryde, and Muir–Unicup, the Blackwood River Basin, Moore River Lakes, and the Buntine–Marchagee region.
- Working on a jointly-funded project with Alcoa to establish whether bauxite mining can be undertaken in the Intermediate Rainfall Zone of the Northern Jarrah Forest without unacceptable impacts on the salinity of water resources. Data are being progressively collected. Experimental sites have been modelled and reports prepared. Associated with this are studies into water yield impacts of land use changes such as bauxite mining, forest management, clearing and revegetation.





- Providing salinity assessment for Notices of Intent to Clear (NOIC).
- Providing support for the Catchment Demonstration Initiative. Four demonstration catchments have been selected to clarify the effectiveness of salinity management options. The project is managed by the Department of Agriculture, with financial management currently with this Department.
- Working with CSIRO on Healthy Country initiatives such as:
  - ✓ Scenario planning
  - ✓ Regional modelling and design
  - ✓ Rural town water management
  - ✓ Farm water futures
- Documented baseline hydrogeological information for Ellen Brook, Brockman River and Upper Canning Southern Wungong catchments.
- Provided technical advice to the Department of Agriculture's Rural Towns Program.



## Engineering Evaluation Initiative

The Engineering Evaluation Initiative (EEI) is a \$4 M priority project under the National Action Plan for Salinity and Water Quality to deliver better engineering approaches to manage salinity. Currently within the Wheatbelt nearly 1000 kilometres of drains are constructed each year to reduce the impacts of salinity. Many of these drains are poorly planned, designed, and constructed and their impacts downstream from the increased flow, increased stream salinity and high acidity are not well understood.

The EEI consists of three main programs:

- Evaluation of specific engineering options
- Safe disposal
- Regional drainage planning.

## Objective

- To review the current knowledge on engineering options to mitigate dryland salinity and to clarify 'best practice' by establishing demonstration sites for a range of engineering options.



## Progress/Outcomes

- Established a Steering Committee.
- Held a seminar and workshop in 2003 to present the current understanding of engineering aspects of salinity management
- Publish regular Salinity Engineering newsletters.
- The EEI Steering Committee selected 11 projects (at 9 sites) to be funded in a \$2 million allocation. Work plans and site assessments for the placement of bores, drains and evaporation basins have been prepared.
- Developed a drain discharge calculator/evaporation water balance model to assist with the design of EEI projects and for later Department and community use.
- The regional drainage evaluation component, including the establishment of an advisory group with broad stakeholder membership, has commenced.

## **Salinity Investment Framework**

The Department's Salinity Management program coordinates the development of the Salinity Investment Framework (SIF).

The Salinity Investment Framework is a new process that will help identify priorities and then guide investment to those projects with the best chance of protecting assets of high public value. Assets include productive land, water, biodiversity (native plants and animals) and rural infrastructure.

Previous investment in salinity management has been criticised for spreading funding too thinly to have any real impact. Advances in our knowledge of salinity have shown that larger levels of intervention are required to halt the impacts of salinity. For instance, in some catchments, up to 80% of the cleared land would need to be revegetated to have any impact and reduce salinity. Armed with such information, the State Salinity Council felt that more focused intervention was required. The Salinity Investment Framework was developed to guide this intervention.

### **Objective**

- To guide public investment in salinity management initiatives at state, regional and catchment levels to projects with the best potential to protect assets of high public value threatened by salinity.

### **Progress/Outcomes**

- Completed Phase I of the SIF and published the interim report in 2003.
- Developed an overarching process for the identification of high importance assets based on value and threat information. This approach was recently used by the Senior Officers Group to identify threats to high importance assets, in an NRM context, across Western Australia. It is also being used by regional NRM groups.
- The process is being applied at the Avon Basin and State level concurrently. A strong multi-agency and community-based team is coordinating this extremely complex process. The aim is to make the process transparent in its operations, participatory and transferable to other regions of the State.

## **Salinity program management and coordination**

Coordination of the Salinity Management Program within the Department of Environment and with other state and national agencies is the function of this component. It ensures that all salinity projects are working towards the objectives of the salinity program — the 'big picture' and involves working closely with regional staff and stakeholders, especially in the Water Resource Recovery Catchments.

### **Objectives**

- To coordinate the DoE Salinity Management Program to achieve the State's Salinity Strategy goals
- To provide advice and support to strategic salinity issues across government, such as the NRM Council, Senior Officers Group, and the Research and Development Technical Committee of the NRM Council.

### **Progress/Outcomes**

- Provided staffing and operational support for the Natural Resource Management
- Developing funding options for the National Action Plan on Salinity and Water Quality.
- Supporting regional NRM groups to evaluate and achieve accreditation for NRM strategies.
- Advising the Minister for Environment on salinity related issues.
- Represented on various groups and councils, such as the Tuart and Wandoo Response Groups, and R & D Advisory Group to NRM Council.

## Stream salinity monitoring and evaluation

A third of the State's divertible water resources are brackish or saline and no longer suitable for drinking, with a further 16% of marginal quality. In addition, with stream salt loads likely to increase five-fold over the next 50 years it is important to know the salinity status of rivers in the South West drainage division. This program determines the salinity status and trends for rivers within the Avon, Northern Agriculture, South Coast and South West NRM regions.

### Objectives

- To identify stream salinity, flow status and trends for rivers within four NRM regions of Western Australia.
- To present key information to stakeholders and the community (in the form of maps and brochures).

### Progress/Outcomes

- Completed salinity status and trends for basins within the Avon and South West NRM regions. Evaluation of the Northern Agricultural and South Coast regions is expected to be completed by the end of June 2004.
- Snapshot sampling was conducted in 2003, classifying stream conductivity and pH across the Avon Basin where continuous flow data are limited. Particular emphasis was placed on understanding and capturing the baseflow hydrology component.



### Where can you go for more information?

For more information contact John Ruprecht, Tim Sparks, Department of Environment,  
Perth (08) 9278 0300

For copies of the salinity related publications contact the Information Centre at the Department of  
Environment (08) 9278 0464

or view and download from the Department website  
available at [www.wrc.wa.gov.au](http://www.wrc.wa.gov.au)

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