

## WHAT HAPPENS TO THE COLLECTED SALT?

The two basic methods of managing saline water from salt interception schemes are:

1. concentration and seepage back into the regional groundwater system
2. crystallisation/harvesting of salt.

### Concentration and Seepage

Saline water is concentrated through solar evaporation and the resulting concentrated saline water seeps back very slowly into the already saline regional aquifer. The return of water to the groundwater system is only allowed where the time lag between disposal and return to river is very long, and benefit can be gained by deferring any immediate impacts.

### Crystallisation/ Harvesting

In some salt management basins the water evaporates, leaving the crystallised salt on the surface. At a number of these basins, commercial operators harvest this salt. Different salts are extracted for different uses:

1. sodium chloride – used for table salt, agriculture, swimming pools, the tanning industry and as a de-icing agent;
2. calcium salts – used for gypsum (gypsum is primarily used in agriculture to improve soil structure);
3. bitterns – a mixture of magnesium, chloride, calcium and sodium left over from the above two extractions, used for dust suppression (for example, on dirt roads); and
4. magnesium sulphate extracted from the bitterns – used as a fertiliser, although much more expensive to extract than the other salts, it has a high value.

## THE BASIN SALINITY MANAGEMENT STRATEGY

In 2001, the Basin Salinity Management Strategy (2001–2015) (BSMS) replaced the Salinity and Drainage Strategy, the first coordinated salinity management initiative established in 1988.

The BSMS has an end-of-basin target of maintaining the River Murray salinity at Morgan below 800EC for 95% of the time and sets out how basin communities and governments will work together to control salinity and protect important assets and environmental values. A key element of the BSMS to achieve this target is through a joint works program to offset a predicted 61EC future increase in average salinity at Morgan.

Since these strategies came into effect, the partner governments of New South Wales, Victoria, South Australia and the Australian Government have, initially through the Murray-Darling Basin Commission and more recently the Murray-Darling Basin Authority, invested in the construction, operation and maintenance of Salt Interception and Drainage Disposal Schemes to meet the salinity targets of the BSMS, therefore protecting the River Murray from the impact of rising salinity.

### Further Information

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For more information on Salinity or Salt Interception Schemes, visit the Murray-Darling Basin Authority website: [www.mdba.gov.au](http://www.mdba.gov.au)

Front and back cover images:  
Mallee Cliffs Salt Management Basin.

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Photo: Phil Pfeiffer



# Keeping salt out of the Murray

## SALT INTERCEPTION SCHEMES

Salt is a natural part of Murray-Darling Basin landscapes and rivers. The groundwater systems close to the River Murray hold more than 100,000 million tonnes of salt. The salts come from the weathering of rocks, from ancient oceans and from salts deposited by rainfall (cyclic salt) over millions of years. All of this salt must necessarily find its way into the river before reaching the sea; typically the river delivers around two million tonnes of salt per year to the sea.

The Basin's flat terrain, low rainfall and high evaporation rates contribute to increased salt concentration across the landscape. Land clearing and irrigation has increasingly mobilised salt (into the landscape and river systems). Compounding this has been the increasing proportion of river flows being diverted for irrigation, industrial and urban uses. There is now less flow in the river to dilute inflows of saline groundwater.

Methods to reduce and manage the amount of salt in the River Murray include:

- reduce saline drainage by improved irrigation efficiency and better delivery systems;
- re-use drainage waters on-farm irrigation;
- river flow management – timed water releases to provide salinity dilution;
- reduce the groundwater recharge and flow by planting deep rooted perennials;
- zoning to direct new irrigation to areas of low salinity impact; and
- divert saline groundwater before it enters the River Murray through salt interception and drainage diversion schemes.

This brochure is about the Salt Interception and Drainage Diversion Schemes in the Murray-Darling Basin.

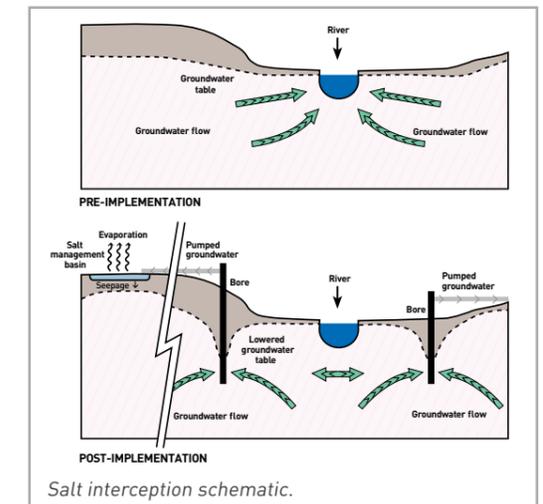
## SALT INTERCEPTION SCHEMES – WHAT ARE THEY?

Salt interception schemes are large-scale pumping schemes that divert saline groundwater and drainage water before entering rivers. In most cases, a bore and pump system extracts the groundwater and pumps it to a salt management basin some distance from the river.

Since 1988 the States of New South Wales, Victoria and South Australia, together with the Australian Government, have funded the construction of salt interception schemes. These schemes prevent approximately half a million tonnes of salt per year from reaching the River Murray.

Salt interception schemes, together with other actions such as improved irrigation practices and river dilution flows, have reduced the salinity in the River Murray by approximately 200 EC\* per year at Morgan in South Australia.

\* EC or Electrical Conductivity, a measure of salinity.



# Keeping salt out of the Murray



Above ground bore pipework – Loxton Salt Interception Scheme. Photo: Phil Pfeiffer.

## 1 2 WAIKERIE

TONNES OF SALT PER/DAY (MAX): 129  
 YEAR (COMMISSIONED): 1992 and 2010  
 OWNER/OPERATOR: SA on behalf of MDBA  
 TYPE OF SCHEME: Groundwater pumping to a salt management basin

## 3 SUNLANDS-QUALCO

TONNES OF SALT PER/DAY (MAX): 19  
 YEAR (COMMISSIONED): 2001  
 OWNER/OPERATOR: SA  
 TYPE OF SCHEME: Groundwater and drainage pumping to a salt management basin

## 4 WOOLPUNDA

TONNES OF SALT PER/DAY (MAX): 190  
 YEAR (COMMISSIONED): 1990/1992  
 OWNER/OPERATOR: SA on behalf of MDBA  
 TYPE OF SCHEME: Groundwater pumping to a salt management basin

## 5 PIKE

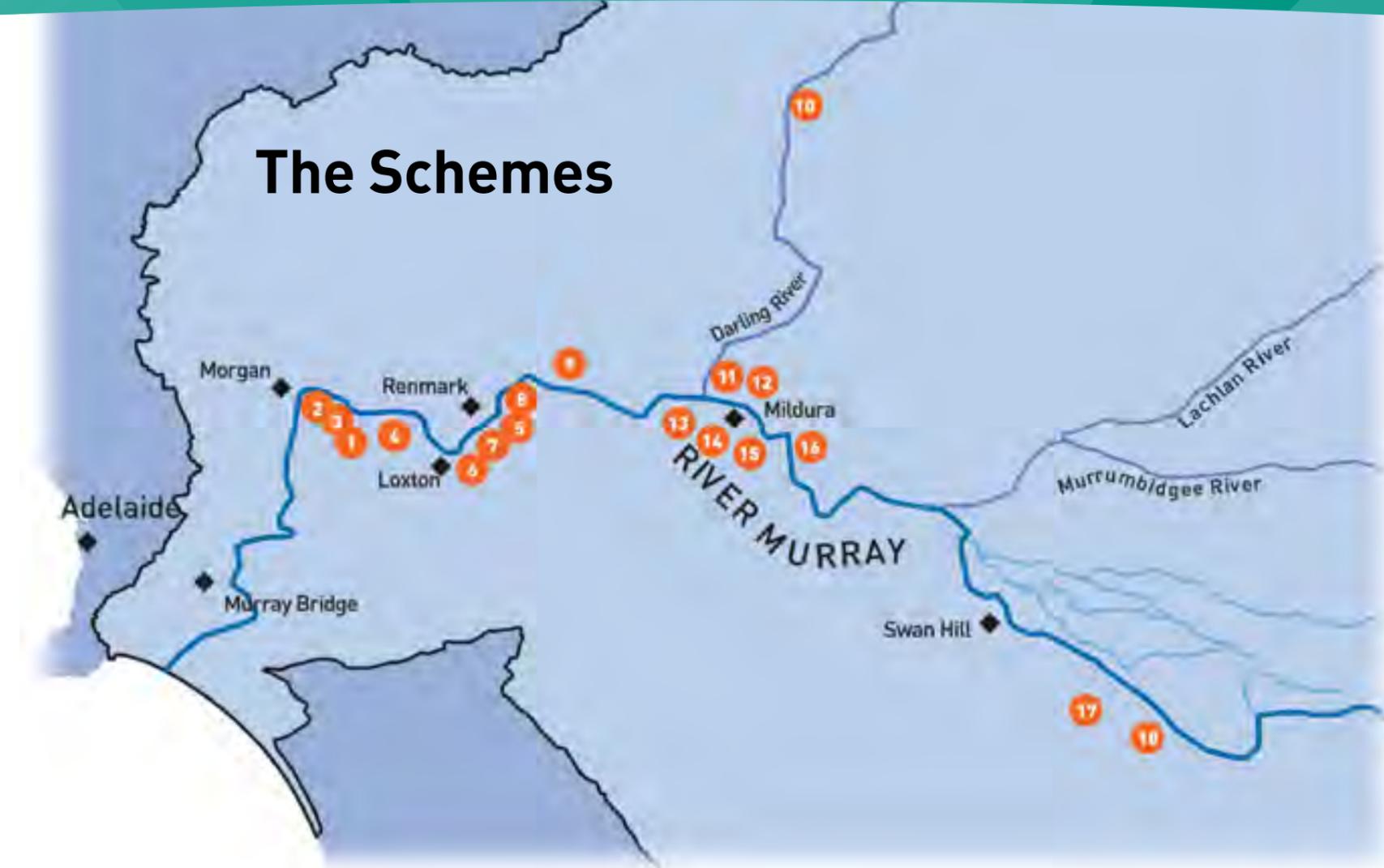
TONNES OF SALT PER/DAY (MAX): 14  
 YEAR (COMMISSIONED): 2011  
 OWNER/OPERATOR: SA  
 TYPE OF SCHEME: Groundwater pumping to a salt management basin

## 6 LOXTON

TONNES OF SALT PER/DAY (MAX): 65  
 YEAR (COMMISSIONED): 2010.  
 OWNER/OPERATOR: SA on behalf of MDBA  
 TYPE OF SCHEME: Groundwater pumping to a salt management basin

## 7 BOOKPURNONG

TONNES OF SALT PER/DAY (MAX): 87  
 YEAR (COMMISSIONED): 2006  
 OWNER/OPERATOR: SA on behalf of MDBA  
 TYPE OF SCHEME: Groundwater pumping to a salt management basin



## 8 MURTHO

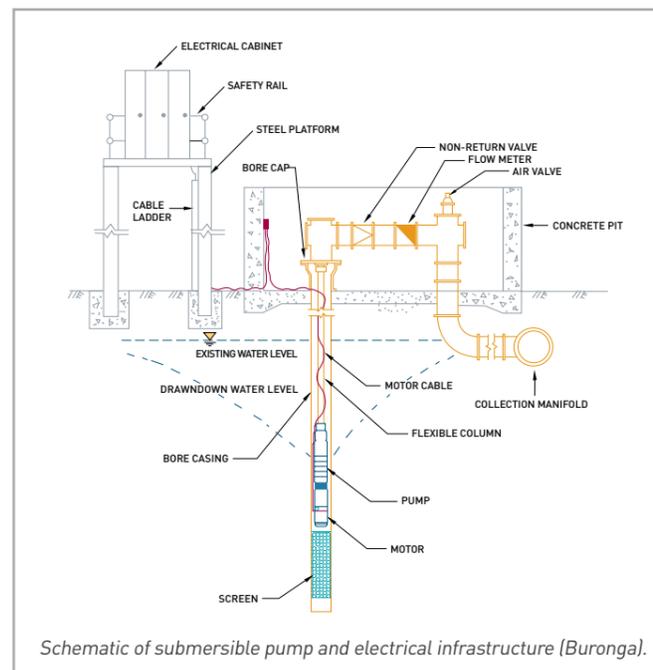
TONNES OF SALT PER/DAY (MAX): 99  
 YEAR (COMMISSIONED): Under construction (expected to be completed in 2012).  
 OWNER/OPERATOR: SA on behalf of MDBA  
 TYPE OF SCHEME: Groundwater pumping to a salt management basin

## 9 RUFUS RIVER

TONNES OF SALT PER/DAY (MAX): 200  
 YEAR (COMMISSIONED): 1984  
 OWNER/OPERATOR: SA on behalf of MDBA  
 TYPE OF SCHEME: Groundwater pumping to a salt management basin

## 10 UPPER DARLING

TONNES OF SALT PER/DAY (MAX): 60  
 YEAR (COMMISSIONED): Under construction (expected to be completed in 2011).  
 OWNER/OPERATOR: NSW on behalf of MDBA  
 TYPE OF SCHEME: Groundwater pumping to salt management basins



Schematic of submersible pump and electrical infrastructure (Buronga).

## 11 CURLWAA

TONNES OF SALT PER/DAY (MAX): 9  
 YEAR (COMMISSIONED): 1973  
 OWNER/OPERATOR: NSW  
 TYPE OF SCHEME: Groundwater pumping to a salt management basin

## 12 BURONGA

TONNES OF SALT PER/DAY (MAX): 200  
 YEAR (COMMISSIONED): 1979  
 (Upgrade: 1988 Rebuilt: 2005)  
 OWNER/OPERATOR: NSW on behalf of MDBA  
 TYPE OF SCHEME: Groundwater pumping to salt management basins

## 13 MILDURA-MERBEIN

TONNES OF SALT PER/DAY (MAX): 140  
 YEAR (COMMISSIONED): 1981  
 (Upgrade: 1990)  
 OWNER/OPERATOR: VIC on behalf of MDBA  
 TYPE OF SCHEME: Groundwater pumping to salt management basins



Barr Creek Weir, part of the Barr Creek Drainage Disposal Scheme. Photo: Phil Pfeiffer.

## 14 LAKE HAWTHORN

TONNES OF SALT PER/DAY (MAX): 38  
 YEAR (COMMISSIONED): 1968  
 OWNER/OPERATOR: VIC  
 TYPE OF SCHEME: Drainage pumping to salt management basins

## 15 PSYCHE BEND

TONNES OF SALT PER/DAY (MAX): 15  
 YEAR (COMMISSIONED): 1996  
 OWNER/OPERATOR: VIC  
 TYPE OF SCHEME: Drainage diversion

## 16 MALLEE CLIFFS

TONNES OF SALT PER/DAY (MAX): 100  
 YEAR (COMMISSIONED): 1994  
 OWNER/OPERATOR: NSW on behalf of MDBA  
 TYPE OF SCHEME: Groundwater pumping to salt management basins

## 17 BARR CREEK

TONNES OF SALT PER/DAY (MAX): 85  
 YEAR (COMMISSIONED): 1968  
 OWNER/OPERATOR: VIC on behalf of MDBA  
 TYPE OF SCHEME: Drainage diversion to a salt management basin

## 18 PYRAMID CREEK

TONNES OF SALT PER/DAY (MAX): 100  
 YEAR (COMMISSIONED): 2007  
 OWNER/OPERATOR: VIC on behalf of MDBA  
 TYPE OF SCHEME: Groundwater pumping to constructed salt harvesting basins