

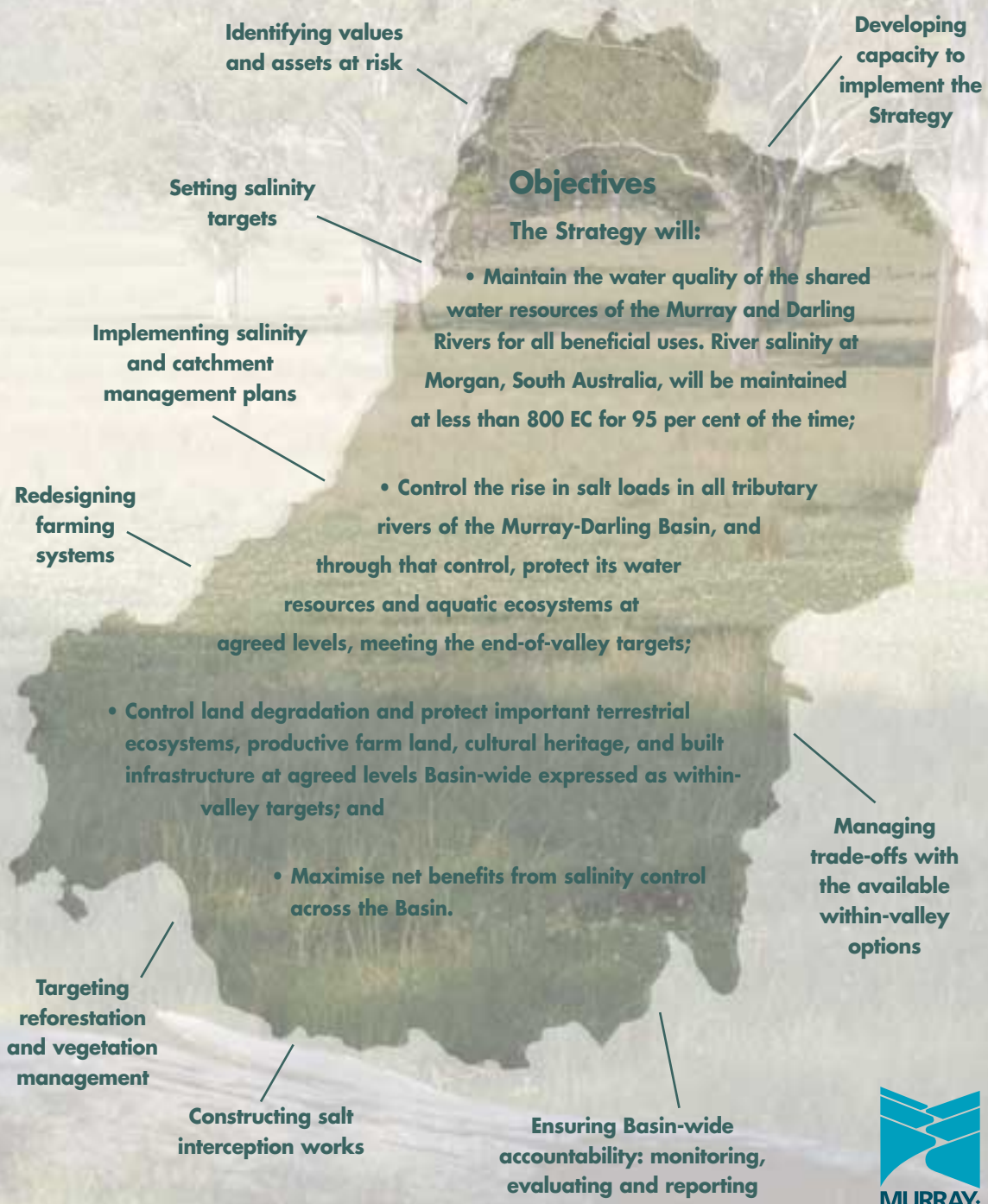
Basin Salinity

management strategy

2001-2015

S U M M A R Y

The Basin Salinity Management Strategy guides communities and Governments in working together to control salinity and protect key natural resource values within their catchments, consistent with the principles of the Integrated Catchment Management Policy Statement. It establishes targets for the river salinity of each tributary valley and the Murray-Darling system itself, that reflect the shared responsibility for action both between valley communities and between States. It provides a stable and accountable framework that, over time, will generate confidence in how we are tracking our joint efforts to manage salinity.



NSW Agriculture

Peter Solness/Network Photographers

NSW Agriculture



Despite the apparent health and beauty of this rolling country near Wellington NSW, 160 hectares in the centre of the photo became salt-affected in just three months in 2000

The Need for Action

Salinity trends

The 1999 Basin Salinity Audit has shown that salt, previously stored in the landscape, is now being mobilised on a massive scale by rising groundwater tables due to land-use changes across the Murray-Darling Basin. 'Business as usual' would mean that the reduction in Lower River Murray salinity achieved over the last decade would be cancelled out within 20 to 30 years, and median salinity levels would exceed the *Australian Drinking Water Guidelines* for good-quality water within 50 to 100 years.

Average river salinities in key tributary rivers will rise significantly, endangering their use for irrigation and urban purposes within 20 to 50 years, and about 3.4 million hectares of land in the eastern and southern regions of the Basin will be salt-affected within 50 years.

Although environmental implications are not well-understood, river salinity levels are having serious impacts on floodplain wetlands of national and international importance.

The current impact costs of dryland salinity in eight tributary valleys of the Basin are estimated to be \$247 million per year. The impact costs of salinity to users of River Murray water total \$47 million per year.

Strategy objectives

The Murray-Darling Basin is the food-bowl of the nation and is a major contributor to Australia's important and burgeoning food export markets. The Basin is home to unique and environmentally-significant natural features, many of which are subject to international treaties. Over two million people directly depend on the natural resources of the Basin for their livelihood, and their future prosperity is dependent upon its sustainable management. These values are at risk from salinity.

Under current trends, future Basin-wide salinity impacts will be so large that it will not be feasible to contain or reduce them in all at-risk areas. The high cost of salinity prevention and rehabilitation will prohibit protection or restoration of natural resource values in all parts of the Basin.

This means that in different areas, careful choices will need to be made between three approaches to salinity management: to attempt to reverse it; to limit its rate of spread and impacts; or to let it take its course. A 'business as usual' approach is not acceptable.

This Strategy has a Basin-wide focus and emphasises the first two approaches, and will:

- maintain the water quality of the shared water resources of the Murray and Darling Rivers for all beneficial uses agricultural, environmental, urban, industrial and recreational;
- control the rise in salt loads in all tributary rivers of the Basin and, through that control, protect their water resources and aquatic ecosystems at agreed levels;





- control land degradation and protect important terrestrial ecosystems, productive farm land, cultural heritage, and built infrastructure at agreed levels Basin-wide; and
- maximise net benefits from salinity control across the Basin.

The means of achieving these objectives is the application of targets for the shared water resources (less than 800 EC for 95 per cent of the time at Morgan), for each tributary valley (end-of-valley salinity, salt load and flow) and for other Basin-wide values and assets (State within-valley management targets).

A Strategic Approach

Co-ordination

This Strategy provides a 15-year Murray-Darling Basin-wide framework for implementing the *National Action Plan for Salinity and Water Quality* (NAP), State salinity strategies (South Australia, Victoria, NSW & Queensland) and regional salinity or catchment management plans.

Consistent with the *Integrated Catchment Management Policy Statement* (ICM), the *Murray-Darling Basin Ministerial Council* (MDBMC) has responsibility for whole-of-Basin outcomes, while the States in partnership with regions are responsible for catchment outcomes. These responsibilities are reflected throughout this Strategy.

Specifically, Council will adopt end-of-valley and Basin targets which will cap rising salinity from all catchments and thus protect values and assets Basin-wide. This Strategy and State strategies will each adopt the same targets with the Council receiving annual reports and ensuring accountability arrangements to meet the objectives of this Strategy. Initiatives under the NAP will be consistent with this Strategy.

Catchment plans will be expected to meet the requirements of the NAP, and be congruent with this Strategy, requiring that they quantify their salinity effects at the target sites and on the Commission's salinity registers, and meet Basin reporting and auditing requirements.

Principles

The Strategy applies the principles of integration, accountability, transparency, effectiveness, efficiency, full accounting and informed decision-making, as explained in the *ICM Policy Statement*, to salinity management in the Basin.

This Strategy differentiates between accountability to offset the salinity impacts of future actions ('new development') and responsibility to offset the future salinity impacts of past actions ('legacy of history').

The Strategy continues the principle of accountability for the salinity impacts of future actions that was a key feature of the *Salinity and Drainage Strategy* (S&D), with NSW, Victoria and South Australia accountable for actions implemented after 1 January 1988 and expands it to include actions implemented by Queensland from 1 January 2000.

This Strategy commits the partner Governments to accept shared responsibility for further action to offset the 'legacy of history', and preserve the Basin salinity target (below 800 EC at Morgan for at least 95 per cent of the time) over 15 years.

Strategic action

In the full Strategy, the partner Governments commit to the nine elements of strategic action set out below. Much of the Strategy implementation will be in the hands of catchment communities, guided by salinity and catchment management plans. The Governments are committed to working closely with communities within the principles of the *ICM Policy Statement*.

- developing capacity to implement the Strategy;
- identifying values and assets at risk;
- setting salinity targets;
- managing trade-offs with the available within-valley options;
- implementing salinity and catchment management plans;

- redesigning farming systems;
- targeting reforestation and vegetation management;
- constructing salt interception works; and
- ensuring Basin-wide accountability: monitoring, evaluating, and reporting.

As part of this action, the Commission and partner Governments will manage a comprehensive knowledge generation program, coordinate and enhance further research and development (R&D) on farming and forestry systems, construct and operate salt interception schemes,

further develop the vegetation bank concept and establish Basin-wide monitoring, evaluation and reporting arrangements.

Commitment

Schedule C of the *Murray-Darling Basin Agreement* will be revised to give effect to the commitments being made by the partner Governments under the Strategy. In endorsing this Strategy and its major policies including salinity targets, redesigning farming systems, the vegetation bank and joint salt interception works, the Ministerial Council has signalled that it is prepared to take decisive action.

Key Elements - Accountability, Monitoring and Reporting

Salinity targets

A key feature of this Strategy is Council's adoption of salinity targets for each tributary valley and a Basin target at Morgan in South Australia. The Basin target, which is for the shared rivers, is to maintain the salinity at Morgan at less than 800 EC for 95 per cent of the time.

These targets themselves do not represent the full range of outcomes sought, but they are a way of measuring progress towards achieving the Strategy's objectives. Council's adoption of these targets will provide the impetus for actions across the Basin, and the basis for accountability arrangements for the partner Governments.

While end-of-valley targets allow for further rises in salinity, they are in effect a 'cap' on salinity that gives the appropriate signals for protecting key values and assets in the valleys, and also encourage the States to meet their obligations to protect the shared rivers.

The partner Governments nominated an interim set of end-of-valley targets for stream salinity and salt loads, and these were considered by catchment communities during the public comment period for the draft Strategy. NSW, Victoria and South Australia have indicated that they will finalise end-of-valley targets by March 2002, while Queensland has indicated it will finalise its targets by March 2004. The current, Council-adopted targets are listed in Table 1.

While there is a need for targets to be adaptive, they will only be changed where there is adequate justification. This will provide certainty and integrity for the Strategy and will ensure that stakeholders' efforts are directed to finding creative and innovative ways to meet the targets.

To assist in the complex process of ongoing assessment of progress towards end-of-valley targets, a monitoring network for collecting continuous flow and salinity data to agreed standards will be required. This Strategy commits the partner Governments to establishing the required end-of-valley monitoring network, with implementation by December 2001.

Salinity credits and debits

An important feature of the Basin salinity target at Morgan is that it is supported by a system of salinity credits and debits. Setting end-of-valley targets and establishing their contribution to the Basin salinity target provides the basis for Basin-wide application of Commission credits and debits. It generates a consistent currency through which trade-offs and Basin-wide accountability can be accommodated, and by convention the currency is EC units (a measure of salinity concentration) at Morgan.



While the essence of this Strategy is to cap salt mobilisation and export from across the Basin landscape, thereby avoiding the need for further salt interception schemes, it is clear that this is achievable only in the longer term. In the short term it is necessary to continue with salt interception schemes to buy time for the benefits of actions to cap salt mobilisation and export from the landscape to take effect.

A new joint program of salt interception works will be undertaken over the first seven years of this Strategy. The aim is to maintain benefits to water users drawing on the shared rivers, and to provide an additional contribution to preserving water quality as measured at Morgan, beyond that deliverable by actions addressing the 'legacy of history' within the tributary valleys. There will be provision to offset impacts of further, new irrigation development. There is also an incentive under this Strategy to develop other, complementary mitigation works.

Valley Report Cards

The design and delivery of outcomes from individual catchment plans will be essential to achieve Basin-wide outcomes. Under this Strategy, States and the Commission will assist individual catchment plans to assess the contribution of proposed actions to meeting the end-of-valley and Basin targets.

The salinity effects of these actions will be recorded in end-of-valley Report Cards and Commission salinity registers. The Report Cards and Commission registers will become an important mechanism for regional, State and Basin annual reporting.

Salinity registers

The system of salinity credits and debits for achieving the Morgan target will be managed through the Commission A Register (for tracking SDEs) and the Commission B Register (for actions to address the 'legacy of history'). The Commission Registers will keep account of all actions undertaken within the Basin after the following agreed baseline dates, 1 January 1988 for accountability for future actions by NSW, Victoria and South Australia (1 January 2000 for Queensland) and 1 January 2000 for responsibility to address the 'legacy of history' effects by partner Governments.

Under this Strategy, the current S&D Strategy Register will be translated directly into the Commission A Register. The Commission B Register is being established to track 'legacy of history' impacts and to assess the effects of actions to address it, for example, revegetation. The effects of these actions are less certain, and are often more time-lagged, than actions qualifying for the Commission A Register. In some cases these actions may result in short-term salinity costs, while providing longer-term salinity benefits.



Peter Solness/Network Photographers

The Valley Report Cards will include both the predicted future impacts and assessed impacts to date of 'legacy of history' and proposed in-valley actions:

- assessed baseline conditions (as at 1 January 2000) for end-of-valley salinity, salt load and flow regimes;
- expected 'legacy of history' impacts on end-of-valley salinity, salt load and flow for 2015, 2050 and 2100;
- agreed end-of-valley salinity and salt-load targets;
- predicted effects of proposed significant in-valley actions on end-of-valley salinity, salt load and flow conditions at 2015, 2050 and 2100; and
- assessed effects of significant in-valley actions undertaken to date, on end-of-valley salinity, salt-load and flow conditions for the current year, and at 2015, 2050 and 2100.

On an annual basis each State will prepare a consolidated Report Card for all valleys within the State for reporting to the Commission.

The River Murray below Yarrowonga Weir



David Easburn

The Commission Registers will operate in harmony using the common currency of Equivalent EC at Morgan, which recognises the economic impact on the shared rivers, and is a continuation of current practice. The States will keep the total of the Commission A Register as well as the cumulative total of both Commission Registers in balance, or in surplus. In the early years of this Strategy there is not expected to be any trade between the Registers.



MDBC

Reporting to Ministerial Council

This Strategy will incorporate transparent accountability arrangements whereby progress towards targets will be monitored and reported to Ministerial Council annually. This follows the same principles as for the Cap on diversions.

Each year States will collate data on all actions undertaken or proposed, and will report these firstly against the agreed end-of-valley targets and subsequently against the Commission A and B Registers.

Basin monitoring and reporting arrangements required for this Strategy will be consistent with NAP and other catchment and state-of-environment reporting needs. Synchronisation of these reporting requirements is a priority in the early years of Strategy implementation.

Reporting to the Commission and Council by the States will consist of:

- an annual report detailing progress with implementation of works and measures and a progressive estimate of salinity effects (at end-of-valley and/or Morgan as appropriate) of those works and measures actually implemented to date; and
- a rolling five-year review and audit for each valley and Commission Register entry, of the assessed effect on river salinity (at end-of-valley and/or Morgan as appropriate) due to actions implemented to date, as well as an update of the expected change in the future flow, salt load and salinity regime due to 'legacy of history' (and any other emerging issues such as climate change).

The monitoring, evaluation and reporting component of Strategy implementation will be overseen by a BSMS working group, comprising senior staff from the partner Governments with technical or policy development responsibility for salinity management. The working group will provide the necessary quality assurance and auditing, and will liaise closely with the high-level inter-jurisdictional working group on salt interception schemes.

This Strategy will be subject to a mid-term review in 2007 to determine the utility of the Strategy for ongoing implementation. As part of the mid-term review, the current state of play regarding predicted 'legacy of history' impacts and the effect of intervention actions undertaken to that time (as assessed by the rolling five-year review and audit process) will be collated into a new Basin Salinity Audit.

Key Elements - Coordinating On Ground Action

Redesigning farming systems

This Strategy will coordinate a range of R&D initiatives to develop new farming systems that can mimic the recharge rates of natural vegetation. Financial support for R&D into these systems will be provided mainly by Government and industry R&D organisations.



NSW Agriculture



NSW Agriculture



NSW Agriculture (Simon Gibbs)



Australian Farm Journal

To target this R&D investment, the Commission will apply a 'criteria-based approach' (as developed by the CRC for Plant-based Management of Dryland Salinity). The approach adopts a number of parameters on which projects are selected and progress is assessed, including impact on recharge, impact on productivity and profitability, area of which solutions are applied, time to complete development and dependence on other activities, economic benefits, and environmental indicators of success.

Initiatives will need to be tailored to the various biophysical settings of the Basin and consider summer and winter dominant rainfall zones. New systems will need to be profitable, or in the case of native-vegetation management, their ecosystem benefits will need to be quantified. Where significant reductions in catchment yield may occur due to reforestation or other vegetation changes this will need to be considered and accounted for.

The new systems will also need to offer sufficient flexibility in design and operation so that astute management can achieve the necessary balance between maintaining downstream flows, protecting assets and values at risk of salinity, and meeting broader regional socio-economic aspirations. Options to be considered will include:

- changing land use from grazing to plantation forestry;
- re-introduction of native perennial grasses, shrubs and trees;
- native vegetation management, rehabilitation and land stewardship;
- perennial cropping systems and perennial-based grazing systems;
- short rotation tree crops;
- phase farming (e.g., using lucerne in rotation with cereal cropping and perennial pasture based grazing systems); and
- companion farming (e.g., oversowing annual crops into perennial pastures).

In some areas the preferred option will be to live with some salinised land and salinised surface and groundwater resources. Potential new opportunities include developing more cost-effective desalination plants, generating heat and electricity from salt disposal ponds, expanding saline aquaculture, producing more products from salt harvesting, developing improved saltland agronomy systems, breeding salt tolerant tree crops, and developing new irrigation technologies that allow the use of low-to-moderate salinity groundwater.

Targeting reforestation and vegetation management

Achieving the objectives of this Strategy is dependent on key parts of catchments and the Basin being planted or managed under perennial plants. Options for reforestation and vegetation management fall into three categories: forestry outside its traditional zone, native vegetation management and short rotation tree crops. Specific challenges include the targeting of areas at a scale of planting that maximises salinity benefits and minimises costs and other adverse impacts, and facilitating innovation in developing and trialling new revegetation options.

Under this Strategy, Council has agreed to further development of the concept of a vegetation bank, into which the partner Governments would contribute funds for targeted investment in reforestation and vegetation management. The intention is for the vegetation bank to invest only in areas where there will be measurable salinity benefits. Consistent with the *ICM Policy Statement*, it will seek to maximise multiple objectives in catchment health. It will not compete directly with fully commercial forestry.

Financing arrangements under the vegetation bank will evolve to accommodate R&D outcomes as they occur. It is the intention over the duration of this Strategy, for the vegetation bank to provide finance for the following options:

- forestry outside of its traditional zone where it would not be commercial otherwise. Investments would be directed to salinised catchments in the uplands receiving 500 mm to 800 mm average annual rainfall. Under the vegetation-bank concept, investors' contributions to forest establishment and maintenance will be in proportion to the commercial and public benefits generated by the new forests.;
- native vegetation management, rehabilitation and land stewardship. Large areas of undulating and steep hill country in the higher rainfall uplands of the Basin, are used for grazing, but profits are generally low. There is an emerging view that where these lands are not reforested they should be rehabilitated and stewarded for a range of ecological services, including salinity management. This option is also expected to be available in medium-to-low rainfall areas in the wheatbelt and the Mallee; and
- innovation for short rotation tree crops. Short rotation tree crops have considerable potential to overcome the economic and social impediments encountered in extending forestry outside of its traditional zone and into the wheatbelt. These crops may prove to be a better long-term option for cleared areas of the Mallee region.

These options are considered to be the three most technically effective and socially acceptable vegetation-related options for salinity management in the Basin. They also provide other benefits, for instance, forestry companion plantings contributing to biodiversity.

Constructing joint salt interception works

Salt interception works are large-scale groundwater pumping and drainage projects that intercept saline flows and dispose of them, generally by evaporation. The *S&D Strategy* provided for improving salinity at Morgan through a joint works program equivalent to 80 EC. Out of this 80 EC, 30 EC was provided as salt disposal entitlements (SDEs) to offset accountable actions (implemented after 1 January 1988). In effect, under this arrangement, the partner Governments agreed to undertake salinity mitigation works to offset the 'historical legacy' of salinity on the assumption it was less than 50 EC.

To maintain Morgan salinity at 800 EC or less for 95 per cent of the time for the duration of this Strategy, the *1999 Basin Salinity Audit* found that a reduction in salinity of about 100 EC at Morgan will have to be found by new interventions over and above within-valley actions such as revegetation.

A new joint program of salt interception works, costing an estimated \$60 million, will commence immediately to deliver at least 46 EC, and potentially up to 61 EC over the first seven years. The partner Governments have agreed that joint salt interception schemes must be economic and technically certain, and all things being equal, the most economic schemes should proceed first.

The Commission will review in the first 12 months of this Strategy, the scale of the program required, and the cost-sharing and benefit allocation arrangements. Of the minimum 46 EC reduction in average salinity at Morgan, 31 EC will be allocated as 'legacy of history' offsets, and 15 EC as SDEs; however, it is highly likely that more credits will be needed to cover both the 'legacy of history' and new development.

The partner Governments have agreed to the following cost-sharing and benefit allocation principles for the new joint works:

- each State will have equal access to a limited number of SDEs but will be accountable for offsetting the effects of future developments;
- partner Governments will have equitable access to the works, first right of refusal and credits generated will be allocated according to contribution to costs;
- the Commonwealth's credits will be re-allocated to the State entries on the Commission Registers, in proportion to the 'legacy of history' affecting each State; and
- each State is to keep its contribution to the Morgan Registers in balance or in surplus.

These principles allocate salinity credits in an equitable manner that acknowledges the historic and geographical differences between the states. Salinity credits arising from the Commonwealth's contribution will be allocated to resolve state differences. In addition the Commonwealth may allocate credits to the Commission A Register to offset actions to provide environmental and social benefits (e.g., wetland flushing).

The Council will finalise cost-sharing and benefit allocation arrangements for the new joint works program by March 2002, after taking advice from the Commission's high-level inter-jurisdictional working group on salt interception schemes.

For further information contact the MDBC office on:
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www.mdbc.gov.au



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