

Salinity Inquiry
Submission No. ...SI.....

24th October 2003

The Committee Secretary
House of Representatives
Standing Committee on Science and Innovation
R1 Suite 116
Parliament House
Canberra ACT 2600



Dear Sir

**Coordination of Science to Combat Salinity Submission from the
Murray-Darling Basin Commission**

The Murray-Darling Basin Commission welcomes the opportunity to make a submission to the Inquiry into the coordination of the science to combat the Nation's salinity problem.

The Murray-Darling Basin Commission prides itself on being a leader in innovative, coordinated and evidence based salinity management over the past 15 years.

The Commission first applied a target driven approach to salinity management interventions under the Salinity and Drainage Strategy 1988-2001, through the use of a scientifically sound pollutant trading framework that balanced the needs of new development (salinity debits) with salt interception schemes (salinity credits) and delivered an improvement in River Murray salinity levels in excess of 15%.

The current Basin Salinity Management Strategy 2001-2015, retains the system of Salinity Credits and Debits and builds upon it with river Salinity and Salt Load Targets that are intended to extend this scientifically based approach to effectively manage dryland salinity in all major tributary river valleys across the entire Basin.

These strategies rely heavily on scientific knowledge and the Commission commends this inquiry to ensure that current and future investment of resources in knowledge generation and support of networks for information dissemination are scrutinised and applied in an optimal manner.

We would welcome the opportunity to address the Committee in relation to the management and coordination of salinity within the Murray-Darling Basin, in particular the role of the Commonwealth as a partner government of the Murray-Darling Basin Commission.

Yours sincerely

A handwritten signature in black ink that reads "Kevin Goss". The signature is written in a cursive, flowing style.

Kevin Goss
Acting Chief Executive

**House of Representatives
Standing Committee on Science and
Innovation**

**Inquiry into the coordination of the science
to combat the Nation's salinity problem**



**Submission by the
Murray-Darling Basin Commission
24 October 2003**



Summary

The “Inquiry into the Coordination of the Science to Combat the Nation’s Salinity Problem” by the House of Representatives Standing Committee on Science and Innovation aims to examine the role of Commonwealth Government in managing and coordinating the application of the best science in Australia’s salinity programs.

The Murray-Darling Basin Commission’s role in salinity management was first formalised in 1988 when the Murray-Darling Basin Ministerial Council (MDBMC) approved the Salinity and Drainage Strategy (S&DS). The Basin Salinity Management Strategy (BSMS) was released in 2001 and provides the framework for salinity management in the Murray-Darling Basin for the next 15 years. The BSMS retains the system of Salinity Credits and Debits and builds upon it with river Salinity and Salt Load Targets to manage Dryland Salinity across the entire Basin.

Commonwealth Government has been instrumental in the developing science and innovation on which the Murray-Darling Basin Commission continues to draw heavily. The Commission has partnered with national initiatives such as the National Dryland Salinity Program; National Land and Water Resources Audit and the Commonwealth’s Cooperative Research Centre Program e.g. Catchment Hydrology, Plant-based Management of Dryland Salinity. Each of these initiatives have contributed significantly to salinity management through broad ranging research across environmental, engineering, social and economic domains; provision of data and information; and developing predictive modelling capacity. Australia is better placed to target management interventions based on a process understanding and thereby develop and test appropriate management options.

To support of a truly integrated catchment approach to salinity management, over the next 5 to 10 years, the following activities would benefit from science coordination so that we can understand change (and uncertainty) – what and when it is needed and how to achieve:

- identify the environmental, economic and social assets at risk from degrading catchment health so that our action and investment can be prioritised and accurately targeted;
- benchmarking natural resource condition and trends in condition to inform salinity target setting;
- predicting the environmental, economic and social impacts of planned actions;
- improving methods to support monitoring and evaluation;
- monitoring and evaluating the impacts of our actions;
- embedding adaptive review mechanisms into science and program delivery; and
- actively engaging in partnerships to share our knowledge.

Australia has a great wealth of scientific knowledge on salinity and its management – the challenge lies in decision makers from on-ground to national policy to access it in a form that is appropriate and timely. The most significant contribution that Australian Government could make to improving the managing and coordinating the application of the best science in relation to Australia’s salinity programs would be, through its Programs and agreements (bilaterals etc), to develop efficient mechanisms to access this knowledge base.

Our Approach to the Inquiry

The inquiry aims to examine the role of Commonwealth Government in managing and coordinating the application of the best science in Australia's salinity programs. The inquiry's terms of reference requests that particular consideration will be given to:

- a) use of salinity science base and research data (including the development of new scientific, technical and engineering knowledge) in the management, coordination and implementation of salinity programs;*
- b) linkages between those conducting research and those implementing salinity solutions, including the coordination and dissemination of research and data across jurisdictions and agencies, and to all relevant decision makers (including catchment management bodies and land holders)*
- c) adequacy of technical and scientific support in applying salinity management options.*

Our approach to this inquiry is to outline the role of science in salinity management from a Murray-Darling Basin perspective and to highlight opportunities for Commonwealth Government to play an increased role in coordination – recognising that Commonwealth Government is a partner to the Murray-Darling Basin Initiative and plays an active role in the direction of the Commission's business.

MDBC Role and Responsibility

The MDBC is the executive arm of the Murray-Darling Basin Ministerial Council and is responsible for:

- managing the River Murray and the Menindee Lakes system of the lower Darling River, and
- advising the Ministerial Council on matters related to the use of the water, land and other environmental resources of the Murray-Darling Basin.

The Commission is an autonomous organisation equally responsible to the governments represented on the Murray Darling Basin Ministerial Council as well as to the Council itself. It is not a government department, nor a statutory body of any individual government.

The main functions of the Commission, specified in clause 17 of the Murray-Darling Basin Agreement, are:

- to advise the Ministerial Council in relation to the planning, development and management of the Basin's natural resources;
- to assist Council in developing measures for the equitable, efficient and sustainable use of the Basin's natural resources;
- to coordinate the implementation of, or where directed by Council to implement, those measures; and
- to give effect to any policy or decision of the Ministerial Council.

The Commission is also required to equitably and efficiently manage and distribute the water resources of the River Murray in accordance with the Murray-Darling Basin Agreement to obtain the highest achievable quality and efficiency of use of such resources.

The Commission therefore has a role in undertaking works and measures at the direction of the Ministerial Council, and also in coordinating the efforts of the government partners to the Murray-

Darling Basin *Initiative*. It has the mandate to initiate, support and evaluate integrated natural resources management across the Murray-Darling Basin.

The Commission comprises an independent President, two Commissioners from each Contracting Government (ie the Commonwealth, NSW, Victoria, SA and Qld) and a representative of the ACT Government.

The Commission works cooperatively with the partner governments, committees and community groups to develop and implement policies and programs aimed at the integrated management of the Murray-Darling catchment and managing and distributing the water of the River Murray in accordance with the Murray-Darling Basin Agreement. This cooperative approach reflects the importance placed on Government-community partnerships and brings to participants and end-users the benefit of shared concerns and expertise, jointly developed and integrated solutions, and avoids duplication of effort.

Salinity Management in the Murray-Darling Basin

The Commission's role in salinity management was first formalised in 1988 when the Murray-Darling Basin Ministerial Council (MDBMC) approved the Salinity and Drainage Strategy (S&DS).

From 1988 to 2001 the S&DS provided the strategic framework for the management of land and water salinisation within the whole Murray-Darling Basin. In signing on to the S&DS Strategy the signatory governments (at that time) of South Australia, Victoria, New South Wales and the Commonwealth were committing to an ambitious strategy, setting out a specific salinity reduction target against benchmark conditions which was formalised as Schedule C to the Murray-Darling Basin Agreement (MDBMC 1992).

The S&DS was a significant breakthrough in the management of natural resources in Australia, providing a framework for coordinated interstate action and community-government cooperation to manage salinity. The S&DS set out to strike an equitable balance between the competing needs of River protection and land management, through the use of engineering options (Salt Interception Schemes) and land and water management options (Community driven Salinity and Land and Water Management Plans).

Under the S&DS, the Commission's key roles (through the guidance of strategic inter-jurisdictional working groups) were to:

- Co-ordinate the investigation, construction and ongoing operation of jointly funded salt interception schemes (Salt Interception Working Group);
- Administer the accountability arrangements for the system of salinity credits and debits that operated under Schedule C of the M-DB Agreement (Salinity and Drainage Strategy Assessment Working Group);
- Co-ordinate strategic investigations and education activities to develop and disseminate new knowledge in salinity related issues (Irrigation and Dryland Issues Working Groups);
- Participate in broader forums for salinity research and development (National Dryland Salinity Program, CRC for Catchment Hydrology, CRC for Freshwater Ecology, National Land and Water Resources Audit, etc).

The S&DS successfully achieved its objectives of improving average salinity levels in the River Murray by over 15%, while allowing significant land management through the construction of groundwater pumps and irrigation drains and subsequent regional development (MDBC 2003a).

However, while the S&DS has produced measurable improvements in River Murray salinity to-date, it was recognised in the late 1990's that future risks due to dryland salinity would require a broadening of the approach to salinity management in the Murray-Darling Basin.

The Basin Salinity Management Strategy (BSMS) was released in 2001 and provides the framework for salinity management in the Murray-Darling Basin for the next 15 years. The BSMS retains the system of Salinity Credits and Debits and builds upon it with river Salinity and Salt Load Targets to manage Dryland Salinity across the entire Basin. Following the precedent of the S&DS, the rules for implementing the BSMS have also been formalised in a revised Schedule C to the Murray-Darling Basin Agreement.

The objectives of the BSMS are:

- To maintain the water quality of the shared water resources of the Murray and Darling Rivers for all beneficial uses—river salinity at Morgan, SA, will be maintained at less than 800 EC for 95% of the time
- To 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—meeting the end-of-valley salinity and salt load targets
- To control land degradation and protect important terrestrial ecosystems, productive farm land, cultural heritage and built infrastructure at agreed levels Basin-wide—expressed as within-valley targets
- To maximise net benefits from salinity control across the Basin

Under the BSMS, partner governments have committed to the following nine elements of strategic action, to be implemented over the next 15 years:

- developing capacity to implement the BSMS;
- 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 through, evaluating, and reporting.

Response to the Inquiry's Terms of Reference

Outlined below is the Murray-Darling Basin Commission (MDBC) submission for the "Inquiry into the Coordination of the Science to Combat the Nation's Salinity Problem" by the House of Representatives Standing Committee on Science and Innovation.

Use of salinity science base and research data in the management, coordination and implementation of salinity programs

Since the 1980's, the Murray-Darling Basin Commission has been heavily involved in evidence-based decision making and targeted investment in natural resource and particularly salinity management. The Commission's activities are developed and negotiated within a multi-jurisdictional framework which includes the Commonwealth. The Commonwealth is an equal

partner in supporting and directing the Commission's knowledge (science) activities that have supported the Salinity and Drainage Strategy and Basin Salinity Management Strategy.

The Salinity and Drainage Strategy (S&DS) was developed based on rigorous science and research and the Murray-Darling Basin Commission is continuing this approach under the Basin Salinity Management Strategy.

Objective and accountable - The reason why the S&DS was successful in improving River Murray salinity by over 15% is that its objectives were simple to understand, it set out a logical and scientific approach to decision making and was backed by appropriate implementation resources. Furthermore, there was strong ongoing engagement and commitment of all M-DB partner Governments with a transparent accountability framework based on monitoring and assessment of proposed actions, with all significant actions undertaken recorded on a Register of Salinity Credits and Debits.

Using common currency - By choosing a biophysical reference point of the River Murray at Morgan in South Australia, and an economic assessment framework supported by downstream salinity cost functions, all possible actions could be assessed in terms of a common currency of downstream salinity effect. Morgan was determined to be the most appropriate site for salinity comparisons as it is located just upstream of the pump offtakes for Adelaide's water supply and had a long data record.

Action based 'best bet' knowledge - Effective salinity management requires knowledge about the catchment environment, the people who live in the catchment and the economic capacity of the catchment community. It is essential to understand the available actions that can be taken to better manage the Basin's resources, however, it is not realistic to wait for "perfect knowledge". In this context it is essential to act based on the best available, "best bet" knowledge, managing risks and continually learning from the results.

The challenge for salinity managers will be to strike the appropriate balance between avoidance/prevention, mitigating the symptoms or choosing to adapt and live with salinity. Salinity processes are complex and while we must not let this complexity be a barrier to action, at the same time it is important not to oversimplify methods. The end-of-valley salinity target based approach emphasised in the BSMS gives an appropriate reference point for decisions about the most appropriate and effective management actions, and the science needed to differentiate between them.

Knowledge across geographic scales - Knowledge is required to effectively manage salinity at all scales (national, Basin, State, catchment, local and property scales). There must be strong links between the knowledge at the different scales, and in particular, how cumulative action at property scale will change the health of the catchment and the Basin. There is now a significant and growing base of knowledge about the biophysical process driving salinity and options for its management, and it is essential that future efforts build and expand on this existing knowledge base, and integrate it with knowledge about the economic and social needs and aspirations of those communities affected by salinity.

Coordinated, multi-jurisdictional approach - As the Murray-Darling Basin includes parts of New South Wales, Queensland, South Australia, Victoria and the Australian Capital Territory, a multi-lateral approach must be emphasised for management of the Basin to ensure appropriate trade-offs and optimum outcomes for all who rely on the Basin's land and water resources, rather than bi-lateral approaches that will not provide sufficient coordination for Basin-wide salinity management.

To achieve this outcome, it will be necessary to have appropriate resources applied under the direction of multi-jurisdictional working groups that also include community representation

The Commission established the Basin Salinity Management Strategy Implementation Working Group (BSMS IWG), comprising representatives of all partner governments and the Community Advisory Committee (CAC), with technical and administrative support provided by the Commission Office. The BSMS IWG is the key group responsible for implementing the Basin Salinity Management Strategy and all members of this group are active in the development and extension of knowledge in relation to the needs of the BSMS.

Contribution to science - The Murray-Darling Basin Commission does not operate in a vacuum. Commonwealth Government has been instrumental in the development of science and innovation on which the MDBC has drawn and partnered including the National Dryland Salinity Program; National Land and Water Resources Audit and the Commonwealth's Cooperative Research Centre Program eg Catchment Hydrology, Plant-based Management of Dryland Salinity. Each of these initiatives have contributed significantly to salinity management through broad ranging research across environmental, engineering, social and economic domains; provision of data and information; and developing predictive modelling capacity. Australia is better placed to target management interventions based on a process understanding and thereby can develop and test appropriate management options.

Linkages between those conducting research and those implementing salinity solutions, including the coordination and dissemination of research and data across jurisdictions and agencies, and to all relevant decision makers (including catchment management bodies and land holders)

The Basin Salinity Management Strategy requires investment in new knowledge to support the implementation of the agreed accountability framework (end-of-valley salinity and salt load targets and the Salinity Registers) by the partner governments and their catchment management bodies). Each of the partner Governments, along with pooled funding through the MDBC, will need to increase investment in these activities.

Knowledge generation – The MDBC has previously provided funds for strategic investment in knowledge generation and dissemination of information related to Natural Resource Management, including salinity. The history of successful investment in dryland salinity investigations and education by the MDBC Dryland Program since the early 1990's is available on request (refer to Supplementary Document B). The MDBC has also played a key role in the coordination of targeted funding for both the Salinity and Drainage Strategy Joint Salt Interception Program and the targeted first phase of the Commonwealth's Natural Heritage Trust through the Murray-Darling 2001 Program. In both cases targeted component funds were directed to key actions/catchments on the basis of sound science and best return on government investment.

The MDBC plays a key role in generating and distributing information related to the Basin, as well as supporting other salinity networks such as the National Dryland Salinity Program. Aside from communication material, the MDBC supports knowledge transfer through its partnerships with Government, State Agencies, Industry, Regional Organisations and Basin Communities. Partnership arrangements are implemented through inter-jurisdictional projects and working groups. Commission working groups through their multi-lateral nature provide a strong coordinating context and allow for rapid dissemination of research and data across jurisdictions and agencies.

Opportunities for coordinated science effort – To inform future salinity management, the communities of the Murray-Darling Basin require sound knowledge that is trusted by decision-

makers and resource managers, and shared in ways that can be understood by the different partners. This knowledge must be communicated through education, training, listening, forming networks, and actively seeking to engage all partners. It is essential to draw upon the wealth of information that resides in government agencies, with the Basin community, within industry, with landholders and land managers, with Indigenous people, and with special interest groups.

To support of a truly integrated catchment approach to salinity management, over the next 5 to 10 years, the following activities would benefit from science coordination so that we can understand change (and uncertainty) – what and when it is needed and how to achieve:

- identify the environmental, economic and social assets at risk from degrading catchment health so that our action and investment can be prioritised and accurately targeted;
- benchmarking natural resource condition and trends in condition to inform salinity target setting;
- predicting the environmental, economic and social impacts of planned actions;
- improving methods to support monitoring and evaluation;
- monitoring and evaluating the impacts of our actions;
- embedding adaptive review mechanisms into science and program delivery; and
- actively engaging in partnerships to share our knowledge.

Data and information management – It is essential that data, information and knowledge is safely stored, well managed, readily accessible and easily understood. Information management systems should be strengthened, particularly at catchment scale, and will be linked at all scales to promote knowledge sharing.

Commonwealth contribution and role – While State/Territory governments have the legislated responsibility for natural resources management within their boundaries, the Commonwealth has taken a greater role in recent years through the provision of 50% of funding for the National Action Plan for Salinity and Water Quality. It is thus essential that the Commonwealth Government work in partnerships across State, Territory, catchment and local government boundaries to take action to protect the health of the Basin. In partnership it will be essential to clearly define roles and responsibilities to:

- determine who will be accountable for achieving, monitoring, evaluating and reporting targets and outcomes at Basin, State and catchment scales;
- ensure that roles, responsibilities and capacities match accountabilities at each of these scales;
- clearly determine, where roles and responsibilities are shared, who will be accountable and to what extent;
- build strong institutional arrangements to manage our natural resources within this partnership;
- where necessary to undertake institutional reform including government, catchment, local and industry arrangements; and
- progressively move to managing our natural resources at a catchment scale by strengthening the institutional arrangements within catchments.

The key roles and responsibilities for the Commonwealth as agreed in the Integrated Catchment Management Policy (MDBMC 2001) include the following:

- provide leadership on matters of national interest, including international obligations;
- coordinate policies across portfolios of the Commonwealth Government;

- generate, coordinate and share knowledge;
- be involved in setting targets for priority national outcomes;
- act to achieve these outcomes using a range of government mechanisms, including providing information and investment;
- be accountable for investments and outcomes;
- ensure that Basin, State and catchment frameworks are adequate to deliver these outcomes;
- monitor progress toward achieving these outcomes;
- engage key partners; and
- review and evaluate Commonwealth Government policies, legislation and mechanisms.

Adequacy of technical and scientific support in applying salinity management options.

Future ‘no further intervention’ (legacy of history) predictions of salinity have been, and still are, key pieces of information in developing strategies within the Murray-Darling Basin to address salinity.

Predictive capacity supporting management and accountability – Under the Basin Salinity Management Strategy, there is currently significant investment by State Governments and the Commission to develop tools to better predict the likely impacts of salinity both at Morgan (the Basin Target site) and for each tributary valley. Salinity predictions will be generated for a number of scenarios including no-intervention, looking out 15, 50 and 100 years and the predicted impact of the within-valley actions proposed by each State.

The accountability framework, for example the Salinity Registers, requires an estimate of baseline conditions under the current levels of development. The process of rolling review and audits, essential to support end-of-valley targets and the program of actions to address salinity at a catchment scale, rely upon the implementation of the best scientific knowledge available. These are the key information drivers to base the implementation activities of the Basin Salinity Management Strategy.

Targets and monitoring – Additional knowledge and modelling tools are required to assist Catchment Management Authorities to meet the agreed salinity management requirements for catchment strategies and plans to deliver on End-of-Valley salinity and salt load targets, to define:

- 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 regimes for 2015, 2050 and 2100;
- agreed end-of-valley salinity and salt load targets
- assessed effects of significant in-valley actions undertaken to date, including effects of catchment management plans on end-of-valley salinity, salt load and flow regimes for 2015, 2050 and 2100.

There are specific requirements in Schedule C that specify the necessity for reviews of each tributary valley and each Salinity Register item at least once every five years. The first review to be undertaken under the requirements of Schedule C is the tri-State mallee zone and will be finalised by June 2004.

With all knowledge generation it is essential that an appropriate level of rigour is applied to ensure confidence in the validity of the science and the ability of management decisions based on it to achieve expected outcomes. To achieve this rigour the MDBC encourages and requires a high level

of peer review process to be applied to models, legacy of history reviews and estimates of accountable actions.

Supplementary Documents

- A - Salinity Update 2003, MDBC (2003a)
- B - Draft Theme Report - Dryland Reference Kit. MDBC (2003b)
- C – BSMS Implementation Working Group Terms of Reference
- D - Salinity and Drainage Strategy – Ten Years On. MDBC (1999).
- E - Basin Salinity Management Strategy 2001-2015. MDBMC (2001)
- F – Murray-Darling Basin Agreement - Schedule C. MDBMC (2002)
- G – BSMS Operational Protocols (MDBC 2003c)
- H – MDBC Projects with Science Review Component