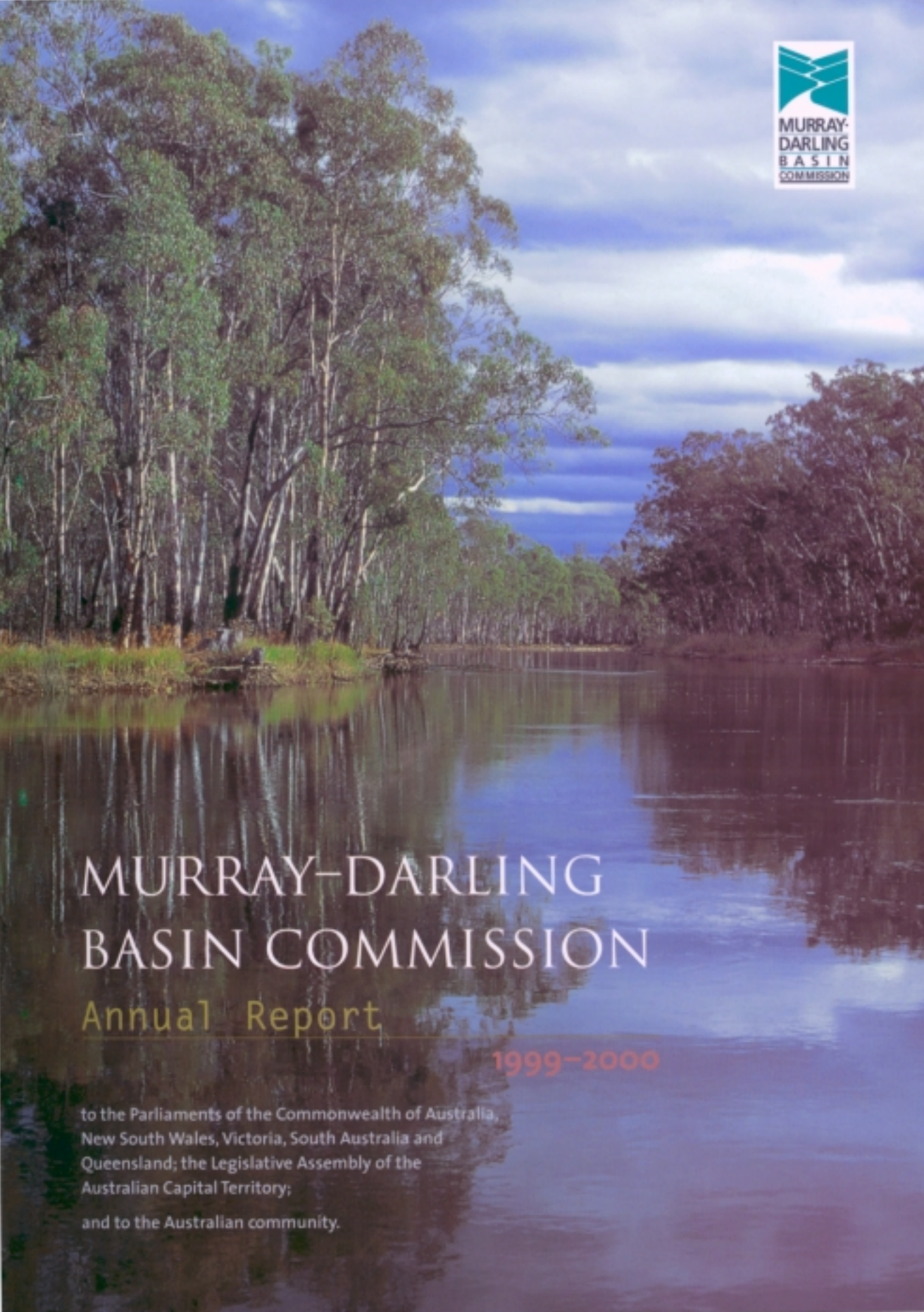

MURRAY-DARLING BASIN COMMISSION

Annual Report

1999–2000

to the Parliaments of the Commonwealth of Australia, New South Wales, Victoria, South Australia and Queensland; the Legislative Assembly of the Australian Capital Territory;

and to the Australian community.

Office of the President

MURRAY-DARLING BASIN COMMISSION

18 October 2000

The Hon Warren Truss MP
Minister for Agriculture, Fisheries and Forestry
Parliament House
CANBERRA ACT 2600

Dear Minister

In accordance with clause 84(1) of the *Murray-Darling Basin Agreement 1992*, I submit our annual report and financial statements covering the year ended 30 June 2000 for tabling before the Parliaments of the Commonwealth, New South Wales, Victoria, South Australia and Queensland, and the Legislative Assembly of the Australian Capital Territory.

I commend the 1999-2000 Annual Report to the five Parliaments and the Legislative Assembly, and I look forward to the Partner Governments continuing support of the Murray-Darling Basin *Initiative.*

Yours sincerely

ROY GREEN
President

GPO Box 409 Canberra ACT 2601 ◊ Telephone (02) 6249 6135 ◊ Facsimile (02) 6249 6139

MURRAY·
DARLING
BASIN
COMMISSION

MURRAY–DARLING BASIN COMMISSION

Annual Report

1999–2000

To the parliaments of the Commonwealth of Australia, New South Wales, Victoria, South Australia and Queensland; the Legislative Assembly of the Australian Capital Territory; and to the Australian community.

It includes the annual report of the Community Advisory Committee.

Published by the Murray-Darling Basin Commission

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ABOUT THIS REPORT

This report describes the objectives and significant achievements of the Murray-Darling Basin Commission during the 1999–2000 financial year. Through the Chairperson of the Murray-Darling Basin Ministerial Council, it is presented for tabling before the parliaments of the Commonwealth, New South Wales, Victoria, South Australia and Queensland, and the Legislative Assembly of the Australian Capital Territory.

The report is tabled in this way because the Commission was established by a legal agreement passed by each of the parliaments (the Australian Capital Territory's involvement is through a memorandum of understanding). The Commission is therefore a unique organisation, 'owned' by the six governments. It is an outcome of the intention of the partner governments to have an organisation that transcends the political boundaries between the Basin States and the Australian Capital Territory so that the far-reaching Murray-Darling river catchments may be managed as effectively as possible.

The Commission 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*. This annual report focuses primarily on those activities the Commission has carried out on behalf of the Ministerial Council in 1999–2000. Information on the 1999–2000 activities of the partners to the *Initiative* will be coordinated through the States' annual reports to the Commission and the Ministerial Council, expected to be provided by early 2001.

This annual report also incorporates the annual report of the Ministerial Council's Community Advisory Committee, the primary community body advising the Ministerial Council on natural resources management issues in the Murray-Darling Basin.

CHIEF EXECUTIVE'S OVERVIEW

The 1999–2000 year provided the opportunity to deliver on the investments made over the past 10 years to the Commission's research program and its on-ground implementation activities. Major initiatives included the release of the Salinity Audit, the completion of a Human Dimension Strategy, a review of the Cap on water diversions after five years of operation, and full activation of the 10 project boards that drive public policy development within the *Murray-Darling Basin Initiative*.

The project boards were established after a major re-engineering review of the Commission and are now functioning well. Major advances are occurring in several areas, including salinity, the Cap, human dimensions and fish management.

During the year, Dr Roy Green replaced Mr Michael Taylor who was acting as President of the Commission. Dr Green, a former Chief Executive of the CSIRO, is also Chairman of the National Land and Water Audit.

Specific issues that warrant mention include:

- The release of the Salinity Audit. This audit indicates the scale of the issues that we will confront over the next 20, 50 and 100 years as we tackle the insidious problems of salinity. Aggregating the data provided by the States to produce a complete Basin-wide picture was a major achievement. The response to the audit has been positive, with governments and affected communities considering its implications carefully and working towards a strategic response.
- The release of the Human Dimension Strategy was another milestone for the Commission. After 10 years of concentrating on the biophysical aspects of the Basin, it has been recognised that in order to bring about sustained change, we need to have coherent strategies in place to support our communities in transition.

- The Community Advisory Committee (CAC) continued to provide leadership and direction to the *Murray-Darling Basin Initiative*. Members of the committee participated in a workshop with the Commission and with the Murray-Darling Basin Ministerial Council. Major concerns for the CAC were the review of the Cap, the next generation of integrated catchment management and the Salinity Audit.
- During the year the Commission invested $11.95 million in a broad range of projects in the research, investigations and education areas needed to underpin public policy development in natural resources management and its implementation.
- The Murray-Darling 2001 project under the Natural Heritage Trust continued to support on-ground activity with a total of $76.6 million (50% from the Commonwealth and 50% from the Basin States) being invested in projects in the Basin. This program continues to be the cornerstone of our on-ground effort to sustain the Basin's natural resource base.
- The pilot interstate water trading process went into its second year and functioned successfully. Since the project began a total of 9373 megalitres has been traded permanently between the states in accordance with specific conditions to ensure environmental protection.
- Major works continued at Hume Dam to ensure its long-term safety and integrity. The program has one more year to run and is proceeding satisfactorily.
- Measures to protect cultural heritage values at Lake Victoria continued to work effectively. Lake Victoria was lowered over the winter of 1999 to enable a complete survey of the archaeological material in its bed. While important material was found, no further significant Aboriginal burials were located.
- During the 1999–2000 water year, allocations for New South Wales (but not South Australia or Victoria) were significantly restricted. This was caused by New South Wales having lower reserves than Victoria at the start of the irrigation season and continuing dry conditions through the year.
- Determination of how best to modify the navigable passes at the lower Murray locks and weirs to reduce costs and improve safety of these ageing assets continued during the year. A range of community meetings provided guidance on what might be possible. The issue of fish passage at these weirs was also considered.

- The Murray mouth was again under stress as a result of prolonged periods of low flow. The mouth did not close but a large amount of sand is now stored in the Coorong and Goolwa channels. This will require significant and extended periods of high flows to be flushed out.
- The Commission completed its draft Corporate Plan. This plan includes a set of behaviours to guide future interaction between the community, agencies and governments. The behaviours that have been identified include courage, inclusiveness, commitment, respect, flexibility, practicability and mutual obligation.
- Another major activity for the Commission has been to review its River Murray modelling environment. For the last 15 years this environment has been the heart of the *Initiative*. It has enabled us to provide predictive capacity to the Commission, and also to audit and assess water availability and salinity. Mr Andrew Close undertook a major review of contemporary river models from around the world with a view to guiding the Commission into the next generation of modelling. This will be an important part of Commission activities over the next few years.

The staff of the Commission made an impressive contribution during the year, providing support to their colleagues in the Commonwealth and States in their efforts to achieve sustainable management of the Murray-Darling Basin. They have my personal thanks and I look forward to another productive year.

D J BLACKMORE
Chief Executive
18 October 2000

1 THE *MURRAY-DARLING BASIN INITIATIVE*

The junction of the Murray and Darling rivers. Through the Murray-Darling Basin Agreement, the six governments with jurisdictions in the Basin and their agencies are working with the community to develop a balance between maintaining and developing economic productivity and environmentally sustainable natural resources management throughout the catchments of the two rivers.

The *Murray-Darling Basin Initiative* is a partnership between six governments and the community which was established to give effect to the 1992 *Murray-Darling Basin Agreement*. The purpose of the *Agreement* is:

> *...to promote and coordinate effective planning and management for the equitable, efficient and sustainable use of the water, land and other environmental resources of the Murray-Darling Basin.*

In its early years the *Initiative* focused on promoting the principles of integrated catchment management and the development of joint community and government structures. These have remained key mechanisms for working to achieve sustainable use of the Basin's natural resources. More recently, emphasis has been placed on:

- the development and implementation of strategic, large-scale integrated catchment management plans;
- concentrating resources in the areas of greatest need; and
- establishing an integrated catchment management framework that will help governments and communities better address issues such as dryland salinity over the next decade.

The *Initiative* brings together affected communities and the governments of the Commonwealth, New South Wales, Victoria, South Australia, Queensland and the Australian Capital Territory (ACT). The overall governance of the *Initiative* is shown in Figure 1 and described in the following sections.

1.1 MINISTERIAL COUNCIL

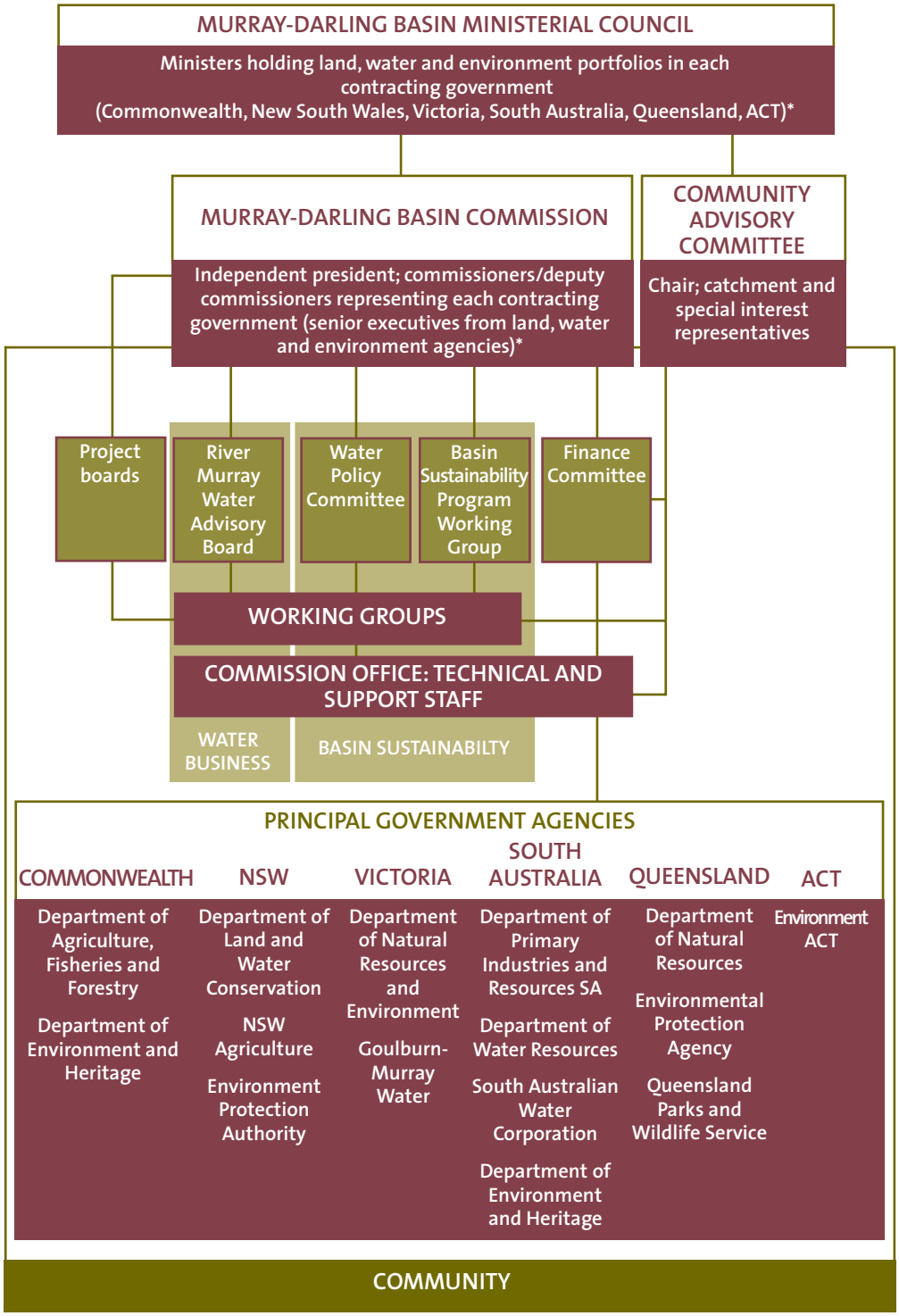
The Murray-Darling Basin Ministerial Council is the primary body responsible for providing the policy and direction needed to implement the *Murray-Darling Basin Initiative*. The Council's main functions are:

- to consider and determine major policy issues concerning the use of the Basin's land, water and other environmental resources; and
- to develop, consider and authorise (as appropriate) measures to achieve the purpose of the *Agreement*.

The Ministerial Council comprises the ministers holding land, water and environment portfolios within the governments of New South Wales, Victoria, South Australia, Queensland and the Commonwealth. Up to three ministers from each government may sit on the Council. The ACT participates in the *Initiative* via a memorandum of understanding. The memorandum allows the ACT to take part in planning and management of Basin environmental resources, but not to be involved in water management of the River Murray system. The memorandum provides for an ACT Government minister to be a non-voting member of the Ministerial Council.

Names of members of the Ministerial Council are shown in Appendix A.

Figure 1: Governance of the Murray-Darling Basin Initiative



* *Participation by the Australian Capital Territory is via a memorandum of understanding (see section 1.1).*

1.2 COMMUNITY ADVISORY COMMITTEE

The Community Advisory Committee (CAC) is an integral part of the *Initiative* and reflects the importance of the community–government partnership. At its first meeting in 1986 the Ministerial Council established the CAC to advise the Council and to provide a two-way channel of communication between the Council and the Basin community. This decision was based on the ministers' earlier recognition of the need for 'effective community participation in the resolution of the water, land and environmental problems in the Basin'.

The terms of reference of the CAC are to advise the Ministerial Council and Commission on:

- natural resources management issues referred to CAC by the Ministerial Council or Commission; and
- the views of the Basin's communities on matters identified by the CAC as being of concern.

The CAC comprises a chairperson and 26 members. Twenty-one members are state representatives chosen on a catchment or regional basis – seven from New South Wales, five from Victoria, four from South Australia, four from Queensland and one from the ACT. Additionally, there is a representative from each of four special-interest 'peak organisations', and an appointee to provide an Aboriginal perspective on natural resources management issues.

The CAC works closely with the Ministerial Council and Commission – the CAC's chairperson attends all their meetings. CAC members also actively participate in a wide range of Commission committees and working groups.

The names of the members of the Community Advisory Committee during the year are listed in Appendix B.

The Committee's contribution is discussed in detail in Chapter 2.

1.3 ROLE AND OPERATION OF THE COMMISSION

The Murray-Darling Basin Commission (MDBC) is the executive arm of the Ministerial Council and is responsible for managing the River Murray and the Menindee Lakes system of the lower Darling River, and for advising the Ministerial Council on matters related to the use of the water, land and other environmental resources of the Murray-Darling Basin.

The responsibilities of the Commission 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.

In meeting its responsibilities, the Commission has dual functions. The first is to develop a Basin-wide framework for the sustainable management of the Basin's water, land and other environmental resources. The second is to actively participate in the *Initiative* through operating the River Murray system and managing Basin-wide policy, planning and knowledge-generation activities.

The Commission comprises an independent president, two commissioners from each contracting government and a representative of the ACT Government. Apart from the president, commissioners are normally chief executives and senior executives of the agencies responsible for stewardship of land, water and the environment. The memorandum of understanding for the participation of the ACT Government (see section 1.1) provides for a non-voting 'representative' from the territory to participate in meetings of the Commission. The chairperson of the CAC also attends all Commission meetings.

Names of members of the Commission are shown in Appendix C.

Achieving an outcome of equitable, efficient and sustainable use of the Basin's environmental resources requires coordinated effort by the six governments which are partners to the *Murray-Darling Basin Agreement* and close cooperation with the Basin community. The Commission actively supports a government–community partnership and relies on it to implement effective natural resources planning and management in the Basin. This cooperative approach brings to participants and end-users the benefit of shared concerns and expertise, jointly developed and integrated solutions, and avoids duplication of effort. In November 1999 the Commission and the CAC developed a set of values (see Box 1) to underpin their partnership and all Commission activities. The Commission was due to formally adopt these values in July 2000.

Box 1: Values	
Courage:	We will take a visionary approach, provide leadership and be prepared to make difficult decisions.
Inclusiveness:	We will build relationships based on trust and sharing, considering the needs of future generations, and working together in a true partnership; we will engage all partners, ensuring that partners have the capacity to be fully engaged.
Commitment:	We will act with passion and decisiveness, taking the long-term view and aiming for stability in our decisions; we will take a Basin perspective and a non-partisan approach to managing the Basin.
Respect:	We will tolerate different views; act with integrity, openness and honesty; be fair and credible; use resources equitably; respect the environment; share knowledge and information; respect each other and acknowledge the reality of each other's situation.
Flexibility:	We will accept reform where it is needed, be willing to change and continuously improve our actions.
Practicability:	We will choose practicable, long-term outcomes, select viable solutions to achieve these outcomes, and ensure that all partners have the capacity to play their agreed part.
Mutual obligation:	We will share responsibility and accountability; we will act responsibly, with fairness and justice; we will support each other through necessary change.

Commission activities associated with natural resources management in the Basin are outlined in Chapter 3. All activities associated with managing and distributing River Murray and lower Darling River water to New South Wales, Victoria and South Australia consistent with the *Agreement* (that is, the operation of River Murray Water as a separate internal business division of the Commission) are set out in Chapter 4.

During 1999–2000 the Commission worked with its partner governments and the CAC to develop a Corporate Plan to provide a framework for its activities over the next three years. The plan, to be formally considered by the Commission in July 2000, describes outputs in four areas: water business, natural resources business, partner relations and business administration. Future annual reports will report progress toward achieving these outputs, using performance measures and milestones specified in the plan.

1.3.1 PROGRAM SUPPORT AND ADMINISTRATIVE STRUCTURES

During 1999–2000 the Commission was advised by 10 project boards, comprising commissioners or deputy commissioners, with CAC members on two of the boards. Further details of these projects are provided in sections 3.2 and 4.1. Names of members of the project boards are shown in Appendix D.

The Commission continued to be advised directly by five high-level committees in 1999–2000, as described below.

Natural resources management

1. The Water Policy Committee provided policy advice on water issues, including implementation of the Council of Australian Governments' water reform agenda, the Cap on growth in water diversions, water quantity, allocation and sharing, and interstate trading.
2. The Basin Sustainability Program Working Group provided advice on the natural resource management objectives of the Basin Sustainability Program, focusing on strategic priorities for knowledge generation and for investment in on-ground works and measures.
3. The Integrated Catchment Management Taskforce advised the Commission on approaches and priorities for integrated catchment management in the Basin over the next decade.

Water resources and assets management

4. The River Murray Water Advisory Board advised the Commission on the operation of River Murray Water, an internal business unit of the Commission. River Murray Water is responsible for directing the operation, management and renewal of River Murray Water and lower Darling system water management works and the joint salt interception schemes of the Murray. The prime function is to provide shares of water under the *Agreement*. The Advisory Committee includes representatives from four governments and an independent business expert. It is chaired by the Murray-Darling Basin Commission's president.

Finances

5. The Finance Committee advised on budgetary and other financial issues.

Following a review of its committees and project boards in late 1999, the Commission established two networks in March 2000 to provide high-level strategic advice. The Network for Water Management will provide leadership on the resolution of strategic water management issues between jurisdictions. The Network for Integrated Catchment Management will provide leadership on the development of principles, policies and strategies to progress the evolution of integrated catchment management in the Basin. Both networks will also establish and direct the work of relevant project boards or other committees and ensure their activities are integrated.

The project boards and the above five bodies were supported by 14 working groups that brought together technical and specialist expertise from agencies of the partner governments and representatives of the CAC. All committees, working groups and other bodies supporting the Commission's work are listed in Appendix E.

The Commission Office provides the technical, policy formulation, secretariat and administrative services required to administer the *Agreement* and to deliver the Commission's programs. It is responsible for coordinating the implementation of the Commission's Natural Resources Management Strategy and the Basin Sustainability Program. The Office includes River Murray Water which manages water resources and assets (see Chapter 4).

1.3.2 POLICY AND PROGRAM IMPLEMENTATION

Policies and programs of the Ministerial Council and the Commission are implemented by the Chief Executive of the Commission Office and by commissioners representing the partner governments. In 1999–2000 the Commission's programs were supported by funds from the contracting governments in proportions approved by the Ministerial Council, as shown in Table 8 (section 5.1). Funds are allocated to states for agreed *Initiative* programs in accordance with estimates approved by the Ministerial Council.

Natural resources management and administration

The Commission has delegated to the Chief Executive those expenditure, employment and contracting powers necessary to operate the Commission Office. Commissioners representing the partner governments have delegated powers from the Commission to approve expenditure of designated funds consistent with the *Murray-Darling Basin Agreement*.

The 1999–2000 budget allocations for the sustainable management of the Basin's natural resources and administration and other support are shown in Figure 2.

Figure 2: Natural resources management and administration 1999–2000 budget allocations

	$'000
NATURAL RESOURCES MANAGEMENT	
Strategic program development	7 003
Strategic investigations and education	8 450
Investigations and construction	1 270
COMMUNICATIONS AND COMMUNITY PARTICIPATION	503
ADMINISTRATION AND SUPPORT	4110
Total	21 336

Water resources and asset management (River Murray Water)

The Commission has delegated to the General Manager, River Murray Water, appropriate powers for water management and asset management functions assigned to River Murray Water under its operating authority. In exercising the delegated powers, the General Manager must consult with the River Murray Water Advisory Board particularly in relation to policy matters.

The 1999–2000 budget allocations for water business are shown in Figure 3.

Figure 3: River Murray Water 1999 – 2000 budget allocations

	$'000
Recurrent expenditure	
Water storage and supply	14 192
Salinity mitigation	2 493
Navigation	958
Recreation, tourism and other	523
Investigations and construction	17 613
Total	35 779

2 REPORT OF THE COMMUNITY ADVISORY COMMITTEE 1999–2000

A community group inspecting a revegetation project. The Community Advisory Committee provides advice to the Commission and the Ministerial Council regarding community perspectives and the development of an effective partnership between the community and governments. During the year the committee played a major role in the preparation of the Integrated Catchment Management Policy Statement (to be submitted to the Ministerial Council in August 2000).

The Murray-Darling Basin Community Advisory Committee is the peak community body advising the Murray-Darling Basin Ministerial Council and Commission on issues related to the sustainable management of the Basin's natural resources.

The Community Advisory Committee (CAC) met on five occasions during the year: at three formal meetings, a joint CAC–MDBC workshop and a joint meeting with the Ministerial Council.

The CAC's chairperson attended all Ministerial Council and Commission meetings during the year, and CAC members participated in meetings and workshops of many other Commission committees. During 1999–2000, the CAC focused on key strategic issues agreed in its work plan, and made significant contributions to both policies and programs.

2.1 PARTICIPATION

Joint CAC–MDBC workshop

Following a successful workshop in 1998, the CAC and the Murray-Darling Basin Commission held a second workshop in November 1999 which focused on:

- identifying the core values that underpin how the *Initiative* must operate; and
- articulating the resultant necessary behaviours.

The workshop considered how to move forward in integrated catchment management and, in this context, the implications of applying the values to behaviours, roles, responsibilities and relationships.

The CAC values these joint meeting opportunities to develop respect and trust between community and government. The agreed values and behaviours are now being used as a practical outcome of the workshop, and will need continued focus to ensure they are applied. The values are courage, inclusiveness, commitment, respect, honesty, flexibility, practicability and mutual obligation.

Joint CAC–Ministerial Council meeting

In March 2000 the first joint meeting of the Community Advisory Committee and the Ministerial Council was held. This meeting provided an opportunity to develop the relationship between the CAC and the Ministerial Council at a time of considerable change in the practice of natural resource management in the Basin. After hearing four perspectives from around the Basin (upland, irrigation, downstream and the environment), ministers and CAC members discussed the following issues:

- the impediments to taking an integrated Basin-wide approach rather than a parochial view;
- the impediments to using precise targets and monitoring rather than acts of faith to manage landscapes;

- investment in human and financial resources to achieve outcomes;
- long-term investment and commitment; and
- roles or responsibilities in governance and partnerships.

The ministers agreed that the opportunity of an annual joint meeting should be pursued.

Murray-Darling Basin Commission processes

CAC members provided advice from a community perspective at Commission forums, committees and working groups throughout the year. The CAC expanded its participation in Commission processes through the inclusion of representatives on steering committees and taskforces established as part of Commission projects, including for the Basin Salinity Strategy, Environmental Flows and Water Quality. The CAC now has three representatives on the Basin Salinity Strategy Taskforce, indicating the importance of this issue to the community, and ensuring a community perspective in the development of the strategy.

The Basin Sustainability Program Working Group now includes one CAC representative who provided input to:

- cross-sectoral issues;
- the continued development of the catchment-based approach for integrated action plans;
- development of three-year rolling plans as the investment basis for the Basin; and
- the Strategic Investigations and Education Program to support on-ground needs.

CAC members also actively participated in the Dryland, Irrigation, Riverine and Communication and Human Dimension Issues Working Groups.

Strategic Investigations and Education Program annual forum

In August 1999, 12 CAC members attended a forum about the Commission's Strategic Investigations and Education Program. The CAC supports this knowledge-generation role, particularly with its focus on on-ground community needs. The successful dissemination and adoption of Strategic Investigations and Education Program outcomes, and recognition of the need for community participation in the development and conduct of individual projects, remain a focus for the CAC. A comprehensive report

providing feedback on the merits, or otherwise, of the current projects was prepared from an end-user perspective (that is, the community). The most significant project in the CAC's view was the Riverine Management and Rehabilitation Scoping Study. Other highly rated projects were:

- Transfer and Adoption of Best Management Practice (Irrigation);
- Structural Adjustment in Irrigated Broad-Acre Farming;
- Managing Total Grazing Pressure in the Mulga-Lands;
- Management of Key Native Grasses; and
- Communicating over the Catchment – Interactive Satellite Student Conversation Conferences.

2.2 STRATEGIC ISSUES

The CAC's work plan addresses four key strategic issues: the human dimension (which includes the vision for sustainable integrated catchment management); basin salinity management (including the review of the Salinity and Drainage Strategy); management of the Cap on diversions; and ongoing implementation of the Basin Sustainability Program. Other issues identified in the work plan are floodplain management, including cross-border issues, and operational issues such as CAC involvement in the development and review of various Commission strategies, and involvement in appropriate Commission working groups. Further detail on these issues follow.

The human dimension

Two CAC members participated on the board for the Human Dimension Project (formerly known as the *Initiative* Operating Environment Project). Other members were also involved in the development of the Human Dimension Strategy which was approved by the Commission in November 1999 (see section 3.2.2). The Committee continued to advise the Ministerial Council on the importance to the *Initiative* of this strategy.

In response to a request from the CAC chairperson, each of the Basin states agreed to sponsor a CAC member to participate in the international landcare conference, 'Society and Resource Management', held in Melbourne in March. This was a unique and valuable opportunity for the CAC to focus on effective long-term solutions to resource management

issues at an interdisciplinary forum. The CAC would like to record its appreciation to the New South Wales Department of Land and Water Conservation, the Victorian Department of Natural Resources and Environment, the then South Australian Department for Environment, Heritage and Aboriginal Affairs, and the Queensland Department of Natural Resources for their support.

Integrated catchment management

The CAC was intensively involved in the development of a new framework for integrated catchment management in the Basin over the next decade (see section 3.2.1). It has identified two significant issues which it considers need to be recognised: the involvement of local government in natural resource management as the third tier of government and with statutory responsibility for land use planning; and the inclusion of terrestrial biodiversity as a Basin priority, given the inter-jurisdictional requirements for effective land and water management.

Basin salinity management

In August 1999 the CAC convened a basin salinity management workshop to better understand dryland salinity. Presentations covered:

- the scale of the salinity hazard for the Murray-Darling Basin;
- the scale of revegetation required to address dryland salinity;
- modelling the impact of farming systems on dryland salinity;
- tools and technology, such as satellite imagery, to monitor salt trends; and
- the scope for airborne geophysics in measuring salt hazard.

The workshop considered the costs of resource degradation to agriculture and biodiversity and the costs of dryland salinity; why banks need to be involved in management; and economic and institutional arrangements for managing dryland salinity. The CAC then focused on three issues:

- how the Commission can better use its tools and techniques to help communities plan and make decisions at the Basin and catchment level;
- the key cost issues to consider in developing options for salinity management; and
- options for salinity management.

This workshop enhanced the CAC's understanding of the salinity hazard, and enabled effective participation of CAC members in the Basin Salinity Strategy Taskforce during the development of options and a salinity management strategy.

The CAC recognises that land retirement is a difficult issue. Nevertheless, it has advised the Ministerial Council that land retirement and ongoing stewardship need to be given serious consideration by governments and communities. In addition, long-term management needs to address specific gains and objectives.

Management of the Cap on diversion of water from the Basin's rivers

The CAC, via its catchment and special interest representatives, invited community response to the Ministerial Council's review of the operation of the Cap and Schedule F of the *Agreement*. The CAC provided a comprehensive submission to the review across all topics on which feedback was sought (see section 3.2.4). The CAC was then given the opportunity of commenting on the draft Overview Report before it was presented to the Ministerial Council, and made some significant suggestions.

Implementation of the Basin Sustainability Program

The community, through its Catchment Committees, continued to play an integral role in the preparation of the community–state three-year rolling plans which enabled the preparation of a Basin Investment Plan for 1999–2000 to 2001–2002 (see section 3.3.2). The Commission provided resources during the year to assist Catchment Committees in the preparation of input for the three-year rolling plans; this was recognised as invaluable by the CAC and the Catchment Committees.

The CAC continued its consideration of issues relevant to delivery of the Irrigation, Dryland and Riverine Sub-Programs of the Basin Sustainability Program. In relation to the Irrigation Sub-Program, the CAC advised the Ministerial Council of its concerns about the availability of information to measure performance, the status of planning for best practice in irrigation drainage design and construction, and the adequacy of drainage water quality monitoring programs. In response to this advice, the Commission is collaborating in a joint project considering broader water quality management frameworks at a state and regional level; water quality and flow monitoring arrangements related to surface drainage and the

management responses to that monitoring; and surface drainage activity in New South Wales.

The CAC supported the Commission's new targeted approach for Murray-Darling 2001 funding (see section 3.4), but expressed concern at the start of the application period about transparency of process, adequacy of community involvement, and data and information for decisions on targeted priorities. CAC members were involved in meetings of the Basin Sustainability Program Working Group where individual projects were assessed.

Snowy Scheme developments and environmental flows

Proposed changes to water release rules, which would result from corporatisation of the Snowy Scheme, have the potential to impact on the Basin and were thus of concern to the CAC. It advised the Ministerial Council that this issue has the potential to divide communities and is very important to Murray-Darling Basin communities, particularly in the Murray, Murrumbidgee, and lower Darling catchments. The CAC is uncertain whether the water savings being advocated are achievable and believes that other options may need to be considered. The CAC also advised the Ministerial Council that increased environmental flows to the Snowy River should not jeopardise the integrity of the Murray-Darling Basin Cap and existing environmental flow arrangements in the Basin.

Two CAC members, including the chairperson, are representing the interests of the community on the Environmental Flows Project Board.

Cultural heritage

In September 1999 the Ministerial Council approved changes to the Basin Sustainability Program, including a new key result area for cultural heritage. It also agreed on a new objective regarding Aboriginal involvement. This followed earlier CAC advice to the Council on the importance of Indigenous communities in the Basin being a part of the *Initiative*. In March 2000 the Ministerial Council agreed that the Indigenous Land Corporation would be invited to be the peak special-interest group responsible for nominating an Aboriginal representative to the CAC. As the CAC has not had the benefit of an Aboriginal member during most of 1999–2000, it has not been able to progress consideration of issues relating to Aboriginal involvement in natural resource management. The CAC did, however, reiterate to the Ministerial Council the importance of Aboriginal representation on catchment committees.

National Natural Resource Management Policy Statement

The CAC provided advice on the proposed directions and approaches of the National Natural Resource Management Policy Statement and processes for public consultation. The document, *Managing Natural Resources in Rural Australia for a Sustainable Future*, was released for comment in December 1999. Catchment Committees were recognised as priority targets for consultation on the draft document. Many members of the CAC, plus the CAC itself, made submissions to the Commonwealth on the paper.

2.3 COMMUNICATION

Newscan

The CAC continued preparation and distribution of its weekly press clipping service, *Newscan*, which provides wide-ranging perspectives on natural resource management issues across the Basin.

Curlew

Three editions of the CAC's newsletter, *Curlew,* were produced and distributed widely throughout the Basin. Each edition varied in its content between:

- issues relevant to the various catchments in the Basin;
- Commission programs and recent publications; and
- information on Committee members so the community is aware of its representatives.

Internet

The CAC has a page on the Commission's web site, and an increasing number of CAC members have internet connections which provide a valuable and rapid method of communication.

3 NATURAL RESOURCES MANAGEMENT

The Murray-Darling Basin Salinity Audit, released in October 1999, predicted that in the coming decades extensive salinisation of areas cleared for dryland farming during the last 150 years would occur. This salinisation will have serious consequences for agricultural productivity, built infrastructure, the environment and river water quality. Preparation of a Salinity Management Strategy (for submission to the Ministerial Council in August 2000) to respond to the challenge was a major activity during the year.

The task of the Commission is to implement the *Murray-Darling Basin Agreement*. The primary objective of the *Agreement* is:

> *...to foster joint action to achieve the sustainable use of water, land and other environmental resources of the Basin for the national benefit of present and future generations.*

The Natural Resources Management Strategy, endorsed by the Ministerial Council in 1990, established the community–government partnership and an integrated catchment management approach as

the foundations for natural resources management in the Basin. The Natural Resources Management Strategy provided the strategic framework for the 1990s. During this period the Commission developed strategies for the integrated management of the Basin's natural resources on a catchment basis.

The Commission and the Community Advisory Committee (CAC) acknowledge that the challenge for the next decade is to direct the evolution of integrated catchment management and the community–government partnership in a way that facilitates sustainable management of natural resources and the development of viable regional communities throughout the Basin.

3.1 VISION FOR THE BASIN

During 1999–2000 the Murray-Darling Basin Commission has focused on developing the next stage of the *Murray-Darling Basin Initiative*. A primary focal point of its work has been the development of a policy on integrated catchment management. It has concentrated on major policy objectives agreed upon by the Ministerial Council that gave key strategic directions for integrated catchment management, most notably Basin-wide salinity control and sustainable rivers management. These have been prepared in parallel with strategies for communication and the human dimension, including cultural change to strengthen community–government partnerships, and a proposed strategy for native fish management.

Consequently, the *Initiative* is now set for a new decade of policy achievement. Significantly, under the proposed Integrated Catchment Management Policy, natural resource management in the Basin will be consistent with the principles laid down under the draft national framework released by the Commonwealth in December 1999.

Throughout the year the Commission worked closely with the CAC in developing the Integrated Catchment Management Policy and other policies and strategies for consideration by the Ministerial Council.

The new Integrated Catchment Management Policy will augment and interpret the Natural Resources Management Strategy that has provided the high level philosophical framework for policy and implementation over the past decade. The Integrated Catchment Management Policy will

support the continuing evolution of catchment management arrangements for the Murray-Darling River valleys, as well as the Basin as a whole, and, for the first time, proposes the principle of catchment targets and accountability arrangements to set a floor for catchment health. It will take account of water quantity and quality concerns and promote the long-term protection of the Basin's riverine and terrestrial environments.

The Basin Salinity Management Strategy has been developed in response to a Basin-wide Salinity Audit. Developed so as to be consistent with the Integrated Catchment Management Statement, the Salinity Management Strategy proposes to implement:

- the principle of water quality targets for the Basin's tributary rivers;
- accountability arrangements for offsetting current actions likely to lead to further salinity; and
- measures to more effectively counter past salinity.

The Salinity Management Strategy will direct tangible implementation of integrated catchment management. It targets irrigation and dryland salinity and supports the broader integrated catchment management process at state and regional levels.

During 1999–2000, a review of the operations of the Cap on water diversions after five years of implementation was conducted and released in draft form for public comment. This was in accordance with the original decision of Council made at the time of the introduction of the Cap. While the draft review found that the Cap was an important initiative to protect the longer-term security of consumptive use of water, it also concluded that its current level, set valley by valley, is not necessarily the right level required to ensure the sustainability of the Basin's riverine environments. As a consequence, the Council agreed to the conceptual development of a Sustainable Rivers Audit to support and better inform the further development of an improved balance between consumptive use and the protection of river environments, and to provide a basic framework for river health monitoring into the future. This will be done with the best science available combined with thorough community evaluation.

While developing these initiatives during the year, the CAC and the Commission forged closer working relationships. In late 1999 they held a joint workshop to reach a common understanding of the values needed in the new statement on integrated catchment management. In addition, the

CAC provided increased levels of representation on the various project boards and taskforces advancing the major policy initiatives. It also conducted its own workshops to provide direct advice about these policy developments. The result has been a significant strengthening in understanding and communication between the Commission and the CAC.

3.2 MAJOR ACTIVITIES CONTRIBUTING TO THE *INITIATIVE*

Ten high-level project boards operated during the year. Their task was to provide direction for strategic projects (see Box 2) and ensure that their outcomes addressed the key natural resource management issues in the Basin in an integrated way.

Box 2: Commission projects during 1999–2000

- Basin Salinity Management Strategy
- Communication Strategy
- Environmental Flow Management and Water Quality Objectives for the River Murray
- Floodplain Management
- Human Dimension Strategy
- Lake Victoria Cultural Heritage
- Mitta Mitta Ex Gratia Payments
- Monitoring and Evaluation Strategy
- Murray-Darling Basin Fish Management
- Pilot Interstate Water Trading
- Review of the Operation of the Cap

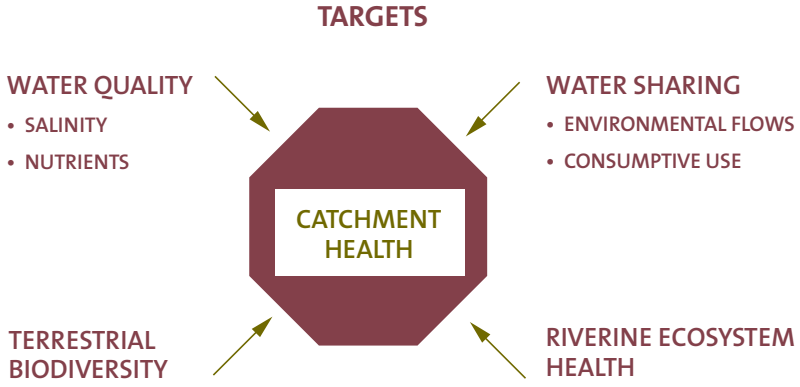
Progress achieved on these and other projects during the year is outlined below. Two projects associated with water resource management (Lake Victoria and Mitta Mitta) are described in Chapter 4.

3.2.1 THE INTEGRATED CATCHMENT MANAGEMENT POLICY FOR 2001–2010

The proposed Integrated Catchment Management Policy (see Box 3) was developed during the year by a taskforce with representatives from the partner governments and the CAC, and included workshopping some material with a larger group of CAC members. The Commission will consider the draft Integrated Catchment Management Policy in July prior to its submission to the Ministerial Council in August 2000 for subsequent public release and three months of public consultation and receipt of submissions.

The policy is consistent with the policy directions of the Commonwealth's discussion paper *Managing Natural Resources in Rural Australia for a Sustainable Future*. It is also intended to be compatible with policy directions arising from Council of Australian Governments' consideration of natural resources management that is currently under way. Many of the components of the proposed Integrated Catchment Management Policy also address the recommendations of the mid-term review of the Natural Heritage Trust. Once agreed, the Integrated Catchment Management Policy will set the directions for more detailed Commission strategies to address

Figure 4: Targets proposed for catchment health in the new integrated catchment management framework



each of the four proposed priorities (see Box 3). The Basin Salinity Management Strategy (see section 3.2.6) will be the first Basin-wide strategy developed within the context of the new integrated catchment management framework.

Box 3: A new Integrated Catchment Management Policy for the next decade

During the last 10 years significant advances have been made in tackling the resources management issues facing the Basin and in establishing institutional arrangements to manage the natural resources at catchment scale. However, with rising salinity levels in the Basin's rivers and a number of other concerns affecting the Basin's catchments, the pace of these advances now needs to be accelerated.

In response to these concerns, the draft Integrated Catchment Management Policy will propose a new approach to managing the natural resources of the Basin. It proposes a 'floor' under catchment health thereby protecting key values by defining a level of health that must be maintained. With this approach, appropriate targets and timeframes would be set at Basin, catchment, sub-catchment and farm scales. Work in catchments to plan, implement and evaluate natural resources management would be given greater support, and stronger links will be made between catchment planning and land use planning. Accountability and reporting requirements would be determined at each scale to help drive meaningful and positive change.

It is hoped the system of targets would send clear messages about the limits of resource capacity. This would help to define sensible options for balancing economic, environmental and social aspirations. It is envisaged that the proposed framework will take about 10 years to build, requiring substantial government, community and industry commitment. If approved, this approach will significantly test the capacities and determination of these

groups to manage the natural resource base for the benefit of both present and future generations.

Draft priorities proposed for target-setting (see Figure 4) include:

- water quality (salinity and nutrients);
- water sharing (including consumptive and in-stream requirements);
- riverine ecosystem health; and
- terrestrial biodiversity.

The level of targets would be based on the nature and requirements of the assets that stakeholders agree should be protected. These include:

- environmental assets, such as wetlands, fish, birds, native vegetation;
- economic assets, such as drinking water, productive land, built infrastructure, water for irrigation and stock, tourist destinations; and
- social assets, such as rural communities, cultural sites, recreational areas.

Under the proposed Integrated Catchment Management Policy, targets for each priority area outcome would be set for each catchment, and will be integrated to help signal the condition of catchment health. This integration will be essential for ensuring that land and river managers do more than simply meet agreed targets. It is only by looking at the overall picture that all the interacting issues can be taken into account so that catchment health is effectively protected.

3.2.2 HUMAN DIMENSION STRATEGY

Since November 1999, joint CAC–Commission workshops have acted as a catalyst for exploring the significance of the 'human dimension' of natural resource management. This dimension (identified as the social, institutional, economic and cultural contexts of natural resource management) has historically been neglected. There is a growing recognition that human relationships – whether they be social, institutional, economic or cultural – are complex and, more importantly, fundamental to the success or failure of sustainable natural resource management.

The Human Dimension Strategy, developed through a project board with the assistance of an expert reference panel and the Communication and Human Dimension Issues Working Group, was endorsed by the Commission in November 1999. The development of the strategy signals the potential for significant changes in the activities and operations of the *Murray-Darling Basin Initiative*. The intent of the strategy is to maximise the potential of the *Initiative* to utilise social and institutional inquiry. At the same time, it needs to encourage the development of an *Initiative* management approach that is responsive to all aspects of social, cultural, economic and institutional matters that are relevant to the ecologically sustainable development and management of the Murray-Darling Basin. The strategy proposes the need for wide-ranging cultural change within the *Initiative* to maximise the potential of the Commission's partnerships.

An implementation plan for the Human Dimension Strategy was developed in the first half of 2000 and will be considered by the Commission in July 2000. The plan focuses on ways to achieve organisational change through integrating the values and behaviours for *Initiative* activities agreed by the CAC and Commission in November 1999 into policies and programs and the everyday work experiences, decision-making and meeting processes of the *Initiative*. The plan focuses on four key areas:

- knowledge generation, dissemination and adoption;
- institutional development;
- strategic engagement; and
- building natural resource management sectoral capacity.

The activities proposed under the plan focus on the need for change and the recognition that new ways of undertaking *Initiative* business are required to address issues now facing the Basin, including dryland salinity. A new Human Dimension Group, comprising representatives of the Commission, Commission Office and the CAC, is proposed to take over from the project board to facilitate the change process.

3.2.3 INITIATIVE COMMUNICATION STRATEGY

The Initiative Communication Strategy 2000–2002 was completed and approved by the Commission in November 1999. The strategy provides an overall framework for all current and future *Initiative* communication activities. It was based on extensive consultation with the Basin community and direct input from the CAC and partner governments through the Communication and Human Dimension Issues Working Group. The strategy emphasises the need to:

- recognise the role of communication in achieving the objectives of the *Initiative*;
- identify and foster strategic partnerships; and
- build on existing communications networks.

This is the first time that a comprehensive and agreed framework for the communication activities of all partners in the *Initiative* has been prepared.

In November 1999 the Commission approved a detailed guide, based on the Initiative Communication Strategy, for preparing a communication plan to help provide a common approach to communication activities by *Initiative* partners. An overview of the communication needs of the partners as identified through the consultation process was also prepared and made publicly available. Both the guide and the summary of the consultation are being utilised by *Initiative* partners and by other natural resource managers within and outside the Basin.

In March 2000 the Commission approved an evaluation plan for the strategy and a three-year implementation plan. The latter will be used by the Commission Office for its communication activities under the strategy. Implementation commenced in early 2000. Initial activities included workshops with government partners to 'map' their communication programs and networks, and to promote use of the strategy and guide.

With the completion of the *Initiative* Communication Strategy, the evaluation plan and the implementation plan, the Commission closed the project in March 2000. Responsibility for monitoring the implementation of the strategy and for evaluating its effectiveness, was given to the Communication and Human Dimension Issues Working Group.

3.2.4 THE CAP

In 1995 the Ministerial Council decided to cap water diversions in the Murray-Darling Basin (see Box 4). This decision, now called 'the Cap', is one of Council's most important initiatives.

Box 4: What is the Cap?

'The Cap' is the balance struck by the Ministerial Council between the significant economic and social benefits that have been obtained from the development of the Basin's water resources on the one hand, and the environmental uses of water in the rivers on the other. In most of the Basin, the Cap will limit future water use to the volume of water that would have been diverted under 1993–94 levels of development. This does not mean the volume of water that was used in 1993–94. Rather, the Cap in any year is the volume of water that would have been used with the infrastructure (pumps, dams, channels, areas developed for irrigation, management rules and so on) that existed in 1993–94, assuming similar climatic and hydrologic conditions to those experienced in the year in question. Thus, the Cap provides scope for greater water use in certain years and lower use in other years.

The Cap itself does not attempt to reduce Basin diversions, merely prevent them from increasing. New developments are possible under the Cap provided that the water for them is obtained by improving water-use efficiency or by purchasing water from existing developments.

By limiting future growth in consumptive water use, the Cap promotes the sustainable use of the Basin's resources by:

- preserving the existing security of supply for river valleys;

- helping maintain water quality;
- encouraging efficient use of water which reduces waterlogging and land salinisation; and
- preventing further deterioration of the flow regime for the environment.

The key tasks in each state for implementing the Cap are:

- defining and monitoring all diversions;
- detailing the Cap development conditions in each river valley;
- developing and calibrating the computer models which will be used to calculate the Cap target in each river valley at the end of each season;
- obtaining Commission endorsement that the calibrated river valley models are fair and accurate representations of the approved Cap;
- streamlining the processes for collecting and collating diversion data and producing annual reports; and
- adjusting water allocation rules to ensure that diversions stay within the Cap in all designated river valleys.

In November 1999, the Independent Audit Group reported on their annual review of Cap implementation over the 1998–99 period. The group concluded that, for South Australia, diversions were within the Cap and, for Victoria, diversions were within acceptable bounds for Cap management. For the ACT, diversions were well below the options being considered for an ACT Cap.

In Queensland the Independent Audit Group concluded that there had been further significant growth in on-farm storages and in the water diverted into those storages, and that urgent action should be taken to establish a regulatory environment that would enable Cap implementation, including appropriate controls over floodplain water harvesting.

In New South Wales the group concluded that diversions were within acceptable bounds for Cap management throughout New South Wales except for those in the Barwon-Darling and the Lachlan, which exceeded long-term Cap estimates. It recommended that New South Wales should report on the underlying reasons for excessive diversions on the Lachlan and Barwon-Darling, including management actions proposed to bring diversions within Cap limits. As a result of these findings, a supplementary audit was performed on these valleys for the first time in February 2000 to address the audit group's recommendation.

From this audit it was concluded that for 1998–1999, diversions in the Barwon-Darling valley were clearly in breach of the Cap. It was decided that New South Wales should report to the Ministerial Council (at its next scheduled meeting in August 2000) on measures proposed to bring diversions from these rivers within Cap limits. The additional information provided by New South Wales for the supplementary audit indicated that the Lachlan Valley was *not* in breach of the Cap.

Queensland and ACT Cap proposals

In 1999–2000, substantive progress was made in the development of Cap arrangements in both Queensland and the ACT. In May and June 2000, Queensland's draft water resource plans for the Condamine-Balonne, Moonie-Warrego and Paroo-Nebine catchments were released. The public consultation process on these draft plans and their subsequent finalisation will allow the details of Cap arrangements in these valleys to be determined.

In an important development for the border rivers system, the Queensland and New South Wales governments decided in November 1999 not to support increases in water use in the border rivers that will cause further deterioration in the flow regime at Mungindi. The two governments also decided not to allow further growth in diversions in the regulated sections of the system. Using this decision as a guide, the Queensland Border Rivers Flow Management Plan is expected to be finalised by July 2001.

The ACT submitted its proposal for a Cap to the Commission in May 2000. This proposal, and the Independent Audit Group's assessment of the proposal, will form the basis of further negotiations in 2000–01 to achieve an ACT Cap acceptable to all jurisdictions.

During the year a review of the operation of the Cap on diversions from the Basin's rivers was undertaken and distributed for public comment. The review considered the Cap in relation to the ecological sustainability of rivers, economic and social impacts, equity and implementation and compliance.

Review of the operation of the Cap

As part of the decision by the Ministerial Council to introduce a permanent Basin-wide Cap on diversions, a major review of the operation of the Cap was scheduled for 2000. This review has been a central feature of Cap implementation in 1999 and 2000 and is intended to improve Cap implementation across the Basin.

The review of the operation of the Cap had four components:

- ecological sustainability of rivers;
- economic and social impacts;
- equity; and
- implementation and compliance.

For each component, the Cap Project Board commissioned a specific report designed to inform the review process. Building upon this knowledge, the board developed a Draft Overview Report which was released in April 2000 by the Ministerial Council for a period of public comment ending on 10 July 2000. The Draft Overview Report will be modified to reflect

comments received in this process and a final report on the review will be presented to the Council in August 2000.

The review did not consider whether or not a Cap was needed. Its brief was to assess the operation of the Cap and examine ways in which it could be further refined to meet the needs of communities within the Basin. The decision to undertake the review of Cap operation emphasises the Ministerial Council's commitment to the Cap. However, it was the view of the Council that a major policy initiative such as the Cap cannot be implemented without a comprehensive review to address any matters that may not have been resolved in the initial phase of implementation.

Sustainable Rivers Audit

When the Cap on water diversions was initially introduced, the Ministerial Council agreed that a balance needed to be struck between consumptive and instream uses of water in the Basin. The review of the operation of the Cap highlighted the need to provide objective advice to the community on whether the current flow regimes are a reasonable balance between consumptive use and those flows necessary to maintain and sustain riverine environments.

As an initial response to the findings of the draft review of the operation of the Cap, the Ministerial Council decided to investigate the benefits of conducting a regular Sustainable Rivers Audit. Such an audit will help monitor the environmental health of the Basin's rivers and provide more information to the community on the location and extent of degradation. The proposed Sustainable Rivers Audit is set to become an important feature of the Commission's activities in future years. The Commission will consider the outline of the Sustainable Rivers Audit at its meeting in July 2000.

3.2.5 ENVIRONMENTAL FLOWS AND WATER QUALITY FOR THE RIVER MURRAY

The Commission recognises the urgent need to improve the environmental condition of the Basin's river systems. A number of policies it has implemented in recent years are designed to achieve this goal. These include:

- the Salinity and Drainage Strategy;
- the Cap on further increases to water diversions;
- the annual entitlement of 100 gigalitres to the Barmah-Millewa forest;
- construction and upgrading of fish lifts on a number of major structures;
- changes to river and storage operations procedures; and
- substantial investment in research to assist river managers achieve better environmental outcomes.

However, the Commission has recognised that these measures do not go far enough. In 1998 it established a project board to develop a comprehensive Environmental Flows Management Plan for the River Murray which will be submitted to the Ministerial Council in 2002. The project board is being assisted by a technical working group that met twice during the year.

As part of its brief, the Environmental Flows Project Board initiated the development of water quality objectives and flow strategies for the Murray. These activities will help identify the trade-offs needed to balance the flow requirements that will protect the Basin's riverine systems as sustainable ecological systems, against the costs that come from satisfying the economic, social and recreational benefits derived from over a century of development.

The Commission is required to manage the Basin's rivers in a way that protects a wide range of needs and interests, including those of agricultural users, industry, tourism and recreational activities, human consumers, cultural significance and the environment. It also recognises that groundwater contributions to streams through base flow can have significant impacts on stream water quality and quantity. In order to provide the knowledge base needed to manage these interests in a way

that gives the best possible environmental outcomes, the Commission released two publications in June 2000: *Report of the River Murray Scientific Panel on Environmental Flows*, and *River Murray Barrages Environmental Flows*.

These reports were commissioned in 1997 from two independent scientific panels to identify changes in river operations for the Murray and lower Darling that would result in general improvements in the environment of these rivers. The first report took account of the geomorphology, riparian vegetation, macrophytes, invertebrates, floodplain ecology, fish habitat, algae and hydrology at specific sites along the length of the Murray, from the Mitta Mitta River above Dartmouth Dam to Murray Bridge in South Australia. The second report examined the operation of the barrages and considered their impact on the environment of the Coorong and lower Murray lakes.

The project board is considering the reports in combination with other research to prepare an initial set of options for improved environmental flows that can be implemented rapidly with minimal impact on existing river users. The options, to be submitted to the Ministerial Council in early 2001, will be a precursor to the overall Environmental Flows Strategy for the Murray.

In August 1999 the *Report on the Impact of the Barmah-Millewa Flood of October 1998 and the First Use of the Barmah-Millewa Forest Allocation* was submitted to the Barmah-Millewa Forum. This report examined the impacts of the 1998 flood of the forest from its annual entitlement for environmental flows (see Box 5). The report offers valuable insight into the practical aspects involved in managing environmental releases. The report also emphasised the need to have well established baselines and monitoring programs against which the benefits of future flood events can be compared.

In April 2000, the Commission released the Barmah-Millewa Forest Water Management Strategy. This strategy provides the framework for future management of the forest as a single entity. The Barmah-Millewa Forum continues to build on the annually funded program of research, works and monitoring to assist it in maximising the benefit to the forests of future flood operation and management.

Box 5: Barmah-Millewa Forest

The Barmah-Millewa Forest, which extends along either side of the River Murray upstream of Echuca, and which covers some 70 000 hectares, contains a unique range of wetland habitats of high environmental value. The Barmah section of the forest in Victoria has been declared a Ramsar wetland site of international significance.

In 1993 the Ministerial Council approved an annual entitlement of 100 gigalitres of water (100 billion litres) to the Barmah-Millewa Forest, provided equally from the water entitlements of New South Wales and Victoria. This followed extensive public consultation undertaken as part of the development of a water management strategy, a business plan and an annual operating plan for the forest. Implementation of these strategies and plans is being carried out by the Barmah-Millewa Forum.

In October 1998 the Commission made its first use of this environmental entitlement and released 100 gigalitres of stored water from Hume Dam to supplement a minor flood already occurring in the forests as a result of increased flows from the Ovens River.

3.2.6 SALINITY

Salinity has always been a major priority for the Commission. Its significance has been upgraded further by the release in October 1999 of the Murray-Darling Basin Ministerial Council's Salinity Audit (see Box 6) and subsequent work to prepare a comprehensive draft Salinity Management Plan for the Basin (which will be submitted to the Council in August 2000). The new Salinity Management Strategy will build on and incorporate the Salinity and Drainage Strategy that has been one of the great achievements of the first decade of the *Murray Darling Basin Initiative*. It includes recognition of the importance of groundwater trends as a cause of increasing dryland salinity in many parts of the Basin. Care was taken to coordinate its preparation with the salinity strategies being

prepared by each of the states. After the new strategy is finalised, the Commission will, for the first time, be in a position to manage the salinity impacts of irrigation, dryland farming and natural sources in a coordinated way.

Salinity and Drainage Strategy

The Salinity and Drainage Strategy of the Murray-Darling came into effect on 1 January 1988 and was formally adopted by the Ministerial Council in April 1989. The strategy provides a framework for joint action by the New South Wales, Victorian, South Australian and Commonwealth governments to effectively manage the problems of waterlogging and land salinisation in the irrigation districts of the Murray Valley in New South Wales and Victoria, and river salinity in the lower Murray River. The strategy is based on a balance between engineering (interception schemes which divert saline groundwater that would otherwise flow into the river) and non-engineering (land and water management) solutions, which tackle both river salinity and land salinisation.

Under the strategy, no State is to construct works or approve any proposal that will have an adverse impact on the salinity of the River Murray unless it has previously earned 'salinity credits' by contributing to salinity mitigation works. The Commission maintains a register of various actions undertaken that increase or decrease river salinity, and determines the net salinity credits available to New South Wales and Victoria.

During 1999–2000, the Commission agreed to take over responsibility from Victoria for management of the Barr Creek–Lake Tutchewop Drainage Diversion Scheme and to operate it to maximise salinity benefits for the River Murray. This action will provide 5.95 EC salinity credits. Consequently, total salinity credits achieved to date from the joint schemes developed under the strategy are now 67 EC against the target of 80 EC. In return for funding these joint schemes, New South Wales and Victoria have been permitted to undertake new drainage works for irrigation purposes with a combined salinity impact of 25 EC.

Review of the Salinity and Drainage Strategy

In 1998 a review of the Salinity and Drainage Strategy was initiated in response to evidence suggesting that the expected increase in River Murray salinity from dryland areas would be greater than the estimates made

when the Strategy was first developed. As part of the review, a report summarising actions undertaken during the first 10 years of the strategy was released concurrently with the Salinity Audit in October 1999. To assist with the review, a range of studies were completed during the year. Based on these studies, the review concluded that the strategy has been extremely successful in reducing salinity in the River Murray, as measured at Morgan. Underpinning the success of the strategy has been clear identification of the problem, a specific and clear statement of objectives, accountability arrangements and action plans to achieve those objectives.

Salinity mitigation works undertaken jointly through the Salinity and Drainage Strategy and by the states prior to and after adoption of the strategy, have led to average salinity for the River Murray at Morgan decreasing from 721 EC for the pre-strategy period (1975–1985) to 569 EC for the post-strategy period (1993–1999). In addition, salinity at Morgan is now below 800 EC for more than 90 per cent of the time compared to 60 per cent for the pre-strategy period.

The review of the Salinity and Drainage Strategy also concluded that there is scope for improvement in monitoring, reporting and documenting actions accountable under the strategy and in the management of the salt interception schemes.

Box 6: Salinity Audit key points

Within the Murray-Darling Basin, under current management systems and in the absence of substantial intervention:

- three to five-million hectares of land will become salinised in the next 100 years, as a result of rising groundwater tables, to the extent that there will be substantial impacts on water quality, productivity, the environment and built infrastructure;
- salinity in the lower Murray will increase by approximately 50 per cent during the next 50 years;
- salt loads in the Macquarie, Namoi, Lachlan, Loddon and Avoca catchments will more than double during the next 50 years;

continued over page

Box 6: Salinity Audit key points – continued from previous page

- salt damage to agricultural productivity and infrastructure in the Basin (such as roads and buildings) will increase to an estimated $1000 million a year during the next 100 years;

- there will be serious impacts on major wetlands such as Macquarie Marshes, the Great Cumbung Swamp, the Avoca marshes and the Chowilla wetlands.

Much of the salt affecting the Basin's major rivers is coming from small so-called local systems on the northern slopes of the Great Dividing Range in Victoria and the western slopes in New South Wales. Although the recharge and discharge sites of these local systems are close together, a large proportion of the salt that they discharge to streams travels hundreds of kilometres with a significant proportion reaching the lower Murray.

More than half of the salt mobilised in the Basin does not get exported through the rivers and out to sea. It is stored elsewhere in the landscape, especially in irrigation districts and floodplain wetlands.

While irrigation areas are potentially the source of large volumes of salt, effective management systems are in place and – provided the current level of investment continues – they are not expected to be a major source of increased salinity in the future.

The main source of future increases in river salinity in the Basin will be from dryland farming and grazing areas rather than irrigation districts.

The Salinity Audit shows that 60 per cent of the increased salinity predicted in the lower Murray will come from dryland sources (rather than irrigation areas) and, of that 60 per cent, over half (37 per cent) will come from the South Australian Mallee region. The rest will come from the dryland parts of catchments in Victoria, New South Wales and Queensland.

Development of the Basin Salinity Management Strategy

At its meeting in March 2000, in response to its salinity audit, the Ministerial Council decided that a draft Basin Salinity Management Strategy should be available for public release and comment in August 2000, and that the strategy should include preliminary end-of-valley targets. The final strategy is to be presented to the Ministerial Council in March 2001 for resolution.

The Council agreed that the strategy should:

- include a program of action in the first year of its implementation;
- extend the principles of the 1988 Salinity and Drainage Strategy across the Basin;
- establish improved accountability arrangements for the salinity outcomes of land and water management plans and other landscape management initiatives;
- include market-based approaches to vegetation management for salinity outcomes; and
- enhance research and development into new options to control groundwater recharge or, where this is not feasible, options to help communities live with salinised land and water resources.

The strategy is also to include a number of public policy initiatives for the longer term which will:

- accelerate the evolution of catchment management organisations;
- accelerate investigations and modelling to develop new intervention options and support catchment-scale to Basin-scale negotiations and resolution of complex trade-offs;
- ensure implementation of salinity monitoring and evaluation arrangements; and
- enhance research and development into new industries for salinity management.

The Salinity Project Board developed the draft strategy for consideration by the Commission in July prior to its presentation to the Ministerial Council in August 2000. The strategy is the first to be developed within the 'umbrella' of the new integrated catchment management framework (see section 3.2.1).

During the last 150 years a large number of snags have been removed from the Basin's rivers, causing a serious loss of fish habitat. The Commission is now helping to return snags to appropriate river reaches as part of a comprehensive approach to river rehabilitation.

3.2.7 FLOODPLAIN MANAGEMENT

A project board to oversee the development of a Murray-Darling Basin Floodplain Management Strategy was established in February 2000. Floodplain management is a state responsibility and New South Wales, Victoria, Queensland and South Australia each have planning processes in place that control use of the floodplain. However floodplain management activities in each state have potential Basin-wide implications. This is particularly the case along the River Murray where various state actions need to be coordinated.

The project board has agreed to a project brief outlining how a strategy for floodplain management, consistent throughout the Basin, will be developed by July 2001. An initial review of floodplain management activities in all the Murray-Darling Basin states has been undertaken. Working arrangements have been established with the Environmental Flows and Water Quality Project Board (see section 3.2.5) to clearly identify the important linkages between river regulation, riverine health and floodplain management.

3.2.8 FISH MANAGEMENT

The Murray-Darling Basin Commission has assigned a high priority to native fish regeneration in the Basin because these animals have suffered serious decline in both distribution and abundance since European settlement. A variety of factors have contributed to this situation, including competition from exotic fish, water pollution and general habitat deterioration. The construction and operation of dams and weirs has also long been recognised as a major factor causing negative impacts.

The Fish Management Project Board has directed the development and implementation of a strategic framework for fish management in the Basin. It will provide guidelines for resource managers on the development of new project proposals and evaluation activities.

A Native Fish Management Strategy for the Murray-Darling Basin is the core of the project. The vision of the draft strategy, to be submitted to the Commission in July 2000, is: 'Restored, viable, sustainable, native fish species and communities throughout the Murray-Darling Basin.' This vision is complemented by 12 key objectives, which focus on enhancement of habitat, environmental flows, fish passage, threatened species and exotic fish.

The draft strategy includes a review of the 1991 Fish Management Plan, which focused solely on the River Murray. This plan provided a coordinating framework and strategic approach to setting priorities for investigations and works concerning fish habitat and fish populations in the River Murray. Seventy of the 75 actions identified in the 1991 plan have been either completed or progressed through the programs of the state agencies and the Commission.

In parallel with the Native Fish Management Strategy, a discussion paper on a strategic Basin-wide approach to fish passage, *Fish Passage in the Murray Darling Basin: Current Developments and Future Options*, was finalised in January 2000. This paper identified the issue of improving fish passage over, via or through river management structures as an area where immediate and tangible benefits to native fish populations are possible. It makes recommendations for the construction of new fish passages, the refinement of existing structures, the removal of redundant weirs and other structures, and appropriate research, communication and education activities. These recommendations will provide the basis for a coordinated approach that brings together the fish passage programs of the Basin states.

The Carp Control Coordinating Group, formed in September 1998 following an earlier agreement with the Murray-Darling Basin Ministerial Council, completed its work in 1999–2000. The group commissioned a document that will translate the national management strategy into a pragmatic methodology for prioritising areas for action and developing regional action plans. These guidelines were field-tested at a series of workshops in Forbes, Renmark and Beaudesert in April and June 2000, and are expected to be finalised by August 2000.

3.2.9 REVIEW OF SURFACE DRAINAGE WATER QUALITY ISSUES

In March 2000 the Commission began investigating water quality issues in irrigated areas, particularly those resulting from drainage disposal. These investigations are in response to a request made to the Murray-Darling Basin Ministerial Council by its Community Advisory Committee.

The investigation is taking account of a number of other major reviews which are currently being undertaken. The investigation is part of a collaborative project with the Victorian Department of Natural Resources and Environment which is reviewing its sustainable irrigation services. The joint project will examine the social, economic and environmental issues of concern to the Victorian Government and also consider:

- the broader water quality management framework at a state and regional level;
- water quality and flow monitoring arrangements related to surface drainage;
- the management responses to that monitoring; and
- surface drainage activity in New South Wales – primarily such activity occurring under the Murray Land and Water Management Plans.

In addition, the investigation will integrate information from the current five-year review of the Shepparton Irrigation Land and Water Management Plan and the five-year review of the New South Wales Murray Plan. It is intended that the project will provide information on drainage design, construction and management in irrigated regions, and the broader regional context within which drainage schemes are being developed. It will also promote increased understanding of the state requirements for surface drainage projects in both Victoria and New South Wales. The investigations are due to be completed in September 2000.

Box 7: Why is the Basin Sustainability Program important?

The Basin Sustainability Program is a critical aspect of the *Murray-Darling Basin Initiative*.

- It promotes integrated catchment management, providing a framework for stable, targeted investment in sustainable natural resources management and for evaluating outcomes of investment.
- It applies to all integrated natural resources management programs in the Basin – whether under the Commission's auspices spanning a number of jurisdictions, the natural resources management responsibilities of individual states and the ACT, or through programs of the Commonwealth.
- It allows the Commission to 'value-add' through its unique role in 'brokering' collaborative arrangements for investment in investigations, communication and technology transfer, promotion and education, and coordinating and advising on resources for on-ground action.

3.3 DELIVERING THE NATURAL RESOURCES MANAGEMENT STRATEGY THROUGH THE BASIN SUSTAINABILITY PROGRAM

In 1996 the Ministerial Council established the Basin Sustainability Program as the planning, evaluation and reporting framework for the Natural Resources Management Strategy. The Basin Sustainability Program has clearly defined objectives, key result areas and performance indicators – agreed to in principle by the partner governments – to guide and report on all natural resources investments in the Basin.

The Basin Sustainability Program is not a funding program; rather it is the means for focusing government activity and community investment within the Basin on common objectives. The original objectives aim to achieve significant improvements in the key result areas of:

- sustainable agricultural productivity;
- water quality; and
- nature conservation.

The Basin Sustainability Program is implemented through three sub-programs that take account of the variety of regions found within the Basin:

- the Riverine Environment Management Sub-Program, covering the thousands of kilometres of biologically rich corridors that dissect the Basin's catchments;
- the Irrigated Regions Management Sub-Program, covering areas of intensive irrigated land use in the Basin; and
- the Dryland Regions Management Sub-Program, covering the Basin's most extensive areas, incorporating dryland agriculture, rangelands and forests.

The Basin Sustainability Program also provides management implementation objectives to ensure that the arrangements for natural resource management enhance the partnership between community and government, and help the managers of the Basin's land and water to protect its catchments.

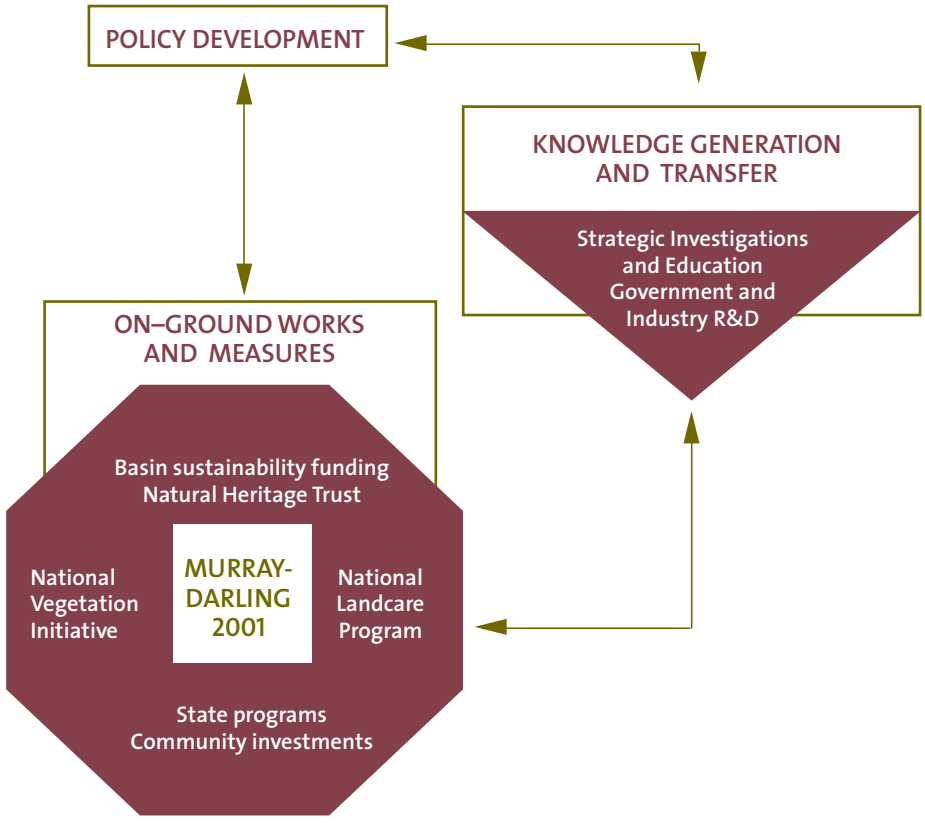
The three sub-programs coordinate with each other and with the management implementation objectives. Design, implementation and reporting of their performances recognises this interaction, and the need for integrated management of Basin-wide issues.

The main functions of the Basin Sustainability Program are to plan, evaluate and report on investments to achieve outcomes in the key result areas through:

- policy development;
- generation and transfer of knowledge; and
- implementation of on-ground works and measures.

The relationships between these three functions, and sources of government and community investments, are shown in Figure 5.

Figure 5: Principal functions of the Natural Resources Management Strategy and their relation to investment or management programs



3.3.1 REVIEW OF THE BASIN SUSTAINABILITY PROGRAM

The Commission undertook a comprehensive stakeholder review of the Basin Sustainability Program's key result areas and objectives during 1998–99. Catchment management committees and relevant government agencies provided advice and contributions. In March 2000, Council approved the revised key result areas and objectives for use over the next three years of the *Murray-Darling Basin Initiative*.

The revised program now includes greater emphasis on direction setting and management implementation objectives, including a specific objective relating to the involvement of Indigenous stakeholders in decision-making for natural resources management. These objectives apply across the Irrigation, Dryland and Riverine Sub-Programs, and respond to the concerns of the Commission and the Community Advisory Committee that the *Initiative* should better consider the human element of natural resources management.

The revised program also includes a new cultural heritage key result area for the Irrigation, Dryland and Riverine Sub-Programs. This recognises the presence of Indigenous and non-Indigenous cultural heritage places in the landscape, and the need to take account of cultural heritage matters when developing policies and actions to manage the Basin's water, land and other environmental resources. The inclusion of this key result area and the new objective relating to the involvement of Indigenous stakeholders are responses to the Ministerial Council's May 1999 decision, following advice from the Community Advisory Committee, to afford a higher priority to Indigenous aspects of the *Initiative*.

Other changes to the Basin Sustainability Program include new objectives for floodplain management and the sustainable use of floodplain, wetland and riverine flora and fauna as part of the sustainable agricultural productivity key result area, and more consistent wording of objectives across the Irrigation, Dryland and Riverine Sub-Programs.

3.3.2 PLANNING, EVALUATION AND REPORTING FRAMEWORKS

Effective management of the Basin's natural resources requires long-term planning and evaluation of outputs and outcomes and clear, concise reporting to support adaptive management. To improve its strategic planning processes for Basin-wide outcomes, the Commission developed strategic plans for the Riverine, Irrigation and Dryland Sub-Programs during 1999–2000. The purpose of the plans is to provide strategic direction for the Commission's statutory and policy development and its Strategic Investigations and Education Program, and for community three-year rolling plans. The plans define a comprehensive set of the policy, knowledge-generation and on-ground strategic activities to be undertaken by *Initiative* partners over the next three years to achieve the Basin Sustainability Program objectives. They will also provide the Commission's issues working groups with a tool to assess the effectiveness of current activities of the *Initiative* partners, as well as provide information to help guide activities and investment priorities.

The Commission endorsed the strategic plans in March 2000 as draft documents, pending an evaluation which is scheduled to conclude in March 2001.

The Commission has also established a range of additional planning, evaluation and reporting frameworks for *Initiative* activities. These

frameworks are outlined below; the outcomes of activities in each area are outlined in section 3.5.

Policy development

The Commission actively oversees policy aspects of the *Initiative*. It needs flexibility to react to issues of the day and to proactively direct those actions needed to support policy changes or develop new policies to address emerging issues (such as dryland salinity). The Commission's policy development activities are carried out primarily through its Statutory and Policy Development Program.

In 1999–2000, the Commission's project boards continued to oversee policy development (see section 3.2) using a formal project management system which provides a transparent, controlled process for planning projects and reporting on them at Commission meetings.

Knowledge generation and transfer

The Commission's activities for the generation and transfer of knowledge are aimed at supporting the equitable, efficient and sustainable use of the Basin's natural resources and are implemented primarily through its Strategic Investigations and Education Program. A three-year rolling plan for the Strategic Investigations and Education Program, developed by the Basin Sustainability Program Working Group, provides the planning framework for strategic investigations and education investment. Issues working groups oversee the riverine, irrigation, dryland and human dimension investments under the Strategic Investigations and Education Program. The plan is updated annually with a major review every three years.

In 1999–2000 the issues working groups revised the three-year rolling plan for the Basin Sustainability Program Working Group to be endorsed by the Commission in July 2000.

On-ground action

The planning, evaluation and reporting frameworks for on-ground works and measures are implemented primarily through the catchment management systems of the partner governments. The Basin consists of 14 catchment management regions, each with a catchment management committee comprising community and government representatives. These regions are primarily based on catchment boundaries (see Figure 6).

Figure 6: Catchment management regions in the Murray-Darling Basin

Every year each state contracting government develops a three-year rolling plan outlining the outcomes to be achieved against Basin Sustainability Program objectives in each management region of the Basin for the proposed level of investment. These plans – based on regional, state and Basin priorities – help direct investment to activities with the best economic, environmental and social outcomes. They show the full extent of investment from a range of sources into catchment management strategies and associated action plans.

A consolidated three-year rolling investment plan for the Basin, based on the state plans, provides a strategic summary of government and community investment across the Basin. It represents a summary of community aspirations for their regions over the next three years and the expected investment required to achieve those aspirations. During 1999–2000 there was significant progress in making this reporting consistent with that for the Basin Sustainability Program and embedding the reporting process within regional reporting systems. This will help streamline the process of program reporting and assist in improving strategic planning and management of total investment for natural resource management in the Basin.

The 1999–2000 round of reporting generated robust figures about the likely levels of investment in natural resource management in the Basin for

the period 2000–01 to 2002–03, and other reliable data concerning the activities being funded. In addition, the community–state three-year rolling plans from each state achieved higher levels of consistency than ever before. This permitted the production of the second consolidated three-year rolling plan for the Basin. This aspect of the reporting process is now well established. Due to the high level of consistency achieved, a summary poster containing the key information from the community–state three-year rolling plans for 2000–01 to 2002–03 is to be released. It will be distributed to regional catchment managers in the second half of 2000.

During 1999–2000 all the Basin states successfully generated consistent annual reports showing actual expenditure against Basin Sustainability Program objectives within each of the catchment management regions of the Basin for on-ground works and measures carried out in 1998–99. This milestone enabled the production of a consolidated annual report for the Basin for the first time.

Key investment information on the three-year rolling investment plan for the Basin for 2000–01 to 2002–03, and for the Basin's annual report of investment in 1998–99, is shown in section 3.4.

3.4 RESOURCING THE NATURAL RESOURCES MANAGEMENT STRATEGY

Funding to address the objectives of the Basin Sustainability Program and the Natural Resources Management Strategy is provided by a range of government programs and community efforts.

In 1999–2000 the first consolidated community–state annual report for the Murray-Darling Basin (see section 3.3.2) showed that in 1998–99 at least $683 million was invested through regional strategies and action plans in the Basin.

The 1999–2000 summary of state three-year rolling plans showed that over the next three years more than 231 regional strategies and local action plans across the Basin (see Table 1) will deliver an anticipated $2.3 billion of public and private investment to:

- maintain agricultural productivity;
- protect the quality of water in the Basin's rivers and streams; and
- conserve the Basin's biodiversity (see Tables 2 and 3).

As part of this total investment, the Commission supports funding programs under the *Initiative* as shown in Table 4.

Table 1: Number of major strategies and plans identified in Basin regions, 1999–2000

State	Region	Number of strategies and plans
New South Wales	Central West	13
	Lachlan	20
	Lower Murray-Darling	10
	Murray	20
	Murrumbidgee	19
	North West	23
	Western	11
Victoria	Mallee	14
	Wimmera	16
	North Central	28
	Goulburn-Broken	12
	North East	15
Queensland	Murray-Darling Basin	8
South Australia	Murray-Darling Basin	22
Total		231

Table 2: Total proposed Basin Sustainability Program investment by sub-program, 2000–2001 to 2002–2003

Sub-program	$ million
Riverine Environment Management	726
Irrigated Regions Management	881
Dryland Regions Management	687
Management Implementation	48
Total	2342

Table 3: Total proposed Basin Sustainability Program investment by key result area, 2000–2001 to 2002–2003

Key result area	$ million
Sustainable agricultural productivity	956
Water quality	857
Nature conservation	481
Management implementation	48
Total	2342

Table 4: Murray-Darling Basin Commission funding programs in 1999–2000

Program	Funding allocation ($ million)
Statutory and Policy Development	7.5
Strategic Investigations and Education	8.45
Murray-Darling 2001 (includes Irrigation Water Management)	76.6
Total	93.55

Note: The total for Strategic Investigations and Education excludes carryover.

Statutory and policy development

Statutory and policy development investment provides for the development and implementation of policies for natural resource management in the Basin, primarily through high-level projects (see section 3.2) and also to carry out statutory obligations of the *Murray-Darling Basin Agreement*. In 1999–2000, $7.5 million was allocated to this program.

Strategic investigations and education

The strategic investigations and education investment supports knowledge generation and transfer (see section 3.3.2). The objectives of the program are to:

- support on-ground investments;
- assist policy development;
- report on the condition, trends and management status of resources, impediments to effective management, and the most appropriate investments; and
- report on performance and transfer results to decision-makers.

Strategic investigations and education investments in sub-programs in 1999–2000 are shown in Table 5.

Table 5: Strategic investigations and education investment in 1999–2000

	Ongoing projects		New projects		Total projects	
Sub-program area	Number	$ million	Number	$ million	Number	$ million
Riverine environment	12	1.2	8	0.3	20	1.5
Irrigated regions	23	1.6	12	1.4	35	3.0
Dryland regions	14	1.8	14	1.5	28	3.3
Management implementation	7	0.2	10	0.7	17	0.9
Total	56	4.8	44	3.9	100	8.7

Note: The above figures are total investment, representing $8.45 million contributed by contracting governments in 1999–2000 and carryover of unspent funds from 1998–99. Actual expenditure does not always match the initial allocation.

Murray-Darling 2001

Murray-Darling 2001 is a multi-partner program to improve the health of the Basin's river systems through integrated catchment management of its land and water resources. It is delivered through the Natural Heritage Trust. The Commonwealth contributes 50 per cent of funding, which the state governments match.

Murray-Darling 2001 aims to:

- improve water quality;
- restore riparian land systems, wetlands and floodplains;
- improve the health of key river systems; and
- encourage ecologically and economically sustainable land use.

In 1999–2000 the combined Commonwealth and state investments under Murray-Darling 2001 contributed to Basin sustainability sub-programs as shown in Table 6.

Table 6: Murray-Darling Basin Commission allocations under the Murray-Darling 2001 Program in 1999–2000

Sub-program area	Funding allocation ($ million)
Riverine environment	24.0
Irrigated regions	38.0
Dryland regions	12.3
Management implementation	2.3
Subtotal	76.6
plus Commonwealth unmatched funds	6.5
Total	83.1

Note: These figures are allocations. Actual expenditure does not always match the initial allocation.

During 1999–2000, in accordance with previous practice, 85 per cent of these funds (the threshold component) were allocated to States on an agreed basis, with the remaining 15 per cent allocated across the Basin according to the merit of proposals in addressing Basin priorities. In November 1999 the Commission agreed to trial a new approach to better target the use of these funds in 2000–2001, namely:

- to allocate the threshold component of Murray-Darling 2001 funding ($60 million) as follows (by percentage):
  - New South Wales 39.8
  - Victoria 39.8
  - South Australia 9.95
  - Queensland 9.95
  - Australian Capital Territory 0.5
- to quarantine a component ($6 million) for allocation to priorities for irrigation water-use efficiency on a competitive basis, with clearly defined objectives being agreed; and
- to quarantine the remainder (approximately $10.35 million) for use on targeted priorities to deliver Basin outcomes, with up to $7 million of this funding directed to key catchments to address salinity as an immediate response to the results of the Salinity Audit of the Basin.

These decisions allowed some funding to be highly targeted to meet priority Basin needs, while maintaining strong support for regionally initiated proposals under the threshold component.

The trial targeted approach will be reviewed late in 2000 to determine whether it should be continued for the last year of the Murray-Darling 2001 Program, and for any subsequent Basin programs.

3.5 OUTCOMES OF THE BASIN SUSTAINABILITY PROGRAM

The following sections provide a summary of progress made towards achieving the objectives of the Basin Sustainability Program (see section 3.3) during 1999–2000. They cover the Riverine, Irrigation and Dryland sub-programs in terms of outcomes across policy development, knowledge generation and on-ground works. A summary is also provided of outcomes against the new direction-setting and management implementation objectives of the program. These apply across the three sub-program areas mentioned above.

An overview of ongoing and recently completed strategic investigations and education projects funded by the *Initiative* can be found in the proceedings of the 1999 Strategic Investigations and Education Annual Forum, available from the Commission.

3.5.1 DIRECTION-SETTING AND MANAGEMENT IMPLEMENTATION

This new section of the Basin Sustainability Program (see section 3.3.1), approved by the Commission in September 1999, primarily covers the outcomes of activity in the communication, education and human dimension areas.

Policy development

The main policy work relevant to direction-setting and management implementation was the development of the draft integrated catchment management framework for the Basin (see section 3.2.1). In June 2000, work commenced on the development of a community communication and engagement process for both the draft framework and the Basin Salinity Management Strategy (see section 3.2.6) for the public consultation period. The process will focus on face-to-face meetings coordinated by the Commission through state teams in each jurisdiction.

Knowledge generation and transfer

The knowledge needed to support implementation of the *Initiative's* Human Dimension Strategy was incorporated into the revised Strategic Investigations and Education Three-Year Rolling Plan. Seven priority areas were identified:

- understanding the nature of change;
- natural resources management governance;
- capacity building and engagement;
- Indigenous involvement;
- framework for community–government partnerships;
- integrated catchment management planning and delivery framework; and
- delivery of sustainable natural resources management through regional frameworks.

An investigations program will commence in 2000–01.

The Commission recognises that ecologically sustainable management will require a considerable cultural shift for both communities and governments. Consequently, educational programs designed for children (the natural resources decision-makers of the future) are seen as an important strategic investment. Working from that starting point, the Commission continued to invest in the primary school program 'Special Forever' (managed by the Primary English Teaching Association).

During 1999–2000 a new three-year program was developed for Special Forever, based on an earlier review of the program over the previous seven years. The administration and program management were also streamlined. Greater emphasis will now be placed on children writing and drawing about natural resource issues within the Basin. As a result of the review, Special Forever was also included under the Strategic Investigation and Education Program to ensure a greater link with the Basin's knowledge generation activities and *Initiative* partners. In 1999, Special Forever involved approximately 17 000 primary school children throughout the Basin, who prepared a wide range of material that was collated into an anthology entitled *Where We Live*. Similar numbers of children are expected to participate in 2000.

'A tree frog' by Angela Pfeffer from Millmerran State School, Queensland, submitted for inclusion in the year 2000 Special Forever anthology. Special Forever is a primary school program sponsored by the Commission and managed by the Primary English Teaching Association. The Commission recognises that ecologically sustainable management of the Basin will require a considerable cultural shift for both communities and governments and sees investment in education as promoting that process.

On-ground action

During the year work commenced on setting up a project to identify the skills base that will be required by members of catchment management organisations to be active participants in implementing the new integrated catchment management policy. An audit is expected to commence early in 2000–01.

There is now a new Basin Sustainability Program objective to support the involvement of Indigenous stakeholders in decision-making for natural resources management. In August 1999, following a meeting with representatives of the Indigenous nations along the River Murray, the New South Wales Department of Land and Water Conservation and the Commission agreed to jointly develop with these nations a memorandum of understanding on communication and consultation regarding environmental issues in the Murray Valley. A draft outline was developed by March 2000 and has been used to promote further discussions with the communities and other stakeholders.

3.5.2 RIVERINE ENVIRONMENT

The aim of the Riverine Environment Sub-Program is to achieve ecologically sustainable management of the rivers and riverine environments of the Basin.

Policy development

Policy development during 1999–2000 was focused on environmental flows, an audit of river health, the control of carp, and floodplain management. Key policy achievements during the year were:

- the development of a framework for a Sustainable Rivers Audit;
- the development of technical options for flow management in the River Murray;
- the development of a proposal for a Floodplain Management Strategy;
- the finalisation of a National Management Strategy for Carp Control; and
- the preparation of a Fish Management Strategy for the Basin.

(See sections 3.2.4, 3.2.5, 3.2.7 and 3.2.8.)

Knowledge generation and transfer

The focus and direction of the Strategic Investigations and Education Program's riverine investigations was aligned to the priority needs of the strategic projects (see section 3.2). Twelve new priority projects were recommended and accepted in the areas of flow management, re-establishment of fish populations and communities, and knowledge transfer. The Commission also initiated major studies into the needs of migratory birds and the management needs of the Murray mouth and Coorong. In addition, the development of a flow management plan for the River Murray was accelerated by the consolidation of all available environmental flow recommendations into a technical review, from which options are to be presented to the Ministerial Council for approval in March 2001.

End users of the knowledge generated by the Strategic Investigations and Education Program's investigations were assisted through a two-day forum held at Canberra in August 1999.

Integration of investigations with partner funding organisations was enhanced by the Commission's participation in the National Rivers Consortium, an initiative of the Land and Water Resources Research and Development Corporation in association with Commonwealth and state agencies. The shared interest of all members of the National Rivers Consortium is to formulate and implement a range of coordinated activities which, over time, will bring about continuous improvement in the health of Australia's rivers.

During 1999–2000 the Commission continued to provide funding support for the Murray-Darling Freshwater Research Centre and, through it, to the Cooperative Research Centre for Freshwater Ecology, which provided knowledge and advisory services throughout the year.

On-ground action

A strategic plan was prepared during the year as the basis for coordinating the activities of the Basin-wide strategies for wetlands, fish and algae according to the planning and reporting framework of the Basin Sustainability Program (see section 3.3). Actions from these strategies and related projects that continued through the year included:

- implementation of the Ministerial Council's Cap on water diversions in the Basin;
- management of the 100 gigalitre water entitlement for the Barmah-Millewa Forest – the world's largest river red gum forest system;
- river operations to enhance environmental values on the River Murray;
- improvements to fishways on River Murray weirs; and
- the funding of supporting investigations.

The ongoing management of the riverine environment was enhanced by continuing investment under the Murray-Darling 2001 initiative within the framework of the Basin Sustainability Program. A range of integrated management plans were supported by Murray-Darling 2001 to identify problems and implement solutions for on-ground outcomes, including:

- erosion control measures to reduce sediment and nutrient transport;
- floodplain and wetland restoration; and
- re-creation of habitat in river channels.

Box 8: Riverine environment

The Strategic Investigations and Education Program's project *River Habitat Rehabilitation through Re-Snagging* is a good example of the activities conducted under the riverine program. Funded by the FishRehab component of Murray-Darling 2001, the project involves the trial creation of snag habitats for fish in the River Murray. Snag piles have long been recognised as the most important habitat component in lowland rivers. In the past, many snags were removed to improve boat navigation and for other purposes. This project will put some back.

Previous ecological studies funded by the Commission established the importance of snags and have characterised their properties in terms of their preferred size, composition and orientation. That research underpins this project, which involves the construction of snag piles at 15 sites along the River Murray between Yarrawonga and Cobram.

The project will provide habitat for native fish species, including the endangered trout cod. It is also generating a methodology and process for designing, costing and logistically undertaking such works. Between 300 and 400 snags will be placed in the river over the next three years. The work has involved extensive consultation with the Department of Land and Water Conservation in New South Wales, the Department of Natural Resources and Environment in Victoria, the Murray-Darling Basin Commission, local governments (Moira and Berrigan Shires), the Maritime Services Board, Parks Victoria, the Yorta Yorta Indigenous community and the Yarrawonga anglers' group.

The habitat re-creation work is being undertaken in a way that allows for scientific evaluation of the success of different snag pile designs. The Commission has provided additional funding to expand the evaluation component to include fish surveys, bed and bank profiles, velocity measurements and macro-invertebrate colonisation – both before and after the snags have been placed in the river.

3.5.3 IRRIGATED REGIONS

The Irrigated Regions Sub-Program aims to achieve ecologically sustainable development in the Murray-Darling Basin within the framework provided by the Commission's Basin Sustainability Program (see section 3.3).

The Commission is funding a number of projects to increase the sustainability, productivity, profitability and water-use efficiency of a wide range of irrigation industries including dairying, viticulture, horticulture, wheat, maize, cotton and vegetables.

Policy development

In 1999–2000 there was a focus on identifying key priorities for the next three to five years and initiating the investigations work required to support the development of relevant policies.

With the development of the draft strategy for the Irrigated Regions Sub-Program there existed for the first time a policy framework which could identify major policy issues for the Basin's irrigated regions and provide a direct link between them and the Commission's Strategic Investigations and Education Program. The following issues were identified:

- a policy framework that promotes best management practices for land and water management planning in irrigated regions;

- policies to better match land use and land capability and reduce salinity impacts;
- agreed procedures and protocols for water quality monitoring and analysis; and
- a policy that integrates planning and management to achieve sustainable use of surface and groundwater resources.

Knowledge generation and transfer

Within the context of the program's three to five-year planning focus, there has been significant investment in large integrated projects developed in collaboration with agency and industry partners. Matters dealt with include channel seepage management, broad-scale adoption of improved on-farm management practices, water-use efficiency practices and salinity impacts. In particular, groundwater issues and management have been recognised as being of concern, most significantly where the Cap has caused increased demand from irrigation.

There is increasing interest in the potential benefits of environmental management systems to Australian agriculture. Through a Strategic Investigations and Education Program project, the Commission has been assessing the feasibility of an audit and certification model to foster better natural resource management. Constraints and drivers to implement such a model have been examined for the dairy, rice, cotton and viticulture industries. A major related project has been examining the extent to which the introduction of ISO 140001, or some other standard in the cotton industry, would meet the Commission's natural resource management objectives.

Other activity designed to promote best management practice at the strategic level includes partnership arrangements with:

- the Dairy Research and Development Corporation and Victoria's Department of Natural Resources and Environment to develop strategies and activities to improve the mean water-use efficiency of the dairy industry in Northern Victoria and Southern New South Wales by 10 per cent; and
- CSIRO, Cooperative Research Centre (CRC) Viticulture and Riverlink (as well as state agencies) to develop integrated best management strategies for vines which increase water-use efficiency of irrigated vines by five per cent over three years and minimise salinity impacts.

The Irrigation Sub-Program has also actively contributed to the National Land and Water Audit.

A major review of the Commission's irrigation projects funded under the Strategic Investigations and Education Program was also undertaken during the year. All completed projects funded since 1993 have been reviewed. The review assessed the potential of these projects to contribute to the achievement of current priorities and identified gaps in the program. The outcomes of the review will be used to guide decisions about future investment through the program. One of the key recommendations of the review is expected to be a greater emphasis on the need for increased communications activity to promote greater uptake of the results of Strategic Investigations and Education Program projects.

On-ground action

Issues that continue to be a priority at the regional and on-farm levels include the need for planning to promote:

- continuing improvements in water-use efficiency;
- a better match between land use and land capability;
- closer integration of surface and sub-surface water management strategies;
- development of water allocation management processes that provide a balance between consumptive and environmental requirements; and
- sustainable groundwater management strategies.

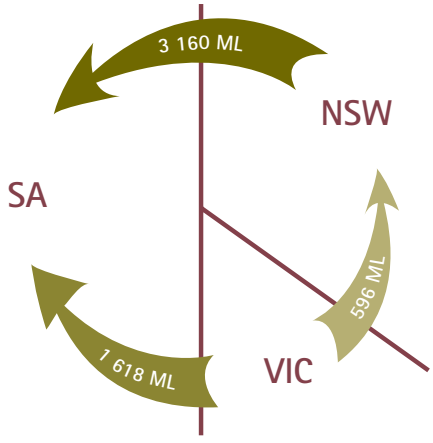
Problems caused by limited, incompatible irrigation data have been identified as a major obstacle to regional and Basin planning. A number of projects developed through the National Land and Water Resources Audit, state agencies and regional planners are finding it increasingly difficult to monitor the key components of irrigation activity and assess the impacts for management and investment purposes. As a result, agreement has been reached between key stakeholders to develop a pilot irrigation management information and reporting system at a Basin, and potentially national, scale.

This project will require data which has not been previously collected on a Basin-wide scale. As a result there will be a need to involve a significant number of stakeholders. Long-term outcomes will include a detailed catchment-based census report on the status of irrigation in the Basin,

including its location and other more specific characteristics. This information will help inform, guide and support improved planning and management decisions at Basin, state, regional and industry levels.

The Commission's pilot Interstate Water Trading Project commenced in January 1998, with trade limited to the buying and selling of high-security water between private diverters. The aim of the pilot project is to facilitate the permanent interstate trade of water within the Murray-Darling Basin and so promote increased water use efficiency. It is also assisting the irrigation industry to become more economically sustainable by facilitating the movement of water from current irrigation activities to higher value irrigation developments that are subject to rigorous environmental clearances. A total of 9373 megalitres has been traded since the project began.

Figure 7: Volume of water (megalitres) permanently traded between states as part of the pilot project for 1999–2000



An improved system of water trading, particularly across state borders, will enable the water to be traded to high-value enterprises such as horticulture and viticulture where it can generate greater economic and environmental benefits.

Preliminary analysis of information about the nature and volume of water being traded indicates that water is moving from low-value uses to higher value irrigation developments. The project will be reviewed by the end of the 2000 calendar year. This review will focus on the socio-economic and environmental impacts of the pilot. If considered successful, the project may be extended to include other water users and regions in the Murray-Darling Basin. Annual reporting on the pilot water trading project to contracting governments is required. This deals with matters such as the uses of traded water, impacts on the Cap and environmental impacts, including salinity.

3.5.4 DRYLAND REGIONS

Within the framework provided by the Basin Sustainability Program, the Dryland Regions Sub-Program works to achieve ecologically sustainable development of the dryland areas of the Murray-Darling Basin.

Policy development

Policy development during 1999–2000 continued to focus on the management of salinity in the Basin. The release of the Salinity Audit (see Box 6, section 3.2.6) identified significant knowledge gaps requiring action by the Dryland Sub-Program. It is now apparent that farming practices in dryland regions will need to change substantially if salinity impacts on infrastructure, environmental assets, farmland and water quality in tertiary streams are to be managed.

Knowledge generation and transfer

The Salinity Audit has shown that the major natural resource management issues in dryland regions can only be addressed successfully through substantial land management change. Consequently, investments that will generate the knowledge needed for effective policy and which will encourage the effective transfer of that knowledge to the relevant organisations and personnel, are high priorities for the Dryland Sub-Program.

During 1999–2000 the Sub-Program developed projects linked with other organisations in order to increase the quantity and quality of information available to support effective natural resource management in dryland areas across the Basin. Joint ventures included:

- the National Dryland Salinity Research, Development and Extension Program Stage II, led by the Land and Water Resources Research and Development Corporation;
- the Sustainable Grazing Systems Program, led by Meat and Livestock Australia;
- the Joint Venture Agroforestry Program, led by the Rural Industries Research and Development Corporation; and
- the Heartlands Project, a joint initiative with CSIRO to develop and evaluate integrated solutions for the effective management of salinity, biodiversity and water quality.

Through its Landmark Project, which focuses on dryland farming, the Commission is conducting a series of investigations that will bring together information about industry-endorsed best practices, their likely success in achieving sustainability in the long term, locations where changes in grazing and agricultural practices are most needed, and the impact of government policies. As part of the project, cost-effective methods for mapping changes in the landscape and rates of adoption of best management practices are also being developed.

The Sub-Program is also working closely with the National Land and Water Resources Audit, contributing to and capitalising on methodology developed to assess the condition of the land and water resources within the Basin. Joint ventures with industry research and development bodies are also providing the Commission with industry pathways for the transfer of products and outcomes from dryland investigations.

During the year the rural industry was involved in a major suite of activities (known collectively as the Landmark Project) that focus on the changes needed to achieve long-term sustainable futures for the key broadacre farming and grazing industries. The Landmark Project is:

- involving industry, community and government in defining the direction of work and promoting integration;
- documenting best management practice systems for key broadacre dryland land uses;

- testing best management practice systems for long-term sustainability; and
- developing methods to cost-effectively map and monitor land use change and the uptake of best management practice systems.

The Salinity Management Strategy now being developed by the Commission will need a wide range of information, some of which is not currently available. To fill this gap, a series of new projects has commenced. They include the development of:

- a methodology that can better quantify the full range of costs of dryland salinity;
- a decision framework for investigating, planning and managing dryland salinity;
- a process that can characterise the hydrogeology of saline catchments; and
- a more detailed understanding of the role of native pastures in catchment water balance, and consequent salinisation processes.

These projects will allow land managers to target tree plantings more strategically when undertaking large revegetation projects in critical catchments.

Recent research, much of it funded through the Strategic Investigations and Education Program, has shown that the movement of sediment and nutrients from dryland regions in the Basin has caused significant problems in many streams. To map the export of nutrient-bearing sediments from rural catchments, a project was established during the year in partnership with the CSIRO.

The project builds on previous work undertaken by the National Land and Water Resources Audit and will identify 'hot spots' for on-ground action. This is being supported by a related project (jointly sponsored by the Victorian Department of Natural Resources and Environment, Meat and Livestock Australia, the Land and Water Resources Research and Development Corporation and the Dryland Regions Sub-Program) that has produced management guidelines for minimising nutrient movement from dryland regions to streams and its impact on water quality.

As part of its effort to improve understanding of the way water moves in the landscape, the Commission continued its funding support for the

Cooperative Research Centre for Catchment Hydrology. Recognising the importance of groundwater trends and management, there has been considerable effort on the part of the Commission to obtain better baseline data regarding the condition of that resource.

The community has a leading role to play in dealing with salinity problems in the Basin. To support this role the Commission has made it easier for the community to access significant natural resource spatial data sets for dryland regions through the development of a Basin-wide CD-ROM known as 'Basin-in-a-Box'. The CDs, which were released in early 1999–2000, include geographic information systems (GIS) data on:

- groundwater for the Murray hydrogeological basin and Darling River catchment;
- woody vegetation;
- climate;
- soils; and
- geology and relief.

Other products and outcomes of the first five years of the Dryland Strategic Investigation and Education Program were summarised during the year to assist transfer and adoption.

On-ground action

Integrated catchment management is being strongly supported by the Dryland Sub-Program. To promote integrated catchment management, Murray-Darling 2001 funding is assisting in the development and implementation of integrated management plans by catchment authorities, boards and Landcare groups. On-ground, Murray-Darling 2001 funding, along with funding from state and local programs, was directed through regional strategies and local action plans to priority issues in dryland regions of the Basin.

The funds supported a range of activities including vegetation management for salinity and biodiversity, erosion control, and nutrient management. Other activities were related to improved management practices for farming, such as water-use efficiency, and minimisation of off-site impacts of nutrients, salt, and pesticides. An additional $7 million will be available for salinity projects in 2000–2001 as the result of a new approach taken to Murray-Darling 2001 funding (see section 3.4). Much of this funding will be spent in dryland areas.

4 WATER RESOURCES & ASSET MANAGEMENT

Bethanga Bridge over the northern arm of Lake Hume. In July 1999, the volume of water in Hume Dam (the Commission's main regulating storage for irrigation and water supply) was low, at 24 per cent of capacity. By June 2000 it had recovered to 42 per cent.

The Commission's responsibilities for the River Murray system include:

- managing and distributing the water resources of the River Murray system in accordance with the *Murray-Darling Basin Agreement*;
- managing and maintaining infrastructure to an appropriate standard through the contracting governments; and
- protecting and, where appropriate, improving the physical and biological environment.

The principal responsibility is to obtain the highest achievable quality and efficiency of use of River Murray system water resources in a manner that reflects environmental and social priorities.

The major issues faced in meeting these responsibilities are:

- the competing demands for water resources;
- environmental issues in relation to river management;
- the need to protect water quality;
- the impact of water consumption on river health;
- conflicting objectives for storage operations;
- ageing infrastructure requiring major investment to maintain or replace;
- community participation in the Commission's decision-making and management processes; and
- the formation of uniform policies across state borders for development and management of the floodplain.

The Commission addresses these responsibilities through its business-oriented internal unit, River Murray Water (see section 4.1.1). Budget allocations to River Murray Water are shown in Figure 3 (section 1.3.2).

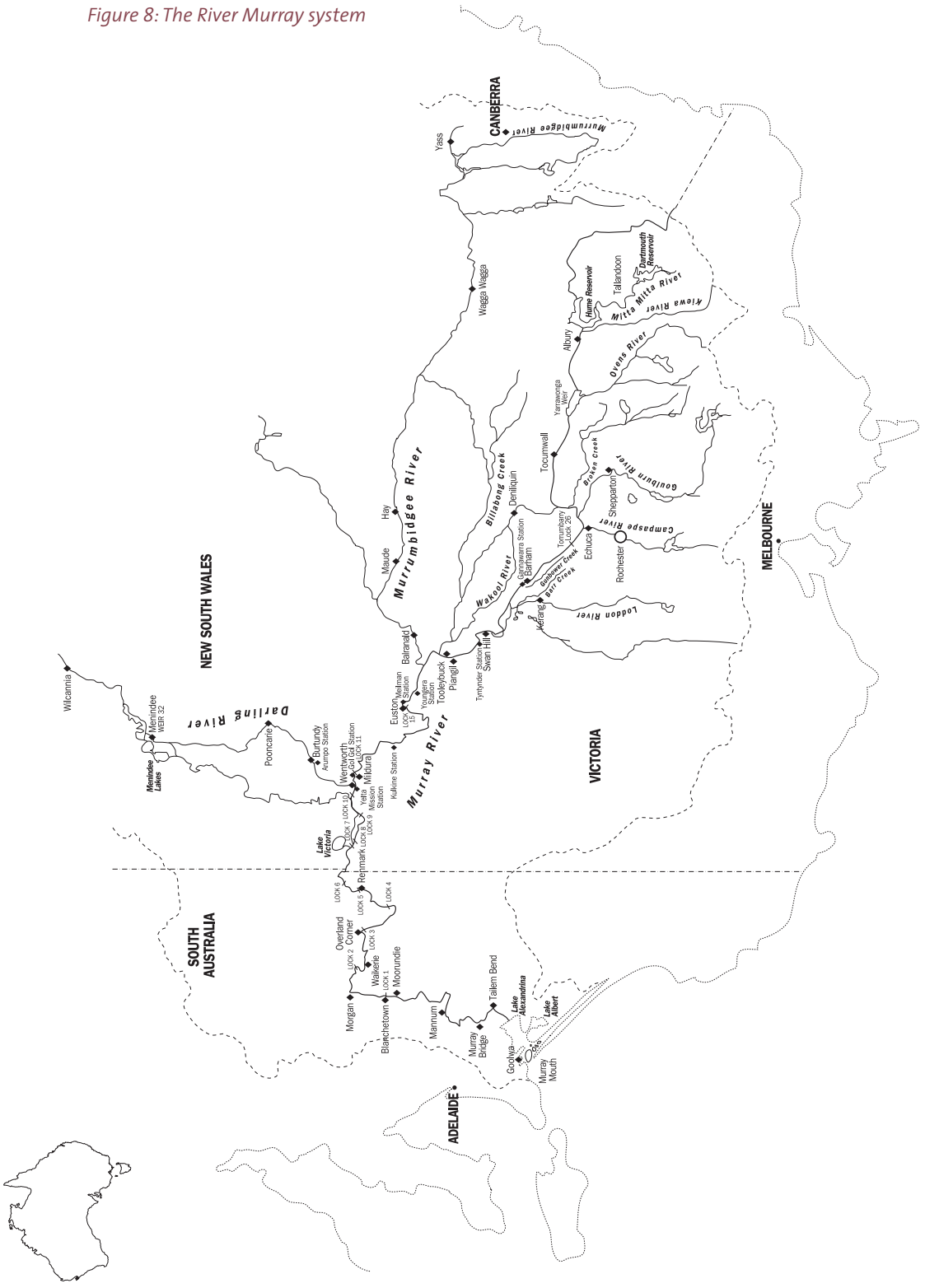
Scope of the River Murray system

The River Murray system is the main course of the River Murray and all its effluents and anabranches (for example, the Edward River). It includes:

- tributaries entering the River Murray upstream of Albury;
- the Darling River downstream of the Menindee Lakes storage;
- Murray-Darling Basin Commission works such as Dartmouth Dam, Hume Dam, Yarrawonga Weir, the Lake Victoria storage, weirs and locks along the River Murray and lower Murrumbidgee, the barrages near the mouth of the River Murray, and salinity mitigation works;
- the Menindee Lakes storage, which the New South Wales Government has leased to the Murray-Darling Basin Commission in perpetuity;
- Stevens Weir (this structure comes under Murray-Darling Basin Commission control, however it is a New South Wales work); and
- numerous flow-regulating structures along the River Murray in the Barmah-Millewa Forest.

The locations of these features are shown in Figure 8.

Figure 8: The River Murray system



The Commission's powers in regard to sharing water resources are limited to the River Murray system. Tributary streams from the River Murray and the Darling River upstream from Menindee Lakes are vested in the governments of Victoria, New South Wales and Queensland.

4.1 STRATEGIC DIRECTIONS AND MAJOR ACTIVITIES

In response to the Council of Australian Governments' Water Reform Principles, the Murray-Darling Basin Ministerial Council established a water business as an internal division within the Murray-Darling Basin Commission in 1996. The business is called River Murray Water. The distinct nature of River Murray Water clearly delineates the service delivery functions of the Commission from its resource management and policy functions.

The establishment of River Murray Water was achieved within the terms of the existing *Murray-Darling Basin Agreement*, thus retaining the essential Basin-wide integration of values that are at the heart of the *Initiative*. Achieving this appropriate distinction between functions in order to clarify roles and responsibilities, whilst preserving the commitment to joint action within the context of Basin-wide values, continues to be a critical objective.

4.1.1 DEVELOPMENT OF RIVER MURRAY WATER

During 1999–2000, a range of options for the further development of River Murray Water were examined in the context of:

- the National Competition Council's second Tranche Report; and
- the Council of Australian Governments' Water Reform Principles.

The principal focus was on how to achieve effective regulation of pricing for services. It was recognised that this would require amendments to the *Murray-Darling Basin Agreement*.

A wide range of options was considered during the year and specific attention was focused on achieving more flexible financial management of the water business. In particular, this included the ability to reduce the volatility of annual capital expenditure inherent in the present annual cash operations of the *Agreement*, and also improved arrangements to recognise and account for the depreciation of the substantial asset base.

Through 1999–2000, Council maintained revised cost-sharing arrangements between the Commonwealth, New South Wales, Victoria and South Australia for water business costs incurred under the *Agreement*. These revised arrangements ensure that costs borne by the states relate closely to the levels of service received. To that extent, the revised arrangements are an effective surrogate for a price-for-service concept based on full cost-recovery principles.

Recognition of the full range of costs required to ensure long-term sustainability of the works under the direction of the Commission represents a significant step in implementation by the states of comprehensive pricing policies.

Major strategic activities carried out by River Murray Water during 1999–2000 were focused on responding to changing community standards in the management of water conservation and salinity mitigation works, and also in ensuring effective and substantial management of assets. These activities are outlined in subsequent sections of this chapter.

4.1.2 INFORMATION TECHNOLOGY STRATEGIES

River Murray Water engaged consultants during the year to scope opportunities for introducing new information technology to the production section. The scoping exercise will identify opportunities to enhance the collection and management of data, as well as the planning and control of river operations. The scoping exercise was still under way at the end of the financial year and will be completed in the next reporting period.

River Murray Water's Information Technology Steering Committee will review the findings of the scoping study and recommend to the Board options for the implementation of new systems. Work in this area will be in accordance with, and linked to, work currently under way in the Commission's Water Policy Unit on the development of daily time-step modelling of the River Murray system.

An Asset Management System, which was implemented last year, has been improved to provide reporting that is more appropriate to River Murray Water's needs. The Board has endorsed the appointment of consultants to advise on the most suitable systems to meet River Murray Water's financial management, information and record management needs. These studies will be undertaken during the first half of 2000–2001.

4.1.3 SNOWY SCHEME REFORMS

In December 1999 the Commonwealth Minister for the Environment requested an environment impact statement in relation to the proposed corporatisation of the Snowy Mountains Hydro-Electric Authority.

The Commission provided input for the preparation of this statement which was released for public comment in June 2000. Significant issues in relation to the Snowy Scheme which are being addressed by the Commission include:

- the codification of water entitlements and water release rules from the Snowy Scheme on an annual and within-year basis;
- the relationship between the proposed Inter-Governmental Water Agreement and the *Murray-Darling Basin Agreement*;
- consideration of impacts on the Murray system arising from any decisions to provide additional environmental flows to the Snowy River;
- consultation arrangements to assist in the preparation of a response to the draft environment impact statement; and
- consultation arrangements to hasten responses to governments by the Commission when specified proposals, relating to corporatisation of the scheme and the provision of environmental flows to the Snowy River, are referred by governments under clause 46 of the *Murray-Darling Basin Agreement*.

In July 1999 the level of Lake Victoria was reduced to unusually low levels to allow an archaeological survey of the lake bed. While the survey failed to find the site of the Rufus River massacre in 1841, it did reveal valuable information about the cultural landscape of the lake bed as well as the impact of operations since the construction of the Lake Victoria storage in 1928.

4.1.4 LAKE VICTORIA CULTURAL HERITAGE

The Murray-Darling Basin Commission remains committed to the protection of cultural heritage at Lake Victoria and continues to manage water storage there in a way that balances cultural heritage values, environmental values and operation of the lake as a water storage.

In mid-1998 the New South Wales National Parks and Wildlife Service granted an eight-year Consent under section 90 of the New South Wales *National Parks and Wildlife Act 1974* for the continued operation of Lake Victoria as a water storage facility. The Consent included a series of detailed conditions aimed at engendering meaningful participation by the local Aboriginal community. These conditions focus on managing and monitoring the impacts on cultural and natural heritage, both on the lake bed and within the surrounding landscape. The Consent also addresses lake operations and the strategic management of water levels to minimise impacts on lakeshore vegetation.

While the Commission has agreed in principle to the intent of the conditions, and has abided by these requirements, the wording and scope of some of the conditions are in conflict with existing jurisdictional responsibilities, making the conditions unacceptable to the Commission. Over the past year, the Commission has worked closely with the New South Wales National Parks and Wildlife Service to revise the conditions of the Consent. The result is a more workable set of requirements which better address the need to protect the significant cultural heritage values of the lake while enabling effective management of the landscape. The revised requirements reflect the operational realities of a water storage.

In late 1999 the Commission began to develop a Cultural Landscape Conservation Management Plan, which will be the blueprint for further development of the monitoring and management procedures already in place on the lakeshore. It is anticipated this plan will be finalised in 2000.

Lake Victoria Advisory Committee

Community involvement in the planning process continued through the Lake Victoria Advisory Committee. The committee includes representatives from:

- the Aboriginal community, who have historic and traditional ties to Lake Victoria;
- local landholders;

- the New South Wales National Parks and Wildlife Service;
- the New South Wales Department of Land and Water Conservation;
- SA Water Corporation;
- the Murray-Darling Basin Commission;
- the regional Catchment Management Committee;
- the irrigation industry;
- the local Aboriginal Land Council;
- the state Aboriginal Land Council; and
- an outside expert in cultural landscape conservation planning.

The committee is led by an independent chairperson. The role of the committee is to provide advice to the Murray-Darling Basin Commission and the National Parks and Wildlife Service on the management of the cultural and natural heritage of Lake Victoria. During the year, committee meetings, workshops, inspections and field trips were held about once a month. As part of its involvement, the Murray-Darling Basin Commission arranged meetings of the Barkindji Elders' Committee to occur between regular meetings. This allowed committee members to be actively involved in decisions affecting the protection of cultural and natural heritage values at the lake, and to communicate these issues to the broader community.

Lake operation

Throughout 1999–2000, the lake was operated in accordance with the Consent conditions. One important activity was refilling the lake after the very low water levels achieved in mid-1999 to allow an archaeological survey of the lower levels of the limestone (including an investigation of the Rufus River massacre site). Before commencing operations the Lake Victoria Project Board had assessed the implications of the proposed draw-down and concluded that there was a low risk that implementation would make it difficult to refill the lake before the beginning of the following summer. However, due to continuing dry conditions, the lake did not refill and there was a consequent loss of available water which had to be shared between the three States. This is an issue that will be addressed in the development of the changed operating regime for Lake Victoria in response to the Consent conditions.

Monitoring and protection of cultural and natural heritage values

During the archaeological survey of the lake bed, the actual site of the Rufus River Massacre was not located, nor were any additional burials found at low levels. However, the low-level survey did reveal valuable information about the cultural landscape of the lake as well as the impacts of lake operation.

Monitoring of the burial protection works continued through the year, with an extensive survey of the lakeshore carried out in October 1999. Results from the survey indicate that the existing protection mounds are withstanding the raising and lowering of the lake very well. Several new burials have been discovered, primarily as a result of windblown sand movement.

During 1999, the Commission and SA Water Corporation completed the first off-lake stockwater supply scheme on one of the properties adjacent to the lake. The purpose of the stockwater scheme and associated fencing is to eliminate stock damage to lakeshore vegetation and beach sediment, which is a major factor in wind and water erosion. While fencing off the entire lake is impractical, encouraging stock to utilise water sources away from the lake will help landholders manage the carrying capacity on paddocks adjacent to the lake, resulting in better landscape protection on the lakeshore.

4.1.6 MITTA MITTA EX GRATIA PAYMENTS

In November 1998 the Ministerial Council agreed in principle to make ex gratia payments to landholders in the Mitta Mitta valley whose pasture productivity had been affected by the operation of Dartmouth Dam. This agreement was based on recognition that floodplain land has become less productive because of the reduction in frequency of short-term beneficial flooding and the lowering of groundwater levels in spring. Approximately 90 properties are potentially affected. A detailed and objective methodology for quantifying the payments was developed in close consultation with a reference group which included Mitta Mitta landholders.

Recipients of ex gratia payments will be required to sign a deed of release against any claim relating to the past or future effects of the normal operation of Dartmouth Dam. The terms of the release have been agreed with community representatives.

Following Commission approval of the detailed package in March 2000, each property has been inspected and the necessary details collected from landholders. It is expected that formal offers will be made to landholders in July and August 2000.

4.1.7 INTEGRATED MANAGEMENT OF SALINITY MITIGATION SCHEMES

Since the early 1980s, more than $70 million has been spent on various salinity mitigation schemes. While some schemes precede the *Initiative* and the Salinity and Drainage Strategy, most have been largely funded by the Commission while operating on a local basis.

In recent times, it has become apparent that efficiency gains can be made in the operation of these schemes. A more focused and integrated method of managing the schemes has been proposed.

In September 1999 the Commission endorsed a draft set of principles to be applied to the integrated operation of major salt interception schemes and agreed that the concept of integrated management should be further developed. Following this endorsement, a strategic planning consultant was engaged by River Murray Water to make an initial assessment of the options. The consultant concluded that integrated management will bring efficiency gains and reduce costs. It will also improve strategic planning and provide an opportunity to address some long-term issues that are currently not receiving adequate attention. As a result of the consultant's findings, an officer was seconded from SA Water Corporation to River Murray Water to develop and implement arrangements for a more integrated management of the existing salinity mitigation schemes under the control of the Commission.

In March 2000 the Commission assumed responsibility for the joint Barr Creek–Lake Tutchewop Scheme. It agreed to make River Murray Water responsible for the future management of the scheme, with Goulburn-Murray Water the responsible constructing authority.

Drilling of a test bore to assess groundwater flows at the site of Waikerie Phase 2 salt interception scheme. Since the early 1980s, in excess of $70 million has been spent on the construction of various forms of salinity mitigation schemes along the River Murray. After receiving recommendations that the overall efficiency of these schemes could be increased through greater coordination of their operation, the Commission is now implementing a program of more integrated management.

4.1.8 REGIONAL SALINITY MANAGEMENT (LAKE VICTORIA)

Regulation of the River Murray by the construction of weirs and dams and the maintenance of high water levels in the river and lakes has had a significant effect on groundwater through the Murray River Valley. In far south-western New South Wales, the construction of weirs along the River Murray and the management of Lake Victoria as a water storage has contributed to rising groundwater tables which has caused land salinisation.

The salinisation problem is being driven by regional pressure as well as leakage from the lake and Frenchman's Creek into the low-lying floodplain. The ultimate extent and degree of salinisation is still unknown, however research suggests that up to 14 000 hectares of land east of the lake and north of Frenchman's Creek will eventually be severely salinised. The timeframe for this is dependent upon the average level of operation of Frenchman's Creek and Lake Victoria (the lower the average level, the

slower the groundwater rises on the adjacent floodplain), but the salinisation is expected to occur in the next 30 to 50 years. The salinised area contains freehold and leasehold land.

The Commission is aware of the salinisation issue and the implications for land management in the area. As part of the section 90 Consent conditions relating to the operation of Lake Victoria, the Commission is required to ensure continued monitoring of landscape changes and impacts relating to salinisation. This involves working closely with land managers to ensure property planning takes long-term trends into account. A management action plan is being developed for the area using Natural Heritage Trust funds and supported by the Commission. In March 2000, the Commission endorsed in principle the purchase of a freehold property east of Lake Victoria which has been affected by salinity.

4.2 WATER RESOURCES MANAGEMENT

The water resources of the River Murray system are used for a wide range of beneficial purposes. In addition to its inherent natural value to riverine, floodplain and estuarine ecosystems, other uses include irrigation, industrial and domestic water supply, navigation, recreation and hydro-electric generation. River Murray Water manages the river system to ensure that the available water is accounted, shared and supplied to South Australia, Victoria and New South Wales in accordance with the *Murray-Darling Basin Agreement*.

River Murray Water undertakes the tasks of sharing and supplying water through three main processes:

- assessing future availability of water;
- accounting for actual use of water; and
- regulating river flows to meet environmental and user needs.

A system of continuous water accounts is used as specified by the *Agreement*. Assessments of the future availability of water are based on the status of these accounts and estimates of future system inflows, including inflows to the River Murray resulting from planned operation of the Snowy Mountains Scheme. River Murray Water uses these assessments to advise the states of their available shares of water for the remainder of the irrigation season. The states then announce water allocations based on these shares and the states' own plans for water management.

The following sections summarise:

- the availability of water in 1999–2000;
- the quantities of water supplied and diverted; and
- key issues related to the delivery of that water.

4.2.1 WATER AVAILABILITY

Following relatively dry conditions in the latter part of 1998–1999, inflow conditions at the start of 1999–2000 were near median. However, drier conditions in the upper Murray and tributary catchments in October and November restricted improvements in stored water volumes. Wetter than median inflow conditions were experienced from December to April, which led to improved water availability late in the 1999–2000 irrigation season. Conditions in May and June 2000 were also wetter than median and led to modest improvements in upper Murray storage.

In the upper Murray catchment areas, the three-year period from November 1996 to October 1999 (inclusive) was a particularly long, dry sequence. The estimated 'natural' inflow to Hume Reservoir (that is, calculated inflow assuming natural conditions with no regulating structures upstream of the reservoir) for that three-year period was the seventh lowest inflow in the historical record (almost 110 years).

Despite low levels in upper Murray storages at the start of 1999–2000, storage in Menindee Lakes was 96 per cent of surcharge capacity, and this resource contributed substantially to water availability in 1999–2000.

At the beginning of July 1999, available water resources were lower than they would otherwise have been as a result of the special draw-down of Lake Victoria's water level between February and July 1999 to allow for an archaeological survey of the lake bed. A small portion of South Australia's additional dilution flow was deferred during August 1999 to ensure continued refilling of Lake Victoria following a recession of flows in the River Murray upstream. A volume of 42 gigalitres was subsequently transferred to New South Wales in view of its very low outlook for water availability following the draw-down of Lake Victoria in the preceding winter.

The share of water available to New South Wales at the start of July 1999 was 1350 gigalitres less than that available to Victoria, mainly as a result of

greater use of water by New South Wales over the previous three irrigation seasons. Throughout 1999–2000, New South Wales and Victorian resources improved by 650 and 760 gigalitres respectively.

Significant rainfall in the Darling River system between February and May 2000 produced increased inflow to Menindee Lakes and raised the storage volume to near surcharge capacity by the end of June 2000. A small volume of spill was released from the lakes in response to these inflows without exceeding channel capacity in the lower Darling River, and was subsequently stored in Lake Victoria.

Initiatives taken to improve water availability during the year included:

- An advanced release of 100 gigalitres of Year 2000–01 Snowy entitlement was arranged by New South Wales from the Snowy Mountains Scheme under special arrangement with participating irrigators in response to the low water availability for New South Wales under dry conditions. Agreement to appropriately adjust shares of Snowy releases to the Hume catchment in 2000–01 was a prerequisite to the special arrangements.
- The temporary transfer of New South Wales' component (50 gigalitres) of the Barmah-Millewa Forest water allocation to an allocation for 1999–00 for consumptive use by New South Wales was arranged under an agreement which includes payback of this resource in a subsequent season.

At the end of June the water resources assessment outlook for New South Wales in the 2000–2001 season ranged from a forecast usage of 910 gigalitres (under very dry conditions) to the estimated maximum usage of 2420 gigalitres (for average conditions or wetter). In comparison, the outlook for Victoria in the 2000–2001 season ranged from a usage of 1720 gigalitres (under very dry conditions) to an estimated maximum usage of 2100 gigalitres for average conditions, but reduced usage for very wet conditions (including Barmah-Millewa Forest commitments).

State irrigation allocations

At 1 July 1999, South Australia had a high likelihood of receiving its full water entitlement in 1999–2000. By the end of July 1999, South Australia's annual entitlement became assured due to improvements in inflows to the River Murray.

Victoria's initial irrigation announcement for the River Murray in 1999–2000 was 100 per cent water right and nil 'sales' water. Victoria's allocation policy was to direct subsequent resource improvements into the reserve until the water right was assured for the following season. Any further improvements were then directed toward increases in 'sales' water. Under this policy, the allocation for 'sales' water in 1999–2000 was progressively increased to 50 per cent by early March and then to 90 per cent by late April 2000.

In contrast, New South Wales maximised water availability in 1999–2000 by adopting the minimum reserve permitted under the *Murray-Darling Basin Agreement*. The initial allocation announcement was zero per cent entitlement for general security irrigation, although most users had access to carryover of unused entitlements from the previous season up to a limit of 20 per cent of entitlement. This was the second year in succession where a record low allocation of zero per cent for general security irrigation was made as the initial allocation. Following improvements in inflows along the River Murray, the allocation was progressively increased to 17 per cent by mid-October 1999. Further improvements in inflows enabled the New South Wales allocation to be progressively increased to 35 per cent by the end of the irrigation season. This was the lowest end-of-season allocation level on record.

In view of the dry season, the Barmah-Millewa Forest allocation was not used to augment forest watering during 1999–2000. New South Wales set aside its share (50 gigalitres) so that it could be made available for consumptive allocation, and paid back in a subsequent year.

State water diversions

Diversion from the River Murray by New South Wales was very low because of the record low allocation. In addition, frequent rainfall events in irrigation areas suppressed demand for irrigation water late in the season. Despite moderately high allocation to Victorian Murray valley irrigators, total diversion to Victoria was also lower than expected because of frequent rainfall events in early 2000.

State diversions from the River Murray and lower Darling River are detailed in Table 7.

Table 7: State diversions[+] (gigalitres)

Year	River Murray				Darling**
	NSW	Vic	SA	Total	NSW
1982–83	1640	1590	700*	3930	88
1983–84	1795	1316	483	3594	475*
1984–85	2211	1747	521	4479	286
1985–86	1985	1577	481	4043	78
1986–87	1795	1472	490	3757	77
1987–88	2156	1842	506	4504	185
1988–89	1500	1335	537	3372	444
1989–90	2077	1649	577	4303	152
1990–91	2308	1853	630	4791	204
1991–92	2431*	1824	573	4828*	96
1992–93	1633	1144	466	3243	77
1993–94	1822	1406	596	3824	156
1994–95	2163	1988*	643	4794	66
1995–96	1969	1741	549	4259	181
1996–97	2223	1744	580	4547	224
1997–98	1863	1694	631	4188	48
1998–99	1978	1766	669	4413	153
1999–2000#	1270	1519	620	3404	58

Notes:

[+] *Data are based on the official MDBC record for the reporting requirements of implementation of the Cap on diversions.*

* *Record high diversion.*

** *Includes releases from Cawndilla Outlet to the Great Darling Anabranch.*

Data provided for 1990–2000 is estimated based on hydrographic and operational data.

Water trade

In November 1997, the Murray-Darling Basin Ministerial Council approved a pilot scheme for *permanent* interstate trade of water entitlements between private diverters in the reaches of the River Murray between Nyah and the barrages. Within the agreed procedures, a volume of 5400 megalitres (or 5.4 gigalitres) of permanent interstate trade occurred in 1999–2000. Adjustment of flow to South Australia to reflect interstate trade to and

from South Australia is made in the irrigation season following the season of the trade. Consequently, flow adjustments in respect of permanent trade in 1998–1999 were made during 1999–2000; and adjustments in respect of trade in 1999–2000 will be made in 2000–2001. Permanent trade between New South Wales and Victoria is implemented by appropriate adjustment of water storage accounts for those states each year.

While significant temporary water trade occurred within states during 1999–2000, relatively small volumes of temporary interstate water trade occurred. During 1999–2000, adjustment of flow to South Australia was made in response to temporary interstate trade that occurred in both 1998–1999 and 1999–2000. The final adjustment resulted in an additional 2400 megalitres passing to South Australia in 1999–2000.

Flow to South Australia

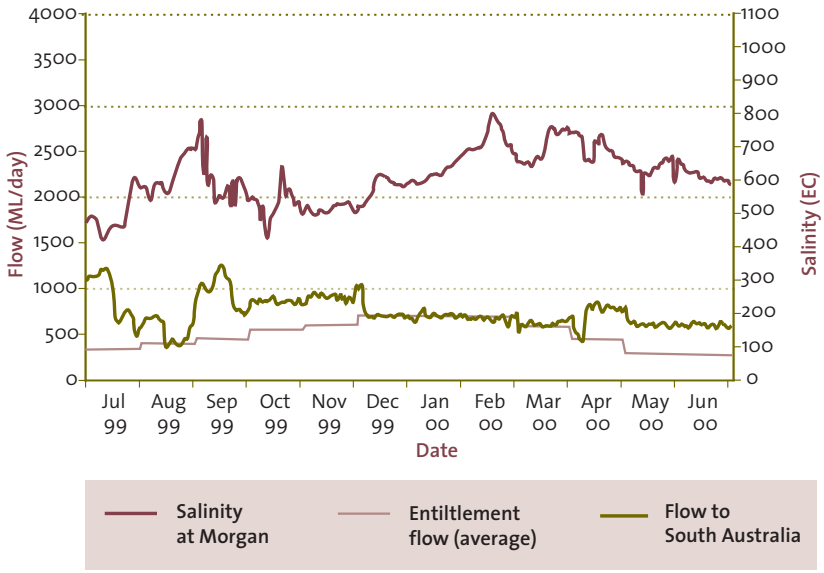
From 1 July 1999, additional dilution flow to South Australia (that is, 3000 megalitres flow per day above the normal entitlement, for the purpose of achieving further dilution of river salinity) was maintained until mid-August 1999 in accordance with the Salinity and Drainage Strategy. In the latter part of August 1999, the additional dilution flow was temporarily ceased until the end of August 1999 under an arrangement agreed to by the Commission to share between the states the impacts of the draw-down of Lake Victoria earlier in the year. The cessation of additional dilution flow was conditional on the salinity level at Morgan remaining below 800 EC units. As salinity levels for the remainder of the season remained below that limit, the water saving was transferred to the New South Wales reserve.

Additional dilution flow was reinstated on 1 September 1999 and continued until early December. It was again provided from early April to the end of June 2000 when storage in Menindee Lakes exceeded the relevant targets for the provision of additional dilution flow.

Some periods of above-entitlement flow occurred in July as a result of rain and the need to hold low water levels in Lake Victoria, and again in September 1999 as a result of increased upstream flows and the constraint of inlet capacity at the lake.

Total flow to South Australia for the year was 2780 gigalitres, which is above the annual entitlement of 1850 gigalitres, but well below the long-term average of 6200 gigalitres. Flow and salinity behaviour is shown in Figure 9.

Figure 9: Flow to South Australia 1999–2000 (combined with salinity levels measured at Morgan)



Operation of storages

Following significant draw-down of storage in the previous season, total Commission storage at the start of July 1999 was low at 45 per cent of active capacity. By comparison, this was considerably higher than the starting level in the previous season (26 per cent of active capacity at the start of July 1998) after the dry season of 1997–1998. Storage steadily improved in the period from July to October 1999 following winter and spring inflows to upper Murray storages. Total storage peaked at 62 per cent in mid-October 1999, and was then steadily drawn down to a minimum of 45 per cent in late March 2000. Total storage recovered to 61 per cent by 30 June 1999.

Storage in Hume Reservoir, the Commission's main regulating storage for irrigation and water supply, was low (24 per cent of capacity at 1 July 1999). This storage increased to a peak of 59 per cent of capacity by late October 1999, and remained near this level until late November. Storage was then drawn down to meet downstream demand, and reached a minimum level of 23 per cent in mid-April 2000. By the end of June 2000 it had recovered to 42 per cent.

Water transfers from Dartmouth Reservoir to augment storage in Hume Reservoir (to meet downstream requirements) commenced in mid-January 2000, although entitlement releases specifically for hydro-electricity generation commenced prior to this in early December. Releases to augment storage in Hume Reservoir for irrigation and downstream requirements continued until mid-March 2000; a volume of about 170 gigalitres (including some power station entitlement releases) was transferred. Slightly greater than minimum flows were maintained in late March and early April 2000 in response to low tributary inflows to the Mitta Mitta River. Some further power station entitlement releases were made between March and the end of June 2000. Storage in Dartmouth began at 45 per cent of capacity at the start of July 1999, peaked at 56 per cent in early January 2000, and was then drawn down to a low point of 53 per cent in early April 2000 before recovering to 56 per cent by end of June 2000.

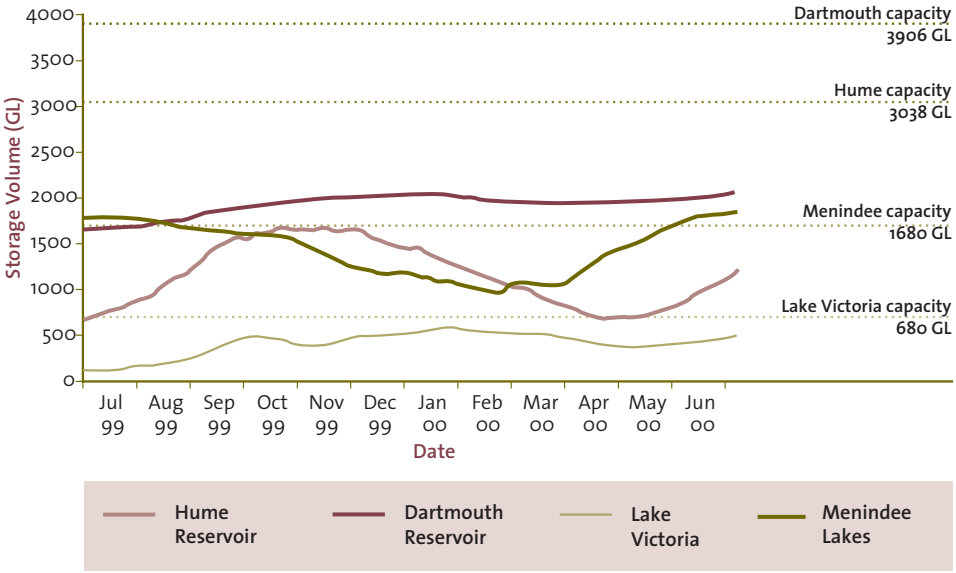
Storage in Menindee Lakes at 1 July 1999 was surcharged at 114 per cent of nominal capacity following improved inflows in the previous April to June period. ('Full capacity' of Menindie Lakes under most conditions is defined as 1680 gigalitres.) Major releases, to augment River Murray flows and storage in Lake Victoria, commenced in early July 1999 and continued until late February 2000. Consequently, without significant inflows, storage in Menindee Lakes was steadily drawn down to a minimum of 61 per cent of capacity by late February 2000. Rain in the Darling River system between February and May 2000 raised Menindee storage to 117 per cent by end of June 2000.

Storage in Lake Victoria at the start of July 1999 was low (only 20 per cent of capacity) following a special draw-down to allow for an archaeological survey to be undertaken. As flows in the lower Darling were fully regulated throughout the 1999–2000 season, and flows in the mid-Murray were fully regulated for most of the season, Lake Victoria did not fill in the winter–spring period of 1999 because conditions were generally dry. Storage in the lake rose to a peak of 90 per cent of capacity by mid-January 2000, and was then drawn down to a low point of 55 per cent by late April. It recovered to 73 per cent by end of June.

At the end of June 2000, most of the Commission's water reserve was stored in Dartmouth Reservoir and Menindee Lakes.

Storage behaviour resulting from River Murray Water's operation of the Commission's four major storages is shown in Figure 10.

Figure 10: Behaviour of major storages 1999–2000



Hydro-electric power stations

Operation of power stations at Hume Dam and Yarrawonga Weir continued throughout 1999–2000 according to downstream flow requirements and generation capacity. At Dartmouth Dam, Southern Hydro made use of its water entitlement (including a special carryover provision from the previous year) to generate additional electricity during periods of high electricity demand.

The Snowy Mountains Scheme

Storage in the Snowy Scheme was high at the beginning of 1999–2000. The Snowy Mountains Council approved the release of up to 1659 gigalitres from Murray 1 Power Station for the 12-month period 1 May 1999 to 30 April 2000 – significantly above the 'minimum notification' release volume of 1062 gigalitres for the 12 months to the end of April. The actual release from Murray 1 Power Station for the 12 months to 30 April 2000 was 1162 gigalitres. This comprised 1062 gigalitres as minimum notification plus 100 gigalitres as an advance of the following season's entitlement to New South Wales irrigators.

In late 1999, following a request by New South Wales, the Commission endorsed an arrangement for an advance of 100 gigalitres from the Snowy Mountains Scheme to participating New South Wales irrigators in the 1999–2000 water year. The advance is to be paid back in the 2000–2001 water year so that there is no impact on the water resources of South Australia or Victoria.

4.2.2 ENVIRONMENTAL REPORT

River flows

Following the moderately dry conditions of 1998–1999, inflow conditions in the upper Murray in July 1999 continued to be low. After near median conditions in August and September 1999, dry conditions prevailed in October and November. Near median conditions were then recorded from December 1999 to April 2000, followed by wetter than median conditions in May and June 2000.

Neither Hume Reservoir nor Dartmouth Reservoir filled during the winter–spring period. Only small to moderate flushes were recorded in the Kiewa and Ovens Rivers, which produced a minor flush downstream of Yarrawonga Weir in August and September 1999. Flow from the Goulburn River to the River Murray was generally regulated at low rates except for a moderate flush in August and September 1999. Flow from the Murrumbidgee River to the River Murray included several periods of higher flows generated by rainfall in the Murrumbidgee catchment. Higher regulated flows were delivered late in the irrigation season from an inter-valley trade account. Flow in the mid-Murray was therefore quite variable throughout the year, except for a period of fairly steady regulated flows in December 1999.

Water quality

A salinity spike, which originated with increased flows in the Darling River upstream of Menindee Lakes, reached the River Murray in mid-December 1999. This produced a rise in salinity of the River Murray at Wentworth (immediately downstream of the Darling junction) from about 450 to 890 EC, however, this peak was subsequently mitigated by the diversion of some of the more saline water into Lake Victoria. Further downstream, the salinity spike caused salinity at Morgan to increase from about 550 to 720 EC in mid-February 2000.

Medium-alert-level blue-green algal counts were recorded in the River Murray in the Mildura and Wentworth Weir pools in December 1999, and generally continued before declining to low levels by late March 2000. High-alert levels of blue-green algae were reported in the River Murray between Tocumwal and Torrumbarry Weir, and also in the Edward River and Gulpa Creek between the River Murray and Stevens Weir in December 1999. Medium-alert-levels persisted in these reaches throughout the months of January to April before declining to low-alert levels in May.

Blue-green algal counts in the lower Darling River and lower Murray were generally low throughout the year, partly due to the relatively high turbidity of Darling River and the moderately high flow rates which occurred in the lower Darling during the warmer months.

Salinity mitigation schemes

- *Victoria*

  The pumping of saline water at the Barr Creek Scheme was usually effective in reducing the salt load reaching the River Murray. However, pumping was suspended on occasions when flows in the River Murray caused a back-up of water levels in Barr Creek that rendered pumping inefficient. Flows in Barr Creek were reduced during the year as a result of a strategy implemented by Goulburn-Murray Water to reduce outfalls from irrigation channels and farm drainage to the creek. An investigation aimed at improving the effectiveness of the scheme began. One proposal is to build a new weir at a higher level than that existing downstream of the pumps so that the frequency of 'backing up' of Barr Creek by raised River Murray water levels is reduced. This would lower the frequency of reduced-efficiency pumping. During 1999–2000, a commercial company conducted trials to harvest minerals from salt residues at Lake Tutchewop. If this operation is successful, it will have the added benefit of extending the life of the Barr Creek Scheme.

  The Mildura-Merbein Scheme was operated in accordance with performance targets. The groundwater pumps were operated for most of the year as there were no periods of extended high flows in the River Murray. Modifications were made at two pump sites to improve pump performance.

  The only opportunity to make controlled releases of saline water from Lake Hawthorn to the River Murray was in September 1999, when there was a short period of high flows in the River Murray which provided the

required dilution. Following heavy rain in February 2000, the water level of Lake Hawthorn became very high. It became necessary to release water to the River Murray for a short period of time to control the lake level. The salinity impact on the River Murray was negligible because the volume of the discharge rate was small compared with the much larger volume of low salinity water flowing in the main channel of the river at that time. Work was undertaken on the channel connecting the lake to evaporation basins, and this has increased the evaporative capacity of the scheme.

- *New South Wales*

  At the Mallee Cliff Scheme, performance of pumping bores has improved to levels at or better than original specifications. This follows successful treatment of iron bacteria that foul the pipelines. Exceptionally good scheme performance over 1999–2000 has ensured that the scheme continues to significantly reduce impacts of saline groundwater on downstream river salinity.

  At the Buronga Scheme, rehabilitation of pumping bores was undertaken to improve performance, which had previously been declining. Other work included temporary repair of some sections of asbestos pipeline. Further improvements in performance are expected following an announcement in June 2000 that New South Wales would fund a major program of refurbishment of the scheme.

- *South Australia*

  The Woolpunda and Waikerie Schemes continue to operate effectively in reducing salinity levels in the River Murray. Many of the initial groundwater target levels in the Woolpunda Scheme have been reached. A performance review is under way to confirm the long-term targets, and reduce bore flow rates accordingly.

  The performance review of the Waikerie Scheme has shown that flow rates in some bores can be reduced, however there may be a need for additional pumping in the western end.

  At the Rufus River Scheme, the new iron bacteria control system installed on one well point line has completely controlled iron bacteria fouling of spears and pipelines, and has enabled the groundwater target level to be achieved. Control systems will be installed on the other lines in the coming year.

Murray mouth

Reduced river flows due to drought conditions across the Basin during the past three years have resulted in the area around the Murray mouth becoming very constricted due to sand deposition. Under natural conditions, tidal flows deposit sand inside the mouth in the Coorong and Goolwa channels. Natural high-river flows flush this accumulation, re-establishing the natural flow paths.

At the beginning of July 1999, following almost six months of low flow to South Australia, the Murray mouth was very narrow. This low flow was at, but did not exceed, the rate of flow to South Australia required by the *Murray-Darling Basin Agreement* for that period of the year.

Measures were undertaken by South Australia, in conjunction with River Murray Water, to maintain a flow path to the mouth despite the long period of reduced river flows. In April 2000, the lower lakes were surcharged at levels above normal full supply level by storing some of the water provided by a period of additional dilution flow to South Australia. During May 2000 there was an opportunity to use water surcharged in the lower lakes to make pulsed releases from the barrages at relatively high flow rates for short periods. These pulsed releases were aimed at clearing accumulated sand and maintaining a flow path at the mouth. They led to a temporary improvement in the cross-sectional area of the river mouth and Coorong and Goolwa channels.

However, by late June 1999 ocean conditions and relatively low regulated river flows led to yet another reduction in the size of the opening of the Murray mouth. The degree of restriction was the greatest seen at that time of year since the mouth closed in 1981. Without significant high flow to South Australia in the winter and spring of 2000, there is a continued risk of mouth closure.

Recent survey work has revealed that approximately 2.8 million cubic metres of sand has accumulated in the vicinity of the mouth. Although the pulsed releases resulted in a temporary improvement, they did not remove any significant volume of sand from the mouth's vicinity. Due to the increased potential for closure of the mouth during the summer of 2000–2001, the Murray Mouth Advisory Committee is giving consideration to a possible major dredging operation to remove the accumulated sand.

The Murray Mouth Advisory Committee met regularly throughout the year to monitor conditions and to coordinate a barrage operation aimed at maintaining a flow path at the mouth and at preventing its closure. The committee's activities included:

- coordinating and reviewing the monitoring of physical conditions at the mouth;
- reviewing the results of environmental monitoring at the mouth;
- preparing a contingency plan for management options for maintaining a flow path at the mouth, and for the long-term management of the mouth; and
- coordinating studies on modelling of sediment transport.

In March 2000 the Commission approved funding for a major study of the lower lakes and Coorong area addressing a range of natural resource and hydrologic processes; and also for a study on the decline of waterbirds and migratory birds near the Murray mouth.

River management activities

- *Mitta Mitta River downstream of Dartmouth Dam*

  A draft Waterway Management Strategy for the Mitta Mitta River downstream of Dartmouth Dam was released in March 1999. This strategy proposed a three-year program of remedial works, including protection from erosion at key sites, willow control and revegetation with native plant species.

  Draft cost-sharing guidelines were proposed in the strategy, based on the principles of both 'polluter/contributor pays' and 'beneficiary pays'. Funding has been obtained from River Murray Water and Goulburn-Murray Water. Contributions are also being sought from Federal, state, regional and local sources. The strategy recommended that a review of the final cost-sharing arrangements should be based on the results of a geomorphic investigation, to identify the rates of erosion occurring in the river channel before and after Dartmouth Dam's construction.

  The 1999–2000 River Murray Water budget contributed approximately $100 000 towards on-ground works undertaken this year in accordance with this strategy. This amount was of similar magnitude to funding allocated in previous years for willow control activities aimed at maintaining channel capacity. Works undertaken this year consisted of

bank protection works (rock armouring) at several key erosion sites in the downstream reaches of the Mitta Mitta River, and routine willow control. A further $40 000 was allocated to the geomorphic investigation. Specialist geomorphologic consultants were appointed in May 2000, and the study is expected to be completed by about September 2000.

Contributions from the other sources identified under the strategy have not yet been obtained (due in part to the recent restructure of funding sources for catchment management authorities in Victoria following the state election). The North-East Catchment Management Authority is continuing to pursue these funding sources.

- *River Murray between Hume Dam and Lake Mulwala*

  Following recommendations of the Commission's Hume and Dartmouth Dams Operations Review, an advisory group on waterway management from Hume to Yarrawonga was formed during the year. Terms of reference were developed, and community representation on the advisory group was negotiated with local councils and special-interest groups. The advisory group also includes representatives from state agencies on both sides of the river as well as South Australia and River Murray Water.

  The first meeting of the advisory group was convened in May 2000. The primary task is to steer the development of a river management plan for the River Murray and anabranches between Hume Dam and Yarrawonga Weir. A consultancy brief for a preliminary scoping study (reviewing and extending the work previously undertaken by consultants) was reviewed by the group in June and advertised in early July 2000. It is expected that this preliminary study will identify key waterway management objectives, and will be completed by October 2000.

  Prior to the adoption of a formal river management plan, the Department of Land and Water Conservation will continue to undertake remedial work to control erosion 'hot spots'. Approximately $450 000 was spent on rock revetment, erosion control works, design of control structures, native revegetation and fencing, and the supporting inspections and investigations.

4.3 ASSET MANAGEMENT

4.3.1 HUME DAM REMEDIAL WORKS

Since April 1995, following a structural review of Hume Dam, the Commission has been pursuing a program of upgrading the dam to contemporary standards. This program addresses stability of the dam itself, the reliability of outlet works and spillway, and the capacity of the spillway under extreme floods. The program is due for completion in two years. Excluding considerations of spillway capacity, total cost is expected to be in the vicinity of $75 million.

A risk assessment approach has been used to ensure that work proceeds in a priority order of most effective risk reduction. The ultimate goal is to reduce risks to as low as reasonably practicable in line with Australian national guidelines and international best practice.

Expenditure on the works for 1999–2000 was $11.8 million, bringing total expenditure so far to $57.9 million. Good progress was achieved throughout the year and is detailed below.

Embankment improvement works – Phase 2

Phase 1 embankment works were completed in the previous year. These works achieved contemporary dam safety standards for normal operating conditions. However, although the embankments reached these standards by November 1997, inflows since that time have not been sufficient to fill the reservoir and prove the performance of the remedial works.

The second phase began in March 1999 and is essentially designed to further improve the stability of the dam under extreme earthquake loading. The works will ensure that Hume Dam can withstand an earthquake 50 times more severe than that experienced in Newcastle in 1989. The estimated cost is $15 million. The works focus on Embankment 1 on the Victorian side of the river. They include:

- extending berms (gravels added to the banks for weighting and strengthening purposes) and filters on Embankment 1B to dam-crest level;
- extending berms and filters at the Southern Junction to dam-crest level;
- improving the alluvial foundations by installing stone columns; and

- constructing a low-height berm and filters at the downstream toe of Embankment 1A, extending from the Junction to the Bend.

At year's end, the Phase 2 works were nearing completion, with only the low-height berm at the toe of Embankment 1A still to be completed.

Spillway gates

Work has commenced to upgrade the operating system of the dam's 29 spillway gates to ensure long-term reliability. The work involves renewing the power supply and distribution system to the operating equipment, providing back-up power sources, rewinding the motors, and adding modern control technology. This work should be completed by February 2001 for an estimated cost of $2.5 million.

Emergency closure gate installation

Other than during floods, the release of water from Hume Dam is made through two hydro-electric conduits and four irrigation conduits. Each conduit has a corresponding emergency closure gate, positioned within the dam to be operated to prevent an uncontrolled release of water should the hydro-electric turbines or irrigation regulating valves malfunction. Replacement of the old and obsolete gates has been undertaken to maintain operational reliability and safety.

This complex task commenced in June 1997 and, at year's end, both hydro-electric and two of the irrigation closure gates had been replaced and commissioned. The remaining two installations should be finished by early 2001. This $18 million project is being jointly funded by River Murray Water and Pacific Power.

Additional works and structural reviews

A third phase of embankment work has been added to ensure that even longer-term integrity is maintained under extreme conditions. This involves raising the downstream berm and filter layer at Embankment 1A to dam-crest level. This work is scheduled for completion in 18 months at an estimated cost of $6 million.

Periodic structural reviews continue to be conducted. These are aimed at reducing structural risks to as low as is reasonably practicable.

Particular attention in these reviews has been paid to the area where the main earthen embankment abuts the concrete gravity dam (which has been the site of the most intensive remedial works). It is expected that

movements in this area will continue through the life of the dam because of the different structural characteristics of the earth fill and the mass concrete. Close surveillance of this area will occur in the period of the next filling of the reservoir to monitor the performance of the complex works at this important junction.

Investigations are continuing into the acceptable flood capacity of Hume Dam. At present, the likelihood of a flood greater than the discharge capacity of the dam has an annual probability of occurrence of once in 110 000 years. However, flood capacity standards are currently under review and it is expected that this aspect of Hume Dam will be the subject of further investigation.

4.3.2 MODIFICATIONS OF NAVIGABLE PASSES AT LOCKS AND WEIRS

River Murray Water has been investigating improvements to the navigable passes on the eleven 'Boule panel'-type weirs of the River Murray (locks and weirs numbers one to 10 and number 15). The steel-framed components, which are removed from the river during high flows for boat passage when the locks are drowned out, are expensive to maintain and hazardous to operate. These navigable passes are nineteenth century technology and the matter of operator safety alone has now rendered them obsolete.

A project steering committee, chaired by River Murray Water and comprised of the South Australian Water Corporation, New South Wales State Water, consultants and a reference group of key stakeholders, has been investigating a range of possible modification options.

At year's end, a series of public meetings provided valuable community feedback on the most viable options. A construction program is planned to progressively modify the passes over the next four years.

4.3.3 OCCUPATIONAL HEALTH AND SAFETY ACTIVITIES

A safety audit of the River Murray structures completed in 1998 identified a number of areas of unacceptable risk to both operators and the public. Principal among them has been:

- the navigable pass operations at the weirs;
- operation and access at the barrages;
- access on the locks and weirs; and
- the safe storage of chemicals and flammable liquids.

These areas have received priority attention over the last year. In addition to the review of the navigable passes described in 4.3.2, a program of access and storage improvements at the locks and weirs has been pursued. The barrages have also received careful attention and, at year's end, vehicle and pedestrian barrier systems were being installed on the Mundoo and Boundary Creek structures.

The approved budget plan for 2000–2001 provides for the continuation of these priority improvements.

The trestles at Mildura Weir, comprising the 'Dethridge'-type weir, are normally removed from the river every two or three years for maintenance purposes, or for the passage of flood flows. A recent occupational health and safety audit has highlighted a number of hazards associated with their removal and reinstatement. Consequently, the planned removal of the trestles has been deferred while the safety issues are addressed ahead of possible high flows in the spring.

4.3.4 OTHER MAJOR ACTIVITIES

Planned routine and cyclical maintenance was undertaken across the asset portfolio during 1999–2000. Major non-cyclical projects are as follows.

Yarrawonga Weir

A structural safety review has been carried out by consultants. The review confirms that remedial works will be needed to bring the structure up to contemporary seismic standards. Investigations of required works have begun with a view to starting construction early.

The operation of the fish lift at Yarrawonga Weir by interim 'trap and truck' means during the October to January spawning season has resulted in a number of possible options for improved fish migration. These are presently being evaluated for implementation during the coming year.

Euston Weir

Following the 1998 safety audit of the lower Murray structures, a more detailed program of structural investigations has been conducted at Weir and Lock 15. Openings excavated in the concrete floor of the lock, to assess the condition of the foundation piles, revealed substantial under-floor voids in two locations. These have been thoroughly investigated and backfilled, and the adequacy of the timber piles confirmed. Further investigation and surveillance will continue to clarify the integrity of the structure.

Other structures

Projects include:

- completion of the first repaint of the high-level outlet tunnel at Dartmouth Dam;
- investigation of the risks associated with operating the removable trestles at Mildura Weir (these are the only 'Dethridge'-type trestles remaining in operation in the River Murray);
- investigations into potential hydro-electric generation at Torrumbarry Weir and, in conjunction with the Sustainable Energy Development Authority of New South Wales, the other 'low-head' weirs on the Murray; and
- the replacement of protective coatings on Redbank Weir which use similar technology to that applied at Maude Weir, and are being completed as a precursor to the projected handover of both structures to New South Wales.

4.3.5 PRELIMINARY PORTFOLIO RISK ASSESSMENT

As a crucial component of the required asset management planning tools, a preliminary (life cycle) risk assessment of River Murray Water's portfolio of structures has been undertaken. The process has analysed a number of factors down to component level, such as the annual likelihood of failure, time required to repair and resume service, owner and third-party consequences and societal consequences.

The important result of this process is a risk ranking within the portfolio of assets which will greatly assist the prioritising of works programs.

4.3.6 LONG-TERM ASSET MANAGEMENT

The first draft of a suite of asset management tools has now been assembled for the portfolio of River Murray Water structures. These include:

- an asset register – containing the essential raw data on the components as source material, rather than a 'financial register';
- detailed descriptions of services to be provided by constructing authorities at activity level, coordinated with the asset register and chart of accounts;

- valuations at component level for all infrastructure assets, for both reproduction costs and modern engineering-equivalent replacement assets;
- condition assessments at component level, including estimated residual life;
- a 100-year capital works profile based on these condition assessments and estimated life cycle capital costs;
- an asset management software information system to store and integrate the data, to produce the required reports, and to generate a renewals annuity; and
- the preliminary portfolio risk assessment outlined in section 4.3.5 above.

This is the first assembly of such asset management tools covering the River Murray Water portfolio. Refinement of the data over the next two or three years is important for checking its accuracy and ensuring its reliability.

5 FINANCE AND HUMAN RESOURCES

The staff of the Commission Office work to provide the Commission with best practice administrative and knowledge systems that will provide both transparency and accountability.

5.1 THE 1999–2000 BUDGET

The Ministerial Council approved a budget of $57.1 million for 1999–2000. The composition of this was:

	$ MILLION
River Murray Water	35.8
Basin Sustainability/Natural Resources Management	21.3
Total	57.1

The contributions by Contracting Governments to this expenditure, together with other funding sources, are shown in Table 8.

TABLE 8: CONTRIBUTIONS OF CONTRACTING GOVERNMENTS AND OTHER SOURCES OF FUNDING

GOVERNMENT	$ MILLION
Commonwealth	9.1
New South Wales	16.3
Victoria	15.2
South Australia	11.6
Queensland	0.5
Australian Capital Territory	0.3
Total Contracting Governments	53.0
Other income	1.6
Funds carried forward from previous year	2.5
Total Commission funding	57.1

5.2 FINANCIAL STATEMENTS

The Australian National Audit Office continues as the Commission's auditor.

The financial statements have been prepared on an accrual basis. These statements, including the auditor's report and the statement on behalf of the Commission, are provided on pages 111 to 135.

5.3 THE 2000–2001 BUDGET

In March 2000, the Ministerial Council approved a budget of $63.6 million for the Commission in 2000–2001. This comprised:

	$ MILLION
River Murray Water	42.3
Basin Sustainability/Natural Resources Management	21.3
Total	63.6

5.4 STAFF OF THE COMMISSION

Staff engaged by the Commission provide advice on policy, strategy and investment programs, and arrange and coordinate implementation on programs. The Commission also employs management and operational staff of River Murray Water.

Staff are employed in accordance with the Certified Agreement between the Commission and its employees. During the year, negotiations commenced between management and employee representatives to develop a new agreement to replace the existing one when it expires in the second half of 2000. The Commission records its appreciation of the role of the Staff Consultative Committee and the cooperation of all staff in implementing the existing agreement during the year, including the introduction of the Performance Management and Development Scheme and the upgrading of the Human Resources Manual, as well as the constructive input to the development of the new Agreement.

At 30 June 2000 the Commission employed a total of 68 staff on a variety of bases, including continuing, fixed term, casual and part time. Other officers are seconded from state and Commonwealth agencies.

Table 9: Staff structure

	Male	Female	Total
Senior Executive	5	1	6
Other employees	32	30	62
Total	37	31	68

The skills base of the Commission (Table 10) reflects the strategic role of the Commission in the formulation, coordination and implementation of policies and in the application of sound management and business procedures.

Table 10: Academic qualifications

Summary qualifications	Total	Science	Engineering	Business
Doctorate	4	3	1	–
Master	7	3	3	1
Bachelor	36	17	8	11
Other tertiary	20	–	–	20
Total	67	23	12	32

The Chief Executive, Don Blackmore, was awarded an honorary doctorate of Science from La Trobe University in recognition of his contribution to natural resources management and the development of sustainable rural communities. With the Commission's approval he continued as a member of the World Commission on Dams.

Australian National
Audit Office

INDEPENDENT AUDIT REPORT

To the President of the Murray-Darling Basin Ministerial Council

Scope

I have audited the financial statements of the Murray-Darling Basin Commission for the year ended 30 June 2000. The financial statements comprise:

- Statement by President and the Chief Executive Officer of the Commission;
- Operating Statement;
- Balance Sheet;
- Statement of Cash Flows;
- Schedule of Commitments;
- Schedule of Contingencies; and
- Notes to and forming part of the Financial Statements.

The President and the Chief Executive Officer of the Commission are responsible for the preparation and presentation of the financial statements and the information they contain. I have conducted an independent audit of the financial statements in order to express an opinion on them to you.

The audit has been conducted in accordance with Australian National Audit Office Auditing Standards, which incorporate the Australian Auditing Standards, to provide reasonable assurance as to whether the financial statements are free of material misstatement. Audit procedures included examination, on a test basis, of evidence supporting the amounts and other disclosures in the financial statements, and the evaluation of accounting policies and significant accounting estimates. These procedures have been undertaken to form an opinion as to whether, in all material respects, the financial statements are presented fairly in accordance with Australian Accounting Standards, other mandatory professional reporting requirements and statutory requirements in Australia so as to present a view of the entity which is consistent with my understanding of its financial position, the results of its operations and its cash flows.

The audit opinion expressed in this report has been formed on the above basis.

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Centenary House 19 National Circuit
BARTON ACT
Phone (02) 6203 7300 Fax (02) 6203 7777

Audit Opinion

In accordance with sub-clause 84(4) of the *Murray-Darling Basin Agreement 1992*, I now report that the financial statements are in agreement with the accounts and records of the Murray-Darling Basin Commission and in my opinion,

(i) the financial statements are based on proper accounts and records;

(ii) the receipt, expenditure and investment of moneys, and the acquisition and disposal of assets by the Commission during the year have been in accordance with the *Murray-Darling Basin Agreement 1992*; and

(iii) the financial statements give a true and fair view, in accordance with applicable Accounting Standards and other mandatory professional reporting requirements of the financial position of the Murray-Darling Basin Commission as at 30 June 2000 and the results of its operations and its cash flows for the year then ended.

Australian National Audit Office

Puspa Dash
Senior Director

Delegate of the Auditor-General

Canberra

28 September 2000

MURRAY-DARLING BASIN COMMISSION

Statement on Behalf of the Commission

In our opinion, the attached financial statements give a true and fair view of the financial position and transactions of the Murray-Darling Basin Commission for the year ended 30 June 2000.

R.M Green AO
President

28 September 2000

B J Blackmore
Chief Executive Officer

28 September 2000

OPERATING STATEMENT
For the period 1 July 1999 to 30 June 2000

	Notes	2000 $'000	1999 $'000
Operating revenues			
Revenues from government	2A	48,722	42,688
Sale of goods and services	2B	857	800
Interest	2C	1,469	1,136
Net gain from sale of assets	2D	5	–
Other		–	23
Total operating revenues		**51,053**	**44 ,647**
Operating expenses			
Employees	3A	4,038	3,923
Suppliers	3B	46,782	41,399
Depreciation and Amortisation	3C	299	285
Interest	3D	22	–
Net loss from sales of assets	3E	–	6
Total operating expenses		**51,141**	**45,613**
Net operating loss		**(88)**	**(966)**
Net loss for the year		(88)	(966)
Accumulated surpluses or deficits at beginning of reporting period		4,171	5,137
Accumulated funds at end of reporting period		**4,083**	**4,171**

The accompanying notes and schedules form part of these financial statements.

BALANCE SHEET
As at 30 June 2000

	Notes	2000 $'000	1999 $'000
ASSETS			
Financial assets			
Cash	4A	11,317	12,743
Receivables	4B	219	98
Investments	4C	16,000	10,500
Other	4D	990	1,377
Total financial assets		**28,526**	**24,718**
Non- financial assets			
Property, plant and equipment	5A	615	582
Inventories	5B	5	8
Fit out cost	5C	404	–
Total non-financial assets		**1,024**	**590**
Total assets		**29,550**	**25,308**
LIABILITIES			
Debt			
Leases	6A	434	–
Total Debt		**434**	**–**
Provisions and payables			
Employees	7A	1,054	805
Suppliers	7B	9,009	9,201
Total provisions and payables		**10,063**	**10,006**
Revenue in advance	7C	13,876	10,419
Total revenue in advance		**13,876**	**10,419**
Total liabilities		**24,373**	**20,425**
EQUITY			
Accumulated funds		4,171	5,137
Contributions by Contracting Governments for purchase of assets		1,094	712
Operating surplus/(loss)		(88)	(966)
Total equity		**5,177**	**4,883**
Total liabilities and equity		**29,550**	**25,308**
Current liabilities		23,510	20,001
Non-current liabilities		863	424
Current assets		28,531	24,726
Non-current assets		1,019	582

The accompanying notes and schedules form part of these financial statements.

STATEMENT OF CASH FLOWS
For the period 1 July 1999 to 30 June 2000

	Notes	2000 $'000	1999 $'000
OPERATING ACTIVITIES			
Cash received			
Contributions by governments		52,085	50,048
Sale of goods and services		714	1,848
Interest		1,490	1,139
Total cash received		**54,289**	**53,035**
Cash used			
Employees		(3,789)	(3,858)
Suppliers		(46,488)	(37,683)
Interest and other financing costs		(23)	–
Total cash used		**(50,300)**	**(41,541)**
Net cash from operating activities	**18**	**3,989**	**11,494**
INVESTING ACTIVITIES			
Cash received			
Proceeds from sale of property, plant and equipment		91	73
Contributions by Contracting Governments for purchase of assets		382	268
Total cash received		**473**	**341**
Cash used			
Purchase of property, plant and equipment		(821)	(268)
Investments		(5,500)	(10,500)
Total cash used		**(6,321)**	**(10,768)**
Net cash from investing activities		**(5,848)**	**(10,427)**
FINANCING ACTIVITIES			
Cash received			
Proceeds from finance lease		439	–
Total cash received		**439**	**–**
Cash used			
Repayments of lease debt		(6)	–
Total cash used		**(6)**	**–**
Net cash from financing activities		**433**	**–**
Net increase in cash held		(1,426)	1,067
Cash at 1 July 1999		12,743	11,676
Cash at 30 June 2000		**11,317**	**12,743**

The accompanying notes and schedules form part of these financial statements.

SCHEDULE OF COMMITMENTS
As at 30 June 2000

	2000 $'000	1999 $'000
By Type		
Capital commitments		
Total capital commitments	**–**	**–**
Other commitments		
Operating leases	2,982	440
Finance leases	573	–
Total commitments payable	**3,555**	**440**
By Maturity		
All net commitments		
One year or less	552	388
From one to two years	546	26
From two to five years	1,581	26
Over five years	876	–
Net commitments	**3,555**	**440**
Operating lease commitments		
One year or less	466	388
From one to two years	460	26
From two to five years	1,323	26
Over five years	733	–
Total operating lease commitments	**2,982**	**440**

* The Commission has entered into an agreement to lease office accommodation and fit out at 15 Moore Street, Canberra City, that expires on 28 February 2007. Operating leases exist for photocopier and plotter equipment and for one vehicle.

The accompanying notes and schedules form part of these financial statements.

SCHEDULE OF CONTINGENCIES
As at 30 June 2000

	2000 $'000	1999 $'000
Contingent losses	–	–
Contingent gains	–	–
Net contingencies	**–**	**–**

SCHEDULE OF UNQUANTIFIABLE CONTINGENCIES

As at 30 June 2000 the Commission was joined as a party to a matter before the courts related to land rights. It is not possible to estimate the amounts of any payments that may eventually be required in relation to this case.

The accompanying notes and schedules form part of these financial statements.

1 Summary of significant accounting policies

1.1 Basis of accounting

The financial statements are general purpose financial reports on the financial position and transactions of the Commission. As indicated in Note 1.5, these statements do not incorporate assets and related depreciation for infrastructure considered to be held in trust by State Constructing Authorities on behalf of the Commission.

The financial statements have been prepared in accordance with Australian Accounting Standards and Accounting Guidance Releases issued by the Australian Accounting Research Foundation, Consensus Views of the Urgent Issues Group and having regard to Statements of Accounting Concepts. Financial statements have been prepared on an accrual basis in accordance with historical cost conventions. No allowance is made for the effect of changing prices on the results or financial position.

1.2 Taxation

Throughout the year under review, the Commission was exempt from all forms of taxation except fringe benefits tax and wholesale sales tax in respect of motor vehicles available for private use.

The Commission is not exempt from goods and services tax and where applicable, appropriate provisions have been included.

1.3 Inventories held for sale

Inventories comprise publications and videos held for sale or free distribution as part of the Commission's communications program. Inventories are stated at the lower of cost and net realisable value.

1.4 Property plant and equipment held by the Commission

All property plant and equipment with a cost equal to or in excess of $600 is capitalised in the year of acquisition and is reported at cost value. All depreciable non-current assets are written off to their estimated realisable value over their estimated useful lives using the straight line method of depreciation. The following useful lives and depreciation rates have been assumed for each category of asset.

Motor vehicles	6.67 years	(15% p.a.)
Computers and IT equipment	3.00 years	(33.3% p.a.)
Office equipment	5.88 years	(17% p,a.)
Furniture, fixtures and fittings	7.69 years	(13% p.a.)

Leasehold improvements are amortised over the estimated life of the improvements or the unexpired portion of the lease whichever is the lesser.

Under the provisions of the *Murray-Darling Basin Agreement*, Contracting Governments are required to contribute to the operating and capital expenditure of the Commission on an annual basis. Contributions by Contracting Governments for the purchase of assets are treated as a contribution of equity.

Recoverable amount test

The carrying amount of each item of property plant and equipment has been reviewed to determine whether it is in excess of the asset's recoverable amount. No write down to recoverable amounts has been made in 1999–2000.

1.5 Assets held by Constructing Authorities but acquired with Commission funds

Infrastructure assets used for the storage and distribution of bulk water and for related activities have been constructed with funds provided by the Commission. These assets are located in the states and operated by employees of state government agencies.

Although such assets are considered to be held in trust by state constructing authorities on behalf of the Commission, they have not been incorporated into these financial statements, nor has depreciation of these assets been taken into account in determining the operating profit/loss for the year. This position will be reviewed as progress is made in the establishment of the water business unit (River Murray Water) within the Commission and the introduction of a user-pays pricing regime for services provided by River Murray Water.

A valuation of these assets was undertaken during the year. This valued these assets at $1.6 billion, on a current replacement cost basis.

The *Murray-Darling Basin Agreement* requires each Contracting Government to account to the Commission for all moneys received from the Commission under the *Agreement*. The Commission must cause a list to be kept of both the assets it acquires and the assets Constructing Authorities acquire with funds made available by the Commission. To meet these requirements, assets acquired by the Commission are included in the Commission's asset registers and accounts (see Note 1.4) and each of the State Constructing Authorities is required by the Commission to prepare an asset register which is to be made available to the Commission on request during the year. The Commission has developed a consolidated register of all assets acquired with funds provided by the Commission.

1.6 Employee entitlements

All vesting employee entitlements (including salaries, employer superannuation contributions, recreation leave, and long service leave) are recognised as liabilities. Liabilities for recreation leave, employer superannuation contributions, and salaries are measured at current remuneration rates at 30 June 2000 (nominal value). The provision for long service leave at 30 June 2000 is measured as the present value of estimated cash outflows attaching to the nominal value at 30 June 2000. Estimated cash outflows are calculated by adjusting the nominal value for each employee for potential remuneration increases and applying a probability factor related to years of service to estimate expected payout and year of payment. The present value of each payout is calculated by applying discount factors derived from current yields of long-term government debt maturing in the expected year of payment.

The classification of recreation and long service leave liabilities into current and non-current is based on the past history of payments. No provision has been made for sick or personal circumstances and support leave as all such leave is non-vesting and the average leave taken by employees for these purposes is less than the annual entitlement for these forms of leave.

1.7 Leases

A distinction is made between finance leases which effectively transfer from the lessor to the lessee substantially all the risks and benefits incidental to ownership of leased assets and operating leases under which the lessor

effectively retains all such risks and benefits. Operating lease payments are expensed on a basis which is representative of the pattern of benefits derived from the leased assets.

Where a non-current asset is acquired by means of a finance lease, the asset is capitalised at the present value of minimum lease payments at the inception of the lease and a liability recognised for the same amount. Leased assets are amortised over the period of the lease. Lease payments are allocated between the principal component and the interest expense.

1.8 Lease incentives

Lease incentives are recognised as liabilities on receipt of the incentive. The amount of liability is reduced by allocating lease payments between rental expense and reduction of liability.

1.9 Revenue received in advance

In accordance with accrual accounting principles expenditures during the year are matched with revenues provided by governments and others to fund them. Amounts received in advance to fund projects in future years and unspent funds provided for the current year that have been authorised to be carried over to the following year in accordance with clause 75 of the *Murray-Darling Basin Agreement* are treated as revenue received in advance.

1.10 Cash

For the purpose of the statement of cash flows, cash includes cash on hand and on call at the bank.

1.11 Rounding

Amounts, including totals and sub-totals, are rounded to the nearest $1,000 except in relation to:

- remuneration of commissioners;
- remuneration of officers;
- remuneration of auditors.

Rounding may give rise to apparent minor discrepancies in additions.

1.12 Resources received free of charge

The Commission receives no resources free of charge.

	2000 $'000	1999 $'000
2 Operating revenues		
2A Revenues from government		
Contributions by contracting governments:		
Commonwealth	9,101	8,572
New South Wales	16,352	15,698
Victoria	15,161	14,482
South Australia	11,588	10,834
Queensland	511	601
Australian Capital Territory	253	218
Add revenue in advance in 1998–99	10,218	2,899
Less contributions paid for 1999–2000 in advance	–	(130)
Less revenue carried forward to 2000–2001	(13,782)	(10,218)
Less equity contribution for purchase of assets	(382)	(268)
Less contributions to be refunded to contracting governments	(298)	–
	48,722	**42,688**
2B Sale of goods and services		
Hydro generation and land & cottage rents	850	784
Sale of publications and videos	7	16
	857	**800**
2C Interest		
Interest from bank and investments	1,469	1,136
	1,469	**1,136**
2D Net gain from sale of assets		
Property plant and equipment	5	–
	5	**–**

		2000 $'000	1999 $'000
3	**Operating expenses**		
3A	**Employee expenses**		
	Salaries	3,910	3,890
	Increase in provision for annual leave	6	63
	Decrease in provision for long service leave	60	(124)
	Separation and redundancy	62	94
		4,038	**3,923**
3B	**Supplier expenses**		
	Expenditure by State Constructing Authorities	34,272	30,937
	Project expenditure	9,727	7,296
	Supply of goods and services	2,783	3,166
		46,782	**41,399**
3C	**Depreciation**		
	Depreciation of motor vehicles	23	24
	Depreciation of office equipment	48	37
	Depreciation of computers	171	201
	Depreciation of furniture, fixtures and fittings	22	23
	Amortisation of fit out costs	35	–
		299	**285**
3D	**Interest**		
	Interest on finance lease	22	–
		22	**–**
3E	**Net loss from sales of assets**		
	Property plant and equipment	–	6
		–	**6**

		2000 $'000	1999 $'000
4	**Financial assets**		
4A	**Cash**		
	Cash on call at bank	11,314	12,740
	Cash on hand	3	3
		11,317	**12,743**
4B	**Receivables**		
	Interest	134	65
	Other debtors	85	33
		219	**98**
4C	**Investments**		
	Term deposits	16,000	10,500
		16,000	**10,500**
4D	**Other financial assets**		
	Prepaid contracts	102	489
	Advances to Constructing Authorities	888	888
		990	**1,377**

5 Non-financial assets ($'000)

5A Property, plant and equipment

	Balance 1 July 1999	Retirements	Acquisitions	Balance 30 June 2000	Balance 30 June 1999
Motor vehicles (cost)	144	95	129	178	144
Accumulated depreciation	(23)			(27)	(23)
	121			**151**	**121**
Office equipment (cost)	270	57	225	438	270
Accumulated depreciation	(174)			(172)	(174)
	96			**266**	**96**
Furniture, fixtures and fittings (cost)	154	2	1	153	154
Accumulated depreciation	(91)			(112)	(91)
	63			**41**	**63**
Computers and IT equipment (cost)	968	54	28	942	968
Accumulated depreciation	(666)			(785)	(666)
	302			**157**	**302**
Net property plant and equipment	**582**			**615**	**582**
Totals retirements/acquisitions		**208**	**382**		

	2000 $'000	1999 $'000
5B Inventories		
Inventory of publications and videos held for sale and distribution	5	8
5C Fit out costs		
Fit out	439	–
Accumulated amortisation	(35)	–
	404	**–**

6 Debt

6A Leases

Finance lease commitments		
Not later than one year	86	–
Later than one year and not later then five	86	–
Later than five	402	–
Minimum lease payments	574	
Deduct – future finance charges	140	–
Lease liability	**434**	**–**
Lease liability is represented by:		
Current	50	–
Non-current	384	–
	434	**–**

	2000 $'000	1999 $'000
7 Provisions and payables		
7A Liabilities for employee entitlements		
Salaries and wages	254	66
Annual leave	320	315
Long service leave	480	424
	1,054	**805**
Current	574	381
Non-current	480	424
Total liabilities for employee entitlements	**1 054**	**805**
7B Suppliers		
Project expenditure payable	747	432
Constructing Authority claims payable	7,604	8,515
Other creditors	658	254
Total suppliers	**9,009**	**9,201**
7C Revenue received in advance		
Queensland 1999–2000 contributions received in advance	–	130
Carry-over of 1999–2000 contributions to 2000–2001	13,782	10,218
Unamortised balance of lease incentive	94	71
Total revenue received in advance	**13,876**	**10,419**

8 Unrecognised Liabilities

The Commission is not aware of any significant unrecognised liabilities at 30 June 2000 other than those recorded in the schedule of commitments.

9 Liabilities assumed by governments

Except as indicated by these statements no liabilities have been assumed by governments.

10 Remuneration of officers

	2000 $	1999 $
Income received or due and receivable by Officers	841,200	692,584

The number of officers included in these figures are shown below in the relevant income bands

	Number	Number
$100,000 – $109,999	–	1
$110,000 – $119,999	1	1
$120,000 – $129,999	2	–
$130,000 – $139,999	–	1
$150,000 – $159,999	2	1
$180,000 – $189,999	–	1
$190,000 – $199,999	1	–

'Remuneration' refers to salary, employer superannuation, estimated cost of motor vehicles provided as part of a remuneration package, spouse travel entitlements and related fringe benefits tax, paid during 1999–2000 for officers concerned with the management of the Office of the Commission where the total paid in respect of an individual exceeded $100 000.

11 Remuneration of Members of the Commission

Remuneration is paid to one executive member. No remuneration is paid to non-executive members who are State or Commonwealth public servants or officers of State agencies. The remuneration paid to the executive member is less than $100 000.

12 Auditors' Remuneration

	2000 $	1999 $
Remuneration to be paid to Commonwealth Auditor General for auditing financial statements for the reporting period. No other services were provided by the Auditor-General.	23,000	23,000
Remuneration paid for internal auditing services during the reporting period (includes assistance in preparation of accrual accounts).	–	30,870

13 Related Party Disclosures

Members of the Commission

Members of the Commission during 1999–2000 were:

Dr RM Green AO (President)	(from 24 March 2000)
Dr C Adrian	
Mr T Fenwick	(to 26 September 99)
Mr D Flett	
Mr S Hunter	
Dr I McPhail	(from 30 September 99)
Mr D Mutton	
Mr J Scanlon	(to 23 March 00)
Dr K Sheridan AO	
Dr R Smith	
Mr S Spencer	(from 30 September 99)
Mr S Sullivan	(from 30 March 00)
Mr P Sutherland	(from 14 December 99)
Mr M Taylor	(to 14 December 99)
Mr B Wonder	

Loans to Members and Officers

No loans were made to members or officers of the Commission.

Transactions with related entities

The Murray-Darling Basin Commission is the executive arm of the Ministerial Council established by the 1992 Murray -Darling Basin Agreement. As a partnership between the States and Commonwealth funds for activities under the direction of the Commission are paid into the Commission's account and disbursed according to Commission priorities. The bulk of Commission funded activity is undertaken by State agencies as constructing authorities. All transactions are at arm's length and in accordance with budgets and programs approved by the Ministerial Council.

14 Economic Dependency

The Commission is dependent on contributions by Contracting Governments to carry out its normal activities.

15 Location of Business

With the exception of assistance provided to the Mekong River Commission under AusAid funding the Commission operates solely in Australia.

16 Subsequent Events

The Commission is aware of no events subsequent to 30 June 2000 that may affect these financial statements.

17 Grants

The Commission is responsible for administering a number of grant programs on behalf of Commonwealth and State governments. Funding for these programs and responsibility for the programs rests with the various individual government bodies, consequently no disclosures have been made in relation to grant programs.

Grants received during the year were for the Mekong Delta and Fish Rehabilitation projects. Details of revenue and expenditure in relation to grant programs are as follows:

	2000 $'000	1999 $'000
Grants program		
Cash available, 1 July	623	523
Contributions by government agencies	453	518
Total receipts	**1,076**	**1,041**
Payments	877	418
Cash available, 30 June	**199**	**623**

18 Cash Flow Reconciliation

Reconciliation of operating surplus to net cash from operating activities

	2000 $'000	1999 $'000
Operating surplus/(deficit)	**(88)**	**(966)**
Depreciation and amortisation	299	285
(Profit)/loss on sale of assets	(5)	6
Changes in assets and liabilities		
(Increase)/decrease in receivables	(121)	455
(Increase)/decrease in other assets	393	(398)
(Increase)/decrease in inventories	(3)	5
Increase/(decrease) in revenue in advance	3,457	7,134
Increase/(decrease) in liability to suppliers	(192)	5,010
Increase/(decrease) in employee provisions	249	(37)
Net cash from operating activities	**3,989**	**11,494**

19. Additional Financial Instruments Disclosure

a) Terms, conditions and accounting policies

Financial Instrument	Note	Accounting policies and methods	Nature of underlying instrument
Financial assets		Financial assets are recognised when control over future economic benefits is established and the amount of the benefit can be reliably measured.	
Receivables for goods & services	**4B**	The majority of the Commission's receipts are from Commonwealth and State governments and major trading banks and the risk of non-payment is considered minimal.	
Investments	**4C**	Investments are limited to term deposits of a duration not exceeding 90 days and are recorded at cost. Interest is accrued as it is earned.	Term deposits are with the major trading banks and earn an interest rate in line with market conditions.
Other debtors	**4D**	As for receivables for goods and services.	
Financial liabilities		Financial liabilities are recognised when a present obligation to another party is entered into and the amount of the liability can be reliably measured.	
Financial lease liability	**6A**	Liabilities are recognised at the present value of the minimum lease payments at the beginning of the lease. The discount rates used are estimates of the interest rates implicit in the lease.	At reporting date, the Commission had a finance lease with a term of seven years. The interest rate implicit in the lease is 8.75 per cent. The lease liability is secured by the leased asset.
Suppliers	**7B**	Creditors and accruals are recognised at their nominal amounts, being the amount at which the liabilities will be settled. Liabilities are recognised to the extent that the goods or services have been received (and irrespective of having been invoiced).	Settlement is usually made net 30 days.

b) Interest rate risk

The Commission's exposure to interest rate risk and the effective weighted average interest rate for classes of financial assets and financial liabilities is set out below:

	Note	Floating interest rate		Fixed Interest rate 1 year or less		Non-interest bearing		Total	
		2000	1999	2000	1999	2000	1999	2000	1999
		$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Financial assets									
Cash at bank	6A	11,314	12,740		–	–	–	11,314	12,740
Cash on hand	6A		–		–	3	3	3	3
Receivables	6B		–		–	219	98	219	98
Investments	6C		–	16,000	10,500		–	16,000	10,500
Weighted average interest rate		5.75%	4.5%	5.6%	4.88%				
Financial liabilities									
Accounts payable	5B		–		–	8,442	9,201	8,442	9,201

c) Foreign exchange risk

The Commission has not entered into any foreign currency transactions.

d) Credit risk exposure

Credit risk represents the loss that would be recognised if counterparties failed to perform as contracted. The credit risk on financial assets of the Commission which have been recognised on the statement of assets and liabilities is the carrying amount, net of any provision for doubtful debts. Due to the nature of the majority of the Commission's clients such risk is considered by the Commission to be low.

e) Net fair values of financial assets and liabilities

The net fair values of investments have been computed at net realisable value at balance date. For other assets and liabilities, the net fair value approximates their carrying value. No financial assets or financial liabilities are readily traded on organised markets in standardised form other than investments. The aggregate net fair values and carrying amounts of financial assets and financial liabilities are disclosed in the balance sheet and in the note to and forming part of the accounts.

APPENDICES

To meet its responsibilities the Murray-Darling Basin Commission brings together representatives from many agencies and communities in its six jurisdictions.

An indication of the range of representation is provided in the following appendices.

APPENDIX A: MEMBERSHIP OF THE MINISTERIAL COUNCIL

MEMBERS FROM 1 JULY 1999 TO 30 JUNE 2000

Commonwealth

The Hon. Warren Truss, MP	Minister for Agriculture, Fisheries and Forestry (Chair) (from 20 July 1999)
The Hon. Mark Vaile, MP	Minister for Agriculture, Fisheries and Forestry (to 20 July 1999)
Senator the Hon. Robert Hill	Minister for the Environment and Heritage
The Hon. Wilson Tuckey, MP	Minister for Forestry and Conservation

New South Wales

The Hon. Richard Amery, MP	Minister for Agriculture and Minister for Land and Water Conservation, Minister for Agriculture
The Hon. Bob Debus, MP	Minister for the Environment

Victoria

The Hon. Sherryl Garbutt, MLA	Minister for the Environment and Conservation (from 1 November 1999)
The Hon. Keith Hamilton, MLA	Minister for Agriculture and Minister for Aboriginal Affairs (from 1 November 1999)
The Hon. Pat McNamara, MP	Deputy Premier and Minister for Agriculture and Natural Resources (to October 1999)
The Hon. Marie Tehan, MP	Minister for Conservation and Land Management (to 18 October 1999)

South Australia

The Hon. Mark Brindal, MP	Minister for Water Resources, Minister for Employment and Training, Minister for Youth (from 26 February 2000)
The Hon. Rob Kerin, MP	Minister for Primary Industries, Natural Resources and Regional Development
The Hon. Iain Evans, MP	Minister for Environment and Heritage, Minister for Recreation, Sport and Racing (from 26 February 2000)
The Hon. Dorothy Kotz, MP	Minister for Environment and Heritage and Minister for Aboriginal Affairs (to 26 February 2000)
The Hon. Michael Armitage, MP	Minister for Government Enterprises (to 26 February 2000)

Queensland

The Hon. Rod Welford, MLA	Minister for Environment and Heritage and Minister for Natural Resources

Australian Capital Territory

Mr Brendan Smyth, MLA	Minister for Urban Services

ACT participation is via a memorandum of understanding, 27 March 1998

APPENDIX B: MEMBERSHIP OF THE COMMUNITY ADVISORY COMMITTEE

MEMBERS FROM 1 JULY 1999 TO 30 JUNE 2000

Chairperson

Mrs Leith Boully

REGIONAL REPRESENTATIVES

New South Wales

Mrs Michele Simpson	Central West
Mr Bob McFarland	Lachlan
Mr Jim Wilton	Lower Murray-Darling
Mr Adrian Wells	Murray
Mr Tom Stacy	Murrumbidgee
Mr Alan Sinclair	North West
Mrs Jenny McLellan	Western

Victoria

Mr Jeremy Gaylard	Goulburn
Mr Rodney Hayden	Mallee
Mr Drew English	North Central
Mrs Noelene Wallace	North East
Mr Lance Netherway	Wimmera

South Australia

Mr Leon Broster	Adelaide
Mr John Berger	Lower Mallee
Mrs Joanne Pfeiffer	Lower Murray
Dr Peter Haslett	Riverland

Queensland

Mr Clarrie Hillard	Border Rivers (from 19 October 1999)
Mr Hugh Gloster	Border Rivers (to 4 September 1999)
Mrs Bobbie Brazil	Condamine
Mr Lloyd Harth	Maranoa/Balonne
Ms Anne Bredhauer	Warrego/Paroo

Australian Capital Territory

Professor Peter Cullen	ACT Environment Advisory Committee

Peak organisation representatives

Mr Tim Fisher	Australian Conservation Foundation
Mr Bruce Lloyd	Australian Landcare Council
Mr Ian Mann	Australian Local Government Association
Mr Les Gordon	National Farmers' Federation (from 5 October 1999)
Mr Greg Brown	National Farmers' Federation (to 5 October 1999)
Mr Ian Woods	Indigenous representative

APPENDIX C: MEMBERSHIP OF THE COMMISSION

MEMBERS FROM 1 JULY 1999 TO 30 JUNE 2000

Dr Roy Green AO	Independent President (from 24 March 2000)
Mr Michael Taylor	Acting President (to 24 March 2000)

Commonwealth

Mr Bernard Wonder	Executive Director, Competitiveness and Sustainability Group, Department of Agriculture, Fisheries and Forestry
Mr Stephen Hunter	Head, Biodiversity Group, Environment Australia

New South Wales

Dr Bob Smith	Director-General, Department of Land and Water Conservation
Dr Kevin Sheridan	Director-General, New South Wales Department of Agriculture

Victoria

Mr Peter Sutherland	Executive Director, Catchment and Water Division, Department of Natural Resources and Environment (from 14 December 1999)
Mr Michael Taylor	Secretary, Department of Natural Resources and Environment (to 14 December 1999)
Mr Denis Flett	Chief Executive, Goulburn-Murray Water (from 14 December 1999)

South Australia

Mr Dennis Mutton	Chief Executive, Department of Primary Industries and Resources, South Australia
Mr Sean Sullivan	Chief Executive, South Australian Water Corporation (from 30 March 2000)
Mr John Scanlon	Chief Executive, Department of Environment, Heritage and Aboriginal Affairs (to 23 March 2000)

Queensland

Mr Scott Spencer	Executive Director Resource Management, Department of Natural Resources (from 30 September 1999)
Dr Ian McPhail	Executive Director, Queensland Parks and Wildlife Service (from 30 September 1999)
Mr Tom Fenwick	Director-General, Department of Natural Resources (to 26 September 1999)

Australian Capital Territory

Dr Colin Adrian	Executive Director Environment ACT, Department of Urban Services

ACT participation is via a memorandum of understanding, 27 March 1998.

APPENDIX D: MEMBERSHIP OF THE PROJECT BOARDS

	Project	Board members			Commission
A	Issues-based boards	Chair	Members		
1	Lake Victoria Cultural Heritage	Scanlon (Commissioner) to February 2000, Harriss (Deputy Commissioner) from February 2000	Harriss (Deputy Commissioner) to February 2000, Flett (Commissioner)		Blackmore, Dole
2	Mitta Mitta Ex Gratia Payments	Dole (River Murray Water)	Flett (Commissioner), Harris (Deputy Commissioner), Hoey (Deputy Commissioner), Rhodes (AFFA)		Dole (River Murray Water)
B	Long-term strategy development boards	Executive	Senior user	Senior supplier	MDBC senior officer
3	Review of the Operation of the Cap	Wonder (Commissioner)	Leece (Deputy Commissioner), Fenwick (Commissioner) to September 1999, Spencer (Commissioner) from September 1999	Fitzpatrick (Deputy Commissioner)	Blackmore
4	Pilot Interstate Water Trading	Flett (Commissioner)	Early (Deputy Commissioner)	Harriss (Deputy Commissioner)	Keyworth
5	Murray-Darling Basin Fish Management	Thompson (Deputy Commissioner)	McPhail (Commissioner)	Lee	Goss
6	Environmental Flow Management and Water Quality Objectives for the River Murray	Hoey (Deputy Commissioner)	Leece (Deputy Commissioner), Fitzpatrick (Deputy Commissioner)	Hunter (Commissioner)	Goss
7	Basin Salinity Management Strategy	Smith (Commissioner)	Sutherland (Commissioner)	Hoey (Deputy Commissioner)	Goss
8	Communication Strategy	Mutton (Commissioner)	Boully (Community Advisory Committee), English (Community Advisory Committee)	Spencer (Deputy Commissioner)	Purdie
9	Human Dimension Strategy	Mutton (Commissioner)	Boully (Community Advisory Committee), English (Community Advisory Committee)	Spencer (Deputy Commissioner)	Purdie
10	Floodplain Management Strategy	Hunter (Commissioner)	Harriss (Deputy Commissioner)	Fitzpatrick (Deputy Commissioner)	Keyworth

APPENDIX E: COMMITTEES AND WORKING GROUPS

Asset Management Committee

Basin Salinity Technical Panel

Basin Salinity Strategy Taskforce

Basin Sustainability Program Working Group

Carp Control Coordination Group

Communication and Human Dimension Issues Working Group

Dryland Issues Working Group

Finance Committee

Fish Working Group

Floodplain Planning Working Group

Groundwater Technical Reference Group

Hume Dartmouth Technical Review Committee

Hume to Yarrawonga Waterway Committee

Integrated Catchment Management Taskforce

Irrigated Infrastructure GIS Working Group

Irrigation Issues Working Group

Lake Victoria Advisory Committee

Network on Integrated Catchment Management

Network on Water Management

Operations and Maintenance Working Group

River Murray Flows Working Group

River Murray Water Board

Riverine Issues Working Group

Salinity and Drainage Strategy Assessment Working Group

Salt Interception Working Group

Water Audit Working Group

Water Liaison Committee

Water Market Reform Working Group

Water Policy Committee

Water Quality and River Health Working Group

APPENDIX F: INFORMATION AVAILABLE FROM THE MURRAY-DARLING BASIN COMMISSION

For updated publication lists and order forms, visit the Murray-Darling Basin Commission web site at: www.mdbc.gov.au.

Murray Darling Basin Initiative strategies

Natural Resource Management Strategy – Murray Darling Basin 1990

Salinity and Drainage Strategy: Ten Years On 1999

Floodplains Wetlands Management Strategy – November 1998

Algal Management Strategy – Technical Advisory Group Report 1994

Communication Strategy 2000

Communication Strategy Guide 2000

Information sheets and brochures

The Murray Darling Basin Initiative

Murray-Darling Basin A4 information sheet

The River Murray System

The River Murray – A Multi-Use Resource

The Upper Murray – Hume Catchment and Snowy Mountains Scheme

The Riverine Plains – Albury to Swan Hill

The Sunraysia Region – Nyah to Wentworth

The Lower Murray – Morgan to the Mouth

River Murray Navigation

Inland Shipping: The Navigation of the Murray-Darling River System

Hume Dartmouth Backgrounder 1–7

Hume Dam Fact Sheets 1–5

Eutrophication

Salinity Audit Community Summary 1999

Stream Salinity in the Murray-Darling Basin 1975–95

The Cap brochure

Setting the Cap: Executive Summary

Murray-Darling Basin Commission Drainage Program 1996–97 Summary

The Pilot Interstate Water Trading Project

What Affects the Reliability of Your Water Allocation?

River Murray Mapping 1993

River Murray Landscape guidelines 1,2,3 and 4

Guidelines for the Preparation of River Management Plans No. 2

Adjusting for Catchment Management Executive Summary 2000–08–02

Posters, maps and wall charts

The Murray-Darling Basin B1

The Murray-Darling Basin 1902 B1

River Murray from Mountains to Sea A1

Towards Sustainable Rivers

River Murray System A1

Frogs of the River Murray

Give Murray Cray a Fair Go! B3

Carp: Villains or Victims B1

Stickers

Squirrel glider

Pink cockatoo

Corroboree frog

Watercolour prints

Trout cod

Macquarie perch

Purple-spotted gudgeon

Murray cray

Newsletters

Curlew – Newsletter of the Community Advisory Committee

Books

The Pilliga by Eric Rolls

Murray-Darling Basin Resources (300 pages; rrp $38.50)

Reading the Land – Workshop Proceedings (74 pages)

Blue-Green Algae – The Story So Far (recommended for teachers only)

Special Forever anthologies (1994–99)

The Emergence of Bioregionalism in the Murray-Darling Basin by JM Powell

Historic Shipping on the River Murray (limited supply)

Listening to the Lachlan

Technical reports

Setting the Cap 1996–97 (Report of the Independent Audit Group, November 1996)

Review of the Cap Implementation 1996–97 (Report of the Independent Audit Group, August 1997)

Review of the Cap Implementation 1997–98 (Report of the Independent Audit Group)

Review of the Operation of the Cap 2000

Water Audit Monitoring Report June 1999

Water Audit Monitoring Report 1996–97

GIS and Irrigation: An Inventory of Projects in the Murray-Darling Basin 1997

Review of Nutrients in Irrigation Drainage – Series 11, 1994

Drainage Program Technical Reports 1–8

Irrigation Forum 1998

Riverine Environment Research Forum 1995–98 (separate publications)

Dryland Forum 1998

Adjusting for Catchment Management – Dryland Technical Report No. 2

Groundwater – A Resource for the Future

Cost Sharing for On-ground Works 1996

Salinity Audit: A 100-Year Perspective 1999

Salt Trends 1997

Natural Resources Management Compendium 94–95, 95–96 (limited supply)

Significant Wetlands for Waterbirds in the Murray-Darling Basin 1997

Hume and Dartmouth Dam, Final Report 1999

Chowilla Resource Management Plan – Community Consultation Program 1991

Chowilla Resource Management Plan – Final Report 1995

GLOSSARY

1999–2000	The financial year 1999–2000, namely 1 July 1999 to 30 June 2000. See also water year.
Agreement	See *Murray-Darling Basin Agreement*.
anabranch	A branch of a river that leaves the main stream and rejoins it further downstream.
Basin	When shown with an initial capital, refers to the Murray-Darling Basin.
Basin States	The four states in which the Murray-Darling Basin is located – namely New South Wales, Victoria, South Australia and Queensland. The Australian Capital Territory is also in the Basin.
blue-green algae	See *cyanobacteria*.
Basin Sustainability Program	The framework for planning, evaluating and reporting on natural resources management in the Basin, described in section 3.3.
CAC	Community Advisory Committee
Commission, the	The Murray-Darling Basin Commission, see section 1.3.
constructing authorities	See *state constructing authorities*.
contracting governments	The contracting governments to the Murray-Darling Basin Agreement 1992, namely the Commonwealth Government and the 'state contracting governments' of New South Wales, Victoria, South Australia and Queensland. As the Australian Capital Territory's participation in the *Murray-Darling Basin Initiative* is by memorandum of understanding (described in section 1.1), it is not a contracting government: see partner governments.
Council, the	See *Murray-Darling Basin Ministerial Council*.
cyanobacteria	A group of bacteria containing photosynthetic pigments, often forming problematic toxic blooms. Commonly referred to as 'blue-green algae'.
during the year	During the financial year 1999–2000, namely between 1 July 1999 and 30 June 2000.
EC (unit)	Electrical conductivity unit. 1 EC = 1 micro-Siemen per centimetre, measured at 25° Celsius. Commonly used to indicate the salinity of water.
ecologically sustainable	Related to using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained and the total quality of life – now and in the future – can be increased.

entitlement flows	Minimum monthly River Murray flows to South Australia, as detailed in the *Agreement*.
gigalitre	One thousand million or 10^9 litres.
groundwater	The water in the saturated pores of soil or rock below the watertable.
Initiative	When the word *Initiative* is italicised, see *Murray-Darling Basin Initiative*.
integrated catchment management	A philosophy that considers the total long-term effect of land management practices on the soils, water, plants and animals of an entire catchment, from production and environmental viewpoints.
irrigation season	The period in which major irrigation diversions occur, usually starting in August–September and ending in April–May.
Murray-Darling 2001	A multi-partner funding program delivered through the Natural Heritage Trust. Details are in section 3.4.
MDBC	The Murray-Darling Basin Commission: see section 1.3.
megalitre	One million or 10^6 litres, about half the volume of an Olympic-sized swimming pool.
Murray-Darling Basin Agreement	Short form: the *Agreement*. The agreement between the contracting governments: see the introduction to section 1. The current *Agreement* is known as the *1992 Agreement*.
Murray-Darling Basin Initiative	Short form: the *Initiative*. Essentially, the partnership of governments and the community formed to enhance the environmental resources of the Murray-Darling Basin; defined more fully in the introduction to section 1.
Murray-Darling Basin Ministerial Council	Ministers holding land, water and environment portfolios in each contracting government. A minister of the Australian Capital Territory Government also participates under the terms of a memorandum of understanding described in section 1.1.
Natural Heritage Trust	The Commonwealth Government's Natural Heritage Trust was established by the Commonwealth Government in 1997 to fund environmental protection, sustainable agriculture and natural resource management.
Natural Resource Management Strategy	The over-arching strategy of the Murray-Darling Basin Initiative. See section 3.
off-allocation	Usage, or a period of usage, of water by irrigators when the usage is not counted against an irrigator's allocation. Periods of off-allocation for a given reach of a waterway are sometimes declared by a regional water authority when unregulated tributary flows or spills from storages produce a flow which is above the total downstream requirements for that reach.

out-of-balance	A term used in tables describing water held in storage by Victoria and New South Wales. It describes the difference in the volumes of water held in reserve in the Commission's storages for later use by those two states. Traditionally, because of Victoria's greater involvement in irrigation activities such as horticulture and dairying – as opposed to annual crops – Victoria has held more water in reserve than New South Wales.
overdraw	Borrowing next season's water from reserves, for use during the current season.
partner governments	The governments involved in the *Murray-Darling Basin Initiative*, namely the governments of the Commonwealth, New South Wales, Victoria, South Australia, Queensland and the Australian Capital Territory. See also *contracting governments*.
rain-rejection flows	It takes a number of days for water released from storage to travel to the point of use by irrigators. If rain occurs in this period, irrigators may not use all or part of the water which has been ordered. The unused water, termed a 'rain rejection', can result in an increase of streamflow downstream.
riparian	Of, inhabiting or situated on the bank and floodplain of a river.
River Murray system	The river system defined in the introduction to section 4.
River Murray Water	An internal business unit of the Commission responsible by specific delegation for exercising the Commission's functions for water management and asset management.
salinity	The concentration of dissolved salts in groundwater or river water, usually expressed in EC units or milligrams of total dissolved solids per litre. The conversion factor is 0.6 milligrams per litre = 1 EC unit (but variable).
sales water	An allocation of water beyond the basic water allocation (or water right), which is available at a different price from the basic water allocation.
salinity credits	Accounting units for the Salinity and Drainage Strategy. Credits are obtained through measures that reduce the salinity of the River Murray.
Strategic Investigations and Education Program	The Commission's funding program to support knowledge generation. Details are in sections 3.3 and 3.4
sleeper licence	An allocation of water to a user that has not been used in the past.
state constructing authorities	The New South Wales Department of Land and Water Conservation, Goulburn-Murray Water, and the South Australian Water Corporation.

surcharge	Water in a lake or reservoir above the nominal full supply level of the storage.
water right	The basic water entitlement or allocation to an individual water user.
water table	The surface below which the pores and fissures of the soil or rock are saturated with water.
water year	In relation to the Snowy Mountains Scheme, the 12 months from 1 May to 30 April. In relation to the River Murray system, the 12 months from 1 June to 31 May.

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