Wetlands Strategy FOR SOUTH AUSTRALIA

Government of South Australia

Natural Heritage Trust

The Department of Water, Land and Biodiversity Conservation

DEPARTMENT FOR environment and heritage

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Nardoo in natural wetland at Bolivar, Adelaide
Vicki Hagan

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Foreword

The South Australian government recognises that wetlands are an essential part of the state's natural assets. Estuaries, coastal marshes and swamps, mound springs, floodplains, and seasonal, ephemeral and permanent lakes and watercourses are all wetlands that must be managed and protected for the benefit of present and future generations. Our wetlands assist in the purification of water, mitigate the impacts of floods, replenish the groundwater and provide vital refuge, nursery areas and habitat for many species. Wetlands are often places of great cultural and spiritual significance for indigenous people, and offer opportunities for recreation and relaxation for all Australians.

The objectives and actions in this Wetlands Strategy guide a whole of government approach for the management, protection and creation of wetlands. The Wetlands Strategy establishes a framework for a more focused and integrated approach to wetlands management for government and non-government partners. This framework particularly recognises the importance of government partnerships with industry, private land-holders, researchers, and regional and local communities and the need for all parties to work within state policy and legislation.

The *State Water Plan 2000* clearly articulated wetlands management as an integral part of water resource management in South Australia and set the broad policy framework to achieve this integration. The Wetlands Strategy has been developed as an initiative arising from the *State Water Plan 2000* and demonstrates the South Australian commitment to bring together wetland and groundwater and surface water management at state, regional and local levels. This unique approach sets the benchmark for wetland policy and management in Australia and other countries.

This Strategy also furthers other government commitments including natural resource management reforms and actions, the Living Coast initiative, and the No Species Loss Strategy. The natural resource management reforms currently underway will assist in implementing many of the actions in this Wetlands Strategy. The Living Coast initiative includes a framework for the development of a Marine and Estuarine Wetlands Conservation Strategy. The No Species Loss Strategy will draw more attention to the management of wetland habitats that support threatened species.

Currently in South Australia, a reform process is underway for natural resource management. As a result, the roles and responsibilities of some organisations and state government agencies will change. While some of the detail for the implementation of this Wetlands Strategy will be affected, the fundemental principles for wetland management, conservation and restoration remain the same.

The Department for Environment and Heritage and Department of Water, Land and Biodiversity Conservation have worked together and consulted with many stakeholders during the development of this Strategy. Wetland scientists and conservationists have also made significant contributions.

South Australia's wetlands provide a range of benefits for all Australians and this Wetlands Strategy will provide a framework for promoting the health, diversity and productivity of our wetlands into the future.

Hon. John Hill, MP

Minister for Environment and Conservation

Minister for the River Murray

V. Hagan

Executive Summary

Wetlands come in many forms, shapes and sizes and are now recognised as among our most important natural assets. Perhaps most importantly, wetlands are key parts of healthy rivers, streams, lakes, estuaries and near-shore coastal and marine environments.

Among their many other important functions, wetlands are significant fish nurseries, they help improve the quality of water and reduce the impact of floods and droughts. They are also places renowned for their wildlife, and many have special cultural significance for indigenous Australians. We all enjoy the range of recreational activities that wetlands offer.

This Strategy gains its mandate from the *State Water Plan 2000*. The State Water Plan set out principles for the management of wetlands and water-dependent ecosystems and includes an action for the State Government to develop a strategy for wetlands that would build on those principles. More recently, the Select Committee on the Murray River further strengthened this mandate when it concluded that '*Wetlands are essential to the maintenance of the hydrological, physical and ecological health of the riverine environment and provide economic, social and cultural benefits to the broader community*'.

With the adoption of this Strategy, South Australia has joined the Commonwealth Government and the other states and territories in forming a national policy framework for the conservation and ecologically sustainable use of wetland ecosystems.

The Wetlands Strategy will ensure wetlands are given appropriate status, and are managed accordingly in South Australia. The Strategy will do this by delivering the key elements of wetland conservation and management to the Government, business, industry, private landholders and the broader community. Of critical importance is the need for all stakeholders to use this Strategy as a mechanism to achieve more integrated approaches for the management of wetlands.

It is estimated that 70% of wetlands have been destroyed in South Australia since European settlement. The Government recognises that in order to protect our remaining wetlands we need to make the management of these environments a state-wide priority. Therefore, this Strategy adopts a state-wide goal to see '*Wetlands recognised and managed as ecological and community assets for the benefit of present and future generations*'.

To achieve the goal, the Strategy sets out seven objectives which aim to deliver the following outcomes:

- Conservation and management of wetlands is an integral element of natural resource management;
- Local actions to care for, and restore wetlands are undertaken with the support of government and non-government organisations;
- The institutional and resourcing arrangements necessary to effectively implement the actions of the Strategy are provided;
- The community is increasingly aware of the importance of wetlands for the wellbeing of all South Australians;
- South Australia's most important wetlands are recognised and protected;
- South Australia's wetlands and their resources are better understood and this information is made readily available.

It is clear that for this Strategy to be implemented effectively there needs to be key partnerships and investment from all sectors of the community. The catchment water management boards, together with local councils will integrate the relevant actions from the Strategy into their regional plans. The sense of stewardship for wetlands held by private landholders is already present in many regions. The Strategy aims to build on this and to ensure that non-governmental organisations continue to play a pivotal role in implementing the Strategy. Likewise, there is a recognised need to engage the business and industry sector more closely in this state-wide effort. It is vital that this Strategy is used to stimulate greater spending on wetlands to see them protected and managed for sustainability.

Wetlands play crucial roles in both aquatic and terrestrial environments. For this Strategy to achieve the state-wide goal, new, and more integrated management practices are essential.

This Strategy expands on existing approaches to integrating wetlands management to general natural resource management. It clearly identifies the responsibilities of various government departments and statutory bodies in wetlands management as part of integrated natural resource management.

L. Kesztler

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Introduction

1

Wetlands are those places in the environment where water and land meet and they are now recognised as among our most important natural assets. Some are permanent, while others come and go with the seasons. They are the swamps and marshes found along rivers and floodplains, they are the Great Artesian Basin (GAB) springs and occasional lakes found mostly in the arid zone, and they are the salt marshes, mudflats and mangroves of the estuaries and coast.

The wetlands associated with rivers and streams help purify water, store it during times of drought and help reduce the impact of floods. Others help to replenish vital groundwater reserves. Many wetlands provide places for sporting and recreational activities and also offer refuge, nursery areas and habitat for many wildlife species. Some natural wetlands also hold special cultural significance for the indigenous Australians. Artificial wetlands are increasingly being used to help with water resource management as well as having amenity and biodiversity values.

Globally, and nationally, it is reported that over the past two centuries around half of the wetlands have been destroyed. It seems that South Australia has exceeded this figure, with estimates suggesting that just 30% of the state's wetlands remain today. In some parts of the state, such as the Mount Lofty Ranges, less than one per cent of the original wetlands are intact. Here in Australia's driest state, the floodplains and river valleys were quickly recognised by the early European settlers as offering fertile soils and water supplies, and so human activities focused in these areas. Unfortunately, this saw broad-scale conversion of wetlands to other uses without appreciating the impacts this would have. Now it is known that loss of wetlands contributes to declining water quality, more severe flooding and the gradual disappearance of many plant and animal species. It also denies the community opportunities to relax and enjoy the environment.

Recognition of the importance of wetlands has been slowly gathering pace over the past thirty years following the signing of the international Convention on Wetlands in the city of Ramsar in Iran in 1971. The Ramsar Convention as it is now known, is the key international agreement that promotes the conservation and ecologically sustainable use of wetlands. The Ramsar Convention refers to ecologically sustainable use as 'wise use.' In Australia today, all governments have developed a framework of policies and strategies designed to see wetlands appreciated and managed for their many values, that reflects 'wise use'.

On 17 October 1973, the South Australian House of Assembly resolved that:"*In the opinion of this house, substantial areas of wetlands in South Australia should be preserved for the conservation of wildlife and where possible, former wetlands should be rehabilitated*". In July 2001 the Select Committee of the South Australian Parliament on the River Murray released its report which reinforced the above themes. They stated that"*Wetlands are essential to the maintenance of the hydrological, physical and ecological health of the riverine environment and provide economic, social and cultural benefits to the broader community*." However, they went on to express concern that"*..despite their importance,…"* wetlands *"… have been one of the least valued and most abused of Australia's natural resources.*"

The last decade has seen the efforts to care for wetlands slowly gathering momentum, with more and more community groups, some private landholders and Government agencies getting involved. Despite these encouraging signs, wetland degradation is continuing in many parts of the state and, as noted by the River Murray Select Committee,".. *there are a number of unresolved policy and administrative issues which threaten to undermine current community support*."

While South Australia has a significant number of existing legal and policy instruments which can help to protect, and ensure wetlands are used wisely, there has remained a need for a more integrated approach. The *State Water Plan 2000* was a step forward by strongly relating wetlands management into water resource management. It foreshadowed the need for a Wetlands Strategy which could further develop more coherent and integrated approaches. Therefore, the purpose of this Wetland Strategy for South Australia is to provide all government, business and private sector stakeholders, especially catchment water management boards, local councils, private landholders, industries and community groups, with the guidance which can ensure wetlands are given appropriate status, and managed accordingly. Of critical importance also, is that all stakeholders use this Strategy as a mechanism to achieve more integrated approaches for the management of water-dependent ecosystems.

The development of this Strategy mirrors the preparation of similar policy documents across Australia and around the world. This has resulted from the realisation that investing in wetland conservation, rehabilitation and management is for more than just the conservation of wildlife; it's also about ensuring the protection of these natural assets that are essential for securing our future, and those of generations to follow.

P. Canty

The Goal, Principles and Objectives of the Strategy

2.1 Introduction and cornerstones of the Strategy

The Wetlands Strategy operates as an integrated part of the existing policy, legislative and strategic frameworks for natural resource management and biodiversity conservation (see Figure 1). This framework is underpinned by the principles of ecologically sustainable development* and appropriately, these same principles are also a foundation, or cornerstone, of this Wetlands Strategy.

Other cornerstone principles include:

- community consultation and participation in the management of natural resources, including water resources;
- the adoption of adaptive and integrated catchment or landscape level approaches to the management of natural resources;
- recognition that action is needed to see water-dependent ecosystems understood, protected and restored or rehabilitated as part of addressing South Australia's degradation of land and water resources and loss of biological diversity;
- the duty of care* implied and expected through both the *Environment Protection Act 1993* and the *Water Resources Act 1997* applies to the implementation of this Strategy; and,
- allied to duty of care, the precautionary principle* will be exercised by all decision-makers in relation to wetlands and the implementation of this Strategy.

In South Australia, responsibilities for wetland management are shared between a number of pieces of legislation. *The Water Resources Act 1997* provides the prime mechanisms for managing and allocating water so as to protect the water regime of wetlands. Other legislation, including the *Native Vegetation Act 1991, National Parks and Wildlife Act 1972, Environment Protection Act 1993, Coast Protection Act 1972, Harbors and Navigation Act 1993* and the *Soil Conservation and Landcare Act 1989* also contribute to the protection and management of wetlands.

Wetlands management, like the management of other natural resources, requires an integrated approach. South Australia has been actively seeking to improve frameworks to better integrate the management of natural resources in recent times.

Within these policy, legislative and strategic frameworks for South Australia, the *State Water Plan 2000* in particular, provides a comprehensive blueprint under which this Wetlands Strategy sits (see Figure 1). Appropriately, the focus of the *State Water Plan 2000* is strongly on the protection and ecologically sustainable use of water-dependent ecosystems – of which wetlands are a significant element.

The *State Water Plan 2000* also sets out principles, goals and actions in relation to providing water for the environment, the management of riparian zones, floodplain management, estuary management, management and allocation of surface and groundwater resources; all of these are directly applicable to the management of wetlands. This recognises the diversity of wetland types found in the state (Section 4). Some wetlands are lakes or intrinsic parts of floodplains, some are groundwater dependent and others make up a large part of the estuarine and coastal environments of South Australia.

The goal and objectives of the Wetlands Strategy provided below have been established to work with and add value to the relevant principles of the *State Water Plan 2000* in particular, as well as the relevant international, inter-governmental, national and state-based policies, laws and strategies (as outlined in Section 6).

Because of the shared legislative responsibilities described above, a number of agencies have a management interest in, or responsibility for wetland management. In order to advance the implementation of the actions described in Section 3, different agencies will take responsibility for initiating and coordinating different activities.

To assist with understanding what follows and how it relates to the goal, the following chart is provided (Figure 2).

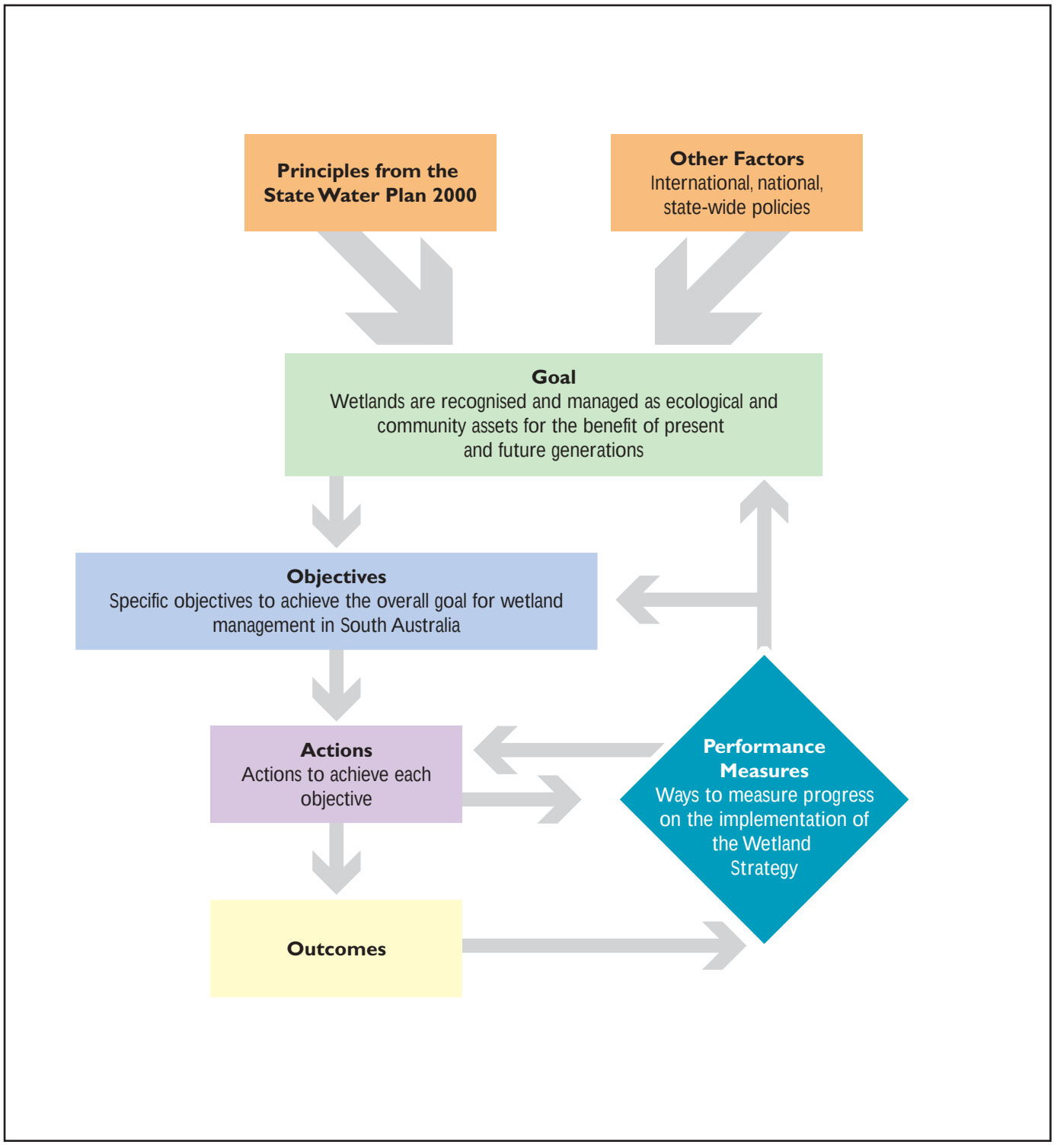
* See Glossary for definition

Figure 1. Framework of where the Wetlands Strategy fits

The State Wetlands Strategy sits within a framework of international, national and state-wide legislation, policies and programs as shown below. A key, but not sole, delivery mechanism for the Wetlands Strategy is via the Catchment Water Management Plans and local Water Allocations Plans being formulated and implemented under the *State Water Plan 2000*.

Figure 2. Understanding the document

The State Wetlands Strategy gains its primary mandate from the principles contained in the *State Water Plan 2000*. The Strategy uses these principles and those from the range of international, national and state-wide legislation, policies and programs to establish a goal for wetlands management which is further reinforced by several cornerstone principles and objectives. Serving to see these implemented are the range of actions directed at various government and non-government sectors. The Strategy also has a framework for monitoring its implementation.



2.2 Goal

The Goal of the Wetlands Strategy of South Australia is to see:

'Wetlands recognised and managed as ecological and community assets for the benefit of present and future generations'

This goal is further defined by the following;

1. The conservation management, and where appropriate, the rehabilitation, of those wetlands that remain is considered a state-wide priority from the perspective of community wellbeing and the conservation of biological diversity;
2. In conjunction with the above, it is recognised that in some situations and regions it will be advantageous for former wetlands to be reinstated, or artificial wetlands to be constructed, and this will be considered on a case by case basis;
3. The full ecological, economic and social values of wetlands are recognised and this Strategy aims to see these values protected, and wetlands used sustainably for improving quality of life;
4. To many South Australians, both indigenous and non-indigenous, wetlands also have great cultural significance and this Strategy seeks to recognise and see these values retained;
5. In both the private sector and government the environmental, social, cultural and economic significance of wetlands will be considered during planning and decision making where there is the potential to impact on wetlands;
6. In order to retain the vital services provided by wetland ecosystems, the principles of ecologically sustainable development will apply to the management of wetlands across the state;
7. In accordance with international conventions, and national and state policies and strategies, all decision-making related to wetland 'health' and sustainability will apply the precautionary principle*. The application of this principle, which is embodied in the *Water Resources Act 1997*, will ensure that the risks of losing further wetlands, or seeing them degraded over time, is minimised; and,
8. This goal supports, and serves to reinforce, the stated core values of the South Australian *State Water Plan 2000* and its principles of Wetland Management as given below.

J. Burnard

* See Glossary for definition

2.3 Principles

Wetland management is an important aspect in managing the health of water-dependent ecosystems. The *State Water Plan 2000* outlines the framework for ensuring the integrated management of water-dependant ecosystems. It provides overarching principles and more specific principles for each element of water-dependent ecosystems including:

- Water for Environment Principles
- Riparian Zone Management Principles
- Wetlands Management Principles
- Floodplain Planning and Management Policy
- Estuary Management Policy

The *State Water Plan 2000* acknowledges the linkages which exist, and which need to be made operational and effective in the management of the various elements of water-dependent ecosystems. These five elements are not stand-alone components of natural water-dependent ecosystems, and must therefore be managed as part of an integrated whole. This Strategy provides another step toward achieving that goal and addresses the Wetland Management principles that are outlined in the *State Water Plan 2000*.

2.3.1 *State Water Plan 2000* - Principles for wetland management

The *State Water Plan 2000* adopted principles for wetland management as provided below. These also apply to this Strategy.

Planning and Management

1. The management of natural wetlands should aim to provide adequate water in an ecologically appropriate regime and of appropriate quality so as to maintain wetland functions and ecological values.
2. The management of natural wetlands should aim to maintain, or rehabilitate, natural wetland functions and structures.
3. There should be recognition of wetland values and their management and protection in all relevant statutory and non-statutory planning processes.
4. Wetlands of recognised conservation significance should be given special protection and management so as to maintain their ecological values.

Artificial Wetlands

5. Artificial wetlands should be used to improve water quality provided this does not adversely affect ecologically sustainable management of natural ecosystems.

Wetland Management Principles from the *State Water Plan 2000*

2.3.2 *State Water Plan 2000* – Other principles that also relate to wetland management

It is also important in the context of the Strategy to recognise those principles and actions set down in the *State Water Plan 2000* which relate most directly to wetlands. In summary these are:

Integrated management of waterbodies and associated water-dependent ecosystems – for them to be managed so that the:

- condition of these systems is maintained or improved;
- long-term integrity of the ecological functions and dependent biodiversity is ensured; and
- ecologically sustainable use of these ecosystems, which includes highest value use of water, is achieved.

Providing water for the environment – the goal is to sustain and, where necessary, restore ecological processes, habitats and biodiversity of water-dependent ecosystems.

Balancing consumption and environmental use – to ensure that 'water allocation and management decisions take a precautionary approach by first ensuring that natural ecological processes and biodiversity of water-dependent ecosystems are maintained. It follows that further allocation of water for new consumptive uses, and any other new water resource developments, must ensure that ecological values are protected.' *(State Water Plan 2000)*

Riparian and floodplain management – to recognise that biophysical processes are maintained by connections of different riparian habitats up and down watercourses and between the watercourse and its floodplain (including the wetlands).

Floodplain management – the goal is to manage flood risk so as to satisfy the social and economic needs of the community while maintaining or rehabilitating the ecosystem functions of floodplains (including the wetlands).

Groundwater dependent ecosystems – to see more detailed policies developed by authorities preparing water plans for each resource and ecosystem which include consideration of policies such as:

- ensuring a throughflow regime appropriate for maintaining sustainability of the resource and dependent ecosystems; and
- specifying buffer distances between wells and wetlands and watercourses, so as to protect the ecological values of these systems.

Protecting estuaries – among the key principles for management in the *State Water Plan 2000* are that:

- estuaries are recognised as having significant ecological values and as being a part of catchments, and
- maintenance of connectivity between marine and freshwater systems is essential for the healthy functioning of estuaries.

2.3.3 Principle for coastal and near-shore environments

Recognising that the *State Water Plan 2000* does not specifically cover those wetlands found in the coastal zone and near-shore marine environments, the following principle applies:

- the maintenance of connectivity between marine and coastal habitats, both offshore and alongshore, is essential for the healthy functioning of coastal zone and near-shore marine environments.

2.4 Outcomes and Objectives of the Wetlands Strategy

To achieve the goal of this Strategy, the Government of South Australia, working in cooperation with all stakeholders seeks to achieve six key outcomes. These outcomes will be achieved through the realisation of the following objectives:

Outcome. Conservation and management of wetlands is an integral element of natural resource management

Objective 1. To manage wetlands as integrated parts of natural resource management at local, regional, national and international scales.

Outcome. Local actions to care for, and restore wetlands are undertaken with the support of government and non-government organisations

Objective 2. To support the care, rehabilitation, restoration or creation, of wetlands by the private and public sectors.

Outcome. The institutional and resourcing arrangements necessary to effectively implement the actions of the Strategy are provided

Objective 3. To ensure effective implementation of this Strategy through appropriate institutional frameworks, supported by the necessary ongoing public resources, and longer term strategic investment by the private sector.

Outcome. The community is increasingly aware of the importance of wetlands for the wellbeing of all South Australians

Objective 4. To raise community appreciation of wetlands as natural assets and generate support for their gaining attention in integrated natural resource management.

Outcome. South Australia's most important wetlands are recognised and protected

Objective 5. To identify those wetlands which are important at the regional, state, national and international levels, and ensure appropriate recognition, management and protection of these sites.

Outcome. South Australia's wetlands and their resources are better understood and this information is made readily available

Objective 6. To develop, maintain, and make readily accessible to all, a comprehensive inventory of South Australia's wetlands and their resources.

Objective 7. To support studies of wetlands that provide an improved understanding, and serve to guide planning and management actions.

South Australian Tourism Commission

G. Blair

Actions to achieve the Goal and Objectives

In the preceding section the goal, cornerstones and underlying guiding principles of this Wetlands Strategy were set out, as well as the objectives to be pursued. Described below are the actions which will be undertaken to see these achieved. These actions are organized according to the six outcome clusters under which the seven objectives of the Strategy were grouped in Section 2.

Section 2.1 described how wetland management is a shared responsibility between a number of agencies because of legislative arrangements. In order to advance the implementation of the actions described below, different agencies will take responsibility for initiating and coordinating different activities.

Conservation and management of wetlands is an integral element of natural resource management

Objective 1. To manage wetlands as integrated parts of natural resource management at local, regional, national and international scales.

Actions:

1.1 Establish a process to ensure that all state, regional and local, statutory and non-statutory planning processes are working to implement the objectives of this Strategy, the relevant goals, policies and principles set-down in the *State Water Plan 2000*, and relevant international conventions, intergovernmental agreements, national and state policies and strategies (Section 6).
[Coordinating responsibility: DEH; Partners: Planning SA, DWLBC, PIRSA, EPA, CWMBs];

1.2 As part of their catchment water management plan, each catchment water management board should address wetlands issues. Accordingly the catchment water management plan should include the identification of wetlands, and their importance, identification of key threatening processes, identification of threatened species or threatened vegetation communities associated with wetlands, the limits of acceptable change, risk assessment approaches, opportunities for rehabilitation, restoration or creation, specific responsibilities, partnerships, funding arrangements and priorities for actions. It is recognised that planning cycles and resource availability will impact on the wetland content in any particular plan. A review of the wetlands elements should occur when catchment water management plans are reviewed, ie at least every five years.
[Coordinating responsibility: CWMBs; Partners: DWLBC, DEH];

1.3 Where the continuing 'health' of wetlands found in South Australia is reliant on the quantity and quality of water supplies coming from other States or Territories, continue to pursue appropriate water sharing and cooperative management arrangements through existing or future formal agreements.
[Coordinating responsibility: DWLBC; Partners: DEH, EPA, AACWMB];

1.4 As part of regional and catchment-level planning, identify and pursue opportunities to protect, rehabilitate, restore or, where appropriate, to create wetlands which can help to improve the 'health' of water resources, improve water quality, manage threatening processes, contribute to biodiversity conservation, or provide opportunities for ecologically sustainable economic uses.
[Coordinating responsibility: CWMBs; Partners: regional NRM groups, DWLBC, DEH, EPA];

1.5 Initiate, and provide specific assistance and encouragement to local government for the implementation of this Strategy through their statutory and non-statutory planning processes.
[Coordinating responsibility: DEH; Partners: CWMBs, DWLBC, Planning SA];

1.6 In order to streamline processes, review, assess and address any jurisdictional or legislative overlaps, uncertainties or impediments to locally-based community action directed at wetland conservation, rehabilitation or restoration for each catchment water management board (see Objective 2 also).
[Coordinating responsibility: DEH; Partners: CWMBs, DWLBC, Planning SA, PIRSA, regional NRM groups];

1.7 Encourage and support the construction of artificial wetlands where they will have water quality and environmental benefits and will not result in the loss or degradation of natural permanent or ephemeral wetland areas, or have any negative impact on any significant natural aquatic or terrestrial environments.
[Coordinating responsibility: CWMBs; Partners: Local Government, DWLBC, DEH, EPA];

Patawalonga and Torrens Catchment Water Management Boards

1.8 Assist catchment water management boards and local government to access technical information to guide the construction of well-designed multifunctional artificial wetlands, where appropriate (see Action 1.7).
[Coordinating responsibility: EPA; Partners: DWLBC, DEH];

1.9 Ensure that all impact assessments commissioned or required (under either Commonwealth legislation, or State legislation and planning controls) for development proposals which have the potential to impact on wetlands include comprehensive assessment of the environmental, economic, social and cultural impacts, as well as the cumulative effects of development.
[Coordinating responsibility: Planning SA; Partners: DEH, PIRSA, EPA, Local Government, Transport SA];

1.10 Ensure the design and related operational rules of infrastructure (including earthworks), minimises impacts on wetlands, and does not impede the movements of native fish and other native species.
[Coordinating responsibility: Local Government; CWMBs Partners: Planning SA, DWLBC].

Local actions to care for, and restore wetlands are undertaken with the support of government and non-government organisations

Objective 2. To support the care, rehabilitation, restoration or creation of wetlands by the private and public sectors.

Actions:

2.1 Expand programs and projects (such as Waterwatch SA, KESAB, Our Patch, Threatened Species Network, Greening Australia, Marine and Coastal Communities Network and UFBP) which serve to educate and empower local people and communities to become more actively involved in integrated catchment and natural resource management.
[Coordinating responsibility: DEH; Partners: DWLBC, EPA, CWMBs, PIRSA, LAP groups, Waterwatch, KESAB, UFBP, regional NRM groups, Threatened Species Network, Greening Australia, Marine and Coastal Communities Network etc];

2.2 Review any jurisdictional or legislative overlaps, uncertainties or impediments to locally-based community action directed at wetland conservation, rehabilitation or restoration (see Objective 1 also).
[Coordinating responsibility: DEH; Partners: CWMBs, DWLBC, EPA];

2.3 Provide guidance and assistance to undertake full and open community consultation in the preparation, review and implementation of wetland management plans and wetland site management plans etc.
[Coordinating responsibility: DEH; Partners: CWMBs, DWLBC];

2.4 Encourage the meaningful participation of indigenous communities in the planning and management of wetlands at the local, catchment and state levels.
[Coordinating responsibility: DOSAA; Partners: DEH, PIRSA, Aboriginal Lands Trust, CWMBs];

2.5 Seek to foster additional business sector sponsorship, support and investment in wetland conservation, rehabilitation and restoration (see Objective 3 also).
[Coordinating responsibility: DEH; Partners: Business SA, CWMBs];

2.6 Build on current incentives (both financial and other) to encourage private landholders to conserve, rehabilitate or restore their wetlands through appropriate mechanisms (see Objective 3 also).
[Coordinating responsibility: DEH; Partners: CWMBs, PIRSA, DWLBC, regional NRM groups];

2.7 Ensure Government-based or funded programs and incentives operating in the state do not encourage, reward or support the destruction, or long-term degradation, of wetlands.
[Coordinating responsibility: DEH; Partners: Planning SA, PIRSA, Local Government, DWLBC, Transport SA, regional NRM groups, CWMBs, EPA];

2.8 Review, and where needed, provide further support and build capacity through regional extension services, to guide and advise local people, community groups and catchment water management boards with respect to achieving community needs, and the goal and objectives of this Strategy.
[Coordinating responsibility: DEH; Partners: PIRSA, CWMBs, regional NRM groups, EPA];

2.9 Make available to the general community in an accessible form the latest findings and information emerging from ongoing research efforts (see Objective 7 below). This should be tailored to meet specific management issues or regional priorities.
[Coordinating responsibility: DEH; Partners: DWLBC, CWMBs, EPA, universities, research bodies, Wetland Care Australia].

The institutional and resourcing arrangements necessary to effectively implement the actions of the Strategy are provided

Objective 3. To ensure effective implementation of this Strategy through appropriate institutional frameworks, supported by the necessary ongoing public resources, and longer term strategic investment by the private sector.

Actions:

3.1 Establish, and allocate new and appropriate levels of resources to a Wetlands Officer position located within the Department for Environment and Heritage. This position will be required to work closely with other agencies, in particular Department of Water, Land and Biodiversity Conservation and catchment water management boards.
[Coordinating responsibility: DEH];

3.2 Report to the SA NRM Council, SA Water Resources Council, SA NRM Steering Committee and the Minister responsible for the *Water Resources Act 1997* on the implementation of the Wetlands Strategy. The statutory reporting requirements regarding the implementation of the State Water Plan under the *Water Resources Act 1997* will play a significant role in this framework for whole of Environment and Conservation portfolio reporting on wetlands initiatives.
[Coordinating responsibility: DEH; Partners: DWLBC];

Department for Environment and Heritage

3.3 DEH to coordinate a review of state arrangements and processes for implementing wetland-related international conventions and agreements (see Section 6.2) and assist the introduction of more streamlined and integrated approaches where necessary.
[Coordinating responsibility: DEH];

3.4 Review the implementation of all relevant national and state legislation, policies and strategies (as outlined in Sections 6.3, 6.4 and 6.5) and pursue the necessary mechanisms to ensure they are being operated to fully support this Strategy.
[Coordinating responsibility: DEH];

3.5 As foreshadowed in Actions 1.1, 1.2, 1.6 and 2.2, ensure the Strategy is implemented in an integrated fashion with, and where relevant through national, state and regional natural resource management strategies and Development Plans.
[Coordinating responsibility: DEH; Partners: CWMBs, DWLBC, EPA, regional NRM groups, Local Government];

3.6 Seek to provide institutional arrangements for implementation of the Strategy, at state, regional and local levels, which encourage partnerships and shared investments within a framework of integrated natural resource management.
[Coordinating responsibility: DEH; Partners: DWLBC, CWMBs, PIRSA, EPA, regional NRM groups];

3.7 Consider each of the actions under Objectives 1, 2, 4, 5, 6 and 7 and pursue, where it is appropriate, implementation approaches to facilitate and encourage collaborative Government-private sector, or community-business sector partnerships and shared investments that result in strategic outcomes.
[Coordinating responsibility: DEH; Partners: CWMBs, regional NRM groups, LAP groups];

3.8 Clearly identify and make known for individual private landholders their rights, responsibilities and opportunities with respect to current and future management of their wetlands.
[Coordinating responsibility: DEH; Partners: CWMBs, regional NRM groups, DWLBC, PIRSA, EPA, Wetland Care Australia];

3.9 Promote, and illustrate with tangible examples and models, the potential benefits to be gained, and attractive investment strategies for business and land managers available through the conservation management, rehabilitation, restoration or creation of purpose-built artificial wetlands (See also Actions 4.5 and 7.5).
[Coordinating responsibility: DEH; Partners: DWLBC, CWMBs, EPA, Local Government];

3.10 See also Actions 2.5, 2.6 and 2.7.

The community is increasingly aware of the importance of wetlands for the wellbeing of all South Australians

Objective 4. To raise community appreciation of wetlands as natural assets and generate support for their gaining attention in integrated natural resource management.

Actions:

4.1 Use key celebrations and events (such as World Environment Day, National Water Week, World Wetlands Day, State Landcare Awards, Biodiversity Month etc) to raise awareness of the environmental, social, economic and cultural importance of wetlands, and to recognise outstanding contributions made to the implementation of this Strategy.
[Coordinating responsibility: DEH; Partners: DWLBC, Local Government, PIRSA, CWMBs, EPA, UFBP, NGOs etc];

4.2 Encourage community access to the State Wetlands Databank (see Action 6.2) and ensure the information it holds is up-to-date and available in a variety of forms, both electronic and non-electronic.
[Coordinating responsibility: DEH, DWLBC; Partners: CWMBs];

4.3 If necessary, identify opportunities to expand the curricula of schools and higher learning institutions to include consideration of the importance of wetlands, their environmental, social, economic and cultural values, and their improved management.
[Coordinating responsibility: DEH; Partners: DECS, CWMBs, EPA];

4.4 Seek to have all environmental education institutions promoting awareness of the importance of wetlands, and encourage the establishment of further education and interpretation sites.
[Coordinating responsibility: DEH; Partners: business sector, Tourism SA];

4.5 Showcase models, at the state and regional level, which demonstrate the 'wise use'* (ecologically sustainable use) of wetlands and their various environmental, social, economic and cultural values (see also Actions 3.9 and 7.5).
[Coordinating responsibility: DEH];

* See Glossary for definition

4.6 Put in place mechanisms to ensure the findings of wetland-related studies are made available in a timely and appropriate form to government agencies/Departments, catchment and regional planning boards and committees, as well as local government, private landholders, the business sector and stakeholders generally (see Action 7.2 also).
[Coordinating responsibility: DEH];

4.7 Review and pursue appropriate actions contained in the '*National Action Plan 2001-2005 for Communication, Education and Public Awareness to Promote Wise Use of Australia's Wetlands*' (See Section 6.3 for further details).
[Coordinating responsibility: DEH; Partners: Wetland Care Australia, interested others].

South Australia's most important wetlands are recognised and protected

Objective 5. To identify those wetlands which are important at the regional, state, national and international levels, and ensure appropriate recognition, management and protection of these sites.

Actions:

5.1 Establish a comprehensive, adequate and representative system of protected areas to contribute to the conservation of South Australia's native biodiversity associated with wetlands.
[Coordinating responsibility: DEH; Partners: landowners, CWMBs, DWLBC, Wetland Care Australia, other NGOs etc];

5.2 Ensure that key wetland sites are identified in the State Wetlands Databank (see Action 6.1) defining their importance at the regional, state, national and international levels. Collate monitoring, survey, and management information for wetlands across the state and link these data to information from associated water resources that wetlands rely upon.
[Coordinating responsibility: DEH; Partners: DWLBC, EPA, CWMBs, regional INRM groups]

5.3 Where it is appropriate, give recognition and provide for suitable management for those wetlands identified as having cultural heritage importance to indigenous and non-indigenous Australians (See Objective 7 below also).
[Coordinating responsibility: DEH; Partners: Aboriginal Heritage Committee, DOSAA, Aboriginal Land Trust];

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5.4 Ensure that all relevant local government and state agencies, catchment water management boards and similar bodies are made aware of those wetlands recognised as being of regional, state, national or international importance and their respective management and 'duty of care'* responsibilities for each site.
[Coordinating responsibility: DEH];

5.5 Ensure wetlands of regional, state, national or international importance are identified in Planning Strategy and Development Plans. Such areas should be supported by appropriate strategies and objectives/principles of development control and included within a Conservation Zone. Surrounding zones should include provisions to minimise threats on such areas (eg minimising introduction of pest species, land division and fire management).
[Coordinating responsibility: DEH, Planning SA; Partners: Local Government, Transport SA];

5.6 Develop and implement management plans for all sites recognised as being of regional, state, national or international importance, and, ensure such management plans consider the regional context, and are integrated with the full range of regional natural resource management plans and programs. Management plans will also be considered in the review and amendment of Development Plans.
[Coordinating responsibility: DEH; Partners: CWMBs, Local Government, regional NRM groups, DWLBC, PIRSA, Planning SA, Environment Australia for Ramsar listed wetlands and important migratory waterbird habitats, land owners];

* See Glossary for definition

5.7 In relation to Action 5.5, ensure that for each site, appropriate monitoring regimes are in place to continually guide management actions. For South Australia's Ramsar sites describe the 'ecological character'* of each site and ensure that management is suitable to retain this, and that monitoring is in place to provide early warning of any changes to this 'ecological character'.
[Coordinating responsibility: DEH; Partners: DWLBC, EPA, CWMBs];

5.8 Where wetlands determined to be of regional, state, national or international importance include, or lie totally within, areas of privately held land, seek to secure the long-term conservation management of these sites using appropriate incentives, investment (See Objective 3) and other state-based mechanisms.
[Coordinating responsibility: DEH; Partners: DWLBC].

South Australia's wetlands and their resources are better understood and this information is made readily available

Objective 6. To develop, maintain, and make readily accessible to all, a comprehensive inventory of South Australia's wetlands and their resources.

Actions:

6.1 As a priority, establish the current range, adequacy, status and accessibility of wetland-related data for supporting and guiding the implementation of this Strategy. Use this to address priority information gaps and design the State Wetlands Databank as an integrated part of the State Water Information Management System (SWIMS). (see Objective 3 and Section 7).
[Coordinating responsibility: DEH; Partners: DWLBC, EPA];

6.2 Further to 6.1 above, develop a comprehensive State Wetlands Databank[1], and ensure this is integrated with related mapping and data holdings being used to guide natural resource management and biodiversity conservation planning at the state-wide, regional, catchment and, where appropriate, national levels.
[Coordinating responsibility: DEH; Partners: DWLBC, EPA];

6.3 Initiate a program to assist in the collection and storage of existing management, ecological and cultural significance knowledge from indigenous and non-indigenous community members with an interest in wetlands.
[Coordinating responsibility: DEH, DOSAA, Aboriginal Heritage Committee, Aboriginal Lands Trust; Partners: DWLBC];

6.4 Identify and document as part of the State Wetlands Databank those wetlands which have cultural heritage significance to the indigenous peoples of South Australia (see Action 5.2 also).
[Coordinating responsibility: Aboriginal Heritage Committee, DOSAA; Partners: DEH, DWLBC];

6.5 Provide for easy access and use (electronic and non-electronic) of the State Wetlands Databank for all government agencies, stakeholders, and especially catchment water management boards, regional INRM groups, soil conservation boards, local government and similar groups with direct responsibility for integrated natural resource planning processes.
[Coordinating responsibility: DEH; Partners: DWLBC, EPA];

6.6 Assist catchment water management boards, regional INRM groups and similar bodies, local government and private landholders to identify wetlands that are considered priorities for rehabilitation or restoration. To assist in this process, and in conjunction with these stakeholders, develop standards and criteria for the identification of wetlands within each catchment or management region, descriptions of the functions and ecological, social, cultural and economic values of each, the extent and value of key areas, the specific threats to be addressed in each case and key management criteria.
[Coordinating responsibility: DEH; Partners: CWMBs, DWLBC, EPA, Local Government, landholders];

6.7 Once established, ensure the databank of the State's wetland resources is updated regularly using new information as it becomes available and based on the on-going monitoring data gathered as part of tracking and assessing the implementation of this Strategy (see Section 7), the *State Water Plan 2000* and other related policies and strategies. At a minimum, the databank will be updated as part of the five-yearly review of the *State Water Plan* and included as a part of the resource inventory section.
[Coordinating responsibility: DEH; Partners: DWLBC, EPA];

[1]It is envisaged that the State Wetlands Databank would include, make available and provide access to a wide range of ecological, biological, hydrological, cultural and social information about wetlands, and that it would do so in a variety of forms (Geographic Information Systems, registers of sites, more user-friendly descriptions etc) to maximize its value and uses. The final design, operational and long-term resource implications are yet to be considered in detail but would be a priority action for the Wetlands Officer within the Department for Environment and Heritage.

* See Glossary for definition

6.8 Include in the wetlands section of the State of the Environment Report for South Australia (under the *Environment Protection Act*) more information regarding the health and status of wetlands in South Australia (The next SoE Report is due for release in 2003 - see Section 7.3). This is to be in addition to the statutory reporting requirements under the *Water Resources Act 1997* (see Figure 3).
[Coordinating responsibility: EPA (SoE Working Group), DEH; Partners: CWMBs];

6.9 Use the State Wetlands Databank to identify wetlands of regional, state, national and international importance (refer to Objective 5 above).
[Coordinating responsibility: DEH Partners: Aboriginal Heritage Committee, Aboriginal Lands Trust, DWLBC, SARDI and others as appropriate].

South Australia's wetlands and their resources are better understood and this information is made readily available

Objective 7. To support studies of wetlands that provide an improved understanding, and serve to guide planning and management actions.

Actions:

7.1 Facilitate and support research into the key management issues and questions relating to South Australia's wetlands, including but not restricted to the following:

- impact assessment tools and approaches – environmental, economic, social and cultural;
- defining for differing wetland types and proposed uses, their limits or thresholds of acceptable change *;
- valuing the social and ecosystem services provided by different wetland types;
- new uses of wetlands and wetland species that are sustainable and generate income for long-term protection and management;
- natural wetting and drying cycles of wetlands, and the biological and other responses to these;
- environmental water needs of different wetland types and their related biota;
- relationships between key individual wetlands and wetland systems, and groundwater;
- restoration and rehabilitation techniques for wetlands;
- taxonomy, distribution, habitat/refugia needs of wetland-dependent plants and animals, especially rare and threatened biota;
- better understanding of the macro and microinvertebrates of wetlands;
- grazing management regimes and pastoral stocking rates that are compatible with retaining wetland functions and values;
- design and management of buffer zones around different types of wetlands;
- implications of long term alterations/changes in salinity and climate change on wetlands;
- managing the impacts of tourism, models for sustainable tourism;
- managing wetlands within integrated catchment frameworks;
- scales of land use changes and their impacts on wetlands;
- inventory tools including minimum datasets, classification systems, wetland condition indices, bioregions for terrestrial and aquatic environments, remote sensing for water balance monitoring/planning etc;
- identification of key weed threats in wetlands and developing management guidelines to prevent or control infestations;
- early warning indicators of impacts on wetlands, and monitoring protocols (see Action 7.3 below)

  [Coordinating responsibility: DEH; Partners: DWLBC, universities, EPA];

7.2 Put in place mechanisms and tools to ensure that the findings of the above research are made available in a timely and appropriate form to government agencies/Departments, catchment and regional planning boards and committees, as well as local government, private landholders, the business sector and stakeholders generally (see Objective 4 above also).
[Coordinating responsibility: DEH];

* See Glossary for definition

7.3 Develop, and support the use of state-wide wetland monitoring, evaluation and reporting protocols to allow for standardised gathering of status and management information to help inform planning processes, site management and to improve the information held in the State Wetlands Databank (see Action 6.2 above). This will also help monitor progress with the implementation of this Strategy, the production of the wetlands section of the State of the Environment Report for South Australia (See Action 6.8 above) and implement some of the objectives of the State Water Monitoring Subcommittee.
[Coordinating responsibility: DEH; Partners: DWLBC, CWMBs, EPA];

7.4 Facilitate the development of a 'toolkit' for wetland impact assessment which can help with placing true and comparative values on the environmental, economic, social and cultural impacts of wetland destruction or degradation, and seek to have this adopted and applied through natural resource management and development planning processes (see Objective 1 also).
[Coordinating responsibility: DEH; Partners: Planning SA, DWLBC, EPA];

7.5 Document knowledge and guidelines, and showcase models, which demonstrate 'wise use' (ecologically sustainable use) of wetlands by indigenous people and local wetland managers. Priorities include guidelines in relation to grazing on floodplains and lake beds, fisheries management, petroleum industry activities and ecotourism (see also Actions 3.9 and 4.5).
[Coordinating responsibility: DEH; Partners: DOSAA, Aboriginal Heritage Committee, Aboriginal Lands Trust]

G. Blair

* See Glossary for definition

Wetlands and their Importance

4.1 What are wetlands ?

Wetlands are diverse in their forms, shapes and sizes. This diversity also equates to a wide variety of functions, as determined by these same factors, and others such as climate, soils and vegetation.

While there are many and varied definitions for 'wetland' (see Appendix 2), the definition provided in the *Water Resources Act 1997*, and further elaborated on in the *State Water Plan 2000*, is appropriate to use in this context and helpful for defining the scope of the Wetlands Strategy.

> Wetland – '. . means a swamp or marsh and includes any land that is seasonally inundated with water.'
>
> *(Water Resources Act 1997)*
>
> this definition of a wetland is taken to '…. include tidal and estuarine systems, seagrass meadows, mound springs, salt lakes, permanent freshwater swamps and lakes, peat swamps and floodplain channels and swamps.'
>
> *(State Water Plan 2000)*
>
> and 'Water is the dominant driver of the ecology of wetlands, with the duration, frequency, seasonality and sequencing of inundations being key factors in determining the productivity and biota of wetlands'
>
> *(State Water Plan 2000)*

To further understand the scope of this Strategy it is informative to consider the wetlands in South Australia that have been recognised as nationally important in *A Directory of Important Wetlands in Australia* (see Section 4.3.4). The *Directory* indicates that South Australia has wetlands ranging across at least nine different marine and coastal types, sixteen different inland wetland types, and three different artificial (or purpose built) wetland types. See Appendices 5 and 6 for further details.

Examples of this range of types include those shown in Table 1. Note that most of the wetlands listed as examples include within them several wetland types and are included here to provide real-life reference points for gaining a better appreciation of the scope of the Strategy. Not all of the sites listed in Table 1 are recognised as being nationally important.

Table 1: A sample of wetland types found in South Australia based on those used by the Ramsar Convention. Note that some, but not all of these sites are recognised as being nationally important.

A range of the wetland types found in South Australia	Some examples
Inland wetlands	
Permanent inland delta	Marne River Mouth
Permanent rivers, streams and creeks (including waterholes)	Riverland Wetland Complex, Flinders Chase River System
*Permanent freshwater lakes	Lake Bonney (Riverland), Lakes Alexandrina and Albert, Loch Luna Wetland Complex
*Permanent saline or brackish lakes	Lake Newland, Birchmore Lagoon, Loveday Swamp, Murrays Lagoon, Mid North
*Permanent saline or brackish marshes	Lake Frome (South East) and Mullins Swamp, Watervalley Wetlands
*Permanent freshwater marshes	Swan Reach Wetland Complex, Deadmans Swamp
*Seasonal/intermittent/irregular freshwater lakes	Big Swamp, Banrock Swamp Wetland Complex, Strzelecki Creek Wetland System, Poocher and Mundulla Swamps
*Seasonal/intermittent/irregular rivers, streams, creeks including permanent and semi-permanent waterholes	Coongie Lakes, Diamantina River Wetland System, Wakefield Rivers
*Seasonal/intermittent/irregular saline or brackish lakes	Lake Hamilton, Lake Eyre, South East coastal salt lakes
*Seasonal saline or brackish marshes	Butchers and Salt Lakes, The Coorong
*Seasonal freshwater marshes	Bool and Hacks Lagoon, Gum Lagoon, Marshes Swamp
Shrub or open bogs	Lanacoona Road Swamps, Upper Tunkalilla Creek Swamps, Upper Hindmarsh River Catchment
Tree and shrub-dominated freshwater wetlands	Flinders Chase Rivers System, Honans Scrub
Freshwater springs	Great Artesian Basin Springs eg. Dalhousie
Subterranean karst wetlands	Ewens Ponds and Picanninie Ponds

*descriptors of 'permanent' or 'seasonal' refer to water not salinity status eg. a seasonal saline lake is always saline, but is seasonally inundated

Marine and coastal wetlands	Some examples
Permanent shallow marine waters	American River wetland system, Streaky Bay, Tumby Bay
Marine subtidal aquatic beds	Franklin Harbor, Streaky Bay and D' Estrees Bay
Sand, shingle or pebble shores	American River wetland system, Baird Bay
Estuarine waters	Onkaparinga estuary, Cygnet estuary
Intertidal mud, sand or salt flats	Wills Creek, Coffin Bay coastal wetland system
Intertidal marshes	Upper Spencer Gulf, Clinton
Intertidal forested wetlands	Davenport Creek, Port Gawler
Coastal brackish/saline lagoons	Point Davenport, The Coorong
Coastal freshwater lagoons	Lashmar Lagoon, Grassdale Lagoons

Artificial wetlands	Some examples
Salt evaporation sites	Wills Creek, Barker Inlet and St Kilda, Penrice Saltfields, Stockyard Plain and Noora Evaporation Basin
Water storage areas	Mount Bold Reservoir
Wastewater treatment areas	Murray Bridge Army Training Area wetlands, Greenfields Wetlands, Whyalla Steelworks
Stormwater treatment areas	Warriparinga, Morphettville Racecourse wetland
Boredrains	Muloorina, Dulkinna, Clayton

4.2 The importance of wetlands

Today, much of the world views wetlands very differently to how people did just twenty years ago. Back then the euphemism 'reclamation' was used for draining and converting wetlands; actions which were proclaimed as being to achieve more productive use of the 'wastelands'. The error of these ways has now been revealed – and rather than being 'wastelands', wetlands are widely recognised as performing vital functions, which provide society with significant services and benefits.

The modern term for these functions is 'ecosystem services' and with the realisation that wetlands are important resources has come the move to see these services accounted for in impact assessment and cost-benefit analyses which are used to guide our land and water-use decision making. While still further progress is needed in this area, it is clear that wetlands are now increasingly viewed as precious areas, places that warrant special care and attention. Importantly, the understanding, technology and desire now exists to see past wetlands reinstated, or degraded wetlands repaired, in order that society can once again enjoy and benefit from their ecosystem services.

With the improved understanding of how wetlands function has come the ability to re-create 'wetlands', or make artificial wetlands, with specific roles in mind. Such purpose-built wetlands are playing an increasingly important role in stormwater and wastewater treatment, while also offering improved amenity, ecotourism and biodiversity conservation opportunities and outcomes. Artificial wetlands, such as the Greenfields wetland at Salisbury, can filter industrial or urban run-off and improve water quality while also providing amenity and habitat.

In more detail these functions, services and benefits of wetlands are as follows:

Wetland functions, services and benefits*

Water purification

The plants, animals and soils in wetlands play a significant role in purifying water, removing high levels of nitrogen and phosphorus, commonly associated with agricultural and urban run-off. This is important for preventing eutrophication further downstream, a process that leads to rapid plant and algal growth followed by depleted oxygen levels in the water. Artificial wetlands, such as the Greenfields wetland at Salisbury, can take industrial or urban run-off and cleanse the water.

Ground water replenishment

Many wetlands help recharge underground aquifers and this is vital for maintaining these water supplies.

Flood mitigation

Wetlands act as water storages and help to mitigate against flooding and flood damage. They slow floodwaters, and floodplains permit waters to spread, rather than be concentrated into narrow river channels resulting in higher flood peaks.

Reservoirs of biodiversity

Freshwater wetlands hold more than 40% of the world's species, while coastal wetlands such as tidal flats (and some freshwater wetlands) are vital to the survival of migratory shorebirds. Wetlands also act as refuges for animal species during drought and other adverse times. The world-wide decline in populations of many frogs species has mirrored the ongoing destruction of wetlands and it is clear that this loss of habitat is a contributing factor. Wetlands are synonymous with waterbirds and the importance of these to the ecology of nearby lands is now being realised. Around the Gunbower Forest wetland in Victoria, the Ibis population provides a free pasture insect control function over an estimated area of 100,000 hectares.

Shoreline stabilization and storm protection

Saltmarshes, mangroves and other coastal wetlands act as the frontline defence against incoming storms and tidal surges. They help minimise the impact of storms by reducing wind and soil erosion caused by wave and current action.

Sediment and nutrient retention and export

Under natural flooding regimes floodplains, including their wetlands, are often the most fertile environments due to the deposition of sediments and nutrients as waters slow and spread across the landscape. With more regulated rivers, and intensive agriculture on floodplains they are now largely deprived of floods, and this natural enrichment process has been lost.

Wetland products

Wetlands are highly productive environments and have been exploited for their products for centuries. Mangrove swamps and tidal wetlands are breeding and nursery areas for many commercial fish species and in Moreton Bay in Queensland the mangroves have been valued at nearly $10,000 per hectare for their fish production value alone. Recreation and tourism (see next page) are other important 'products' of wetlands. Forested wetlands, such as the Barmah-Millewa Forest shared by Victoria and New South Wales along the River Murray, can support ecologically sustainable production of timber products, and also growing ecotourism.

Climate change mitigation

Wetlands are also a factor in ongoing climate change debates. While some wetland types release methane, others act as carbon sinks and the destruction of these wetland types releases carbon dioxide, a greenhouse gas. Conversely, wetland restoration increases the sequestration of carbon. Retaining coastal wetland resources is recognised as an important adaptation strategy against the anticipated rises in sea level that will result from changes in the climate.

* See Glossary for definition

Recreation and tourism

Wetlands provide the venue for many human recreational activities such as fishing, hunting, boating, birdwatching and camping. These activities help to support local and regional tourist industries. In South Australia, The Coorong, Coongie Lakes and the Riverland are testimony to this important function of wetlands. The Banrock Station Wine and Wetland Centre in the Riverland now receives around 70,000 visitors per year with obvious flow-on benefits to the local community.

South Australian Tourism Commission

Cultural significance

To indigenous Australians many wetlands and their immediate surrounds are of great spiritual or cultural significance. They can include burial places, represent former campsites, or places where traditional hunting practices took place and may continue today.

Wetlands, riverine and coastal environments and any land within one hundred metres of any water source are likely to contain archaeological, historic or traditional significance to Aboriginal people. Wetlands were not just water sources but high grade resources for Aboriginal people, providing abundant foods such as fish, birds and eggs, reptiles and plant tubers. Fibres for domestic needs were also procured from wetland plants. In some areas the Aboriginal people would have practised regimes to manage the wetlands, such as fire regimes.

All of South Australia's Wetlands of International Importance and most of the important sites for shorebirds have associated significant Aboriginal heritage sites.

For non-indigenous Australians many wetlands also hold historical significance in relation to the early settlers.

Education, science and research

Many wetlands provide ideal venues for raising awareness and educating the community and students about the importance of wetlands, how they function and general biological principles. They also offer opportunities for detailed applied management research to improve our understanding of how water-dependent ecosystems operate and their fundamental maintenance needs.

4.3 South Australia's internationally and nationally recognised wetlands

4.3.1 Wetlands of International Importance

Australia is a signatory to the Convention on Wetlands, known more commonly as the Ramsar Convention after the city in Iran where it was signed by eighteen countries in 1971. The Ramsar Convention has three main pillars; wise use, Wetlands of International Importance and international cooperation (see Section 6.2). Parties to the Ramsar Convention are expected to identify and designate under the Convention those wetland sites which meet the criteria for being a Wetland of International Importance (see Appendix 3). Upon designation of such sites, routinely referred to as Ramsar sites, each country commits itself to managing them to retain the special ecological, hydrological and other values found there. Where appropriate, Ramsar sites are intended to be demonstration sites for best practice management which illustrates the Convention's principle of 'wise use', or ecologically sustainable use as it is known today.

In Australia there are presently sixty-three wetland sites listed under the Convention on Wetlands as Wetlands of International Importance, and of these, five are in South Australia (see Figure 3);

- The Coorong and Lakes Alexandrina and Albert Wetland
- 'Riverland'
- Bool and Hacks Lagoon
- Coongie Lakes
- Banrock Station Wetland Complex

Department of Water, Land and Biodiversity Conservation

4.3.2 International Biosphere Reserves

United Nations Educational, Scientific and Cultural Organisation's Man and the Biosphere Program aims to develop a global network of sites that are 'living laboratories' demonstrating solutions that reconcile the conservation of biodiversity with its sustainable use. The sites are intended to show the links between ecology, economics, sociology and

politics. In Australia there are twelve Man and the Biosphere sites at present, including Bookmark Biosphere Reserve in the Riverland of South Australia. As demonstration sites for ecologically sustainable development, Man and the Biosphere Reserves are akin to the concept of multiple use reserves and parks, which is used in South Australia. The Bookmark Biosphere in South Australia contains important wetlands along the floodplain of the River Murray and includes the Chowilla floodplain which is part of the 'Riverland' Ramsar site (see section 4.3.1).

4.3.3 Sites of international importance for migratory shorebirds

Australia has in place bilateral agreements with the Governments of both Japan and the People's Republic of China for conservation of the migratory birds which annually traverse the 'flyway' extending from New Zealand and Australia north through countries such as Papua New Guinea, Indonesia, Thailand, the Philippines and Vietnam, on through China, South and North Korea and Mongolia to the Russian Federation and Alaska. Further details of these agreements are given in Section 6.2.

At the 1996 global conference of the Ramsar Convention in Brisbane, Japan and Australia took the lead in launching the Brisbane Initiative – the East Asian-Australasian Flyway Shorebird Site Network. This initiative aims to establish a network of the most important wetland sites used by migratory shorebirds on their annual pilgrimage to their breeding grounds and back. Today there are thirty-one sites on this network (see Appendix 4), with 11 of these being in Australia, including The Coorong in South Australia. This initiative now forms part of the over-arching Asia Pacific Migratory Waterbird Conservation Strategy 2001-2005 and is directed by the Shorebird Action Plan.

In 1993 the Australasian Wader Studies Group of Birds Australia and the World Wide Fund for Nature (WWF) published *'A National Plan for Shorebird Conservation in Australia'*. Among 201 sites identified by the plan as being of international and national importance for shorebirds, thirty-three are within South Australia (see Appendix 4). Of these, the sites identified as being the most important in terms of providing habitat for five or more shorebird species in South Australia are:

- Spencer Gulf
- The Coorong
- Price Saltfields
- Penrice Saltfields
- Kangaroo Island; and
- Clinton Conservation Park.

4.3.4 Nationally important wetlands

In 1993, under the auspices of the Australian and New Zealand Environment and Conservation Council (ANZECC), the Commonwealth Government, in collaboration with the respective state and territory Governments published *'A Directory of Important Wetlands in Australia'*. Applying criteria developed cooperatively for national application by the Commonwealth, state and territory Governments (see Appendix 5) this first edition of the *Directory* included descriptions of 520 'nationally important' sites, of which fourty-three were in South Australia. The second edition of the *Directory* published in 1996 included 698 sites, with sixty-eight from South Australia. In February 2001 the third edition of the *Directory* was made available with a total of 851 sites described. For South Australia sixty-nine sites were described, which by comparison with the previous edition sees the addition of the Commonwealth Government's Murray Bridge Army Training Area Wetlands. Appendix 6 provides the names of these sites. Further details can be obtained from the web site of Environment Australia at http://www.ea.gov.au/water/wetlands/database/index/index.html It is expected that in the near future additional data will be provided for Kangaroo Island, the Mount Lofty Ranges, Northern Agricultural Districts and the Eyre Peninsula which may see further 'nationally important' sites identified for South Australia.

The Great Artesian Basin springs have been declared an endangered ecological community under the *Environment Protection and Biodiversity Conservation Act 1999*.

It should also be noted here that under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999*, there is scope for certain sites to be declared as 'threatened ecological communities' (see section 6.3). Such a designation for a wetland site would automatically make it of national importance also.

Figure 3 shows the distribution of both the internationally and nationally important wetlands of South Australia. In summary, the sixty-nine internationally and nationally important sites identified in the *Directory* have a total area of approximately 4.2 million hectares. Among these sixty-nine sites can be found more than thirty different wetland types (see Section 4.1 above and Appendix 2).

Some of the information contained in this section is based on the Wetland Values and Function Fact Sheets produced by the Ramsar Convention Bureau in February 2001.

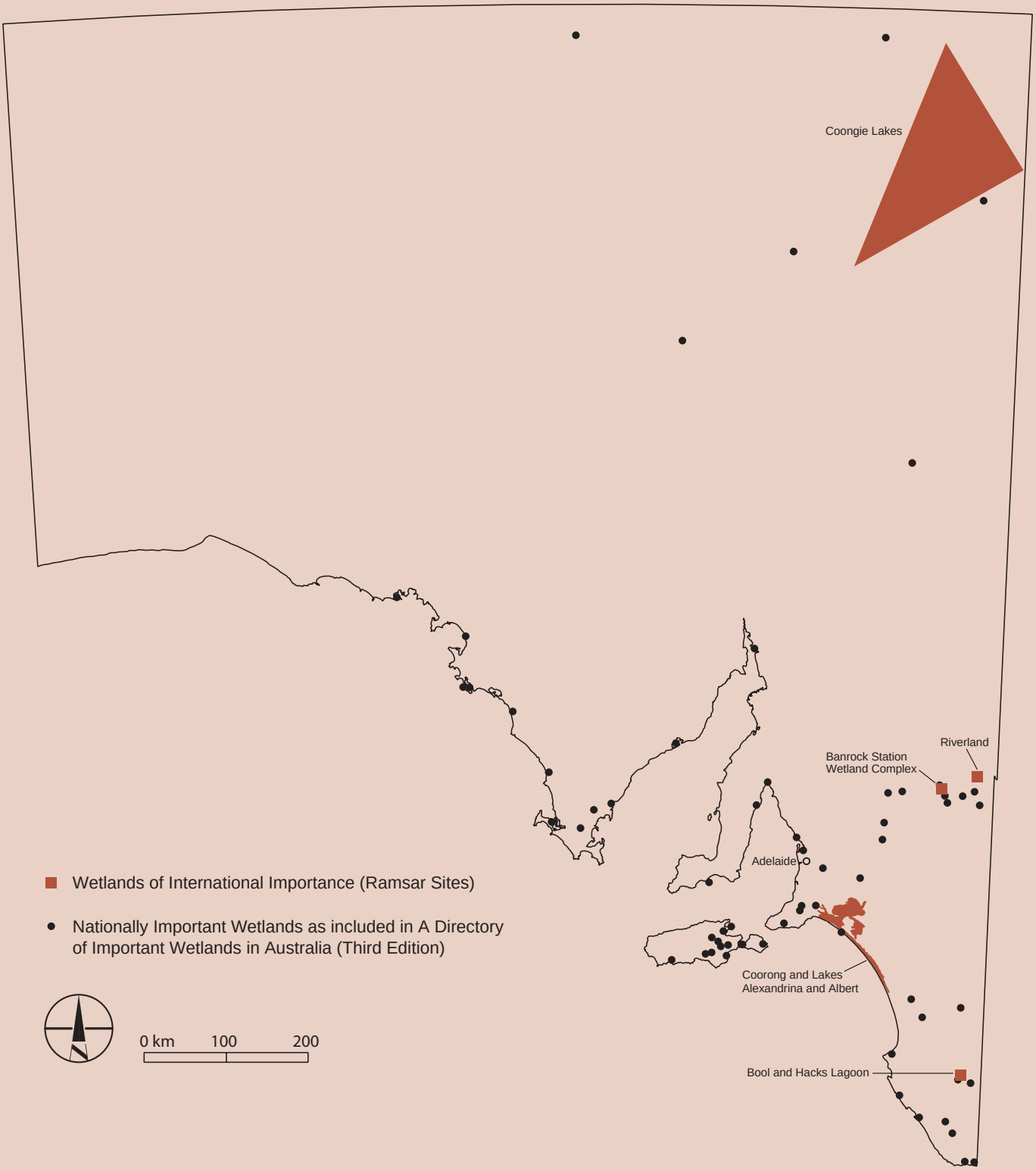

Figure 3. Important Wetlands in South Australia

G. Blair

South Australia's wetland resources – threats and management issues

5.1 Introduction

Nationally it is estimated that since European settlement in Australia, approximately 50% of the wetlands have been destroyed. While a comprehensive state-wide inventory of wetland resources has yet to be completed, it seems likely that in South Australia around 70% of the natural wetlands have been converted to other uses in this same period.

In some regions the loss of wetland resources has been even higher. In the Adelaide-Mount Lofty Ranges region less than 1% of the former wetlands remain and in the South East around 6% remain. In both of these regions, draining of wetlands for agriculture has been the main cause of wetland loss, however across South Australia wetland destruction or degradation due to a range of factors has been caused, and is continuing today. These threats are considered below in more detail.

With diversions and regulation both interstate and within South Australia, the flows in the River Murray have been reduced by more than two-thirds. The floodplain wetlands along the River Murray now face either permanent inundation (due to weirs holding artificially high pool levels), or are subjected to more frequent 'human induced' droughts. Either way, these ecosystems have suffered through being denied the natural wetting-drying cycles to which they evolved over many thousands of years.

Over the past 110 years, there has been a visible reduction in flows and extinction of Great Artesian Basin (GAB) springs in parts of the GAB, resulting from the uncontrolled development of free flowing bores.

Farm dams and reservoirs divert up to 80% of run-off from the streams of the many hills and ranges, depriving downstream ecosystems of the water they need to survive and often contributing to salinity problems in downstream reaches. During significant rainfall events in highly dammed catchments, runoff is generally in the form of high energy pulses when the catchment is saturated and this can lead to severe erosion and local flooding. Estuaries are dominated by seawater, with little of the original freshwater flows reaching, and diluting, the lower end of rivers as they once did.

The above paints a very gloomy picture for those regions where quality information exists, such as the Murray-Darling Basin and the South East. In other regions, such as the Eyre Peninsula, the information is inadequate to make accurate statements about wetland loss. This lack of baseline data and wetland mapping remains a serious impediment to managing wetland resources.

While there have been major impacts on wetlands, and there continue to be many threats to these ecosystems, it is wrong to assume that nothing is being done to see wetlands protected and reinstated. As the following section briefly considers, community groups along with catchment water management boards and government at all levels have been working in various parts of the state to improve wetlands and conserve their biodiversity. These efforts are a start, but need to be built on and better directed and resourced for gaining strategic outcomes.

5.2 Current management of wetlands

Currently within South Australia there are many organisations involved in conserving, rehabilitating and restoring wetlands.

Community and Local Action Plan groups along the River Murray in South Australia, along with organisations such as Wetland Care Australia and the Australian Landscape Trust have been actively restoring wetlands with funding from the River Murray Catchment Water Management Board, the Natural Heritage Trust, the Murray-Darling Basin Commission and the Department for Environment and Heritage. The commitment of these organisations and people has greatly improved the condition of many wetlands by reinstating semi-natural water regimes, removing pest plants and animals and revegetating with local species.

In the Upper South East of South Australia, the South East Dryland Salinity and Flood Management Scheme is developing a coordinated wetland management program which aims to restore natural surface flow regimes to many wetlands. The program will assist to protect wetlands remaining in this area from the damaging effects of rising saline groundwater.

In the Far North, the Lake Eyre Basin Coordinating Group, Georgina Diamantina Catchment Committee, Cooper Creek Catchment Committee and the Arid Areas Catchment Water Management Board all play a role in facilitating research and planning for biodiversity conservation.

The South Australian Murray-Darling Basin region has a partnership approach to provide leadership for wetland management issues. A River Murray Wetland Policy Group and a River Murray Wetlands Technical Support Group have been formed to set technical and policy directions for the development and implementation of wetland management plans, wetland rehabilitation plans and on-ground works.

Representatives from the Department of Water, Land and Biodiversity Conservation, the Department for Environment and Heritage, Local Action Planning Groups and the River Murray Catchment Water Management Board (RMCWMB) form the Wetland Policy and Technical Support groups. The RMCWMB and Wetland Care Australia are undertaking good work with the local community on wetland rehabilitation projects.

The Department for Environment and Heritage also considers wetlands as a priority for addition to the state reserve system and has purchased land containing wetland areas not well represented in the system.

In other areas of South Australia wetland conservation is also being undertaken by committed community groups and individual landholders. This Strategy aims to help build on this work and integrate wetland management in the state's broader natural resource management programs and initiatives.

5.3 Major threats to wetlands across South Australia

Across the state there are a number of root causes, factors and issues which pose threats to the various wetland resources. Significantly, these exist because of past failures to fully appreciate the importance of wetlands and the roles they play in terms of quality of life and environmental 'health'. This lack of understanding has manifested into the factors which this Strategy seeks to address, either through direct intervention or more subtle long-term changes in attitude and approach by those that make regular decisions which impact on wetlands.

In summary, the root causes, major threats and management issues for South Australia's wetlands are as follows:

T. Sharley

5.3.1 Root causes

Failure to value the functions, services and benefits of wetlands

At the most fundamental level, the greatest single threat to wetlands continues to be the limited value that society places on the functions that wetlands perform and the services and benefits which are a product of these (see Section 4). This is in part due to limited understanding by the community of these functions and also, significantly, that many wetland functions are 'public goods' whose benefits accrue to the wider community rather than individual landholders.

While steps are needed to educate and inform decision makers and landholders better, there is also an urgent need to develop policy mechanisms that address public good issues, shift community perceptions and paradigms about wetlands, and to enlist the support and involvement of local stakeholders and the business sector in seeing wetlands protected and restored.

Lack of baseline information and integrated approaches

The *State Water Plan 2000* makes the following observation, '*The overriding threats* [to wetlands]*…are a lack of baseline information, poor planning and poorly integrated management activities of organisations and landholders.*' (Section 4.4.4 of the *State Water Plan 2000*). This statement provides a clear mandate for the Strategy.

A high priority has to be to gain a comprehensive understanding of the baseline condition and a readily accessible inventory of the state's wetlands; one that can be shared between and help guide the relevant management agencies, catchment water management boards, industry and community groups. It will be crucial for the success of this Strategy to achieve integrated approaches to planning and management between these same bodies, and organisations.

5.3.2 Major threats and management issues

Destruction of wetlands - conversion to alternative uses

This threat, euphemistically called 'reclamation' for many years, includes among a range of actions, the drainage of wetlands for various agricultural, horticultural and forestry activities as well as housing, industrial and tourist developments. Added to these are wetland losses resulting from activities such as road construction and urban expansions.

Changes to water regimes

The regulation of rivers and diversion of water for urban supplies, industry and agricultural production has seen significant changes to the natural flow regimes upon which most wetlands rely. This has resulted in many wetlands, notably some of those along the floodplains of the River Murray, being permanently inundated and in effect 'drowned'. Alternatively, many wetlands are now deprived of water as it becomes a more and more scarce commodity. Water is no longer provided in the volumes it was previously, nor at the times of year when floodplain ecosystems require it for maintaining natural ecological processes. Drainage schemes, especially in the South East, have in the past, and continue today, to divert waters away from natural flow patterns. Channelisation of waterways accelerates waterflows, can exacerbate flooding and erosion, and prevents the deposition of sediments on the floodplains and in wetland ecosystems. The impacts of groundwater extraction on the ecosystems dependent on this water supply is also a concern.

Introduced plant and animal species

Like most of Australia's ecosystems, wetlands have also suffered the depredations of various introduced plant and animal species. In South Australia some of these include Weeping Willows, California Burr, Mexican Poppy, Noogoora Burr, Bathurst Burr, Couch Grass, Kikuyu Grass, Blackberries, Athel Pine, Parkinsonia, Buffel Grass, Red Fin, European Carp, Goldfish, Gambusia (Mosquito Fish), Trout, European Rabbits, Camels, House Mice, Feral Cats, Feral Pigs and Red Foxes. The impacts of these species range from gradual decline in water quality, loss of natural vegetation, loss of native fish, modification and degradation of habitats, and a general loss of biodiversity. Fortunately, in much of the state's low rainfall areas rabbit populations have been greatly reduced by the release of the rabbit Calicivirus, and the return of some floodplain plant species they once consumed is now becoming evident. Among the introduced species, sheep and cattle must also be considered, as overgrazing and pugging on wetland areas and along river banks can cause significant losses of natural functions and values.

Pollution impacts

While today wetland 'technology' is being used to design artificial wetlands for wastewater treatment and improved amenity, a continuing threat to natural wetlands are the various forms of pollution to which many are subjected. This can include diffuse pollution from broad land use sources as well as many and point sources. These include rubbish disposal (many rural rubbish depots are in, or adjacent to wetlands), urban or rural 'pollution' from industrial or urban sources or stormwater, seepage from septic treatment systems located on floodplains through to spraying for mosquito or locust control. Diffuse pollution including agricultural chemicals and nutrient rich runoff causes excessive algal growth and associated impacts. A further water quality problem can arise from the inappropriate disposal of excess irrigation drainage water into wetlands. This can increase nutrient and salinity levels and in some cases alter the composition of vegetation communities in favour of more aggressive species such as couch grass and other exotic plants. Run-off from highly salinised areas can also be a significant pollution impact.

Inappropriate land use practices

South Australia's problems with unsustainable and inappropriate land use practices are well documented. Part of that broader agenda of reform toward more sustainable agricultural production has to include the protection and reinstatement of trees and understorey vegetation, especially along riparian margins and around wetlands. Inappropriate grazing regimes on floodplains have the potential to degrade wetlands. Inefficient water use is a continuing problem as it results in reduced water availability for environmental flows which help to sustain and rehabilitate degraded wetlands. Over-exploitation of groundwater resources is also impacting on those wetlands fed from these sources. Acid sulphate soils are also an issue in some parts of the state.

Salinity

Rising saline groundwater occurs as a result of increased recharge due to irrigation practices and the clearance of deep-rooted perennial vegetation which is replaced by shallow-rooted annual crops and pastures. Due to hydraulic gradients, the movement of saline groundwater tends to concentrate into surface water resources. Many of South Australia's wetlands, both inland and along river corridors, are suffering from this process. Rising in-stream salinity levels are also a major problem, especially for the floodplain wetlands of the River Murray.

Over-exploitation of wetland resources

Taken very broadly this threat includes those recreational uses of wetlands which can result in degradation or gradual deterioration in the 'health' of the ecosystem. Recreational activities such as power boating, jet skiing, four-wheel driving, trail bike riding, hunting, camping, fishing or horse riding in sensitive wetland areas can have serious long-term impacts. Even within large, more robust wetlands, such activities, if unregulated, can lead to the loss of the natural asset which was being so appreciated by the people involved. The growing trend toward aquaculture in wetland areas and their catchments, for yabbies and marron especially, also requires careful and sensitive management if the impacts seen in other countries are to be avoided in South Australia. If not well managed and closely scrutinised, over-fishing can be a serious threat to wetland biodiversity.

5.4 Regional management issues for wetlands

While the above general categories cover the major threats faced by wetlands, it is also instructive to look at these in more detail on a region by region basis and to consider the management issues they illustrate. The regions used here are the same as those applied in the *State Water Plan 2000* – see Figure 3. Table 2 on page 40 summarises the threats and management issues on a region-by-region basis.

Adelaide and Mount Lofty Ranges

Few natural wetlands remain in the Adelaide metropolitan area and Mount Lofty Ranges. It is thought that less than 1% of those wetlands at the time of European settlement remain within this region. Those that remain, such as coastal marshes and mangrove areas, are affected by the changed water flows and discharge of urban stormwater to estuaries. The swamps of the Fleurieu Peninsula are under consideration by the Commonwealth Government for declaration as a 'threatened ecological community' (see section 4.3.4). In the Mount Lofty Ranges large areas of permanent wetlands and ponds have been lost since the 1840's. The interception of up to 80% of the water flows by reservoirs and dams has reduced the downstream flows to a level where they cannot support the original ecosystems. Drainage, grazing, sand mining and peat extraction have all played a part in this overall reduction in wetland area in this region.

Murray-Darling Basin

The condition of wetlands along the River Murray has been greatly altered and degraded by changes to river flows. The River Murray is 100% regulated below Wentworth, reducing (in 2001) current mean annual flow to South Australia by 52% of natural unregulated flows. The occurrence of overbank flows onto the floodplain has been significantly reduced. Under natural conditions an overbank flow occurred in 84% of years. This has been reduced to just 39% of years. Also, more than half of the formerly temporary floodplain wetlands were permanently inundated by the higher river levels held by the weirs. Due mostly to 'reclamation' for dairy pastures, only 380 hectares of wetland remain (3.6%) of approximately 10,500 hectares of former natural floodplain in the Mannum to Wellington reach of the River. Regulated stable river levels favour introduced species (carp especially) and disadvantage native species. Efforts coordinated through Local Action Plans have resulted in the hydrological manipulation of several significant wetland areas such that they are managed to emulate a natural wetting/drying hydrological cycle. The Barrages have had a major impact on the river estuary, greatly reducing outflows and increasing the chances of mouth closure and changing the ecosystems of Lakes Alexandrina and Albert from brackish to freshwater.

South East

Less than 2% of permanent wetlands and 8% of the temporary wetlands remain in the Lower South East. While temporary flooding still occurs in most years, the extent and duration has been generally reduced by large scale drainage schemes which re-direct water to the sea in the Lower South East. In the Upper South East, uncoordinated private drainage tends to move water downstream faster, towards the large terminal wetlands of the Bakers Range Watercourse and Tilley Swamp. However, the frequency of filling of these large ephemeral wetlands is currently very low and the inundation is thought to

be greatly reduced from the natural flood frequency. The Upper South East Dryland Salinity and Flood Management Scheme is developing a coordinated wetland management program which aims to restore natural surface flow regimes to many wetlands.

Mid North

The full extent of wetland resources in this region is not known. However, Spencer Gulf and Gulf St Vincent contain representative remnant salt marsh systems, samphire flats, tidal flats and mangroves. On Yorke Peninsula there are also important saline lake systems. However, impacts to these systems include: dryland salinity, agriculture, stormwater run-off, human recreation, rubbish dumping, weed invasion, vegetation clearing, mining and grazing. Deteriorating water quality and introduced plants and animals are adversely affecting these wetland areas

Far North

Information available for this extensive region indicates the generally good condition of the wetlands, and, by comparison with the rest of the state, the generally unaltered flow regimes. In some parts of the region, wetlands have been adversely affected by the diversion of water from groundwater sources and permanent waterholes. The water pressure and flow rates of some Great Artesian Basin springs have been altered. For these arid lands the management of water resources, with isolated wetlands areas, critical aquatic refuge areas, extreme flow variability, and across border issues has very different management challenges than for the rest of the state. Unregulated stock access, environmental weeds and the impacts of recreational 4WD vehicles provide additional management issues for wetlands in the region.

Eyre Peninsula

Eyre Peninsula contains excellent examples of inland coastal saline lake systems within South Australia. These wetland systems are confined mainly to the south-western side of the Peninsula. There are also several areas with good quality coastal wetland systems consisting of mangroves and samphire flats; these are located within the numerous bays and tidal inlets scattered around the Peninsula. Wetlands associated with these coastal dune systems are also important. The eastern portion of Eyre Peninsula contains many degraded saline lake systems and the occasional freshwater wetland. These remaining freshwater wetlands are quickly becoming saline due to the effects of dryland salinity. Threats include deteriorating water quality, vegetation clearance contributing to increased salinisation, livestock grazing, introduced plants and animals, altered water regimes and introduction of industries dependant upon irrigation.

Kangaroo Island

The western section of Kangaroo Island contains many freshwater wetlands that are in relatively good condition. Kangaroo Island contains some of the least disturbed inland freshwater wetlands within the high rainfall area of South Australia. The eastern section of Kangaroo Island also contains several freshwater wetlands; but the majority have become saline due to increased dryland salinity. Threats to wetlands on Kangaroo Island include salinisation and rising water tables, vegetation clearance, livestock grazing, deteriorating water quality and introduced plants and animals. The remaining wetlands are also affected by the diversion of water and disruption to flows.

P. Brennan

Table 2. Regional summary of wetland management issues

Management issues	Adelaide and Mount Lofty Ranges	Murray-Darling Basin	South East	Mid North	Far North	Eyre Peninsula	Kangaroo Island
Altered flow regimes							
Water diversion – artesian							
Water diversions - surface sources							
Accelerated run-off through channelisation							
Watercourse erosion, silting							
Conversion of wetlands to drainage basins							
Stormwater, sewage and irrigation water disposal							
Loss/reduction of aquifer recharge							
Water quality (urban run-off, industrial pollution, septic tanks)							
Rubbish dumping							
Mining in salt lakes							
Sand mining, peat extraction							
Impact of forestry and/or agricultural chemicals							
Local and regional rising saline groundwater							
Overuse of groundwater							
Creation and management of artificial wetlands, watering points							
Alienation /isolation of riparian zones;							
Overgrazing of riparian zones and floodplain by stock, koalas							
Fire management and control							
Floodplain cropping and horticulture							
Introduced plant and animal species							
Aquaculture							
Recreational impacts including tourism							
Cultural significance of wetlands							
Limited management data							
Lack of community extension services							

Policy and legislative frameworks for wetland management in South Australia

6.1 Introduction

For South Australia there exists an extensive array of policy and legal instruments which can, and do, have either direct or indirect impact on the management of wetland resources. These various policy and legal instruments operate at several levels; international, inter-governmental, national, state and local.

As emphasised in the *State Water Plan 2000*, one of the challenges is to see this spectrum of sectoral policies and laws implemented in a suitably integrated way to support the long-term sustainable use of water-dependent ecosystems. For wetlands, which through their inherent diversity cross many jurisdictional and institutional boundaries, it is especially important that integrated approaches be taken if the goal and objectives of this Strategy are to be achieved.

6.2 International conventions and agreements

In terms of this Strategy there are several international conventions and agreements that provide immediate and direct obligations and expectations upon Australia, and in turn South Australia, with respect to wetland management. These are summarised below. There are also others that provide more indirect obligations, mainly through their promotion of the principles of ecologically sustainable development.

Convention on Wetlands (Ramsar, Iran, 1971)

The Ramsar Convention, as it is commonly known, is best known for its List of Wetlands of International Importance on which South Australia has four sites included at present (see section 4.3.1). Signatories to this Convention are expected to undertake a range of actions, among them being to identify and designate those sites that qualify for being Ramsar sites, and from then on to ensure these sites are managed so as to retain their special attributes. Signatories are also expected to '….. *formulate and implement their planning so as to promote …… as far as possible the wise use of wetlands in their territory.*' (Article 3.1 of the Convention).

Convention on the Conservation of Migratory Species of Wild Animals

This Convention expects its signatories to take actions which will see the long-term conservation of migratory species assured. Australia's actions under the bilateral migratory bird agreements with Japan and China and the East Asian-Australasian Flyway Shorebird Network (all described below) are a significant response to our obligations under the Convention on Migratory Species.

Japan-Australia Migratory Bird Agreement (JAMBA) and the China-Australia Migratory Bird Agreement (CAMBA) – see also section 4.3.2

In broad terms these two bilateral agreements provide obligations in terms of Australia, Japan and China taking various actions to protect the migratory birds which are known to migrate between the respective countries. Both JAMBA and CAMBA expect actions to be taken to protect the indicated species of migratory birds, but also their 'environments'. This commitment is largely pursued today through the Asian-Pacific Migratory Waterbird Conservation Strategy 2001-2005 and under it the East Asian-Australasian Flyway Shorebird Network described below

Asia-Pacific Migratory Waterbird Conservation Strategy 2001-2005 and the East Asian-Australasian Shorebird Site Network - see also section 4.3.3

Launched in 1996 the East Asian-Australasian Flyway Shorebird Network now falls under the Asia-Pacific Migratory Waterbird Conservation Strategy 2001-2005. Under this initiative one of the aims is to establish a network of the most important wetland sites used by migratory shorebirds on their annual pilgrimage to their Northern Hemisphere breeding grounds and back. Today there are 29 sites on the East Asian-Australasian Flyway Shorebird Site Network (see Appendix 4), with 11 of these being in Australia, including The Coorong in South Australia.

Agenda 21

The 1992 *Earth Summit* held in Rio de Janeiro, Brazil, provided the global blueprint for ecologically sustainable development - *Agenda 21, the Rio Declaration*. In Australia, the *National Strategy for Ecologically Sustainable Development* (see below) was the national policy response to Agenda 21, and today there are several states/territories, including South Australia with local Agenda 21 programs. Emerging from this conference were the three international conventions designed to provide primary mechanisms for implementing Agenda 21; namely the Convention on Biological Diversity, the Convention to Combat Desertification and the Framework Convention on Climate Change (see below). The 2002 *World Summit on Sustainable Development* held in Johannesburg, South Africa furthered global initiatives for ecologically sustainable development.

Convention on Biological Diversity (CBD)

This Convention aims to provide a broadly based framework for the conservation of biological diversity. The objective of the Convention is '..the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the use of genetic resources.' For Australia, there is a National Strategy for the Conservation of Australia's Biological Diversity (see below) which provides the national framework for agreed actions under the CBD. At the State level the Department for Environment and Heritage is preparing a Biodiversity Plan for each region. Those completed to date are for the Murray-Darling Basin, the South-East, Kangaroo Island and the Northern Agricultural District, with others to follow.

Convention to Combat Desertification

This Convention aims to arrest the processes of land degradation which are brought about by factors such as overgrazing, poor irrigation methods, deforestation and climate change. The Convention aims to achieve its objectives through *'long-term integrated strategies that focus simultaneously in affected areas, on improved productivity of the land and the rehabilitation, conservation, and sustainable management of land and water resources leading to improved living conditions, in particular at the community level.*'

United Nations Framework Convention on Climate Change

The Climate Change Convention aims to address the problems resulting from the increasing concentrations of carbon dioxide and methane in the atmosphere – the so-called 'greenhouse effect'. Wetlands are likely to be affected by the expected changes in hydrology which climate change will bring, and those in the coastal zone may be inundated by the rising level of sea. For Australia, the major response to the obligations under the Climate Change Convention are addressed through the National Greenhouse Strategy adopted by the Commonwealth and state/territory Governments in 1998.

6.3 National policies, legislation, strategies and programs

South Australia participates in a number of national councils that develop and approve strategies for improved natural resources management. The most relevant in relation to water resources management are the Council of Australian Governments (COAG), and the new Natural Resource Management Ministerial Council. In June 2001 COAG agreed to form a Natural Resource Management Ministerial Council to subsume NRM issues from the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ), the Australian and New Zealand Environment and Conservation Council (ANZECC) and the Ministerial Council on Forestry, Fisheries and Aquaculture (MCFFA).

P. Canty

National Strategy for Ecologically Sustainable Development◊ (1992)

The Council of Australian Governments endorsed a national strategy for ecologically sustainable development in December 1992. This strategy sets out principles and objectives for achieving ecologically sustainable development (ESD) in Australia. It defined ESD as 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.

National Strategy for the Conservation of Australia's Biological Diversity◊ (1996)

Conservation of biological diversity for future generations is a foundation of ecologically sustainable development and is one of the three core objectives of the national strategy for ESD. In 1996 all states and territories endorsed the national strategy for the conservation of Australia's biological diversity. The strategy sets out principles that underpin objectives and actions that are required to protect Australia's biological heritage. South Australia is at present preparing regional Biodiversity Plans (see below).

Council of Australian Governments (COAG) Water Reforms◊ (1994)

In February 1994, the Council of Australian Governments (COAG) adopted a strategic framework for water reforms covering water pricing, institutional arrangements, sustainable water resources management and community consultation. Of most relevance for this Strategy are the elements of the water reform framework that deal with catchment management and environmental flows.

National Water Quality Management Strategy◊ (1992)

The national water quality management strategy was developed through the ARMCANZ and ANZECC Ministerial Councils and endorsed by the South Australian Government in 1992. It is now widely recognised as the basis for water quality policy development throughout Australia. The objective of the strategy is to achieve sustainable use of the nation's surface and groundwater resources by protecting and enhancing their quality while maintaining economic and social development. South Australia is developing an Environmental Protection Policy (Water Quality) under the *EPA Act 1993*.

National Principles for the Provision of Water for Ecosystems◊ (1996)

ARMCANZ and ANZECC jointly developed the national principles for the provision of water for ecosystems in July 1996. The purpose of these twelve principles is to guide jurisdictions on how to deal with the specific issue of providing water for ecosystems in the broader context of water allocation. South Australia has adopted the goal, *to sustain and, where necessary, restore ecological processes and biodiversity of water-dependent ecosystems by ensuring the provision of water for ecosystems* and has used the twelve principles in developing its approach to this issue as articulated through the *State Water Plan 2000*.

Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) of the Commonwealth Government provides a national legislative base for environment protection and the conservation of biodiversity. This Act provides, among other things, that Commonwealth Government approval must be gained for any action that may have a significant impact on a matter of '*national environmental significance*'. These matters include nationally listed threatened species and ecological communities, listed migratory species and Ramsar-listed wetlands.

Native Title Act 1993

This Act set out processes for the determination of native title rights where Aboriginal or Torres Strait Islander people have maintained a continuous connection with their traditional lands or waters. In South Australia vast areas in the north-west of the state are Aboriginal lands. Many wetlands have special cultural significance to indigenous Australians, and their knowledge of sustainable management practices developed over centuries is also important in the context of this Strategy.

National Dryland Salinity Program◊

The prevention of dryland salinity is one of Australia's most important and pressing natural resource management issues. South Australia has a State Dryland Salinity Management Strategy which was adopted in 2001.

National Land and Water Resources Audit◊

The National Land and Water Resources Audit is a component of the Natural Heritage Trust initiative of the Commonwealth Government. It aims to provide a comprehensive nationwide appraisal of Australia's land, water and vegetation resources. The seven national theme studies focus on water availability, dryland salinity, vegetation, rangelands, land use, capacity for change in water/land management and catchment/estuary health.

◊ Indicates that this is based on, or quoted from, text contained in the *State Water Plan 2000*, or its supporting Explanatory Document

National Principles and Guidelines for Rangelands Management

The focus of these Principles and Guidelines is on sustainable management of Australia's rangelands which represent some of the most sensitive ecosystems and support diverse industries and communities, including Australia's important pastoral industries. It identifies a need for rangeland communities to develop regional strategies which address the full range of social, cultural, aesthetic, economic and environmental issues they face.

National Local Government Biodiversity Strategy

This Strategy was endorsed by the National General Assembly of Local Governments in November 1998, having been developed under the auspices of the national Biological Diversity Advisory Council. In the context of the Wetlands Strategy for South Australia it includes a range of relevant actions under the themes of awareness, training and education, resourcing, legislative arrangements, regional partnerships and planning and information and monitoring.

National Action Plan for Salinity and Water Quality

The National Action Plan (NAP) for Salinity and Water Quality announced by the Commonwealth Government in late 2000 and subsequently endorsed by COAG, is a direct response to the escalating problems of salinity (both dryland and in-stream) and declining water quality in the agricultural regions and major rivers of Australia. The program will seek to see management systems developed more strongly at the catchment level by community-based consortia. A partnership agreement between South Australia and the Commonwealth Government is now in place for the cooperative implementation for the NAP.

National Action Plan 2001-2005 for Communication, Education and Public Awareness to Promote the Wise Use of Wetlands

This Action Plan is being developed by a national task force of experts in the field of wetlands communication, education and public awareness. It is in response to the Ramsar Convention's adoption of guidelines on this issue in 1999. On World Wetlands Day (2 February) 2001 the first part of this Action Plan was released. It contains a review of current activities and identifies and range of future priorities in this area. Copies of the Action Plan are available from Environment Australia.

National State of the Environment Report

These Reports are generated by the Commonwealth Government every 5 years with the next one due for release in 2002. Most States, including South Australia now produce State of the Environment Reports also.

National Reserves System Program – terrestrial and marine/coastal

These are collaborative programs between the Commonwealth and the state/territory governments which aim to achieve national systems of protected areas which are comprehensive, adequate and representative for both the terrestrial and marine/coastal environments. Under these programs the identification of potential additions to the national reserves system are guided by the Interim Biogeographic Regionalistion for Australia and the Interim Marine and Coastal Regionalisation for Australia, respectively.

6.4 Intergovernmental arrangements

South Australia's major surface and groundwater resources, the River Murray, Lake Eyre Basin, the Great Artesian Basin and the groundwaters of the South East, each have catchments that extend beyond the State's borders. As the downstream state in each of these catchments, South Australia has been effective in establishing partnerships with the upstream states to recognise and protect its legitimate interests in those resources.

Murray-Darling Basin Agreement◊

This collaborative arrangement between the Commonwealth, NSW, Victorian and South Australian governments is for the regulation and sharing of water within the Murray-Darling Basin. It has existed in various forms since 1914. The Governments of Queensland and the ACT are now also part of what has become known as the Murray-Darling Basin Initiative. The Murray-Darling 2001 Program, initiated in 1995, is funded by the partner governments and provides for on-ground works. A number of important strategies have been endorsed by the Murray-Darling Basin Ministerial Council, including those for salinity and drainage, fish management and algal management. In 1998 the Floodplain Wetlands Management Strategy was endorsed. The Commission has recently adopted its Integrated Catchment Management (ICM) Strategy 2001-2010.

◊ Indicates based on, or quoted from, text contained in the *State Water Plan 2000*, or its supporting Explanatory Document.

Groundwater (Border Sharing) Agreement◊

The groundwater resources of the Otway and Murray Basins along the South Australian-Victorian border are the subject of the Border Groundwaters Agreement 1985 between South Australia and Victoria under the *Groundwater (Border Agreement) Act 1985 (South Australia) and the Groundwater (Border Agreement) Act 1985* (Victoria). Under this agreement, extraction from the shared groundwaters is limited to permissible annual volumes specified for a number of management zones along the South Australian-Victorian border.

Lake Eyre Basin Intergovernmental Agreement

Following action initiated by South Australia and Queensland, a Heads of Agreement for the Lake Eyre Basin was signed by South Australian, Queensland and Commonwealth Ministers in May 1997. This constituted a statement of good faith towards proceeding with the development of a formal agreement for the sustainable management of the Cooper Creek and Georgina Diamantina River catchments. Such a formal agreement was signed by South Australian, Queensland and the Commonwealth Governments in 2000 and it establishes a Ministerial Forum to deal with issues such as water quality and river flows and related natural resource management. Supporting and advising the Ministerial Forum is a Community Advisory Committee and a Scientific Advisory Panel.

Great Artesian Basin Strategic Management Plan and Consultative Council◊

In December 1996, the Commonwealth, New South Wales, Queensland, South Australian, and Northern Territory Governments, together with other stakeholders, established the Great Artesian Basin Consultative Council, a non-ministerial body, to coordinate the effective management of the Great Artesian Basin. The council's primary role is to advise the participating governments on the management of the Great Artesian Basin from a whole-of-basin perspective. The council adopted a Strategic Management Plan for the entire basin in September 2000 following extensive community consultation.

Queensland Water Management Plans

The Cooper Creek and Diamantina River systems flow from Queensland into South Australia where they both support significant wetlands. The Queensland Government prepared *Water Resource (Cooper Creek) Plan 2000*. That plan recognised South Australia's needs and the need to maintain water resources for wetlands.

The Queensland Government during 2001 commenced the development of a water plan for the Georgina-Diamantina catchment.

Lake Eyre Basin Community Initiative

The Lake Eyre Basin Community Initiative refers to the community-based Lake Eyre Basin Coordinating Group (LEBCG) and the Cooper Creek and Georgina-Diamantina Catchment Committees. These bodies were formed in 1998 and arose from concerns within the Lake Eyre Basin community about natural resource management issues and how to best involve themselves in it.

The LEBCG and the catchment committees have each prepared strategic plans to achieve sustainable management for their catchments. In each of the plans there is recognition of the importance of water management and the protection of wetlands.

6.5 South Australian legislation, policies and strategies

The context for policies at the South Australian level is provided by a number of Acts, and other state-wide strategic policy documents. While specific state legislation directed at the management of wetlands does not exist, there are, as indicated below, a number of laws which can, and do, impact on wetlands.

Water Resources Act 1997◊

The *Water Resources Act 1997* came into operation on 2 July 1997. From the perspective of the South Australian Wetlands Strategy, the Act has a number of key features including:

- devolution of water resources management responsibilities to local communities, primarily through the establishment of catchment water management boards (CWMBs) and water resources planning committees in any area of the state;
- a more holistic and ecologically sustainable approach to water resources management, including the provision of water for the environment; and
- management of water resources through a hierarchy of catchment water management plans, water allocation plans and local water management plans prepared and regularly reviewed through a comprehensive process of community involvement.

◊ Indicates based on, or quoted from, text contained in the *State Water Plan 2000*, or its supporting Explanatory Document.

State Water Plan 2000

The *State Water Plan 2000* provides a contemporary assessment of the state and condition of South Australia's water resources and sets out the government's strategic policy directions for their sustainable use and management. It sets the policy framework for water resources management and use throughout the state, with catchment water management plans, water allocation plans and local water management plans providing the regional and local focus. The Act requires these regional and local plans to be consistent with the *State Water Plan* and provides for regular reviews to ensure consistency through a comprehensive process of community involvement. The *State Water Plan 2000* contains a package of policy principles for the management of all water-dependent ecosystems, including wetlands.

South Eastern Water Conservation and Drainage Act 1992

The *South Eastern Water Conservation and Drainage Act 1992* aims to provide for the conservation and management of water, and the prevention of flooding of rural land in the South East. The objects of the Act includes '*the enhancement or development of natural wetlands and the natural environment generally in the South East*'. The South Eastern Water Conservation and Drainage Board established under the Act, has the ability to direct landholders to rectify unauthorised or non-complying Private Water Management Works to ensure the proper management or conservation of surface or underground water.

Environment Protection Act 1993◊

The *Environment Protection Act 1993* came into operation on 1 May 1995 and is the primary pollution control and prevention legislation in South Australia. The Environment Protection Act provides for standards of care that apply to industry and the community, by means of general environmental duty of care, offences under the Act; and Environment Protection Policies and regulations. The *Environment Protection Act* requires that a State of the Environment Report be produced at least every five years. These reports include information on the state of South Australia's water resources.

◊ Indicates that this is based on, or quoted from text contained in the *State Water Plan 2000*, or its supporting Explanatory Document

Native Vegetation Act 1991◊

The Native Vegetation Act 1991 controls the clearance of native vegetation in South Australia, with clearance generally requiring the consent of an independent authority, the Native Vegetation Council. The Act provides an existing legal mechanism to protect wetlands, and their surrounding vegetation.

Soil Conservation and Landcare Act 1989◊

The *Soil Conservation and Landcare Act 1989* encourages landholders to manage land sustainability. It provides for the establishment of Soil Conservation Boards whose tasks are to develop District Plans, supported by education and promotion programs, and to provide regulatory enforcement when appropriate.

Local Government Act 1999◊

The *Local Government Act 1999* establishes the system of local government and provides for councils' functions and powers. The Act gives local councils powers in relation to flood management, including power to acquire land in order to carry out flood mitigation or prevention works and power to act in an emergency. Councils also have powers to establish and manage drainage infrastructure in relation to roads, including the appointment of drainage authorities. Section 196 of this Act relating to community land and the preparation of management plans is especially relevant, particularly for wetlands in the coastal and estuarine areas.

Garry Hera-Singh

Development Act 1993◊

The *Development Act 1993* has as its overall objective the proper, orderly and efficient planning and development of the state. It makes provision at the highest level for the preparation and maintenance of the planning strategy that sets the framework for an integrated approach to development.

Coast Protection Act 1972◊

The Coast Protection Act 1972 established the Coast Protection Board to develop, amongst other things, coastal management plans with local councils for any land subject to tidal movement. This means that management of estuaries largely lies under this Act and the *Development Act 1993*, although a number of other pieces of legislation also impact on estuaries.

Harbors and Navigation Act 1993

Among the objects of this Act is '*to provide for the safe use of South Australian waters for recreational and other aquatic activities*' (Part 3 (f)) and under the Act intertidal wetlands are defined as 'adjacent land' meaning those responsible for implementing this legislation will need to take the Wetlands Strategy into account.

National Parks and Wildlife Act 1972◊

The National Parks and Wildlife Act 1972 provides protection for many wetlands through their inclusion in various reserves set aside for conservation purposes. The Act also provides guidelines on conservation management and the status of native plants and animals, which rely on wetlands.

Fisheries Act 1982

This Act has among its stated objectives '*ensuring, through proper conservation, preservation and fisheries management measures, that the living resources of the waters to which this Act applies are not endangered or overexploited*'. The Act provides for the establishment of Aquatic Reserves.

Pastoral Land Management and Conservation Act 1989

The *Pastoral Land Management and Conservation Act 1989* seeks to ensure that all pastoral land in South Australia is well managed and utilised prudently so its renewable resources are maintained and its yield sustained. The Act aims to provide for monitoring of the condition of pastoral lands, to prevent degradation of the land and its native plant and animal life, and for the rehabilitation of those lands where damage has occurred.

Petroleum Act 2000

The *Petroleum Act 2000* aims to ensure ecologically sustainable operations that minimise impacts to natural and cultural heritage whilst maximising the returns to the community. This aim is delivered through objective regulation where company activities have to meet pre-set environmental objectives agreed to by government, industry and the community. Environment, in the context of this act, includes land, air, water (including both surface and underground), organisms, ecosystems, buildings, cultural artefacts, social and economic manifestations and amenity values.

Mining Act 1971	The intention of the *Mining Act 1971* is to provide secure legal title for the exploration of and subsequent exploitation of, mineral deposits; provide landowners and other parties with the right to comment on tenement applications; provide for the payment of rental and royalties to the Crown as the holder of all minerals within South Australia; and to regulate mining operations to ensure activities are conducted within the framework of sustainable development. Through the consultation and regulation provisions under the *Mining Act 1971* management issues for sensitive areas such as wetlands are identified and addressed to ensure that activities are conducted in an environmentally responsible manner.
Aboriginal Heritage Act 1988	This Act provides a legislative basis for recognising and protecting Aboriginal heritage, be that culturally significant sites, objects or remains.
Aquaculture Act 2001	Marine aquaculture licenses and leases and landbased aquaculture permits are issued under this Act.
River Murray Act (in development)	It is anticipated that this Act will provide for the protection and enhancement of the River Murray and related areas and ecosystems.
Sustainable Resource Management Strategy for Aboriginal Managed Lands in South Australia	Released in February 2000, this Strategy applies to the more than 100 properties in South Australia which are managed by Aboriginal people, principally, but not restricted to the Far North of the State. Among a range of issues, the vision and priorities of the Strategy are to preserve the cultural practices and culturally important places, to restore degraded areas and prevent further degradation of land and water resources and the loss of biodiversity, and to protect and re-establish plant and animal populations used for bush tucker.
Marine and Estuarine Strategy◊	The South Australian Government released *Our Seas and Coasts: A Marine and Estuarine Strategy for South Australia* in 1998. The strategy provides a framework for management and conservation of the State's marine and estuarine environments. The inextricable links between estuaries and other water resources requires improved coordination and an adaptive management approach to further the protection and management of marine and estuarine ecosystems. The *State Water Plan 2000* reinforced the need for integrated management by identifying the need to develop an 'Estuary Management Implementation Plan'.

◊ Indicates that this is based on, or quoted from text contained in the *State Water Plan 2000*, or its supporting Explanatory Document

Marine Planning Program.	The Marine Planning Program is to provide an ecosystem-based approach to ecologically sustainable use of the marine environment. The Marine Planning Framework has clear links to the State Planning Strategy and will provide essential guidelines for the future management of activities within the marine environment. The State Wetlands Strategy will inform the marine plans in that the objectives and principles of the plans should mirror the Strategy's goal and principles. The State's Marine Protected Areas program is including wetlands with high conservation value as part of the process for selecting marine protected areas.
The Living Coast Strategy	The South Australian Government is seeking to develop a high level, strategic document that integrates existing and new initiatives that relate to coast and marine management.
Artificial Reefs Policy (in development)	Under this policy, it is anticipated that the placement of any material in South Australian seas will be considered as sea-dumping. The construction of artificial reefs, groins, aquaculture & research structures and breakwaters, and dredging operations will be addressed in the policy.
South Australian Dryland Salinity Strategy	Released in November 2001, this strategy identifies actions to protect our natural environment, biodiversity resources and economic resource base by keeping dryland salinity impacts to current levels or where possible reducing them. The strategy identifies actions to research the impact of salinity on wetlands; options for enhancement and management of wetland ecosystems; and surveying and monitoring of significant environmental assets at risk from salinity.
Regional Biodiversity Plans for South Australia	The Department for Environment and Heritage is at present preparing Biodiversity Plans for the various regions of the state. Those completed so far are for the Murray-Darling Basin, the South-East, Kangaroo Island and the Northern Agricultural District.
Environment Protection (Water Quality) Policy	This policy provides a consistent state-wide approach to the protection of water quality across all South Australian water bodies. The Policy incorporates controls to reduce diffuse and point source pollution to achieve the sustainable management of state waters while allowing economic and social development.

Implementation, monitoring and review of performance

7.1 Fundamental benchmarks

At its most fundamental level, the measures of success for this Strategy will be gauged by both the extent and condition of South Australia's wetlands into the future. It is the clear intention of this Strategy to ensure that actions are taken to not only prevent further degradation of wetlands, but in fact to see their condition improved through rehabilitative actions. The intention is also to see appropriate former wetlands reinstated or restored to assist the programs which aim to return South Australia's waterways to their former 'healthy' condition.

Given these broad performance benchmarks, monitoring of implementation and outcomes must be geared to provide, at its most basic, a picture of the total area of wetlands in the state, and their condition. Tracking of these over time will give a clear picture of whether or not the Strategy is having the desired affect, and in so doing indicate if changes are required to the prescribed actions, or the way these are being implemented, or both.

It will initially be difficult to measure these fundamental benchmarks for those regions where wetland inventory is presently incomplete (Mid North, Far North, Eyre Peninsula and Kangaroo Island). Also, there has not been to date a rigorous, systematic and standardised approach taken to describing the condition of wetlands across the state, and this is also a major impediment to setting the initial baseline against which the success or otherwise of the Strategy will be measured. Despite these limitations, Actions 6.1 and 6.2 (Section 3) of this Strategy relating to the establishment of the State Wetlands Databank will allow for advancement in this area in the near future. Similarly, Action 7.3 provides for the development of a state-wide wetland monitoring protocol to allow for the standardised gathering of information on the condition of wetlands. Together these actions will lay the groundwork for measuring the extent and condition of the state's wetlands for the future. For this reason they are considered priority actions under this Strategy.

7.2 The responsibility for coordinating and leading implementation, target setting and performance evaluation

7.2.1 Responsibility for coordinating and leading implementation

Action 3.1 and 3.2 (in Section 3) states the following:

3.1 Establish, and allocate new, and appropriate levels of resources to a Wetlands Officer position located within the Department for Environment and Heritage. This position will be required to work closely with other agencies, in particular Department of Water, Land and Biodiversity Conservation and catchment water management boards [Coordinating responsibility: DEH];

3.2 Report to the SA Natural Resource Management Council, SA Water Resources Council, SA NRM Steering Committee and the Minister responsible for the *Water Resources Act 1997* on the implementation of the Wetlands Strategy. The statutory reporting requirements regarding the implementation of the State Water Plan under the Water Resources Act 1997 will play a significant role in this framework for whole of Environment and Conservation portfolio reporting on wetlands initiatives. [Coordinating responsibility: DEH; Partners: DWLBC];

The Wetlands Strategy sits under and forms an integrated part of the *State Water Plan 2000*. The Minister responsible for the Water Resources Act, the South Australian Water Resources Council and the catchment water management boards all have statutory roles in reporting on implementation of water plans, all of which can include wetland management actions. This is described in Figure 4.

As foreshadowed by the *State Water Plan 2000*, the catchment water management boards also have a key role with coordinating and integrating implementation of the Strategy at

the regional level through the catchment water management plans. Action 1.2 (in Section 3) describes this further as follows:

1.2 As part of their catchment water management plan, each catchment water management board should address wetlands issues. Accordingly, the catchment water management plan should include the identification of wetlands, and their importance, identification of key threatening processes, identification of threatened species or threatened vegetation communities associated with wetlands, limits of acceptable change, risk assessment approaches, opportunities for rehabilitation, restoration or creation, specific responsibilities, partnerships, funding arrangements and priorities for actions. It is recognised that planning cycles and resource availability will impact on the wetland content in any particular plan. A review of the wetlands elements should occur when catchment water management plans are reviewed at least every five years. [Coordinating responsibility: CWMB; Partners: DWLBC, DEH].

At the local level this means that actions will be achieved through partnerships between a range of stakeholders including catchment water management boards, local government, integrated natural resource management groups, community groups, private landholders and the business sector. It is at this level that strategic investment in wetland management has to be achieved in order for the goal and objectives of the Strategy to be achieved. Objectives 1, 2 and 3 (in Section 3) deal with promoting such investments.

Department of Water, Land and Biodiversity Conservation

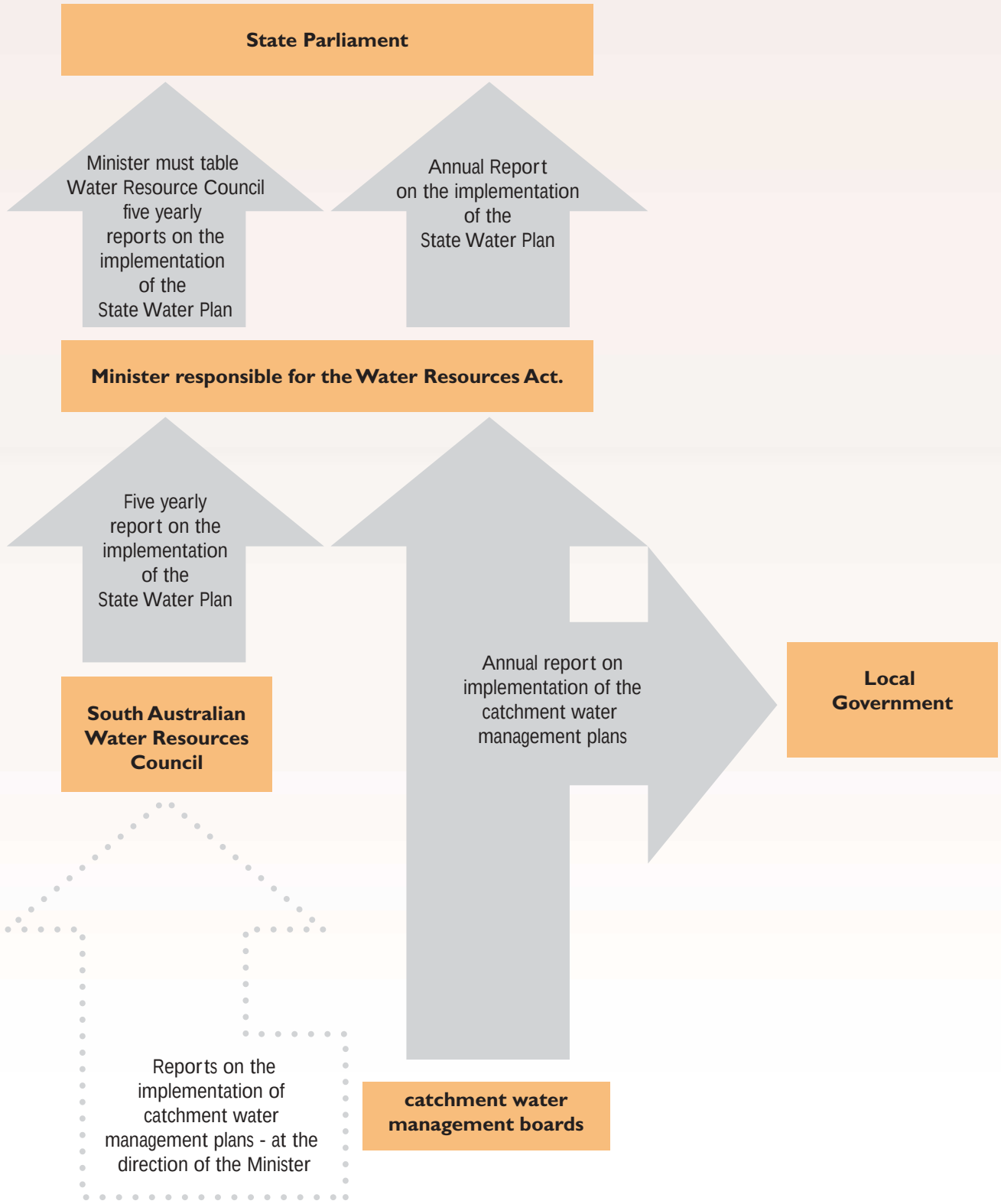

Figure 4. Statutory reporting under the *Water Resources Act 1997*

7.2.2 Performance evaluation

Under the *State Water Plan 2000*, there is a performance evaluation framework. The monitoring framework described herein (see section 7.4) for the Strategy complements the *State Water Plan 2000* framework and is largely concerned with evaluating the achievement of outputs at the state scale (or 'responses' in the terminology of the State of the Environment reporting framework). This will provide information to assist with this overarching reporting framework for the *State Water Plan 2000*. Additional monitoring and evaluation of the

wetland condition, which concerns the achievement of outcomes, will be developed as part of implementation of the Strategy.

The State Water Monitoring Subcommittee is charged with coordinating the performance monitoring for the *State Water Plan 2000*. Successful implementation and evaluation of this Strategy will require close cooperation with the State Water Monitoring Subcommittee.

A key part of performance monitoring also lies with the catchment water management boards. It is expected that under their catchment water management plans (see Action 1.2 above) monitoring and evaluation against the relevant actions set out in this Strategy will take place.

7.3 Timeframes for performance evaluation

Action 6.8 (in Section 3) states the following in terms of regular and formal performance evaluation:

6.8 Include in the wetlands section of the State of the Environment Report for South Australia (under the *Environment Protection Act*) more information regarding the health and status of wetlands in South Australia (The next SoE Report is due for release in 2003 see Section 7.3). This is to be in addition to the statutory reporting requirements under *Water Resources Act 1997* (see Figure 4) [Coordinating responsibility: EPA (SoE Working Group), DEH; Partners: CWMBs].

The reporting mechanisms described in Figure 4 provide the framework for evaluating implementation of the Strategy in terms of outputs. This is described in Section 7.4 below. This means that there are both annual and five-yearly opportunities for reporting progress.

7.4 Monitoring the implementation of specific actions

In terms of the specific actions set out in Section 3, the following monitoring approaches will be applied in the first instance. As is often the case with such monitoring regimes, fine tuning may be required after the first formal round of performance evaluation. If so, Department for Environment and Heritage, Department of Water, Land and Biodiversity Conservation, the State Water Monitoring Subcommittee and the Environment Protection Agency will recommend new performance measures through the SA Natural Resource Management Council.

Note that the 'Performance measures' column below will be considered by Department for Environment and Heritage, catchment water management boards and others when designing their respective, detailed performance indicators which will be measurable, achievable, relevant and time-limited. Therefore, what follows should be viewed as advisory and designed to offer guidance for more detailed planning phases.

Conservation and management of wetlands is an integral element of natural resources management

Objective 1. To manage wetlands as integrated parts of natural resource management at the local, regional, state, national and international scales.

Actions	Responsibility	Performance measure
1.1 Establish a process to ensure that all state, regional and local, statutory and non-statutory planning processes are working to implement the Objectives of this Strategy, the relevant goals, policies and principles set-down in the *State Water Plan 2000*, and relevant international conventions, intergovernmental agreements, national and state policies and strategies (Section 6).	Coordinating responsibility: DEH; Partners: Planning SA, DWLBC, PIRSA, CWMBs, EPA.	The number of catchment water management plans, local water management plans, local action plans, development plans, regional biodiversity plans and similar regional or local, statutory and non-statutory planning processes that have recognised and incorporated actions directed at implementation of this Strategy.
1.2 As part of their catchment water management plan, each catchment water management board should address wetlands issues. Accordingly the catchment water management plan should include the identification of wetlands, and their importance, identification of key threatening processes, identification of threatened species or threatened vegetation communities associated with wetlands, the limits of acceptable change, risk assessment approaches, opportunities for rehabilitation, restoration or creation, specific responsibilities, partnerships, funding arrangements and priorities for actions. It is recognised that planning cycles and resource availability will impact on the wetland content in any particular plan. A review of the wetlands elements should occur when catchment water management plans are reviewed, ie at least every five years.	Coordinating responsibility: CWMB; Partners: DWLBC, DEH.	The number of the CWMBs that have comprehensively addressed wetlands issues as part of their catchment water management plans. Included in those are the identification of wetlands, and their importance, identification of key threatening processes, identification of threatened species or threatened vegetation communities associated with wetlands, the limits of acceptable change, risk assessment approaches, opportunities for rehabilitation, restoration or creation, specific responsibilities, partnerships, funding arrangements and priorities for actions.
1.3 Where the continuing 'health' of wetlands found in South Australia is reliant on the quantity and quality of water supplies coming from other states or territories, continue to pursue appropriate water sharing and cooperative management arrangements through existing or future formal agreements.	Coordinating responsibility: DWLBC; Partners: DEH, CWMBs, EPA.	For each of these cross-border management frameworks, key elements have been achieved which support the implementation of this Strategy. New cross-border arrangements have been advanced in response to recognised concerns and issues.

Actions	Responsibility	Performance measure
1.4 As part of regional and catchment-level planning, identify and pursue opportunities to protect, rehabilitate, restore or, where appropriate, to create wetlands which can help to improve the 'health' of water resources, improve water quality, manage threatening processes, contribute to biodiversity conservation, or provide opportunities for ecologically sustainable economic uses.	Coordinating responsibility: CWMBs; Partners: Regional INRM groups, DWLBC, DEH, EPA.	See Action 6.6 also. For each region, the opportunities/priorities for wetland rehabilitation have been identified. These opportunities/priorities have been factored into the plans of the relevant CWMBs (see Action 1.2 above). The number and area of wetlands within each region that are being rehabilitated.
1.5 Initiate, and provide specific assistance and encouragement to local government for the implementation of this Strategy through their statutory and non-statutory planning processes.	Coordinating responsibility: DEH; Partners: CWMBs, DWLBC, Planning SA.	Specific assistance has been provided to local governments to implement this Strategy. The actions and expectations raised in the Strategy have been reflected in statutory and non-statutory planning processes.
1.6 In order to streamline processes, review, assess and address any jurisdictional or legislative overlaps, uncertainties or impediments to locally-based community action directed at wetland conservation, rehabilitation or restoration for each catchment water management board (see Objective 2 also).	Coordinating responsibility: DEH; Partners: CWMBs, DWLBC, Planning SA, PIRSA, Regional INRM groups.	A review has been conducted for South Australia to establish if there are areas for potential streamlining to assist local community action directed at wetlands conservation, rehabilitation or restoration. Where such reviews have been undertaken, they have resulted in administrative changes that are further facilitating such community actions.
1.7 Encourage and support the construction of artificial wetlands where they will have water quality and environmental benefits and will not result in the loss or degradation of natural permanent or ephemeral wetland areas, or have any negative impact on any significant natural aquatic or terrestrial environments.	Coordinating responsibility: CWMBs; Partners: Local Government, DWLBC, DEH, EPA.	Purpose built wetlands have been constructed that have not resulted in the loss or degradation of natural wetlands, or significant natural aquatic or terrestrial environments.
1.8 Assist catchment water management boards and local governments to access technical information to guide the construction of well designed multifunctional artificial wetlands, where appropriate (see Action 1.7).	Coordinating responsibility: EPA; Partners: DWLBC, DEH.	Technical information to support well-designed multifunctional artificial wetlands has been disseminated to catchment water management boards and local government. If so, this has resulted in improved design approaches generating tangible environmental, social or economic benefits.

Actions	Responsibility	Performance measure
1.9 Ensure that all impact assessments commissioned or required (under either Commonwealth legislation, or state legislation and planning controls) for development proposals which have the potential to impact on wetlands include comprehensive assessment of the environmental, economic, social and cultural impacts, as well as the cumulative effects of development.	Coordinating responsibility: Planning SA; Partners: DEH, PIRSA, Local Government, Transport SA, EPA.	All impact assessments undertaken in the state for this evaluation period for actions with the potential to impact on wetlands, have considered the full environmental, economic, social and cultural values of the wetland(s) in question.
1.10 Ensure the design and related operational rules of infrastructure (including earthworks), minimises impacts on wetlands, and does not impede the movements of native fish and other native species.	Coordinating responsibility: Local Government, CWMBs; Partners: Planning SA, DWLBC.	All additional structures constructed in the region/state minimise impacts on wetlands and do not impede movements of fish and other species and all other alternative options were explored.

Local actions to care for, and restore wetlands are undertaken with the support of government and non-government organisations

Objective 2. To support the care, rehabilitation, restoration or creation of wetlands by the private and public sectors.

Actions	Responsibility	Performance measure
2.1 Expand programs and projects (such as Waterwatch SA, KESAB, Our Patch, Threatened Species Network, Greening Australia, Marine and Coastal Communities Network and UFBP) which serve to educate and empower local people and communities to become more actively involved in integrated catchment and natural resource management.	Coordinating responsibility: DEH; Partners: DWLBC, EPA, CWMBs, PIRSA, LAP groups, Waterwatch, KESAB, UFBP, regional NRM Groups, Threatened Species Network, Greening Australia, Marine and Coastal Communities Network etc;	All relevant programs operating in the state have been identified. The level of participation and the geographic coverage across the state of each of the programs has been established. This level of participation and the geographic coverage has increased, or expanded, respectively. The above monitoring information has been used to guide priority setting and allocations of resources to achieve the targets set.

Onkaparinga Catchment Water Management Board

Actions	Responsibility	Performance measure
2.2 Review any jurisdictional or legislative overlaps, uncertainties or impediments to locally-based community action directed at wetland conservation, rehabilitation or restoration (see Objective 1 also).	Coordinating responsibility: DEH ; Partners: CWMBs, DWLBC, EPA.	See Action 1.6 above.
2.3 Provide opportunities for full and open community consultation in the preparation, review and implementation of wetland management plans and wetland site management plans etc.	Coordinating responsibility: DEH; Partners: CWMBs, DWLBC.	There has and continued to be full and open community consultation in the preparation, review and implementation of plans relevant to wetlands management. Where appropriate, such consultations have been designed to include the full participation and consideration of views and interests of relevant indigenous communities.
2.4 Encourage the meaningful participation of indigenous communities in the planning and management of wetlands at the local, catchment and state levels.	Coordinating responsibility: DOSAA; Partners: DEH, PIRSA, Aboriginal Lands Trust, CWMBs.	As for Action 2.3
2.5 Seek to foster additional business sector sponsorship, support and investment in wetland conservation, rehabilitation and restoration (see Objective 3 also).	Coordinating responsibility: DEH; Partners: Business SA, CWMBs.	There has been increased business sector sponsorship, direct support or investment in wetland conservation, rehabilitation and restoration in the state.
2.6 Build on current incentives (both financial and other) to encourage private landholders to conserve, rehabilitate or restore their wetlands through appropriate mechanisms (see Objective 3 also).	Coordinating responsibility: DEH; Partners: CWMBs, PIRSA, DWLBC, regional NRM groups.	The number of wetlands under private ownership that have been conserved or rehabilitated in each region through the various incentive schemes available.
2.7 Ensure government-based or funded programs and incentives operating in the state do not encourage, reward or support the destruction, or long-term degradation, of wetlands.	Coordinating responsibility: DEH; Partners: Planning SA, PIRSA, Transport SA, Local Government, DWLBC, regional NRM groups, CWMBs, EPA.	There has been a review to establish if any government-based incentives are either directly or indirectly resulting in wetland destruction or degradation.

Actions	Responsibility	Performance measure
2.8 Review, and where needed provide further support and build capacity through regional extension services, to guide and advise local people, community groups and catchment water management boards with respect to achieving community needs, and the goal and objectives of this Strategy.	Coordinating responsibility: DEH; Partners: PIRSA, CWMBs, regional NRM groups EPA.	A review of the adequacy of regional extension services to support the implementation of this Strategy has been undertaken. If this review indicated the need for greater regional capacity, this has been addressed.
2.9 Make available to the general community in an accessible form the latest findings and information emerging from ongoing research efforts (see Objective 7 below). This should be tailored to meet specific management issues or regional priorities.	Coordinating responsibility: DEH; Partners: DWLBC, CWMBs, universities, research bodies, Wetland Care Australia, EPA.	See Actions 7.2, 7.4 and 7.5 below.

The institutional and resourcing arrangements necessary to effectively implement the actions of the Strategy are provided

Objective 3. To ensure effective implementation of this Strategy through appropriate institutional frameworks, supported by the necessary ongoing public resources, and longer term strategic investment by the private sector.

Actions	Responsibility	Performance measure
3.1 Establish, and allocate new and appropriate levels of resources to a Wetlands Officer position located within the Department for Environment and Heritage. This position will be required to work closely with other agencies, in particular Department of Water, Land and Biodiversity Conservation and catchment water management boards.	Coordinating responsibility: DEH;	The position has been filled and the person has developed the appropriate links with DWLBC and CWMBs. New appropriate level resources have been allocated to support state-wide implementation of the Strategy.
3.2 Report to the SA Natural Resource Management Council, SA Water Resources Council, SA Natural Resource Management Steering Committee and the Minister responsible for the *Water Resources Act 1997* on the implementation of the Strategy. The statutory reporting requirements regarding the implementation of the State Water Plan under the *Water Resources Act 1997* will play a significant role in this framework for whole of Environment and Conservation portfolio reporting on wetlands initiatives.	Coordinating responsibility: DEH; Partners: DWLBC.	Reports on the implementation of the Strategy have been completed within specified timeframes to the following: • State NRM Council and SA NRM Steering Group (as required) • Minister responsible for the *Water Resources Act 1997* (annually) • SA Water Resources Council (every 5 years)
3.3 DEH to coordinate a review of state arrangements and processes for implementing wetland-related international conventions and agreements (see Section 6.2) and assist the introduction of more streamlined and integrated approaches where necessary.	Coordinating responsibility: DEH.	There has been a review of state arrangements and processes for implementing international conventions and agreements relating to wetlands (as specified in Section 6) If yes, this has resulted in recommendations for streamlining and improving approaches where necessary. If so, these changes have been introduced.
3.4 Review the implementation of all relevant national and state legislation, policies and strategies (as outlined in Sections 6.3, 6.4 and 6.5) and pursue the necessary mechanisms to ensure they are being operated to fully support this Strategy.	Coordinating responsibility: DEH.	There has been a review conducted of the implementation of all relevant state legislation to determine if it is being operated to fully support this Strategy. If yes, this has resulted in recommendations for any changes to implementation. If so, these changes have been introduced.

Actions	Responsibility	Performance measure
3.5 As foreshadowed in Actions 1.1, 1.2, 1.6 and 2.2, ensure the Strategy is implemented in an integrated fashion with, and where relevant through national, state and regional natural resource management strategies and development plans.	Coordinating responsibility: DEH; Partners: CWMBs, DWLBC, EPA, regional INRM groups, local government.	See Performance measures for Actions 1.1, 1.2, 1.6 and 2.2.
3.6 Seek to provide institutional arrangements for implementation of the Strategy, at state, regional and local levels, which encourage partnerships and shared investments within a framework of integrated natural resource management.	Coordinating responsibility: DEH; Partners: DWLBC, CWMBs, PIRSA, regional INRM groups, EPA.	The number of instances of new partnerships and shared investments that have occurred within this reporting period. In-kind contributions are recognised as part of shared investments. The level of partnerships and shared investments is trending up or down.
3.7 Consider each of the actions under Objectives 1, 2, 4, 5, 6 and 7 and pursue, where it is appropriate, implementation approaches to facilitate and encourage collaborative government-private sector, or community-business sector partnerships and shared investments that result in strategic outcomes.	Coordinating responsibility: DEH; Partners: CWMBs, regional INRM groups, LAP groups.	See immediately above, plus the performance measures for Actions 2.5, 2.6 and 2.7.
3.8 Clearly identify and make known for individual private landholders their rights, responsibilities and opportunities with respect to current and future management of their wetlands.	Coordinating responsibility: DEH; Partners: CWMBs, regional INRM groups, DWLBC, PIRSA, Wetland Care Australia, EPA.	Action has been taken to identify and make known to individual private landholders their rights, responsibilities and opportunities with respect to current and future management of their wetlands. If so, in what form did this action take ?
3.9 Promote, and illustrate with tangible examples and models, the potential benefits to be gained, and attractive investment strategies for business and land managers available through the conservation management, rehabilitation, restoration or creation of purpose-built artificial wetlands (see also Actions 4.5 and 7.5).	Coordinating responsibility: DEH; Partners: DWLBC, CWMBs, local government, EPA.	See also Actions 4.5 and 7.5. Action has been taken to promote, with tangible examples and models, the potential benefits to be gained and attractive investment strategies for business and land managers available through the conservation management, rehabilitation, restoration or creation of purpose-built artificial wetlands. If so, in what form did this action take ?
3.10 See also Actions 2.5, 2.6 and 2.7.		As for Actions 2.5, 2.6 and 2.7

The community is increasingly aware of the importance of wetlands for the wellbeing of all South Australians

Objective 4. To raise community appreciation of wetlands as natural assets and generate support for their gaining attention in integrated natural resource management.

Actions	Responsibility	Performance measure
4.1 Use key celebrations and events (such as World Environment Day, National Water Week, World Wetlands Day, State Landcare Awards, Biodiversity Month etc) to raise awareness of the environmental, social, economic and cultural importance of wetlands, and to recognise outstanding contributions made to the implementation of this Strategy.	Coordinating responsibility: DEH; Partners: DWLBC, Local Government, PIRSA, EPA, CWMBs, UFBP, NGOs etc.	Increased promotion of wetland activities at key environmental celebrations and events by the government sector, and the non-government sector.
4.2 Encourage community access to the State Wetlands Databank (see Action 6.2) and ensure the information it holds is up to date and available in a variety of forms, both electronic and non-electronic.	Coordinating responsibility: DEH, DWLBC; Partners: CWMBs.	See Action 6.5.
4.3 If necessary, identify opportunities to expand the curricula of schools and higher learning institutions to include consideration of the importance of wetlands, their environmental, social, economic and cultural values, and their improved management.	Coordinating responsibility: DEH; Partners: DECS, CWMBs, EPA.	School and higher learning curricula have been reviewed to establish the current situation. This review has identified gaps or areas of improvement. Where gaps or areas of improvement were identified, these have been addressed.
4.4 Seek to have all environmental education institutions promoting awareness of the importance of wetlands, and encourage the establishment of further education and interpretation sites.	Coordinating responsibility: DEH; Partners: business sector, South Australian Tourism Commission.	There has been a review to establish which facilities or places of environmental education have wetland-related exhibits and displays. This review has identified venues where opportunities exist for this to be put in place. Where opportunities were identified, this has been taken up. There have been additional wetland education and learning facilities established in the state since the adoption of this Strategy.

Actions	Responsibility	Performance measure
4.5 Showcase models, at the state and regional level, which demonstrate the 'wise use'* (ecologically sustainable use) of wetlands and their various environmental, social, economic and cultural values (see also Actions 3.9 and 7.5).	Coordinating responsibility: DEH.	See Action 7.5
4.6 Put in place mechanisms to ensure the findings of wetland-related studies are made available in a timely and appropriate form to government agencies/Departments, catchment and regional planning boards and committees, as well as local government, private landholders, the business sector and stakeholders generally (see Action 7.2 also).	Coordinating responsibility: DEH.	See Action 7.2
4.7 Review and pursue appropriate actions contained in the *'National Action Plan 2001-2005 for Communication, Education and Public Awareness to Promote Wise Use of Australia's Wetlands'* (See Section 6.3 for further details).	Coordinating responsibility: DEH; Partners: Wetland Care Australia, interested others.	The review has been completed through wide consultation, recognising the links between Actions 4.3 & 4.4. If so, the priority actions identified in the *National Action Plan*, will be supported or implemented.

Department for Environment and Heritage

* See Glossary for definition

South Australia's most important wetlands are recognised and protected

Objective 5. To identify those wetlands which are important at the regional, state, national and international levels, and ensure appropriate recognition, management and protection of these sites.

Actions	Responsibility	Performance measure
5.1 Establish a comprehensive, adequate and representative system of protected areas to contribute to the conservation of South Australia's native biodiversity associated with wetlands.	Coordinating responsibility: DEH ; Partners: landowners, DWLBC, Wetland Care Australia, CWMBs, NGOs etc.	South Australia's state-wide, nationally and internationally important wetlands have been identified. There has been an increase in the representation of wetlands (currently under-represented) in the 'protected area reserve system'. Where appropriate, significant wetlands are considered for addition to the East Asian-Australian Shorebird Site Network or designated as a Wetland of International Importance.
5.2 Ensure that key wetland sites are identified in the State Wetlands Databank (see Action 6.1) defining their importance at the regional, state, national and international levels. Collate monitoring, survey, and management information for wetlands across the state and link these data to information from associated water resources that wetlands rely upon.	Coordinating responsibility: DEH; Partners: DWLBC, EPA, CWMBs, regional NRM groups.	The State Wetlands Databank has been established. Key wetland sites are identified and their importance documented within the databank. Wetland and water resource information is linked to the databank.
5.3 Where it is appropriate, give recognition and provide for suitable management for those wetlands identified as having cultural heritage importance to indigenous and non-indigenous Australians (See Objective 7 below also).	Coordinating responsibility: DEH; Partners: Aboriginal Heritage Committee, DOSAA, Aboriginal Land Trust.	Of the wetlands identified through Action 6.3 as having cultural heritage importance, the proportion of those that have suitable management regimes. Sites of special cultural significance to non-indigenous Australian have been recognised and provided with appropriate management regimes.
5.4 Ensure that all relevant local government and state agencies, catchment water management boards and similar bodies are made aware of those wetlands recognised as being of regional, state, national or international importance and their respective management and 'duty of care' * responsibilities for each site.	Coordinating responsibility: DEH.	The information pertaining to Actions 5.1 and 5.2 above has been drawn to the attention of (a) all government agencies, (b) CWMBs and similar bodies, (c) relevant private landholders.

* See Glossary for definition

Actions	Responsibility	Performance measure
5.5 Ensure wetlands of regional, state, national or international importance are mapped in planning strategies and development plans. Such areas should be supported by appropriate strategies and objectives/principles of development control and included within a conservation zone. Surrounding zones should include provisions to minimise threats on such areas (eg minimising introduction of pest species, land division and fire management).	Coordinating responsibility: DEH, Planning SA; Partners: local government, Transport SA.	Planning strategy and development plans all include suitable recognition of wetlands with recognised regional, state, national or international importance. Amended and updated plans include modification and provisions consistent with the goal and guiding principles of this Strategy.
5.6 Develop and implement management plans for all sites recognised as being of regional, state, national or international importance, and, ensure such management plans consider the regional context, and are integrated with the full range of regional natural resource management plans and programs. Management plans will also be considered in the review and amendment of development plans.	Coordinating responsibility: DEH; Partners: CWMBs, local government, regional INRM groups, DWLBC, PIRSA, Planning SA, Environment Australia for Ramsar-listed wetlands and important migratory waterbird habitats, land owners.	Of the sites recognised as being of regional, state, national or international importance the proportion that have management plans (a) in place, (b) under development. For South Australia's Wetlands of International Importance the proportion of sites that have management plans in place which meet the Australian Ramsar Management Principles set in the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.
5.7 In relation to Action 5.5 above, ensure that for each site, appropriate monitoring regimes are in place to continually guide management actions. For South Australia's Ramsar sites describe the 'ecological character'* of each site and ensure that management is suitable to retain this, and that monitoring is in place to provide early warning of any changes to this 'ecological character'.	Coordinating responsibility: DEH; Partners: DWLBC, CWMBs, EPA.	All plans being developed under 5.5, for sites of recognised regional, state, national or international importance include appropriate monitoring regimes. Regarding Ramsar sites and 'ecological character' (see 5.5 above).
5.8 Where wetlands determined to be of regional, state, national or international importance include, or lie totally within, areas of privately held land, seek to secure the long-term conservation management of these sites using appropriate incentives, investment (see Objective 3) and other state-based mechanisms.	Coordinating responsibility: DEH; Partners: DWLBC.	Wetlands determined to be of regional, state, national or international importance which include areas of privately held land, have long-term conservation management arrangements secured.

* See Glossary for definition

South Australia's wetlands and their resources are better understood and this information is made readily available

Objective 6. To develop, maintain, and make readily accessible to all, a comprehensive inventory of South Australia's wetlands and their resources

Actions	Responsibility	Performance measure
6.1 As a priority, establish the current range, adequacy, status and accessibility of wetland-related data for supporting and guiding the implementation of this Strategy. Use this to address priority information gaps and design the State Wetlands Databank as an integrated part of the State Water Information Management System (SWIMS).	Coordinating responsibility: DEH; Partners: DWLBC, EPA – see Objective 3 and Section 7.	For each management region, the range, adequacy, status and accessibility of wetland-related data has been assessed. This has resulted in action to address the identified gaps.
6.2 Further to 6.1 above, develop a comprehensive State Wetlands Databank, and ensure this is integrated with related mapping and data holdings being used to guide natural resource management and biodiversity conservation planning at the state-wide, regional, catchment and, where appropriate, national levels.	Coordinating responsibility: DEH; Partners: DWLBC, EPA.	The State Wetlands Databank has been established. The wetland data available is in a format which integrates it with related data supporting natural resource management.
6.3 Initiate a program to assist in the collection and storage of existing management, ecological and cultural significance knowledge from indigenous and non-indigenous community members with an interest in wetlands.	Coordinating responsibility: DEH, DOSAA, Aboriginal Heritage Committee, Aboriginal Lands Trust; Partners: DWLBC.	The information and knowledge gathering program has been established. A range of information on the local, 'hands-on' management, ecological and cultural significance of wetlands from the indigenous and non-indigenous communities has been made available.
6.4 Identify and document as part of the State Wetlands Databank those wetlands which have cultural heritage significance to the indigenous peoples of South Australia (see Action 5.2 also).	Coordinating responsibility: Aboriginal Heritage Committee, DOSAA; Partners: DEH, DWLBC.	The wetlands of cultural heritage significance to the indigenous South Australians have been identified and where appropriate, documented.

Actions	Responsibility	Performance measure
6.5 Provide for easy access and use (electronic and non-electronic) of the State Wetlands Databank for all government agencies, stakeholders, and especially catchment water management boards, regional NRM groups, soil conservation boards, local government and similar groups with direct responsibility for integrated natural resource planning processes.	Coordinating responsibility: DEH; Partners: DWLBC, EPA.	The usefulness and operability of the State Wetlands Databank has been evaluated to determine the ease of accessibility and usability. The State Wetlands Databank is used by (a) government departments/organisations, (b) private individuals and organisations.
6.6 Assist catchment water management boards, regional NRM groups and similar bodies, local government and private landholders to identify wetlands that are considered priorities for rehabilitation or restoration. To assist in this process, and in conjunction with these stakeholders, develop standards and criteria for the identification of wetlands within each catchment or management region, descriptions of the functions and ecological, social, cultural and economic values of each, the extent and value of key areas, the specific threats to be addressed in each case and key management criteria.	Coordinating responsibility: DEH; Partners: CWMBs, DWLBC, local government, landholders, EPA.	Standards and criteria are produced to guide CWMBs in recognition of and description of wetlands. For each CWMB the wetlands within their catchment or management region have been identified, and described in terms of functions, and ecological, social and economic values of each, the extent and value of key areas against standard criteria, and the specific threats to be addressed in each case. For each CWMB the wetlands within their catchment or management region that are considered priorities for rehabilitation or restoration have been identified (See Action 1.4 also).
6.7 Once established, ensure the databank of the state's wetland resources is updated regularly using new information as it becomes available and based on the on-going monitoring data gathered as part of tracking and assessing the implementation of this Strategy (see Section 7), the *State Water Plan 2000* and other related policies and strategies. At a minimum, the databank will be updated as part of the five-yearly review of the *State Water Plan* and included as a part of the resource inventory section.	Coordinating responsibility: DEH; Partners: DWLBC, EPA.	The data within the State Wetlands Databank is updated for each of the regions, at least as part of the five-yearly review of the State Water Plan.

Actions	Responsibility	Performance measure
6.8 Include in the wetlands section of the State of the Environment Report for South Australia (under the *Environment Protection Act*) more information regarding the health and status of wetlands in South Australia (The next SoE Report is due for release in 2003 - see Section 7.3). This is to be in addition to the statutory reporting requirements under the *Water Resources Act 1997* (see Figure 3).	Coordinating responsibility: EPA (SoE Working Group), DEH; Partners: CWMBs.	New reporting criteria regarding the health and status of wetlands in South Australia are developed for use in SoE reporting. Annual reports on implementation of this Strategy have been provided to the South Australian Water Resources Council and South Australian Parliament.
6.9 Use the State Wetlands Databank to identify wetlands of regional, state, national and international importance (refer to Objective 5 above).	Coordinating responsibility: DEH Partners: Aboriginal Heritage Committee, Aboriginal Lands Trust, DWLBC, SARDI and others as appropriate.	See the Actions under Objective 5.

South Australia's wetlands and their resources are better understood and this information is made readily available

Objective 7. To support studies of wetlands that provide an improved understanding, and serve to guide planning and management actions.

Actions	Responsibility	Performance measure
7.1 Facilitate and support research into the key management issues and questions relating to South Australia's wetlands, including but not restricted to the following (see Action 7.1 in section 3).	Coordinating responsibility: DEH; Partners: DWLBC, Universities, EPA.	There is increased investment for supporting wetland-related research in the State from, (a) Commonwealth and state government sources, (b) business sector, and (c) other sources.
7.2 Put in place mechanisms and tools to ensure that the findings of the above research are made available in a timely and appropriate form to government agencies/Departments, catchment and regional planning boards and committees, as well as local government, private landholders, the business sector and stakeholders generally (see Objective 4 above also).	Coordinating responsibility: DEH.	Research findings are made available to (a) government departments, (b) CWMBs, soil boards etc, (c) the business sector, and (d) private landholders, local stakeholders.
7.3 Develop, and support the use of state-wide wetland monitoring, evaluation and reporting protocols to allow for standardised gathering of status and management information to help inform planning processes, site management and to improve the information held in the State Wetlands Databank (see Action 6.2 above). This will also help monitor progress with the implementation of this Strategy, the production of the wetlands section of the State of the Environment Report for South Australia (see Action 6.8 above) and implement some of the objectives of the State Water Monitoring Subcommittee.	Coordinating responsibility: DEH; Partners: DWLBC, CWMBs, EPA.	A state-wide wetland monitoring, evaluation and reporting protocol has been developed. The protocols have been introduced into the catchment water management plans (see Actions 1.2, 5.4 & 5.5) of the CWMBs and other relevant plans, and they are being applied in full. Data from the application of the monitoring protocol has been used to form part of the wetlands section of the State of the Environment Report and annual reports to the South Australian Water Resources Council and Parliament (see Action 6.7).

Actions	Responsibility	Performance measure
7.4 Facilitate the development of a 'toolkit' for wetland impact assessment which can help with placing true and comparative values on the environmental, economic, social and cultural impacts of wetland destruction or degradation, and seek to have this adopted and applied through natural resource management and development planning processes (see Objective 1 also).	Coordinating responsibility: DEH; Partners: Planning SA, DWLBC, EPA.	The 'toolkit' for impact assessment has been developed. The 'toolkit' has been distributed widely to (a) government departments, (b) local governments, (c) CWMBs etc, (d) the business sector and (e) local stakeholders.
7.5 Document knowledge and guidelines, and showcase models, which demonstrate 'wise use' (ecologically sustainable use) of wetlands by indigenous people and local wetland managers. Priorities include guidelines in relation to grazing on floodplains and lake beds, fisheries management, petroleum industry activities and ecotourism (see also Actions 3.9 and 4.5).	Coordinating responsibility: DEH; Partners: DOSAA, Aboriginal Heritage Committee, Aboriginal Lands Trust.	The guidelines and models for the wise use of wetlands, and particularly those in relation to indigenous peoples knowledge, grazing on floodplains and lake beds, fisheries management and ecotourism have been produced. These guidelines have been widely distributed to (a) government departments, (b) local governments, (c) CWMBs etc, (d) the business sector and (e) private landholders and local stakeholders.

Department of Water, Land and Biodiversity Conservation

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Glossary of Terms

Duty of care

Duty of care underpins ecological sustainable development (see below), and is also reflected directly in the *Environment Protection Act 1993* and the *Water Reources Act 1997*. The latter requires the use of caution and other safeguards, to reduce to a minimum the detrimental effects of use and management of water resources. Based on text contained in the *State Water Plan 2000* (Section 4.2.2, page 27).

Ecological character

Ecological character is the sum of the biological, physical, and chemical components of the wetland ecosystem, and their interactions, which maintain the wetland and its products, functions, and attributes. As defined by the Ramsar Convention on Wetlands.

Ecologically sustainable development

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. From the *State Water Plan 2000*.

Ecosystem services

Describes the full suite of benefits which human populations gain from a particular type of ecosystem. For a wetland this may include functions-benefits such as: water storage-flood mitigation, fish nursery-recreational/commercial fish catch, sediment trapping-improved water quality, cultural significance for indigenous Australians-former burial or camping ground, social importance to all Australians-fishing, swimming, nature photography etc. It is now possible to put a dollar value on most, if not all of these, ecosystem services to help guide cost-benefit deliberations.

GAB Springs

Great Artesian Basin Springs include mound springs and other water rising from the ground within the Great Artesian Basin.

Natural resource management

Natural resources include:

- land, soil, geological features, water, vegetation, animals (including fish), other organisms and ecosystems
- the cultural heritage or amenity of an area but not minerals administered under any of the mining Acts.

Natural resource management is about sustainable management of natural resources that incorporates economic, social and environmental values and involves the community, industries and governments in planning and decision making.

Integrated natural resource management includes coordinating policies, programs, plans and projects, and coordination in the exercise and performance of administrative and statutory powers and functions by government agencies, statutory authorities, local government bodies, and the broader community, relevant to the management of the State's natural resources.

Limits of acceptable change

This concept goes hand in hand with that of 'thresholds of acceptable change'. The term is used to indicate that if a form of exploitation goes beyond this point it will no longer be ecologically sustainable. So, limit or threshold of acceptable change means the point up to which human uses are ecologically sustainable.

Precautionary principle

Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. From the *State Water Plan 2000*.

Rehabilitation (of wetlands)

Actions that improve the ecological health of a wetland by reinstating important elements of the environment that existed

prior to European settlement. From the *State Water Plan 2000.*

Restoration (of wetlands)
Actions that reinstate the pre-European condition of a wetland. From the *State Water Plan 2000.*

Stormwater
Runoff in an urban area.

Waste water
Domestic waste water is water used in the disposal of human waste, for personal washing, washing clothes or dishes, and swimming pools. Industrial waste water is water that has been used in the course of carrying on a business that has been allowed to run to waste or has been disposed of or has been collected for disposal.

Water-dependent ecosystems
Those parts of the environment, the species composition and natural ecological processes, which are determined by the permanent or temporary presence of flowing or standing water, above or below the ground. The in-stream areas of rivers, riparian vegetation, springs, wetlands, floodplains, estuaries and lakes are all water-dependent ecosystems. From the *State Water Plan 2000*.

Wise use
The wise use of wetlands is their sustainable utilisation for the benefit of mankind in a way compatible with the maintenance of the natural properties of the ecosystem. As defined by the Ramsar Convention on Wetlands.

Abbreviations

AACWMB	Arid Areas Catchment Water Management Board
CWMB	Catchment Water Management Board
DECS	Department of Education and Children's Services
DEH	Department for Environment and Heritage
DOSAA	Department of State Aboriginal Affairs
DWLBC	Department of Water, Land and Biodiversity Conservation
EPA	Environment Protection Agency
GAB	Great Artesian Basin
INRM	Integrated Natural Resource Management
KESAB	Keep South Australia Beautiful Incorporated
LAP groups	Local Action Planning groups
NGO	Non-government Organisation
NRM	Natural Resource Management
PIRSA	Department of Primary Industries and Resources South Australia
SARDI	South Australian Research and Development Institute
SoE	State of the Environment
UFBP	Urban Forest Biodiversity Program

Appendix 1:

Membership of the Stakeholder Reference Group and Government Agency Consultative Group

The following people, or organisations were consulted during the stages of drafting, leading up the release of the Strategy for full public comment. This was done in an effort to provide a cross-section of perspectives and expertise to guide and inform the drafting. Those members of the Stakeholder Reference Group who chose to offer comments did so 'informally' based on their respective expertise, backgrounds and day-to-day activities relating to wetlands.

Stakeholder Reference Group

NAME	ORGANISATION
Lynn Brake	Arid Areas Catchment Water Management Board
Tony Sharley	Banrock Station
Ross Manthorpe	Local Government Association of South Australia
Michael Garrod	Onkaparinga CWMB
Jennifer Schilling	South East CWMB
David Leek	Arid Areas CWMB
Keith Downard	Torrens and Patawalonga CWMBs
Lisa Mensforth	River Murray CWMB
Keith Smith	Northern Adelaide and Barossa CWMB
Meroe Darke	LAP Mannum to Wellington
Barry Lincoln	Mid Murray LAP group
Todd Goodman	Renmark to the Border LAP group
Peter Waanders	Riverland West LAP group
Michelle Campbell	Berri Barmera LAP group
Graham Gates	Coorong and Districts LAP group

Jan Whittle	Goolwa to Wellington LAP
Anne Jensen	Wetland Care Australia
Bill Williams *(now deceased)*	The University of Adelaide
Keith Walker	The University of Adelaide
George Ganf	The University of Adelaide
Janice White	University SA
Trevor Watts	SA Recreational Fishing Advisory Council
Lorraine Rosenberg	South Australian Fisheries Industry Council
David Paton	University of Adelaide Department of Environmental Biology
Bill Gemmell	SA Farmers Federation
Greg Campbell	S. Kidman & Co.
Martin Reeve	Nature Conservation Society
Tom Mowbray	Nature Conservation Society
Michelle Grady	Conservation Council SA
Steve Tunstill	Santos Ltd.

Government Agency Consultative Group

NAME	ORGANISATION
Leanne Liddle	DEH (Aboriginal Partnerships)
Dave Cockshell	PIRSA Petroleum
Ian Hopton	PIRSA Sustainable Resources
Pru Freeman	PIRSA Minerals
Mark DeJong	South East CWMB
Michael Good	DWLBC
Doug Fotheringham	Office for Coasts and Marine (DEH)
Brenton Grear	DEH Mount Gambier
Peter Goonan	DEH EPA
Simon Lewis	DWLBC (formerly DEH)
Lisien Loan	DEH (Biodiversity Strategies)
Jenny Bourne	DEH (Port Augusta)
Neil Collins	DWLBC (formerly DEH)
Graeme Moss	DEH (Kangaroo Island)
Peter Copley	DEH (threatened species)
Khia Atkins	DEH (Berri)
Ryan Incoll	DEH (Black Hill)
Mark Bachmann	DEH (Mount Gambier)
Geoff Axford	DEH (Port Augusta)
Nigel Cotsell	DEH (Port Lincoln)
Cathryn Hamilton	SA Water Corporation
Lee Webb	Planning SA
Ken Stokes	DEH (Berri)
Qifeng Ye	SARDI
Kathy Eyles	Environment Australia
Richard Hancock	Office of Economic Development (formerly Department of Industry and Trade)

Appendix 2:

Definitions of 'wetland' and Ramsar's wetland types showing those found in South Australia

Definitions of 'wetland'

At the international level the Ramsar Convention on Wetlands (see Section 6.2 and Appendix 7) uses the following very broad definition of the term 'wetland';

"*areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres.*"

In addition, the Ramsar Convention, through Article 2.1 of its text, provides that 'wetlands' '*may incorporate riparian and coastal zones adjacent to wetlands, and islands or bodies or marine water deeper than six metres at low tide lying within the wetlands……..*'

The Floodplain Wetlands Management Strategy (1998) of the Murray-Darling Basin Commission also recognises the variety of definitions available for wetlands, and for its purposes cites three that '*are most appropriate to the wetland types in the Murray-Darling Basin.*'

These are:

- the Ramsar definition given above
- the definition used by the National Wetlands Research and Development Program: '*Inland standing (lentic) shallow bodies of water*'
- the definition applied by Wetland Care Australia in their Strategic Plan 1998:

Wet phase – a permanent or temporary area of fresh, brackish or saline water that is typically shallow slow moving or stationary and reasonably well-vegetated.

Dry phase – land that such water has covered

Note: a wetland in an estuary or shallow marine area comes within the scope of this definition. Although wetland areas are often associated with the margins of lakes and rivers, lakes and rivers as such are not included.

Ramsar's Wetland Types

When the *Wetlands Policy of the Commonwealth Government of Australia* was adopted in January 1997, a number of specific qualifications were placed on the Ramsar typology system as follows:

i. 'Rocky marine shores, including rocky offshore islands and sea cliffs' (Type D – see below) are not considered as wetlands unless they form an integral part of a larger wetland continuum associated with one of the other marine and coastal wetland types listed in the classification;

ii. the main in-channel elements of 'permanent rivers and streams, including waterfalls' (Type M – see below) are not considered wetlands; and

iii. 'Human-made wetlands' (Types 1-9 and Zk(c) – see below) are acknowledged as being capable of providing valuable functions and addressing specific environmental management issues and their creation should be encouraged where suitable technology is available and it is not possible to restore previously existing wetlands. However, human-made, or purpose-built wetlands, should not be considered as replacement, or compensation, for natural wetlands proposed for destruction without expert supporting advice. Except where such purpose-built wetlands qualify as Wetlands of International or National Importance, the conservation of these sites is of secondary importance to the conservation of natural wetlands.

The range of wetland types recognised by the Ramsar Convention, with an indication of those that are found in South Australia – shaded

Marine / Coastal Wetlands

A — Permanent shallow marine waters in most cases less than six metres deep at low tide; includes sea bays and straits.

B — Marine subtidal aquatic beds; includes kelp beds, sea-grass beds, tropical marine meadows.

C — Coral reefs.

D — Rocky marine shores; includes rocky offshore islands, sea cliffs.

E — Sand, shingle or pebble shores; includes sand bars, spits and sandy islets; includes dune systems and humid dune slacks.

F — Estuarine waters; permanent water of estuaries and estuarine systems of deltas.

G — Intertidal mud, sand or salt flats.

H — Intertidal marshes; includes salt marshes, salt meadows, saltings, raised salt marshes; includes tidal brackish and freshwater marshes.

I — Intertidal forested wetlands; includes mangrove swamps, nipah swamps and tidal freshwater swamp forests.

J — Coastal brackish/saline lagoons; brackish to saline lagoons with at least one relatively narrow connection to the sea.

K — Coastal freshwater lagoons; includes freshwater delta lagoons.

Zk(a) – Karst and other subterranean hydrological systems, marine/coastal.

Inland Wetlands

L — Permanent inland deltas.

M — Permanent rivers/streams/creeks; includes waterfalls.

N — Seasonal/intermittent/ irregular rivers/streams/creeks.

O — Permanent freshwater lakes (over 8 ha); includes large oxbow lakes.

P — Seasonal/intermittent freshwater lakes (over 8 ha); includes floodplain lakes.

Q — Permanent saline/brackish/alkaline lakes.

R — Seasonal/intermittent saline/brackish/alkaline lakes and flats.

Sp — Permanent saline/brackish/alkaline marshes/pools.

Ss — Seasonal/intermittent saline/brackish/alkaline marshes/pools.

Tp — Permanent freshwater marshes/pools; ponds (below 8 ha), marshes and swamps on inorganic soils; with emergent vegetation water-logged for at least most of the growing season.

Ts — Seasonal/intermittent freshwater marshes/pools on inorganic soils; includes sloughs, potholes, seasonally flooded meadows, sedge marshes.

U — Non-forested peatlands; includes shrub or open bogs, swamps, fens.

Va — Alpine wetlands; includes alpine meadows, temporary waters from snowmelt.

Vt — Tundra wetlands; includes tundra pools, temporary waters from snowmelt.

W — Shrub-dominated wetlands; shrub swamps, shrub-dominated freshwater marshes, shrub carr, alder thicket on inorganic soils.

Xf — Freshwater, tree-dominated wetlands; includes freshwater swamp forests, seasonally flooded forests, wooded swamps on inorganic soils.

Xp — Forested peatlands; peatswamp forests.

Y — Freshwater springs; oases.

Zg — Geothermal wetlands.

Zk(b) – Karst and other subterranean hydrological systems, inland.

Human-made Wetlands

1 — Aquaculture (e.g., fish/shrimp) ponds

2 — Ponds; includes farm ponds, stock ponds, small tanks; (generally below 8 ha).

3 — Irrigated land; includes irrigation channels and rice fields.

4 — Seasonally flooded agricultural land (including intensively managed or grazed wet meadow or pasture).

5 — Salt exploitation sites; salt pans, salines, etc.

6 — Water storage areas; reservoirs/barrages/dams/ impoundments (generally over 8 ha).

7 — Excavations; gravel/brick/clay pits; borrow pits, mining pools.

8 — Wastewater treatment areas; sewage farms, settling ponds, oxidation basins, etc.

9 — Canals and drainage channels, ditches.

Zk(c) – Karst and other subterranean hydrological systems, human-made.

Note : **"floodplain"** is a broad term used to refer to one or more wetland types, which may include examples from the R, Ss, Ts, W, Xf, Xp, or other wetland types. Some examples of floodplain wetlands are seasonally inundated grassland (including natural wet meadows), shrublands, woodlands and forests. Floodplain wetlands are not listed as a specific wetland type herein.

Appendix 3:

Criteria for designating Wetlands of International Importance under the Ramsar Convention on Wetlands

As last amended by the 7th Ramsar Convention Conference of the Contracting Parties (San Jose, Costa Rica, 1999), the criteria for designating wetlands as internationally important are as follows:

Criterion 1: A wetland should be considered internationally important if it contains a representative, rare or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.

Criterion 2: A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.

Criterion 3: A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.

Criterion 4: A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.

Criterion 5: A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.

Criterion 6: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

Criterion 7: A wetland should be considered internationally important if it supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.

Criterion 8: A wetland should be considered internationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.

The Ramsar Convention's Wise Use 'toolkit' contains as Handbook 7 *'Strategic framework and guidelines for the future development of the List of Wetlands of International Importance'*. This contains specific guidance and advice for how Parties should apply each of the above criteria.

Appendix 4:

Important sites for shorebirds in South Australia

Section 6.2 provides further information in relation to this appendix. In summary, in 1993 the Australasian Wader Studies Group of Birds Australia and the World Wide Fund for Nature (WWF) published *'A National Plan for Shorebird Conservation in Australia'*. Among 201 sites identified by the Plan as being of international and national importance for shorebirds, 33 are within South Australia as listed below.

Table 3. Important sites for shorebirds in South Australia

Site	Protected Area status	No. of species which are nationally important	No. of species which are internationally important
Spencer Gulf	-	12	10
The Coorong	R	10	9
Price Saltfields	-	10	8
Penrice Saltfields	-	8	7
Kangaroo Island	**	8	6
Clinton Conservation Park	***	7	6
Coffin Bay wetlands	**	4	4
Tourville Bay	-	4	3
Lake Eyre	***	3	3
Lake George	**	3	3
Cape Northumberland – Green Point	-	3	2
Murat Bay	-	3	1
Great Sandy Point – Parham	-	2	2
Wright Bay	-	2	1
Streaky Bay	-	2	1
Sceale Bay	-	2	1
Rivoli Bay	-	2	1
Carpenters Rocks	-	2	1

Site	Protected Area status	No. of species which are nationally important	No. of species which are Internationally important
Murray Mouth lakes	R	1	1
Coorong coast R 1 1			
Gunyah Beach	***	1	1
Canunda National Park	***	1	1
Sandy Point – Port Arthur	**	1	1
Lake Eliza	**	1	1
Beachport – Nora Creina Bay	**	1	1
Sleaford Bay	-	1	1
Port River mouth	-	1	1
Port Prime	-	1	1
Lake Torrens	-	1	1
Lake Newland (Talia)	-	1	1
Baird Bay	-	1	1
Avoid Bay	***	1	-
Guichen Bay	-	1	-

-	no conservation management
*	< 10% under some form of planning control
**	10 - 90% under some form of planning control
***	> 90% of the area is within a conservation area
R	Ramsar site, part R = site is partially included in a Ramsar area

Appendix 5:

Criteria for the inclusion of sites in *A Directory of Important Wetlands in Australia*

In 1993, under the auspices of the Australian and New Zealand Environment and Conservation Council (ANZECC), the Commonwealth Government, in collaboration with the respective state and territory governments published *'A Directory of Important Wetlands in Australia'*. Applying criteria developed cooperatively for national application by the Commonwealth, state and territory governments (as shown below) this first edition of the *Directory* included descriptions of 520 'nationally important' sites, of which 43 were in South Australia. The second edition of the Directory published in 1996 included 698 sites or which 68 were in South Australia. In February 2001 the third edition of the *Directory* was made available with a total of 851 sites described. For South Australia there are 69 sites described, which by comparison with the previous edition sees the addition of the Commonwealth Government's Murray Bridge Army Training Area Wetlands. Appendix 6 provides the names of these sites. Further details can be obtained from the web site of Environment Australia at http://www.ea.gov.au/water/wetlands/database/index.html

Criteria for determining 'nationally important' wetlands

A wetland may be considered nationally important if it meets at least one of the following criteria:

Criterion 1: It is a good example of a wetland type occurring within a biogeographic region in Australia.

Criterion 2: It is a wetland which plays an important ecological or hydrological role in the natural functioning of a major wetland system/complex.

Criterion 3: It is a wetland which is important as the habitat for animal taxa at a vulnerable stage within their life cycle, or provides a refuge when adverse conditions such as drought prevail.

Criterion 4: The wetland supports 1% or more of the national populations of any native plant or animal taxa.

Criterion 5: The wetland supports native plant or animal taxa or communities which are considered endangered or vulnerable at the national level.

Criterion 6: The wetland is of outstanding historical or cultural significance.

Appendix 6:

South Australia's internationally and nationally important wetlands.

The criteria by which these sites were determined to be of international or national importance are provided in Appendices 3 and 5, respectively. Section 6.2 provides further details.

1. Wetlands of International Importance as designated under the Ramsar Convention on Wetlands
   - Bool and Hacks Lagoon
   - The Coorong and Lakes Alexandrina and Albert Wetland
   - Coongie Lakes
   - 'Riverland'
   - Banrock Station Wetland Complex

2. Wetlands of National Importance (see Appendix 5 for further details).

The following list has been taken from *A Directory of Important Wetlands in Australia (2001, 3rd edition)*

Important Note

This list is limited to those high value wetlands for which sufficient information is available to meet the national criteria. There are many more wetlands which no doubt meet the criteria for which information is currently incomplete. It is anticipated that these wetlands will be listed as this information becomes available.

Murray-Darling Basin
Banrock Station Wetland Complex
Gurra Lakes Wetland Complex
Irwin Flat
Loch Luna Wetland Complex
Loveday Swamps
Lower Murray Swamps
Marne River Mouth
Noora Evaporation Lakes
Pike-Mundic Wetland Complex
Riverland Wetland Complex
Spectacle Lakes
Stockyard Plain
Swan Reach Wetland Complex
Murray Bridge Army Training Area wetlands (Commonwealth managed)

South East
Bool & Hacks Lagoon
Butchers & Salt Lakes
Deadmans Swamp
Ewens Ponds
Honans Scrub
Lake Frome & Mullins Swamp
Marshes Swamp
Naen Naen Swamp & Gum Lagoon
Piccaninnie Ponds
Poocher & Mundulla Swamps
South East Coastal Salt Lakes
The Coorong, Lake Alexandrina & Lake Albert
Watervalley Wetlands

Rangelands
Coongie Lakes
Diamantina River Wetland System
Strzelecki Creek Wetlands System
Inland Saline Lakes (Simpson-Strzelecki Dunefields bioregion)
Lake Eyre
Dalhousie Springs
Lake Eyre Mound Springs

Eyre Peninsula
Upper Spencer Gulf Mangrove System
Baird Bay
Big Swamp
Coffin Bay Coastal Wetland System
Davenport Creek
Franklin Harbour
Lake Hamilton
Lake Newland
Point Labatt
Streaky Bay
Tod River Wetland System
Tumby Bay

Yorke Peninsula & Mid-North
Clinton
Point Davenport
Port Gawler & Buckland Park Lake
Wills Creek

Adelaide and Mt Lofty Ranges
Barker Inlet & St Kilda
Lanacoona Road Swamps
Onkaparinga Estuary
Tookayerta & Finniss Catchments
Upper Hindmarsh River Catchment
Upper Tunkalilla Creek Swamps

Kangaroo Island
American River Wetland System
Birchmore Lagoon
Busby and Beatrice Islets
Cygnet Estuary
Cygnet River
D'Estrees Bay
Flinders Chase River Systems
Grassdale Lagoons
Lake Ada
Lashmar Lagoon
Murrays Lagoon
Waidrowski Lagoon
White Lagoon Wetland System

Photos

Front Cover — Kaurna Park Wetalnds, Salisbury, Adelaide
Northern Adelaide and Barossa Catchment Water Management Board

Nardoo in natural wetland at Bolivar, Adelaide, *Vicki Hagan*

Page iv — Seasonal wetlands, Parafield, Adelaide
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Page 10 — Channel Country, Lake Eyre Basin
Peter Canty

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Julia Burnard

Page 17 — Traditional basket-weaving, The Coorong, South East, *South Australian Tourism Commission www.southaustralia.com*

Page 18 — Algebuckinna Waterhole, Lake Eyre Basin
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Page 20 — Warriparinga Wetland, Adelaide
Patawalonga and Torrens Catchment Water Management Boards

Page 21 — Scuba diving, Picanninnie Ponds South East
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Page 23 — Saltmarsh, Tumby Bay, Eyre Peninsula
Department for Environment and Heritage

Page 26 — Lake Toontawaranie, Lake Eyre Basin
Graham Blair

Page 29 — (COLLAGE)

River red gum
Department of Water, Land and Biodiversity Conservation

The Bubbler
Phil Brennan

Salisbury Wetland
Northern Adelaide and Barossa Catchment Water Management Board

Channel Country, Lake Eyre Basin
Peter Canty

Tod River Wetland System
Department of Water, Land and Biodiversity Conservation

Page 31 — Fishing on the River Murray, Renmark
South Australian Tourism Commission www.southaustralia.com

The Coorong and mouth of the River Murray
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Page 34 — Fish surveys, South Stewart Waterhole, Lake Eyre Basin
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Page 36 — Birdwatching at the Banrock Station Wetland Complex, Riverland
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Page 39 — 'The Bubbler' Wabma Kadarbu Mound Springs Conservation Park, Outback
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Page 56 — River red gum, River Murray floodplain lagoon
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Page 62 — Waterwatch - monitoring wetland invertebrates
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Page 68 — Mangroves near Port Broughton, Spencer Gulf
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Page 76 — Salt Creek, South East
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