Government of South Australia
South Australian Murray-Darling Basin
Natural Resources Management Board

South Australian Murray-Darling Basin
Natural Resources Management Board

Regional NRM Plan

Volume 3:

Regulatory and Policy Framework

A healthy, living landscape meeting the social, environmental, economic and cultural needs of the community, and ensuring the rights and wellbeing of future generations.

Natural Resources Management Act 2004

Natural Resources Management Plan

for the

South Australian Murray-Darling Basin Natural Resources Management Region

I, Karlene Maywald, Minister for the River Murray, hereby adopt this Natural Resources Management Plan comprising Volumes 1, 2, 3 and 4 pursuant to section 80(3)(a) of the *Natural Resources Management Act 2004*.

Hon Karlene Maywald
Minister for the River Murray

Date 28 / 4 / 09

Foreword

The South Australian Murray-Darling Basin Natural Resources Management Region contains a range of natural assets that are of great economic, social, environmental and cultural value. An array of unique and diverse habitats supports many species of plants and animals, many of which do not exist anywhere else in the world. The Region's economy is largely based on agriculture, manufacturing, recreation and tourism and these activities rely heavily on the Region's natural resources.

Sustained action is needed to ensure the long-term sustainability of these natural resources and the South Australian Murray-Darling Basin Natural Resources Management Board (the SAMDB NRM Board) is pleased to present the South Australian Murray-Darling Basin Natural Resources Management Plan. This Plan has been developed with the communities of the Region under the *Natural Resources Management Act 2004*.

This Plan represents a milestone in natural resources management for the Region. It takes a major step towards fully integrated management of all natural resources within the Region. The Plan builds upon and extends the considerable work, investment and achievements that we have already made to protect, preserve and restore natural resources for our own benefit, and the benefit of our children and grandchildren. By implementing the strategies defined in the Plan, it is possible to achieve the vision of a healthy living landscape meeting the social, environmental, economic and cultural needs of the community and ensuring the rights and wellbeing of future generations.

The success of this Plan can only be achieved by the involvement, commitment and the cooperative action taken by landholders, industry, government and the wider community. This Plan is one for the Region, a united front on how we intend to manage our precious natural resources.

The SAMDB NRM Board is committed to the delivery of this Plan with its partners and to communicate its NRM outcomes through decisive monitoring, evaluation and reporting programs. The SAMDB NRM Board will use these programs to learn, adapt and continually improve the way we manage our natural resources.

The SAMDB NRM Board acknowledges all organisations and individuals who have contributed to the regional planning effort and offers its appreciation for the hard work and dedication shown by those who have prepared this Plan. I hope you share the SAMDB NRM Board's commitment in the implementation of this important Plan for the protection and enhancement of the Region's natural resources.

Bill Paterson
Presiding Member

Contents

1. Introduction

NRM and the Region

1.1 | The NRM Region

The South Australian Murray-Darling Basin Natural Resources Management Board (the SA MDB NRM Board) is responsible for one of eight natural resources management regions in South Australia. The SA MDB NRM Region (see Figure 1.1) supports a population of approximately 126,000 people and extends over more than 5.6 million hectares, from the Victorian and New South Wales borders to the catchment boundary along the Mount Lofty Ranges, to the Murray Mouth, and up to 14 kilometres into the Southern Ocean.

This is one of South Australia's most ecologically diverse and agriculturally productive regions. It supports a wide range of flora, fauna, natural environments and human activities. The proper management of these natural resources will maintain a capable and prosperous South Australia.

The Region's ecological areas

The Region can be divided into six distinct ecological units and bioregions, as detailed below.

River Corridor

From the border of South Australia and Victoria to Overland Corner, the River meanders through a floodplain some 5–10 km wide that includes a complex pattern of anabranches and billabongs. Beyond Overland Corner, the River has incised a narrow gorge through limestone where geological structure largely determines its course. The ecology of the River Corridor is unique in the Region, given the fluvial (riparian) processes involved in its formation. Aeolian (wind) processes dominate the rest of the Region.

Coorong and Lower Lakes

The Coorong and Lower Lakes area features low-lying alluvial and coastal plains overlain by low sand ridges, with some outwash fans and isolated remnant hills along the western edge, and calcrete-capped old coastal dunes, up to 40 m high adjacent to the Coorong. This area consists of sedgelands, grasslands and low shrublands providing a wide range of habitats and is of international importance for migratory birds.

Murray Mallee and Murray Plains

Murray Mallee and Murray Plains includes the majority of the Region's agricultural area and consists predominantly of low rainfall mallee and shrubland communities.

Eastern Mount Lofty Ranges

The Eastern Mount Lofty Ranges supports stringy-bark forest, woodland and grassy woodland communities. A number of small tributary catchments drain the Ranges, joining either the River Murray or Lake Alexandrina.

South Olary Plains

The South Olary Plains, a pastoral region of low rainfall, extends north of the River Murray and west of the border with New South Wales. It features mallee, woodlands and chenopod shrubland vegetation, the majority of which remains uncleared. A number of species in this region are listed as threatened due to over-grazing of domestic stock, goats, rabbits and kangaroos.

In addition to the terrestrial systems above, the Coorong bioregion is also an important ecological system within the SA MDB NRM Region. The Coorong marine habitats, including complex near-shore reef systems and the marine organisms they support, are highly diverse. Species of conservation significance include the Leafy Sea Dragon, as well as migrating Southern Right and Humpback Whales. The bioregion also supports a number of marine species which are of importance to commercial and recreational fisheries.

More about the Region

The Region is in the rainshadow of the Mount Lofty Ranges, resulting in a marked reduction in rainfall compared to the country to the west. Even over short distances, a large reduction in rainfall can occur. Annual rainfall ranges from an unreliable 235 mm near Yunta, just beyond the northern extremity of the Region, to 387 mm at Lameroo, near the south-eastern corner of the Region, to 768 mm at Mount Barker near the western edge of the Region.

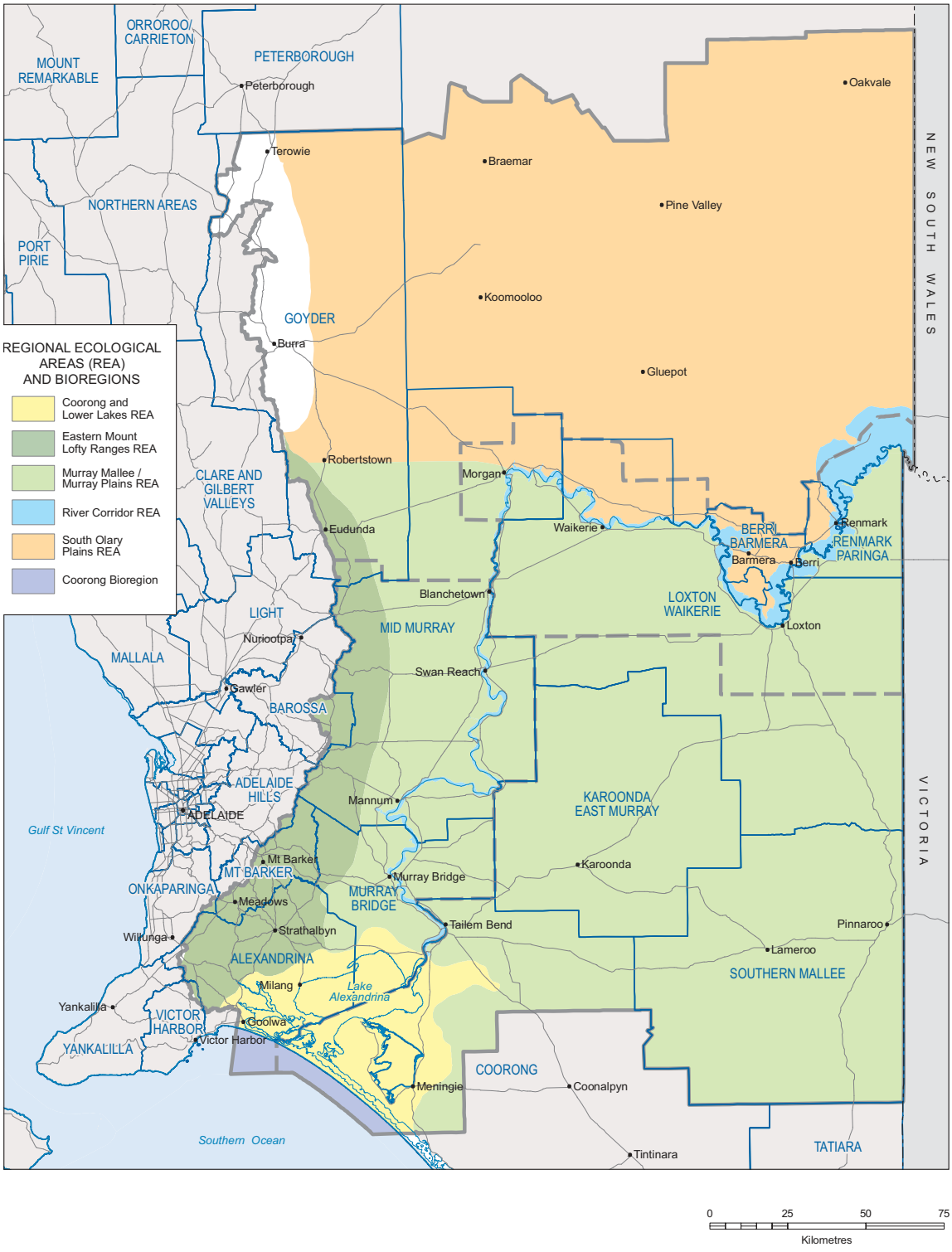


Figure 1: The SA MDB NRM Region and its ecological areas and bioregions

'Natural resources management is an approach to managing our environment that strives to achieve a balance between our collective need for resources and the needs of our environment'

Biodiversity

The Region supports a diverse range of flora, fauna and natural environments. It is home to a number of species and ecosystems that are of state, national and international significance. Most notable are the Ramsar-listed Chowilla Floodplain and the Coorong and Lower Lakes areas (the northern lagoon of the Coorong is in the SA MDB NRM Region).

Much of the Region's fauna is under threat. Of the 95 species of mammal that have been recorded for the Region, it is thought that only 50 of these currently have viable populations. Over 110 species of reptile have been recorded in the Region, two with a state conservation status of 'endangered' and five with a status of 'vulnerable'. Of the 13 species of frogs, two are considered significant, with one, the Golden Bell Frog, listed as nationally vulnerable. Approximately 31 species of native freshwater fish occur within the Region (four of these are listed as threatened under the *Environmental Protection and Biodiversity Conservation Act 1999*), of which eight move between fresh and salt water regimes. In addition to freshwater fish, large numbers of estuarine and marine fish (three of which are listed as threatened under the *Environmental Protection and Biodiversity Conservation Act 1999*) move between the Coorong and Lower Lakes and marine ecosystem. Aquatic invertebrates recorded within freshwater environments (rivers, creeks, wetlands and waterholes) in the Region include worms, molluscs, crustaceans and insects.

Human activities

The Region's natural resources support a wide range of human activity including irrigated and dryland agriculture, tourism and recreation and various manufacturing industries (notably food products and wine and beverages). Many South Australian towns and urban centres, including Adelaide, rely heavily on the River Murray for a large proportion of their annual potable water supply needs. The Region also faces significant urban growth pressures around some of its major towns, most notably Mount Barker and Goolwa, placing increased pressure on natural resources in these localities.

Primary production utilises about 82% of the land area of the Region consisting mostly of pastoral lands (43%) and dryland cropping and higher rainfall pasture areas (38%). Grazing of the rangelands is a major land use north of the River Murray. Adjacent to the River Murray, within part of the Mallee and along the Eastern Mt Lofty Ranges, horticulture is a major land use consisting of wine grapes, citrus, stone fruit and vegetables. There are also areas of dairy production on the Lower Murray Reclaimed Irrigation Areas and around the Lower Lakes. In the agricultural areas, broad-hectare farming is largely mixed cereal and livestock grazing, although pulse and oilseed crops are increasing as cropping intensifies, particularly in the more reliable rainfall areas to the south.

The drought

The Region has been gripped by severe drought in recent years, with water inflows during the past two years being the lowest on record. Particularly dry winter seasons throughout the Murray-Darling Basin system have resulted in low inflows, as well as declining pool and groundwater levels in many areas throughout the Region.

The impact of drought is particularly evident at the downstream end of the River Murray system and other catchments, including the Eastern Mount Lofty Ranges, Burra and the Marne and Saunders. There are often insufficient flows, for example, to maintain healthy levels in the lower lakes, provide links between the lakes and the Coorong, maintain refuge pools for native fish, and maintain the naturally open Murray Mouth. Numerous wetland systems along the course of the River and other water-dependant ecosystems in South Australia are adversely affected, and judicious management of scarce environmental water provisions is needed to maintain as much ecosystem function and health as possible.

Reductions to allocations, limited water access and worsening water quality have significantly affected horticultural, agricultural and dairy industry output and, in turn, have had wider impacts on local communities and economies. Whilst irrigators along the River Murray system have been hit hard with reduced water allocations since

2006/2007 (60% in 2006/2007 and 32% in 2007/2008), water users in other areas have also been hit with either reduced access to water and/or poor water quality. Little improvement is expected without significant rainfall and runoff.

Other threats

Major threats to the natural resources of the Region arise from past and current uses. Some arise from decisions and actions made within the Region while others arise from the decisions and actions of upstream states or from global processes (e.g. climate change). Of particular note are:

- the impact of introduced pest plant and animals
- the continued fragmentation and decline of remnant native ecosystems
- ongoing land degradation processes such as dryland salinity and soil acidity
- the allocation, capture and non-licensed taking of water resources beyond sustainable limits
- altered flows within river systems
- declining water quality due to increasing salinity, nutrients and pollution
- inappropriate development practices.

Many of these threats are further compounded by the risk of a warmer, drier Region under climate change predictions. Also considered a threat is a lack of broad community understanding of many natural resource processes and best management practices, which may contribute to further unintended degradation.

Neighbours in NRM

The SA MDB NRM Region shares its boundaries with four other South Australian NRM Boards (Adelaide and Mount Lofty Ranges, South East, Northern and Yorke, and SA Arid Lands) as well as Victoria's Mallee Catchment Management Authority (CMA) and the Lower Murray-Darling CMA in New South Wales (see Figure 1.2). Although these boundaries exist, many natural resources management issues need to be jointly addressed. The SA MDB NRM Board is committed to developing and maintaining effective working relationships with all neighbouring regions for this purpose.

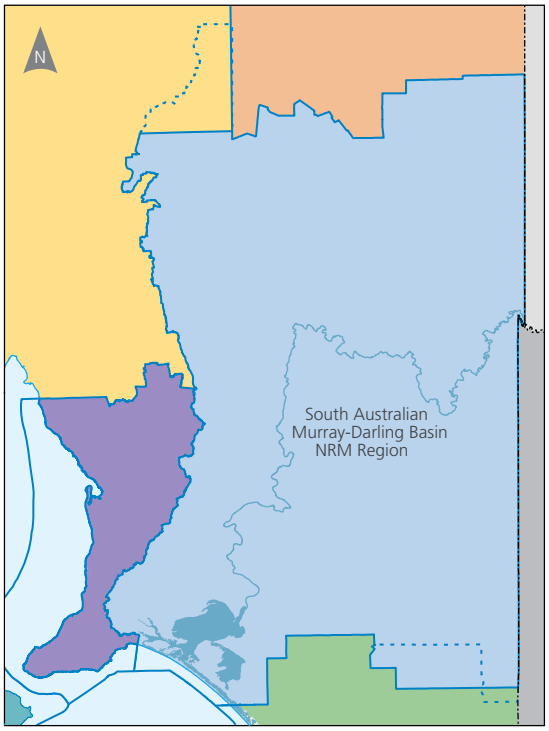


Figure 2: Map of neighboring regions

Examples of existing programs which are run in partnership or jointly-funded with other NRM Boards include:

- the Southern Emu Wren Recovery Program and the Land Management Program with the Adelaide and Mount Lofty Ranges NRM Board
- the Coorong South Lagoon Flow Restoration Project and the implementation of the Coorong District Local Action Plan with the South East NRM Board
- programs for the control of dingoes and feral goats with the SA Arid Lands NRM Board.

1.2 | What is NRM?

Natural resources management (NRM) is an approach to managing our environment that strives to achieve a balance between our collective need for resources and the needs of our environment. Natural resources include air, water, land, soil, plants, animals and micro-organisms, and the ecosystems they form.

Because NRM entails active management of natural resources, people are central to its practice. However, in the context of the *Natural Resources Management Act 2004* (and therefore this Plan), the exploitation of natural resources such as minerals and energy is not considered part of NRM.

When practised in an integrated manner, NRM can improve both ecosystem resilience and agricultural productivity. In other words, it aims to augment social, physical, financial and natural capital.

The *Natural Resources Management Act 2004* creates a regulatory framework for the management of the water, soil and biological assets of each region. It requires the SA MDB NRM Board to prepare a regional NRM plan, setting out the policies it will use to protect the environment and the interests of the community.

The preparation of the SA MDB NRM Plan created an opportunity for the community and stakeholders to develop an integrated vision for the future of natural resources for the SA MDB NRM Region.

1.3 | The purpose of the Plan

The SA MDB NRM Plan:

- assesses the current state and condition of the Region's natural resources, the current and likely future processes that threaten them, and consider opportunities for their better protection and management
- sets long-term, 20-year targets for the desired state and condition of the Region's natural resources
- describes the broad strategies and actions required to achieve these targets
- provides the basis for raising a natural resources management levy to fund the SA MDB NRM Board's statutory obligations under the Plan
- provides a sound basis for direct investment in natural resources management into the Region by the Australian and South Australian Governments
- guides the approach to NRM of all the Region's stakeholders, including the SA MDB NRM Board, the South Australian Government, local government, industry groups, community groups and individuals
- communicates a shared vision and goals for the natural resources of the Region.

The Plan aims to support ecologically sustainable development in the Region and achieve an appropriate balance between the environmental, social, economic and cultrual outcomes through the use of natural resources. In doing so it also seeks to foster a landscape approach to natural resources management where ecological systems or catchments are managed as a whole.

1.4 | The structure of the Plan

Figure 1.3 shows the relationship between the four volumes of the regional NRM plan: Strategic Plan, State of the Region report, Regulatory and Policy Framework, and Business Plan.

The SA MDB NRM Board will contribute to achieving the long-term vision by implementing a range of strategies and actions that are funded through the NRM levy and other income sources. These strategies and actions are delivered through the Program Areas.

Partnerships and collaboration are essential to the successful implementation of both the Business Plan and the plans of our partners, and therefore the overall achievement of the Strategic Plan. A collaborative partnership approach is vital in ensuring commitment between all key partners to collectively make a difference to natural resources management.

1.5 | Volume 3: Regulatory and Policy Framework

The Regulatory and Policy Framework presents the regulations and policies that underpin the implementation of the regional NRM plan. This volume helps ensure the Plan as a whole meets the requirements of the NRM Act. This volume includes statutory requirements for water affecting activities, pest control, soil conservation and land management. It also aims to achieve alignment between the regional NRM plan, local government development plans, and NRM objectives. The Regulatory and Policy Framework will be reviewed and updated as necessary to reflect new requirements.

Future direction

Volume 1: Strategic Plan

Purpose
The Strategic Plan provides direction and sets challenging targets for NRM in the Region. By doing so, it provides guidance for the future investment decisions and actions of all stakeholders.

Main content
This volume includes the vision, goals, guiding principles, resource condition targets (the long-term outcomes sought), management action targets (the medium-term outcomes sought) and the actions required to achieve these targets. It also outlines the Plan development process.

Review and updating
This volume sets direction for the ensuing 10 years. It will be reviewed and updated every five years.

Current position

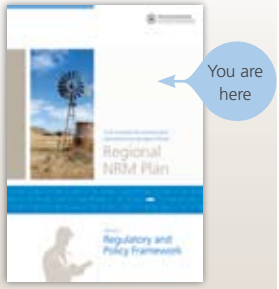
Volume 2: State of the Region

Purpose
The State of the Region provides the best available information to underpin the regional NRM plan's strategic directions, investment priorities, and future monitoring and evaluation.

Main content
This volume describes the natural resources of the Region, and reports on their current state and condition, as well as trends in state and condition. It identifies threats and pressures impacting on natural resources, and the current methods for managing these pressures and threats.

Review and updating
This volume will be reviewed every five years.

Requirements



Volume 3: Regulatory and Policy Framework

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The Regulatory and Policy Framework presents the regulations and policies that underpin the implementation of the regional NRM plan. This volume helps ensure the Plan as a whole meets the requirements of the NRM Act.

Main content
This volume includes statutory requirements for water affecting activities, pest control, soil conservation and land management. It also aims to achieve alignment between the regional NRM plan, local government development plans, and NRM objectives.

Review and updating
This volume will be reviewed and updated as necessary to reflect new requirements.

Implementation

Volume 4: Business Plan

Purpose
The Business Plan outlines actions to be undertaken by the SA MDB NRM Board in order to implement the Strategic Plan and meet the requirements of the Regulatory and Policy Framework.

Main content
This volume details the staff, physical infrastructure and other resources required to undertake these actions and to monitor and evaluate their impact. It also outlines funds required from various sources, including the Natural Resources Management Levy.

Review and updating
This volume presents a rolling three-year investment plan and is reviewed, with parts updated, annually.

Figure 3: Description of the volumes of the regional NRM plan

2. Water affecting activities

WAA permits and policies

2.1 | Permit application and assessment process

Section 75(3)(k) of the *Natural Resources Management Act 2004* (the NRM Act) requires the South Australian Murray-Darling Basin Natural Resources Management Board (the SAMDB NRM Board) to set out matters it will consider when exercising its powers to grant or refuse permits under Chapter 7, Part 2, of the NRM Act.

A permit is required for water affecting activities (WAAs) contained within section 127(3). A permit may be required for activities listed in section 127(5) of the NRM Act. A number of activities are excluded from requiring a permit under section 129 of the NRM Act; this includes activities which are approved under other legislation, such as the *Environment Protection Act 1993*, the *River Murray Act 2003* or the *Development Act 1993*. In addition, the SAMDB NRM Board has identified some instances where activities that would otherwise require a permit are excluded from needing a permit. These activities are shown in Table 1, along with complying standards that may be required.

WAAs will be grouped as follows (as per the requirements of the NRM Act).

- **Excluded activities:** These activities do not require a permit. They are identified in section 127(7) and 129 of the NRM Act or are listed as an excluded activity within this document.
- **Complying activities:** These activities do not require a permit where all principles under Section 2.1.1 have been satisfied.
- **On-merit assessment:** WAAs that are not 'excluded' and are not 'complying' will be assessed by the relevant authority against the principles in Sections 2.2 and 2.3, WAA permit policies.

The process of decision making, as it relates to permitting of WAAs, is illustrated in Figure 4.

Section 136 of the NRM Act provides that an NRM plan may require the relevant authority to give notice of an application for a permit to persons specified in the plan, those persons (if any) prescribed by the regulations and to the public generally. Section 136 does not apply to applications for any of the WAAs identified in this regional NRM plan.

These policies for the control of WAAs apply across the SAMDB NRM Region (see Figure 5).

2.1.1 | Principles of complying activities

The following principles detail the requirements that must be met for a WAA to be considered a 'complying activity':

1. Subject to principle 2 (below), a permit is not required to undertake a water affecting activity identified in this plan for which a permit is otherwise required where:
   a. the Board has endorsed Best Practice Operating Procedures (BPOPs) in relation to the activity; and
   b. the person proposing to undertake the activity has obtained written approval from the Board to undertake the activity or activities in accordance with the BPOPs; and
   c. the activity is undertaken in accordance with the BPOPs.
2. Principle 1 does not apply to a WAA referred to in sections 127(3)(a), (b), (c), (d), or (f) of the NRM Act.
3. To avoid doubt, a WAA permit is required to undertake a WAA if any of the conditions in principle 1 are not met.
4. An approval given by the Board in accordance with principle 1(b) is valid for 12 months from the date it was given, or for such other period of time specified by the Board, and will apply to any activities to which the BPOPs relate that may be undertaken in that period.
5. An approval given by the Board in accordance with principle 1(b) may be cancelled by the Board where, in the Board's opinion, the person to whom the approval was given does not comply with BPOPs or in any other circumstances as the Board thinks fit.
6. The Board may refuse to give an approval in accordance with principle 1(b) to a person who, in the Board's opinion, has contravened or failed to comply with BPOPs or in any other circumstances as the Board thinks fit.

2.1.2 | Water allocation plan interface

A water allocation plan may set out additional policies that the Board will take into account when considering an application for a permit. The policies in a water allocation plan may be different to the policies in the regional NRM plan. To the extent that a water allocation plan includes different policies, the policies in the regional NRM plan will not apply to that prescribed water resource.

Note 1: Development applications

Where an activity is defined as 'development' under the Development Act, a development application must be submitted to the local planning authority (usually the local Council) for assessment. As part of its assessment, Councils refer specific issues to state government agencies for advice or direction. Where a development application incorporates a WAA, the applicant will still need to provide the same information that would be required for a stand-alone WAA. This information will then be referred by the Council to the regional NRM board and/or DWLBC for advice or direction, which is conveyed back to the applicant as part of the Council's response to their development application.

Although this process may sound complicated, it maximises simplicity from the applicant's perspective, since they need only lodge one application with one planning authority, rather than separate development and WAA permit applications.

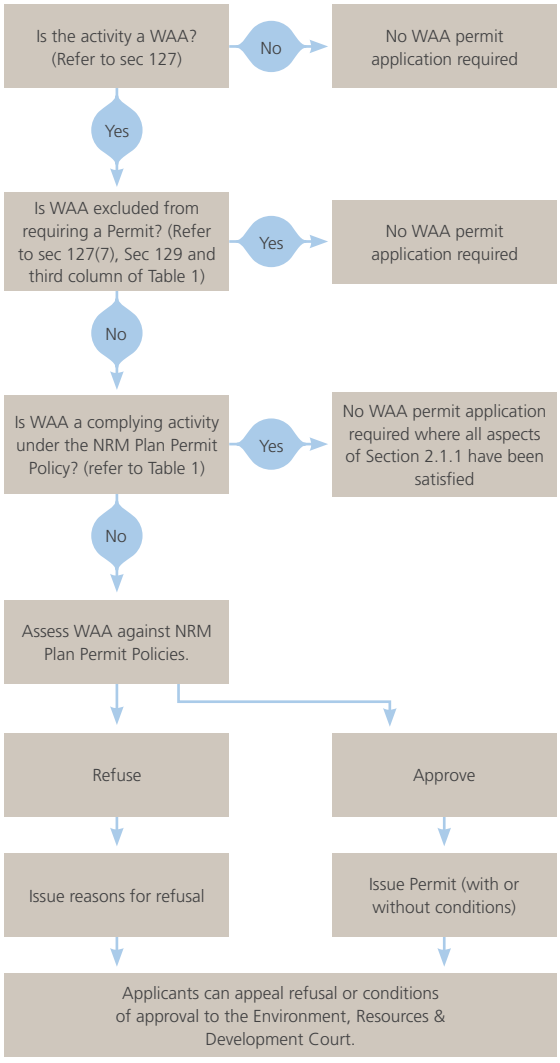

Figure 4: The decision-making process for WAA permits

Figure 5: WAA policy area

Table 1: Water affecting activities (WAAs) and exclusions (continued over page)

WAAs—including NRM Act reference	Examples of WAAs[1]	Excluded activities[2]	Complying activities[3]	Relevant authority
127(3)(a) Drilling, plugging, backfilling or sealing of a well	Well closure	As specified in the NRM Act	None—all applications assessed on merit	Minister
127(3)(b) Repairing, replacing or altering the casing, lining or screening of a well	Well maintenance or upgrade	As specified in the NRM Act	None—all applications assessed on merit	Minister
127(3)(c) Draining or discharging water directly or indirectly into a well	Managed aquifer recharge	As specified in the NRM Act	None—all applications assessed on merit	Minister
127(3)(d) The erection, construction or enlargement of a dam, wall or other structure that will collect or divert— (i) water flowing in a prescribed watercourse; or (ii) water flowing in a watercourse in the Mount Lofty Ranges watershed that is not prescribed; or (iii) surface water flowing over land in a surface water prescribed area or in the Mount Lofty Ranges watershed	Dam, wall or other structure Piping a watercourse Channelling a watercourse Stormwater harvesting/ treatment wetland	Harvesting rainwater from the roof of a building	None—all applications assessed on merit	Board
127(5)(a) The erection, construction or enlargement of a dam, wall or other structure that will collect or divert water flowing in a watercourse that is not in the Mount Lofty Ranges watershed and that is not prescribed, or flowing over any other land that is not in a surface water prescribed area or in the Mount Lofty Ranges watershed	Dam, wall or other structure Piping a watercourse Channelling a watercourse Stormwater harvesting/ treatment wetland	Harvesting rainwater from the roof of a building	None—all applications assessed on merit	Board
127(5)(b) The erection, construction or placement of any building or structure in a watercourse or lake or on the floodplain of a watercourse	Pump house Horse shelter Culvert Crossing point or bridge Fencing	Activity that is proposed to be undertaken beyond the 1-in-100-year ARI flood recurrence level, where flood mapping is available	Activity that is undertaken by a local government (directly or by its contractors), state agency or utility (e.g. SA Water). An activity in relation to which the Board has provided financial or any other form of assistance pursuant to section 42 of the NRM Act	Board

1. This column is not intended to be an exhaustive list and is simply provided as a guide to the types of activities that are WAAs.
2. WAAs that were authorised before the adoption of the regional NRM plan do not need to be authorised again, provided that the WAA has been completed or the licence, permit or deveopment consent remains in force.
3. Subject to Section 2.1.1 of these policies.

Table 1: Water affecting activities (WAAs) and exclusions (continued)

WAAs—including NRM Act reference	Examples of WAAs[1]	Excluded activities[2]	Complying activities[3]	Relevant authority
127(5)(c) Draining or discharging water directly or indirectly into a watercourse or lake	Discharge from a desalination plant Stormwater from buildings, roads and carparks	Activity that involves draining or discharging water of better quality than the receiving waters at a rate not exceeding 1 ML/yr	Activity that is undertaken by a local government (directly or by its contractors), state agency or utility (e.g. SA Water). An activity in relation to which the Board has provided financial or any other form of assistance pursuant to section 42 of the NRM Act	Board
127(5)(d) Depositing or placing an object or solid material in a watercourse or lake	Island in on-stream dam Rip rap Rocks Tyres Snags Filling a watercourse	None	Activity that is undertaken by a local government (directly or by its contractors), state agency or utility (e.g. SA Water). An activity in relation to which the Board has provided financial or any other form of assistance pursuant to section 42 of the NRM Act	Board
127(5)(e) Obstructing a watercourse or lake in any other manner	Planting vegetation Failure to control invasive weeds	None	Activity that is undertaken by a local government (directly or by its contractors), state agency or utility (e.g. SA Water). An activity in relation to which the Board has provided financial or any other form of assistance pursuant to section 42 of the NRM Act	Board
127(5)(f) Depositing, or placing an object or solid material on the floodplain of a watercourse, or near the bank or shore of a lake, to control flooding from the watercourse or lake	Levee banks Depositing fill	None	None—all applications assessed on merit	Board
127(5)(g) Destroying vegetation growing in a watercourse or lake, or growing on the floodplain of a watercourse	Removal or destruction of trees, shrubs, grasses, reeds	None	Activity that is undertaken by a local government (directly or by its contractors), state agency or utility (e.g. SA Water). Removal of proclaimed pest plants that does not involve a WAA pursuant to 127(5)(d) or (h). An activity in relation to which the Board has provided financial or any other form of assistance pursuant to section 42 of the NRM Act	Board

Table 1: Water affecting activities (WAAs) and exclusions (continued)

WAAs—including NRM Act reference	Examples of WAAs[1]	Excluded activities[2]	Complying activities[3]	Relevant authority
127(5)(h) Excavating or removing rock, sand or soil from— (i) a watercourse or lake or the floodplain of a watercourse; or (ii) an area near to the banks of a lake so as to damage, or create the likelihood of damage to, the banks of the lake	Desilting wetlands, swamps and springs Realignment or alteration of a watercourse Groundwater Access Trench (GAT) construction	Desilting a dam, provided it: • Involves the removal of unconsolidated material deposited since dam construction or since the dam was previously desilted • Does not involve a WAA pursuant to 127(5) (d)	Activity that is undertaken by a local government (directly or by its contractors), state agency or utility (e.g. SA Water). An activity in relation to which the Board has provided financial or any other form of assistance pursuant to section 42 of the NRM Act	Board
127(5)(i) Using water in the course of carrying on a business at a rate that exceeds 1 ML/ha/yr if irrigation or 1 ML/yr if non-irrigation, if the water has been brought into the Region by means of a pipe or other channel	Use of imported water for irrigation Use of imported water for industrial purposes	Where the water is sourced from an SA Water owned or operated mains water supply network	None—all applications assessed on merit	Minister
127(5)(j) Using effluent in the course of carrying on a business at a rate that exceeds 1 ML/ha/yr if irrigation or 1 ML/yr if non-irrigation	Use of treated effluent (e.g. CWMS) for irrigation Use of treated effluent for industrial purposes	Where a person or business undertaking the WAA is legally obligated to comply with a mandatory code of practice for the use of effluent (for example, but not limited to the EPA Code of Practice for Milking Shed Effluent 2003)	None—all applications assessed on merit	Minister

2.2 | General objectives and principles

The general objectives and principles against which all 'on-merit' WAA applications will be assessed within the SA MDB NRM Region are described below.

2.2.1 | Objectives

1. Develop and use water resources in a sustainable and equitable manner to maximise productive use, while providing for the needs of natural ecosystems.
2. Prevent activities which could lead to deterioration in the quality and quantity of surface or underground water.
3. Protect watercourse, lake and floodplain geomorphology.
4. Protect the long-term integrity of ecological functions and dependent biodiversity.

2.2.2 | Principles

1. A WAA must be undertaken in such a way that, in both the short-term and the long-term, it ensures:
   a. maintenance or improvement of water quality
   b. capture of water is within sustainable limits
   c. equitable sharing of the water available for consumptive use
   d. maintenance of natural hydrological and hydrogeological systems and environmental water requirements
   e. preservation of ecosystems dependent on water
   f. protection against the risk of harm to public and private assets and public safety from flooding
   g. continued monitoring of potential impacts from the activity.
2. A WAA must not :
   a. cause or exacerbate soil erosion or bank destabilisation of a watercourse or lake, or erosion of a floodplain
   b. be located in ecologically sensitive areas where the activity will or is likely to have a significant detrimental impact
   c. have adverse impacts on water resources, other natural resources, and ecosystems that depend on water resources or communities at both local and regional levels
   d. have adverse impacts on biodiversity and habitat preservation
   e. cause or exacerbate unnatural waterlogging or rising watertables
   f. cause unacceptable deterioration in the quality of surface water, underground water or water in a watercourse or lake
   g. create or exacerbate the incidence or intensity of local or regional flooding or increase the flood risk to public and private assets, communities or individuals
   h. impact on authorised devices or activities for scientific purposes.

2.3 | Activity-specific objectives and principles

In addition to the general objectives and principles set out in Section 2.2, the Board will consider the following objectives and principles when determining to grant or refuse a permit for an activity that will be assessed 'on merit', and when formulating best practice operating procedures.

2.3.1 | Constructing, backfilling or repairing wells—section 127(3)(a) and (b)

The objectives and principles that follow apply specifically to an activity under section 127(3)(a) (comprising drilling, plugging, backfilling or sealing of a well) or section 127(3)(b) (repairing, replacing or altering the casing, lining or screen of a well) of the NRM Act, which will be referred to here as the 'activity' or 'activities'.

Objectives

1. Protect the quality of underground water resources.
2. Protect groundwater-dependent ecosystems.
3. Minimise the impact on the underground water resources.
4. Protect the underground water resources from pollution, deterioration and undue depletion.
5. Ensure the integrity of headworks are maintained.
6. Ensure wells are constructed in the correct aquifer system.

Principles

1. The equipment, materials and method used for the activity shall not adversely affect the quality of the underground water resource.
2. Aquifers shall be protected during the activity to prevent adverse impacts on the integrity of an aquifer.
3. Where a well passes through two or more aquifers, an impervious seal must be made and maintained between the aquifers to prevent leakage between aquifers.
4. Wells drilled for the drainage or discharge of water into a well shall be pressure cemented along the full length of the casing.
5. The activity shall not adversely affect the quality, quantity and accessibility of water for supply from existing wells operated by other landholders.
6. The activity shall not adversely affect water-dependent ecosystems.
7. The activity shall not significantly increase local drawdown.
8. A well may be deepened provided that it does not penetrate a different aquifer.
9. A replacement well may be drilled provided that:
   a. the original well is backfilled in accordance with a permit issued pursuant to section 127(3)(a) of the NRM Act;
   b. the replacement well is within 20 metres of the original well; and
   c. the replacement well takes water only from the same aquifer as the original well.

2.3.2 | Drainage or discharging water into a well—section 127(3)(c)

The objectives and principles that follow apply specifically to an activity under section 127(3)(c) of the NRM Act, concerning draining or discharging water directly or indirectly into a well—'artificial recharge'.

Objectives

1. Protect the quality of underground water resources.
2. Protect groundwater-dependent ecosystems.
3. Minimise adverse effects on underground water resources.
4. Protect underground water resources from pollution and deterioration.
5. Ensure the integrity of headworks are maintained.
6. Ensure wells are constructed in the correct aquifer system.
7. Ensure the sustainable operation and management of managed aquifer recharge schemes (also known as aquifer storage and recovery schemes).

Principles

1. Water that is drained or discharged into a well must comply with the *Environmental Protection Act 1993* and any associated policy.
2. A permit to drain or discharge water into a well will not be issued unless a risk assessment is undertaken to the satisfaction of the Minister. This risk assessment must be consistent with the *National Water Quality Management Strategy—Australian Guidelines for Water Recycling: Managing Health & Environmental Risks, Phase 1 2006* and other documents current at the time, including:
   a. an investigation into the sustainability of the draining or discharging site, including but not limited to tests for transmissivity, maximum injection pressures and calculated likely impacts on the integrity of the well and confining layers, and impacts of potentiometric head changes to other underground water users
   b. an appropriate operation or management plan demonstrating that operational procedures and monitoring regime are in place to protect the integrity of the aquifer, minimise the wastage of water and protect the discharge site on an ongoing basis
   c. a water quality assessment which identifies hazards in the source water
   d. a report on the consequences and impacts to the native underground water resource where the water quality characteristics (salinity and chemistry composition) of the water to be discharged differs to that of the native underground water.
3. Water that is drained or discharged into a well only by means of gravity is exempt from meeting the requirements of principle 2(a).
4. Roof runoff that is drained or discharged into a well via a closed system of capture and transport is exempt from meeting the requirements of principles 2(a), (c) and (d), provided that the system is equipped with a mechanism to divert first flush water.
5. Further to principle 2(b), continuation of draining and discharge is dependent on an annual report that addresses the impacts to the native underground water at the draining or discharge site. Roof run-off captured in a closed system and then drained or discharged into a well is exempt from this principle.
6. For the purposes of principles 1 and 2, the relevant concentrations, levels or amounts shall be measured in sufficient representative samples[4] of:
   a. the water to be drained or discharged
   b. native underground water collected from the proposed point of injection, or as near as possible to the proposed point of injection.
7. The draining or discharging of water directly or indirectly into a well must not degrade ecosystems dependent on the underground water or detrimentally affect the ability of other persons to lawfully take from that underground water.
8. The headworks for the draining or discharge of water shall be constructed so that extraction, draining and discharge operations can be metered without interference.
9. The headworks for the draining or discharge of water shall be constructed so that water cannot leak if the well becomes clogged.
10. Wells constructed for the draining or discharge of water at pressures greater than gravity, must be pressure-cemented along the full length of the casing. This does not exempt the need to follow the general specifications for well construction.

4. For the purpose of this principle, 'sufficient representative samples' means suitable samples, collected with equipment appropriate for the substance, material or characteristic to be measured and taken at suitable locations and times to accurately represent the quality of the relevant water.

2.3.3 | Water diversion and storage—sections 127(3)(d) and 127(5)(a)

The objectives and principles that follow apply to an activity under section 127(3)(d) or section 127(5)(a) of the NRM Act, concerning the erection, construction, modification, enlargement or removal of a dam, wall, or other structure that will collect or divert, or collects or diverts, water flowing in a watercourse, or surface water flowing over land within the WAA policy area, as shown in Map 1.

Objectives

1. Ensure that dams, walls or any other water collection or diversion mechanisms in a watercourse, floodplain or drainage path are sited, constructed and operated in a manner which:
   a. protects the rights of downstream water users (including the environment) to access those water resources
   b. maintains amenity.

Principles

Siting

1. A dam, wall or other structure for the storage, collection or diversion of water must not:
   a. be constructed in areas prone to erosion
   b. contribute to dryland salinity or intrusions of saline underground water into watercourses.
2. Subject to the application of other principles in this regional NRM plan, a dam, wall or other structure for the storage, collection or diversion of water may be constructed on-stream if the relevant authority is satisfied that:
   a. due to topography or other natural features of the proponent's land, there is insufficient surface water run-off from that land that could be collected in an off-stream dam to meet the reasonable requirements of the proponent, *and*
   b. it is not practicable for the proponent to divert water from a watercourse or a drainage path (including by pumping or siphoning that water) into an off-stream dam.

Note 2: On-stream and off-stream dams

Dams have traditionally been constructed across watercourses and drainage paths to capture water for a variety of purposes.

There is a need to protect flow patterns and the associated water-dependent ecosystems from the impacts of extractions.

An on-stream dam typically inhibits all flow until the dam is filled. Once filled, water spills over and flows further downstream. On-stream dams have been shown to reduce the rate and volume of streamflow from natural undeveloped conditions. Although on-stream dams may provide a more reliable water supply for the user, the structure inhibits water flows that are required to sustain water-dependent ecosystems and reduces the opportunity for downstream landholders to collect water.

'On-stream' dams may create problems for both other users and ecosystems downstream as they can reduce flow duration and total yield, and lengthen periods of no flows. There is little flexibility in the management of 'on-stream' dams as they capture all flow until full.

'Off-stream' dams provide greater flexibility, as the mechanism used to extract water from a watercourse can be varied to allow capture of water at different times or flow rates.

Sub-catchment limits

3. The total volume of all dams within a surface water sub-catchment zone defined in Figure 5 shall not exceed the limit specified in Column 7 of Table 2 (see page 24).
4. When the limit for a surface water sub-catchment zone has been reached or exceeded, any other methods of surface or watercourse water diversions or harvest shall not be permitted.

5. Principles 4 and 7 do not apply where the diversion is solely for the purpose of improving water quality prior to returning the diverted water to the same watercourse or drainage path within three (3) days, with loss of water volume only allowed via minimised evaporation and seepage from the water body.
6. Principles 4 and 7 do not apply to authorised structures[5] for the specific purpose of measuring streamflow.

5. For the purpose of this principle, an 'authorised structure' means a structure authorised by the Board, a local government authority or the Minister.

> **Note 3: Limits on water consumption, surface water sub-catchment zones**
> *Every surface water sub-catchment zone requires a limit to be placed on the amount of surface water and watercourse water that may be taken for consumptive purposes. The surface water sub-catchment zones to which the limits apply are those zones delineated in Figure 5 (General Registry Office Plan Number still to be registered). GIS layers of these zones can be obtained from the Board.*

Allowable dam volumes

7. The total dam volume allowed on an allotment will be calculated as outlined below.
   a. If the current total volume of dams in the surface water sub-catchment zone containing the allotment equals or exceeds the surface water sub-catchment limit defined in Principle 3, then the allowable dam volume will be zero megalitres.
   b. If the current total volume of dams in the surface water sub-catchment zone containing the allotment is below that surface water sub-catchment zone's limit defined in Principle 3, then the allowable dam volume (megalitres) is the lower volume derived from the application of the following:
      I. 0.3 (30% of) X the area of the allotment (km^2) X long term average rainfall between the months of May and November (mm) for the locality X run-off coefficient (as defined in Principle 9), or
      II. the surface water sub-catchment zone limit, defined in Principle 3, for the surface water sub-catchment zone containing the allotment minus the current total volume of dams in the surface water sub-catchment zone containing the allotment.
   c. If a dam is to be constructed in a location that does not fall within a surface water sub-catchment zone (as defined in Figure 5) then the maximum allowable dam volume shall be calculated as follows:
      0.3 (30% of) X the area of the allotment (km2) X long term average rainfall between the months of May and November (mm) for the locality X run-off coefficient (as defined in Principle 8).
8. Where a dam ('the new dam') is to be constructed on an allotment created by a land division (or series of divisions) of a larger allotment ('the original allotment') that contains a dam or dams ('the old dam'), the combined capacity of the new dam (or dams) and the old dam (or dams) shall not exceed the limits detailed in Principle 7.
9. For the purpose of Principle 7, the run-off coefficient is 0.1 (10%), unless otherwise specified in a water allocation plan that relates to a prescribed water resource, the area of which includes the allotment (refer to Section 2.1.2 for additional detail).

Flow regime

10. A dam, wall or other structure that collects or diverts surface water flowing over land or water from a watercourse must include a device (a 'low flow bypass') that ensures any flows at or below the Threshold Flow Rate will:
    a. not be collected or diverted; or
    b. be bypassed around the dam or otherwise returned to the same watercourse or surface water flow path immediately downstream of the dam, wall or other structure as soon as reasonably practical AND the water will be of an equivalent or better quality AND be of an equal or greater quantity.

11. For the purposes of principle 10, the threshold flow rate (litres/second) means the greater of:
    a. the flow rate of a watercourse or flow path determined by multiplying the unit threshold flow rate (litres/second/km^2, as defined by Table 2, column 8—see page 24), by the area of catchment (km^2) that contributes to the watercourse or drainage path, that is above the point where the water is diverted from the watercourse or drainage path, *or*
    b. one (1) litre/second.
12. A low flow bypass shall:
    a. be designed and constructed to ensure its operation is automated and can not be manually overridden
    b. not be obstructed or tampered with in any way
    c. be maintained in such a condition that it continues to be effective in meeting Principle 10.

Dam design features

13. Dams, walls, or other structures for the collection, storage or diversion of water must, where appropriate and practicable, be designed and constructed to incorporate a range of features to improve water quality and enhance ecological values. Such features include, but are not limited to:
    a. an irregular edge
    b. a variety of depths to increase habitat for a variety of plants and animals
    c. well vegetated edges
    d. minimal stock access
    e. an upstream silt trap for on-stream dams (one-tenth the size of the dam)
    f. provision for aquatic biota migration where appropriate
    g. provision of an island at least 0.5 metres above the maximum dam water level in water at least 0.5 metres deep.
14. Applicants for a permit under this section of the policies for control of WAAs must address each element of Principle 13. Where the applicant believes any one of these elements is not appropriate or practicable, they shall provide justification for this opinion in their application. The relevant authority will then use this information in making a determination on which elements of Principle 13 are not appropriate or practicable.

Dam construction

15. The erection, construction, enlargement, modification or removal of a dam, wall or other structure to collect or divert water must only be undertaken in a manner that minimises the removal or destruction (e.g. via inundation of area) of riparian and in-stream vegetation.
16. The erection, construction, enlargement, modification or removal of a dam, wall or other structure to collect or divert water must be undertaken in a manner that prevents silt or sediments from entering the watercourse, including but not limited to the use of erosion and sediment control measures such as diversion drains, revegetation, straw bale barriers, filter fences, sediment traps and detention basins.
17. The erection, construction, enlargement, modification or removal of a dam, wall or other structure must ensure a minimum 20-year design life in accordance with best practice guidelines (endorsed by the Board) for all watercourse flow conditions up to the 100-year average recurrence interval (0.01 annual exceedence probability) flow rate for the proposed dam location.

Dam maintenance

18. Desilting of a dam does not require a WAA permit provided desilting only involves the removal of unconsolidated material deposited since construction of the dam or material deposited since the dam was previously desilted. Desilting may be undertaken provided:
    a. it does not enlarge the dam capacity or increase the dam wall height
    b. the excavated material is not placed in or near a watercourse, floodplain or lake.

2.3.4 | Building or structure in a watercourse, lake or floodplain—section 127(5)(b)

The objectives and principles that follow apply specifically to an activity under section 127(5)(b) of the NRM Act, concerning the erection, construction or placement of any building or structure in a watercourse, lake or floodplain.

Objectives

1. Minimise the potential for erosion and the restriction of surface water flows.
2. Protect the ecology of a watercourse, lake, or floodplain of a watercourse.

Principles

1. Construction and placement of structures—including roads—in a watercourse, floodplain of a watercourse, lake, wetland or area subject to inundation:
   a. shall be designed to minimise the risk of erosion resulting from the construction and location of the structure; and
   b. must not adversely affect the provision of environmental water requirements of those areas (e.g. by impeding flows); and
   c. must not adversely affect the migration of aquatic biota; and
   d. must not alter the hydrology of a stream in such a way as to adversely impact on the ecology; and
   e. must not result in flooding, either upstream or downstream; and
   f. must not be constructed where it, or any debris collected by it, would increase the risk of damage to property or the risk to safety of persons.

2.3.5 | Drainage or discharge of water into a watercourse or lake—section 127(5)(c)

The objectives and principles that follow apply specifically to an activity under section 127(5)(c) of the NRM Act, concerning the draining or discharging of water directly into a watercourse or lake.

Objectives

1. Manage drainage or discharge water such that contaminants are contained and managed on site to minimise the conveyance of contaminants into watercourses or lakes.

Principles

1. Drainage or discharge of water into a watercourse or lake must only be undertaken where protective measures have been provided to minimise erosion or degradation in the quality of the receiving water. Suitable protective measures include, but are not limited to:
   a. detention basins to regulate the rate, volume and quality of water discharged
   b. reuse of drainage or discharge water occurs under conditions that would not present a risk to public or environmental health
   c. litter traps
   d. pre-treatment of the water before discharge
   e. a requirement that the quality of water drained or discharged into a watercourse lake or floodplain is of a quality similar to or better than that of the receiving water environment
   f. discharge into the receiving waters occurs at times of naturally high flow.
2. All treatment devices must be appropriately managed to ensure that they continue to function according to their design, particularly in the removal of accumulated sediment and litter.
3. Storage of any contaminated water must only be undertaken in storage vessels with no natural catchment that are constructed to prevent leakage or overflow of any contaminated water.

Note 4: Waste stream from desalination processes

The discharge of a waste stream (brine and other chemicals) from desalination processes would usually be considered under this section of these policies for the control of WAAs.

2.3.6 | Management of obstructions—sections 127(5)(d),(e) and (f)

The objectives and principles that follow apply specifically to an activity under the following sections of the NRM Act:

- 127(5)(d)—depositing or placing an object or solid material in a watercourse or lake;
- 127(5)(e)—obstructing a watercourse or lake in any other manner; and
- 127(5)(f)—depositing or placing an object or solid material on the floodplain of a watercourse or near the bank or shore of a lake to control flooding from the watercourse or lake.

Objectives

1. Ensure that watercourses, floodplains and lakes are free of obstructions that may impede natural stream flow or cause unnecessary flooding.

Principles

1. Depositing or placing an object[6] or solid material in a watercourse or lake may only occur where it includes either:
   a. the construction of an erosion control structure, for example, but not limited to a rock chute or rip rap
   b. an authorised activity for scientific purposes, for example, but not limited to, flow measuring devices, *or*
   c. an authorised device or structure[7] used to regulate water flowing in a watercourse.
2. Any object or solid material used in the control or prevention of watercourse erosion must be designed with consideration of the local-scale and catchment-scale landscape and hydrological processes and must not cause either of the following:
   a. increase erosion upstream or downstream
   b. detrimental offsite impacts, for example, but not limited to, flooding.
3. The depositing or placing of an object or solid material in a watercourse or lake must not:
   a. adversely impact on water-dependent ecosystems
   b. adversely affect the migration of aquatic biota.
4. Objects or solid materials that impede the flow of water must be designed to provide a low flow by-pass mechanism, excluding those authorised structures for the specific purpose of measuring stream flow.
5. Obstructing a watercourse, lake or floodplain shall not cause erosion.
6. Depositing or placing an object or solid material on the floodplain of a watercourse, or near the bank or shore of a lake, to control flooding from the watercourse or lake shall not:
   a. adversely impact upon the natural flow of a watercourse
   b. increase the risk of flooding (upstream or downstream), *or*
   c. cause or increase watercourse erosion.
7. Depositing or placing an object or solid material on the floodplain of a watercourse, or near the bank or shore of a lake, to control flooding from the watercourse or lake should:
   a. provide for the needs of ecosystem processes (including the migration of aquatic biota); and
   b. minimise the impact or risk of flooding on human communities.

2.3.7 | Management of vegetation removal and excavation—sections 127(5)(g) and (h)

The objectives and principles that follow apply specifically to an activity under the following sections of the NRM Act:

- 127(5)(g)—destroying vegetation growing in a watercourse or lake or growing on the floodplain of a watercourse
- 127(5)(h)—excavating or removing rock, sand or soil from:
  iii. a watercourse or lake or the floodplain of a watercourse, *or*
  iv. an area near to the banks of a lake so as to damage, or create the likelihood of damage to, the banks of the lake.

6. For the purpose of these principles, an 'object' can include vegetation, such as fallen trees and other plant debris.
7. For the purpose of this principle, an 'authorised device or structure' means a structure or device authorised by the NRM Board, a local government authority or the Minister.

Objectives

1. Ensure that watercourses, lakes and floodplains are protected against adverse ecological impacts arising from destruction of vegetation and excavation or removal of rock, sand or soil.
2. Preservation of the geomorphic characteristics of a watercourse, lake or floodplain.

Note 5: Native vegetation controls

Destruction of, damage to and removal of native vegetation requires approval under the South Australian Native Vegetation Act 1991.

Principles

1. Alteration to the alignment of a watercourse, or destruction of vegetation within a watercourse, lake or floodplain shall only occur where it is for the protection of existing infrastructure or rehabilitation of a watercourse, lake or floodplain, and the activity does not result in any of the following:
   a. increased erosion
   b. increased flooding
   c. bed and bank instability
   d. downstream sedimentation
   e. destruction of significant habitat for native fauna
   f. decline in water quality
   g. alteration to the natural flow regime of a watercourse.
2. The excavation and removal of rock, sand or soil must not adversely impact on either:
   a. the ecology of a watercourse, lake or floodplain, *or*
   b. migration of aquatic biota.

2.3.8 | Use of imported water and effluent—sections 127(5)(i) & (j)

The objectives and principles that follow apply specifically to an activity under section 127(5)(i) concerning the use of imported water in the course of carrying on a business at a rate that exceeds one (1) megalitre per hectare per annum and an activity under section 127(5)(j) of the NRM Act comprising the use of effluent in the course of carrying on a business at a rate that exceeds one (1) megalitre per hectare per annum, or one (1) megalitre per annum for non-irrigated activities.

Objectives

1. To ensure that effluent is used in such a manner that there is no risk to public health.
2. Protect the productive capacity of the land.
3. Protect against the risk of detrimental impacts to public and private assets by rising watertables.

Principles

1. A permit is required for the use of imported water and effluent where the water or effluent is used on the land at a rate that exceeds one (1) megalitre per hectare per annum, or one (1) megalitre per annum for non-irrigated activities.
2. Where a person or business has complied with a mandatory SA Government code of practice for the use of imported water or effluent, a permit is not required (for example, the EPA Code of Practice for Milking Shed Effluent 2003).
3. The use of effluent must not pose a risk to human health.
4. The use of imported water or effluent must not cause a rise in underground water levels that would adversely impact on land, public and private assets, other water resources or natural resources and their beneficial uses.
5. The use of imported water or effluent must not adversely affect the natural flow regime or ambient quality of the receiving waters.
6. The use of imported water or effluent must not adversely affect the productive capacity of the land by impacts including, but not limited to, increasing salinity, water logging, sodicity, toxicity, nutrient concentrations or watertables.
7. The use of imported water or effluent must not adversely affect the condition, biodiversity or extent of a water-dependent ecosystem.

8. Any dams constructed for the storage of chlorinated imported water or effluent must be constructed so as to prevent:
   a. leakage from the dam through the soil
   b. overflows from the dam onto the surface of the land surrounding the dam
   c. overflow from the dam into a watercourse or lake.
9. Any dams constructed for the storage of chlorinated imported water or effluent must not be located in a watercourse, floodplain, lake, or drainage path.
10. The use of imported water or effluent will not be permitted where its use will adversely affect the environment.

Table 2: Surface water sub-catchment zone data (continued over page)

	1	2	3	4	5	6	7	8
Catchment	**Surfacewater sub-catchment zone**	**Surfacewater sub-catchment zone area (km²)**	**Average annual rainfall (mm)**	**Average May–November rainfall (mm)**	**Average May–Nov runoff (10% of May–Nov rainfall) (mm)**	**30% of May–November runoff (mm)**	**Surfacewater sub-catchment zone limit (ML)**	**Unit threshold flow rate (l/s/km²)**
Baldina Creek	BA	99.14	415.20	305.80	30.58	9.17	909.47	1
Burra Creek—Razorback	BU1	52.97	420.10	309.10	30.91	9.27	491.16	1
Burra Creek—Mount Bryan TS	BU2	63.51	439.70	330.10	33.01	9.90	628.91	1
Burra Creek—Firewood Creek	BU3	99.04	462.20	347.10	34.71	10.41	1031.32	1
Burra Creek—Springbank Valley	BU4	39.97	462.10	346.15	34.62	10.38	415.07	1
Burra Creek—Upper Burra Creek	BU5	89.99	438.75	324.65	32.47	9.74	876.45	1
Burra Creek—Logan Creek	BU6	65.59	473.10	355.50	35.55	10.67	699.56	1
Burra Creek—Lagoon Hill	BU7	47.77	473.10	355.50	35.55	10.67	509.50	1
Burra Creek—Worlds End	BU8	82.56	314.70	223.30	22.33	6.70	553.10	1
Burra Creek—Mid Burra Creek	BU9	61.01	314.70	223.30	22.33	6.70	408.74	1
Burra Creek—Lower Burra Creek	BU10	335.32	235.10	157.35	15.74	4.72	1582.89	1
Caroona Creek	CA	19.12	261.30	180.70	18.07	5.42	103.67	1
Craigie Plain	CP	145.45	302.90	208.50	20.85	6.26	909.77	1
Keynes Plain	KP	467.61	321.40	225.48	22.55	6.76	3163.00	1
Levi Creek	LC	90.45	442.00	327.20	32.72	9.82	887.86	1
Narcoota - Deep Creek	NC	247.69	379.90	269.08	26.91	8.07	1999.42	1
Newikie Creek	NE	247.92	415.20	305.80	30.58	9.17	2274.46	1
Piltimitiappa Creek	PC	10.26	234.70	147.80	14.78	4.43	45.47	1
Pine Creek	PN	58.38	361.80	258.15	25.82	7.74	452.13	1

Table 2: Surface water sub-catchment zone data (continued)

	1	2	3	4	5	6	7	8
Catchment	**Surfacewater sub-catchment zone**	**Surfacewater sub-catchment zone area (km^2)**	**Average annual rainfall (mm)**	**Average May–November rainfall (mm)**	**Average May–Nov runoff (10% of May–Nov rainfall) (mm)**	**30% of May–November runoff (mm)**	**Surfacewater sub-catchment zone limit (ML)**	**Unit threshold flow rate (l/s/km^2)**
Red Creek	RC	135.43	379.65	273.15	27.32	8.19	1109.76	1
Robertstown Lagoon	RL	107.16	476.00	351.60	35.16	10.55	1130.34	1
Stone Chimney Creek	SC	51.44	395.60	282.60	28.26	8.48	436.15	1
Sedan	SE	151.90	412.45	304.30	30.43	9.13	1386.74	1
Spring Hut Creek	SH	279.96	313.50	219.30	21.93	6.58	1841.83	1
Stonefield	ST	118.70	342.17	241.60	24.16	7.25	860.33	1
Towitta Creek	TC	94.36	363.47	263.10	26.31	7.89	744.76	1
Truro Creek	TR	193.85	400.43	291.17	29.12	8.74	1693.24	1
Waupunyah Creek	WA	221.00	264.40	168.30	16.83	5.05	1115.83	1
Wonna Creek	WC	329.22	395.48	288.30	28.83	8.65	2847.42	1
Wild Dog	WD	25.83	353.75	253.95	25.40	7.62	196.75	1
Witto Creek	WI	164.00	248.00	164.25	16.43	4.93	808.11	1
Williams Reservoir	WR	29.97	261.30	180.70	18.07	5.42	162.48	1
Marne River	M1	113	619	482	48	14	1,631	2
	M2	109	499	389	39	12	1,270	1.5
	M3	28	373	291	29	9	248	1.5
Saunders Creek	S1	25	488	380	38	11	291	1.5
	S2	33	474	369	37	11	366	1.5
	S3	26	379	296	30	9	228	1.5
	S4	8	391	305	30	9	77	1.5
Milendella Creek	L1	37	412	321	32	10	352	1.5
Long Gully	Y1	58	364	284	28	9	490	1.5
Bees Knees	K1	41	364	284	28	9	346	1.5
Reedy Creek	R1	44	590	461	46	14	606	1.5
	R2	38	599	468	47	14	531	1.5
	R3	66	533	416	42	12	821	1.5
	R4	51	421	328	33	10	506	1.5
	R5	22	446	348	35	10	234	1.5
	R6	33	403	314	31	9	316	1.5
	R7	57	360	280	28	8	480	1.5
Salt Creek	N1	201	363	283	28	8	1,710	1.5
Preamimma Creek	P1	73	359	280	28	8	609	1.5

Table 2: Surface water sub-catchment zone data (continued)

	1	2	3	4	5	6	7	8
Catchment	**Surfacewater sub-catchment zone**	**Surfacewater sub-catchment zone area (km²)**	**Average annual rainfall (mm)**	**Average May–November rainfall (mm)**	**Average May–Nov runoff (10% of May–Nov rainfall) (mm)**	**30% of May–November runoff (mm)**	**Surfacewater sub-catchment zone limit (ML)**	**Unit threshold flow rate (l/s/km²)**
Rocky Gully Creek	G1	99	362	283	28	8	843	1.5
Bremer River	B1	200	496	386	39	12	2,315	2
	B2	78	637	497	50	15	1,168	3
	B3	86	715	558	56	17	1,438	3.5
	B4	45	572	446	45	13	606	3
	B5	64	539	421	42	13	808	3
	B6	29	478	373	37	11	321	3
	B7	68	410	320	32	10	650	3
Angas River	A1	62	714	557	56	17	1,039	4
	A2	39	719	561	56	17	658	4
	A3	20	650	507	51	15	303	4
	A4	16	563	439	44	13	212	4
	A5	44	505	394	39	12	523	4
unnamed creek	E1	56	510	398	40	12	673	1.5
Finniss River	F1	28	806	629	63	19	526	7.5
	F2	142	813	634	63	19	2,701	7.5
	F3	23	804	627	63	19	431	7.5
	F4	71	641	500	50	15	1,059	7.5
	F5	46	783	611	61	18	842	7
	F6	29	591	461	46	14	407	4
	F7	36	475	371	37	11	398	7.5
Tookayerta Creek	T1	42	803	626	63	19	786	7.5
	T2	33	798	622	62	19	622	7.5
	T3	25	658	514	51	15	391	7.5
Deep Creek	D1	34	579	452	45	14	459	7
Currency Creek	C1	58	737	575	57	17	993	7
	C2	32	596	465	46	14	442	7

3. Control of pest animals and plants

Managing pests in the Region

Animal and plant control is fundamental to sustainable land management, and is a key component of the South Australian Government's Natural Resources Management (NRM) reform agenda. As a community we need to manage existing pests and restrict their spread—while being prepared for new threats from exotic incursions—if further impacts on agricultural productivity, our natural environment and public safety are to be prevented and if the degradation of the past is to be ameliorated.

It is essential that policies for animal and plant control are pragmatic and forward looking, and that there is an innovative and responsive structure able to take appropriate actions to minimise the deleterious effects of pest animals and pest plants.

The South Australian Murray-Darling Basin Natural Resources Management (SA MDB NRM) Board's pest animal and plant strategies are a vital part of Australia's integrated approach to national biosecurity and are consistent with state and national plans and strategies including the:

- Draft South Australian Biosecurity Strategy
- Australian Weeds Strategy Australian Invasive Animals Strategy
- Weeds of National Significance Strategies (as relevant to the SA MDB NRM Region)
- National Weed Spread Prevention Action Plan.

3.1 | Background

Legislation for the control of pest plants and animals has been in existence in South Australia for over one hundred years. Early legislation was enacted primarily to protect agriculture from the impact of pest animals and plants. The *Animal and Plant Control (Agricultural Protection and Other Purposes) Act 1986* was the first pest control legislation that clearly recognised that the protection of both agricultural production and environmental quality must go hand in hand with land management legislation. The NRM Act (which repealed the Animal and Plant Control Act) incorporates a chapter on animal and plant control that facilitates integrated and sustainable natural resources management, while engaging the community in the development and implementation of pest management programs.

In the State NRM Plan, under Goal 4 (p. 56), four activities are defined as the responsibility of regional NRM boards:

- strategic management of pest species in their region, in accordance with their own plans
- cooperating with the state government in implementing the Biosecurity Strategy for South Australia
- proposing the declaration of pest plants and animals, including consultation
- ensuring landholders comply with requirements to control new incursions and existing pests in accordance with the NRM Act.

To strategically manage pests in the Region, the Board has developed the *SA MDB NRM Board Regional Pest Management Plan 2008* which:

- identifies the assets and land uses within the Region threatened by impacts of pests
- identifies and prioritises relevant pest plants and animals for management action (including overabundant species)
- highlights knowledge gaps to be addressed over the life of the Regional Pest Management Plan.

A copy of the Regional Pest Management Plan can obtained from the Board's head office.

The Regional Pest Management Plan is also consistent with the draft South Australian Biosecurity Strategy, which was released in 2008. Operational plans being developed at the NRM Group level for management of the Region's pest plants and animals will complement many of the actions defined in the Biosecurity Strategy. These operational plans may also provide information on the risk of pests, which will assist future decisions regarding the 'declaration' of species.

This Regulatory and Policy Framework aims to provide the Board's policy for the control of the Region's pest plants and animals through firstly ensuring landholders are well informed and willing to be involved in pest management; and secondly, that landholders comply with the requirements to control pests in accordance with the NRM Act.

3.2 | Principles

The following principles underpin pest animal and plant management in the Region.

- Recognise that the protection of natural ecosystems, communities and industries from environmental, social and economic impacts by the management of invasive species is essential for the benefit of current and future generations.
- Create genuine partnerships that offer engagement at all levels of community, industry and government, by respecting the needs and knowledge of those people on the ground who are critical to achieving effective pest plant and animal control.
- Encourage landowners (private and public) to manage and develop natural resources as part of their duty of care and to ensure that management of pest species is a primary focus.
- Integrate effective and ecologically sustainable pest species management into all NRM planning and decision-making essential to protecting the environmental, social and economic values of natural resources, including the values of primary production and public health and safety.
- Involve industry, land owners and community in the development of policy and plans to manage pest plants and animals that threaten—or may threaten—primary industries, natural ecosystems and public safety.
- Proactively manage invasive species by cost-effective prevention through early detection and rapid response to incursions.
- Follow a strategic approach that focuses on the pests themselves and manages the actual—rather than the perceived—impacts of pest species, based on management decisions developed through a framework of risk assessment and risk management.
- Establish standards of best practice, based on research, experienced animal welfare considerations and other statutory requirements that pest species management must comply with.

3.3 | Prioritisation of pest management

The continued introduction of new pests and the risk of rapid spread of serious pests affect the Region and its community in a number of ways. Weed infestations and pest animals will invariably cross property and regional boundaries, necessitating a cooperative coordinated approach for effective management. In addition to increasing effectiveness, working in partnership with others reduces the overall cost of controlling pests by facilitating resource sharing.

Proactive management of invasive species by prevention, early detection and rapid response to incursions is most cost-effective and, as such, decisions about pest species management must be based on a framework of risk assessment and risk management. This requires a strategic approach that focuses on the pests themselves and manages the actual, rather than the perceived, impacts.

The first step in tackling the threat of new pest incursions is to assess and review the status of the pest utilising the SA Pest Risk Management System. This ensures that the Board and the community have updated information on the potential new threats, which will ultimately help to identify the highest priority threats and therefore plan the most cost-effective programs for the area.

The SA Pest Risk Management System has been used to develop the Regional Pest Management Plan, which was adopted by the Board in 2007.

Pests that have been listed as suggested regional priorities have been assessed at the local level for each of the NRM group regions. Priorities were accurately defined using the SA Pest Risk Management System based on pest risk, feasibility of containment and for general land use classifications. Table 3 and Table 4 show the current pest plant and pest animals priorities for the Region and their place in the hierarchy of management controls.

The pest species assessed for the Region have been categorised into the following hierarchy of management principles and actions (based on the SA Pest Risk Management System).

3.3.1 | Alert

Aims to prevent the species arriving and establishing in the Region (e.g. Serrated Tussock infestations in NSW not yet recorded in SA) through:

- prevention of entry to Region
- ongoing surveillance for incursions of the species
- training and awareness activities for the community to enable early detection.

3.3.2 | Eradicate from Region

Aims to remove the pest species from the Region (e.g. Branched Broomrape) through:

- detailed surveillance and mapping to locate all infestations/populations
- destruction of all infestations/populations
- prevention of entry to Region and keeping/movement and sale within
- a direction to the public that they must not grow pest species and that all cultivated pest plants must removed
- monitoring progress towards eradication.

3.3.3 | Destroy infestations

Aims to significantly reduce the extent of the pest species in the Region (e.g. Bridal Veil) through:

- detailed surveillance and mapping to locate all infestations/populations
- destruction of all infestations/populations, aiming for local eradication at feasible sites
- prevention of entry to Region and keeping, movement and sale within
- a direction to the public that they must not grow pest species
- the consideration of quarantine provisions (in the case of pest animals)
- monitoring progress towards reduction.

3.3.4 | Contain spread

Aims to prevent the ongoing spread of the pest species in the Region (e.g. Wheel Cactus) through:

- surveillance and mapping to locate all infested properties
- control/enforce control of all infestations/populations, aiming for a significant reduction in pest density
- prevention of entry to Region and movement and sale within (in the case of pest plants)
- possible control of entry, movement and keeping under permit conditions (in the case of pest animals)
- a direction to the public that they must not allow pest plants to spread from cultivated plants (if grown)
- monitoring change in current distribution.

3.3.5 | Protect sites

Aims to prevent spread of the pest species (e.g. African Boxthorn) to key sites/assets of high economic, environmental or social value through:

- pest may be of limited current distribution but only threatens limited industries/habitats (lower pest risk). Or the pest may be more widespread but is yet to invade/impact upon many key sub-regional industries/habitats (higher pest risk)
- surveillance and mapping to locate all infested sub-regions
- identification of key sites/assets in the Region
- control/enforce control of infestations/populations in close proximity to key sites/assets, aiming for a significant reduction in pest density
- limits on movement and sale of species within Region (in the case of pest plants)
- a direction to the public that they must not allow spread from cultivated pest plants (if grown) in close proximity to key sites/assets
- possible control of entry, movement and keeping under permit conditions (in the case of pest animals)
- monitor change in current distribution within and in close proximity to key sites/assets.

3.3.6 | Manage pest population

Aims to reduce the overall economic, environmental and/or social impacts of the pest species through targeted management (e.g. Bridal Creeper) through:

- research and development of integrated pest/weed management (IWM/IPM) packages for the species including chemical/herbicide, biological and cultural control where feasible
- promotion of integrated pest/weed management (IWM/IPM) packages to landholders
- monitoring decrease in pest impacts with improved management
- identifying key sites/assets in the Region and ensure adequate resourcing to manage weed species.

3.3.7 | Manage sites

Aims to maintain the overall economic, environmental and/or social value of key sites/assets through improved general pest management (e.g. Caltrop) by:

- promoting general IPM/IWM principles to landholders, including the range of control techniques, maintaining competitive vegetation/crops/pastures, farm management practices, hygiene and property management plans
- identifying key sites/assets in the Region and ensure adequate resourcing to manage these to maintain their values
- broadening focus beyond weeds/pest animals to all threatening processes.

3.3.8 | Monitor

Aims to detect any significant changes in the species pest risk including increases or decreases in pest density and subsequent impacts on agricultural productivity, biodiversity assets and public safety (e.g. Gazania) by monitoring the spread of the species and reviewing any perceived changes in weediness/pest animal invasiveness

3.4 | Why do we declare plants and animals?

Government intervention in pest animal and plant control via legislation becomes necessary where individual landholders are unable or unwilling to control the pest animal or plant to a level that prevents its spread and has negative impacts on surrounding landholders and the wider community.

If a pest is already widespread or not spreading at all, then the decision on whether to control a pest animal and what level of control to apply is solely the responsibility of the individual landholder. If, however, a pest is spreading from one landholder's property to other areas where it is causing negative impacts, then the control has fallen below the socially-acceptable level (called 'market failure'). This is the point at which government intervention is required and the Minister may 'declare' the provisions that require a landholder to take action to destroy or control an animal or plant.

Government intervention through declaration of a species may also be required to stop the sale, movement, keeping or release of an animal or plant that is a potential threat to natural systems, communities and industry. These threats include potential environmental, social and economic impacts.

A 'declared animal or plant' is any animal or plant that is made subject to any of the provisions of the NRM Act 2004. Potentially, any animal or plant can be declared under the NRM Act. However, the NRM Act defines that:

Animal means a live vertebrate or invertebrate animal and includes the eggs or semen of such an animal, but does not include any animal of a class excluded from the ambit of this definition by the regulations.

Plant means vegetation of any species and includes the seeds and any part of any such vegetation, or any other form of plant material, but does not include any vegetation or material excluded from the ambit of this definition by the regulations.

Native animal means a protected animal within the meaning of the National Parks and Wildlife Act 1972 and any species included in Schedule 10 of that Act, but does not include a dingo or any other animal of a class excluded from the ambit of this definition by the regulations.

It should be noted that native animals (as defined above) cannot be declared unless the declaration is supported by the State NRM Plan or a regional NRM plan.

Animal and Plant Control Regulations will apply to any live vertebrate animal (mammal, bird, reptile or amphibian) of any species, but will exclude fish and invertebrates.

3.5 | How are animals and plants declared?

The relevant Minister may, by notice in the Gazette, declare that specific provisions (keeping, movement, sale etc.) of the NRM Act shall apply to particular animals and plants. This allows animals and plants to be allocated, for convenience, into classes to which different provisions of the NRM Act apply and may be declared for whole or parts of the state.

The Minister can, by declaration, also assign each Class of animals and plants to categories that may attract different levels of penalties.

Established risk assessment criteria will be used to advise the Minister on which provisions (and therefore the nature of restriction) that will apply to individual species based on their current or potential threat to agriculture, the environment or public safety.

The relevant Minister may by notice in the Gazette vary or revoke a declaration.

Declared pests are grouped into numerous classes according to the various provisions of the NRM Act. These are generalised groupings. Several different provisions of the NRM Act can apply to the same class of declared pests.

A generalisation of the declared plant classes is as follows:

- class 1—generally requiring notification and destruction of the plant throughout the whole state (although, sometimes only control in part of the state)
- class 2 and 4—generally requiring notification in at least part of the state and control of the plant throughout the whole state
- class 3, 5 and 7—generally requiring control of the plant in part of the state
- class 6, 8 and 9—special provisions apply
- class 10 and 11—restricting sale only
- class 12—enforced control along watercourses in the pastoral zones.

Further information, including the SA list of declared pests, can be found by contacting DWLBC, Animal and Plant Control Group. The declared pests found in the SA MDB NRM Region (as at 1 October 2008) are listed in Table 3 (see page 38). Those species that have been deemed a priority through the Regional Pest Management Plan, but are not declared, are also identified in Table 3.

3.6 | Managing the risk from declared animals and plants

The following sections of the NRM Act relate specifically to the prevention or control of impacts caused by pest species of animals and plants that may have an adverse effect on the environment, primary production or the community. This section is intended to provide a guide to the relevant sections of the NRM Act and is not intended to be a substitute for the NRM Act. Certain sections include reserve

powers of the NRM Act and as a result may or may not be gazetted for implementation by the Minister at this time.

3.6.1 | Section 175 (Movement)

Subsection 1 prohibits the general movement of a declared animal and plant into a control area.

Subsection 2 prohibits the movements of any animal, plant, soil, vehicle, farming implement or other produce, goods, material or thing carrying a declared plant along a public road.

Subsection 3 prohibits the movement of any animal, plants, soil, vehicle, farming implement or other produce, goods, material or thing carrying a declared plant of that class from one part of the land to another part of that land and that is not affected or infested with animals or plants of that class, or to any land within the control area.

Subsection 4 gives a defence if the movements are under the terms of a written approval given by the authorised NRM officer; or the movement was not the result of a willful or negligent act or admission on the defendant's part.

3.6.2 | Section 176 (Possession)

Subsection 1 prohibits a person keeping or possessing a declared animal.

Subsection 2 prohibits a person from possessing a declared plant.

Subsection 3 states that if a person allows a plant to grow or cultivates it then it is taken that the person is in possession of the declared plant under (2).

3.6.3 | Section 177 (Sale)

Subsection 1 prohibits a person from selling a declared animal or plant of a class.

Subsection 2 prohibits a person from selling any animal, plant, soil, vehicle, farming implement or other produce, goods, material or thing carrying a declared plant of a class.

Subsection 3 gives a defence if the sale under (2) and (3) are under the terms of a written approval given by an authorised NRMofficer; or the movement was not the result of a willful or negligent act or omission on the defendant's part.

3.6.4 | Section 178 (Sale of contaminated items)

This provision provides the platform for the introduction of a Vendor Declaration System whereby vendors must give notice of the presence of a particular declared plant to the purchaser.

Subsection 1 states a person must not sell any animal, plant, soil, vehicle, farming implement or other produce, goods or materials that contain or are carrying a declared plant of a class to which this subsection applies without first giving notice of the presence of the particular declared plant to the purchaser in the manner set out in the regulations.

3.6.5 | Section 179 (Offence to release animals or plants)

The intent of this provision is to prohibit the willful or negligent release of a declared animal or plant. Whilst this provision will be listed by declaration for all non-indigenous vertebrate animals it is most likely to only be used against a significant willful act or gross negligence (e.g. deliberate release of deer).

3.6.6 | Section 180 (Notification of the presence of animals and plants)

This provision requires landholders to notify the Board, within a specified time period, if they become aware of the presence of a specific declared animal or plant that has been classed as a notifiable pest.

3.6.7 | Section 181 (Requirement to control certain animals and plants)

This requires a person to comply with any instructions issued by an authorised NRM officer (on a form approved by the Minister) to keep an animal in captivity or to keep a plant within the boundaries of land owned by the person.

3.6.8 | Section 187 (Ability to control or quarantine any animal or plant)

A notice under this section may prohibit or restrict the movement from or within the quarantine area of any declared animal or plant of a specified kind, any soil, vehicle, farm implement or other produce, goods, material or thing of a specified kind.

3.7 | Enforcing a landholder's responsibility to control declared animals and plants

The following sections of the NRM Act relate to the obligations of landholders in controlling declared pest species.

3.7.1 | Section 182 (Owner to take action to destroy or control animals or plants)

This section outlines a landholder's responsibility to destroy, control, or take prescribed measures against a declared animal or plant.

3.7.2 | Section 183 (Requirement to implement an action plan)

This section empowers authorised NRM officers to require an owner to prepare an action plan to remedy a breach of section 182, such as an infestation of declared plants or animals.

3.7.3 | Section 184 (Native animals)

Under this section, a protection order or notice to prepare an action plan can only apply to a native animal if a State Authorised Officer issues the order or notice.

3.7.4 | Section 193 (Securing compliance)

This section empowers authorised NRM officers to require a person to destroy or control priority declared animals or plants.

3.8 | Animal and plant control on road reserves

The Board has the responsibility under section 182 of the NRM Act to control Declared Weeds and Animals on road reserves and has the ability to recover costs of this work from the adjoining landowners under section 185 of the NRM Act.

For practical purposes, landowners should have an opportunity to be able conduct control programs on roadsides so long as they comply with the legal implications and best practice guidelines so that the liability risk is appropriately managed and that the native vegetation is preserved in line with Council guidelines.

Therefore, any landowner that intends to undertake their own control of declared pests on road reserves must obtain authority from their local Council and must comply with any conditions imposed as part of that authorisation. (Note that under section 221 of the Local Government Act it is illegal for land owners to interfere with or remove vegetation without such authorisation.)

It is advisable that the landowner notify the Board of any control work they complete on the road reserve in order to avoid double treatment of the same land. If they fail to notify, they may be liable for the costs of any unnecessary work carried out by the Board.

3.9 | Landholder cooperation

People are the key to successful pest management and therefore the aim is to continue to develop a network of enthusiastic, motivated people controlling pests at all levels of community, industry and government. These people are a valuable source of expertise, identifying issues, developing projects and getting the job done.

Gaining the cooperation of landholders using a combination of educative tools, property visits and advice notices are preferred methods, as better sustainable outcomes can be achieved if the landholder is fully engaged in the proposed control programs.

However, if there is a demonstrated history of unsatisfactory cooperation by the landholder and the declared pest plant or animal is seen as a priority in respect to control or destruction by the Board, then a compliance process should proceed.

3.10 | Compliance process guidelines

These guidelines outline what is generally required to achieve cooperation with a landholder or, failing that, to commence enforcement procedures to gain satisfactory control measures as outlined in the Board policies. A diagram showing the basic compliance process is described in Figure 6.

Due to biological differences that occur between declared plants and seasonal variations that can impact on control timeframes, the guidelines have been focused on the issue of action plans or protection orders. Action plans are more suited to pests that can afford longer control timeframes for optimum control (allow a minimum timeframe of at least six weeks) or a control program staged over a number of seasons.

Protection Orders may enable an opportunity for shorter term control options; however, they should only be used where:

- the breach or likely breach is having or is likely to have an impact on the natural resource that is more than minor, or is unknown or where the impact is ongoing
- the nature and extent of the action required to secure compliance will need more than a minor level of on-going supervision and review
- the likely impact of the breach is such that a level of deterrence is necessary
- the conduct of the landholder in breach indicates a lower level of commitment or capacity to avoid future or on-going breaches and reduced likelihood of achieving voluntary compliance.

3.11 | Protection order or enforcement of an action plan

The serving of a Protection Order or enforcement of an action plan should not commence without gaining approval from the General Manager of the Board or a State Authorised Officer.

This process is to ensure that:

- the landholder details are correct and exact.
- the procedures have been followed in line with the NRM Act and the regional NRM plan.
- it is appropriate and proportional to the contravention.
- the process is transparent and conducted fairly, consistently and equitably, and in accordance with the NRM Act.

A trivial breach of the NRM Act should not attract any enforcement action.

A trivial breach is one which meets all of the following criteria:

- there is no harm to natural resources, and no potential for harm
- the breach is a result of a reasonable oversight or out of the reasonable control of the person
- the breach can be easily, and is, rectified
- the offender has no history of breaching the NRM Act.

Figure 6: SA MDB's pest animal and plant control compliance process

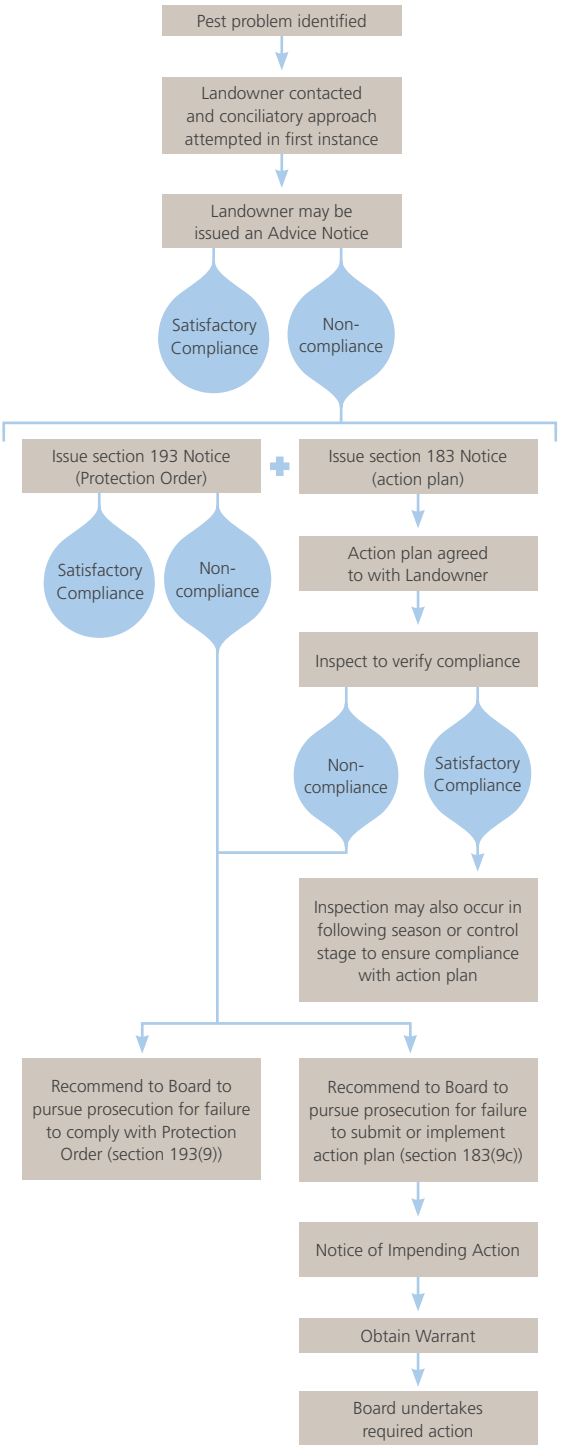

Table 3: Declared and non-declared priority pest plants of the Region assessed against the State Risk Assessment Framework for each NRM Group area for general land use classifications

	Ranges to River	Mallee & Coorong	Rangelands[8]	Riverland
Eradicate from Region				
Alligator weed (*Alternanthera philoxeroides)* Alert	x	x		x
Arrowhead (*Sagittaria montevidensis)* Alert	x	x		x
Broomrapes (*Orabanche* spp.)—except *O. australiana*—Alert	x	x	x	x
Salvinia (*Salvinia molesta)* Alert	x	x		x
Water hyacinth (*Eichhornia crassipes)* Alert	x	x		x
Destroy infestations				
Alkali sida (*Malvella leprosa*)	x	x	x	x
Bridal veil (*Asparagus declinatus*) Alert	x	x	x	x
Cabomba (*Cabomba caroliniana*) Alert	x	x		x
Coolatai grass (*Hyparrhenia hirta*)	x	x	x	x
Creeping knapweed (*Acroptilon repens*)			x	
Khaki weed (*Alternanthera pungens*)	x	x		
Mexican feathergrass/needlegrass (*Nasella tenuissima*/spp.) Alert	x	x	x	x
Primrose willow (*Ludwigia peruviana*)	x	x		x
Serrated tussock (*Nasella trichotoma*) Alert	x	x	x	x
Texas needlegrass (*Nasella leuchotricha*) Alert	x	x	x	x
Three-horned bedstraw (*Galium tricornutum*)			x	
Contain spread				
Aleppo pine—not declared—(*Pinus halepensis*)	x	x	x, c&p	x
African rue (*Peganum harmala*)	x	x	x	x
Giant reed—not declared—(*Arundo donax*)	x	x		x
Calomba daisy (*Oncosiphon suffruticosum*)	x	x	x	x
Cut-leaf mignonette (*Reseda lutea*)	x	x	x	x
Creeping knapweed (*Acroptilon repens*)	x	x		x
Desert ash—not declared—(*Franxius* spp.)				x
Golden dodder (*Cuscuta campestris*)	x	x	x	x
Poison buttercup (*Ranunculus sceleratus*)	x	x		x
Perennial ragweed (*Ambrosia* spp.)				x
Tamarix—not declared—(*Tamarix ramosisima*)				x
Wheel cactus (*Opuntia robusta*)	x	x	x, g	x
Willows—seeding—(*Salix* spp.)				x
Protect sites				
African boxthorn (*Lycium ferocissimum*)	x	x	x	x
Athel pine (*Tamarix aphylla*)			x	
Boneseed (*Chrysanthemoides monilifera)*	x	x		x
Buffalo burr—not declared—(*Solanum rostratum)*			x	
Cape Tulip—one leaf, two leaf—(*Moraea flaccida, Moraea miniata)*	x	x		
Dog rose/Sweet briar (*Rosa canina, Rosa rubiginosa)*			x	
English/Scotch broom, Cape broom (*Cytisus scoparius, Genista monspessulana*)	x	x		

8. Rangelands area is split into two zones: g = grazing and c&p = crop pasture areas).

Table 3: Declared and non-declared priority pest plants of the Region assessed against the State Risk Assessment Framework for each NRM Group area for general land use classifications (continued)

	Ranges to River	Mallee & Coorong	Rangelands	Riverland
Khaki weed (*Alternanthera pungens*)			x	x
Lincoln weed (*Diplotaxis tenuifolia*)	x			x
Olive (*Olea europaea)*	x	x	x, c&p	x
Pepper tree—not declared—(*Schinus molle)*			x	
Silverleaf nightshade (*Solanum elaeagnifolium*)	x	x	x, c&p	
Slender thistle (*Carduus tenuiflorus)*			x, c&p	
Soldier thistle (*Picnomon acarna)*			x, c&p	
Wheel cactus (*Opuntia robusta)*			x, c&p	
Manage weed				
Bridal creeper (*Asparagus asparagoides)*	x	x	x	x
Blackberry (*Rubus fruticosus* sp. agg.)	x	x		
Boneseed (*Chrysanthemoides monilifera)*	x	x		x
Cape Tulip—one leaf, two leaf—(*Moraea flaccida, Moraea miniata*)			x	x
Golden dodder—native vegetation—(*Cuscuta campestris)*	x	x	x	x
Horehound (*Marrubium vulgare)*	x	x		x
Innocent weed (*Cenchrus incertus, Cenchrus longispinus)*				x
Salvation jane (*Echium plantagineum*)	x	x		
Silverleaf nightshade (*Solanum elaeagnifolium*)	x	x	x	x
Skeleton weed (*Chondrilla juncea)*		x	x,c&p	
Three-corner jack (*Emex* spp. [*australis*])			x	
Three-horned bedstraw (*Galium tricornutum*)	x	x		x
Yellow burrweed (*Amsinckia* spp.)	x	x		
Manage sites				
African lovegrass (*Eragrostis curvula)*	x	x	x	x
Athel pine (*Tamarix aphylla)*			x	x
Bathurst burr (*Xanthium spinosum*)				x
Blackberry (*Rubus fruticosus* sp. agg.)				
Bladder campion (*Silene vulgaris)*	x	x		
Boneseed (*Chrysanthemoides monilifera)*		x		
Buffalo burr—not declared—(*Solanum rostratum)*			x	x
Caltrop (*Tribulus terrestis)*	x	x	x	x
Cape/Montpellier broom (*Genista monspessulana)*	x	x		
Cutleaf mignonette (*Reseda lutea*)			x, g	x
Dog rose/Sweet briar (*Rosa canini, Rosa rubiginosa)*				x
English/Scotch broom (*Cytisus scoparius)*	x	x		
Gorse/Furze (*Ulex europaeus)*	x	x	x	
Hoary cress (*Cardaria draba*)		x		
Horehound (*Marrubium vulgare)*			x	
Innocent weed (*Cenchrus incertus, Cenchrus longispinus)*	x	x	x	
Lincoln weed (*Diplotaxis tenuifolia)*		x	x	
Noogoora burr—complex—including California burr—(*Xanthium strumarium* sp. agg.)	x	x	x, g	x

Table 3: Declared and non-declared priority pest plants of the Region assessed against the State Risk Assessment Framework for each NRM Group area for general land use classifications (continued)

	Ranges to River	Mallee & Coorong	Rangelands	Riverland
Onion weed (*Asphodelus fistulosus)*			x, c&p	
Pepper tree—not declared—(*Shinus molle)*			x	
Salvation jane (*Echium plantagineum)*		x		
Slender thistle (*Carduus tenuiflorus)*			x	
Soldier thistle (*Picnomon acarna)*			x	
Spiny rush—not declared—(*Juncus acutus)*	x	x		x
Three-corner jack (*Emex* spp. [*australis*])			x	
Wild artichoke (*Cynara cardunculus)*			x	
Wild radish—not declared—(*Raphanus raphanistrum)*			x	
Yellow burr-weed (*Amsinckia* spp.)			x	x
Monitor				
Aleppo pine (*Pinus halepensis)*			x, g	
Bathurst burr (*Xanthium spinosum)*			x, g	
Dog rose/Sweet briar (*Rosa canini, Rosa rubiginosa)*	x	x		
False caper (*Euphorbia terracina)*	x	x	x	x
Gazanias—not declared—(*Gazania linearis)*			x	x
Onion weed (*Asphodelus fistulosus)*			x, g	
Olive (*Olea europaea)*			x, g	
Skeleton weed (*Chondrilla juncea)*			x, g	
Soldier thistle (*Picnomon acarna)*			x	
Spiny rush—not declared—(*Juncus acutus)*		x		
Thorn apple—not declared—(*Datura stramonium)*			x	
Water dropwort (*Oenanthe pimpinelloides)*	x	x		
Wild artichoke (*Cynara cardunculus)*	x	x		x

Table 4: Management guidelines for all declared priority pest animals of the Region assessed against the State Risk Assessment Framework for each land use classification

	Land use						
Pest animal	Crop/pasture	Forestry	Native vegetation	Non-arable	Perennial horticulture	Urban	Aquatic
Wild dog (Dingo)	Protect sites	Protect sites	Contain	Contain	Protect sites	Manage sites	Protect sites
Rabbit	Manage pest	Manage sites	Manage pest	Manage pest	Manage sites	Manage sites	Manage sites
Fox	Manage pest	Manage pest	Manage pest	Manage pest	Manage pest	Manage pest	Manage pest
Goats	Protect sites	Manage pest	Manage pest	Manage pest	Protect sites	N/A	Manage pest
Pigs	Destroy	Destroy	Destroy	Eradicate	Eradicate	N/A	Eradicate
Deer	Protect sites	Contain	Contain	Contain	Protect sites	N/A	Contain
Feral cats	N/A	N/A	Manage sites	N/A	N/A	Manage sites	N/A

4. Management and protection of land

Land management in the Region

Under the NRM Act, the South Australian Murray-Darling Basin Natural Resources Management Board (SA MDB NRM Board) is the 'relevant authority' for the management and protection of land (Sec.121a). The aim of this Regulatory and Policy Framework is to provide clarity to land managers in regards to the Board's approach to exercising its powers under section 122 of the NRM Act.

Under section 123 of the NRM Act, the Board can require a landowner to prepare an action plan if it considers:

a. that an owner of land has been, is, or is likely to be, in breach of the general statutory duty on account of land management practices or activities undertaken in relation to land for which the owner is responsible
b. that those practices or activities have resulted in, or could reasonably be expected to result in, unreasonable degradation of land or an unreasonable risk of degradation of land.

Under the NRM Act (section 121):

> *Degradation of land means any change in the quality of land, or any loss of soil, that has an adverse effect on water, native vegetation or other natural resources associated with, or reliant on, land, any other aspect of the environment, or biological diversity.*

Also under section 122 of the NRM Act, before taking action the Board must consider any relevant provisions of the regional NRM plan (as set out within this section).

4.1 | Background

Legislation for the control of land management previously existed through the repealed *Soil Conservation and Land Care Act 1989*. Land management is now controlled predominantly through the NRM Act, integrated with other natural resources management issues. Land management issues in the rangeland areas of the Region are also regulated through the *Pastoral Land Management and Conservation Act 1989*.

Land management is a complex issue in the Region given the diverse range of landscapes, current land uses and changing land use and land management practices.

Climate variability, market forces and other events also influence land management practices across the Region. Land degradation can be caused by events beyond the control of the landowner.

To enable the Board to appropriately resource this and other roles under the NRM Act, the NRM Team Leader (Land Management) and authorised NRM officers will have the following land conservation roles:

- the role of the NRM Team Leader (Land Management) is to ensure the Board's legislative responsibilities are carried out in a manner consistent with the NRM Act, identify and monitor breaches or potential breaches of the NRM Act, liaise with landowners, collect site information and maintain all site records
- authorised NRM officers identify and report potential breaches of the NRM Act and monitor sites where breaches or potential breaches of the NRM Act have been identified.

4.2 | Land management objectives and principles

The Board's objectives for land management are to prevent land degradation, minimise the risk of land degradation and ensure that soil and land resources are used sustainably.

In achieving these objectives and exercising its powers under section 122 of the NRM Act, the Board will be guided by the following land management principles:

1. all land should be managed within its capability
2. land management systems and practices should aim to assess and minimise the risk of land degradation
3. prevention of land degradation is preferable to rehabilitation
4. off-site impacts of land degradation must be minimised
5. land management strategies may need to adapt to changing land capability resulting from climate variability
6. land management systems and practises should aim to deal with causes, not symptoms, of land degradation
7. degraded land should be rehabilitated where this is technologically feasible and justified on social, economic and environmental grounds.

4.3 | Policy guidelines for the protection and management of land

The following Regulatory and Policy Framework outlines the Board's policy guidelines that meet the legislative responsibilities with regard to land management in accordance with the NRM Act.

4.3.1 | General guidelines

The following general guidelines will apply before the Board issues a notice for a landholder to prepare an action plan (under section 123).

- Determine whether the land degradation or high risk of degradation is an isolated event or more widespread in the district.
- When a land degradation problem is noticed, establish whether the problem is due to management or due to extraneous events.
- Determine if the condition or circumstance existed before the operational commencement of the NRM Act (1 July 2005).
- Determine whether the land degradation or high risk of degradation is due to land management practices or activities for which the landowner is responsible, whether the management was inappropriate and any remedial action taken.
- Consider the issues that may be contributing to the land degradation problem.
- Attempt to resolve the problem through the landowner taking voluntary action before imposing a requirement to prepare an action plan.
- Compliance process commences when all other options for voluntary action have been exhausted.
- Impose the requirement to prepare an action plan if the problem cannot be resolved through the landowner taking voluntary action.

Step 1: Potential breach: complaint received or issue identified

The NRM Team Leader (Land Management) and authorised NRM officers have been assigned the responsibility to identify and report land degradation or land at risk of degradation. Members of the community are also able to lodge a complaint with the same process for all reports received. The identity of the person lodging the complaint, the incident report and all actions taken are confidential.

When the NRM Team Leader (Land Management) receives information of a potential land degradation issue, an 'Incident Report – Land Degradation' is completed to assist with determining the appropriate action to be taken.

The NRM Team Leader (Land Management) then conducts a drive-by visit to assess the potential breach, considering the above general principles and the following criteria:

- land cover/disturbance assessment
- best district practice
- seasonal conditions
- magnitude of the problem (i.e. is the problem widespread involving a number of landholders, over a large area of land or a small, isolated, 'one-off' event).

If the information received is validated the NRM Team Leader (Land Management) contacts the landowner to:

- introduce the Board as the relevant authority
- advise the landowner that a land degradation issue has been identified
- arrange a time for a property visit to discuss the issue.

Step 2: Negotiate with landholder to encourage voluntary action

Negotiations regarding voluntary actions as stipulated under the NRM Act (section 122(3)) commence at the time of the initial property visit. During the visit, a site assessment is made and information collected on the Site Assessment Report.

If it is determined that a breach of statutory duty has occurred (under section 122(1)(a)) *and* that unreasonable land degradation or risk of degradation (under section 122(1)(b)) has also occurred the NRM Team Leader (Land Management) will hold discussions with the landholder to:

- ascertain whether the landowner is aware of the problem and assess their attitude towards the problem
- ask the landowner what actions they intend to undertake to address the problem to prevent a recurrence, and determine the feasibility of these
- suggest any alternative ways the problem could be addressed not identified by the landowner.

During the property visit the NRM Team Leader (Land Management) and authorised NRM officer establish the nature, scale and urgency of the problem to determine the range and immediacy of actions required.

Within seven (7) days of the visit, the NRM Team Leader (Land Management) sends an Advice Letter and Reply Form to the landowner outlining the agreed actions to address the land degradation as discussed during the property visit.

The landowner is given the opportunity to confirm that the stated outcomes and actions are consistent with the discussions held during the property visit via the Reply Form. The landowner is informed that their actions will be monitored.

Step 3: Monitoring

The NRM Team Leader (Land Management) and/or authorised NRM officers undertake monitoring to ensure voluntary action is undertaken to address the land degradation issue. The monitoring process may require follow up contact with the landowner and visits to the property.

The NRM Team Leader (Land Management) holds the information documented by the authorised NRM officers on the actions taken by the landholder to address the land degradation. Regular updates on the progress of actions are given to the Regional NRM Group.

Step 4: Failure of the voluntary process (if applicable)

The voluntary process will be regarded as having failed when:

- the landholder has not achieved the desired outcomes as identified on the reply form with respect to the land degradation problem or risk of land degradation identified
- all reasonable steps to resolve the matter through voluntary action by the landowner have been taken.

The NRM Team Leader (Land Management) and the Operations Manager will inform the General Manager of the Board that the voluntary process to resolve the problem has failed. If accepted by the General Manager a notice is then issued to the landholder requiring them to prepare an action plan.

An action plan is prepared by the landowner and must set out in detail:

a. the measures the landowner proposes to take to address any breach of the general statutory duty, and to comply with the general statutory duty in the future
b. the periods within which those measures are proposed to be taken.

A breach of section 123 has occurred if an owner of the land fails to comply with a notice under this section or fails to implement an action plan in accordance with its terms.

If the landowner fails to implement an action plan in accordance with its terms, the Board has the authority to engage a suitably qualified person to devise and implement measures to address the problem. The Board also has the authority to recover costs for addressing those measures from the landowner. The landowner may also be liable for penalties.

While land management actions are primarily dealt with under Chapter 6 of the NRM Act—Management and protection of land—it is possible under the provisions of section 193 to issue a Protection Order or, under section 195, a Reparation Order, on the grounds that a breach of the general statutory duty (section 9) has occurred.

A Reparation Order (section 195) and Protection Order (section 193) allows action to be taken immediately. Under sections 195 and 193 the Board specifies to the landowner the remedial actions required to address the problem, with clear timeframes. If the requirements are not met, the Board is able to engage a person to undertake the required actions and recover the cost as a debt. If the debt is not recovered, the amount together with any interest charged can be registered against the title of the land (section 199(3)).

Figure 7 shows the process described above in simple form.

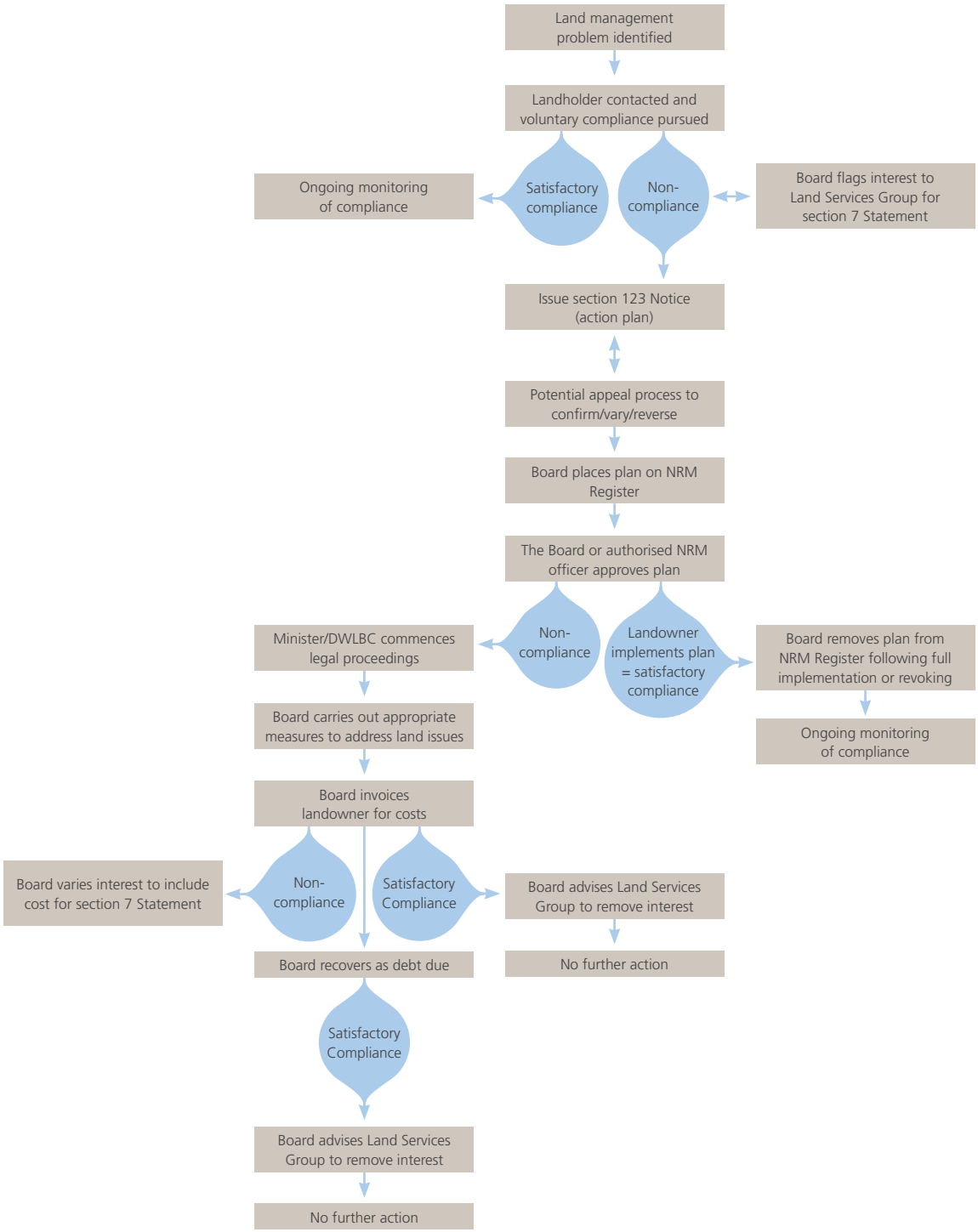

Figure 7: Board process for the management and protection of land (under the NRM Act section 121)

5. Legislation and development planning review

Consistency with legislation, policy and regulations

The NRM Act requires the regional NRM plan be consistent with relevant South Australian legislation, and to identify changes (if any) to Development Plans under the *Development Act 1993* considered by the South Australian Murray-Darling Basin Natural Resources Management Board (the SAMDB NRM Board) to be necessary or desirable in order to promote the objects of the NRM Act and the objects of the *River Murray Act 2003*.

5.1 | Consistency with other legislation

The regional NRM plan is consistent with the requirements of sections 75(4), 75(5) and 87 of the NRM Act which relate to relevant South Australian legislation.

Section 75(4) of the NRM Act requires:
'A plan should be consistent with the state NRM plan.'

Section 75(5) requires:
'A plan, when adopted, (and amendments made to a plan when adopted) should, as far as practicable, be consistent with:

a. any relevant management plan under the *Coast Protection Act 1972* and
b. any relevant Development Plan under the *Development Act 1993* (subject to any proposal to amend such a plan) and
c. any relevant environment protection policy under the *Environment Protection Act 1993* and
d. any relevant plan of management under the *National Parks and Wildlife Act 1972* and
e. the principles of clearance of native vegetation under the *Native Vegetation Act 1991* and any guidelines relating to the management of native vegetation adopted by the Native Vegetation Council under that Act and
f. any relevant policy relating to the administration or operation of a Mining Act published for the purposes of this Chapter by notice in the Gazette by the Minister for the time being administering that Act after consultation with the Minister administering this Act and
g. such other plans, policies, strategies or guidelines as are prescribed by the regulations.'

Section 87 requires:
'To the extent that a plan applies to the Murray-Darling Basin or in relation to the River Murray, the plan should:

a. seek to further the objects of the *River Murray Act 2003* and the Objectives for a Healthy River Murray under that Act and
b. be consistent with the terms or requirements of the Agreement approved under the *Murray-Darling Basin Act 1993*, and any relevant resolution of the Ministerial Council under that Agreement approved under that Act.'

5.2 | Local government policy alignment

5.2.1 | Context

The NRM Act requires that regional NRM plans identify policies in Development Plans under the Development Act that, in the opinion of the Board, be reviewed in order to promote the objects of the NRM Act or improve the relationship between policies in Development Plans and the Board's plan. The NRM Act also requires the Board to identify changes that, in the opinion of the Board, are necessary or desirable to any statutory instrument, plan or policy.

This section:

- identifies policy gaps in Development Plans and Strategic Management Plans
- identifies actions by which the Board and local and state government can better align NRM-related policy.

5.2.2 | Process of review and consultation

A desktop review of all regional councils' Development Plans and Strategic Management Plans was undertaken to broadly identify the policy issues requiring development, amendment or further examination.

Using the desktop review as the basis of discussion, fifteen member councils, the Department for Water Land and Biodiversity Conservation, the Department of Planning and Local Government (DPLG), and the Board were consulted about ways in which Development Plan and Strategic Planning Processes could better reflect NRM Objectives. The Region's 15 member councils are listed below:

- Adelaide Hills Council
- Alexandrina Council
- Barossa Council
- Berri Barmera Council
- Coorong Council
- Goyder District Council
- Karoonda East Murray Council
- Loxton Waikerie Council
- Mid Murray Council
- Mount Barker District Council
- Rural City of Murray Bridge
- City of Onkaparinga
- Renmark Paringa Council
- Southern Mallee Council
- Victor Harbor Council.

The location of the councils above is provided in Figure 5.

Of relevance to the review and consultation process was DPLG's development of a template for Development Plan format and content for adoption by all councils, known as the Better Development Plan (BDP) Process. The goal of the project is to create BDPs that provide greater certainty, consistency and ease of use for the community and industry. A range of policy modules have been developed as part of a general BDP library available to councils. The new structure also allows for the location of all relevant issues to be mapped and located together. At the time of review, only one council in the Region had undergone a conversion to the BDP format.

5.2.3 | Legislative context

The following sections of the NRM Act, Development Act and *Local Government Act 1993* relate to council Development Plans and Strategic Management Plans.

Natural Resources Management Act 2004

Section 75(3) of the NRM Act requires that:
'Regional NRM plans identify any policies reflected in a Development Plan under the Development Act that applies within its region that should, in the opinion of the board, be reviewed under that Act in order to promote the objects of this Act or to improve the relationship between the policies in the Development Plan and the policies reflected in the board's plan.'

Section 75(3)(fa) requires that:
'Regional NRM plans identify the changes (if any) considered by the board to be necessary or desirable to any other statutory instrument, plan or policy (including subordinate legislation) to promote the objects of this Act and, insofar as the plan may apply within a part of the Murray-Darling Basin, the objects of the *River Murray Act 2003* and the Objectives for a Healthy River Murray under that Act.'

Section 7(1) states:
'The objects of this Act include to assist in the achievement of ecologically sustainable development in the State by establishing an integrated scheme to promote the use and management of natural resources…'

Development Act 1993

Section 3 states:
'The objects of this Act are to provide for the proper, orderly and efficient planning and development of the state...'

Section 23(3) provides for the creation of Development Plans as the documents from which 'development' will be assessed. The Development Act and development regulations 2008 prescribe the matters Development Plans may address.

Section 37 provides for the referral of a Development Application to a state agency for specialist comments and, in some circumstances, direction.

Local Government Act 1999

Section 122 requires councils to prepare and adopt Strategic Management Plans for the management of its area.

Section 122(2) states that Strategic Management Plans:

a. should (as far as practicable) be consistent with the Planning Strategy and the Development Plan(s) for the council's area, and with other relevant statutory policies and plans; and
b. must comply with any requirement prescribed by the regulations.

5.2.4 | Summary of review findings—policy gaps

The following is a summary of findings from the review of council Development Plans and Strategic Management Plans.

NRM issues in Development Plans and Strategic Plans

In the Development Plans and Strategic Plans, some NRM issues are thoroughly discussed, while some are outlined in less detail.

Well-covered issues are detailed below.

- stormwater, water management and pollution
- lakes, coastal and estuarine—coastal ecosystems and erosion, cultural issues relating to coastal areas and sea level change
- native vegetation and reforestation/deforestation
- land erosion potential and alternative energy sources
- atmospheric noise pollution and diffuse pollution

Poorly-covered issues (with explanation) are detailed below.

Water allocation planning and WAAs

- Some Development Plans refer to specific WAAs such as the construction of dams or placement of structures within watercourses; however, this is in limited cases with the majority not mentioning the issue at all. Additonally, water allocation planning prescribed areas are generally not identified or covered by Development Plans.

Lakes, coastal and estuarine—marine parks

- For the few councils with coastal areas in the Region, marine parks are generally not adequately covered by the relevant Development Plans. This is generally due to the majority of marine parks being outside Development Plan boundaries, in addition to the fact that Marine Parks were not formally constituted under the Marine Parks Act until after the relevant Development Plans were most recently updated. In the future, councils should address the potential impact of development on neighboring marine parks in future amendments. Policy for these parks is currently being developed and implications for the assessment of development should eventually be incorporated into Development Plans.

Pests, overabundant native species and biosecurity

- There is good coverage of pest plant and animal species issues within three Development Plans. This is generally at the zone level (i.e. not necessarily covering the entire council area) and either in the context of olive plantation and management, or in relation to management of aquaculture facilities. The remainder of the Development Plans provide little coverage.
- Biosecurity is rarely mentioned across all Development Plans.

Dryland salinity expansion and land capability

- Dryland salinity expansion is mentioned in several plans, generally at the council-wide level. Other Development Plans do not mention the issue. Land capability is generally poorly covered given the importance of the issue in land use planning assessment. Those Development Plans that do make mention of the issue, do so fleetingly in relation to intensive animal-keeping activities and consideration of land division formats.

Adaptation to climate variation and greenhouse emissions

- Policies relating to greenhouse emissions are only given mention in relation to waste management facilities (via ministerial policy), and are generally not adequately considered for other forms of development.

Mapping in development plans

Most maps in Development Plans provide little or no mapping of key issues (such as water allocation planning areas, Environment Protection Act and *Biodiversity Conservation Act 1999* areas, ecologically significant areas, Ramsar areas, floodplain, River Murray tributaries, land capability, or stormwater infrastructure areas). This is despite the fact that Development Regulations require some issues to be considered in development assessment (for example River Murray tributaries and River Murray floodplain). Additionally, the existing maps, structure plans, concept plans and figures in Development Plans are sometimes difficult to find.

Definitions in development plans

Definitions of activities and of locations are important. They guide the development assessment process, referrals, timeframes for consultation, who is consulted, interpretation and relevance of certain policies, and level of compliance.

Definitions are provided in the *Development Act 1993*; however, additional definitions are provided in individual Development Plans, sometimes with a lack of consistency in meaning and how they are applied. There are also similar issues for definitions in other relevant legislation such as the NRM Act and *River Murray Act 2003*.

Strategic issues

The following issues were identified as relevant to achieving the alignment of NRM policy:

- councils are generally not developing Stormwater Management Plans, despite this being required by *Local Government (Stormwater Management) Amendment Act 2007*
- NRM Boards often lack understanding of council development assessment and strategic planning issues, and conversely councils often lack knowledge on existing and emerging NRM issues (such as climate change, dryland salinity and cumulative impacts of development)
- some councils currently informally refer applications to the Board for comment, advice and assistance. However, currently the Board has no formal involvement in the assessment process
- there is a high level of complexity and uncertainty about the relationship of referrals in relation to WAA, water allocation planning and regulated areas (for example, River Murray floodplain and tributaries).

5.2.5 | Alignment of natural resources management policy

The following actions have been identified to address policy gaps in Development Plans and Strategic Management Plans. Actions have been incorporated into the Strategic Plan and the Business Plan.

Development plans and strategic management plans

- Review the content of Better Development Plan modules to broaden the level of coverage of NRM issues.
  Lead: NRM Boards, NRM Council and the Department of Planning and Local Government
  Partners: LGA and DWLBC
- Develop advisory guidelines about a range of NRM issues that provide information to development applicants and Council staff, to assist development application and assessment.
  Lead: NRM Board and the Department of Planning and Local Government
  Partners: Councils and DWLBC
- Prepare policy that addresses climate change and sustainable tourism economies, and make recommendations for strategic policy and Council's strategic directions.
  Lead: Department of Premier and Cabinet (Sustainability and Climate Change Division), LGA
  Partners: Other state and local government agencies and councils
- Explore policy options for land division in relation to land capability and sustainable development.
  Lead: NRM Board and the Department of Planning and Local Government
  Partners: LGA and DWLBC
- Develop GIS maps of key NRM areas (including tributaries, floodplains, prescribed areas and Ramsar areas in the Schedules of the Development Act), and investigate ways of promoting their availability in Development Plans, to planning staff and the public.
  Lead: NRM Board and Local Government
  Partners: LGA and the Department of Planning and Local Government
- Develop consistent definitions in the Development Act, Development Plans and other relevant legislation (for example, River Murray Floodplain).
  Lead: NRM Council, the Department of Planning and Local Government and LGA
  Partners: NRM Board and councils

Strategic directions

- Develop a state government agency engagement strategy for NRM Boards.
  Lead: NRM Council and NRM Boards
  Partners: Other state government agencies
- Revise and continue implementation of the SAMDB NRM Board's 'Local Government NRM Engagement and Communication Plan'.
  Lead: NRM Board and local government
  Partners: LGA and NRM Council
- Improve local government NRM-related planning skills and access to advice.
  Lead: NRM Board
  Partners: DWLBC, LGA, the Department of Planning and Local Government and councils
- Implement a local government education and training program to improve NRM practice and knowledge.
  Lead: NRM Board
  Partners: the Department of Planning and Local Government, DWLBC, LGA, councils and PIRSA

- Develop local government sustainability action plans that link NRM-related strategic and corporate goals to specific actions, development planning and assessment, funding opportunities, budget cycles and resourcing drivers.

  Lead: State government and LGA

  Partners: NRM Council and local government
- Encourage and support the development of Stormwater Management Plans for local government, especially in regional areas

  Lead: Stormwater Management Authority

  Partners: The Department of Planning and Local Government, LGA, DWLBC, NRM Board and councils
- Investigate ways in which the Board can work more collaboratively with local government on development assessment and strategic planning issues.

  Lead: NRM Board

  Partners: DWLBC, the Department of Planning and Local Government and councils
- Investigate options to simplify the relationship between Water Allocation Planning decisions and development assessment decisions.

  Lead: NRM Board and DWLBC

  Partners: The Department of Planning and Local Government and LGA
- Investigate Land Management Agreements as a tool to facilitate improved environmental outcomes.

  Lead: NRM Boards, DWLBC and the Department of Planning and Local Government

  Partners: LGA and councils
- Maximise funding support available to local government for projects that help achieve regionally-endorsed NRM objectives, e.g. wastewater and stormwater reuse, watercourse and riparian rehabilitation.

  Lead: NRM Board, councils

  Partners: DWLBC, NRM Council.

Appendices

SAMDB NRM PLAN:
REGULATORY AND
POLICY FRAMEWORK

Appendix A: Glossary

Acid sulfate soils: the common name given to soils and sediments containing iron sulfides, the most common being pyrite. When exposed to air due to drainage or disturbance, these soils produce sulfuric acid, often releasing toxic quantities of iron, aluminium and heavy metals.

Adaptive management: a management approach, often used in NRM, where there is limited information, a lot of complexity, or both, and there is a need to implement some management changes sooner rather than later. It is an approach that involves learning from management actions, and using that learning to improve the next stage of management.

Agricultural zone: generally, areas south of Goyder's line with annual rainfall greater than 250 mm.

Allotment: has the same meaning as in the *Real Property Act 1886* and also includes two or more contiguous allotments owned or occupied by the same person and operated as a single unit.

Alternative water resources: include stormwater, wastewater, lower quality water (e.g. brackish groundwater) and seawater. Their productive use offers significant scope to provide social and economic benefits while helping to solve some environmental problems.

Annual exceedance probability (AEP): the probability that a given flow or rainfall event will be exceeded in any one year.

Aquatic ecosystems: an ecosystem located in a water body. The two main types are marine and freshwater ecosystems.

Aquifer: a layer of permeable rock, sand, or gravel through which groundwater flows and containing enough water to supply wells and springs.

Asset-based approach: an approach that provides a basis for the protection, rehabilitation and management of natural resources that the community believes to be important, such as biodiversity, water resources and agricultural land. Under this approach, NRM planning focuses on protecting the identified asset by addressing multiple threats to it at a regional level. It differs from ecosystem or geographic approaches to natural resources management which consider multiple threats to multiple assets but only on a localised scale.

Assets—see Natural resources.

Attractant flows: flows over the barrages that attract fish to the base of the barrage and which in turn lead fish to utilise the fishways.

Australian Height Datum (AHD): a measure of height above or below the mean sea level, as determined at thirty tide gauges around the continent.

Authorised officer: a person appointed to be a state authorised officer or a regional authorised officer under the NRM Act.

Average recurrence interval (ARI): the average value of the periods between exceedances of a given flow or rainfall event.

Baseline information: the known data, measured trends and the assessed status of a natural resource (e.g. water quality in a river) or of a social condition relevant to natural resources management (e.g. community knowledge of a threatened species and the required actions for its protection). Baseline information provides a 'baseline' by which the success or failure of our management actions can be assessed.

Biodiversity: the variety of life forms represented by plants, animals and other organisms and micro-organisms, the genes that they contain, and the ecosystems and ecosystem processes of which they form a part.

Bioregion: a territory defined by a combination of biological, social and geographic criteria rather than by geopolitical considerations. Generally refers to a system of related, interconnected ecosystems.

Biosequestration—see Carbon sequestration.

Biota: all living organisms in a given area, including fungi, bacteria and algae.

Black water: wastewater from toilets, containing faeces and urine.

Broad-hectare agricultural production: generally, commercial-scale cereal or grazing enterprises that are mostly reliant on rainfall (rather than irrigation) for plant production.

Carbon sequestration: the absorption of carbon dioxide from the atmosphere by living trees and vegetation.

Climate change sector agreement: an agreement between the Minister and a particular person, entity, industry or business group on a voluntary basis for the purpose of recognising, promoting or facilitating strategies to meet any target set under the *Climate Change and Greenhouse Emissions Reduction Act 2007*.

Coastal ecosystems: an ecosystem that is located in a coastal environment, bounded by the coastal land margin and the continental shelf. A coastal ecosystem may include dunes, sandy beaches, limestone cliffs, rocky shores, estuaries and lakes. Off shore it may include reefs, seagrass beds and upwellings.

Connectivity: the extent to which patches of similar or complementary ecosystems are connected for the purpose of animal movement, for plant and animal reproduction, and for supporting ecosystem resilience. Connectivity can be improved by establishing corridors and by providing protection from pests and predators.

Conservation action planning: localised planning focusing on habitat and ecosystem type at the landscape scale and incorporating monitoring, evaluation and science.

Conservation status: the listing of a taxon on state, Australian or international conservation lists according to the threat to its viability.

Constituent council: a council whose area, or part of whose area, comprises or is included in the region of a regional NRM board or an NRM group, as the case may be.

Contaminants (and indicators of contaminants): include, but are not limited to, nutrients, metals, biological organisms (for example, *E. coli*), temperature, dissolved oxygen, colour, turbidity, suspended sediments, leachate, hydrocarbons, and litter.

Control: in relation to a particular class of animals means: destroy the animals and their warrens, burrows, nests or harbours (whether occupied or not); reduce the extent to which land is inhabited or subject to infestation by the animals; or undertake any other prescribed action, as far as is reasonably achievable. In relation to a particular class of plants it means: destroy the plants; reduce and inhibit the propagation of the plants; prevent the spread of the plants; or undertake any other prescribed action, as far as is reasonably achievable. (Taken from the NRM Act).

Declared pest (animal or plant): a class of pest animals or plants declared for control purposes under Section 174 of the NRM Act. See Volume 3: Regulatory and Policy Framework, Section 3 for more information.

Desalination/reverse osmosis: a process that converts seawater or brackish water to fresh water or an otherwise more usable condition through removal of dissolved solids.

Desilting: the removal of unconsolidated material deposited in a dam since construction, or material deposited since the dam was previously desilted.

Detention basin: a pond or basin constructed for the temporary detention of water to provide time for suspended sediments and other heavy pollutants to settle before discharge into a watercourse, lake, or other water storage.

Domestic purpose (in relation to the taking of water): does not include taking water for the purpose of watering or irrigating more than 0.4 of a hectare of land; or taking water to be used in carrying on a business (except for the personal use of persons employed in the business). (Taken from the NRM Act).

Domestic wastewater: water used in the disposal of human waste; water used for personal washing; water used for washing clothes or dishes; and water used in a swimming pool.

Drainage caissons: man-made drainage sumps that collect shallow groundwater.

Drainage path: the path that surface water naturally flows along over land.

Drawdown: a drop in the level of a watertable as a result of the formation of a cone-shaped depression, caused by multiple wells pumping water from an aquifer at a withdrawal rate that exceeds the natural recharge rate.

Dryland agriculture: rain-fed agriculture, practised in areas where crop or pasture production is limited to that part of the year when rain falls.

Dryland salinity: the process whereby salts stored below the surface of the ground are brought close to the surface by the rising watertable. The accumulation of salt degrades the upper soil profile, with impacts on agriculture, infrastructure and the environment.

Ecological area: the five regional ecological areas differentiated by topography, geology and climate with distinctive vegetative cover and biodiversity conservation management issues in the SAMDB NRM Region.

Ecological communities: unique and naturally occurring groups of plants and animals.

Ecologically sustainable development (ESD): the use, conservation, development and enhancement of natural resources in a way, and at a rate, that will enable people and communities to provide for their economic, social and physical well-being, while still sustaining the potential of natural resources to meet the reasonably foreseeable needs of future generations; safeguarding the life-supporting capacities of natural resources; and avoiding, remedying or mitigating any adverse effects of activities on natural resources.

Ecosystem: a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Ecosystem services: the full suite of benefits that human populations gain from a particular type of ecosystem such as maintenance of climates; provision of clean water and air; pollination of crops and native vegetation; fulfilment of people's cultural, recreational, spiritual and intellectual needs; and provision of options for the future (for example, by maintaining biodiversity).

Effluent: domestic or industrial wastewater.

Electrical conductivity (EC): the measure of a solution's ability to conduct electricity. EC units are used as a measure of salinity levels in soil and water.

Endemic: a species that is native to, and restricted to, a particular geographical region. Highly endemic species are those with very restricted natural ranges; they are especially vulnerable to extinction if their natural habitat is eliminated or significantly disturbed.

Environmental flow: the share of water provided and managed for the environment to protect river health.

Environmental values: aspirations of the community in regard to the Region's natural resources.

Environmental water requirements: the water regime needed to sustain the ecological values of water-dependent ecosystems, including their processes and biological diversity, at a low level of risk.

Ephemeral flows: stream flows that only endure for a short time following a heavy rainfall event. The stream channels are often not well defined.

Ephemeral streams—see Wetlands.

Estuary: a partially enclosed coastal body of water that is permanently, periodically, intermittently or occasionally open to the sea within which there is a measurable variation in salinity due to the mixture of seawater with water derived from or under the land.

Floodplain: any area of land adjacent to a watercourse, lake or estuary that is periodically inundated with water and includes any other area designated as a floodplain by an NRM plan; or by a Development Plan under the *Development Act 1993*. (Taken from the NRM Act.)

Fluvial: the processes associated with rivers and streams, as well as the deposits and landforms created by them.

Geomorphic characteristics: features of a landform or landscape including, but not limited to, bed and banks of a watercourse, floodplain of a watercourse or lake, cliffs, soils, rocks and other mineral forms.

Global surface temperature: the area-weighted global average of (i) the sea surface temperature over the oceans (i.e. the sub-surface bulk temperature in the first few metres of the ocean), and (ii) the surface air temperature over land at 1.5m above the ground.

Goyder's Line: a boundary line across South Australia set in 1866 that follows a distinct change in the natural vegetation. To the south, it is composed mainly of mallee scrub whilst to the north, salt-bush. In general, the line represents the demarcation of a long-term average rainfall of 10 inches (254 mm) and indicates the reliable limit of land for agriculture (e.g. cropping).

Greenhouse signal: a greenhouse-induced climate change response significantly different from natural variations shown in long-term climate data (e.g. sea level, rainfall or temperature).

Grey water: all non-toilet household wastewater (i.e. from showers, baths, hand basins, washing machines, laundry troughs, dishwashers and kitchen sinks). Its quality varies according to its previous use and from household to household.

Groundwater: water occurring naturally below ground level; or water pumped, diverted or released into a well for storage underground.

Groundwater access trench: shallow trenches excavated to allow direct access to underground water.

Groundwater base flow: usually, the amount of streamflow that is due to groundwater discharge. Unless groundwater base flows are intercepted by wells or other means, they are usually constant, reflecting long-term hydrogeological regimes. In periods of low or zero rainfall, streamflow may be comprised solely of base flows.

Groundwater mounding: the local rise of a watertable above its natural level, typically under irrigation.

Groundwater recharge: the process whereby water below the land surface is replenished by either direct infiltration of rainfall or by leakage from surface water bodies like streams or lakes.

Headworks: any assembly on top of a well and located between the well casing and the water delivery system.

Horticulture: the art, industry and science of plant cultivation.

Hydrogeology: the study of groundwater, which includes its occurrence, recharge and discharge processes, and the properties of aquifers; see also Hydrology.

Hydrological flow regime: the flow regime applicable to a particular watercourse or aquatic ecosystem as it varies by seasonal and more episodic climatic events (e.g. periodic severe flooding or drought). It may be a natural regime or man-managed (e.g. by weir pool manipulation). It also includes the water quality dimensions associated with particular flow periods (e.g. high salinity during periods of low flows and high turbidity due to erosion during high flows).

Hydrology: the science that describes and analyses the occurrence of water in nature, and its circulation near the surface of the earth.

Hyper saline: water that is more saline than seawater.

Industrial wastewater: water (not being domestic wastewater) that has been used in the course of carrying on a business (including water used in the watering or irrigation of plants) that has been allowed to run to waste or has been disposed of or has been collected for disposal.

Intensive farming: a method of keeping animals in the course of carrying on the business of primary production in which the animals are usually confined to a small space or area and usually fed by hand or by a mechanical means.

Interstate Water Entitlements Transfer Scheme: a scheme for the transfer of water entitlements between States under the Agreement approved under the *Murray-Darling Basin Act 1993*.

Keystone aquatic plants: those species whose loss from a system leads to the loss of other species. Keystone aquatic plants form the architecture for the wetland habitats; without them the ecosystem cannot function as it should.

Lake: a natural lake, pond, lagoon, wetland or spring (whether modified or not) and includes part of a lake, or a body of water designated as a lake by an NRM plan; or by a Development Plan under the *Development Act 1993*. (Taken from the NRM Act.)

Land division: a land division that requires approval under the *Development Act 1993* and includes circumstances where contiguous allotments cease to be owned or occupied by the same person, and/or cease to be operated as a single unit.

Landscape-scale management: strategic approaches to manage natural resource management values and threats at a landscape scale, being of a sufficient size to sample all landforms of the landscape (i.e. from the top of the hill to the bottom of the valley).

Low-flow bypass: a device that ensures that any water flow at or below the threshold flow rate will not be diverted from a watercourse or drainage path by a dam, wall or other structure, or ensures that these flows are returned to the same watercourse or drainage path immediately downstream of the dam, wall or structure.

Market-based instruments: schemes that use market-like approaches to encourage 'good behaviour', changing management actions to improve natural resource management outcomes. They have the potential to provide incentives to improve the condition of the land and waterways at a lower cost than many traditional policies and laws.

Native animal: a protected animal within the meaning of the *National Parks and Wildlife Act 1972* and any species included in Schedule 10 of that Act, not including a dingo or any other animal of a class excluded from the ambit of this definition by the regulations. (Taken from the NRM Act.)

Native underground water: water naturally occurring below ground level that exists in the relevant aquifer absent of any such water drained or discharged to that aquifer by artificial means.

Natural disaster: a serious disruption to a community or region, caused by the impact of a naturally occurring rapid onset event that threatens or causes death, injury or damage to property or the environment and which requires significant and coordinated multi-agency and community response. Natural disasters can be caused by one or a combination of natural hazards, including bushfire, earthquake, flood, storm, cyclone, storm surge, landslide, tsunami, meteorite strike, and tornado.

Natural resource assets: people, land, water, biodiversity and atmosphere.

Natural resources: soil, water resources, geological features and landscapes, native vegetation, native animals and other native organisms, and ecosystems. (Taken from the NRM Act.)

Natural resources management: an approach to managing our environment that strives to achieve a balance between our collective need for resources and the needs of our environment. Natural resources include air, water, land, soil, plants, animals and micro-organisms, and the ecosystems they form.

Off-stream dams: a dam that is not constructed across a watercourse and is primarily designed to hold water from a source other than the catchment area of the dam. Other water sources may include, but are not limited to, underground water and water diverted or pumped from a watercourse or drainage path that is not in the catchment area of the dam. Off-stream dams may capture a limited volume of surface water from the catchment area of the dam (up to 5% of its total capacity).

On-stream dam: a dam, wall or other structure placed on or constructed across a watercourse or drainage path for the purpose of holding back and storing the natural flow of that watercourse or the surface water flowing along that drainage path.

Pastoral zone: generally, areas north of Goyder's line with annual rainfall less than 250 mm per annum. The pastoral zone is commonly called the rangelands.

Rare species: a category for threatened fauna and flora under the *National Parks and Wildlife Act 1972* (South Australia).

Recharge area: the area of land from which water from the surface (rainfall, streamflow, irrigation, etc.) infiltrates into an aquifer.

Recovery planning: identification of the research and management actions required to stop the decline of, or support the recovery of, listed threatened species or threatened ecological communities.

Riffle: the flow of 'broken' water over gravel, pebble, cobble or boulder.

Riparian zones/areas: that part of the landscape adjacent to a water body that influences and is influenced by watercourse processes.

Runoff: water flowing over land or in a natural or man-made drain, after having fallen as rain or hail or having precipitated in any other manner.

Saline discharge: the process whereby excess groundwater containing dissolved salts rises close to the land surface, resulting in dryland salinity problems. Saline discharge occurs into waterways when saline groundwaters enter the river channel.

Salinisation: the process whereby land or water resources become adversely affected by high levels of salt (usually sodium chloride) that inhibit normal ecosystem functioning (including crop production). Salinisation often results from salts that are naturally present in the landscape being mobilised as the result of human activity. Key causes of salinisation are the flushing of saline groundwaters into streams due to poor irrigation practices, mobilisation of salts stored in the landscape due to the clearance of native vegetation, and the infusion of saline waters into once fresh groundwaters due to excessive extraction.

Salt interception: the practice of intercepting saline groundwater (either naturally occurring or irrigation induced) before it can discharge into rivers, discharge onto floodplains or otherwise impact on natural resource assets. Along the River Murray in the Riverland area of South Australia, a series of closely spaced bores extract saline groundwater before it can enter the river and then pump it to remote disposal basins.

Statistical Division (SD): geographic boundaries, as described in the 2006 edition of the Australian Standard Geographic Classification (ASGC 2006).

Stock / domestic dam: a dam for the purpose of the storage of water for domestic purposes or use by livestock, with a capacity of up to 5 megalitres or wall height of up to 3 metres from the natural ground level.

Structural plant groups: similar vegetation associations based on growth forms, height and cover.

Structure (in relation to a body of water or watercourse): something built or constructed, including, but not limited to, a ford, causeway, culvert, fence, jetty, boat mooring, weir or retaining wall.

Sub-catchment: the area of land determined by topographical features within which rainfall will contribute to runoff at a particular point.

Surface water: water flowing over land (except in a watercourse), after falling as rain or hail or having precipitated in any another manner, or rising to the surface naturally from underground. Also, water of either kind that has been collected in a dam or reservoir or contained in any stormwater infrastructure. (Taken from the NRM Act.)

Surface water sub-catchment zone: a zone defining the area within which the total allowable dam volume is limited. The zone boundary is based upon the sub-catchment boundary, with adjustments to align the sub-catchment boundary to the nearest practicable allotment boundaries.

Sustainability: forms of progress that meet the needs of the present without compromising the ability of future generations to meet their needs. (Taken from World Commission on Environment and Development.)

Tenth percentile flow rate: that flow rate (litres/second) obtained from a time-weighted annual flow duration curve (with the time step being 1 day – mean flow), which is greater than or equal to ten percent of all flows during that period.

Threatened species: plants or animals that are listed as rare, vulnerable, endangered or critically endangered or extinct in the wild as per the *National Parks and Wildlife Act 1972* (SA) or *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth).

Threshold flow rate: the flow rate of a watercourse or drainage path (litres/second) determined by multiplying the unit threshold flow rate (litres/second/square kilometre), by the area of catchment (square kilometres) that contributes to the watercourse or drainage path, that is above the point where the water is diverted from the watercourse or drainage path; or 1 litre/second; whichever is the greater value.

Total dissolved solids (TDS): measure of the dissolved salts in water and an alternative salinity measurement to EC unit.

Total Kjeldahl Nitrogen: a method for quantitative determination of nitrogen in chemical substances.

Turbidity: measure of the cloudiness or muddiness of water.

Underground water—see Groundwater.

Unit threshold flow rate: the flow rate (litres/second/square kilometre) of a sub-catchment determined by dividing the 10th percentile flow rate (litres/second) for a surface water sub-catchment zone by the area of the surface water sub-catchment zone (square kilometres).

Vascular plant species: a plant with woody tissue and seeds and veins for transporting water and food.

Volunteer species: any plant that germinates, though not sown in that season. This includes all weeds or seeds from previous seasons' crops.

Vulnerable species: a category for threatened fauna and flora under the *National Parks and Wildlife Act 1972* (SA) or *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth).

Water affecting activities (WAAs): activities that can have adverse impacts on the health and condition of water resources, on other water users and on the ecosystems that depend on water resources. These water resources include watercourses, lakes or dams, floodplains, groundwater, springs, wetlands, waterholes and catchment landscapes, among others.

Water allocation plan (WAP): a statutory document under the NRM Act that establishes appropriate water extraction and management regimes by defining the 'sustainable limit' of a prescribed water resource.

Watercourse: a river, creek or other natural watercourse (whether modified or not) in which water is contained or flows, whether permanently or from time to time, and includes a dam or reservoir that collects water flowing in a watercourse; a lake through which water flows; a channel (but not a channel declared by regulation to be excluded from the ambit of this definition) into which the water of a watercourse has been diverted; part of a watercourse; an estuary through which water flows; or any other natural resource, or class of natural resource, designated as a watercourse for the purposes of the NRM Act by an NRM plan. (Taken from the NRM Act.)

Water holding allocation: the quantity of water that a water licence holder is entitled to request be converted to a water taking allocation. (Taken from the NRM Act.)

Water licence: a licence granted under the NRM Act authorising the holder (subject to the requirements of the Act) to take (or to hold) water from a watercourse, lake or well or to take (or to hold) surface water from a surface water prescribed area and includes a licence granted endorsed with a water (holding) allocation. (Taken from the NRM Act.)

Water resource: a watercourse or lake, surface water, underground water, stormwater and effluent.

Watertable mounding—see Groundwater mounding.

Water taking allocation: the quantity of water that a water licence holder is entitled to take and use pursuant to the licence. (Taken from the NRM Act.)

Water Use Efficiency (WUE): a simple measure of crop production per unit of water applied. The focus is usually on increasing WUE to make better use of scarce rainfall or irrigation waters.

Wetland (or ephemeral streams): an area that comprises land that is permanently or periodically inundated with water (whether through a natural or artificial process), where the water may be static or flowing, may range from fresh water to saline water, and where the inundation with water influences the biota or ecological processes (whether permanently or from time to time). This also includes any other area designated as a wetland by an NRM plan or a Development Plan under the *Development Act 1993*. It does not include a dam or reservoir that has been constructed by a person wholly or predominantly for the provision of water for primary production or human consumption, or an area within an estuary or within any part of the sea, or an area excluded from the ambit of this definition by the regulations.

Appendix B: Abbreviations used in this Plan

Organisations

ALT	Aboriginal Lands Trust
AMLR NRM Board	Adelaide and Mount Lofty Ranges Natural Resources Management Board
ANCA	Australian Nature Conservation Agency
AusSi	Australian Sustainable Schools Initiative
AWI	Australian Wool Innovation Limited
CCSA	Conservation Council of SA
CFS	Country Fire Service
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DECS	Department of Education and Children's Services
DEH	Department for Environment and Heritage
DFC	Department of Families and Communities
DFEST	Department of Further Education, Employment, Science and Technology
DPC	Department of Premier and Cabinet
DPLG	Department of Planning and Local Government
DWLBC	Department of Water, Land and Biodiversity Conservation
DTEI	Department for Transport, Energy and Infrastructure
DTED	Department of Trade and Economic Development
DPC	Department of Premier and Cabinet
EPA	Environment Protection Authority (SA)
GRDC	Grains Research and Development Corporation
GWRDC	Grape and Wine Research and Development Corporation
LAPs	Local action planning groups
ICLEI	International Council for Local Environmental Initiatives
LGA	Local Government Authority
MDBC	Murray-Darling Basin Commission
MDBA	Murray-Darling Basin Authority
MLA	Meat and Livestock Australia
NGOs	Non-Government Organisations
OWS	Office of Water Security
PIRSA	Primary Industries and Resources SA
RDB	Regional Development Board
SAMRIC	South Australian Murray-Darling Basin Resource Information Centre
SANTFA	South Australian No-Till Farmers Association
SAPOL	South Australian Police
SARDI	South Australian Research and Development Institute
SATC	SA Tourism Commission
SAW	SA Water
SES	State Emergency Service

Other

AHD	Australia height datum
ASR	Aquifer storage and recovery
BDP	Business development plan
BMP	Best management practice
BPOP	Best Practice Operating Procedures
CAP	Conservation action planning
CCA	Community capacity assessment
CCATP	Community capacity assessment tools and processes
CO_2-e	Equivalent carbon dioxide
CSSSM	Community stream sampling and salinity mapping
EC	Electrical conductivity units
EMLR	Eastern Mount Lofty Ranges
EMS	Environmental management system
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
GIS	Geographic information systems
GPS	Global positioning system
GPT	Gross pollutant trap
ILUA	Indigenous Land Use Agreement
IMCRA	Interim Marine and Coastal Regionalisation for Australia
LMRIA	Lower Murray reclaimed irrigation area
LWMP	Land and water management plan
IPM	Integrated pest management
IPP	Indigenous partnerships project
IWM	Integrated weed management
LMRIA	Lower Murray reclaimed irrigation areas
LWMP	Land and water management plans
MAR	Managed aquifer recharge
MAT	Management action target
MBIs	Market-based instruments
MERI	Monitoring, evaluation, reporting and improvement
NRM	Natural resources management
NRM Act	*Natural Resources Management Act 2004* (SA)
NTU	Nephelometric turbidity units
NWI	National Water Initiative
NWQMS	National Water Quality Management Strategy
PWA	Prescribed wells area
PWRA	Prescribed water resources area
R&D	Research and development
RAMSAR	Ramsar Convention on Wetlands
RCT	Resource condition target
REA	Regional ecological areas
RMEM	River Murray Environmental Manager
SAMDB NRM (Board or Region)	South Australian Murray-Darling Basin Natural Resources Management (Board or Region)
SASP	South Australian Strategic Plan
sp.	Species
spp.	Subspecies
STEDS	Septic tank effluent disposal system
TLM IPP	The Living Murray Indigenous Partnerships Project
TMB	Threatened Mallee Bird Recovery Program
WAAs	Water affecting activities
WAP	Water allocation plan
WDE	Water-dependent ecosystem
WUE	Water use efficiency

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For more information
For more information about this publication please contact:

SA MDB NRM Board
PO BOX 2343
Murray Bridge SA 5253
Phone: (08) 8532 1432
Email:
enquiries@samdbnrm.sa.gov.au

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