

Adelaide and Mount Lofty Ranges Natural Resources Management Plan

Volume 2

Business and Operational Plan 2019–20 to 2021–22

Thriving communities caring for our hills, plains and seas



Government of South Australia
Adelaide and Mount Lofty Ranges
Natural Resources Management Board



Natural Resources
Adelaide and Mt Lofty Ranges

Natural Resources Management Act 2004

Natural Resources Management Plan

Volume 2: Business and operational plan
2019–20 to 2021–22

for the

Adelaide and Mount Lofty Ranges region

prepared by the

**Adelaide and Mount Lofty Ranges
Natural Resources Management Board**

I, David Speirs, Minister for Environment and Water, hereby adopt this Natural Resources Management Plan,
Volume 2: Business and operational plan pursuant to section 80(3)(a) of the *Natural Resources
Management Act 2004*.

A handwritten signature in black ink, consisting of a large, stylized 'D' followed by a series of loops and a final horizontal stroke.

David Speirs MP,
Minister for Environment and Water

Date: 27/03/2019



Contents

Foreword	1	Funding board actions	
The future of NRM – managing our landscapes	2	– expenditure	12
About the region’s plan	3	Staff and physical resources required to implement the plan	14
The Strategic Plan for the Adelaide and Mount Lofty Ranges region	3	Guiding the board’s investment	15
Guiding principles for the NRM plan	4	Adaptive planning	
What the NRM plan is trying to achieve	5	– what are the elements in the region?	15
Indicators of achievement: business performance	6	Describing issues	16
The region	8	Developing projects	16
Managing public land in the region	9	Appendix A: The levy and its impact ..	17
Key drivers of change in the region	9	Division 1 Regional NRM Levy	17
Funding board actions		Division 2 NRM Water Levy	19
– funding sources	11	Combined impact of the Division 1 and 2 levies on gross regional product	21
		Appendix B: Water affecting activity permits	22
		Glossary	40

Foreword

A message from Presiding Member, Felicity–Ann Lewis

The management of natural resources in South Australia is about to undergo significant reform.



The State Government has announced that it will introduce a new Landscape South Australia Bill to Parliament in the first quarter of 2019, to replace the *Natural Resources Management Act 2004* (NRM Act). The reforms offer an important opportunity to consider what is currently

working well under the existing NRM Act as well as simplify, remove or amend aspects that are overly complicated or impeding good on–ground outcomes.

The Adelaide and Mount Lofty Ranges Natural Resources Management Board (NRM board) welcomes the government’s reform agenda and aims to capitalise on opportunities to strengthen the delivery of practical on ground works that address local priorities.

While the new Landscape South Australia legislation is being developed, the NRM board is continuing to operate in accordance with the NRM Act. Under the Act, the board must prepare and maintain a 10–year strategic plan and a three–year business and operational plan.

The region’s strategic plan 2014–24, prepared after extensive public consultation, identifies a long term vision for our region’s natural resources and the actions needed to maintain the natural systems that underpin them. The business and operational plan complements the strategic plan by setting out the practical, medium-term priorities that the NRM board will invest in.

As the Presiding Member of the Adelaide and Mount Lofty Ranges NRM Board, I am pleased to present the Business and Operational Plan 2019–20 to 2021–22.

The plan reflects the community–driven strategies and actions in the region’s strategic plan and demonstrates how the board’s income is being used to deliver on key natural resources issues. Consistent with the Government’s policy, the plan proposes to limit increases to the regional NRM land and water levies to CPI over the life of the plan, while maintaining the board’s active commitment to the sustainability of the region’s natural resources.

We all have a role in ensuring a resilient, sustainable future and we hope that you will continue to engage with the board’s work into the future. For some, it might simply be through paying their annual regional NRM levy while for others it may be volunteering for one of our region’s many environmental projects; choosing local native species for a home garden, or adopting good water and land management practices to help ensure a rural property’s long–term sustainability.

At whatever level you wish to participate, we welcome your active involvement in the way natural resources are managed as we continue to better understand our natural resources issues and what we need to do to address them.

The future of NRM – managing our landscapes

The South Australian Government is currently undertaking significant reforms to change the way that natural resources are managed.

The new legislation is intended to strengthen community-led delivery of natural resources management at local and whole-of-landscape scales. The focus of the reforms is on empowering communities and land managers to be directly responsible for the sustainable management of their region's natural resources with an emphasis on soil quality, water management and pest plant and animal control.

As part of the reforms, the government intends to repeal the *Natural Resources Management Act 2004* and develop a new *Landscape South Australia Act*, to support natural resources management across the state.

While many of the specific aspects of the new legislation are still being developed in consultation with the community, one of the most significant reforms expected to affect the region is the abolishment of the Adelaide and Mount Lofty Ranges Natural Resources Management Board. In its place, the establishment of three new boards is proposed to serve the region:

- Plains and Valleys – to the north of Adelaide
- Hills and Fleurieu – to the south of Adelaide
- Green Adelaide – metropolitan Adelaide.

The NRM board is working with government to support the reforms and ensure that existing knowledge, systems and processes are appropriately transitioned under the new legislation. While these important preparatory activities take place, the board continues to operate under the NRM Act. This Business and Operational Plan has been developed in accordance with the current legislative requirements and the Government's priorities for natural resources management.

Once the new legislation has passed through Parliament, regional plans and business plans may need to be further updated. Any change to planning processes will be managed to ensure future planning is simple, accessible and transparent. Future plans will continue to build on, but not duplicate, the excellent level of community input provided to date.

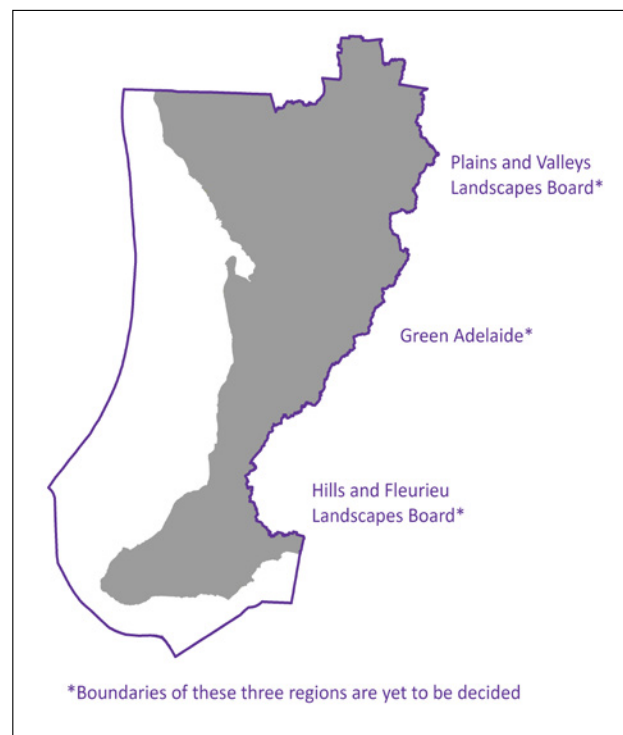


Figure 1: AMLR Region with proposed Landscape Boards and Green Adelaide

About the region's plan

The Adelaide and Mount Lofty Ranges Natural Resources Management Plan (the NRM plan) has been prepared under the NRM Act and is presented in two volumes:

Strategic Plan for the Adelaide and Mount Lofty Ranges Region 2014–15 to 2023–24: which provides the long-term directions for all stakeholders managing natural resources in the Adelaide and Mount Lofty Ranges region

Adelaide and Mount Lofty Ranges Natural Resources Management Board Business and Operational Plan 2019–20 to 2021–22: which outlines the strategic actions the board will undertake and how they will be funded (this document).

Under the NRM Act, the Strategic Plan for the region is required to be reviewed at least once in every 10-year period. The board is working to ensure that the valuable information and knowledge contained in the Strategic Plan is transitioned appropriately to the two proposed new Landscape SA boards (Plains and Valleys and Hills and Fleurieu) and Green Adelaide.

The Business and Operational Plan must be reviewed at least once every three years, or at any time the board proposes an increase above the CPI in the amount to be raised by a levy. This document is a new Business and Operational Plan for 2019–20 to 2021–22. It is intended that the plan will not undergo a further review until the Landscape South Australia Act is in place.

To complement the Strategic Plan and Business and Operational Plan, the board also intends to publish detailed annual implementation plans that outline the practical projects that address the priority investment areas.

An implementation plan for 2019–20 will be published following its endorsement by the board, prior to the commencement of the financial year.

The Strategic Plan for the Adelaide and Mount Lofty Ranges region

Volume 1 of the NRM plan for the Adelaide and Mount Lofty Ranges, the Strategic Plan, sets the direction for all stakeholders to work together to improve the natural resources of the region.

The plan adopts a systems (resilience) approach to natural resources management which is about:

- thinking about the region as linked systems
- recognising complexity, uncertainty and natural variability
- identifying the drivers that may cause a system to move to a more undesirable state
- identifying the way in which those drivers may act on a system and the thresholds that may exist between the states
- targeting effort towards those areas where it can make the greatest difference in preventing systems approaching or crossing thresholds.

The key elements of the plan are summarised in Figure 2.

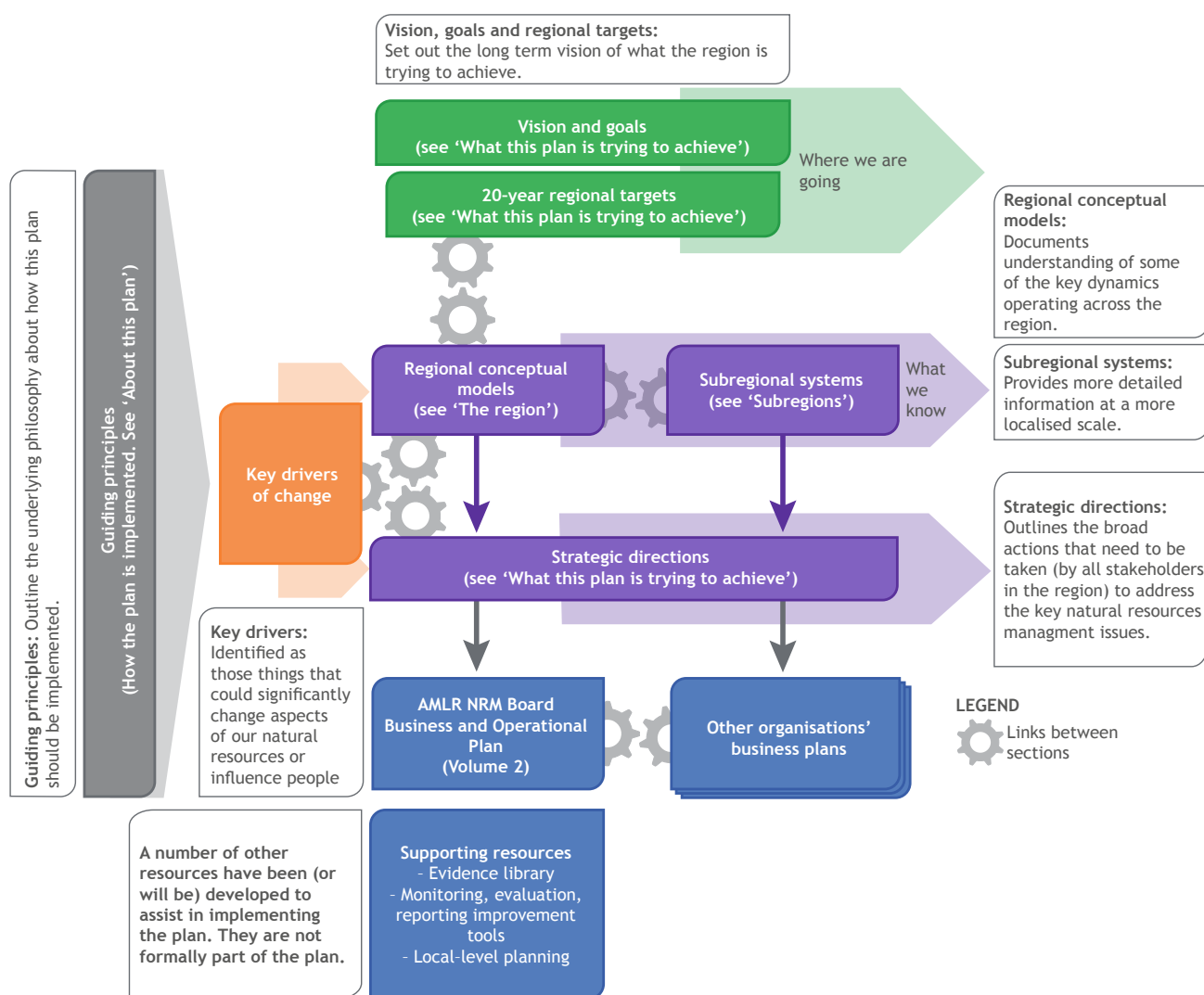


Figure 2: Key elements of the NRM plan

Guiding principles for the NRM plan

A set of guiding principles informs the underlying philosophy for implementation of the NRM plan:

- achieve results through government, communities, research institutions and businesses working together
- plan for uncertainty and take action using an adaptive management approach
- consult with stakeholders to balance competing social and economic demands to ensure that healthy natural resources underpin healthy communities
- base decisions on the best available information
- allow for innovation
- protect and enhance core natural resource assets and processes
- allow for the intergenerational timeframes required to manage ecological systems.



Photo by : Ben Della-Torre

What the NRM plan is trying to achieve

The NRM plan is based on a long-term vision for the future of the region and was developed following extensive consultation undertaken for the first plan in 2008.

The vision, 'Thriving communities caring for our hills, plains and seas', is supported by four goals, which outline what the stakeholders in the region are aiming to achieve by 2028 (20 years from the adoption of the first NRM plan). The desired future described in the goals forms the basis to guide action by stakeholders in managing and improving the natural resources of the region. The goals are:

- Ecological processes for life and livelihood
 - healthy seas, rivers and landscapes
 - well-functioning ecological processes that support life and livelihoods
- Communities engaged and active
 - communities living within resource limits
 - informed and engaged communities actively protecting and restoring our natural resources

- Amenity, culture and environment valued
 - use and reuse of natural resources based upon environmental, economic, social and cultural values
 - iconic sites protected and new ones created
- Knowledgeable decisions and action partners
 - uncertainty acknowledged and actions taken to anticipate change
 - partners committed to working together to achieve natural resources outcomes.

The 20-year regional targets (Table 1) assist with evaluating the region's collective performance in the achievement of the shared vision and goals over the long term. Details on how the regional targets link to the regional conceptual models and other elements of the plan are given in the Strategic Plan (Volume 1). The regional targets require action from all stakeholders and individuals with a commitment to NRM in the region in order to be achieved. The regional targets are ambitious, but are considered to be achievable with appropriate investment.

Measuring success against the regional targets is an important element of measuring the success of the plan's implementation. A set of core indicators is used to monitor progress and report cards are produced to report on progress against the targets. Further information on these indicators and report cards can be found at:

www.naturalresources.sa.gov.au/adelaidentloftyranges

Table 1: Regional targets

Target* by 2028	
T1	The region will have the system capacity to harvest up to 35 GL of stormwater and 50GL of wastewater per annum
T2	The aquatic ecosystems and groundwater condition is maintained or improved
T3	All water resources used within sustainable yield (allowing for variability)
T5	The productive capacity of agriculture maintained or increased
T6	Land condition for primary production improved by 15%
T7	The condition and function of ecosystems (terrestrial, riparian) recovered from current levels
T8	The extent of functional ecosystems (coastal, estuarine, terrestrial, riparian) increased to 30% of the region (excluding urban areas)
T9	The conservation prospects of native species (terrestrial, aquatic, marine) improved from current levels
T10	The land-based impacts on coastal, estuarine and marine processes reduced from current levels
T11	The decline of seagrass, reef and other coastal, estuarine and marine habitats halted, with an identifiable trend towards restoration
T12	All coast, estuarine and marine water resources meeting water quality guidelines to protect defined environmental values
T13	Participation in natural resources management activities increased by 20%

*Note: T4 (Average annual cost of flood damage reduced) removed after a review and evaluation of targets

Indicators of achievement: business performance

As part of the process of evaluating and reporting on the success of the Business and Operational Plan, the board has developed three-year intermediate targets to measure progress towards the 20-year regional targets, set for achievement in 2028. The intermediate targets for the three year period of the business plan are set out in Table 2.

These intermediate targets will help the board to connect project outputs to short term outcomes and enable the board to report on achievements within the timeframe of this Business and Operational Plan.

Monitoring progress against the intermediate targets also provides the board with feedback about whether progress is on track towards the longer-term regional targets.

Achievement against the targets will be assessed and published on the board's website annually in October. A copy of the report will be available at:

www.naturalresources.sa.gov.au/adelaidentloftyranges.

Table 2: Intermediate targets

Intermediate Targets (2019–2022)		Link to regional target	Links to regional conceptual models
i1	34,000 people participate in natural resources management capacity building activities	T13	community support for NRM, building capacity of natural resource managers
i2	Greater than 70% participants in natural resources management capacity building activities exhibit desired NRM actions or behaviors	T2, T5, T6, T7, T12, T13	sustainable primary production, community support for NRM, building capacity of natural resource managers
i3	Partner with Primary Production Groups on 16 innovative sustainable NRM Projects.	T5, T6	sustainable primary production, building capacity of natural resource managers
i4	Increasing trend in total investment (board and partners) in board supported Water Sensitive Urban Design and Green Infrastructure projects	T1, T2, T10, T12, T13	marine health, aquatic health
i5	1800–3900 tonnes per annum of sediment and debris are captured and removed from urban waterways by priority board operated stormwater quality devices	T2, T10, T12	building capacity of natural resources managers, marine health, aquatic health
i6	2960ha of land managed for water quality improvement	T2, T10, T12	building capacity of natural resources managers, marine health, aquatic health
i7	Water allocation plans including low flows are developed, implemented and reviewed, to contribute to the sustainable management of prescribed water resources	T3	aquatic health, adapting to a changing climate
i8	The extinction risk is reduced for 75% of priority threatened or declining species	T9	terrestrial landscape health, marine health, aquatic health
i9	Existing native ecosystems managed to meet pre-determined biodiversity outcomes across 90,082 ha	T7, T8	terrestrial landscape health, aquatic health, marine health
i10	Habitat constructed to meet pre-determined biodiversity outcomes across 27,797 ha	T8	terrestrial landscape health, aquatic health, marine health
i11	90% of actions in collaborative work plans are implemented for priority coastal conservation areas	T11	building capacity of natural resources managers, marine health, aquatic health, terrestrial landscape health



Photo by Bill Doyle

The region

The Adelaide and Mount Lofty Ranges region is one of eight natural resources management regions established in South Australia under the *Natural Resources Management Act 2004*.

It includes metropolitan Adelaide and the western side of the Mount Lofty Ranges, extending from Mallala and the Barossa in the north, to the Fleurieu Peninsula in the south (Figure 3). The region also extends up to 30 km into the marine environment. It covers a total area of approximately 11,200 square kilometres, of which approximately 59 per cent is land. The marine area makes up the remaining 41 per cent.

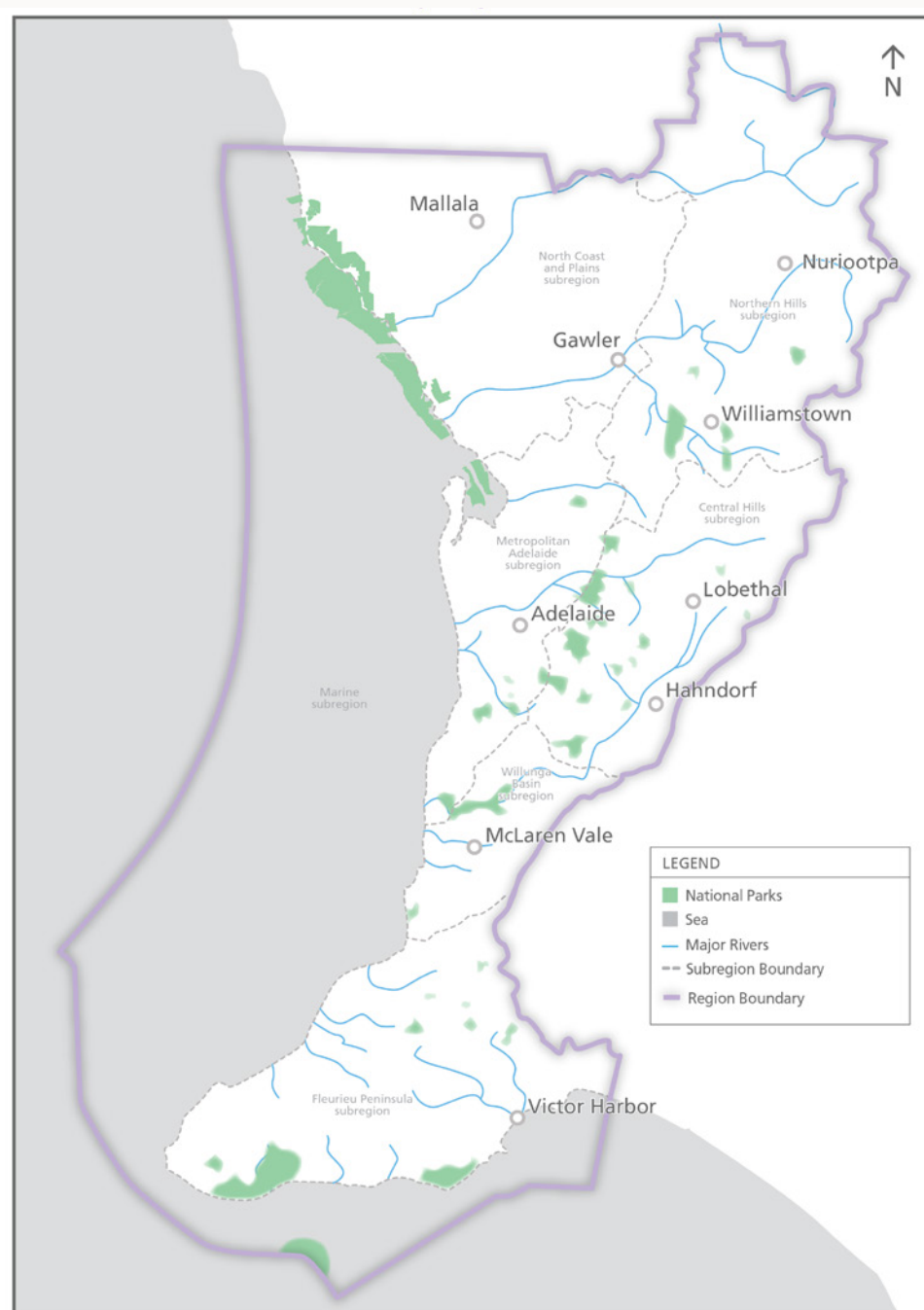


Figure 3: Adelaide and Mount Lofty Ranges NRM region

Managing public land in the region

Within the region, there are more than 58,000 hectares of protected areas in national parks, marine parks, other reserves and areas of crown land managed for conservation purposes. The region also has extensive areas of land that is owned and managed by SA Water, and forestry reserves managed by South Australian Forestry Corporation (Forestry SA). These public lands form an important part of the regional social–ecological systems and contribute to natural resources outcomes such as conservation of biodiversity, improved water quality and soil quality. The board works in an integrated way across the landscape, taking into account public land areas and working closely with the relevant land managers. With the Department for Environment and Water (the department) being the major provider of services in the board’s delivery of the NRM plan, there is a particularly close relationship and integration with NRM–related activities across department–managed public land.



Photo by Rachel Godoy

Key drivers of change in the region

Four key drivers of change have been identified as a consequence of understanding the dynamics of the region – further information about these dynamics can be found in the Strategic Plan. These drivers could propel terrestrial, aquatic or marine health, as well as a range of social systems, across thresholds to a different state or an undesirable condition. The key drivers of change are:

- land management and change
- economic impacts
- knowledge and capacity (community capacity)
- climate change.

Land management and change

Land use in the region is changing. In particular, urban areas are expanding, rural living is increasing and primary production uses are intensifying. These changes along with the way land is managed, can result in a wide range of impacts on natural resources. Impacts and consequences include:

- clearance, and fragmentation of vegetation
- increased use of water resources and decreasing water quality
- fragmentation of primary production land and reduction in farm size, leading to decreased ability to run profitable primary production businesses
- intensification of land use leading to soil impacts
- conflicts between adjoining land uses
- increased invasive species (plant and animal)
- altered fire regimes (pre–existing and new/emerging threats).

Economic impacts

Areas within 100 km of the Adelaide GPO consistently generate around 25 per cent of South Australia's total farm-gate production value, much of it from high-value horticulture, winegrape and livestock industries. This distinctive pattern of production arises from a combination of favorable natural resources and climate, major investments in infrastructure, and good access to labour, transport and support industries. Very few parts of the state enjoy this combination of factors.

The area has opportunities to adapt to the impacts and uncertainties of climate change, water scarcity, and a carbon-constrained economy. Within this region, SA's farm-sector and food system are buffered from external shocks through: the generally high and reliable rainfall and cool climate conditions of the Mount Lofty Ranges; by access to multiple water resource options, including recycled wastewater; and by proximity to a major market and national freight network.

From our marine environment, commercial fisheries contribute \$7.6 million to the economy (gross regional product) and provide important social benefits to the region. The main fisheries include the Gulf St Vincent Prawn Trawl fishery for Western King Prawn (as well as by-product catches of Slipper Lobster and Calamari) and the mixed-species Marine Scalefish Fishery. The coast and marine environment also supports a range of recreational industries, for example, recreational fishing, charter boat activities and tourism.

Changes in economic circumstances at a personal, local, state or global level all impact on the condition of natural resources and our ability to manage them. Building knowledge of the connections between economic viability and natural resources management is important due to their interdependencies.

Community capacity

People are an integral part of the environment, particularly in the Adelaide and Mount Lofty Ranges region, which has a significant population for its geographic area. Most land in the region is in private ownership and to achieve improved natural resources outcomes, it is critical to work with the landowners and managers of the region.

People are critical to improving NRM outcomes, contributing through physical action on the ground and advocacy to policy-makers and the broader community about the value of natural resources. This includes both the intrinsic value offered by the natural resources themselves and the value of the industries those natural resources support.

Climate change

The future climate in the region is predicted to:

- be warmer and drier, with longer and hotter hot spells
- have less reliable rainfall and later breaks in the season
- have sea level rise and storm surges, which impact on coastal infrastructure and ecosystems (including internationally significant migratory bird species).

These predicted changes are likely to drive a wide range of changes to natural resources in the region and changes to the industries that rely on those natural resources.

Further information on the predicted changes and potential impacts of climate change can be found in the 'Adapting to a changing climate' regional conceptual model in Volume 1: Strategic Plan for the Adelaide and Mount Lofty Ranges Region 2014–24.

Planning and improvement

In addition to the four key drivers of change that underpin the NRM plan, the board also presents information, budget and projects against a fifth 'driver of change'. This is the support required for ongoing adaptive planning and continuous improvement. The projects encompassed by this driver include;

- ongoing monitoring, evaluating and reporting on the successful implementation of the plan
- ongoing monitoring, evaluation and reporting on the state of natural resources
- continuous improvement to the plan, including supporting local planning.

Budget and projects against this 'driver of change' are also currently supporting transition activities under Landscape South Australia reform.

Funding board actions – funding sources

The board expects to receive funds to support its Business and Operational Plan from a range of sources (Table 3). These include the regional NRM levy, the NRM water levy and various state and Australian Government funding programs.

Table 3: Summary of board income streams

Table 3: Summary of board income streams

Funding source	2018–19 adopted budget (\$)¹	Estimated budgets (\$)		
		2019–20	2020–21	2021–22
Levy funds				
Division 1 – regional NRM levy²	30,716,303	31,545,643	32,397,376	33,272,105
Division 2 water levy (prescribed water resources)³	696,000	726,238	823,147	842,109²
Division 2 water levy (public water supply)	1,200,000	1,232,400	1,265,675	1,299,848
Australian Government funding				
National Landcare Program – Regional Land Program (RLP) – Core Services	413,451	404,365	403,683	396,632
National Landcare Program – RLP Soil Acidity – What Lies Beneath	126,380	168,545.75	168,545.75	168,545.75
National Landcare Program – RLP Back from the Brink	1,000,000	700,000	700,000	700,000
Other income sources⁴				
Adelaide Living Beaches – Tennyson Dunes	52,532	53,845	–	–
Education program in schools	19,500	–	–	–
Gross Pollutant Trap maintenance	40,000	–	–	–
Interest	150,000	150,000	150,000	150,000
TOTAL INCOME	34,414,166	34,981,036.75	35,908,426.75	36,829,239.75

¹ The 2018-19 budget shown is the approved starting budget for the 2018-19 year. Additional income may be received beyond this starting budget from income sources that are approved annually. An amount of \$200,000 for water levy penalties has been removed from the 2018-19 approved budget – these funds will now be retained within the NRM fund. This decision will affect future years.

² The board is proposing a CPI increase to both the Division 1 and Division 2 levies for the life of this business plan. For 2019-20 CPI will be applied at a rate of 2.7%. For planning purposes, the same rate has been applied for 2020-21 and 2021-22 however the rate actually applied may vary from this. Further information on the levy and its impact can be found in Appendix A.

³ The board has approved a new levy being raised in the Central Adelaide Prescribed Wells Area from 2020-21 onwards. The amounts indicated in this table also take account reduced revenue from an exemption to the levy where the total value is less than \$15 and planned reductions to allocations in the Kangaroo Flat area.

⁴ Funding agreements for other income sources are generally negotiated with local councils, state government agencies and other organisations annually.

Funding board actions – expenditure

The board’s work program is based on the community driven strategies and actions in the region’s Strategic Plan.

Details about the specific projects the board invests in can be found in the board’s annual implementation plans, found at: www.naturalresources.sa.gov.au/adelaidentloftyranges/about-us/our-regions-plan

For this Business and Operational Plan, the board’s broad areas of investment are presented under the key drivers of change for the region, identified as:

- land management and change
- economic impacts
- knowledge and capacity (community capacity)
- climate change

To support the adaptive planning approach adopted by the board, a number of additional projects have been identified (see chapter in Strategic Plan: ‘Continuous improvement and NRM planning’). The investment in these projects are grouped below under the heading ‘Planning and improvement’.

The budget expenditure presented in this section is for all three years of this Business and Operational Plan or for the life of the plan should the plan be replaced by new Landscape SA and Green Adelaide plans before the end of the three year period (Table 4).

Under the Landscape South Australia reforms, the Government has indicated that new boards will have the following investment priorities:

Green Adelaide

-  Coastal management
-  Urban rivers and wetlands
-  Water sensitive urban design
-  Green streets and flourishing parklands
-  Fauna in the city
-  Controlling pest plants and animals
-  Nature education

Landscape SA boards

-  Soil quality
-  Water management
-  Pest plant and animal control
-  Land stewardship

The board has historically invested significant resources in a range of programs that contribute to these priorities. An indication of how the board’s future expenditure aligns with these priorities is provided through the pictures contained in Table 4.

Table 4: Summary expenditure 2019–20 to 2021–22

Key driver	Investment priorities	2019–20 Budget (\$)¹	2020–21 Budget (\$)¹	2021–22 Budget (\$)¹
Land management and change	• Support land managers to protect and improve the condition of land, water and ecosystems • Improve the long-term prospects of threatened and declining species and communities • Restore and conserve coast and marine environments, including through the Adelaide Living Beaches Strategy • Invest in key water management projects including securing low flows in the Western Mount Lofty Ranges, protecting and enhancing watercourses, and integrated urban water management • Operate and maintain water management services assets, including the Patawalonga Lake System • Support management of over abundant native species and priority pest plants and animals • Undertake water resource management and planning in collaboration with water users and the community 	23,360,710	23,995,799	24,626,385
Economic impacts³	• Support sustainable production 	605,350	621,807	638,148
Community capacity	• Support volunteers and community-run natural resource centres • Increase the knowledge and capacity of natural resources managers • School and community education • Promote healthy soil management 	7,187,212	7,382,605	7,576,612
Climate change²	• Ecosystem, urban and primary production adaptation 	149,996	154,073	158,122
Planning and improvement	• Regional planning • Monitoring, evaluation, reporting and improvement	2,809,224	2,885,596	2,961,426
TOTAL⁵		34,112,491	35,039,881	35,960,694

¹ Indicative: subject to the development of annual implementation plans and funding agreements negotiated annually with local governments, state government agencies and other organisations.

² Climate change adaptation, and understanding of climate change impacts, is also incorporated in a wide range of projects funded under other key drivers.

³ Investment in economic impacts and benefits is also incorporated in a wide range of projects funded under other key drivers.

⁴ Total does not add exactly due to rounding.

⁵ Total figures do not include Australian Government funding.



Staff and physical resources required to implement the plan

Staff resources

The projects outlined in this plan are implemented by Department for Environment and Water staff, who are provided to the board through a service agreement, negotiated annually. A range of partnerships, service agreements and grants from other organisations also support project officers who assist in the delivery of the projects in this plan. These project officers are funded on a project-specific basis and are tied to specific project outcomes.

Physical resources

Staff supporting the delivery of the plan on behalf of the board are located in a number of offices across the region, which aim to maintain close links with the community.

In the period 2019–20 to 2021–22 the board will continue the construction of water sensitive urban design and low-flows projects. These will not require the acquisition of land as these projects will be undertaken with partners, such as local government and private property owners, on their land. After completion, any asset will be the property of the partner. Where appropriate the board may also transfer assets from the board's asset register.

It is not envisaged that the board will need to acquire and retain any additional land or infrastructure assets during 2019–20 to 2021–22.

Guiding the board's investment

The regional NRM plan, completed in 2013, is a high-level plan for the region. Its purpose is to provide the overall strategic direction on the types of actions needed to address important natural resources issues.

To operationalise the strategic plan, the board undertakes more detailed planning with the community to identify local issues and inform how the board prioritises its investment.

Adaptive planning – what are the elements in the region?

Regional and local planning are part of the ongoing adaptive planning process in the region.

In its simplest form, adaptive planning is about continuous learning and therefore regular improvements to the NRM plan. An adaptive planning process allows us to regularly

test our understanding (and the assumptions we make) of issues and actions in our region – this is often commonly referred to as a 'plan-do-learn cycle'.

The elements of the adaptive planning framework and how they fit together are shown in Figure 3. The key documents that form part of this adaptive planning framework are:

- Adelaide and Mount Lofty Ranges NRM plan
 - Volume 1: Strategic Plan 2014–15 to 2024–25
 - Volume 2: Business and Operational Plan 2019–20 to 2021–22 (this document)
- Annual Implementation Plan
- Strategic plan to local action – the process of local level planning (see following sections of this chapter).

Local planning forms one part of the adaptive planning approach for the region. There are two key components to the process:

1. describing our understanding of issues
2. developing projects to address those issues.

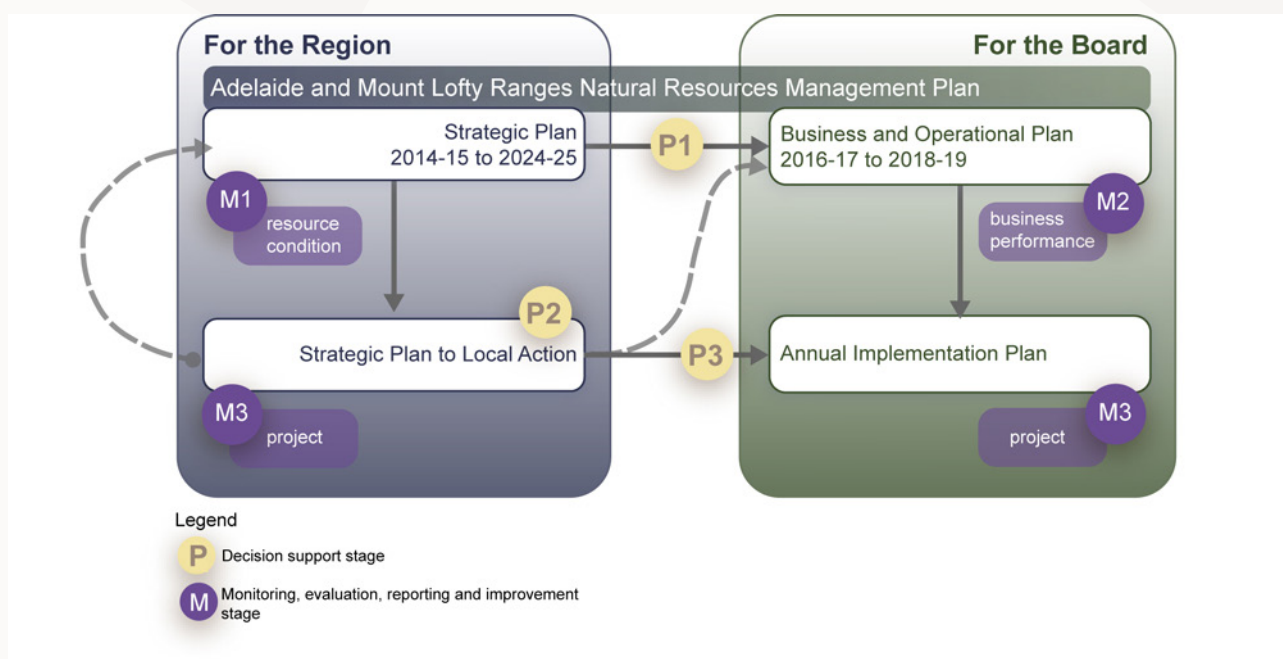


Figure 3: Elements of the adaptive planning framework for the Adelaide and Mount Lofty Ranges region

Describing issues

Social–ecological systems form the basis of the NRM plan and they are complicated. Even at a local scale, it is difficult to try to understand all the links within and between systems, causes and effects of changes to that system and responses to threats. This means it can be challenging to clearly target action where it will have the biggest impact.

To help manage this complexity and provide meaningful direction to investment in action, the board's planning process has been designed to break down systems into more manageable issues that can be described more simply. As systems are complicated, there are always going to be interactions and overlaps between the various issues.

The board's current list of issues was compiled based on:

- community and stakeholder input to the regional planning process
- input from other planning processes in the region
- discussion with staff across the region.

The list of local level planning issues can be viewed at: www.naturalresources.sa.gov.au/adelaidentloftyranges

The board uses a decision support tool to help identify priority issues. The issues that are not immediately identified as a priority for investment are not discarded, but are held and reviewed if new information that changes our understanding about the issue becomes available.

Developing projects

The second part of this process involves developing projects that the board will invest in to address the key natural resources issues for the region. This can be considered as the 'treatment' of the issues.

The board uses a decision support tool to assess project proposals and make decisions about which projects will be funded and implemented in the annual implementation plan.



Photo by Martin Stokes

Appendix A: The levy and its impact

The Adelaide and Mount Lofty Ranges Natural Resources Management Board specifies the collection of two levies to support its investments: the Division 1 Regional NRM Levy; and the Division 2 NRM Water Levy. In accordance with section 75(3)(i) of the NRM Act, an assessment of the economic and social impact of these levies has been undertaken.

The scope of the assessment has not included an appraisal of the social and economic benefits that may be realised from the board's investment of the levies however this is also an important aspect to consider. The board's investments help to conserve the region's natural resources so that people can continue to access clean water, sustainably grown food as well as natural spaces that provide habitat for native plants and animals and support community health and wellbeing. Each of these provide important social and economic benefits to the people of the Mount Lofty Ranges region.

Division 1 Regional NRM levy

Table A1: Board's proposed expenditure and quantum of the regional NRM levy

	2019–20	2020–21	2021–22
Division 1 Regional NRM Levy	\$31,545,643	\$32,397,376	\$33,272,105

Quantum of the Division 1 Regional NRM levy

The quantum of the Division 1 Regional NRM levy proposed to be raised to support the board's work program is summarised in Table A1. It is proposed that the levy will be increased by Consumer Price Index (CPI) in each of the three years covered by this business plan¹.

Local government collection of the Division 1 Regional NRM Levy

The Division 1 Regional NRM Levy is collected from regional landholders by constituent local councils on behalf of the NRM board.

The share of the total to be collected by each local council is calculated based on the proportion of the total capital value of the region within that council area. The estimated share for each local government for the 2019–20 year is presented in Table A2. The final contribution for each local government area will be published annually in the Government Gazette.

Under section 95 of the NRM Act, local councils collect the levy from owners of rateable land. Councils can choose from a number of different options in how their portion of the levy is shared between land owners, including options based on the value, purpose, area and location of rateable land or the number of properties within their council area.

The Natural Resources Management (Financial Provisions) Regulations 2005 allows local governments to recover ongoing costs associated with the cost of a levy (4(C)(6)) on the basis of:

\$1,848 (indexed) plus 18 cents (indexed) for each assessment of levy against a piece of rateable land.

Table A2: Estimated levy share for each local government area for 2019–20

Council area	Average levy contribution per household (\$)¹	Total levy contribution (\$)
Adelaide	57	1,755,765
Adelaide Hills	55	966,053
Adelaide Plains	32	179,437
Alexandrina	52	177,458
Barossa	34	474,425
Burnside	81	1,714,557
Campbelltown	51	1,220,432
Charles Sturt	48	2,937,786
Gawler	30	366,464
Holdfast Bay	61	1,281,868
Light	33	332,033
Marion	43	1,971,997
Mitcham	59	1,732,697
Mount Barker	50	113,259
Norwood Payneham & St Peters	65	1,375,767
Onkaparinga	35	2,890,101
Playford	23	1,105,909
Port Adelaide Enfield	38	2,705,537
Prospect	56	576,483
Salisbury	30	2,038,150
Tea Tree Gully	40	1,778,337
Unley	73	1,391,241
Victor Harbor	37	397,977
Walkerville	81	323,740
West Torrens	46	1,542,510
Yankalilla	36	195,660

¹CPI will be applied at a rate of 2.7 per cent for the 2019–20 financial year, with the rate to be applied in other years to be determined in the preceding financial year

Economic and social impact of the Division 1 Regional NRM Levy

The key findings of an economic impact assessment of the Division 1 Regional NRM Levy are as follows:

- Among the four main land use types, residential properties account for 82 per cent of the levy raised (\$25.76 million); commercial properties 11 per cent (\$3.48 million); rural properties 3 per cent (\$0.9 million); and industrial properties 2 per cent (\$0.51 million).
- Residential property levy: mean of \$44 across the region (ranging from a mean of \$23 in Playford to a mean of \$81 in Burnside and Walkerville); median of \$45, maximum of \$4331 (in Victor Harbor); and minimum of less than \$1.
- Commercial property levy: mean of \$83 across the region (ranging from a mean of \$35 in Alexandrina, Light and Yankalilla to a mean of \$106 in Marion); median of \$37, maximum of \$135,127 (in Adelaide); and minimum of less than \$1.
- Industrial property levy: mean of \$92 across the region (ranging from a mean of \$22 in Yankalilla to a mean of \$174 in Barossa and Light); median of \$40, maximum of \$66,860 (in West Torrens); and minimum of less than \$1.
- Rural property levy: mean of \$58 in the region (ranging from less than \$3 in Unley to a mean of \$86 in Burnside); median of \$45, maximum of \$4634 (in Adelaide Plains); and minimum of less than \$1. The local government areas of Adelaide, Holdfast Bay, Prospect and Walkerville have no rural properties and would collect no levy from this land use category.
- Across all properties: mean of \$46 (ranging from a mean of \$26 in Playford to a mean of \$81 in Burnside); median of \$36; maximum of \$135,127 (in Adelaide); and minimum of less than \$1.

Impacts on households

The impact assessment estimated that the levy would be a minor impost on both average-income and low-income households. The exception would be for a household with the maximum capital value in the region combined with a low income (e.g. a single pensioner), where the impact could be significant. Residents falling within this category may be eligible for a 'Cost of living concession' from the South Australian Government to help assist with the costs of various living expenses, including the NRM levy.

Impacts on dryland farms

The impact assessment estimated that the levy would have a minimal impact on farm profitability for marginally profitable enterprises with lower land values (e.g. sheep) but could have a moderate impact for marginally profitable enterprises with relatively high land values (e.g. beef).

Impacts on non-farm businesses

The impact assessment estimated that the mean and median levy amounts would have minimal impact on business gross operating surplus across all industries. The median maximum levy (\$2349 for commercial properties and \$566 for industrial properties in 2019–20) could have a minimal impact for businesses in ten sectors and a moderate impact for businesses in four sectors. There could be a significant impact for businesses in the remaining four sectors: transport; postal and warehousing; professional, scientific and technical services; health care and social services, and other services.

Division 2 NRM Water Levy

The quantum of the Division 2 NRM Water Levy proposed to be raised to support the board's work program is summarised in Table A3. It is proposed that the levy will be increased by Consumer Price Index (CPI) in each of the three years covered by this business plan.

Table A3: Board's proposed expenditure and quantum of the Division 2 NRM Water Levy

	2019–20 (\$)	2020–21 (\$)	2021–22 (\$)
Division 2 NRM Water Levy – prescribed water resources	726,238	823,147	842,109
Division 2 NRM Water Levy – public water supply	1,232,400	1,265,675	1,299,848

Collection of the Division 2 NRM Water Levy

The Department for Environment and Water bills licensed water users and collects the revenue on behalf of the board. Table A4 outlines the prescribed resources and the levy rate per megalitre (ML) proposed to be charged for the 2019–20 to 2021–22 years.

Table A4: Division 2 NRM Water Levy for prescribed water resources 2019–20 to 2021–22

Area	2019–20	2020–21	2021–22
McLaren Vale Prescribed Wells Area (PWA)	\$6.16/ML on water allocated	\$6.33/ML on water allocated	\$6.50/ML on water allocated
Northern Adelaide PWA	\$6.16/ML on water allocated	\$6.33/ML on water allocated	\$6.50/ML on water allocated
Barossa Prescribed Water Resources Area (PWRA)	\$6.16/ML on water allocated	\$6.33/ML on water allocated	\$6.50/ML on water allocated
Western Mount Lofty Ranges PWRA	\$6.16/ML on water allocated	\$6.33/ML on water allocated	\$6.50/ML on water allocated
Central Adelaide PWA	–	\$6.33/ML on water allocated	\$6.50/ML on water allocated
Western Mount Lofty Ranges PWRA (water allocated for public water supply)	Fixed charge of \$1,232,400	Fixed charge of \$1,265,675	Fixed charge of \$1,299,848
NRM Water Levy on persons authorised under Section 128 of the NRM Act to take source water for the purpose of: a managed aquifer recharge and recovery or reuse scheme, or aquifer storage and recovery scheme, or dewatering from a water resource within the: - Western Mount Lofty Ranges PWRA - Barossa PWRA - McLaren Vale PWA - Northern Adelaide Plains PWA	\$6.16/ML on water allocated	\$6.33/ML on water allocated	\$6.50/ML on water allocated

Combined social impact of Division 1 and Division 2 levies on irrigated farms

The estimated combined impact of the Division 1 and Division 2 levies on the financial performance of representative farms is as follows:

- For profitable farms (e.g. winegrape farms within the Barossa Prescribed Water Resources Area and apple farms) the impact on farm profitability could be minimal.
- For moderately profitable farms (e.g. winegrape farms within the Western Mount Lofty Ranges Prescribed Water Resources Area, almonds, olives, potatoes, irrigated dairy and irrigated beef) the impact on farm profitability could be moderate.
- For marginally profitable farms (e.g. winegrape farms within the Northern Adelaide Plains Prescribed Wells Area) the impact could be significant.

Combined impact of the Division 1 and 2 levies on gross regional product

Gross regional product (GRP) for the Adelaide and Mount Lofty Ranges NRM region for 2016–17 was estimated to be \$84.724 billion. The various levy amounts to be collected under Division 1 and 2 levies as a proportion of GRP show that the total amount to be collected is less than 0.1 per cent of the Adelaide and Mount Lofty Ranges NRM region GRP.



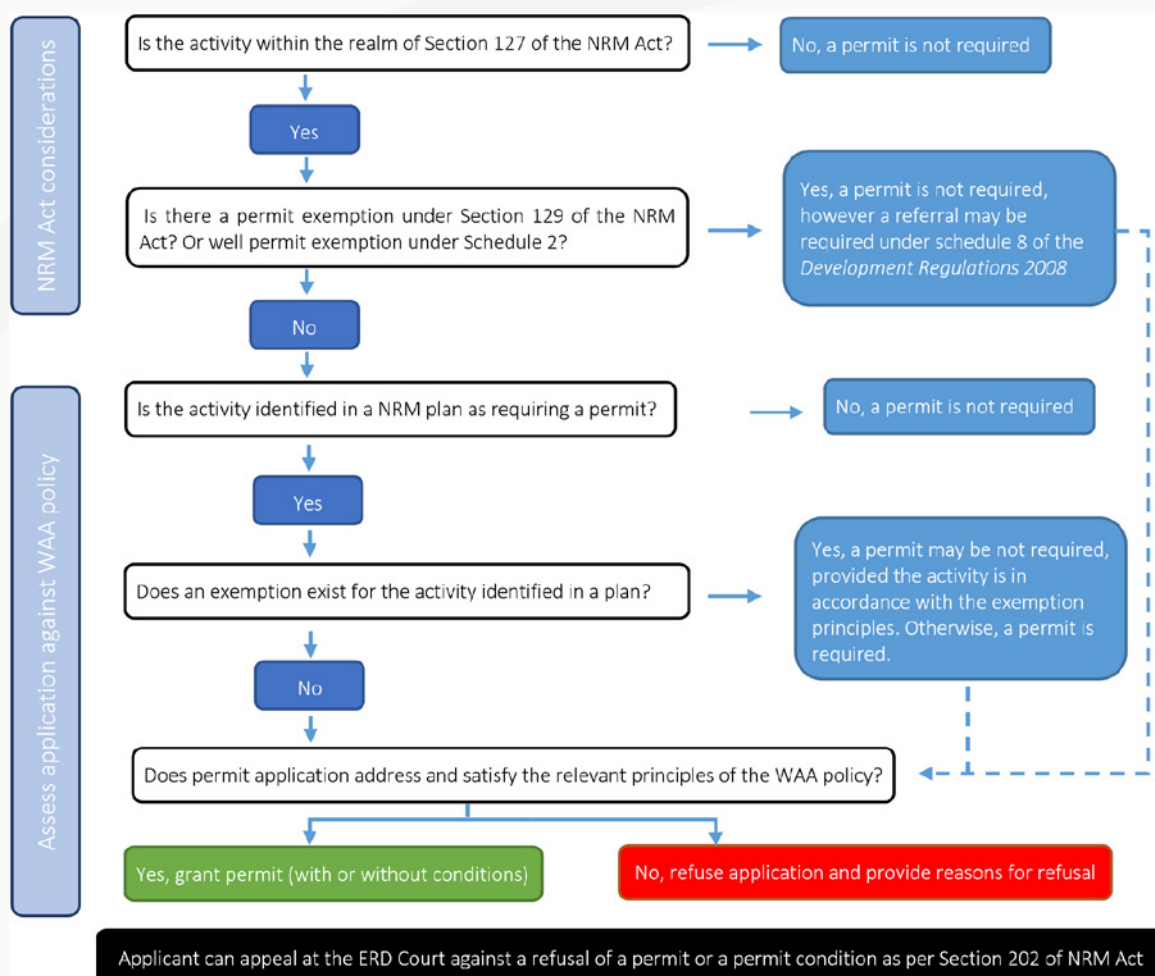
Appendix B: Water affecting activity permits

Section 75(3)(k) of the *Natural Resources Management Act 2004* (the NRM Act) requires the Adelaide and Mount Lofty Ranges Natural Resources Management 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.

The conditions under which the board will grant or refuse a permit may be outlined in either the regional NRM plan (this document) or a relevant water allocation plan (WAP). Where a WAP exists and outlines policies for any given water affecting activity, the policies within the WAP will be used as the basis for the assessment of the permit application. The policies in this section will be used only where a relevant WAP does not apply.

A permit is required for water affecting activities (WAAs) described in section 127(3) of the NRM Act, and 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, for example, activities approved under other legislation, such as the *Environment Protection Act 1993 (SA)* or the *Planning, Development and Infrastructure Act 2016 (SA)*. In addition, the board has identified some instances where activities that would usually require a permit are excluded (Table B1).

A WAA permit application is assessed using the following steps:



Public notification

Public notification is not required for any WAA permit applications under the NRM Act.

Current recommended practice

The board has determined a process for granting exemptions to landowners for particular WAAs that would otherwise require a permit.

Current recommended practices (CRPs) are approved procedures endorsed by the board. A CRP sets out what the board considers to be the most appropriate approach, methodology and/or design for undertaking activities pursuant to section 127 of the NRM Act. In addition, a CRP may clarify the standards required to discharge the specific duty, pursuant to section 133 of the NRM Act.

In some instances, a CRP will negate the requirement for a WAA permit. Table B1 lists the WAAs that have the potential to be low risk and therefore suitable for a CRP. A list of approved CRPs is published on the board's website.

Best practice operating procedures

The board has determined a process for granting exemptions to local government and other statutory authorities for particular WAAs that would otherwise require a permit. Best practice operating procedures are approved procedures developed by eligible authorities to exceed minimum standards of operations for a range of water activities undertaken.

Table B1: Water-affecting activities (WAA) and associated exclusions

127(3)(a)	Act definition: Drilling, plugging, backfilling or sealing a well <i>For example, well closure</i>
	WAAs excluded from requiring a permit: • None
	Relevant authority: Minister
127(3)(b)	Act definition: Repairing, replacing or altering the casing, lining or screening of a well <i>For example, well maintenance or upgrade</i>
	WAAs excluded from requiring a permit: • None
	Relevant authority: Minister
127(3)(c)	Act definition: Draining or discharging water directly or indirectly into a well <i>For example, managed aquifer recharge</i>
	WAAs excluded from requiring a permit: • None
	Relevant authority: Minister

127(3)(d)	Act definition: The erection, construction, modification, enlargement or removal of a dam, wall or other structure that will collect or divert, or collects or diverts: (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 <i>For example, construction of a dam, wall or other structure; channeling a watercourse</i> WAAs excluded from requiring a permit: • None Relevant authority: Board
127(5)(a)	Act definition: 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, 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 <i>For example, construction of a dam, channeling a watercourse</i> WAAs excluded from requiring a permit: • None Relevant authority: Board
127(5)(b)	Act definition: The erection, construction or placement of any building or structure in a watercourse or lake or on the floodplain of a watercourse <i>For example buildings or structures <10m²; culvert; crossing point or bridge; fencing</i> WAAs excluded from requiring a permit: • Activity that is proposed to be undertaken beyond the one in 100 year flood recurrence level, where flood mapping is available, or a distance of 10 metres or more from the banks of the nearest watercourse, where flood mapping is not available • Activity undertaken by local government (directly or by its contractors), a state agency or utility that has a board–endorsed best practice operating procedure addressing the activity • Activity undertaken in accordance with any board–endorsed current recommended practice • A board–endorsed activity • Activity pursuant to an obligation under either the <i>Metropolitan Drainage Act 1935</i>, or <i>South–Western Suburbs Drainage Act 1959</i> Relevant authority: Board

127(5)(c)	Act definition: Draining or discharging water directly or indirectly into a watercourse or lake <i>For example, stormwater from buildings</i> WAAs excluded from requiring a permit: • Activity undertaken by local government (directly or by its contractors), a state agency or utility that has a board–endorsed best practice operating procedure addressing the activity • Activity undertaken in accordance with any board–endorsed current recommended practice • A board–endorsed activity • Activity pursuant to an obligation under either the <i>Metropolitan Drainage Act 1935</i>, or <i>South–Western Suburbs Drainage Act 1959</i> Relevant authority: Board
127(5)(d)	Act definition: Depositing or placing an object or solid material in a watercourse or lake <i>For example, island in an on–stream dam; rip raps; rocks; tyres; snags; filling a watercourse etc.</i> WAAs excluded from requiring a permit: • Activity undertaken by local government (directly or by its contractors), a state agency or utility that has a board–endorsed best practice operating procedure addressing the activity • A board–endorsed activity • Activity undertaken in accordance with any board–endorsed current recommended practice • Activity pursuant to an obligation under either the <i>Metropolitan Drainage Act 1935</i>, or <i>South–Western Suburbs Drainage Act 1959</i> Relevant authority: Board
127(5)(e)	Act definition: Obstructing a watercourse or lake in any other manner <i>For example, planting vegetation</i> WAAs excluded from requiring a permit: • Activity undertaken by local government (directly or by its contractors), a state agency or utility that has a board–endorsed best practice operating procedure addressing the activity • A board–endorsed activity • Activity undertaken in accordance with any board–endorsed current recommended practice Relevant authority: Board

127(5)(f)	Act definition: 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 <i>For example, levee; depositing fill</i> WAAs excluded from requiring a permit: • Activity pursuant to an obligation under either the <i>Metropolitan Drainage Act 1935</i>, or <i>South–Western Suburbs Drainage Act 1959</i> • A board–endorsed activity • Activity undertaken in accordance with any board–endorsed current recommended practice Relevant authority: Board
127(5)(g)	Act definition: Destroying vegetation growing in a watercourse or lake, or growing on the floodplain of a watercourse <i>For example, removal or destruction of trees, shrubs, grasses</i> WAAs excluded from requiring a permit: • Activity undertaken by local government (directly or by its contractors), a state agency or utility that has a board–endorsed best practice operating procedure addressing the activity • A board–endorsed activity • Activity undertaken in accordance with any board–endorsed current recommended practice Relevant authority: Board
127(5)(h)	Act definition: 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 <i>For example, desilting, wetlands, swamps and springs</i> WAAs excluded from requiring a permit: • Activity undertaken by local government (directly or by its contractors), a state agency or utility that has a board–endorsed best practice operating procedure addressing the activity • Activity undertaken in accordance with any board–endorsed current recommended practice • Activity pursuant to an obligation under either the <i>Metropolitan Drainage Act 1935</i>, or <i>South–Western Suburbs Drainage Act 1959</i> • Desilting a dam, provided it: - o involves the removal of unconsolidated material deposited since dam construction or since the dam was previously desilted - o does not involve a WAA pursuant to 127(5)(d) Relevant authority: Board

127(5)(i)	Act definition: Using water, in the course of carrying on a business in an NRM region, at a rate that exceeds 1 ML/ha/yr, if the water has been brought into the region by means of a pipe or other channel <i>For example, use of imported water for irrigation</i> WAAs excluded from requiring a permit: • Where the water is sourced from an SA Water owned or operated mains water supply network • Activity undertaken in accordance with the board's current recommended practice Relevant authority: Minister
127(5)(j)	Act definition: Using effluent, in the course of carrying on a business in an NRM region, at a rate that exceeds 1 ML/ha/yr <i>For example, use of treated effluent</i> WAAs excluded from requiring a permit: • None Relevant authority: Minister
127(5)(k)	Act definition: An activity prescribed by the regulations <i>For example, forestry</i> WAAs excluded from requiring a permit: • None Relevant authority: Board

Water affecting activity permit policies for the region

The following general objectives and principles apply to all 'on merit' WAA applications assessed in the Adelaide and Mount Lofty Ranges region.

Objectives

1. Develop and use water resources in a sustainable 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 and preserve watercourse, lake and floodplain geomorphology.
4. Protect the long term integrity of ecological functions and dependent biodiversity.

Principles

1. Activities should not compromise the use or quality of water resources, or the capacity for natural systems to restore or maintain water quality.
2. Activities should not take place where they are likely to adversely impact on the migration of biota.
3. Natural creek and watercourse systems should be retained.
4. The design, construction and management of structures and activities must not result in watercourse erosion.
5. Activities should be designed and located so as not to alter the geomorphology of a watercourse or lake.
6. Activities should not contribute to dryland salinity or rising water tables.
7. Activities should not compromise the integrity of authorised scientific data collection and monitoring facilities related to the assessment and management of water resources.
8. Activities should not:
 - a. be located in ecologically sensitive areas
 - b. cause or exacerbate unnatural waterlogging, or increase groundwater induced salinity

- c. affect water-dependent ecosystems, or environmental water requirements for underground water, watercourse, wetlands or floodplains
- d. cause or increase the risk of flooding, upstream or down
- e. cause or increase erosion, or affect bed and bank stability, or
- f. detrimentally impact on ecological diversity and habitats.

Objectives and principles for specific water-affecting activities

The following objectives and principles relate to specific situations. They are additional to those expressed in the whole-of-board area water-affecting activities permit policies.

Well construction and repair: section 127(3)(a) and (b)

Where a WAP applies, the objectives and principles in the relevant WAP will be used as the basis for assessment.

The following objectives and principles apply to permits for activities relating to wells under the following sections of the Act:

- 127(3)(a) drilling, plugging, backfilling or sealing of a well
- 127(3)(b) repairing, replacing or altering the casing, lining or screen of a well.

Objectives

1. Protect the quality of underground water resources.
2. Protect groundwater-dependent ecosystems.
3. Minimise the impact on underground water resources.
4. Protect underground water resources from pollution, deterioration and undue depletion.
5. Ensure the integrity of headworks is maintained.

Principles

1. Well construction must be in accordance with the General Specification for Well Construction, Modification and Abandonment in South Australia (or any subsequent or related policy), as provided by the relevant authority.

Impact of well works on water quality and integrity of the aquifer

2. The equipment, materials and methods used in the drilling, plugging, backfilling or sealing of a well, or the replacement or alteration of the casing, lining or screen of a well, must not adversely affect the quality of the underground water resource.
3. Aquifers must be protected during the drilling, plugging, backfilling or sealing of a well, or the replacement or alteration of the casing, lining or screen of a well, to prevent adverse impacts on the integrity of the aquifer.
4. New wells constructed for the purpose of taking underground water must not be located within 300 metres of an operational well that has a permit or licence to recharge the underground aquifer and is being used for managed aquifer recharge (MAR) unless:
 - a. the new well will be completed in an aquifer that is not in direct hydraulic connection with the aquifer into which the water is being recharged; or
 - b. the new well is part of the existing MAR scheme.

Sealing between aquifers

5. Where a well passes, or will pass, through two or more aquifers, an impervious seal shall be made and maintained between all aquifers.

Wells for drainage or discharge

6. The headworks for the draining or discharge of water must be constructed so that extraction and draining or discharge operations can be metered without interference.
7. The headworks for the drainage or discharge of water must be constructed so that water cannot leak if the well becomes clogged.
8. Wells constructed for the drainage or discharge of water must be pressure cemented along the full length of the casing.

Draining or discharge of water into a well: section 127(3)(c)

Where a WAP applies, the objectives and principles in the relevant WAP will be used as the basis for assessment.

The following objectives and principles apply specifically to activities under section 127(3)(c) of the Act, comprising the draining or discharging of water directly or indirectly into a well (commonly part of an MAR scheme).

In addition the Environment Protection (Water Quality) Policy 2003 (or any subsequent or related policy), prepared under the *Environment Protection Act 1993 (SA)*, should also be considered.

Note: In addition to the requirements outlined below for drainage or discharge into a well, an MAR development may also require a water licence for the recovery component of the scheme, and a water licence for the source water.

Objectives

1. The sustainable operation and management of managed aquifer recharge schemes.
2. Reasonable and practicable measures are taken to avoid the discharge of contamination to the receiving underground water resource during the draining or discharging of water into a well.
3. Prevent environmental harm from the draining or discharging of water into a well.
4. Ensure that draining or discharging water directly or indirectly into a well does not have the potential to adversely affect:
 - a. the quality of underground water
 - b. the integrity of the aquifer, including (but not limited to) the confining layer of the aquifer and the ability of the aquifer to transmit water
 - c. water tables, including (but not limited to) waterlogging, land salinisation and damage to infrastructure (e.g. roads, buildings, foundations)
 - d. any underground water-dependent ecosystem or ecologically sensitive area that depends on the underground water resource
 - e. the ability of other persons to lawfully take from that underground water, or
 - f. the longevity of operations.

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 hydrogeological risk assessment is undertaken to the satisfaction of the relevant authority. This hydrogeological risk assessment must be consistent with the *National Water Quality Management Strategy – Australian Guidelines for Water Recycling: Managing Health & Environmental Risks, Phase 1 2006 (or any subsequent or related policy)*, and include:
 - a. an investigation into the suitability 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 regimes 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 ambient underground water resource, where the water quality characteristics (salinity and chemistry composition) of the water to be discharged differs to that of the ambient underground water.
 3. Water that is drained or discharged into a well by means of gravity only is exempt from meeting the requirements of principle 2(a).
 4. Roof runoff (surface water) 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 ambient underground water at the draining or discharge site. Roof runoff (surface water) captured in a closed system and then drained or discharged into a well is exempt from this principle.
 6. For the purposes of principles 2 and 3, the relevant concentrations, levels or amounts shall be measured in sufficient representative samples of:
 - a. the water to be drained or discharged
 - b. ambient underground water collected from the proposed point of injection, or as near as possible to the proposed point of injection.
- Note: '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 so as to accurately represent the quality of the relevant water.
7. For the purposes of this plan, the term 'ambient underground water' means water that occurs at the proposed site of injection in the relevant aquifer, before beginning the proposed draining and discharge activity.
 8. The draining or discharging of water directly or indirectly into a well must not detrimentally affect the ability of other persons to lawfully take from that underground water, or degrade ecosystems dependent on the underground water.
 9. The headworks for the draining or discharge of water shall be constructed so that extraction and draining and discharge operations can be metered without interference.
 10. The headworks for the draining or discharge of water must be constructed so that water cannot leak if the well becomes clogged.
- Note: For the purposes of this plan, the term 'headworks' means any assembly on top of a well and located between the well casing and the water delivery system.
11. 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.



Water storage and diversion: section 127(3)(d) and 127(5)(a)

Where a WAP applies, the objectives and principles in the relevant WAP will be used as the basis for assessment.

Where a WAP does not exist, or is not in operation, the objectives and principles that follow apply specifically to an activity under:

- Section 127(3)(d) – the erection, construction, modification, enlargement or removal of a dam, wall or other structure that will collect or divert, or collects or diverts (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
- Section 127(5)(a) – 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 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.

Note: Dams that have a wall height greater than three metres or a volume of five megalitres or greater require development approval under the *Development Act 1993* therefore do not require a permit for a water affecting activity. Development approval is issued by local councils. Applications received by a local council are referred to the relevant authority for direction.

Objectives

1. Maintain and improve the quality and quantity of water flowing in the region.
2. Ensure that dams, walls or other water collection or diversion mechanisms in watercourses and drainage paths are constructed and managed in a manner which:
 - a. protects the needs of downstream users
 - b. protects water quality and quantity
 - c. protects ecosystems dependent on these resources.

Principles

1. The combined capacity of all dams in a catchment within an allotment shall not exceed 50 per cent of the annual runoff for that catchment in the allotment.

Note: For the purposes of principle 1, 'annual runoff' is a volume derived from 10 per cent of the mean annual rainfall for the allotment, multiplied by the area of the allotment.

Note: For the purposes of principle 1, the term 'allotment' means an allotment delineated on a certificate of title under the *Real Property Act 1886* and includes two or more contiguous allotments owned or occupied by the same person and operated as a single unit for the purpose of primary production.

Location

2. Dams, including dam walls and spillways must not be located:
 - a. in, immediately upstream or downstream of an ecologically sensitive area
 - b. in an area prone to erosion
 - c. on–stream for third order, or higher, streams (and water should be diverted to an off–stream dam wherever possible for first and second order streams), or
 - d. where the migration of aquatic biota could be adversely affected.

Note: For the purpose of principle 2, an ‘on–stream dam’ means 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 runoff flowing along that drainage path.

Note: For the purpose of principle 2, an ‘off–stream dam’ means a dam, wall or other structure that is not constructed across a watercourse or drainage path and is designed to hold water diverted, or pumped, from a watercourse, a drainage path or aquifer, or from another source. Off–stream dams may capture a limited volume of surface water from the catchment above the dam, but may not take an amount of surface water, from the catchment above the dam, in excess of 5 per cent of its total volume.

3. In order to minimise impacts on downstream water–dependent ecosystems:
 - e. dams must not be located on–stream for third order or higher streams; or
 - f. water should be diverted to an off–stream dam wherever possible for first and second order streams.

Note: For the purposes of principle 3, the threshold flow rate (litres/second) means:

- a. The flow rate of a watercourse or drainage line (litres/second) determined by multiplying the unit threshold rate (litres/second/square kilometre) by the area of catchment (square kilometre) that contributes to the watercourse or drainage line, that is above the point where the water is diverted from the watercourse or drainage line: or

- b. 1 litre/second, whichever is the greater.
- c. For the purposes of (a), the unit threshold flow rate of a subcatchment can be determined by dividing the 10th per centile flow rate (litres/second) for a subcatchment (square kilometres), where the 10th per centile flow rate is the 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 10 per cent of all flows during that period.

Dam construction and design

4. Dams should be sited and constructed to:
 - a. minimise the loss of soil from the site through soil erosion and siltation
 - b. minimise the removal or destruction of in–stream or riparian vegetation.
5. Provision shall be made for flow to pass the dam as follows:
 - a. A diversion structure shall include a device that prevents the diversion of water from the watercourse or drainage line during periods of flow at, or below, the threshold rate.
 - b. An on–stream dam, wall or structure shall include a device that regulates the diversion of any flow at, or below, the threshold rate, away from the dam and returning it back to the same watercourse or drainage line below the dam, wall or structure.
6. Collection or diversion of water flowing in a watercourse, or over land, must not adversely affect downstream water–dependent ecosystems by causing reduced stream flow duration, lengthened periods of no or low flow, or other such impacts, unless it is part of an NRM plan project of the board (for example, a constructed wetland).

Removal of a dam

7. Removal of a dam shall not result in:
 - a. increased erosion
 - b. increased flooding
 - c. bed and bank instability
 - d. downstream sedimentation
 - e. loss of riparian vegetation
 - f. decline in water quality, or
 - g. alteration to the natural or pre-existing flow regimes of a watercourse.
8. The site of the dam should be remediated and revegetated so that there are no ongoing impacts on the downstream environment.

Structures in watercourses: section 127(5)(b)

The objectives and principles that follow apply specifically to an activity under section 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.

Objectives

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

Principles

1. Construction and placement of structures, including roads, in a watercourse, a floodplain of a watercourse, a lake, a wetland, or an area subject to inundation:
 - a. shall be designed to minimise the risk of erosion resulting from the construction and location of the structure
 - b. must not adversely affect the provision of environmental water requirements of those areas (for example, by impeding flows)
 - c. must not adversely affect the migration of aquatic biota
 - d. must not alter the hydrology of a stream in such a way as to adversely impact on the ecology
 - e. must not result in flooding, either upstream or downstream
 - 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. Structures that impede the flow of water, including but not limited to weirs, must be designed to enable flows at or below the threshold flow rate, excluding structures for the specific purpose of measuring stream flow for scientific purposes.

Draining 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) draining or discharging water directly, or indirectly, into a watercourse or lake.

In addition to the objectives and principles outlined in this section, the requirements of the Environment (Water Quality) Policy 2003 (or any subsequent or related document) prepared under the *Environment Protection Act 1993* (SA) should be considered.

Objectives

1. Protect ecosystems dependent on the receiving water resources.
2. Sustain the existing uses of the receiving water resources.

Principles

1. Drained and discharged water must be of a suitable quality to:
 - a. sustain the existing uses of the receiving waters
 - b. protect ecosystems that are dependent on the receiving waters.
2. Draining or discharging water must be undertaken in a manner that ensures:
 - a. contaminants in drainage or discharge water are contained and managed on site to minimise the conveyance of contaminants into watercourses, lakes, or underground water resources
 - b. the quality of water drained, or discharged, into a watercourse, or lake, is of the same quality or better than that of the receiving water environment.
3. The discharge or drainage of water into a watercourse must be at a rate and in a location such that:
 - a. the geomorphology of the watercourse is protected
 - b. the flow capacity of the watercourse is considered
 - c. there is no increase in the risk of flooding downstream
 - d. the migration of aquatic biota is not adversely affected.

4. Drainage or discharge of water into a watercourse, or lake, shall be undertaken only where protective measures have been provided to minimise erosion or degradation in the quality of the receiving water.
5. Watercourses shall be retained in their natural state, to promote natural filtering and pollutant removal processes.

Depositing objects in a watercourse: sections 127(5)(d), 127(5)(e) and 127(5)(f)

The objectives and principles that follow apply specifically to an activity under:

- section 127(5)(d) depositing or placing an object or solid material in a watercourse, or lake
- section 127(5)(e) obstructing a watercourse, or lake, in any other manner
- section 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. Watercourses and lakes are protected against:
 - a. destruction of bed and banks
 - b. water pollution
 - c. erosion
 - d. habitat destruction.
2. Watercourses, or lakes, are free of obstructions that may:
 - a. impede natural stream flow, or
 - b. cause unnecessary flooding.

Principles

1. An object, or solid material, shall be deposited or placed in a watercourse, or lake, only where it includes:
 - a. the construction of an erosion control structure, for example a rock chute or rip rap
 - b. a device or structure used to extract or regulate water flowing in a watercourse, for example diversion weirs, or
 - c. an activity required for scientific purposes, for example flow measuring devices.

2. Any object or solid material used in the control or prevention of watercourse erosion shall not cause:
 - a. increased erosion upstream or downstream
 - b. detrimental impacts.
3. The depositing or placing of an object, or solid material, in a watercourse, or lake, shall not adversely affect:
 - a. water-dependent ecosystems
 - b. the migration of aquatic biota, or
 - c. the natural flow regime.
4. Obstructing a watercourse or lake shall not cause erosion.
5. 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.
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, should:
 - a. provide for the needs of ecosystem processes (including the migration of aquatic biota)
 - b. minimise the impact or risk of flooding on human communities.

Note: For the purpose of these principles, an 'object' can include vegetation, such as fallen trees and other plant debris.

Destroying vegetation or excavating in a watercourse: sections 127(5)(g) and 127(5)(h)

These sections do not apply where the clearance of vegetation requires approval under the *Native Vegetation Act 1991*.

The objectives and principles that follow apply specifically to an activity under:

- section 127(5)(g), destroying vegetation growing in a watercourse, or lake, or growing on the floodplain of a watercourse
- section 127(5)(h), excavating or removing rock, sand or soil from:
 - a watercourse, or lake, or the floodplain of a watercourse, or
 - 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.

Objectives

1. Ensure that watercourses, lakes and floodplains are protected against adverse impacts arising from the destruction of vegetation or the excavation and removal of rock, sand and soil.

Principles

1. Vegetation shall be destroyed only where it is for the protection of existing development or infrastructure, or rehabilitation of a watercourse, and does not result in any of the following:
 - a. increased erosion
 - b. increased flooding
 - c. bed and bank instability
 - d. downstream sedimentation
 - e. decline in water quality
 - f. alteration to the natural flow regime of a watercourse
 - g. destruction of significant habitat for wildlife.
2. The excavation and removal of rock, sand or soil must not adversely impact on:
 - a. the ecology of a watercourse, lake or floodplain
 - b. migration of aquatic biota.
3. The excavation and removal of rock, sand or soil must not result in:
 - a. increased erosion
 - b. increased flooding
 - c. bed and bank instability
 - d. downstream sedimentation
 - e. loss of riparian vegetation
 - f. decline in water quality
 - g. alteration to the natural flow regime of a watercourse.

Use of imported water or treated effluent water: sections 127(5)(i) and 127(5)(j)

Where a WAP applies, the objectives and principles in the WAP will be used as the basis for assessment.

Where a WAP does not exist, or is not in operation, the objectives and principles that follow will apply specifically to an activity under:

- section 127(5)(i), for the application of water on land, in the course of carrying on a business, at a rate that exceeds 1 ML/hectare/year, if the water has been brought into the region by means of a pipe or other channel
- section 127(5)(j), using effluent, in the course of carrying on a business, at a rate that exceeds 1 ML/hectare/year.

Note: If the use of effluent is managed through a licence issued by the Environment Protection Authority, this section (section 127 (5)(j)) does not apply.

Objectives

1. The sustainable use of imported water or effluent so that it does not adversely impact on:
 - a. structures or ecosystems, through a rise in underground water levels
 - b. the natural flow of watercourses
 - c. the quality of surface water, underground water or water in watercourses
 - d. the productive capacity of the land, through rising underground water levels, salinity, sodicity, waterlogging or nutrient levels, or
 - e. the condition, biodiversity or extent of water-dependent ecosystems.

Principles

1. Use of imported water or effluent water should not cause a rise in the underground water level, sufficient to detrimentally affect structures or ecosystems.
2. Use of imported water or effluent should not adversely affect the natural flow of water, or the quality of surface water, underground water or water in a watercourse, or lake.
3. Use of imported water or effluent should not adversely affect the productive capacity of the land, by causing salinity, sodicity, waterlogging, perched water tables or other such impacts.
4. Use of imported water or effluent should not adversely affect water-dependent ecosystems.
5. Imported water or effluent should be stored in a closed system, with no natural catchment, and constructed to prevent:
 - a. leakage to the surrounding soils
 - b. overflow from the dam to the surface of the land surrounding the dam
 - c. overflow from the dam into a watercourse.

Glossary

Aquifer

A permeable zone of rock or sediment in which underground water is stored.

Board-endorsed activity

An activity for which express written support or approval has been provided by the board or its representative based on having been scored accordingly using the risk assessment for WAAs.

Best practice operating procedure

Board approved procedures developed by eligible authorities to exceed minimum standards of operations for a range of water activities undertaken that incorporates the scoring of proposed works using the board's risk assessment.

Catchment

Is the area of land determined by natural topographic features that naturally drains to a watercourse or lake.

Catchment area (of a particular point)

The land determined by natural topographic features, from which runoff has potential to naturally drain to that point.

Current recommended practice (CRP)

Guidelines which stipulate the board's 'current recommended practice' for undertaking specific water affecting activities. In some cases, a CRP will negate the need to apply for a WAA permit application.

Detrimentially affect

An activity that causes, or is likely to cause, temporary or permanent damage or harm to: water quality, aquatic life or ecosystem health.

Effluent

Domestic wastewater or industrial wastewater (as defined in the NRM Act).

Environment Protection (Water Quality) Policy 2015

The Environment Protection (Water Quality) Policy 2015 provides the structure for regulation and management of water quality in South Australian inland surface waters, marine waters and groundwaters.

First order watercourse

A watercourse that does not have a tributary flowing into it.

Floodplain

- a. Any area of land adjacent to a watercourse, lake or estuary that is periodically inundated with water. This includes any other area designated as a floodplain by: a regional NRM plan; or
- b. a Development Plan under the *Development Act 1993*.

Headworks

An assembly on top of a well that is located between the well casing and the water delivery system.

Managed aquifer recharge (MAR)

Water is artificially recharged (by draining or discharging water into a well) to an aquifer for subsequent recovery.

National Water Quality Management Strategy, Australian Guidelines for Water Recycling: Managing Health & Environmental Risk (Phase 2) 2009

These guidelines provide a generic 'framework for management of recycled water quality and use' that applies to all combinations of recycled water and end users

Rip rap

Graded rock placed on the bed or banks of a watercourse as an erosion protection measure.

Rock chute

An engineered rock structure designed to control the bed grade of a watercourse.

Second order watercourse

Where two first order watercourses join, the subsequent watercourse becomes a second order watercourse.

Stream order

Stream order is the method for classifying the order of a watercourse. This is based on the Strahler stream ordering system, and is defined at 1:50,000 topographic map series. Stream ordering describes the most upstream part of a watercourse as a first order stream. When two first order watercourses join they become a second order stream, and when two second order watercourses join they become a third order stream and so on.

Third order watercourse

When two or more second order watercourses join they form a third order watercourse.

Threshold flow rate

The flow rate at or below which water must not be taken, or if taken is to be returned to the same watercourse or drainage path immediately downstream of the dam or structure. This rate is site-specific and can be calculated by the following method:

- The flow rate of a watercourse or drainage line (litres/sec.) determined by multiplying the unit threshold rate (litres/sec./square kilometres) by the area of catchment (square kilometres) that contribute to the watercourse or drainage line, that is above the point where the water is diverted from the watercourse or drainage line; or 1 litre/second, whichever is the greater.
- For the purposes of (a), the unit threshold flow rate of a subcatchment can be determined by dividing the 10th per centile flow rate (litres/second) for a subcatchment (square kilometres), where the 10th percentile flow rate is the flow rate (litres/second) obtained from a time weighted annual flow duration curve (with the time step being one day – mean flow), which is greater than or equal to 10 per cent of all flows during that period.

Watercourse

As defined in the NRM Act and means 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) a dam or reservoir that collects water flowing in a watercourse;
- (b) a lake through which water flows;
- (c) 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;
- (d) part of a watercourse;
- (e) an estuary through which water flows;
- (f) any other natural resource, or class of natural resource, designated as a watercourse for the purposes of the NRM Act by an NRM plan.

Additionally, Section 3(3)(a) of the NRM Act provides the following definition for a watercourse:

- (i) the bed and banks of the watercourse (as they may exist from time to time); or
- (ii) the water for the time being within the bed and banks of the watercourse (as they may exist from time to time); or
- (iii) both, depending on the context.

Water dependent ecosystems

Those parts of the environment, the species composition and natural ecological processes that are determined by the permanent or temporary presence of flowing or standing water, above or below ground.

Water quality

The physical, chemical and biological characteristics of water.

Water pollution

Any chemical, physical or biological change in the quality of a body of water that has a harmful effect on any living thing that drinks, uses or lives in, and around it.

Water resource

A watercourse or lake, surface water, underground water, stormwater (to the extent that it is not within a preceding item) and effluent, as defined in the NRM Act.

Wetland

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 and 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) and includes any other area designated as a wetland by:

- a. an NRM plan; or
- b. by a Development Plan under the *Development Act 1993*;

but does not include:

- c. 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.

Water pollution

Any chemical, physical or biological change in the quality of a body of water that has a harmful effect on any living thing that drinks, uses or lives in, and around it.



DISCLAIMER: The Adelaide and Mount Lofty Ranges Natural Resources Management Board and the Government of South Australia, their employees and their servants do not warrant or make any representation regarding the use or results of use of the information contained herein as to its correctness, accuracy, currency or otherwise.

Licensed under Creative Commons
Attribution 3.0 Australia Licence
www.creativecommons.org/licenses/by/3.0/au
Copyright Owner: Crown in right of the State
of South Australia 2019

Printed on recycled paper
FIS 95567

