

**SUMMARY
REPORT**

**The
State
We're
In**



Acknowledgement of Country

The EPA acknowledges and respects the Aboriginal peoples of South Australia as the first peoples and nations of this state. We recognise them as the traditional custodians of land and waters in South Australia and that their spiritual, social, cultural and economic beliefs are of ongoing importance today. We recognise that they have made, and continue to make, a unique and irreplaceable contribution to the state.



Artwork by Ngarrindjeri artist Jordan Lovegrove.

South Australia State of the Environment Summary Report 2023

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ISBN 978-1-925521-10-8 | December 2023

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Foreword

South Australians can be proud of the work that has been done to help protect and restore our environment. South Australia has taken leadership in reducing greenhouse gas emissions through renewable energy generation, progressing a circular economy through resource recovery and removing a range of plastics from the waste stream. Programs have also been implemented to tackle biodiversity loss and improve management of our water resources.

The 2023 State of the Environment Report shows, however, that for some areas, particularly climate change impacts and biodiversity, the trends continue to get worse. The 2018 State of the Environment Report included recommendations for addressing impacts on climate, biodiversity and coastal regions. However, plans and actions have not delivered improvements at a scale and speed sufficient to address these impacts.

Unless urgent measures are taken, the climate emergency and biodiversity losses will become crises for the environment and our communities.

The impacts of climate change will be felt across our state. For South Australians in metropolitan, regional and remote communities, extreme weather events will present significant health risks through heat, poor air quality, bushfires and floods. For industry, adaptation to these impacts will present significant business challenges. For the environment, changing ecological conditions will occur at a pace that is faster than nature's ability to adapt.

For the first time, the 2023 SOER includes liveability, which recognises the importance of our environment for people's health and wellbeing. This was recognised as an important value by the community from our consultation through YourSAy. Managing impacts from urban sprawl and infill through addressing protection and enhancement of green space and tree canopy, implementing water sensitive urban design and better facilitation of active and public transport is vital for maintaining the liveability of our environment, particularly in the face of climate change

Despite the scale of the challenges and the fact that we may not always have sufficient data to fully understand the state of our environment, we do know that our actions for helping to protect the environment will influence its health for future generations. A number of strategies and plans have been developed across government to address critical environmental issues. Many of these have been discussed in this report. They provide actions that are critical to the future of our environment, society and economy. However, this report also recognises the lack of an overarching framework that could identify interdependencies between agencies and programs and prioritise actions based on the level of risk. Without this, critical actions may not receive the attention needed. We also need to measure the impact of these actions to understand whether they are making a difference.

The EPA recognises the importance of cultural knowledge of Aboriginal peoples as the traditional custodians in protecting and restoring Country. However, in the past, we have failed to incorporate their understanding of health of Country into the State of the Environment Report. For the first time, South Australia's State of the Environment Report includes an expert report and recommendations on how we can more effectively incorporate Aboriginal cultural perspectives into our approach for protecting the environment.

A healthy environment supports healthy people. It also supports South Australia's economy. We need to improve this connection and inspire South Australians to be involved in protecting and maintaining a healthy environment. We can learn from Aboriginal peoples, who have a more holistic view of the environment on which they rely and see themselves as having a responsibility to 'look after Country, so that it can look after you'.

The State of the Environment Report highlights pressures that have the potential to impact the environment and makes recommendations for action. Accountability will be important to ensure actions are resourced, enabled, driven and supported to ensure their implementation.

We have 'planned'—we now need to 'do' and 'review'. Prioritisation and delivery of recommendations and actions are essential to South Australia achieving its goals.

Protecting the environment for future generations is a shared responsibility. If we all play our part and work together, our response will be stronger. This report is not just for government, but also for industry, communities and individuals. It can serve as a catalyst for meaningful conversations and collaboration. We will need to work together to achieve the necessary outcomes. By embracing resilience, sustainability and responsibility collectively, we can help ensure the future and prosperity of our beautiful state, for generations to come.

Ms Catherine Cooper

Presiding Member
Board of the Environment Protection Authority



Delivering the 2023 State of the Environment Report

The preparation of the State of the Environment Report (SOER) is required every five years under the Environment Protection Act 1993 (EP Act). This is the eighth published SOER since 1988, and the sixth prepared under the requirements of the EP Act.

The 2023 SOER collates and provides information, which is sorted for ease of access into seven highly interlinked aspects of the environment, namely: Climate, Air, Land, Waters, River Murray, Sea and Liveability. It adopts the international pressure-state-response model, which reports on the state or condition of the environment and identifies the key pressures that are or could be impacting the environment and responses that are being used to mitigate those pressures and protect and restore environmental condition. The SOER provides recommendations to government to address significant environmental issues and offers suggestions that could be applied to improve environmental outcomes.

Upon completion of the 2018 SOER, the EPA undertook an [independent review](#) to identify areas for improvement. In response to this review, the EPA sought to improve its stakeholder engagement by establishing a [YourSAY page](#) to seek input from the general community, undertook regional engagement and expanded stakeholder representation on the SOER Project Board and Assurance Group. An interagency project team was also formed and included staff from the Department for Environment and Water (DEW) who were responsible for preparing [South Australia's environmental trend and condition report cards 2023](#), that form an integral part of the SOER.

In addition, for the first time, the 2023 SOER has included the views of Aboriginal peoples on 'How Healthy is Country'.

The EPA sincerely thanks all people who have provided input and reviewed the information that is presented in this report.

Information was also obtained via the commissioning of independent opinion papers by experts in specialised fields, accessing relevant websites including the [Australia SOER 2021](#) and by utilising in-house environmental knowledge.

General stakeholder feedback highlighted the importance of reporting on the implementation of SOER recommendations and the 2023 SOER reports on the South Australian Government and agency work that aligns with the recommendations made in the 2018 report.

A continuing issue that has been raised by recommendations in previous SOERs, has been the lack of data and information for some environmental aspects and the limited reliability of current data in other cases. DEW's expansion of its trend and condition reporting has been a response to this challenge, and it is implementing further measures to address this. However, this is still a significant issue for South Australia, making it difficult to prioritise where environmental investments are to be targeted and assess the effectiveness of programs aimed at protecting and restoring environmental condition.

It is recognised that further improvements in environmental reporting need to be made to better incorporate the views of Aboriginal peoples, to further integrate with reporting undertaken by DEW and Landscape Boards and align with national reporting frameworks.



Recommendations and significant issues

The environment supports everything we need to survive, grow and prosper—air, water, food, resources, and health and wellbeing. It is therefore vital that we do everything we can to protect, maintain and restore the environment, for current and future generations.

Yet the activities we undertake continually impact the very aspects of the environment we rely on for our survival and health and wellbeing. We have historically adapted the environment to suit our needs. The moment is long overdue for us to now adjust to and meet the demands of our environment. It is now crucial to promptly address the challenges and effects our environment is experiencing. Acknowledging the necessity to manage the environment comprehensively and the interdependent nature of the challenges, as well as implementing effective responses, are vital for successfully dealing with these issues.

The [Australia State of the Environment Report 2021](#) provides a sombre message:

“

‘Overall, the state and trend of the environment of Australia are poor and deteriorating as a result of increasing pressures from climate change, habitat loss, invasive species, pollution and resource extraction. Changing environmental conditions mean that many species and ecosystems are increasingly threatened. Multiple pressures create cumulative impacts that amplify threats to our environment, and abrupt changes in ecological systems have been recorded in the past 5 years.’

‘Although there have been numerous environmental initiatives at both national and state and territory levels, there is insufficient overall investment and lack of coordination to be able to adequately address the growing impacts from climate change, land clearing, invasive species, pollution and urban expansion.’

‘Ongoing environmental decline also has negative economic impacts on industries, businesses, regions and individuals. In a rapidly changing climate, with declining biodiversity, the general outlook for our environment is deteriorating. The impacts of this will affect us all.’

”

These messages also apply to South Australia.

**The SOER provides RECOMMENDATIONS
to the South Australian Government.**

**It also highlights SIGNIFICANT ISSUES raised
during consultation and analysis regarding issues
affecting environmental outcomes for South Australia.**

Recommendations

It is advised that if the South Australian Government accepts these recommendations, they are incorporated into the business planning strategies of relevant agencies with progress reported annually.

This will ensure the recommendations are delivered and can be appropriately referenced in the 2028 State of the Environment Report to improve transparency and accountability for their implementation.



LOXTON

Tree of Knowledge
Flood Levels

1931

1974

1975

1973

1952

1990

1993

1981

1991

1991

1991

TREE

Taking action

On 31 May 2022, the South Australian Parliament declared a climate emergency, recognising that climate change is happening now and at a faster rate than was expected. This declaration signals the government's intention to take action.

Our biodiversity is still declining, despite considerable effort and investment that has been undertaken to protect it. This has been highlighted in past South Australian State of the Environment Reports.

Our population is growing and there is no doubt that human activities are the greatest driver of environmental change. We now need to reduce our impacts, adapt to our environment and better appreciate that our health and wellbeing is intrinsically linked to the health of our environment. Unless we take action, population growth is likely to be unsustainable.

A number of reports have been produced by the South Australian and Australian governments since the 2018 SOER that provide actions and recommendations to tackle the issues we are facing. These include, but are not limited to:

- [South Australia's Waste Strategy 2020-2025](#)
- [Valuing Our Food Waste \(2020-2025\)](#)
- [Circular Economy in South Australia's Built Environment - Action Plan 2023](#)
- [South Australian Government Climate Change Action Plan 2021-2025](#) with updated [Actions](#)
- [Planning for Climate Change 2023](#)
- [Blue Carbon Strategy 2020-2025](#)
- [Carbon Farming Roadmap for South Australia](#)
- [Resilient Water Futures](#) (to be developed)
- [Water Security Statement 2022](#)
- [Urban Water Directions Statement 2022](#)
- [Stormwater Management Planning Priorities for South Australia 2022](#)
- [Nature Conservation Directions Statement 2020](#)
- [Healthy Parks Healthy People SA 2021-2026](#)
- [State Landscape Strategy](#)
- [The 30-year Plan for Greater Adelaide 2017 Update](#)
- [Greater Adelaide Regional Plan 2023](#) (discussion paper)
- [20 year State Infrastructure Strategy Snapshot 2020](#)
- [Green Infrastructure Commitment 2021](#)
- [Cycling Strategy for South Australia 2022-32](#)
- [South Australia's Disaster Resilience Strategy 2019-2024.](#)

Several recommendations and actions are duplicated across reports and many reports do not provide an indication of urgency for their implementation. In addition, many of the issues, recommendations and actions identified in past reports, including the SOER, are still relevant today. A more coordinated and consistent approach is needed across government to implement these actions according to their urgency and deliver on-ground change.

IT IS RECOMMENDED

The South Australian Government develops and implements an overarching framework that contextualises and orients its policies and actions for protecting and restoring the environment, identifying critical priorities based on level of risk and clarifying the relationships and interdependencies between them in delivering co benefits.



Responding to climate change

Climate change is happening, and the rate of change is accelerating. Internationally, 2,349 jurisdictions in 40 countries have made a Climate Emergency Declaration and in May 2022, South Australia was the first state in Australia to make this declaration.

International scientific data, the extreme weather-related events that are becoming increasingly commonplace around the world and here in Australia, and local predictions of climate change effects in South Australian regions are indications of the need for urgent action.

Predictions for [South Australia](#) indicate there will be more very hot days, heat waves will be longer and hotter, and there will be more droughts and more dangerous fire weather. Health impacts from these changes are likely for vulnerable people, those living in urban 'heat islands' and bushfire prone locations, as well as for the more arid northern parts of South Australia, including remote Aboriginal communities.

Economic impacts from climate change are likely to be widespread, with more extreme events (for example, floods and fires) affecting infrastructure, potential direct impacts on industry profitability (for example reduced rainfall for agriculture) and financial impacts from substantial industry and government investments required to fund adaptation. The environmental, human health and economic impacts, as well as impacts on our personal wellbeing from a harsher climate, suggest that climate change will also have social impacts.

There are links and interdependencies between actions, identified by several South Australian Government agencies, aimed at meeting our commitments to emission reductions and our efforts to adapt and build resilience to climate changes that have and are occurring. For example:

- more energy efficient buildings reduce emissions, while also improving thermal comfort and helping occupants to adapt to the changing climate;
- nature-based climate change solutions can also achieve biodiversity benefits.

The South Australian Government has identified targets and actions to reduce emissions and support climate adaptation through a wide range of strategies, which are the responsibility of various agencies. A coordinated approach across government is essential for identifying and capitalising on the links and interdependencies between these, across a range of sectors.

IT IS RECOMMENDED

The South Australian Government notes the links and interdependencies between emissions reduction, climate change adaptation and different societal sectors, and tasks relevant agencies with collaborating in risk assessment, response planning and program delivery to capture the benefits of a coordinated approach.



Biodiversity protection

An expert paper was commissioned to assess the challenges facing South Australia's biodiversity under a changing climate and identify actions required to secure a positive future. This complements the outcomes of the 2018 SOER independent expert analysis on biodiversity, which are still considered to be relevant.

The paper stated that there is broad consensus that climate change could be the greatest threat to biodiversity by 2050, and that we need to identify strategies to enhance the resilience of remaining biodiversity and carry out well-targeted restoration, in the context of a rapidly changing climate and against a backdrop of past and existing human-created pressures.

Current reporting on the state of the environment is heavily constrained by a lack of data, and government does not have the resources to collect this on its own. It must build on existing endeavours, partner with others (for example, citizen scientists), be a part of nationally funded programs, capture advances in technology, and invest in research most likely to inform and engage people to change policy and management, using 'Value of Information' analysis.

Biodiversity planning, research and enabling efforts need to be prioritised towards threats to biodiversity and constraints to biodiversity recovery that are climate change dependent. A climate adaptation approach needs to be adopted to underpin our on-ground conservation investments, targeting localities and program types that will be resilient and effective in a changing climate.

Responses should learn from others, use partnerships, be informed and coordinated by an independent expert advisory group and have First Nations involvement as an essential part of every opportunity.

On a positive note, most actions to address biodiversity decline also reduce greenhouse gas emissions and conversely, nature-based solutions to address climate change (such as habitat restoration, blue carbon and climate-friendly agriculture), will also benefit biodiversity. Therefore, win-win outcomes can be achieved.

IT IS RECOMMENDED

The South Australian Government ensures that all conservation policies, strategies and programs, particularly habitat restoration and rewilding, consider the impacts of climate change, and incorporate climate adaptation into their design.



Source: GISA

Management of plastics

It is estimated that globally, we are manufacturing 430 million tonnes of plastic each year, and by 2040, 29 million tonnes per year will end up in the ocean.

Plastics in the ocean and in our creeks, rivers and lakes are having major adverse effects on biodiversity, via physical impacts such as ingestion by aquatic animals and suffocation and entanglement of wildlife, and by impacts caused by the additives used in plastics, which are often toxic, hazardous and contain long-lived chemicals.

Microplastics from tyres are in the urban air we breathe, and plastics are also in some of the food and drink we consume. These plastics can lead to a range of human health impacts, including cancer, cardiovascular, inflammatory, auto immune and neurodegenerative diseases. Also, as most plastics are currently made from hydrocarbons, greenhouse gas emissions from their manufacture add to climate change.

Global efforts to address environmental impacts from plastics are occurring and South Australia is a leader in this field, for example, our long-standing container deposit scheme and more recent bans on single use plastics.

However, global plastic production is increasing, and South Australia's plastic recycling rate is 28%, so we need to continue to ramp up our efforts to ban or reduce plastic use, decrease its toxicity and facilitate greater plastic recovery and reuse through design changes and increased recycling.

An [expert paper](#) on plastics commissioned by the EPA provides suggestions for consideration by the South Australian Government in its continuing efforts to address waste and facilitate the circular economy, with the aim of achieving:

- reduced use of plastics (more bans on certain plastic items; behaviour change)
- less discharge of plastics into the environment (increased regulation; behaviour change)
- use of less toxic plastic materials (design changes)
- further increases in recycling (expansion of the container deposit scheme to non-beverage containers; container refilling; new recycling technologies; material recovery facility upgrades; procurement of products and infrastructure with more recycled plastic content; improved material and product design to facilitate recycling; behaviour change).

IT IS RECOMMENDED

The South Australian Government notes the plastics 'expert paper' and tasks agencies to review and recommend if the suggestions on regulatory and procurement changes, design standards, recycling technology improvement and behaviour change can be used to better facilitate the circular economy, environment protection and human health outcomes.



EPA Boat - Nori (Ngarrindjeri word for the pelican). Artwork by Summer Sumner

Inclusion of Aboriginal values and knowledge

The 2018 State of the Environment Report for South Australia acknowledged that it did ‘not explicitly reflect the perspectives of Aboriginal people’, that the report ‘would be more complete with this perspective’ and that this ‘will be addressed in the next report’.

During the preparation of the 2023 State of the Environment Report, engagement was carried out with Aboriginal peoples and an [expert paper](#) was also commissioned to explore how the South Australian Government could more effectively engage and actively involve First Nations people in monitoring, reporting on and caring for Country.

The expert paper identified that, internationally, the Kunming-Montreal Global Biodiversity Framework ‘acknowledges the important roles and contributions of indigenous peoples and local communities as custodians of biodiversity and as partners in its conservation, restoration and sustainable use’.

The paper also points out that the *Australia State of the Environment Report 2021* emphasised the importance of including First Nations values, knowledge and expertise ‘to create the first holistic assessment of the current state of Australia’s environment’, ‘highlighting the importance of cultural knowledge that has sustained Australia for tens of thousands of years’.

The expert paper suggests that the achievement of more effective Aboriginal engagement and active involvement in caring for Country in South Australia would require the adoption of a formal, structured and resourced process.

The paper suggests that the establishment of a First Nations Expert Environment Committee would be an important first step, with appropriate commitment, support and partnerships provided by the South Australian Government. The aim would be for this committee to partner in the co-development and co-delivery of a framework to facilitate ‘best practice engagement of First Nations peoples in environmental research, monitoring, risk assessment, management and reporting’.

The South Australian Government has previously made a commitment to ‘Establish an Aboriginal Ministerial Advisory Group to ensure the minister for the environment hears directly from Aboriginal people’¹ and that, ‘The (new) Biodiversity Act will incorporate the knowledge of Aboriginal South Australians in the management of land and respect for its ecosystems’.² The SA First Nations Voice to Parliament is also in the process of being established.

IT IS RECOMMENDED

South Australian Government ensures that, in establishing a South Australian First Nations Voice to Parliament, an Aboriginal Ministerial Advisory Group and introducing a Biodiversity Act incorporating knowledge of Aboriginal South Australians, it creates and implements an effective framework for bringing First Nations values, knowledge and expertise into the state’s efforts to protect, restore and report on the health of the environment.

1 South Australian Labor (election commitment): For the Future - Environment: Protecting Parks

2 South Australian Labor (election commitment): For the Future - Plan for Biodiversity Protection

Significant issues

Managing impacts from population growth

As a society, we tend to manipulate the environment to suit our needs. However, by doing this, we also risk damaging the very environment that we rely on to support its liveability. The health of our environment in which we live, work and play is intrinsically linked with our own health and wellbeing. This will be heavily influenced by where we live and our socio-economic environment.

- Human activities are no doubt the greatest driver of environmental change. With a growing population and in the face of climate change, we need to consider:
 - ✓ food security and water availability, both for the community and the environment
 - ✓ impacts on green space, natural environments and primary production areas from urban infill and expansion
 - ✓ an expansion of transport needs and industry sectors required to support a growing population that will also increase our environmental footprint through increasing energy and resource demands
 - ✓ more waste and wastewater that needs to be managed.
- The [Greater Adelaide Regional Plan Discussion Paper](#) advises that Greater Adelaide's population is estimated to grow by up to 670,000 people over the next 30 years. An increasing population requires an expansion of urban area or increased density through infill (both within Greater Adelaide and regional centres). Growth and development need to consider how impacts to the environment will be mitigated including maintaining or restoring green space and tree canopy for both cooling and biodiversity, providing safe active and public transport options, and providing solutions that will facilitate better integration of water that balances the needs of the community and the environment. Noise and odour issues may also increase with higher density of housing and encroaching of residential areas upon nearby industry.
- Impacts from urban sprawl and infill was the biggest concern expressed by our community who responded to the [SOER YourSAy](#) page. In addition, participants also indicated that a clean environment that supported wellbeing, liveability and healthy ecosystems was also important.
- Transport is responsible for the highest amount of greenhouse gas emissions in South Australia. According to a [Benchmarking Adelaide](#) report released in August 2023, car congestion has risen over the past four years. This report stated that Adelaide's public cycling and transport networks lag behind 19 other similar cities resulting in a 16% increase in traffic congestion compared with a 27% fall experienced by 14 of the other cities. Transport is the highest source of greenhouse gas emissions and increased traffic congestion is only going to exacerbate this problem. Public transport options, and strategies to encourage safe active transport, such as walking and cycling, within metropolitan Adelaide need to be considered and implemented. Active transport not only reduces energy usage, but also has co-benefits of physical and mental health.
- Urban sprawl and infill may also result in a reduction of permeable surfaces from loss of green space. This may result in an increased risk of flooding during high rainfall events. In addition, increased runoff of stormwater impacts our creeks and marine environments. As management of stormwater is not consistent between councils with different resourcing and priorities, improved governance of stormwater across South Australia is required to lead and implement strategic and best practice stormwater management that reduces potential impacts and values stormwater as a water source. Stormwater management was highlighted as a key issue by the SOER Assurance Group.
- Maintaining green space was raised as important for recreation and to mitigate urban heat islands. This includes retaining trees and significant vegetation of various structures—upper, medium and lower storeys—located on both public and private land where possible. A [report](#) undertaken by the University of Adelaide found that tree protection in South Australia was limited, and a vast majority of local governments in other Australian capital cities have laws designed to protect urban trees more effectively than those in South Australia. A review is currently underway on our tree laws.

We all are responsible for the changes.

Therefore, we all have a responsibility for addressing the impacts.



Reviewing environmental reporting

Environmental reporting is undertaken by a number of South Australian Government agencies including DEW, Landscape Boards and the EPA. In addition, State of the Environment Reporting is also undertaken at a national level which includes state-based information.

- *DEW's Tracking changes in South Australia's environmental trend and condition report cards 2023* is used to inform the State of the Environment Report. It was noted the reliability of data specified in a number of the report cards is either poor or fair based on the collection methods, age of information and the applicability and accuracy of the information used.
- There is also some uncertainty regarding the desired targets for the condition of the state's environmental assets. It would be preferable to identify what success looks like, and continually evaluate the effectiveness of policies and programs to ensure they are meeting the desired aims. This will help inform future state-wide and regional priorities, and strategic planning.
- A *National Strategy and Action Plan* was released by the Australian Government in 2018 to develop a common national approach for environmental reporting, which adopted environmental economic accounting. This principle was agreed to by all environment ministers across Australia in 2017. The report recognises many benefits that a consolidated approach to environmental reporting would bring to support environmental decision-making.
- Therefore, environmental reporting for South Australia needs to be reviewed, to improve and refine information that measures progress in responding to key environmental issues, and to link indicators to the health and wellbeing of the community and the environment. Potential options for improvement may include:
 - ✓ providing a road map that outlines future reporting processes to monitor and report on South Australia's natural assets
 - ✓ broadening the context for environmental reporting that incorporates indicators that link the environment to health, wellbeing and liveability in Greater Adelaide and regionally. This may include adopting other reporting frameworks such as *natural capital accounting* including *Environmental Economic Accounting*, data visualisation tools and interactive reporting, and provision of real-time data. This will help inform the assessment of impacts and benefits from policy responses, and support South Australia in keeping pace with national harmonisation of environmental accounting and reporting
 - ✓ a state-wide approach for monitoring to ensure consistency in collecting data that can be used for reporting on environmental condition at different time and spatial scales
 - ✓ ensuring that indicators and data collection identify whether government programs are achieving the desired environmental outcomes
 - ✓ improving capacity to collect/collate reliable and consistent data from various sources to assess and report on environmental trend and condition. This will help better inform state and federal government decisions for environmental protection and restoration at the landscape, regional or state scale
 - ✓ aligning with national and international monitoring and reporting frameworks to enable consolidation and comparison of environmental data and the condition and trend of our environmental assets
 - ✓ building meaningful relationships to walk with Aboriginal peoples to incorporate their values, knowledge and expertise regarding trend and condition of the environment, and associated responses
 - ✓ ensuring that recommendations identified in the SOER are followed by actions for implementation with clear roles and timeframes for delivering these recommendations
 - ✓ reviewing reporting requirements in relevant legislation to ensure they are fit for purpose and have a clear role in the protection and restoration of our environment.

Ecosystem-based management of the marine environment

- The need for ecosystem-based management of our marine environment by government agencies was recognised as an issue in the Australia State of the Environment Report 2021.
- Different marine ecosystems provide various benefits, including natural values, for example, biodiversity, and ecosystem services, including carbon sequestration, fish nurseries, coastal protection - these values need to be adequately recognised, for example, via EEA, when balancing potential environmental impacts with economic and social benefits.
- There are multiple pressures on our coastal and ocean environments, and the services they provide, including stormwater, agricultural runoff, wastewater discharges, plastic pollution, marine industries, and coastal industrial discharges. Climate change itself is a major pressure and will exacerbate these other issues.
- The assessment and management of these pressures, including collection of data and monitoring of potential impacts, is currently undertaken independently by a number of organisations. This would be better considered using a more holistic ecosystem based management approach that considers cumulative impacts.
- Integration and coordination would need to span policy, planning, implementation, monitoring and reporting activities, and such an approach will make more efficient use of our resources and knowledge.
- To achieve better outcomes for the marine environment, the protection and restoration of marine ecosystems needs to be integrated and coordinated, consider individual environmental pressures and cumulative impacts, and be driven by ecosystem characteristics, recognising the values that they provide.

Integrated management of water

- Water security is critical for supporting our urban, rural and natural environments. Demands on our water supply for our communities and the environment is likely to increase with climate change (reduced overall rainfall and higher temperatures) and an expanding population.
- A significant volume of wastewater (70%) and stormwater (97%) is still discharged into surface waters and the marine environment. This is a resource that could further supplement our water use and take the pressure off our water supplies from other sources. Much of our stormwater and wastewater infrastructure is reaching its end of life which presents an opportunity to implement changes that would improve reuse. This would also support the protection of our waterways and coastal systems as stormwater and wastewater are two significant pressures that impact the health of these environments.
- In South Australia, water is managed by a number of different agencies. This includes those responsible for natural environments (surface waters, marine and groundwater), drinking water, water used for other purposes (for example, irrigation), wastewater and stormwater.
- Integrated management of our waters would provide a more holistic and consistent approach across the state in the governance, management and use of our waters. It would do this by integrating the delivery of water, wastewater, recycled water and stormwater services to support water security, public health, and environmental and urban amenity outcomes. It is acknowledged that SA Water is currently developing the Resilient Waters Futures Project discussion paper to support the delivery of an integrated Urban Water Strategy for Greater Adelaide. It is suggested that a similar approach to support the integrated management of water should also be considered for regional centres.

Emerging areas

It is important to identify emerging areas so that strategies can be identified to address them before they become significant. Such areas include the following:

- ✓ Antimicrobial resistance (AMR) is seen as one of the next biggest global threats and can impact our food, agribusiness and environmental management sectors as well as human health. A Cooperative Research Centre for Solving Antimicrobial Resistance in Agribusiness, Food and Environments has been established in South Australia to tackle AMR at source across a diverse and complex range of systems and the environment.
- ✓ The implementation of environment protection and sustainable development initiatives in regional areas needs to be further considered due to challenges associated with economies of scale and transport distances. Circular economy measures requiring effective markets to underpin recycling and reuse are more challenging in these contexts, as are the efficient management of wastes including wastewater. In addition, as our development in renewable energy grows, so will the waste from renewable energy infrastructure once it reaches its end of life. Consideration needs to be given to how this waste will be integrated into the circular economy.
- ✓ South Australia is supporting the development of new industries (for example, hydrogen energy, offshore wind farms, construction of submarines and expansion of powerlines) that deliver jobs, security and benefits for the economy. We must ensure these industries are supported in a manner that does not compromise our environment. Over the last few years, we have observed the emergence of new types of environmental pollutants in waters and on land. This includes pesticides, microplastics, per- and poly-fluoroalkyl substances (PFAS), and pharmaceutical products, just to name a few. The identification and mitigation of emerging contaminants have been deemed a key priority area by agencies responsible for environment protection across the country, and will be a priority area for South Australian authorities.
- ✓ South Australia has experienced a significant growth in regional tourism, particularly since COVID-19. As a result, regional centres have reported an increase in impacts from tourists, including rubbish and damage to sand dunes and coastal vegetation from four-wheel driving (4WD). Given that regional tourism is often based on the health and attractiveness of the environment, it is imperative that growth in tourism is not at the expense of the environment and ecosystems.
- ✓ There is an increased risk that more people are becoming disconnected from nature with increasing urbanisation, advances in technology and the occurrence of more extreme weather conditions. We need to improve this connection and better educate ourselves to understand the importance of protecting the environment, and the benefits this brings economically, socially and for our wellbeing. This will facilitate behaviour change and increase the chance of people becoming more actively involved in protecting the environment that supports them.



Camping in the Flinders Ranges

Who was engaged and what did they say



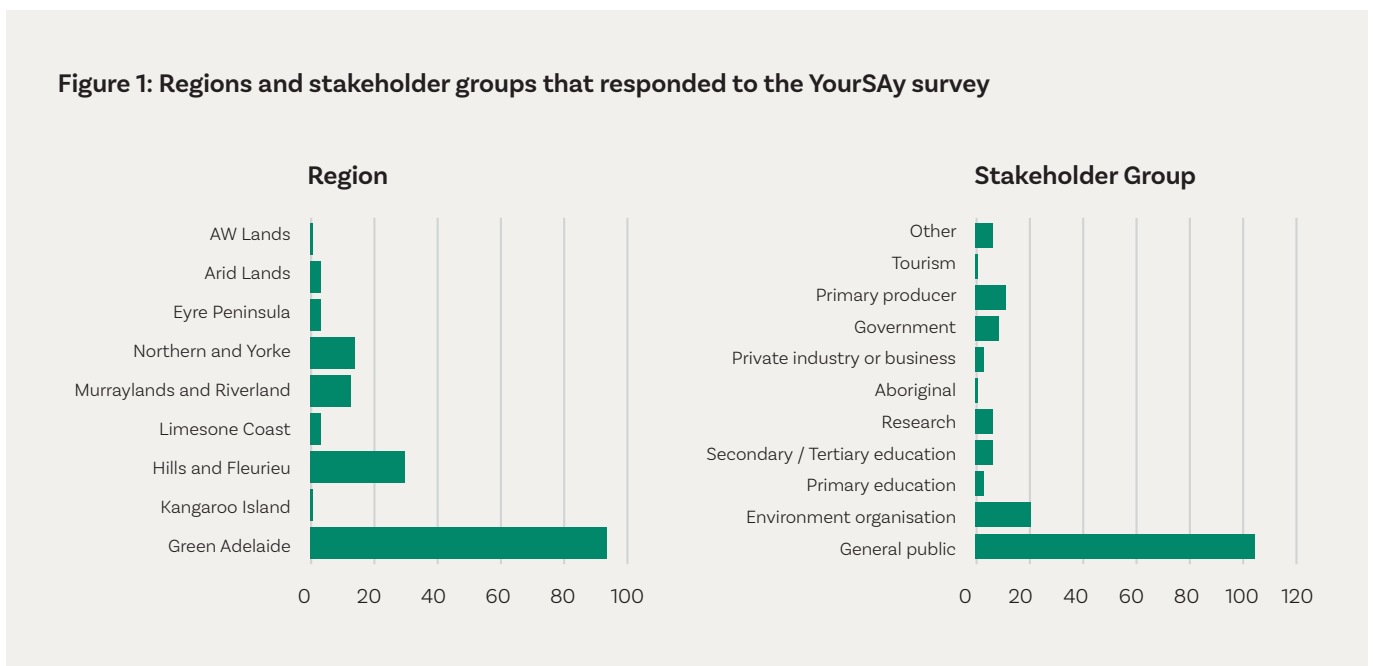


The community

The EPA undertook an independent review of the SOER after its completion in 2018. This review recommended the EPA enhance stakeholder engagement and improve its capacity to inform stakeholders of the state of the environment to drive change. In response, the EPA established a YourSAy page seeking community input on what they valued about South Australia’s environment and their thoughts on the key environmental issues facing South Australia. In addition, photos were requested that could be used in the SOER and environmental projects that were being undertaken.

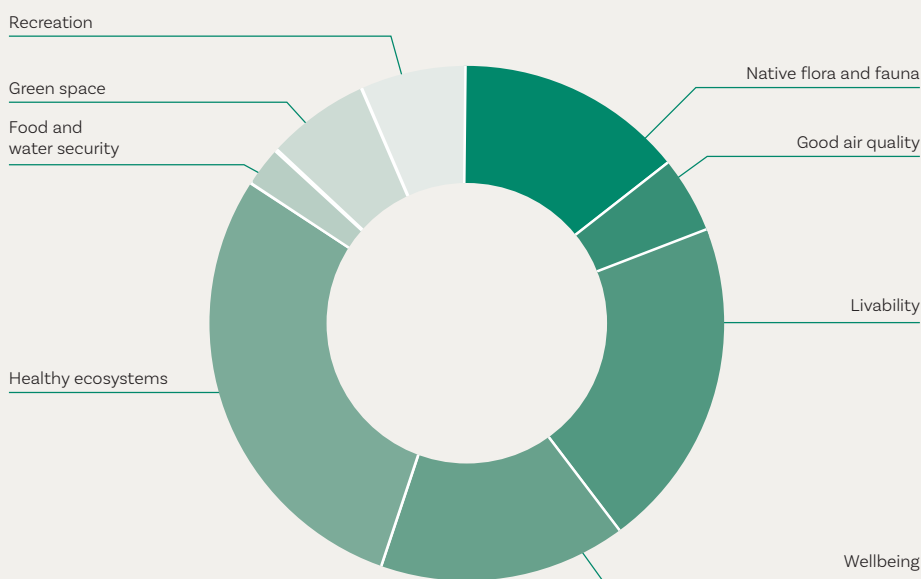
A total of 165 responses to our survey were received from various South Australian regions and stakeholder groups (Figure 1).

Figure 1: Regions and stakeholder groups that responded to the YourSAy survey

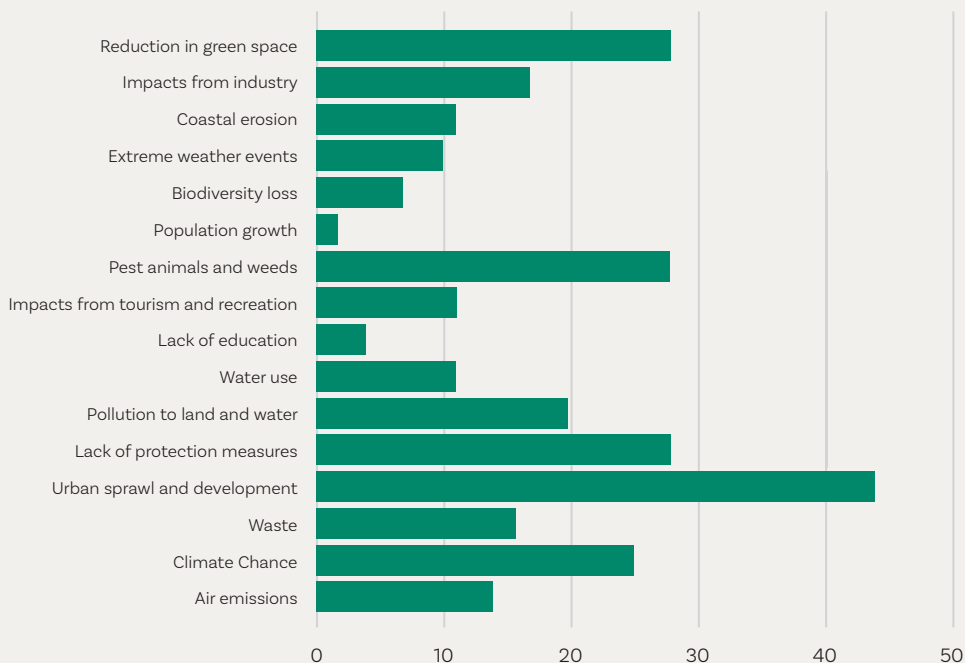


Responses were categorised into various topics depending on the information they provided in the survey (Figure 2). Individual people often provided input on more than one topic. Based on this information, it appeared that people valued a clean natural environment to support liveability and wellbeing and a healthy ecosystem. Urban sprawl and development was the key environmental issue of concern to people who responded, followed by reduction in green space and pest animals and weeds. Many responders also mentioned the lack of protection measures by government was of concern.

Figure 2: Categorisation of responses received from the community on what they value about the environment (top graph) and the key issues they saw impacting the environment (bottom graph)



The key issues they saw impacting the environment



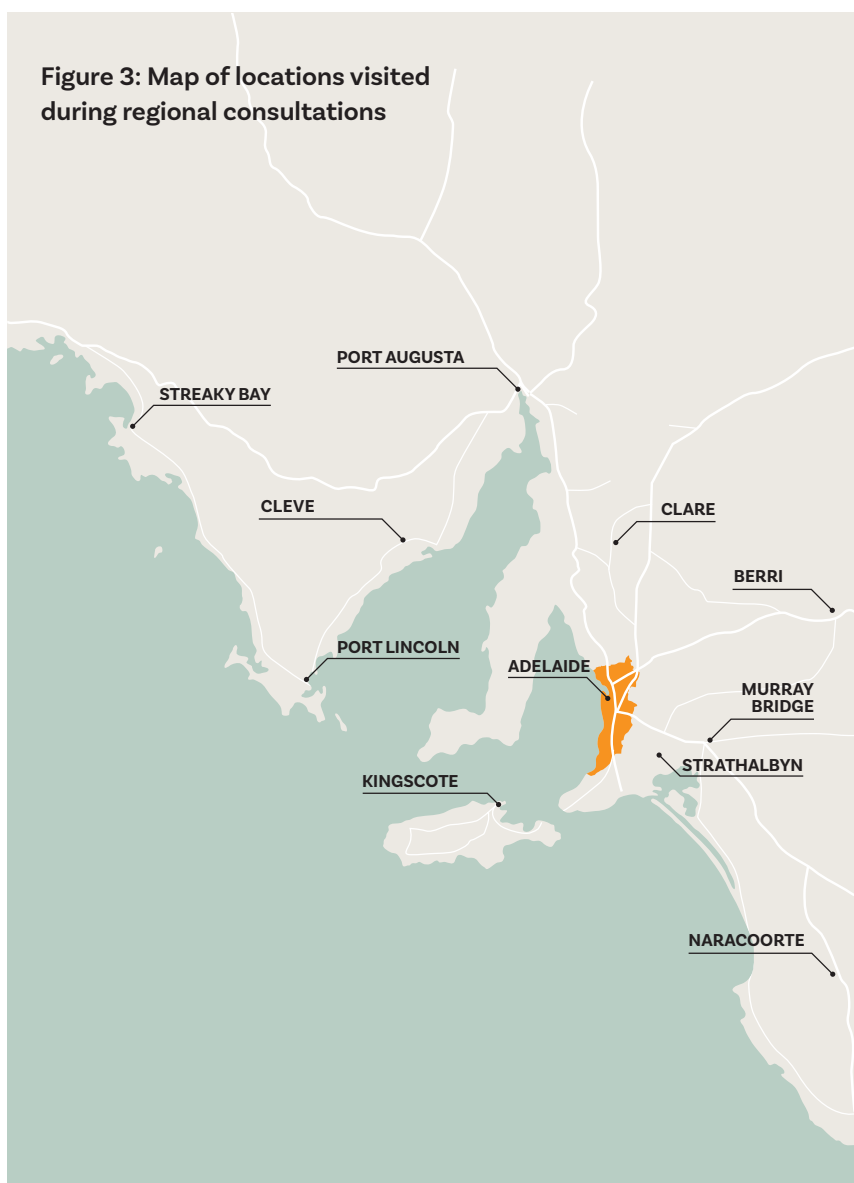


Kingscote, Kangaroo Island

Regional stakeholders

In the planning stages for the SOER, engagement with Landscape SA officers from around South Australia highlighted that the State of the Environment Report needed to have more regional content, to add to the whole-of-state information. As part of the process to achieve this, engagement was carried out with a range of stakeholders around the state, via a series of face-to-face workshops, held in August and September 2022. Engagement with Aboriginal peoples was carried out via a more-targeted separate process (see next section).

Face-to-face workshops were held in Kingscote, Port Augusta, Strathalbyn, Streaky Bay, Cleve, Port Lincoln, Clare, Adelaide, Naracoorte, Murray Bridge and Berri, and with Alinytjara Wilurara LSA staff (in Adelaide) (Figure 3). The workshops were attended by 95 people representing 57 different organisations, including Landscape Boards (32 attendees across 9 regions), local government (31 attendees from 26 councils), Regional Development Australia, DEW, Murray-Darling Basin Authority (MDBA), and, industry associations and non-government organisations. Many of the issues raised in these workshops (Figure 4) were similar across the regions.





Welcome to Cleve, Eyre Peninsula

General comments

- Lack of compliance and resources to manage land and coastal areas (including national parks and marine parks) particularly from impacts of tourism and recreational use, including 4WD and camping. Requires resources to manage (personnel, funding, infrastructure, policy).
- Disparity between regional areas and Greater Adelaide in terms of resource allocation and policy development. At times, these processes do not recognise regional challenges such as distances, population and resources from rate payers, for example, circular economy, waste management.
- Identify incentives for the community to adopt better environmental practices (collaboration, kids education, awareness, economic, promotion, funding, accessibility, coordination).
- Improve coordination of research, data collection, monitoring and reporting to address priority areas.
- Assistance with funding applications and better allocation of funding. Encourage volunteering.
- Better engagement and promotion of outcomes of SOER. Need the SOER to inform priorities.
- Review environmental reporting and make it more relevant, accessible and priority driven.

Figure 4: Key issues raised during regional consultation



- Extreme events - flood, fire and drought and impact on industries, people and infrastructure.
- Climate impacts on industry and biodiversity.
- Facilitate carbon farming in agriculture.
- Need to consider drought resilience planning.



- Impacts of tourism—4WD, camping resulting in debris and vegetation impacts.
- Pressures on biodiversity from farming, land use, vegetation clearance, burns.
- Poor management of vegetation and soil health.
- Feral animals and invasive weeds.
- Overabundance of native species (for example, kangaroos).
- Recognise importance of Aboriginal knowledge in land management.
- Benefits of maintaining and restoring biodiversity need to be promoted.



- Effective management of water is required.
- Delivery of Murray-Darling Basin Plan 450 GL recovery is an issue for irrigators.
- Improve water quality.
- Greater involvement of Aboriginal peoples in water planning and management.



- Biosecurity risks from transport.
- Need to prepare for sea-level rise and warming.
- Strengthen and prioritise marine park management.
- Enhance fisheries and aquaculture monitoring to inform planning and management.



- Waste management and circular economy (implementation and resourcing is a challenge in regional areas).
- Water availability and security.
- Stormwater management.
- Management of recycled water.
- Identify opportunities to establish renewable energy particularly on Eyre Peninsula.
- Better adaptation of urban infrastructure (including regional) to flooding.
- Maintain and restore green space in built-up areas.
- Emphasise the financial, health and wellbeing benefits of the environment and its importance to the regional and state economy.

Aboriginal peoples

Australia is home to the oldest continuing living culture in the entire world with Aboriginal and Torres Strait Island people caring for Country for at least 65,000 years.

Being the oldest continuing culture in the world means Aboriginal people have a unique perspective on the integrated relationship between humans and the natural environment, and the importance and influence that the environment has on human health and wellbeing. Learning, understanding, and embedding Aboriginal knowledge in future protection and restoration of Country is an important element of South Australia's reconciliation journey.



The artwork by Ngarrindjeri artist Jordan Lovegrove represents the Environment Protection Authority (EPA) and their dedication to safeguarding the environment and reporting on the state of the environment. It also highlights the vital role of Aboriginal peoples in land and sea management and the importance of monitoring the 'Health of Country.' The central meeting place symbolises the EPA, while background patterns reflect South Australia's landscapes, with green and ochre representing the land and blue symbolising the sea and rivers.

The artwork underscores the deep connection between Aboriginal peoples and their homeland, their shared mission to protect the environment for future generations, and the celebration of diverse Aboriginal communities working together for the wellbeing of South Australia.

Jordan Lovegrove – Karko Creations



Lake Gairdner National Park

For the first time, the SOER has included the views of Aboriginal peoples on the health of Country. It aims to better represent the role and opportunity for Aboriginal peoples in looking after Country.

The EPA has commenced the journey of walking together with Aboriginal peoples in the development of the SOER and has met with:

- Dr Roger Thomas, the (then) Commissioner for Aboriginal Engagement
- Landscape Board general managers and Chairs, to discuss opportunities to work with Landscape Boards in working together with Aboriginal peoples given that the Statement of Commitment signed by the nine Boards overlaps with the objectives of the SOER
- the Aboriginal Engagement Committee who work with the Northern and Yorke Landscape Board. Committee members include a representative from the region's five Nations—Nukunu, Narungga, Ngadjuri, Kurna and Peramangk. They stated that the South Australian Government should aim for 'a cohesive working partnership and relationship' and that 'Partnerships and relationships are very important', as 'it is not just about providing advice, information and recommendations'. In looking after Country 'We need to share the driving and not drive with one of us in the back seat'. 'It is important to look after land for wellbeing and culture. If our land is not well, we are not well'³. They also recommended that regional partnerships should be established to help care for Country that include representatives from Aboriginal Nations, local government, Landscape Boards, DEW and the EPA
- members of the Alinytjara Wilurara Landscape Board who raised the issue of 'accessibility of the SOER, for example, videos, instead of text, and that internet access is problematic for some Aboriginal communities'. They also stated that 'working with Aboriginal communities is needed', and that 'the SOER needs to strengthen the narrative about Aboriginal people's link to the land and their involvement in looking after Country and how they are achieving this'.
- the Aboriginal Engagement Network from the SA Arid Lands Landscape Board
- representatives from Warpulai Kumangka (Kurna strategic advisory group to Green Adelaide) who provided their views on the importance of people's connection to Country and the link between the health of Country and the health of people. They stressed the importance of working together and caring for Country, and expressed their concern for the health of Country
- Aboriginal Rangers from the Nipapanha Community Aboriginal Corporation who manage Australia's first Indigenous Protected Area at Nantawarrina. Their views were provided about their community and the importance of healthy country
- (and commissioned an) expert paper from Associate Professor Steve Hemming and Professor Daryle Rigney, citizen of the Ngarrindjeri Nation. Both are part of the Indigenous Nations and Collaborative Futures Research Hub, Jumbunna Institute for Indigenous Education and Research, University of Technology Sydney.

All welcomed the opportunity of having more involvement in the development of the SOER, but reiterated that it would be important for the SOER to drive action especially by government. All groups stressed that the South Australian Government needed to work in partnership with Aboriginal people and that cultural knowledge needed to inform and be integrated into restoring and caring for Country. *When Country is healthy, we are healthy. Access to Country is required to learn about Country and understand Country and what it is telling us.*

³ Consent obtained from Ms. Pat Waria-Read, Ngadjuri Elder.

Expert opinions

The SOER Project Board sought independent expert opinions on three key topics facing South Australia’s environment. The views expressed are that of the author and not necessarily those of the EPA or of the South Australian Government.

Considering the significant nature of these issues, the SOER has provided a recommendation relating to each of these three topics to the South Australian Government for consideration

Biodiversity and climate change

Highlight the challenges facing South Australia’s biodiversity under a changing climate, the positive actions required to secure its future, and current examples of relevant actions.

Author: Professor Hugh Possingham, The University of Queensland and Biodiversity Council

- This report notes that South Australia’s biodiversity is declining rapidly. An overview of the key threats to biodiversity is provided along with actions that could be implemented to mitigate biodiversity decline.
- The lack of investment and challenges in collecting monitoring data to inform trends in biodiversity was also highlighted in the report. It was recognised that as of September 2023, South Australia has no explicit goals and targets for biodiversity.
- It was stated that, to address biodiversity decline, monitoring and research needed to be more focused, cost-effective, long term and integrated with partners nationally and globally, and that South Australia would need to take a far more radical approach to many conservation interventions in the context of a rapidly changing climate.

Addressing environmental risk from plastics

Document and compare:

- *the whole-of-life-cycle environmental risks from plastic, considering pollution sources at different life-cycle stages, plastic types, pollution volumes and impacts;*
- *the approaches being used in comparable jurisdictions to address these risks; and suggest priority measures that South Australia could consider to strengthen our current and planned responses?*

Author: Mr Vaughan Levitzke PSM:

- The paper provides information about plastics, including the quantities involved, their uses and the problems they cause. It discusses what is currently happening internationally, nationally and in South Australia to address the issues caused by plastics. The author shares a proposed framework to address plastics that is being developed internationally, identifies investment opportunities for Australian governments and the private sector and makes recommendations on what South Australia could do better or differently.

“

‘Our beloved plastic is after just 70 years become dominant in the environment, it has come back to haunt us in ways we had never imagined’

”



Information board at the Goowla barrages.

Engaging and involving Aboriginal peoples

How could we more effectively engage and actively involve First Nations Peoples in monitoring, reporting on and caring for Country and what benefits could this achieve?

Authors: Associate Professor Steve Hemming and Professor Daryle Rigney, Jumbunna Research, Jumbunna Institute for Indigenous Education and Research, University of Technology Sydney

- The report provides examples of guiding statements from global, national and local sources as a pathway to highlight the importance of and guide suggestions for the development of a South Australian framework for the inclusion of First Nation values, knowledge and expertise in SOER reporting and ongoing environmental management.
- The authors advise that South Australia requires the identification of the fundamental absence of a formal, structured, and resourced process for ensuring respectful inclusion of First Nation values, knowledge and expertise and propose that a state-level structural response is required to improve alignment between the South Australian SOER and Commonwealth and international monitoring and reporting regimes. Several proposals for action have been provided by the authors to achieve these outcomes.

The State of our Environment





The following section provides an overview of the state of South Australia's environment across seven environmental themes.

Each theme identifies key messages, the pressures facing our environment, and the trend and condition that incorporates information provided by the DEW South Australia's environmental trend and condition report cards 2023. It is acknowledged that the following themes are not mutually exclusive. Suggestions and opportunities for improvement are also highlighted within each theme.

Banners incorporated into each theme provide the trend, condition and a short summary for a particular indicator, with the colour of the banner representing the indicator trend of the report card. The entire report card can be accessed by clicking on the banner.

Icon index

Trend

-  Getting better
-  Stable
-  Getting worse
-  Unknown

Condition

-  Very good
-  Good
-  Fair
-  Poor
-  Not applicable
-  Unknown

Information reliability

-  Excellent
-  Very good
-  Good
-  Fair
-  Poor



Sunset near Port Augusta,
Eyre Peninsula

CLIMATE

Key messages

- South Australia's climate is changing, and it will impact every aspect of our regional and urban environments. We need to be proactive and make changes now to build resilience and protect our environment and our health. Governments at all levels, businesses, households and the community each have important roles and need to work together to mitigate the causes and adapt to the impacts of climate change.
- Recent changes to our climate can only be explained by human-caused emissions of greenhouse gases and modifications to our environment. In South Australia, following the progress in decarbonising the electricity generation sector, the transport and agriculture sectors are now the highest emitters of greenhouse gases.
- In May 2022, South Australia declared a climate emergency and committed to restoring a safe climate by transforming the economy to net zero emissions.
- The South Australian Government now has state-wide goals of:
 - ✓ reducing net greenhouse gas emissions by more than 50% from 2005 levels by 2030;
 - ✓ achieving net zero emissions by 2050;
 - ✓ achieving 100% renewable energy generation by 2030;

Building on existing actions, the South Australian Government is developing a state wide emissions reduction plan to support the next steps to achieve the targets.

- We are making progress on achieving our targets as follows:
 - ✓ Approximately 70% of South Australia's energy is now generated via renewable energy sources;
 - ✓ South Australia's carbon dioxide equivalent emissions (MtCO₂-e) have reduced by 42% since 2005.
- The South Australian Government has identified a list of 65 actions to mitigate the causes of climate change and strengthen South Australia's adaptation response. These actions have been allocated to various South Australian government agencies. However, there is concern that actions are not being delivered at the pace that is required to make a difference. A risk-based framework needs to be applied to prioritise actions across government.
- We need to ensure that we maintain and improve our capacity to store carbon by protecting and restoring vegetation, both on land and in the sea.

What are the pressures

- Human activities are the biggest driver impacting climate change. We are responsible for the emission of greenhouse gases that cause climate change. In addition, we alter our environment, for example, clearing vegetation from land, and impacting wetlands and mangrove areas and losing seagrass from pollution, which then reduces the capacity of our environment to absorb carbon. We therefore need to be responsible for addressing this and reducing the amount of greenhouse gases that reach the atmosphere, particularly with an increasing population.

Greenhouse gas emissions


 Getting better


 Good

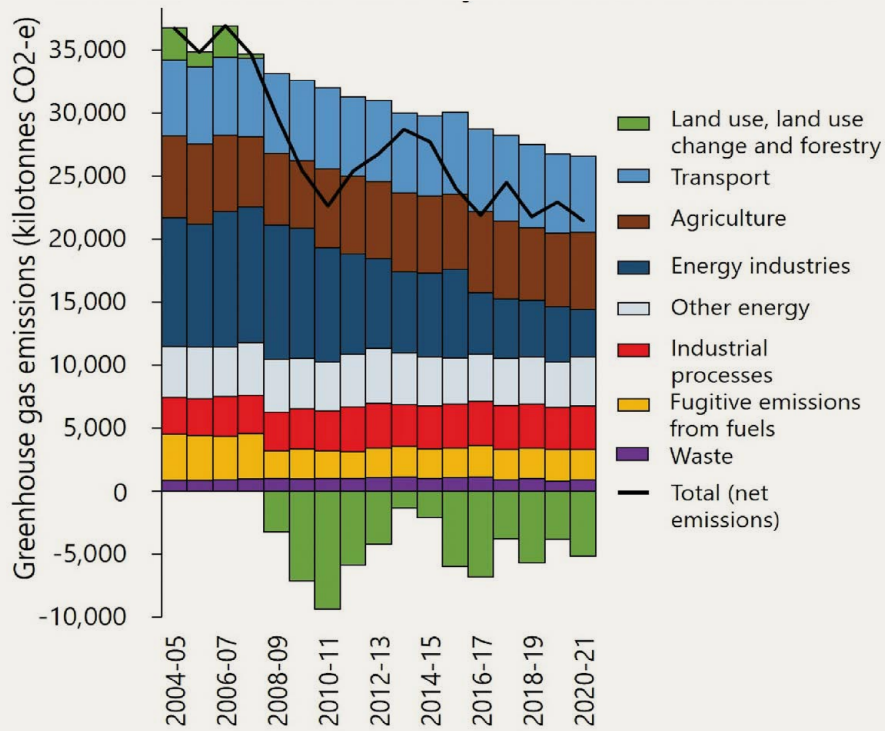

 Good

South Australia's greenhouse gas emissions decreased by 42% between 2004–05 and 2020–21.

- South Australia's greenhouse gas emissions (carbon dioxide equivalents / MtCO₂-e) have decreased by 42% from 2004-05 to 2020-21. In 2020-21, South Australia's greenhouse gas emissions were 11.9 tonnes per capita, the third lowest compared with other Australian states and territories on a per capita basis.
- Greenhouse gas emissions are from various sources. Transport is currently the highest source of emissions followed by agriculture (Figure 5). Emissions from the energy sector have declined significantly, most likely due to South Australia's investment in renewable energy. Since 2008-09 to 2020-21, the net emissions from land use and forestry have been negative, that is, more carbon has been sequestered than released.


Figure 5: South Australia's greenhouse gas emissions by sector 2004-05 to 2020-21

Source: DEW Report Card 2023.



What is the trend and condition

Temperature

Temperature		<p>Average annual temperatures have increased across South Australia, particularly in the arid north-east.</p>
Projected temperature		<p>Higher maximum temperatures and more days of 40°C or more are projected for South Australia.</p>

- Mean annual temperature, averaged across South Australia is increasing and is now approximately 1.1 degrees Celsius (°C) warmer than in the 1970s. Mean temperature anomaly increases from 1920 to 2020 for South Australia is higher than experienced in Australia and globally (Figure 6).
- Average daily maximum temperatures across South Australia are projected to increase by between 1.4°C to 2.2°C by 2050 with more days above 40°C predicted to double by 2039.
- Australia’s warmest year on record occurred in 2019 when we experienced 41 extremely warm days, about triple from what had been experienced in any year prior to 2000. In 2023, the world has just experienced the hottest September on record with the average surface temperature of 16.38°C, which is 0.5°C above the temperature of the previous warmest September in 2020, and around 1.75°C warmer for the month of September compared with the pre-industrial reference period of 1850-1900.

Figure 6: Annual temperature: Global, Australia and South Australia

Source: DEW Climate change science and knowledge plan for South Australia 2022

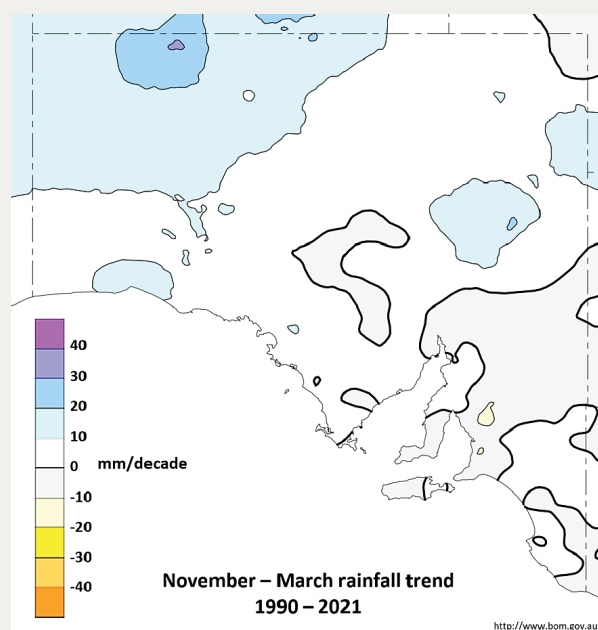
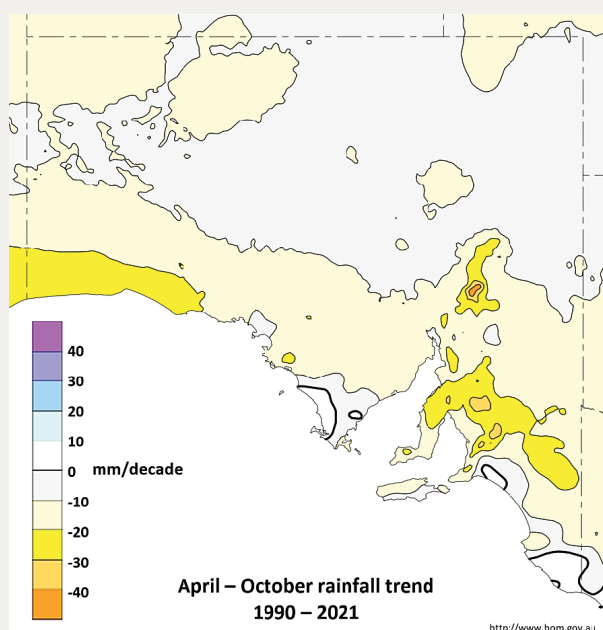


Rainfall

Rainfall		<p>Rainfall is declining in April to October in South Australia's southern agricultural areas and increasing in November to March in the north-west.</p>
Projected rainfall		<p>Annual and spring rainfall across South Australia is projected to decline significantly by 2050.</p>

Figure 7: Rainfall trends across South Australia

Source: DEW Report Card 2023.



- Over more than 30 years, significant regional variation can be seen in seasonal rainfall trends across South Australia with winter rainfall decreasing in the south of the state and summer rainfall increasing in the north (Figure 7).
- Average annual rainfall across South Australia is projected to decrease by between 4% and 23% by 2050 under plausible emissions scenarios.
- The persistent drying trend in southern South Australia has the potential to affect future water security, reduce agricultural yields, increase fire risk, and impact ecosystems.

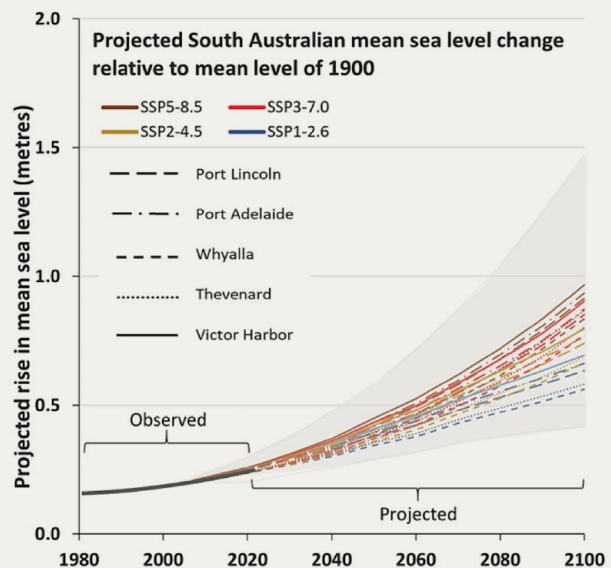
Seas—sea levels, surface temperature and acidification

Sea level	 Getting worse  Fair  Good	Sea levels along South Australia’s coast are rising, and the rate of rise is increasing.
Projected sea level	 Getting worse  Not applicable  Good	Sea levels along South Australia’s coast are rising, and the rate of rise is projected to increase in the future.

- Sea levels along the South Australian coast have risen by an average rate of 2 mm per year from 1966 to 2022. The rate of sea level rise is increasing and from 1993 to 2022 was between 3 mm and 5 mm per year in some locations. Mean sea levels measured at tide gauges located at Port Adelaide, Thevenard and Victor Harbor have increased by 10-12 cm from 1965-69 to 2017-21. The rate of rise is projected to increase in the future under plausible emissions scenarios (Figure 8).

Figure 8: Observed and projected sea-level rise

Source: DEW Report Card 2023.



- The annual 2022 sea surface temperature (SST) anomaly for the Australian region was the highest on record reaching 0.80 °C above the 1961-1990 average. Since 1900, the average sea surface temperature has risen by 1.05°C with eight out of ten of the warmest years on record occurring since 2010. Rising sea surface temperatures impact marine ecosystems and biodiversity, increase the risk of harmful algal blooms and can cause a poleward shift in species distribution. It may also result in adverse impacts to our fisheries, aquaculture and tourism industries.
- The pH of our oceans is also decreasing as a result of increased carbon dioxide in the atmosphere. Since the 1880s, the pH of oceans has decreased by around 0.12, which corresponds to around a 30% increase in acidity. A decreasing pH places further challenges on marine ecosystems including the growth and physiology of plants and animals, and has significant impacts on those animals that have shells and external skeletons that comprise of calcium carbonate.




Controlled burn in the Adelaide Hills


Extreme weather

- According to the [Bureau of Meteorology](#), one of the greatest impacts of climate change is the severity and frequency of extreme weather events that include floods, fires, drought, thunderstorms, high wind events and heatwaves. An increased frequency of notable events have occurred in South Australia since 2018.
- The 2022-23 River Murray flood event was the largest since 1956 and resulted from heavy rain and floods that occurred interstate. The flow rate peaked at the South Australia/Victoria border at 186 GL per day on 22 December 2022. Approximately 4,000 hectares of agricultural land and 3,500 private residents were impacted because of this event.


Fire danger weather



Getting worse



Fair



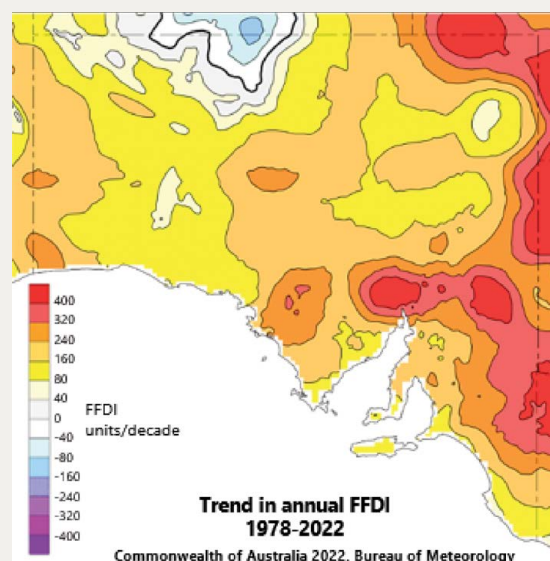
Good

Fire danger weather has increased in occurrence and severity across most of the state since the 1970s.

- The Forest Fire Danger Index (FFDI) is a measure of fire weather conditions and fuel availability which is influenced by recent rainfall. The increase in FFDI has been variable across the state since 1978. The far north-west has seen the lowest increases. The highest rates of increase in FFDI are observed in the mid north, south-east and far north-east. The far north-west has seen the lowest increases (Figure 9).
- South Australia experienced exceptionally high fire danger weather conditions in 2019, which decreased in 2021 and 2022 with the relatively wet and cool conditions experienced during this time. The long-term trend in the accumulated FFDI is expected to continue to increase with climate change with increasing temperature and decreasing rainfall.

Figure 9: Trend in annual FFDI between 1978 and 2022


Source: DEW Report Card 2023.




What is being done

- The South Australian Government has state-wide goals to reduce greenhouse gas emissions by more than 50% by 2030 and achieving net zero emissions by 2050. South Australia has made an encouraging start to achieving these goals. The Climate Change and Greenhouse Emissions Reduction Act 2007 will be reviewed and amended, to update greenhouse gas emission targets and strengthen climate action.
- Responses to the 2018 SOER recommendation ‘Climate Change Planning and Adaptation’ highlights several initiatives that are being undertaken by the South Australian Government to address climate change.
- The South Australian Government has produced several reports to help address climate change which include:
 - ✓ A climate change science and knowledge plan that provides data and identifies what information needed to support our response to climate change.
 - ✓ Climate change actions that identifies 65 actions to progress towards these targets and strengthen South Australia’s climate change response.
 - ✓ A guide to climate projections to inform risk assessment and planning in South Australia.


Renewable energy



Getting better



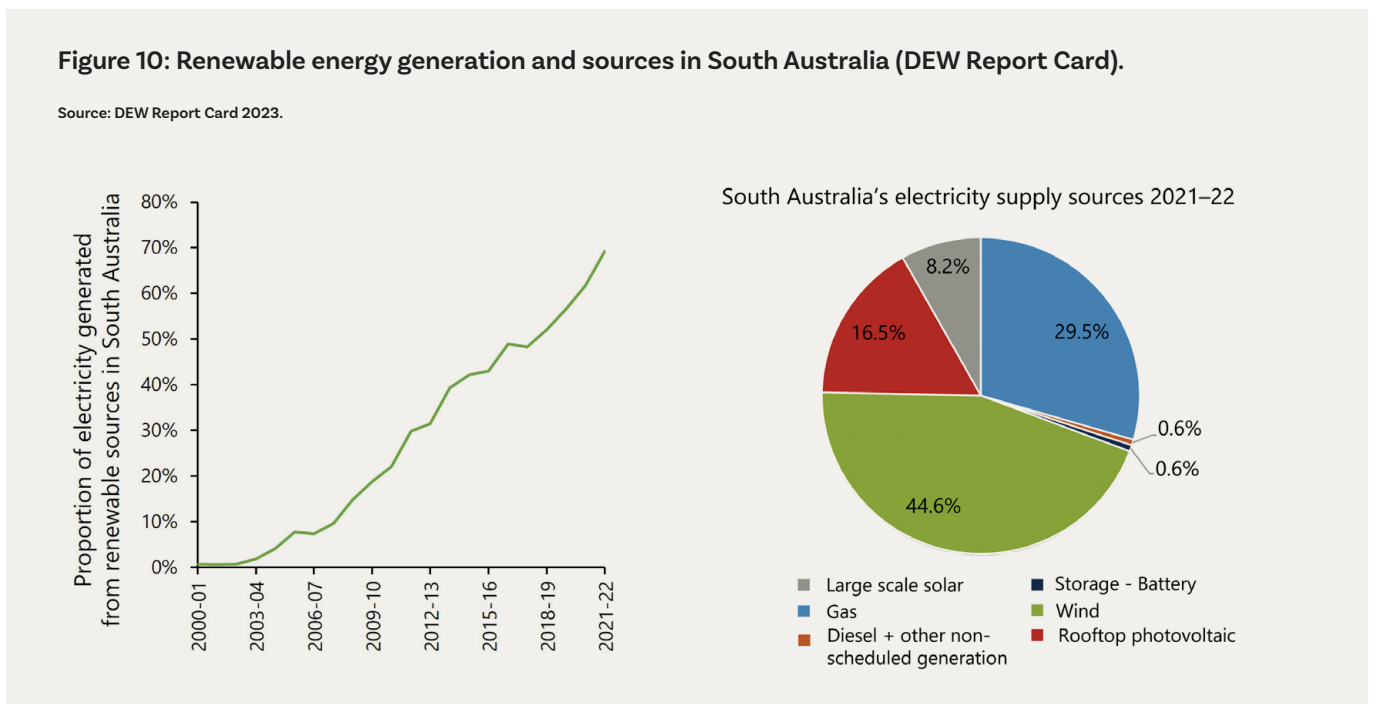
Very good



Very good

South Australia has transformed its energy system from 1% to over 69% renewable energy in just over 20 years.

- South Australia has made significant investment into renewable energy with around 69% of South Australia’s energy now generated via intermittent renewable energy sources. Wind is now the dominant source of renewable energy and contributed to 44.6% of South Australia’s total energy output and 64% of renewable energy output in 2021-22 (Figure 10).



- Further investment into renewable energy is expected following the passage of the Hydrogen and Renewable Energy Act 2023.



Inversion layer over Adelaide
from Windy Point lookout

AIR

Key messages

- One of the largest global environmental risks to human health is air pollution. It increases the risk of impacts to the health and wellbeing of our community. The estimated figure for world-wide premature deaths due to ambient outdoor air pollution was 4.2 million people in 2019. In Australia, annual mortality related to air pollution is estimated to be more than 3,200 deaths. Air quality can also impact amenity (for example, odour), ecological health and plants and animals.
- South Australia and Adelaide's air quality is generally good. Air pollutant levels are usually within national standards in most locations across the state. During 2022, South Australia experienced its best air quality since 2017. However, emissions from motor vehicles, industry and domestic wood heaters continue to place pressure on our air quality and have the potential to worsen with the increase in population, development and traffic.
- Health impacts from air quality are expected to rise in line with the increasing proportion of elderly and vulnerable people. It is therefore important that we maintain good air quality. Monitoring of air quality needs to be adequate and appropriately located to inform risks to human health.
- A changing climate resulting in drier land conditions and increased threat of bushfires will place increased pressure on our air quality from dust and smoke, particularly in regional locations including remote Aboriginal communities and pastoral lands.
- During the 2020 lockdowns that occurred in South Australia, air quality monitoring undertaken in the Adelaide CBD indicated that carbon monoxide (CO) dropped by 40% during March and April when compared with measurements during the same time over the previous five years. These observations were aligned with the reduction in traffic volume experienced in Adelaide during this time, which demonstrates the impacts of transport emissions on the quality of our air. Ongoing emissions from transport could be reduced by encouraging active transport, use of public transport and electric vehicles.



Night sky near Eudunda: Ash Penhall Photography

What are the pressures

- Air quality is influenced by a number of factors including emissions from transport and industry, wood smoke through use of wood heaters and fires (for example, controlled burns and bushfires), use of home appliances (for example, barbeques, petrol fuelled gardening tools) and dust. In Australia, the types of air pollutants, specific pollutant substances and the general sources of these substances are described in [Australia State of the Environment 2021](#).
- Global urbanisation and industrialisation as a result of population growth and developing economies, will increase the variety and loads of air pollutants. This, along with climate change, is likely to escalate the risk of impacts to air quality and consequently human health.
- Impacts to human health from poor air quality which may result in respiratory illness including [asthma](#) or [chronic respiratory conditions](#), aggravation of cardiovascular and respiratory diseases, lung cancer, heart disease, strokes and even premature death. There is [increasing evidence](#) that even relatively low levels of air pollution can have adverse effects on our health and consequently any improvement in air quality will result in better health outcomes. Recent research indicates that [fine particles](#) pose a greater risk to Australian communities than other air pollutants.

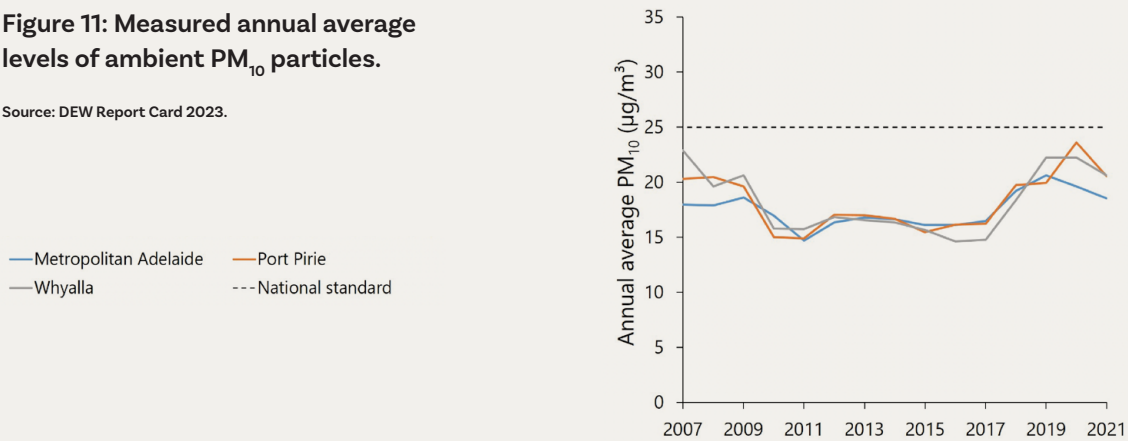
What is the trend and condition



- Between 2007 and 2017, ambient levels of PM₁₀ particles either reduced or remained stable. Since then, the level of PM₁₀ particles has increased, most likely from the effects of below average rainfall and drier conditions that were experienced across much of South Australia during 2018 and 2019. Levels of PM₁₀ measured at sites in Port Pirie and Whyalla were generally higher than those measured at sites in the Adelaide metropolitan area in 2021. The national standard of 25 µg/m³ was met at all sites (Figure 11).

Figure 11: Measured annual average levels of ambient PM₁₀ particles.

Source: DEW Report Card 2023.



- Levels of ambient PM₁₀ particles are influenced by emissions from a range of sources, including: transport; domestic, industrial, commercial, agricultural, forestry and mining activities, dust and the use of energy and resources.

Particles (PM_{2.5})

Getting better

Good

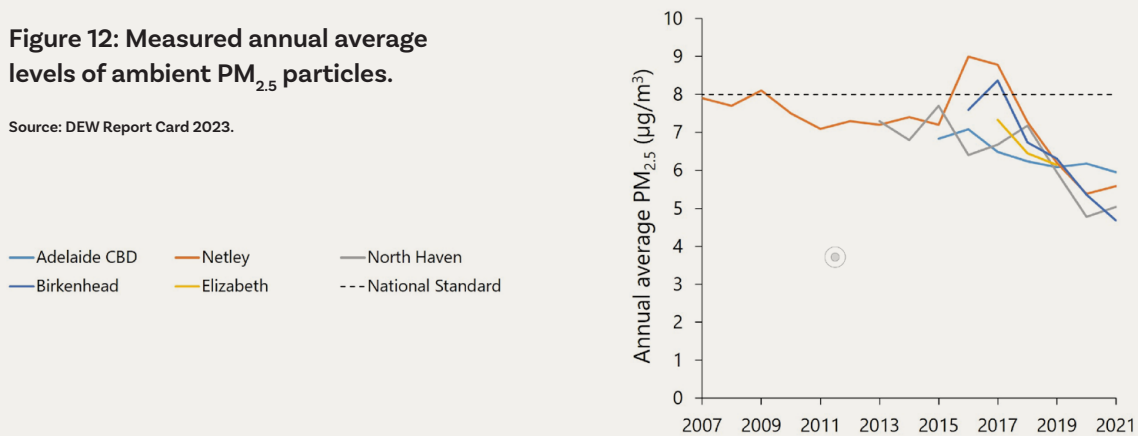
Very good

Annual average PM_{2.5} particle concentrations have decreased since 2007 and meet the national standard.

- PM_{2.5} particle levels are generally on the decline, which is mainly attributed to improvements in fuel quality, motor vehicle engine, pollution control technologies and product standards (for example, wood heaters), and a decrease in manufacturing. The occasional annual rise in PM_{2.5} averages can be linked to other contributors such as smoke from planned burning and bushfires. The national standard of 8 µg/m³ was met at all locations in 2021 (Figure 12).

Figure 12: Measured annual average levels of ambient PM_{2.5} particles.

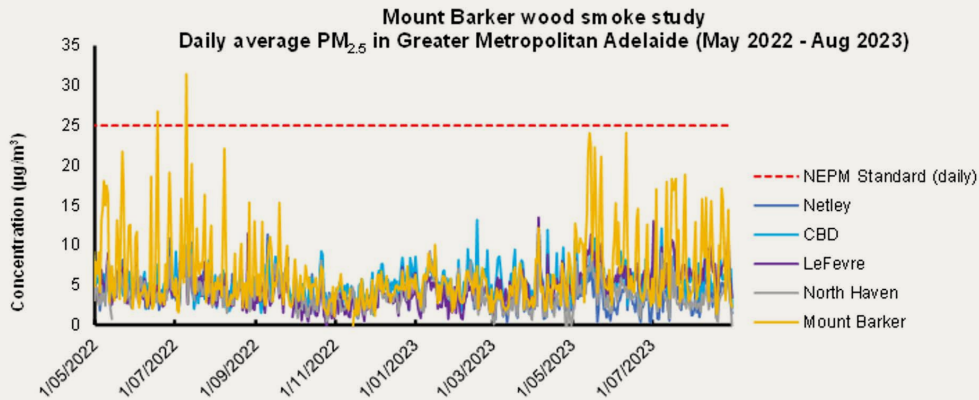
Source: DEW Report Card 2023.



- PM_{2.5} particles are mainly produced by combustion sources such as motor vehicles, power generation, industrial boilers and burning of wood and vegetation. The EPA has five monitoring stations for PM_{2.5} particles located in metropolitan Adelaide.

- In 2022-23, the EPA undertook a wood smoke monitoring program in collaboration with the Mount Barker District Council to identify the extent of particulate pollution emitted from the use of wood heaters in Mount Barker. The study found there was a direct link between the use of wood heaters during winter and elevated PM_{2.5} particles rising during evening peaking around midnight, and then gradually falling until the morning hours (Figure 13).

Figure 13: Air quality monitoring from Mount Barker wood smoke study.



Nitrogen dioxide (NO₂)

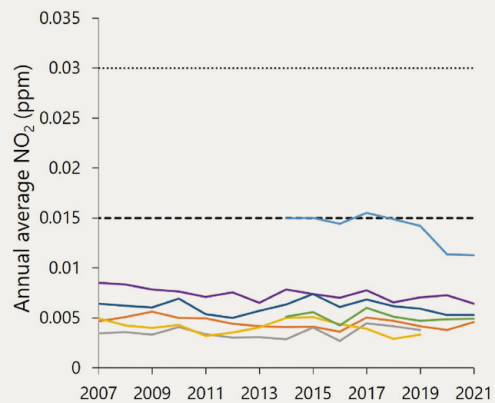
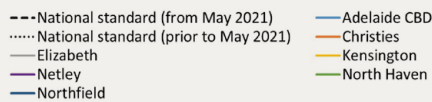


Annual average levels of nitrogen dioxide in South Australia are stable and meet the national standard.

- Vehicles, industries that burn fossil fuels and wood burning are common sources of nitrogen dioxide. (NO₂). Levels of NO₂ in our air have been stable since 2007 at most sites and are below national standards (Figure 14). Nitrogen dioxide levels measured at the Adelaide CBD station tend to be higher than at other sites due to the station's proximity to roads and traffic emissions. Australian standards were strengthened in 2021 to reflect current health knowledge.

Figure 14: Annual average levels of nitrogen dioxide

Source: DEW Report Card 2023.



- Current monitoring of NO₂ is currently focused within metropolitan Adelaide, as previous monitoring in other locations such as Gawler, Mount Gambier, Port Pirie and Whyalla showed lower levels than metropolitan Adelaide.



Smelter at Port Pirie

Sulfur dioxide (SO₂)

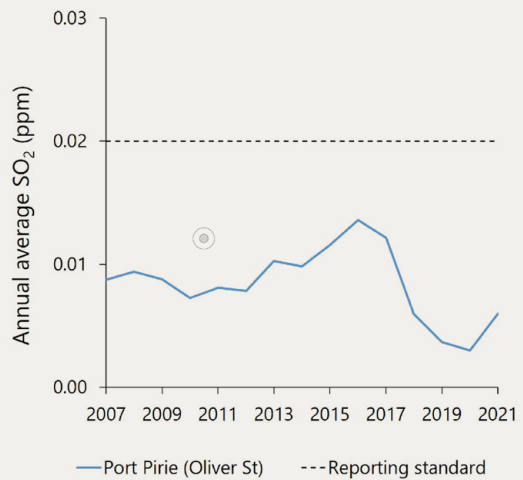


Sulfur dioxide levels in Port Pirie have reduced in recent years and meet the reporting standard.

- Sulfur dioxide (SO₂) monitoring is currently focused in Port Pirie where there are emissions from the Port Pirie smelter. Annual average levels of SO₂ have been variable at the Port Pirie Oliver Street air quality monitoring station over the assessment period (2007 to 2021), but have generally decreased since 2016 (Figure 15). Improvements in recent years are the result of new technology that was installed at the smelter as part of the Port Pirie Smelter project.

Figure 15: Average annual levels of sulphur dioxide in Port Pirie

Source: DEW Report Card 2023.





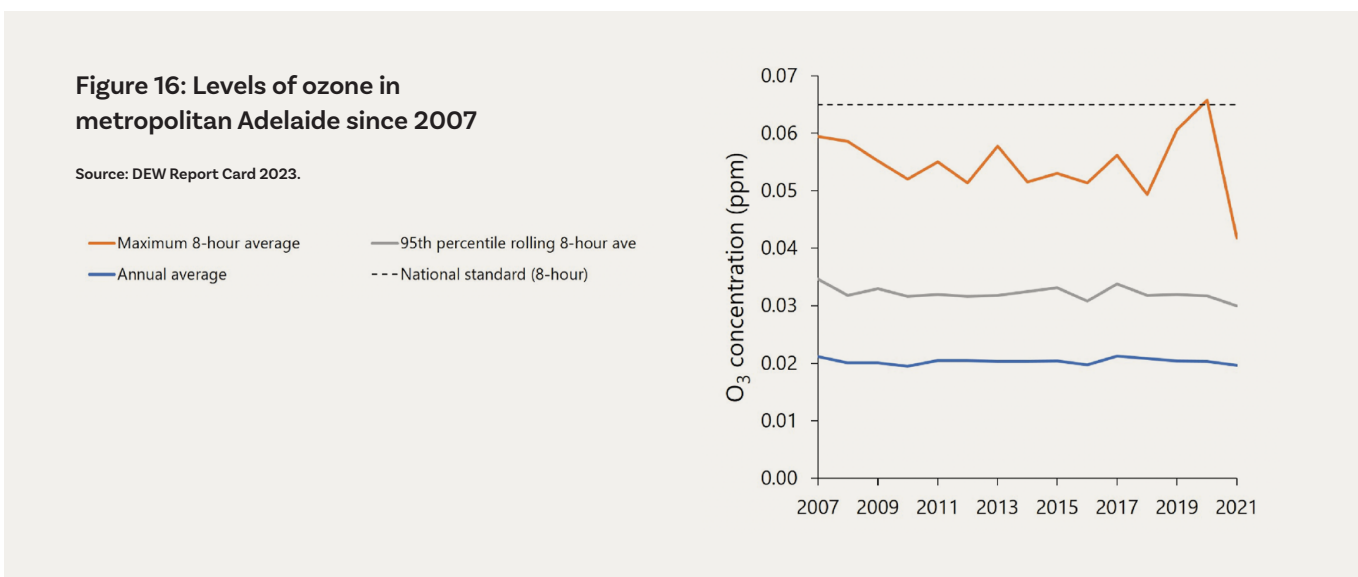
Kangaroo Island Bushfires 2019-20 : New Matilda

Ground-level ozone (O₃)

Stable Very good Very good

Ground-level ozone concentrations in South Australia are stable and meet the national standard.

- Monitoring within the Adelaide metropolitan region has demonstrated that concentrations of ground-level ozone (O₃) have remained stable since 2007 and below the national standard (Figure 16). This standard was updated in 2021 to reflect the latest knowledge about health impacts from air pollution. Significant emission events such as bushfires can lead to higher-than-normal levels of O₃ as occurred in the summer of 2019-20.



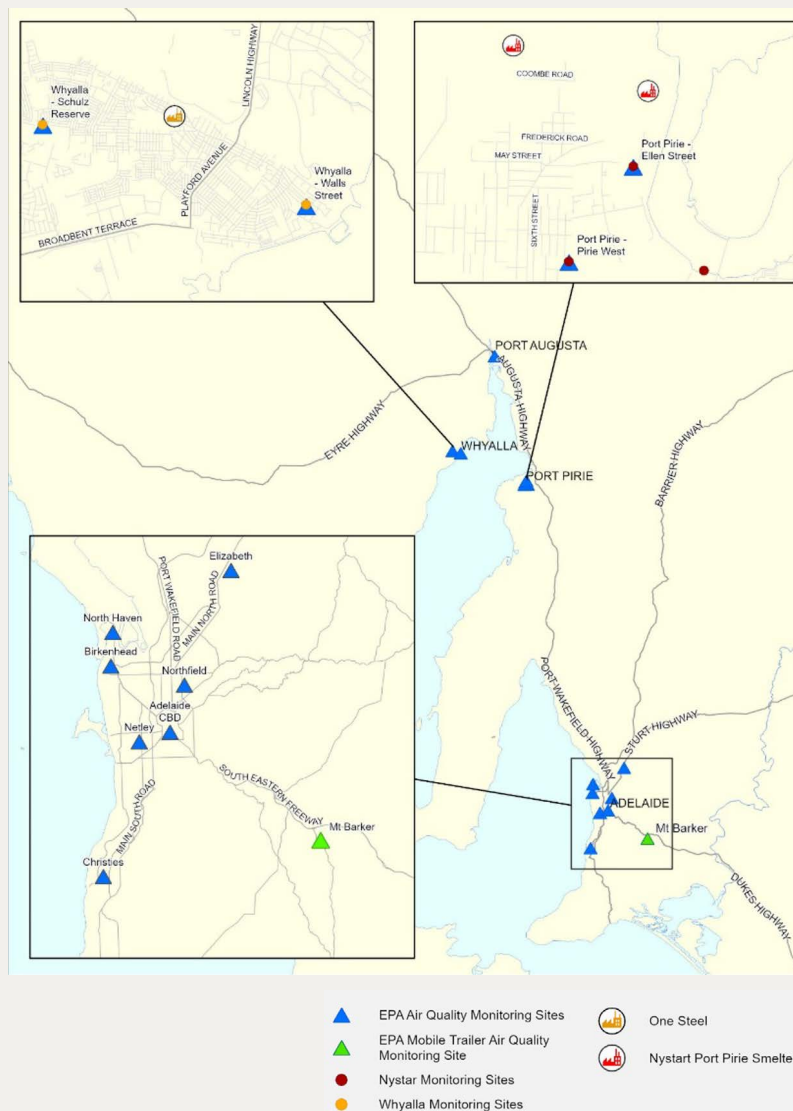
- Ground level ozone is a secondary pollutant and is formed by chemical reactions between nitrogen oxides and volatile organic compounds (VOCs) with warm and sunny weather. Sources of nitrogen oxides and VOCs include emissions from vehicles and industries, burning of fossil fuels and smoke.

What is being done

Monitoring is undertaken by the EPA to provide information about the quality of our air. The EPA currently operates 7 monitoring stations in metropolitan Adelaide and a further 3 stations in the regional centres of Port Pirie (1) and Whyalla (2) for various pollutants (Figure 17). Ongoing lead-in-air monitoring is also undertaken by the EPA at 4 locations in Port Pirie. When required, the EPA also conducts shorter-term monitoring, as was recently undertaken in Marino, Lonsdale and Hallett Cove for dust, Victoria Road for traffic emissions and Mount Barker for wood smoke from heaters. Additional monitoring stations would assist with understanding the extent of air quality across the state and impacts on air quality from various sources of pollutants particularly in regional areas where dust and smoke are likely to become more of a risk with climate change.

- Industries are required to report air emissions via the National Pollutant Inventory (NPI). This data assists the EPA with assessing risk and planning monitoring, management and regulatory actions for EPA licensed facilities that emit air pollutants. NPI reporting does not cover emissions of greenhouse gases which is reported through the National Greenhouse and Energy Reporting and National Greenhouse Gas Inventory. In South Australia, the NPI program is administered by the EPA.
- The EPA licenses industries that emit air pollutants. Mining and extractive industries are co-regulated with the Department for Energy and Mining. The regulation of odour, dust and smoke from facilities that are not licensed by the EPA is carried out by authorised officers under the Local Nuisance and Litter Control Act 2016 appointed by the minister or local councils, as well as police officers.

Figure 17: Locations of EPA air quality monitoring stations



- To reduce traffic emissions, the South Australian Government has introduced incentives for the purchase of new battery electric or hydrogen fuel cell vehicles that include a \$3,000 subsidy and a three-year registration exemption for vehicles first registered from 28 October 2021. There have been 7,000 subsidies made available and as of November 2023, 5,000 subsidies still remain.
- There have been calls for bans on wood heaters (for example, Asthma Australia), and some governments in Australia, for example, in the ACT, are phasing them out. Increased compliance work to regulate the way domestic wood heaters and fires in the open are operated is an option, which could be supplemented with an education campaign approach, noting that both approaches would require adequate resourcing.



LAND

Key messages

- South Australia is home to diverse landscapes ranging from coastal areas to arid regions. It supports biodiversity, recreation, tourism, primary industries and cultural values.
- South Australia's native biodiversity is globally unique and, therefore, forms an integral part of our cultural heritage and identity. Biodiversity also underpins our wellbeing and economic prosperity. Therefore protecting biodiversity is critical. South Australia has implemented a number of programs to help protect biodiversity, yet our native species and health of our ecosystems are still in decline with little indication of widespread recovery.
- Habitat loss and degradation is one of the key causes of species loss and biodiversity decline. Although there has been an increasing trend in the area of land under protection, more needs to be done to encourage the protection and more importantly, the restoration of habitats to protect biodiversity.
- National parks, native vegetation heritage agreements and Indigenous protected areas safeguard the wellbeing of ecosystems, wildlife, and communities and play a vital role in addressing global challenges such as biodiversity loss and climate change. These areas also contribute to our health and wellbeing as we use parks for recreation, and they support South Australia's natural and cultural heritage. Continued protection and sustainable management of protected areas are crucial for biodiversity and our communities.
- Consistency and reliability of data collection needs to be improved to inform condition and trend of biodiversity across the state. The South Australian Government is working towards improving our capacity to measure, collate, assess and report on biodiversity. Future improvements will also focus on reporting formats that adequately capture the richness of information to better inform evaluation, planning, regulation, and conservation efforts.
- A changing climate with increased temperatures, reduced rainfall and a greater frequency of extreme weather events such as drought, flood and fires, will have significant impacts on land and biodiversity, and poses risks to our communities, industries (particularly primary industries) and infrastructure. We need to prepare, adapt and resource accordingly.
- Competing and increasing land use, for example with the expansion of housing and the development of renewable energy projects, may place additional pressures on biodiversity and vegetation and as well as other land uses such as primary industries. The location, scope and operation of any new projects need to be sustainable and consider risks.
- Emerging issues that may impact our habitats, ecosystems and biodiversity need to be identified and addressed. For example, but not limited to, impacts from increased tourism, expansion of renewable energy, new incursions of invasive species, potential impacts of light pollution on our native fauna and antimicrobial resistance which can impact our food, agribusiness, and environmental management sectors.
- The monitoring and management of Country would benefit greatly by better incorporating the cultural knowledge of Aboriginal peoples and providing them with access to land to facilitate this.

What are the pressures

- Our land is subject to several pressures that can impact the important services that our land provides, including:
 - ✓ climate change including bushfires, drought and heat, floods, wind and other extreme weather events
 - ✓ pollutants that are emitted from a number of sources. These may include pesticides and herbicides that can impact non target organisms, nutrients, industrial chemicals, light pollution and antimicrobials
 - ✓ land use and habitat modification that can occur with agriculture, mining and quarries, gas and petroleum, cropping, renewables, recreation and urban development. This can result in land use conflicts, destruction and fragmentation of habitats, native vegetation clearance, decreased pollination and displacement of species
 - ✓ pest species and diseases that predate and/or compete with native flora and fauna.

What is the trend and condition

Soils

- Maintaining healthy soils is critical to support a healthy environment and our food production. Issues such as wind and water erosion, soil acidification and salinity, declines in soil structure, fertility and water absorption capacity all need to be addressed, particularly in the face of climate change.
- Wind and water erosion poses the biggest threat to agricultural soils in South Australia and is likely to become exacerbated with climate change. Approximately 5.4 million hectares (61%) of agricultural land is susceptible to wind erosion and 2.9 million hectares (32%) to water erosion.

Days at risk of soil erosion



Getting worse



Fair



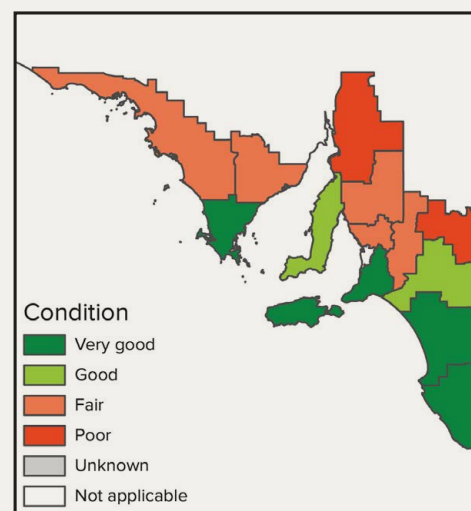
Very good

The statewide trend of soil erosion risk on agricultural land is getting worse. Level of risk varies across agricultural districts.

- The level of soil erosion risk varied across agricultural districts (Figure 18). Seven districts that are in higher rainfall areas had a 'very good' or 'good' condition rating. The Upper North and Northern Mallee districts had a 'poor' condition rating due to well-below average rainfall in most of the past five seasons.
- Soil erosion risk on agricultural land has been getting worse over the past five years most likely due to declining rainfall resulting in less plant growth and, and therefore, ground cover to protect soil from erosion. This trend is observed for 6 of the 14 agricultural districts located in lower rainfall areas. The trend for the remaining 8 districts is considered to be stable.

Figure 18: Condition rating of days at risk of soil erosion across South Australia

Source: DEW Report Card 2023.





Soil acidity



Getting better



Fair



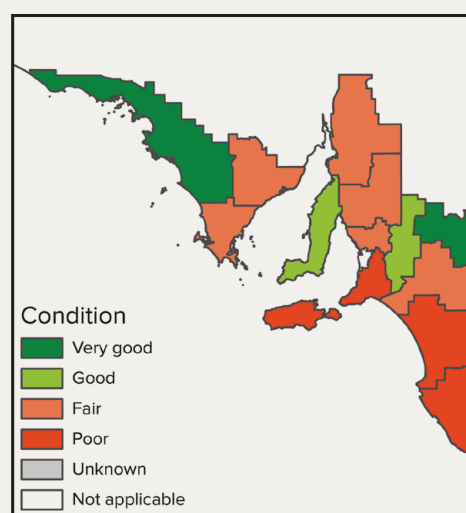
Good

Soil acidity on agricultural land is fair overall and has started to improve with higher lime use.

- The extent of soil acidity differs across the agricultural districts with districts exhibiting higher soil acidity located in areas that have higher rates of naturally occurring acidic soils (Figure 19). The trend in agricultural soil acidity has been getting better since 2018 with the use of lime.
- Approximately 3.9 million hectares (44%) of agricultural land in South Australia is considered at risk of acidity. Of this, about 2.5 million hectares (28%) are already close to or at pH levels that are too acidic and, which is reducing the yield of crops and pastures. Soil acidification is a natural process in the higher rainfall areas of South Australia, but can be significantly accelerated by agricultural practices.

Figure 19: Acidity condition in agricultural districts across South Australia

Source: DEW Report Card 2023.



- Around 1.5 million hectares of cleared agricultural land is affected by watertable induced dryland salinity with the Upper South East and areas of Eyre Peninsula most impacted. Dryland salinity also impacts native vegetation and infrastructure such as roads, sewers and buildings. Natural (or primary) salinity can be a feature of some soils and waterbodies. However, human-induced (or secondary) salinity can arise where land use and management activities lead to increased intensity or extent of salinity in the landscape.
- Soil acidity and dryland salinity caused by land use changes are major threats to the health of our soils and impact agricultural productivity.

Habitats

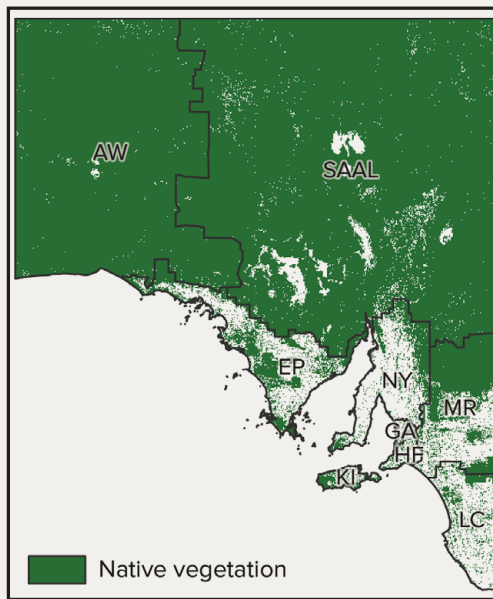
- Native vegetation is important as it provides habitat and supports healthy ecosystems for our plants, animals and fungi. It also protects soils, coastlines and waterways from erosion and salinity and stores carbon.

Native vegetation: percentage cover	 Getting worse  Unknown  Poor	In 2020, native vegetation percentage cover was 87.8% statewide and continues to decline.
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- In 2020, the state-wide percentage cover of native vegetation was 87.8%. The extent of vegetation coverage varies across the nine landscape regions and appeared to be low in regions that support key agricultural areas and/or are developed (Figure 20).




Figure 20: Percentage native vegetation cover across South Australia.




Source: DEW Report Card 2023.



Biodiversity

- Australia is home to around 600,000 native species, many of which are found nowhere else in the world. Half of the world’s marsupials are found in South Australia.
- Habitat loss and degradation is the most dominant cause of species loss followed by invasive species and diseases, adverse fire regimes and climate change.

Native flora: percentage declining	 Getting worse  Unknown  Poor	The percentage of terrestrial native flora species declining is getting worse, but this trend has poor reliability.
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Native fauna: percentage declining	 Getting worse  Unknown  Poor	The percentage of terrestrial native fauna species declining is getting worse, but this trend has poor reliability.
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- Across South Australia the estimated percentage of native flora species declining was 41.6% and was 44.1% for native fauna. However, this varied across landscape regions.
- The percentage of native flora and fauna declining is getting worse across South Australia with the 2022 assessment indicating that 7 of the 9 landscape regions showed a declining trend when compared with a 2002 baseline. The trend in percentage decline was unknown for the remaining two regions, Alinytjara Wilurara and Green Adelaide.

Invasive species

- Invasive species can kill or outcompete native plants and animals, livestock, crops, and pastures, and spread disease. They can also impact the structure and function of ecosystems and biodiversity. Therefore, it is important that appropriate controls are in place to minimise spread and prevent new incursions of pests and diseases.

Established
invasive
species
abundance
and
distribution



Stable



Fair



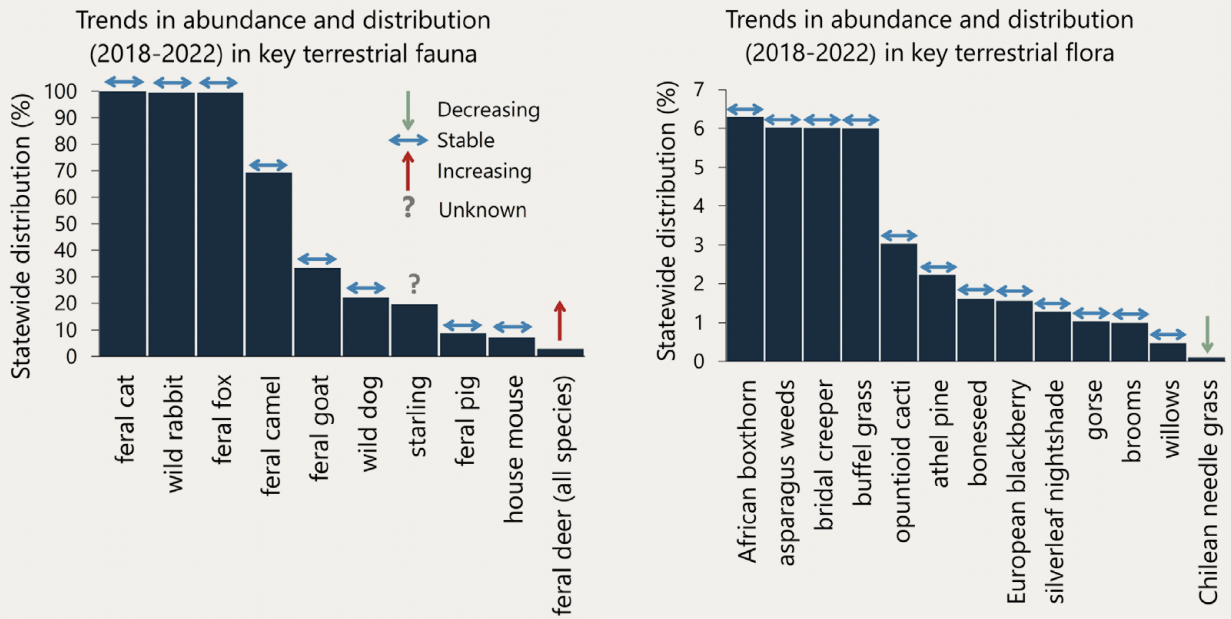
Poor

Abundance and distribution of established terrestrial invasive species is stable in South Australia.

- Many pest animal species numbers in South Australia have remained stable, except for deer that are increasing in number across a several of landscape regions, including Limestone Coasts, Hills and Fleurieu, Murraylands and Riverland, Green Adelaide, Eyre Peninsula and Northern and Yorke. Chilean needle grass is the only weed species that is decreasing across the state (Figure 21).

Figure 21: Trends in abundance and distribution of pest animals and established weeds between 2018 - 2022

Source: DEW Report Card 2023.



New
incursions
of invasive
species



Unknown



Unknown



Fair

In 2022, 41 new incursions of terrestrial invasive species were reported, but there is insufficient information to determine a trend.

- In 2022, 7 incursions of non-established weeds and 34 incursions of non-established pest animals were reported in South Australia with more than half the reports being for birds. It is unknown why the incursions since 2019 have been increasing. However, they could be the result of implementing targeted campaigns for the reporting of certain invasive bird species in 2021 and 2022, or incursion numbers may just be increasing.



Superb fairywren

What is being done

- A new [Biodiversity Act](#) is currently being developed to help protect and conserve biodiversity. This legislation will integrate the goals of the *Native Vegetation Act 1991*, the *National Parks and Wildlife Act 1972* and the *Landscapes SA Act 2019* and put the protection of biodiversity at the centre of these laws for the long term. The Biodiversity Act will incorporate the knowledge of Aboriginal peoples in the management of land and respect for its ecosystems. In addition, the South Australian Government has committed \$8 million to introduce a modern data system [BioData SA](#) to capture, manage and share South Australia's biodiversity data and guide decision-making for protection and restoration programs.
- The [Landscape South Australia Act 2019](#) provides the framework for managing land, water, pest plants and animals, and biodiversity across the state and supports the work of [nine Landscape Boards](#). It was introduced on 1 July 2020 and replaced the Natural Resources Management Act 2004.
- Department of Primary Industries and Regions SA (PIRSA) coordinates the management of animal and plant pests and diseases in South Australia. PIRSA is currently developing [new biosecurity legislation](#) to improve protection against pests and diseases.
- The Department for Energy and Mining (DEM) is the lead agency for regulating both [mining and quarries](#), and [gas and petroleum](#). These industries are co-regulated with the EPA under a memorandum of understanding with DEM as they can also result in potential noise, air quality and water quality impacts.
- Prevention, early detection and intervention regarding new incursions is an important strategy for managing pest species as it is the most cost effective. Since the 1960s, [invasive species](#) have cost Australia more than \$390 billion in impacts and management. Each year, landholders spend substantial amounts of time and money on weed and pest animal control.
- [Prescribed burns](#) and [cultural burns](#) help manage the ecological health of habitats and protect them from bushfire risks and invasion of feral species by reducing fuel loads and promoting the growth of native vegetation. Cultural burns are also an integral part of Aboriginal culture in looking after and connecting with Country. There is a growing awareness of the [importance and value](#) of cultural burns for caring for Country.
- PIRSA, the South Australian Research and Development Institute (SARDI), DEW and Landscape Boards are working with primary producers and pastoralists, including industry peak bodies, to support the implementation of sustainable agricultural practices and management of pastoral land. Some farmers are also adopting [regenerative agriculture practices](#) that focus on restoring and enhancing the health and vitality of ecosystems, soil, and agriculture.

Soil protection: adoption of no-till



Stable



Very good



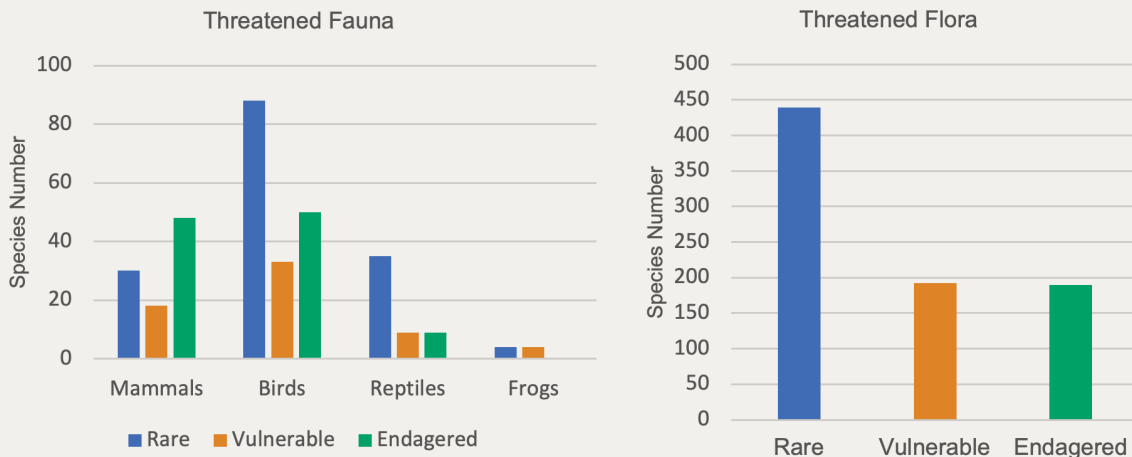
Poor

Agricultural crops are now mostly sown using no-till and adoption of this method has reached a stable level.

- No-till sowing is being adopted by farmers to reduce the risk of soil erosion. The adoption of no-till sowing for annual crops has increased from 16% in 1999 to 83% in 2016. No-till sowing has now stabilised at around 80%, which is considered to be very good. Other [improvements in farming practices](#) such as stubble retention and managing stock grazing are also being implemented to help minimise soil erosion.

- In South Australia, threatened species are given formal legal protection under the *National Parks and Wildlife Act 1972* as endangered, vulnerable or rare. More than 1,100 species are listed in South Australia as threatened to aid in their protection (Figure 22).

Figure 22: Threatened species listed under the National Parks and Wildlife Act



Landscapes adequately protected



Getting better



Fair



Good

South Australia's landscape protection is getting better, with 30% adequately protected, and positive trends in some regions.

- The protection of landscapes in South Australia is getting better.
 - ✓ Two new national parks have been proclaimed over the last five years. Glenthorne National Park - Ityamaitpinna Yarta was proclaimed in May 2020, and Nilpena Ediacara National Park was proclaimed in June 2021 and opened in April 2023. Other recent additions to the protected area system include the Aldinga Washpool addition to Aldinga Scrub Conservation Park, Hindmarsh Valley National Park, and a new section added to Scott Creek Conservation Park
 - ✓ Since 1980 when the Native Vegetation Heritage Agreement program was first introduced, there have been over 1,600 heritage agreements in South Australia providing long-term protection to over one million hectares of native vegetation
 - ✓ South Australia has 10 nationally funded Indigenous Protected Areas (IPAs) that cover 6.19 million hectares. Many of these areas are supported by Indigenous Ranger Programs. There have been no new IPAs established in South Australia since 2016
- The Native Vegetation Council (NVC) is an independent body established under the Native Vegetation Act 1991. The NVC monitors the overall condition of the state's native vegetation and makes decisions on a wide range of matters concerning native vegetation in South Australia including Heritage Agreement Schemes, supporting revegetation of land, monitoring native vegetation and vegetation clearance applications.
- The new Planning and Design Code that became operational in 2021 includes native vegetation overlays to ensure removal of native vegetation is considered upfront in a planning assessment.
- Light pollution may also impact natural behaviour of native wildlife, particularly for nocturnal animals. Animals perceive light differently from humans and artificial light can disrupt critical behaviour and cause physiological changes in wildlife. South Australia has established Australia's first Dark Sky Reserve, which is located in the Mid-Murray Council region, and is one of only 15 in the world.



Adelaide Oval and the River Torrens

WATERS

Key messages

- Inland waters, which include rivers, creeks, lakes, reservoirs, wetlands and groundwater, play a vital role for our environment and society. They possess significant importance and value in a range of environmental and economic aspects, including ecology, water quality and supply, biodiversity, industrial, transportation, recreation, culture and human wellbeing.
- South Australia is the driest state in the driest inhabited continent on earth. Appropriate management of our water resources is critical to the environment and to our economic growth, health and wellbeing. This is reflected by SA Water's Resilient Water Futures initiative. An integrated approach for the management of South Australia's diverse water resources will be necessary to ensure water security for the community and the environment.
- Climate change will lead to a hotter and drier climate. This will impact water availability for the environment and for human use. We need to implement appropriate actions that will secure water for our community and maintain a healthy environment. We need to reduce the pressure on natural water from water extraction. This could be achieved by increasing the reuse of stormwater and treated wastewater, integration of rainwater tanks of appropriate volumes, and recycling of greywater particularly in new builds.
- Groundwater is a vital water source for many people, industries and groundwater dependent ecosystems and is the largest freshwater resource in South Australia. Reliance on groundwater is only expected to rise in the future due to the impacts of climate change. Yet assessment of impacts to groundwater quality is still poorly understood due to its invisible nature and being 'out of sight out of mind'. Collation of existing data and collection of new data is needed to provide a baseline of groundwater quality from which the potential impacts of climate change can be assessed in the future.
- The EPA Aquatic Ecosystem Condition Reports have indicated the ecosystem condition of inland waters in catchments that are significantly modified has not improved over the last 20 years of monitoring and continue to be impacted by various pressures such as nutrients, sediments and salinity. This has mainly been caused by diffuse pollution from urban and agricultural landscapes and degraded riparian vegetation from land clearing and grazing. Better protection and rehabilitation of our surface waters, including riparian zones, is required to maintain and improve biodiversity. Implementation of better land management practices are also needed at the reach or sub-catchment scale to reduce the movement of nutrients and fine sediment into creeks and rivers.
- Water is also important culturally and spiritually to Aboriginal peoples. Aboriginal knowledge needs to be better incorporated into the protection and allocation of waters across South Australia.



Livestock Barossa Valley

What are the pressures

- Being the driest state of the driest inhabited continent, water is an important resource in South Australia. Pressures on our inland waters, including surface water and groundwater, include:
 - ✓ climate change impacts from declining annual rainfall, hotter temperatures, intense rainfall events and more dangerous fire weather that will affect water supply and water use both for people and the environment
 - ✓ resource use including water extraction and recreational activities
 - ✓ habitat modification including land clearance, removal of native vegetation, addition of dams and other water collecting devices, change of land use including urban development, and disturbance of acid sulfate soils
 - ✓ pollution from various sources such as wastewater discharge, chemicals from industry (in particular legacy use), stormwater runoff, agriculture (fertilisers, pesticides and livestock), microplastics, nutrients and sediments
 - ✓ pest species and disease introduced via translocation that may compete with native species.

What is the trend and condition

Surface waters

- Inland surface waters that are classified as being in a healthy condition typically occur where large areas of native vegetation have been retained and where water flows occur in spring. Creeks located in areas with higher rainfall and less disturbance from human activities including urban development and agriculture, were generally in better condition.
- In agricultural areas, streams are often nutrient enriched, silted and have riparian zones with few or no native plants and dominated by introduced grasses and weed species. Urban streams are usually in a degraded state due to stormwater inflows, channelisation, weed invasion and, occasionally point-source discharges from industries.

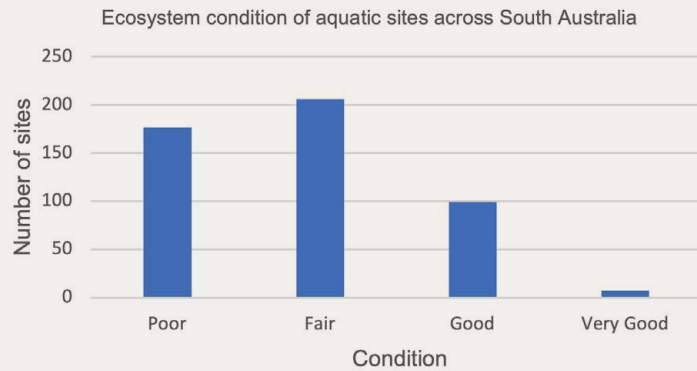
Aquatic ecosystem condition EPA condition assessments



Aquatic ecosystems in South Australia are recovering from the Millennium Drought.

- Ecosystem condition for some catchments is improving, based on the assessment of 69 sites that have been monitored three or more times. However, this is mainly due to recovery from drought conditions rather than catchment restoration. A considerable number of sites across South Australia are still considered to be in 'fair' or 'poor' condition based on the most recent sampling event per site (Figure 23).

Figure 23: Ecosystem condition of inland aquatic sites across South Australia



Wetlands: percentage cover



In 2020, wetlands percentage cover was 1.9% statewide, but there is insufficient information to determine a trend.

- In 2020, the percentage of wetlands cover was 1.9% statewide. This is based on an estimated extent of 1,903,100 hectares (ha). Due to recent changes in the sensors and accuracy of satellite data it is currently not possible to assign a trend to percentage cover of wetlands. The condition of wetlands percentage cover is unknown, as there are no agreed statewide benchmarks
- Extensive reduction in wetlands occurred prior to satellite observations. For example, in the south-east of the state, more than 1.6 million hectares of wetlands (over 50% of the area) were converted to agricultural land by various drainage schemes.
- South Australia has 1,903,100 hectares of wetlands that include six Ramsar wetlands that appear on the List of Wetlands of International Importance under the Ramsar Convention and are included because of their ecological, botanical, zoological, limnological or hydrological importance. Wetlands are an important ecosystem as they perform functions such as improving water quality and supporting some of the most biologically productive and diverse habitats on earth. They are also very important culturally to Aboriginal peoples.

Native fauna: percentage declining



The percentage of inland waters native fauna species declining is stable, but this trend has poor reliability.

Native flora: percentage declining



The percentage of inland waters native flora species declining is stable, but this trend has poor reliability.

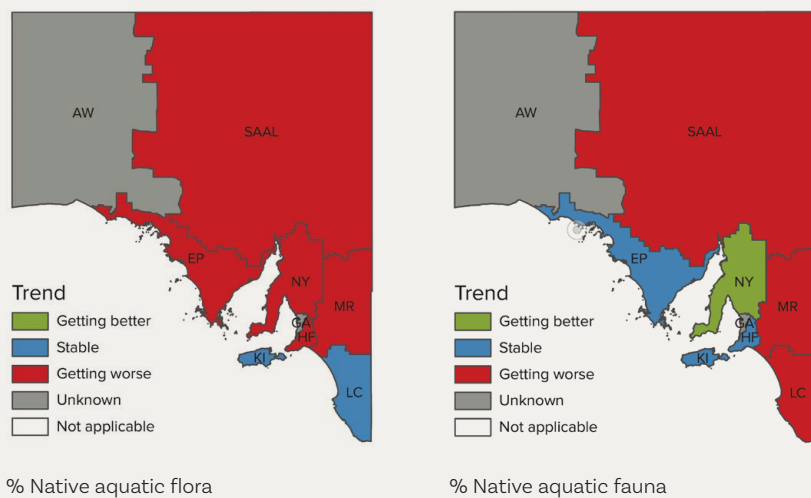
- When compared with a 2002 baseline, the 2022 assessment of percentage of native inland aquatic fauna and flora species declining showed variations in trend across landscape regions. However, the overall trend has stabilised across the state (Figure 24).



Endangered Southern Bell Frog '*Litoria raniformis*' at Chowilla

Figure 24: Trend in the percentage of species declining

Source: DEW Report Card 2023.



<p>Established invasive species abundance and distribution</p>		<p>Abundance and distribution of established invasive species in inland waters is stable in South Australia.</p>
<p>Inland waters New incursions of invasive species</p>		<p>From 2019 to 2022, 9 new incursions of invasive species were reported in inland waters, but there is insufficient information to determine a trend.</p>

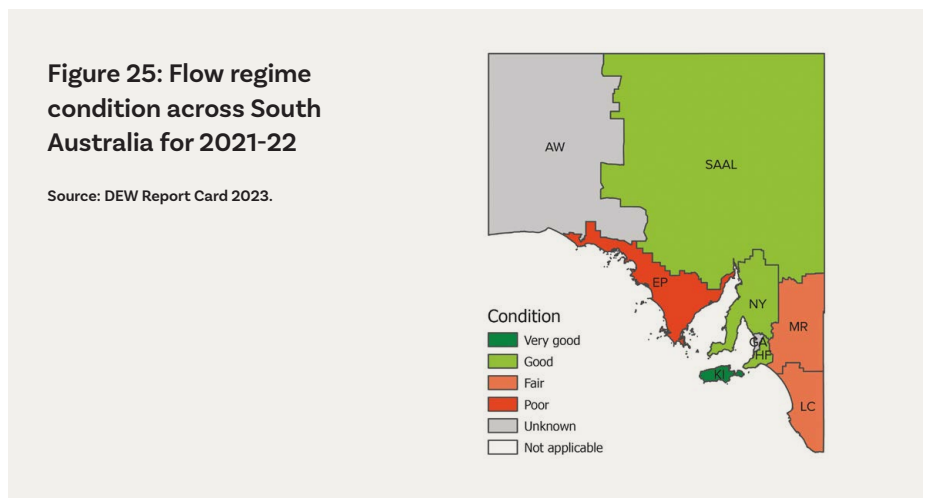
- The trend in abundance and distribution of invasive species of fish, weeds and invertebrates is stable for the SA Arid Lands, Murraylands and Riverland, Hills and Fleurieu and Green Adelaide with these regions considered to be in poor condition. Trends for the remaining landscape regions are unknown due to limited data. The presence of invasive species is found in almost all waterways. However, there have been no reports of any spread to new regions.
- Nine new incursions of invasive species were reported to the South Australian Government from 2019 to 2022. However, these were located in backyard ponds and retail settings and, therefore, could be controlled and destroyed. No new incursions were reported for the natural environment.



Creek in the Fleurieu Peninsula

<p>Streamflow</p>	  	<p>Streamflow is declining across South Australia. However, in 2021–22 the overall condition was considered good due to above-average rainfall across much of the state.</p>
<p>Flow regime (zero flow days)</p>	  	<p>Despite a long-term declining trend in flow regime, the overall condition was considered good in 2021–22 due to above-average rainfall across much of the state.</p>

- The condition of streamflow (surface water quantity) was assessed to be good in South Australia driven by the above average rainfall that occurred across much of the state in 2022. However, since 1986, the trend in streamflow has shown a decline for each landscape region, with the exception of Alinytjara Wilurara and Green Adelaide, for which the trends are unknown.
- The overall flow regime condition (number of flowing days) was assessed to be good in South Australia, although is variable across the landscape regions. However, the trend for flow regime for surface water is showing a decline across every landscape region, except for Alinytjara Wilurara and Green Adelaide, for which the trends are unknown (Figure 25).



- The flow regime of a river is one of the main drivers of aquatic ecosystem condition, and increased flowing days enable more flora and fauna to complete life cycles and support biodiversity and improved water quality. Flow regimes are influenced by rainfall and groundwater infiltration via springs into rivers and can be impacted by climate change, capture of runoff into dams and extraction of groundwater.

Groundwater

- We rely on groundwater as a water supply for both industrial and personal use, particularly in certain regional areas where surface water is scarce. In some cases, this has led to overallocation of water resulting in groundwater depletion and or degradation including rising salinity. Groundwater also provides a vital source of water for many Aboriginal communities and remote pastoral properties in South Australia, as they rely solely on groundwater to meet their water needs.



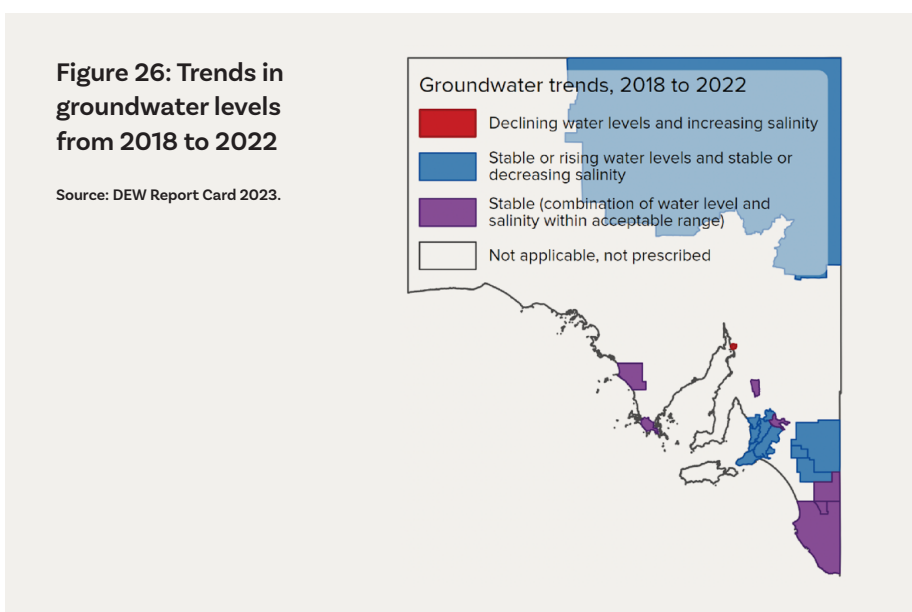
Snorkeling in Ewens Ponds Conservation Park, Limestone Coast

Water level and salinity

Stable Good Good

The salinity of South Australia's groundwater resources is generally stable, and water level trends are variable.

- The overall condition of groundwater resources in South Australia is good with 5-year trends in water salinity generally stable, and groundwater levels variable depending on the groundwater management area which can be influenced by rainfall and/or extraction. Over the past 5 years, metered groundwater extractions were less than 28% of the volume allocated. In individual regions, metered use ranged from 5% to 53% of the 2021-22 allocation volume (Figure 26).



What is being done

- In South Australia, water is managed and monitored by a number of different agencies. This includes for natural environments (surface water and groundwater), drinking water, water used for other purposes (for example, irrigation), wastewater and stormwater.
- The Planning and Design Code features overlays that include watercourses and referral requirements to relevant South Australian government agencies.
- Groundwater pollution has resulted from industry whereby, historically, chemicals were disposed of on the ground or via drains. The EPA has established several groundwater prohibition areas (GPAs) that restrict the use of groundwater from bores located in these areas due to potential impacts to health. Since 2013, there have been 12 GPAs with all but one being declared from 2018.
- The Australian Water Quality Guidelines now incorporate cultural and spiritual values for water quality management. The EPA is currently working towards incorporating cultural and spiritual values into the revised version of the *Environment Protection (Water Quality) Policy 2015*, reflecting the inclusion of these in the national guidelines. DEW has established partnerships with Aboriginal peoples to inform water resource planning in regional areas. Landscape Boards in South Australia are also forming partnerships with Aboriginal peoples in managing and caring for waters.



RIVER MURRAY

Key messages

- The River Murray is part of the Murray Darling Basin, which is a vital national resource. It is the lifeblood of South Australia, providing essential water for irrigation, industry, domestic and recreational use and is the nation's most iconic river, supporting estuarine, floodplain and wetland environments and ecosystems of national and international significance.
- The rivers, lakes, wetlands and surrounding riparian areas have a very strong cultural and spiritual significance for Aboriginal peoples, including those represented by the River Murray and Mallee Aboriginal Corporation RNTBC, Mannum Aboriginal Community Association Incorporated, the Ngarrindjeri Aboriginal Corporation RNTBC and the First Nations of the South East.
- The river is an important source of water for South Australian cities and towns, including Adelaide. The Murray-Darling Basin agreement sets the volume of water that needs to be supplied to South Australia for irrigation, town and industrial water supply and environmental purposes. South Australia's annual entitlement is 1,850 gigalitres which may be reduced during dry conditions.
- The South Australian Government appointed a Commissioner for the River Murray to advocate for the health of the Murray, Lower Lakes and Coorong in South Australia. This included securing the delivery of 450 GL of additional environmental water as specified in the Murray-Darling Basin Plan, which is required for the river to withstand future dry spells. So far, only 12.2 GL has been registered with the Commonwealth Environmental Water Holder. The South Australian Government provided a response to the 2019 Murray-Darling Basin Royal Commission, which outlines our expectations and requirements for full delivery of the Basin Plan. The South Australian Government has introduced the Water Amendment (Restoring Our Rivers) Bill 2023 to the Australian Parliament to amend the Water Act 2007 and the Murray-Darling Basin Plan, to enable water buybacks to contribute to the delivery of the 450 GL of environmental water by 2027. This Bill has now been passed by the Australian Parliament.
- In 2022-23, the River Murray experienced its largest flood event since 1956 and the third highest flood ever recorded. There have been many significant environmental benefits from the flood observed along the length of the River, including improved condition of long-lived vegetation such as river red gum and black box due to receiving much needed water to areas of floodplain that had not received water for over 60 years. However, the flood also caused substantial damage to properties, industries and businesses and negatively affected tourism during the peak season.



Kayaking River Murray

- Securing the delivery of water to the lower reaches of the River Murray, including the Coorong, Lower Lakes and Murray Mouth is critical to protect Aboriginal cultural values, maintain flows, maintain and/or improve ecological condition, ensure the Murray Mouth remains open and to support habitats for significant plants and animals, including threatened species and communities. Although many ecological benefits have been observed following the flood, the importance of the delivery of water for the environment remains critically important, along with ongoing monitoring and active management to sustain these benefits and inform future management of riverine, floodplain and wetland habitats along the River Murray, Lower Lakes, Murray Mouth and Coorong.

What are the pressures

There are a range of environmental pressures and issues that can impact the River Murray which include:

- ✓ climate change impacts that affect water supply to the river altering flows, water supply to wetlands, the Lower Lakes and Coorong, and water availability for users that rely on the river as a water source. Droughts, such as the Millennium Drought, cause disastrous effects for the environment and communities. While flooding can provide numerous environmental benefits to the river, it can also result in devastation to communities, industries and businesses, and have negative environmental consequences, such as loss of mudflat habitat, as has been experienced in 2022-23
- ✓ resource use, including water extraction that can impact water flows and salinity levels vital for ecosystem health. This is particularly complex due to competing demands, different water management arrangements between the Murray-Darling Basin (MDB) states and territory, and the need to ensure a balance of water supply for the environment, human water needs (as per the MDB Plan), cultural and spiritual values and extractive use for horticulture, pastures and other industries
- ✓ habitat modification such as the introduction of locks, weirs and storages to regulate flows and the creation of artificial 'beaches' by illegally depositing sand at shack sites.
- ✓ pollution from various sources such as leaking septic tanks, wastewater discharge, stormwater runoff, agriculture (fertilisers, pesticides and livestock), microplastics, nutrients and sediments. This may result in declining water quality, potential harmful algal blooms and impacts to plants and animals including fish, reptiles and birds and other species that support a healthy ecosystem
- ✓ diseases and pest species such as European carp which is one of the most common fish species present in the River Murray. Modelling undertaken for the 2020 DEW report card estimated that there was approximately 550 kg of carp per hectare in the South Australian section of the River Murray during that time. Carp degrade waterways and compete with native species.



River Murray flood event

What is the trend and condition

The 2022–23 flood event

- The recent flooding along the River Murray between November 2022 and February 2023 was the largest flood event since 1956 and the third-highest flood ever recorded (Figure 27). Flows peaked at the South Australian-Victorian border on 22 December 2022, reaching 185 GL/day (Figure 28).

Figure 27: Highest peak flow rates at the South Australian-Victorian border over the past 100 years

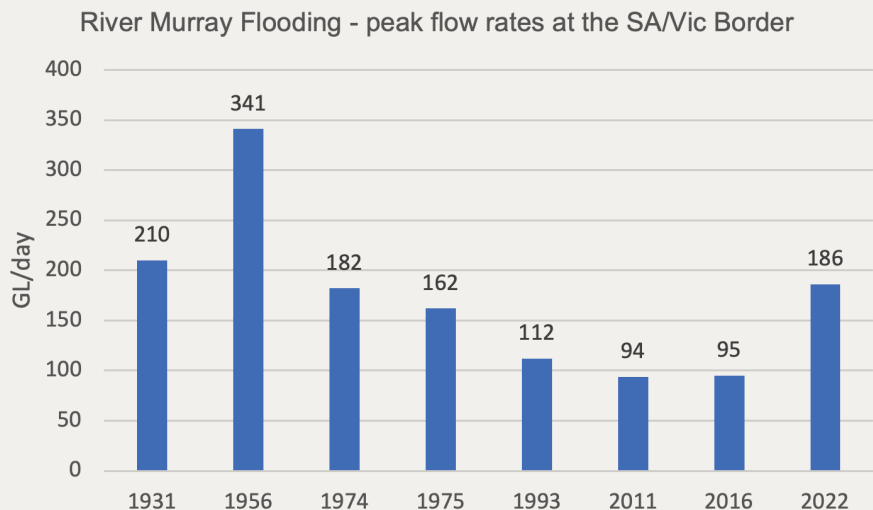
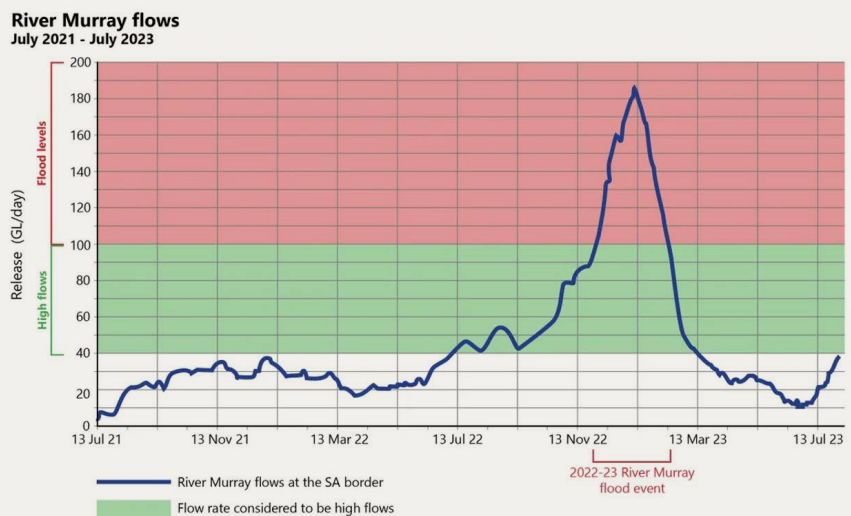


Figure 28: River Murray flow rates at the South Australian-Victorian border

Source: [DEW River Murray Flows](#)



- Environmental outcomes of the River Murray flood have so far included:
 - ✓ full reconnection of river floodplain and estuarine environments were fully reconnected, supporting the flow of water, and improvements of water quality due to the flushing out of salt and nutrients from the river system
 - ✓ Vegetation growth and improvement in tree health and the quality of understory vegetation. This, along with more water in our wetlands will support the cycle of life to sustain populations of insects, frogs, fish and birds
 - ✓ provision of much-needed water to areas of the floodplain and wetlands that had not seen water for more than 60 years. This is supporting a boom in frogs, fish, turtles and birdlife across the river system. DEW is working with the Goyder Institute for Water Research to use this opportunity to undertake monitoring and research that will help inform the future management of riverine, floodplain and wetland habitats
 - ✓ connecting the river with floodplains and wetlands enabling fish dispersal and movement into new habitats along the river. Increased water flows also benefit the recruitment of native fish, other animals and plants
 - ✓ fish kills, predominantly consisting of carp, occurred along the beaches at Goowla and Middleton as a result of them being flushed out to the marine environment from the high flows
 - ✓ The opening of the Murray Mouth and the ceasing of dredging for the first time since 2015.

The River Murray

River Murray flow-dependent fish populations



Stable Poor Fair

Flow-dependent fish populations are in poor condition. Murray cod are improving, while golden perch are stable.

- The population age structure of Murray cod is in good condition with 9 of the past 10 years showing a desirable population age structure and recent recruits detected in all years since 2012-13. Golden perch population age structure was in poor condition with a desirable population age structure in 4 of the past 10 years. Young of the year golden perch were observed for the first time in 2020-21 since 2013-14. The contrasting outcomes for these two fish species are due to the different spatial scales of connected, flowing habitat that are required for the spawning and recruitment of each species.

River Murray floodplain trees condition



Getting better Poor Poor

Floodplain tree condition is rated poor, but is getting better.

- The tree condition within the River Murray floodplains is based on river red gums and black box trees located on the Chowilla, Pike and Katarapko managed floodplains. River Murray floodplain trees are in poor condition, but are improving in areas where water for the environment has been delivered.
- The condition of these trees has improved since the Millennium Drought in 1996-2010. However, condition varies between individual trees ranging from very poor to excellent depending on their relative location on the floodplain and water availability. Delivery of water to the floodplain is being undertaken using a number of methods, with rainfall and unregulated high flows also critical for the resilience and recovery of these trees.

River Murray: salinity



Getting better



Good



Very good

The average salinity of River Murray water in South Australia is getting better.

- The River Murray has a naturally salty landscape, particularly in the southern region. Rising salinity levels are also the result of human activities including water extraction, clearance of native vegetation and agriculture. Some saltiness can be tolerated by plants and animals. However, long periods of high salinity can cause harm to the natural environment and also crops and livestock.
- The salinity of the River Murray at Lock 6, Morgan and Murray Bridge has declined on average since the Millennium Drought in 2010, with Lock 6 and Morgan remaining below the Basin Plan target levels in 2021-22. Salinity levels at Murray Bridge did exceed the target levels during the Millennium Drought, but have been maintained below the target since 2010. A reduction in salinity is the result of the adoption of more efficient irrigation practices, higher river flows and salt interception schemes. In 2021-22, the seven salt interception schemes located in South Australia extracted 270,000 tonnes of salt.

Lower Lakes

Lower Lakes aquatic and littoral vegetation



Getting better



Good



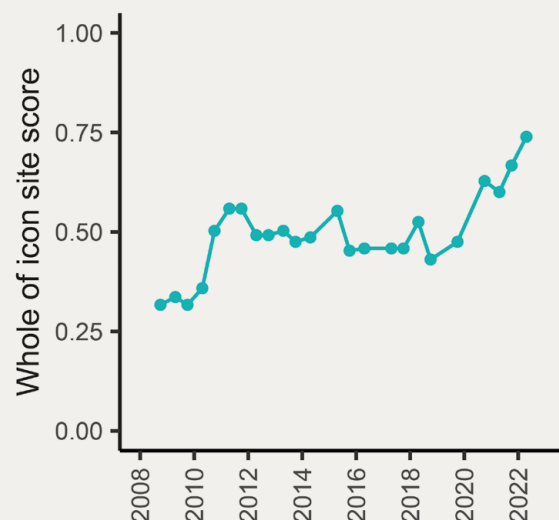
Very good

Aquatic and littoral vegetation condition in the Lower Lakes is generally good and getting better.

- The trend for Lower Lakes aquatic and littoral vegetation was assessed from 2008 to 2022 using the whole of icon site scores and habitat scores. The whole of icon site score shows improvements (Figure 29) and this was underpinned by improving trends in Lake Alexandrina, Lake Albert, Goolwa Channel and permanent wetlands. Temporary wetlands were found to have declined in condition despite recent improvements.
- Improvements in scores can be attributed to the delivery of water to the Lower Lakes that has protected aquatic environments and supported seasonal variation in lake levels that allows for the recruitment of desirable native plant species.

Figure 29: Trend in aquatic and littoral vegetation condition in the Lower Lakes

Source: DEW Report Card 2023.





Murray Mouth dredge

CLLMM diadromous fish recruitment

Getting better Fair Good

Recruitment of diadromous fish is getting better, due to improved connectivity.

- Recruitment of diadromous fish (those that move between freshwater, estuarine and marine environments), is getting better. However, this has varied between years. This was based on the assessment for congollis and common galaxias.
- Despite declines since 2014-15, recruitment of diadromous fish improved between 2006 and 2022 improved. This was in response to improved connectivity between freshwater, estuarine and marine environments that allows these fishes to migrate to the necessary habitats for spawning and recruitment. Higher flows in 2021-22 were expected to be beneficial to recruitment. However, fewer young-of-the-year fish were captured than expected.
- The delivery of the Murray-Darling Basin Plan to maintain flows and connectivity between the River Murray, Lower Lakes and Coorong is critical for supporting diadromous fish movement and recruitment.

Murray Mouth barrage outflow and dredging

Getting better Poor Very good


Flows through the Murray Mouth have improved, but dredging has remained necessary to keep the Murray Mouth open.

- An open Murray Mouth is important for maintaining connectivity between the freshwater environments of the River Murray and Lower Lakes with the estuarine (Coorong) and marine (Southern Ocean) environments. This supports the flushing of salt and nutrients from the river system and healthy environments for native flora and fauna.
- Sufficient outflows through the barrages and Murray Mouth are required to keep the Murray Mouth open. The Murray-Darling Basin Authority has calculated that the minimum annual water flow required to achieve this is 730 GL per year. This minimum outflow target has been met 44% more often since 2012 due to a combination of the breaking of the Millennium Drought and the delivery of water for the environment through the Basin Plan.
- Dredging of the Murray Mouth commenced in 2002 due to the threat of the Mouth closing during the Millennium Drought, and ceased with the breaking of the drought in 2010. Dredging recommenced again in January 2015, due to the return of low flows in 2014 and the deteriorating condition and openness of the Murray Mouth. Since then, two dredges have been operating in the Goolwa and Tauwitchere channels until the recent 2022-23 River Murray flood, which resulted in the ceasing of dredging in November 2022. The Murray-Darling Basin Plan seeks to provide barrage outflows to the Coorong, Lower Lakes and Murray Mouth to ensure that the Murray Mouth remains open without the need for dredging in at least 95% of years.




Coorong


Coorong waterbirds populations



Getting worse



Poor



Very good

Abundances of Coorong waterbird populations are getting worse.

- Coorong waterbirds are grouped into ‘guilds’ based on their diet, the way they search for food and their life history. These guilds include generalists (for example, silver gull), herbivores (for example, black swan), migratory shore birds (for example, red-necked stint), piscivores (for example, Australian pelican) and resident shorebirds (for example, red-capped plover).
- The abundance of waterbirds in the Coorong is declining, but this varies between guilds. Abundance of generalists and herbivores was assessed as being stable or having improved, while resident and migratory shorebirds and piscivores were assessed as having declined.
- Abundance declines were most severe for migratory shorebirds. These declines can be due to a number of factors, including local habitat conditions in the Coorong and the loss and decline of sites along their migratory flyways. This in turn affects habitat quality and availability for feeding and breeding.
- Habitats for waterbirds in the Coorong have also been impacted by prolonged high nutrient and high salinity conditions, the presence of filamentous algae and limited food resource availability. The [Healthy Coorong, Healthy Basin](#) program is investigating ecological restoration options to improve waterbird habitats in the Coorong, along with on-ground actions to improve habitats in the Lower Lakes and south-east of South Australia supporting the provision of refuge sites and complementary habitats for waterbirds until conditions in the Coorong improve.

What is being done

- The Murray-Darling Basin Authority (MDBA) is responsible for planning the Murray-Darling Basin's water resources, with all planning decisions made in the interest of the Basin as a whole. In South Australia, the Commissioner for the River Murray plays an important role in advocating for the health of the River Murray and delivery of the Murray Darling Basin Plan. The Water Amendment (Restoring Our Rivers) Bill 2023 has now been passed by the Australian Parliament and guarantees the delivery of 450 GL for the environment and acknowledges First Nation people's connection, history and water needs.
- Locks and barrages to manage water flows are operated by SA Water and water allocation from the River Murray is managed via the Water Allocation Plan for the River Murray Prescribed Watercourse administered under the Landscape South Australia Act 2019. The opening allocation for South Australian River Murray irrigators for the 2023-24 water year was 100%.
- The Murraylands and Riverland Landscape Board carries out a range of activities that contribute to the management and protection of the River Murray, Coorong and Lower Lakes, including management of wetlands and floodplains, restoration programs, education, and research and monitoring.
- The Healthy Coorong, Healthy Basin program aims to undertake activities that contribute to the ecological recovery of the Coorong, including potential long-term management solutions for the supply of water to this unique environment. This includes a Coorong Restoration Roadmap for which consultation has just been completed and which sets out key processes and principles to restore the Coorong.
- The Goyder Institute for Water Research carries out research that informs the protection and management of the health of the River Murray and Coorong under their Water for the Environment research program.
- The National Carp Control plan is still being considered as a mechanism to control carp populations in the River Murray and surrounds. However research is showing that native fish populations are improving with the delivery of water for the environment therefore providing greater competition for carp.
- Water salinity in the River Murray is managed through the adoption of the Basin Salinity Management 2030 strategy. This strategy supports the management of salinity through the operation of salt interception schemes and encouraging the improvement of farming and irrigation practices to prevent extra salt from entering the river. South Australia is home to seven salt interception schemes.
- Monitoring and research is underway to identify impacts the 2022-23 flood had on ecosystem health. In addition, the One Basin Cooperative Research Centre and the Coorong, Lower Lakes and Murray Mouth Research Hub have both been funded by the Australian Government to support critical research needs.
- The River Murray flood did result in extensive damage to housing and infrastructure which resulted in considerable costs to people and the government. Plan SA is currently reviewing planning rules to assist with the rebuilding process and mitigate the impacts of future River Murray flood events.
- The Planning and Design Code became fully operational in 2021, including policies relating to:
 - ✓ a range of Overlays protecting key environmental assets, such as the River Murray, including referrals to relevant South Australian Government agencies
 - ✓ improved hazard mapping through the creation of overlays for terrestrial flooding and acid sulfate soils.
- The EPA assesses and regulates discharges of pollutants to the river including from vessels such as houseboats, slipways, dredging and septic.

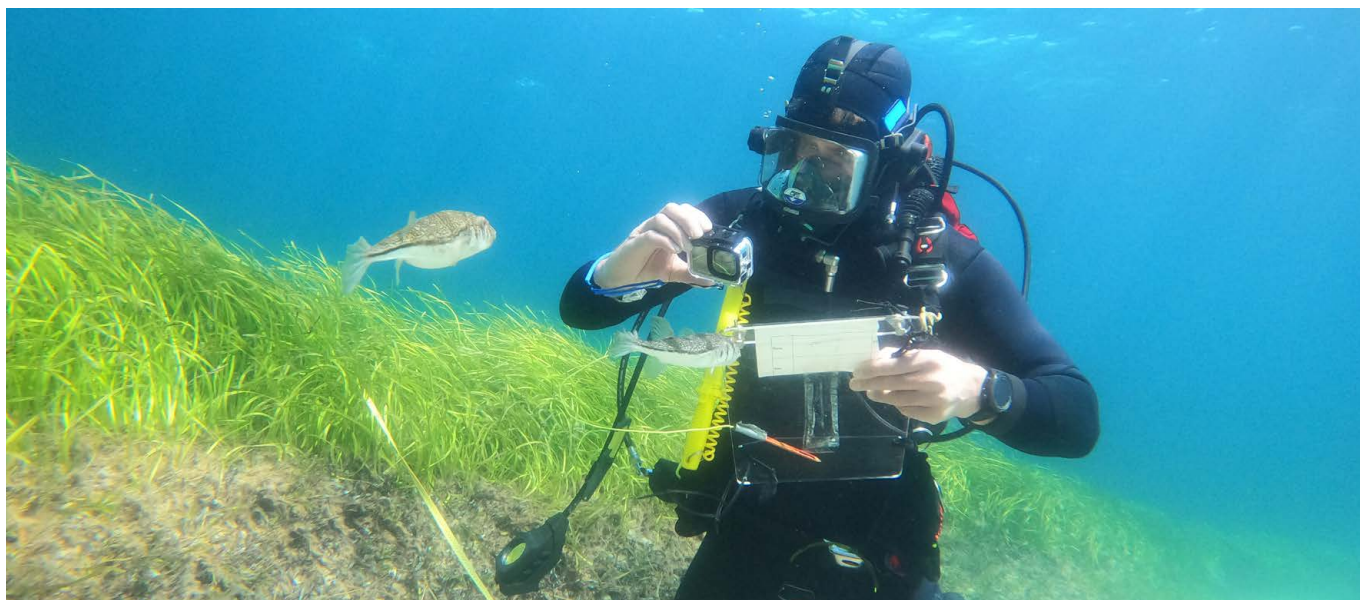


Southern right whale,
Fowlers Bay

SEA

Key messages

- About 85% of southern Australia’s marine life is not found anywhere else in the world. Protecting and conserving marine ecosystems is crucial to maintain their integrity and the services they provide.
- Our coasts are losing their natural resilience and are less able to protect themselves from wind, tidal surges and wave action caused by storms. Coastal erosion, habitat modification, coastal developments, pollution, sea level rise and seagrass loss all impact coastal resilience. These pressures and impacts will worsen with the effects of climate change decreasing the resilience of our coast even further.
- Coastal habitats across South Australia have the capacity to capture 3.6% of the greenhouse gases produced in our state. Mangroves and saltmarshes lock away more carbon per hectare than seagrass. However, seagrass locks away more carbon in total, as it covers a larger area.
- Pollution from various sources including urban stormwater and wastewater is an ever-increasing threat to the condition of South Australia’s coastal waters. Urban stormwater needs to be managed more effectively to reduce volumes and pollutants that are present in stormwater prior to discharge into the marine environment. Microplastics are also becoming more of an increasing threat to our marine environment.
- COVID-19 saw a large increase in numbers of tourists holidaying in South Australia with the restrictions on interstate and overseas travel. In addition, promotion of locations within social media also creates increased visitation, for example, at Perlubie Beach. This resulted in damage to beaches, dunes, and coastal vegetation from people four-wheel driving off existing tracks, an increased footprint of campers, collecting wood for campfires and rubbish from toileting and general use. The Eyes on Eyre Project has been implemented to improve experiences for tourists within the region while protecting the environment that supports this important industry. This has resulted in better environmental outcomes as the booking system records personal details, which directs accountability towards campers. Note: Tourism impacts have been observed in other South Australian regions as well.
- Consultation with regional agencies and other government departments responsible for managing coastal and marine ecosystems has indicated that undertaking compliance checks to ensure that people and industry are doing the right thing, is challenging due to the area of coverage that is required across South Australia’s coastline. Expanding and facilitating cross-authorisation of compliance officers may enable a greater coverage of compliance activities across our regional coastlines.



An inquisitive visitor while monitoring seagrass

- There are multiple pressures on our oceans that are currently not considered from a cumulative perspective. Monitoring and reporting of different aspects of the marine environment is undertaken independently by a number of organisations. A more integrated and coordinated approach and adopting ecosystem-based management would assist in delivering better environmental outcomes.
- The lack of coordination and integration between government agencies in the management of our coastal ecosystems and marine environment between government agencies was recognised as an issue in the [Australian State of the Environment Report 2021. A Sustainable Oceans Plan](#) is currently being developed by the Australian Government in consultation with other stakeholders.
- We need to better engage with and integrate the knowledge of Aboriginal people when managing and restoring our coast and marine environments.

What are the pressures

Marine ecosystems are of immense importance for both the environment and human wellbeing, and provide a [wide range of ecosystem services](#): South Australian marine waters fall within three nautical miles of the coastline and include both Spencer Gulf and Gulf St Vincent. Around 90% of South Australians live within 50 km of the coast with 75% being within the Greater Adelaide region. Pressures on our coast and marine environments such as dunes, beaches, estuaries, intertidal zones, and nearshore and offshore areas, include:







- ✓ climate change is resulting in coastal erosion, increasing storm surges, sea level rise, increasing ocean temperatures, ocean acidification and salinity which all have the potential to impact our coastal and marine biodiversity and industries that rely on the marine environment for their livelihood (for example, fishing, tourism and aquaculture). Climate change may also impact coastal developments such as housing
- ✓ potential impacts from activities that the marine environment supports, those being fishing and aquaculture industries, tourism, and recreation. It also supports transport corridors and extractive industries. If not managed appropriately, these activities can result in impacts to biodiversity and ecosystem health
- ✓ impacts from modification of coastal habitats via construction, including housing, breakwaters, marinas, and dredging. This can lead to vegetation clearance which, in turn, destroys habitat for plants and animals, mobilises pollutants, and disrupts coastal processes
- ✓ pollution such as wastewater discharge, chemicals and nutrients from industry, debris including microplastics, stormwater runoff and sediments from various sources. These all have the potential to affect water quality and ecosystem health including flora and fauna
- ✓ pest species and diseases that have been, or may be, introduced via translocation by marine transport, movement of marine equipment, discharge of ballast water, or humans or other animals.



Mangroves, Yorke Peninsula

What is the trend and condition

Habitats/ecosystems

<p>Mangrove vegetation: percentage cover</p>	 Unknown	 Unknown	 Good	<p>In 2020, mangrove percentage cover was 0.014% statewide, but there is insufficient information to determine a trend.</p>
<p>Coastal saltmarsh: percentage cover</p>	 Unknown	 Unknown	 Good	<p>In 2020, coastal saltmarsh percentage cover was 0.019% statewide, but there is insufficient information to determine a trend.</p>

- The trend and condition of coastal mangrove and saltmarsh percentage cover is unknown due to the change in satellite technologies used to undertake measurements. It is known that there has been a loss of mangrove cover due to clearing for coastal urban developments, pollution discharges and oil spills. In 2020, the percentage cover of mangroves was 0.014% and saltmarsh was 0.019%, with the Northern and Yorke and Eyre Peninsula landscape regions supporting the most coverage.
- In 2020, vegetation dieback, which included 9 hectares of mangroves and 10 hectares of saltmarsh, was noted within the [Adelaide International Bird Sanctuary National Park–Winaityinaityi Pangkara](#) at St Kilda. Mapping was undertaken in 2021 to identify the extent of dieback that had occurred in the sanctuary. Investigations and monitoring are being undertaken and coordinated by the [Department for Energy and Mining](#), [Department for Environment and Water](#) and the [Environment Protection Authority](#) to prevent further impact and promote recovery of the affected areas.
- Mangroves and saltmarsh are important ecosystems as they trap sediments, prevent coastal erosion, maintain water quality, cycle nutrients, and provide habitat for our marine animals. They are also very good at storing carbon.

Seagrass: cover within sampling sites



Stable



Unknown



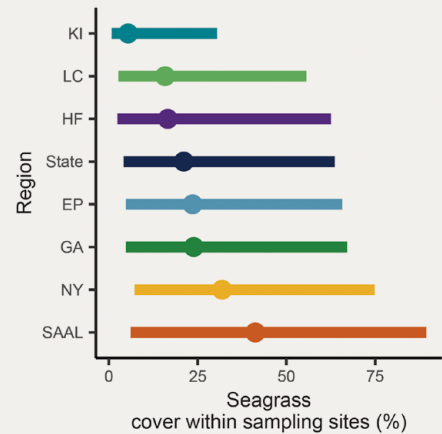
Good

The statewide trend in seagrass cover within sampling sites is stable. However, seagrass cover is getting better in some areas and worse in others in response to local conditions.

- The coverage of seagrass (*Posidonia* and *Amphibolis*) across the South Australian coastline is considered to be stable. It appears to be increasing in the Green Adelaide region and declining around Kangaroo Island, predominantly due to observed loss in Nepean Bay. The Cygnet River catchment runoff has been linked to extensive loss of seagrass in this area.
- At a regional scale, estimates of seagrass cover within sampling sites varied between and within landscape regions (Figure 30).
- Seagrass provide important habitats, including breeding and nursery grounds, feeding and refuge sites for marine species supporting biodiversity. Seagrass meadows also contribute to carbon sequestration and help reduce wave energy which prevents coastal erosion.

Figure 30: Estimates of seagrass cover across landscape regions. Bars in graph indicate high variability in seagrass cover

Source: DEW Report Card 2023.



Subtidal macroalgae: percentage cover



Stable



Good

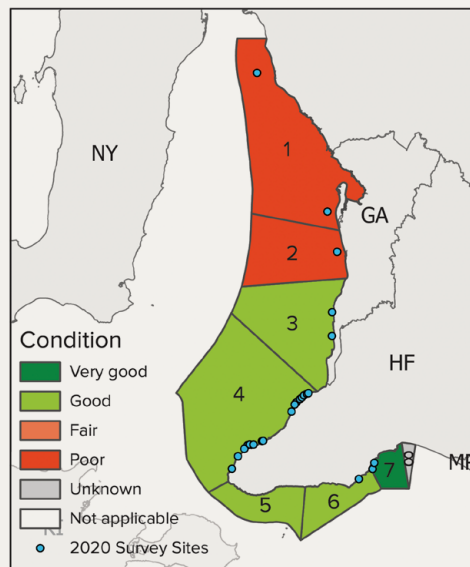


Fair

The percentage cover of macroalgae on subtidal reefs is stable, based on limited data along the Adelaide and Fleurieu Peninsula coastlines.

Figure 31: Condition of subtidal macroalgae percentage cover across the Greater Adelaide region

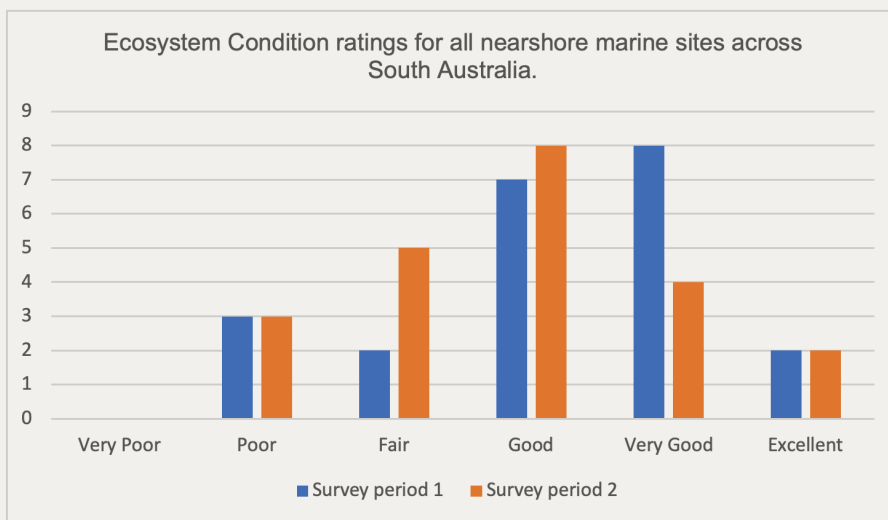
Source: DEW Report Card 2023.



- Macroalgal percentage cover on subtidal reefs along the Adelaide and Fleurieu Peninsula coastlines are generally in good condition, with assessments indicating there is a north-south gradient of increasing cover because of both natural differences in the environment and the impacts of urban development, as well as increased pollution levels in stormwater runoff near metropolitan areas (Figure 31). The statewide trend in macroalgal percentage cover has been assessed as stable across these regions.

- The EPA monitors the marine environment via its [Aquatic Ecosystem Condition Reporting](#) which includes other parameters besides vegetation cover to measure ecosystem health. One region is surveyed each year which is repeated every five years. Ecosystem condition is variable across the state (Figure 32) with some regions improving between survey periods and others declining in condition. The areas in best condition are generally located away from human interference and coastal development, where they are least exposed to nutrient enrichment from activities such as wastewater and stormwater discharges, sea cage aquaculture and dredging. Particularly healthy sites are located along the far west coast and limestone coast of South Australia.

Figure 32: Ecosystem condition ratings for all nearshore marine sites across South Australia. Condition ratings have been provided for the past two survey periods for each region.



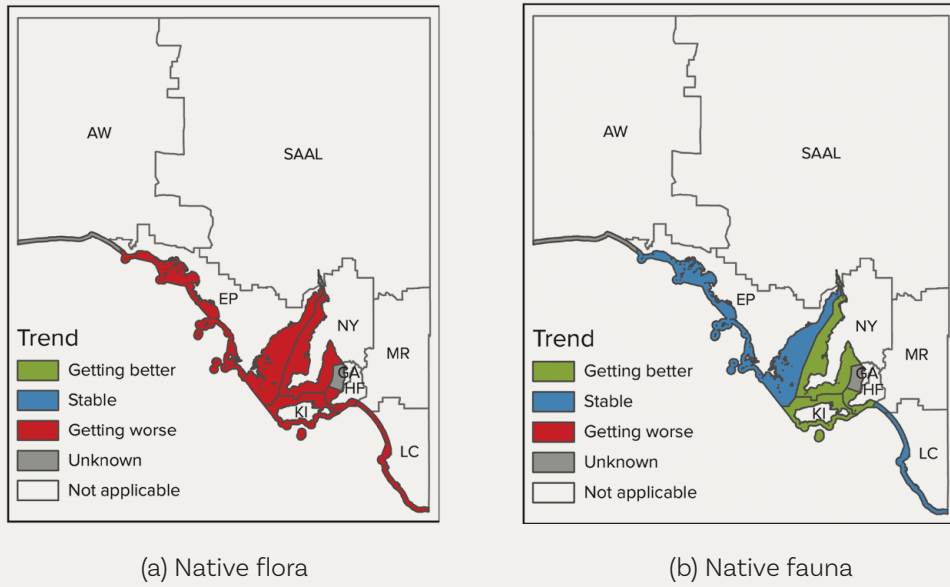
Flora and fauna

<p>Native flora: percentage declining</p>	Getting worse Unknown Poor	<p>The percentage of coastal and marine native flora species declining is getting worse, but this trend has poor reliability.</p>
<p>Native fauna: percentage declining</p>	Stable Unknown Poor	<p>The percentage of coastal and marine native fauna species declining is stable, but this trend has poor reliability.</p>

- The percentage of native flora declining in South Australia is based on an assessment for 113 of 179 coastal species. When compared with a 2002 baseline, this declining trend is getting worse in six landscape regions which includes Hills and Fleurieu, Eyre Peninsula, Kangaroo Island, Northern and Yorke, Murraylands and Riverland, and Limestone Coast (Figure 33a).
- The percentage of native fauna declining has stabilised based on the assessment for 96 of 165 coastal and marine native fauna species. When compared to a 2002 baseline, this trend is improving in four landscape regions which includes Hills and Fleurieu, Kangaroo Island, Northern and Yorke and SA Arid Lands. The declining trend has stabilised in three landscape regions including Eyre Peninsula, Murraylands and Riverland, and Limestone Coast (Figure 33b).

Figure 33: Trend in percentage of native flora and fauna declining across South Australia

Source: DEW Report Card 2023.



- Species were defined as 'declining' if the rate at which they were recorded showed a greater than 90% chance of reduction between 2002 and 2022. An estimated 49.2% of coastal and marine native flora and 22.6% coastal and marine native fauna species are declining in South Australia which varies between regions. However, the condition was rated unknown as there are no agreed benchmarks for coastal and marine flora and fauna.

<p>Established invasive species abundance and distribution</p>		<p>Abundance and distribution of established marine invasive species is stable in South Australia.</p>
<p>New incursions of invasive species</p>		<p>New incursions of marine invasive species are stable in South Australia.</p>

- South Australia is largely free of marine pests with the trend in abundance and distribution, and incursion of new invasive species stable across across the state. Boats and vessels present the greatest risk of spreading marine pests with the highest detections generally found around ports and marinas. PIRSA is responsible for managing aquatic pests across the state.
- Based on public reporting between 2019 and 2022, most invasive species had not spread past the localised area where they have been historically been reported. During this time, 6 exotic species were reported in South Australia, all within the Green Adelaide region. Of these, 3 reports were confirmed, 2 reports were possible and 1 report related to detection on a transit vessel. By way of comparison, there were 2 new exotic species detected during 2015-2019.



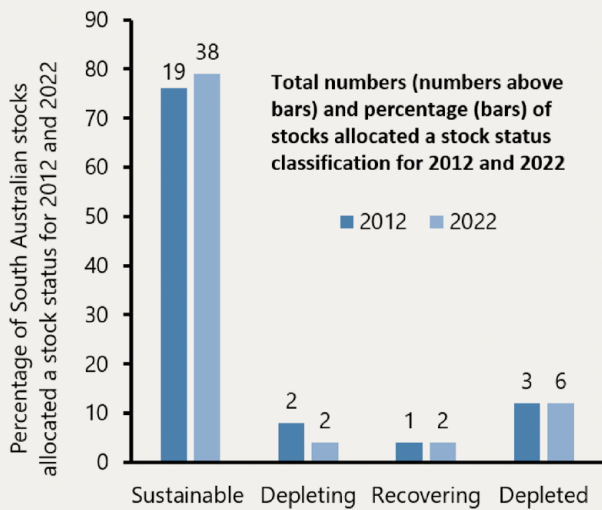
Recreational boating on Yorke Peninsula

Proportion of fish stocks sustainable



In South Australia, 79% of fishery stocks are classified as sustainable, and 12% are depleted.

Figure 34: Classification of fish stocks in South Australia



- In 2022, 79% of fish stocks were classified as sustainable in South Australia with more than 75% of fish stocks remaining stable since 2012 (Figure 34). However, six South Australian stocks have transitioned to a worse category during this period, including Central Zone Blacklip and Greenlip Abalone, Gulf St Vincent and Spencer Gulf/West Coast Snapper, northern Gulf St Vincent Southern Garfish and West Coast Western King Prawn. Northern Spencer Gulf Garfish transitioned from depleting to recovering.

- Snapper fish stocks in the West Coast/Spencer Gulf, and Gulf St Vincent/Kangaroo Island areas remain classified as depleted, characterised by low biomass and poor recruitment over the past ten years. The Snapper fishery in Gulf St Vincent, Spencer Gulf and west coast of South Australia has been closed since 1 November 2019. Considering the 2022 stock assessment still indicated that Snapper stocks remain depleted, the Snapper fishery remains closed until 30 June 2026 to help its recovery.
- Maintaining the sustainability of South Australia’s fisheries supports healthy ecosystems, regional economies through tourism, and recreational and commercial fishing, and provides for traditional fishing.



Top of Spencer Gulf above Port Augusta

What is being done

Marine protected areas



South Australia's marine park protection is stable, with 44.8% of our waters protected, including 6.2% highly protected.

- South Australian marine parks came into effect in 2014 and play an important role in the protection and conservation of marine biodiversity (Figure 35). The total area of South Australia's 19 marine parks has increased by 358 km² (0.5%) between 2012 and 2022 and now covers 44.8% of state waters with 6.2% being highly protected under sanctuary zones (5.1%) and restricted access zones (1.1%) (Figure 36).
- Recent findings from the five-year status report indicate that the marine park network is contributing to the protection and conservation of marine wildlife. An evaluation of marine parks will be undertaken in 2024 to further inform this and determine how marine parks are achieving the objects of the *Marine Parks Act 2007*.

Figure 35: South Australia's marine park network

Source: DEW Report Card 2023.

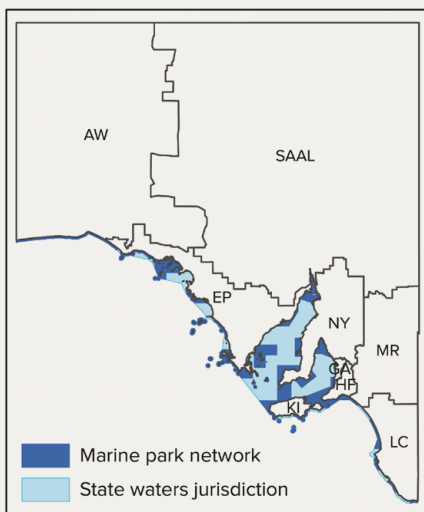
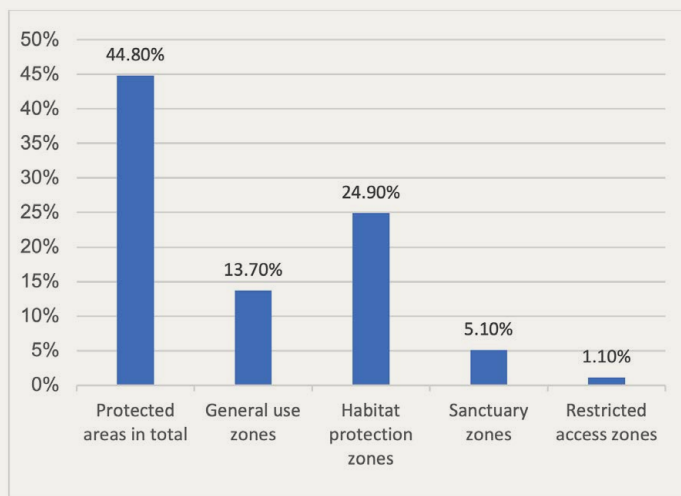


Figure 36: Percentage of state waters under protection





- The [Blue Carbon Strategy for South Australia](#), sets a path for protecting and restoring valuable vegetated ecosystems along South Australia's coastline, including mangroves, saltmarsh and seagrass meadows. These aquatic plant communities store carbon in their living biomass and, even more significantly, in their anoxic soils. Blue carbon ecosystems can store up to four times as much carbon per area than land-based forests over hundreds and thousands of years.
- The EPA monitors ambient aquatic ecosystem health across all marine waters in South Australia. Data collected from monitoring helps inform coastal developments including aquaculture, dredging and desalination plants. Results can also trigger additional investigations, which have been initiated for Coffin Bay after monitoring found a [decline in condition](#) in 2019. Monitoring and reporting is also undertaken by a number of other agencies including DEW, SARDI and Landscape Boards. Better integration of Aboriginal knowledge into these processes would with understanding and protecting the health of sea Country.
- PIRSA is responsible for the regulation of [commercial](#) and [recreational](#) fishing, managing [aquatic biosecurity](#), and the sustainable development of [aquaculture](#) in South Australia. [SARDI's aquatic science division](#) undertakes research to support the sustainable use of marine resources while protecting the ecology of South Australia's aquatic environments.
- The [Coast Protection Board](#) was formed in 1972 under the *Coast Protection Act 1972* to protect and restore South Australia's coastline. DEW and Landscape Boards are also involved in undertaking research and managing our coasts.
- [National Pollution Inventory](#) (NPI) reporting for industries that discharge into the marine environment helps further understand environmental risks and cumulative impacts from multiple sources of pollutants. It is noted that some industries who do discharge nutrients are currently not required to report, for example, aquaculture.
- Over the last 70 years, the cumulative impact of discharges has contributed to the degradation of the nearshore environment throughout the Adelaide metropolitan biounit with the loss of over 6,000 hectares of [seagrass](#) and degradation of rocky reefs documented. Ecosystem condition is still being impacted by nutrients and sediments discharged from various sources including stormwater and wastewater treatment plants. Better reuse of stormwater and wastewater and better integration of WSUD into urban planning would help reduce pollutant loads that are being discharged into the marine environment.
- [Adelaide's beaches](#) are the most visited public land in South Australia. The South Australian Government is responding to sand erosion that is currently occurring along Adelaide metropolitan beaches and results in the build-up of sand in some regions and the loss of sand in other areas. [Three options](#) have been presented to the community to manage sand erosion.
- The EPA is currently undertaking a scientific assessment to understand the current state of the [Port Adelaide waterways](#), particularly with respect to the reduction of pollution discharges that have occurred with the closure of Penrice Holdings and improvements made at Bolivar Wastewater Treatment Plant. As of 2019, it was found that 83% of the water quality objectives identified in the [Port River Water Quality Improvement Plan](#) had been met. Further investigations are being undertaken into the [Port River dolphin deaths](#) that have occurred within the Adelaide Dolphin Sanctuary. The cause of the deaths of these dolphins is still unknown.
- [Native shellfish reefs](#) have been constructed to restore an almost extinct habitat. These reefs are important to the health of the marine environment. Like coral reefs, shellfish reefs provide homes for many marine species, while also helping to improve water quality through the natural process of filter feeding. These reefs also provide other benefits to the marine environment, such as protection of the shoreline. Windara Reef adjacent to Ardrossan, was the first shellfish reef established in South Australia, and is the largest restored reef in the Southern Hemisphere at 20 hectares. There are now three other reefs established at O'Sullivan Beach, Glenelg and Kangaroo Island.
- [A number of initiatives](#), including research, are being undertaken to protect snapper stocks for the future. This should include investigations into why the snapper fishery became depleted in the first place to reduce the risk of it returning to these levels once the fishery is reopened, and potentially help prevent other fisheries from suffering the same fate.
- Research is being undertaken by the Commonwealth Scientific and Industrial Research Organisation, National Environmental Science Program and Fisheries Research and Development Corporation to further understand sources and impacts of plastics in the marine environment to help inform management responses and policy development.



Beachside, Glenelg North

LIVEABILITY

Key messages

- Liveability defines the degree to which a place is suitable or good for living in and includes both urban and rural environments. It interacts with and depends on our natural environment that provides ecosystem services such as water, land, food, air, shelter, health and wellbeing. The state of our urban and rural environment influences our health in many ways.
- Our population is growing. We need to respond to key issues such as climate change, water management, green space, biodiversity, transport, waste management, energy use, noise, and odour, to ensure that impacts from population growth are managed. By integrating sustainable practices into our lifestyles, industries, and policies, we can work towards a more sustainable future for our growing population.
- Reusing and recycling treated wastewater and stormwater, and optimising our water use, including adopting a more holistic approach to integrated water management, will help reduce the pressure on our public water supplies, and drainage and sewer network all of which are ageing and built for lower population density.
- Coordination and further implementation of best practice for the management of stormwater runoff including water sensitive urban design is still required to manage and improve the quality of stormwater that flows into surface waters and the marine environment. Better management of stormwater may also have other added benefits such as providing water for greening and helping cool our urban centres. Improved governance over stormwater management is suggested to provide a more holistic approach in leading and implementing strategic and best practice stormwater management.
- South Australia has experienced major bushfires, flooding, heatwaves and extreme storms, all of which are likely to increase in severity, duration and frequency in the future with climate change. These events will affect the way we live, impact our plants and animals and place pressure on our water supply and food production. Building resilience in government, businesses and our communities is an important issue to address both now and in the future.
- Protection and restoration of green space with mixed structure including tree canopy is vital. It contributes to social, physical and mental wellbeing for our communities, improves air quality, absorbs noise, reduces heat and energy use, and supports biodiversity. Better protection of our trees, native vegetation and maintenance/ areas of sown endemic vegetation is required, as is the establishment and maintenance of multi-storey vegetation, water features and green spaces is required, particularly infor new developments and urban infill on both private and public land. IncorporationBetter incorporation of knowledge from Aboriginal peoples is also recommended when planning for the maintenance and restoration of green space.
- South Australia is very car-dependent, with around 85% of people using cars as their primary mode of transport. The Committee for Adelaide's Benchmarking Adelaide Report indicated that Adelaide lags behind similar cities when it comes to providing efficient public transport services and cycling infrastructure.



Cycling

- South Australia is leading the way in resource recovery and recycling, and has the highest resource recovery rate of any state or territory in Australia. South Australia was also the first state in Australia to introduce container deposit and plastic waste avoidance legislation. However, the recovery of waste is still below expectations.
- COVID-19 impacted the way we lived. Bicycle sales increased dramatically, visitor numbers to our national parks rose by 77% in 2020 compared with the same time the previous year, air quality improved due to people staying at home, more people appreciated parks and gardens in their local area and more Australians were moving to regional areas. However, the pandemic also generated a significant waste stream of masks, testing kits, single use gowns, gloves, wipes, and other single-use items.
- Differences between Greater Adelaide and regional communities, including the economies of scale and distances between regional townships and cities, needs to be considered during the development of any policies and actions plans.

What are the pressures

- Human activities and climate change are the most significant pressures on the liveability of our environment. Both will be affected by population growth.
- The 2021 census indicated that South Australia's population was 1,828,700. This is a 6% increase in six years. The majority of population growth was from overseas migration. The fastest growing local government areas were Adelaide Plains (4.9%), Mount Barker (3.6%), and Gawler (3.2%). Regional South Australia experienced high growth rates in many coastal LGAs including Copper Coast (2.1%), Alexandrina (1.8%) and Victor Harbor (1.8%). The Greater Adelaide Regional Plan Discussion paper estimates that Adelaide's population could grow by up to 670,000 people over the next 30 years.
- With a growing population, we need to consider:
 - ✓ water and food security, especially in the face of climate change
 - ✓ Preventing the reduction of green space, natural environments and primary production areas when designing urban infill and expansion. This will benefit biodiversity, reduce heat islands and affect our supply of critical resources (for example, food, water and fibre etc) and industry sectors
 - ✓ how the expansion of industry sectors required to support a growing population will impact on our environmental footprint
 - ✓ the potential for increased emissions from transport and other sources that are influenced by human activities
 - ✓ that increased population means more waste and wastewater that needs to be treated for reuse and potentially disposed of.

What is the trend and condition

Water supply

- An adequate water supply is critical to support our urban and rural environments, communities, industries and people. Demand on our water resources will increase with an expanding population, and hotter temperatures and lower rainfall from climate change.
- The Bureau of Meteorology National Water Account for Adelaide for 2020-21 indicated that 229 GL was sourced and supplied to Adelaide, which was similar to the year before. South Australia’s water supply is predominantly sourced from the River Murray (54%) followed by surface water (23%), groundwater (20%) and desalination (2%).
- It is estimated that 69 GL of wastewater and 135.6 GL of stormwater is discharged to the marine environment every year. This represents an opportunity for the harvesting and reuse of this water to help secure water supplies for Greater Adelaide and regional centres. Better use of greywater and rainwater tanks could also help secure our water supplies.
- SA Water is working with DEW, EPA LGA, Green Adelaide and Planning and Land Use Services to develop a Resilient Water Futures strategy to deliver an urban water security plan to ensure a secure and sustainable water supply for the future.
- In South Australia, water is managed and monitored by a number of different agencies. This includes natural environments (surface waters, marine waters and groundwater), drinking water, water used for other purposes (for example, irrigation), wastewater and stormwater. Integrated management of our waters would provide a more holistic and consistent approach across the state in the governance, management and use of our waters by integrating the delivery of water, wastewater, recycled water and stormwater services to support water security, public health, and environmental and urban amenity outcomes.

Green Space

- Green space in urban environments has many benefits including cooling cities, taking up stormwater and recharging our groundwater supplies, filtering air pollution, protecting biodiversity and promoting social interaction and wellbeing.

Urban heat



Stable



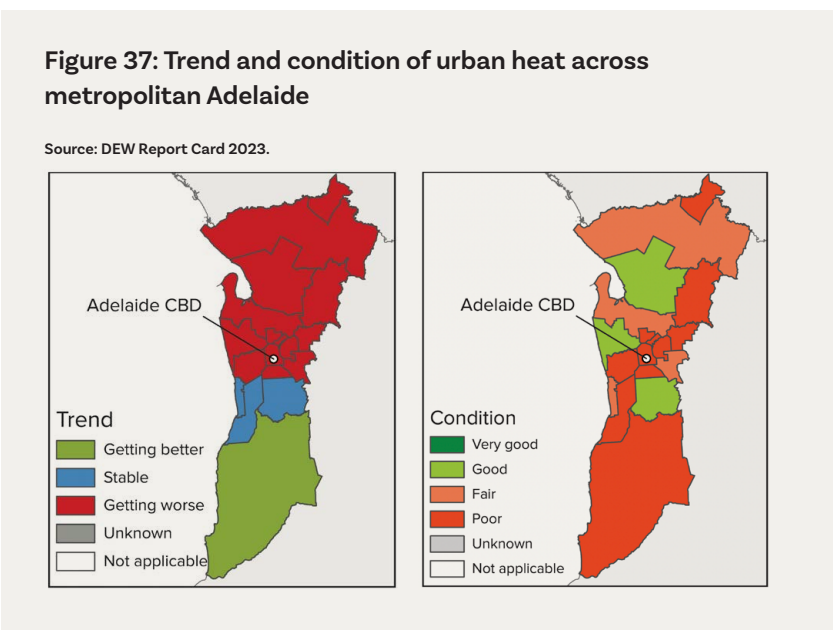
Fair



Fair

Overall, urban heat in metropolitan Adelaide is stable but many localised areas are getting worse.

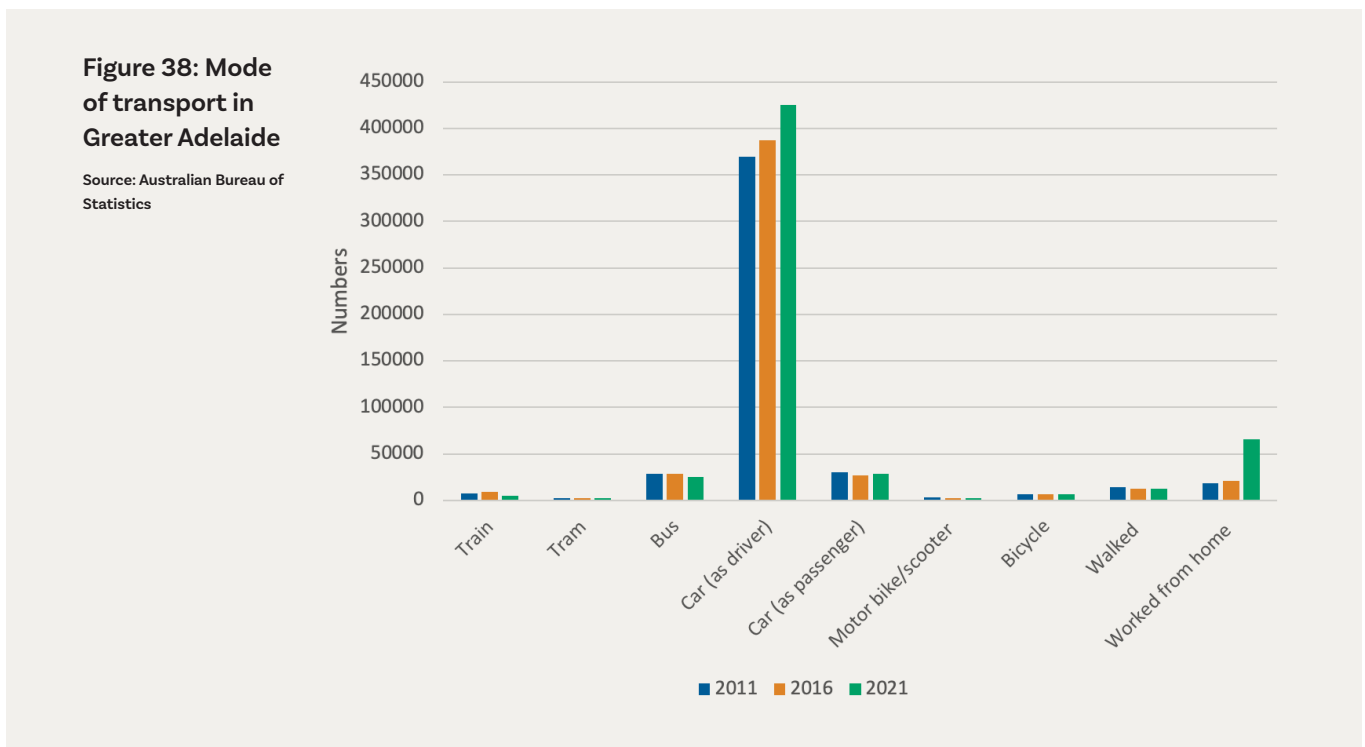
- The overall urban heat in metropolitan Adelaide has remained stable between 2014 and 2023, with the average urban heat intensity in metropolitan Adelaide increasing by 0.20°C indicating an overall stable trend. There is significant variation within local government areas, showing localised areas of warming and cooling between 2014 and 2023. Urban heat intensities for individual local government areas range from good (+1.8°C) to poor (+6.0°C) Figure 37.
- Changes to land surfaces and the built environment or changing vegetation cover, drive urban heat intensity trends and condition at a local scale.



- In 2021, 73.2% of South Australians surveyed in metropolitan Adelaide stated that they had access to green space within 400 m from where they lived. Many respondents to the SOER YourSAy page mentioned that natural environments and green space was very important for the liveability of their area and for their health and wellbeing. Many also mentioned that they had concerns that urban sprawl and infill was reducing the area of green space and impacting the natural environment.
- The Australian Bureau of Statistics National Land Account indicated that, in 2016, South Australia had the lowest natural terrestrial vegetated wooded areas and the highest area of artificial surfaces. A study undertaken in 2021 indicated that half of the suburbs within Greater Adelaide had lost at least 9.8% of their residential tree cover between 2011 and 2021.
- A report undertaken by the University of Adelaide in 2022 reviewed urban tree protection in Australia where it was determined that South Australia’s laws were markedly less stringent than those in New South Wales, Victoria and Western Australia. Tree protection laws for existing mature trees are currently being reviewed.
- A 30-Year Plan for Greater Adelaide target was to increase tree canopy cover to 30% for those council areas currently with less than this value and maintain tree cover for those areas with greater than 30% cover. The Green Adelaide Landscape SA Board is leading the creation of the first Urban Greening Strategy for metropolitan Adelaide, the Australia’s first National Park City and a range of rewilding and biodiversity projects to address liveability in SA’s major urban centre. The Green Infrastructure Commitment has also set a target to increase urban green cover in South Australia by 20% by 2045 and provide shade trees to improve amenity for pedestrians, cyclists and public transport customers, targeting ≥50% canopy cover over footpaths and bikeways.
- An Interim Report for the Inquiry into the Urban Forest was released in October 2023 and provides 13 recommendations to better protect tree canopies in urban areas.

Transport

- Approximately 85% of people in South Australia use cars as their primary mode of commuting (Figure 38). South Australians are particularly reliant on cars in regional areas and urban fringes where other forms of transport are limited. The number of registered cars has increased by 4.5% over the past five years with the number of electric vehicle sales doubling between 2022 and 2023.




- A 30-Year Plan for Greater Adelaide target was to increase the share of work trips that use active or public transport for inner, middle and outer Adelaide by 30% by 2045. The 2020-21 update report indicates that we are off-track and that this target requires review and requires a change in travel behaviour, development patterns and infrastructure planning.
- In 2022, a select committee of the Legislative Council was established to report on Public and Active Transport South Australia in response to concerns about the decline of public transport services in metropolitan Adelaide and lack of accessible public transport in regional areas and also for developments located on the city fringe. The committee has made a 13 recommendations to facilitate and improve public and active transport.
- A Benchmarking Adelaide Report undertaken in 2023 has indicated that Adelaide lags behind similar cities when it comes to providing efficient public transport services and cycling infrastructure. A Cycling Strategy for South Australia 2022-2032 has been developed to help facilitate greater uptake of cycling.


Waste

- With an increasing population comes more waste that exists in many forms, including food and food packaging, electrical products, industrial, agricultural and construction, just to name a few. The 2020 Snapshot on the 20-year State Infrastructure Strategy by Infrastructure SA has stated that South Australia produces the most waste per capita of all national jurisdictions yet we are the most efficient at processing and recycling waste resulting in the nation’s lowest waste-to-landfill rate.


Circular economy: resource recovery



Getting better



Fair



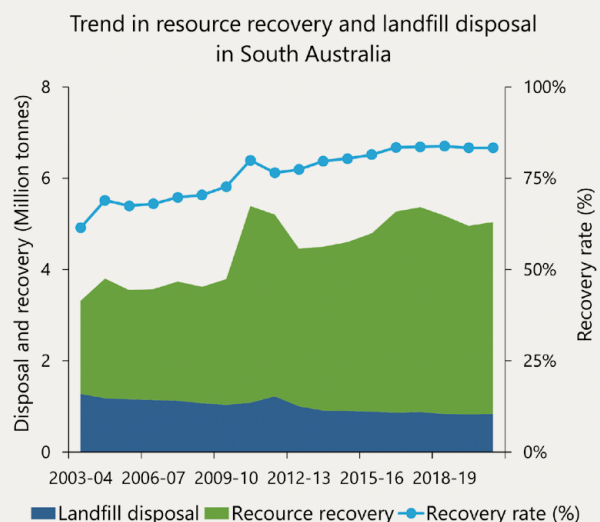
Good

South Australia’s transition to a circular economy is getting better based on high diversion rates in the resource recovery sector.

- The trend of South Australia’s transition to a circular economy has improved in the resource recovery sector since 2003-04. According to the 2021-22 Circular Economy Resource Recovery Report, there has been an overall 35.3% reduction in waste sent to landfill since 2003-04. The 2021-22 recovery rate for South Australia is 81.9% for all materials, which is down slightly from the 2020-21 rate when it was 83.3% (Figure 39).

Figure 39: Trend in resource recovery and landfill disposal in SA 2020-21

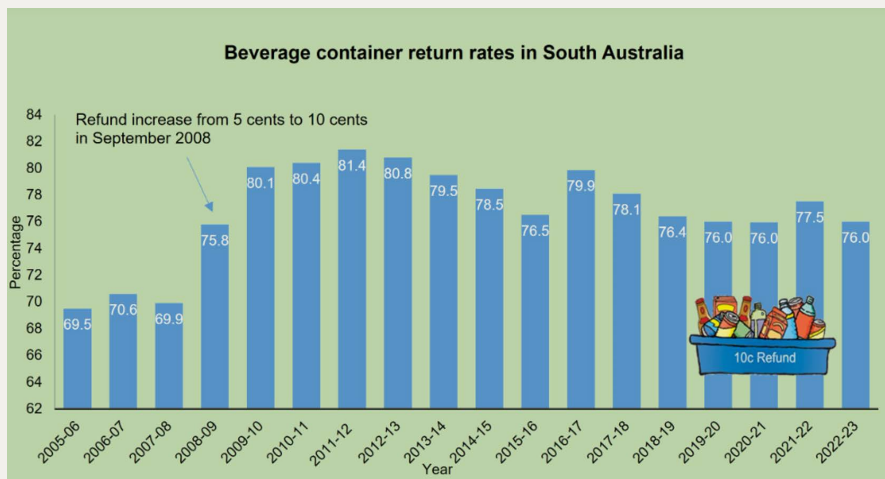
Source: DEW Report Card 2023.



- In South Australia, food waste makes up approximately 22% by weight of total household waste collected at kerbside. About 26% of commercial and industrial waste streams is food waste. A [Valuing Our Food Waste \(2020-2025\)](#) strategy to reduce and divert household and business food waste has been developed by Green Industries SA.
- Better education and initiatives are required to drive improved recycling of plastics and food waste both in businesses and households. [Recovery rates from kerbside collections](#) in metropolitan councils is only 51.5%, which is below the target of 70% waste diversion by 2025. Further [single-use plastic bans](#) will be implemented in the coming years.

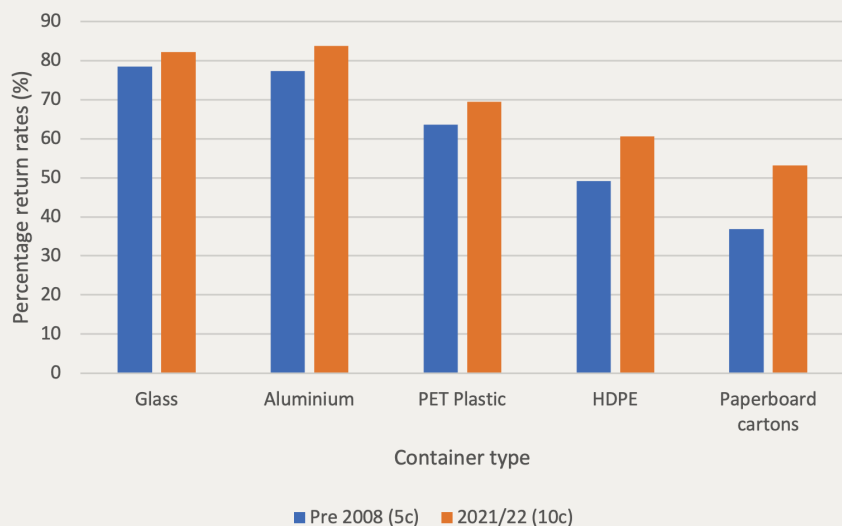
• [Container deposit legislation](#) (CDL) is currently being reviewed to modernise the scheme. and had an overall return rate of 76% in 2022-23 (Figure 40). This equated to over 660 million containers returned and was worth more than \$66 million refunded to the South Australian community. However, when compared with glass and aluminium, return rates are low for PET, most HDPE and paperboard carton products (Figure 41).

Figure 40: Percentage beverage container return rates in South Australia since 2005-06



• New waste streams are emerging including electrical equipment, lithium-ion batteries, and retired wind turbines. Recycling of soft plastics (with the closure of REDcycle), electrical equipment waste, waste from disasters such as fires and floods, and waste from end-of-life renewable energy infrastructure (for example, lithium batteries, solar panels and wind-farm blades) need to be considered.

Figure 41: Container return rates for 2021-22 and prior to the refund increase from 5c to 10c that occurred in September 2008



- The EPA heard from regional stakeholders that implementing circular economy measures in the regions is challenging, due to the lack of infrastructure, lack of economies of scale and large transport distances/diffuse waste sources.

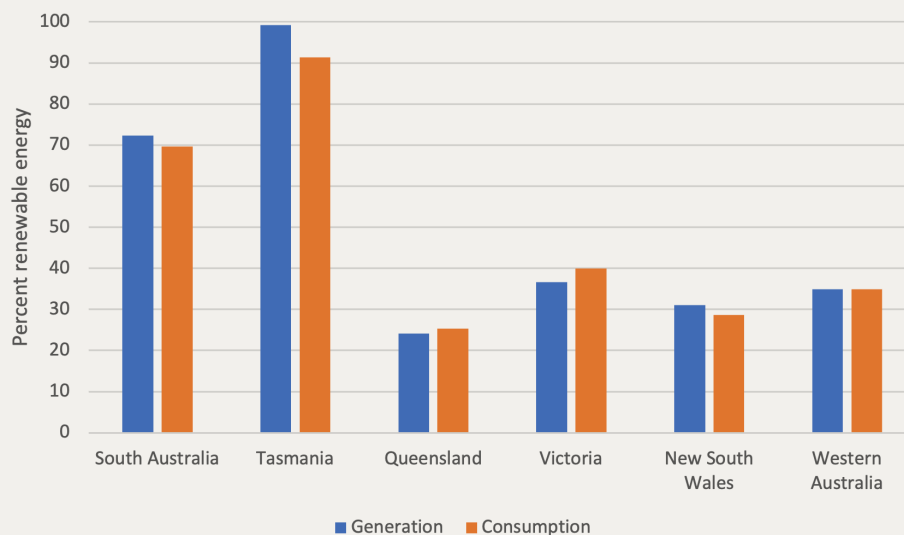
Stormwater

- Urban areas have more built up and covered, impermeable surfaces and less green space which leads to higher stormwater runoff and potential localised flooding. This may impact property, businesses and the natural environment.
- Water sensitive urban design has been applied in a number of locations. Incorporating water sensitive design into new developments provides multiple benefits, including reducing stormwater runoff, and consequently, the risk of flooding. It also helps retain water for greening, thereby helping to mitigate the urban heat island effect. Inclusion of rain gardens, wetlands and retention/detention ponds in new developments and redevelopments which treats stormwater and can enhance liveability by providing blue-green spaces.
- Gross pollutant traps are used to capture rubbish and other debris before it reaches our waterways. According to Green Adelaide, in the Torrens and Patawalonga catchments, the equivalent of around two Olympic-sized swimming pools of debris was captured during 2022/23. Across metropolitan Adelaide, around 2,300 to 3,300 tonnes of material is captured per year in gross pollutant traps.

Energy

- South Australia is at the forefront of the global energy transition, having transformed its energy system from 1% to over 70% renewable energy in just over 16 years, and is the second highest in Australia (Figure 42). By 2025-26, the Australian Energy Market Operator forecasts that this could rise to approximately 85%.
- Between June 2022 and June 2023, South Australia's energy generation via renewables has been 72.3% compared with 36.3% nationally. Wind was our greatest source of energy generated in South Australia in 2021-22, accounting for 41% of the total energy generated. South Australia has also made significant investments in large-scale solar power projects. Solar energy contributed to over 20% of electricity generated for South Australia in 2020-21.

Figure 42: Percentage of renewable energy generated and consumed across Australia



- COVID-19 resulted in household energy use increasing nationally by 5% due to people working from home.
- The biggest concerns to the community regarding the provision of energy is reliability and cost, impacts of renewable energy infrastructure on the natural environment and amenity, and disposal of infrastructure once it reaches its end of life.

Noise, odour and air pollution

- The EPA is responsible for assessing and managing noise, odour and air quality issues if they are coming from an EPA licensed site. If this is not the case, councils have the capacity to manage these issues under the [Local Nuisance and Litter Control Act 2016](#). Nuisance can be in the form of dust, odour, noise, smoke, fumes, aerosols, vibration and insanitary or unsightly conditions from domestic, commercial and industrial premises. To be considered a nuisance, this must 'constitute an unreasonable interference with the enjoyment of the neighbouring premises by persons occupying those premises'.
- Noise, odour, and air incidents make up half of the incidents reported to the EPA via its [pollution reporting line](#). Higher density living and residential encroachment onto industrial and agricultural areas may also increase the prevalence of these incidents being reported.
- There has also been considerable concern about the impacts that noise from wind farms have on people's health particularly with respect to sleep quality. [Flinders University](#) undertook a sleep study that compared wind-farm noise with traffic noise, and the results, which were presented at the [Wind Farm Noise 2023](#) international conference in Dublin, indicated that wind-farm noise is not more disruptive to sleep than traffic noise.
- Wood smoke from wood heaters has also raised community concerns. The EPA undertook a monitoring program in collaboration with the Mount Barker District Council to identify the extent of smoke and other emissions from wood heating. As expected, emissions increased significantly during the winter period and were more elevated at night when people were more likely to be at home and using their wood heaters. Currently, there are [legislated requirements](#) which specify Australian standards for wood heaters and moisture content for firewood that is sold by retail outlets. However, wood smoke is still an issue for many communities in South Australia.
- Hotter and dryer conditions resulting from climate change is likely to increase the occurrence of dust and pollen and increase the risk of smoke impacts from bushfires.

What is being done

The [Planning and Design Code](#) became fully operational in 2021, and includes [policies](#) relating to:

- ✓ new residential infill policies to encourage incorporation of tree planting, soft landscaping and stormwater detention and reuse to be incorporated into residential development
 - ✓ encouraging water sensitive urban design for commercial, master planned residential and infill development
 - ✓ new native vegetation overlays to ensure removal is considered upfront in a planning assessment
 - ✓ promotion of walkable communities by encouraging a greater mix of land uses in suburban areas, and a continued focus on infill development in well-served locations
 - ✓ opportunities for both policy and spatial updates to the Code to be investigated.
- Referrals to relevant agencies may also be required under the [Planning, Development and Infrastructure \(General\) Regulations 2017](#) who will assess potential risks to liveability and the environment associated with development applications.
 - Regional plans are currently being prepared by the State Planning Commission to spatially apply the Planning and Design Code. There will be [six country regional plans](#) and a plan for [Greater Adelaide](#). Environmental considerations and liveability are relevant to these plans. Infrastructure SA is also now preparing the next [20-Year State Infrastructure Strategy](#) that prioritises infrastructure requirements that will sustain or enhance the liveability of South Australia. This includes roads, rail, ports, housing and facilities associated with health, culture, sports, tourism, education, energy, water and waste utilities.
 - The Expert Panel Review in relation to the [Planning System Implementation Review](#), under the [Planning, Development and Infrastructure Act 2016](#), has been completed and the findings report and government's response are expected to be released in late 2023. The review provide recommendations on the Planning and Design Code and related instruments including urban tree cover, which is an important consideration in urban liveability.
 - One of the key objectives in the South Australian Government's Climate Change Action Plan is to accelerate urban greening to reduce urban heat, create habitat for wildlife, and improve liveability and amenity. In response to this objective, DIT has established a [Green Infrastructure Commitment](#) to 'identify and pursue feasible opportunities to expand green infrastructure (including water sensitive urban design) on public land, focusing on priority areas identified by Green Adelaide, corridors which provide for active travel, and new infrastructure projects'



Responses to the 2018 SOER recommendations

The 2018 SOER made six recommendations.

The following information was provided directly by South Australian Government agencies on the work that has and is being undertaken over the past five years which aligns with the delivery of the 2018 recommendations.



Climate change planning and adaptation

It was recommended that the SA Government review the state’s climate change response to ensure that climate risks are adequately embedded into planning and investment by government agencies.

Legislation and policy

- 2019—The *Landscape South Australia Act 2019* (LSA Act) officially commenced in July 2020 and replaced the *Natural Resources Management Act 2004* for managing the state’s land, water, pest animals and biodiversity. The LSA Act embeds climate change within the objects of the Act and expressly recognises that climate change is a significant factor in our environment, including the need for mitigation and adaptation.
- 2019—A state planning policy, *SPP5 – Climate Change* was released. The *Planning, Development and Infrastructure Act 2016*, which underpins South Australia’s land use planning system, embeds the consideration of climate change, with the majority of the Act coming into force in 2021.
- 2022—South Australian and other jurisdictional building ministers required the Australian Building Codes Board to develop enhanced residential energy efficiency provisions, to be incorporated into the National Construction Code, *NCC 2022 residential energy efficiency*.
- 2023—The *Environment Protection (Objects of Act and Board Attributes) Amendment Act 2023* amends the objects of the *Environment Protection Act 1993* and requires that climate change adaptation and mitigation expertise is held within the membership of the EPA Board.

Reports, plans and strategies

- 2019—South Australia signed a national initiative: the [Trajectory for Low Energy Buildings](#).
- 2019-2020—The previous state government released the [Directions for a climate smart South Australia](#), the [Blue Carbon Strategy 2020-2025](#), and the [South Australian Government Climate Change Action Plan 2021-2025](#).
- 2020-2021—South Australia's nine Landscape Boards developed five-year landscape plans for their region. All of these plans consider climate change mitigation and adaptation for natural resources and landscapes.
- 2021—State agencies prepared plans for their contribution to the Climate Change Action Plan 2021-2025, for example, [The EPA's role in supporting South Australia's response to climate change 2021-25](#).
- 2021—[DEW Report on the operation of the Climate Change and Greenhouse Emissions Reduction Act 2007](#) (South Australia).
- 2022—DEW prepared the [Climate change science and knowledge plan for South Australia](#) and published the [South Australian Government CLIMATE CHANGE ACTIONS](#).
- 2022—The [State Landscape Strategy](#) was developed and approved under the LSA Act. Climate change is embedded throughout the strategy's strategic priorities, which include a commitment to pursue resilient landscapes by mitigating and adapting to climate change.
- 2023—the state government released [South Australia Responding to climate change](#), which describes priority actions towards a net zero emissions future, collaboration, climate resilience and government leadership.
- 2023—The Department for Trade and Investment released the [Planning for climate change](#) to describe how the development planning system is responding to the challenges and opportunities relating to climate change.
- The [SA Water Business Strategy](#) included a strategic focus area of 'proactive environmental leadership' and the delivery of specific initiatives, for example, [reaching net zero carbon](#), [Zero Cost Energy Future](#), [quantifying and reducing scope 1 emissions](#), [Brinkley Wastewater Treatment Plant](#), and new [Standard for bushfire resilience](#). Challenges have included the lack of cost-effective technology for reducing or capturing fugitive emissions from wastewater treatment plants, and the lack of a consistent framework for determining and measuring Scope 3 (value chain) emissions.

Projects and activities

- 2022—On 31 May 2022, the South Australian Parliament declared a climate emergency and committed to transforming the economy to net zero emissions to contribute to the restoration of a safe climate.
- 2022—DEW published the [Guide to climate projections for risk assessment and planning in South Australia 2022](#) and the [New climate projections for South Australia - Maps and key findings 2022](#), to assist with climate change risk assessment, adaptation planning and community engagement.
- 2022—The Department for Infrastructure and Transport (DIT) updated its [climate change adaptation guideline](#) to reflect the 'Guide to climate projections for risk assessment and planning in SA'.
- 2022—Primary Industries and Regions SA (PIRSA) and DEW released the [Carbon Farming Roadmap for South Australia](#).
- 2022—Green Industries SA (GISA) supported the development, trialling and running of Business SA's [Accelerating Net Zero Emissions for Business- Pilot Program](#) with 32 small to medium-sized enterprises participating. GISA's [Business Sustainability Program](#) supported 22 projects that focused on carbon reduction in delivery of carbon reduction and net zero emissions.
- PIRSA has approved over 50 aquaculture licences to farm seaweed, contributing to carbon sequestration from oceans and reduced methane production from cows through a feed supplement from seaweed.

Biodiversity decline

It was recommended that the South Australian Government develop a biodiversity action plan to prioritise conservation efforts across the landscape that takes into account climate change and the findings of recent reviews, and is informed by broad public consultation.

Legislation and policy

- Development planning and regulation has specific components addressing biodiversity, for example, [State Planning Policies \(SPPs\)](#) – SPP 4: Biodiversity (2019), urban tree canopy overlay/offset scheme (2021) and the Regulated and Significant Tree Overlay in the Planning and Design Code.
- The South Australian Government is currently developing a [Biodiversity Act](#) to protect and conserve biodiversity in South Australia.

Reports, plans and strategies

- Landscape SA developed regional five-year landscape plans for all SA regions (2020–21), including identifying priorities for reversing biodiversity declines, and have been implementing these plans through a variety of programs, projects and activities since then.
- The Department for Environment and Water released the [Nature Conservation Directions Statement](#) (2020) and has managed biodiversity programs that include the [SA Parks network](#), [Native Vegetation Heritage Agreements](#), environmental water provisions of the Murray-Darling Basin Plan (see River Murray section), the [SA Habitat and Wildlife Bushfire Recovery Framework](#), the [Kangaroo Island Bushfire Recovery](#), the [Dynamic Fire and Biodiversity tool](#), and the [National Environment Science Program Threatened Species Recovery Hub](#).
- The 2023 DEW trend and condition report cards had a renewed focus on further understanding biodiversity decline and data gaps by incorporating new biodiversity themes and indicators.

Projects and activities

- Over the next four years, the South Australian Government will be developing a new database, [Biodata SA](#), to improve the capture and management of biodiversity data in South Australia. BioData SA will also improve access to quality data to inform evidence-based decision-making in areas such as mining, planning, development approvals, emergency response, biodiversity management and climate change.



Coffin Bay, Eyre Peninsula



Sand erosion northern Adelaide beaches Image: Ronni Wood (yourSAy.sa.gov.au/soer)

Coastal protection in a changing climate

It was recommended that the South Australian Government review the monitoring of the South Australian coast and sea levels, and assess how it informs policy to ensure planning for development, infrastructure and beach management adequately accounts for risks from climate change.

Legislation and policy

- The State Planning Policies, under South Australia’s Planning and Design Code, include [SPP 13: Coastal Environment](#) (2019), with coastal area policies generally reflected through the application of the Coastal Area Overlay.
- The administration of the [Coast Protection Act 1972](#) by the [Coastal Protection Board](#) has addressed a range of coastal protection issues.

Reports, plans and strategies

- The DIT’s [climate change adaptation guideline](#) includes consideration of sea-level rise and management of coastal assets.

Projects and activities

- DEW’s [Adelaide beach management](#) activities and its coastal management work, including land surface elevation mapping of the SA coastline to enable the assessment of risks of rising sea level, have been, and are, addressing coastal protection in a changing climate.

Waste management

Challenges in implementing this recommendation included an increase in waste generation resulting from natural disasters and COVID-19, ongoing challenges with insecure end markets for secondary raw materials (first with international end-market closures arising from China Sword and then slow development of onshore markets) costs (for example, 40% increase in the solid waste levy), pursuing non-mandatory product stewardship schemes allowing the continuation of various complex materials entering our waste/recycling streams, and recycling industry challenges (for example, the Visy MRF fire and the collapse of REDCycle).

It was recommended that the South Australian Government advocate for coordinated national action to reduce waste, including through regulation of packaging, providing leadership in the strengthening of the local resource.

Legislation and policy

- 2019—The EPA has completed a review of South Australia’s iconic Container Deposit Scheme (CDS), which showed the state can increase the recovery and recycling of beverage containers to boost the local remanufacturing industry and maintain South Australia’s leadership. The EPA continued to lead work nationally on expanding the scope of eligible containers, and led the development of a behavioural study to understand what drives consumers to participate in CDSs across jurisdictions.
- 2020—The development and implementation of the Recycling and Waste Reduction Act 2020 has provided a framework progressively introducing export bans for a range of ‘waste’ materials.
- 2020—South Australia passed the Single-use and Other Plastic Products (Waste Avoidance) Act 2020, the first of its kind in Australia, progressively introducing single-use plastics bans and administered by GISA.
- The EPA’s mass balance reporting requirements, introduced by the SA EPA via the Environment Protection (Mass Balance Reporting and Other Measures) Variation Regulations 2020 have addressed the accountability and waste levy aspects of the waste management industry.

Reports, plans and strategies

- 2019—A Disaster Waste Management Capability Plan and its accompanying guidelines were developed and embedded into the South Australian State Emergency Management Plan. This was the first of its kind in Australia. GISA was appointed as Disaster Waste Management Functional Lead and carried out this function after the 2019-20 bushfires and is doing so following the recent River Murray flood.
- South Australia’s Waste Strategy 2020-25 was released in 2020 as a major step in the transition to a circular economy, achieving environmental gains while boosting the South Australian economy, followed by a strategy to reduce and divert household and business food waste, South Australia’s first Food Waste Strategy: Valuing Our Food Waste 2020-2025, which is a strategy to reduce and divert household and business food waste. Both strategies are administered by GISA.
- 2022—GISA worked with Regional Development Australia in the Limestone Coast and Murraylands and Riverland to develop two ‘Circular Economy Opportunities’ reports for these regions. These reports outline the economic development opportunities for the regions to maximise and retain value locally, and increase resilience and business sustainability, while building on their natural environmental capital.
- GISA represents the South Australian Government in a national reference group to coordinate and report on the South Australian implementation of the National Waste Policy Action Plan



Sorting waste

Projects and activities

- 2017—GISA has provided more than \$75 million in project funding to build and improve waste, recycling and resource recovery equipment and infrastructure, supporting innovation, resource efficiency and circular economy transition, via its Recycling Infrastructure Grants, Circular Economy Market Development Grants and Business Sustainability Program.
- SA Water’s Recycling and reuse and Proactive Environmental Leadership have sought to address waste management through recycling, with challenges including perceptions that recycled materials are inferior to new materials, and the cost of recycled products.
- The Local Government Association of South Australia (LGA) has addressed waste and recycling through its Circular Procurement Pilot Project and updates of waste-related templates, documents and resources.
- The waste and recycling industry has continued to develop its waste management approaches, for example, through infrastructure projects, including transfer station upgrades, new materials recovery facility construction, upgrades to existing facilities, and biogas capture and storage.
- The EPA has completed a substantial waste reform program aimed at establishing a robust regulatory environment to support the sustainable operation of the waste and resource recovery industry. This has included new regulatory measures to address stockpiling of waste, development of a position statement on thermal energy from waste activities, introduction of monthly reporting requirements for waste facilities and amendments to how the waste levy is collected from landfills.

Aquatic ecosystem resilience

It was recommended that the South Australian Government prioritise water management and on ground land stewardship initiatives based on the risks to the sustainability of significant aquatic ecosystems.

Legislation and policy

- 2019–The release of State Planning Policy [SPP 14: Water Security and Quality](#) addressed water quality aspects, supporting aquatic ecosystem resilience.

Reports, plans and strategies

- SA Water has advocated for source water protection as part of its [Environment Policy](#), and has faced challenges such as demand for, cost of and willingness to pay for wastewater treatment plant upgrades and recycled water infrastructure, and the need to understand the most efficient investment to protect aquatic ecosystems (e.g. investment in urban and agricultural runoff versus point source pollution).

Projects and activities

- DEW's [Water management](#) activities, including the [Flows for the Future](#) program in the eastern Mt Lofty Ranges, as well as River Murray, Coorong and Lower Lakes initiatives have been the key contributions to South Australian efforts to address aquatic ecosystem resilience.
- Landscape SA (LSA) have been carrying out programs that contribute to aquatic ecosystem resilience, including allocating water for the environment via [water allocation plans](#), protecting groundwater dependent ecosystems (GDEs) via the [Far North Wells](#) and [Adelaide Plains](#) water allocation plans, and land and water management activities across the state (see [LSA websites](#)).
- EPA's [Aquatic Ecosystem Condition Reports](#) have reported on aquatic ecosystem condition annually, and the EPA's regulatory activities aim to protect water quality from pollution via the administration of the [Environment Protection Act 1993](#) and the [Environment Protection \(Water Quality\) Policy 2015](#), licensing of industries, investigation and compliance work and by providing direction or advice on development [planning](#) proposals.
- NGOs such as [Water Sensitive SA](#) have promoted and facilitated water sensitive urban design (WSUD), which enhances aquatic ecological health by improving stormwater quality before it reaches a 'natural' watercourse.
- Agricultural sustainability programs and land use practices have reduced pressures on aquatic ecosystems by: continuing to address soil erosion risks via minimum/no tillage and stubble retention, reducing the risk of chemical and nutrient runoff via precision agriculture, avoiding [spray drift](#) into watercourses through careful weather-informed timing of chemical-label-compliant spraying, including watercourse protection in their farm management plans and, in some cases, by the adoption of regenerative principles into their farming systems.



Sampling invertebrates to monitor ecosystem health of streams

Environmental information

It was recommended that the South Australian Government review environmental reporting in the state, including the environmental themes and measures that are assessed and reported by the trend and condition report cards, to further improve reporting, and strengthen links between reporting and environmental management.

Legislation and policy

- Nothing reported

Reports, plans and strategies

- DEW updated the themes used in the [2020 environmental trend and condition report cards](#), with a greater focus on biodiversity and ‘Liveability’ as a new theme in 2023, along with a rigorous and transparent environmental information and data management approach (Managing Environmental Knowledge).
- Landscape SA developed five-year landscape plans based on environmental information. They have undertaken program and project-specific monitoring and evaluation as outlined in their monitoring, evaluation, reporting and improvement plans, for example, [LSA M&R](#), as well as using DEW trend and condition report cards. Resourcing continues to limit monitoring, in many regions, to a focus on specifically measuring the outcomes of externally funded programs.
- PIRSA produced the [ZONING IN: South Australian Aquaculture report 2022](#), a summary of aquaculture activity, regulation and environmental monitoring and the final report on the regional Environmental Monitoring Program for the Lower Spencer Gulf will be available in December 2023.

Projects and activities

- The EPA commissioned an [independent review](#) of the 2018 South Australian SOER process. The EPA provided responses to the 14 recommendations from the review and several of them have been implemented as part of the 2023 SOER, for example, an enhanced stakeholder engagement process, promoting knowledge to facilitate adoption, discussing the impact from previous SOER recommendations and incorporating more regionally relevant information.

Governance

SOER Project Board

The delivery of the 2023 SOER was supported by a Project Board appointed by the Chief Executive of the EPA. The purpose of the Board was to provide strategic direction to inform the report's content. This included the framework of the Summary Report and key recommendations and issues that have been presented to the Minister for Climate, Environment and Water. Membership consisted of the following people.

Name	Role
Mr Keith Baldry	Project Executive EPA
Ms Sandy Carruthers	Executive Director Strategy, Science and Corporate Services DEW
Dr Stephen Christley	EPA Board Member
Professor Chris Daniels	Chair, Green Adelaide; Adjunct Professor at UniSA and the University of Adelaide
Dr Jon Gorvett	Chair SOER 2023 Project Board (as Chief Executive EPA)
Ms Tara Ingerson	Project Manager SOER 2023, EPA
Mr Rob Kerin	Chair Regional Development Australia (South Australia)
Mr Ian Liddy	Project Officer, Aboriginal Affairs and Reconciliation, Attorney-General's Department
Mr Andrew Solomon	Aboriginal Engagement and Science Officer SOER 2023, EPA
Mr Craig Wilkins	Chief Executive, Conservation Council SA

SOER Assurance Group

An Assurance Group was established to support the production of the SOER and ensure its content provides information that is both accurate and relevant to South Australians. It included representation from the following organisations.

Alexandrina Council	Landscape SA
Association of Mining and Exploration Companies	LEGATUS Group (Regional LGAs)
Australian Land Conservation Alliance	Livestock SA
Conservation Council SA	Local Government Association of SA (LGA)
Department for Energy and Mining (DEM)	Nature Conservation Society of SA
Department for Environment and Water (DEW)	Primary Industries and Regions SA (PIRSA)
Department for Industry, Innovation and Science (DIIS)	Primary Producers SA (PPSA)
Environment Institute, University of Adelaide	SA Health
Green Industries South Australia (GISA)	SA Water
Health and Wellbeing	South Australian Fire and Emergency Services Commission (SAFECOM)
Infrastructure SA	South Australian Tourism Commission (SATC)
Landcare Association of SA	University of SA

Abbreviations

°C	degrees Celsius
4WD	four-wheel driving
ACT	Australian Capital Territory
AMR	antimicrobial resistance
CBD	central business district
CDL	container deposit legislation
CDS	container deposit scheme
DEM	Department of Energy and Mining
DEW	Department for Environment and Water
DIT	Department for Infrastructure and Transport
EEA	environmental-economic accounting
EPA	South Australian Environment Protection Authority
EPA Board	South Australian Environment Protection Authority Board
EP Act	Environment Protection Act 1993
FFDI	Forest Fire Danger Index
GISA	Green Industries SA
GL	gigalitre
GPA	groundwater prohibition area
HDPE	high-density polyethylene
IPA	Indigenous Protected Area
LGA	Local Government Association of South Australia
LSA	Landscape SA
LSA Act	Landscape South Australia Act 2019
M&R	monitoring and reporting
MDB	Murray-Darling Basin
MBDA	Murray-Darling Basin Authority
MtCO ₂ -e	metric tonne of carbon dioxide equivalent
NO ₂	nitrogen dioxide
NPI	National Pollutant Inventory
NVC	Native Vegetation Council
O ₃	ozone
PET	polyethylene terephthalate
PIRSA	Primary Industries and Regions SA
PM ₁₀	particulate matter with a diameter of 10 micrometres or less
PM _{2.5}	particulate matter with a diameter of 2.5 micrometres or less
PSM	Public Service Medal
SARDI	South Australian Research and Development Institute
SO ₂	sulphur dioxide
SOER	State of the Environment Report
SPP	state planning policy
µg/m ³	micrograms per cubic metre
VOC	volatile organic compound
WSUD	water sensitive urban design

