

# Adelaide Coastal Water Quality Improvement Plan

For public comment



## The Adelaide Coastal Water Quality Improvement Plan (ACWQIP) provides a long-term strategy to achieve and sustain water quality consistent with community expectations for Adelaide's coastal waters.

### Background

The Adelaide Coastal Waters Study (ACWS) commenced in 2001 in response to community concern and findings that confirmed a considerable area of seagrass has been lost in the last few decades and progressive seagrass loss is still occurring off the coast of Adelaide. Running until 2007 this study investigated seagrass loss, water quality decline and sea floor instability. When formally released in 2008, the ACWS included 20 technical reports and a Final Report (Fox et al. 2007). The final report put forward 14 recommendations and made evident that the problems facing Adelaide's coast require a careful and strategic response, integrating activities of a range of organisations from government, business and community.



Adelaide's coastal waters extend from Port Gawler in the north to Sellicks Beach in the south (see map). Water catchments including the Gawler River and other Northern Adelaide catchments, Port River, Torrens, Patawalonga, Field River,

Christies Creek, Onkaparinga and the southern coastal catchments in the Aldinga area drain into Adelaide's coastal waters. These catchments are within the ancestral and traditional lands of the Kaurna, the Aboriginal people of the Adelaide Plains. The Kaurna people have been included in consultation for the development of this ACWQIP, along with the broader community.

The ACWS findings indicated that nutrient rich inputs and sediments from stormwater, wastewater treatment plants and industrial discharges are the main causes for loss of seagrasses along the Adelaide coastline. While the study was being undertaken, the EPA negotiated a short-term improvement strategy to reduce nutrient loads from Adelaide's wastewater treatment plants and to reduce the portion of sediments discharged from Penrice Soda Holdings into the Port River. The EPA has since completed the Port Waterways Water Quality Improvement Plan, which focuses on further reducing nutrient loads in the Port waterways.



### Introduction to the ACWQIP

The development of a draft Adelaide Coastal Water Quality Improvement Plan (ACWQIP) included reviewing ACWS findings and recommendations and a process of community and stakeholder consultation. Using this information to establish environmental values (EVs) – those features of the coast that are important to the community, and water quality objectives – measurable targets that protect water quality the ACWQIP will provide strategies for implementing the 14 ACWS recommendations. Work has been undertaken to develop long-term targets for water quality improvement for Adelaide's coast and to obtain a picture of the effects that current and future actions will have on achieving the long-term targets.

Some important tools and background information have been developed to guide and assess appropriate courses of action. These include an Adelaide catchment model, a monitoring and assessment framework, and information about the effects of climate and population change.

The Adelaide community recognises that achieving improvements in water quality and encouraging the return of seagrass will take time, and that the cost of necessary changes must be balanced with social and economic considerations. However, the Adelaide community has indicated the improvements are not occurring as quickly as they would like. The ACWS has given a sense of urgency to achieving large reductions in nutrient, sediment and coloured dissolved organic matter loads as soon as possible.

The ACWQIP has been developed in a manner consistent with that of the National Water Quality Management Strategy – a system that has been used with success to resolve difficult water quality management issues across Australia. This national strategy is endorsed through legislation in South Australia and is referred to in key strategic documents such as the State Natural Resources Management Plan 2006 (Department of Water, Land & Biodiversity Conservation 2006).

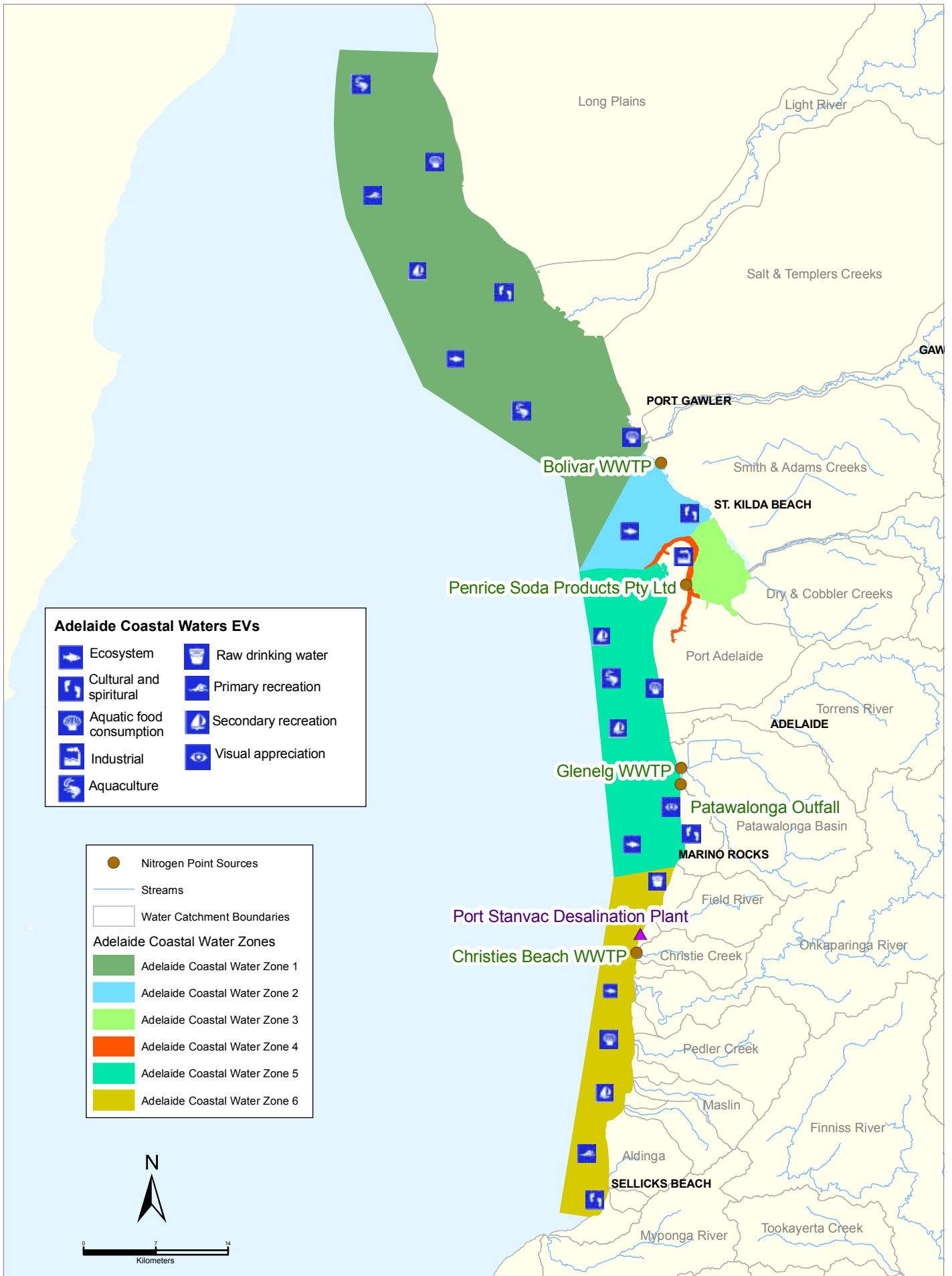


Figure 1

# Adelaide Coastal Water Quality Improvement Plan

## Water Quality Management Sections

### Showing Environmental Values and Nitrogen Point Sources Discharges

## Nutrient and sediment inputs to Adelaide's coastal waters



Nutrients, primarily nitrogen and phosphorus loads, sediments (or suspended solids) and to a lesser extent coloured dissolved organic matter, have been found to impact Adelaide's coastal waters and reef health and are key issues for water quality and seagrass health.



The measurement of nutrient and sediment loads for the Adelaide coastal waters was mostly undertaken in 2003. The findings have been used as baseline data for the recommended reductions proposed in the ACWS.

The ACWS identified wastewater treatment plants and Penrice Soda Holdings to be the biggest contributors of nutrients to coastal waters. Stormwater from catchments was found to be the biggest contributor to sediment loads.



The 2008 loads indicate that progress is being made (Table 1). The 2030 values are the 20-year targets for annual nutrient and sediment loads for Adelaide's coastal waters.

## Reducing nutrient loads

The ACWS recommends a reduction in nitrogen loads of approximately 75% from 2003 levels (Table 1) to halt seagrass loss and create conditions that support seagrass restoration.

Significant reductions in nutrient load discharges from wastewater treatment plants, Penrice Soda Holdings and stormwater have occurred since the 1990s (Table 1). This has been achieved through changes in practices and technology improvements.

Existing commitments to projects supporting nitrogen load reductions for Adelaide's coastal waters will achieve around a 50% reduction of 2003 levels. Further nitrogen reductions should occur over time through successive environmental improvement programs at Penrice Soda Holdings and upgrades to wastewater treatment plants. Such improvements are vital given the additional volumes of wastewater associated with the planned population increases for Adelaide.



The cost of building highly efficient wastewater treatment plants to further reduce nitrogen loads to Adelaide coastal waters is high, as are the energy costs to run them. Wastewater reuse may be a more cost-effective solution as it offers

economic return for investment. 'Water for Good, a plan to ensure our water future to 2050' (Office for Water Security 2009) outlines further actions aimed at securing a water supply for the Adelaide region and some of these actions will also benefit Adelaide's coastal waters.

Stormwater and wastewater reuse schemes are presently operational in Adelaide however far more reuse is needed to adequately reduce nitrogen loads to coastal waters. Comprehensive strategies to maximise the economic use of wastewater and stormwater will be developed as indicated by Water for Good Actions 16 and 19 to develop master plans for efficiently managing stormwater and wastewater use in Adelaide.

Table 1: Nitrogen and suspended solid loads for the past, present and future

Water input sources	Nitrogen (tonnes/year)				Suspended solid loads(tonnes/year)			
	1975–85	2003	2008	2030 Target	1975–85	2003	2008	2030 Target
WWTPs	2 279	1 136	821	300	7 005	1 580	1 060	760
Penrice	1 300	1 000	604	250	100 000	1 780	810	890
Stormwater	639	153	153	50	9 160	6 860	6 180	3 430
Totals	4 218	2 289	1 578	600	116 165	10 220	8 050	5 080

Sources: Draft ACWQIP and ACWS Final Report (Fox et al 2007)

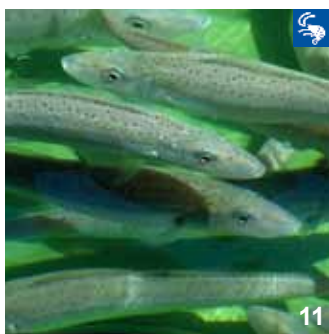
## Reducing sediment loads

The ACWS recommends a reduction in sediment loads of 50% from 2003 levels (Table 1) to allow sufficient light levels for seagrass to grow.

Initial reductions of sediment loads have been observed (Table 1) as a result of environmental improvement programs at Penrice Soda Holdings, upgrades to wastewater treatment plants and on ground works by the Adelaide and Mount Lofty Ranges Natural Resource Management Board and local councils.

Appreciable drops are expected in the future through implementation of the Adelaide and Mount Lofty Ranges Natural Resource Management Regional Plan and 'The 30-Year Plan for Greater Adelaide' (Department of Planning and Local Government 2009) which will contribute towards achieving long-term targets for sediment loads.

Use of Water Sensitive Urban design (WSUD) will assist in contributing towards achieving water quality improvement targets in the ACWQIP. The initial approach for WSUD in Adelaide has been developed by the Department of Planning and Local Government in partnership with other state and local government agencies and a WSUD technical manual has been produced which is available on the web. Work to set targets for implementing WSUD in the Adelaide region are included as actions in Water for Good and 'The 30-Year Plan for Greater Adelaide'.



While use of this approach for new design and development will prevent further stormwater and sediments from reaching Adelaide's coastal waters, these measures need to be applied to all redevelopments and infill development

within Adelaide as the population increases to see coastal water quality improvement. In areas of Adelaide where redevelopments do not occur, retrofitting and behaviour change is required that reflects principles of water sensitive urban design. In the meantime however, Adelaide's metropolitan coast is likely to suffer ongoing water quality problems from stormwater inputs of sediments and coloured dissolved organic matter, particularly after large rainfall events. Regular dredging needed to maintain beaches and channel openings at Glenelg, West Beach and North Haven will also continue to have an impact on the water quality and aesthetics of Adelaide's metropolitan coast.

## Implications for water quality and seagrass



The ACWQIP has set specific targets to reduce the nutrient and sediment loads to Adelaide's coastal waters in line with the Adelaide Coastal Waters Study recommendations. If these targets are achieved there should be improvements to Adelaide's coastal water quality, a halt in seagrass loss and eventually a recovery of seagrass meadows.

Initial nitrogen load reductions of approximately 50% from 2003 levels are considered achievable in the short to medium term but further reductions will be more difficult to achieve. However, without the reduction of nitrogen loads to approximately 75% of those in 2003, seagrass loss will continue and recovery will be unsustainable.

It is likely that seagrass will recover towards land if the initial reduced nitrogen loads are combined with reduced sediment loads. This will require a 50% reduction in sediments from 2003 levels. With significant reductions of sediment loads Adelaide's nearshore waters will be of improved quality for swimming and other recreational activities.

Recommendations from the ACWQIP have shaped strategies and actions for implementation in the water quality improvement plan. These strategies involve future works by companies such as SA Water and Penrice Soda Holdings aimed at achieving reductions set out in the ACWS recommendations for nitrogen and sediments. Actions undertaken by the EPA, Department for Environment and Natural Resources, the Adelaide and Mount Lofty Ranges Natural Resource Management Board, local governments and households will also contribute towards achieving these reductions. The long-term strategies and short-term actions proposed for water quality improvement in the plan have been developed to reflect community agreed environmental values for Adelaide's coastal waters. Regular monitoring of the coastal system will be done to continually reassess these strategies implemented from the plan.

## Vision for Adelaide's coastal waters:

Healthy aquatic ecosystems where environmental, social and economic values are considered in a balanced management approach that aims to see the return of the 'blue line of seagrass' closer to shore.



13



14

## ACWQIP strategies and specific actions required for improvement in water quality and return of seagrass closer to shore over the next 2 to 5 years

### STRATEGY 1: Reduce nutrient, sediment and coloured dissolved organic matter discharges

- EPA continue to work with SA Water and Penrice Soda Holdings to reduce nutrient and sediment loads
- Encourage practical action for sediment reductions
- Encourage uptake and implementation of Water Sensitive Urban Design across Adelaide region

### STRATEGY 2: Integrate reuse of wastewater and stormwater across Adelaide

- Undertake further investigative work regarding options to facilitate greater integrated reuse of stormwater and wastewater (links to Actions 16 and 19 in Water for Good)
- Develop pilot or regional area projects for integrated reuse of stormwater and wastewater

### STRATEGY 3: Further investigate sources and volumes of sediment and coloured dissolved organic matter (CDOM)

- Further investigate sources of CDOM and sediments for catchment modelling
- Identify practical and prioritised action that can be taken for reductions in CDOM and sediments from catchments

### STRATEGY 4: Integrate monitoring for cumulative impact assessment across Adelaide region

- Facilitate integrated monitoring of cumulative impacts and emerging issues across agencies for Adelaide's coastal waters
- Investigate and coordinate gap and operational funding for monitoring that needs to be done to meet recommendations of ACWS
- Support ongoing monitoring of reef and seagrass condition to integrate with other monitoring activities

### STRATEGY 5: Model and evaluate the impacts of climate change, human impacts and population growth implications for Adelaide's coastal waters

- Information from CDOM and sediment investigations and integrated monitoring activities to be fed into future modelling work
- Model projection of waste water treatment plant inputs and outflows as a result of population change

### STRATEGY 6: Establish planning and funding priorities for water initiatives across the Adelaide region

- Identify priority funding areas for projects with multiple benefits (incorporate triple bottom line accounting into project planning)
- Trial investigations for storage and re-use of water normally discharged to coast in winter months

### STRATEGY 7: Undertake seagrass mapping and rehabilitation work

- Develop and update Seagrass Ready maps that integrate water quality and sediment information
- Further support for seagrass rehabilitation work

### STRATEGY 8: Build community capacity to take action

- Use Healthy Waters networks and local government contacts to get messages across to community regarding how it can take action for water quality improvement
- Further develop linkages with Kaurna and Ramindjeri people regarding community water quality messages



## How can you help improve Adelaide's coastal water quality?

### Have your say

Please share your views with us on the Adelaide Coastal Water Quality Improvement Plan. It will be available for public comment from June to August 2011. To incorporate your views we need your feedback by 26 August 2011.

All submissions received will be acknowledged. You can view the plan on the EPA website at [www.epa.sa.gov.au](http://www.epa.sa.gov.au)

### Take action

The health of Adelaide's coastal waters is everybody's responsibility. Individuals can play a role in reducing water use and improving water quality. Sending less water into sewage and stormwater systems will ultimately reduce the impact on the health of our marine waters. You can begin by using less water in your daily activities and reuse water where practical.

Installing water efficient appliances wherever possible will also be of benefit. You can reduce the quantity of stormwater going down drains by designing gardens that allow for rainwater to absorb into the ground and by installing rainwater tanks.

Also, get involved with coast and marine community groups. Many are linked to local government, the Adelaide and Mount Lofty Ranges Natural Resource Management Board and the Conservation Council of SA and raise awareness of issues relating to Adelaide's coast and marine environment. These groups also provide a voice for community views on progress toward a healthy Adelaide coast.

## Get informed

For updates on water policy and 'Tips' and 'Information Sheets' on water quality get onto the EPA website or one of the suggested Website links.

### Website links

Environment Protection Authority (SA) – South Australia's water quality:  
[www.epa.sa.gov.au/water\\_quality.html](http://www.epa.sa.gov.au/water_quality.html)

Environment Protection Authority – Adelaide Coastal Waters Study reports:  
[www.epa.sa.gov.au/acws.html](http://www.epa.sa.gov.au/acws.html)

National Water Quality Management Strategy:  
[www.environment.gov.au/water/quality/nwqms/index.html](http://www.environment.gov.au/water/quality/nwqms/index.html)

### Links to tips to save and reuse water

SA Water:  
[www.sawater.com.au](http://www.sawater.com.au)

Department for Planning and Local Government Water Sensitive Urban Design Technical Manual for the Greater Adelaide Region:  
[www.planning.sa.gov.au/go/wsud](http://www.planning.sa.gov.au/go/wsud)

## Further information

Environment Protection Authority  
GPO Box 2607, Adelaide SA 5001  
Telephone: (08) 8204 2004  
Facsimile: (08) 8124 4670  
Freecall (country): 1800 623 445  
Email: [epainfo@epa.sa.gov.au](mailto:epainfo@epa.sa.gov.au)  
Internet: [www.epa.sa.gov.au](http://www.epa.sa.gov.au)

## References

Department of Planning and Local Government (2009) The 30-Year Plan for Greater Adelaide 2009.

Department of Water, Land & Biodiversity Conservation (2006) State National Resources Management Plan 2006.

Fox DR, Batley GE, Blackburn D, Bone Y, Bryars S, Cheshire A, Collings G, Ellis D, Fairweather P, Fallowfield H, Harris G, Henderson B, Kampf J, Nayar S, Pattiaratchi C, Petrusевичs P, Townsend M, Westphalen G and Wilkinson J 2007, The Adelaide Coastal Waters Study Final Report, Volume 1: Summary of Study Findings November 2007.

Office for Water Security (2009) Water for Good Plan 2009.

## Acknowledgments



Funding and resources for the Water Quality Improvement Plan were provided by the Australian Government. Valuable input was provided by individuals from the following groups: Eco Management Services Pty Ltd and Strategic

Matters; ARUP Pty Ltd; Water Quality Branch, Environment Protection Authority (EPA); and Adelaide Coastal Waters Steering Group members.

## Contributing Authors

Shiloh Gerrity, Damian Griffante, Darren Green, Linda-Marie McDowell and Peter Pfennig.

## Adelaide Coastal Waters Steering Group



The Adelaide Coastal Waters Steering Group was established during 2008 to oversee the finalisation of the ACWQIP. The close liaison between the organisations involved has been of great importance to its development and

planned implementation. The Steering Group includes representatives from:

- Adelaide and Mount Lofty Ranges Natural Resource Management Board
- Coast Protection Board
- Conservation Council of SA
- Department of Environment and Natural Resources
- Department of Planning and Local Government
- Department of the Premier and Cabinet
- Department of Sustainability, Environment, Water, Population and Communities (Australian Government)
- Department for Transport, Energy and Infrastructure
- Department of Treasury and Finance
- Environment Protection Authority
- Local Government Association
- Department for Water (formerly Office for Water Security and Department for Water, Land and Biodiversity Conservation)
- Penrice Soda Holdings
- Primary Industries and Resources SA
- SA Water
- South Australian Recreational Fishing Advisory Council
- Stormwater Management Authority

## Photographs

### Cover, clockwise from top left:

- 1 Christies Beach (EV – Primary recreation), EPA
- 2 Bolivar WWTP (EV – Industrial use), EPA
- 3 Sunset at Glenelg Jetty (EV – Visual appreciation), SATC
- 4 Divers (EV – Primary recreation), PIRSA

### Inside:

- 5 Recreational fisherman on Largs Bay jetty (EV – Human consumption), EPA
- 6 Adelaide city and River Torrens, (EV – Visual appreciation), EPA
- 7 Adelaide coastline (EV – Visual appreciation), SATC
- 8 Seagrass (EV – Ecosystem), DENR
- 9 Aerial view of Glenelg WWTP (EV – Industrial use), DENR
- 10 Adelaide desalination plant (EV – Raw drinking water), SA Water
- 11 Whiting (EV – Aquaculture), PIRSA
- 12 Kingston Park (EV – Visual appreciation), EPA
- 13 Adelaide Sailing Club (EV – Secondary recreation), Jason Bekin
- 14 Stormwater flows in Sturt River (EV – Industrial use), EPA
- 15 Christies Creek outlet (EV – Industrial use), EPA
- 16 Beach scene Glenelg (EV – Primary recreation), SATC
- 17 Aerial view of Port Adelaide (EV – Industrial use), Penrice
- 18 Major discharge of stormwater from Torrens River into Adelaide's coastal waters (EV – Industrial use), DENR
- 19 Dolphins (EV – Cultural and spiritual values), EPA