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Water Quality  
and HabitatsCoasts and  
the Sea

“Our marine waters are among the most biologically diverse and unique in the world.”

## Water Quality and Habitats Issues



South Australia has 4,000 kilometres of coastline ranging from cliffs, rocky shores and sandy beaches in the South East and West Coast, to mud flats, seagrass, sapphire and mangrove habitats in the upper Spencer and St Vincent Gulf regions. Marine and estuarine environments provide habitat for a wide range of plants and animals, including internationally and nationally important species, such as southern right whales, Australian sea lions, dolphins and the

leafy seadragon. Our marine waters are among the most biologically diverse and unique in the world, with many endemic species (those found only in southern Australia).

Good water quality will sustain many ecological systems such as seagrasses and rocky reef habitats. These habitats provide food, shelter and nursery areas for recreationally and commercially fished species and also keep the beaches in good condition, which promotes recreation and tourism. These services add millions of dollars to South Australia's economy and play a vital role in our culture and recreational activities.

There are many ways in which humans place pressure on coastal and marine environments. Major sources of pollution include:

- treated wastewater from our sewage system,
- stormwater that carries a lot of pollutants from roads,
- agricultural land and other sources,
- discharges from industries, and
- shipping and recreational boating.

Coastal development has increased significantly over recent years and puts additional pressure on the coastal environment. Most of the pressures that affect our marine environment occur in the shallow coastal areas where there are sub-tidal and mudflat habitats. These areas are very diverse and are valued for their biodiversity, as well as being important habitats for recreational and commercially valued species. They are extremely sensitive to environmental change and the biggest pressures occur around metropolitan Adelaide.

Southern Australia is a hotspot for seagrass diversity, harbouring about one third of all species and including at least 14 species that occur nowhere else in the world. It is estimated that \$50 million is lost each year due to loss of seagrasses and the ecosystem services they provide.

## Trends



Seagrass extent along the metropolitan coast is still **declining**.



Nitrogen concentration along metropolitan coastal waters is **increasing**.



Impacts of water quality on coastal reefs are **increasing**.



Poor water quality is causing the quality of coastal ecosystems to **decline**.



Nutrient loads in wastewater discharged into St Vincent Gulf are **decreasing**.



Nutrients in the Port River are **decreasing**.



Nutrients in the Inman Estuary are **decreasing**.

## Water Quality and Habitats

### What is the Current Water Quality and Habitat Situation?



#### Condition indicators

##### Animal or plant species abundance

In most ecosystems there are animals and plant species that are vulnerable to the slightest change in their surrounding environment. Changes in their distribution and abundance can provide a good indication of the "health" of our coastal and marine resources.

#### Seagrass

The continuing loss of seagrass in many of South Australia's coastal regions is a major concern for the health of the marine environment. Seagrasses contribute significantly to nutrient cycles and provide important fish nursery areas, and a habitat for many other plant and animal species. High levels of nutrients in the water can cause seagrasses to die off. In the 2003 State of the Environment report it was noted that between 1995/96 and 2002, approximately 720 hectares of seagrass was lost in the St Vincent Gulf. The loss of seagrass has continued and it is suggested that another 590 hectares have been lost since 2002. This is on top of the 5,000 hectares of seagrass that has disappeared from the metropolitan Adelaide coastline since 1935.

#### Mangroves and saltmarsh

Most of the mangroves and saltmarsh (or samphire) communities in South Australia are found in the upper areas of Spencer Gulf and St Vincent Gulf. Mangrove communities are under threat from:

- invasion by weed species,
- trampling and bait digging by recreational fishers,

- water quality and pollution, and
- land reclamation for development.

There is currently no overall monitoring of saltmarsh and mangrove communities.

#### Rocky Reef species

South Australia's reefs are highly productive, diverse and unique ecosystems. The northern reefs along Adelaide's coastline are the most heavily affected due to poor water quality. This is because they are the closest to the outfall from the wastewater treatment plants and the majority of Adelaide's stormwater discharges.

The condition of the central reefs has declined compared to the previous report: whereas southern reefs have been the least affected of all metropolitan reefs and are considered to be in good health.

#### Quality of coastal waters assessed against national water quality guidelines

The health of marine habitats such as seagrass beds, mangrove forests and reef ecosystems is heavily influenced by water quality. The amount of pollution entering the marine environment has increased as coastal development and urbanisation of coastal regions occur. Water quality in the near-shore marine environment of the state is not thought to have changed much since the 2003 State of the Environment Report and on the whole, water quality in the Adelaide metropolitan bathing waters is rated as good for recreational purposes. However, in the northern and central regions the amount of total nitrogen has significantly increased and these elevated nitrogen concentrations are likely to be degrading rocky reef habitats. Reef condition at Noarlunga, Southport and Horseshoe reefs is also deteriorating.



## Water Quality and Habitats

### What is the Current Water Quality and Habitat Situation?

#### Condition indicators (Continued)

#### Volume and pollutant load of stormwater and effluent discharged to the marine environment

Stormwater and effluent discharge are a major source of marine pollution. The Adelaide region produces large quantities of stormwater and most of this drains unchecked into St Vincent Gulf causing damage to nearshore environments. Only a small amount of stormwater is re-used.

In general, South Australian waters are naturally low in nutrients, so when nutrients such as nitrogen are added through wastewater, stormwater and industrial agricultural discharge, damage to our marine environment can occur. The largest source of the nitrogen that goes into our marine environment comes from the wastewater treatment plants at Bolivar, Glenelg and Christies Beach, and as industrial discharge from Penrice Soda Products.

#### Litter in the marine environment

Marine litter is a significant problem as marine life can become tangled in the litter or accidentally eat it. Marine rubbish can come from a wide range of sources, but most of the material that impacts on marine mammals is linked to commercial fishing. Approximately 1,500 seals are killed each year as a result of being tangled in discarded rubbish, and the number of instances seems to be increasing.



### Responding to Water Quality and Habitat issues

#### Volume of stormwater and treated waste water re-used

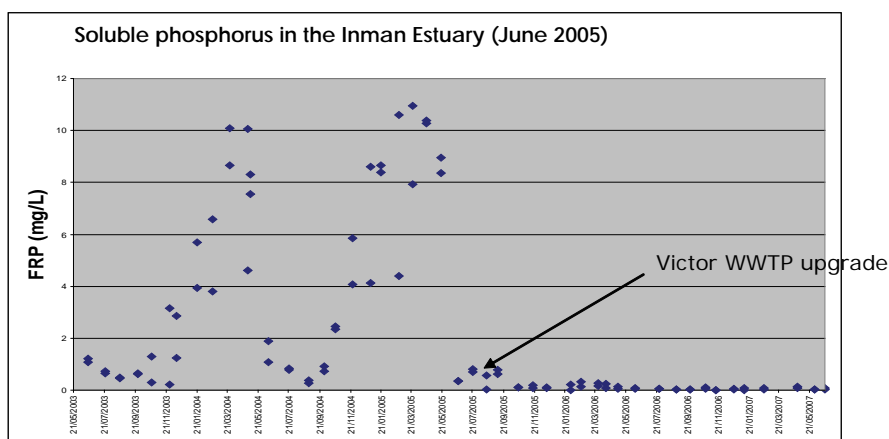
There are four wastewater treatment plants (WWTPs) located on the Adelaide metropolitan coastline which receive water from Adelaide's sewage system. In 2003, only 15% of this water was re-used but in 2007, 30% of this water was re-used rather than discharged into the marine environment. Increased re-use of water will reduce the pollutant load

entering the marine and estuarine environments and provide more suitable conditions for the recovery of ecosystems and ecosystem services.

In 2005, SA Water upgraded the WWTP at Victor Harbor. This upgrade improved the quality of the water to a level suitable for irrigation and the subsequent decrease in discharge has resulted in less nutrient pollution in the Inman Estuary. Phosphorus is one nutrient that has declined significantly in the Inman Estuary since the WWTP upgrade.

#### Water Quality Improvement Plan

The Port Waterways Water Quality Improvement Plan (WQIP) has been developed to investigate the options for reducing pollution entering the Port River and Barker Inlet. Nutrient reduction targets are now set in legislation for the two main sources of nutrient pollution, SA Water and Penrice Soda Products.



Source: EPA 2007

## Water Quality and Habitats



### Taking Action for the Marine and Coastal Environment

- Join your local Coastcare group to help protect the local coastal environment.
- You can reduce the impact of stormwater by making sure that you do not put any litter into stormwater, and remove any you see. You can also reduce the amount of stormwater going into the sea by installing a rainwater tank in your home. Can you think of any other ways that you can reduce stormwater going to the sea?
- You can reduce the amount of wastewater you create by using the dual flush option on toilets, checking that your bathroom has a low-flow shower head and turning taps off when you're not using them.

## Impacts of the degradation of water quality and habitats



### Biodiversity

As water quality decreases, marine biodiversity also decreases. Our marine waters are among the most biologically diverse in the world, and are home to nationally and internationally important species, providing habitat for unique communities of plants and animals and supporting large commercial and recreational fisheries.



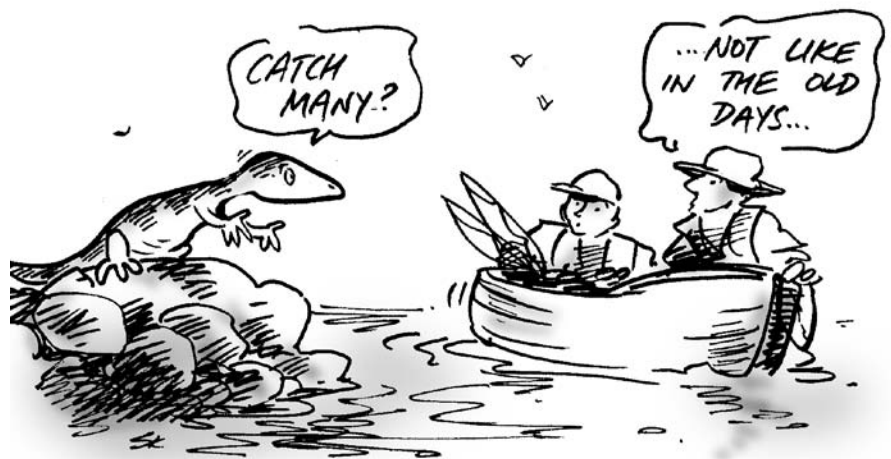
### Economy

A less healthy marine and estuarine environment means that fish stocks will decline, thus reducing income from this industry, and opportunities for aquaculture. A less healthy coast will also affect tourism opportunities.



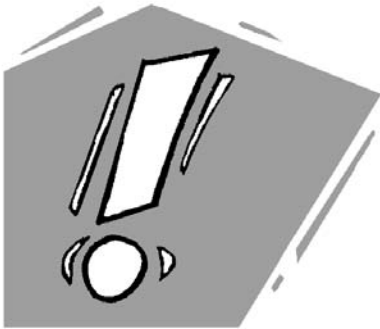
### Culture

Our coastal environment is an important part of Australian culture. Less healthy marine, estuarine and coastal environments could affect recreational opportunities and affect our sea views.





## Water Quality and Habitats



# Attention!!

## What is an estuary?

An estuary is a body of water on the coast that is connected to the sea and has at least one river flowing through it - generally where the 'mouth' of a river meets the sea. Estuaries have freshwater from the river and saltwater from the ocean flowing into them and the organisms that live there are often highly specialised. Estuaries have been nicknamed the nurseries of the sea as many fish and other marine animals use them to breed and grow.

In South Australia the Coorong is an estuarine environment and it is unique. It is an estuary in parts that receive freshwater inflow from the River Murray in the north. South Australian estuaries are generally poorly understood as they are complex systems that are a mix of freshwater and marine environments. Estuaries can also be threatened by pollution which comes from the river upstream, the ocean or the environment surrounding the estuary.

The EPA monitors the water quality of a number of estuaries in South Australia and the water quality often changes depending on the amount of sea water flowing into or out of the estuary with the tides. Several options for monitoring the health of estuaries have been tested by the EPA. One of the methods used to monitor changes in water quality is micropaleontology. Micropaleontology is the study of small fossils, generally smaller than 4 mm in diameter and most often smaller than 1 mm in diameter. The skeletons of small organisms (often single cell organisms called diatoms) can be studied to see how they may have changed over time. Identifying differences in these fossils at different points in history can help to classify the condition of the estuary over time.

A Wetland Strategy for South Australia has been developed to address coastal pressures.

**“ Estuaries have been nicknamed the nurseries of the sea as many fish and other marine animals use them to breed and grow. ”**



## Water Quality and Habitats

# Research Ideas about Water Quality and Habitats

- 1 What is meant by 'coastal water quality and habitats' of South Australia?

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- 2 Why are the water quality and habitats of our marine environment important?

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- 3 How have water quality and habitats influenced the Australian identity and culture?

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- 4 How have human activities impacted on water quality and habitats in your community, South Australia, Australia and globally?

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- 5 What does the State of the Environment report tell us about water quality and habitat issues in South Australia?

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- 6 What might happen in the future if things continue as they are?

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- 7 What are government, business and industry doing to address water quality and habitat issues?

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- 8 What can we do individually, or in communities, to reduce our impact on the water quality and habitat of our coastal environments?

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### References

Page, B, McKenzie, J, McIntosh, R, Baylis, A, Morrissey, A, Calvert, N, Haase, T, Berris, M, Dowie, D, Shaughnessy, PD, Goldworthy, SD (2004) *Entanglement of Australian sea lions and New Zealand fur seals in lost fishing gear and other marine debris before and after Government and industry attempts to reduce the problem. Marine Pollution Bulletin* 49, 33-42

### Resources

For more detailed information on the issue and actions you can take see the State of the Environment report for South Australia 2008.

This is available at:  
[www.epa.sa.gov.au/soe](http://www.epa.sa.gov.au/soe)



This fact sheet is part of a set of 20 fact sheets about the key environmental issues identified in the State of the Environment report 2008, produced for the Environment Reporting Education Resource. You can access the fact sheets and learn more about taking action for the environment at the Education Resource website: [www.epa.sa.gov.au/soe](http://www.epa.sa.gov.au/soe). For more information call the Environmental Education Unit of the Department for Environment and Heritage (08) 8463 3911.

