

Water Quality of Adelaide's Metropolitan Coastal Waters

- a community summary



Introduction

In February 1995 the Environment Protection Authority (EPA) began a long-term water quality monitoring program to assess the quality of the water in the metropolitan coastal waters of Gulf St Vincent. This brochure summarises the results from the first eight years of the program. The full report can be viewed at <www.epa.sa.gov.au/>.

The metropolitan coastal waters extend from Outer Harbor in the north to Aldinga in the south and contain extensive marine ecosystems such as seagrass beds, rocky reefs and sandy beaches.

Water samples were collected monthly at each of the seven metropolitan jetties and compared to both the national guidelines (ANZECC (2000)) and samples from a site at Port Hughes on Yorke Peninsula which is relatively unaffected by urban development. These samples were analysed for 25 parameters, broadly categorised as turbidity, nutrients, heavy metals, algae and microbiology.

Water quality was classified as either good, moderate or poor, using national guidelines, and based on the environmental values of the water:

- protection of the aquatic ecosystem
- protection of recreational users of the water
- protection of aquaculture.

What did we find?

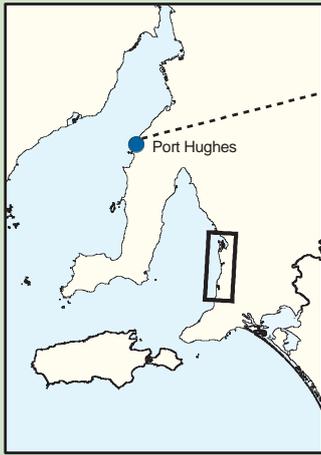
Overall, the quality of our waters ranges from poor or moderate to good for the protection of the ecosystem; good for the protection of recreational users (e.g. swimming); and generally good for the protection of aquaculture.

- The classification for the protection of the ecosystem is typical of coastal waters moderately affected by urban development. However, nutrients and heavy metals, particularly zinc, compromise the water quality.
- Microbiology results show that water quality is safe for swimming.
- Although there are no commercial aquaculture facilities in the study region, the sites are classified to indicate suitability for this potential use. Monitoring shows that water is generally classified as good for aquaculture at all beaches.



Turbidity

Turbidity is a measurement of water clarity. High turbidity reduces light penetration through the water and can cause a reduction in plant and algal life. Turbidity is also often associated with suspended sediments, which may smother seagrass and reef habitats and reduce the available area for organism growth. Turbidity was classified as moderate at five sites and good at three for the protection of the ecosystem. Stormwater runoff, flow from rivers, adverse weather conditions and industrial discharges can all increase turbidity.



Port Hughes			
Turbidity	GOOD	GOOD	NGA
Nutrients	MODERATE	NGA	GOOD
Heavy Metals	POOR	NGA	POOR
Microbiology	NGA	GOOD	GOOD
Algae	MODERATE	NGA	NGA

Semaphore			
Turbidity	MODERATE	MODERATE	NGA
Nutrients	MODERATE	NGA	GOOD
Heavy Metals	POOR	NGA	POOR
Microbiology	NGA	GOOD	GOOD
Algae	POOR	NGA	NGA

Henley Beach			
Turbidity	MODERATE	MODERATE	NGA
Nutrients	MODERATE	NGA	GOOD
Heavy Metals	POOR	NGA	POOR
Microbiology	NGA	GOOD	GOOD
Algae	POOR	NGA	NGA

Brighton			
Turbidity	MODERATE	MODERATE	NGA
Nutrients	MODERATE	NGA	GOOD
Heavy Metals	POOR	NGA	POOR
Microbiology	NGA	GOOD	GOOD
Algae	POOR	NGA	NGA



Largs Bay			
Turbidity	MODERATE	MODERATE	NGA
Nutrients	GOOD	NGA	GOOD
Heavy Metals	POOR	NGA	POOR
Microbiology	NGA	GOOD	GOOD
Algae	POOR	NGA	NGA

Grange			
Turbidity	GOOD	GOOD	NGA
Nutrients	MODERATE	NGA	GOOD
Heavy Metals	POOR	NGA	POOR
Microbiology	NGA	GOOD	GOOD
Algae	POOR	NGA	NGA

Glenelg			
Turbidity	MODERATE	MODERATE	NGA
Nutrients	MODERATE	NGA	GOOD
Heavy Metals	POOR	NGA	POOR
Microbiology	NGA	GOOD	GOOD
Algae	POOR	NGA	NGA

Port Noarlunga			
Turbidity	GOOD	GOOD	NGA
Nutrients	MODERATE	NGA	GOOD
Heavy Metals	POOR	NGA	POOR
Microbiology	NGA	GOOD	GOOD
Algae	MODERATE	NGA	NGA

All poor results for heavy metals are Soluble Aluminium and Total Zinc

Environmental value Ecosystem Recreation Aquaculture

Classification ■ GOOD ■ MODERATE ■ POOR NGA No Guidelines Available for Classification



High turbidity may reduce swimmer visibility after storms and during high winds, and swimmers should use their own judgement to assess the safety of swimming.

Nutrients & algae

Coastal aquatic ecosystems are likely to be affected by elevated concentrations of ammonia and oxidised nitrogen at some locations, which can cause excessive algal growth, leading to lower light penetration, increased turbidity and the smothering of seagrass and rocky reef habitats. The possible effects of increased nutrients were reflected in high chlorophyll concentrations (an indicator of algal growth) at all beaches, with poor classifications at six sites. The main

sources nutrients discharged into the coastal waters are SA Water's Glenelg, Bolivar and Christies Beach wastewater treatment plants (WWTPs) and urban stormwater.

Heavy metals

Water quality is classified as poor at all sites for zinc, and moderate at three sites for nickel. Elevated zinc concentrations can cause reductions in growth, survival and reproduction in most types of aquatic organisms. It is not clear whether the high zinc concentrations are due to pollution or are naturally occurring, as the reference site at Port Hughes also had elevated concentrations of zinc. Natural sources of zinc include the weathering of rocks and soils. It is unclear whether these elevated concentrations are adversely affecting our coastal aquatic ecosystem or not.

All other heavy metals were classified as good for the protection of the ecosystem.

Water quality is generally classified as good for the protection of aquaculture at all sites across the study region. However, as with the ecosystem values, aquaculture is potentially compromised by zinc, which is classified as poor at all sites. Zinc can accumulate in the tissue of shellfish, which may be a threat to fish and shellfish health, rather than a risk to humans ingesting aquacultured organisms.

Microbiology

Microbiological results were good at all beaches. On this basis, the Department of Human Services has advised that generally the water is safe for swimming at all sites. There were occasional elevated results at some sites, which is typical of urban catchments after heavy rain and includes environmental sources such as birds and dogs.

Factors affecting water quality in Gulf St Vincent

The water quality and ecology of the metropolitan beaches has been affected by Adelaide's historical and current industrial and urban developments.

- Elevated nutrient and turbidity levels have contributed to the loss of over 4000 hectares of seagrass and the degradation of rocky reefs in Gulf St Vincent.
- The Glenelg, Bolivar and Christies Beach WWTPs have discharged nutrient-rich wastewater and sewage sludge (ceased in 1993) for many years into the marine environment.
- The increased total area of impervious surfaces from sprawling urban development has resulted in greater volumes of stormwater entering the marine environment.
- Stormwater is often high in organic waste such as animal faeces, green waste (lawn clippings and leaves), nutrients, industrial runoff, and rubber, oil and heavy metals from roads and motor vehicles.

These historical and current effects have reduced the available habitat, altered water and sand movement, and threatened water quality along the coastline.



The future

It is not surprising that some environmental values have been compromised in the coastal waters of Gulf St Vincent. There is a long history of human impact on the gulf, resulting in seagrass loss and the degradation of reef habitats.

Several positive developments, some already implemented, will deliver improvements to the waters of Gulf St Vincent.

- SA Water is continuing to reduce nutrients in the wastewater of the metropolitan WWTPs.
- Ongoing work by the catchment water management boards (CWMBs) will reduce stormwater contamination in the catchments.
- The introduction of the *Environment Protection (Water Quality) Policy 2003* and supporting codes of practice by the EPA will reduce pollution, especially from diffuse sources.
- The Adelaide Coastal Waters Study, due for completion in 2006, will increase knowledge of South Australia's marine environment and help agencies manage the waters in an ecologically sustainable way.

The above initiatives will improve the water quality of the metropolitan beaches over time; however, many marine habitats are extremely sensitive and will only recover gradually. Pollution is a consequence of human development; initiatives by industries, the EPA, CWMBs, councils, and community groups will reduce pollution levels, enabling the water quality to improve over time. This should encourage the return of seagrass meadows, healthy reef ecosystems and marine life in Gulf St Vincent, outcomes that benefit all South Australians.



Gulf St Vincent has been receiving waste and polluted water for a long time. Slowing or even reversing the ecological effects of historical and ongoing pollution will take many years.

What can I do to help reduce pollution in Gulf St Vincent?

Every person in South Australia can help to improve the State's water quality. Simple actions such as washing your car on grass so that no water enters the stormwater system will help reduce the flow of pollutants into the gulf.

The 1997 EPA publication *Stormwater Pollution Prevention Code of Practice for the Community* outlines many practices to reduce stormwater entering the marine environment, such as:

- keeping garden and green litter out of gutters and stormwater drains
- sweeping instead of using the garden hose to clean driveways
- using fertilisers, pesticides and herbicides sparingly and never near drains or watercourses, and investigating less hazardous alternatives
- reducing paved areas in your garden to allow water to soak into the soil
- reducing car usage to help improve water and air quality
- cleaning up after your pets so that faeces do not enter the stormwater system.

This is by no means an exhaustive list; refer to the Stormwater Code of Practice for more ideas to help reduce water pollution, and it may save you money too.

Further reading

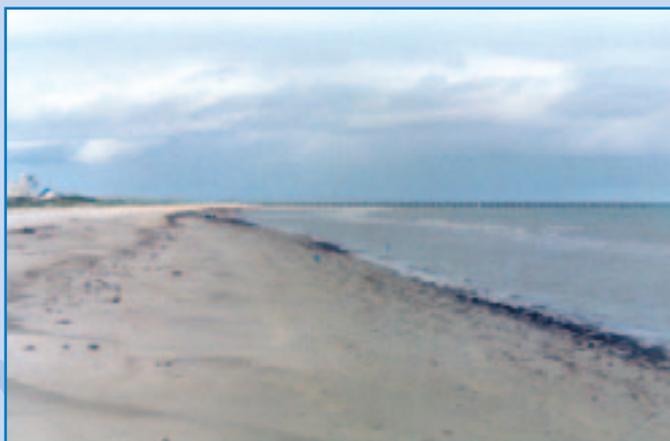
The following reports are available free from the EPA web site (www.epa.sa.gov.au/pub.html), or by calling the EPA—8204 2004 (Freecall 1800 623 445 for country callers).

Environment Protection Authority 1997, *Ambient Water Quality Monitoring of Gulf St Vincent's Metropolitan Bathing Waters*, Report no. 1, Department for Environment, Heritage and Aboriginal Affairs, Adelaide.

Environment Protection Authority 1998, *Changes in seagrass coverage and links to water quality off the Adelaide metropolitan coastline*, Department for Environment, Heritage and Aboriginal Affairs, Adelaide.

Environment Protection Authority 2003, *The health of subtidal reefs along the Adelaide metropolitan coastline 1996-1999*, Environment Protection Authority, Adelaide.

Environment Protection Authority 2004, *Ambient Water Quality Monitoring of the Gulf St Vincent Metropolitan Coastal Waters*, Report no. 2, Environment Protection Authority, Adelaide.



Environment Protection Authority

GPO Box 2607

Adelaide SA 5001

Telephone: (08) 8204 2004

Facsimile: (08) 8204 9393

Freecall (country): 1800 623 445