Water Quality of the Port River Estuary

— a community summary
INTRODUCTION

In September 1995, the EPA began a long-term program to monitor water quality in the Port River estuary.

The estuary consists of the Port River, North Arm, Outer Harbor and the Angas and Barker inlets. It is a biologically diverse aquatic ecosystem, supporting extensive saltmarshes, mangrove stands and seagrass beds. This provides varied habitats for many species of birds, fish, crustaceans, and other marine invertebrates, making the estuary an important natural asset.

The EPA collects water samples monthly from nine sites across the estuary, measuring 21 different parameters in five categories—nutrients, water clarity, heavy metals, chlorophyll (algae) and microbiology. Water quality data is categorised as good, moderate or poor using a classification system based on national water quality guidelines.

The EPA’s first Port River report summarised data from September 1995 to December 1996 (EPA, 1997a), and found the water quality to be mainly poor to moderate.

This brochure summarises a new report, Ambient water quality in the Port River estuary September 1995–August 2000. Once again, water quality was shown to be poor to moderate for many parameters—only 51% of classifications were good, 31% were moderate, and 18% were poor. Outer Harbor was the best site, with 71% of the parameters classified as good.
The five categories analysed

**Nutrients**

High nutrient concentrations can lead to excessive algal and plant growth, causing fish deaths and smothering seagrasses and other plants. Some algal species produce toxins, making shellfish unsafe to eat. The poor nutrient classifications at seven sites in the estuary were due to oxidised nitrogen and ammonia, the main sources being discharges from Penrice Soda Products and the Port Adelaide wastewater treatment plant. SA Water and Penrice are implementing environment improvement programs (EIP) to reduce nutrient loads to the estuary. Stormwater is also a likely contributor to elevated nutrient levels and both the Torrens and the Northern Adelaide and Barossa Catchment Water Management Boards are taking steps to reduce the pollution entering stormwater and our waterways.

**Water clarity (turbidity)**

Turbidity in the river has improved slightly since 1995–96. Five sites had good (low) turbidity, while the remaining four were moderate. Stormwater runoff, industrial discharge, construction work, dredging and storms all increase turbidity.

**Heavy metals**

Heavy metal readings were poor at five sites and moderate at four due to high copper concentrations. Zinc was moderate, and aluminium, cadmium, iron, lead and mercury were good at all sites. Industries can cause heavy metal pollution and urban runoff also contains metals from wearing tyres and brakes, and leaking lubricating oil.

**Chlorophyll**

The concentration of chlorophyll $a$ is a good indicator of the amount of algae in water. Chlorophyll $a$ concentrations were poor or moderate at all sites, and have increased at the majority of sites since 1995–96.

**Microbiology**

Readings were good at three sites and poor at six due to enterococci and faecal streptococci. Sources may include faecal waste from stormwater, septic tank seepage, boats and sewage outfalls. Discharge from the Port Adelaide wastewater treatment plant is chlorinated, but this does not entirely eliminate bacteria. Since 1995–96, five sites have declined from good to poor after a small number of high readings, which could be due to occasional short term events such as large stormwater discharges.
Factors affecting the river

The water quality and ecology of the Port River estuary have been affected historically by Adelaide’s industrial and urban development.

- Dredging has created deep channels for shipping, and extensive areas of vegetation, including saltmarshes, mangroves and seagrass, have been removed.
- The diversion of the Torrens River in the early 1900s changed the flow of fresh water into the estuary.
- The West Lakes development in the 1970s increased seawater movement with a flow-through system, drawing 500 million litres of seawater a day into the Port River.

Current uses of the river and its surroundings continue to threaten its health.

- The SA Water wastewater treatment plants at Bolivar and Port Adelaide, and Penrice Soda Products at Osborne, discharge large amounts of nutrients into the estuary.
- Torrens Island, Osborne and Pelican Point power stations use estuary water for cooling purposes. Coupled with the Penrice Soda outfall, this adds thermal pollution to the estuary.
- Building and maintenance of ships at slipways around the estuary can pollute the waters.
- Stormwater flow into the estuary is often contaminated by organic waste such as animal faeces, leaf litter and lawn clippings, industrial runoff, and rubber, oil, lead, copper and zinc from motor vehicles.

These historical and current factors have reduced the natural habitat available, altered water movement and salinity, and increased pollution in the estuary.
The poor to moderate water quality classifications are not surprising, given the long history of human impact on the Port River estuary. The EPA is committed to improving the water quality of the estuary.

Several positive developments, some already implemented, will deliver improvements.

- In January 2002, SA Water diverted the sewage received at the Queensbury pumping station to Bolivar. This reduced the flow of wastewater to the Port River by about 30%.

- SA Water will divert the remaining flow to Bolivar by December 2004. This will reduce turbidity, nutrients, algal problems and microbiological contamination.

- Penrice Soda Products commissioned a settling pond system in April 2001. Initial monitoring shows suspended solids have been reduced by about 95%. Penrice is also developing an environment improvement program to reduce the discharge of ammonia in its wastewater.

- The EPA is preparing an Environment Protection (Water Quality) Policy, providing a regulatory framework to address diffuse pollution in stormwater and streamflow.

- The development of wetlands by councils, catchment water management boards and the former MFP to treat stormwater is expected to reduce the amount of nutrients, metals, bacteria and suspended solids entering the Port River.

We have been polluting the Port River estuary for many years and, even if we could prevent all pollutants from entering the estuary, it would still take time to recover. Nutrients and metals stored in the sediments and the historical loss of seagrass and mangroves will continue to impact on the estuary’s water quality.

The above initiatives will significantly improve the water quality of the estuary; however, while we expect rapid improvements in some water quality parameters, other changes will be more gradual. With careful long-term planning and management we will overcome the legacy of past mistreatment of the estuary.
Further reading

The following reports are available free on the EPA website (www.epa.sa.gov.au/pub.html) or from the Environment Shop.


Environment Protection Authority 2000, Special survey of the Port River: Heavy metals and PCBs in dolphins, sediments and fish, EPA, Adelaide.


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