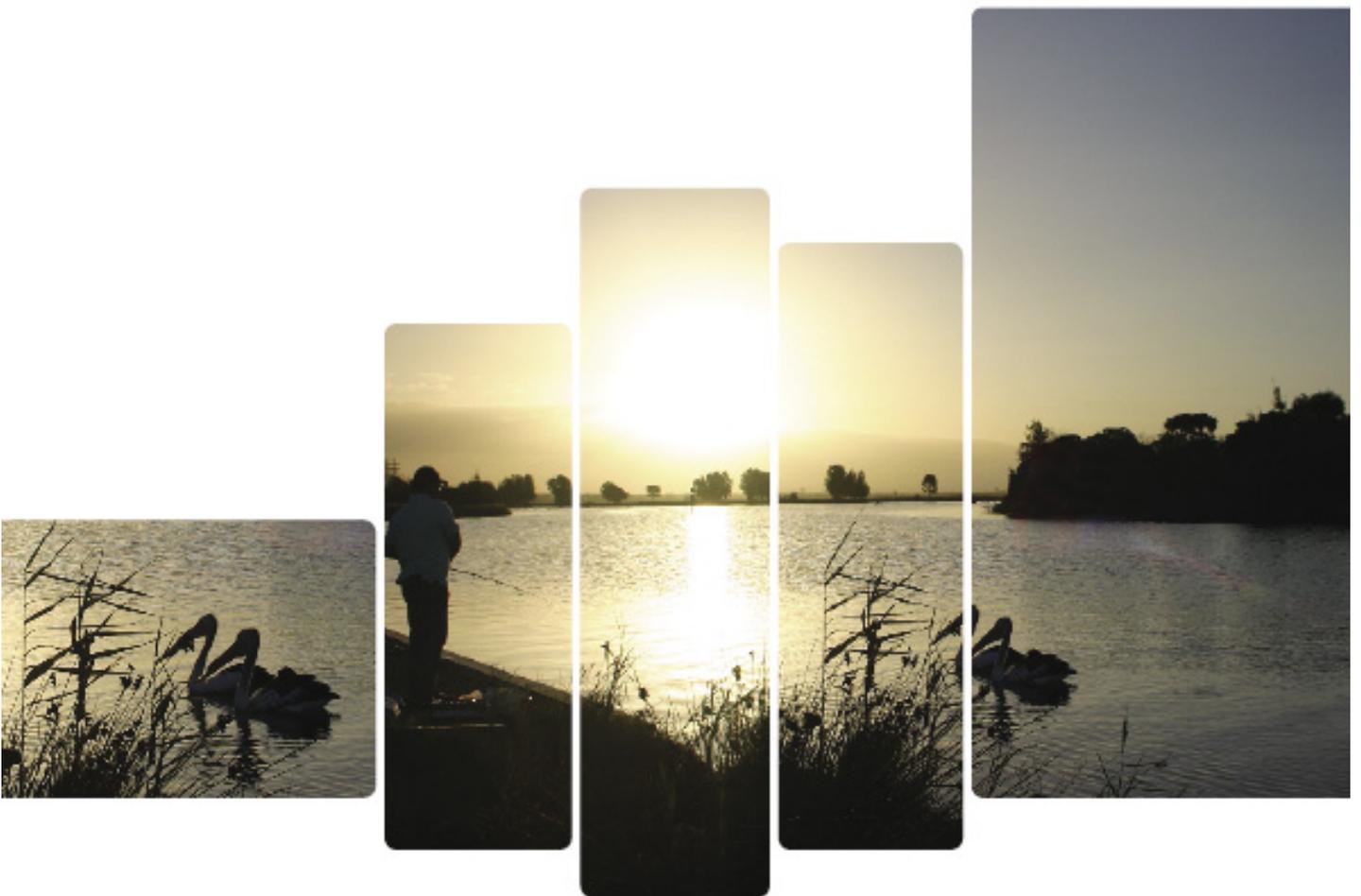




Australian Government

Australia's National Programme of  
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case study 20: peel-harvey waterway

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## executive summary

The Peel Harvey Waterway receives waters draining from the Peel, Harvey and associated catchments of the Murray, Serpentine and Harvey Rivers. Since the 1960s there have been episodes of noxious algal overgrowth and fish kills. Contributing factors include diffuse source pollution from agricultural and urban land use and transport corridors; and point source pollution from sewage and other waste treatment plants. Two major strategies have been adopted to reduce the inputs of nutrients and the consequent occurrences of algal blooms and fish kills: the construction of the Dawesville Channel, a major seaway/canal into the Harvey Estuary; and the adoption of a Catchment Management Plan for the Peel Harvey system to limit the input of nutrients from various diffuse and point sources.

Construction in 1994 of the Dawesville Channel provided some relief. Total nitrogen levels at sampling stations reduced from 50 per cent above to 40 per cent below guideline levels, while total phosphorus concentrations in the Estuary reduced from 200 per cent above to 50 per cent above guideline levels.

The Peel Harvey Waterway is managed by the Western Australian Department of Water, supported by the Peel Harvey Catchment Council (PHCC) in partnership with Western Australian Environment Protection Authority (EPA). This arrangement provides a strategic framework for the very wide range of community, industry, shire and government agencies with operational responsibilities within the catchment.

A major activity of the PHCC-EPA partnership has been development of a Water Quality Improvement Plan (WQIP) through a major program funded jointly by the Commonwealth and Western Australian Governments under the Commonwealth *Coastal Catchments Initiative*. This program commenced in 2003 and a report is currently in preparation.

## introduction

The Peel Inlet and Harvey Estuary make up a single shallow waterway located in the south west of Western Australia. The Peel Inlet has a surface area of 75 square kilometres and a volume of about 61 million cubic metres (61,000 megalitres), while the Harvey Estuary has a surface area of 61 square kilometres and a volume of about 56 million cubic metres (56,000 megalitres). The average depth of the combined system is 90 centimetres.

Two openings connect the inlet to the ocean. The natural connection is at the north end of the Peel Inlet at Mandurah, and is about 4.5 kilometres in length. The second connection is a man-made channel connecting the estuary to the ocean near the junction of the Peel Inlet and the Harvey Estuary. This connection, the Dawesville Channel, is 2 kilometres long, and was opened in 1994 in response to deteriorating quality in the waterway.

The catchment for the Peel-Harvey waterway (see [Figure 1](#)) covers about 11,900 square kilometres and extends up to 170 kilometres inland from the coast. Three major rivers drain the catchment: the Murray with a catchment area of 7,900 square kilometres, the Serpentine with a catchment area of 1,500 square kilometres, and the Harvey with a catchment area of 1300 square kilometres. The Serpentine and Harvey Rivers are dammed for upstream water supplies, and flows are heavily regulated.

The Peel-Harvey catchment comprises two distinct regions. The coastal land around the Inlet and the Estuary is generally of low relief, and flat land (less than 20 metres above sea level) extends up to 30 kilometres inland from the coast. Much of this land is prone to inundation, and there were abundant wetlands in this area prior to agricultural development. To the east of this coastal plain lies the Darling Scarp, rising to the Darling Plateau. This land is characterised by steep slopes, rising in some places 400 metres over 10 kilometres, with valleys deeply incised into the plateau.

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The Peel-Harvey is typical of South West Australian catchment and drainage systems. The waterway is mostly shallow and slow to drain to the sea because of the limited natural entrance channel at Mandurah and the Dawesville Channel. The Peel-Harvey basin has a Mediterranean climate, with hot dry summers and cool wet winters. Rainfall is typically strongly seasonal and spatially variable, ranging from about 900mm per annum on the coastal plain to about 1,300 millimetres per annum on the scarp, declining to about 450 millimetres per annum at the eastern extremity of the catchment.

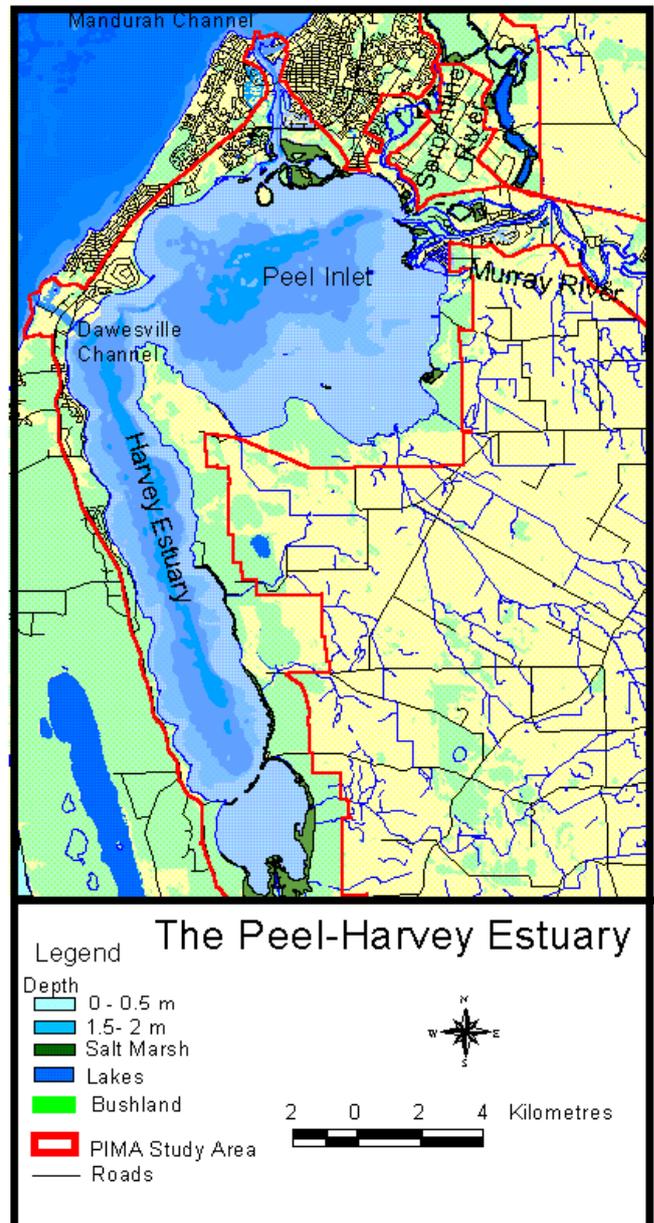
The seasonality in rainfall results in a high range of salinity values in the Peel-Harvey, from less than one third of the salinity of seawater after high rainfall events to 40 per cent higher than seawater after dry periods. Such semi-enclosed coastal waterways/lagoons are particularly vulnerable to nutrient enrichment but they play an important seasonal role as feeding and roosting areas for migratory bird species. The Peel-Harvey is the most important area for waterbirds in south western Australia. This has been recognised by core areas that have been included in the 21,000 hectares Peel-Yalgorup Ramsar site.

### pollution issues

The shires bordering and draining to the waterway have experienced and continue to experience rapid development and changes of land use since the 1950s. Management of the Peel Harvey Estuary and its catchments has posed complex interlinked problems resulting from increasing and changing patterns of human use and impact. These have involved point source and diffuse source nutrient pollution and impacts that have overwhelmed the tidal flushing capacity of the channels linking the estuary to the sea.

Early eutrophication episodes were associated with agricultural development of the catchments. By the 1980s eutrophication reports were more frequent, and accompanied by major algal blooms in the inlet and estuary, leaving substantial deposits of decaying algae on the shores and shallow low-energy waters across the whole waterway. Urban development now plays an increasing role in modification of waterway processes, while simultaneously creating a broader recognition of the high natural values of the environment and demand for recreational use and enjoyment.

Figure 1: Peel-Harvey Waterway



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### management context

The early episodes of eutrophication were linked to the use of phosphate-based agricultural fertilisers, with consequent leaching of phosphorous through the sandy soils into the local waterway. The issue of agricultural sources of phosphates is being addressed through various mechanisms, including end-of-pipe criteria, and fertiliser formulation to reduce the loss of soluble nutrients to local waterways. However, the current management is complex because factors that contribute to water quality problems originate from a combination of activities that come under the responsibilities of a wide range of agencies within local and state governments. Management co-ordination mechanisms have evolved to address changing contemporary issues of land and estuary use and water quality management. The Peel Harvey Waterway is currently managed by the Western Australian Department of Water, with the support of the Peel Harvey Catchment Council (PHCC) in partnership with Western Australian Environment Protection Agency. This arrangement provides a strategic framework for the very wide range of community, industry, shire and government agencies with operational responsibilities within the catchment.

The present driving issue in water quality management is urban development. Currently 6 per cent of the catchment area is occupied by developed urban areas but they contribute about 30 per cent of nutrient input. Recent modelling studies indicate that full development of current urban planning schemes would produce a four-fold increase in urban-sourced nutrient loadings to the waterway.

A water quality improvement plan for the Peel Harvey catchments is being developed through a series of projects under the Commonwealth *Coastal Catchments Initiative*. They address legislative and institutional mechanisms, monitoring, decision support, agricultural best practice and water sensitive urban design.