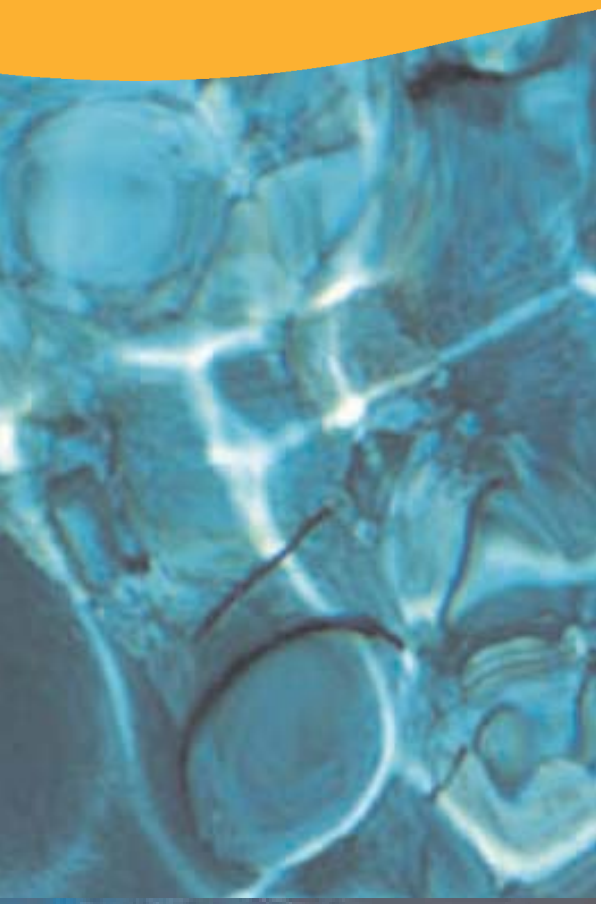
Committed to improving water quality in Cockburn Sound

KWINANA INDUSTRIES COUNCIL

2004



People and industry share Cockburn Sound.

A Valuable Asset

Cockburn Sound, located 20 kilometres south of Fremantle Inner Harbour, is the most intensively used marine environment in Western Australia.

It is a significant State asset in economic, environmental and social terms.

The sheltered waters of the Sound are popular for fishing and more than 12,000 recreational boating trips are recorded annually. The Sound is also used for commercial fishing, with more than 130 species of fish and 14 crustacean and mollusc species found in various habitats, as well as aquaculture operations involving mussel farming.

Yet the Sound is also a vital part of a major industrial area because it supports extensive port facilities, a strategic national naval base and marine maintenance shipyards.

The multiple uses of the Sound are expected to increase in the near future, contributing further to the West Australian lifestyle and economy. Preserving a healthy marine ecosystem in Cockburn Sound therefore demands careful environmental management and planning by all users including industry, State Government and the community.

The Kwinana Industries Council (KIC) and its member companies are committed to ensuring a healthy Cockburn Sound marine ecosystem that can be enjoyed by people, whilst supporting the growth of Western Australia.

The KIC is committed to the sustainable development of Cockburn Sound by balancing the economic, environmental and social progress of the area.

The goal of industry is to achieve sustainability through:

- Efficiently processing resources to provide a range of goods and services needed by our society;
- Achieving an acceptable and decreasing level of environmental impact;
- Providing jobs and income for our community; and
- Engaging in cooperative projects that benefit local communities, the State and Australia.

Western Australia's Industrial Hub

In 1953 industrial development adjacent to Cockburn Sound began with the construction of the BP oil refinery in the Kwinana Industrial Area. During the next five decades, this part of the eastern shore of Cockburn Sound witnessed the development of industries such as minerals refining/processing, iron and steel manufacturing, cement, chemical, fertiliser and power production, multiple port facilities and a bulk grain terminal.

Many associated service and support companies were also established in the area to supply the major Kwinana industries.

From the 1950s onwards Cockburn Sound became the 'outer harbour' for Fremantle Port. In 1966 a wastewater treatment plant was built at Woodman Point, at the northern end of the Sound, to treat metropolitan sewage.

In the early 1970s, at the southern end of the Sound, a causeway was built to connect Garden Island to the mainland to further the development of HMAS Stirling as the main Australian naval base servicing the Indian Ocean.

In the 1990s the Henderson Marine Precinct was also developed at the northern end of Cockburn Sound with a range of dockyard and other facilities for shipbuilding and marine maintenance.

Both marine developments further increased the combined industrial, commercial, naval and recreational use of Cockburn Sound.

Today the Kwinana Industrial Area comprises a unique blend of industries, many of which are interdependent in their use of resources and infrastructure. This creates significant synergies through the flow of materials and wastes between industries to create new products.

Cockburn Sound is an intensively used marine environment.

An Economic Impact Study released in 2002 demonstrated the economic effect of the Kwinana Industrial Area was:

- *$4.3 billion in direct sales*
- *22 per cent of the WA manufacturing sector's total income*
- *Nearly $9 billion of direct and indirect economic contribution to Australia*
- *Employee earnings of $600 million per annum*
- *Nearly 4,000 people directly employed*
- *$812 million capital expenditure planned over the five years to 2007*

Improving water quality benefits marine life.

Water Quality

As industry grew along Cockburn Sound, so too did the level of nitrogen inputs to the water. This was demonstrated by studies undertaken in the early 1970s.

Since then, ongoing management strategies have reduced nitrogen inputs to the Sound, so that they are now much lower than they were 30 years ago.

The increased boating, shipping and naval uses of Cockburn Sound also raised new issues. A State Government study in the 1990s found there was widespread contamination of sediments and mussels by tributyltin (TBT), a highly toxic ingredient used in anti-foulant paints applied to ships and boats[1].

Foreign marine organisms were also discovered in the Sound. Whilst there are several ways in which foreign marine organisms may have been introduced, it is thought that the discharge of ballast water or dislocation from ship's hulls may have been the cause.

The same study also found that manufacturing industry discharge into Cockburn Sound had reduced significantly and more of the inputs came from groundwater previously contaminated by other sources. Other findings from the study were that:

- Metals and organic contaminants inputs from industry were far less than the late 1970s;
- Seagrass dieback had slowed considerably; and
- All local beaches met human-health guidelines for swimming and shellfish harvesting.

A survey in 1999/2000 found only two marine infestations in the Sound[2] whilst a sediment study in 2002 found a marked decline in TBT levels throughout the Sound.

Further studies in 2002 indicated that water quality had improved from the early 1990s. This was evident from the lower levels of phytoplankton, which indicates lower levels of nitrogen[3].

1. "Southern Metropolitan Coastal Waters Study Progress Report," Department of Environmental Protection. May 2000
2. "Characteristics of Sediment in Perth's Nearshore Coastal Waters," prepared for Kwinana Industries Council. D.A. Lord and Associates Pty Ltd. June 2000. Report No. 99/095/3
3. "Cockburn Sound Water Quality 2002/03," prepared for Kwinana Industries Council, Marine and Freshwater Research Laboratory Environmental Science, Murdoch University.

Key Water Quality Questions

Q Why did Cockburn Sound nitrogen levels increase from the 1950s?

The increase in nitrogen resulted from treated domestic sewage and industrial wastewater discharges. Both were far less controlled by environmental regulations in previous decades. Industry and Governments are now far more aware of the consequences and are proactive in preventing and reducing wastewater discharge.

Q How did this impact on Cockburn Sound?

The waters of Cockburn Sound are naturally low in nitrogen and this meant the increased input of nitrogen had a significant impact on marine plant growth.

Nitrogen encourages the growth of microscopic algae called phytoplankton. Too much phytoplankton starves seagrass of the light it needs to grow, resulting in seagrass dieback. Damage to overall marine and estuarine habitats can then occur due to the destruction of seagrass meadows.

The amount of phytoplankton in the water correlates with how much nitrogen is available for growth. Therefore, a good indicator of water quality is to measure phytoplankton levels.

Q What happened to reverse the nitrogen levels in Cockburn Sound?

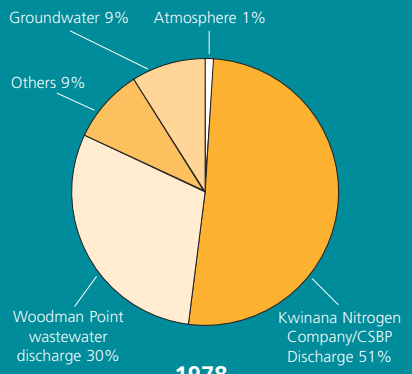
From the mid-1970s onwards industrial and treated sewage discharges were progressively reduced by industry and the State Government. This process was further accelerated in the 1990s and will continue in the next few years with the completion of the Kwinana Water Reclamation Plant and associated reduction in and redirection of effluent discharges to the Sepia Depression.

Q What happens to ship ballast water?

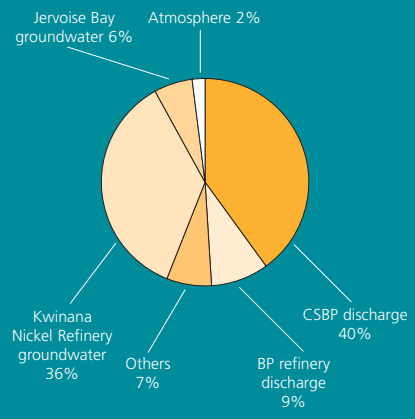
Since 2001 the Australian Quarantine and Inspection Service has had mandatory rules covering ballast water in ships. The rules are aimed at reducing the risk of introduction of exotic organisms into Australia. This involves processes such as re-ballasting at sea, ballasting in deep-water, non-discharge in Australian ports and taking on ballast in agreed 'clean' overseas ports. A ship must obtain written permission from a quarantine officer before discharging ballast water in Cockburn Sound or any other port.

Nitrogen Inputs into Cockburn Sound

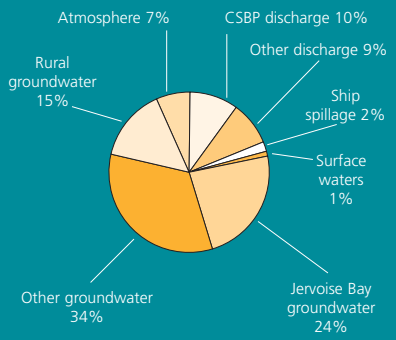
(The decreasing size of the charts illustrates the substantial fall in nitrogen inputs)



1978
(2,000 tonnes/year)

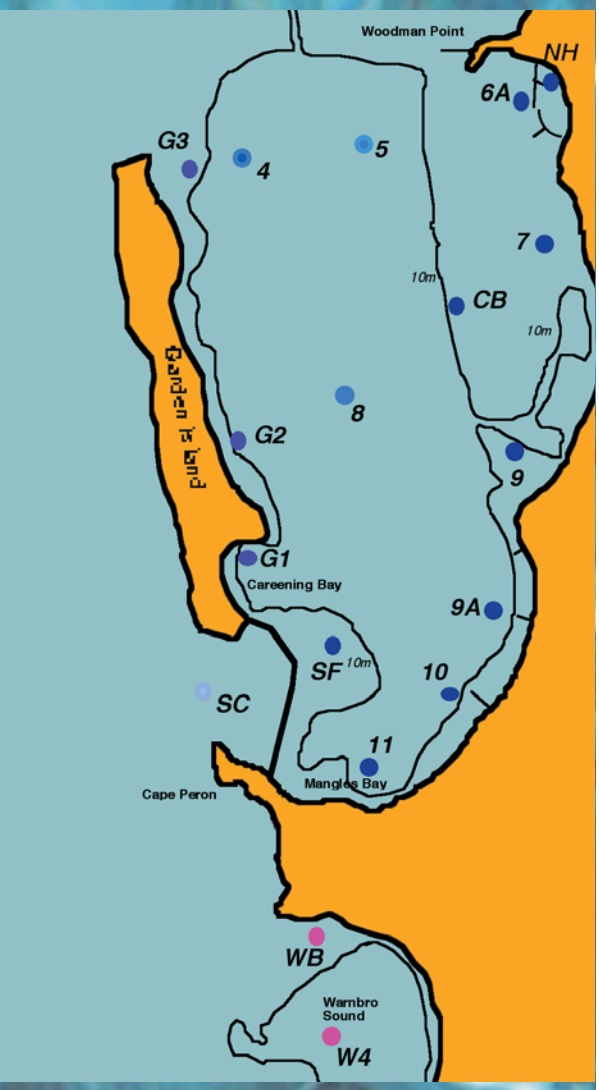


1990
(1,080 tonnes/year)



2000
(300 tonnes/year)

"Cockburn Sound Management Council - State of Cockburn Sound", prepared by DA Lord & Associates in association with PPK Environment and Infrastructure Pty Ltd, June 2001.



Cockburn Sound monitoring sites.

Independent Annual Monitoring of Water Quality

Murdoch University's Marine and Freshwater Research Laboratory monitors the water quality indicators in Cockburn Sound every summer at the request of the KIC.

The KIC is committed to undertaking water quality monitoring during the summer period, as phytoplankton levels strongly influence water clarity during this time. Phytoplankton levels are also known to rise with increased nitrogen levels in water.

The objective of the monitoring program is to assess water quality indicators over a long period of time and to determine trends in phytoplankton and nitrogen concentrations within Cockburn Sound.

The monitoring program now consists of 16 sites in Cockburn Sound and two in Warnbro Sound (as shown on the adjacent map). The monitoring locations will vary over time in response to changing emission sources.

Annual monitoring has now been carried out nearly every year since 1982. This means there is more than 20 years of comparative data that demonstrates the long term improvement in water quality in the Sound.

Water samples being taken from Cockburn Sound.

Water treatment in Kwinana.

Water Reclamation

The $25 million Kwinana Water Reclamation Plant, a combined Water Corporation and industry initiative, will deliver many environmental benefits in the Kwinana / Rockingham area.

It will commence operation during 2004, confirming industry and State Government commitments to improving water quality in Cockburn Sound.

The environmental benefits of the project are substantial with a significant reduction in the quantity of industrial wastewater being discharged by pipeline into Cockburn Sound.

Reclaimed water will be used by industry in Kwinana wherever feasible.

The reclamation plant is expected to reduce industry demand for scheme water by six million kilolitres (six gigalitres) a year.

Treated wastewater not required by industry will be safely discharged into an existing approved zone four kilometres offshore from Cape Peron (subject to approval under the Environmental Protection Act), which is the western most point of Rockingham.

The changes to scheme water use by industry since 1995 are outlined on this page.

Saving scheme water in Kwinana

1995	***Industry starts to examine reduction programs***	***7.3 gigalitres used***
2002	***Industry water reduction programs in place***	***5.4 gigalitres used***
2004	***Kwinana Water Reclamation Plant opens***	***2.9 gigalitres used (estimate)***

Perth households use approximately 144 gigalitres of scheme water each year.

A gigalitre is a million kilolitres.

Industry operates on the eastern shore of the Sound.

Recreation is a prime use for Cockburn Sound.

The Future

The long term management of Cockburn Sound is of vital importance to the future of industry and all other users of this important natural resource.

For this reason the KIC is an active participant in the Cockburn Sound Management Council, along with Commonwealth, State and local Governments and a range of community groups .The Council was established in 2000 to coordinate environmental planning and management of Cockburn Sound and its catchment.

As the Cockburn Sound Management Council was being formed the Environmental Protection Authority commenced drafting an Environmental Protection Policy (EPP) for Cockburn Sound. The draft EPP outlines the environmental values, objectives and criteria for managing Cockburn Sound and will undergo a public consultation process.

The EPP requires the Cockburn Sound Management Council to prepare an Environmental Management Plan for the Sound. An interim Plan has now been completed detailing a five point plan for implementing the EPP:

1. Protecting the environmental values of Cockburn Sound
2. Facilitating multiple use of Cockburn Sound and its foreshore
3. Integrating management of the land and marine environments
4. Coordinating research and investigations
5. Monitoring and reporting on performance

Through the KIC's involvement in the Cockburn Sound Management Council, and with the licence commitments of individual companies, industry will continue to work towards its goal of improving water quality in Cockburn Sound so as to ensure a healthy marine ecosystem.

More information on general industry issues, the KIC, or its member companies can be obtained from the Kwinana Industries Council's website www.kic.org.au or by contacting the KIC Office at:

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The Kwinana Industries Council Community Information Service allows you to find out the latest information on public safety, environmental and other issues in the Kwinana Industrial Area simply by using your telephone: 1300 304 346

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