Australian Government

Australia's National Programme of Action for the Protection of the Marine Environment from Land-Based Activities

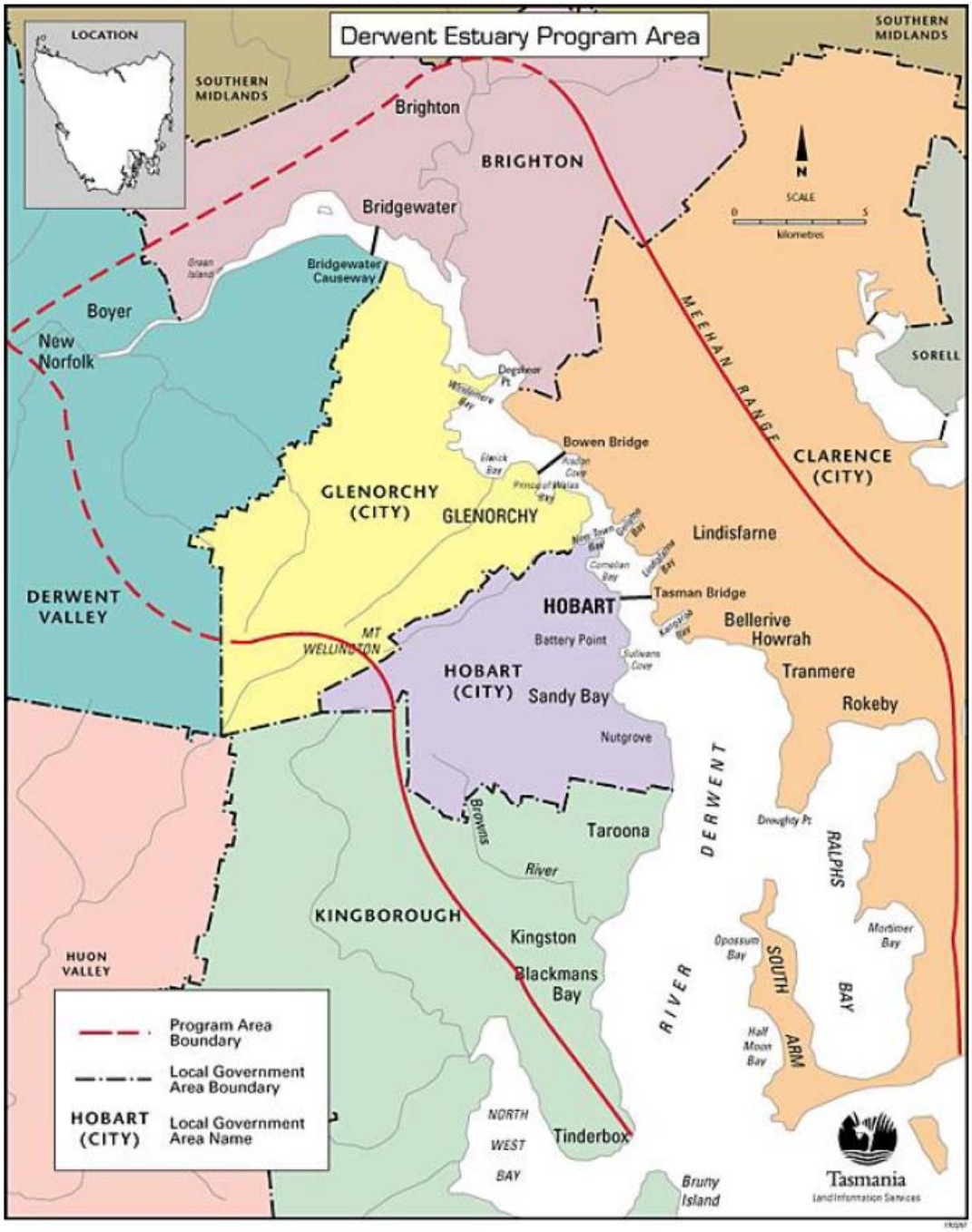
October 2006

case study 6: derwent estuary

introduction

The Derwent Estuary (Figure 1) covers an area of almost 200 square kilometres. It is an integral part of the Hobart metropolitan area and of Tasmania's natural, cultural and economic heritage. It was one of the first areas of Australia settled by Europeans and has a history of urban, agricultural and industrial land use. The estuary coast and its catchment support a population of 192,000 and a broad range of economic and social activities. It is widely used for recreation, boating and fishing. It is Tasmania's 3rd largest port and sustains a range of industries including paper production, zinc smelting and boat building.

Figure 1: Derwent Estuary



The estuary is generally deep with average tides of 1 meter and has reasonable tidal flushing with residence times less than 2 weeks. Since the 1920s there has been a 30 per cent decline in natural flows from the estuary catchment, due to a combination of water transfers for hydro electricity and a climatic dry period.

pollution issues

Historically the Derwent Estuary has been affected by inadequate treatment of residential and industrial wastes, inadequate land management and stormwater treatment and introduction of marine pests through hull surface and ballast waters of vessels using the Port of Hobart.

Reports on the state of the Derwent Estuary in 2003 and 2004 identify seven specific issues as priorities for management:

- extreme heavy metal contamination of sediment and biota (mercury, zinc, cadmium, lead and copper);
- intermittent faecal contamination of recreational waters;
- organically-enriched sediments with locally depressed oxygen levels;
- elevated nutrient concentrations;
- severely altered environmental flows and physical barriers to fish migration;
- loss of estuarine habitat and species; and
- severe infestation by introduced marine pests, particularly the Northern Pacific seastar.

point source issues

The Derwent Estuary Program has reviewed effluent quality criteria for sewage and industrial waste treatment plants which are regulated by the Environment Division of the Department of Tourism, Arts and the Environment in accordance with *the Environmental Management and Pollution Control Act 1994* and the *State Policy on Water Quality Management 1997*. Performance of plants is self-monitored and is reviewed annually with consequent prioritising of repairs, replacements and upgrade of plant and infrastructure. The *State of the Derwent Estuary Report* (2003) records several significant upgrades in sewage treatment plants and consequent declines of 50 per cent in TSS, 47 per cent in BOD, 11 per cent DIN and 99.9 per cent in thermo-tolerant coliforms.

The Zinifex Hobart Zinc Smelter is classified as level 2 Industrial premises with a history of significant pollution but has achieved substantial reductions in water and air emissions since 1996. The Norske Skog Paper Mill is also classified as level 2 Industrial premises.

The 2003 *State of the Derwent Estuary Report* recorded a decline of 15 per cent in total flows and 41 per cent in total sediment discharges but little change in other parameters. The continuing residual problems with heavy metals in Derwent estuary benthic sediments and levels in shellfish make them unsafe for human consumption. Recent long core sampling indicates a gradual reduction in sediment heavy metal levels although these are still high by national and international standards. Despite reductions in heavy metal loads and levels in sediments further action is needed to reduce loads and mange risks associated with contaminated sediments and seafood.

a water quality improvement plan for heavy metals

A Water Quality Improvement Plan for Heavy Metals is in the final stages of development. Funding from the Australian Government's *Coastal Catchment Initiative* (CCI) in 2003 and funding and resources from the Tasmanian Government and Derwent Estuary Program Partners has provided for development of a Water Quality Improvement Plan to address heavy metal contamination of the Derwent Estuary. The project was carried out and supported by an extensive team of scientists and technical specialists, including, industry, government and non-government.

The draft plan proposes a range of management actions including:

- Further capture and remediation of contaminated groundwater and stormwater at the Zinifex Hobart smelter site – Zinifex has committed to $2 million to implement these programs;
- Development of dredging guidelines and protocols to avoid disturbing contaminated sediments;
- Management of nutrient loads to prevent low oxygen levels which could cause sediments to release heavy metals;
- More detailed surveys of heavy metals in fish and other biota; and
- More community information and awareness about seafood safety.

A period for public comment on the draft Plan closed recently.

diffuse source issues

stormwater

Stormwater was identified as a significant priority issue in the Derwent Estuary Program with substantial sediment and other pollution arising from inadequate stormwater management. Over the first five years of the Environment Management Plan all six participating Councils have implemented stormwater management projects with a total expenditure of over $3 million co-funded by the Australian Government.

A review of stormwater management for the period 1998-2003 concluded that some improvements were already manifested visually in the Derwent Estuary and that there were quantifiable improvements in terms of volumes of litter and sediment prevented from entering the estuary.

The report recommended a commitment to Water Sensitive Urban Design for the incorporation of infiltration and ground water recharge and stream flow maintenance measures. This recommendation has been supported by the publication of a stormwater management plan for Hobart regional Councils.

boat wastes

Boat wastes were identified as a significant issue in the Environment Management Plan. Measures that have been implemented in the course of the Plan include upgrading Domain Slipways funded by the Natural Heritage Trust to implement Best Environmental Practice and installation by Hobart Ports with support from *RiverWorks* Tasmania of a sewage pump-out facility at Sullivan's Cove to service recreational vessels using Constitution Docks and Victoria Dock.

recreational water quality

Recreational Water Quality is a significant pollution issue. The immediate management measure is weekly monitoring of recreational water quality during summer months. The 2004 report card noted that in the middle of the estuary seven sites did not meet current water quality guidelines for swimming. The 2001 Environment Management Plan reported that urban runoff contributed an estimated 90 per cent off the total load of faecal bacteria to the Derwent and that the estuary was at greatest risk of contamination following heavy rainfalls. The stormwater management plan addresses measures to reduce and manage contamination levels.

marine pests

Marine Pests have caused significant ecological change. The Derwent as an isolated southern hemisphere temperate estuary is vulnerable to introductions, particularly of temperate species. The following species are considered to be having the greatest ecological impact on the estuary:

- Northern Pacific seastar (*Asterias amurensis*)
- Japanese seaweed (*Undaria pinnatifida*)
- Toxic dinoflagellate (*Gymnodinium catenatum*)
- Pacific oyster (*Crassostrea gigas*)
- New Zealand half crab (*Petrolisthes elongatus*)
- New Zealand seastar (*Patiriella regularis*)
- New Zealand screw shell (*Maoricolpus roseus*)

All these species have invaded natural as well as disturbed habitat. They are generally abundant and widespread. Once introduced they are difficult to control. Some containment may be achieved for large species through collection and removal of large populations. The major emphasis is on measures to reduce the risk of further introductions through hull fouling or ballast water of ships using the Port of Hobart.

habitat and species management

In common with most estuarine and coastal areas the most impacted habitats and threatened species are those of foreshores. These are the areas where initial settlement and development occurred and where habitat alienation through reclamation for port, public and industrial development is most common.

Habitat and species management is an important activity stream in the management plan. Activities include research and monitoring to determine the distribution of habitat types, changes over time, current and potential threats and issues that need improved management. The voluntary monitoring agreement between the Government of Tasmania, the six Councils and the industry groups comprising the Derwent Estuary Program is fundamental to continuing and increasing the effectiveness of habitat and species management.

Education on the nature of, threats to and sustainable use of foreshore species and habitats is an ongoing component of the management plan.

management context

The management framework is a non-statutory cooperative framework including the full range of interests that use, affect or manage the Derwent Estuary. Membership includes the Tasmanian State Government, six local governments, four major industry groups, peak environmental/conservation bodies and community groups. The partnership operates through the Derwent Estuary Program, which was established in 1999 with the mission of working together to understand the Derwent Estuary system, to take action to progressively enhance and protect the estuary's values, and to inform and involve the community in this process.

The vision for the program is an estuary with a healthy and diverse ecosystem that supports a wide range of recreational and commercial uses and is a source of community pride and enjoyment.

The initial five year Environment Management Plan was prepared in 2001 drawing upon a 1997 report on the state of the Derwent estuary and on work already in train as a result of that report. The approach in development of the Plan was that it should be pragmatic in seeking to establish a balance of environmental, social and economic outcomes; adaptive and evolving on the basis of the best available information; guided by regular reporting in relation to environmental indicators and targets; and financially sustainable.

The 2001 Environment Management Plan envisaged a five year review which is currently being finalised.

A core element of the Plan is a coordinated monitoring and information program which monitors 29 beach stations, 26 ambient water stations and the outputs of 10 sewage treatment plants and two industrial waste treatment plants. The results of the monitoring program and of actions to address marine pollution in the Derwent Estuary are reported in annual *State of the Derwent Report Cards*.

Monitoring is a core element of the program. It is essential to measure the achievements of the management plan against performance objectives and to determine the overall effectiveness of the management regime in achieving the longer term vision of the Derwent as an estuary with a healthy and diverse ecosystem that supports a wide range of recreational and commercial uses and is a source of community pride and enjoyment.