

# Teamwork needed from inland to coast



Human activities have modified natural environments from inland to the sea. The cumulative effects of these changes are degrading coastal habitats, particularly those near major human settlements.

Poor water quality and a lack of management coordination are highlighted in Chapter 8 of *Australia: State of the Environment 1996* as key issues affecting Australia's marine and coastal regions. Soil erosion, fertiliser use, intensive animal production and sewage and other urban and industrial discharges have increased nutrient and sediment levels in many bays and estuaries, the report says.

Intense pollution resulting from human activities is degrading coastal habitats including saltmarshes, mangroves and temperate seagrass beds, particularly near major population centres. Australia's coral reefs are also exposed to significant pressures. Other signs of deterioration include the rising incidence of algal blooms, an increasing number of introduced species and a reduction in fish stocks.

Each year, Australia's sewerage systems discharge about 10 000 tonnes of phosphorus and 100 000 tonnes of nitrogen, much of which enters the sea. But even greater quantities of nutrients (possibly 85%) come from

diffuse catchment sources which are difficult to regulate. Between Palm Beach and Cronulla in Sydney, 200 large stormwater outlets discharge water containing high levels of pollutants such as sediments, bacteria, nutrients, trace metals and organic chemicals.

Scientists estimate that, in Queensland, the amounts of sediment, nitrogen and phosphorus entering the sea each year have increased three to fivefold since European settlement. The rivers of Queensland's east coast catchments are estimated to deliver about 14 million tonnes of sediment to estuaries and coastal marine waters annually.

A particularly serious problem is the loss of seagrass beds, with more than 1600 square kilometres (about 3% of the total known area of Australian seagrass) lost in recent decades around the coast. Much of this loss is attributed to floods and cyclones and human changes such as elevated nutrient levels, run-off, dredging and reclamation.

Seagrass beds are critical habitats for turtles and dugong, as well as being important nursery areas for commercial and recreational fisheries. Prospects for recovery are poor as there is no record of temperate seagrass recovering on reasonable timescales.

The marine environment is also threatened by algal blooms and introduced species. Annual blooms on the Port River Estuary, near Adelaide, have poisoned mussels and massive blue-green blooms in Western Australia's Peel-Harvey estuary affect fish and crab populations.

At least 55 species of fish and invertebrates, plus several seaweeds have been introduced, either intentionally for aquaculture or accidentally in ships' ballast water or encrusted on their hulls. Toxic marine algae threaten fisheries in Victoria and Tasmania, and concern is growing at the spread of the Northern Pacific seastar, a hazard to scallop and abalone fisheries, aquaculture farms and marine life in general. A national Centre for Research in Introduced Marine Pests has been established at CSIRO's Marine Laboratories in Hobart to research early warning tools, better prediction, improved control methods and effective assessment of risk and costs.

Over-exploitation has put several fish species at risk,

## Lists and treaties

HAVE you ever wondered how many international treaties relating to the environment, conservation and heritage Australia is party to? Well, if you'd like to count them try Appendix 1 of *Australia: State of the Environment 1996*.

More than 60 multilateral and bilateral treaties are listed in the appendix, dating back to the 1924 International Agreement for the Creation at Paris of an International Office for Dealing with Contagious Diseases of Animals.

Other treaties cover topics such as whaling, plant protection, cultural property, Antarctica, nuclear weapons testing, space exploration, oil pollution, wetlands, ozone depletion, fisheries, climate change and hazardous waste.

Appendix 2 of the report lists plant and animal species in Australia which are recognised in the Commonwealth's Endangered Species Protection Act 1992 (Schedule 1), and those being considered for listing as endangered, vulnerable, or presumed extinct. The report also contains a subject index, an executive summary, a list of acronyms and a comprehensive glossary.



reducing breeding stock to dangerously low levels. Species affected include the southern bluefin tuna, eastern gemfish, orange roughy and coral trout. Regional populations of loggerhead turtles are threatened and barramundi stocks in northern Australia are seriously depleted.

Although Australia has a large number of marine protected areas, (more than 300 in 1992) most of those in the southern and eastern half of the continent are small and many environments and bioregions are not adequately represented. This issue is being addressed under the national Ocean Rescue 2000 program.

*Australia: State of the Environment 1996* reports that an increasing awareness of the pressures on our estuaries and seas has resulted in a range of management responses to prevent, contain and reduce degradation. But the management of our marine and coastal system still lacks an integrated and coordinated framework built on a set of ecosystem-based goals and environmental performance indicators.

'Apart from the Great Barrier Reef Marine Park Authority, no agency is responsible for managing the marine environment on such a basis,' the report says. 'We do not have the long-term research and monitoring to provide information at a national level, and research and

CSIRO Fisheries



Over-fishing of species such as gemfish and the southern bluefin tuna has reduced breeding stock to dangerous low levels in Australian waters.

management are yet to be fully integrated as a basis for sustainable use of coastal and marine resources.'

The report call for an integrated approach to management which encompasses the chain of events from land use in catchments through to the coastal zone to tackle serious environmental problems from inland waters to the sea.

## Two fish, one fish

OVER-EXPLOITATION of some of Australia's most important commercial fish species has reduced breeding stocks to dangerously low levels. Management responses aimed at addressing these declines are outlined in Chapter 8 of *Australia: State of the Environment 1996*.

Barramundi stocks in northern Australia, are seriously depleted. Their numbers are highly variable and appear to be strongly influenced by the amount of rain in the wet season. Environmental factors such as these are being accounted for in management strategies.

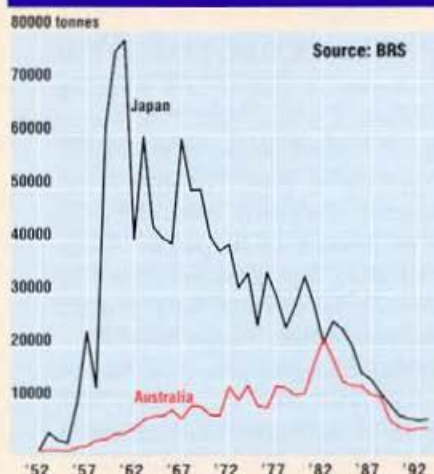
In the Northern Territory, commercial barramundi fishing has been drastically reduced under a scheme where fishers are charged a levy to compensate those leaving the fishery. For recreational fishers, the time allowed for fishing is controlled and bag limits have been set. In Queensland, protection strategies have included closed seasons, size limits, limited licensing, gear restrictions, and education to increase public awareness.

Past uncontrolled fishing of the southern bluefin tuna is estimated to have reduced breeding stock to less than 10% of the original. Catch controls over the past 20 years have been used in efforts to increase breeding stock to early 1980s levels, but it is hard to tell whether this slowly maturing species is recovering. A cooperative approach to managing the southern bluefin fishery between Australia, Japan and New Zealand has been formalised with the Convention for the Conservation of Southern Bluefin Tuna.

The biomass of the adult population of eastern gemfish is at a dangerously low level and the total allowable catch has been set at zero since 1993. However, about 267 tonnes in 1993 and 134 tonnes in 1994 were taken as by-catch during fishing for other species.

Fishing of orange roughy began in the mid 1980s. Catches rapidly increased each year until 1990, when 44 000 tonnes were taken in the south east trawl fishery. Research indicated that the breeding stock had been reduced to 30% of its original level. Authorities are acting to reduce the catch to a target of 3 500 tonnes for 1998 and beyond, in an effort to maintain the spawning stock at the present level.

Annual catch of southern bluefin tuna



Annual catch of gemfish

