Managing the coast

Some 85% of Australians live within cooee of the coast, so it's not surprising that the 'coastal zone' is home to many of Australia's environmental woes.

Most of our major cities are there, and they have contributed the expected range of problems including water pollution from sewage and industrial waste and the destruction of estuarine fish breeding sites. Conflicts between development and conservation crop up regularly as residential and tourist pressures grow.

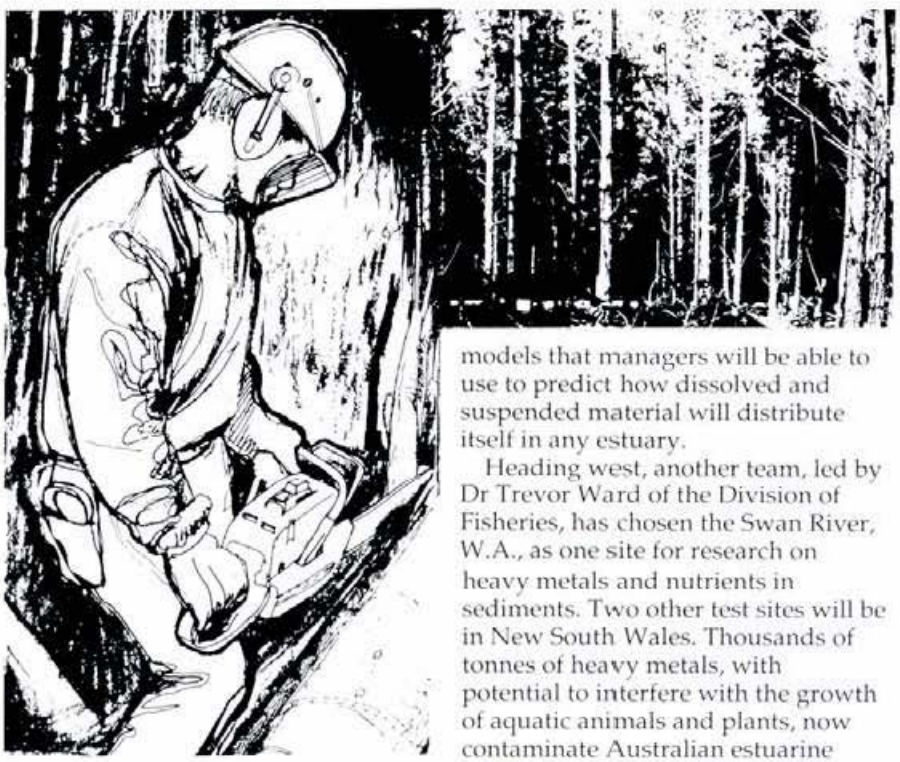
And the problems are not confined to heavily populated areas. In the far north of Queensland, for example, a dramatic example of the damage that inappropriate land use can do to the neighbouring marine environment has unfolded in recent years.

Australia's second-largest river system (in terms of water flow), the Mitchell, flows through Cape York into the Gulf of Carpentaria. Large-scale land-clearing and an expansion of grazing have seen run-off increase and sediment levels rise. In addition, chemicals used to defoliate trees have found their way into the river and the Gulf.

The result has been a rapid decline in fish and prawn populations. The local fishing industry, Aboriginal communities and landholders have instituted a process of consultation and monitoring to try to ensure the survival of both the area's marine environment and the local agricultural industry.

In recognition of the scale and urgency of the problems needing solutions, CSIRO in 1990 nominated the coastal zone — broadly the area of land that affects the nearby sea and the part of the sea that affects the land — as a national research priority area. Now a $2-million-a-year Coastal Zone Project, running initially for 3 years and bringing together research groups from seven CSIRO Divisions, has been launched. Its general aim is to contribute information and techniques that will lead to better management of the areas at risk.

According to the project's co-ordinator, Dr John Finnigan of the Centre for Environmental Mechanics, the broad aim of the project is to 'develop a better understanding of how various elements of the coastal



zone work, and especially how they interact. We plan to put this knowledge into a "user-friendly" form usable by environmental managers after it has been scientifically verified.'

One research team, led by Dr Keith Smettem of the Division of Soils, will be examining the effects of different land use practices on the quantities and types of nutrients that find their way into estuaries. A practical outcome should be a decision-support system that will show managers in advance what effects different types of development will have.

Much of this research will focus on tropical northern Queensland, where large areas of rainforest have been cleared to make way for agriculture. Nutrients from this intensive agriculture end up in rivers, posing the question: what effects will they have on the rivers and, out at sea, on the Great Barrier Reef?

An important estuary at the other end of Australia, Tasmania's Derwent River, will be the initial testbed for another line of research — on the distribution of various chemicals, both natural and introduced, in estuaries. The aim of the project, led by Dr Dennis Mackey of the Division of Oceanography, is to gather information needed to develop models that managers will be able to use to predict how dissolved and suspended material will distribute itself in any estuary.

Heading west, another team, led by Dr Trevor Ward of the Division of Fisheries, has chosen the Swan River, W.A., as one site for research on heavy metals and nutrients in sediments. Two other test sites will be in New South Wales. Thousands of tonnes of heavy metals, with potential to interfere with the growth of aquatic animals and plants, now contaminate Australian estuarine sediments. For full assessment of their biological effects, much more information is needed on how both nutrients and heavy metals are transported, and how they are stored in and released from sediments.

An important research goal is to identify 'biological indicators', such as seagrass and plankton species, that can act as an early warning system for excess nutrient levels that may lead to algal blooms and eutrophication.

To help ensure that the research results find their way into the decision-making process, Dr Doug Cocks and colleagues at the Division of Wildlife and Ecology plan to develop a computer-based information system, called CAMRIS (Coastal and Marine Resources Information System), that will tie in with various other Australian geographic information systems. This is intended to provide a comprehensive view of what is in the coastal zone, on land and at sea.

The coastal zone project researchers will be collaborating with State and federal agencies to ensure that their investigations target the real needs of coastal managers. They will also be collaborating with university and Australian Institute of Marine Science researchers in much of the work.