

Conclusions

Key findings

When compared with much of the world, Australia's coasts and oceans are in relatively good condition. However, the condition of inshore waters varies. While there are many areas that are largely in good condition, areas near human settlements have been affected, sometimes severely.

Although there is a consistency between the findings of the 1996 State of the Environment Report and those of this report, many important initiatives have started in this five-year period that will continue to have a positive effect in future years.

Substantial progress has been made in addressing the introduction of marine pests, upgrading sewage treatment plants, reusing treated wastewater, treating and reusing stormwater, and implementing measures to achieve sustainability in commercial fisheries and protecting marine biodiversity.

State of the coastal and marine environment

Our knowledge of the marine environment remains limited, particularly for areas remote from population centres and for the deep-sea environment and continental shelf. Progress is being made, however, with the mapping of the extended continental shelf.

Much existing information is scattered and in many cases is not collected in a consistent manner. It is still not possible, for example, to assess the loss of important habitat areas such as seagrass, mangrove or saltmarsh on a continental scale.

The quality of estuarine coastal and inshore waters has not improved over the past five years on a national basis. Water quality has improved in specific localities and regions, such as coastal waters off Sydney. Diffuse agricultural runoff and stormwater runoff significantly affects inshore waters. The management of disturbed coastal acid sulfate soils has been recognised as an important issue.

Understanding the sources of nutrients and how they behave in coastal waters has improved over the last five years. However, the overall loads of nutrients discharged into the coastal environment appear to be increasing.

More than half of Australia's estuaries are modified and are not in good condition, as a result of the pressures caused by human settlements. Fragmentation of responsibilities for estuary management is delaying improvements to the condition of estuaries.

Coastal and marine species have been subject to pressures, including loss of habitat and the effects of fishing activities. Measures to reduce the mortality rates of threatened species such as albatrosses and turtles have been implemented in the past two years and should result in fewer deaths in the future.

Pressure for coastal development, including the expansion of human settlements and tourism, has resulted in further modification of coastal habitat in the past five years. In some coastal areas of Australia, there is no unmodified coastal environment remaining.

Management of the coastal and marine environments

The development of Australia's Oceans Policy has been a major response to the fragmentation of marine management responsibilities. Progress is being made on the first of 12 intended Regional Marine Plans.

Coordinating bodies such as Coastal Councils are beginning to integrate the efforts of the various agencies and communities involved in coastal management. However, Indigenous peoples are currently finding it very difficult to participate fully in coastal and ocean discussion processes.

Funding from the Natural Heritage Trust since 1997 for coastal and marine environment issues has been substantial and has acted as a catalyst for many practical improvements to coastal environments by a wide range of stakeholders.

The establishment of Marine Protected Areas to conserve marine biodiversity has progressed. Ten Marine Protected Areas have been declared since 1996 by State, Territory and Commonwealth governments.

Although the overall catch from commercial fisheries over the last five years is similar, there have been large variations in individual fisheries. Some species that were heavily fished in the 1970s and 1980s have still not recovered.

It is difficult to assess the state of Australia's commercial fisheries. There are some sustainably managed fisheries, including one now internationally recognised by independent audit, but they are in the minority. Recent legislative amendments to ensure fisheries are managed on a sustainable basis in the future have been enacted by the Commonwealth.

The management of bycatch is now being addressed by the industry and governments.

Aquaculture is one of Australia's fastest-growing primary industries. Its expansion may increase competition in the coastal zone for access to suitable sites. The environmental effects of aquaculture activities are not yet fully understood and there are many ecological challenges to be addressed.

Risks to the marine and coastal environments

The susceptibility of Australian waters to the introduction of exotic marine species is significantly higher than previously thought. Australia has a well developed strategic approach to managing ballast water. However, hull fouling is now recognised as an important source of introduced marine pests and should be given a similar priority. There have been a number of infestations discovered in Australia in the last five years and contrary to earlier opinion, there are threats to tropical habitats as well as temperate ones.

There are risks to the economic viability of the \$2.3 billion commercial fishing industry if we cannot manage the sustainable use of the marine ecosystems from which the fish are caught. The tendency in the past has been to discount the ecosystem risks or uncertainties because of economic pressures.

There are both economic and environmental risks from the contamination of seafood by pollution. Seafood quality is generally good. There have been only a few occurrences of sewage pollution affecting seafood quality with significant human health and economic consequences.

Shipping and offshore oil and gas operations have relatively good management systems in place, but need continual assessment and improvements to ensure the minimisation of risks.

Emerging issues

- The future development of aquaculture, with all its ramifications, particularly sea cages, ranching, and associated effects.
- The potential for the occurrence of coral bleaching and associated indirect effects to occur as a result of climate variability and change.
- The continuing development of fishing technology, particularly cheap spatial location and deep-water fishing gear.
- The emerging recognition of the ecological effects of invasive species in both temperate and tropical habitats.
- The continuation, despite public recognition, of weak attempts at integration of management.
- The effects on coastal structures and infrastructure from sea level and other potential climate changes.
- The lack of knowledge about the continental shelf and slopes of the EEZ, which creates a limited set of values.
- Tourism in the Antarctic, as tourist numbers have doubled over the past eight years and tourist activities continue to diversify.
- The involvement of Indigenous people in fisheries management issues across Australia. Indigenous involvement in marine resource management will require knowledge exchange, capacity building and communication. Regional Marine Plan boundaries do not mesh with Indigenous cultural boundaries, for example.

Key implications

In Australia there has been a big emphasis on the management of land and the value of agriculture to our economy and our communities. There has been less emphasis on the value of wetlands, estuaries and other coastal environments. The issue to be addressed is the balance to be achieved between the value of the land and the value of the coastal environment. A whole-of-catchment approach to resource management is worth pursuing. The danger is that the issue will become so hard that all the stakeholders—managers, community, Indigenous people and industries—will retreat from a systemic view.

Marine management should in the future look at the pressures and people's interactions with the environment, rather than strictly the management of the resource.

The quality of coastal and marine water is vitally dependent on land management practices and activities in the catchments. As point-source pollution is being tackled, the management of diffuse sources of pollution will become of greater importance.

The competition to use coastal and marine space will intensify. There may be competing environmental values in progressing alternative energy systems such as tidal power in coastal areas. Without a full account of environmental and economic values for any proposal, irreversible environmental changes may occur.

Glossary

- aggregating behaviour** The concentration of fish for unknown reasons or direct causes such as the concentration of food organisms, or for spawning.
- anthropogenic** Caused by human activity.
- Australia's Marine Area** The area of sea or seabed for which Australia has jurisdiction and/or rights under the Law of the Sea Convention. It includes the Exclusive Economic Zone and continental shelf off the Australian mainland.
- barrens** An area of (usually) rocky reef without vegetation, caused by excessive grazing.
- benthic** The organisms or environment of the seabed, for example plants and animals living on or in the sub-sea sediment.
- benthos** Organisms living on or in association with the seafloor.
- bioaccumulation** The accumulation of a chemical in plant or animal tissue at concentrations higher than in the surrounding water.
- biocide** A chemical which kills animals and plants.
- biodiversity** The variety of all native life-forms: the different plants, animals and micro-organisms, the genes they contain and the ecosystems they form; often considered at three levels: genetic diversity, species diversity and ecosystem diversity.
- biogeochemical** The movement of chemical elements between organisms and non-living compartments of atmosphere, aquatic systems and soils.
- biota** All living organisms of a region.
- broodstock** Specimen or species, either as eggs, juveniles, or adults, from which a first or subsequent generation may be produced in captivity, whether for growing as aquaculture or for release to the wild for stock enhancement.
- bryozoans** Marine animals commonly known as moss animals, sea mats or (for some forms) lace coral. The majority of living bryozoans are encrusting, forming flat sheets that spread out over the substrate but others grow upwards into the water column.
- bycatch (or incidental capture)** The catch of species other than those targeted by fishing activity.
- cephalopods** molluscs characterised by a distinct head with arms or tentacles attached to it, e.g. cuttlefish.
- cetaceans** Members of the mammalian group Cetacea, including whales, dolphins and porpoises.
- crustacea** A class of arthropods, which have gills and bodies covered by a hard shell (e.g. crabs, lobsters, shrimps).
- demersal** Living on or near the bottom of the sea.
- denitrification** The process by which nitrogen, which would otherwise be available to plants, is converted to a gaseous form and lost from the soil or water column.
- dinoflagellates** A group of single-celled algae.
- echinoderms** A member of the class Echinodermata comprising sea urchins and sea cucumbers. The skin of the typical species is covered with spines.
- ecosystem** A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.
- ecosystem services** The role played by organisms and environmental processes in creating a healthy environment for human beings, from production of oxygen to soil formation and maintenance of water quality.
- El Niño** An extensive warming of the central and eastern Pacific that leads to a major shift in weather patterns across the Pacific. In Australia (particularly eastern Australia), El Niño events are associated with an increased probability of drier conditions.
- endemism** species found only in a particular region, e.g. a species endemic to South Australia is not found anywhere else.
- enterococci** An indicator organism used to assess the presence of human pollution (as distinct from animal pollution) in waterways or the sea.
- epifauna** invertebrates that attach themselves to rocky reefs or to the seafloor. They include hydroids, sea-pens, small bryozoans and sponges.
- erosion** The removal of a fairly uniform layer of soil from the land surface by raindrop splash and/or runoff.

- eutrophication** Excessive nutrients which causes high plant growth. Often resulting in nuisance algal blooms, turbid waters and subsequent decay and decomposition of the plants.
- faecal coliform** The portion of the coliform bacteria group which is present in the intestinal tracts and faeces of warm-blooded animals. A common pollutant in water.
- fishing effort** The amount of fishing gear of a specific type used on the fishing grounds over a given unit of time, e.g. the number of hauls of a beach seine net per day.
- formation water (or production water)** Water produced together with oil from the oil-bearing strata in oil wells. Usually underlies the oil in geological formations and is produced in increasing quantities as the oil is depleted.
- heavy metals** Metallic elements with relatively high atomic weights such as lead, cadmium, arsenic and mercury. Generally toxic in relatively low concentrations to plant and animal life.
- hydrocarbons** Organic molecules containing hydrogen and carbon, the major components of petroleum.
- hydroids** Small invertebrates whose colonies can take many growth forms including flower-like, tree-like or feathery. Hydroids are best represented in cool temperate southern Australian seas.
- imposex** The imposition of male characteristics on female organisms, as caused by some pollutants.
- infrastructure** The built systems of, for example, water supply, wastewater treatment, drainage, airports, roads and ports.
- invertebrates** Animals without internal skeletal structure.
- leachate** A soluble substance that is washed out of the soil.
- Lynghya*** A toxic marine cyanobacterium (blue-green algae) that appears to tolerate a wide range of salinity.
- macroalgae** Large algae, e.g. kelp.
- mariculture** Fish farming or aquaculture of marine animals or plants.
- middens** Very old rubbish pits of former inhabitants of an area, usually Indigenous.
- nutrients** Substances required for the growth of plants, e.g. nitrogen and phosphorus.
- organochlorines** Complex organic molecules with chlorine atoms attached (e.g. pesticides).
- organotin** Highly toxic chemicals comprising tin combined with organic molecules, used in antifouling paints such as tributyl tin.
- pathogens** An organism that can produce disease.
- pelagic** Associated with the open sea, particularly the surface or middle depths of the water column, e.g. fish swimming freely in the open sea.
- phytoplankton** Small plants that are suspended in water and free-drifting.
- pollutants** A substance in excess in an ecosystem or not belonging to an ecosystem.
- polychaete worms** A class of segmented worms with several seta (bristles) per segment. Very widespread in the marine environment.
- ppb** parts per billion.
- Ramsar Convention** The Convention on Wetlands, signed in Ramsar, Iran, in 1971, providing the framework for the conservation and wise use of wetlands and their resources.
- sessile** Organisms fixed in one position to a substrate.
- substrate** A surface on which organisms live or a substance serving a biochemical reaction.
- syngnathids** A family of fish including the seahorses and pipefish.
- taxa** The named classification unit to which individuals or sets of species are assigned, such as species, genus and order.
- temperate zone** The zone where the temperatures are mild.
- threatened species** A species of plant or animal threatened with extinction either locally or globally, without defining its formal status as to the degree of threat.
- toxicant** A substance that could cause adverse effects in a living organism.
- upwelling** The phenomenon of deep water rising to the surface, usually bringing nutrients which can increase productivity.
- vulnerable species** A species of plant or animal vulnerable to extinction, but carrying a lower level of concern than 'endangered'.

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