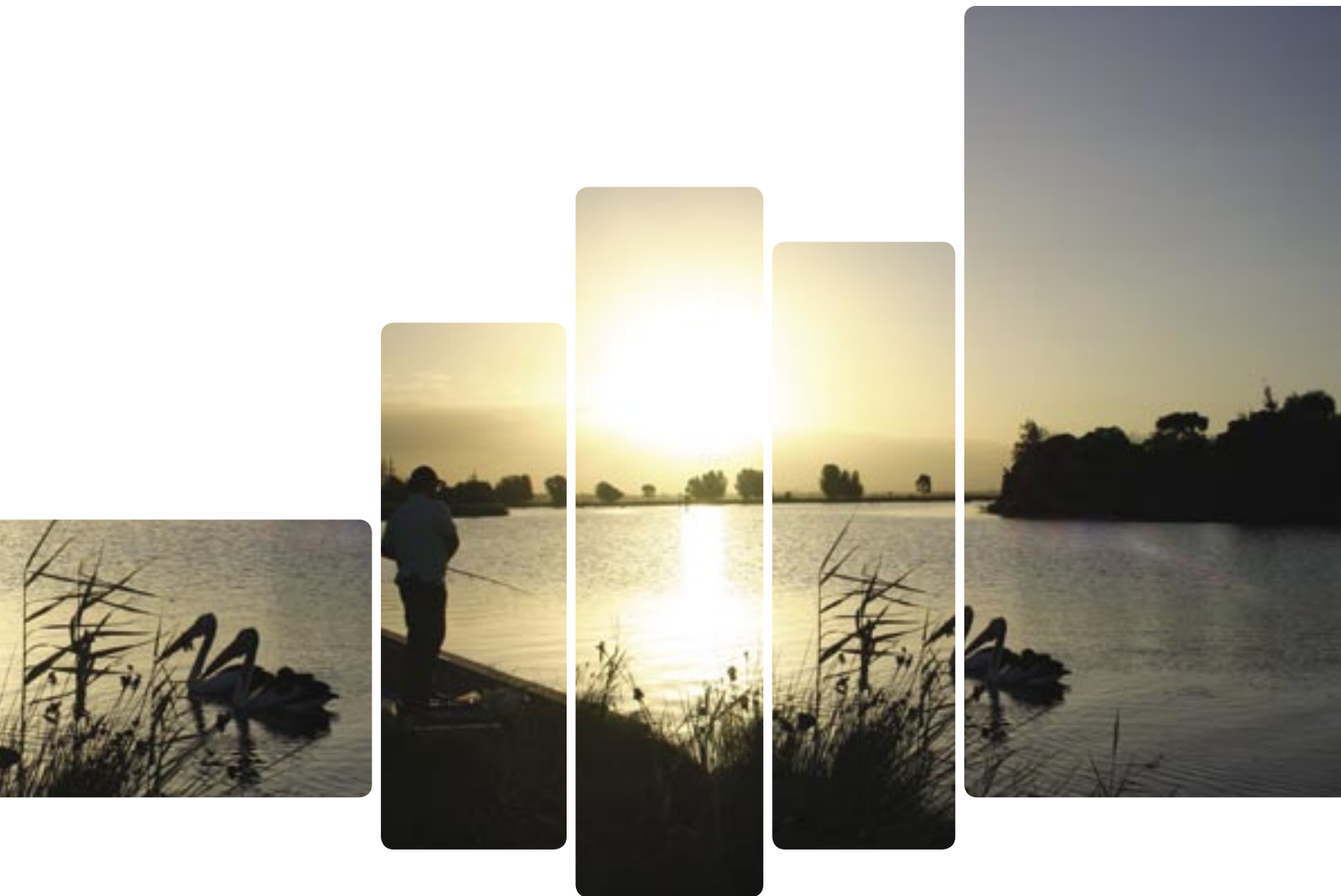


NATURAL RESOURCE MANAGEMENT MINISTERIAL COUNCIL

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

October 2006



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

Natural Resource Management Ministerial Council

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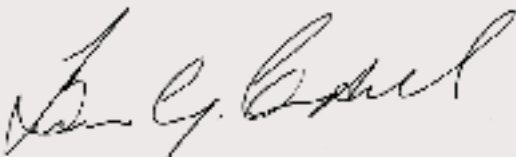
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All Australians are connected to the coast in one way or another. Many of us live and work on the coast, while many holiday on beaches, estuaries and harbours that are the envy of the world. Even inland communities are connected to the coastal zone by the river systems that meander from their farms, towns and cities to the coast. Australia's connections with the coast are not only geographical, but economic, emotional and spiritual. The richness and diversity of Australia's coastal zone is an integral part of the Australian culture and its wise use is an issue of national significance.

Australian, State, Territory and Local Governments are working cooperatively through the 2006 *National Cooperative Approach to Integrated Coastal Zone Management (ICZM)* to protect the 36,000 kilometres of Australia's coastal zone. This cooperative approach seeks to ensure effective and complementary arrangements within and across jurisdictions. It highlights the catchment-coast-ocean continuum and the need to encourage ecologically sustainable development by securing adequate flows of freshwater to the coastal zone and minimising land-based sources of pollution.

Australia's National Programme of Action for the Protection of the Marine Environment from Land-based Activities builds on the *National Cooperative Approach to ICZM* and illustrates the specific activities of Australian governments to address land-based sources of pollution. The many laws, policies, strategies and on-the-ground activities comprise an extensive programme that reflects Australia's diversity and constitutional structure.

Much is being done in Australia to ensure our connection with the coast remains productive and rewarding. The outlook is at once positive and challenging. We must remain vigilant in our efforts to reduce the impact of land-based activities on the coastal and marine environment and look for new ways to involve all spheres of government, local communities and industry. It is a challenge for all Australians.



Ian Campbell
Minister for the Environment and Heritage
Australian Government

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one

introduction





introduction

On a global scale, approximately 80 per cent of marine pollution arises from land-based activities such as urban development, agriculture, manufacture, transport, energy production and day-to-day domestic activity. Types of pollution include litter and oils, municipal wastewater, nutrients and sediments, radioactive waste, heavy metals and persistent organic pollutants. Once in the marine environment, the pollutants are absorbed by marine life, settle in river mouths and on the ocean floor, or follow currents and eddies to distant locations. The pollutants pay no attention to national maritime boundaries or the sensitivity of the ecosystems they impact upon.

When pollution levels rise to unsustainable levels the impact is felt not only by living marine ecosystems but by the economic sectors dependent on them. These can include the tourism, fisheries, hospitality and transport sectors. Public health can also be affected, as can foreshore protection, aesthetics and public amenity.

Under the *United Nations Convention on the Law of the Sea* (UNCLOS) parties have a responsibility to protect the marine environment from land-based activities. In 1995 the international community agreed to the non-binding Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) and reaffirmed its commitment in this regard at the 2001 Intergovernmental Review of the GPA. Further information on the GPA can be obtained at <http://www.gpa.unep.org>.

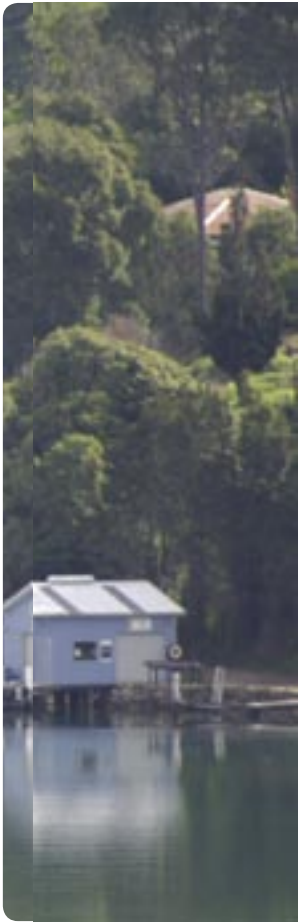
Under the GPA, governments are invited to develop National Programmes of Action for the Protection of the Marine Environment from Land-based Activities (NPA). NPAs are intended to be long-term iterative processes that are action oriented and contribute to national sustainable development strategies. Varying legal and social frameworks mean that NPAs must respond to the uniquely specific circumstances and priorities of each country.

In May 2004, Australia joined with the United Nations Environment Programme (UNEP) to host the Global H₂O: Hilltops-2-Oceans Partnership Conference in Cairns. The conference drew on international experiences in developing and implementing NPAs and highlighted the need to foster collaborative partnerships between government, water resource managers, local and indigenous communities, industry, the private sector and research bodies. The conference concluded that governments should avoid the tendency to treat various policy instruments as alternatives to one another rather than as potentially complimentary mechanisms.

Australia's NPA builds on the concepts outlined in the GPA, the outcomes of the H₂O conference and the 2006 *Framework and Implementation Plan for a National Cooperative Approach to Integrated Coastal Zone Management* (ICZM). It documents the range of actions, recently completed or underway, which constitute Australia's NPA. It highlights the activities of Australian, state and territory governments, and through case studies, a sample of activities undertaken by local government, industry and other non-government organisations. It is by no means exhaustive.

two

the challenge for australia





the challenge for australia

Australia's coastal zone is approximately 36,000 kilometres long and borders the Pacific, Indian and Southern Oceans as well as the Timor Sea, Arafura Sea and Torres Strait. The marine environment includes climatic zones from the tropical north to temperate in the south with some external territories within the polar zone.

More than 86 per cent of the Australian population now live within 50 kilometres of the coast and many millions of Australian and international tourists visit coastal areas regularly. For most of the time since European settlement, the majority of the Australian population was concentrated in coastal capital cities. Now about a quarter of Australia's population lives on the coast outside capital cities where population growth is currently 60 per cent above the national average (see **Figure 1**).

Figure 1: Australian Jurisdictions and Major Population Centres



While Australia's coasts and oceans are in relatively good condition, the condition of the inshore waters varies considerably, particularly in areas near human settlement (SoE 2001). These trends are placing greater pressure on coastal resources, both built and natural.

Australia's long and diverse coastline, coupled with its federal system of government, means that no one jurisdiction is responsible for protecting coastal and marine waters from land-based sources of pollution. Balancing economic, environmental and social needs and aspirations to achieve desired outcomes presents a significant challenge requiring national cooperation.

the challenge for australia



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catchment degradation

On a national scale, nutrients originating from diffuse catchment sources account for an estimated 85 per cent of total nutrient loading to the coastal zone. While algal blooms are a natural phenomenon they are more common and affect more areas today than several decades ago (Cosser 1997).

For example, the majority of the Western Port catchment in Victoria's south is used for irrigated pasture and intensive horticulture. Drains have been constructed and mangroves removed to reclaim land for farming. As a result, increased sedimentation and high turbidity along with inputs of nutrients, herbicides and pesticides has been associated with a loss of 70 per cent of seagrass cover in Western Port since the 1970s (Turner et al. 2004).

The Peel-Harvey estuary catchment has been extensively cleared and wetlands drained for agriculture and flood mitigation. In addition there has been a rapid urban expansion. This has resulted in increased nutrient transport from the catchment and a decrease in the capacity of the wetlands to filter pollutants causing deleterious effects on the water quality of these Ramsar wetlands.

In Queensland grazing land development has resulted in extensive clearing of vegetation, causing widespread soil erosion and nutrient transport into the Great Barrier Reef World Heritage Area. Increased sediment and nutrient loads are impacting on some of the inner reefs (Anon 2003). It is estimated that 23,000,000 tonnes of sediment, 77,000 tonnes of nitrogen and 11,000 tonnes of phosphorus are exported to the inshore coastal waters of the Great Barrier Reef annually. Sediment and nutrient delivery to Great Barrier Reef waters from terrestrial discharge has increased by four times in the 130 years since European settlement of the adjacent coast (Wachenfeld et al. 1998).



the challenge for australia

coastal development

A wide variety of pollutants may be transported into waterways. Artificial drainage systems transport surface runoff from roofs, roads, car parks, verges, construction sites and other urban areas. Household, commercial and industrial drainage waters from coastal development pose a significant risk to the marine environment.

South-east Queensland (SEQ) has one of the fastest growing populations in Australia, increasing by 2.9 per cent per annum. It is estimated only 25 per cent of the original catchment vegetation remains. Around Moreton Bay 1200 hectares of mangroves and 600 hectares of salt marsh were lost between 1974 and 1987. Water quality has declined in the Brisbane River with nitrate and phosphate loads increasing 22 fold and 11 fold respectively since 1950. Sediment loads have increased four fold since 1918 (Healthy Waterways 2001). Poor water quality has resulted in coral and seagrass loss in several areas as well as increased growth of macroalgae and occasional algal blooms (Turner et al. 2004).

On the Swan Coastal Plain in Western Australia, between 1996 and 2004, 2217 hectares in total of high conservation wetlands were lost due to urban development and many remaining wetlands are in poor condition (EPA 2006). This reduces the natural systems ability to assimilate pollutants before they reach the marine environment.

The Great Barrier Reef region experienced a 40 fold increase in the number of tourists visiting the area between 1946 and 1980, and significant growth has continued since that time (Cosser 1997). The economy of many small coastal communities relies on the holiday season. Ensuring that coastal infrastructure can support visitation rates during peak holiday periods is a significant challenge for many local governments.

Sewage treatment plants often discharge waste water, treated to varying degrees, into relatively enclosed, poorly flushed coastal waters. Sydney Water and Western Australia's Water Corporation have constructed deep ocean outfalls to discharge large volumes of waste to areas where currents dilute and disperse the pollutants. While this has reduced the visible effects of water pollution for coastal inhabitants, the long-term environmental impacts from this practice are yet to be determined (SoE 2001).



the challenge for australia



industrial development

Industrial development has concentrated on the coastline, due to access to transport infrastructure and port facilities. The Derwent Estuary, in Tasmania, is impacted by high levels of zinc, mercury, lead, cadmium and copper as a result of historical industrial discharges over the past 90 years (Turner et al. 2004). Shellfish collected from most areas of the Derwent are well in excess of guidelines for human consumption (zinc in oysters and lead in mussels). Mercury levels in flathead are very close to the limit (Coughanowr 2006).

In Cockburn Sound, Western Australia, industrial development of the adjacent coast and increase in inputs of industrial wastewater during the 1950s and 1960s resulted in a decrease in the coverage of seagrasses from 2930 hectares in 1967 to 660 hectares in 1999. This represents a decrease of seagrass coverage in the shallow areas of Cockburn Sound (less than 10 metres deep) from 80 per cent to 18 per cent (DAL Science and Engineering 2002).

Between 1949 and 1976 Homebush Bay, New South Wales, was used as a dumping ground for the deadly poison dioxin produced at a nearby chemical factory and waste was buried in landfills or held above ground in drums. The dioxin leached into the waters of Homebush Bay on the Parramatta River which drains to Sydney Harbour. Commercial fishers were banned from fishing in the Harbour on 24 January 2006 after scientific tests on bream revealed high levels of dioxin. The Harbour was shut to prawn fishing on 3 December 2005. Homebush Bay has been closed to fishing since 1989.



the challenge for australia

habitat loss

The quality of receiving waters is intrinsically linked to catchment management. Terrestrial habitat loss generally leads to increased transport of pollutants from the land to waterways and the marine habitat. Removal of riparian vegetation, coastal habitat and modification of river flows reduces the natural ability of waterways to filter pollutants from the catchment.

Mangrove communities have important functions in providing habitat for the juvenile stages of many commercially important species of fish and crustaceans. They also trap nutrients and stabilise sediments against coastal erosion processes. Loss of mangroves in estuaries due to development pressures have led to bank erosion resulting in increased sedimentation and smothering of benthic organisms, and turbidity which has follow-on implications for other marine habitats. In many estuaries mangroves are being re-established in order to improve water quality and reduce erosion.

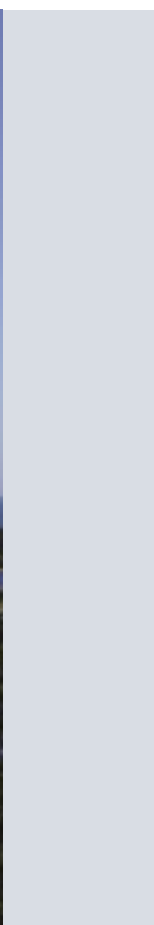
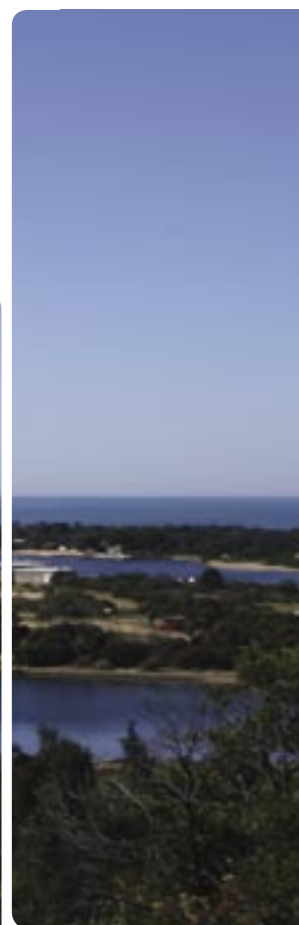
Studies of the factors contributing to seagrass decline have shown that increased human-inputs to the coastal zone often have a causal link with seagrass loss (Wachenfeld et al. 1998). In 1992, seagrass loss was also a major cause of death of dugongs in Hervey Bay, Queensland.

A comparison of historical photographs of the Great Barrier Reef with current conditions shows less coral cover now than in periods before 1960 on some fringing reef-flats. Near Mackay, in Far North Queensland, studies have found that increased run-off of nutrients and sediment from agricultural areas has stressed and killed inshore coral and there has been a change toward a more algal and seagrass dominated habitat (ABC 2006).



three

australia's actions to address land-based activities





australia's actions to address land-based activities



Australia's collective response to the challenges posed by land-based sources of marine pollution, endorsed by the Council of Australian Government's Natural Resource Management Ministerial Council¹, is summarised in this publication. The respective activities are categorised into those undertaken:

- At a national scale, that is as a cooperative effort by all Australian Governments;
- At a bilateral scale, that is involving two Australian jurisdictions;
- At a single jurisdiction scale, that is solely by the Australian Government, by respective states and the Northern Territory; or
- At a local government scale; or
- By non-government organisations and industry.

Some lessons learned and the elements of any good practice approach to managing land-based activities are also outlined. These elements provide pointers to the way forward for existing or evolving interventions.

This publication is accompanied by a CD of 24 case studies and an internet searchable database of 199 actions directed at protecting the marine environment from land-based activities (see www.deh.gov.au/coasts/pollution/npa/index.html). All of the information has been compiled by the Australian Government in collaboration with the states and the Northern Territory, and includes a number of non-government activities.

The NPA database is not intended to be comprehensive, but rather a snapshot of the key legislation, policies and programmes relevant to the GPA, to provide sufficient contact information – particularly websites – for gaining additional information. There are many other actions that contribute indirectly to protecting the marine environment, however, for the purpose of this NPA they are not included.

The types of pollution addressed by any action are identified in the NPA database.

¹ The Natural Resource Management Ministerial Council (NRMCMC) is the peak inter-governmental forum for consultation, coordination and, where appropriate, integration of action by governments on natural resource management issues. The agreed objective of the Council is "to promote the conservation and sustainable use of Australia's natural resources". The NRMCMC is comprised of Australian, State, Territory and New Zealand government ministers responsible for primary industries, natural resources, environment and water policy. Papua New Guinea and the Australian Local Government Association participate in meetings as observers. The NRMCMC is jointly chaired by the Australian Government Ministers responsible for Environment and Heritage, and Agriculture, Fisheries and Forestry. The Council is supported by the Natural Resource Management Standing Committee (NRMSC), membership of which comprises Departmental Heads/CEOs of relevant Australian, State, Territory and New Zealand government agencies.

australia's actions to address land-based activities

NATIONAL ACTIONS

national cooperative approach to integrated coastal zone management

In October 2003, the Natural Resource Management Ministerial Council (NRMMC) endorsed the *Framework for a National Cooperative Approach to Integrated Coastal Zone Management* (ICZM). The ICZM Framework addresses ecologically sustainable use and development issues affecting the coastal zone that benefit from a national approach.

An Implementation Plan for the Framework was jointly developed by all participating jurisdictions, endorsed through the NRMMC in April 2006. Sound progress is being made in implementing the Plan through cooperative efforts between all jurisdictions. Some commenced to date include:

- managing the impact of acid sulphate soils by finer scale mapping and developing tools and guidelines to improve development and rehabilitation;
- integrating population trends into coastal zone planning through targeted research into demographic trends and coordinating national research efforts; and
- improving our understanding of climate change impacts by assessing coastal vulnerability to climate change.

national water quality management strategy

The National Water Quality Management Strategy (NWQMS) is a response by Australian governments to growing community concern about the condition of the nation's water bodies and the need to manage them in an ecologically sustainable way. In 1994 the NWQMS was included in the Council of Australian Governments (COAG) Water Reform Framework, and included three major elements - policies, process and guidelines.

The NWQMS aims 'to protect and enhance the quality of water resources while maintaining economic and social development' by emphasising:

- the importance of ecologically sustainable development;
- integrated catchment management;
- best management practice, including the use of acceptable modern technology, waste minimisation and waste utilisation; and
- the role of economic measures, including applying the user pays and polluter pays principles.

The NWQMS consists of 21 guideline documents, which provide the principles for managing key elements of the water cycle. The aim of the guidelines is to help the community, catchment managers, environment protection agencies and water authorities protect water quality, including developing local action plans for water quality management. These guidelines cover:

- policies and processes to achieve water quality;
- fresh and marine water quality;
- monitoring and reporting guidelines;
- effluent and sewerage system management;
- urban water, stormwater and recycled water;
- groundwater protection; and
- drinking water guidelines.



australia's actions to address land-based activities

The process for implementing the NWQMS involves government working with the community to identify, protect and enhance environmental values of waters, which may include protection for ecosystem maintenance, water supply, agricultural purposes and cultural values. This involves development of management plans for catchments, aquifers, estuarine areas, coastal waters or other water bodies. Management of water resources is mainly a state and territory responsibility, and so implementation of the NWQMS requires implementation of state and territory water policies, guidelines and community consultation programmes.

A national example of NWQMS implementation is the *Coastal Catchments Initiative (CCI)*, which through preparation of Water Quality Improvement Plans, implements a catchment management based strategy for protecting water quality in coastal and urban 'hotspots'.

national pollutant inventory

The National Pollutant Inventory (NPI) is a publicly accessible database containing information on substance sources and emissions to the Australian environment. The NPI contains two types of data – emissions from facilities and diffuse emissions.

Industry facilities that exceed an NPI reporting threshold estimate substance emissions annually and report to the environmental agency in their state or territory. Diffuse data comes from smaller industries, mobile sources such as motor vehicles and aircraft, and everyday household activities such as solid fuel burning and lawn mowing. Diffuse sources are estimated less frequently by state and territory governments. The NPI reports on 90 substances identified as important because of their health and environmental effects. Substance emissions to air, land and water must be reported.

The main purpose of the NPI is to collect and publish information about emissions of substances to help environmental decision-making, to meet community right-to-know obligations and raise awareness of the need for cleaner production and waste minimisation.

Substance emissions to water include emissions from facilities as well as diffuse emissions. Diffuse emissions are estimated within defined water catchments and usually only include total nitrogen and total phosphorus. To date, 32 catchment studies have been completed for key urban and rural areas in Australia.

The top five substances reported to water by industry are nitrogen, ammonia (total), phosphorus, boron and compounds and manganese and related compounds. Sectors that are major emitters of these substances to water include: water, sewerage and drainage; metal ore mining; and basic chemical manufacturing.

The legislative framework underpinning the NPI is called the NPI National Environment Protection Measure (NPI NEPM), and was agreed to by the Australian, state and territory governments in 1998.

the natural heritage trust and the national action plan for salinity and water quality

The Natural Heritage Trust (the Trust) was established by the Australian Government in 1997 to help restore and conserve Australia's environment and natural resources. In 2002-03 the Australian Government extended the Trust for a further five years, including a commitment to improve Australia's water quality. By 2007-2008 the total Australian Government investment through the Trust will be \$3 billion.

The Trust is administered by a Ministerial Board comprising the Minister for the Environment and Heritage and the Minister for Agriculture, Fisheries and Forestry. There are also a number of organisations and committees which oversee and support the Trust, such as the *Natural Heritage Trust Advisory Committee*, which brings together some of Australia's most respected scientific and natural resource management experts, and the *Natural Resource Management Ministerial Council*, comprising of Ministerial representation from the Australian Government and each state and territory government.

australia's actions to address land-based activities

The Trust takes a long term, coordinated approach to tackling the major environmental challenges facing Australia. It does so by providing funding for environmental activities at the community, regional and national levels. Local investment is through the Australian Government Envirofund, which provides small amounts of funding to community-based groups to address local natural resource management issues. Regional investments are the principal delivery mechanism for the Trust, where investment is made on the basis of regional NRM plans accredited by the Australian and relevant state/territory government.

The Trust delivers important resource condition outcomes including improved water quality, reduced erosion, improved estuarine health, improved vegetation management and improved soil condition. The Australian Government in working with state and territory governments to deliver funding to these investment levels through four programs, which are:

- *Coastcare* - invests in activities that contribute to protecting coastal catchments, ecosystems and the marine environment;
- *Rivercare* - invests in activities that contribute to improved water quality and environmental conditions in river systems and wetlands;
- *Landcare* - invests in activities that contribute to reversing land degradation and promoting sustainable agriculture; and
- *Bushcare* - invests in activities that contribute to conserving and restoring habitat for the native flora and fauna which underpin the health of the landscape.

The National Action Plan for Salinity and Water Quality (NAP) is a \$1.4 billion programme over seven years, aimed at reversing trends in dryland salinity, improving water quality and securing reliable water supply for human uses, industry and the environment. It is implemented in parallel with the NHT regional programme, and combined they are referred to as the regional NRM programmes.

Across Australia fifty-six (56) regional bodies have been established, based on catchments or bioregions, to develop and implement accredited regional plans and investment strategies. These regional bodies include a range of stakeholders representing a diversity of interests, including Indigenous, farmer, conservationist and local government interests.

Regional plans detail catchment wide activities addressing a range of natural resource management issues including land and water management, biodiversity and agricultural practices. These regional plans set out the means for identifying and achieving the region's natural resource management targets. They are agreed by governments and the community and, together with investment strategies for implementation, define the goals and contributions that all parties will undertake. All Australian Government, State, Territory and regional joint investment decisions for the Trust and NAP are based on a region's investment strategy.

The NRMCC has also established the *National Framework for Natural Resource Management Standards and Targets* which sets out consistent national directions and approaches to natural resource planning, target-setting, action and performance measurement at all levels and comprises:

- national natural resource outcomes, with a minimum set of matters for which all regions must set regional targets to progress towards these outcomes, and national guidelines and protocols for regional target-setting, monitoring and reporting; and
- national standards defining best-practice management of natural resources, applying principally to legislative, policy, process and institutional systems which, when adopted, will help achieve national outcomes.



australia's actions to address land-based activities

The NRMCC has recognised the need to be able to measure and report upon the performance of government investment in natural resource management under the Trust and NAP. In response to this need the NRMCC established the *National Natural Resource Management Monitoring and Evaluation Framework* to assess the progress and effectiveness of the Trust and NAP to assist improved land and water resources management and natural resource condition. The Framework provides an architecture for assembling accurate, cost-effective and timely information on the:

- performance of programmes, strategies and policies; and
- health of the nation's land, water, vegetation and biological resources.

national water initiative

The NWI represents the commitment of the Australian Government and state and territory governments to water reform. The overall objective of the NWI is to achieve a nationally compatible market, regulatory and planning based system of managing surface and groundwater resources for rural and urban use that optimises economic, social and environmental outcomes. These outcomes will include reducing pollutant discharges to coastal waters.

The Australian Government is investing \$2 billion through the *Australian Government Water Fund* (AGWF) to assist with the achievement of NWI objectives, outcomes and actions. The fund comprises:

- *Water Smart Australia Programme* (\$1.6 billion) – supports projects that will make a significant contribution to the sustainable and efficient management of Australia's water resources (administered by the National Water Commission);
- *Raising National Water Standards* (\$200 million) – supports projects to improve capacity to monitor, evaluate and report on water resources; improve knowledge and skills to manage water resources, and enhance innovation for water use efficiency (administered by the National Water Commission); and
- *Community Water Grants Programme* (\$200 million) – supports projects that help local community organisations save, recycle or improve the health of their local water resources (jointly administered by the Departments of the Environment & Heritage; and Agriculture, Fisheries and Forestry).

state of the environment reporting

State of the Environment (SoE) reporting is mandated at a national level in Australia through the *Environment Protection and Biodiversity Conservation Act 1999*. A report is required to be produced every five years and, since 1996, the report has been prepared by an independent committee appointed by the Minister for the Environment and Heritage (<http://www.deh.gov.au/soe/index.html>). The next national report is expected to be tabled in Parliament by the Minister late 2006.

Most states and territories also undertake SoE reporting although the reports are produced on a different time cycle to that of the Australian Government. All states and territories, except Western Australia, have SoE reporting mandated under legislation, with reporting cycles every three to five years. Most SoE reports are based on themes such as atmosphere, land and biodiversity and there is a set of core environmental indicators that states and territories use to some extent.

There are a number of SoE reporting themes relevant to issues around land-based activities, namely inland waters, land, coasts and oceans. Indicators have been used to assess both the condition of aspects of the environment, including coastal habitat, and the responses of governments to issues of land-based pollution and changes in habitat extent and condition. Some governments have undertaken comprehensive surveys of some coastal habitats such as seagrass that can report changes over time. Urban stormwater runoff, particularly in the coastal environment, can also be reported to some extent.

The information outlined in SOE reports can be used by agencies to identify emerging environmental issues, or to underpin policies and programmes designed to mitigate the effects of land based activities on the coastal environment.

australia's actions to address land-based activities



In the state of New South Wales SoE reporting by local governments is mandatory. The aim of the annual SoE Reports is to document and measure the continued progress of both councils and their local communities towards ecological sustainability by providing sound information for future environmental management.

BILATERAL ACTIONS

coastal catchments initiative

The \$34 million Coastal Catchments Initiative (CCI) is one of the Australian Government's primary vehicles for meeting its commitments under the GPA. The CCI agreements are negotiated between the Australian Government and state, territory, regional and local agencies on specific coastal "hotspots" and the nature of "water quality improvement plans" designed to reduce the impact of land-based activities in those areas. During plan preparation the CCI funds a series of interim projects designed to assist preparation of a competent plan, address institutional barriers to plan implementation or establish monitoring and decision-support systems.

The improvement plans enable the focussing of resources on the specific activities most likely to deliver cost-effective water quality improvements, whilst seeking from the respective jurisdiction implementation of management strategies to sustain these improvements into the long term. There are currently 15 Water Quality Improvement Plans in preparation and four being implemented around the nation.



australia's actions to address land-based activities

reef water quality protection plan (reef plan)

The Reef Water Quality Protection Plan, or Reef Plan, is an ambitious joint initiative signed by the Prime Minister of Australia and the Premier of Queensland to improve the quality of water entering the Great Barrier Reef lagoon.

The Reef Plan combines resources of all levels of government, industry and the community to meet its ten-year goal of halting and reversing the decline in water quality entering the Great Barrier Reef. The Reef Plan identifies actions, mechanisms and partnerships to build on existing government policies and industry and community initiatives and is described in detail in Case Study 3.

A recent undertaking to establish the Reef Water Quality Partnership provides the opportunity for Australian and Queensland governments to work closely with the regional Natural Resource Management (NRM) bodies in reef catchments to coordinate efforts on water quality monitoring, modelling, assessment and reporting.

queensland wetlands programme

The Queensland Wetlands Programme is another initiative of the Australian and Queensland Governments that is directly relevant to the protection of the marine environment from land-based activities. The programme comprises the \$8 million Great Barrier Reef Coastal Wetlands Protection Programme and the \$15 million NHT funded Queensland Wetlands Programme. It aims to implement measures to support the conservation and management of wetlands.

Projects include improving the wetland information base; improving planning arrangements; on-ground works; communication, education and capacity building; and monitoring and evaluation.

CASE STUDY – COASTAL CATCHMENTS INITIATIVE

The Coastal Catchments Initiative (CCI) aims to address sources of land-based pollution to coastal water quality 'hotspots', through the development and implementation of Water Quality Improvement Plans (WQIPs). The CCI is implemented in partnership with state and local governments, and regional NRM organisations, and is aligned with GPA frameworks.

The CCI addresses a range of legislative and policy objectives relating to Australia's international obligations. Where WQIPs protect coastal Ramsar wetlands, ecological attributes and functions are linked to targets for water quality and pollutant loads. Through predictive modelling the CCI contributes to the assessment of likely impacts of development and allows Australian governments to determine and set appropriate environmental conditions.

The CCI is a priority action in the *National Cooperative Approach to Integrated Coastal Zone Management* and provides information for State of the Environment Reporting. Through a common planning framework the CCI links the *National Water Quality Management Strategy* and *National Principles for Provision of Water for Ecosystems*.

The CCI also supports jurisdictions to improve their adaptive management capacity and provides an ecosystem based approach to integrated water cycle management. The CCI addresses diffuse sources through agricultural diffuse source controls and institutionalising water sensitive urban design in state and local government planning and decision-making.

australia's actions to address land-based activities

AUSTRALIAN GOVERNMENT ACTION

legislation

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) regulates environmental issues that are of international and national significance (e.g. under the *1972 Convention for the Protection of the World Cultural and Natural Heritage*). The Act prohibits actions that have, or are likely to have, a significant impact on the environmental values associated with Commonwealth land, and/or on a 'matter of national environmental significance'. The relevant matters are marine waters beyond three nautical miles off the coast, world heritage properties, RAMSAR-listed wetlands, migratory species protected under international agreements, nationally threatened species and communities, nuclear actions and any additional matter specified by regulation.

The EPBC Act also provides a framework for approvals, permits and development assessment for actions that are likely to have a significant impact on a matter of National Environmental Significance (NES). The framework includes processes for cooperation and coordination with state government approvals processes. All GPA categories are included as this Act covers any activity that may affect a matter of NES or Commonwealth Land, and is particularly relevant to Ramsar listed wetlands and World Heritage Areas such as the Great Barrier Reef and the Wet Tropics.

The *Great Barrier Reef Marine Park Act 1975* was enacted to provide for the protection, wise use, understanding and enjoyment of the Great Barrier Reef in perpetuity through the care and development of the Great Barrier Reef Marine Park. The Act established the Park and also the Great Barrier Reef Marine Park Authority, a statutory authority responsible for its management. It provides a framework for planning and management including through zoning plans, plans of management and enables regulations, collection of environmental management charges, and enforcement.

The Authority undertakes a variety of activities including developing and implementing zoning and management plans, environmental impact assessment and permitting of use, research, monitoring and interpreting data, providing information, educational services and marine environmental management advice. The Authority operates in cooperation with Queensland State agencies.

Specific policies relevant to the GPA include Dredging and Spoil Disposal, Environmental Impact Management, Managing Activities that include the Direct Take of a Protected Species, and Sewage Discharges from Marine Outfalls.

policies and strategies

A programme of Regional Marine Planning is underway which has objectives relevant to the GPA including to ensure continuing marine ecosystem health, safeguard marine biological diversity and ensure the establishment of a representative system of marine protected areas. The strategy was created under Australia's Oceans policy but is now enabled through the EPBC Act (see above). The plans will draw on Australia's growing marine science and socio-economic information base to provide a detailed picture of each marine region. Each plan will describe a region's key habitats, plants and animals, natural processes, human uses and benefits, and threats to the long-term ecological sustainability of the region. The bioregional plans will also provide the platform for developing the National Representative System of Marine Protected Areas in Commonwealth waters around Australia.



australia's actions to address land-based activities

A draft Threat Abatement Plan for Harmful Marine Debris has as its goal “to provide a national framework to guide the coordinated implementation of measures to prevent and mitigate the impacts of harmful marine debris on marine species”. The plan will build on existing activities to mitigate marine debris, such as government programs to improve waste retrieval from watercourses; anti-littering laws; laws controlling overboard disposal of ship and boat garbage and fishing gear; and plans to reduce the litter from plastic shopping bags. As described by Section 271 of the EPBC Act, Threat Abatement Plans focus on strategic approaches to reduce the impacts of Key Threatening Processes that jeopardise the long-term survival of native species and ecological communities. The Marine Debris Threat Abatement Plan will specifically target abatement of injury and fatality to protected marine species caused by harmful marine debris. Harmful marine debris consists of plastic garbage washed or blown from land into the sea, fishing gear abandoned by recreational and commercial fishers, and solid non-biodegradable floating materials (such as plastics) disposed of by ships at sea.

programs, capital works and economic instruments

The Community Water Grants Program (see information on the [National Water Initiative on page 14](#)) assists communities to save, recycle or improve the health of local water resources. For example, grants are available for projects intending to improve water treatment, surface and ground water health through stormwater and run-off treatment, erosion control, cleaning up rivers, creeks or wetlands, and for reducing pollution in rivers, creeks or coastal areas. The Program provides grants of up to \$50 000 to communities.

research, monitoring and education

The \$100 million Commonwealth Environmental Research Facilities (CERF) programme aims to advance Australia's understanding of current and emerging challenges facing the conservation and use of the nation's environmental assets. Three research hubs have been funded in 2006/7:

- a research hub for *Applied Environmental Decision Analysis*;
- a research hub for *Tropical Rivers and Coastal Knowledge (TRACK)*; and
- a research hub for *Landscape Logic: Linking Land and Water Management to Resource Condition Targets*.

A major component of the CERF program is the \$40 million Marine and Tropical Sciences Research Facility (MTSRF) which has the vision of ensuring the health of North Queensland's public environmental assets, particularly the Great Barrier Reef and its catchments, tropical rainforests including the Wet Tropics World Heritage Area, and the Torres Strait. These programs are still under development and so the GPA categories that will be addressed are not yet known.

Land and Water Australia is an Australian Government-funded research purchaser which delivers science relevant to managing Australian landscapes and natural resources sustainably. The organisation has a number of recent programs relevant to the NPA including a National River Contaminants Program (2001-06), National Rivers Consortium, National Wetlands R&D Programme, Environmental Water Allocation Program (2004-09), Australia's Tropical Rivers (2005-10), Social and Institutional Research Program (since 1999), and the National Riparian Lands R&D program (since 1993).

The Fisheries Research and Development Corporation is an Australian Government corporation funded jointly by the fishing industry and funds research on managing the natural resources on which the commercial, recreational and traditional sectors of the fishing industry depend in an ecologically sustainable way. Programs of particular relevance include Natural Resources Sustainability, ESD Reporting and Assessment and Environmental Flows.

australia's actions to address land-based activities

Geoscience Australia is an Australian Government research organisation with a key goal to provide data, technical information, advice and research for maritime boundary definition, regional marine planning and environmental management. National programs include several undertaken with the Coastal CRC (see below) including data collection and presentation through the World Wide Web (OzEstuaries), Coastal Water Habitat Mapping and Pristine Estuaries assessment. The Coastal Research and Management Program seeks to understand processes and impacts of catchment derived sediment and nutrient loads within estuaries and coastal waterways around Australia; and test the performance of, and develop new, indicators of water quality (especially nutrients). The sea bed mapping projects aims to generate an inventory/baseline of habitats (deep water) for Regional Marine Planning (see above).

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) is an Australian Government research organisation. It has an international reputation in coastal biophysical science across catchments, estuaries, marine systems and in related social and economic research; investing approximately \$20 million each year into coastal research. CSIRO strengths include the development and application of coupled catchment and coastal water quality and ecosystem models, and their application to applied coastal and catchment management. CSIRO research is also focused on development and implementation of automated sensor networks, remote observations, and techniques for model-data fusion. CSIRO has a demonstrated record of successfully applying integrated systems approaches to regional and local development, planning and management, typically in partnership with other Commonwealth and state agencies and research collaborators. CSIRO will continue to invest substantially in research into the effects of landuse and climate change on the movement of materials from the terrestrial environment to marine systems, providing assessments of the impacts of catchment derived sediment and nutrient on estuaries and coastal waterways, and supporting uptake and adoption of research by coastal and catchment managers and communities.

The Bureau of Meteorology provides extensive data and information in the areas of climate monitoring and climate change, weather forecasting and ocean modelling. Upgrades to the Bureau's in-house supercomputer capacity to support global operational numerical weather prediction and climate studies; and the expansion and upgrading of radar and surface automatic weather station networks have all contributed to the Bureau's standing as the pre-eminent National Meteorological Service in the southern hemisphere and one of the more technologically advanced in the world.

Cooperative Research Centres (CRCs) are national research initiatives of the Australian Government co-funded by partners from state and local government, and industry. Three CRCs have undertaken work directly relevant to the GPA. The *eWater CRC* builds and supports decision systems and models for total water cycle management in urban and rural catchments, integrating water quality and quantity, stream ecology and economics. The CRC was funded for a seven year program in 2004. The *Coastal CRC* provided decision-making tools and knowledge necessary for the effective management and ecosystem health of Australia's coastal zone, estuaries and waterways. This CRC ceased operations in June 2006. Finally, the *Reef CRC* aimed to plan, fund and manage world-leading science for the sustainable use of the Great Barrier Reef World Heritage Area. This CRC also ceased operation in June 2006 although many of its activities have been complemented by the new MTSRF hub (described above).



australia's actions to address land-based activities

NEW SOUTH WALES

legislation

The principal NSW legislation addressing the protection of coastal and marine resources are the *Protection of the Environment Operations Act 1997* (the main environmental management legislation in the State) and the *Coastal Protection Act 1979* which deals specifically with the protection of coastal habitat and vegetation. These Acts have specific objectives of protecting the marine environment from land-based sources of pollution or direct habitat destruction. Other Acts focus on the protection of terrestrial and near shore habitats, often with the aim of conserving biodiversity (e.g. the National Parks & Wildlife, Marine Parks and Fisheries Management Acts).

The relevant NSW legislation deals with release of contaminants to the marine or coastal environment either through licensing point-source discharges or through creating an offence for releasing a pollutant or causing environmental harm. While the latter approach is relevant to both point source and diffuse discharges, the vast majority of regulatory activity, including prosecutions, deals with point-source offences and most diffuse land-based sources of pollution are being addressed through better guidance and encouraging best practice.

NSW has also taken a statutory approach to establishing catchment management bodies. The *Catchment Management Authorities Act 2003* provided catchment management groups with limited statutory power to place restrictions on activities that could produce diffuse land-based coastal marine pollution (e.g. property vegetation plans). Catchment Management Authorities (CMAs) are responsible for involving regional communities in management of the natural resource management issues facing their region, and are the primary means for the delivery of funding from the NSW and Australian Governments to help land managers improve and restore the natural resources of the State. Coastal CMAs are required to address coastal and marine issues within their Catchment Action Plans. Some CMAs, such as the Northern Rivers, are investing in coastal floodplain and acid sulphate soil water quality management projects. There is a very active floodplain network involving local government staff as well as agency officers working to rehabilitate disturbed areas and mitigate the impacts of acid drainage.

While a number of pieces of legislation touch on the protection of coastal and marine vegetation and habitats, they are generally limited to the delimitation and conservation of specific areas (e.g. marine parks or aquatic reserves), or to setting direction for development assessment approvals. Given the rapid development along the NSW coastline, this is an important approach, although it does not address existing impacts or the need for rehabilitation. However, the NSW Department of Primary Industries places an emphasis on rehabilitating fish habitats and has formalised habitat repair activities with the creation of the Aquatic Habitat Rehabilitation Program.

policies and strategies

A number of the policies and strategies relevant to GPA threats deal specifically with a single type of habitat (e.g. wetlands or littoral forests), with a notable exception being the State Environmental Planning Policy (SEPP) No. 71 - Coastal Protection. This policy has broad aims that cover the majority of the GPA threats including the objective of preserving 'the marine environment of NSW'. The principal thrust of the Policy is the protection and preservation of coastline habitats and amenity, but clauses 15 & 16 provide specifically that development must not be approved if it will discharge untreated stormwater or effluent to coastal waters.

Another strategy to contribute to the health of marine waters is the consideration of the environmental values of waterways in strategic planning and land use decisions by state and local government. The NSW Water Quality and River Flow Objectives and the NSW Marine Water Quality Objectives reflect the community's values and uses for rivers, estuaries and coastal waters and provide long-term goals for water quality. The Objectives are increasingly being applied by councils and state agencies and CMAs in their planning and consent processes.

australia's actions to address land-based activities

programs, capital works, economic instruments

There are numerous programs dealing with all types of GPA threats, although few implement economic instruments. Program themes included stormwater, wetlands, coastal land management and estuaries. The Urban Stormwater Program, administered by the Stormwater Trust, was highly active and successful in NSW over a number of years, providing seed funding to address stormwater quality hot spots and to give the stormwater industry and stormwater managers an opportunity to develop new ways of addressing the serious problem of poor stormwater quality. The program concluded in July 2006, however a new Urban Sustainability Program will make \$80 million in new grants available over the next five years to fund local environment programs, such as urban water management initiatives for stormwater and runoff.

The most common capital investment relevant to the GPA is in wastewater treatment infrastructure. While sewage treatment is managed by local governments in most of the State, an integrated approach has been adopted in Sydney and Illawarra (the principal population centres) through the statutory, State-owned corporation called Sydney Water. In the 2004-2005 period, 10 treatment plants owned by Sydney Water discharged to coastal waters. Of a total volume of 422,232 ML, 13 per cent was discharged to near coastal waters and the remaining 87 per cent at deep water outfalls. The majority of these discharges were treated to a primary treatment standard. A comprehensive and ongoing water quality and ecosystem health monitoring program has demonstrated that the discharges from these treatment plants have a negligible impact on the marine environment.

A response to the problems associated with Acid Sulfate Soils (ASS) included the establishment of ASS Management Advisory Committee to drive interagency and community coordination, a review of ASS management in Local Environmental Plans, the NSW ASS Hot Spot Remediation Program and a Floodgate Management Program. The ASS Hotspots Remediation Program, launched in November 2000, identified areas where previous land management both contributed to and could have lead to further severe soil and water acidification, poor water quality, reduction in agricultural productivity, loss of estuarine habitat and degraded vegetation and wildlife. The program provided \$2.65 million for remediation of seven identified hotspots, chosen due to severe acidification of water or soil with impacts such as salt scalds, degraded water quality, and fish kills. The hotspots were located in the Clarence, Tweed, Hastings, Macleay, Manning and Shoalhaven catchments.

research, monitoring and education

Monitoring and education programs are often relevant only at specific local scales so were not fully captured here. However there are a number of relevant programs, such as the Urban Stormwater education program, the 'Don't be a Tosser' litter prevention campaign, and the Harbourwatch and Beachwatch recreational water quality monitoring. The Beachwatch Partnership Program has also assisted councils outside the greater Sydney area to standardise recreational water quality monitoring. The paucity of state-wide research initiatives reflects the normally focussed (e.g. catchment-based) nature of such activities and their usual confinement to a local or regional scale.

In 2004 the Healthy River Commission was discontinued and the Natural Resources Commission (NRC) established by the *Natural Resources Commission Act 2003* with a broad function of providing the NSW Government with independent advice on a range of natural resource management issues. The NRC's core functions are to:

- recommend state-wide standards and targets for natural resource management;
- review and recommend the approval of Catchment Action Plans prepared by 13 Catchment Management Authorities across NSW; and
- audit Catchment Management Authorities' implementation of these plans and their effectiveness in achieving state-wide standards and targets.



australia's actions to address land-based activities

effort directed at GPA categories

The majority of initiatives listed for NSW are aimed at addressing sediment, nutrients and habitats (including coastal vegetation). However, all GPA threats are touched-on in at least seven and up to 23 initiatives. This represents a comprehensive coverage of GPA threats in NSW.

Importantly the high-priority pollutants, nutrients and sediments are well-represented across the range of initiatives, rightly reflecting the need to treat these pollutants at as many levels as possible. Conversely, many of the habitat and coastal vegetation initiatives are focussed at a high (statutory) level, which is appropriate given the need to proactively balance economic growth with sustainability. This is particularly true in NSW where coastal development is increasing rapidly.

The majority of initiatives are at the mid-level of policies, strategies and programs although legislation exists for all GPA threats. However, point sources, such as sewage treatment plants, remain a focus of the majority of current management and initiatives.



australia's actions to address land-based activities

VICTORIA

legislation

The *Environment Protection Act 1970* is the key legislation that regulates and manages land-based sources of pollutants to the marine environment. This Act provides a broad-spectrum approach to the types of pollutants it addresses, rather than targeting specific pollutants. It also manages impacts to marine habitats. There is some legislation dealing with specific pollutants, but these are not land-derived pollutants (e.g. oil from shipping) and therefore are relevant to the NPA only in terms of mitigating impacts to marine habitats from these pollutants.

The *Planning and Environment Act 1987* establishes a rigorous framework for the orderly planning for land use and development, whilst the *Environment Effects Act 1978* provides a comprehensive framework for assessment of proposals that may impact the environment, including those activities that could lead to land based sources of pollution.

Collectively these three principal Acts establish the regime for land use allocation, assessment of impacts and establishment of the regulatory requirements for discharge to the environment.

Extensive areas of public land in Victoria are managed for a variety of beneficial uses, including conservation, recreation and natural resource production. All public land is subject to management requirements and broad principles established through legislation and through more specific management plans and operational codes of practice. For near coastal areas, the *Coastal Management Act 1995*, *National Parks Act 1975* and the *Crown Land Reserves Act 1978* provide for long term strategic planning, management and protection of 96 per cent of all land abutting the coast. A comprehensive and representative system of Marine National Parks and Reserves has also been established.

The *Victorian Catchment and Land Protection Act 1994* enables a catchment-based approach to natural resource management including managing land-based pollutants and activities impacting the marine environment. As the name implies, this legislation focuses on catchment management and land protection, which for coastal catchments, includes a focus on minimising impacts to coastal ecosystems, and establishes a number of mechanisms for achieving this (e.g. Catchment Management Authorities (CMAs), and Regional Catchment Strategies, see below). This legislation and associated initiatives better enable ecosystem-based management (e.g. considering the catchment to coast continuum) than previous legislation. These mechanisms have the scope to consider all land-based pollutants and activities affecting coastal and marine ecosystems.

There are many *Best Practice Environmental Management Guidelines* and *Codes of Practice* in Victoria that exist to support the implementation of legislation and high level policies. These documents describe practices that will ensure compliance with relevant legislation and range from voluntary to statutory codes.

strategies and policies

The Victorian Coastal Strategy and Coastal Action Plans developed pursuant to the *Coastal Management Act 1995* deal specifically with protection of the marine environment with particular focus on habitat protection and restoration, improving water quality and maintenance of estuaries.

Every coastal CMA has developed a Regional Catchment Strategy (under the *Victorian Catchment and Land Protection Act*). These take a 'catchment to coast' approach to identifying land and water resources, impacts to them and actions required to improve degraded resources and maintain remaining resources.



australia's actions to address land-based activities

The *Victorian River Health Strategy* is the main mechanism specifically targeted at improving water quality in catchments. Under this strategy *Regional River Health Strategies* are developed. These identify the river health objectives for regional rivers and guide the development of water quality plans to achieve these objectives. The development of these regional strategies and plans are lead by the CMAs. The focus is on all inland waterways, but strategies and plans in coastal catchments also consider coastal waterways.

Strategies aimed specifically at the marine environment include the Port Phillip Bay Environmental Management Plan, which is being implemented to achieve significant reductions in nitrogen inputs to Port Phillip and for the internationally significant Gippsland Lakes, the Gippsland Lakes Future Directions and Action Plan. This Plan is being implemented to achieve significant reductions in nutrient inputs to the Lakes and address environmental water flows from river systems (see **Case Study 2**). A similar focus is at an early stage for Western Port and Corner Inlet.

Planning for coastal development is presently receiving considerable attention within Victoria (e.g. through the *Coastal Spaces Initiative*). A recognised need from these planning initiatives is to ensure that significant coastal values, including coastal vegetation, is protected for the purposes of maintaining the integrity of coastal ecosystems. The provision of infrastructure, such as innovative sewage treatment facilities for small settlements, in these planning activities will also likely contribute to improved management of pollutant discharge.

programs, capital works, and economic instruments

There are several programs in Victoria that consider land-based pollutants in coastal catchments and therefore include activities impacting the marine environment. Most of these are directly invested in through the Regional Catchment Investment Plan process and incorporate a diverse range of activities, such as the implementation of actions under Regional River Health Strategies. There is also progress towards developing Water Quality Improvement Plans (WQIPs) under the National *Coastal Catchments Initiative*. The Port Phillip and Western Port region has made the most significant progress under this initiative to build on the *Port Phillip and Western Port Regional Catchment Strategy*, the *Port Phillip Bay State Environment Protection Policy* and the associated *Environmental Management Plan*. The WQIP is being developed to identify the most cost effective opportunities for reducing nitrogen loads and improving environmental flows from in-flowing rivers.

The focus of capital works has been two-fold – large infrastructure projects, such as sewage treatment plants and upgrades, and smaller, more community-based, catchment works.

The State of Victoria has a total of 19 treated water discharges - estuarine waters (2), marine (15), and two to Port Phillip Bay. The total volume discharged per year is 336,457 ML, of which 97 per cent is treated to a secondary level and the remainder is to a primary treatment standard.

Coastcare/Coast Action is a state-wide, community-based program that undertakes on-ground works to restore and protect coastal assets. These works often target rehabilitation of coastal vegetation, to improve coastal habitat and water quality of run-off into creeks and estuaries.

From a Local Government perspective there has been a concerted focus on stormwater management, with most local government areas now having detailed stormwater management plans in place, and domestic wastewater management and potential solutions on the regional coast. The Stormwater Management plans have an increasing on ground focus on local stormwater retention and filtration and reuse before discharge. There is still an opportunity for significant further progress in this direction. Economic instruments as a tool to manage land-based pollutants and activities affecting the marine environment are still at an early stage of development; however research and pilot programs are underway signalling the intent to employ this management tool.

australia's actions to address land-based activities

research, monitoring and education

Most research, monitoring and education activities are focussed on sediments and nutrients, with some attention on litter, coastal vegetation and habitats. There is no state-wide coordinated research program or framework to address land-based pollutants and activities affecting the marine environment. Government funded or initiated research is undertaken, but usually to meet specific and immediate management needs.

Typically education activities are incorporated into monitoring or capital works programs, such as *CoastCare/Coast action*, *Waterwatch*, *Melbourne Water Rivers and Creeks Program*.

Regular monitoring of coastal water quality (nutrient, sediment and human health indicators) is undertaken by the Victorian Government in some coastal waterways. There is presently consideration of monitoring pressure indicators rather than, or in addition to, condition indicators, which may affect the comprehensiveness of future coastal water quality monitoring programs. The community-based *Waterwatch* program primarily monitors water quality in freshwater waterways, although has incorporated some estuarine monitoring in a few regions. Water quality data is publicly reported and available via the internet. Coastal vegetation and a range of other coastal values are mapped by the Victorian Government.

effort directed at GPA categories

Sediment and nutrient discharges are addressed by a greater number of initiatives than for other GPA categories. Point sources, such as sewage treatment plants and septic tanks systems, remain a focus of current management and initiatives. However, the focus has been broadened recently to include the more difficult challenge of managing diffuse sources of pollutants. This is evident in the appearance of legislation, strategies, policies and programs based on catchments and identifying the connectivity with coastal and marine ecosystems. This reflects the reality that catchment impacts are acknowledged as a significant contributor of sediment and nutrients to coastal ecosystems and require urgent attention. The Gippsland Lakes (see [Case Study 2](#)) is one example of catchment-based management to reduce nutrient discharge to coastal ecosystems.

The activities directed towards managing and protecting coastal vegetation is mostly restricted to high-level initiatives, such as legislation, strategies and policies, but supported by a continuing strong local focus on vegetation management and restoration.

Increasingly risk assessment is being used as the strategic framework to identify values, threats and management response. Market based instruments are becoming increasingly significant as drivers for encouraging land restoration and revegetation.

Radioactive pollutants are not currently the focus of any initiative – a reflection of the lack of radioactive pollutants as an issue rather than the issue being overlooked.



australia's actions to address land-based activities

CASE STUDY – GIPPSLAND LAKES

The Gippsland Lakes are a series of coastal lagoons in south-eastern Victoria separated from the sea by sand dunes but linked to oceanic waters by an artificial entrance opened in 1889. The Lakes create a distinctive regional landscape of wetlands and flat coastal plains, which is of considerable environmental significance in terms of its landforms, vegetation and fauna and is protected under the Ramsar Convention.

The management of this area is highlighted as a case study because of the successful cooperative approach amongst a diverse range of stakeholders. Management is shared among many bodies including a Regional Coastal Board, two Catchment Management Authorities (CMAs), several Victorian Government organisations and four Local Governments. A number of mechanisms have been created to facilitate coordination among these bodies, such as the Gippsland Integrated Natural Resources Forum and the Gippsland Lakes and Catchment Taskforce (which comprises representatives of all of the key management groups).

This latter group was created by the State Government in 2001 in response to studies commissioned by the Coastal Board which showed that nutrient and sediment loads were the priority issues degrading water quality and ecosystem health. The Taskforce created an integrated Future Directions and Action Plan, which has been funded with over \$20 million by the Victorian Government across a series of projects since 2001.

Complementing this plan is the Gippsland Water Quality Action Plan developed by the CMAs and the Coastal Board, in consultation with key stakeholders. The Plan includes activities to improve water quality, with a key component being to reduce nutrient loads by 40 per cent by 2022. Importantly, modelling involved with the development of the Plan has suggested that such reductions may not be feasible with current best management practices and levels of investment. Therefore activity has targeted cost effective improvements in on-ground practices in priority areas and investigations into additional methods of achieving nutrient load reductions.

australia's actions to address land-based activities

QUEENSLAND

legislation

The principal Queensland legislation regulating land-based coastal and marine pollution is the *Environmental Protection Act 1994*. This Act establishes offences for causing environmental harm/nuisance, creates an environmental duty of care, and provides frameworks for regulating 'environmentally relevant activities' (through a subordinate Regulation) and for developing Environmental Protection Policies (see below). While many of the provisions relating to offences are primarily reactive in nature and limited to point-source pollutants, the other elements offer a more proactive approach that can be also relevant to diffuse land-based pollution. Agriculture as a source of pollutants is treated under the general duty of care and through encouraging preparation of industry "codes of practice" on a due-diligence basis. This legislation thus deals with the majority of the NPA pollutants and also protection of habitat to some extent.

The *Coastal Protection and Management Act 1995* allows for the preparation of State and regional coastal management plans (see below) under which it is possible to issue notices to mitigate certain offences. The Act regulates environmental aspects of development in the coastal zone, including construction of artificial waterways and dredging in tidal waters. The state and regional plans also address loss of wetlands and riparian areas. The *Integrated Planning Act 1997* provides for creation of regional plans to guide local government in preparing their Planning Schemes. It is the central instrument for landuse planning and development assessment decision-making. Both of these Acts deal with planning and development constraints and thus do not address existing activities that may be relevant to the GPA (e.g. agriculture, urban stormwater).

Several Acts deal indirectly with the management of diffuse sources of nutrients and sediments from broadscale land uses. For example, the *Vegetation Management Act 2004* was introduced to phase out broadscale clearing of remnant vegetation by December 2006. The *Water Act 2000* covers, inter alia, protection and improvement of watercourses' physical integrity. "Physical integrity" relates to bed and bank stability, and associated water quality e.g. the clearing of native vegetation, excavation, placement of fill and dumping of waste that may wash into a watercourse and is thus relevant to the NPA. The *Wild Rivers Act 2005* provides the opportunity for rivers with most of their natural values intact to be nominated and declared as Wild Rivers to preserve their values. The *Soil Conservation Act 1986* facilitates the conservation of soil resources and the implementation of soil conservation measures for the mitigation of water-borne erosion.

Other relevant legislation deals primarily with management of coastal, marine and tidal habitats through declaration of protected areas such as Parks and Fish Habitat Areas and development of assessment processes for new developments and activities. These instruments are thus primarily restricted to preventing further degradation of marine habitats from future uses and development.



australia's actions to address land-based activities

policies and strategies

The *Environmental Protection (Water) Policy 1997* is enabled under the *Environmental Protection Act 1994* and provides a framework for developing environmental indicators, water quality guidelines, water quality objectives and environmental values for water. There is also a suite of mechanisms for managing water quality including regulating point sources, issuing “penalty infringement notices” and defining implications for local government. Penalty infringement notices have been a particularly useful tool in altering potentially polluting behaviour of industry.

State Coastal Management Plans and subsequent Regional Coastal Management Plans describe how the coastal zone is to be managed but are principally relevant to the NPA in protecting habitat and coastal vegetation from development pressures. Under provisions of the *Coastal Protection and Management Act 1995* these plans have the effect of State Planning Policies for the purpose of making and amending planning schemes and assessing and deciding development applications. State Planning Policies (SPPs) are statutory instruments under the *Integrated Planning Act 1997* with the purpose of articulating the Queensland Government’s position on development issues of State interest. Other SPPs dealing with Acid Sulfate Soils and with flood and landslide risks are of potential relevance to the NPA in addition to the coastal plans.

The Environmental Protection Agency and the Department of Natural Resources, Mines and Water also have State Interest Planning Policies (SIPPs) that enunciate state interests as a guide to planning in Queensland. The SIPPs interpret existing legislation, policies, strategies, plans and international/national commitments in planning terms. The EPA’s SIPP on Queensland Waters is relevant to the NPA, but state interest relating to coastal management is primarily addressed through the State Coastal Management Plan (see above). The State Interests in Natural Resources is relevant in that it identifies responsibilities in terms of preventing land degradation and protecting natural waters, including minimising harm to marine waters from diffuse pollutants.

programs, capital works and economic instruments

The Reef Water Quality Protection Plan (Reef Plan) is an ambitious joint initiative of the Australian and Queensland Governments to improve the quality of water entering the Great Barrier Reef lagoon (see [Bilateral Actions on page 15](#)).

Two activities highly relevant to all NPA categories are the (closely linked) Queensland Water Quality Guidelines and Environmental Values and Water Quality Objectives programs. These programs aim to set values, objectives and guidelines for a range of water bodies throughout the state. These activities are consistent with the *Environmental Protection Act 1994* and subordinate legislation (see above) and the National Water Quality Management Strategy.

Funding schemes available from 2006-2011 under the ‘Local Government Infrastructure Grant and Subsidy Programs’ are activities relevant to both capital works and economic instruments. Over \$100 million is available per year for applicants seeking to improve wastewater treatment and reuse through on-ground activities and research.

A related program is the Queensland Government’s \$3 million per annum Queensland Water Recycling Strategy, aimed at maximising water recycling in an efficient, economic and environmentally sustainable manner without adverse health effects. The program is a broad-based approach to provide guidance, demonstrate the efficacy and address public concern about water recycling. Recently the State government has pledged a further \$700 million to divert treated water from the State’s largest treatment facility inland to be reused for industry and agriculture.

A significant program touching on policy, monitoring, strategy development, education and research is the Moreton Bay and Waterways Catchments Partnership (or Healthy Waterways Program) for South East Queensland. This project is described separately in Case Study 7.

australia's actions to address land-based activities

CASE STUDY – REEF WATER QUALITY PROTECTION PLAN

The natural, social and economic values of Great Barrier Reef World Heritage Area are nationally and internationally recognised. However, best available scientific evidence indicates that extensive modification of the land catchment has led to significant increases in pollutant loads in the rivers flowing to the Reef lagoon. Of particular concern are high concentrations of chemicals, sediments and nutrients from broadscale landuses.

In response to these challenges the Australian Prime Minister and Queensland Premier launched the *Reef Water Quality Protection Plan* (Reef Plan) in December 2003. Reef Plan is a cooperative and precautionary approach to Reef protection, involving all levels of government and stakeholders. The Plan identifies appropriate actions, mechanisms and partnerships to build on existing Government policies and industry and community initiatives.

Reef Plan includes nine strategies with sixty five actions. Strategies address: self management approaches; education and extension; economic incentives; planning for natural resource management and land use; regulatory frameworks; research and information sharing; partnerships; priorities and targets; and monitoring and evaluation.

research, monitoring and education

Most research and education activities are undertaken on a local scale with specific objectives on land based impacts on pollutant management. Nonetheless, it is important to note that Queensland has a rich history of conducting scientific, field and laboratory experiments on agricultural farming practices and grazing lands for extension information and the development and application of agricultural systems models. On a statewide basis, there is widespread water quality monitoring and assessment of freshwater and estuaries undertaken by a number of agencies in Queensland waters, a statewide landcover assessment and monitoring and research linked with a number of State Investment Programs. The Queensland Government has also been an active participant in a number of national applied research programs relevant to the NPA such as the Cooperative Research Centres for Coastal Zone, Reef, eWater, and more recently, the Marine and Tropical Sciences Research Facility (see [page 18](#)).

effort directed at GPA categories

All GPA categories are addressed by a number of initiatives at more than one level. There is a strong legislative and policy foundation for management of most GPA threats. Most are also subject to monitoring and all of the pollutants are covered under programs aimed at incorporating values, objectives and guidelines into planning and statutory development assessment. Sediments, nutrients and habitat are provided for by the largest number of initiatives. Sewage is also touched on under several instruments. This perhaps reflects the local and regional management of major sewage treatment infrastructure by Local governments in Queensland, compared to a more centralised approach in many other states.



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WESTERN AUSTRALIA

legislation

The principal Western Australian legislation for environmental protection is the *Environmental Protection Act 1986* which addresses land-based coastal and marine pollution in most GPA categories. The definition of pollution and environmental harm covers coastal marine pollution from a range of sources, including diffuse land-based sources. The Act allows for licensing and regulation of waste discharges from prescribed premises. A Licensing Policy framework has been established with an overarching objective of protecting community-derived environmental values of the marine environment.

The *Waterways Conservation Act 1976* provides for the conservation and management of Western Australia waters (including the rivers, inlets and estuaries to which the Act applies) and of the associated land and environment, for the establishment of management bodies.

Both of the above Acts along with the *Conservation and Land Management Act 1984* also deal to some extent with conservation or protection of coastal and marine habitats and vegetation.

More recently the *Swan and Canning Rivers Management Act 2006* was passed by the Western Australian Parliament in September 2006. The legislation is expected to come into effect in mid 2007.

The legislation will provide greater protection for the Swan and Canning rivers by enabling more co-ordinated management of commercial and recreational activities and urban and rural influences on the rivers. It also requires economic, social and environmental factors to be considered in managing the rivers.

policies and strategies

The Western Australia government has enacted a number of policy mechanisms relevant to protection of the marine environment. Environmental Protection Policies (EPPs) are developed under Part III of the *Environmental Protection Act 1986* and have the force of law. In the past EPPs have not always been constructed as an instrument of coercive law and there is an emerging tendency to avoid coercive provisions in protection policies. A number of EPPs are currently in force for several coastal and marine areas.

A State Environmental Policy (SEP) is a non-statutory Government policy position on a particular aspect of the environment enabled under Part II section 17(3) of the *Environmental Protection Act 1986*. The process for developing a SEP is largely based on the statutory requirements for developing an EPP but provides for a more flexible policy instrument with guidance on matters of environmental significance without the need for coercive powers. The first SEP was for the protection of Cockburn Sound and the EPA has since initiated the development of a SEP for the coastal zone.

The State is implementing the National Water Quality Management Strategy through a number of mechanisms but importantly through the State Water Quality Management Strategy No. 6 which seeks to ensure environmental values, environmental quality objectives and environmental quality criteria are established and water quality protected. The Cockburn Sound SEP is based on this approach.

Marine environmental quality is directly related to the types and quantities of wastes discharged to it. The State Water Quality Management Strategy sets out a framework to establish environmental values for all of the state's marine, estuarine and fresh-waters and to protect them from the effects of waste discharges and pollution.

Other relevant policies include the Statement of Planning Policy No 2.6 State Coastal Planning Policy, the Water and Rivers Commission Foreshore Policy 1 - "Identifying the Foreshore Area" and the Coastal Zone Management Policy which deal with balancing coastal development, and the Statewide Policy No. 4 Waterways which touches on a range of needs for protection of the states waterways. Western Australia also has a number of relevant strategies dealing with issues ranging from coastal development, to litter, stormwater, water quality, environmental weeds, and the marine environment.

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programs, capital works and economic instruments

Two extant programs in Western Australia are highly relevant to the GPA threats. The first is the development of Water Quality Improvement Plans for coastal waters in Western Australia including the Peel-Harvey Estuarine System, Swan-Canning Estuary and Vasse-Wonnerup and Geographe Bay.

The second program creates the Catchment Management Plans being developed for catchments of Western Australia. This program covers aspects of catchment management that will lead to reduced volumes of land-based sources of marine pollution, but is not directly relevant to the GPA threats.

CASE STUDY – WATER QUALITY IMPROVEMENT PLANS ON THE SWAN COASTAL PLAIN

In 2003 the Australian and Western Australian Governments initiated a series of projects that would lead to preparation of a Water Quality Improvement Plan (WQIP) and a framework for its implementation. The draft WQIP for the Peel Harvey region, which is being prepared by the Western Australian Environment Protection Authority in partnership with various State agencies and the Peel Harvey Catchment Council, addresses phosphorus loads to this estuarine system.

The results of the component projects of the Peel-Harvey programme indicate that:

- excessive nutrients predominantly emanate from diffuse sources;
- phosphorus load discharge from the three river systems is approximately 145 tonnes and a reduction of at least 48 per cent is required to meet the target set by the EPA;
- nearly 70 per cent of the phosphorus discharges come from agricultural activities; and
- urban areas account for only 6 per cent of the land use by area but contribute more than 20 per cent of the phosphorus inputs – and this figure is rising, with gardens, lawns and on-site sewerage systems (septic tanks) being the source of this pollution.

Building on the Peel-Harvey CCI, the Australian and Western Australian Governments established in mid 2006 further CCI programmes to protect and improve water quality in the Swan-Canning Estuarine System, and Ramsar-listed Vasse-Wonnerup wetlands/Geographe Bay. The Swan-Canning and Vasse Geographe WQIPs are supported by a series of jointly managed projects, each contributing to development and implementation of the WQIPs. These projects build on the outputs from the Peel-Harvey projects particularly focusing on implementing WSUD, implementing agricultural source controls, predictive modelling and monitoring activities and development of decision-support tools.

research, monitoring, education

The majority of state-wide marine research in Western Australia is coordinated through the Western Australian Marine Science Institute (WAMSI). The WAMSI provides a focus for marine research and includes all WA tertiary institutions and Government agencies, CSIRO, AIMS and Industry partners. The WAMSI research program includes strategic research to understand cause-effect pathways and establish environmental quality criteria to underpin the regulation and management of land-based sources of pollution. It needs to be remembered that WA has over 12,000 km of coastline and although there are few specific monitoring and education activities on a state-wide basis, a number of the programs and strategies incorporated monitoring elements.



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The Swan River Trust's monitoring program presently involves measurement parameters in catchment and estuarine waters, variously weekly and fortnightly. The main objectives of the present monitoring program are to track trends in water quality, measure compliance against management targets, and determine the effectiveness of catchment and estuary management measures. Reporting to the community is primarily through web-based information on water quality that is updated on a weekly basis: the 'Algae Activity Report' is a weekly map and brief description of algal densities in the Swan and Canning rivers, and current alerts on toxic species are also included. In addition, overviews of water quality in the estuary and catchment (relative to targets) are available in the Swan River Trust annual reports.

effort directed at GPA categories

All GPA 'threats' (save radiation) are addressed by several initiatives ranging from legislative instruments to policies strategies and monitoring. Most of the categories receive most focus through specifically-targeted policies and strategies and many of these have intrinsic monitoring programs. Predictably sediments and nutrients receive the most attention followed by protection of habitats. These are recognised as priority threats around Australia.

SOUTH AUSTRALIA

legislation

The principal legislation for environmental protection from pollution in South Australia is the *Environment Protection Act 1993* which addresses land-based coastal and marine pollution in all GPA categories. The objects of the Act are broad and include prevention of environmental harm as well as providing for remediation and mitigation activities for existing sources of environmental pollution. In common with other environmental legislation around Australia, the focus of the Act is on point source pollution although unlike many state environmental Acts, agriculture is included in Schedule 1 in a list of potentially polluting activities. The Act also provides for offence provisions, licensing and enforcement measures.

The *Coast Protection Act 1972* establishes a Coast Protection Board, one function of which is protecting the coast from erosion, damage, deterioration, pollution and misuse thus broadly embracing all of the GPA-relevant threats.

The *Natural Resources Management Act 2004* provides for ecologically sustainable development and management of natural resources. The Act applies to all state waters as well as land, and has a broad definition of natural resources including ecosystems. The Act provides for a catchment-coast-ocean approach to NRM and requires protection of coastal and marine ecosystems from land-based impacts. The Act establishes a state NRM Council; eight natural resources management boards that cover the entire state, and a hierarchical planning framework with self-funding provisions. The Act also provides for the preparation of water allocation plans for prescribed water resources. These plans must provide water for ecosystems including estuaries.

There is currently draft legislation [Local Government (Stormwater Management) Amendment Bill] that amongst other things will provide for reducing stormwater impacts on the marine environment by catchment-based plans for the management and reuse of stormwater.

Other relevant Acts deal with protection of vegetation or creation of parks and are thus relevant to protecting habitat and coastal vegetation.

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policies and strategies

The *Environment Protection (Water Quality) Policy* (under the *Environment Protection Act 1993*) seeks the sustainable management of waters including managing water quality objectives with respect to pollution from both diffuse and point sources. Part 5 of the Policy addresses diffuse land-based pollution but is mostly relevant to stormwater impacts, for example with the creation of Stormwater Pollution Prevention Codes.

The State Natural Resources Management Plan 2006 is South Australia's state-wide policy framework for management of natural resources. It is a statutory plan under the *Natural Resources Management Act 2004*. The Act requires all eight regional NRM plans to be consistent with the State NRM Plan. The State NRM Plan 2006 embraces a whole ecosystem approach and addresses land-based impacts on the coast and marine environment. Also the Act specifically requires regional NRM Plans to "include information as to the arrangements to ensure proper management of wetlands and estuaries, and marine resources, with particular reference to the relationships between catchment, wetland, estuarine and marine systems.."

The South Australian Department for Environment and Heritage released the *Living Coast Strategy for South Australia* in 2004. Objective 3 of the Strategy is aimed at reducing land-based coastal marine pollution including that from diffuse sources. One specific action within the *Living Coast Strategy for South Australia* is aimed a Catchment Management, and seeks to "actively encourage Catchment Water Management Boards/Regional NRM Boards and local government to develop integrated water quality and stormwater management strategies' and to 'implement strategies to reduce diffuse pollution of watercourses and stormwater drains discharging into marine waters.'" (South Australian Department of Environment and Heritage, (1994) *Living Coast Strategy for South Australia*, p.42).

Other policies and strategies seek to protect specific habitat types (e.g. wetlands, estuaries), regional areas, or specific threats (e.g. The Coastal Erosion, Flooding and Sea Level Rise Standards and Protection Policy).

programs, capital works and economic instruments

A number of programs in South Australia were relevant to GPA threats including a Marine Planning Framework for South Australia and a program for Marine Protected Areas. Environment Improvement Programs under the *Environment Protection Act 1993* provide clear and demonstrable scheduling of improvements to be undertaken by licensees to enable them to meet the general environmental duty or other provisions of the Act. A series of EIPs have been undertaken over the past several years to improve waste water treatment in several plants discharging to the marine environment. Over \$210 million in capital works are proposed for the next five years.

Of the more than 105,000 megalitres (ML) of treated sewage produced in 2004/2005 in South Australia approximately 21,298 ML was reused. Around 83,537 ML of wastewater treated to a 'secondary level' was discharged to the marine or coastal environment.

Catchment water management boards were forerunners to NRM boards but under different legislation. These boards over the period 1997 – 2005 invested heavily (multi-millions of dollars) in numerous programs and capital works that assisted in reducing land-based impacts on the marine environment. These included education programs, investigations, stormwater management and water quality improvement works, and riparian restoration/ protection programs.

research, monitoring and education

The number of research, monitoring and education programs at a state-wide scale is limited. There are numerous, more locally focussed programs. One highly relevant education program is the Coast and Marine Education Framework, an educational resource for teachers and students that links the South Australian Curriculum Standards and Accountability Framework with coast and marine education.



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The Adelaide Coastal Waters Study (2001- 2006) is a multi-disciplinary research program that aims to better understand the processes impacting on the health of the Adelaide metropolitan coastal waters, notably the extensive seagrass beds.

effort directed at GPA categories

All GPA categories are covered by initiatives at a number of levels. As with other states, nutrients and sediments receive a good deal of attention as does habitat and to a lesser extent coastal vegetation. The large number of activities relevant to each type of GPA threat owes partly to a tendency for South Australian legislation, policies and programs to broadly define their activities. These broader definitions more readily encompass the relevant NPA threats.

TASMANIA

legislation

The principal Tasmanian environmental protection legislation is the *Environmental Management and Pollution Control Act 1994*, which provides for licensing of point source activities, penalties and liabilities for polluting, development assessment approval, and under Section 23A, creates a general environmental duty to take “such steps as are practicable or reasonable to prevent or minimise environmental harm or environmental nuisance.” As with the other states this environmental protection legislation is powerful but primarily reactive and does not deal with diffuse land-based pollution.

Other legislation dealing with GPA pollutant categories tends to have a specific focus. For example, on aquaculture and fisheries as is the case for the *Marine Farming Planning Act 1995* and *Living Marine Resources Act 1995*. An emphasis on protection of habitats used for aquaculture and fisheries reflects the importance of these industries to the Tasmanian economy. A number of Acts deal with both terrestrial and marine, coastal habitat and vegetation protection and, as with other jurisdictions, these generally deal with development assessment approvals or declare parks and reserves.

policies and strategies

There are policies and strategies that touch on all of the GPA threats (except radiation). The State Coastal Policy mentions land based pollutants in a number of areas and the State Policy on Water Quality Management deals directly with GPA-relevant threats including stormwater and other diffuse pollution. The latter policy also sets up a mechanism for developing Codes of Practice aimed at reducing land based sources of marine pollution (among other things).

An important broad-based strategy is the development of coastal and marine indicators for a range of threats relevant to land based sources of pollution and habitat destruction. Tasmania has modified a series of nationally developed indicators and is currently a national leader in this approach. This initiative fits well with the program for setting Protected Environmental Values (see below).

programs, capital works and economic instruments

There are few state-wide initiatives under the category of capital works or economic instruments but a number of programs are relevant to the NPA. The program for setting Protected Environmental Values for Tasmanian Waterways is an initiative under the *State Policy on Water Quality Management 1997* which requires protected environmental values to be set for all Tasmanian surface waters (including estuarine and coastal waters). Other relevant programs deal with marine farming or the now disbanded Coast Care.

australia's actions to address land-based activities

Wastewater treatment in Tasmania is managed by Local Government. Across the State there are 49 plants that discharge to marine and coastal waters (including estuaries). In total, these plants are licensed to discharge around 60,000 ML per year to the marine and coastal environment. However, this total is an over-estimate of actual discharges and is also reduced by recycling (up to 8.4 per cent under licensing arrangements). Ten per cent of the discharges are tertiary and 15 per cent primary treated while the remainder is treated to a secondary standard.

CASE STUDY - DERWENT ESTUARY

The Derwent Estuary Program is a good example of a collaborative approach by local, state and federal governments to address the management of complex marine pollution issues. It is characterised by a robust non-statutory partnership with a dedicated Secretariat, coordinating a multi-sectoral program that is based on and guided by best available scientific research and monitoring, using adaptive and evolving management responses to problems.

The major issues relate to catch-up management of pollution consequences of urban and near-urban land use. An important focus of the program is management of heavy metal loads in groundwater and stormwater from industrial sites and in sediments affected by past pollution

Management of point source pollution through sewage and industrial waste processing is largely addressed through implementation of statutory controls to implement state, national and international standards as appropriate.

Management of diffuse source issues involves development and implementation of guidelines and best practice recommendations. Some of these have statutory components but most are implemented through non-statutory commitment of partner agencies to the Program.

research, monitoring and education

There is little in the way of State-based education programs relevant to the NPA, but a number of research and monitoring activities are underway. Principal among these are monitoring programs for pesticides and general water quality and mapping of marine benthic communities with links to the activities of Regional NRM bodies in the State.

effort directed at GPA categories

All relevant categories of GPA 'threats' are addressed by state initiatives. As with most other states the priority pollutants (sediments and nutrients) rightly receive the most attention. These are followed by habitat and coastal vegetation which are under threat in the developing coastal regions of the country. Unusual amongst the states, trace metal contamination was touched on by a range of initiatives including three Acts. This perhaps reflects the legacy of metal contamination in the Derwent River, which forms the centrepiece to Tasmania's capital, Hobart. Another important factor already mentioned above, is the underlying emphasis on water quality and protection of habitat to maintain the active aquaculture and fishery industries of the State.



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NORTHERN TERRITORY

legislation

The Northern Territory has two general purpose Acts relevant to land-based sources of marine pollution. These are the *Water Act 1992* and the *Waste Management and Pollution Control Act 1995*. These acts contain general provisions allowing for environmental protection, the enforcement of penalties, licensing and planning with respect to land based sources of pollution to waterways. As well as these two specific acts, the *Environmental Assessment Act* covers all potential environmental, social and economic impacts of new developments (including impacts on the marine environment) and makes recommendations that are then taken up by other acts such as the *Planning Act* and the *Mine Management Act*.

policies and strategies

A new strategy "The Conservation and Management of Coastal & Marine Biodiversity in the NT" is planned for release in late 2007. This plan will review the existing Northern Territory Coastal Policy and address relevant GPA threats, including pollution and habitat protection. The Draft Parks and Conservation Masterplan, due for release shortly, provides for the declaration and protection of representative areas across the state. The Northern Territory also has a draft Stormwater Management Strategy in development, an important mechanism for addressing diffuse pollution although only that from urban areas.

programs, capital works and economic instruments

Two relevant programs are underway. The first is the Integrated Natural Resource Management (NRM) Plan for the Northern Territory. Although this plan is equivalent to the regional plans of NRM bodies funded under Commonwealth NHT and NAP funding, it deserves particular mention as there is only a single regional body for the entire NT. This means that the new plan is a territory-wide endeavour. Moreover, the plan refers directly to protection of the marine environment from land-based sources of marine pollution, a strong focus not shared by all regional NRM plans with coastal responsibilities.

The other relevant program is the Caring for Sea Country Program which seeks to include local Indigenous communities in planning, policy, management and research arrangements for coastal management.

An important capital investment relevant to the GPA, as with the states, is wastewater treatment. Five Sewage Treatment Plants discharge treated wastewater to the coastal and marine environment in the Darwin area (the capital and most populous city of the Northern Territory). In the 2004-2005 period, these plants discharged a combined volume of 9232 ML to the marine environment of which half was treated to a primary, and half to a secondary standard of treatment. Secondary treated sewage effluents are also discharged from waste stabilisation ponds to the marine environment in a number of other small coastal communities and townships. These discharges occur under *Water Act* licences or with approval from the Department of Health & Community Services.

research, monitoring and education

The Marine Group (NRETA) has recently been created to oversee the coordination of marine biodiversity research, monitoring and education. Four projects (Marine Protected Areas, off-reserve biodiversity management, marine debris, coastal and marine database) funded under the NHT/National Action Plan for Salinity and Water Quality (NAP), address actions relevant to the GPA. There are also a number of smaller existing programs relevant to localised areas (e.g. see the Darwin Harbour case study, industry monitoring programs).

australia's actions to address land-based activities

Apart from the establishment of the Marine Group, there is little evidence of coordinated research, monitoring or education relevant to GPA threats. A notable exception is Nhulunbuy, where Alcan Gove (through CDU and AIMS researchers) is currently monitoring and assessing the impacts of marine pollutants in Melville Bay. This is being assisted by regional sea country planning activities being undertaken by Northern Territory Government in partnership with the Northern Land Council and Indigenous communities. The Dhimurru Sea Country Plan provides for the development of an integrated research and monitoring plan for Yolngu land-owners in Northeast Arnhem Land.

effort directed at GPA categories

The majority of the GPA pollutants are treated under two Northern Territory Acts. There is no specific legislation dealing with coastal habitat or vegetation, but aspects of these issues are addressed by a number of current or emerging strategies and programs dealing with protected areas, biodiversity and mangroves.

The NRM plan will have an impact on the way that GPA pollutants are addressed in the Northern Territory through the four new coastal and marine projects. A marine debris monitoring program started by WWF Australia in 2001 and now being undertaken by the Northern Territory government is an example of an initiative dealing specifically with litter which otherwise would be treated only generally under environmental protection legislation.

The small number of initiatives for the NT reflects its smaller population and consequently smaller magnitude of land-based impacts (and smaller resource base) compared with the States. Nevertheless, the Northern Territory has initiatives covering all GPA threats.

Recently the Northern Territory Government has focused a great deal of attention on developing a Management Plan for Darwin Harbour, the centre of population in the Northern Territory. This plan was created under the Northern Territory Coastal Policy (now under review and is explored in [Case Study 23](#)).





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LOCAL GOVERNMENT

Local government is the front line manager of many of the issues directly affecting pollution of the marine environment. Through catchments all local governments are linked to the issue of the quality of flows into the sea. On the coast the linkages and the pressures of actions and impacts are direct. The priorities of local governments in relation to marine pollution and the condition of waterways reflect the priorities of their ratepayers and residents.

Most Australian local authorities are facing issues of long term sustainability of access to fresh water and maintaining local environmental, heritage and recreational values. While issues of marine pollution may not be immediate priorities for local governments with no marine frontage, the volumes and quality of storm water, soil run-off and treated urban and industrial waste waters entering environmental water flows are important locally as well as downstream.

The issue of water cycle management and marine pollution come together at the coast. Here, urbanisation is placing increasing pressure on the environment, character, heritage and recreational opportunities of the coast. It is also increasing pressure on habitats, biological diversity and ecosystem processes through demand for land and infrastructure for transport corridors, supply of services and treatment of wastes. The rate of population growth in coastal areas outside capital cities is more than 60 per cent higher than the national average. This growth is typically associated with tourism that injects revenue and generates employment but further increases demand for public services.

Local governments in Australia operate under state or territory legislation. While there are many broad similarities, the scope of arrangements differs among states and territories. Local governments are key agents in implementation of legislation and policies of a broad range of government departments or agencies. They have clear and accountable responsibilities for environmental matters that directly affect human health such as water supply and treatment of solid and liquid wastes. They typically discharge responsibilities under state environmental legislation for land use planning, approvals and conditions for development, and some forms of environmental monitoring and reporting.

Whatever the legislative context, local government does not address the issues of catchment management and marine pollution in isolation. Effective action involves partnership of local communities, industries, local, state, territory and Australian governments.

The development and implementation of all the actions in the local case studies (cited in this publication and on the accompanying CD) have involved partnerships which integrate Australian and state government policies with funding and direct participation by all three spheres of government and voluntary action by local people. Local government is a key player in on-site activities and engagement with local people but the case study summaries reflect a wide spectrum of situations of local government involvement in governance and management of projects relating to land-based sources of marine pollution. At one extreme are councils with responsibilities for total water cycle management in entire catchments from hilltops to the ocean. This is the case for Douglas Shire in Queensland. At the other extreme are formalised multilateral partnerships addressing catchments in South East Queensland, the Derwent in Tasmania and the Peel Harvey Catchment in Western Australia. Between is a range from two council partnerships – as with the Townsville and Thuringowa Cities *Creek to Coral* Program, to associations of neighbouring councils in the cases of the Association of Bayside Municipalities of Port Phillip Bay, Victoria.

The case studies demonstrate the importance of active long term engagement of local communities, local industry and local government for implementation of programs to address the water cycle and pollution of the sea from land. Success depends on achieving change in attitudes and household behaviour for conserving water, and reducing pollution. Cleaning and maintenance of watercourses and wetlands and regenerating damaged habitats require substantial and long term effort beyond the capacity of local government workforces. In all of the local government case studies community and non-government groups invest substantial effort in community education and local site management.

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Residents of local governments with economies based on coastal lifestyle, recreation and tourism are generally more likely to be sensitive to environmental impacts and to support measures to sustain or improve the quality and natural recreational amenity of the marine environment. However demand for residential and retirement coastal lifestyle frequently drives a tension within communities and local governments between maintaining or improving current conditions for existing residents and realising the economic benefits of ongoing development and an increasing population. These tensions are typically reflected in differences of priority in local government financing between costs of provision of public services to maintain the amenity and environment of existing properties, and the opportunities to increase council and commercial income through increasing rateable value through further development and infrastructure to meet the demands of an increasing population.

Upstream areas away from the coast typically have economies based on agriculture where costs of housing, rates and service provision levels are usually low in comparison with coastal and urban areas. Cropping and grazing in such upstream areas are major economic activities but can generate significant runoff loads of silts, agricultural fertilisers, animal waste and pesticides. For most agricultural activities, measures to reduce downstream pollution require direct and personal actions and commitment by land owners and occupiers. The necessary changes in practice cannot simply be achieved through regulation and enforcement. Without substantial persuasive effort through education, demonstration and technical extension such measures can easily be seen as additions to the costs of local communities for the benefit of wealthier downstream communities.

Applied research and agronomic practices such as those developed to reduce the pollution of Great Barrier Reef waters are producing an increasing number of examples of reducing pollution while reducing farm costs and increasing profitability. Despite the prospect of such mutual benefits the preparatory education and extension for widespread adoption typically requires sustained effort over a decade or more. If the case for new practice is not broadly accepted, adoption levels are likely to be low and the cost of effective enforcement high. Government extension programs, local community groups and programs and economic groups such as the fertiliser industry can play important roles in identifying and promoting measures that protect soil fertility and economise on the use of water, fertilisers, herbicides and pesticides.



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CASE STUDY – INTERNATIONAL COUNCIL FOR LOCAL ENVIRONMENTAL INITIATIVES

Local government is the front line for management of many of the issues directly affecting the quality and in some cases the quantity of water entering the marine environment. The ICLEI-ANZ Water Campaign provides a framework and support for local governments addressing issues that include reducing pollution entering the sea from coastal catchments and land areas. The campaign framework also supports councils to reduce water use within council operations and within their municipal communities.

Established in 1990, the International Council for Local Environmental Initiatives (ICLEI) is an international association of local government agencies to promote and support activities of local government organizations that have made a commitment to sustainable development. A major program of its Australia and New Zealand office (ICLEI-ANZ) is its proprietary Water Campaign which is a capacity building program that supports councils to address water resource management through a performance-based milestone framework. It has 79 participating local governments which receive ongoing support and technical information to build their capacity to address water quality and water conservation issues in their daily operations, and in the community. The campaign receives strong support from the Australian Government and participating state government agencies.

The campaign addresses a combination of economic and environmental objectives. Economic objectives include reducing water consumption, demand for potable water supply and peak flow in urban waterways and increasing the use of waste water, and on-site detention of storm water. Environmental objectives include reducing water consumption and levels of silt, nutrients and chemicals entering local waterways and increasing protection of local environmental values, processes, recreational and cultural amenity. While the objectives may not focus directly on protection of marine ecosystems their achievement at the catchment level can be an important element in reduction of pollution and in education and involvement of communities in the water cycle management responsibilities.

Recent attention to the issue of security of longer term water supply has focussed on the management, treatment and appropriate use of stormwater and processed outputs of treatment plants in order to reduce demands for primary water harvest and potable water, to maintain environmental flows and regenerate aquifers. Where the cost-effective solution to upstream pollution used to be seen as dilution, there is increasing attention to treatment to remove pollutants and reuse water. This is reflected in the adoption of guidelines for Water Sensitive Urban Design in several of the local government case studies and in programs such as the ICLEI-ANZ Water Campaign. The synergy of management of water security with pollution reduction has the potential to change the economic dynamics of local reduction of the levels of silts, nutrients and chemicals entering catchment water flows.

An example of this is the City of Salisbury, South Australia, and adjacent municipalities of northern Adelaide where aquifer re-charge from treated stormwater is providing water security for an area affected by water shortage. Treated stormwater flows beyond the capacity for aquifer recharge continue down the water courses with an apparent but as yet unreported reduction in pollutant levels reaching the marine environment.

Associations of local governments are important in providing for collective development, support and introduction of programs that would otherwise be beyond the in-house capacity of all but the largest units. Case study examples are the development of Water Sensitive Design Guidelines by the Municipal Association of Victoria and the water campaign of the International Council for Local Environmental Initiatives- Australia New Zealand (ICLEI-ANZ).

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CASE STUDY – SOUTH EAST QUEENSLAND HEALTHY WATERWAYS PARTNERSHIP

The South East Queensland Healthy Waterways Partnership bridges the gaps between scientific organisations, government agencies, industry groups and the community. Coordinating an integrated program of waterways-focussed research, planning and policy enables the Partnership to identify solutions and develop tools that help partners and supporters make better management decisions and set meaningful targets, as well as providing a means for monitoring the outcomes of their actions.

The success of the Partnership's approach is underpinned by:

- a clear vision;
- a cooperative approach across the South East Queensland Region, with 18 local governments and a range of other partners, strong support from the State Government and financial backing from the Australian Government;
- a sound understanding of the health of the watershed as well as Moreton Bay derived from a comprehensive Ecosystem Health Monitoring Program;
- targeted research to address issues requiring appropriate management actions;
- identification of management actions on the basis of a sound understanding of the waterways and rigorous public consultation;
- a results-focussed set of management actions that individually are clearly owned by those elements of government, industry or the community which are responsible for implementation;
- positive successes from the expenditure of significant financial resources in remedial work, especially from the reduction of point sources of pollution such as discharges from sewage treatment plants; and
- a comprehensive marketing and communications program.



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NON-GOVERNMENTAL ORGANISATIONS AND INDUSTRY

Broadly-based national non-government organisations including the Australian Marine Conservation Society (AMCS) and the World Wide Fund for Nature (WWF) address the importance of management of marine pollution in their national campaigns and are involved in national and state advisory groups. Others such as the Wilderness Society are not directly engaged in marine pollution but their activities in relation to land degradation are particularly relevant in the context of the quality of water reaching the sea from affected catchments.

The broad public concern at the impacts of marine pollution and conservation issues was first captured in the late 1980s in Clean Up Sydney Harbour Day and subsequently expanded through establishment of Clean Up Australia Day. The Surfrider Foundation was established to protect access and quality of natural areas for surfing and other coastal nature-based recreation. These initiatives grew from the experience and concern of people involved in marine recreation in natural environments and have attracted mass volunteer support, funding and in-kind resources for their projects. Clean Up Australia estimates that in the past 16 years volunteers have devoted more than eight million hours in clean up activities that have collected more than 200,000 tonnes of litter.

Many coastal communities have a range of local groups and individuals who are potential volunteers for practical on-ground conservation and public awareness work. Unlocking that potential can require advice and support to build local organisations to support activity. There can be a range of needs depending on the skills and experience that potential volunteers bring in a particular context. Some programs have been developed to focus on capacity building and networking and peer support. They provide the organisation, information and skills to the volunteers to enable them to engage in necessary activities on the ground and in effective public awareness and to maintain and build further support for action. An example of this is the Waterkeepers Program which is active in Victoria and Tasmania as an umbrella group which provides a range of practical support to component local independent bodies. The support from Waterkeepers ranges from help in establishing incorporated bodies to deal with legal and public liability issues, to training in fundraising and public awareness, ongoing current awareness and peer group networking and contact with scientists and other specialists for technical support.

The management of volunteer programs involves specialist skills that are not necessarily available within local government organisations. It also involves issues of insurance and liability for volunteers and their work. Conservation Volunteers Australia specialises in managing volunteer projects. It is managing volunteer action and education programs within, *inter alia*, the Townsville and Thuringowa Cities *Creek to Coral* Program. Since 2000 it has also operated a broad program "*Revive Our Wetlands*" that has involved more than 17,000 volunteer days applied to a wide range of activities.

Engagement of industry and commercial interests is an important component of community action. The most basic level of involvement is through reactive compliance with regulatory and licensing requirements for management of pollution and emissions from operations. More substantial is engagement in organisational and consultative groups with proactive identification and adoption of potential operational improvements to pollution and emissions as is the case with the Zinifex Hobart Smelter in the Derwent Estuary, Tasmania and Western Dairy in the Geographe Bay area in Western Australia. Financial and in-kind sponsorship of program elements provides practical support and political depth to community and local government partnerships.

Direct engagement of industry associations in identifying and promoting means of reducing pollution and impacts of their activities is particularly important for introduction and uptake of new methods. The case study of the Fertilizer Industry Federation of Australia provides an example of such engagement.

australia's actions to address land-based activities

CASE STUDY – FERTILIZER INDUSTRY FEDERATION OF AUSTRALIA

The Fertilizer Industry Federation of Australia, Inc. (FIFA) demonstrates a responsible approach to confronting the environmental and health problems that can result through the manufacture, storage, distribution and use of an industry's products.

The fertiliser market's significant size and the proximity of farmland and natural ecosystems indicate that fertilisers may contribute to adverse environmental impacts. Eutrophication of inland and coastal waterways is of greatest concern, and can lead to adverse impacts on marine environments.

In 2002, FIFA signed an "Eco-Efficiency Agreement" with the Australian Government, detailing actions to reduce the adverse ecological and human health impacts of the industry's products, including:

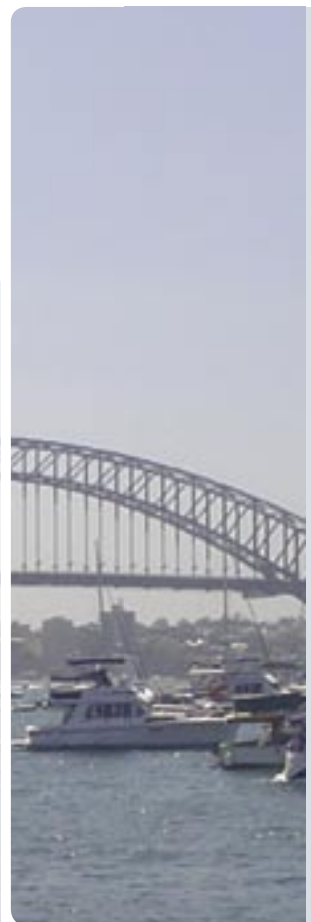
- the industry's training, quality assurance and accreditation program Fertcare for managing environment and food safety issues;
- the Fertcare Accu-Spread program assessing fertiliser spreading equipment;
- the industry 's environmental performance is independently assessed annually; and
- publishing quarterly *The Fertilizer*.

FIFA members employ a suite of environmental management tools and member companies have invested more than \$10 million in research. In 2004, FIFA convened an international conference to discuss environmental management, and made industry environment awards. It promotes soil testing and nutrient planning in the Great Barrier Reef catchments. In 2005, FIFA entered into a National Landcare Program Industry Partnerships Agreement.

By 2005 most companies had adopted environmental policies, plans, procedures and management systems. More than half of the industry staff had environmental performance objectives in their employment contracts. The sites reporting license conditions breaches dropped from 249 in 2002 to four in 2005.

four

lessons learned





lessons learned

The history of addressing water quality issues in Australia is a recurring sequence of problem identification, development of guidelines and codes of practice, and legislation and enforcement to underpin implementation of actions to address the water quality problem. Such management is relatively straightforward and amenable to supporting legislation when it relates to specific locations or point sources. In this regard, there is a raft of legislation, policy, programs and strategies across all Australian jurisdictions to prevent land-based impacts on the marine environment. Governments have legislation dealing with pollution control to waterways and the marine environment covering the majority of NPA 'threats' (e.g. *Victorian Environment Protection Act 1970* or NT's *Waste Management and Pollution Control Act 1995*). The focus of most of this legislation is usually point-source pollution and function primarily through enforcement of offence and penalty provisions.

In many Australian states, legislation to control pollution is linked to planning legislation which *inter alia* seeks to manage ecologically sustainable development for the marine environment. Good examples are Queensland's *Integrated Planning Act 1997* and the *State Environmental Planning Policy 71 – Coastal Protection* in New South Wales. In several jurisdictions planning legislation is complemented by law aimed specifically at protecting the coastal environment from development pressures (for example, Western Australia's proposed *State Coastal Planning Policy* or the *Coast Protection Act 1972* in South Australia).

The most recent water quality issue to be addressed is that of silt, debris and nutrient pollution from diffuse sources, such as stormwater runoff. Management is complicated and variable depending on the intensity and frequency of rainfall. Several urban case studies reflect significant progress through implementing water sensitive urban design and development approval regulations requiring treatment and discharge standards for stormwater runoff in local government areas. This process has been assisted because of opportunities to use treated stormwater to augment or substitute for primary treated water supply. The planning and regulatory framework for urban development provides a legislative basis for water sensitive urban design.

A more widespread issue is that of stormwater runoff from land used for primary production. The case studies include examples of development of agronomic practice in cropping to reduce runoff of fertilizers, pesticides and silt. There are commercial economic incentives through retention of soil fertility and reduced costs through more efficient and targeted use of chemicals, but changes in practice typically require substantial effort through demonstration and extension programs over several years. Widespread introduction of such measures depends on their acceptance by many individual primary producers.

Silt runoff from land used for grazing can be a significant pollution source and presents further management problems. The problems are particularly acute in areas where the profitability of grazing businesses is marginal and erratic because low rainfall and recurrent drought produce unreliable pasture and stocking levels. These areas can be substantial sources of silt pollution in time of flood. Significant reductions can be achieved through measures such as fencing to protect a buffer strip of vegetation on water courses and major drainage lines and through early stock reduction in times of drought, but such measures are beyond the financial reach of marginal businesses. Addressing this water quality problem will involve complex economic and social issues.

A phenomena common in many jurisdictions is the absence of high-level coordination for research, education or monitoring initiatives aimed at either point or diffuse sources of marine pollution. This represents a significant gap in any approach to reducing marine pollution and habitat destruction.

The following are some of the lessons learned from successful Australian programs to protect the marine environment from land-based activities.

lessons learned

co-operative approaches

Implementation of most programs is jurisdictionally and administratively complex. Authority and funding typically involve legislation and associated instruments spread across all spheres of government and through various funding programs. Specific management tasks and responsibilities may be carried out by government agencies, mandated through regulations or devolved to community groups or NGOs. As a consequence GPA issues in Australia are generally addressed through an approach that recognises:

1. no single agency has responsibility or jurisdictional power across the coastal zone;
2. coastal management is generally more successful when all major stakeholder groups are engaged; and
3. the need for 'co-operative federalism', through such mechanisms as the Framework for a National Cooperative Approach to Integrated Coastal Zone Management (ICZM Framework) and associated Implementation Plan.

Despite broad recognition of the need for co-operative arrangements, there are commonly many barriers to their establishment and maintenance. However, several integrated programs have demonstrated how such barriers can be overcome.

Most of the case studies are examples of programs where community organisations have been a major driving force to achieve integrated management. Their commitment and energy have built and maintained complex co-operative arrangements under very different circumstances. This is an important strength.

An emerging strength is the growing recognition of synergy between protecting marine environments, and managing pollution of river systems, groundwater and stormwater because of concerns over water supply and re-use. The case studies of Hornsby Shire and Salisbury are examples of co-operative programs delivering benefits to marine environments through objectives not primarily related to preventing marine impacts. The Port Phillip Bay, Townsville Creek to Coral and the Derwent Estuary Program case studies contain examples of stormwater management to address marine pollution through water use efficiency outcomes.

The issue of well-coordinated co-operative arrangements being hampered by institutional barriers is reflected at a broader level in the ICZM Framework. The Plan has high-level support and well-developed co-operative mechanisms and will better integrate and harmonise existing activities.

strong leadership networks

Experience indicates that successes arise when there is strong leadership, including local champions. Effective leadership teams need individual members who are prepared and supported to be the public face of reform and who have the personal skills to engage in and drive robust processes of vision development and action planning with a broad community of interests. They also need the capacity to build and maintain leadership networks of official and community players at different scales and within and between governments.

Effective on-ground programs require complex co-ordination of policy and actions within and among the community, industry groups and the departments and agencies of all three spheres of government. Leadership must create a framework of quality strategic design, commitment to process as well as content, and the ability to work within the capacity of the respective communities and key stakeholders. Community trust is essential, and is only given where the leadership is dedicated to the program's objectives, and not driven by organisational or personal ambitions.

Such leadership requires tactical and strategic skills with the judgement to balance risk and caution and the ability to perceive, create and capitalise on opportunities.



lessons learned

The leader or leadership team requires a comprehensive marketing and communications program to reach out within and beyond the partnership. They also need to create respected and trusted independence so that they can work with all government, community and industry partners without being captured by any of them.

setting a baseline

While there may be general awareness and need to manage a particular marine environment there is often inadequate information on specific symptoms or management issues. This is complicated by the need to act typically coming after decades of increasing human activity have changed the nature of the ecosystems and their capacity to accept human impacts. In a number of instances, such as for the Douglas Shire Water Quality Improvement Plan, studies have related current pollution loads to probable baseline pre-European local settlement levels.

An example of good baseline knowledge is the South East Queensland partnership program which developed a sound understanding of the health of all sections of the watershed as well as Moreton Bay. This was derived from a comprehensive and continuing Ecosystem Health Monitoring Program which delivers an integrated regional assessment of the health of South East Queensland waterways and Moreton Bay. The Derwent Estuary provides a similar example of a program built on solid scientific understanding of pollution sources, loads and environmental quality data.

long term vision and targets

A common element of successful programs is a clear, long-term vision extending beyond normal geographic, jurisdictional, sectoral and temporal boundaries. Partnership programs generally require broad community agreement on a long-term vision, with a time frame beyond the normal administrative time horizon. This may be one or even two or more decades. The visions for successful programs are very similar, combining elements of healthy and diverse ecosystems supporting recreational and commercial livelihoods and lifestyles with concepts of sustainability, harmony, pride and collaboration in management.

The process for developing the precise wording for the program vision is important for developing mutual understanding and building trust. A key integrating instrument in this respect is the National Water Quality Management Strategy which includes clear guidance on developing shared visions for improved water quality.

A thoroughly discussed and broadly supported long-term vision is an important reference point for assessing and prioritising management actions and periodically reviewing ongoing programs on the basis of their contribution to realising the vision. This can provide a clear indication of situations where short-term pressures and actions are leading to unsustainable or unacceptable outcomes.

The need for action to protect the marine environment may not be seen as high priority in the upper catchment. This recognition is demonstrated in the Swan Coastal Plain and Gippsland Case Studies and in the links between coastal management and the activities of several community-driven regional bodies in the ReefPlan case study.

A characteristic element of successful programs is clarity of purpose or performance objectives, unambiguous assignment of specific responsibilities to specific accountable agencies, and measurable indicators of management action and performance outcomes. For example, The South East Queensland Healthy Waterways Partnership Program has specific 2020 action targets for wastewater re-use.

Other common targets include specific requirements for frequency of activities such as inspection or monitoring to determine environmental condition; and enforcement and education to address compliance with management conditions.

lessons learned

change management

Examples of good practice typically address issues identified in two or more decades of research, monitoring and demonstration. The progression to action to address the issues reflects awareness raising and determined championing to achieve integrated commitments to change in complex operational situations.

Recognition of the need to manage pollution reaching marine environments from land-based activities is relatively recent. Addressing that need involves major changes in practice and behaviour of individuals, businesses and governments. Such changes can take substantial time to become accepted practice. At a personal level, these include personal responsibilities for litter, household wastes, gardening practice, management of pet animals, fishing and boating behaviour, and consumption patterns. At a corporate level, they include industrial responsibilities and cost acceptance for waste management and ecologically sustainable land use practices in agriculture and urban development. Government responses may include financing of capital and recurrent expenditure for sustainable outcomes. Such changes raise substantial issues of inter-government co-operation and governance and of national, state and local, and private/public sector responsibilities with respect to costs and benefits of management or management failure.

The natural pace of change in most of these areas is decadal if not generational. This is because the changes are to institutional structures, in human capital, and in attitudes and culture, which must be strategically planned, and continuously evaluated and adapted. Further, changes to manage NPA issues are part of a broader spectrum of changes in social values, attitudes and expectations flowing from economic growth, new information, cultural experience and education. As impacts are understood, so too are the constraints to containing, halting or reversing the impacts, which may take time to become accepted or integrated into management. This points to a need to carefully manage economic growth while addressing rehabilitation and remediation needs.

An example is the Derwent Estuary program partnership which is addressing heavy metal pollution in sediments affecting seafood to levels that are unacceptable under the Food and Safety Australia and New Zealand Guidelines. The issue has been well documented since the 1970s but it was two decades before the necessary attitudinal and institutional changes occurred to address heavy metal pollution management within a comprehensive management strategy.

Although recognition and management for change should require less lead time for new projects, it remains the case that time is needed to create acceptance of the scale and nature of changes needed to manage land-based activities.

monitoring, evaluation and review

Consistent, publicly available and peer-reviewed information about outcomes is essential if management is to be adaptive and responsive to performance and change. The systems and tools required to do this effectively include long-term data collection protocols, data and metadata management, statistical analysis, predictive modelling, and the capacity to report results clearly using plain language and images.

Reporting of environmental condition should be accompanied by monitoring levels of human activities and impacts affecting and changing land use, water quality, natural resources and ecosystem processes. This reporting should also be balanced with monitoring of management responses to priority issues. In this way communities of interest are judged not only on their performance, but also on the 'effort' being directed to key issues.

Thus, the South East Queensland Ecosystem Health Monitoring Program is of crucial operational importance in providing data to assess the extent and effectiveness of management actions relating to the condition of Moreton Bay and its catchment, and providing the receiving water quality monitoring required by EPA licensing. This and Derwent Estuary example have the combined strengths of data-rich reporting of substantial monitoring and evaluation programs with web-based and media-backed public report card presentations.



lessons learned

The scope and strategy of monitoring and evaluation systems and the reporting of their results show wide variety. It can be argued that some standardisation of approach with mandatory external peer review and oversight of these programs would provide performance audit strength for maintaining long term standards in publicly funded programs.

Without quality monitoring and evaluation programs in place and operating routinely, there is no cycle of feedback to decision makers and the community to re-affirm the value of the investments they have made to improve the environmental conditions. This breeds a one-off project mentality about environmental management and restoration which does not lead to the long-term acceptance and monitoring of responsibility needed to protect marine environments.

Commitment to regular program and strategy review and renewal is important. Primary information sources for review are the results of monitoring of the condition of the managed environment and performance evaluation of implementation of management actions. These will generally suggest areas in which the strategy or implementation can be improved.

targeted research

All management to protect the marine environment from land-based activities should involve robust research specifically undertaken to develop and improve management practices. Areas of need include design and implementation of measures to reduce impacts of specific activities, to enhance predictive modelling, of combinations of activities in the ecological processes and natural resilience or self-repair capacity of the affected ecosystems. Management also requires research to design and refine long term monitoring of the state of managed environments and the behaviour of people in relation to compliance with management constraints and the conduct and levels of activities permitted within plans and supporting regulations.

recognition of success

Management to protect the marine environment from land-based activities addresses an area of wide public concern. Much of the information that reaches the public media highlights new or increasing problems and can give the impression that they are not being addressed. This NPA contains substantial examples that show that with co-operation, leadership, resourcing and commitment, significant changes can be achieved by groups and individuals. New practices can remove or reduce impacts, activities can be conducted sustainably, and damaged areas can be rehabilitated.

Awards or public recognition of success and contributions are particularly important for ongoing local community-based programs. They recognise the contributions of the recipients and they bring broader public attention to the achievements of the programs.

five

conclusion





conclusion

The need to address land-based sources of marine pollution and protect coastal and marine environments and biological diversity is accepted in all three spheres of Australian government and through Australia's participation in regional and global programs.

A strength of the Australian approach is the diversity of mechanisms used for managing the GPA threats. Vertical diversity, or the range of instruments available to manage each GPA category, adds to the capacity to minimise pollutants and protect habitat in a manner that is fit-for-purpose. Horizontal diversity: the different mechanisms developed by each state, territory and the Commonwealth allows for innovation and recognition of differing climatic, social and economic status and development around the nation. It can also promote learning among the different jurisdictions and allow local or regionally-based groups to flourish.

An ongoing challenge of the Australian system is that the diversity of approaches and issues with integration can result in duplication or gaps in effort, and inadequate coordination and communication. A number of mechanisms, however, are in place to overcome some of these issues. Good examples are provided by the Reef Water Quality Protection Plan and the Australian Government's Coastal Catchments Initiative (CCI).







glossary of terms

Australian Government Water Fund - The Australian Government Water Fund is a \$2 billion Australian Government programme to invest in water infrastructure, improved water management, and better practices in the stewardship of Australia's scarce water resources. The Fund supports practical on-ground water projects that improve Australia's water efficiency and environmental outcomes.

Australian Government - For the purpose of this document Australian Government refers to the Government of the Commonwealth of Australia (see **Commonwealth of Australia**).

Biodiversity - Biodiversity is the variety of all life forms: the different plants, animals and micro-organisms, their genes and the ecosystems of which they are part.

Coastal Catchments Initiative(CCI) - a \$34 million programme of the Australian Government's Natural Heritage Trust, implemented in partnership with state and local governments, and regional natural resource management organisations.

The CCI seeks to achieve targeted reductions in land-based pollution to coastal water quality 'hotspots', pursued through the development and implementation of Water Quality Improvement Plans (WQIPs). WQIPs are prepared in accordance with the Australian Government's *Framework for Marine and Estuarine Water Quality Protection*.

Coastal Zone - Includes coastal waters and those areas landwards of the coastal waters where there are processes or activities that affect the coast and its values.

Coastal Zone Management - Includes the protection, conservation, rehabilitation and ecologically sustainable development of the coastal zone through coastal planning, and managing coastal use and development.

Commonwealth Environment Research Facilities (CERF) - CERF is an investment of \$100 million over five years by the Australian Government to world-class public good research. The programme will see funding allocated to two broad streams of research: \$60 million will be allocated to advance our understanding of current and emerging challenges facing the conservation and use of the nation's environmental assets; and \$40 million has been allocated for a Marine and Tropical Sciences Research Facility, located at James Cook University, to support vital research relating to the Great Barrier Reef and its catchments, including tropical rainforests, and Torres Strait.

Council of Australian Governments' (COAG) - COAG is the peak intergovernmental forum in Australia, comprising the Prime Minister, State Premiers, Territory Chief Ministers and the President of the Australian Local Government Association (ALGA). The then Prime Minister, Premiers and Chief Ministers agreed to establish COAG in May 1992. It first met in December 1992. The Prime Minister chairs COAG. The COAG Secretariat is located within the Australian Government Department of the Prime Minister and Cabinet.

The role of COAG is to initiate, develop and monitor the implementation of policy reforms that are of national significance and which require cooperative action by Australian governments. Issues may arise from, among other things: Ministerial Council deliberations; international treaties which affect the states and territories; or major initiatives of one government (particularly the Australian Government) which impact on other governments or require the cooperation of other governments.

Commonwealth of Australia (the Commonwealth) - There are three levels of government in Australia: Commonwealth Government (referred to in this document as the Australian Government); State and Territory Government and Local Government.

Australian Government - The Australian Government passes laws which affect the whole country. The Australian Constitution defines a number of issues that the Australian Government can make laws on. There are three 'arms' of the Australian Government:

- the legislature (or parliament) is responsible for debating and voting on new laws to be introduced under the power of section 51 of the Constitution.

glossary of terms

- the executive is responsible for enacting and upholding the laws established by the legislature.
- the judiciary is the legal arm of the Commonwealth Government and is responsible for enforcing the laws and deciding whether the other two arms are acting within their powers.

State and Territory Government - Six states joined together to form the Commonwealth of Australia and the Australian Government. Each retain the power to make their own laws over matters not controlled by the Australian Government under the Constitution. State governments also have their own constitutions, as well as a structure of legislature, executive and judiciary.

Territories are areas within Australia's borders that are not claimed by one of the six states. Territories can be administered by the Australian Government, or they can be granted a right of self-government. The Constitution of Australia allows territories to become states with the approval of the Commonwealth legislature.

Local Government - Local governments are established by state and territory governments to take responsibility for a number of community services. Their powers are defined by the state or territory government which established them. Local governments are also known as local councils.

Cooperative Research Centre (CRC) - The CRC Programme was established in 1990. The objective of the Programme is *"to enhance Australia's industrial, commercial and economic growth through the development of sustained, user-driven, cooperative public-private research centres that achieve high levels of outcomes in adoption and commercialisation."*

The CRC Programme was established to bring together researchers and research users. The programme emphasises the importance of collaborative arrangements to maximise the benefits of research through an enhanced process of utilisation, commercialisation and technology transfer. It also has a strong education component with a focus on producing graduates with skills relevant to industry needs.

There are currently 57 CRCs operating in six sectors: environment (14), agriculture and rural-based manufacturing (15), information and communication technology (5), mining and energy (7), medical science and technology (8) and manufacturing technology (8). Since the commencement of the CRC Programme, all parties have committed more than \$11 billion (cash and in-kind) to CRCs. This includes more than \$2.6 billion from the Australian Government CRC Programme, \$2.8 billion from universities, \$2.1 billion from industry and more than \$1.1 billion from CSIRO.

Economic Instruments - Economic instruments are tools, such as levies/charges, pollution offset schemes and tradeable permits, that when used appropriately can entail least cost solutions to environmental problems, provide greater flexibility and encourage innovation. Economic instruments can be used on their own or in combination with other measures to improve the efficiency of environmental protection efforts.

Ecosystem Services - Ecosystem services are the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfil human life. Examples include provision of clean water, maintenance of liveable climates (carbon sequestration), pollination of crops and native vegetation, and fulfilment of people's cultural, spiritual, intellectual needs.

Environmental Flow - Environmental flow refers to the timing, quantity, quality and duration of water flows required to maintain waterway health and interactions between the catchment, floodplain, wetland, groundwater and stream. Effective management of environmental flows requires understanding of these interactions.

Environment Protection and Biodiversity Conservation ACT 1999 - The Australian Department of the Environment and Heritage administers the *Environment Protection and Biodiversity Act 1999* (EPBC Act). Under the EPBC Act, the Commonwealth can:



glossary of terms

- list key threatening processes: processes which may threaten the survival, abundance or evolutionary development of a native species or ecological community processes such as foxes, feral cats, feral pigs, fire ants and root rot fungus; and
- develop and implement threat abatement plans: plans which provide for research, management, and any other actions necessary to reduce the impact on Listed Key Threatening Processes on a listed threatened species or ecological community.

Ecologically Sustainable Development - Ecologically sustainable development is the using, conserving and enhancing of community resources so that ecological processes can be maintained now and in the future, can be increased.

Ecologically Sustainable Development (ESD) Reporting - the Environment Protection *and Biodiversity Conservation Act 1999* (EPBC Act) requires Australian Government organisations to include in their Annual Reports a section detailing the environmental performance of the organisation and the organisation's contribution to Ecologically Sustainable Development (ESD).

Estuary - An estuary is broadly described as a semi-enclosed coastal water body where saltwater from the open sea mixes with freshwater draining from land or where marine and fluvial sediments occur together.

Framework for a National Cooperative Approach to Integrated Coastal Zone Management (ICZM Framework) - The ICZM Framework outlines an approach to national cooperation in managing coastal issues and achieving ecologically sustainable development outcomes in the coastal zone over the next decade.

GPA - The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities. The United Nations Environment Programme provides the Secretariat to the GPA.

Integrated Coastal Zone Management (ICZM) - The fundamental goal of ICZM is to maintain, restore and improve the quality of coastal ecosystems and the societies they support. A defining feature of ICZM is that it seeks to address both development and conservation needs within a geographically specific place and within a specified timeframe.

Local Government - Local governments are established by state and territory governments to take responsibility for a number of community services (see **Commonwealth of Australia**).

Ministerial Councils - The particular importance of ministerial councils in the Australian context is to facilitate the implementation, nationally, of plans and proposals which would not otherwise be possible because of the limitations imposed by the division of constitutional powers between the Australian, state and territory governments.

Natural Resource Management Ministerial Council (NRMMC) – The NRMMC consists of the Australian, state, territory and New Zealand government ministers responsible for primary industries, natural resources, environment and water policy. The Council is the peak government forum for consultation and, where appropriate, integration of action by governments on natural resource management issues. The agreed objective of the Council is to promote the conservation and sustainable use of Australia's natural resources. Papua New Guinea and the Australian Local Government Association participate in meetings as observers.

The Natural Resources Standing Committee supports the NRMMC in the achievement of its objectives and develops cooperative and coordinated approaches to matters of concern to the council. Department Heads or Chief Executive Officers of the government agencies responsible for natural resource policy issues are members of the Natural Resource Management Standing Committee. Papua New Guinea is an Observer.

Marine and Tropical Sciences Research Facility (MTRSF) - See "Commonwealth Environment Research Facilities (CERF)".

glossary of terms

National Action Plan for Salinity and Water Quality (NAP) - At the meeting of the Council of Australian Governments in November 2000, the Australian, state and territory governments agreed to the NAP. This programme, the first of its kind, tackles two of Australia's most serious environmental issues, salinity and water quality.

The NAP provides for Australian, state and territory governments to jointly invest \$1.4 billion. These funds are to support the actions of communities and land managers in priority regions across Australia to manage salinity and improve water quality through comprehensive natural resource management plans and investment strategies. In essence, achieving national objectives through regional solutions at regional problems.

The goal of the NAP is to motivate and enable regional communities to:

- prevent, stabilise and reverse trends in dryland salinity affecting the sustainability of production, the conservation of biological diversity and viability of our infrastructure; and
- improve water quality and secure reliable allocations for human uses, industry and environment.

National - In the context of this document, national action means action undertaken cooperatively between the Australian, state and territory governments.

National Principles for the Provision of Water for Ecosystems - The purpose of these National Principles is to provide policy direction on how the specific issue of water for the environment should be dealt with in the context of general water allocation decisions. The goal for providing water for the environment is to sustain and where necessary restore ecological processes and biodiversity of water dependent ecosystems.

Natural Resource Management Ministerial Council (NRMMC) - See **Ministerial Councils**

National Environment Protection Measure (NEPM) - NEPMs are broad framework-setting statutory instruments, defined in the *National Environment Protection Council Act 1994* (NEPC Act), that outline agreed national objectives for protecting or managing particular aspects of the environment.

Natural Heritage Trust (the Trust) - In 1996, the Australian Government established the Trust to help restore and conserve Australia's environment and natural resources. The Trust has total funding of \$3 billion over 12 years to 2007-08. At least \$350 million will be spent on measures to improve Australia's water quality.

Through the Trust, the Australian Government takes long-term, coordinated approach to tackling the major environmental challenges facing the nation. The Trust will deliver important resource condition outcomes including improved water quality, less erosion and improved soil condition, improved estuary health, improved vegetation management, more sustainable agricultural practices, and better protection for threatened ecosystems. It does this by providing funding for environmental and natural resource management activities at a community level, a regional level and a national/state level.

National Programme of Action for the Protection of the Marine Environment from Land-based Activities (NPA) - The NPA builds on the *National Cooperative Approach to ICZM* and illustrates the specific activities of governments in Australia to address land-based sources of pollution, including laws, policies, strategies and programmes.

The National Pollutant Inventory (NPI) - The NPI is a publicly accessible database containing information on substance sources and emissions to the Australian environment. The NPI contains two types of data – emissions from facilities and diffuse emissions.

National Water Initiative (NWI) - The overall objective of the NWI is to achieve a nationally compatible market, regulatory and planning based system of managing surface and groundwater resources for rural and urban use that optimises economic, social and environmental outcomes. These outcomes will include reducing pollutant discharges to coastal waters.



glossary of terms

National Water Quality Management Strategy (NWQMS) - The NWQMS consists of 21 guideline documents, which provide the principles for managing key elements of the water cycle. The aim of the guidelines is to help the community, catchment managers, environment protection agencies and water authorities protect water quality, including developing local action plans for water quality management.

OzEstuaries - OzEstuaries is a database provides comprehensive information about Australian estuaries and coastal waterways. This information helps to generate a better understanding of coastal environments, the complex processes that occur in them, the potential environmental health issues and how to recognise and deal with these issues. OzEstuaries represents the collaborative efforts of more than 100 coastal scientists from a range of government agencies and universities (<http://www.ozestuaries.org/>).

Ramsar Convention (Ramsar) - The Ramsar Convention (Ramsar, Iran, 1971) was the first intergovernmental treaty between nations for the conservation of natural resources. Australia was one of the first nations to become a Contracting Party to the Convention. There are now more than 135 Contracting Parties to the Convention who have designated more than 1200 wetland sites throughout the world to the Ramsar List of Wetlands of International Importance.

The broad aim of the Ramsar Convention is to halt the worldwide loss of wetlands and to conserve those that remain through wise use and management. Contracting Parties make a commitment to:

- Designate at least one site that meets the Ramsar criteria for inclusion in the List of Wetlands of International Importance;
- Protect the ecological character of listed sites;
- Include wetland conservation within their national land-use planning;
- Establish nature reserves on wetlands and promote wetland training;
- Consult with other Contracting Parties about the implementation of the Convention.

State of Environment Reporting (SoE Reporting) - SoE reporting is mandated at a national level in Australia through the *Environment Protection and Biodiversity Conservation Act 1999*. A report is required to be produced every five years and, since 1996, the report has been prepared by an independent committee appointed by the Minister for the Environment and Heritage (<http://www.deh.gov.au/soe/index.html>). The next national report is expected to be tabled in Parliament by the Minister late 2006.

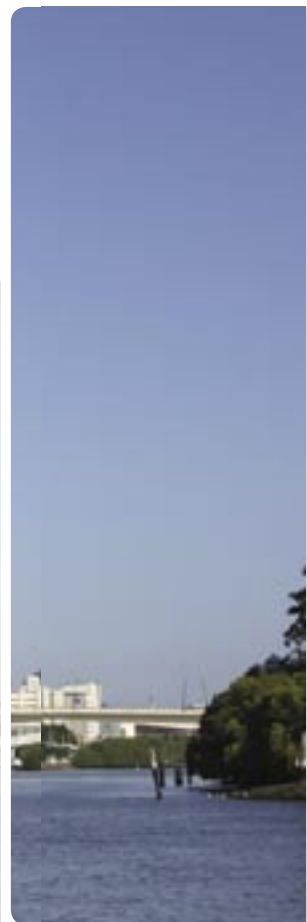
Most states and territories also undertake SoE reporting although the reports are produced on a different time cycle to that of the Australian Government. All states and territories, except Western Australia, have SoE reporting mandated under legislation, with reporting cycles every three to five years.

State and Territory Government - For the purpose of this document, state and territory government refers to the governments of the six states of Australia (New South Wales, Queensland, South Australia, Tasmania, Victoria and Western Australia) and the territories assigned the right of Self Governance (Australian Capital Territory and Northern Territory). (see **Commonwealth of Australia**).

Threat Abatement Plan - Threat abatement plans provide for the research, management, and any other actions necessary to reduce the impact of a listed Key Threatening Process on a threatened species or ecological community. Implementing the plan should assist the long term survival in the wild of the threatened species or ecological community.

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references





references

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