

# The State of the Marine Environment

Trends and processes



UNEP



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## Foreword

Recognising the significance of the risks posed by human development activities on the coastal and marine environment, 108 governments and the European Commission adopted the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) in 1995. They made a commitment to deal with nine land-based threats to the marine environment, namely sewage, persistent organic pollutants (POPs), radioactive substances, heavy metals, oils (hydrocarbons), nutrients, sediment mobilization, marine litter and the physical alteration and destruction of habitats.

The GPA calls for periodic reviews and in response to this mandate the UNEP/GPA Coordination Office commissioned this report: *The State of the Marine Environment: Trends and processes*. Its purpose is to give a broad global perspective on the situation, providing regional and sometimes national examples. The report provides an overview of the current state of the coastal and marine environment in relation to the nine categories of threats outlined by the GPA.

The report often relies on information that dates back farther than the adoption of the GPA, largely because of limited contemporary data. At the same time, there exists a considerable time lag between the pressures imposed on the environment, the subsequent development of policies, the implementation of measures and, eventually, the visible manifestation of the impact of such responses. While the findings of the report may not be based on as current information as we would like, the resulting analysis is indicative of trends in the state of the marine environment as they relate to the GPA.

The report indicates that legal and institutional arrangements have been strengthened and now cover most regions of the world. In addition, ongoing programmes, including GEF supported large marine ecosystems (LME) programmes, contribute to the implementation of the GPA. Despite these heightened efforts globally, coastal and marine ecosystems continue to deteriorate mainly because of pressures by human development. Progress in dealing with the nine GPA source categories has been uneven: progress has been made in Persistent Organic Pollutants, Radioactive Substances and Oils (Hydrocarbons), results are mixed in Heavy Metals and Sediment mobilization and conditions have worsened in Sewage, Nutrients, Marine Litter, and Physical Alteration and Destruction of Habitats.

This report informs and compliments the other studies we have produced for the Second Intergovernmental Review Meeting, and it provides a basis for some of the new strategic directions proposed in the Programme of Work for the UNEP/GPA Coordination Office (2007-2011). The report also aims to contribute to the Global Assessment of the Marine Environment.

The UNEP/GPA Coordination office and its partners are pleased to present this report and it is our hope that the findings presented here will further support global, regional and national efforts in implementing the Global Programme of Action.

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# Acronyms and abbreviations

|                 |   |
|-----------------|---|
| AMAP            | Arctic Monitoring and Assessment Programme  |
| Billion         | 1000 x million  |
| CEP             | Caspian Environment Programme   |
| CO <sub>2</sub> | Carbon dioxide  |
| CSD             | Commission on Sustainable Development of the UN   |
| DDT             | Dichlorodiphenyltrichloroethane   |
| DPSIR           | Driver-Pressure-State-Impact-Response framework   |
| EEA             | European Environment Agency   |
| EMAP            | Environmental Monitoring and Assessment Programme of the us   |
| ESCAP           | Economic and Social Commission for Asia and the Pacific   |
| G               | giga = 10 <sup>9</sup> = billion = 1000 x million   |
| GEMS            | Global Environmental Monitoring System  |
| GEO             | Global Environment Outlook  |
| GESAMP          | Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection<br>(IMO/FAO/UNESCO-IOC/WMO/WHO/IAEA/UN/UNEP)  |
| GIWA            | Global International Waters Assessment  |
| GMA             | Global Assessment of the Marine Environment   |
| GPA             | Global Programme of Action for the Protection of the Marine Environment<br>from Land-based Activities   |
| HCB             | Hexachlorobenzene   |
| HCH             | Hexachlorocyclohexane   |
| HELCOM          | Helsinki Commission/The Baltic Marine Environment Protection Commission   |
| IAEA            | International Atomic Energy Agency  |
| ICARM           | Integrated Coastal Area and River Basin Management  |
| ICES            | International Council for Exploration of the Seas   |
| IHE–Delft       | International Institute for Infrastructural, Hydraulic, & Environmental Engineering   |
| IUCN            | World Conservation Union  |
| LOICZ           | Land-Ocean Interactions in the Coastal Zone   |
| MAP             | Mediterranean Action Plan   |
| MDG             | Millennium Development Goals  |
| NGO             | non-governmental organization   |
| OECD            | Organisation for Economic Cooperation and Development   |
| OSPAR           | Convention for the Protection of the Marine Environment of the North-East Atlantic  |
| PADH            | Physical Alteration and Destruction of Habitats   |
| PAH             | Polycyclic Aromatic Hydrocarbon   |
| Pb              | Lead  |
| PBq             | pétabequerel  |
| PCB             | Polychlorinated biphenyl  |
| Po              | Polonium  |
| POP             | Persistent Organic Pollutant  |
| ppm             | parts per million   |
| PTS             | Persistent Toxic Substances   |
| RAMSAR          | Convention on Wetlands of International Importance, especially as Waterfowl Habitat   |
| ROPME Sea Area  | Regional Organization for the Protection of the Marine Environment of<br>the sea area surrounded by Bahrain, I.R. Iran, Iraq, Kuwait, Oman, Qatar,<br>Saudi Arabia and the United Arab Emirates |
| SOE             | State of the Environment  |
| t               | tonne (1000 kg)   |
| T               | tera = 10 <sup>12</sup> = trillion  |
| TBT             | tributyltin   |
| UK              | United Kingdom  |
| UN              | United Nations  |
| UNEP            | United Nations Development Programme  |
| USA             | United States of America  |
| USDA/NRCS       | us Department of Agriculture/Natural Resources  |
| USEPA           | us Environmental Protection Agency  |
| WET-WASH        | Wastewater Emission Targets – Water, Sanitation and Hygiene   |
| WRI             | World Resources Institute   |
| WSSCC           | Water Supply and Sanitation Collaborative Council   |
| WSSD            | World Summit on Sustainable Development   |
| WCMC            | World Conservation Monitoring Centre  |



## Executive summary

### Progress has been made in the framework of the GPA in...

1 Thirty-eight per cent of the world's population live within a narrow fringe of coastal land, only 7.6 per cent of the Earth's total land area (UNEP 2006) and largely depend on coastal resources for their livelihoods. As a result, coastal and marine ecosystems are rapidly deteriorating because of human pressure, almost 80 per cent of which originate on land. In recognition of this, governments adopted the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) in 1995. This report provides an overview of the current situation and of progress in the protection of the marine environment in the GPA framework. Although the information presented here may not be comprehensive, it is indicative of the present State of the Marine Environment.

### ...legal and institutional arrangements, implementation and cooperation...

2 Since the adoption of the GPA, the legal and institutional arrangements that support action have been expanded and strengthened and now cover most regions of the world. The implementation of plans and programmes is underway and is increasingly seen as a contribution to the achievement of the targets set by the international community, such as the Millennium Development Goals and the Johannesburg Plan of Implementation (WSSD). Cooperation both within the framework of the GPA as well as with other conventions and programmes is also well established.

### ...covering nine degradation source categories:

3 The current status of action for the nine source categories within the framework of the GPA has been reviewed. Current trends vary for each category, as does progress in controlling deterioration. The picture that emerges shows that although much has been achieved, still more needs to be done. Briefly, the situation is as follows:

#### Sewage

- Discharge of untreated domestic wastes is a major source of marine pollution, and perhaps the most serious problem within the framework of the GPA. Globally, in spite of action, the problem is growing worse, mainly because of growth in population and rapid urbanization. The problems are worse in developing regions, where only a fraction of sewage is treated; the main constraint to progress there is not technical but financial.

#### Persistent Organic Pollutants

- These highly toxic and stable organic chemical substances (pesticides, industrial chemicals and associated by-products) can accumulate in organisms and persist for years and even decades in the environment. In the two decades since international controls were instituted, the situation has improved considerably, although problems still remain in developing regions dependent on agriculture and in fragile ecosystems such as the Arctic. Even in these areas steady improvements are likely, in view of the regulatory system currently in place.

#### Radioactive substances

- Energy generation and other civilian and military activities that could possibly release radioactive substances are highly regulated. Some countries feel there is cause for concern about the danger posed by nuclear accidents; however, the IAEA Safety has concluded that there is no support for the contention that maritime shipments of radioactive materials, as currently carried out, are unsafe. The 2005 Mauritius Strategy notes that States should maintain dialogue and consultation, in particular under the aegis of

the IAEA and IMO, with the aim of improving mutual understanding, confidence building and enhanced communications in relation to safe maritime transport of radioactive materials

#### Heavy metals

- Heavy metals are essential to life in minute quantities, but become toxic in higher concentrations; mercury, lead and cadmium are considered the most dangerous. These pollutants are by-products of industrial and mining activities, and from burning of fossil fuels for energy and transport. The current situation is not clear-cut. Most developed regions have instituted control measures, but this progress is offset by new sources of pollution in emerging economies. Overall, growing awareness of the danger is having a positive effect on putting control measures in place.

#### Oils (hydrocarbons)

- Significant amounts of oil and oil by-products are released into the environment, mainly as a result of activities related to energy production and use. Oil contamination damages habitats and wildlife as well as posing a threat to human health. There has been significant improvement since 1985, mainly in marine transportation of oil, although the danger of an oil-spill remains. However, because of growth in population and industrialization, it is expected that land-based oil runoff will increase.

#### Nutrients

- Imbalances in nutrient ratios cause widespread changes in the structure and functioning of ecosystems, which, in turn, have generally negative impacts on habitats, food webs and species diversity, including economically important ones. The potential seriousness of the problem was not foreseen some decades ago when it first emerged. Both the frequency and intensity of so-called 'coastal dead zones' are rapidly increasing. Control of land-based sources of nutrients has been uneven. Relative success has been achieved with point sources but diffuse sources are proving more difficult to curtail.

#### Sediment mobilization

- Increase or decrease in sediment flows seriously disrupts coastal ecosystems and habitats, including wetlands, coastal lagoons, estuaries, sea grass beds and mangroves. These changes result from modifying land-use and/or the hydrological regime. Overall, the situation appears to be worsening, with progress in some areas being offset by deterioration in others. In the future, growing populations and increased development can only make current trends more pronounced.

#### Marine litter

- Ecosystems and wildlife, human health and safety, cultural and aesthetic values and economic activities all suffer as a result of litter. Since most of this litter is non-degradable, or only breaks down very slowly, it inevitably accumulates over time. Thus, the problem is continually worsening, in spite of both national and international efforts to control it. As the problem has largely cultural roots (current attitudes and behaviour demonstrate that people do not feel responsible), building awareness and providing information offers some hope for the future.

#### Physical alteration and destruction of habitats

- Damage to coastal habitats and wildlife is increasingly becoming more severe as a result of human population growth and increased economic and development activities. The most affected coastal systems include wetlands, mangroves and coral reefs. While deterioration is worse in regions that have faster growth in population, no area is spared. Overall, the situation is worsening and will most likely continue to worsen in future.

#### Progress has been uneven, but real impacts will only show in the longer term

4 An overall assessment of the situation concerning land-based sources of pollution and progress in implementation of the GPA shows that while the framework for action is solid, progress in dealing with the nine source categories has been uneven. There are three areas where good progress has been made (Persistent Organic Pollutants, Radioactive Substances, Oils (Hydrocarbons)), two areas where results are mixed (Heavy Metals and Sediment mobilization) and yet a third group where conditions have worsened (Sewage, Nutrients, Marine Litter, Physical Alteration and Destruction of Habitats). On the one hand success is directly related to factors such as the regulatory system, institutional structures, technology or funding, all areas of concern to the GPA. On the other hand there are factors that are outside the scope of the GPA but that nevertheless have a determining influence, as is the case of population growth and development. The conclusion is that, while progress has undoubtedly been made and continues to be feasible, there is still a long way to go. Bearing the framework of the GPA in mind, it is important to realise that these processes often take 15 to 20 years before meaningful commitments to joint management can be secured, and an even longer time before the environment actually begins to respond.

#### Four priority problems, six emerging challenges, two important management approaches

Four priority problems were identified from within the source categories of the GPA, namely sewage and management of municipal wastewater, nutrient over-enrichment, marine litter and physical alteration and destruction of habitats. These problems have been designated as an area for priority attention in most regions, and are the subject of novel approaches. Six emerging challenges deserve special attention: nutrient over-enrichment in relation to coastal dead zones, depletion of freshwater flows, the importance of coastal and freshwater wetlands, the abundant stream of new chemicals, the importance of resilient coastal habitats for coastal protection, and sea level rise. Two topics were recommended as being of major importance for the way forward: the coordination with other international

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