## Chapter 31. Conclusions on Other Human Activities

**Contributor:** Alan Simcock (Lead member)

### 1. The nature and magnitude of the human activities

#### *1.1 Communications and transport*

The network of shipping routes covers the whole ocean. There are particular choke points, where large numbers of ships pass through relatively limited areas, with consequent increases in the risks of both disasters and chronic pollution problems. The impending opening of the Panama Canal to larger ships will tend to modify the pattern of ship movements. Global warming is likely to lead to more use of the routes between the Atlantic and Pacific Oceans through Arctic waters, with increased risks to ecosystems that have slow recovery times, and where infrastructure for response to disasters does not currently exist. Shipping traffic grows in relation to world trade, and considerable further growth is therefore likely. Cargo ships have been steadily increasing in size, but limits are probably being reached because of the draught limitations of some of the world's choke points. More emphasis is being placed in many areas on coastwise movement of goods by ship to reduce pressures on roads. Passenger shipping is largely divided into cruise ships and ferries. The cruise-ship market is growing steadily and is also moving to larger vessels. Ferries are most important around the Baltic Sea, the North Sea and the Mediterranean Sea (where there are large international cargo movements over relatively short crossings) and in States with a large scatter of islands (such as Greece, Indonesia and the Philippines).

Ports form the nodes of the network of shipping routes. General cargo ports have changed completely over the past 50 years with the introduction of containerization. A hierarchy of these ports is developing, with transhipment as cargoes are cascaded to the ports nearest to their final destinations. Specialized oil and gas ports are naturally located near the sources of supply and the major centres of demand. This pattern is likely to change as a result of changes in the oil and gas markets. Other bulk terminals respond to the same drivers. In some cases, there are challenges because of the location of sources of supply or established delivery centres near important sites for marine ecosystems and biodiversity.

Submarine cables likewise cross nearly all ocean basins. The development of fibre-optic cables in the 1980s permitted the parallel development of the internet. Submarine pipelines linking land-terminals are relatively limited in their coverage, being mainly found in the Mediterranean Sea, the Baltic Sea and the waters around the United Kingdom. The environmental challenges that they present are the same as those for pipelines linked to offshore oil and gas operations.

 

### *1.2 Waste*

All parts of the ocean are affected by waste materials arriving by a variety of routes. Waste can take the form of discharges of liquid waste from land and emissions to the air, of dumping solid waste and other matter at sea, and of marine debris resulting from poor management of waste on land, discharges of garbage by ships and loss of fishing gear. Areas of particular concern are large conurbations, where large amounts of human bodily waste have to be disposed of, and areas of heavy industrial concentrations. Sewage from areas of high human population does not inevitably cause problems, since it can be treated to remove the potential to cause problems. However, in many parts of the world, particularly in developing countries, there is a lack of adequate sewage collection and treatment systems, and large amounts of untreated sewage are discharged to the sea. Much progress is being made in some places (particularly South America), but there is still a vast amount of further installation needed. Likewise, methods exist to avoid discharges of hazardous substances from industries, or to control them to acceptable levels, but these are not being applied everywhere. In this context, the massive growth of chemical industries in East Asia over the past decade-and-a-half presents particular difficulties. High levels of use of agricultural fertilizers and pesticides are also leading to discharges and emissions of nutrients and hazardous substances. Recent studies suggest that windborne transport of all these kinds of emissions is causing problems in the open ocean.

### *1.3 Extractive industries*

Offshore oil and gas exploration and development is focussed in specific geographic areas where important oil fields have been discovered. Notable offshore fields are found: in the Gulf of Mexico; in the North Sea; off the coast of California (in the Santa Barbara basin), United States; in the Campos and Santos Basins off the coast of Brazil; off the coast of Newfoundland, Canada; off West Africa, mainly west of Nigeria and Angola; in the Gulf of Thailand; off Sakhalin Island on the Russian Pacific coast; in the Persian Gulf, on the Australian North West Shelf and off the west coast of New Zealand.

Offshore mining is a localised activity and is currently limited to relatively close to the shore. The activity on the largest scale is sand and gravel dredging, which takes place in Canada, Denmark, Japan, the Netherlands, the United Kingdom, and the United States. Other minerals extracted from the seabed include tin, titanium ores and diamonds. Countries where such activities are currently active include Australia, Brazil, India, Indonesia, Malaysia, Myanmar, Namibia, New Zealand, South Africa and Thailand. Other minerals currently being considered for extraction include gold (Alaska, United States) and iron (New Zealand – where currently a permit has been refused by the Environmental Protection Authority). The impacts are largely in the form of smothering the seabed. As regards deep-sea mining in the Area (the seabed and ocean floor and their subsoil beyond national jurisdiction) no actual extraction has yet started. Without careful management of such activities, there is a risk that the biodiversity of areas affected could be destroyed before it is properly understood.

 

### *1.4 Coastal zone*

All around the world, there is a constant interaction between sea and land. On rocky coasts, changes usually take place over geological time. On softer coasts, the changes can happen within a human lifetime. The changes happen both by the sea eroding land and by sedimentation creating new land. In many places, humans assist these processes, either by undertaking works to protect the land against erosion, or by reclaiming land from the sea. Significant areas of land reclamation have occurred in Europe (about 15,000 $km^2$) and in Asia (about 12,000 $km^2$) over the past century. This has lead to losses of much coastal habitat (especially of mangroves, salt marshes and coastal flood plains) and to significant adverse effects from changes in the form of the coast (in particular, the creation of "armoured", artificial coastlines). In comparison, about 15 $km^2$ is eroded from the coast of Europe every year. An important driver in reclamation processes is the increasing proportion of the human population who live in coastal areas.

Tourism and recreation is a major use of the coastal zone. It is also a significant element of many national economies, and (especially in the case of many small island States) it may be the main support of the local economy. In most cases, the attractions of a coastal tourist resort will lie in beaches, dramatic scenery or interesting flora and fauna (either on land or in the sea), or some combination of these. But the natural attractions have to be linked to the provision of adequate facilities for the tourists. In many cases, therefore, there is an inherent tension between conserving the natural attractions and developing the necessary facilities.

### *1.5 Other activities*

The other activities discussed in Part V have very distinct profiles. Desalinization is crucial for the States on the southern shore of the Persian Gulf: without it, the present populations of that area could not be supported. The same applies to some island States, such as Malta and Singapore. Elsewhere, it is more of a fall-back for situations when natural water resources are insufficient, but may have an important role in avoiding constraints on urban development and in facilitating mining in desert areas. Renewable energy production from the sea (through offshore wind-farms and from wave and tidal power) is still in its infancy in much of the world, but clearly has great potential for growth. The use of marine genetic resources is also in its infancy. Finally, marine scientific research is fundamental for improving the management of all other human activities that affect the ocean. Without adequate coverage of all parts of the ocean, it will be difficult to make progress.

 

## 2. Socioeconomic aspects of the human activities

### *2.1 Communications and transport*

Shipping is fundamental to the world economy, both for the supply of raw materials to those who will process them as well as for the delivery of agricultural and industrial products to consumers. The lead time for the delivery of new ships and the fluctuations in the world economy mean that there are substantial variations in the demand and supply sides of shipping, with consequential effects on the profitability of the industry. Ship-building has become concentrated in East Asia, and ship-breaking in South Asia. The personnel of the industry are drawn mainly from North America, Europe and South and East Asia, with Africa and South America being under-represented. At present supply and demand for qualified officers and crew are more or less in balance, but there is a risk of a lack of qualified officers and crew if and when the world economy expands rapidly. Women form only about two per cent of those employed in shipping, and are mainly on cruise ships and ferries. There is a lack of information about deaths and injuries to seafarers.

The move in general cargo shipping to containerization has revolutionized ports: investment in machinery that requires skilled operators has ended the need for large numbers of dockworkers capable of handling heavy loads by hand. The efficiency of port operations is very important for ship-operators. Increasingly, the ports in a region are in competition with each other, and the charges are affected by the extent to which port charges are expected to cover the costs of construction and maintenance of ports and their road links to the hinterland. The quality of port infrastructure and operations varies widely, although many developing countries achieve the highest standards in both.

The provision of submarine cables is driven by demand for internet bandwidth. This shows no signs of slowing its growth. Submarine cables to carry the traffic are mainly provided by consortiums of telecommunications companies, internet service providers and private-sector investors. The market appears to be working smoothly.

### *2.2 Waste*

The socioeconomic aspects of waste reaching the sea have both direct and indirect features. Waterborne pathogens are commonly carried with sewage. These can seriously affect human health, both through bathing in contaminated water, and through eating fish and seafood contaminated with them. Other wastes have socioeconomic implications by affecting food quality and through their effects on fish and other species used for food by, for example, adverse effects on reproduction. More indirectly, effects of waste on water quality can damage tourism and reduce the aesthetic, cultural, religious and spiritual ecosystem services that humans get from the sea.

 

### *2.3 Extractive industries*

The offshore oil and gas industries are significant for the economies of the countries that have started them: the industry accounts for about 21 per cent of Norway's gross domestic product (GDP), 35 per cent of Nigeria's GDP, 3.5 per cent of the United Kingdom's GDP and 1.5 per cent of United States GDP. The number of people employed is relatively small: estimated at 200,000 worldwide.

Compared with land-based mining, the extraction of minerals from the seabed is a very small-scale activity. The United Kingdom industry for extracting sand and gravel seems to be the largest, with 400 employees.

### *2.4 Coastal zone*

Since a high proportion of humans live in the coastal zone, there is a preoccupation with making sure that: (1) land used for housing, industry or agriculture is not lost or flooded, (2) the demand for land suitable for urban development and ports (and in some cases agriculture) is met, and (3) existing homes and infrastructure are not destroyed. This leads to a readiness to invest substantial amounts in both coastal protection and land reclamation. The long-term effectiveness of hard engineering approaches to these tasks has been called into question, and in many parts of the world the approach tends more towards adjusting the natural process of erosion and sedimentation to achieve the desired ends.

As has been said, in many parts of the world, tourism and recreation is a major economic activity in the coastal zone. It requires a relatively high proportion of labour in preparing and serving food and in cleaning and maintaining accommodations, providing jobs that in many regions are strongly seasonal. A high proportion of these jobs are filled by women.

### *2.5 Other activities*

Desalinization is essential for the continued existence of many States. It may likewise be important for avoiding constraints on future economic development in other places. Renewable energy from maritime sources, which is beginning to be implemented in some parts of the world, has a significant potential role to play in mitigating climate change,. The use of marine genetic resources offers possibilities of finding and applying new marine ecosystem services. Marine scientific research is an essential underpinning of managing the sustainable use of the ocean.

## 3. Pathways from the human activity to its environmental impacts

### *3.1 Communications and transport*

There are three main pathways by which shipping impacts on the environment: loss of ships, chronic discharges and emissions, and noise.

Ports also impact on the environment in three main ways: the demand for coastal land (which often leads to reclamation of the necessary land from the sea), changes in the form of the coast (with hard coastlines replacing softer ones) and dredging to maintain navigation channels (and the consequent need to dispose of the dredged material). Ports also inevitably lead to concentrations of shipping, and therefore represent areas where the impacts of shipping are equally concentrated.

Submarine cables have very limited environmental impacts, since they are very slim (typically 25 – 40 millimetres wide in the deep sea), and since their routes are usually chosen to avoid, where possible, areas that may cause problems from bottom trawling and ships' anchors. In soft substrates on continental shelves the cables are usually buried by ploughing, but again the zone affected is narrow.

### *3.2 Waste*

Waste products reach and affect the marine environment through a variety of routes. Liquid discharges may reach the sea either though discharges to rivers or directly through pipelines. Waste emissions to air can be carried to the sea directly, or through run-off from the land on which they are originally deposited. Substances applied to land may volatilize and be re-deposited, either directly to the sea, or through successive re-volatilizations and re-depositions. Solid waste and other matter may be deliberately dumped into the sea, or may reach it from badly-managed waste disposal on land.

### *3.3 Extractive industries*

The offshore oil and gas industries affect the marine environment through six main pathways: the effects of seismic exploration during the exploration phase; the drill cuttings (and the drilling muds used to lubricate the drills which are mixed with them) that are discarded on the seabed; the chemicals that are used and discharged during operation; the produced water (and its admixture of oil) that is discharged during production, and which increases in quantity as the wells age; the gas that may be flared off during production; and the oil spills that may occur. In addition, there is the question of the disposal of offshore production platforms when they are decommissioned at the end of the field's life.

Since offshore mining is currently based on dredging, the impacts on the marine environment come from disturbance of the seabed and (except with sand and gravel extraction) the discharge of the dredged material that is rejected as not containing the minerals that are sought. Disturbance of the bed of the deep sea by future mining has considerable potential to harm benthic biodiversity, about which there is as yet limited knowledge.

### *3.4 Coastal zone*

There are two main ways in which anthropogenic change to the natural processes of erosion and sedimentation along the coast affects ecosystems. First, wherever and

 

however the anthropogenic change happens, there are likely to be consequential changes in the processes elsewhere in the general neighbourhood. Secondly, such change usually involves moving from soft shore forms (gravel, sand or mud) to hard shore forms (stone or concrete). In addition to these two processes, changes in land affecting river regimes (for example, through the building of dams) tend to reduce the flow of sediment from land to sea, weakening beach replenishment, as well as weakening the force of rivers, which can lead to the extension of sand bars at their mouths.

Significant provision of tourist and recreational facilities usually leads to major changes in the shore environment. Hard shorelines can replace soft ones. Urban development can destroy the natural hinterland of the shore. Night-time lighting can significantly affect habitats. Increased discharges of sewage (especially if not properly treated) can produce the problems associated with excessive nutrient discharges. Regular cleaning of beaches removes the natural detritus which is important for many shore-living birds and animals.

### *3.5 Other human activities*

The pathways by which desalinization can affect the marine environment are mainly through its intakes of seawater and discharges of brine. The energy required for desalinization can also have important implications when it is provided by the burning of fossil fuels. Most forms of renewable energy generation make substantial demands for ocean space which cannot be used for other purposes. The structures required for wind-farms may have effects on migrating birds, but with proper planning these seem to be limited. Although potential pathways for environmental effects exist for other forms of human activity, they are currently judged to be minimal. Provided collection of specimens is done with care, there is no reason why the development of the use of marine genetic resources should adversely affect the marine environment. Marine scientific research has to be involved with all forms of marine biota and habitats, but provided proper protocols are followed, no significant adverse effects should result.

## 4. Major ecosystem impacts

### *4.1 Communications and transport*

Steady progress has been made in reducing the numbers of ships lost at sea, thus damage to the environment from shipping disasters has dropped significantly, particularly in respect of the amounts of oil spilled in such disasters. Regimes have been established to control chronic discharges from ships, in particular in the form of oil, sewage, garbage and air pollutants. Measures have also been taken to deal with invasive species carried in ballast water and with wrecks. The challenge now is to improve enforcement of these regimes. Noise from ships may well be a source of significant human impact on marine life. Losses of containers overboard are low.

 

Ports have an important role to play in enforcing the control regime over ships. Since they are often in competition with other ports in the region, the regional memorandums of understanding on port state control have an important function. The quality of port reception facilities for waste oil, sewage and garbage is also important in reducing environmental impacts of ports and their users. The disposal of dredged material needs proper management. Even where the material is harmless, it can damage bottom-living plants and animals by smothering them. Where the material contains contaminants (usually from historic industrial activities), disposal at sea risks remobilizing them and again requires proper management.

Submarine cables have always been at risk of breaks from submarine landslides, mainly at the edge of the continental shelf. As the pattern of cyclones, hurricanes and typhoons changes, submarine areas that have so far been stable may become less so, and thus produce submarine landslides and consequent cable breaks. With the increasing dependence of world trade on the internet, such breaks (in addition to breaks from other causes, such as ships' anchors and bottom-trawling) could delay or interrupt communications vital to that trade.

### *4.2 Waste*

Waste material introduced into the ocean can cause problems for the marine environment in a variety of ways. Hazardous substances (heavy metals, persistent organic pollutants, polycyclic aromatic hydrocarbons (PAHs), pesticides and endocrine disruptors) can be toxic to marine biota, reduce their reproductive success or weaken their immune systems so that they succumb more easily to disease. Excessive discharges and emissions of nutrients (particularly nitrogen compounds) from human bodily wastes, animal excreta, food-processing plants, agricultural fertilizers and traffic can produce hypoxic (low oxygen) dead zones in the sea, which can kill bottom-living plants and animals and reduce fish stocks. They can also cause algal blooms which can smother beaches and which can consist of algae species that generate toxins harmful both to humans and marine life. Pathogens in human and animal waste can cause illness from contact with the water into which they are discharged and from food from the sea that they contaminate. All these impacts undermine human health and ecosystems and make them much less resilient to other pressures.

### *4.3 Extractive industries*

It is possible to regulate all the pathways by which the offshore oil and gas industries affect the marine environment to keep the impacts at an acceptable level. The success of such regulation depends on the regulatory methods chosen and the degree to which they are enforced. The impact of noise disturbance from seismic exploration depends very much on the overlap of the area to be explored with the habitats of marine life that is sensitive to noise. These animals often have seasonal patterns of migration, and seismic exploration can be timed so that overlaps do not happen. Information on the impact is limited. The impact of drill cuttings is mainly

from the drilling muds with which they are mixed, although some release of metals can occur form the rock cuttings themselves. Regulation of the drilling muds used can control this problem. The same approach can be used to control the chemicals used on, and discharged from, offshore installation. Produced water, because of its quantity, has to be discharged to the sea. The problem which it poses is the oil content. This oil content can be largely removed by centrifuges, and an acceptable level (usually 30 parts per million or less) can be achieved. In the North Sea, steps have been taken to tighten limits as the amount of produced water increases. Spills from offshore installations or breaks in pipelines occur. The main safeguard against such spills is the proper environmental management of the whole operation. In at least one region, steps have been taken to encourage high standards of such management. There are two main approaches to the removal of decommissioned installations. Under 1989 IMO Guidelines, installations should be removed so that there are 55 metres of clear water over any remains. In the North Sea, removal of the rest of the installation is the norm, although exceptions can be made. In the Gulf of Mexico, it is much more usual to allow installations to be placed to form artificial reefs.

For current offshore mining, the main issue are the turbidity created by the dredging and the management of the disposal of unwanted dredged material. In most cases, both are likely to mean that the area mined will be effectively cleared of marine biota. Recovery and the scale and speed of re-colonization after mining has ceased in an area will very much depend on local circumstances.

### *4.4 Coastal zone*

The form of *c*onsequential changes resulting from anthropogenic changes to the land/sea boundary will depend entirely on local circumstances: it may take the form of promoting erosion that would not otherwise have happened, because the longshore water movements are re-focused, or it may take the form of causing siltation where it has not previously happened, or it may be a mixture of these in different places. Only very careful modelling during the planning process can hope to identify the consequences, and even then the best models can prove not to have been adequate. Where soft shorelines are replaced with hard shorelines, the local biota will be affected. It will become more difficult for animals to move from sea to land and back, which may disturb their foraging or breeding patterns. It may also affect local plant communities. Such changes are likely to make the shoreline less resilient. Finally, it will offer a new hard substrate to biota that arrive, which is likely to change the local fish and shellfish communities. The natural consequence of beach erosion is the landward retreat of coastal habitats, but this natural process is hindered by coastal development, which causes so-called “coastal squeeze”; there is no space for the habitats to retreat. Coastal squeeze results in the fragmentation and removal of some habitats and the species they support. Finally, in areas where sediment loads have increased above natural levels, impacts include burial of habitat, reduced light levels caused by turbidity, changes to substrate (e.g., mud draping over once rocky habitat), and smothering of coral reefs and other sessile fauna.

 

Tourism and recreational development is likely to produce all the problems of coastal development described above. In addition, it is likely to lead to large numbers of people walking on the shore (and thus compacting sand and disturbing breeding sites) and using the water (and thus disturbing larger animals and fish (not least with noisy motorized devices), creating oil films on the water surface from sun-tan preparations and leaving litter that becomes marine debris).

### *4.5 Other activities*

Any effects of desalinization intakes and discharges are very local – a matter of tens of metres – and even these can be reduced by proper design. The remaining other activities should not create major environmental impacts, but the use of autonomous floats in marine scientific research needs – and is receiving – care over their eventual fate.

## 5. Integration of environmental and socioeconomic trends

### *5.1 Communications and transport*

The levels of activities in shipping and in the ports that it uses, and the demand for submarine cables, all respond fairly directly to the world economic situation. The growth of industry in the Pacific basin, especially in the west, means that the pressures from all forms of communications and transport will particularly increase there. Growth in communications and transport activity means that, even if all ships, ports and cables achieve the best currently practicable level of environmental protection, the pressures from them will nevertheless continue to increase. Since the environment is finite, it will only be possible to limit the pressure on the environment to no more than current levels, if improved performance in safeguarding the marine environment against those pressures is achieved.

### *5.2 Waste*

Waste generation has tended to increase at least in step with economic growth. In some ways, economic growth has generated additional forms of waste, particularly through the development of packaging to protect agricultural and industrial products. It is only relatively recently that efforts have been devoted to waste minimization. Population and industrial growth means that, even if the best currently practicable levels of waste reduction and control are generally achieved, there will be increasing pressure on the finite marine environment. As with shipping, this implies that continuous improvement in environmental protection is needed.

### *5.3 Extractive industries*

The creation of an extractive enterprise is the result of a decision balancing the economic benefits to be gained against the environmental and other impacts. It is

 

therefore important that, when a decision is initially taken, there should be a clear view of what measures will be required to protect the marine environment. There is now widespread understanding of what is required in most environments. Problems arise, however, when the circumstances of a new development are very different from past experience. This is particularly the case in Arctic conditions, where natural processes to break down contamination will be slower because of the cold.

### *5.4 Coastal zone*

Socioeconomic pressures are likely to be strongly in favour of intervention to reclaim land and prevent erosion. With economic growth, there will be pressure for ports to improve their capacities, which is likely to require more land. Short of complete relocation of the port, reclamation of land from the sea may be the only option. Equally, where erosion or flooding is threatened, there will always be pressure to safeguard existing investments in housing, industrial buildings and infrastructure.

Because of the economic importance of tourism and recreation in so many places, there is usually pressure to extend tourist facilities. The problem is that too great an extension is likely to lead to devaluing the attractions that enabled a tourist industry to develop in the first place, and thus to undermine the justification for any extension. Without integrated coastal zone management to balance economic gain against environmental change, there is a risk that the basis of the economic gain can be eroded.

### *5.5 Other activities*

Pressures to increase the amount of desalinization that is carried out will result from pressures to expand populations in water-poor locations. The economic and social drivers of such developments are outside the scope of this Assessment. The need for mitigation of climate change is undeniable, and the economics of expanding the amount of energy produced from marine renewable sources will depend on judgments about how far this form of mitigation is good value. Much of the genetic diversity in our seas and oceans remains unknown and relatively unexplored. Without marine scientific research, it will be difficult (if not impossible) to achieve and maintain sustainable management of all human activities affecting the sea.

## 6. Environmental, economic and social influences

### *6.1 Communications and transport*

The global shipping industry has recognized the need for improvement of its environmental performance. States have thus adopted, through the International Maritime Organization (IMO), a range of measures to try to improve the industry's performance. Enforcement of these measures is crucial. The IMO has now started a collective process to improve the performance of its members in this enforcement.

 

For submarine cables, the International Cable Protection Committee brings together cable owners, maintenance authorities, cable system manufacturers, cable ship operators, cable route survey companies and governments to consider all aspects of ensuring the safety of submarine cables and reducing their impact on the environment.

### *6.2 Waste*

Global systems have been put in place to control persistent organic pollutants and mercury. These offer the possibility that the impacts of some forms of hazardous substances on the marine environment will be brought under control. In some regions (for example, the European Union), more general systems have been set up for controlling present and future chemicals that are placed on the market. There is general recognition in most international investment programmes of the need to improve sewage collection and treatment in many developing countries. The Global Programme of Action to Protect the Marine Environment from Land-Based Activities provides a framework within which States can consider their overall approach to these problems. The challenge is to make all these various steps operational.

### *6.3 Extractive industries*

Offshore oil and gas extraction is usually significantly more expensive than extraction on land by normal drilling processes. Placer mining from the coastal seabed, however, may well not be much more expensive than winning the same minerals on land. Commitment to offshore developments will therefore depend on judgements about future demand, costs and prices. The hydrocarbon market is currently changing significantly with the emergence of new sources such as “fracking” and the Athabasca oil sands. The global market in hydrocarbons, and the other minerals mined from the seabed, will therefore determine the pressures to develop marine extractive industries further. However, in the longer term, the increasing difficulties of sourcing minerals on land are likely to increase the interest in mining the bed of the deep sea. The International Seabed Authority is charged with regulating such activity in the Area.

### *6.4 Coastal zone*

In the absence of integrated coastal zone management, with its capacity to bring together in one decision-making process all the various factors that can affect the sustainability of a coastal zone, there are bound to be problems in balancing the different factors involved in the land/sea interface and in maintaining a successful tourist industry.

### *6.5 Other activities*

The factors that will affect developments in the other human activities discussed in Part V are those sketched out above.

 

## *7.* Capacity building gaps

The capacity-building gaps identified in this Part are summarised in Chapter 32 (Capacity-building in relation to human activities affecting the marine environment).