



## INTRODUCTION

The White Paper for Sustainable Coastal Development in South Africa, published in April 2000, identified the coast as a rich national heritage resource which offers a range of benefits for the people of South Africa. As a distinctive, complex and interconnected natural system with finite resources, the coast is vulnerable to overuse and degradation. It is subject to direct and indirect influences, and to inland activities and those occurring far offshore. Maintaining the diversity, health and productivity of our coast is central to sustaining the economic and social benefits it provides.

The Western Cape Province has the longest coastline – over 1 000 km - of the four South African coastal provinces. It stretches from north of the Olifants River on the Atlantic Ocean coast, to the mouth of the Blaaukrantz River on the southeast coast. This highly diverse and dynamic coastal environment is strongly influenced by both the cold, northward-flowing Benguela Current and the warmer, southward-flowing Agulhas Current. Most people in the Western Cape live within 25 km of the coast; consequently development and other pressures on the coastal zone are expected to continue. The coastal zone is a relatively narrow band and is influenced by the direct interaction between land and sea and associated air masses. It includes estuaries and wetlands, sandy beaches and rocky shores. The subtidal area is made up of off-shore reefs and sand flats.

### **The priority issues for the coastal zone, reported on in this chapter:**

- Habitat modification due to development;
- Pollution associated with development; and
- Overexploitation of marine resources.

## DRIVERS AND PRESSURES

Some of the driving forces and pressures that influence the coast in the Western Cape include:

**Coastal development** – The major driver for habitat modification in the coastal zone in recent years has been development due to the demand for coastal resorts, golf courses, residential areas and retirement centres. This has led to significant alteration, fragmentation and loss of coastal habitats.

**Reduced freshwater inflow** – A number of inland activities and processes, notably water abstraction and impoundment (damming) as well as alien invasive vegetation in catchment areas, have modified river flow and have reduced freshwater flows into the coastal zone.

**Coastal mining** – Mining, particularly diamond and sand mining, has significantly modified coastal habitats, mainly on the West Coast of the Western Cape.

**Invasive alien plant and animal species** – Invasive alien plants in the coastal zone have stabilised sand dunes, disrupting natural sand movement, and altered coastal habitats resulting in a loss of biodiversity in the coastal zone. Invasive alien animal species, such as some alien mussel species, are also responsible for the loss of indigenous marine species.

**Global climate change** – It is predicted that changes in global climate patterns will result in long-term modification of some habitats. The coastal zone in particular is vulnerable to increases in the sea-level.

**Effluent discharges and stormwater runoff** – Runoff associated with increased urban and industrial developments (in the coastal zone) have resulted in a reduction in (sea) water and estuarine quality.

**Poor agricultural and forestry practices** – Environmentally detrimental agricultural and forestry practices in inland water catchment areas have contributed to the deterioration of water quality, which affects coastal wetlands and estuaries.

**Lack of co-operative governance** – There is a lack of co-operation between departments involved in the management of freshwater and marine ecosystems, including estuaries.

**Migration** – Pressures that underlie coastal development in South Africa include the movement of people to the coast due to perceived opportunities for income generation, accompanied by inadequate State capacity to deal with this pressure.

**Ship traffic and dredge dumping** – Oil pollution and litter associated with ship traffic, as well as ballast exchange and dredge dumping in or close to harbour areas affects water quality and can lead to a loss of habitats and species. Ballast exchange also has the potential to introduce invasive alien species into the marine environment.

**Poor resource management** – The primary cause of over-exploitation of marine resources in South Africa is excessive fishing effort applied by the commercial, recreational and subsistence sectors. The commercial sector targets a few pelagic<sup>15</sup> and demersal<sup>16</sup> species with large populations, while the recreational and subsistence sectors target more reef species which have smaller populations. Factors working against a reduction in fishing effort include:

- Over-capitalisation within certain sectors of the industry;
- Lack of detailed information on stock size and life histories;
- Current open access nature of subsistence and recreational fishing (except for crayfish and abalone);
- Cross-subsidisation between sectors and continual improvements in harvesting efficiency; and
- High monetary value of certain marine resources, which also attracts illegal activity.

## ISSUE: HABITAT MODIFICATION DUE TO DEVELOPMENT

Coastal towns in the Western Cape such as Knysna and Plettenberg Bay, face increasing planning challenges as they try to balance the rapid growth in the tourism and recreational industries with conservation objectives. Development that encroaches on the coastal zone results in degradation and/or loss of marine and coastal habitats. Fragmentation of marine and coastal habitats leads to a loss in biodiversity and ecosystem productivity. In the Western Cape, ribbon development along the coast has been a particular concern and recently the high number of golf courses in the coastal zone has been the subject of much debate. In response, the Department of Environmental Affairs and Development Planning (D:EA&DP) commissioned a “Rapid Review of Golf Courses and Polo Field Developments” in the Western Cape ([www.capegateway.gov.za](http://www.capegateway.gov.za)).

The following section uses estuaries, which are particularly sensitive marine environments, to give an indication of habitat modification.

### STATE

#### Estuarine Health Status

Estuaries are an important component of the coastal environment. Because of the rough seas along the coast, their sheltered locations make them attractive sites for resort development. Ecologically, they serve as vital nursery areas for a number of marine fish and shellfish and are important feeding and roosting areas for a number of birds. Since estuaries are areas where rivers meet the sea, they are affected by activities in the catchments of rivers, the adjacent marine environment and the immediate estuary surrounds (estuaries are often used as receiving basins for domestic and industrial waste).

15. Fish that are caught at or near the sea surface (pelagic fish live in the water column).

16. Bottom foraging fish that normally live on or near the seabed.



**Figure 6.1:** Map of the average state of health of estuaries per catchment (Source: Turpie, 2004)

The National Strategic Biodiversity Assessment states that the overall health of South African estuaries is relatively good (Turpie, 2004). About 28% of the estuaries are considered to be in excellent condition, 31% in a good condition, 25% in a fair condition, and 15% in poor condition (see Table 6.1).

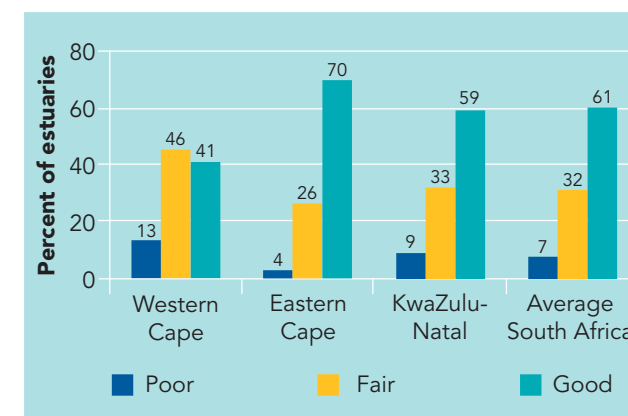
Estuaries along the south and south east coast of South Africa tend to be healthier than those in the rest of the country, with those along the former Transkei/Ciskei coastal area in the best condition (Figure 6.1). Estuaries fed by larger catchments also tend to be in poorer health than the estuaries in adjacent

smaller catchments. Generally larger systems also have more development pressures. However, around urban centres (such as Cape Town) even small catchments have significant development pressures.

There are 46 estuaries in the Western Cape and the health status for most of them is fair-to-good, although generally the Western Cape estuaries are in worse condition than estuaries in the other coastal provinces (Figure 6.1.). All Western Cape estuaries near to and north of Cape Town are in a poor condition. The same results are evident

**Table 6.1:** Summary of the health status of South African estuaries of each type in each zone (Source: Turpie 2004)

| Biogeographical Region | Health category | Total      |
|------------------------|-----------------|------------|
| Cool Temp              | Excellent –good | 2          |
|                        | Fair            | 4          |
|                        | Poor            | 5          |
| <b>Total</b>           |                 | <b>11</b>  |
| Warm Temp              | Excellent –good | 89         |
|                        | Fair            | 23         |
|                        | Poor            | 15         |
| <b>Total</b>           |                 | <b>127</b> |
| Subtropical            | Excellent –good | 63         |
|                        | Fair            | 39         |
|                        | Poor            | 19         |
| <b>Total</b>           |                 | <b>121</b> |



**Figure 6.2:** Health status of estuaries based on fish communities (Source: Harrison et al., 2000)

in the data based on the health of the estuarine fish communities.

The Western Cape has more estuarine fish communities rated as being in poor health than similar communities in other coastal provinces. However most of the province's estuarine fish communities, as illustrated in Figure 6.2, are rated as fair or good. (Harrison et. al. 2000).



### STATE

#### Percentage of land based effluent being discharged into the marine environment

In 2003, the South African marine environment (including estuaries) received over 1 355 760 m<sup>3</sup> of industrial and domestic effluent each day. Over 32% of this was discharged in the Western Cape. Domestic effluent comprises over 95% of the total effluent discharge in the Western Cape region, with industrial effluent comprising approximately 5%. The industrial effluent discharged into the marine environment off the West Coast of the Western Cape mainly comprises effluent from fish processing plants (DWAF, 2004).

#### Number and location of marine discharges

This indicator shows the location, nature and volume of wastewater discharge (urban and industrial point source discharges) into coastal waters. Land-based sources of pollution to the marine environment – such as pipeline discharges - reflect potential pressures along the coast<sup>17</sup>.

In South Africa discharges of land-derived wastewater to the marine environment are to the offshore marine environment, the surfzone and to estuaries. The locations of existing discharges (outfalls) to the offshore, surfzone and estuaries are indicated in Figures 6.3 – 6.5 (DWAF, 2004). In the Western Cape, 12% of the effluent is discharged into the offshore marine environment, 60% to the surfzone and 28% into estuaries.

**IMPACTS**

The impacts of habitat modification include:

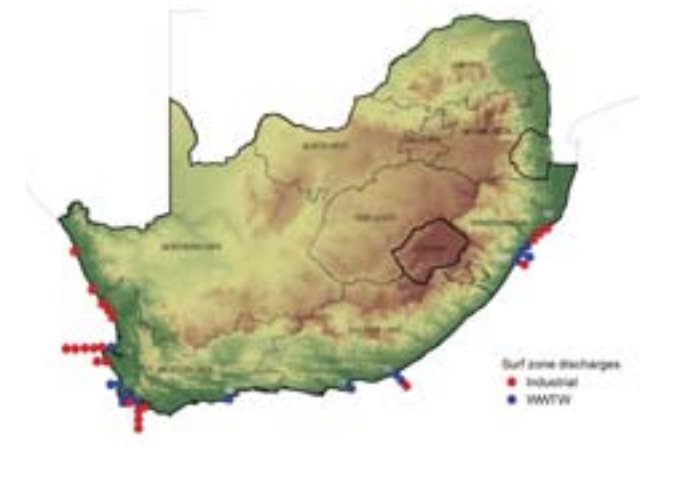
- Transformation of the coastal zone results in the loss of biodiversity and the environmental services it provides.
- Marine resource depletion, due to habitat modification can lead to a loss of income and increased poverty, especially for subsistence communities that rely on the marine environment for food and employment.
- Habitat modification of the marine environment results in the destruction or transformation of the natural features and resources which attract tourist and can lead to a decrease in tourism revenue.
- Transformation of the coastal zone may lead to a loss of aesthetic appeal or 'sense of place'.

## ISSUE: POLLUTION ASSOCIATED WITH DEVELOPMENT

Pollution in the marine environment degrades marine and coastal habitats through, for example, deterioration of water quality, loss of biodiversity and ecosystem productivity, and bioaccumulation of toxins in marine species.



**Figure 6.3:** Location of discharges in the offshore marine environment (Source: DWAF, 2004)



**Figure 6.4:** Location of discharges into the surfzone (Source: DWAF, 2004)

17. The available data primarily covers municipal and industrial wastewater discharges, and is obtained from DWAF - Directorate: Waste Discharge and Disposal/ Water Resource Planning Systems.

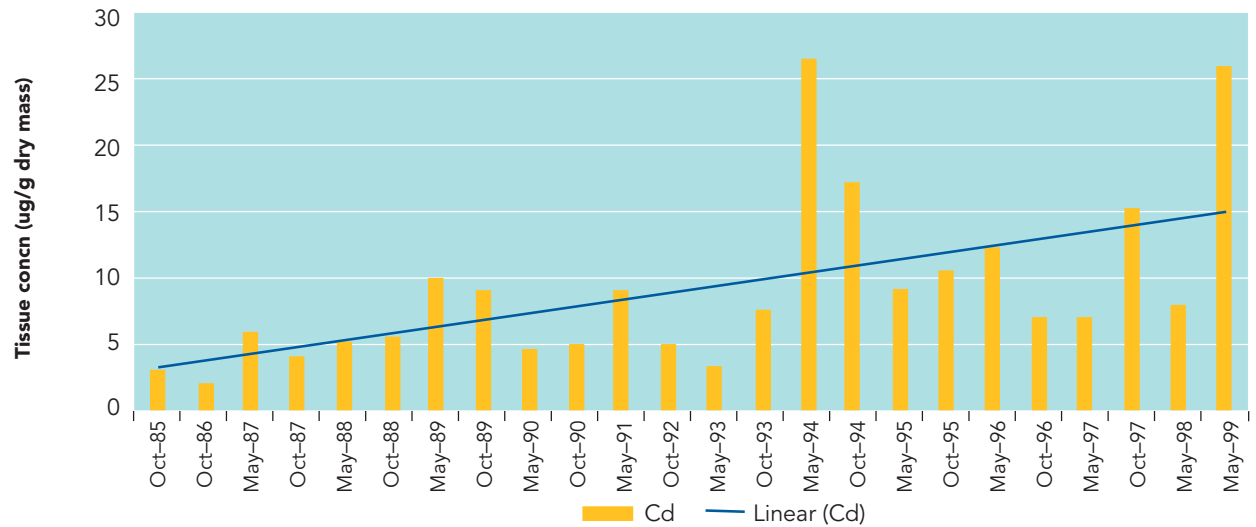


**Figure 6.5:** Location of discharges into estuaries  
(Source: DWAF, 2004)

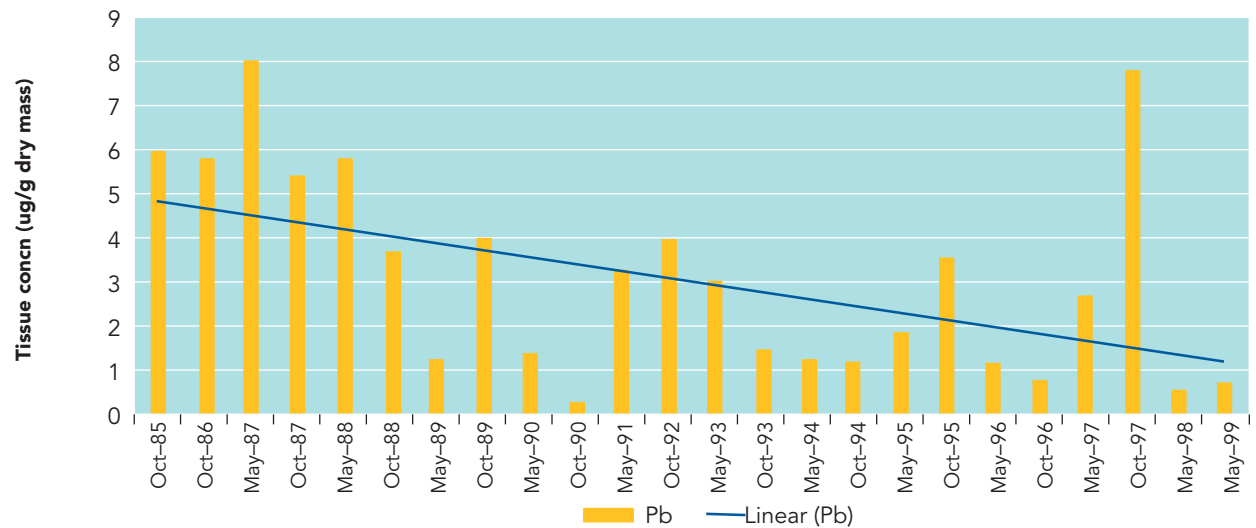
### Concentrations of heavy metals in filter feeders

Industrial and domestic effluent from developed areas ultimately find their way into the marine environment. Industrial chemicals and chemical residues from such effluents in their biologically active forms are potentially harmful to a range of species, including humans, mainly through bioaccumulation of chemicals in the food chain.

The Mussel Watch Programme, managed by the Marine and Coastal Management Branch of DEAT, investigates trends in the quality of marine coastal waters by using changes in concentrations of heavy metals in mussels as indicators. As natural bioaccumulators, oysters, mussels and other filter feeders are used to monitor the levels of chemicals in the water column, as well as provide an early warning system of unpredicted residues into previously uncontaminated areas. Being sessile (i.e., fixed in a single location) mussels can be used to monitor both short-term variability and long-term trends of contamination in coastal systems.



**Figure 6.6:** Cadmium concentrations at Green Point (Source: CMCWQC, 2001)



**Figure 6.7:** Lead concentrations at Green Point (Source: CMCWQC, 2001)

To date, analysis of data (Figures 6.6 and 6.7) shows an increasing trend in cadmium levels (CMCWQC, 2001). In contrast, a decreasing trend in lead concentrations has been found which might be explained by reduced levels of lead permitted in lead-based fuel. These trends are similar at most of the 45 sampling locations in the Western Cape between Saldanha Bay and Pringle Bay.

### IMPACTS

The impacts of coastal pollution include:

- The deterioration in the quality of marine products and recreational areas increases human health risks.
- Significant clean-up expenditure is required when coastal pollution has to be mitigated.
- The deterioration of the coastal zone due to pollution can result in a loss of tourism revenue and a loss of income due to the deterioration of quality of marine products.
- Pollution can lead to the loss of sensitive species resulting in the loss of biodiversity.

## ISSUE: OVEREXPLOITATION OF MARINE LIVING RESOURCES

Overexploitation of marine living resources involves both the legal overexploitation of resources and the illegal harvesting of resources (poaching). Overexploitation of marine species leads to loss of biodiversity, as well as degradation and destruction of marine and estuarine habitats. Human presence in sensitive feeding, breeding and roosting areas, can also disturb coastal birds and lead to a decline in their population numbers. Most commercial fishing activities straddle provincial boundaries and are best reported at national level. However, estuarine and inshore based fishing sectors, e.g. West Coast rock lobster, abalone,

oysters, seaweed and net fishing (trek netting), can be more appropriately reported at a provincial level.

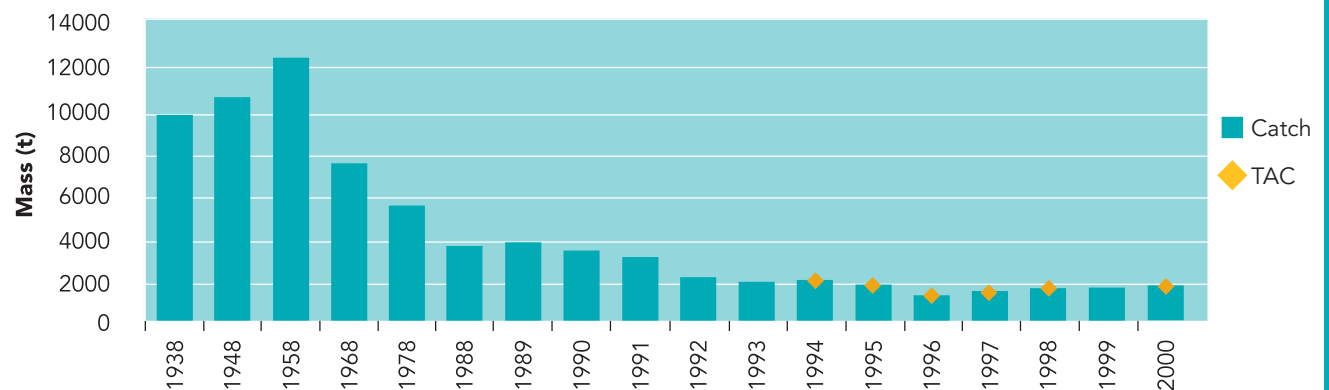
In the Western Cape, the poaching of certain lucrative species such as abalone and the West Coast Rock Lobster are a particular problem and these and many other species have seen a dramatic decrease in numbers, with some populations facing collapse. Although poaching has occurred for some time, conflict over poaching erupted in 1994 with what was known as the “abalone war”. Small communities, such as Hawston near Hermanus, were highlighted as hotspot areas (Hauck and Hector, 2000). The illegal harvesting of marine resources in many instances has now moved away from small community-based illegal harvesting to more organised criminal networks and international syndicates (Hauck and Hector, 2000). Operation Neptune (a collaborative venture between DEAT, SA Police Services and other law enforcement agencies) and other marine policing initiatives have resulted in increasing apprehension of poachers and confiscation of large quantities of illegal abalone and rock lobster.

### STATE

#### Total Allowable Catch (TAC<sup>18</sup>) of South African West Coast Rock Lobster

This indicator provides some indication of the stock status of the West Coast Rock Lobster as the bulk of the catch is in the Western Cape. The West Coast Rock Lobster forms the bulk of the commercial crustacean fishery and comprised over 80% of the catch in 2000. Between 1938 and 1958 catches increased from 10 000 tonnes to 13 000 tonnes; from 1968 onwards catches have gradually declined to 1 700 tonnes in 2000 (Figure 6.8).

Poaching of abalone is a particular problem in the Western Cape, and strictly controlled protected areas for abalone are needed as a means to prevent this species from collapsing. The same considerations would apply for protection of other species, such as the West Coast Rock Lobster (*Jasus lalandii*), the Giant Periwinkle or Alikreukel (*Turbo sarmaticus*), and threatened line fish species.



**Figure 6.8:** South African West Coast Rock Lobster: Catch 1938-2000 and Total Allowable Catch (TAC) 1994-2000. (Source: Attwood 1999; 2001a; 2001b, 2002 and Fishing Industry Handbook 2001, 2002) Note: yearly data from 1988

18. Total allowable catch is the maximum quantity of fish of individual species or groups of species made available annually for combined recreational, subsistence, commercial and foreign fishing. The Total allowable catch is scientifically determined based on population numbers.

## IMPACTS

The consequences of overexploitation of living marine resources include:

- Loss of biodiversity and stress on habitats and resources.
- The loss of income and food security due to depletion.
- The loss of revenue as recreational angling is a popular activity for temporary residents in the region.
- Species imbalances such as undesirable changes in species prey dynamics.

### Summary and Status of Indicators used in this Chapter

| Coastal Zone Indicators  | How we are doing? | Comments  |
|--|-------------------|---|
| Estuarine Health Status  | ☹️                | The state of the Western Cape's estuaries are worse than in the rest of SA, especially near the CMA.                        |
| Percentage of land based effluent being discharged into the marine environment | ?                 | A fairly large 32% of South Africa's effluent is discharged in the province's marine environment – no trend data available. |
| Number and location of marine discharges                                       | N/A               | Baseline information.   |
| Concentrations of cadmium in filter feeders                                    | ☹️                | Levels are increasing   |
| Concentrations of lead in filter feeders                                       | 😊                 | Levels are decreasing.  |
| Total Allowable Catch (TAC) of South African West Coast Rock Lobster           | ☹️                | There has been a significant decline in numbers.  |



### Suggested Indicators for Future Monitoring

- Land cover changes in the coastal zone. This indicator would provide baseline information on the transformation of land in the coastal zone. The categories could be derived from DEAT's South African Estuaries Catchment Landcover Programme (DEAT 2005).
- Recorded landed catches and official estimates of illegal catches of abalone, rock lobster and line fish. As the number of line fish permits merely indicate the potential number of entries into the fishery and the data can not be disaggregated easily to a provincial level, it is recommended that the data from the National Linefish Survey (to be initiated by Marine and Coastal Management in 2005) be used to evaluate the percentage or amount of fish being caught recreationally, in the Western Cape, in future reports.



## RESPONSES

The table below summarises some of the legislation and other initiatives that have been implemented in response to the coastal and marine issues discussed below

|                      |  |
|----------------------|--|
| <b>International</b> | <ul style="list-style-type: none"> <li>• Lake Areas Development Act (Act 39 of 1975)</li> <li>• Sea Birds and Seals Protection Act (Act 46 of 1973)</li> <li>• Minerals Act (Act 50 of 1991)</li> <li>• Dumping at Sea Control Act (Act 73 of 1980)</li> <li>• Marine Pollution (Control and Civil Liability) Act (Act 6 of 1981) that gives effect to Civil Liability Convention</li> <li>• Marine Pollution (Prevention of Pollution from Ships) Act (Act 2 of 1986) giving effect to MARPOL 73/78</li> <li>• Marine Pollution (Intervention) Act (Act 64 of 1987) that gives effect to 1969 Intervention Convention and 1973 Intervention Protocol</li> <li>• Territorial Waters Act (Act 87 of 1963)</li> <li>• Marine Traffic Act (Act 2 of 1981)</li> <li>• Merchant Shipping Act (Act 57 of 1951)</li> <li>• Guidelines for Marine Water Quality</li> <li>• Guidelines on the Management of Dredged Material</li> <li>• International Whaling Commission (IWC) Convention of 1946</li> <li>• Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) of December 1991</li> <li>• Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) of 1975 Antarctic Treaty of 21 June 1961</li> <li>• Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) of March 1975</li> <li>• Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention) of May 1994</li> <li>• Convention for the Conservation of Antarctic Marine Living Resources</li> <li>• United Nations Convention on the Law of the sea</li> </ul> |
| <b>National</b>      | <ul style="list-style-type: none"> <li>• Section 24 of the Constitution of the Republic of South Africa (Act 108 of 1996)</li> <li>• White Paper for Sustainable Coastal Development in South Africa</li> <li>• Maritime Zones Act (Act 15 of 1994)</li> <li>• Sea Shore Act (Act 21 of 1935)</li> <li>• Marine Living Resources Act (Act 18 of 1998)</li> <li>• Environmental Conservation Act (Act 108 of 1997)</li> <li>• National Environmental Management Act (Act 107 of 1998) (NEMA)</li> <li>• National Environmental Management: Biodiversity Act (Act 10 of 2004)</li> <li>• National Environmental Management: Protected Areas Act (Act 57 of 2003)</li> <li>• National Water Act (Act 36 of 1998)</li> <li>• Reserve Determination studies by Department of Water Affairs and Forestry</li> <li>• DEAT Marine and Coastal Management's National Linefish Survey</li> <li>• National State of the Coast report (in preparation)</li> </ul>  |

### Provincial

- Coastal Zone Policy for the Western Cape.
- The proclamation of Marine Protected Areas (e.g. at Cape Point).
- CAPE Estuarine Programme

### Other (Local)

- Municipal Systems Act (Act 32 of 2000) has obligations for environmental management by local authorities.
- City of Cape Town Coastal Zone Management Strategy (2003) sets out to be a systematic, integrated, multi-disciplinary approach to manage and protect the Cape Metropolitan Area coastal zone, so that social and economic opportunities are optimised

## LINKS

The coastal zone is important for economic growth, social development and improvement of quality of life, and to the sustainable use of our natural environment. This chapter has the strongest links to:

**Economic development and Tourism** – economic growth and poorly planned, unsustainable tourism within the coastal zone results in the degradation of the marine environment and the loss of biodiversity.

**Health and Waste and Sanitation** – poor waste and sanitation services results in the pollution of the marine environment, which can lead to illness.

**Biodiversity** – marine biodiversity is linked to and is as important as freshwater and terrestrial biodiversity.

**Inland waters and water supply** – freshwater systems are linked to marine systems and activities in inland water catchments influence the amount of freshwater flow into estuaries.

**Urban development** – unsustainable and poorly planned urban growth and development in the coastal zone is one of the major factors resulting in the degradation and pollution of coastal ecosystems.

## CONCLUSION

The health of the coastal zone is a concern in the Western Cape. The marine environment is facing significant and increasing pressure from tourism, urban development and economic growth, much of which is occurring close to or in the coastal zone. Generally the health of the estuaries in the province is below the national average, and the Western Cape has the highest percentage of estuaries that are in a poor condition. Additionally, 32% of all of South Africa's effluent discharged into the marine environment is discharged in the Western Cape.

Applied fishing effort is still excessive in the Western Cape and some marine resources are severely depleted. Poaching of abalone is a particular problem in the Western Cape and abalone populations have been severely depleted and face collapse. Other species that are similarly threatened include the West Coast Rock Lobster, Giant Periwinkel (Alikreukel) and various line fish species.

South Africa has international legal obligations guiding management and use of its coastline, and is a signatory to the World Conservation Strategy of the IUCN. The methods





for sustainable use and conservation are laid down mainly in the regulations of the Marine Living Resources Act (Act No. 18 of 1998), which controls exploitation and has safeguards in place to protect marine ecosystems. Various regulations under the Marine Living Resources Act (Act No. 18 of 1998) are intended to control exploitation and protect the marine environment.

Coastal developments and their associated impacts need to be very strictly controlled, as the cumulative effects of, for example, habitat modification and polluted runoff and sewage, pose a threat to the marine environment. It is expected that the implementation of the Provincial Spatial Development Framework (PSDF) for the Western Cape will mitigate and prevent fragmentation of terrestrial ecosystems at development nodes along the coast and improve the functionality of estuaries that have been affected by development. However, the implementation of the PSDF and sustainable management of the coastal zone will require the co-ordination of and co-operation between a number of government departments that are involved in the administration and management of the coastal zone.

## DATA NOTES

- The estuarine health status indicator should reflect an assessment of the status of South African estuaries based on their ecological health that uses, for example, water quantity, water quality from catchment, vegetation, birds and fish communities. There are currently a number of initiatives that can contribute to the development of a 'National Estuarine Health Assessment Programme' based on the Estuarine Health Index (DEAT and DWAF). Until such a programme becomes operational, the Estuarine Health Index (Harrison et. al. 2000) is used as an indicator.