BCLME
Benguela Current Large Marine Ecosystem Programme

TRAINING AND CAPACITY NEEDS ASSESSMENT FOR THE BCLME

FINAL DRAFT REPORT

Prepared by: B.M. Clark, M. T. Laros, and L.J. Atkinson

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In association with:

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SUSTAINABILITY MATTERS
Sustainable environmental policy, planning and management solutions

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Report to the Benguela Current Large Marine Ecosystem (BCLME) Programme Co-ordinating Unit, Windhoek, Namibia

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1. EXECUTIVE SUMMARY

The highly dynamic and productive Benguela Current Large Marine Ecosystem (BCLME) borders on the coastline of three countries, namely Angola, Namibia and South Africa. The BCLME Programme was developed with the principal objectives of better understanding and protecting this unique ecosystem, through the implementation of several policy actions. In order to address the identified policy actions required, a Strategic Action Plan for the BCLME was devised. The Strategic Action Plan identified the strengthening of human and infrastructure capacity and the maintenance of existing capacity as a very high priority for the region. It was identified that a comprehensive collaborative study of human capacity, training and infrastructure was needed to address transboundary issues, together with an assessment of the status of existing capacity and trends observed therein. This study represents an initial assessment of human capacity, training and infrastructure available within the three countries bordering the BCLME. It was designed to collect basic background information required for a capacity and training needs assessment workshop to be held in the region, in the near future. The focus was primarily on assessing capacity within each of the countries to fulfil their national obligations under the five priority action areas comprising the BCLME programme - Sustainable Management and Utilisation of Living Marine Resources, Assessment of Environmental Variability, Ecosystem Impacts and Improvement of Predictability, Management of Mining and Drilling Activities, Management of Pollution, and Maintenance of Ecosystem Health and Protection of Biological Diversity. The structure of this report follows these five priority action areas focussing on each of the three countries. Due to the dynamic nature of human capacity and training requirements, this assessment cannot be considered definitive and many aspects reported on here, will remain in a state of flux.

Angola

Sustainable Management and Utilisation of Living Marine Resources

The key government institutions responsible for the sustainable management and utilisation of living marine resources in Angola are the Ministry of Fisheries, the Institute for Marine Research (IIM) and the Institute for the Development of Artisanal Fisheries (IPA). All three of these institutes are in the process of institutional restructuring and growth. With the advice of the IIM, the Ministry of Fisheries is required to establish TACs, quotas, administer vessel licensing and implement conservation measures. The Ministry of Fisheries has a well-developed institutional structure to achieve this; there are however, critical human resource deficiencies in terms of technical skills and infrastructure available in the Ministry and its departments. The Ministry reports an oversupply of administrative posts and personnel and a shortage of technical skills and insufficient office space, vehicles, computers and software.

The IIM is currently the only scientific research institute of its type within Angola. Its role is to formulate and execute research programmes to gain knowledge about the living marine resources in Angola's territorial waters and Exclusive Economic Zone and to provide management recommendations on TACs, taking into account the protection

of the marine environment. There is however, currently no training plan or available human capacity development plan for the IIM and this is identified as a major gap.

The Institute of Artisanal Fisheries (Instituto da Pesca Artesanal) supports the development of sustainable artisanal fisheries in Angola and administers the licensing of artisanal fishing vessels. The Institute for the Development of Artisanal Fisheries provides local capacity that enables co-management of living marine resources.

Any level of a skills development strategy for the all of the Angolan institutions involved in the marine and coastal management sector appears to be lacking. The two fishing schools, Cefepescas and Helder Neto, are in urgent need of upgrading of vital equipment and infrastructure and are not able to operate efficiently. The facilities of such fishing schools and structured fishery orientated courses (through the university) are a matter of priority in order to enable the supply of graduates as interns or junior researchers at the institutions. Within all institutions mentioned above, fully developed training plans, that support the implementation of capacity development as well as general strategies, are absent.

Management of Mining and Drilling Activities

The institutions responsible for the management of environmental impacts resulting from mining and drilling activities in Angola are the Ministry of Urban Affairs, the Ministry of Petroleum and, to a lesser degree in relation to the BCMLE, the Ministry of Geology and Mines. Other organisations that play a significant role in the implementation of environmental protection measures include the International Maritime Organisation (IMO), the International Petroleum Industry Environmental Conservation Association (IPIECA) and private oil companies like SOLANGOL, the national oil company. Although there is provision for increased human capacity at the Ministry of Urban Affairs, critical areas of skills requirements are technical expertise in environmental quality, licensing and environmental education. One of the primary gaps identified in this Ministry is the lack of a local environmental management qualification in Angola. The lack of resources and capacity prevents implementation of any structured training programme. The most regular training provided, and the most urgently needed is that of the English language. The Ministry of Urban Affairs urgently require all basic forms of communication facilities and infrastructure such as telephone, fax and email. This directorate currently has no telephone lines, an issue which should be immediately addressed.

Currently there are no pollution regulations or water and air quality standards for Angola and international standards are generally used. The key gaps that still exist for Angola however, are EIA regulations, and environmental quality standards for water and air as well as regulations for pollution and waste management. The Ministry of Petroleum require key staff of biologists, environmental engineers, chemists and environmental lawyers and training to develop the skills and facilities for water quality testing. Whilst computers and telephones are less of a problem at this Ministry, office space is considered a major infrastructural problem.

Representatives from the Ministry of Mining and Geology were not available for interviews for the duration of this study and the consultant team were not able to ascertain whether there are likely to be authorised offshore mining activities in the short to medium term. However, it was established that, currently, there is no authorised off shore diamond mining in Angola.

Environmental variability, ecosystem impacts and improvement of predictability

The research capacity to support the implementation of assessment of environmental variability, ecosystem impacts and improvement of predictability within Angola exists mainly within the IIM's oceanography and environmental units, partnership programmes, fishing and oil industries and to a lesser degree, the Ministries of Urban Affairs and Environment and Petroleum. Angolan government authorities are severely under-capacitated to address environmental control of the oil industry in Angola's off-shore and onshore marine and coastal environments. There is further a lack of formalised legislative framework to address this environmental control. The Environmental Impact Assessment (in draft form) regulations, pollution and waste management regulations and water and air quality standards are not yet in place. A key gap in this draft report is the assessment of the capacity of the Ministry of Mining and Geology who were unavailable for interviews or discussion at the time of research for this report.

Management of Pollution

Local Angolan institutions that assist in the implementation of pollution management are the Ministries of Urban Affairs and Environment, Petroleum, Water & Energy as well as local government. As yet there are no regulations for pollution and waste management (in draft form) and there are no water or air quality standards set for Angola. This is seen as a significant gap in the legal support for environmental management in the context of a flourishing oil industry.

Maintenance of Ecosystem Health and Protection of Biological Diversity

The key institutions involved in driving the conservation of Angola's biodiversity resources and protecting ecosystem health include: the Ministries of Urban Affairs and Environment and Fisheries as well as the IIM. Key capacity and training needs for these institutions have been highlighted in previous policy action areas. Two programmes, in which Angola is a participating, that will assist in addressing this policy action are that of the IUCN's Southern African Biodiversity Programme (SABSP), which aims to promote conservation and sustainable development and the Southern African Botanical Diversity Network (SABONET).

In summary, the major gaps in human capacity and training needs within the context of the BCLME, identified by this study, for Angola are:

<u>Policy and Legislation</u>: environmental impact management, environmental quality management and lack of a national pollution control and waste management strategy.

Human Capacity and Infrastructure: management and technical staff capacity, budget and infrastructure constraints, specifically vessels, office space, computer hardware and software and basic communications, including telephone, fax and email.

Training: environmental impact management, environmental monitoring in the marine and coastal environments, structured marine science training programmes and in-service training facilities.

Namibia

Sustainable Management and Utilisation of Living Marine Resources

The Ministry of Fisheries and Marine Resources (MFMR) manages the exploitation of living marine resources through rights of exploitation, total allowable catches (TACs), quotas and (where appropriate) licensing of fishing vessels. The Directorate of Operations is responsible for monitoring, control and surveillance, and with the assistance of the parastatal Fishery Observer Agency, is achieving this task excellently. Although effort is put into staff training, additional assistance is still required in respect of providing senior and mid-level staff with management and leadership skills and data manipulation skills for all staff members. Staff currently lack the necessary experience required in order to fulfil their tasks successfully. Vacant post need to be filled, new posts created and the existing training and capacity building activities need to be enhanced. The research work of the Directorate is undertaken within the National Marine Information and Research Centre (NatMIRC). Staff at NatMIRC are generally well qualified, but have limited experience and there is a shortage of qualified technicians.

Namibia Maritime and Fishery Institute (NAMFI), contributes to the management and exploitation of fisheries in Namibia by offering various maritime related courses while Polytechnic of Namibia offers training courses for fisheries inspectors and observers.

Management of Mining and Drilling

Management of the environmental effects of mining and petroleum exploration and production activities on the marine environment is shared between the Ministry of Mines and Energy (MME), the Ministry of Environment and Tourism (MET) and the Ministry of Agriculture, Water and Rural Development (MAWRD). Although the legislation governing prospecting and mining for minerals, other than petroleum, is fairly stringent, the lack of compliance monitoring renders it ineffective. The Petroleum Act (1991) provides better protection for the environment than the Minerals Act. Additional staff are urgently required within the Ministry of Environment and Tourism, particularly to monitor and oversee implementation and compliance with EIAs and EMPs.

The Department of Water Affairs (DWA) in MAWRD is responsible for controlling pollution of the land environment in Namibia through the rather antiquated Water Act of 1956. A new draft Pollution and Waste Management Bill has the potential to dramatically enhance control over environmental pollution by the mining industry, but has not yet been implemented. The most critical gap in addressing this policy action is severe staff shortages and lack of appropriately trained staff in all of these agencies.

Environmental variability, ecosystem impacts and improvement of predictability

The responsibility for monitoring and researching oceanographic variability off Namibia lies with the Directorate Resource Management (DRM) within the Ministry of Fisheries and Marine Resources (MFMR). A number of routine monitoring projects are conducted by the Ministry while the Angola-Benguela frontal region is monitored opportunistically, often with foreign assistance in vessels. Despite a severe shortage of staff and resources, an impressive array of data, over relatively long time-periods, has been accumulated, however, linkages between the environmental and fish stocks is still poorly understood.

Management of Pollution

The existing legal and institutional framework for waste management and pollution control in Namibia is considered highly fragmented and poorly coordinated. At least eight government ministries, in some respect, deal with waste management and pollution control in Namibia, however, there is no formal policy on pollution control and waste management. Although new legislation has been developed, it has not yet been entered into force and should be urgently addressed.

The Directorate of Resource Management within the Department of Water Affairs (DWA) at the MAWRD is currently the lead agency responsible for management of marine pollution that originates on land which is based on a permit system. There is however, a critical shortage of staff and capacity to enforce any conditions stipulated in the permit. Regionally based staff are urgently needed to assist with monitoring and compliance and institutional integration among the eight government Ministries is considered essential.

The Directorate of Maritime Affairs (DMA) in the Ministry of Works, Transport and Communication (MWTC) is responsible for management of pollution that enters the sea from ships and offshore installations. Although this Directorate is also critically understaffed, fortunately the situation appears to remain in control as marine pollution is not considered a major issue in Namibia, and that which does exist, is mostly localised in nature.

Maintenance of Ecosystem Health and Protection of Biological Diversity

The Ministry of Environment and Tourism (MET), Directorate of Resource Management within the Ministry of Fisheries and Marine Resources (MFMR) and relevant municipalities are collectively responsible for ensuring coastal development activities in Namibia are environmentally sustainable. There is very limited legal or statutory protection for biodiversity specifically in Namibian environmental legislation. The Marine Resources Act, 2000, forms the legal framework for management of living marine resources in Namibia, however, there is no direct reference to protecting biodiversity therein. The responsibility for conservation of marine biodiversity in Namibia lies with a small group of staff in the Directorate for Resource Management in the Ministry for Fisheries and Marine Resources and with compliance staff responsible for control of mining and pollution. The lack of specific policy or legislation relating to the conservation of biodiversity and ecosystem health in Namibia is the most critical gap in this policy action.

In summary, the major gaps in human capacity and training needs within the context of the BCLME, identified by this study, for Namibia are:

Policy and Legislation: gaps exist in the policy and legal framework for control and management of pollution and environmental impacts, legislation for the control of environmental impacts is lacking and much of the environmental legislation for Namibia is fragmented and antiquated despite new legislation being available in draft format for lengthy periods of time.

Human Capacity and Infrastructure: there is a critical shortage of staff across all institutions, existing vacant posts need to be filled, additional posts need to be created and suitable duties and responsibilities must be devolved to the appropriate levels of management.

Training: training is required at virtually all levels and for a huge variety of disciplines, links need to be established between the institutions requiring training and those offering training to ensure that the appropriate training is achieved.

South Africa

Sustainable Management and Utilisation of Living Marine Resources

The Department of Environmental Affairs and Tourism (DEAT) is the all-encompassing government department addressing environmental issues within South Africa. The directorate Marine and Coastal Management (MCM) are the lead agents for all government related marine environmental matters within South Africa. MCM's primary function is to provide scientific liaison, logistic, administrative and personnel management support to the Minister of DEAT, to meet various international commitments and to fulfil national, provincial and parastatal responsibilities. Three Chief Directorates of MCM address this policy action area, namely: Research, Antarctica and Islands; Monitoring, Control and Surveillance and Resource Management. These Directorates have sufficient office space, computer supplies, vehicles and operational budget for them to achieve their specific mandates, however, it was a unanimous opinion throughout MCM that the email service currently utilised is considered inefficient. The staff employed at MCM are generally well qualified by means of either degrees or diplomas suited to their level and position of employment, but staff lack experience. This is due to a high staff turn-over, which in turn is induced by a lack of promotional structure, insufficient incentive and opportunities for self improvement within MCM. Most staff members interviewed felt it important to reinstate a structured, performance based promotions plan. A lack of human capacity within MCM is highlighted as being the most critical aspect of the organisation, exacerbated by the fact that many of the posts available are vacant, and have been so for a lengthy period of time. Many of the currently employed staff members would also greatly benefit from a structured training program being implemented. Training has been expressed as lacking at all levels and technical management staff expressed the urgent need for a mentorship-type training program. The type of training most broadly required was that of bringing experts into the organisation and attending short training courses or workshops. Fields in which training was expressed as being most urgent include stock assessment, maritime law and legal training, use of advanced computer programs, communication in all languages, aquaculture technology, taxonomy and specimen preservation and oil pollution combating and prevention.

At the provincial government level within the Western Cape, the Chief Directorate: Environmental Affairs and Development Planning (DEA&DP) addresses environmental issues of relevance to this policy action. This Directorate in the process of restructuring and aims to integrate more effective planning and environmental functions. DEA&DP will require additional staff capacity to implement the policies and legislation that are being planned for. Various training needs have been identified by staff interviewed.

The Western Cape Nature Conservation Board (WCNCB) is responsible for conservation of biodiversity in the Western Cape Province, however, there is an urgent need to incorporate jurisdiction over the marine environment into their mandate. Negotiations were in progress at the time of this study to reach a Memorandum of Understanding. The lack of clear policies or guidelines at provincial level have prevented effective management of marine resources. Additional staff and training will be required by WCNCB to implement effective marine management if the marine environment is added to their mandate.

Provincial governance of environmental matters within the Northern Cape Province is the duty of the Department of Agriculture, Land Reform, Environment and Conservation (DALEC), specifically the Directorate: Environment. There is currently a severe shortage of staff capacity and training within this Directorate. Infrastructural capacity was also identified as being severely limiting in terms of office space, vehicles, computer hardware, communication equipment and operational budget.

A local government authority, the Overstrand Municipality, recently signed "Memorandum of Agreement" with MCM whereby they have accepted responsibility for marine law enforcement within their area of jurisdiction. This allowed Overstrand Municipality to acquire sufficient staff but these staff require further training, specifically of marine issues.

The Marine Living Resources Act principally addresses marine resource management and sustainablility and although various issues are considered to be insufficiently covered, overall the Act is considered suitable. Policy relating specifically to aquaculture was identified as being a major gap in this legislation.

Management of Mining and Drilling

All legislation and matters relating to mineral and energy matters are administered by the Minister of Minerals and Energy, Department of Minerals and Energy (DME). Their objective is to ensure responsible exploration, development, processing, utilisation and management of minerals and energy resources and to minimise negative impacts on the marine environment. The legislation pertinent to this is that of the Minerals Act of 1991, however, this act not specify any regulations relating specifically to the marine environment which is considered a major gap. The new Minerals and Petroleum Resources Act, currently in draft stage, will aim to address this legislation gap. The DME have insufficient staff numbers and a deficiency in qualified and trained marine environmental expertise. There is an urgent need for training in all marine related aspects including EIA and EMP evaluation. Members of the DME

interviewed for this study expressed a lack in infrastructure of vehicles and communications equipment (telephone/fax/email).

Department of Agriculture, Land Reform, Environment and Conservation (DALEC) and the Department of Environmental Affairs and Development Planning (DEA&DP) address this policy action at provincial levels. Capacity and training needs of these organisations are discussed in the previous policy action.

Environmental variability, ecosystem impacts and improvement of predictability

The responsibility for research and monitoring of environmental and oceanographic variability in South Africa lies with the Department of Environmental Affairs and Tourism, Branch: Marine and Coastal Management but this organisation receives considerable assistance from other parastatal and private research organisations. Although training was expressed as being urgently needed for this policy action, expertise required for training in this field is only available from first world countries. Legislation relating to aquaculture was identified as being a significant gap.

The South African Environmental Observation Network (SAEON) is a research facility that has establish selected environmental observatories to provide long-term studies of ecosystems. Data collected by this organisation directly addresses this policy action, however, the relevant expertise for evaluation and efficient use of this data is currently lacking and was expressed to only be available from first world countries.

Management of Pollution

The institutional capacity for management of pollution within South Africa is considered to be fragmented and disjointed, making laws and policies difficult to implement. As many as five organisations manage environmental pollution matters in South Africa, with the result of a lack of co-ordination and insufficient staff dedicated to this aspect. The Department of Transport delegated the national responsibilities of oil pollution combating (once the oil spill has occurred) to the DEAT Branch: Marine and Coastal Management to be managed in consultation with the Department, whilst the responsibilities of oil pollution prevention was delegated to the South African Maritime Authority (SAMSA). Additional staff and intensive training at all levels and through all organisation is required, however, there are currently no assigned training programs for this purpose, mostly because international expertise required for this specific training.

The Department of Water Affairs and Forestry (DWAF) is responsible for, inter alia, the quality of water when it reaches the sea. There is however a major gap in regulations regarding diffuse sources of pollution (e.g. storm water runoff), which may cumulatively have a significant impact on marine water quality along the coastline. There is currently considered to be too few staff (at all levels) within DWAF dedicated to this sector to adequately manage and administer this area of responsibility

The South African Maritime Safety Authority (SAMSA) principle mandate is that of marine pollution prevention. It was expressed that additional staff and the associated training required is urgently needed at operational and technical levels, specifically for marine pollution management.

Maintenance of Ecosystem Health and Protection of Biological Diversity

Maintenance of ecosystem health and protection of biological diversity in South Africa is primarily the responsibility of the Department of Environmental Affairs and Tourism and all marine related aspects thereof are addressed by Marine and Coastal Management (MCM). Formal legislation relating to this policy action is considered to be very vague and should address marine biodiversity conservation more specifically. As previously mentioned, there is considered to be a serious staff capacity deficit within MCM with training urgently required at all levels. Other organisations that address minor aspects of this policy action in some way include Department of Water Affairs and Forestry (DWAF), DEA&DP, WCNCB, DALEC, City of Cape Town Municipality and South African National Parks.

In summary, the major gaps in human capacity and training needs within the context of the BCLME, identified by this study, for South Africa are:

Policy and Legislation: fragmented and administered by diverse government departments and agencies, legislation is either awaiting revision or replacement, the Marine Living Resources Act does not adequately provide for delegation of responsibilities to a suitable or appointed authority for specific issues and issues relating to mariculture have not been addressed therein, marine pollution implementation legislation is considered inadequate.

Human Capacity and Infrastructure: the most critical and unanimous aspect is the lack of human capacity, vacant posts and the bureaucratic procedures required to fulfil these posts are severely impacting on marine conservation and research in South Africa, additional posts need to be created. Infrastructure is not considered to be severely debilitating.

Training: project or programme management training, coastal zone management and assessment of environmental impacts, fishery management and stock assessment training were the most sought after training requirements within South Africa.

2. GENERAL INTRODUCTION

2.1. BACKGROUND TO THE STUDY[1]

The Benguela Current Large Marine Ecosystem (BCLME) is situated along the south-western coast of Africa, and covers three adjoining countries - Angola, Namibia and South Africa. It stretches from east of the Cape of Good Hope in the south, equator-wards to the Angola Front, which is situated near the northern geopolitical boundary of Angola (Fig.1). It represents one of the four major coastal upwelling ecosystems of the world, and as such, is an important centre of marine biodiversity and marine food production. It is in fact one of the most productive ocean areas in the world, with a mean annual primary productivity of 1.25grams of carbon per square metre per year - about six times higher than the North Sea ecosystem. Near-shore and off-shore sediments hold rich deposits of precious minerals (particularly diamonds), as well as important oil and gas reserves. The natural beauty of the coastal regions, many of which are still pristine by global standards, have also enabled the development of significant tourism in some areas.

The activities of human populations in the region have had, and continue to have, a negative impact on the environment of the BCLME. Commercial exploitation of living marine resources in the BCLME commenced in the early part of the seventeenth century with the harvesting of fur seals. This was followed by extensive whaling in the eighteenth and nineteenth centuries, commercial trawling around the 1900s and commercial purse-seine fishing about 50 years later. From their inception, these fisheries expanded rapidly, peaking in the 1960s and 1970s, and in the absence of effective management and enforcement, resulted in the severe depletion and collapse of several fish stocks. Pollution from industries and poorly planned and managed coastal developments and near-shore activities also has, and continues to take its toll, resulting in rapid degradation of vulnerable coastal habitats. These human factors and the existing shortage of human capacity to monitor and assess resources and the environment, superimposed on an environment that is highly variable and poorly understood, have manifested themselves in declining fish stocks, some unsustainable harvesting practices, uncertainty regarding ecosystem status and yields, increasing pollution, habitats destruction and alteration, and loss of biotic integrity.

Faced with this situation, scientists, managers and government officials from the three participating countries decided to approach the international community for material assistance to enable them, *via* a joint partnership, to establish and implement an appropriate framework for management actions. Inspired by progress being made on sustainable management of other Large Marine Ecosystems (LMEs) - the Black Sea LME in particular - the three countries requested support from the Global Environmental Facility, GEF, a fund established in 1991 under the management of The World Bank, the United Nations Development Programme (UNDP) and the United Nations Environmental Programme (UNEP). An initial grant from the GEF enabled the development of a comprehensive project proposal

[1] Information in this section was summarized from the Transboundary Diagnostic Assessment and Strategic Action Programme prepared for the BCLME Programme.

including the necessary instruments such as the synthesis and assessment of information on the BCLME, a Transboundary Diagnostic Analysis, Strategic Action Programme, and Project Brief. A grant of $15.2 million was approved by the GEF for the implementation of the Strategic Action Plan some five years later, and the BCLME Programme was initiated in March 2002.

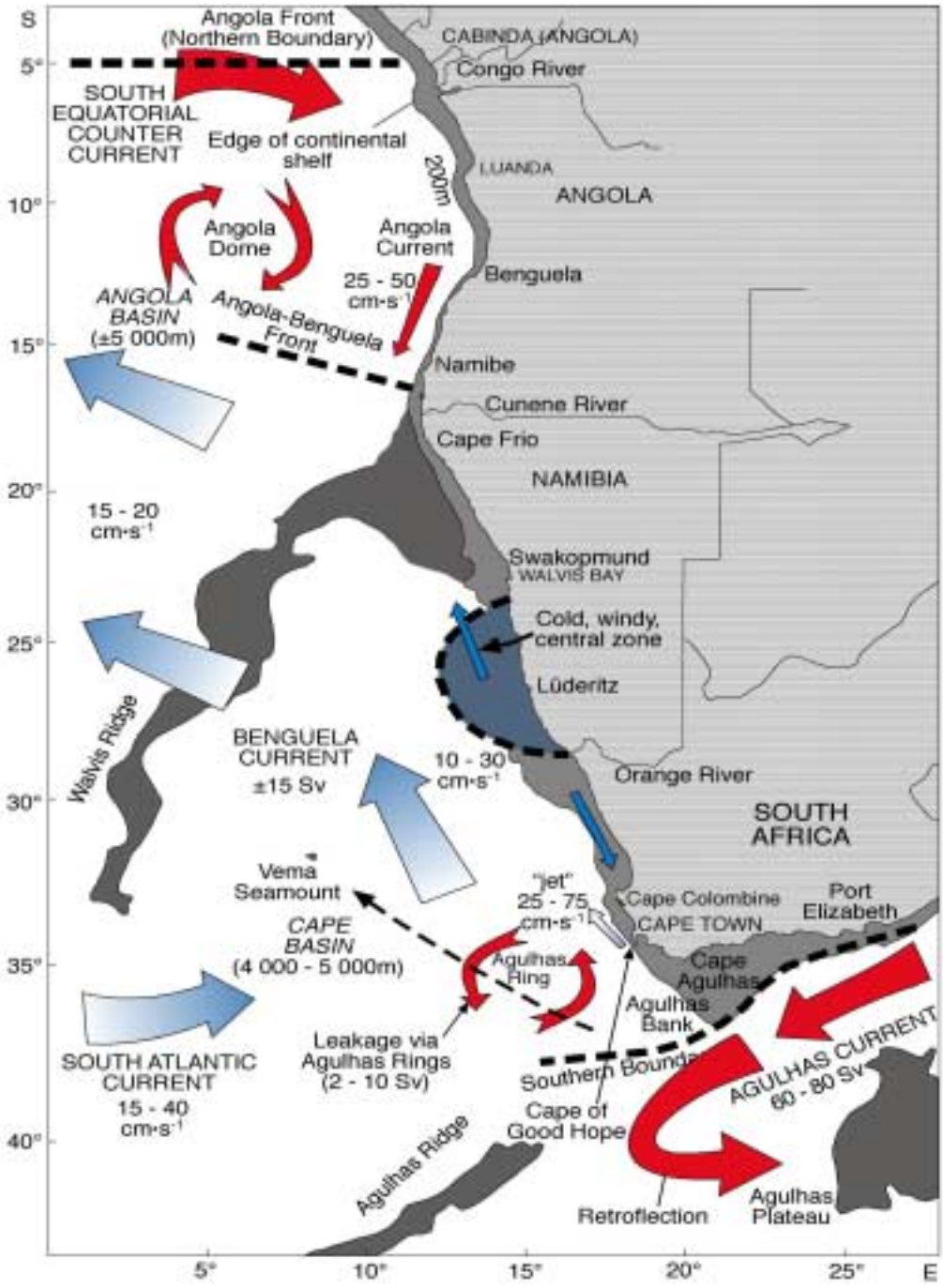


Fig. 1. Key features and boundaries of the BCLME (Source: Strategic Action Programme for the BCLME).

The programme itself comprises a number of policy actions aimed at protecting the Benguela ecosystem. These include Sustainable Management and Utilisation of Living Marine Resources, Assessment of Environmental

Variability, Ecosystem Impacts and Improvement of Predictability, Management of Mining and Drilling Activities, Management of Pollution, Maintenance of Ecosystem Health and Protection of Biological Diversity, and Capacity Strengthening. The strengthening of human and infrastructure capacity and the maintenance of existing capacity was identified as a high priority, if not the highest priority, in the region. Existing capacity is stretched to the limit to address national priorities within the BCLME, and there is a serious lack of capacity to address the priority transboundary issues identified in the TDA and highlighted in the SAP. It was identified therefore that a comprehensive collaborative study of human capacity, training and infrastructure was needed to address priority transboundary issues, together with an assessment of the status of existing capacity and trends therein.

This document reports on the results of the first stage of this needs assessment. It uses as its point of departure the priority actions identified in the Strategic Action Plan for the BCLME and attempts to highlight areas where shortcomings in training or capacity are likely to be encountered in the implementation of this plan. It is by no means a definitive assessment of capacity and training needs for the region, rather it is designed to form a basis for the collaborative development of a regional strategic plan for capacity strengthening and maintenance within the context of the BCLME, focusing on transboundary needs.

2.2. SCOPE OF THE STUDY

This study represents an initial assessment of human capacity, training and infrastructure available within the three countries bordering the BCLME. It was designed to collect basic background information required for a capacity and training needs assessment workshop to be held in the region in the near future. The focus was primarily on assessing capacity within each of the countries to fulfil their national obligations under the five priority action areas comprising the BCLME programme - Sustainable Management and Utilisation of Living Marine Resources, Assessment of Environmental Variability, Ecosystem Impacts and Improvement of Predictability, Management of Mining and Drilling Activities, Management of Pollution, and Maintenance of Ecosystem Health and Protection of Biological Diversity. The purpose of the study was to identify where the major capacity gaps exist and hence to assist the BCLME Programme in focussing their efforts in respect of capacity building and training, to achieve the most effect. Data required for the project were collected over a relatively short period (ca. 30 person days) from both published and unpublished sources including organisational profiles, internet web sites, as well as from face to face and telephonic interviews with representatives from key government institutions, NGOs and private sector enterprises in the three countries. Project team members visited as many identified organisations as possible in the region in order to collect relevant information and to conduct interviews with key individuals at these organisations. A major constraint faced by the project executants was availability of key personnel over the period in which the data were collected and their willingness to take the time to participate in structured interviews.

The study proceeded more or less according to the following steps:

1. A list of all National, Provincial and Local Government institutions, Non-government organisations (NGOs) and private sector enterprises involved with training, research, management, monitoring and/or compliance in respect of the Coastal Zone and Marine Environment in the BCLME region (Angola, Namibia and South Africa) focusing on fisheries, environment, pollution, and biodiversity was compiled at the outset;
2. Data were then obtained on the approximate numbers of personnel employed within or based at each of these institutions broken down in terms of their line function (research, management, or compliance) and area of responsibility and/or expertise (fisheries, environment, pollution, or biodiversity protection) through face-to-face and telephonic interviews, and email questionnaires;
3. Based on the above, gaps and weaknesses, and requirements and opportunities for training and capacity building were identified, and recommendations put forward as to how best to address the key problems identified and to take advantage of available opportunities;

The key deliverable from this project was thus a report in electronic and hard copy format that provided both raw and summarized data and information on training, research, management, monitoring and compliance capacity within National, Provincial and Local Government institutions, Non-government organisations (NGOs) and private sector enterprises involved with management in respect of the Coastal Zone and Marine Environment in the BCLME region (Angola, Namibia and South Africa). The report focuses on fisheries, environment, pollution, and biodiversity; identifies gaps and weaknesses in existing capacity; identifies requirements and opportunities for training and capacity building in the region; and makes recommendations as to how best to address any problems identified and to how to take advantage of available opportunities.

A recent study was commissioned by Benguela Environment, Fisheries Interaction and Training (BENEFIT) Programme on existing capacity for training of research, management and compliance staff by registered training institutions in the BCLME region. The executants of this study produced a detailed report, titled Training Institutes in the SADC Region, on capacity in this respect and hence this information was not repeated here.

2.3. STRUCTURE OF THIS REPORT

This report documents the findings on an initial study on capacity, training and infrastructure available within the three countries bordering the BCLME for the purpose of implementing the Strategic Action Plan for the BCLME Programme. It is structured in a way to make information collected during this study as easily accessible as possible to persons from a range of different backgrounds with different points of departure and with different needs, whilst providing adequate context in each case.

The report starts of with a **General Introduction** that explains the history and origins of the BCLME Programme, the scope and context of this study and how it fits within the overall BCLME Programme. The report provides some background to the environment into which the BCLME Programme is being implemented in terms of other international, multilateral and bilateral donor funded programmes that are currently being implemented in the region and the international agreements to which the three participating countries have or intend acceding to. The report then provides an assessment of the extent to which existing policies and legislation, and available human and infrastructural capacity within the three countries, – **Angola**, **Namibia** and **South Africa** – is able to fulfil their national obligations under the five priority action areas comprising the BCLME programme. The section on each of the individual countries starts off with a brief profile on the socio-economic and environmental characteristics of the country – **Country profile** – goes on to provide a summary of the key policy and legislative instruments applicable to the five priority action areas – **Policy and Legal Framework** – and then provides an assessment of the extent to which these policies and the available human and infrastructural capacity are able to meet national obligations in respect of the five policy action areas - **Sustainable Management and Utilisation of Living Marine Resources**, **Assessment of Environmental Variability**, **Ecosystem Impacts and Improvement of Predictability**, **Management of Mining and Drilling Activities**, **Management of Pollution**, and **Maintenance of Ecosystem Health and Protection of Biological Diversity**. Relevant information collected for each country is then summarised in a section entitled **Summary of Findings** and key gaps in the existing policy legal frameworks and existing human and infrastructural capacity are highlighted in **Gaps to be addressed by the BCLME Programme**. A **Bibliography of Documents Consulted** and a **List of People Consulted** are provided at the end of the document along with a copy of the questionnaire used in face-to-face and telephonic interviews in **Appendix 1**.

3. CONTEXT OF THE BCLME PROGRAMME

3.1. OTHER REGIONAL AND INTERNATIONAL PROGRAMMES

The BCLME programme does not stand in isolation and should definitely not be viewed as such. Scientists from Angola, Namibia and South Africa have always acknowledged that the Benguela is an integrated and complex system that can only be managed successfully through cooperation and the sharing of knowledge and expertise across the region. Scientists from the three countries have thus been working together for a long time on joint projects and initiatives, notably including the Benguela Environment, Fisheries and Training (Benefit) Programme, Environmental Conditions and Fluctuations in Recruitment and Distribution of Small Pelagic Fish Stocks (ENVIFISH), Interactions and Spatial Dynamics of renewable resources in upwelling Ecosystems (IDYLE), the Global Ballast Water Management Programme (Globallast), the CAPE Action for People and the Environment Programme (CAPE), various initiatives under the Southern African Development Community (SADC) programme including the Regional Fisheries Information System Project (RFIS), and a number of bilateral donor supported programmes. The BCLME is designed to build on and work in conjunction with these other initiatives to ensure sustainable and integrated management of the living and non-living resources of the Benguela region. A brief discourse on each of the other major programmes active in the region is provided here for completeness.

3.1.1. Benguela Environment, Fisheries Interaction and Training (BENEFIT) Programme

BENEFIT is a southern African Development Community (SADC) marine science and training programme involving the three member states of Angola, Namibia and South Africa. It is a 10-year programme established in 1997. Its overall stated goal is to promote optimal and sustainable utilisation of the Benguela ecosystem's living resources by fostering research into living resources and environmental factors that influence them, by developing human capacity and infrastructure for marine science and technology, and by providing system-wide data and information for resource management. The programme is composed of a research component comprising Environmental and Resources Working Groups and a capacity building component comprising the Training Working Group. The research components focussed in the early part of the programme on supporting research into small pelagic fish, hake, horse mackerel and rock lobster due to the socio-economic importance of these resources, but has expanded its mandate to include in-shore living resources as well as artisanally exploited species and mariculture. This component has been extremely productive and successful and has contributed significantly to research output in the region.

The training component of BENEFIT on the other hand was designed to contribute to the development of human capacity in marine fisheries science and technology in the Benguela Current region. Initially, most of its activities

have been focussed on training activities integrated into the research programme and did not accomplished as much as hoped in its own right. Key products have included providing trainee scientists (students) and technicians with on-the-job training on dedicated research and training cruises, and workshops on methodology, analysis and processing of data. Later it was recognised that a greater contribution was required in this area, and a dedicated Training Plan was developed at the end of 1999. Bridging the capacity gap between north and south was highlighted as a top priority in this document. South Africa was considered to have well developed educational institutions; in Namibia these institutions were considered to be in the early stages of growth, with programmes still being formulated; while in Angola, educational institutions at all levels were highlighted as having suffered greatly from the effects of the civil war that ravaged the country for more than twenty years. The training plan provided an assessment of regional training needs (focusing specifically on research) and capacity for meeting them. The main findings of this study are summarized here, as many are still applicable.

Technical training was seen as one of the top priority training areas, there being a dearth of trained oceanographic technicians and electronic technicians familiar with the design, maintenance and repair of marine electronic equipment. Angola was perceived to be worst off (no dedicated technical training in marine science exists in this country), followed closely by Namibia (where B.Sc. graduates who generally lack the appropriate technical skills or training often occupy technical posts and do technical work). Cape Technikon in Cape Town was identified as the only institution in the region, which trains students specifically as oceanographic technicians (having done so successfully for more than 30 years through the 3-year National Diploma in Oceanography). The Cape Technikon also offers Bachelor of Technology, Master and Doctor of Technology degrees.

The second major gap highlighted in the BENEFIT training plan was the lack of numerical and statistical training amongst fisheries scientists. Key needs in this respect, included development of stock assessment, statistical analysis and biostatistics, and modeling skills. Various institutions in the region (mostly South African coupled with a few in Namibia) were identified as being able to cater for the needs of the region. Relevant courses were thought to be under-subscribed, attributed to the tendency for students in the life sciences to avoid mathematical subjects.

Another important gap identified in the report covered training of fishery inspectors and observers. Separate training programmes were identified as being necessary for compliance enforcement officers (inspectors), who enforce the laws and regulations and have statutory quota control functions, and observers, who collect data from commercial vessels and observe and report on possible infringements, but do not have law enforcement powers. Namibia was considered to have adequate numbers of inspectors and observers but Angola and South Africa were perceived as being deficient in this respect. The Namibian observer-training programme was highlighted as the best developed in the region. It was felt that if it were suitably expanded and modified it would be able to meet regional needs. It was also identified that better training was required for inspectors in all three countries in the region, who at the time, were trained through short courses or through in-service training that concentrated on the operational facets of their work only.

Other training priorities identified in the report included trans-disciplinary training for fisheries managers, training of quality control officers, training in environmental monitoring (including remote sensing) and language training. With respect to transdisciplinary training, the authors of the report identified that most fisheries managers in the region were trained as administrators or scientists, and that while skilled in their fields, they often lacked sufficient understanding of the other disciplines required for effective fisheries management (e.g. fisheries biology, the economics of resource exploitation, socio-economics and marine law). Managers, they felt, required greater exposure to these other disciplines. Training in the regulation and monitoring of processing standards in the fishing industry was identified as a priority in Namibia and Angola, but not in South Africa, where the South African Bureau of Standards (SABS) and Fishing Industry Research Institute (FIRI) were able to satisfy the demand. The scope and extent of routine environment monitoring (including ship-board sampling, fixed monitoring and the receipt and processing of satellite imagery in Angola, and to a lesser extent Namibia, was also highlighted as being limited by a shortage of trained staff. The dominant language of the Benguela region being English, places people from Angolan (whose home language is for the most part Portuguese) at a bit of a disadvantage when attending meetings, conferences and courses. The report identified therefore that Angolan scientists and technicians would be able to derive greater benefit from BENEFIT and other regional programmes if they were to receive some tuition in basic English.

More details on the research and training outputs of the BENEFIT programme are provided in the Benefit Training Plan (see bibliography), Annual Reports generated by the secretariat and on their website http://www.benefit.org.na.

3.1.2. Environmental Conditions and Fluctuations in Recruitment and Distribution of Small Pelagic Fish Stocks (Envifish)

ENVIFISH was a three-year (1998 – 2001) European Union funded project between the fisheries ministries of Angola, Namibia and South Africa, the Departments of Oceanography and Zoology at UCT, and six European marine institutes from Italy, Norway, Germany, Britain and Portugal. The main objective of ENVIFISH was to improve sustainable management of small pelagic fish stocks, such as sardines and anchovies, along the southern African west coast. The programme focussed on identifying and quantifying key environmental conditions that influence fluctuations in the recruitment and distribution of small pelagic fish in the Benguela and Angolan systems.

One of the features of the project was to develop a consistent, quality controlled database of satellite, oceanographic and fisheries data, together with tools for analysing these data. ENVIFISH examined data collected over the last 15 years (1982 to 1997). This period has seen major variations in abundance of pelagic species in the region, including evidence of long-term changes in species dominance, 3-10 year cycles, as well as substantial year-to-year variability; all of which have combined to make management of these resources difficult. ENVIFISH examined forward theories of causal links and empirical relationships between environmental variability and fisheries trends.

The programme of ENVIFISH further aimed to develop adequate training and capacity building to allow scientific findings to be transferred to management and decision making, in the respective African countries.

Specific ENVIFISH objectives were:

- To develop a consistent and quality-controlled database of satellite, oceanographic and fisheries data, together with tools for analysing the data;
- To identify and quantify the key environmental features associated with, and possibly causing, the significant variability in abundance in small pelagic fish stocks in the last 15 years;
- To evaluate the impact of key environmental features, such as areas of spawning and recruitment habitat, as well as processes such as concentration, enrichment and retention, on recruitment success;
- To relate environmental conditions to the spatial distribution of small pelagic fish stocks
- To develop adequate training and capacity building to allow these scientific findings to be transferred to management and decision-making processes in the African countries involved.

3.1.3. Interactions and Spatial Dynamics of renewable resources in upwelling Ecosystems Programme (IDYLE)

The IDYLE Programme is a collaborative program between the French *Institut de Recherche pour le Développement* (IRD), Marine and Coastal Management (MCM), the University of Cape Town, South Africa (UCT) and other universities and institutes within the region, including NatMIRC Laboratory of the Ministry of Fisheries and Marine Resources of Namibia and Fisheries Research Laboratory of Angola. The first phase of the project started at the beginning of 2001, and will continue until the end of 2004. This phase of the programme will end in December 2004 and part of the IRD team will retreat to France from mid-2003. Funding is received from the above-mentioned institutes and IDYLE is closely associated with the Benguela Ecology Programme (BEP-V) and affiliated to the BENEFIT Programme (see above). The scientific focus of the IDYLE programme is to understand how the adaptive strategies of different species of fish and their dynamics are structured by the presence of strong inshore upwelling along the Benguela Current and to examine the resulting ecosystem patterns. In understanding the adaptive strategies of these species, application can be made to sustainable development and viability of fisheries. The programme focuses on the mesoscale dynamics of the environment, reproductive strategies, spatial (macroscale) strategies and pelagic fish aggregations. These multidisciplinary questions will be addressed by linking different models of ecosystem dynamics in order to improve understanding the impact of:

- spatial structuring of the environment on population dynamics (spawning area, recruitment area, migration);
- interspecific relationships in the ecosystem (trophic relationships, multi-species aggregation strategies);
- spatio-temporal structuring on exploitable resources (comparison between pros and cons of management by quotas, marine reserves or effort limitation).

One of the principle aims of the IDYLE Programme is to train young scientists and students from partner countries (South Africa, Namibia and Angola) in modelling, data analysis, information systems, analysis of remote sensing images, and environmental evaluation. In the second phase of the programme (2005-2008), more emphasis will be given to the comparative approach between upwelling ecosystems (mainly the Benguela Current, the Humboldt Current and the Canary Current) and a part of the French team will work from France, another part from one or two of the other ecosystems (still to be defined).

The IDYLE Programme is based and developed in the Benguela ecosystem, more particularly the Southern sub-ecosystem, which is separated from the Northern sub-ecosystem by very strong upwelling off Lüderitz, a natural border for many marine resources. The Programme makes use of generic tools to allow rapid transfer of the methodology and results to other areas. It is a follow-up of the "Viability of exploited pelagic fish resources in the Benguela Ecosystem in relation to the environment and Spatial aspects" (VIBES Project), which operated between 1998 and 2001. The IDYLE Programme is directed specifically towards coastal pelagic resources and their management. Training is a large component of the programme and is conducted at both a bilateral (expertise shared between France and South Africa) and a regional scale (expertise shared within South Africa). A total of nine scientists from IRD are involved for varying periods of time in the programme, with several part-time scientists (2 French, 10 South African and 2 Namibian) contributing at least one third of their time to the programme. Up to 14 other staff and post-graduate students are intensively involved in various projects of the programme. The scientists of this programme supervise on average 8 to 10 students per year at Masters and PhD level. Most of the students are based in Cape Town and come from local Universities such as University of Cape Town, University of Western Cape or Namibian and Angolan universities. Other PhD candidates will be recruited from French institutions, when the necessary qualifications are not available locally. This programme has, by means of seminars, offered several training opportunities regarding statistics and modelling tools, mainly for students and young scientists of the three countries of the region. These seminars run intensively over periods of 2 to 5 days, included some theory, followed by software demonstrations after which the participants practised with their own data.

3.1.4. The Global Ballast Water Management Programme (Globallast)

The Globallast Programme is a project aimed at reducing the transfer of potentially harmful species in ships' ballast water in developing countries of the world. The implementing agency, the International Maritime Organization (IMO) and executing agency, the United Nations Development Programme (UNDP) are working together on a global initiative aimed at reducing aquatic species transfers through ships' ballast water. Ballast water has been identified as the source of introduction of numerous invasive species, leading to serious ecological and economic problems around the world. The Global Ballast Water Management Programme (Globallast) has been operational since March 2000, with funding provided by the Global Environment Facility (GEF). The Globallast Programme is currently being implemented in six pilot countries, namely Brazil, China, India, Iran, South Africa and Ukraine with one demonstration

site per country. In South Africa, the Globallast programme is being implemented with the support of the Department of Environmental Affairs and Tourism, Branch: Marine and Coastal Management.

The South African Global Ballast Water Management Programme was launched in February 2001 and aims to develop the capacity within the region to implement and enforce the IMO's voluntary ballast water management guidelines, and prepare for the IMO's upcoming mandatory regime. In South Africa, Globallast has been working through the demonstration site of Saldanha Bay where approximately 8 million tonnes of ballast water are received from international sources annually. The threat posed by ballast water is especially apparent in Saldanha Bay due to the proximity of the port to sensitive resources such as the West Coast National Park, mariculture facilities and commercial fisheries. A port survey conducted by Globallast in April 2001 demonstrated the presence of up to eight alien species in the bay, although only two were considered to be invasive. Replicate surveys are continuing around South Africa through the National Ports Authority, with fieldwork already complete at the Ports of Richard's Bay and Coega. Globallast is also working with countries of the West African sub-region to provide the necessary technical support for replication of similar activities.

3.1.5. CAPE Action Plan for the Environment

The CAPE Action Plan for the Environment is a strategy and action plan prepared by South Africa with the assistance of the Global Environment Facility. The long-term aim of the project is to ensure that "by the year 2020, the natural environment of the Cape Floral Kingdom and the adjacent marine environment will be effectively conserved, restored wherever appropriate, and will deliver significant benefits to the people of the region in a way that is embraced by local communities, endorsed by government and recognized internationally." It has three broad areas of focus: 1) Conserving biodiversity in priority areas, 2) Using resources sustainably and 3) Strengthening institutions and governance.

The C.A.P.E. program focuses on partnerships at many levels in order to achieve its aims. A wide range of experts and organizations have united to drive the CAPE project, including *inter alia*, government departments at national and provincial level (Western and Eastern Cape), South African National Parks, National Botanical Institute, Western Cape Nature Conservation, Eastern Cape Provincial Environmental Advisory Council, Botanical Society of South Africa, Wildlife and Environment Society of Southern Africa and the Fynbos Forum. Currently, up to sixteen government departments, statutory bodies and conservation NGOs have agreed to be implementation partners, forming the C.A.P.E. Implementation Committee. These organisations have committed to collaborative action to ensure progress within the CAPE Programme.
Several core projects are being planned and implemented by multi-disciplinary teams. These include the establishment and strengthening of the Conservation Planning Unit, which aims to make the most important biodiversity information available for land-use and conservation planning and decision-making. Other such projects, addressing C.A.P.E. objectives are currently being planned and implemented.

3.1.6. Regional Fisheries Information Systems (RFIS) Project

The RFIS project, together with Benefit, formed part of the Southern African Development Community (SADC) marine fisheries portfolio of assistance to the sector. Although the project was recently terminated and is no longer in existence, the contribution thereof to capacity development and training is highlighted here. The overall goal of the project was "to improve the sustainable utilisation of marine fisheries of the SADC region contributing to national and regional development objectives and the sustainable livelihoods of coastal communities". The aim of the project was thus to improve the management of marine fisheries resources in southern Africa through the provision of timely, relevant and cost effective information. The four main objectives were to enhance communication of fisheries management information, to support training capacity, to promote the use of information for management of the artisanal sector, and to fisheries management and environmental information for the Benguela region through support to the BENEFIT programme. The project was funded by the Department for International Development (DFID) of the UK but the Directorate of Food, Agriculture and Natural Resources (FANR) of the SADC Secretariat coordinates its implementation. The project established partnerships with various institutions, NGOs and local and national government agencies in Angola, Namibia and South Africa and provided support for a range of information related activities including providing assistance and advice with the collection of baseline information, assisting with the design of data collection systems, data management, analysis and dissemination, and also contributed by promoting national and regional workshops, training programmes, exchange visits, and distance learning courses.

3.1.7. Bilateral donor supported programmes

The three countries bordering the BCLME also receive considerable bilateral assistance for staff training and development from various northern-hemisphere governments, donor-agencies and international bodies. For example, all three countries have had, or are having, fisheries scientists trained in Norway (largely through M.Sc. courses at the University of Bergen) in terms of NORAD's Nansen Programme, while many scientists and technicians from the region have benefited from participation in resource surveys, environmental investigations and gear-performance studies on board donor country vessels (Anon 1999d). Both Norway and Germany have provided bilateral support to programmes or projects within the BCLME region. The Norwegian research vessel *Dr Fridtjof Nansen* has been based in the south-east Atlantic since her commissioning in 1994, while Germany has scheduled visits of several research vessels to regional waters, including the *RV Humboldt*, *RV Kottsov, RV Meteo*r, and *RV Poseido*n.

The Nansen Programme has contributed significantly to training and capacity strengthening among local fisheries institutions, particularly in Angola and Namibia. The German government, through the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), has supported the training of marine environmental scientists and technicians in Namibia, in addition to being a strong supporter of BENEFIT training activities. Namibia also receives training assistance from a number of other countries (including South Africa) and donor agencies, and the FAO, the latter in

the form of stock assessment courses and advice from expert consultants. The French government for example has supported a bilateral study of the artisanal coastal fisheries of Angola.

3.1.8. International agreements ratified by BCLME countries

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, 1989

The Basel Convention was adopted in March 1989, entered into force in May 1992. This convention seeks to establish a global regime for the control of international trade in hazardous and other waste. The main feature of the convention is the establishment of a system of prior informed consent for the transboundary movement of hazardous wastes. No waste may thus be exported to a state that is party to the convention without express consent of the competent waste authority in that state and subject to any conditions it may impose. Wastes are classified as hazardous, either by reference to categories set out in the Annexes I and III of the convention, or if they are so classified by national legislation. Article 4 of the convention requires that parties to convention take appropriate measures to minimize generation of hazardous wastes, to ensure availability of adequate disposal facilities, to reduce transboundary movement of hazardous and other wastes to a minimum, and permit the export of hazardous wastes only if they do not have the technical capacity and facilities to dispose of the wastes in an environmentally sound manner themselves, or where the wastes themselves are required for recycling or recovery. The convention also requires that parties prohibit the import and export of wastes to and from non-party countries except pursuant to certain conditions.

The Basel Convention has been ratified by Namibia and South Africa but has not yet been ratified by Angola.

United Nations Convention on the Law of the Sea, 1994

This convention was concluded in December 1982 and entered into force in 1994. It seeks to establish a comprehensive legal regime to regulate activities on and in relation to the world's oceans and seas. Article 61 requires coastal states to "determine the allowable catch of the living resources in its exclusive economic zone", and "taking into account the best scientific evidence available to it …ensure through proper conservation and management measures that [ensure] the maintenance of living resources in the exclusive economic zone is not endangered by overexploitation". Such measures must be designed to "maintain or restore populations of harvested species at levels that can produce the maximum sustainable yield". Article 63-65 requires states to cooperate in the conservation and development of straddling stocks, highly migratory species and marine mammals. Article 194 requires states to take necessary measures to ensure that activities under their jurisdiction or control do not "cause damage by pollution to other states and their environment" and to take measures to minimise the "the release of toxic, harmful or noxious substances, especially those that are persistent, from land based sources, from or through the atmosphere, or by dumping", as well as "pollution from vessels, installations and devices used in exploration or exploitation of the natural resources of the seabed and subsoil" and "pollution from other installations and devices

operating in the marine environment". Article 196 requires states to take necessary measures to "prevent, reduce and control pollution of the marine environment resulting from the use of technologies under their jurisdiction or control, or the intentional or accidental introduction of species, alien or new, to a particular area of the marine environment, which may cause significant and harmful changes thereto". Article 199 requires states to "jointly develop and promote contingency plans for responding to pollution incidents in the marine environment". Article 204 requires states to endeavor, as far as practicable, to "observe, measure and analyse, by recognized scientific means, the risks or effects of pollution of the marine environment" particularly those activities that they permit or engage in. Articles 207-211 require states to adopt laws to "prevent, reduce and control pollution of the marine environment" from *inter alia,* land-based sources (including rivers, estuaries, pipelines and outfall structures), seabed activities, dumping, vessels, from or through the atmosphere, while articles 213-222 specify measures required to enforce such legislation.

None of the BCLME countries have ratified this Convention, but many aspects of the Convention are provided for in domestic law in South Africa and Namibia already.

International Convention for the Prevention of Pollution of Ships, 1973 (MARPOL 73/78)

The International Convention for the Prevention of Pollution of Ships, 1973, was adopted in 1973 and subsequently modified by the Protocol of 1978. These documents are to be consulted as one and are generally referred to as MARPOL 73/78. This Convention sets the standards developed by the International Maritime Organisation for tankers and other large vessels. This Convention serves as the most important global treaty for the prevention of pollution from the operation of ships and requires that states party to the Convention must provide reception facilities and regulations for the disposal of oily wastes and chemicals. The Convention serves to control all waste disposal at sea which includes all oil, hazardous waste, solid waste (plastics, tins, glass, organic matter etc) and sewage. According to these regulations prescribed therein, it is mandatory for ships to separate ballast water from crude oil washing systems and ships are prevented from cleaning out their bunkers at sea. Further, all new tankers since 1993 are required to have double hulls and approved 'environment-friendly' designs and old tankers must be upgraded once they reach 25 years of age. This stipulation is important as the majority of the world's supertank fleet was built between 1970 and 1978 and would imply that the majority would have been upgraded to date. The Convention does not regulate the disposal of waste by dumping at sea or to pollution arising from exploration and exploitation of sea-bed minerals.

South Africa and Namibia have acceded to the MARPOL 73/78Convention and have enacted domestic legislation accordingly.

International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties

This Convention authorises coastal states to intervene, subject to certain conditions, with regard to pollution damage that may be caused by foreign vessels in the high seas and may threaten the environment of the relevant country's coastline. South Africa incorporated this Convention as law in the International Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties Act, 64 of 1987.

International Convention on Civil Liability for Oil Pollution Damage

This Convention provides for a compensation fund for clean-up costs and environmental damage subject to certain conditions and ceilings. It is incorporated as law in South Africa and Namibia by the Prevention and Combating of Pollution of the Sea by Oil Act, 1981 and the general regulations prescribed under this Act.

Convention of the International Maritime Organisation 1948

The International Maritime Organisation is a specialist United Nations agency dealing with maritime matter, including development of all the marine pollution control conventions. All three BCLME countries have been admitted to become a party to this Convention.

International Convention on Oil Pollution Preparedness, Response and Co-operation - 1990

The International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC) requires signatory parties to establish measures for dealing with pollution incident, either nationally or in co-operation with other countries. South Africa is a party to this Convention and is thereby required to ensure that all ships carry onboard, an oil pollution emergency plan, which is to be developed by the International Maritime Organisation. Operators of offshore units governed by South Africa are also required to have such an oil pollution emergency plan for responding promptly and effectively to oil pollution incidents. Ships are required to report incidents of pollution to coastal authorities. Equipment for combating oil pollution is required to be available at all times, oil spill combating exercises are required to be practiced and a detailed plan for dealing with pollution events must be developed. Parties to the convention are also required to provide assistance to others in the event of a pollution emergency. Neither Namibia nor Angola are signatories to this convention, but Namibia at least intends becoming a party

Convention on Biological Diversity, 1992

The Convention provides for the conservation of the biodiversity of the planet, the sustainable use of biological resources and the fair and equitable sharing of benefits arising from the use of genetic resources. Parties of this Convention are obliged to protect biodiversity and thus indirectly promote environmentally sound integrated pollution and waste management practices. An underlying principle of this convention is that states have the sovereign right to exploit their own resources, but that activities within a country should not cause damage to their environments and those of other states.

The Convention on Biological Diversity (CBD) was signed by Namibia at the Rio Earth Summit in 1992 and ratified in March 1997. Namibia's National Biodiversity Programme was set up in September 1994 to coordinate, support,

guide and stimulate national activities relating to biodiversity conservation and the sustainable use of biological resources. It is coordinated from within the Directorate of Environmental Affairs (DEA) of the Ministry of Environment and Tourism, but works closely with a number of institutional and individual partners. By the time Namibia ratified the Convention, the National Biodiversity Programme was in a strong position to support Namibia's national and international obligations under the CBD. The National Biodiversity Programme has prioritised making available the country's data (computerised) for environmental management and planning purposes. This programme is directly geared towards coordinating, stimulating and supporting activities to implement the Convention on Biological Diversity.

South Africa ratified the Convention on Biological Diversity on 2 November 1995 and has published the White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity. South Africa is hereby obliged to ensure that the agreement is implemented in accordance with its objectives. South Africa is thus required to develop national strategies, plans or programmes, or adapt existing ones, to address the provisions of the Convention, and to integrate the conservation and sustainable use of biodiversity into sectoral and cross-sectoral plans, programmes and policies. Although no specific domestic legislation has been promulgated to give effect to this Convention, many legislative mandates are indirectly relevant.

Angola signed and ratified the Convention on Biological Diversity in 1998.

Ramsar Convention on Wetlands of International Importance

The Ramsar Convention is an inter-governmental treaty that provides a framework for international co-operation for the conservation of wetland habitat. South Africa and Namibia are both contracting parties, and hence have obligations to promote the wise use of wetlands and uphold the ecological integrity of wetlands through stringent application of Integrated Environmental Management principles and practices.

International Convention on the Regulation of Whaling

The International Whaling Commission (IWC) was established in 1946 in Washington DC under the International Convention for the Regulation of Whaling, which entered into force in 1948. The main objectives of the Convention are the conservation of whale stocks and the orderly development of the whaling industry in terms of the regulations of the Convention. This Convention was ratified by South Africa in 1946 and until 1967, South Africa operated two whaling stations within the constraints of the IWC but all whaling was terminated in 1975. All whales are now fully protected in South African and Namibian waters by the national legislation of Marine Living Resources Act, 1998 and the Marine Resources Act, 2000, respectively.

Convention on the Ban of Import into Africa and the Control of Transboundary Movement and Management of Hazardous Waste within Africa – Bamako Convention 1991

This convention was developed under the auspices of the Organisation of African Unity (OAU) and entered into force in April 1998. The objectives of the Bamako Convention are to protect human health and the environment from dangers posed by hazardous wastes by reducing their generation to a minimum, in terms of quantity and/or hazard potential. The Bamako Convention came into being due to African states, represented by the Organisation for African Unity, being of the view that the Basel Convention was not sufficiently strict. The Bamako Convention was thus further adopted by these African States. The Bamako Convention totally prohibits the importation of hazardous waste into Africa. It also prohibits the dumping of waste at sea and contains important provisions on waste generation in Africa. None of the BCLME countries have acceded to the convention but it may well be in their interests to do so.

Convention for the Prevention of Marine Pollution from Land-based Sources, 1974

This Convention is relevant to the pollution of coastal waters from land-based sources. None of the BCLME countries have acceded to this Convention but they may accede to it in due course.

United Nations Law of the Sea Convention 1982 (UNCLOS)

This Convention addresses protection and preservation of the marine environment and gives basic obligations to prevent, reduce and control pollution from land-based sources, pollution from sea-bed activities, pollution by dumping, pollution from vessels and pollution from or through the atmosphere. Although South Africa has not ratified this Convention, many aspects of the Convention are provided for in South African law already.

SADC Environmental Policy and Regulatory Framework for Mining

The main purpose and objective in establishing the Southern African Development Community (SADC) was to obtain formal regional cooperation, co-ordination and integration between SADC countries on various aspects relating to trade, transportation, communication, energy and the environment. In line with this, the SADC Sub-committee on Mining and the Environment undertook the job of assessing existing regulatory frameworks for mining as they pertained to the environment and for developing an Environmental Policy and Regulatory Framework for SADC with a view to assisting member states to harmonise the regulation and environmental management of their mining sectors.

The authors of the report note that most SADC countries follow a traditional command-and-control regulatory approach, in which government prescribes desired changes through requirements, then promotes and enforces compliance with these requirements through laws, regulations and/or permits. They suggest though, that while this is a workable approach, additional value could be leveraged through the implementation of market based and economic incentives, and by encouraging a greater degree of co- and self-regulation. They note that all three BCLME countries apply a system where environmental impacts of mining are identified, assessed and mitigatory measures recommended, but only Namibia and South Africa take this process further by requiring that the environmental impacts identified and assessed, be managed throughout the life of the mining operation. South

Africa is the only country that requires that financial provision be made for rehabilitation and/or ongoing management of environmental impacts.

They recommend in their report that an effective "cradle-to-grave" environmental management approach for mining be applied within SADC, along the lines of Integrated Environmental Management (IEM). They suggest that this include requirements for identifying, predicting, and assessing environmental impacts, adequate opportunity be given to interested and affected parties (I&APs) to make their input, that alternatives (including the no-go option) and mitigation measures are thoroughly investigated, that arrangements be made for monitoring and management of impacts, and that mines be closed efficiently and effectively. They also provide a detailed set of requirements for new mines including detailed feasibility investigations (to ascertain whether the mining operation is economically and technically feasible), environmental scoping exercises (to assess the status of the receiving environment, to identify potential impacts and alternatives, allow I&APS to express their views), Environmental Impacts Assessments (EIAs) and Environmental Management Programmes (EMPs), financial provision for rehabilitation, and environmental monitoring and EMP performance assessment and remediation. Detailed guidelines are also provided for closure and rehabilitation of mines, as are recommended environmental quality standards and criteria for the region.

SADC Protocol on Fisheries

The SADC Protocol on Fisheries has recently been adopted (signed August 2001). This Protocol incorporates international best practice for fisheries management and the key elements of various international instruments, thereby promoting sustainability of the fish stocks and ecosystems of the SADC region and the communities reliant on them. As this Protocol has not yet come into force, it is too early to say whether the member states will abide by its intentions, or what effect it will have on fisheries management in the region.

SADC-MCS Programme

The SADC-Monitoring Control and Surveillance (MCS) programme is a regional program funded by the European Development Fund to develop MCS activities in the SADC coastal member states (Angola, Namibia, South Africa, Mozambique and Tanzania) working within the framework of the SADC Marine and Fisheries Policy. The overall objective of the MCS Programme is to establish and maintain national institutional capacity for efficient, cost-effective and sustainable monitoring, control and surveillance of fisheries as well as establishing mechanisms for effective regional cooperation on MCS issues. The Programme aims to run until 2005 with the first year (2001) having been dedicated to organisational activities within the programme and the establishing of contacts within the region. A baseline study has also been carried out in all the countries involved in the programme and a series of national workshops were held which facilitated increased communication between MCS authorities within the region, thus promoting understanding and affinity with the SADC countries. The Project Management Unit (PMU) of this Programme is located at the Marine Sector Co-ordinating Unit in Windhoek, Namibia.

South East Atlantic Fisheries Organisation (SEAFO)

SEAFO is another agreement that should improve cooperation between fishing nations of the southeast Atlantic. This organisation has been negotiated within the framework of the UNFSA to manage the high seas stocks of the southeast Atlantic. It will not have any direct bearing on many of the large-scale commercial fisheries of the region, however any mechanism that improves communication, transparency and, crucially, trust between nations sharing fish stocks is likely to have a positive impact on the management of shared resources. Namibia has ratified, but not yet endorsed SEAFO, South Africa and Angola have signed the Convention but have yet to ratify it. Norway is the only other signatory to ratify this convention thus far. The headquarters of the organisation are hosted in Windhoek, Namibia.

UN Agreement for the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks

The United Nations Fish Stocks Agreement seeks to lay down a comprehensive regime for the conservation and management of straddling and highly migratory fish stocks. This agreement was adopted in New York, USA in December 1995 and was entered into force in December 2001 with the thirtieth country signing agreement. Namibia signed agreement in 1998 and South Africa in 2003. Angola has yet to sign this agreement. The agreement applies to both the territory of the high seas and within the EEZ of coastal countries.

FAO Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas

The High Seas Fishing Compliance Act of 1995 serves as the federal legislation to implement the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas. This Act requires high seas fishing vessels to operate under permits issued by the Secretary of Commerce and to comply with international conservation and management measures. The Act provides civil, criminal and forfeiture penalties for violation. The Act defines the High Seas to be any waters beyond the territorial sea or exclusive economic zone (or the equivalent) of any nation and prohibits high seas fishing vessels of the U.S. from engaging in commercial harvesting operations on the high seas without a valid permit.

Protocol on Shared Watercourse Systems in the SADC Region

This convention was signed in August 1995 and requires that the discharge of all types of wastes into shared watercourses take place only under permit from the relevant country within the state concerned. Such a permit may only be issued provided the state concerned has determined that the intended discharge will not have “a detrimental effect on the regime of the watercourse system”.

Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter (London Convention), 1972

The London Convention provides international regulations (for those countries ratified to the convention) to regulate the dumping at sea of waste generated on land and loaded on board specialised dumping vessels to be disposed of at sea. This convention is continually updated and amended with consultation with the relevant ratified parties. These regulations provide a list of substances that are strictly prohibited from being disposed at sea and a list of substances that require permits, which specify strict controls and conditions for disposal of such substances. In 1990, parties to the London Convention agreed to phase out sea disposal of industrial waste, to be effective by 1 January 1996 and in early 1991, all incineration at sea was proclaimed to have stopped. In 1996 amendments to the London Convention of Annexes I and II were provided which, *inter alia*, prohibited dumping of radioactive matter, industrial waste (effective in 1996) and incineration at sea of industrial waste and sewage sludge. South Africa incorporated the London Convention as law by the Dumping at Sea Control Act, 73 of 1980, but Namibia and Angola have yet to take this step.

Ramsar Convention

Namibia and South Africa have acceded to the Ramsar Convention on Wetlands of International importance and have each nominated several coastal wetlands for conservation including the Walvis Bay Lagoon, Sandwich Harbour Lagoon, the Orange River Estuary, and Langebaan Lagoon.

4. ANGOLA

4.1. COUNTRY PROFILE

Angola is abundant in natural resources and is potentially one of the wealthiest countries in Africa. After the ravages of four decades of conflict, Angola is in the process of reconstruction and development to develop its natural and social capital in order to grow its economy and address poverty.

Situated at the northern extent of the Benguela Current system and bordered by the Democratic Republic of Congo to the north, in the east by Zambia and Namibia in the south, Angola has a land area of 1,246,700 km2.

Angola can be divided into six geomorphological areas, namely coastal, marginal mountain, the old tableland, the Zaire Basin and the Basins of Zambeze and the Cubango. The highest point is Moco Hill (2 620 m) in the central part of the country where the major Angolan rivers have their origins. Temperatures range from between 25 and 33o C in the rainy season (September to April) and between 18 and 22o C in the dry season (May to August). In the North the climate is tropical and wet with an annual average rainfall of 1 200 – 2 000 mm. The coastal region has an average annual rainfall of less than 600 mm, decreasing from north to south.
The country can be divided into five ecozones (SARDC, SADC&IUCN 1994) cited by Russo *et al* (2002):

- Lowland Tropical Forest (rainforest): in the northeast, characterized by high rainfall all year round, high evaporation, and low soil fertility.
- Moist Savanna: around 70% of the country, characterized by rainfall between 500 and 1 400 mm a year and a broad range of soil types generally poor in nutrients.
- Dry Savanna: in southern Angola, characterised by unpredictable summer rainfall of 250-500 mm a year, generally fertile soils but sparse vegetation.
- Nama-Karoo: in the south-west, characterised by an average rainfall of 100-400 mm a year, and
- Desert: along a narrow coastal strip in south-west Angola, characterised by very low average rainfall of 10-85 mm a year.

Around 6,4 % of Angola is demarcated as protected areas that are located throughout all ecozones except the Lowland Tropical Forest (Russo, *et al*, 2002).

The coastline is 1,650 km in length and is extremely variable in terms of physical characteristics and is generally described as tropical in the north and temperate in the south (SIDA, 2000). Angola's marine environment is significant in the context of the BCLME due to its hydrographic regime and the biodiversity and biomass that it supports (BENEFIT, 1999). There are two key characteristics of the hydrographic regime of Angola's marine environment: the Angola-Benguela front, the meeting place of the warm Angolan and cold Benguela currents at around 17ºS. The second phenomenon is the Angolan Dome, a large cyclonic eddy that is thought to influence both

the depth and the position (together with seasonal current and temperature changes) of the Angola-Benguela front. The influence of the Benguela and Angola currents varies according to the season and their divergence results in strong upwelling, leading to a high primary production. The coastal and marine environments form a significant base of the local economy, with oil drilling and fisheries being two of the major industries contributing to the GDP.

The years of conflict have had a crippling effect on the Angolan economy, resulting in widespread poverty and severely hampering the delivery of social services. Current population estimates for Angola are more than 12,2 million (Russo *et al*, 2002) growing at a rate of 2.7% per annum. More than 40% of the population are urbanised (Tapscott, 1999) with about 20% of the total population living in the capital, Luanda. Angola is rated 160th on Human Development Index out of 174 countries (de Souza *et al*, 2001) with 65% of the urban population living below the poverty line. It is also anticipated that the rural population are worse off than their urban counterparts. The life expectancy is 47 years, the infant mortality rate is 170 per 1 000 and the under five mortality rate is 292 per 1 000 (UNDP; 1998). Per capita income reported for 2002 was about $500 (www.mbendi.com) with inflation above 100%. Subsistence agriculture is the main livelihood for 85% of the population (Russo *et al*, 2002) while artisanal fishing is a further significant contributor of employment and protein. Angola however is dependent on food aid and imports for more than half of its grain requirements. One of the major reasons sited for the lack of production on Angola's fertile agricultural lands (estimated to be between five and eight million hectares) is the reluctance of the many farmers who have sought refuge in urban areas to return to the conflict-ridden rural areas. In 1999 the government of Angola presented its Programa de Reabilitacação de infrastructures Sociais e Produtivas (Rehabilitation Programme of Social and Productive Infrastructure) (Russo *et al*, 2002).

The fishing and oil sectors together with other forms of mining (Angola used to be the fourth largest diamond producer in the world) make up the three largest contributors to the GDP with Angola's oil exports providing almost half of the GDP. In 2002, the Angolan economy is reported to have grown by 15% due to the flourishing energy sector (www.Mbendi.com). This is the direct result of foreign investment in the oil industry and export income from oil. Angola's oil and gas resources are the largest in southern Africa with recoverable oil reserves estimated at 4 million barrels. Besides the 15 key international oil companies that have invested in Angola's oil industry, Sociedade de Combustiveis de Angola U.E.E (SONANGOL), the national oil company, the Ministry of Petroleum and the Ministry of Urban Affairs and Environment are the major players in the development and regulation of the oil and gas exploration, drilling, transportation, storage, refining and export. Other key partners that assist in the environmental protection within the Angolan oil industry sector are the International Maritime Organisation (IMO) and the International Petroleum Industry Environmental Conservation Association (IPIECA).

The fisheries sector on the other hand, is in the process of recovery and redevelopment, with the assistance of the World Bank through the Angolan Support Fund for Fisheries Development and through the many southern African research and capacity building partnerships described in section one of this report. In 1999 the SADC reported that over fishing and hydroclimatic conditions had reduced the fisheries potential in Angola's waters to 360,000

tons/annum (285,000 tons small pelagic species like Horse Mackerel and Pilchard, 55,000 tons demersal species and 7,000 tons deep-water crustaceans.

The average catch in 1956-1970 was 300 000 tons, and 600 000 tons in 1973 (Barros Neto, 1977). The total catch in 2002 was 245 806,6 tons (GEP, Angola, 2002). The reported catches are supported by TAC and monitoring of living marine resources.

The Angolan government institutions in partnership with regional initiatives such as *inter alia* RFIS, BENEFIT and the BCLME Programme are focusing on building a research and monitoring capacity for the management of marine resources at scientific and technical levels. The key Angolan institutions involved include the Ministry of Fisheries (Ministerio das Pescas) responsible for all forms of regulation and the Institute for Marine Research (Instituto Investigacao Marinha - IIM) responsible for all research and monitoring functions of Angola's marine environment. The Institute for Artisanal Fisheries (Instituto de Desenvolment da Pesca Artesanal - IPA) is responsible for the advancement of the artisanal fisheries sector.

Angola faces many challenges in the regulation of the oil and fisheries sectors which, together with land-based sources of pollution (from industry and lack of sanitation in informal settlements), could have significant impacts on the biodiversity and ecosystem health of the BCLME. Furthermore, biodiversity, ecosystem health and industries dependent on living marine resources are all vulnerable to climatic perturbations affecting the BCLME that are believed to be exacerbated by global climate change (O'Toole *et al* 2001). Notwithstanding these challenges, growth and development in these sectors is most likely to support economic growth in the short-term, and hopefully, alleviate poverty. Consequently, significant effort must be focused on building the capacity of local institutions to improve the regulation and development of these sectors. A specific focus must be prioritised research that can inform decision-making in these sectors as Angola's marine resources are the least studied across the BCLME.

The following section of this report will describe policy and legal framework relevant to the BCLME Strategic Action Programme. The sections that follow analyse the capacity and training of key institutions according to the BCMLE Policy Action Areas. This approach has resulted in the bulk of the institutional descriptions being dealt with in the first few Action Area sections. To avoid repetition under each Action Area section the reader is referred back to previous sections of the report where relevant. Consequently, the first sections are longer and more detailed than those presented towards the end of the report.

4.2. POLICY AND LEGAL FRAMEWORK

4.2.1. The Constitution of the Republic of Angola (Lei Constituional da Republica de Angola), 1992

The constitution of the Republic of Angola was signed into law in 1992. The constitution provides the basis for the Environmental Framework Act through two articles that enable environmental protection and conservation and the right to a healthy and unpolluted environment (Russo *et al*, 2002):

Article 12:

> *All natural resources existing in the soil and subsoil, in internal and territorial waters, on the continental shelf and in the exclusive economic area, shall be the property of the state, which shall determine under what terms they are used, developed and exploited.*
>
> *The State shall promote the protection and conservation of natural resources guiding the exploitation and use thereof for the benefit of the community as a whole.*
>
> *Land, which is by origin the property of the State, may be transferred to individuals or corporate bodies, with a view to rational and full use thereof, in accordance with the law.*
>
> *The State shall respect and protect people's property, whether individuals or corporate bodies, and the property and ownership of land by peasants, without prejudice to the possibility of expropriation in the public interest, in accordance with the law.*

Article 24:

> *All citizens shall have the right to live in a healthy and unpolluted environment.*
>
> *The State shall take the requisite measures to protect the environment and national species of flora and fauna throughout the national territory and maintain ecological balance.*
>
> *Acts that damage or directly or indirectly jeopardize conservation of the environment shall be punishable by law.*

The following summary of the legal and policy contexts draws significantly on the work undertaken by SAIEA (Russo *et al*, 2002). Where relevant these policies, laws and strategies are discussed in more detail within the capacity analysis under the BCLME Action Areas in section 3.3.

4.2.2. General Environmental Law/ Environmental Framework Act (Lei de Bases do Ambiente), 1998

Administered by the Ministry of Urban Affairs and Environment, this law provides the framework for all environmental legislation and regulations in Angola. It provides the definitions of key concepts and definitions such as protection, preservation and conservation of the environment, the promotion of quality of life and the use of natural resources. A key principle is the development of resources for the benefit of all Angolans. This law incorporates key international sustainable development declarations and agendas policies, e.g. Agenda 21 and also establishes citizens' rights and responsibilities.

One of the critical concerns identified is the lack of co-ordination and potential conflict between this law and other development-focused legislation. Key gaps that exist include a finalised set of Environmental Impact Assessment Regulations and regulations for pollution control and waste management.

4.2.3. Fisheries Act (Lei das Pescas), 1992

The Fisheries Act, administered by the Ministry of Fisheries, regulates all fishing activities within the marine Exclusive Economic Zone and inland/interior waters. It provides the framework for the sustainable management of living marine resources through the stipulation of quotas that are consistent with the conservation of marine resources. Hence the law establishes that the government may need to limit catches or season, based on the health of the resources. The Fisheries Act also regulates the industrial and artisanal fishing industries in terms of licensing of vessels.

The key elements of the Fisheries Act, and associated regulations, includes the following:

- Scope of the law, definitions of artisanal and industrial fishing, types of fishing vessels (including a distinction between national and foreign vessels);
- Aspects of fisheries planning and management including: international and regional co-operation, definition of regulation, licensing systems and tax rates, the definition of rules for foreign and national vessels, management of conflict between fishers and the supply of statistical data to government;
- Establishes the authority and capacity for the authorisation of mariculture activities;
- Quality and export of fishing products; and,
- Monitoring, control and surveillance, including powers of agents, pursuit of vessels, arrest of vessels, infractions and penalties and administrative and legal capacity and procedures.

Further regulations and decrees cover specific aspects of the fisheries industry, for example, the decree regulating crustacean fisheries (Decreto Executivo, No. 10 of 1997) and the decree on the certification of the source and quality of fishing products for export (Decreto Executivo No. 36 of 1997).

A new Draft Fisheries Act is currently under discussion and is likely to be promulgated in 2004. A key gap in the existing legislation identified by the consulting team, is the lack of any mention of the need or intention to establish marine protected areas.

The Angolan government's sectoral strategies for fisheries development are discussed in section 3.3.1 below.

4.2.4. Interior and Marine Exclusive Economic Zone Act (Lei sobre Agues Interiores Oceanos e Zona Economica Exclusiva), 1992.

Administered by the Ministry of Water and Energy, this law regulates internal waters and lakes, the use of natural resources, the protection of the marine environment and the promotion of scientific marine research. It is not clear how this law links to the Fisheries Act or the establishment of the IIM's (Institute for Marine Research) changes mandate, which includes research for inland waters and fisheries.

4.2.5. Petroleum Activities Act (Lei das Actividades Petroliferas), 1978

This law establishes SONANGOL's exclusive rights for exploration, drilling and production related oil products. Another key aspect of this law is the facilitation of SOLANGOL's partnerships with international oil companies to enable increasing human and technological capacity in Angola's oil industry.

4.2.6. Petroleum Activities Decree (Decreto Lei das Actividades Pertroliferas), 2000

This law establishes the principle of regulating the oil industry in order to ensure sustainable development. One of the key instruments that this law imposes is the compulsory use of environmental impact assessments in regulating the development of offshore or onshore activities.

4.2.7. Mining Act (Lei das Minas), 1979

Administered through the Ministry of Geology and Mines, this act establishes all mineral resources as state property and regulates the exploration and mining of all minerals in Angola. While the Act establishes the requirement for the rehabilitation of the environment, it is deficient in environmental impact assessment requirements.

4.2.8. Local Municipalities Act (Lei das Autoridades Locais), 1999

The Local Municipalities Act establishes the promotion of development, basic sanitation, environmental protection and land management as the responsibilities of provincial and local government. One of the key issues identified is the lack of funding and capacity of provincial and local government to implement responsibilities for environmental quality in the context of the urgency to redress delivery of basic services through much of the country.

4.2.9. Foreign Investment Act (Lei do Investimento Estrageiro), 1994

Introducing mechanisms for environmental protection and the safety, health and environment of workers, this act regulates responsibilities of foreign investments to ensure compliance with local policies.

4.2.10. Draft Water Act (Lei das Aguas)

Currently under discussion, this draft law establishes the priorities for the access to, use of and protection of water resources. A further supportive mechanism for environmental protection is mandatory environmental impact assessment requirements for all water projects.

4.2.11. Draft Environmental Impact Assessment Decree (Decreto Lei de Estudos de Impacto Ambiental)

Also currently under discussion, this legislation will provide specific requirements and set standards and norms for EIA procedures. Projects of a specific scale or in a specific location or which have the potential to result in significant

environmental and social impacts will require EIAs for consideration prior to authorisation. The specific requirements for EIAs will include the extent of public participation, the key steps to be undertaken in an EIA and the information to be presented in an EIA report.

4.3. BCLME POLICY ACTION AREA A: SUSTAINABLE MANAGEMENT AND UTILISATION OF LIVING MARINE RESOURCES

The key government institutions responsible for the sustainable management and utilisation of living marine resources are the Ministry of Fisheries, the Institute for Marine Research (IIM) and the Institute for the Development of Artisanal Fisheries. International and regional initiatives outlined in section 2 above play a significant role, as do the commercial and artisanal fishing industries. Education and training institutions, discussed under section 3.8 below also make a valuable contribution.

Ministry of Fisheries (Ministério das Pescas)

The Ministry of Fisheries (Ministério das Pescas) is the key organisation responsible for the regulation of the sustainable management and utilisation of Angola's living marine resources. The Ministry is responsible for the management, administration and research for living marine resources in Angola. Up until 2001 the functions of environment and fisheries were in the same ministry, at which point they were allocated to separate Ministries. The Ministry of Fisheries implements its research and development mandate in co-operation with international and regional initiatives of inter alia the BCLME, BENEFIT, FAO, FIDA, EU, SADC RFIS and the governments and research institutes of Norway, Portugal and France, and in concert with three institutes: 1) the Institute for Marine Research (Instituto Investigacao Marinha - IIM) which provides for all of the policy and research capacity of the Ministry (see description of IIM below); 2) the Institute for the Development of Artisanal Fisheries (Instituto de Desenvolmento da Pesca Artesanal - IPA) which has a mandate to develop and support artisanal fishing in Angola; and, 3) the National Institute of Fishing Industries (Instituto Naçional de Apoio às Industrias de Pesca). Two fisheries training institutes, Cefepecas and Helder Neto are partly funded through the Ministry.

One of the key resource management functions undertaken by the Ministry, with the advice of the IIM, is to evaluate marine resources and establish TAC, quotas, vessel licensing and conservation measures. The IIM, with data from the Cabinet of Studies, planning and Statistics (Gabinete de Estudo, Planeamento e Estatistica) and scientific cruises (primarily the twice-yearly surveys of the Nansen Programme) assesses and proposes to the Minister of Fisheries TACs and other management measures for key commercial species. The Technical Council (Conselho Técnico), comprised of directors of the Ministry and representatives of industry fishing associations, advise on and review the scientific basis for the determination of TAC and conservation measures. The Council's advice informs the Minister's decisions on quotas for different species and thus commits the National Directorate of Fisheries (Direcção Nacional das Pescas) to the licensing of the industrial and semi-industrial fishing vessels and committing the Institute of Artisanal Fisheries (Instituto da Pesca Artesanal) to the licensing of artisanal fishing vessels (FAO Website, www.fao.org). It is national policy to give priority to national vessels.

The key law governing living marine resources is, as outlined above, the Fisheries Act (Lei das Pescas, No. 20/92). A new Fisheries Act is currently being drafted and aims to be approved in 2004. This legislation will more directly address the interests of artisanal fishers and will also better empower MCS officers. Furthermore, there is significant interest to ensure that the new legislation provides an adequate framework for the development and regulation of mariculture activities, a proposed growth sector in Angola.

The main goal of fishing policy in Angola is to "optimize the benefit for the Angolan population of the long term sustainable exploitation of marine resources in the Economic Exclusive Zone (EEZ)". It is government policy to increase sustainable fisheries production and to develop and support artisanal fisheries in order to address employment and poverty. The sector objectives include:

- Rational exploitation of marine resources within the biological sustainable limits;
- Improvement in supplying the population with fishing products;
- Improvement of the living conditions for fishermen and communities dependent on fishing activities; and,
- Increasing the income from the fishing activity in order to, at least, cover the financing needs of this sector.

General strategies have been defined, as well as strategies for artisanal and industrial fisheries. General strategies include:

- Developing the appropriate mechanisms in order to manage resources, taking into account, not only the fleet components, but also the fishing methods;
- Improving and developing systems for fishing licensing, monitoring, control and surveillance;
- Organising a data base which will constitute the basis for an information management system;
- Increasing exports of fishing products, mainly the most valuable ones;
- Creating an organisation to support the export in the industrial and artisanal sub-sectors.

Artisanal Strategies include:

- Introducing monitoring, control and surveillance;
- Strengthening the institutions;
- Initiating training programs in the areas of fish handling, processing and marketing;
- Improving techniques in order to increase production and productivity in the area of catches, processing and commercialisation;
- Introducing measures in order to reduce catching losses;
- Creating centers to support fishermen and communities dependent on fishing activities;
- Develop an extension service in order to increase knowledge and the access to information;
- Improving access to credit; and,
- Providing technical assistance in order to improve quality.

Industrial Strategies include:

- Strengthening the institutions including development of a better relationship between the industrial and artisanal sub-sectors;

- Maximising catches within the biological sustainable limits, encouraging a greater participation of the national fleet and dividing the remaining surplus of the biological production by the operators of mixed and foreign enterprises; and,
- Establishing a rehabilitation program for fish processing and distribution giving priority to: freezing, refrigeration, salting and drying, production of salt; fishmeal for national consumption; improvement of distribution channels; improvement of food safeguards for domestic consumption; and, the improvement of quality control of the export products (FAO Website Resources: www.fao.org.za).

Ongoing policy research and advice is provided by the IIM. Currently the focus areas for Angola's engagement in the BCLME are artisanal fisheries, aquaculture, the management of shared resources and capacity building in the sector (Dr De Barros Neto quoted in Beguela Current News, November 2003).

The Ministry has a new approved establishment total staffing of 250 posts (Decree No 5/03 of 20 May 2003 – Decreto-Lei No. 5/03). Not all of these posts are filled as the organogram has only recently been approved. Currently within the Ministry there are 50 staff at management level, 99 technical staff and 66 administrative staff (Pers Com, Lucinda Alfredo Gourgel Baptista, Head of Human Resources Department). These figure differ markedly from those reported in 1999 by the FAO which identified 429 staff persons in the central services of the Fisheries Ministry (including supervisors and crew of the surveillance vessels), 493 in the Institutes and Schools and Support Fund, and 303 persons in the regional delegations.

The Ministry is made up of the following key functional positions and sections relevant to BCLME Policy Action Area A: the Minister, two deputy Ministers and their respective offices; three councils including the Technical Council mentioned above (Conselho Tecnico); the General Secretary (Secretaria Geral), Cabinet of International Co-operation (Gabinete de Intercâmbio InterNaçional), Cabinet of Planning Studies and Statistics (Gabinete de Estudos, Planeamento e Estatística), Legal Cabinet (Gabinete Juridico); Cabinet of the Inspection (Gabinete de Inspecção), the National Directorate of Fisheries (Direcção Naçional de Pescas), National Directorate of Human Resources (Direcção Naçional de Recursos Humanos). The three institutes mentioned above as well as Escolas de Pescas are part of the Ministry. It appears that there may be plans to consolidate existing fishing industry institutions. The following provides a brief description of some of the above-mentioned key functional areas:

National Directorate of Fisheries (Direcção Naçional de Pescas) develops and co-ordinates the implementation of fisheries policy relating to fleet development ensuring that this is developed within the sustainable limits of the exploited resources together with the IIM, controls vessel licensing and ensures that vessel registry and catch data (maintained on a SQL Server database) are submitted to the Cabinet of Studies, Planning and Statistics.

The Cabinet of Studies, Planning and Statistics (Gabinete de Estudos, Planeamento e Estatística) is the central information warehouse, planning capacity for public investment in the fishing sector (SADC F&MRSCU, 2001).

The Cabinet of Inspection (Gabinete de Inspecção) has three departments: administration, prosecution and monitoring, control and surveillance (MCS). In 2001 it was reported that there were still three patrol vessels (18m), two of which were fully operational (SADC F&MRSCU, 2001), which were all in need of repair and that the Ministry had received seven new patrol vessels (13m). These vessels are stationed in Luanda and are meant to be at sites at each of the Cabinet's provincial operational bases. A significant gap reported in 2001 is the lack of a long-range patrol vessel (SADC F&MRSCU, 2001). An important function of MCS is to control and mediate conflict between industrial and artisanal fisheries. One of the major problems reported is the encroachment of commercial fishing vessels in areas reserved for artisanal fishing.

In 2001, the MCS department had a compliment of 122 officers, including 93 compliance observers with the power of arrest and that inspectors head operations in marine patrol, land patrol, artisanal fisheries and within the communications centre. An operation room houses hardcopy and computer-based records of licensed vessels and legal infringements. Significant duplication of data management systems was reported in 2001 a key area of assistance by RFIS.

The following is a breakdown of the MSC existing staffing and vessels in each of the coastal provinces received from the MSC. This shows an increase in staffing capacity since 2001.

Luanda Province has a directorate with three Departments: Inspection and Surveillance (DIF); Department of Legal proceedings (Instrução Processual) (DIP); and, Fishing Activities Monitoring Centre (MONICAP). Total personnel: 102 being (7 of which are managers), there are four Inspectors and four Sub (junior)-Inspectors and 85 Observers. Luanda MCS has one operational patrol vessel.

Benguela Province has a total of 18 staff members, three of which are managers. There is one patrol vessel and one operational smaller vessel.

Namibe Province has a total of 27 staff members, three of which are managers. There is one patrol vessel and one smaller vessel.

Kwanza-South Province has a total of 36 personnel, with three managers. There are two small vessels available to MSC staff.

Zaire Province has seven staff members, one manager and one small vessel.

Bengo Province has a total of six staff members, one manager and one small vessel.

The department also maintains a Vessel Monitoring System (VMS) that is applied to 70 trawlers. This system assists with the control of industrial vessels 3 nm from shore into on artisanal areas. (SADC, http://www.schoemans.com.na/sadc). Onboard systems collect GPS, vessel speed and heading information every 10 minutes. This is downloaded every 8 hours to Centra in Portugal before being transmitted to Angola via a modem link. Additions proposed to the VMS in 2001 were an onboard SOS button, automatic alarms for vessel entry into a prohibited zone, and catch and environmental data (SADC F&MRSCU, 2001).

Most of the Ministry's capacity is based in Luanda with capacity in each of the coastal provinces (Cabinda, Zaire, Luanda, Kwanza South, Benguela and Namibe). Major staffing gaps are at the highest technical levels within the Ministry. It is reported that there are more administrative staff than actually required and that a programme of upgrading skills of administrators into technical posts is currently underway. In general, the Ministry has too few trained staff to effectively implement its responsibilities. It is recommended that the new mandates of the Fishing Act and the priority actions of the BCLME are analysed to inform a detailed assessment of the current staffing and infrastructural capacity of the Ministry of Fisheries.

The National Directorate of Human Resources (Direcção Naçional de Recursos Humanos) is responsible for human resources management (administration, staffing/recruitment and human capacity development/training) within the Ministry and is also responsible for the two existing training schools, Cefopescas (Luanda), and Helder Neto (Namibe). Furthermore, the Directorate is also responsible for the development of training policy for the sector. The Ministry of Fisheries has formally identified training requirements for its own personnel and for the IIM however a training plan has not yet been developed. The following training needs have been identified for:

Ministry staff:

information management systems; training planning and management; budget management; conceptualisation and management of projects; ecology; accounting; marine law; human resources law; economics; electrical engineering; electromechanical engineering; naval electronic engineering; computer engineering; naval engineering; mechanical engineering; civil engineering; telecommunications engineering; naval mechanical engineering; industrial mechanical engineering; refrigeration engineering; coastal fisheries management; marine navigation; and radio communications technical training.

IIM Staff:

aquaculture, marine biology, biotechnology, biochemistry, oceanography, marine geoscience, management, ichthyology, microbiology, marine chemistry, mariculture, and fish processing technology. Note that meetings with IIM staff have identified further training requirements.

The Ministry also reported a lack of capacity with respect to office space, vehicles, vessels and computer hardware and software.

Institute for Marine Research (Instituto Investigacao Marinha) - IIM

The IIM was the former Institute of Fisheries Research (IIP), formerly known as the Centre of Fisheries Research (CIP). The CIP was founded in 1977. The IIM is currently the only scientific research institute of its type within Angola. Its role is to formulate and execute research programmes to gain knowledge about the living marine resources in Angola's territorial waters and Exclusive Economic Zone as well as provide management recommendations on maximum exploitation rates taking into account the protection of the marine environment. It

studies the hydrological conditions of the Angolan platform and factors affecting the distribution of fish species. The formulation and improvement of preserving and processing fish as well as experiments for the cultivation of mollusks and crustaceans are undertaken (IIP/IIM information pamphlet). The Ministry of Fisheries and the IIM are in the process of institutional restructuring and growth. The revised statutory functions of the IIM and its new organogram are currently under consideration by the Ministry of Fisheries. The BCLME Activity Center on Ecosystem Health, Marine Pollution and Biodiversity is located in Angola and works very closely with the IIM.

The IIM, as part of the Ministry of Fisheries works within the Fisheries Act. It is the opinion of the department heads at the IIM that the legal tools mostly exist for sound management of living marine resources and that the current gaps will be addressed in the new Fisheries Act. A major problem appears to be the level of awareness of the law and communication regarding living marine resources resulting in ineffective implementation.

The following are the proposed future statutory functions of the IIM that have been described by the Director, Dr de Barros Neto:

"The IIM: is assigned to:

a) Contribute by defining strategies and approaches for marine research specifically for the implementation, coordination and management of the applied research activities, the development of experimental research for marine science and technology, fish biology, aquaculture and other related scientific and technical activities;
b) Study marine and fish resources, their environment, conservation and sustainable exploitation, to carry out research in the field of aquaculture, efficient utilization of by-catch and non-targeted species and continuous investigation of the living marine resources in order to allow sustainable use of the resources in the Exclusive Economic Zone (EEZ) by adopting measures for conservation and sustainable management of the resources;
c) Develop techniques enabling exploitation and sustainable use of the living marine resources and of Coastal and Marine Systems;
d) Propose measures for sustainable management of the living marine resources, coastal and marine systems and to study the effects of these measures and of other interventions in the ecosystem
e) Publicise information and results from IIM's activities and from other similar national or foreign institutions by publishing and distributing scientific reports and other forms of information and promoting active participation of the fisheries private sector in order to inform them of these outputs;
f) Contribute to the improvement and specialization of the scientists and technicians in the fields of living marine resources, marine and coastal systems and related fields by promoting cooperation with institutions of Higher Learning such as, Universities and Technical Colleges
g) Promote internal and external capacity building by organizing seminars, symposia, workshops, short-term training and other similar actions;
h) Carry out or promote research and development studies related to marine and fish resources on its own initiative or by agreements or contracts, within the mandate of IIM, with public and private national or foreign companies;
i) Issue technical-scientific reports and information in the field of living marine resources, coastal and marine systems;

j) Promote the exchange with similar scientific and technical national or international organizations;
k) Select and recruit national and foreign work force for the improvement of work within IIM;
l) Run its activities in accordance with private enterprise, specifically with the ship owners, the process industries, the aquaculture industry, through projects of investment and integrated developments involving IIM departments, establishing Program Units, regional laboratories and other facilities whenever necessary; and,
m) Besides the assignments described above, the Institute of Marine Research (IIM) is a leading organization dealing with quality control and inspection of fish and fish by-products, with the responsibility of carrying out quality control and inspection of fish and its by-products, fish shops and all fishing process industries, and to issue the appropriate healthy certificates (BENEFIT/IIM, 2003)."

In discussion with the key heads of departments it was apparent that not everyone was aware of an existing strategy for the IIM. There were varying opinions due to the fact that in the past some of the research priorities had been funder driven resulting in *de facto* research priorities. A new strategic plan is being drafted for the IIM due to the addition of new responsibilities and expanded mandate, including environment, aquaculture and fisheries technologies. A key addition to the mandate of the IIM is the responsibility for research and development and of freshwater fisheries and aquaculture sectors. The IIM is also in the process of reprioritising its scientific agenda in partnership with BENEFIT, through the development of a Science Plan (Angola Science) for the IIM. Funds for the organisation of an Angola Science Symposiums and the further development of the initiative is awaiting further funding (pers. comm. Neville Sweijd, Director of BENEFIT).

Current projects of the IIM

From the list of projects presented below, there is a strong alignment of the IIM to contributing to meeting BCLME priority action areas. The local BCLME activity centre and BCLME projects in general, have a huge potential to increase the capacity of the IIM through the provision of resources, expertise and opportunities for graduate internships. One of the concerns expressed, however, is the extent to which these interventions can be sustainable, in terms of the increased human capacity provided to the IIM.

<u>Department of Fish Resources:</u>

- Vertical distribution of Horse mackerel
- Nutritional content of Horse mackerel
- Acoustic Identification of Horse mackerel
- Assessment and variability of pelagic fish stocks of Northern Angola
- Reproductive Biology of big-eye Dentex (*Dentex machrophtalmus*) caught in the Benguela area
- Genetic Analysis of deep sea crab population *Chaceon maritae*
- Ecosystem approach to fisheries project.
- Stock assessment of pelagic fisheries
- Stock assessment of demersal fisheries

<u>Department Oceanography:</u>

- Characterisation of phytoplankton dynamics in coastal areas of Luanda Province
- Seasonal Oceanography in the Northern Benguela Current
- Harmonisation of Regulation for harmful algae in the BCLME Region
- Capacity building development to monitor harmful algae in the BCLME Region
- Application of nuclear techniques to detect harmful algae

Department of Fish Processing:

- Quality Control Programme

Department of Mariculture:

- Shrimp Culture
- Mussels Culture
- Management of Quilunda Lagoon

Environmental Unit:

- Equipping Lobito Province Laboratory in collaboration of Ministry of Petroleum with the support of Nansen Programme;
- Equipping the Water Quality Control Laboratory in Cabinda Province in collaboration of Ministry of Urban Affairs and Environment and Cabinda Government with the support of Chevron Texaco;
- Assessment of Marine Pollution derived by petroleum exploration with the support of Atomic Energy International Agency; and,
- National Environmental Monitoring Program in collaboration of the Ministry of Urban Affairs and Environment, Ministry of Petroleum and University of Agostinho Neto with the support of the Nansen Programme.

Statistics Unit:

- Marine data centre with the support of Nansen Programme

Other projects are elaborated but are not implemented due to financing problems.

The IIM, as part of the Ministry of Fisheries, works within the Fisheries Law and its current and future functions and structure are defined within a government decree. (Directo-Lei No 12/03).

Based in Luanda Province the IIM has branches in Benguela Province (Benguela and Lobito Municipalities) and in Namibe Province (Namibe and Tômbwa Municipalites). In total the IIM has around fifty graduates, of which 90% are biologists (BENEFIT/IIM, 2003). There are currently six key research departments within the IIM: oceanography (biological, chemical and physical), living marine resources, aquaculture and fish processing.

The future proposed structure includes the following structural breakdown. Note that this structure is still in draft stage and may change. For example it is proposed to formalise the Environmental and Statistics Units.

- General Director;
- Director's Board;
- Scientific Board;
- Technical Deputy Director;

- Fiscal Board;
- Administrative Deputy Director;
- Department of Technical Services Research Support (Sector: Documentation; Informatics; Fleet Management);
- Department of Technologies (Sectors: Aquatic and Aquaculture Fish Processing; Laboratory)
- Department of Marine Resources and Environment (Sectors: Environment and Ecosystem Health; Stock Assessment of Living Marine Resources);
- Department of Administrative and General Services (Sectors: Human Resources; Finance and Property); and,
- Sector of Inspection and Quality Control of Fish Products.

The following shows a breakdown of existing staffing in managment, technical and administrative positions at the provincial IIM centres. Research scientists are included in the categories of managers and technicians.

Table 3.3a. IIM staffing and levels for provinces

Staffing level	Luanda Province	Benguela Province	Namibe Province	Total
Managers	12	5	3	**20**
Technicians	61	21	10	**92**
Administrators	59	33	12	**104**
Total	132	58	25	**215**

There has recently been the appointment of new directors and the upgrading of laboratory facilities at the Namibe and Lobito offices. This, together with the return of highly qualified personnel from study, is improving the overall capacity of the IIM to fulfil its mandate. On the whole it is reported that more technical and research staff are required and that administrative staffing numbers need to be reduced. IIM will have an organogram approved by the Ministry for the implementation of the expanded mandate. The Institute will however require further capacity beyond that which is currently approved. Even with the new posts, it is anticipated that the staffing will be inadequate to fulfil the mandate. The IIM, in the discharge of its BCLME project responsibilities, is creating internship positions for recent graduates. A major obstacle is the availability of appropriately qualified individuals. As is are no marine science undergraduate or post graduate courses available, these interns will need either significant orientation training or must be returning graduates who have studied abroad.

In general it was reported that it was difficult to retain good scientists due to low salaries and, because some courses undertaken outside of Angola, were not recognised by government and hence qualified individuals may not be compensated at the appropriate levels.

As the IIM is mostly responsible for providing the scientific basis for the sustainable management of living marine resources, the critical gaps such as the lack of long-term data sets for population sizes of current key or potential commercial species and the reported training needs (see below), must be addressed as a matter of urgency.

A further skills gap identified is in taxonomy, as an integral skill required for managing ecosystem health function and understanding environmental impacts associated with offshore exploration, mining and drilling. A concern reported was that, currently, there was lack of information on the taxonomy of organisms inhabiting affected sediments.

The IIM will need to undertake a detailed analysis of their staffing requirements once their mandate has been clarified and once the new fisheries legislation is in place.

There is currently no training plan or available human capacity development plan for the IIM. Training is planned annually for the following year but not all of this training goes ahead, due to budgetary constraints.

Training requirements were identified at a workshop with the department heads. The IIM has specific needs for implementation of its specialist research mandate, however there are also general needs. Many felt that it was essential that training involved evaluation of an individual's ability to apply the training within their jobs and that in many cases, short courses linked to service training were seen as most effective. Also, the training plan should be linked to the strategic plan in terms of individuals' positions and responsibilities.
The following are the needs expressed by the participants:

- Statistics;
- Computer section requires training on GIS, visual basic, networking and Unix;
- There is a need for on the job and academic training;
- Training on stock assessment tools;
- Survey design for stock assessment;
- Implementing the link between stock assessment and management;
- Acoustic techniques for stock assessment;
- Aquaculture:
    - Water quality issues for aquaculture;
    - Management;
    - Evaluation of impacts;
    - Risk analysis;
    - Genetics; and,
    - Management of aquaculture systems.
- Advanced computer software;
- Technical training (toxicity, heavy metals testing etc);
- Working with specialised equipment;
- Assessment of environmental impacts;
- Monitoring environmental impacts;
- Technical training (chemical and biological pollutants in sediments and water);
- Pollution
    - Microbiology and chemical sampling design and technical testing;
    - Technical training on chromatograph and spectro-chromatography testing;

    - Advanced microbiology;
    - Statistics; and,
    - Advanced computer software (programming and modelling).
- Computer software: Excel and Access
- English language
- English and computer training is ubiquitous
- Leadership skills as IIM is growing and is becoming involved internationally;
- Management of programmes and projects – e.g. log-frame analysis;
- Communications – proposal, report writing and presentation skills;
- Ecology – stock assessment is taking ecosystem approach and therefore need to understand the life histories approach; and,
- Taxonomy training – this is also an area where there are no dedicated skills (skills gap)

The recent acquisition of the new Angolan research vessel, the *Tombw*a and the projects to upgrade the laboratories in Namibe have significantly improved infrastructural capacity, however it is aparent that there are failures in some basic services, such as water and electricity, and communications services, such as telephone and email.

On the whole, the outlook is positive for the IIM with a close working relationship with the BCLME Activity Centre, the proposed structure responding to both the BCLME and the additional mandates given to the Institute. It is still to be seen as to how the human resources development plan will respond to the Science plan, the new structure and the new mandates.

There is a strong developing relationship between the IIM and the Faculty of Science at the University of Agostino Neto. Students here are able to access further training with the IIM in internships while working on BCLME Programme-funded projects, however, the faculty does not currently provide the opportunity to major in marine sciences, oceanography or coastal management courses. There appears to be a greater demand for suitably qualified students to work on BCLME projects with the IIM than are available. It is apparent that the BCLME and the IIM will need to plan for a two year lead-in time in order to bring students through to the level of training that will make them ready for participation in these projects. On the job training is possible but a basic level of scientific training is essential (pers. comm. Maria de Lourdes Sardinah).

The BCLME Activity Centre in Luanda is interested in assisting the Faculty of Science in developing of a set of under graduate and post-graduate marine science modules. The priority skill gaps that should be addressed are marine biology, geophysics, oceanography and water quality monitoring. Water quality monitoring was also a reported need of the Ministry of Petroleum, which sited a lack of suitably qualified people and available laboratories as a major obstacle in marine pollution monitoring.

If there was to be a new set of modules proposed for marine sciences, the Head of the Faculty of Science would need to propose this to the Ministries of Education and Fisheries. It is possible that the appropriate modules could be

developed and presented in with another SADC universities. There is a strong opinion that courses must be presented locally if sustainable educations and marine science training systems are to develop in Angola.

Institute for the Development of Artisanal Fisheries (Instituto de Desenvolment da Pesca Artesanal (IPA)

Founded in 1992, originally as a department of the Ministry of Fisheries, the key purpose of the IPA is to support the development of sustainable artisanal fisheries in Angola. The IPA receives funding from government and in turn supports artisanal fisheries through the administration of a credit fund (FUNDEPA). This enables the IPA to provide credit to artisanal fishers to upgrade vessels and equipment. A 1999 survey revealed that there were approximately 21,500 artisanal fishers in Angola and about 5000 vessels used in the industry. Monitoring of the sector was initially undertaken through ARTFISH. Recent reports indicate catches of 35,000 – 40,000 tons/annum (SADC RFIS, 2001).

The IPA's role is also to advance national government policy with respect to artisanal fisheries, including: improving monitoring, control and surveillance; training in the areas of fish handling, processing and marketing; improving techniques in order to increase production; creating centers to support fishermen and communities; improving the extension service; improving access to credit; and, providing technical assistance in order to improve quality.

Currently a key focus of the IPA is to support the development of co-operatives such as those established in Luanda and Kwanza-South, however, this challenge is significant in the context of more than 100 landing sites along the coast, only 40 of which can currently be monitored. Much of the IPA's work is undertaken through extension officers who advance more sustainable fishing practices.

One of the major projects being undertaken with the assistance of the African Development Bank (ADB) is the establishment of centres in each of the coastal provinces with two the larger provinces, Cabinda and Namibie. The IPA is working together with local fishers to find the most suitable location for the centres. A UNDP-funded project is also been undertaken in the fishing community of Ambriz to build capacity among women and to stimulate economic activity. The extent to which these two initiatives are being co-ordinated is unclear.

The promotion of inland artisanal fisheries, previously one of the functions of the Department of Agriculture has recently been added to the mandate of the IPA. It will now also need to focus on developing capacity in the relevant areas of the 18 provinces.

It is the opinion of many in the artisanal fisheries sector that the proposed revision of the Fisheries Law will more directly address the needs of artisanal fishers. Under the current law, all artisanal fishers should be licensed. This is a significant challenge in the context of subsistence economies. A further aspect of improvement in the new law is that it will only allow commercial fishing licenses to fishers and companies with land-based infrastructure. This will

aim to limit the amount of fish landed that is frequently left to spoil, due to the lack of market or refrigeration facilities (pers. comm., Moises Longui, IPA Director).

Current staffing is seen as inadequate. The existing staffing structure and organogram is being reviewed, however, even the current posts cannot be filled due to budgetary constraints. The current staffing number is 160, however less than 75% of these positions are filled. Luanda province has most capacity with 81 staff, 35 of which serve the capital. There is a plan to recruit more staff, as the Institute will be responsible for inland fisheries in the future. Currently it only has staff and offices serving seven coastal provinces, whereas in the future it will be required to service all relevant provinces.

A significant gap is the number and level of technical expertise available within the IPA. With the current effective moratorium on further placements the IPA's plans in the interim are to "work smarter" and engage the assistance of fisherman in gathering information. Furthermore, there are plans to strengthen relationships with local NGOs.

The ADB-funded infrastructure project will also provide for 10 integrated posts to rollout infrastructure projects at 10 different centres in the coastal provinces. The lack of technical skills in sustainable fisheries management, however, will remain a major capacity and skills gap in the medium term.

There are is currently no training plans for the IPA however, the skills and training needs are known and have been communicated as follows:

Training needs of communities along the coastline:

- Organisational management training in order to support the development of associations and co-operatives.
- Marine resource management and responsible fishing
- Business skills
- Literacy and numeracy
- Responsible fishing

Training needs for the IPA staff include:

- English language
- Stock assessment and management
- Marine and coastal resources management
- Community development and co-management
- Statistics
- Project development, monitoring and evaluation

The rollout of the ADB-funded project will also include a training programme, which is still in the process of being defined and planned. Training is an area in which the BCLME programme could significantly add value. Developing

models for co-management of marine resources is an important area of focus if restrictions on fishing of certain species are to be avoided (pers. com. Moises Longui, IPA Director).

Essential land-based infrastructure requirements for fishing communities include fish landing facilities, refrigeration facilities and roads. Each of the 10 planned centres will include:

- Refrigeration facilities
- Ice factories
- Fish processing facilities
- Slipways and other infrastructure for landing fish
- Water tanks
- Communications facilities
- Roads
- Schools for fishers, and
- Healthcare centres.

The IPA's infrastructural needs include computers and communication infrastructure such as email, telephones and fax facilities.

Other projects of the IPA include:

- Manufacture of isothermic boxes to preserve fish. Only about 40 of the 5000 vessels used by artisanal fishers have onboard isothermic storage facilities.
- The development of different types of nets to accommodate different kinds of catches and to protect certain species.

Cefepescas is a training facility that provides technical training for the fishing industry and was established 20 years ago with the assistance of Swedish funding. There are three key types of training courses: entry level (usually to students in the 16 to 22 year age category), technical courses for mature students already engaged in the industry and a number courses that can be provided on a demand basis for government departments or private industry. Cefepescas is part of the Institution for National Information Professionals (INIFOP) in Angola and offers the following courses: Navigation and skippers course, Refrigeration technician, Electrical technician, Mechanical technician, Surveillance and monitoring and Fishing management.

Surveillance and monitoring and fishing management are short courses provided on a demand basis. Recently the fisheries management course was provided to candidates from the Institute for the Development of Artisanal Fisheries.

From 1982 to 1992 significant funding came from SIDA for the development of facilities and the maintenance of equipment while government paid for salaries. There were originally five working vessels, infrastructure and equipment and books all funded by SIDA. Now there are no vessels in operation. The facilities have a capacity for

240 students, including classrooms and practical training laboratories, boats (although none of these are currently in working order), accommodation, canteen and recreational facilities.
In recent year, Cefepesca has not had capacity attendance, currently there are 92 students registered in 2003. In the past the courses were provided over a two-year period (while there was support from SIDA). Now because of lack of funding the course can only be offered for one year. Much of the equipment required for practical training is no longer working. In the institute there are two working telephones, no cars, no vessels and there are limited computers. Recently there has been contribution by the Spanish government for desktop publishing and printing training laboratory.

Ministry of Education

The Ministry of Education is made up with the following key functional positions and sections: the Minister, the Vice-Minister, and their respective offices; three councils including the Technical Council, Executive Council, and Vice-chancellors Council; Legal Cabinet; Cabinet of Planning Studies and Statistics; Cabinet of Education National Inspection; Cabinet of International Co-operation; Information and Documentation Centre; General Secretary; three National Directorates: Human Resources, General Education, Technical Professional Education, Higher education and Social Affairs; and, three National Institutes: Education, Training and Scholarships and Public Institutions of Higher Education. The total establishment staffing is 557 posts with 122 management positions, 352 researchers and technicians, and 88 administrative positions.

There is currently no specific government skills development plan for the fisheries industry of for marine and coastal resource management. This identified need must be brought to the attention of the Minister and appropriate additional courses and facilities proposed. It is essential however for the proposal to show how the existing institutions will be involved in meeting these needs.

The Ministry of Fisheries has indicated that there are plans to build a training centre for medium professional skills in Luanda and Benguela and further university facilities in Namibe. These planned facilities must be assessed and planned for in the context of the IIM's existing and refurbished laboratories, the existing facilities of the University in Luanda, facilities at Cefepescas, Helder Neto as well as the network of centres being developed by the Institute for the Development of Artisanal Fisheries.

Training programme of Helder Neto Institute is carried out in collaboration with the Ministry of Education. This institute focuses on medium-level skills in Fisheries as well as other skills areas. In the Institute has a strong partnership with Polacs - Polónia. The Ministry of Fisheries has indicated that the "trainers and the programmes" offered at Helder Neto are outdate and have not kept pace with changes in the industry. Critical needs identified include new courses on fisheries management and aquaculture. Furthermore, it is reported that the training, aimed at medium skills level (i.e. in between a technical qualification from Cefepescas an academic qualification from

university) does not meet international standards, e.g., masters tickets for skippers and navigators. The Institute also has deficiencies in basic infrastructure and equipment.

Table 3.3b). BCLME POLICY ACTION AREA A: SUSTAINABLE MANAGEMENT AND UTILISATION OF LIVING MARINE RESOURCES. SUMMARY OF ORGANISATIONAL ROLES AND RESPONSIBILITIES.

Level	Organisation	Role	Areas of responsibility/ activity
National Government	Ministry of Fisheries	Fisheries management, monitoring, control and surveillance, set TAC, formulate policy, research, monitoring of catches, vessel licensing	Whole country
	Institute of Marine Research	Research and monitoring of the living marine resources of Angola to inform policy development; stock assessment and TAC.	Whole country
A	Institute for the Development of Artisanal Fisheries	Promotion of the development of artisanal fisheries through extension, provision of infrastructure and training; and the development of associations and co-operatives.	Whole country
Non-Government Organisations	South East Atlantic Fisheries Organisation (SEAFO)	Implementation of the SEAFO convention to ensure conservation and sustainable use of living marine resources in south east Atlantic	International (South East Atlantic)
	Southern African Development Community (SADC) Sector Coordinating Unit	Provides guidance in formulation, evaluation, management and implementation of fisheries policies, programmes and projects	SADC Region
Programmes	Benguela Environment Fisheries Interaction and Training Programme (Benefit)	Education and training, Funding, Research, Environmental monitoring	Namibia, Angola, South Africa
	Benguela Current Large Marine Ecosystem (BCLME) Programme	Funding, environmental monitoring, policy and legal analyses, socio-economic assessments	Namibia, Angola, South Africa

4.4. BCLME POLICY ACTION AREA B: MANAGEMENT OF MINING AND DRILLING ACTIVITIES

The government institutions responsible for the management of environmental impacts resulting from mining and drilling activities are the Ministry of Urban Affairs, the Ministry of Petroleum and, to a lesser degree in relation to the BCMLE, the Ministry of Geology and Mines. The International Maritime Organisation (IMO) and the International Petroleum Industry Environmental Conservation Association (IPIECA) are active partners in the management of environmental impacts. SOLANGOL and private oil companies play a significant role in the implementation of environmental protection measures required by the Angolan government and bodies such as IPIECA.

Ministry of Urban Affairs and Environment (Miniterio do Urbnismo E Ambiente)

In 1993 the National Secretariat for the Environment was established. In 1997, this became the Ministry for the Environment; in 1999 it was merged with fisheries as the Ministry of Fisheries and Environment. Finally in 2001 the current Ministry of Urban Affairs and Environment was formed. This regular change has resulted in instability in the institutions responsible for managing the environment. Financing is a major constraint, as environment is not seen as a priority in Angola. The priorities must currently include reintegration of mobilised forces post-war, poverty, displaced people, education and health, especially HIV/AIDS. Environmental education is however receiving attention and is receiving government budget and is seen as an essential investment in sustainable development.

The Ministry is responsible for overseeing urban affairs and for the environmental quality and conservation of biodiversity in Angola. As the key authority responsible for the implementation of the Environmental Framework Act and all associated regulations (see section 3.2 above), the Ministry is also therefore responsible for the development and regulation of environmental impact assessments. The Draft Environmental Impact Assessment Decree is currently under discussion and up until now, mining and oil companies have been requested to submit EIA reports in terms of the Environmental Framework Act and have generally followed international or their own country's standards for the EIA process and products. Due to the lack of current capacity, the Ministry of Petroleum currently reviews EIA reports and authorises oil exploration and drilling activities. This is discussed further in the section below on the Ministry of Petroleum.

It is not clear to what extent the Environmental Framework Act and its, soon to be published, EIA Decree will be in conflict with the Mining Act, No 5 of 1979, which focuses more on rehabilitation of the environment post-mining rather than on pre-permitting investigations to assess the environmental impacts as an informant to decision-making.

The Ministry, with the assistance of the UNDP, has engaged an expert consultant to develop the National Environmental Action Plan (NEAP) for the next ten years (Republica de Angola, Ministerio do Urbnismo E Ambiente, 2003). The NEAP elaborates the plan for priority action by the Ministry and all other organs of state, the private

sector and NGOs. The second draft is currently being finalised in consultation with relevant ministries and will be submitted to cabinet by April 2004. This plan will influence the funding allocations within the Ministry.

As the environment sector is seen as a "junior" ministry in government it is required to work in co-operation with other ministries. There is a relationship between Environment and other key ministries such as Energy and Water but this requires strengthening. A multi-sectoral Commission for the Environment was established in 2001, which includes all directors of relevant departments. This was established to improve co-ordination and cooperation, but is only an advisory body. There is a proposal, which was put before the Commission in 2003 to establish a Council for Environment and Sustainable Development. This proposal has also been submitted to the prime minister's office as it is proposed that he would chair the Council. It is proposed that this Council would have decision-making powers, which would significantly reduce the problems of the junior level of the Ministry (pers. com. Carlos dos Santos, Director: Environment).

A committee also exists for the petroleum industry to address environmental issues. One of the major collaborative projects is the development of an environmental database to harmonise and integrate all environmental information held by government and the private sector. The allocation is about US$500,000 for this work, including rollout of the system and training of personnel. The work should begin in 2004 with the priority sensitive areas receiving attention first. This work has now been included as a government programme. Integrated into the government programme are the celebration of National Environment Day, 31 January and World Environment Day, 5 June.

The legislation that enables the new structure of the Ministry of Urban Affairs and Environment was promulgated in 2003. There are four new executive directors: Environment, Natural Resources, Urban Affairs and Territorial Affairs and Housing. The tender for recruiting further staff will be put out next year through the Ministry of Public Works and Social Security. The new placements will only take place after new offices for the Ministry are in place. While the organogram provides for an establishment staffing number of 262 (management: 104; technical: 111; administrative: 47) the exact number of staff proposed for the various sections of the Ministry, particularly for the departments dealing with EIA, natural resources etc. were not available at the time of writing this report.

The Human Resources department is part of a cross-sectoral section: the General Secretariat, as is the legal department and international relations and planning and statistics (at level of director). The plan in the future is to establish Institutes similar to the IIM for the following areas: Housing; Geography and Cartography; Planning of Urban and Territories; Promotion of the Environment; and, Natural Resources. There are also plans to establish two funds from permit fees, for Housing and Environment.

There are nine people in the Directorate of Environment: 1 Director, 1 Head of each of the following departments: Environmental Quality, Environmental Education and Licensing, with about 2 other staff members in each section. The Licensing Department is supposed to review and authorise activities requiring EIAs, but its current capacity is

too limited to take on this responsibility at present. Critical areas of skills requirements are technical expertise in environmental quality, licensing and environmental education.

One of the key concerns raised, is the lack of a local environmental management qualification in Angola, in order to supply a steady stream of skilled people to the environmental management sector. A further problem is that the salary packages are much more attractive in the private sector and consequently it is difficult for the Ministry to attract or retain qualified staff.

The Ministry does have a training plan in place but it is not really implemented due to the lack of resources and capacity. The most regular training is English language training as this is still a vital need. Other training needs include:

- Environmental auditing
- Resource economics
- Management
- Environmental management systems
- Environmental statistics
- Environmental Impact Assessment
- Design and implementation of monitoring systems
- Geographical Information Systems
- Licensing and permitting
- Environmental quality/State of environment monitoring and reporting
- Environmental sanitation
- Pollution control
- Policy, strategy and planning (e.g. for waste management, biodiversity, desertification)
- Biodiversity/conservation planning
- Natural resource management
- Protected area management (rangers courses), and
- Negotiation skills.

Environment Directorate does not have its own headquarters and occupies about 10% of the Ministry of Fisheries offices. They will relocate to their own offices by July 2004. Computers are a major requirement, as are all forms of communication facilities and infrastructure such as telephone, fax and email. The directorate currently has no telephone lines.

Ministry of Petroleum (Ministerio dos Petroleos)

The oil and gas industry contributes more than 50% to Angola's GDP, mostly through export earnings and has attracted investment of more than 15 large international oil companies. SOLANGOL, the national oil company has developed partnerships with many of these companies with a view to strengthening Angola's oil exploration, drilling and refining capacity. Most of the oil and gas drilling activities are focused in the Cabinda enclave and in the province

of Zaire, with wells located both on and offshore (Tapscott, 2001). The Angolan oil industry was first established in 1966, but since 1997, the industry has grown rapidly with the discovery of rich reserves.

The Ministry of Petroleum (MoP) is responsible for managing the oil resources of Angola and licensing for all related activities. The Department of Environmental Protection within the MoP was created in 1993 and is responsible for managing all environmental aspects of the oil industry operations.

Angola is currently in the process of developing a gas drilling industry. While some of the by-product gas is used to assist in oil drilling, much of this resource is flared as a waste product. Flaring of gas impacts air quality (although these effects are not monitored) and is a waste of a potential energy resource. A plan, which is currently in the early stages of implementation, is the Angolan Liquefied Natural Gas Project. This is a government project and is being driven by SOLANGOL and aims to harvest the gas and sell on to markets.

The Petroleum Activities Act (No 13 0f 1978) has been supplemented with a Petroleum Activities Decree (No. 39 of 2000), which includes environmental management aspects. A set of regulations that link the Environmental Framework Act with the Petroleum Act is currently under discussion. Other regulations associated with the Oil legislation include those relating to ballast water, waste discharge to sea, exploration, drilling, waste management and procedures for spills (including notification and response procedures), notification and management of incidents such as emergencies, and Environmental Impact Assessment (EIA).

EIAs and environmental management plans are required at all different phases of exploration, drilling, production and decommissioning, and public participation may also be required. These studies and their approvals are required before the commencement of any activities. The Minister of Petroleum provides the authorisation of activities under the Petroleum and Environmental legislation in consultation with the Minster of Urban Affairs and Environment.

Currently there are no pollution regulations or water and air quality standards for Angola and international standards are generally used (e.g. for oil in water it is 40 ppm). Many of Norway's environmental quality standards used are adapted for local conditions (pers. comm. Manuel Xavier Jr., Head of the Environmental Department, Ministry of Petroleum).

Every three months the oil drilling companies are required to submit a report to the Ministry. This must include information on quantity and quality of discharge, chemical composition, incident reporting etc. Effectively this is a report in environmental compliance.

Generally, local opinions suggest that the current and developing legislation, once in place, will provide a robust framework for environmental protection in the oil and gas industries. The key gaps that still exist however, are EIA

regulations, and environmental quality standards for water and air as well as regulations for pollution and waste management.

The Ministry of Petroleum (MoP) reports ongoing interaction with the Ministries of Fisheries and Urban Affairs and Environment in the co-ordination of their respective activities. They are engaged in the discussion of the draft National Environmental Action Plan and are undertaking a partnership project to consolidate environmental information. The MoP has also highlighted the importance of the development of an environmental database. This proposed project will be co-ordinated by the Ministry of Urban Affairs and Environment, but all relevant ministries will be involved and will contribute to and have access to the information.

The MoP experiences major problems with spills at sea and discharges to sea with respect to the verification of size, clean up response and monitoring. The National Oil Spill Contingency Plan (NOSCP) being developed in partnership with the IMO and the IPIECA will deal with some of these problems and will include satellite facilities for remote assessment of size of spills. The plan for the implementation of the NOSCP is to develop a partnership with the Navy and the Airforce and to have a 24-hour response team. This plan is awaiting approval from the Minister. There is also a developing partnership with the Republic of Congo on the border to enable satellite imagery, to assist in transboundary issues.

Currently there is no strategic level assessment of the cumulative impact of oil industry in Angola's marine environment. A much-needed initiative to develop a comprehensive environmental monitoring programme for offshore oil activities is being planned by the IIM in partnership with the Ministries of Petroleum and Urban Affairs and Environment (see other related environmental monitoring initiatives in section 3.5). This initiative will integrate all current data sources from industry, research cruises and fixed point monitoring.

The Ministry of Petroleum's National Directorate of Petroleum has four key departments: Licensing and Permitting; Production Development; Refining and Petrochemicals and Environmental Protection. There are currently only four people within the Department of Environmental Protection, one manager and three technical staff. The department requires 12 people at a minimum to cope with the current workload. There is currently a proposal with the minister to add a further 4 people to the department as soon as possible. The Inspectorate within the MoP also assists the Environmental Management Department in monitoring. The inspectorate has more than 30 staff and two departments: supervision of operations and legal enforcement. The key staff required are biologists, environmental engineers, chemists and environmental lawyers. Furthermore, skills and facilities for water quality testing have been identified as a major gap.

The MoP's legal department also assists the Environmental Protection Department and the Inspectorate. Many of these lawyers have environmental law training inputs, which are useful in the enforcement of environmental aspects or the MoP's regulations.

The MoP's training plan is implemented on the basis of available funding. Most regularly the training includes: English language, offshore on the job training, EIA, petroleum operations, Safety Health & Environment (SHE) and environmental monitoring. However there is a need for more training on all of these aspects. The training needs that have been identified by the Head of the Environmental Protection Department are:

- Environmental Impact Assessment
- Public participation
- Licensing and follow up
- Environmental quality monitoring
- Database development, updating and use (decision support tools)
- Oil spill response training
- English language

Office space is the major problem for the Environmental Protection Department, but also for the MoP in general. Other infrastructure, such as computers are, less of a problem. The effective implementation of the NOSCP will require attention to infrastructure such as vessels, airplanes and helicopters as this area is currently significantly deficient. As mentioned above, water quality monitoring and facilities that can test these aspects is a major gap in capacity. The MoP is liaising with the Ministry of Science and Technology and the IIM to address this problem.

Ministry of Mining and Geology

This Ministry is involved mostly in the inland exploration of minerals, specifically in alluvial diamond fields. ENDIAMA, the state mining company has sole rights to prospecting, mining and marketing of diamonds in Angola. Currently there is no authorised off shore diamond mining in Angola. The consultant team was not able to interview representatives of the Ministry of Mining and Geology during the allocated interviewing period to ascertain whether there are likely to be authorised offshore mining activities in the short to medium term.

The cumulative impacts of alluvial mining, such as destruction of terrestrial, freshwater and estuarine habitats; and changes in water quality from pollution and increased turbidity on Angola's marine and coastal environment, have not been assessed.

Table 3.4 . BCLME POLICY ACTION AREA B: MANAGEMENT OF MINING AND DRILLING ACTIVITIES. SUMMARY OF ORGANISATIONAL ROLES AND RESPONSIBILITIES.

Level	Organisation	Role	Areas of responsibility/ activity
National Government	Ministry of Urban Affairs and Environment	Development of legislation and policy for management and protection of the environment; conservation of biodiversity; the development and implementation of EIA legislation; the development of air and water	Whole country

		quality standards and pollution and waste management. Urban Affairs and Housing	
	Ministry of Petroleum	The sustainable development of the oil industry in Angola. Regulates: licensing for oil exploration and drilling; reporting and enforcement of environmental performance in the oil industry.	Whole country
	Ministry of Geology and Mines	Regulates the exploration and mining for minerals in Angola. Responsible for ensuring compliance with environmental rehabilitation aspects of legislation.	Whole country
International Organisations/ NGOs	International Petroleum Industry Environmental Conservation Association (IPIECA)	Assist in the development of industry standards and National Oil Spill Contingency Plans (NOSCP) and other environmental protection guidelines. Play a significant role in the industry self-regulation	International
	International Maritime Organisation (IMO)	Assists in implementation of international agreements for marine conservation and protection through	International
Programmes	Benguela Current Large Marine Ecosystem (BCLME) Programme	Funding, environmental monitoring, policy and legal analyses, training etc.	Namibia, Angola, South Africa

4.5. BCLME POLICY ACTION AREA C: ASSESSMENT OF ENVIRONMENTAL VARIABILITY, ECOSYSTEM IMPACTS AND IMPROVEMENT OF PREDICTABILITY

One of the key contributions to meeting this policy action area is the availability of the long-term research marine environmental and oceanographic data. In Angola, hydrographic data (specifically temperature and salinity) have been collected along the coast of Angola since the late 1960s. The IIM has been involved in collecting data *via* Angolan and foreign surveys, mostly the Nansen programme, as well as that provided through the Cuban and Russian surveys of the late 1970s and early 1980s, fixed stations data at Lobito and Lucira. A key programme currently run in partnership with BENEFIT is the Namibe Monitoring Line – Seasonal Oceanography Programme which monitors the area at the Angola Benguela Current Fronts, while significant amounts of data is held by the Southern African Data Centre for Oceanography (SADCO) and various oil companies. One of the key challenges has been the recovery and consolidation of oceanographic and marine environmental data. At a workshop held on *Angola's Needs for Mutli-Sectoral Management of Marine Environmental Information* (BCLME/IIM, 2003) the priorities for recovering information and developing a comprehensive database within the context of a monitoring programme were highlighted.

The development and implementation of a marine environmental information management strategy must assess and use historical data, address current industry and government priorities and be supported by adequate infrastructure and training. Angola will be receiving in excess of US$1,600,000 for EVAG related projects while an allocation of US$100,000 has been set aside for the assessment of needs in information management.

The current research capacity to support the implementation of this policy action area exists mainly within the IIM's oceanography and environmental units, partnership programmes (as mentioned above), fishing and oil industries and to a lesser degree, the Ministries of Urban Affairs and Environment and Petroleum. Agostinho Neto University will also collaborate in the National Environmental Monitoring Programme. This serves as a perfect vehicle to fund and train students wishing to specialise in information management systems and marine sciences.

<u>Department Oceanography:</u>

- Characterisation of phytoplankton dynamics in coastal areas of Luanda Province
- Seasonal Oceanography in the Northern Benguela Current
- Harmonisation of Regulation for harmful algae in the BCLME Region
- Capacity building development to monitor harmful algae in the BCLME Region
- Application of nuclear techniques to detect harmful algae

During interviews, the oceanography department was identified as requiring further capacity at a research scientist level.

Environmental Unit:

- Equipping Lobito Province Laboratory in collaboration of Ministry of Petroleum with the support of Nansen Programme;
- Equipping the Water Quality Control Laboratory in Cabinda Province in collaboration of Ministry of Urban Affairs and Environment and Cabinda Government with the support of Chevron Texaco;
- Assessment of Marine Pollution derived by petrol exploration with the support of Atomic Energy International Agency; and,
- National Environmental Monitoring Program in collaboration of the Ministry of Urban Affairs and Environment, Ministry of Petroleum and University of Agostinho Neto with the support of the Nansen Programme.

Further training is required in the oceanography; marine geosciences; assessment of environmental impacts; monitoring environmental impacts; technical training (chemical and biological pollutants in sediments and water); microbiology and chemical sampling design and technical testing; technical training on chromatograph and spectro-chromatography testing; and statistical analysis.

The currently identified further needs in oceanographic monitoring is north of the Benguela–Angola Front, specifically the establishment of monitoring lines at Lobito and Luanda (pers. comm., Neville Sweijd, Director, BENEFIT).

The key to Angola's successful contribution to implementing this policy action area is the adequate, planning and prioritisation of research and monitoring. The IIM is currently reviewing its strategy to respond to the BCLME Programme priorities and industry needs, however, there are already significant advances at aligning the project focus of the IIM to engage these priorities. It will be essential to co-ordinate the National Environmental Monitoring Programme with other monitoring initiatives. The IIM is in a perfect position to play this key role.

Table 3.5 . BCLME POLICY ACTION AREA C: ASSESSMENT OF ENVIRONMENTAL VARIABILITY, ECOSYSTEM IMPACTS AND IMPROVEMENT OF PREDICTABILITY BCLME POLICY ACTION SUMMARY OF ORGANISATIONAL ROLES AND RESPONSIBILITIES.

Level	Organisation	Role	Areas of responsibility/ activity
National Government	Institute for Marine Research (IIM)	Undertake research and co-ordinate monitoring activities, development of a marine and coastal resources database, data management; data analysis; co-operation in the development of early warning systems	Whole country
	Ministry of Urban Affairs and Environment	Development of a National Environmental Monitoring Programme in partnership with the Petroleum Industries Operations for Environment, Health and Safety (PIOEHS)	Whole country

	Ministry of Petroleum	Are a partner in the development of the national environmental database.	Whole country
International Organisations/ NGOs	Southern African Data Centre for Oceanography (SADCO)	Oceanographic research in Southern Africa	Regional/Southern Africa
Programmes	Benguela Current Large Marine Ecosystem (BCLME) Programme	The EVAG and work plan co-ordinated by the South African BCLME activity centre.	Namibia, Angola, South Africa
	BENEFIT	An important partner in the Namibe Monitoring Line – Seasonal Oceanography Programme and the development of the Angola Science programme that seeks to prioritise marine sciences research.	Namibia, Angola, South Africa

4.6. BCLME POLICY ACTION AREA D: MANAGEMENT OF POLLUTION

The local institutions that can assist in the implementation of this policy action area are the Ministries of Urban Affairs and Environment, Petroleum, Water & Energy as well as local government. Some of the key areas of concern for marine pollution and litter are land-based point sources from unserviced urban areas and polluted rivers and marine outfalls from industry.

The Environmental Framework Law, which covers aspects of pollution and waste management, has not been supplemented by the relevant regulations to enable implementation. As yet there are no regulations for pollution and waste management and there are no water or air quality standards set for Angola. This is seen as a significant legal deficiency in the context of a flourishing oil industry. The Ministries of Urban Affairs and Environment and Petroleum have identified environmental quality monitoring as key human resource deficiencies. The development of further capacity in this is a critical need.

The current draft water act establishes a framework for the protection of water resources and establishes the Ministry of Water and Energy as responsible for water quality. This is a shared responsibility with the Ministry of Urban Affairs and Environment, which carries the overall responsibility for environmental quality in Angola. Local government has delegated responsibility for waste management and indirectly, pollution, in terms of the Local Authorities Act, however implementation of these responsibilities lags far behind the established legal responsibilities in the context of a huge backlog in delivery of basic services. At the time of writing this report, the consultant team had not yet been able to engage the Ministry of Water and Energy in order to establish their capacity and training needs. This is seen as a gap and will require further focus after the finalisation of the new Water Act.

The Ministry of Petroleum is in the process of developing a National Oil Spill Contingency Plan (NOSCP) in partnership with the IMO and the IPIECA and is forming a partnership with the Republic of Congo to use satellite imagery for managing transboundary pollutions problems (as described in section 3.3). Furthermore its hopes to increase its efficiency in the validation of oil spill size and treatment by industry. The Ministry of Petroleum has developed mandatory reporting requirements for the oil industry regarding quality and quantity of sea discharges of waste, as well as required reporting and response to oil spills. A major capacity constraint is in the independent verification of these reports. As mentioned in section 3.4, water quality testing has been identified not only as a skill deficiency, but also as an infrastructure requirement. It is not clear whether the upgraded IIM laboratories will be able to assist the Ministry of Petroleum. The IIM however, would be willing to assist once the laboratories have been completed.

Pollution management must be earmarked for further capacity assessment within a pollution and waste management strategy for Angola. Without a clear legislative framework and strategy for pollution control and waste management, it is impossible to assess in any detail other capacity needs, other than to highlight this as the area of most need of

capacity development from legal, strategy, human resources and training perspectives. This is probably the area with the weakest capacity in Angola, in terms of implementing international agreements on marine pollution and the BCLME SAP.

Table 3.6. BCLME POLICY ACTION AREA D: MANAGEMENT OF POLLUTION SUMMARY OF ORGANISATIONAL ROLES AND RESPONSIBILITIES.

Level	Organisation	Role	Areas of responsibility/ activity
National Government	Institute for Marine Research (IIM)	Undertake research and co-ordinate monitoring activities, development of a marine and coastal resources database, data management; data analysis; pollution monitoring partnership projects Biodiversity , Ecosystem Health and Pollution Activity Centre is based in Luanda	Whole country
	Ministry of Urban Affairs and Environment	Development of a National Environmental Monitoring Programme in partnership with the Petroleum Industries Operations for Environment, Health and Safety (PIOEHS) Responsible for the development of pollution and waste management regulations and water and air quality standards	Whole country
	Ministry of Petroleum	Responsible for the control of pollution in the oil industry through reporting requirements. Driving the development of the NOSCP.	Whole country
International Organisations/ NGOs	International Petroleum Industry Environmental Conservation Association (IPIECA)	Assist in the development of industry standards and National Oil Spill Contingency Plans (NOSCP) and other environmental protection guidelines. Play a significant role in the industry self-regulation	International
	International Maritime Organisation (IMO)	Assists in implementation of international agreements for marine conservation and protection.	International
Programmes	Benguela Current Large Marine Ecosystem (BCLME) Programme	Developing projects to assist Angola in address pollution management.	Namibia, Angola, South Africa

4.7. BCLME POLICY ACTION AREA E: MAINTENANCE OF ECOSYSTEM HEALTH AND PROTECTION OF BIOLOGICAL DIVERSITY

The key institutions involved in driving the conservation of Angola's biodiversity resources and protecting ecosystem health include: the Ministries of Urban Affairs and Environment and Fisheries as well as the IIM, which provides most of the scientific research capacity. The key international funding partners, including the UNDP and NORAD. Angola has prioritised the development of National Biodiversity Strategy and Action Plan. It is envisaged that the NBSAP will be developed in tandem with the National Environmental Monitoring Programme.

Angola is a member of the IUCN's Southern African Biodiversity Programme (SABSP), which is set to promote conservation and sustainable development. There is an existing Memorandum of Understanding with the government of Angola, which will enable it to access funds for biodiversity conservation activities. The country is also a participant in the Southern African Botanical Diversity Network (SABONET).

The relevant laws include the Environmental Framework Act and the Fisheries Act with the latter in the process of review. The current Fisheries Act does not make provision for Marine Protected Areas, a deficiency that should be addressed as a matter of urgency. Angola therefore has no declared Marine Protected Areas along its coastline. A planning process is required to identify appropriate locations for the development of MPAs along the coastline as part of the implementation of the NBSAP.

Key threats to biodiversity and ecosystem health are unmanaged development, unserviced urbanisation and over exploitation of marine and coastal resources. The significant tourism and recreational potential of Angola's coastline may result in uncontrolled or unmanaged tourism development and activities such as the unregulated use of off-road vehicles in sensitive coastal environments. Angola still has the opportunity to plan for, and set in place, biodiversity conservation mechanisms that could assist in maintaining ecosystem health within its marine and coastal environments. The management of the coastal environment, as a sensitive environment, has not been assigned to any specific agency and the Ministry of Urban Affairs and Environment does not have the capacity to undertake this function. The management of MPAs would require dedicated capacity and where appropriate should ideally be linked to land-based protected areas.

Besides the development of the NBSAP and the National Environmental Monitoring Programme, Angola is also engaged in two UNDP funded projects on marine mammals and turtles in partnership with Agostinho Neto University's Faculty of Science. Further strategic interventions however, will result from the BEHP AG's implementation plan.

While the IIM has marine biodiversity expertise, marine ecology, marine and coastal management and taxonomy have been highlighted as skills and training needs at all levels. A concern expressed is that marine sediments, *inter*

alia in Angola require further research from a taxonomic perspective. Many of these organisms remain undescribed in the context of significant impacts to these environments resulting from oil drilling activities.

Table 3.7. BCLME POLICY ACTION AREA E: MAINTENANCE OF ECOSYSTEM HEALTH AND PROTECTION OF BIOLOGICAL DIVERSITY			
Level	**Organisation**	**Role**	**Areas of responsibility/ activity**
National Government	Institute for Marine Research (IIM)	Undertake research and co-ordinate monitoring activities, development of a marine and coastal resources database. Establish TACs.	Whole country
	Ministry of Urban Affairs and Environment	Responsible for biodiversity conservation and ecosystem health maintenance for all of Angola. Responsible for developing and implementing the National Biodiversity Strategy and Action Plan (NBSAP).	Whole country
International Organisations/ NGOs	United Nations Development Programme	Have assisted in the development of the National Environmental Action Plan and the NBSAP.	International
	NORAD	Will assist in the development of the National Environmental Monitoring Programme	International
Programmes	Benguela Current Large Marine Ecosystem (BCLME) Programme	Biodiversity, Ecosystem Health and Pollution Activity Centre is based in Luanda	Namibia, Angola, South Africa
	BENEFIT	An important partner in the Namibe Monitoring Line – Seasonal Oceanography Programme and the development of the Angola Science programme that seeks to prioritise marine sciences research.	Namibia, Angola, South Africa

5. NAMIBIA

5.1. COUNTRY PROFILE

Namibia occupies a land area of approximately 824 000 km^2 which is home to an estimated 1.75 million people (Urban Dynamics and Trend Line 2001). It is one of the most sparely populated countries in the world with an average population density of only 2.12 people/km^2. Of significance to the BCLME is that only a small proportion of this (~7%) resides in the coastal zone, almost all of which live in coastal towns (Swakopmund, Walvis Bay, Lüderitz, Henties Bay and Oranjemund). Namibian society is very much dualist in nature, a function of its colonial heritage and governance by South Africa under its apartheid policies, until independence in 1990. These policies created huge spatial and racial differences in human well-being and infrastructure, many of which still exist today. Its physical infrastructure, for example, is amongst the best in Africa, but poverty, unemployment, high population growth, low levels of education and low levels of economic growth are still critical problems. Evidence of this is still clear from the division of land within the country, employment and education statistics. An estimated 60% of the population practice subsistence agro-pastoralism on communal land (37.1% of the total) and 10% of the population practice freehold farming on 43.3% of the land (Southern African Institute for Environmental Assessment 2003). Agriculture (as is evident from the previous figures) is the largest employer, providing almost 37% of the employment within the country. Other important sectors of the economy include mining, commercial fishing, tourism and the tertiary sectors such as wholesale, retail and transport services. Primary industries (mining, fishing, and agriculture) together contribute about 20% of the GDP, secondary industries (manufacturing and the like) about 15%, and the service sector about 55% (Central Bureau of Statistics 2001). All of this points to a high reliance on natural resource use. The GDP per capita was about N$9000 (U$2000) in 1997, placing it in a middle-income category (Urban Dynamics and Trend Line 2001). This, however, masks a high level of income inequity where the wealthiest 10% of households (5.3% of the population) earn more than 50% of the income. Unemployment is currently at 34.5% (up from 20% in 1991). At least 27% of the labour force in the country had no formal schooling in 1991, 35% had only primary school education, 33% had secondary school education, and only 4.5% had some form of tertiary education. To its credit, the Government of Namibia has made a huge effort since independence to improve levels of education, devoting as much of 30% of the budget (or between 7.5 and 9.5 of the GDP) to education. The population growth rate, at 3.1%, is high, even for African standards.

From an environmental point of view, Namibia is the most arid country south of the Sahara, with 92% of the country's land surface defined as hyper-arid, semi-arid or arid. Rainfall is low and variable, and there are no permanently flowing rivers, apart from those on the northern and southern borders. Namibia's coastline stretches about 800 nm (1 500 km). The shelf area to 200 m depth, is approximately 110 000 km^2 and to 1 000 m, is about 230 000 km^2. The 1 000 m depth contour lies in the range of 30 to 130 nm from the coast, but is mostly about 80 nm from shore. Coastal marine waters are cold but highly productive and support a variety of important commercial and a small recreational fishery (see Anon 1991, O'Toole 1997, and Hampton *et al.*1999 for more details on this).

5.2. POLICY AND LEGAL FRAMEWORK

5.2.1. The Constitution of the Republic of Namibia, 1990

The Constitution is the supreme law in Namibia, providing for the establishment of the main organs of state (the Executive, the Legislature and the Judiciary) as well as guaranteeing various fundamental rights and freedoms. Provisions relating to the environment are contained in Chapter 11, article 95, which is entitled "promotion of the Welfare of the People". This article states that the Republic of Namibia shall –
actively promote and maintain the welfare of the people by adopting, inter alia*, policies aimed at … maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilisation of living natural resources on a sustainable basis for all Namibians, both present and future; in particular, the Government shall provide measures against the dumping or recycling of foreign nuclear waste on Namibian territory.*

While a number of pre-independence laws were expressly repealed by the Constitution (section 112), in accordance with Clause 140 of the Constitution all other laws in force immediately before the date of independence, remain in force until they are repealed or amended by new legislation or are declared unconstitutional by a competent court. Many of the South African acts that were applicable at the time of independence are thus still applicable. Many of them have been amended since this time, and a number of new laws have been passed or are nearing completion.

5.2.2. Namibia's Green Plan (1992)

Namibia's Green Plan opens with the statement "to secure for present and future generations a safe and healthy environment and a prosperous economy". It provides guidelines for wise and sustainable use of living and non-living resources in Namibia including air, water and land, as well as guidelines for sustainability within the agriculture, fisheries, forestry, wildlife, tourism, mining, trade and industry sectors. It commits the Government of Namibia to among other things, subjecting all ministerial activities to an annual environment audit, encouraging big commercial and mining enterprises to undergo annual environmental audits, ensuring that independent environmental impact assessments form part of the pre-feasibility study of all development projects and subjecting all such projects to long-term regular environmental monitoring, and encouraging environmental awareness and education initiatives.

With respect to pollution, the Green Plan notes the need for new comprehensive legislation to address effluent treatment and disposal methods and standards, and also states that -
"more effective legislation is needed to control pollution. An awareness of polluter responsibility should be promoted and fines increased in line with current market values". The Green Plan also calls for, *inter alia*, the establishment of a national body to be responsible for waste management as well as the preparation and adoption of a national waste reduction plan, backed up by legislation. In the respect of hazardous waste, the Green Plan notes that the most important shortcoming is the lack of effective legislation to control the disposal and processing of hazardous waste produced in Namibia.

In terms of protection of biodiversity, the Green Plan recognises that marine environments in Namibia have been neglected, relative to terrestrial environments and commits the government to "protect the special places that best represent the landscape and ecological diversity of Namibia".

5.2.3. Namibia's Environmental Assessment Policy for Sustainable Development and Environmental Conservation

Namibia's Environmental Assessment policy was adopted by the cabinet in August 1994. This policy requires that all policies, programme and projects, as listed in the policy, whether they are initiated by the government or private sector, should be subject to an Environmental Assessment (EA). The list of policies, programmes and projects requiring an EA is comprehensive and includes any policy, programme or project on the use of natural resources as well as structure plans, land acquisition for parks and reserves (including marine), mining and mineral exploration, ports and harbours, reclamation of land from the sea, salt works, mariculture, tourism and recreation facilities, effluent and desalination plants, to name but a few. The format and requirements for an environmental assessment are laid out in the policy. The purpose of the policy is seen as informing decision makers and promoting accountability, ensuring that alternatives and environmental costs and benefits are considered, promoting the user pays principle, and promoting sustainable development.

5.2.4. Environmental Management Bill

The development of this Bill began in 1996 and has been through a large number of drafts, which have attempted to accommodate the diverse sectoral interests covered by the Bill. A sixth and 'final draft' was produced in 1998, but by the time of writing this report, had not yet been approved by Parliament. According to the Southern African Institute for Environmental Assessment (2003) the main reason for delay relates to the lack of consensus over whether the Bill should be administered by the Office of the Environmental Commissioner located within the Ministry of Environment and Tourism (MET), overseen by a proposed Sustainable Development Commission (SDC) or whether there should be a more neutral 'Namibia Environment Agency' located outside the government. The Bill as it stands at the moment follows the former route, which calls for an Environmental Commissioner, whose responsibility it will be to maintain a register of EIAs, supervise and review EIAs and make recommendations to the SDC. The role of the SDC under this model would be to review, advise and comment on policy, monitor compliance by government institutions, review EIAs and recommend conditions to be imposed, hear appeals and coordinate pollution control and waste management, amongst other responsibilities.

The purpose of the Bill is seen as to –
give effect to Article95(l) and 91(c) of the Namibian constitution by establishing general principles for the management of the environment and natural resources; to promote the co-ordinated and integrated management of

the environment; to give statutory effect to Namibia's Environmental Assessment Policy; to enable the Minister of Environment and Tourism to give effect to Namibia's obligations under international conventions; to establish certain institutions in particular to provide for a Sustainable Development Commission and Environmental Commissioner.

The Bill sets out various environmental rights and duties: it ensures that proponents and decisions makers can be held accountable to the public, and sets out a list of principles for environmental management. The Bill includes 13 principles of Environmental Management set out as follows:

1. Renewable resources shall be utilised on a sustainable basis for the benefit of current and future generations of Namibians,
2. Community involvement in natural resource management and sharing in the benefits arising there from shall be promoted and facilitated,
3. Public participation in decision making affecting the environment shall be promoted,
4. Fair and equitable access to natural resources shall be promoted,
5. Equitable access to sufficient water of acceptable quality and adequate sanitation shall be promoted and the water needs of ecological systems shall be fulfilled to ensure the sustainability of such systems,
6. The precautionary principle and the principle of preventative action shall be applied,
7. There shall be prior environmental assessment of projects and proposals which may significantly affect the environment or use of natural resources,
8. Sustainable development planning shall be promoted in land use planning,
9. Namibia's moveable and immoveable cultural and natural heritage, including its biodiversity, shall be protected and respected for the benefit of current and future generations,
10. Generators of waste and polluting substances shall adopt the best practicable environmental option to reduce such generation at source,
11. The 'polluter pays' principle shall be applied,
12. Reduction, re-use and recycling shall be promoted, and
13. There shall be no importation of waste into Namibia

The Bill distinguishes between projects that require Environmental Impacts Assessments (EIAs) and proposals (defined as policies, plans, programmes and new or revised legislation) that require strategic environmental assessments, but the process to be followed is fairly similar in both cases. The Bill stipulates that any proposal for any listed activity (as per the EA Policy) be accompanied by a completed environmental questionnaire when submitted to the responsible ministry or authority. The authority is required to liase with the Environmental Commissioner, and together they decide whether an EIA is required or not. If they agree that an EIA is not required, the Commissioner issues an environmental clearance certificate (with or without conditions). If not, the proposal is referred to the SDC (in the case of a disagreement or if the proponent appeals) or a standard EIA process is followed. The SDC is then responsible for issuing conditional or unconditional environmental clearance for the

project after the EIA is complete, or for refusing such clearance. The authority is responsible for ensuring compliance with the stipulated conditions and for monitoring the projects progress in terms of the EIA report.

The Bill also endows the Minister of Environment and Tourism with a range of general powers including the right to stop a person from –
Performing any activity or failing to perform an activity as a result of which the environment or any components thereof is or may be seriously damaged, endangered or detrimentally affected.

The Bill also provides a definition of pollution, as –
The direct or indirect introduction, as a result of human activity, of substances, vibrations, heat, radiation or noise into the air, water or land which may be harmful to human health or well-being or the quality of the environment, result in damage to material property, or impair or interfere with amenities and other legitimate uses of the environment.

This Bill fills a major gap in the Namibian environmental legislation and should be proclaimed as a matter of urgency.

5.2.5. White Paper on National Water Policy for Namibia (2000)

This policy, which is the basis for the draft Water Bill, recognises that:

- water is essential for human life, economic development and environmental integrity.
- there is a need for inter-sectoral coordination between all stakeholders involved in using and managing water resources.
- a cost effective approach is needed for water pricing that will help to limit water wastage and reduce environmental impacts.
- water resources must be protected from pollution through enforcing *polluter pays* principles and regular water quality monitoring on all proposed projects.
- alternative water sources (including opportunities for waste water reuse, water reclamation and recycling and desalination), must be developed in order to relieve pressure on the environment.
- there is a need to improve knowledge on the vulnerability of critical wetland ecosystems and to develop strategies for their management.

However, the policy makes no mention of assessing or monitoring biological resources within wetlands or the course of action that will be taken if a wetland system is found to be in need of protection. It also does not reinforce the requirement (based on Namibia's EA policy) that projects aiming to develop new boreholes, dams or alternative water sources, must undergo Environmental Assessments. The policy offers no strategy or plan to protect wetlands and associated biodiversity. No reference is made to the *Biodiversity* or *Ramsar* conventions, both of which are important international conventions to which Namibia is a signatory.

5.2.6. Water Act, 1956

This is the principal text dealing with water pollution in Namibia. It was developed by South Africa, prior to independence, but together with many other South African acts was taken over under the conditions of Clause 140 of the Constitution of the Republic of Namibia. The Act is administered by the Department of Water Affairs (DWA) within the Ministry of Agriculture, Water and Rural Development (MAWRD). It distinguishes between "private" and "public" water, public water including water in public streams, underground and seawater and private water being any water on private land. Riparian landowners have the exclusive rights to use and enjoy water on their land, with one important exception – they may not pollute it. It is a criminal offence in terms of the Act to –
Pollute freshwater or the sea in a way that makes the water less fit for any purpose for which it is or could be used by people, including use for the propagation of fish or other aquatic life, or use for recreational or other legitimate purpose.

The Act requires that water used for industrial purposes be purified before it is returned to a public stream or the sea, so as to conform with requirements established by the Minister of Agriculture, Water and Rural Development, but can be exempted from doing so, subject to certain conditions. The Minister in this instance may issue a permit to allow the discharge of waste water, effluent or waste in a un-purified or semi-purified state into a public stream, subject to such conditions that it does not cause pollution of "public or other water, including sea water" or provided that the discharge point is sufficiently close to the sea that no person will be prejudicially, and no aquatic or marine life detrimentally, affected by such discharge. The Minister may also exempt local authorities from the relevant provisions of the act provided they do not discharge water used for any industrial purpose other than the purification or disposal of sewage.

Penalties for conviction of an offence in terms of the Act are relatively low. Conviction for a first offence, for example, attracts a fine not exceeding N$2000 or imprisonment for a period not exceeding 6 months, or both, while the fine for a second offence attracts a fine of not less than N$1000 or 6 months imprisonment or both.

The definition of pollution is missing from this Act, and is considered potentially problematic (Enact 1999).

5.2.7. Health Act, 1919

This Act was made applicable to Namibia in 1920 (then South West Africa) and is still in force today. The stated intention of this Act is to "make provision for the public health" but it covers environmental aspects as well. This Act regulates, among other things, sanitation, food and public water supplies, and is administered by the Ministry of Health and Social Services. Local authorities are given considerable powers under the Act to regulate potential polluting activities and waste handling, but from a public health perspective only. It sets out statutory duties of local authorities to ensure the prevention of pollution of water supplies, every local authority being required to take all "lawful, necessary, and reasonably practicable measures" to prevent pollution to water supplies and to purify any

water supplies that may have become polluted. It also empowers the local authority to take (legal) action against any person polluting any water supply or stream so as to be a nuisance or danger to health.

5.2.8. The Hazardous Substances Ordinance, 1974

This ordinance applies to the manufacture, sale, use, disposal and dumping of hazardous substances, as well as their import and export. It is administered by the Minister of Health and Social Services. It allows for the classification of hazardous substances into four categories, but only the classification of Group 1 hazardous substances has taken place to date. The Ordinance makes provision for an Executive Committee that may make regulations controlling the importation, transportation and dumping or other disposal of any grouped hazardous substance. Enact (1999) make the observation, though, that it does not appear that the permitting requirement in terms of the Ordinance is enforced. The Ordinance also provides for the appointment of inspectors who are granted wide-ranging powers to search and seize documents and premises. Penalties in terms of the Ordinance provide for a fine of N$500 or six months imprisonment, or both for a first offence, and a maximum penalty of N$2000 or two years imprisonment, or both, for a repeat offence.

5.2.9. Pollution Control and Waste Management Bill

The purpose of this Bill is to regulate and prevent discharge of pollutants to the air, water and land in Namibia, and to enable the country to fulfil its international obligations in this regard. It provides for the establishment of a Pollution Control and Waste Management Agency, and for the publication of standards, objectives or requirements in relation to air and water quality and activities likely to cause pollution. The mandate of the Agency is to secure effective control and prevention of pollution in Namibia, the reduction and minimisation of waste, and the regulation of waste imports and exports. The board is responsible for, among other things, monitoring the effects of pollution on the environment, monitoring compliance with and enforcing the Bill, making recommendations to the Minister of MET on pollution control and waste management, issuing licences for disposal of effluent, undertaking and promoting research into pollution control and waste management. The proposed Board will consist of members from the Ministries of Agriculture, Water and Rural Development, Health and Social Services, and a representative from the Namibian Association of NGOs and from the Namibian National Chamber of Commerce and Industry. The Agency may delegate its duties in respect of pollution monitoring to a local authority or other competent bodies with the approval of the Minister. The Act also provides for the declaration of water quality action areas by the Minister, where, in his/her opinion, it is necessary to reduce levels of pollution so as to comply with water quality objectives, or to protect human health or the environment. Once an areas has been declared a water quality action area, the Minister may prepare, adopt and implement a plan of action to improve water quality within the affected area

With respect to water pollution, the Act forbids any person from discharging or disposing of pollutants into any water or water course aside from the discharge of domestic waste from a private dwelling or the discharge of pollutants or waste to a sewer or sewage treatment works, without a water pollution licence. Water pollution licences are issued

by the Executive Director of the Pollution Control and Waste Management Agency and are valid for five years. In issuing such a licence, the Director must consult with the Minister responsible for water affairs, and must give regard to water quality standards, the contents of an EIA submitted in respect of the application or provisions of a relevant applicable action plan. A water pollution licence must specify the amount of pollutants that may be discharged over a specified period, the locations of pipes or structures from which discharges may take place, any treatment or pre-treatment to which pollutants must be subject to prior to discharge, the design, construction, operation and maintenance of any structures required to achieve this, requirements for monitoring and reporting of the amount and rate of discharges and must provide for the seasonal and other variations that may occur in the amount of pollutants which may be discharged. Application for a water pollution licence must be made to the Agency and must be accompanied by details of the activity to which the application relates, including the nature and location of the activity and its actual and potential effects on the environment. Members of the public must be given the opportunity to comment on all licence applications. The Agency and all competent authorities are required to maintain a registry of all licences issued. The Agency is also empowered to carry out water protection works to prevent or reduce the discharge of pollutants or waste into a water body or watercourse, to remove or dispose of the pollutant or waste, and to remedy, mitigate and restore waters or water courses, including dependent flora and fauna, to conditions existing prior to the pollution having entered the system. The costs of such works can be recovered from the person or persons who caused the pollution to enter the system, unless they have been issued a licence in this regard. The Director of the Agency is also empowered to appoint inspectors for the purposes of this Act, who have wide ranging powers in respect of monitoring compliance with the Act, including the power to enter and search any premises or vehicle without a warrant or court order and to collect evidence as required.

The Bill also provides for the preparation of a draft National Waste Management Plan, to be submitted to the Minister within three years of the Bill coming into force. The purpose of the plan is to document the quantities and types of waste generated in Namibia, to describe existing methods and systems for collection, transport, treatment and disposal of waste, to analyse current and project future needs for additional capacity and infrastructure in this respect, to define short, medium and long-term objectives in respect of waste management. Local authorities will be required to prepare and submit to the Agency local waste management plans.

Littering is defined as an offence in terms of the Bill, for which a maximum fine of N$ 5 000.00 or six months in prison, or both, may be levied. It also provides for the classification of hazardous waste, and for the promulgation of regulations controlling the storage, transport and disposal of such waste. It also provides for the development, publication and periodic review of a National Emergency Response Plan establishing measures to be taken and procedures to be followed in the event of a major pollution incident in Namibia.

This Bill also fills an important gap in the current legislation and should be gazetted as a matter of urgency.

5.2.10. Prevention and Combating of Pollution of the Sea by Oil (1981)

The purpose of this Act is to provide a framework for the prevention and combating of pollution of the sea by oil and for determining liability in respect of loss or damage caused by the discharge of oil from ships, tankers or offshore installations. In terms of this act it is an offence to discharge oil from any ship, tanker or offshore installation except in an emergency, or as a consequence of damage or through accidental leakage, provided all necessary and reasonable steps have been taken to prevent this from happening. Any such discharge must be reported to the nearest port authority by the quickest means possible. The Act conveys upon the Minister of Works, Transport and Communication, extensive powers to take steps to prevent pollution of the sea where oil is being, or is likely to be discharged, including unloading, transferring, disposing, or burning the oil, moving, sinking or redirecting a ship, and to order any person, capable of doing so, to render assistance in cleaning up the oil. It also allows for inspection of ships or tankers and of their records in the event that there is reasonable grounds to suspect that an offence has been committed, and for taking of samples of oil for the purpose of preventing discharge of oil from the vessel. It provides for entry onto any land for purposes of, or connected to, the cleanup of spilled oil. The Act also stipulates that liability for loss, damage or costs, caused by discharge of oil, resides with the owner of the vessel from which it was spilled except in the event of war, terrorism or negligence on the part of the government or its officials. Insurance against liability for loss, damage or costs is compulsory for owners of any vessel transporting or carrying more than 2 000 tons of oil. The Act also empowers the Minister to detain any ship responsible for an oil spill until sufficient funds are deposited or a guarantee is furnished to cover the costs of cleanup. A pollution safety certificate is required for the operation of any offshore installation. The Act also provides for a State Revenue Fund into which any revenue derived in terms of this Act must be paid, which can be used for conducting any research connected with the pollution of the sea by oil, or for any action required for preventing or removing oil in or discharged from a ship or offshore installations.

5.2.11. Draft National Oil Spill Contingency Plan

The National Oil Spill Contingency Plan (NOSCP) is designed to provide a framework for national response to an oil spill in Namibia. It is guided by international norms and practices and outlines responsibilities for initiating and coordinating actions necessary to effect protection and clean-up operations. It recognises that Namibia faces the possibility of an oil spill along its coastline, especially as marine traffic along its coastline is increasing. It delegates responsibility for managing and co-ordinating the national response of an oil spill to the National Response Team (NRT) of the National Oil Spill Contingency Organisation (NOSCO), situated within the Ministry of Works, Transport & Communication (MWTC). The objectives of the plan is five fold, and includes ensuring health and safety, ensuring that the coastal and marine environment is protected, ensuring effective reporting and speedy response, ensuring that necessary personnel, equipment and funds are available to prevent, combat, contain and clean up oil spills and to adequately dispose of waste oil and polluted materials, and ensuring good record keeping, during an oil spill. It defines responsibilities for the NRT as well as other affiliated or associated organisations including MWTC, the Directorate of Maritime Affairs (DMA), the Directorate Civil Aviation (DCA), the NOSCO Operation Team (OT),

Namibian Ports Authority (NAMPORT), the Roads Contractor Company (RCC), the Ministry of Fisheries and Marine Resources (MFMR), Ministry of Environment and Tourism (MET), the Ministry of Mines and Energy (MME), Namibian Minerals Corporation (NAMCOR), the Ministry of Finance (MOF), the Ministry of Home Affairs (MHA), the Ministry of Defence (MOD), the Ministry of Foreign Affairs & Information and Broadcasting (MFA&IB), Office of the Attorney General (AG), Ministry of Higher Education, Youth and Employment Creation (MHEYEC) the Ministry of Agriculture, Water and Rural Development (MAWRD) and the Ministry of Health and Social Services (MHSS).

The NOSCP define three types of spill – small or minor (Tier 1) spills or less than 10 tons or 400 litres of diesel oil, medium (Tier 2) spills of 10-100 tons or 400-10 000 litres, and major (Tier 3) spills of >100 tons or 10 000 litres. Tier 1 spills are considered to be associated with transfer or bunkering operations and would normally be handled by local resources. Tier 2 spills are usually associated with shipping incidents in ports or coastal water but could be from pipelines, tank failures or nearshore exploration and production and would normally be handled by all available local resources but may require additional resources from Government and industry. Tier 3 spills cover major incidents involving oil tankers, production platforms or oil pipelines, and usually require all resources available nationally and may require regional or international assistance. It indicates that each of these institutions will be responsible for sea-water intakes, sensitive resources and installations within their area of responsibility and that they are required to draw up contingency plans for the protection of the marine environment in the area of jurisdiction. It defines and lists sensitive areas and areas along the coast that require special protection (e.g. coastal wetlands and birds), it rates each in terms of priority (High, Medium or Low), indicates actions to be taken in the event of a spill. It also provides general recommendation and advice on how to respond under different circumstances and to different spill scenarios, it lists and describes equipment available for combating and cleaning up spilled oil, provides relevant meteorological data and contact numbers for key responsible persons and organisations.

5.2.12. The Minerals Policy of Namibia

The Minerals Policy of Namibia sets out guiding principles for the development of the mining sector designed to ensure that it maintains its leading role in the growth of the national economy while at the same time operating within environmentally acceptable limits. To this end, one of the objectives of the policy is listed as ensuring compliance with national and other relevant environmental policies. It recognises that some prospectors and mining companies have in the past, shown little respect for the environment and as a result have caused significant adverse environmental impacts. The Policy therefore commits the Ministry of Mines and Energy (MME) to ensuring that the development of the mining industry proceeds on an environmentally sustainable basis, that mineral development in proclaimed protected areas commences only when rehabilitation is guaranteed, to investigating the establishment of financial mechanisms (environmental trust funds or bonds) for environmental rehabilitation and aftercare in other areas, and to developing national waste management standards and guidelines in consultation with the mining industry. It stipulates that the government will enact exploration and mining legislation benchmarked against environmental global best practice, that it will investigate the establishment of mandatory mechanisms for funding of

final mine closure plans (including rehabilitation) and that it will monitor industry compliance with this through the use of Environmental Management Plan (EMP) contracts. The Policy also indicates that small-scale mining operations (often the worst culprits in respect of environmental mismanagement) will be encouraged to comply with their environmental contracts and good environmental standards through regular monitoring and inspection of their operations by MET and MME staff. In respect of the marine mining sector, the Policy requires that the government in consultation with stakeholders, establish an Environmental Assessments Working Group and develop a framework for the generation of Environmental Management Programme Report guidelines, and that MME in consultation with MET and MFMR ensure that all mining vessels be equipped with Vessel Monitoring Systems (VMS), which collectively, will help to avoid cumulative and collective damage to the environment. This policy also commits the Government of Namibia to the implementation of the SADC treaty and SADC mining sector protocol (see section 4.2.1 above) and to encouraging other SADC member states to ratify all environmental conventions appropriate to the mining industry in the region.

5.2.13. Minerals (Prospecting and Mining) Act, 1992

This Act controls all mining activity in Namibia. Mineral rights are vested in the state, and companies or individuals are required to apply to the Ministry of Mines and Energy (MME) for licences to explore, and mine, mineral deposits. Large-scale mining is administered through long-term mining licences, whereas small-scale mining (up to a point) can take place in terms of mining claims. A claim is valid for three years only, but a mining licence is valid for up to 25 years, and may be renewed for shorter periods thereafter. Presently, environmental control of mining operators is covered by this Act, but in future is likely to be covered by an Environmental Management Act.

In terms of this Act, companies or individuals wishing to prospect for minerals in Namibia must be in possession of an exclusive or non-exclusive prospecting licence. Such a prospecting licence allows a person (or company) to peg a claim that is valid for 21 days, during which time they are required to register the claim with the mining commissioner. Applications for registration of a claim must contain particulars of the condition of, and any existing damage to, the environment in the area to which the application relates as well as an estimate of the effects proposed prospecting or mining might have on the environment, and to describe steps that will be taken to prevent or reduce this. They are also required to satisfy the commissioner that in the course of any mining or prospecting operations appropriate measures will be taken to minimize or prevent any pollution of the environment. If the individual (or company) wishes to start mining they must apply for a mining license, the application for which must contain the same particulars as for a prospecting license as well as details as to the manner in which the person (or company) intends preventing pollution, dealing with any waste, reclaiming and rehabilitate land disturbed through prospecting and/or mining operations and how the effect of such operations on the land (and sea) adjoining the mining area will be minimized. In the event that a mineral license lapses, is cancelled or the holder of the license abandons a license area (including reconnaissance, prospecting, retention or mining areas), they are required to take all necessary steps to remedy, to the satisfaction of the Minister, any damage caused to the environment by the prospecting and/or mining activities.

Elsewhere in the Act, it stipulates that holders of mineral licences, i.e. reconnaissance, exclusive prospecting, mining or mineral deposit retention license, are required to prepare environmental impact assessments indicating the extent of any pollution of the environment prior to them starting any prospecting or mining and to estimate any pollution that is likely to be caused by their activities. If any pollution is likely to be caused, EIAs and EMPs are evaluated by the MME, the Directorate of Environmental Affairs (DEA) in the Ministry of Environment and Tourism (MET) and, for offshore areas, the Ministry of Fisheries and Marine Resources (MFMR).

The Act also requires that the holder of a mineral license is required to report any incidence in which any mineral is spilled in the sea or on land or if such land becomes polluted or if any damage is caused to any plant or animal, to the Minister of the MME and to take whatever steps are considered necessary in terms of good practice to remedy the situation. If the license holder fails to comply with this in good time, the Minister has the right to take whatever steps are necessary to remedy the situation, at the expense of the license holder.

The Act also confers upon the Minister of MME the power to declare that prospecting or mining operations in any area may be carried out only with the special permission of the Minister if he or she deems it necessary or expedient for the protection of, or the prevention of pollution to the environment or natural resources of Namibia, and that such activities are subject to terms and conditions, as may be determined by the Minister.

Miller & Kegge (2000) prepared a set of guidelines to advise mining companies of their obligations with respect to the environment and to assist them to comply with these requirements. It provides a useful summary of the legislation and checklists of major activities which typically take place during exploration, construction, operation and decommissioning phase of mining, as well as corresponding checklists of typical impacts and common mitigation measures that can and should be applied, as required, and a checklist of items to be considered in drawing up an environmental management plan.

5.2.14. Petroleum (Exploration and Production) Act, 1991

This Act stipulates that all rights in relation to exploration for, production and disposal of petroleum, vests in the state. The Act provides for the issuing of licences for reconnaissance, exploration and production of petroleum, and for the control of environmental impacts caused by such activities. Powers in terms of this Act are vested in the Minister of Mines and Energy, who may (but is not obliged to) require applicants for petroleum licence to carry out an EIA, or may give directions in relation to the conservation of natural resources (including petroleum) and the waste thereof and in relation to the prevention of the spilling of production water, drilling fluid or cuttings. He or she is required, however, to "take account of the need to conserve and protect the natural resources" in or adjacent to licence areas.

Applicants for reconnaissance and exploration licences must estimate the effect their operations may have on the environment. Conditions imposed on the holders of these licences include not interfering with fishing or marine

navigation, preventing the waste or spilling of any other substance extracted from a well (including for example drilling fluid and drill cuttings, and production water) and prevent pollution of any water area (including estuaries, harbours, river, etc.) by any of the above material. Applicants for production licences must comply with more stringent requirements including stipulating the manner in which they intend preventing pollution, dealing with waste, safeguarding natural resources, and reclaiming and rehabilitating land disturbed by production operations, as well as providing a statement setting out any significant effect production operations are likely to have on the environment and the manner in which they intend controlling or eliminating this effect. If a licence holder relinquishes their right, or if such a right lapses or is cancelled, the rights holder is required to remove all goods brought into the licence area, to plug or close off any wells drilled, and to perform any actions specified by the Minister of the MME required for the protection of natural resources in the area.

A model petroleum agreement has been prepared, which constitutes a contract between the holder of an exploration license and the Government of Namibia, required in terms of the Act. This document includes a clause on environmental protection (Clause 11) that binds the license holder to all provisions contained in the Act, as well as requiring the license holder to comply with some fairly stringent environmental requirements. Details as to the nature of these requirements are contained in the section on Management of Mining and Drilling in Namibia (Section 4.5).

5.2.15. White Paper on Energy Policy (1998)

Namibia's Energy Policy as outlined in this White Paper recognises that there is a close interaction between energy and the environment and that energy related activities (from investigation through production to consumption) can impact on the environment. It recognises further that the MME has neither the capacity nor resources to attend to the potential effects of all of these aspects on the environment, and as such, has elected to focus on four energy-environment challenges, being the assessment of energy related projects, woodland depletion, household health, and its own institutional capacity for environment-related activity. With respect to assessment of energy projects the white paper commits the government, to coordinate and work with MET, MFMR and other ministries, in requiring and enforcing EIA's for all major energy-related projects, policies and programmes having potential impact on the natural environment, and in taking account of environmental and social costs of new energy projects when deciding about such projects.

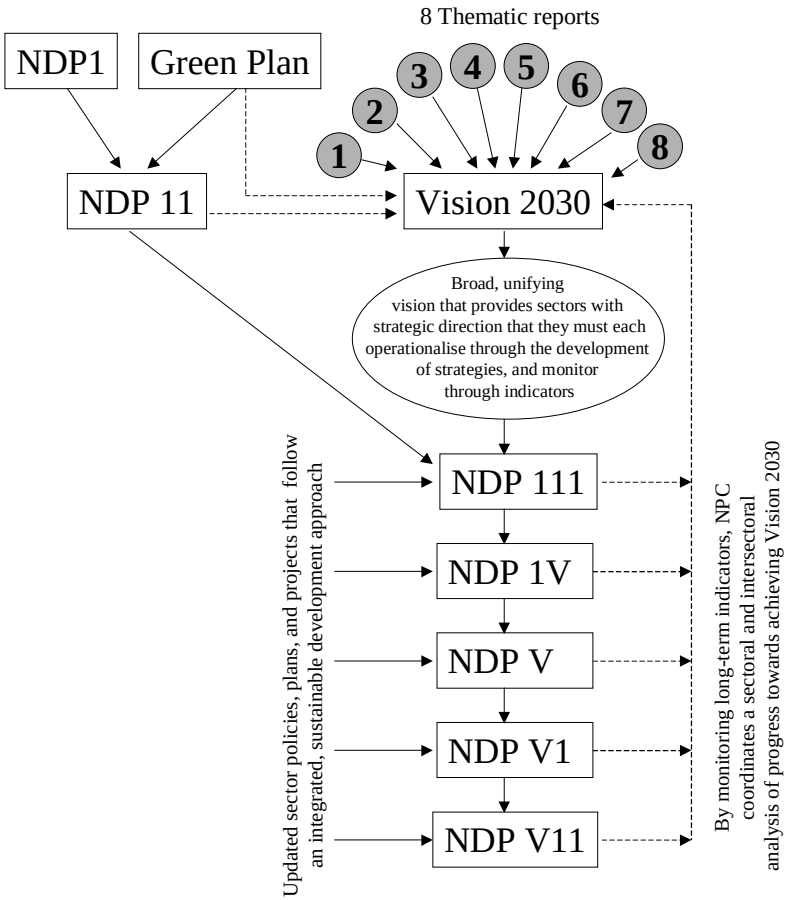
5.2.16. The Foreign Investments Act, 1990

This Act requires that the Minister of Trade and Industry assess, among other things, the impact which the activities of an enterprise seeking a Certificate of Status Investment (required to invest money in the country) is likely to have on the environment, and where necessary, measures proposed to deal with these impacts.

5.2.17. Namibia's National Development Plans and long term development vision

Namibia's first National Development Plan (NDP1) was prepared shortly after Independence, but was highly sectoral in its approach. Consequently, it was not successful in integrating the various sectors of the economy at a strategic or programmatic level. This weakness was recognised by government. Based on the lessons learnt from NDP1 and the foundations laid by Namibia's Green Plan, an effort was made to incorporate environmental and sustainable development issues and options into the country's most recent National Development Plan (NDP II – for the years 2001 to 2006). In addition, Namibia's VISION for 2030 which has been described as " *a broad, unifying vision – epitomising the concept of sustainable development and moulded, to some extent, by Namibia's Green Plan and NDPII*" aims to help guide the country's five-year development plans from NDP III through to NDP VII (Figure 1) and, at the same time, provide direction to government ministries, the private sector, NGOs and local authorities.

Figure 1. NDP II and VISION 2030 – putting sustainable development at the heart of national planning



The VISION for 2030 fully embraces the idea of sustainable development – for example, the Ideal Vision for the Natural Resource Sector is quoted as: " *Namibia shall develop its natural capital for the benefit of its social, economic and ecological well-being by adopting strategies that: Promote the sustainable, equitable and efficient use of natural resources; Maximize Namibia's comparative advantages and; Reduce all inappropriate resource use practices.*

However, natural resources alone cannot sustain Namibia's long-term development, and the nation must diversify its economy and livelihoods".

Although Namibia does not have a national strategy for sustainable development, the most recent National Development Plan (NDP II) and the Vision 2030 project conducted in 2001, have placed sustainable development at the heart of national planning**.**

Namibia's national management objectives

Not surprisingly, improving human health, education, living conditions and equity have been Namibia's top policy priorities since Independence. The resulting improvements (which have been considerable) are essential for ensuring the social sustainability and political stability required before Namibia can move towards improved economic and environmental sustainability. While reviving and sustaining economic growth is also a major management objective for the country, the environmental issues that share the crux of the sustainable development challenge have yet to be listed amongst the nations most important objectives. Despite this, NDP II attempts to incorporate the most important issues relating to environment and sustainability into most of its objectives and strategies.

Ultimately, the link between environment and development still requires more emphasis and the strong need to capitalise on Namibia's comparative advantages (such as pollution-free marine products) and provide suitable incentives to ensure that the country's natural resources are used in the most appropriate, efficient, sustainable and equitable way possible must be acknowledged as a pivotal management objective – one that can play an important role in poverty reduction, sustaining economic growth, improving human well being and, consequently, achieving sustainable development.

5.2.18. White Paper Towards Responsible Development of the Fisheries Sector (1991)

This document provides a detailed overview of the Namibian fisheries sector, strategies for the management of key fish stocks, some comment on the approach to environmental protection (specifically pollution and dumping of waste), perspectives for the development of the fisheries sector as a whole (including aspects such as the involvement of foreign fishing companies and state participation in fisheries, allocation of rights, quotas and licences), and details on the proposed legal framework and its implementation. Most of these aspects are covered in some detail.

5.2.19. Marine Resources Act, 2000

This Act is designed to provide for the conservation of the marine environment in Namibia, for the responsible utilisation, protection and promotion of marine resources, and for control over marine resources. This act replaces

the Sea Fisheries Act, 1992 and the Sea Birds and Seals Protection Act, 1973. It provides for the appointment of fishery inspectors and observers, for the establishment of a Fishery Observer Agency, a Marine Resources Advisory Council, and a Marine Resources Fund. It lists requirements for commercial harvesting of resources and measures for the management and control of fisheries.

5.3. BCLME POLICY ACTION AREA A: SUSTAINABLE MANAGEMENT AND UTILISATION OF LIVING MARINE RESOURCES

The Ministry of Fisheries and Marine Resources (MFMR)

The Ministry of Fisheries and Marine Resources (MFMR) was established in 1991 with the primary responsibility to manage the exploitation of living marine resources through rights of exploitation, total allowable catches (TACs), quotas and (where appropriate) licensing of fishing vessels. MFMR comprises four directorates including the Directorate of Operations, the Directorate for Resource Management, the Directorate for Policy, Planning and Economics and the Directorate on Aquaculture. The Directorate of Resource Management exists to provide information and advice, required for the sustainable utilisation and conservation of living aquatic resources. While senior management is mostly based in Windhoek, most of the research work of the Directorate is undertaken within the National Marine Information and Research Centre (NatMIRC), in Swakopmund and the Lüderitz Research Centre. The Directorate for Resource Management employs about 100 staff, of which around 40 are qualified scientists[2]. The Directorate operates two research vessels, a 47-m research stern-trawler *R. V. Welwitschia* (scientific capacity 9) and the Kuiseb (scientific capacity 3), that are also used for training purposes

According to the capacity and training assessment undertaken for the development of the Benefit Training Plan (Anon 1999d), the staff at NatMIRC are generally well qualified, but have limited experience. The report notes that, on appointment, most of the staff have basic training as marine scientists, but have had to undergo further training through studying for post-graduate degrees at South African or overseas universities, and the attendance of courses and specialist workshops locally or abroad. Interviews conducted as part of this study concur with these observations. Unfortunately high staff turnover in recent years has exacerbated this situation. Once qualified, many staff (including some of the best-qualified individuals) have left the organization in recent years. Reasons cited for leaving include recent declines in morale within the organization related to promotions not being linked to performance, experience or skill, reluctance of senior management to adopt or take seriously recommendations put forward by scientists, and better employment prospects elsewhere. Loss of key individuals further reduces morale and encourages other qualified staff to leave. The Directorate is making an effort to remedy the situation with ongoing donor supported training programmes but until motivational problems can be sorted out this situation is unlikely to improve. Another particular personnel problem highlighted by the BENEFIT Training Report that seems to be still very much in evidence is the shortage of qualified technicians needed to maintain and develop the specialized research equipment. The extent to which these problems have compromised the ability of the Directorate to provide necessary and relevant data for fisheries management is unclear but is likely to be significant.

In spite of the problems within the organization, relations between MFMR and the industry seem in general to be very good. Industry vessels and crew are used in research surveys for a number of the commercially exploited species,

[2] This includes staff engaged in environmental monitoring (oceanography), coastal and biodiversity management

through the allocation of "research quotas". Industry also shares the costs of some of the annual stock assessments that are outsourced to the Marine Resources Assessment Group, at the University of Cape Town. Proceeds of the sale of the landed catches from the research quotas go into a central industry controlled fund and are used to compensate the company providing the vessel and crew for the surveys and to cover the industry contribution to stock assessment costs.

Personnel within the Directorate see training as an ongoing priority, for staff at all levels. This would include bringing in experts from overseas to assist with on the job training, allowing staff to complete postgraduate degrees at institutions within the region and overseas, as required, as well as organizing and conducting regional scientific and training workshops for sharing of information, experience and training.

The Directorate of Operations has the responsibility of monitoring, control and surveillance. Their primary objectives are to restrict fishing activity to those that are entitled to do so, to ensure that fishing activity is conducted within legal and administrative guidelines, and to ensure that revenue from landings is correctly calculated. In terms of maintaining compliance, the Directorate of Operations in Namibia is without a doubt one of the most effective organisations of its kind in the region. From the time of independence, the Namibian government acted swiftly against illegal fishing, arresting, prosecuting and confiscating 11 high cost trawlers between 1990 and 1991. This has acted as a substantial deterrent to illegal fishing in the EEZ and has all but eliminated illegal fishing by foreign fleets in Namibian waters. The Directorate of Operations maintains an integrated programme of inspection and patrol at sea, on land and in the air. Through the parastatal Fishery Observer Agency, they are able to maintain virtually complete coverage of all vessels in Namibian waters by onboard observers, which serve to ensure compliance and to collect scientific data. Approximately 250 observers are engaged in this programme, of which 70 are at entry-level and still under-going training. Around 110 are Grade 1 observers, thus able to collect basic biological data such as length-frequency measurements, in addition to fulfilling their compliance role. A further 50 have been trained to Grade 2 level and collect more detailed biological data, particularly ageing material, as well as monitor discards. There are about twenty Grade 3 observers who have specialised in a particular species and collect a full-array of biological data, including maturity staging.

The observer programme is supplemented with systematic sea patrols and regular at-sea inspections, air patrols designed to detect unlicensed fishing vessels and to monitor the movements and operations of the licensed fleet, comprehensive coverage of all landings by onshore inspectors, and shore patrols to ensure compliance by recreational and commercial fishers in the inshore zone. The Directorate of Operations comprises two divisions – the Division of MCS that employs around 100 staff, including 70 inspectors, and the Division of Technical Services that employs about 70 staff including engineers, pilots and administrative staff. They have two patrol vessels (a third under construction) and a single surveillance aircraft. Senior staff within the Directorate feel that existing staff would benefit from further training (particularly in the fields of leadership and staff management, basic statistics and data manipulation, biology and ecology and communications), additional infrastructure (e.g. vehicles, computers, aircraft),

an increase in their staff compliment, and an increase in operating expenses. The Department has and continues to put considerable effort into staff training. Fisheries inspectors and deck officers are normally sent to or receive training at the Namibia Maritime and Fishery Institute (NAMFI – see below), while technical staff (engineers etc.) and pilots are sent to Northlink in Cape Town (the former) and abroad for training (the latter). Senior management staff are also sent abroad for training when such opportunities become available.

The purpose of the Directorate of Policy, Planning and Economics is to manage the development of the fisheries sector, nationally and internationally, by ensuring that fisheries activities contribute to Namibia's socio-economic development goals, by creating a conducive environment in which the fisheries sector can grow to its full potential, as well as ensuring that Namibia is represented internationally and that national fisheries interests are protected. Their responsibilities also include administering fisheries legislation and regulations, managing the collection of fees generated by fishing activities, managing the collection and preparation of fisheries statistics and information. Regrettably none of the senior staff from this Directorate were available for interview during this study and hence information is lacking here. It is understood that it is a relatively new directorate and is still establishing itself and its aims and objectives in many respects.

A brand new Directorate on Aquaculture has also just been established within MFMR. A total of 35 posts have been approved for this directorate but only four of these have been filled as yet. Input received from the director of the institute suggests that existing staff would benefit from further training, as would any new recruits. Training is needed at operational, research and technical levels and could best be achieved by bringing experts in from elsewhere to work within the Directorate and for staff from to attend short training courses that are available in the region (e.g. in Malawi). A preliminary report on training needs for scientific and technical support has been compiled, which addresses the immediate training needs of the newly established Directorate, however, as the Directorate expands and Aquaculture becomes a thriving industry, additional training needs of staff may arise. The following staff requirements are envisioned with training needs as indicated:

Aquaculture Researchers

- Nutrition and feeding of aquaculture species (2x scientists)
- Aquatic Animal health (diseases) of cultured species (2x scientists)
- Physiology and biology of indigenous aquaculture species (2x scientists)

Fish Farm Manager (at Hatchery)

- Pond production system: management, planning, administration, maintenance and general insight in feeding, health and water quality (2 x staff)

Technical staff for Researchers and Farm Managers

General exposure requested for one to two month courses for:

- Research assistants (3x)

- Aquaculture farm assistant (3x)

  In water quality monitoring, feeding, animal diseases, hatcheries etc.

Technical Assistants and Lead Labourers

- General exposure (one month courses) to be provided to these staff on the day to day running of production ponds (4xTehcnical Assistants and 2 x Lead Labourers)

Staff listed above will need training in computers, electronics and pump systems

- Researchers (6 x staff)
- Technical staff (8x staff)

Extension Officers

- One of the objectives within the Directorate Aquaculture is to provide assistance to new fish farmer entrepreneurs in rural areas. A competent team of extension officers who are well conversant in Aquaculture need to be trained (4x staff)

Inspector Officer

- Qualified person to carry out inspection at ponds to ensure correct procedures are followed e.g. water quality, health, alien species introduction *(*1x staff*)*

Namibia is responsible for co-ordinating the SADC Sector Marine Fisheries and Resources (MRF), which includes providing the region with leadership and guidance in the formulation, evaluation, management and implementation of specific policies, programmes and projects for the development of the sector. This responsibility has been delegated to the SADC Sector Co-ordinating Unit for the purpose. The SADC Sector Co-ordinating Unit was originally based in the MFMR headquarters in Windhoek, but have recently taken up their own offices. MRF aims to develop sustainable marine fisheries in all SADC coastal states and is geared towards development of regional fisheries resources assessment, management and surveillance systems, labour intensive and value-adding technologies and industries, internal and external markets, and mariculture. One of its key initiatives of this programme included developing the SADC Fisheries Planning and Management Course, which was hosted by the University of Namibia. This course offered 3 months of training to middle and senior managements in the SADC region, covering both inland and marine fisheries.

Namibia Maritime and Fishery Institute (NAMFI)

Namibia Maritime and Fishery Institute (NAMFI), based in Walvis Bay, contributes to the management and exploitation of fisheries in Namibia by offering various maritime related courses (e.g. marine safety, marine engineering, fishing and deck officer courses). NAMFI trains inspectors and observers from the Directorate of Operations in MFMR in their occupational functions. NAMFI also designs courses to meet the specific needs of

industry such as courses in productivity, basic hygiene, safety and supervisory training. The Polytechnic of Namibia offers training courses for fisheries inspectors and observers in conjunction with the Namibia Maritime and Fishery Institute and the Ministry of Fisheries and Marine Resources. The University of Namibia (UNAM), recently instituted a B.Sc. degree in Natural Resources (taken over 4 years), within the Faculty of Agriculture and Natural Resources. The degree includes courses in physical and chemical oceanography and fisheries science. UNAM also offers a B.Sc. Agriculture degree in Food Science and Technology that includes a number of courses relevant to fish processing. These institutions all make a valuable contribution to management of living marine resources in Namibia but require ongoing support and guidance if they are going to continue in this role.

Namibia has received and continues to receive considerable support for the management of fisheries resources, both financial and scientific/technical, from bilateral and multilateral donors. The main bilateral donors are Norway (NORAD and the Nansen programme), Germany (GTZ and KfW), Sweden (SIDA), Denmark (DANIDA & DANCED), The Netherlands (DGIS), Spain, Iceland (ICEIDA), France, Great Britain (DFID) and Japan. The principal multilateral donors are the European Union (EU), WFP, UNDP, UNFPA, UNICEF, FAO and the World Bank. Some of the more noteworthy interventions include assistance from the German Technical Co-operation Agency (GTZ) with capacity building and institutional strengthening at MFMR, support to marine research stations at Swakopmund and Lüderitz, environmental monitoring, sea fisheries legislation, EIAs, aquaculture and MPA design. NORAD has assisted with developing the Namibian MCS system, has funded numerous training programmes (e.g. stock assessment, MCS), assisted in developing environmental legislation and provides support in the form of fishery research vessels. DANCED funded an Integrated Coastal Management Project for the Erongo region (which includes Swakopmund and Walvis Bay) and funds a cleaner technology Programme for the fish processing industries in Walvis Bay. DANIDA provided a fisheries patrol vessel for monitoring of fisheries activities within the EEZ. The German Kreditanstalt für Wiederaufbau (KfW) funded a study on the development of the port of Walvis Bay. These contributions have assisted Namibia immeasurably in providing an appropriate framework for managing marine resources in the country.

Table 4.1. BCLME POLICY ACTION AREA A: SUSTAINABLE MANAGEMENT AND UTILISATION OF LIVING MARINE RESOURCES. SUMMARY OF ORGANISATIONAL ROLES AND RESPONSIBILITIES.

Level	Organisation	Role	Areas of responsibility/ activity
National Government	Ministry of Fisheries and Marine Resources	Fisheries management (including transboundary), formulate policy, monitoring, control and surveillance, monitoring of catches, research, stock assessment, environmental monitoring, set TAC and other management tools, environmental protection	Whole country

	Ministry of Environment and Tourism (Directorate of Environmental Affairs)	Environmental protection, planning and coordination in terrestrial areas. Administers coastal parks and assists by ensuring compliance amongst recreational fishers in these areas. MET also manages a number of cross-cutting programmes which address priority environmental issues and challenges	Coastal parks (Skeleton Coast Park, West Coast Recreation Area, Namib Naukluft Park)
Regional Government	Erongo Regional Council	Not yet defined	Erongo Region
Local Government	Henties Bay, Swakopmund, Walvis Bay and Luderitz Town Councils	Law enforcement within municipal areas, public health	Municipal areas
Parastatal	Namibia Maritime and Fisheries Institute	Maritime/fisheries training	Whole country
	Polytechnic of Namibia (School of Natural Resources and Tourism)	Education and training	Whole country
	University of Namibia (Coastal Resource Research Centre)	Education and training, research	Whole country
Non-Government Organisations	South East Atlantic Fisheries Organisation (SEAFO)	Implementation of the SEAFO convention to ensure conservation and sustainable use of living marine resources in south east Atlantic	International (South East Atlantic)
	Southern African Development Community (SADC) Sector Coordinating Unit	Provides guidance in formulation, evaluation, management and implementation of fisheries policies, programmes and projects	SADC Region
	International Commission for the Conservation of Atlantic Tunas (ICCAT)	Aims to maintain the population of tuna and tuna-like fish in the Atlantic Ocean at levels that will permit maximum sustainable yields, as well as the implementation of research programmes, the analysis of fishing statistics and the formulation of stock conservation recommendations	International (Atlantic)
	Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)		International (Antarctic)
Programmes	Benguela Environment Fisheries Interaction and Training Programme (Benefit)	Education and training, Funding, Research, Environmental monitoring	Namibia, Angola, South Africa
	Benguela Current Large Marine Ecosystem (BCLME)	Funding, environmental monitoring, policy and legal analyses, socio-economic assessments	Namibia, Angola, South Africa
Private sector	Fishing industry Mining sector	Fishing, training, funding research Mining, research	-

5.4. BCLME POLICY ACTION AREA B: MANAGEMENT OF MINING AND DRILLING

Management of the environmental effects of mining and petroleum exploration and production activities on the marine environment is at present shared between the Ministry of Mines and Energy (MME), the Ministry of Environment and Tourism (MET) and the Ministry of Agriculture, Water and Rural Development (MAWRD). Greater responsibility is, however, likely to be transferred to the MET when the Environmental Management Act, which is currently in draft format, is proclaimed. (Mining in terms of this Act is a listed activity and as such will be subject to a full environmental impacts assessment).

Ministry of Mines and Energy (MME)

Currently, legislation governing prospecting and mining for minerals other than petroleum is fairly stringent but the lack of compliance monitoring renders it somewhat toothless. The legislation requires MME to ensure that mining companies (or individuals) undertake environmental assessments to assess the likely impacts of prospecting, and to rehabilitate areas that have become degraded in the course of the prospecting operations, prior to being issued with such a licence. Prospectors are also required to satisfy the Mining Commissioner that in the course of any prospecting operations appropriate measures will be taken to minimize or prevent any pollution of the environment. Similar conditions are imposed by MME with respect to issuing mining licenses with the additional proviso that the company (or individual) conduct an environmental impact assessment (EIA) and prepare an environmental management plan (EMP) before commencing mining. The EIAs and EMPs are supposed to be evaluated by MME, the Directorate of Environmental Affairs (DEA) in the Ministry of Environment and Tourism (MET) and, for offshore areas, the Ministry of Fisheries and Marine Resources (MFMR). Mining inspectors reporting to the Government Mining Engineer in the Directorate of Mining in MME are responsible for monitoring operations and enforcement of laws and regulations. In practice the inspectors are mainly involved in safety issues and have little or no experience in environmental protection. The net result in most cases therefore, is that mining companies complete an environmental questionnaire prior to starting prospecting, which is then submitted to the Department of Environmental Affairs (DEA) for "safekeeping". Because requirements for undertaking an EIA and preparing an EMP are not required before a license is issued (as is the case with prospecting), in practice these are often not undertaken. Environmental effects of mining operations are generally not monitored, as MME has no dedicated staff for this purpose. No funds are required to be deposited against potential failure to undertake necessary rehabilitation. As a consequence, this is seldom undertaken. Fortunately many of the larger mining companies have their own environmental performance requirements (e.g. ISO 14000) and operate in a more responsible manner than the law requires them to. Both MME and MET desperately need additional staff capacity to assist them in fulfilling their environmental responsibilities and obligations, particularly with respect to compliance monitoring. These people do not necessarily have to be highly qualified in the environmental field, provided they receive the necessary on the job training to allow them to fulfill their duties. This must happen in conjunction with the proclamation of much needed new legislation, some of which is already in draft format and has been in this form for some time (see for example the Draft Environmental Management Act - section 4.2.4).

Environmental control over prospecting for and production of petroleum is currently governed by the Petroleum Act (1991), which offers better protection for the environment than the Minerals Act. In this instance, the Ministry of Mines and Energy has, at its disposal a "Model Petroleum Agreement" that governs the relationship between the petroleum company and the Ministry. It requires the applicant for any petroleum license to undertake two environmental impact assessment studies prior to starting any exploration. The first of these EIAs is required to be carried out in two parts - a baseline study to be undertaken prior to a seismographic survey, followed by an environmental impact assessment of the effects of drilling on the environment. The second of the EIAs constitutes an assessment of the effects of production on the environment. These EIAs are required to contain environmental guidelines to be followed in order to minimize environmental damage including (but not limited to) marine resource protection, fuel storage and handling, liquid and solid waste disposal, selection of drilling sites, blowout prevention, combating oil spills, flaring, well abandonment, rig dismantling and site completion, reclamation and noise control. The Petroleum Directorate includes petroleum inspectors responsible for environmental monitoring and compliance who report to the Petroleum Commissioner.

Ministry of Environment and Tourism (MET)

The Directorate of Environmental Affairs (DEA) comprises one of four directorates under the Ministry of Environment and Tourism (MET). The DEA lists as its responsibility, the maintenance of ecosystem health and maintenance of biological diversity in Namibia. It describes its mission as being to "Promote environmental protection, environmental planning and environmental coordination to support the sustainable and equitable use of natural resources and national development, and to protect the environment and human welfare from unsustainable, unhealthy and inappropriate practices". It is a small institution comprising a core of a small number of full-time professionals and administrative staff. Only one of the professionals, assisted by one of the administrative staff members, is responsible for coordinating all environmental assessment work in Namibia, including that for the mining industry. The DEA is thus not really in a position to pick up at the point where MME leaves off and is certainly in no position to monitor compliance with legal requirements, with EIAs or EMPs. Additional staff are urgently required within this Ministry to assist in the evaluation and processing of EIA, EMPs and with compliance monitoring. Particularly important is the need for qualified staff in all the major centres that can monitor and oversee implementation and compliance with EIAs and EMPs. Staff within the Environmental Assessment Unit at DEA would also benefit from further training (the most senior person having only a four year BSc degree) but are not really in a position to do so due to extremely limited capacity at present. Significant enhancement in the capacity of the Unit will be required if and when the Environmental Management Bill is gazetted. Another issue that causes problems from time to time is the fact that MET only has jurisdiction up to the high water mark for most of its activities, from which point MFMR takes over. This obviously causes problems for "transboundary" species such as seabirds but problems also arise because MET is geared to deal with environmental issues (conservation, biodiversity, etc.) while MFMR has the infrastructure to work at sea (boats and aircraft) but its personnel are almost exclusively focussed on the economic exploitation of resources, and have little regard for conservation issues.

Ministry of Agriculture, Water and Rural Development (MAWRD)

The Department of Water Affairs (DWA) in MAWRD is responsible for controlling pollution of the land environment in Namibia through some rather antiquated legislation, being the Water Act of 1956. Water pollution licences are required by any mining company wishing to discharge effluent to the environment. This includes the disposal of fines material generated by the diamond mining industry that is discharged to sea from a number shore based processing plants. The area of responsibility does not include the large number of mining vessel operating in the offshore concession areas. The new draft Pollution and Waste Management Bill has the potential to dramatically enhance control over environmental pollution by the mining industry, but seems to have stalled due to inter-institutional disagreements (see sections 4.2.9 and 4.2.11 for more details on this).

Table 4.2. BCLME POLICY ACTION AREA B. MANAGEMENT OF MINING AND DRILLING ACTIVITIES. SUMMARY OF ORGANISATIONAL ROLES AND RESPONSIBILITIES.

Level	Organisation	Role	Areas of responsibility/ activity
National Government	Ministry of Mines & Energy	Lead agency responsible for ensuring that mining activities in Namibia are environmentally sustainable, issues prospecting and mining licences as well as exploration and production licences for petroleum	Whole country
	Directorate of Environmental Affairs, Ministry of Environment and Tourism	Works with MME in evaluating environmental assessments, impact assessments and management plans	Whole country
	Department of Water Affairs, Ministry of Agriculture, Water and Rural Development	Lead agency responsible for control of marine pollution resulting from land based activities, grants exemption permits allowing mines to discharge effluent into the surroundings	Whole country
	Ministry of Fisheries and Marine Resources	Assists with the evaluate EIAs for offshore mining and petroleum operations	Whole country
Regional Government	-	-	-
Local Government	-	-	-

Parastatal	National Petroleum Corporation of Namibia	Collects offshore environmental data relevant to petroleum exploration and production in Namibia including weather and drifter buoy data needed for oil spill modeling and contingency planning, wave and current data, and pollution monitoring during drilling and production	
	Polytechnic of Namibia (School of Natural Resources and Tourism)	Education and training	Whole country
	University of Namibia (Coastal Resource Research Centre)	Education and training, research	Whole country
Non-Government Organisations	-	-	-
Programmes	Benguela Current Large Marine Ecosystem (BCLME)	Funding, Research, Environmental monitoring	Namibia, Angola, South Africa
Private	Namibian Petroleum Operator Association (NAMPOA)	Provides forum for industry co-operation	Whole country

5.5. BCLME POLICY ACTION AREA C: ASSESSMENT OF ENVIRONMENTAL VARIABILITY, ECOSYSTEM IMPACTS AND IMPROVEMENT OF PREDICTABILITY

The marine environment off Namibia (and in fact the whole of the Benguela region) exhibits a very high level of natural variability, which in turn has profound influence on the biota of the region. The northern Benguela in particular exhibits extreme variations in temperature, characterised by periodic intrusions of warm water from Angola juxtaposed with periods of prolonged upwelling of cool water that affects much of the coastline. The intrusions of warm water from the north are usually accompanied by low oxygen conditions. This and the occasional sulphur eruptions and red tides have significant widespread (the former) and local (the latter two) effects on biodiversity and resources in the region. The responsibility for monitoring and researching oceanographic variability off Namibia lies with the Directorate Resource Management (DRM) within the Ministry of Fisheries and Marine Resources (MFMR). The subdivision Environment within the Directorate has certain staff dedicated for the purpose, including a number of physical and chemical oceanographers. These staff make use of both Namibian and foreign donor provided research vessels to collect relevant oceanographic data off Angola and Namibia.

A number of routine monitoring projects are conducted, both from NatMIRC and the Lüderitz Research Centre. A sampling line off Walvis Bay (the 23° S latitude line) is sampled monthly to a distance of 70 nm offshore, and a shorter line off Lüderitz, for temperature, salinity and oxygen profiles, basic chemical and nutrient components, as well as zooplankton and phytoplankton densities. A similar line is sampled at 20° on a quarterly basis and once per year the 18° is monitored. Basic oceanographic data are also collected systematically from many of the routine fish surveys. Remote sensing of SST, chlorophyll and winds are down-loaded and processed daily, while a network of weather stations along the coast provide continuous metrological data. The Angola-Benguela frontal region is monitored opportunistically, while foreign research vessels form ships-of-opportunity from which environmental data are collected. Finally, a two-year dedicated project investigating the occurrence of hydrogen sulphide outbreaks between Walvis Bay and Henties Bay will be concluded early in 2004. However, the over-riding impression is that despite an impressive array of data, some over relatively long time-periods, the linkages between the environmental and fish stocks is still poorly understood, not only in the northern Benguela, but in eastern boundary upwelling systems globally.

Table 4.3. BCLME POLICY ACTION AREA C. ASSESSMENT OF ENVIRONMENTAL VARIABILITY, ECOSYSTEM IMPACTS AND IMPROVEMENT OF PREDICTABILITY. SUMMARY OF ORGANISATIONAL ROLES AND RESPONSIBILITIES			
Level	**Organisation**	**Role**	**Areas of responsibility/ activity**
National Government	Ministry of Fisheries and Marine Resources	Environmental monitoring (physical, chemical and biological oceanography)	Whole country
	Namibia Meteorological Service, Ministry of Works, transport and Communications	Collection and provision of weather and climate data	Whole country
	Namibian Long-Term Ecological Research Network, Ministry of Environment & Tourism	Aims to provide, access, understand and use long-term ecological data and information in Namibia	Whole country
Provincial Government	-	-	-
Local Government	-	-	-
Parastatal	Polytechnic of Namibia (School of Natural Resources and Tourism)	Education and training	Whole country
	University of Namibia (Coastal Resource Research Centre)	Education and training, research	Whole country
Non-Government Organisations	-	-	-
Programmes	Benguela Environment Fisheries Interaction and Training Programme (Benefit)	Education and training, Funding, Research, Environmental monitoring	Namibia, Angola, South Africa
	Benguela Current Large Marine Ecosystem (BCLME)	Funding, Research, Environmental monitoring	Namibia, Angola, South Africa
Private	-	-	-

5.6. BCLME POLICY ACTION AREA D: MANAGEMENT OF POLLUTION

The existing legal and institutional framework for waste management and pollution control in Namibia is considered unnecessarily complicated and is scattered in a variety of statutes and regulations (Enact 1999, Namibia Global Research CC 2001). Many of the existing statutes and regulations are no longer appropriate in an independent Namibia as they were enacted prior to current understanding of the ecosystem processes and before the development of modern environmental monitoring and management techniques. At least eight government ministries deal with waste management and pollution control in Namibia:

- Ministry of Environment and Tourism (MET)
- Ministry of Health and Social Services (MHSS)
- Ministry of Agriculture, Water and Rural Development (MAWRD)
- Ministry of Works, Transport and Communication (MWTC)
- Ministry of Mines and Energy (MME)
- Ministry of Trade and Industry (MTI)
- Ministry of Regional and Local Government and Housing (MRLGH), and
- Ministry of Fisheries and Marine Resources.

Few formal mechanisms exist to promote cooperation between the various responsible agencies at the ministerial level. Making matters worse, is the fact that many components are not regulated at all. There is also a lack of clarity as to which legislation is applicable and which agency or ministry is responsible for particular issues. Furthermore the legislation does not give any one ministry or agency a lead or co-ordinating role as far as pollution control and waste management is concerned. There is no formal policy on pollution control and waste management in Namibia, but there are a number of references to it in the Green Plan. The Green Plan notes the need for new comprehensive legislation to address effluent treatment and disposal methods and standards, and also states that -
"more effective legislation is needed to control pollution. An awareness of polluter responsibility should be promoted and fines increased in line with current market values".

In respect of water pollution, most of the Ministries listed above have some or other role to play under the current structure. MET is a relatively minor player in the greater scheme of things, but appears to have taken a lead role in trying to implement a proper framework for management of pollution in Namibia. The MET established a Pollution Control and Hazardous Waste Management Programme in late 1999, designed essentially as a capacity-building programme to implement what was perceived as the coming new legislation (The Pollution Control and Waste Management Bill). This programme was jointly funded by NORAD (Norwegian Agency For Development Cooperation) and the Namibian Government, while the Norwegian State Pollution Control Authority provided a resident advisor for the programme. Five focal areas were covered by the programme, including; basic waste management, hazardous waste management, water pollution, public awareness/information, and the general implementation of the coming new legislation/institutional structures. The new draft Bill developed by the programme calls for the issuing of water pollution licences to be transferred to the proposed Pollution Control and Waste

Management Agency, rather than the current situation where such licences are issued by the Directorate for Water Affairs. The Directorate of Environmental Affairs also funded the development of a series of state of the environment reports for Namibia, one of which deals with waste and pollution (Namibia Global Research CC 2001). The authors of this report do not consider marine pollution to be a major issue in Namibia. They note that it is not a very widespread problem, the highest concentrations of pollution in the marine environment occurring in the ports of Walvis Bay and Lüderitz. Most of the pollution in the port originates from fish factory effluent, accidental oil spills, dredging and hazardous substances used in the repair and maintenance of fishing vessels and other ships. Discharge of highly saline effluent from the salt works at Walvis Bay and Swakopmund are a minor issue as they contain high levels of the salts sodium chloride, magnesium chloride and calcium chloride. Most of the rest of the Namibian coastline is free of pollution from land-based sources as it lies within the Skeleton Coast Park or the Namib/Naukluft Park. Although it has not happened yet, the report also highlights the risk of a major pollution event arising from oil tankers that travel along the coast.

Department of Water Affairs (DWA): Directorate of Resource Management

The Directorate of Resource Management within the Department of Water Affairs (DWA) at the MAWRD is currently the lead agency responsible for management of marine pollution that originates on land. Management and prevention of water pollution is based on a permit system administered by the DWA. The Department grants exemption permits allowing businesses and other institutions such as local authorities to discharge effluent into the surroundings. These exemption permits allow institutions to discharge effluent that is not in compliance with the standards set forth (in this case the 1962 Water Quality Guidelines). The process for obtaining a permit requires that an institution submit an application to DWA in which they respond to questions dealing specifically with relevant treatment (e.g. oxidation ponds, bio filters, septic tanks). DWA writes a technical report based on the information provided (and if possible) a site inspection which is then evaluated by DWA and other relevant ministries (usually including MHSS), based on which the permit is either denied, a temporary (valid for one year) or normal (valid for five years) permit is issued. There are currently more than 120 exemption permits that have been granted around the country and there are only 5 staff members within the Directorate of Resource Management (9 in the whole country), responsible for coordination, enforcement and compliance monitoring for all of these permits. Another major short coming is that there is little legal backdrop within the current legislation to stop an enterprise from polluting if it does not adhere to conditions set out in its exemption permit. If an exemption permit is not granted or is withdrawn, the enterprise can continue polluting with little fear of being penalised or shutdown. DWA has, in fact, never won a court case involving pollution of water resources! This can be attributed, at least in part, to the lack of expertise amongst the officials charged with prosecuting and presiding over pollution related offences but also the inadequacy of the Water Act for dealing with pollution control (Enact 1999). The provisions against water pollution in the Act are very difficult to enforce and require a high degree of technical proof to obtain a conviction. Penalties for conviction of an offence in terms of the Act are trivial (see section 4.2.9) and are not considered sufficient to be a major deterrent. DWA do not even have the capacity to analyse water samples and must outsource this to contractors either in Namibia (freshwater samples) or in South Africa (seawater samples). Additional staff capacity is urgently required

within this Directorate to assist them in performing their statutory obligations. Of greatest urgency is the need for regionally based staff to assist with monitoring and compliance.

The State of Environment Report on Waste Management and Pollution in Namibia (Namibia Global Research CC 2001) suggests that improvements in the management and control of pollution requires increased awareness and involvement of the public, use of improved technologies by industry and an improved decentralised mechanism for permits and inspections. They also felt that the development of an information management system for pollution that could be used by all concerned, from government to private individuals, was essential. Improved institutional integration (horizontally and vertical), amongst all departments and spheres of government, was also considered necessary. O'Toole (1997) lists several factors he considers contribute to localised pollution of the marine environment in Namibia including poor control over oil transfer at tanker terminals, the lack of a functional and well tested oil spill contingency and response plan, lack of equipment, training and exercise scenarios to combat local spills, poor co-ordination between agencies and government ministries responsible for dealing with environmental pollution, the lack of a designated disposal site for oil or toxic waste, the lack of a waste management plan, absence of legislation controlling the use of TBT paints, no effective service for collection of rubbish from vessels anchored outside of harbour limits, and the insufficient and irregular monitoring of effluent by authorities.

Under the current structures, wastewater and sewage, while managed by the local authorities, tends to fall between the mandates of MHSS and MAWRD in terms of supervision. Regional government up to this point has not been responsible for waste management and pollution control, but as decentralisation proceeds, the MRLGH will become responsible for some of the activities currently dealt with by MAWRD. The MRLGH has in fact already drawn up Model Sewage and Drainage Regulations (of 21 May 1996) for use by local authorities. Few of the older towns in Namibia (with the exception of Windhoek) have effective waste management systems and most water-borne sewage systems are based on evaporation ponds. These are overseen by the DWA, which issues exemption permits but lacks the manpower or authority to enforce improvements where they are deemed necessary. There is also a move to decentralise other aspects of water pollution control by putting monitoring compliance and enforcement into the hands of the local authorities. Under the new approach, DWA would issue a single permit to a local authority that would list all individual organisations or parties not discharging effluent into the sewage system, and would place responsibility on the local authority to ensure that all industries within its jurisdiction comply with the permit conditions. DWA would backstop this by doing spot checks and by responding to complaints from the public.

Hazardous waste is generated from a wide range of industrial, commercial, agricultural and domestic activities in Namibia. Facilities for disposal of such waste are limited and much of it ends up in river courses and ultimately reaches the sea. Typical examples listed by Namibia Global Research CC (2001) include tannery waste, solvents, heavy metals, oil, acid, pesticides (including DDT), rodenticides, fungicides, herbicides, medical and radioactive waste.

No information seems to be available concerning the pollution loads carried by Namibia's perennial rivers on the northern and southern borders of the country, but pollution by agricultural and health pesticides is suspected in the Orange and Kunene Rivers (Namibia Global Research CC 2001).

The Directorate of Maritime Affairs (DMA) in the MWTC also plays a role with respect to management and prevention of pollution of the maritime environment, being responsible for marine oil pollution that arises from shipping activities. Its activities in this respect are administered through the Prevention and Combating of Pollution of the Sea by Oil Act, 1991. Responsibilities of the DMA include sea worthiness certification, registration of vessels, personnel licensing and registration, oil pollution prevention and control, search and rescue services, accident investigation, international liaison and co-operation, and maritime law administration. Assistance in this regard, including on-the-job and formal training and technical advice, is being provided by the Norwegian Government. The Marine Pollution Department within the DMA consists of 3 professionals based in Windhoek, Walvis Bay and Lüderitz. The National Response Team (NRT) of the National Oil Spill Contingency Organisation (NOSCO), situated within the MWTC, is listed as the responsible agency for managing and co-ordinating national response to an oil spill in Namibia in the latest National Oil Spill Contingency Plan prepared with the aid of the International Maritime Organisation. Roles and responsibilities for this and other state, parastatal and non-government organisations in Namibia are defined within this document, which is still in draft form (see Section 4.2.11 for more details on this). In terms of this plan, government authorities control dispersant use and oiled debris may be disposed of in landfill sites. Limited tier-2 level equipment (adequate to deal with a spill of up to 100 tons) including containment and recovery equipment is jointly held by the MWTC and NAMPORT at Walvis Bay and Lüderitz. Representatives at NAMPORT, various ministries and municipalities have also received an intensive training course in the use of this equipment. The port of Walvis Bay has also developed a local oil spill contingency plan.

The Ministry of Fisheries and Marine Resources (MFMR) also play a role in control of marine pollution in as much as they are required to do in terms of regulations published under the Marine Resources Act, 2000. For example, in terms of the Government Notice 241 (Regulations relating to the exploitation of marine resources), no person may "discharge waste generated on a fishing vessel into the sea, except biodegradable household waste or fish offal" and "no person may, without written permission of the Minister, leave any fishing gear or any other non-biodegradable object utilised for harvesting marine resources on or in the sea or on the sea shore on the termination of harvesting". Whether anything is actually done in practice to enforce these regulations is not known.

Table 4.4. BCLME POLICY ACTION AREAD. MANAGEMENT OF POLLUTION. SUMMARY OF ORGANISATIONAL ROLES AND RESPONSIBILITIES.

Level	Oraganisation	Role	Areas of responsibility/ activity

National Government	Directorate Maritime Affairs, Ministry of Works, Transport and Communications	Responsible for marine oil pollution that arises from shipping activities, responsible for managing and co-ordinating national response to an oil spill in Namibia	Whole country
	Department of Water Affairs, Ministry of Agriculture, Water and Rural Development	Lead agency responsible for management of marine pollution that originates on land, grants exemption permits allowing businesses and other institutions to discharge effluent into the surroundings	
	Ministry of Fisheries and Marine Resources	Assists with control of marine pollution from fishing vessels, and clean-up from oil spills	
	Ministry of Regional and Local Government and Housing	Likely to become responsible for management of wastewater and sewage for municipalities in the future, have prepared drawn up Model Sewage and Drainage Regulations (1996) for use by local authorities	
	Directorate Environmental Affairs, Ministry of Environment & Tourism	Has developed new legislation and is trying to implement a proper framework for management of pollution in Namibia	
Regional Government	-	-	-
Local Government	Swakopmund Municipality	Competent authority w.r.t. control of pollution	Swakopmund Municipality
	Walvis Bay Municipality		Walvis Bay Municipality
	Lüderitz Municipality		Lüderitz Municipality
Parastatal	Namibian Ports Authority	Responsible for operation of ports of and pollution control in Walvis Bay and Lüderitz	
	Polytechnic of Namibia (School of Natural Resources and Tourism)	Education and training	Whole country
	University of Namibia (Coastal Resource Research Centre)	Education and training, research	Whole country
Non-Government Organisations	-	-	-
Programmes	Benguela Current Large Marine Ecosystem (BCLME)	Funding, Research, Environmental monitoring	Namibia, Angola, South Africa
Private	NAMPOA	Provides forum for industry co-operation	Whole country

5.7. BCLME POLICY ACTION AREA E: MAINTENACE OF ECOSYSTEM HEALTH AND PROTECTION OF BIOLOGICAL DIVERSITY

The Ministry of Environment and Tourism (MET), Directorate of Resource Management within the Ministry of Fisheries and Marine Resources (MFMR) and relevant municipalities are collectively responsible for ensuring coastal development activities in Namibia are environmentally sustainable. Legal and statutory protection for marine biodiversity in Namibia is somewhat scant though. The Marine Resources Act, 2000, forms the legal framework for management of living marine resources in Namibia in as much as it is designed to "provide for the conservation of the marine ecosystem and the responsible utilization, conservation, protection and promotion of marine resources on a sustainable basis". No allusion is made in the Act to protection of biodiversity *per se*, which stands in stark contrast to the policy of the Ministry of Environment and Tourism's policy on terrestrial and freshwater ecosystems, which is "to ensure protection of all species and subspecies, of ecosystems and of natural life support processes". Not even a whole page of the 63-page White Paper on Fisheries (Towards Responsible Development of the Fisheries Sector) is devoted to "Protection of the Marine Environment". Vast stretches of the Namibian coast are protected from recreational fishing up to a distance of two nautical miles from the high water mark, including the Skeleton Coast Park, the Namib-Naukluft Park, the area between Walvis Bay harbour and Pelican Point, and the offshore islands. None of these areas are closed to commercial fishing though, except two areas in the vicinity of Lüderitz that are closed to rock lobster fishing. The Permanent Secretary of the MFMR may also grant an exemption to allow any person to fish in these areas. A number of areas within the EEZ are however partially protected. For example, the inshore region within the 200 m isobath are protected from fishing by trawling to afford protection to Namibia's vulnerable sardine stocks and juvenile hake. To date this has been fairly successfully monitored and with the imminent implementation of a compulsory vessel monitoring system for all fishing vessels this regulation will become fully enforceable. Similarly, Namibia's orange roughy spawning grounds are off-limits to all activities (other than the orange roughy fishing vessels) and the crab long-line pot fishery is restricted to beyond the 400 m isobath to protect smaller individuals that occur in shallower waters.

The rationale for directing so little effort specifically towards the conservation of marine biodiversity in Namibia, is probably due, in part at least, to the fact that species richness in most marine habitats in Namibia is low (in most cases lower than the South African west coast and in comparison to other major upwelling systems around the world), and the fact that most marine habitats support few endemic species. There are also fewer threats to marine biodiversity in Namibia relative to other coastal states. The coastal zone is virtually devoid of permanent human settlement apart from four medium sized coastal towns of Lüderitz, Walvis Bay, Swakopmund and Henties Bay, whose populations range from 4 500 to 50 000. A lot of shipping traffic traverses Namibian waters (mostly ships rounding the southern tip of Africa travelling between the Far East, Europe and North America), but few ships actually call at Namibian ports. High levels of pollutants, which occur in other major shipping lanes, are largely absent from Namibian waters therefore. The most significant threat to marine biodiversity in Namibia is probably overfishing, and to a lesser extent mining and pollution, all of which are dealt with elsewhere in this report. One alien

species, the Mediterranean mussel *Mytilus galloprovincialis*, has invaded Namibian wasters, having spread up the coast from South Africa since its introduction in the 1970s. The distributions of intertidal indigenous species have been locally altered by this invasion, but despite its rapid growth and high fecundity, it does not appear to have had any ecosystem effects as yet (Sakko 1998 in Barnard 1999). Several species of alien oysters, including the Pacific oyster *Crassostrea gigas* and the European oyster *Ostrea edulis* have been introduced to Namibia coastal waters for mariculture purposes. These species have not become established outside the sheltered coastal waters off Lüderitz, Walvis Bay and Swakopmund and are not considered a major threat to Namibian biodiversity therefore. Besides being a nuisance to local communities, off road vehicle (ORV) use in the Namibian coastal zone is also a potential threat to biodiversity. In particular ORV use poses a threat to highly fragile lichen fields and breeding sea birds, some of which are endangered. Impacts of these activities is particularly noticeable on the coastline between Swakopmund and Walvis Bay where ORV use has defaced coastal dunes and significantly damaged coastal vegetation.

MFMR recently commissioned a baseline study on marine reserves in Namibia through the Namibia/German Fisheries Assistance Project (Mastailer 1998). The objectives of the study were to collect baseline information pertaining to the necessity of and possibility for establishing MPAs along the Namibian mainland and island coastlines. It highlights the fact that there are currently no undisturbed reference areas available for quantifying/assessing the impact of mining/fishing activities on the environment in general and the lobster resource in particular. The author stresses that there is no legal basis for protecting the two rock lobster reserves and the bird and seal islands from mining or other potential impacts. The report included a list of possible candidate sites for the establishment of MPAs, as well as recommendations for restricting activities in these proposed MPAs. The Namibia Nature Foundation is currently funding the salary of one scientist based at NatMIRC in Swakopmund who is looking at translating some of the recommendations from the Mastailer report into practice.

Namibia has been a signatory to the Ramsar Convention on Wetlands of International importance since 1995. Namibia initially designated three coastal wetlands as Ramsar sites including Walvis Bay, Sandwich Harbour and the Orange River Mouth (the latter shared with South Africa) but several additional sites have been identified as possible candidate sites (Kunene Mouth, Cape Cross lagoon, Swakopmund saltworks, Ichaboe Island, Possession Island, and Mercury Island) (Mastailer 1998).

Table 4.5. BCLME POLICY ACTION AREA E. MAINTENNACE OF ECOSYSTEM HEALTH AND PROTECTION OF BIOLOGICAL DIVERSITY. SUMMARY OF ORGANISATIONAL ROLES AND RESPONSIBILITIES.

Level	Organisation	Role	Areas of responsibility /activity
National Government	Ministry of Fisheries & Marine Resources	Lead agency responsible for ensuring protection for and sustainable use of marine biodiversity in Namibia.	Whole country

	Directorate of Environmental Affairs, Ministry of Environment and Tourism	Environmental protection, planning and coordination in terrestrial areas. Administers some coastal parks and assists by ensuring compliance amongst recreational fishers in these areas. MET also manages a number of cross-cutting programmes which address priority environmental issues and challenges	Coastal parks (Skeleton Coast Park, West Coast Recreational Area, Namib Naukluft Park)
Provincial Government	-	-	-
Local Government	-	-	-
Parastatal	Polytechnic of Namibia (School of Natural Resources and Tourism)	Education and training	Whole country
	University of Namibia (Coastal Resource Research Centre)	Education and training, research	Whole country
Non-Government Organisations	Namibia Nature Foundation	Promotes sustainable development, conservation of biological diversity and natural ecosystems, and wise and ethical use of natural resources for the benefit of all Namibians	Whole country
	Namibia Scientific Society - Namibia Wissenschaftliche Gesellschaft (NWG)	Umbrella body for a variety of scientific activities. Study groups in Astronomy, Botany, Ethnology, Herpetology and Ornithology	Whole country
	Coastal Environmental Trust of Namibia		Whole country
	Earthlife Namibia		Whole country
	Wildlife Society of Namibia		Whole country
Programmes	Benguela Environment Fisheries Interaction and Training Programme (BENEFIT)	Education and training, Funding, Research, Environmental monitoring	Namibia, Angola, South Africa
	Benguela Current Large Marine Ecosystem (BCLME)	Funding, Research, Environmental monitoring	Namibia, Angola, South Africa
Private	-	-	-

6. SOUTH AFRICA

6.1. COUNTRY PROFILE

South Africa occupies a total land area of approximately 1.22 million km^2, and supports a population of approximately 44,8 million people (Census South Africa 2001, Statistics SA). The average population density is 34.4 persons per km^2; the eastern half of the country being more densely populated than the west, due to the aridity of this area. The length of the coastline is just less than 3 000 km long with a total of 38.9 % of the population living within 100 km of the coast (Census South Africa 2001, Statistics SA). The area of South Africa of relevance to the BCLME is from the northern-most border with Namibia, Alexander Bay, until just east of Port Elizabeth on the south-east coast. This area encompasses a total estimated coastline length of 1600 km.

Unemployment levels are currently estimated to be at approximately 15.5 % of the population, where the economically active sector of the population is considered to be between 15 and 65 years of age (Census South Africa 2001, Statistics SA). The industries responsible for the highest GDP of South Africa are finance (20.5 %) and manufacturing (18.5 %). The reported GDP generated from fishing activities is combined with that of agriculture and contributes a comparatively small proportion to the GDP of only 3.1 % (Statistics South Africa).

The extent of education in South Africa is considered to be improving with 30.8 % of the population older than 20 years, having some degree of secondary schooling and 20 % of the population having completed secondary level schooling in 2001. Although only 8.4 % of the population older than 20 years is recorded to have received some level of tertiary education in 2001, this is higher than the estimate of 1996 (7.1%). The percentage of the population not receiving any schooling has decreased from 19.1 % in 1996 to 17.9% in 2001 (Census South Africa 2001, Statistics SA).

The South African coastline is very rugged, with few sheltered embayments and is dominated by high wave conditions and strong winds for most of the year. The only sheltered marine habitat along this coastline is represented by estuaries, with the result that they are important for biodiversity and the focus of coastal development. In the past, the northern most region of Namaqualand in the Northern Cape Province served as the centre for diamond mining activities, however, due to decreasing resources, many land-based diamond mining operations are closing, resulting in the need for extensive rehabilitation programmes for the natural environment and to create alternative livelihoods for people in this area (White Paper for Sustainable Coastal Development in South Africa 2000). The West Coast of the Western Cape Province is the centre of South Africa's fishing industry with the strong upwelling of the cold Benguela Current being focussed here, supplying nutrients to the lucrative fishing grounds.

The Cape Peninsular lies at the junction of the cool, temperate west coast and the warm, temperate south coast and consequently has a particularly high biological diversity. As a result, this area is recognised as being a global 'hot-spot' for exceptionally high biodiversity of both marine and terrestrial species. The nutrient rich upwelled waters of the Benguela current play a large part in yielding this high biodiversity in the marine environment. However, increasing urbanisation and the demand for coastal land is exerting tremendous pressure on the natural assets of the densely populated Cape Peninsular (White Paper for Sustainable Coastal Development in South Africa 2000). The retroflection of the warm Agulhas Current impacts on the coastal regions of South Africa along the south-western regions of the Western Cape Province (White Paper for Sustainable Coastal Development in South Africa 2000). The warm, shallow waters of the Agulhas Bank serve as spawning grounds for many commercial pelagic fish species with this area having a significant impact on successful recruitment of juveniles into the fisheries. The coastline of the Eastern Cape Province, of relevance to the BCLME, is comprised of a few urban centres and large undeveloped coastal areas, rich in natural assets like dunefields, large estuaries and high biodiversity of vegetation.

South Africa is considered to be a dry country with a mean annual rainfall of 502mm per annum. The climate and rainfall are strongly influenced by the ocean currents. The cold, northward-flowing Benguela current results in dry, semi-arid conditions along the western half of the country, whilst the warm, southward-flowing Agulhas current produces temperate to tropical conditions in the eastern half of the country.

6.2. POLICY AND LEGAL FRAMEWORK

5.2.1 The Constitution of the Republic of South Africa, 1996 (as amended by the Constitution of the Republic of South Africa Amendment Act, 1997)

The Constitution of the Republic of South Africa is the legal source for all law, including environmental law in South Africa. The Bill of Rights is fundamental to the Constitution of South Africa and, in Section 24 of the Act, it states that:

"Everyone has the right (a) to an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that (I) prevent pollution and ecological degradation; (ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

The Constitution defines national and provincial powers with respect to environmental management, planning and development functions relevant to coastal management. These include nature conservation, agriculture, disaster management, environment, housing, pollution control, regional planning and development, tourism and urban and rural development. Marine resources specifically, are the responsibility of national government, however, certain powers relating to marine conservation may be extended to provincial or local government, where the capacity exists. The Constitution emphasises the need for co-operative governance, and the need to devolve management functions

to the lowest sphere of government able to undertake them (White Paper for Sustainable Coastal Development 2000).

5.2.2 National Environmental Management Act, 1998 (NEMA)

The National Environmental Management Act (NEMA) is South Africa's overarching environmental legislation. The Act emphasises the principle of co-operative governance and ensures that the environmental rights provided for in the Constitution are protected and fulfilled. It establishes a framework to implement the White Paper on Environmental Management Policy for South Africa, the White Paper for Environmental Management Policy for South Africa and the White Paper on Integrated Pollution Waste Management for South Africa. Although the Act requires the lead agent, the Department of Environmental Affairs and Tourism (DEAT), to ensure effective custodianship of the environment, it also acknowledges that the State alone is unlikely to be able to manage the environment effectively. The scope for public involvement in environmental management is provided for in the Act, which includes the ability to institute private prosecutions and gives the public the ability to participate in the management of the environment. The Act also makes provision for the issuing of Regulations in order to carry out the purposes and provisions of NEMA. The regulations require that an environmental impact assessment be undertaken where there is any proposed construction or upgrading of facilities below the high water mark. These regulations help in identifying and controlling activities, which may have detrimental effects on the environment. An example of such Regulations is the highly controversial 'Regulations in terms of the National Environmental Management Act: Control of Vehicles in the Coastal Zone' that were published in December 2001 and effectively provided for a general prohibition of recreational use vehicles in the coastal zone and provided procedures for approving the use of vehicles in the coastal zone under specific circumstances.

5.2.3 The Environment Conservation Act, 1989

The Environment Conservation Act was originally passed to provide for the effective protection and controlled utilization of the environment, forming a basis for environmental conservation in South Africa. Although many of its provisions have since been repealed by NEMA, the Environmental Conservation Act continues to provide some legislation pertinent to impacts on the environment and the control thereof. The Act makes provision for the declaration of protected natural environments, including that within territorial waters, and for the identification of activities that may have a detrimental effect of the environment. Regulations to control potentially harmful activities within demarcated sensitive coastal areas were promulgated under this Act. Key regulations governing environmental impact assessments and identified activities that may be detrimental to the environment were subsequently promulgated under this Act. However, the sections of this Act that provide for the "Control of Activities which may have a detrimental effect on the Environment" and the associated Environmental Impact Assessment regulations have been repealed by NEMA, but remain in force until new regulations (currently being drafted) are promulgated under NEMA.

5.2.4 Marine Living Resources Act, 1998

The Marine Living Resources Act (MLRA) seeks to ensure the sustainable utilisation of marine living resources, through scientifically based and publicly acceptable operational management procedures. This Act repeals most of the old Sea Fishery Act 12 of 1988 and its preamble reads as follows:

"*To provide for the conservation of the marine ecosystem, the long-term sustainable utilisation of marine living resources and the orderly access to exploitation, utilisation and protection of certain marine living resources; and for these purposes to provide for the exercise of control over marine living resources in a fair and equitable manner to the benefit of all the citizens of South Africa; and to provide for matters connected herewith.*"

The Act and Regulations published therein aim to provide for the conservation of South Africa's marine ecosystems and the sustainable utilisation of marine living resources. It affords protection to every species of sea animal (vertebrate and invertebrate), including the spawn or larvae of such sea animal, but excluding any seal or sea bird. Fish and marine organisms are protected by means of prohibition against their catching, disturbance or possession although the Act makes provision for the granting of commercial, recreational and subsistence fishing rights. The Act emphasises fair and equitable access to resources, the gradual transformation of fishing methods, the development of fees for utilisation and a favourable business environment in fisheries. The Act provides for a principle of national control and co-ordination and places responsibility for resource-allocation decisions with the Minister of Environmental Affairs and Tourism.

5.2.5 Sea Birds and Seals Protection Act, 1973

The Sea Birds and Seal Protection Act provides for the protection and control of capture and killing of sea birds and seals, and for the disposal of the products of these organisms. The Act also provides for control over access to certain islands and rocks within South African waters. The Act states, *inter alia*, that no person shall pursue, shoot at or wilfully disturb, kill or capture any sea bird or seal or wilfully damage the eggs of any seabird. It also forbids collection or removal of seabird eggs, feathers or guano from any island, unless the Minister has granted a permit for these actions.

5.2.6 The Sea-Shore Act, 1935

Although the Sea-Shore Act is dated, it remains fundamental to any existing or proposed institutional arrangements for the coast. Ownership of the sea and sea-shore is vested in the President for use and benefit of the public. The Act allows for specific uses of the area but does not provide for any form of access rights to the sea-shore from above the high water mark. The administrative functions of the Act have been largely assigned to the coastal provinces. In order to align with the Constitution, the Sea-Shore Act needs to be updated to be consistent with other recent environmental and planning legislation, and to fill existing gaps in the legislation (White Paper for Sustainable Coastal Development 2000).

5.2.7 The Development Facilitation Act, 1995, and provincial planning legislation

The National Development Facilitation Act facilitates and fast-tracks implementation of development programmes and projects in relation to land, by laying down general principles governing land development in South Africa. The Constitution states that planning is a provincial responsibility and, for this reason, most coastal provinces are preparing new development planning legislation in terms of the principles of the Development Facilitation Act. This Act will have relevance in obtaining approval for any permanent structure to be established in the coastal zone.

5.2.8 Marine Traffic Act, 1981, South African Transport Services Act 1981 and Merchant Shipping Act, 1951

The Marine Traffic Act aims to regulate marine traffic in South African waters and to provide for matters connected herewith. This Act provides for the right of innocent passage of any vessel through the territorial waters of South Africa and stipulates regulations for such activities. This Act should be viewed in conjunction with the South African Transport Services Act of 1981, which defines the regulations of goods transported through harbours, the use of harbours and the authority in charge of licensing, admission and charges of vessels in harbours, subject to the provisions of the Merchant Shipping Act of 1951. The Merchant Shipping Act provides for the regulation and the relevant authority to charge fees for registration of ships, tonnage measurements, survey services (including safety checks on storage of dangerous cargo), certificates of competency and record books to be charged to vessels registering within South Africa. The Merchant Shipping Act, the Marine Traffic Act and the South African Transport Services Act together provide for the regulations to be adhered to by all vessels entering South African territorial waters.

5.2.9 Wreck and Salvage Act, 1996

The International Convention on Salvage, 1989, is incorporated into the Wreck and Salvage Act, 94 of 1996 and states, *inter alia*, that the salvor is to carry out salvage operations with due care to prevent or minimise damage to the environment. "Damage to the environment" is defined as "substantial physical damage to human health or to marine life or resources in coastal inland waters or areas adjacent thereto, caused by pollution, contamination, fire, explosion or similar major incidents." Stipulated in the Act are certain financial benefits to be granted to the salvor if it is to the satisfaction of the State Party that the salvor has prevented or minimised damage to the environment to the best of his ability during the salvage operations.

5.2.10 Maritime Zones Act, 1994

The Maritime Zones Act gives South Africa the rights over internal and territorial waters, contiguous and exclusive economic zones (EEZs) and the continental shelf of the sea within a specific zone. The Act stipulates that the Republic of South Africa may take the necessary measures to protect the coastline or related interests, including

fishing, from pollution or any threat of pollution resulting from a maritime casualty, which may be expected to result in major harmful consequences.

5.2.11 National Water Act, 1998

The National Water Act identifies sustainability and equity as central guiding principles in the protection, use, development, conservation, management and control of water resources. The Act provides a series of measures intended to ensure the comprehensive protection of all water resources. Within this context, measures are defined to prevent the pollution of water resources and to remedy the effect of pollution of water resources. This Act is founded on the principle that national government has overall responsibility for and authority over water resource management and it lays the basis for regulating water use detailing the various types of licensed and unlicensed entitlements to use water. These include control measures for discharge of waste-water (and its contents) into any water resource on land and in the sea. The Act also recognises the need to share some water resources with other countries and provides regulations for this.

The Act provides regulations and conditions for the issuing of general authorisations and licenses to be granted for use of water resources. Water use, as defined in the Act, includes the discharging of waste-water into a water resource through a marine outlet pipe and disposing of waste in a manner that may detrimentally impact on a water resource. A person is permitted to discharge waste, or water containing waste, into the marine environment where there is control over the purification, disposal and treatment of such waste and subject to authorisation from the person controlling the outlet pipe. Licences may be granted by the responsible authority, which can specify the permissible levels of chemical and physical components permitted to be discharged into the marine environment. The conditions of the licence may also specify the treatment to which the waste-water must be subjected to and the volume of waste water allowed to be discharged. The Act makes provision to specify the management practices required to prevent the pollution of any water resource by waste disposal but lacks legislation directly addressing issues of effluent being discharged into the marine environment.

5.2.12 Water Services Act, 1997

The Water Services Act provides for the right of access to basic water supply and basic sanitation. It stipulated that the Minister may prescribe compulsory national standards relating to the quality of water discharged into any water resource system. In prescribing these standards, the Minister is compelled to consider any impact the water service might have on the environment.

5.2.13 Public Health Act, 1919

This Act, originally promulgated by South Africa, was adopted by Namibia at independence in 1990, and remains in use in both countries. Details of this Act are covered under section 4.2.7.

5.2.14 International Convention for the Prevention of Pollution from Ships Act, 1986 (Marine Pollution Act - Prevention of Pollution from Ships)

The International Convention for the Prevention of Pollution from Ships Act provides for South Africa to legally apply the regulations agreed to in the signing and ratifying of the International Convention for the Prevention of Pollution from Ships, 1973, also known as MARPOL 73/78. The Act adopts all regulations stipulated by the International Convention. In signing and ratifying the Convention, South Africa agreed to 1) be conscious of the need to preserve the marine environment in particular, 2) recognise that any release of oil or other harmful substance by ships is a serious source of pollution, 3) recognise that the Convention's prime objective of protecting the environment is to be achieved by preserving the seas and coastal environment from pollution and 4) seek to achieve complete elimination of intentional pollution of the marine environment by oil and other harmful substances and the minimization of accidental discharge of such substances. For further details of this Act and the Protocol of 1978 (served as an amendment to the Convention important for, *inter alia*, segregation of ballast tanks, provision of clean ballast tanks and washing of crude oil), see section 5.2.15 and 5.2.16 below.

5.2.15 Prevention and Combating of Pollution of the Sea by Oil Act, 1981 (Marine Pollution Act -Control and Civil Liability)

This Act provides for the prevention and combating of pollution of the sea by oil and matters related therewith. The Act deems it an offence to discharge oil from any vessel unless it can be proved that 1) it was to secure the safety or prevent damage of the vessel, or to save a life, or 2) oil escaped from the vessel as a consequence of damage and that all reasonable steps were taken to prevent, stop or reduce oil escaping. The Act prescribes the requirement to report any oil discharge or the likelihood of oil discharge by the master of the vessel by means of the quickest communication available. The Act stipulates that it is the duty of the relevant designated Authority to 1) take measures to prevent pollution of the sea where oil is being discharged or is likely to be discharged (designated authority is currently Department of Transport, SAMSA, see section 5.6), 2) to guard against and prevent pollution of the sea by oil (designated authority is currently Department of Transport, SAMSA) and 3) where the sea has been polluted by oil from vessels, to remove such pollution from the sea (designated authority is currently Department of Environmental Affairs and Tourism, Branch: Marine and Coastal Management, see section 5.6). The Act further stipulates regulations for liability, exemptions, inspections, insurance and right of entry of vessels entering South African waters relating specifically to oil pollution.

5.2.16 International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties Act, 1987 (Marine Pollution Act - Intervention)

This Act provides for South African authorities to intervene in cases of oil pollution occurring on the high seas i.e. outside of South Africa's territorial waters. The Act provides legal authority for South Africa to implement the

International Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties. Parties who have signed the Convention have accordingly agreed to

…take measures on the high seas as may be necessary to prevent, mitigate or eliminate grave and imminent danger to their coastline or related interests from pollution or threat of pollution of the sea by oil following upon a marine casualty or acts related to such a casualty, which may reasonably be expected to result in major harmful consequences.

The Convention does not allow such measures to be taken against any warship and does not affect the principle of freedom of the high seas.

5.2.17 Disaster Management Act, 2002

The Disaster Management Act provides regulations and protocol to manage a disaster that may arise as a result of natural or human induced events. A "disaster" is defined as "a progressive or sudden, widespread or localised, natural or human-caused occurrence which causes or threatens to cause death, or disease; damage to property, infrastructure or the environment." An oil spill or other such event that threatens the environment would be classified as a disaster and is required to be managed according the procedures outlined in this Act.

5.2.18 South African Marine Safety Authority Act, 1998

The South African Maritime Safety Authority Act provides for the establishment of the South African Maritime Safety Authority (SAMSA) and identifies the objectives and duties to be carried out by this authority. The Act identifies SAMSA to be the 'authority', previously identified as the 'Minister', with which the responsibility lies to achieve the objectives outlined in this Act and in the Merchant Shipping Act (1951), Marine Traffic Act (1981), Marine Pollution Act (1981, 1986 and 1987) and the Wreck and Salvage Act (1996). The objectives of SAMSA, defined within the Act, are 1) to ensure safety of life and property at sea, 2) to prevent and combat pollution of the marine environment by ships and 3) to promote South Africa's maritime interests. However, within the Act it states that the responsibility of matters relating to the combating of pollution is assigned to the Department of Environmental Affairs and Tourism. Also provided for in the Act is the option to amend or appeal (by means of publication in the *Gazette*) the delegation of this responsibility. The fragmentation of authority and duties to combat, prevent and control pollution of marine waters is considered to be problematic and requires revision in order to achieve this objective.

5.2.19 Dumping at Sea Control Act, 1980

The Dumping at Sea Control Act provides for the control of dumping at sea of substances as scheduled in the Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter, 1972, (known as The London Convention 1972) to which South Africa has acceded. The Act declares it a criminal offence to deliberately dispose at sea of any substance listed in schedules of the Act, which include persistent plastics and other persistent synthetic materials. The Act schedules prohibited substances and those substances requiring permits to be disposed of at sea (restricted substances) and sets out guidelines in this regard. The Act details general considerations to be taken into account when the Minister grants a permit and lists the possible effects on marine life,

fish and shellfish culture, fish stocks and fisheries and seaweed harvesting and culture here. A further aspect identified to be considered is the possible effects on other uses of the sea e.g. protection of areas of special importance for scientific or conservation purposes. For further information on The London Convention, 1972, see section 2.1.8 of this document below.

5.2.20 Minerals Act, 1991

The Minerals Act provides for regulation of prospecting for, and the optimal exploitation, processing and utilisation, of minerals. It also regulates the orderly utilisation and rehabilitation of the surface of land during and after prospecting and mining operations. The Act requires the holder of the prospecting permit or mining licence to rehabilitate the "surface of land" to the Regional Director's satisfaction and to do this as an integral part of, and simultaneous with, prospecting or mining operations. Prior to commencing prospecting or mining operations, section 39 of the Minerals Act requires a "layout plan and rehabilitation programme", now referred to as an Environmental Management Plan Report (EMPR) to be submitted to the regional director Department of Mines and Energy (DME).

The Environmental Management Programme (EMP) is required to consist of, *inter alia*:

- A description of the environment.
- A motivation for the project.
- A detailed description of the operation and infrastructure.
- An assessment of the impacts of the project on the environment.
- A clear indication of how the identified impacts on the environment will be managed.
- Details of financial provision for effective environmental management

Procedural, format and performance assessment requirements for these documents are further detailed in Section 8 of the Act. To ensure that all aspects of the environment are brought into consideration, the Act stipulates that before the Director: Mineral Development approves any EMP he must to consult with each relevant government department, including provincial departments, charged with the administration of any law which relates to any matter affecting the environment. Exemptions from EMPRs may be granted in certain circumstances.

Approval of an EMP may take a considerable period of time thus the legislation makes allowance for granting of temporary permission to proceed with prospecting or mining operations. Such permission will, however, only be granted after consultation with the other departments and under stringent conditions.

On termination of prospecting and mining activities, all structures not required by the landowner are to be demolished and all debris removed. The mining licence holder is responsible for rehabilitation, until such time that the Regional Director issues a closure certificate. Before a mining or prospecting licence is granted, the applicant must demonstrate the financial ability to pay for rehabilitation by establishing a rehabilitation trust fund, submitting bank guarantees, lodging cash with the DME or by other mutually acceptable arrangements.

5.2.21 Mineral and Petroleum Resources Development Act, 2002

The Minerals and Petroleum Resources Development Act makes provision for equitable access to and sustainable development of the nation's mineral and petroleum resources. The Act affirms the State's obligation to protect the environment for the benefit of present and future generations, to ensure ecologically sustainable development of mineral and petroleum resources and to promote economic and social development. Chapter 4 of the Act deals with Environmental Management principles as set out in section 2 of the National Environmental Management Act, 107 of 1998. The holder of a prospecting or mining right or permit must abide by the general objectives of integrated environmental management as stipulated in Chapter 5 of NEMA and is required to conduct an environmental impact assessment and thereby manage all environmental impacts in accordance with the environmental management plan. The Act also stipulates that the holder of such a right or permit is responsible for any environmental damage, pollution or ecological degradation resulting within or outside the boundaries from the mining activity. On application for a mining right, an environmental management programme is required to be submitted to the Minister and on application for a prospecting right or mining permit, an environmental management plan (as prescribed) is required to be submitted. Only on approval of the environmental management programme or plan by the Minister, can such a mining or prospecting right or licence be granted.

6.3. BCLME POLICY ACTION AREA A: SUSTAINABLE MANAGEMENT AND UTILISATION OF LIVING MARINE RESOURCES

The Department of Environmental Affairs and Tourism (DEAT) is the all-encompassing government department addressing environmental issues within South Africa. DEAT is divided into six directorates, each dealing with different aspects of the environment, although, there is often overlap in areas of concern among these directorates. The six directorates are; 1) Tourism, 2) Biodiversity and Conservation, 3) Marine and Coastal Management, 4) Environmental Quality and Protection, 5) Environmental Planning and Coordination and 6) Corporate Affairs and Communications. DEATs' mission is to *"lead sustainable development of our environment and tourism for a better life for all by, inter alia, promoting the sustainable development and conservation of our natural resources*". The directorate Marine and Coastal Management (MCM) are the lead agents for all government related marine environmental matters within South Africa and are thus concerned directly with aspects of the BCLME Policy Action Area A: Sustainable Management and Utilisation of Living Marine Resources.

Marine and Coastal Management (MCM)

Marine and Coastal Management's aim is to provide for the responsible custodianship of South Africa's marine and coastal resources and ecosystems for the benefit of current and future generations of South Africans. MCM's primary function is to provide scientific liaison, logistic, administrative and personnel management support to the Minister of DEAT, to meet various international commitments and to fulfil national, provincial and parastatal responsibilities. MCM facilitates sustainable development of marine and coastal resources by integrating human needs and natural resources.

Although the Department of Environmental Affairs and Tourism is housed inland in Pretoria, along with the other five directorates, Marine and Coastal Management head offices are located in the coastal city of Cape Town. The most recent figures of employees for the Branch: MCM indicate a total staff capacity of 595, of which 58 are qualified scientists. At the time of investigation for this report, 155 of the 595 posts were vacant, 126 were in the process of being filled, while 29 posts were not funded or are to be outsourced. These figures are however, continually in a state of flux and are only representative at the time of this study.

Marine and Coastal Management operate a number of research vessels, the largest of which are the two stern trawlers, *R. S. Africana*, a 78 m vessel with capacity for 18 scientists, and the *R. S. Algoa*, a 52 m vessel with capacity for 13 scientists. Both these vessels are moderately well-equipped and suitable for multidisciplinary research and training purposes but their equipment and facilities would benefit from an upgrade. A budget of R500 000.00 was allocated in 2003 to replace the smaller research vessel *R.S. Sardinops* and to purchase four new patrol vessels. However, only the latter has been achieved with the budget allocated in 2003 and additional budget is required to replace the research vessel.

Within the Branch: Marine and Coastal Management, there are three Chief Directorates, 1) Research, Antarctica and Islands, 2) Monitoring, Control and Surveillance and 3) Resource Management, and three Directorates namely: 1) Legal and Communication Services, 2) Finance and Procurement and 3) Support Services (Fig. 5.2). The core functions of all three Chief Directorates address different aspects of the BCLME Policy Action Area A: Sustainable Management and Utilisation of Living Marine Resources.

The Chief Directorate: Research, Antarctica and Islands is divided into two Directorates, namely; 1) Research and Development and 2) Antarctica and Islands. For the purposes of the BCLME, Antarctica and Islands are not of relevance, however, the Directorate: Research and Development, directly addresses many issues within the BCLME Policy Action Area A. This Directorate is divided into seven Sub-directorates, these being:

1. Research Support and Administration
2. Offshore Resources
3. Inshore Resources
4. Ecosystem Utilisation and Conservation
5. Ocean Environment
6. Technical Services
7. Mariculture and Research Aquarium

It is within this Directorate that 51 of the 58 scientific staff at MCM are located. This Directorate advises on and promotes the sustainable utilisation of coastal and living marine resources and the conservation of marine and coastal ecosystems by conducting and supporting appropriate research. The core functions, relevant to all seven Sub-directorates, are to:

- Undertake research so as to provide advice on sustainable resource utilisation including commercial, recreational and subsistence fisheries,
- Apply an ecosystem approach in providing advice,
- Investigate the development of under-utilised resources or new marine resources,
- Undertake long-term monitoring of resources and the environment,
- Promote research on economic and socio-economic fishery issues,
- Promote mariculture development, Marine Protected Areas, ecotourism and conservation of biodiversity,
- Predict the impacts of changes in the marine environment due to ecosystem variability, and to
- Provide decision-makers with the best scientific advice available, taking into account international practise.

The Chief Directorate: Resource Management aims to optimise the sustainable use of South Africa's coastal resources and is further divided into two Directorates, namely; Resource Management and Allocations (100 funded posts) and Integrated Coastal Management and Development (34 funded posts). Further subdivisions of the Directorate: Resource Management and Allocations are illustrated in Figure. 5.2. The Directorate: Integrated Coastal Management and Development is divided into four Sub-directorates, three of which are directly relevant to BCLME

Policy Action Area A, these are; 1) Subsistence Fishing Management, 2) Sustainable Livelihood and Socio-economic Coastal Development and 3) Integrated Coastal Management, the forth one, Marine and Coastal Pollution Management, being of relevance to Pollution Management (see section 5.6). The primary function of the Sub-directorate: Subsistence Fishing Management is to oversee and implement the granting of subsistence fishing access rights, to manage outsourced contracts and to interact with stakeholders. This Sub-directorate has four staff members with one environmental officer post currently vacant and unfunded, therefore unlikely to be filled. The Sustainable Livelihood and Socio-economic Coastal Development Sub-directorate is a recently created Sub-directorate and although there are seven posts available, to date, only one has been filled. This Sub-directorate is anticipated to serve the functions of promoting mariculture developments, managing sustainable livelihood opportunities for coastal communities, managing a system of coastal and marine parks and promoting eco-tourism. The third Sub-directorate: Integrated Coastal Management serves to manage a coastal information and decision support system, maintain awareness, education and training programmes, monitor the state of the coast, and manage the framework for estuarine heritage in South Africa. Of the nine staff positions allocated to this Sub-directorate, four are vacant and in progress of being filled.

The Chief Directorate: Monitoring, Control and Surveillance, further divided into the Directorate: Compliance and the Directorate: Monitoring and Surveillance, aims to promote and enforce compliance to ensure the sustainable utilisation of marine and coastal resources and to promote focussed law enforcement actions in respect of marine and coastal resources respectively. The Directorate: Monitoring and Surveillance includes only 12 permanently employed staff members while 20 unfunded Assistant Inspector posts and 50 unfunded posts for monitoring of commercial landings are required to be outsourced. The Directorate: Compliance is considerably larger with 134 permanent staff members distributed through the coastline from the West Coast, Cape Peninsula, Overberg, South West Coast and the North East Coast. Between two and 21 inspectors are stationed at each port or harbour along the coast to monitor access rights and permits and to enforce compliance with regulations.

The infrastructure provided by Marine and Coastal Management in terms of their head office, based at the Foreshore, Cape Town and their research laboratory in Sea Point, are considered to be of sufficient standard and size for the staff members currently employed. The majority of staff interviewed expressed that there is sufficient office space, computer supplies, vehicles and operational budget for them to achieve their specific mandates. Although the communication facilities like telephone, fax and email are provided for, is was a unanimous opinion that the email service currently utilised, SITA (the official government information technology service) is not of sufficient quality for their needs and an alternate service provider is required. This is being investigated. Certain sectors also indicated the requirements for a dedicated vehicle for their use, e.g. fisheries economics sub directorate. Although the operational budgets provided were generally considered sufficient, several sections indicated that they were not able to purchase expensive equipment that was needed and expensive projects are not able to be considered due to financial constraints.

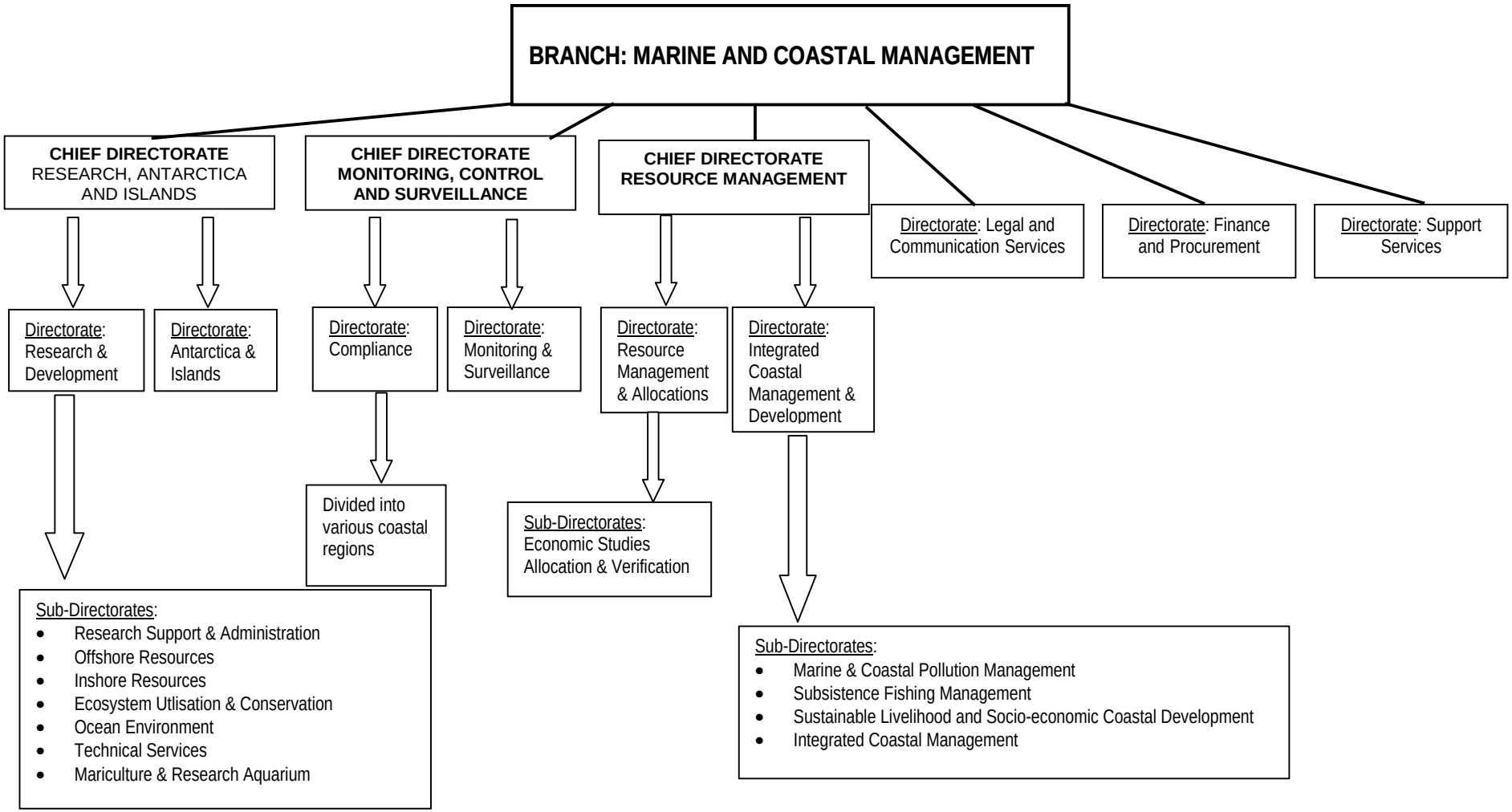


Fig. 5.2. Organogram showing institutional structure of Marine and Coastal Management, Branch of Department of Environmental Affairs and Tourism

The capacity and training needs assessment, as conducted by means of interviews with key, available management personnel, indicate that staff employed at MCM are generally well qualified by means of either degrees or diplomas suited to their level and position of employment, but that experience was often lacking. Experience can only be gained with time, and the general trend currently encountered within MCM is for both young and experienced scientists and technicians to be easily tempted by other employment offers from outside the company, often from international organisations. Once staff have acquired some level of experience and training from within MCM, other more attractive employment offers are taken up and the experience is lost to MCM. The reasons advocated for high staff turn-over included lack of promotional structure, insufficient incentive and opportunities for self improvement within MCM, and that higher management do not appear to take into account the advice of scientists and researchers when making decisions. In recent years, all structured promotional programs have been halted and the only way for many staff members to improve their personal job satisfaction and salary package within MCM is to apply for higher posts in different sections. This has led to highly qualified staff members leaving the sector in which their expertise is pertinent and moving into a higher position in another sector, but not having the relevant experience for this new post. While this type of strategy can be used in some of the sections within MCM, in others, like the technical support services and engineers, this is not possible and staff are forced to remain in their positions with little or no opportunity for advancement. Young technicians starting out are generally content with both job position and salary, but with time, they seek recognition for their work in terms of promotions and salary increases. Both situations, i.e. being forced to move to other departments in order to gain in status and being forced to remain in the same position without incentives to improve status, has led to low moral among staff and a sense of redundancy in many sections. Most staff members interviewed from all fields felt it important to reinstate a structured, performance based promotions plan. Such a plan has been developed and presented to the Director-General and is anticipated to be implemented very shortly. Many staff are of the opinion that, once implemented, this plan will boost moral, reduce the current high staff turn-over rate and improve job satisfaction among staff at MCM.

A unanimous opinion of all MCM staff interviewed for this study was that currently, there are too few staff members to successfully fulfil their assigned mandate and that many of the currently employed staff members would greatly benefit from a structured training program being implemented. Training is required at all levels, i.e. management, research, technical and operational (in appropriate sections of MCM) and that additional staff are required at all levels (additional research and operational staff are only required in specific sections). Many of the required staff posts have been created, however, the lengthy administrative and bureaucratic processes required to fill these posts leads to extended periods of time during which staff are required to operate with severely reduced capacity. An additional problem lies in that on many occasions, a person suitably qualified for the requirements of the post is simply not available within South Africa or such a person would not be attracted to applying for the post. Frequently posts are filled with under-qualified or unsuitably qualified persons, who, as a result, are unable to do the work or are unhappy in their job, and leave within a short period of time. It is of the opinion of technical management staff that there is an urgent need to create a mentorship program whereby younger staff are trained by gaining experience

working with older, experienced staff, and in this way, they are prepared to fill such posts by promotion when the higher post becomes vacant. It is believed that such a mentorship program would eliminate the unending cycle of appointing unsuitable candidates who leave shortly thereafter, creating further under-staffed situations, requiring more intensive training.

Most of the staff interviewed were of the opinion that the most efficient means of training large numbers of staff in highly technical skills is by bringing experts into the organisation for extended periods (at least three years) to work on a specific program with permanently employed MCM staff. An example of such a program that is unanimously considered to have been highly successful within MCM is that of the IDYLE Programme (see section 2.1.7). Many staff felt that such ventures are the most suitable and effective means of gaining training and building capacity within MCM and would like to see more such initiatives implemented. Other effective means of training staff and building capacity were listed as attending short training courses and workshops either within or outside of South Africa. It was however stressed that these courses and workshops need to be custom-designed and highly specific for the staffs' needs in order to prove worthwhile. Many research staff considered sabbaticals of 6-12 months in other countries to be extremely important for development and maintenance of their skills and technological applications within their field of expertise. Sabbaticals could be used as tools to rejuvenate stagnating research and interests, and are considered highly desirable by some senior research staff. Although several staff members have requested the introduction of a sabbatical program, they are also well aware that it is unlikely to be implemented due to current lack of staff capacity. Although enrolment for higher degrees or diplomas is strongly encouraged and supported by MCM, it is generally felt that most staff entering into MCM already have the relevant degree or diploma required for their job, and most further studies are for personal improvement and therefore not highly desirable to build capacity within the institute.

Marine and Coastal Management serve as the lead marine research and management institute within South Africa and often provide training services to other organisations and institutes. The institutes that MCM make use of for building capacity and furthering their knowledge and skills are predominantly the tertiary institutes of universities and technikons. Those most frequently identified to offer specific courses relevant to the training needs of MCM were University of Cape Town, University of Stellenbosch, Rhodes University, University of the Western Cape, University of Port Elizabeth, Natal University, Oceanographic Research Institute, CSIR and Cape Technikon. Further training for many specific fields of research are simply not available within South Africa or the SADC region. These include mariculture, stock assessment, fisheries economics, oil spill prevention and clean up. There were no specific institutes within the broader SADC region that were identified as desirable to send MCM staff for further training.

Specific expertise was identified to exist within South Africa that could be used to build capacity within MCM. Many of the individuals identified are ex-staff members of MCM whose experience and knowledge has proven to be irreplaceable. For this reason, remaining staff would like to consult with ex-staff to gain much-needed experience, particularly in the fields of acoustic surveys, GIS training and pollution management. Other areas requiring expertise

from abroad includes stock assessment, compliance, co-management and fisheries economics. The majority of staff interviewed at MCM did not consider there to be significant expertise within the SADC region in these fields that could significantly contribute to capacity building within MCM. Most outside expertise in respect of these disciplines is located in Europe, United Kingdom, New Zealand and Australia. Staff involved with subsistence fishing management indicated, however, that they could gain knowledge and experience from other SADC countries like Tanzania, Kenya, Mozambique and Mauritius.

While various levels of training were identified as being urgently required by staff members at MCM, some specific areas were identified as being more urgent than others. The areas where training seems to be most urgently required include stock assessment, maritime law and legal training, use of advanced computer programs (e.g. stock assessment and bio-economic modelling programs), communication in all languages, aquaculture technology, taxonomy and specimen preservation and oil pollution combating and prevention. Several training needs were expressed specific to sections within MCM, e.g. technical staff require specific training relating to the equipment being used etc.

The majority of MCM management staff interviewed for this study felt that with additional staff capacity and the relevant associated training, they would be capable of fulfilling the objectives of the BCLME program related to their area of expertise. MCM currently provides some degree of training and capacity building for Namibia and Angola and would be able to continue providing the skills, equipment and facilities to serve as a lead agent for the BCLME region. It is strongly felt that in order for the BCLME programme to be successful, a lead agent is required to co-ordinate, initiate and manage joint projects and that MCM could fill this role in many areas. Some management sections of MCM however, felt that the BCLME program has been designed by scientists and that there was insufficient focus on management. It was expressed that the BCLME program needs to include higher levels of management and produce an implementation plan detailing what is required to be done and how it is going to be done. It was expressed that the fisheries economics sector had not been exposed to the BCLME program sufficiently and no contact had been made between South Africa, Namibia and Angola relating to fisheries economics. Further concern was expressed in that many of the BCLME projects appear to be contracted out due to lack of sufficient expertise or staff within government organisations, however, these projects require long-term monitoring and ongoing research and that once foreign funding was withdrawn, these projects would simply cease to exist. It was felt that these projects should be conducted within government organisations by building the required capacity and training needed. The majority of management staff interviewed at MCM are willing, co-operative and supportive of the BCLME program and perceive the substantial benefits to be gained. However, major concerns expressed in implementing the program include not having sufficient staff or facilities (e.g. research vessels) to adequately conduct work within South Africa alone at present, and that long-term increases in their annual budgets would be required if the additional scope of Namibia and Angola were to be incorporated into their work profile.

Relations between MCM and the fishing industry are generally considered to be good. The fishing industry frequently makes use of private consultancies for independent stock assessment of commercial species and meet with government officials on a regular basis to discuss changes to the recommended TACs. Members of the fishing industry namely, Oceana Group Ltd. and Premier Fishing (Pty) Ltd. have recently established a partnership with the Branch: Marine and Coastal Management to provide funds for students in the marine science field. In terms of this agreement, financial support will be provided to students at Master's level for a period of two years at a South African institution. This initiative is to be implemented in 2004 academic year and is an indication of the willingness of the fishing industry to support and align themselves with larger sustainable resource utilisation programmes like the BCLME.

The Provincial Government of the Western Cape, Development of Environmental Affairs and Development Planning (DEA&DP)

The Provincial Government of the Western Cape, Chief Directorate: Environmental Affairs and Development Planning (DEA&DP) aims to protect the environment in the Western Cape Province through conservation and sustainable use of natural resources, to minimise pollution and waste and to ensure all developments are sustainable and do not degrade the environment. A memorandum of understanding was developed between the Chief Directorate: Environmental Affairs and the Western Cape Nature Conservation Board on 31 March 2000 in terms of which both parties agrees to co-operative governance over environmental issues within the Western Cape Province. The key functions of the Chief Directorate: Environmental Affairs is to develop provincial and departmental environmental policies, to implement and monitor effects of these policies and to prepare draft environmental legislation and regulation for submission to higher authorities. The Directorate further recommends delegation of environmental functions to other competent local government authorities e.g. Western Cape Nature Conservation Board.

There are currently three Directorates within the Chief Directorate Environmental Affairs, namely; 1) Environmental Management, 2) Biodiversity and Pollution and 3) Waste Management. DEA&DP are therefore involved in contributing to the implementation of BCLME Action Areas A: Sustainable Management and Utilisation of Living Marine Resources, D: Management of Pollution and E: Maintenance of Ecosystem Health and Protection of Biological Diversity Action Areas, within the coastal areas, in Marine Protected Areas through the WCNCB (should these be delegated), in coastal management and in management of pollution as it affects the marine environment. The environmental impact assessment authority for areas below the high-water mark are the responsibility of the national government, Department of Environmental Affairs and Tourism.

Directly related to the BCLME Action Area A is DEA&DPs' current engagement in the Coastal Livelihoods Programme for which a Coordinator has been appointed. It is assumed that this capacity forms a nascent coastal management unit as part of the future Directorate: Biodiversity and Coastal Management.

The Department of Environmental Affairs and Development Planning (DEA&DP) in the Western Cape Provincial Government is in the process of restructuring and integrating more effective planning and environmental functions. This process of restructuring will result in three functional areas: 1) Environmental and Land Management, 2) Environmental and Land Planning; and, 3) Financial Management and Administration, the former two being the two line function Chief Directorates. It is envisaged that these new structures and capacities will be implemented by April 2004. The future institutional arrangements are as follows:

Chief Directorate: Environmental and Land Planning will consist of three directorates, namely Planning, Biodiversity and Coastal Management, Pollution and Waste Management, as well as Functional Support. In total the establishment staffing for this Chief Directorate is 106 posts, the detailed breakdown of management, technical and administrative posts was not available at the time of drafting this report. The Chief Directorate: Environmental and Land Management will integrate the land development and environmental impact assessment applications. In total the establishment staffing for this Chief Directorate is 111 posts, the detailed breakdown of management, technical and administrative posts was not available at the time of drafting this report.

Interviewees expressed satisfaction with enabling policy legislation for coastal management and living marine resources in South Africa and with the Provincial Coastal Zone Management Policy. The single largest concern voiced is the time that it may take to grow sufficient capacity to implement the policies and legislation.

The process of redesign and development of the new directorates of Biodiversity and Coastal Management and Pollution and Waste Management will increase the capacity of DEA&DP to be a partner in the implementation of the BCLME Programme. The institutional restructuring of DEA&DP will include a human capacity development plan. The internal human resources department within the Western Cape Province plans for training of staff, however the following training needs have been expressed by the interviewees in relation to marine and coastal management: project/programme management; coastal zone management; assessment, management and monitoring of environmental impacts; and, communications (report and proposal writing, public).

Western Cape Nature Conservation Board (WCNCB)

The Western Cape Nature Conservation Board (WCNCB) is a public institution with the statutory responsibility for conservation of biodiversity in the Western Cape Province. The origins of this institution lie in the establishment of the Cape Department of Nature Conservation in 1952, under the provincial Department of Environmental, Cultural Affairs and Sport. After lengthy discussions and negotiations with the Provincial Government of the Western Cape, the statutory body of the WCNCB was officially established on 1 April 2000. Where previously the nature conservation departments relied entirely on the provincial government for funding, the forming of an independent statutory body allowed partnerships with other programmes and the ability to generate revenue from services offered.

The WCNCB is responsible for the conservation of natural resources, including the management of all public protected areas in the province, excluding those owned by the SANParks (Lemm & Attwood 2003). WCNCB aims to fulfil their assigned mandate in providing protection and biodiversity conservation to the Western Cape province, including the islands, within the province, but not including any marine ecosystems. According to the Marine Living Resources Act (see section 5.2.4), the management of the marine environment is the responsibility of national government with little scope for provincial government management. Prior to April 2000 the Cape Department of Nature Conservation (now WCNCB), accepted responsibility for management of Marine Protected Areas of the Western Cape and now, although outside of its mandate, WCNCB have continued some degree of marine conservation at their own discretion and by making use of internal funds. In fulfilling their assigned mandate for terrestrial and island ecosystems, WCNCB staff, in many cases but to a limited degree, continue to extend their duties to incorporate marine ecosystems. The extent of management of marine ecosystems currently undertaken by WCNCB is however, not nearly adequate in terms of achieving biodiversity conservation or sustainable development and utilisation of marine resources. Management within the WCNCB have expressed the urgent need to incorporate jurisdiction over the marine environment within their mandate, but, as yet, this has not been achieved. WCNCB have shown a willingness to get involved in marine management and accept responsibility for marine law enforcement e.g. appointment of Fishery Control Officers. At the time of this study, negotiations were in progress to lever some financial support to WCNCB from the Marine Living Resources Fund, allowing WCNCB to implement formal marine conservation structures. This is however, an interim solution and remains to be formally addressed through the formulation of a 'management agreement' between MCM and WCNCB with an associated specific mandate to address marine conservation management (Lemm & Attwood 2003).

Although no staff members of WCNCB are formally dedicated to marine conservation (because this is not part of their assigned mandate) the number of staff that are involved in some level of marine research or conservation is a total of 28 members. Management staff constitutes 7 members, research staff, 5, technical staff, 8 and administration staff, 8. Management staff interviewed for this study expressed a lack of staff capacity to implement marine monitoring programs and felt that additional training, specific to marine conservation, is needed for current staff members. However, these needs are difficult to motivate for with marine conservation not being part of WCNCB's assigned mandate. The required expertise to provide such training is located within South Africa in the form of institutions like Marine and Coastal Management, Oceanographic Research Institute, KZN Wildlife etc.

Management staff from WCNCB interviewed for this study expressed a keen desire to align their provincial organisation with the objectives of the BCLME program but require specific marine environmental conservation responsibilities to be incorporated in the funded mandate of WCNCB or a 'management agreement' to be implemented, delegating at least certain responsibilities for marine conservation within the Western Cape province to WCNCB for a period of time, with the associated funding provided for.

Provincial Government of the Northern Cape: Department of Agriculture, Land Reform, Environment and Conservation (DALEC), Directorate: Environment

Provincial governance of environmental matters within the Northern Cape Province is the duty of the Department of Agriculture, Land Reform, Environment and Conservation (DALEC). Within this Department, the Directorate: Environment deals specifically with marine environment conservation. The Environmental Management program of DALEC aims to ensure that the environment is not harmful in any way to the well-being and health of people, while promoting environmental awareness and sustainable development. The program consists of two sub-programmes; the one of relevance to the marine environment is that of Coastal Management and Impact Management. The main objectives of this sub-program are to create public awareness of the Environmental Impact Assessment procedure, to streamline this procedure within the department, to improve processing of Environmental Management Program Reports (EMPR) and queries related to mining activities, to increase control over coastal resources, to increase tourism along the coastal area of the province, to review and implement coastal legislation and to develop provincial coastal guidelines that will enable control and monitoring of sustainable development project along the coast. The BCLME Action Areas which are of relevance to this Directorate are B: Management of Mining and Drilling Activities and E: Maintenance of Ecosystem Health and Protection of Biological Diversity. As only two staff members are dedicated to this directorate, it requires capacity building and training at all levels. Infrastructural capacity was also identified as being severely limiting in terms of office space, vehicles, computer hardware, communication equipment and operational budget.

It was expressed that once capacity has been established within DALEC for efficient marine conservation, increased authority should be awarded to all provincial administrations and that DEAT should be encouraged to consult provincial authorities on issues pertinent to those locations. This would ensure that province specific priorities were adequately addressed.

A generic training program for the Northern Cape Provincial Coastal Committee is currently being compiled, but does not include capacity for technical training. It was also expressed that institutes and expertise available within South Africa and the SADC region, Namibia specifically, would greatly benefit the training needs of DALEC to implement more efficient marine conservation. The most favoured means of increasing capacity through training was through bringing experts into the agency for a lengthy period of time (six to 12 months) providing staff an opportunity to learn through gaining experience. Higher degrees or diplomas were also expressed as being desirable and required for increasing capacity.

DALEC is committed to sustainable management and utilisation of renewable and non-renewable marine and coastal resources. Through these main objectives of the department, alignment with the aims of the BCLME program can be achieved, however, a severe shortage of staff, training and infrastructure is required to be addressed before DALEC can be considered capable of implementing BCLME objectives. It was further expressed that there has been very limited communication about the BCLME program to government departments of the Northern Cape and that due to

the geographic location (on the border with Namibia) there should be considerably enhanced focus of the BCLME program in this region.

Local government (Municipal) Authorities

In general, local authorities in South Africa contribute little toward management of living marine resources but the role played by the Overstrand Municipality as outline here demonstrates that they can make an important contribution. The Overstrand Municipality manages a section of coast 150 km long within the Western Cape province. The primary function of the municipality is to provide services for rate paying property owners and industrial activities in this area, which in its broadest definition, is considered to include environmental management. Administration of marine environments, specifically the Betty's Bay Marine Protected Area within the Overstrand Municipality's jurisdiction, was previously considered the responsibility of national government (Marine and Coastal Government). National government (MCM) were conducting very limited management, monitoring or enforcement in this area and increasing criminal activities (poaching of abalone and rock lobster) centred in the Overstrand, led the municipality to undertake management of marine environmental issues.

By way of a recently signed "Memorandum of Agreement" between Overstrand Municipality and MCM (April 2003), the municipality has officially accepted responsibility for enforcing Marine Living Resources Act (MLRA) requirements in the area, specifically marine law enforcement. According to the Agreement signed, MCM is responsible for providing financial support for the marine law enforcement activities conducted by the Municipality, while the Municipality is to provide regular reporting to MCM. It is further hoped that the Agreement will provide better communication channels between the two organisations, which, in the past, has been poorly conducted.

Prior to the signing of the Memorandum of Agreement, only one Senior Nature Conservation Officer was responsible for all conservation issues and management of the terrestrial and marine reserves in the region. The staff capacity was severely inadequate, however, with the new Agreement, an additional five staff members have been employed and will receive training specifically to conduct compliance of the Marine Living Resources Act. According to the 'Agreement' all coastal employees are delegated Officers under the MLRA. Two of the six staff have tertiary qualifications while the four other field staff are trained in compliance issues, but require further training of marine issues.

It was also further indicated that there is imminent intention to incorporate the Betty's Bay MPA into a larger Kogelberg MPA that will stretch throughout the region. If this were implemented, additional staff and training would be required, and hopefully provided for. Prior to the 'Memorandum of Agreement', the Overstrand Municipality had limited infrastructure and equipment available for marine law enforcement, however, budget has since been made available and the Municipality has purchased a vessel, radios, vehicles and provided accommodation for new marine staff. The infrastructure and equipment is now considered to be satisfactory for the task required.

Table 5.1. BCLME POLICY ACTION AREA A: SUSTAINABLE MANAGEMENT AND UTILISATION OF LIVING MARINE RESOURCES. SUMMARY OF ORGANISATIONAL ROLES AND RESPONSIBILITIES.			
Level	**Organisation**	**Role**	**Areas of responsibility/ activity**
National Government	Department of Environmental Affairs and Tourism	Promote environmental protection, conservation and planning. Facilitate tourism development, maintain sustainable development and protect natural biodiversity. Improve the quality and safety of the environment, set TAC.	Whole Country
	Branch: Marine and Coastal Management	Fisheries management, implement monitoring, control and surveillance, formulate marine legal policy, stock assessments, research of new fisheries, environmental monitoring, recommend TAC.	Whole Country
Provincial Government	Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning (DEA&DP)	Environmental and land planning management, including environmental impact assessment applications, minimise pollution and waste, conservation of biodiversity and coastal resources, develop provincial and departmental environmental policies, implementing and monitoring effects of these policies and preparing draft legislation and regulations	Western Cape Province
	Western Cape Nature Conservation Board (WCNCB)	Conservation of natural resources, including the management of all public protected areas in the province, excluding those owned by the SANParks, protect and conserve biodiversity of the Western Cape, including the islands, but not the marine environment.	Western Cape Province, terrestrial and islands, not marine environment
	Provincial Government of the Northern Cape: Department of Agriculture, Land Reform, Environment and Conservation (DALEC), Directorate: Environment	Create public awareness and streamline EIA procedures, improve processing of EMPRs and queries related to mining activities, increase control and monitoring over coastal resources, to review and implement coastal legislation and to develop provincial coastal guidelines.	Northern Cape Province
Local Government	City of Cape Town / Cape Metropolitan Council	Environmental Management Department has a coastal management strategy but is not	City of Cape Town

		directly involved with regulating the utilisation of living marine resources.	
	Overstrand Municipality	Provide services for rate paying property owners and industrial activities, including marine law enforcement in the region.	Overberg Region of the Western Cape Province
Parastatal	Centre for Marine Studies, University of Cape Town	Education, training and research	Whole country
Non-Government Organisations	Southern African Development Community (SADC) Sector Coordinating Unit	Guiding formulating, evaluation, management and implementation of fisheries polices, programmes and projects	Whole country
Programmes	Benguela Environment Fisheries Interaction and Training Programme (BENEFIT)	Education and training, funding research, environmental monitoring	Angola, Namibia, South Africa
	Benguela Current Large Marine Ecosystem (BCLME)	Funding, environmental monitoring, policy and legal analyses, socio-economic assessments, transboundary issues	Angola, Namibia, South Africa
Private sector	Environmental consultants and consultancy companies	Facilitating environmental conservation needs, socio-economic impacts on the marine environment, environmental education and training, community development and resource management	Local/regional/international
	Fishing Industry.	Funding research and training	

6.4. BCLME POLICY ACTION AREA B: MANAGEMENT OF MINING AND DRILLING ACTIVITIES

In terms of the Constitution of the Republic of South Africa, 1996, all laws and matters relating to mineral and energy matters are administered under the control of the Minister of Minerals and Energy in the National Government. The overall aim of this Department is to ensure responsible exploration, development, processing, utilisation and management of minerals and energy resources.

Department of Minerals and Energy (DME)

The Department of Minerals and Energy is compiled of three Directorates, namely: 1) Energy, 2) Mineral Development and 3) Mine Health and Safety. The Directorate: Mineral Development addresses environmental issues of mining and drilling activities through the Sub-Directorate: Mine Environmental Management. The responsibility of this government department is to implement, monitor and enforce management protocol for such mining activity to minimize negative impacts, including those on the marine environment. It is also the responsibility of this Sub-Directorate to evaluate and make recommendations to the Director regarding all EMP's and EIA's submitted to the department, including those pertaining to marine environmental matters. Although this sector of the government is the official governing body for all mining impacts within South Africa, two branches of DEAT (Environmental Planning and Coordination and MCM) contribute significantly to such management protocol implemented. In evaluating mining related EMP's and EIA's, the DME makes use of extensive consultation and evaluation by several other government departments, namely; Department of Agriculture, Department of Water Affairs and Forestry, Department of Environmental Affairs and Tourism (specifically Marine and Coastal Management) and local municipalities.

The principle legislation pertaining to the mineral industry in terms of the licensing of prospecting and mining activities is the Minerals Act of 1991 (see section 5.2.20). The Act does not specify any regulations relating specifically to the marine environment and this aspect was identified as a major gap in the current legislation by those interviewed for this study. A new Minerals and Petroleum Resources Act is in draft stage and proposed to be promulgated early in 2004. The new Act aims to address environmental issues more thoroughly, this however, remains to be tested once implemented.

The Sub-Directorate: Mine Environmental Management have capacity to employ 5 staff members in the section, two of which were vacant at the time of this study. As this Sub-Directorate does not conduct any research relating to mining and drilling in the environment, no research staff are employed. At the time of this study, there was one management staff member (the second management position was vacant) and two technical environmentalist staff members (the third technical position was vacant) employed in this section. Although these staff members are required to address marine environmental issues relating to mining and drilling, specifically in evaluating EIA's and EMP's, none have any level of marine environmental training, as would be required to adequately perform these

duties. This fact highlights the desperate deficiency in qualified and trained marine environmental expertise in this government department. At a minimum, the vacant positions should be filled, and additional posts created with a pre-requisite for any additional staff being some background in marine conservation. Intensive training, at all levels, is desperately required, specifically in marine environmental management.

The infrastructural capacity of DME is considered to be lacking in two aspects; vehicles and communications equipment (telephone/fax/email). At the time of the study, the sub-directorate had no vehicle available to them and this was felt to be limiting.

Due to the lack of any marine expertise within this sub-directorate, management interviewed considered the best option to be to employ persons who already have a higher degree or diploma with relevance to marine environmental conservation or management. In addition it was expressed that workshops and short training courses, either within or outside the country, would be the most suitable means of training for this sub-directorate. Although a sabbatical option was considered to be very beneficial to gain international experience, it was acknowledged that limited staff makes this option inappropriate. Specific training courses that were expressed as being desirable were 1) Coastal Zone Management, 2) Assessment, monitoring and management of environmental impacts, 3) Marine ecology and specific marine practical training e.g. dive course. At the time of this study, the sub-directorate had no formal plans for capacity building or training specifically for marine issues and this was identified as a serious gap to be urgently addressed. As an interim measure, it was suggested that contract staff be employed to address the current backlog in processing applications, however, no plans for this have been implemented either.

Suitable expertise is available within South Africa to address the training needs the DME have for their marine environmental conservation requirements. Several institutions like Marine and Coastal Management, a variety of local universities and technikons and private organisations offer training programmes, workshops and courses to address marine environmental management issues. Similar such organisations within the larger SADC region also offer the necessary training. Personal expertise is similarly available from within South Africa and the SADC region to provide such training to the DME.

The current lack of marine expertise within the sub-directorate: Mine Environmental Management prevents this department of the DME from successfully achieving their aims and forces them to rely heavily on the input from other government departments, especially Marine and Coastal Management. Reliance on other government departments delay procedures and place further pressure on other departments that are also lacking in capacity for such additional tasks, which are not part of their assigned mandates. Marine environmental matters currently receive very little attention from the DME themselves (much of it being distributed to other government departments) while offshore operations are largely ignored due to lack of expertise. The petroleum section of mining in South Africa has, thus far, been largely ignored by DME in terms of environmental issues, again, due to lack of expertise in the sub-directorate. The new legislation to be implemented in early 2004, reflects that the petroleum section of mining will be

allocated to the Petroleum Agency of South Africa (PASA). Although there are currently no environmentalists employed in this agency, it is highly probable that PASA will employ specialists to address the marine environmental issues and evaluation of EIA's and EMP's.

Provincial Government of the Northern Cape: Department of Agriculture, Land Reform, Environment and Conservation (DALEC), Directorate: Environment

Provincial governance of environmental matters within the Northern Cape Province is the duty of the Department of Agriculture, Land Reform, Environment and Conservation (DALEC). The main objectives of this sub-program are to, *inter alia*, create public awareness of the Environmental Impact Assessment procedure, to streamline this procedure within the department, to improve processing of Environmental Management Program Reports (EMPR) and queries related to mining activities. Further detail of this department is addressed in section 5.3.

The Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning (DEA&DP)

The Provincial Government of the Western Cape, Chief Directorate: Environmental Affairs aims to protect the environment in the Western Cape Province through *inter alia*, minimising pollution and waste and to ensure all developments, including that of mining operations in the region, are sustainable and do not degrade the environment (see section 5.3). DEA&DP may be required to assist the DME in reviewing EIA's or EMP's of relevance to their area of jurisdiction, however, there is very limited mining occurring within the Western Cape Province and no mining occurs within the coastal zone. In this way, this provincial government department is not directly relevant to the Policy Action Area B of the BCLME.

Table 5.2. BCLME POLICY ACTION AREA B: MANAGEMENT OF MINING AND DRILLING ACTIVITIES. SUMMARY OF ORGANISATIONAL ROLES AND RESPONSIBILITIES.

Level	Organisation	Role	Areas of responsibility/ activity
National Government	Department of Minerals and Energy (DME)	Implement, monitor and enforce environmental management protocol for mining activity and minimize negative impacts on the marine environment, evaluate and make recommendations regarding EIA's and EMP's	Whole country
	Marine and Coastal Management (MCM)	Assist in marine related EMP and EIA evaluation and provide recommendations	Whole country – marine impacts from mining
	Department of Water Affairs and Forestry (DWAF)	Assist in EIA and EMP evaluations and provide recommendations	Whole country – freshwater impacts from mining

Provincial Government	Provincial Government of the Northern Cape: Department of Agriculture, Land Reform, Environment and Conservation (DALEC), Directorate: Environment	Create public awareness and streamline EIA procedures, improve processing of EMPRs and queries related to mining activities.	Northern Cape Province
	Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning (DEA&DP)	Environmental and land planning management, including environmental impact assessment applications, minimise pollution and waste, assist DME in EIA and EMP processing and make recommendations.	Western Cape Province
Local Government	Municipalities	Assist in marine related EMP and EIA evaluation and provide recommendations for impacts within their areas of jurisdiction	The municipal district zone
Parastatal	-	-	-
Non-Government Organisations	-	-	-
Programmes	Benguela Current Large Marine Ecosystem (BCLME)	Funding, environmental monitoring, policy and legal analyses, socio-economic assessments, transboundary issues	Angola, Namibia, South Africa
Private sector	-	-	-

6.5. BCLME POLICY ACTION AREA C: ASSESSMENT OF ENVIRONMENTAL VARIABILITY, ECOSYSTEM IMPACTS AND IMPROVEMENT OF PREDICTABILITY

Similarly to the marine environment of Angola and Namibia, that of South Africa is also subjected to very high levels of natural variability, impacting on the biota of the region. Prolonged periods of upwelling of cold-water results in extreme temperature variations along much of the South African coastline, particularly in the west coast region. Harmful algal blooms and red tide events are known to occur frequently along this stretch of coastline, specifically at Elands Bay. The statutory responsibility for researching and monitoring environmental and oceanographic variability in South Africa lies with the Department of Environmental Affairs and Tourism, Branch: Marine and Coastal Management but this organisation receives considerable assistance from other parastatal and private research organisations.

Marine and Coastal Management

The responsibility of environmental variability, ecosystem impacts and improvement of predictability lies with The Directorate: Research and Development of Marine and Coastal Management but is distributed through several Sub-Directorates of MCM namely, Ecosystem Utilisation and Conservation, Ocean Environment and Mariculture and Research Aquarium (see Fig. 5.2). The views of management personnel from these Sub-Directorates interviewed for this study are reflected in the summary of the institute (MCM) documented under Policy Action Area A: Sustainable Management and Utilisation of Living Marine Resources (see section 5.3). A specific concern raised by the relevant sub-directorates of MCM in relation to Policy Action Area C was the fact that expertise required for training in this field is only available from Europe (specifically Norway and Germany), United Kingdom and United States with very limited local or SADC region expertise being able to meet the level of training required. The BENEFIT and IDYLE (see section 2.1.7) programmes were again highlighted as being successful initiatives that have provided some degree of information transfer, capacity building and training in this specific field of research. Insufficient staff (operational, research and technical levels) and lack of adequate training (due to limited capacity within the country or SADC region) were given as the primary reasons for not being able to successfully fulfil their assigned mandates. The legislation and policy currently in existence relating to aquaculture and the impact on health and safety of harmful algal blooms and red tides were considered to be wholly insufficient and vague. More comprehensive legal policies are required that directly address these issues.

The objectives of the Sub-Directorates: Ecosystem Utilisation and Conservation, Ocean Environment and Mariculture and Research Aquarium of MCM appear to be well aligned with the objectives of the BCLME Policy Action Area C: Assessment of Environmental Variability, Ecosystem Impacts and Improvement of Predictability. Management of these Sub-Directorates have been directly involved in aligning their strategic objectives with that of the BCLME programme with respect to transboundary management, joint projects and upholding national responsibilities.

Management staff in these sub-directorates are looking towards the BCLME programme to assist in addressing some of deficiencies that exist in terms of capacity and training.

One particular area of concern expressed by management was that of specific monitoring programmes, initiated by the Activity Centre for Environmental Variability, Ecosystem Impacts and Improvement of Predictability (BCLME-driven), not being implemented by a government institution such as MCM. It was expressed that such long-term monitoring programmes should be contained within government structures to ensure the necessary long-term success thereof. The majority of such projects initiated by the BCLME Activity Centre for Environmental Variability, Ecosystem Impacts and Improvement of Predictability have been awarded to academic or private institutions. Management interviewed felt that this increased the risk of these projects not fulfilling the long-term objectives, as intended by the BCLME.

South African Environmental Observation Network (SAEON)

In April 2002, the South African government granted funding to the National Research Foundation (NRF) to form the South African Environmental Observation Network (SAEON). SAEON is a research facility that has establish selected environmental observatories (field stations or sites) linked by an information management network to serve as research and education platforms for long-term studies of ecosystems that will provide for incremental advances in our understanding of ecosystems and our ability to detect, predict and react to environmental change. SAEON aims to bring better cohesion between research programmes nationally and internationally and will ensure that Long Term Ecological Research (LTER) data is archived and accessible as a national asset for generations to come. SAEON's vision is to establish a South African observation and research network that provides the understanding, based on long-term information, needed to address environmental issues. The SAEON is well positioned to make important contributions to ecosystem understanding and research coordination, training and management, environmental information and data management and early warning of potentially hazardous events.

SAEON is a member of the International Long-Term Ecological Research Network (ILTER) and fulfils the South African component of the Environmental Long-Term Observatory Network of Southern Africa (ELTOSA), managing regional collaboration, coordination and information from South Africa. SAEON directly addresses the BCLME Policy Action Area C: Assessment of Environmental Variability, Ecosystem Impacts and Improvement of Predictability. SAEON specifically addresses the development of an early-warning system for major environmental events within South Africa and analysis of existing long-term data series.

Table 5.3. BCLME POLICY ACTION AREA C: ASSESSMENT OF ENVIRONMENTAL VARIABILITY, ECOSYSTEM IMPACTS AND IMPROVEMENT OF PREDICTABILITY. SUMMARY OF ORGANISATIONAL ROLES AND RESPONSIBILITIES.

Level	Organisation	Role	Areas of responsibility/

			activity
National Government	Department of Environmental Affairs and Tourism	Promote environmental protection, conservation and planning. Facilitate tourism development, maintain sustainable development and protect natural biodiversity. Improve the quality and safety of the environment, set TAC.	Whole country
	Branch: Marine and Coastal Management	Fisheries management, implement monitoring, control and surveillance, formulate marine legal policy, stock assessments, research of new fisheries, environmental monitoring, recommend TAC.	Whole country
Provincial Government	-	-	-
Local Government	-	-	-
Parastatal	South African Environmental Observation Network (SAEON)	Serve as platforms for long-term studies of ecosystems to improve understanding of ecosystems and the ability to detect, predict and react to environmental change, provides cohesion between organisations and data archive facilities	Whole country
Non-Government Organisations	-	-	-
Programmes	ENVIFISH	Identifying and quantifying key environmental conditions that influence fluctuations in the recruitment and distribution of small pelagic fish in the Benguela and Angolan systems	Angola, Namibia, South Africa
	IDYLE	Understand the adaptive strategies of fish and dynamics structured by strong inshore upwelling along the Benguela Current, examine the resulting ecosystem patterns with application to sustainable development and viability of fisheries	Angola, Namibia, South Africa
	Benguela Environment Fisheries Interaction and Training Programme (BENEFIT)	Education and training, funding research, environmental monitoring	Angola, Namibia, South Africa
	Benguela Current Large Marine Ecosystem (BCLME)	Funding, environmental monitoring, policy and legal analyses, socio-economic assessments, transboundary issues	Angola, Namibia, South Africa
Private sector	-	-	-

6.6. BCLME POLICY ACTION AREA D: MANAGEMENT OF POLLUTION

The institutional capacity for management of pollution within South Africa is considered to be fragmented and disjointed, making laws and policies difficult to implement. Although the legislation is well provided for (see section 5.2.14 – 5.2.16), the implementation of the law is poor and fragmented with various responsibilities resting with various organisations. Up to five organisations are responsible for management of various aspects of marine pollution within South Africa and are as follows:

1) Department of Environmental Affairs and Tourism, Branch: Marine and Coastal Management – oil spill pollution combating i.e. once it has entered the environment
2) Department of Transport who have inaugurated the South African Maritime Safety Authority – oil pollution prevention
3) Department of Water Affairs and Forestry – response to any oil spills in fresh water, issuing of permits for effluent disposal into freshwater systems as well as compliance monitoring. There are discussions currently underway between the DEAT and DWAF regarding the management of pipeline discharges from land into the ocean.
4) National Ports Authority – jurisdiction over any oil pollution occurring within the boundaries of any harbours or ports within South Africa
5) Department of Minerals and Energy – addressing coastal mining related pollution issues by means of EMP enforcement (see section 5.4).

There is a strong sense of lack of co-ordination among the different institutes and sufficient and suitable capacity is severely lacking in this sector. There is no lead implementing agency to provide a co-ordinating role for marine pollution management. Marine pollution management within South Africa is generally considered to be required in cases of emergency e.g. a shipping disaster resulting in an oil spill, while on a global scale, South African coastal waters are considered to have low levels of marine pollution which do not pose a serious threat to the environment or human health (Brown 1987). Most of the marine pollution is focused around larger harbours or fish factory areas and consists of fish factory effluents, dredging and hazardous substances used in the repair and maintenance of fishing vessels. Pollution that originates on land and is discharged into the ocean by means of pipelines has, in the past, been the responsibility of Marine and Coastal Management to monitor, but with recent restructuring, the Department of Water Affairs and Forestry have expressed the intention to take over management of this monitoring role.

The Department of Transport delegated the national responsibilities of oil pollution combating (once the oil spill has occurred) to the DEAT Branch: Marine and Coastal Management to be managed in consultation with the Department, whilst the responsibilities of oil pollution prevention was delegated to the South African Maritime Authority (SAMSA) in 1998. In the event of an oil spill incident, the nearest local authorities, like municipalities, port and harbour authorities and wildlife organisations (i.e. the authority that has jurisdiction over that particular stretch of coastline; harbour etc.) are responsible for implementing, managing and monitoring clean-up operations of the

shoreline. Marine and Coastal Management coordinates the activities of these local authorities in the event of a clean-up operation being required.

Marine and Coastal Management

The responsibilities of marine pollution management lies within the Chief Directorate: Resource Management, Directorate: Integrated Coastal Management and Development, Sub-Directorate: Marine and Coastal Pollution Management (see section 5.3 and Fig. 5.2). The specific responsibilities of this Sub-Directorate with respect to oil pollution are defined as:

- co-ordination and implementation of coastal protection and clean-up measures during oil spill incidents
- control and management of "Kuswag" (Coast-watch) vessels and aircraft
- control of all dispersant spraying operations
- maintenance of dedicated oil spill equipment and dispersant stocks
- sensitivity mapping for oil spill response
- compilation of relevant oil spill contingency plans
- development of policies on oil spill response strategies (e.g. on dispersant use)

MCM, Sub-Directorate: Marine and Coastal Pollution Management have developed Coastal Oil Spill Contingency Plans for all coastal regions (21) of South Africa, which aims towards achieving efficient response to oil spill incidents. The goal of these contingency plans is to clearly define the responsibilities of various stakeholders, the structures to be set up and the response required by such parties for the duration of the incident. The Department is currently in the process of reviewing and updating these plans in consultation with local authorities, to bring them in line with new local government structures.

Marine and Coastal Managements' role in combating oil pollution is currently severely limited due to a lack of human capacity. Of the 10 posts for the Sub-Directorate: Marine and Coastal Pollution Management, only four are currently occupied. This Directorate is currently operating at minimal staff capacity and desperately requires the complete staff compliment to fulfil its assigned mandate. Additional staff and intensive training at all levels is required, however, there are currently no assigned training programs for this purpose. The most appropriate training opportunities for marine pollution management, as expressed by management staff interviewed for the purposes of this study, are short training courses, workshops and through mentorship programs with external expertise brought in for periods of up to a year to train staff. There are however, very few training programs specifically for marine pollution management within South Africa or the SADC region and although some courses offered through the local universities and technikons provide a degree of training, the most urgently required training is that offered by international institutes specialising in such training e.g. 6-week course offered by Swedish government, and a variety of courses offered by an institute in Southampton, UK. The practical training required for marine pollution management implementation, e.g. skipper's courses, seamanship, sample collection etc., is readily available from two institutes in Cape Town, namely, Cape Technikon and Northlink College. Although these institutes provide some

degree of practical and technical training required for marine pollution management, there are no structured plans within the Sub-Directorate: Marine and Coastal Pollution Management to regularly make use of such courses. There is very limited expertise available within South Africa that could be brought in to assist with training, although, those that are available, would contribute substantially.

MCM have provided some level of marine pollution management training for several countries of the Indian Ocean Islands (e.g. Seychelles, Comores etc.) during the last three years and have such course work facilities available. The MCM Sub-Directorate: Marine and Coastal Pollution Management would hope to serve as the lead agent and assist and train relevant departments/personnel from Angola and Namibia.

Department of Water Affairs and Forestry (DWAF)

The Department of Water Affairs and Forestry (DWAF) is responsible for the management and regulation of freshwater resources in South Africa. Ultimately, DWAF is responsible for the quality of water within water catchments and its quality when it reaches the sea. Within this area of responsibility, DWAF is also responsible for issuing permits for discharge of effluent into freshwater systems and for compliance monitoring of permit conditions. It is important to note that the national Department of Environmental Affairs and Tourism (DEAT) currently manages the authorisation of marine outfalls and discharges through the EIA Regulations (Environmental Conservation Act, section 5.2.3). There are, however, discussions currently underway between the DEAT and DWAF regarding the management of pipeline discharges from land into the ocean. DWAF has developed and updated water quality guidelines for various receiving environments, including marine water quality guidelines and has expressed intentions to take over monitoring of effluent discharged into the marine environment.

One of the key legislative gaps is the regulation of sea disposal outfall. This is currently not sufficiently covered within the new National Water Act (section 5.2.11) and there are proposals to draft and promulgate a new Marine Pollution Act. Much of the regulation of pipeline outfalls is covered through the required EIA authorisation; however, there is currently a lack of capacity to adequately monitor compliance to permit conditions. Furthermore there appears to be a gap in monitoring of seawater quality in general. Where this is undertaken, for example by the City of Cape Town (section 5.3), the indicators and variables monitored often relate only to human heath.

DWAF has commissioned the CSIR to develop operational policy for the treatment and disposal of wastewater in coastal areas (including estuaries, the surf zone and offshore marine waters) of South Africa. An interactive website allows stakeholders to track the development of the policy and operational guidelines: http//www.wamsys.co.za/outfalls (Cape Metropolitan Coastal Water Quality Committee Annual Report, 2003).

The standards for regulation of point sources of pollution are relatively high when compared internationally, however there is a gap in regulations regarding diffuse sources of pollution (e.g. storm water runoff), which may cumulatively have a significant impact on marine water quality along the coastline.

DWAF is currently undergoing institutional restructuring where specialist services, such as water quality regulation, are being re-organised within clusters (ex-regions) which service a number of regions. The relevant clusters in the field of water resource protection (historically responsible for the issuing and compliance monitoring of effluent discharge permits) affecting marine water quality of the BCLME are now grouped under water resource management within a Southern Cluster (Western and Eastern Cape Regions) and a Central Region (includes *inter alia* Northern Cape Regions). The total amount of staff allocated to regulating water quality directly in areas relevant to the BCLME is as follows: two managers; two technicians and two administrators. This is, however, currently considered to be too few staff (at all levels) to adequately manage and administer this area of responsibility.

There is an internal training plan in place for individuals within DWAF working in the water quality field. Furthermore, the University of Pretoria provides a custom-made Water Quality Management Course for DWAF. Further training is required in the following areas: project/programme management; assessment and monitoring of licences; coastal zone management; assessment, management and monitoring of environmental impacts; communications (report and proposal writing, public speaking); ecology (life histories of marine organisms, conservation, fisheries management); technical training (use and maintenance of laboratory and scientific equipment); and scientists needs cross training in social dimension of sustainability.

South African Maritime Safety Authority (SAMSA)

The South African Maritime Safety Authority (SAMSA) was formally inaugurated in April 1998 following which the Department of Transport delegated all national responsibility for marine pollution prevention to SAMSA. SAMSA serves as South Africa's independent statutory maritime safety authority and is accountable to the Minister of Transport. The agency is a partially self-funding, non-profit, commercialised organisation and carries out all the existing functions of the previous Chief Directorate: Shipping. SAMSA's mandate is to promote South Africa's maritime interests and exercise control over shipping to ensure safe and clean seas through the primary functions of the survey of ships, prevention of pollution of the sea and liase international and regional co-operation. Specific roles of SAMSA with respect to marine pollution prevention can be identified as being:

- control of shipping casualties
- supervision of oil transhipments
- prosecutions in the case of deliberate discharges of oil
- legal aspects pertaining to a shipping casualty or oil spill
- processing and payment of claims arising out of an oil spill
- compilation of relevant contingency plans

SAMSA plays a vital role in the development of marine training on the Southern African continent for the enhancement and establishment of good regional maritime standards and marine administrations. The relevant

legislation (Marine Pollution -Control and Civil Liability Act 6 of 1981, see section 5.2.15) is administered by SAMSA, but certain of the functions are delegated to DEAT, MCM.

At the time of this study, there was only one management staff member assigned full-time to matters of marine pollution, although it was indicated that the organisation was undergoing restructuring which included the creation of several additional posts for marine pollution management. The current staff capacity is considered to be severely limiting. It was expressed that additional staff and the associated training required is urgently needed at operational and technical levels, specifically for marine pollution management. At this stage there is no structured training programs available for staff within SAMSA to attend and it was expressed that the necessary courses are mainly available in Europe (Sweden and UK), with very limited training available in South Africa and the SADC region. Local institutes (universities and technikons) provide suitable initial training and expertise is available within the country to provide some degree of general pollution management training, but specific training for marine pollution management, prevention and combating is principally available internationally. SAMSA are already strongly integrated with the GloBallast Program (see section 2.1.7) which was developed with the intention of addressing the BCLME region. With fulfilment of the additional staff and training requirements, it was expressed that SAMSA would be in the position to facilitate and provide for the objectives of the BCLME Policy Action Area D: Management of Pollution. It was however strongly expressed that in order to align pollution management in South Africa, only one authority must be assigned to act as a co-ordinating body for all marine pollution issues.

Provincial Government of the Western Cape

The Provincial Government of the Western Cape, Directorate: Pollution and Waste Management aims to firstly develop and implement measures for integrated pollution and waste management in terms of pollution prevention and the hierarchical approach to waste management, and secondly to develop co-operative management measures that integrate pollution and waste management into provincial and local government policies, strategies and planning processes. This provincial government Directorate principally develops and implements pollution and waste management policies, legislation, strategies, action plans, norms, standards and guidelines for other organisations, focusing specifically on waste minimisation, recycling and re-use strategies. Although such documents provide guidelines for pollution management within the Western Cape Province, this Directorate is relatively new and still developing its staffing capacity. It is unclear, at this stage, how freshwater pollution and marine outfalls will be managed in the future. Final agreement as to the respective responsibilities of municipalities/local government, provincial government and national government (DWAF and DEAT: MCM) are currently being negotiated.

Provincial Government of the Northern Cape

The Department of Agriculture, Land Reform, Environment and Conservation, Directorate: Environment operates a program of Environmental Management. Within this program, a sub-program titled, Waste Management, Pollution Control and Environmental Education addresses the environmental pollution issues of the Northern Cape Province at a provincial level. This program promotes waste management policies, sustainable resource management, initiates

waste management and re-cycling projects and receives co-operation from municipalities and local communities to maintain a clean environment. However, as is the case in the Western Cape Province, this Directorate at provincial government level implements very limited control or monitoring of marine pollution and this remains the overall responsibility of National government.

City of Cape Town

Catchment Management, Storm water and River Management (supported by Scientific Services) and Water and Sanitation (Wastewater Department)

The City of Cape Town is responsible for: 1) managing the quality of its own marine outfall effluent from sewerage treatment works (Wastewater Department), 2) for stormwater management and catchment management (Catchment Management, Storm water and River Management Department) and 3) for monitoring water quality of rivers from a public health perspective. The City of Cape Town's responsibility for marine pollution is largely focussed around public health rather than ecosystem health. Monitoring of seawater at important recreational beaches at 40 points along the False Bay coastline and at 37 points along the Atlantic coastline is undertaken every two weeks by Scientific Services. The indicators used are for public health and these results are published in the Cape Metropolitan Coastal Water Quality Committee Annual Report. The water quality of industrial marine outfalls along the coast of the City of Cape Town is regulated by DWAF. Over the past few years, DEAT has also undertaken monitoring of mussels for heavy metals at strategic points along the coastline (e.g. outfall of Wildevoelvlei). The Environmental Health Department of the City works in union with other relevant departments to address concerns identified in monitoring results.

Interviewees have indicated that a key problem in the current regulation of marine pollution is the lack of clarity on the respective responsibilities of local, provincial and national government. Furthermore, the implementation of the legislation is deficient due to capacity shortfalls at national and provincial levels.
The City of Cape Town's capacity is also in a phase of transition as, although the current restructuring process has finalised the new top management structure, the micro-design for lower level management, technical and administrative staff is still to be finalised. It is likely that the City's capacity will be reduced and rationalised in the process of consolidating the previous seven local government structures.

Currently, within the city it is estimated that about 40 people at all levels spend a about 20% of their time dealing with water quality issues. Five of which are managers, three researchers, 20 technicians and 12 administrative staff. It is important to stress that the single focus of these individuals is on public health. Until such time as the micro design and restructuring process is complete, it is difficult to assess the adequacy of the capacity of the City of Cape Town with respect to the BCLME region. It is also essential to clarify any future role that the city might have with regard to managing industrial point sources of pollution along the City coastline. Notwithstanding the above, there is a perceived shortage of management and technical expertise within this municipal department.

While the City has complied with the National Qualifications Framework of South Africa and has also developed a workplace skills plan and a training matrix, the following training areas (across all levels of staff) are seen as important in building capacity for contributing to the BCLME Programme: leadership skills; project/programme management; experimental design (scientific sampling programmes, sampling strategies); coastal zone management; assessment, management and monitoring of environmental impacts; and, technical training (use and maintenance of laboratory and scientific equipment).

Table 5.4. BCLME POLICY ACTION AREA D: MANAGEMENT OF POLLUTION. SUMMARY OF ORGANISATIONAL ROLES AND RESPONSIBILITIES.

Level	Organisation	Role	Areas of responsibility/ activity
National Government	Department of Environmental Affairs and Tourism	Promote environmental protection, conservation and planning. Facilitate tourism development, maintain sustainable development and protect natural biodiversity. Improve the quality and safety of the environment, set TAC.	Whole country
	Branch: Marine and Coastal Management	Fisheries management, implement monitoring, control and surveillance, formulate marine legal policy, stock assessments, research of new fisheries, environmental monitoring, recommend TAC.	
	Department of Water Affairs and Forestry (DWAF)	Issue and monitor compliance of effluent discharge permits to freshwater. Currently researching guidelines for marine disposal. May become responsible for managing sea outfalls.	All fresh water areas of South Africa
Provincial Government	Provincial Government of the Western Cape, Directorate: Pollution and Waste Management	Develop and implement measures for integrated pollution and waste management, develop co-operative management integrating pollution and waste management into provincial and local government policies, currently limited marine pollution monitoring	Western Cape Province
	Provincial Government of the Northern Cape, Department of Agriculture, Land Reform, Environment and Conservation (DALEC), Directorate: Environment	Promotes waste management policies, sustainable resource management, initiates waste management and re-cycling projects, but limited control or monitoring of marine pollution	Northern Cape Province
Local Government	City of Cape Town: Catchment	Management of quality of marine outfalls from	City of Cape Town

	Management, Storm water and River Management (supported by Scientific Services) and Water and Sanitation (Wastewater Department)	sewerage works, river water and seawater quality for recreation from a public health perspective.	
Parastatal	South African Maritime Safety Authority (SAMSA)	Exercise control over shipping to ensure safe and clean seas through survey of ships, prevention of pollution of the sea and liase international and regional co-operation	Whole country
Non-Government Organisations	-	-	-
Programmes	-	-	-
Private sector	-	-	-

6.7. BCLME POLICY ACTION AREA E: MAINTENANCE OF ECOSYSTEM HEALTH AND PROTECTION OF BIOLOGICAL DIVERSITY

Department of Environmental Affairs and Tourism (DEAT)

Maintenance of ecosystem health and protection of biological diversity in South Africa is primarily the responsibility of the Department of Environmental Affairs and Tourism, and is addressed by two branches 1) Biodiversity and Conservation (only initiated in 2001) and 2) Marine and Coastal Management (MCM).

Branch: Biodiversity and Conservation

Within the branch Biodiversity and Conservation, there are two directorates namely 1) Biodiversity and Heritage and 2) Transfrontier Conservation Areas and Protected Areas. There are two statutory bodies that report directly to this branch, these being South African National Parks (SANParks) and the National Botanical Institute (NBI). Although this branch aims to address all biodiversity and conservation issues of South Africa, it currently focuses on terrestrial aspects of *inter alia*, Transfrontier Conservation Areas, Conservation Management, Resource Utilization and Biodiversity Management. Some of the projects managed by this branch include implementation of the Convention on International Trade in Endangered species of Wild Fauna and Flora (CITES), the National Biodiversity Strategy and Action Plan (NBSAP) and the Cartagena Protocol on Biosafety (CPB). Although many of these projects will include aspects relating directly to the marine environment, the branch Marine and Coastal Management is currently the primary management body for such marine related aspects.

Branch: Marine and Coastal Management

The Department of Environmental Affairs and Tourism, Branch: Marine and Coastal Management address issues of ecosystem health and protection of biodiversity. All three Chief Directorates of Marine and Coastal Management (MCM), namely: Research, Antarctica and Islands, Monitoring Control and Surveillance and Resource Management have sections that, in some way, address issues relating to this Policy Action Area. There is however, no dedicated Directorate or Sub-Directorate that deals solely with such issues. The capacity and training needs assessment for Marine and Coastal Management as a whole, (detailed in BCLME Policy Action Area A section 5.3) is also pertinent to this Policy Action Area. Legislation addressing conservation of the marine biodiversity of South Africa is addressed by the Marine Living Resources Act (see section 5.2.4), which directly provides for the establishment of Marine Protected Areas and for the protection of marine biodiversity. The country has also acceded to the Convention on Biological Diversity of 1992 and in this manner is bound by the requisites of this convention. In accordance with the Convention, South Africa has published a White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity, providing guidelines of such issues to be addressed.

Many of the management staff interviewed from MCM felt that legislation relating to this Policy Action Area was very vague and in need of revision to be more specific to marine biodiversity conservation in general and not only addressed through Marine Protected Areas. It was expressed that even where guidelines existed in preserving

biodiversity, there were gaps in the implementation thereof. The Minister ultimately has sole jurisdiction over such matters and it was strongly felt that more rigorous and enforced consultation with staff and/or an advisory forums (including private conservation organisations) would facilitate better management of ecosystems and biodiversity. It was also expressed that the current legislation is designed with the sole purpose of controlling identified fisheries but that there was little control over non-consumptive use of the marine environment which can often degrade ecosystems and biodiversity to a greater extent. As already reflected in addressing previous BCLME Action Areas (this document), there is a serious staff capacity deficit within MCM, which prevents effective and efficient implementation of any section's assigned mandates. Training of current staff and training of potential new staff is urgently required at all levels before these sections can be considered aligned with the BCLME requirements.

Department of Water Affairs and Forestry (DWAF)

DWAF are responsible for managing the "*Ecological Reserve*" (water required for desired ecological functioning) in estuaries. The ecological reserve is usually monitored on an ongoing basis as part of permit conditions for large water abstraction schemes, e.g. the Berg River Monitoring Programme. In this way, DWAF address issues of biodiversity and ecosystem health maintenance. For additional responsibilities of DWAF, see section 5.6.

Provincial Government of the Western Cape – Department of Environmental Affairs and Development Planning (DEA&DP)

The provincial capacity for pollution and waste management, biodiversity planning and coastal management is currently being developed. The Province is following a "Biosphere approach" to terrestrial biodiversity planning. Further details are addressed in section 5.3.

Western Cape Nature Conservation Board (WCNCB)

The Western Cape Nature Conservation Board is responsible for monitoring of ecosystem health and protection of biodiversity within the Western Cape Province. The mandate of the WCNCB provides for protection and conservation of the biological diversity of terrestrial and island ecosystems within the Western Cape province, but not that of marine ecosystems. There is a potential that the management of certain Marine Protected Areas could be delegated to the WCNCB where these areas are contiguous with terrestrial protected areas currently managed by the WCNCB, however, an official agreement has yet to be reached between DEAT and WCNCB. The capacity and training needs of this Directorate, with respect to the BCLME Policy Action Area E, are similarly reflected by those expressed in BCLME Policy Action Area A (see section 5.3).

Provincial Government of the Northern Cape

The Department of Agriculture, Land Reform, Environment and Conservation, Directorate: Environment (see section 5.3) operates a program of Conservation Services that aims to conserve and protect the national heritage of the province. A sub-programme titled Conservation Management Services aims to ensure the conservation of the natural environment, biodiversity, ecological systems and processes and in this way addresses the objectives of the

BCLME Policy Action Area E. However, the needs of this department relating to capacity building and training are are reflected in more detail in BCLME Policy Action Area A.

City of Cape Town: Environmental Management Department (EMD)

The Environmental Management Department (EMD) is responsible for Environmental Management within the City of Cape Town (CCT), this includes coastal management as a focus area. The EMD also regularly updates its State of Environment report that consolidates data and indicators from various sources within the city administration. The Integrated Metropolitan Environmental Policy (IMEP) has resulted in a number of focussed strategies, one of which is the Coastal Zone Management Strategy (CZMS). This includes objectives for *inter alia* Sustainable Coastal Management Plans.

A concern raised by the interviewee is the extent to which policy and legislation has understood implementation, as organisational change management. Implementation can only be effectively undertaken where there is sufficient capacity. For effective coastal zone management within the CCT, increased capacity is required at the technical, operational and administrative levels. While there is an existing training matrix in place, it does not deal specifically with marine and coastal issues and training is therefore required in the following areas: leadership skills; project/programme management; experimental design (Scientific sampling programmes, sampling strategies); coastal zone management; assessment, management and monitoring of environmental impacts; communications; ecology; technical training; and in addition, interacting with the public, co-management mechanisms and agreements (training of community organisations); programme design and monitoring related to the point sources of pollution.

South African National Parks (SANParks)

South African National Parks (SANParks) also makes a contribution towards conservation of marine biodiversity and marine resources in South Africa. It is a parastatal organisation whose mandate it is to acquire and manage a system of national parks representative of the indigenous wildlife, vegetation, landscapes and cultural assets of South Africa. There are currently 26 such parks in South Africa, of which six include areas of sea or MPAs. All six of these are situated in the Benguela region. SANParks are committed to managing the marine areas within these parks and have assigned marine duties to rangers in these parks.

Table 5.5. BCLME POLICY ACTION AREA E: MAINTENANCE OF ECOSYSTEM HEALTH AND PROTECTION OF BIOLOGICAL DIVERSITY. SUMMARY OF ORGANISATIONAL ROLES AND RESPONSIBILITIES.

Level	Organisation	Role	Areas of responsibility/ activity
National Government	Department of Environmental Affairs and Tourism	Promote environmental protection, conservation and planning. Facilitate tourism development, maintain sustainable development and protect natural biodiversity.	Whole country

		Improve the quality and safety of the environment, set TAC.	
	Branch: Marine and Coastal Management	Fisheries management, implement monitoring, control and surveillance, formulate marine legal policy, stock assessments, research of new fisheries, environmental monitoring, recommend TAC.	Whole country
Provincial Government	Provincial Government of the Western Cape, Directorate: Environmental Affairs	Terrestrial biodiversity and only delegated areas of marine biodiversity associated with MPAs.	Western Cape Province
	Western Cape Nature Conservation Board (WCNCB)	Conservation of natural resources, including the management of all public protected areas in the province, excluding those owned by the SANParks, protect and conserve biodiversity of the Western Cape, including the islands, but not the marine environment.	Western Cape Province, terrestrial and islands, not marine environment
	Provincial Government of the Northern Cape: Department of Agriculture, Land Reform, Environment and Conservation (DALEC), Directorate: Environment		Northern Cape Province
Local Government	Overstrand Municipality	Provide services for rate paying property owners and industrial activities, including marine law enforcement in the region.	Overberg Region of the Western Cape Province
	City of Cape Town: Environmental Management	Coastal biodiversity and broad environmental management within the City.	City of Cape Town
Parastatal	South African National Parks (SANParks)	Acquire and manage a system of national parks within South Africa and addressing transboundary issues	Whole country
Non-Government Organisations	-	-	-
Programmes	The Global Ballast Water Management Programme (Globallast)		
	CAPE Action Plan for the Environment		
Private sector	-	-	-

6. SUMMARY OF FINDINGS

6.1 ANGOLA

Sustainable Management and Utilisation of Living Marine Resources

Angola is well equipped in terms of its legal, strategic planning, research, management and enforcement capacity to address the BCLME Policy Action Area A: Sustainable management and utilisation of Living Marine Resources. While the legal framework is being updated to address some of the current shortcomings, the Ministry of Fisheries has a well-developed institutional structure as well as systems for monitoring catches determining TACs on the basis of stock assessments undertaken by the IIM. There are however, critical human resource deficiencies in terms of technical skills and infrastructure available in the Ministry and its departments. The Ministry reports that it currently does not have the required capacity to discharge of its responsibilities set out in the current fisheries legislation. The current Monitoring Surveillance and Control capacity is present in all coastal provinces but has needs in the areas of training, vessels as well as basic communications infrastructure. On the whole the Ministry reports an oversupply of administrative posts and personnel and a shortage of technical skills and insufficient office space, vehicles, computers and software. The IIM has identified a number of needs with respect to training and requires support in the development of communications infrastructure. It is also in the process of redefining its strategy and research focus. This revised strategy should inform a further assessment of institutional requirements for implementation of the strategy as well as training needs. The Institute for the Development of Artisanal Fisheries, which is also in a process of institutional restructuring, provides a significant local capacity that enables co-management of living marine resources, even with only 75% of its approved posts filled. The current BCLME projects, African Development Bank-funded centres and UNDP capacity building projects, as well as the IPA's establishment of associations and co-operatives, show good promise for capacity development at the local level. A critical concern though is the maintenance and support of the new facilities. Within all institutions mentioned above, fully developed training plans, that support the implementation of capacity development as well as general strategies, are absent.

While the key skills and training needs have been identified, a skills development strategy for the all of the Angolan institutions involved in the marine and coastal management sector appears to be lacking. The key to addressing the training priorities is by enabling partnership development between local institutions and regionally recognised institutions or active training programmes such as BENEFIT. Furthermore, the two existing fishing schools Cefepescas and Helder Neto, and the planned new fishing training facility, should be rationalised with a view to addressing industry priorities over the medium term. Neither of the existing schools are fully utilised and both are in apparent need of upgrading of vital equipment and infrastructure. The lack of a current marine sciences "stream" at the Faculty Science at the of National University of Agostinho Neto must be addressed as a matter of priority in order to enable the supply of graduates as interns or junior researchers at the IIM. It is recommended that marine science modules be presented at the science faculty and be developed in partnership with other SADC institutions.

Management of Mining and Drilling Activities

The environmental control by Angolan government authorities of the burgeoning oil industry in Angola's off-shore and onshore marine and coastal environments is severely under-capacitated. Both of the key government departments involved, the Ministries of Petroleum and Urban Affairs & Environment, report significant staff and skills shortages of environmental management expertise at the management and technical levels as well as monitoring capacity. Furthermore, one of the key legal instruments for managing environmental quality management, the Environmental Impact Assessment (in draft form) regulations, pollution and waste management regulations and water and air quality standards are not yet in place. Notwithstanding these legal deficiencies, the Ministry of Petroleum has developed reporting requirements for each stage of oil industry activities, which are required prior to the authorisation of such activities, as well as regular reporting on quantity and quality of waste discharges. The oil industry has mechanisms of self-regulation through industry association's standards and practices.

While there are no approved offshore diamond mining rights, the impact of mining on Angola's water resources and the quality discharged to sea and general waste management regulations, require urgent attention.
A key gap in this draft report is the assessment of the capacity of the Ministry of Mining and Geology. Critical areas of concern, other than the capacity to manage impacts from mining activities, are the extent to which rights will be granted for off-shore prospecting and the extent to which there is conflict or co-ordination between the Environmental Framework Act and the Mining Act.

Assessment of Environmental Variability, Ecosystem Impacts and Improvement of Predictability

The IIM, the Ministries of Urban Affairs & Environment and Petroleum and the University of Agostinho Neto are key Angolan partners in the National Environmental Monitoring Programme. This project will focus on sensitive environments as a priority. Other long-term monitoring programmes for the assessment of environmental variability and ecosystem impacts are largely run by the IIM or international or regional programmes such as the long-term monitoring programme of the Benguela-Angola Front area by BENEFIT (Namibe Monitoring Line). The establishment of further monitoring lines at Lobito and Luanda, north of the Beguela-Angola Front, have been suggested.

Currently, the IIM's Oceanography department and Environmental Unit and regional and international partners are responsible for implementing most of the relevant projects. The IIM's proposed new strategy together with BCLME's EVAG projects will identify and address priorities for monitoring Angola's marine environment and will be receiving dedicated funding for this purpose. While there is an appropriate focus of the EVAG's activities and resources on establishing a good basis for ongoing assessment of environmental variability and ecosystem impacts, a key concern is the development and retention of Angolan skills to ensure the sustainability of such interventions. While the upgrading of laboratories at Cabinda and Lobita will improve infrastructural capacity, oceanography, various environmental quality monitoring and chemical sampling techniques, research design and statistical analysis are key deficiencies in Angola's ability to contribute to the implementation of this BCLME SAP policy action area.

Management of Pollution

Angola's capacity to manage pollution from all perspectives (law, strategy, human capacity, training and infrastructure) requires urgent attention if it is to contribute significantly to the implementation of this BCLME priority action area. In the absence of a clear set of pollution and waste management regulations and air and water quality strategy and management, capacity development strategy, Angola's marine and coastal environment remains under significant threat of pollution. The key institution responsible for environmental quality, the Ministry of Urban Affairs & Environment currently has no dedicated capacity assigned to the management of pollution. Furthermore, the delegation of waste management to provincial and local authorities does not appear to have been linked to a capacity and skills development plan. The priority for local and provincial authorities is the delivery of basic services (including sanitation and waste management), for which there is a significant backlog. The Ministry of Petroleum, together with the oil industry, has made significant advances in the management of pollution through reporting requirements and will be concluding a National Oil Spill Contingency Plan; there are however capacity constraints in monitoring and verifying these reports. The cumulative pollution impact of the oil industry activities on Angola's marine resources has been highlighted as is one of the IIM's current projects.

The draft Water Act will also provide a regulatory framework for water quality management, however, in the absence of enabling pollution and waste management regulations and water and air quality standards, together with a lack of capacity for monitoring and enforcement, Angola's environment remains at risk.

Maintenance of Ecosystem Health and Protection of Biological Diversity

The Ministry of Urban Affairs and Environment has prioritised the development a National Biodiversity Strategy and Action Plan (NBSAP) the implementation of which will depend on all key resource management Ministries in Angola. This together with the National Environmental Monitoring Programme will assist in prioritising interventions in the conservation of biodiversity in the marine and coastal environments. One of the key gaps identified is the current lack of Marine Protected Areas in Angola. An analysis should be undertaken to inform the need for and position of MPAs. Coastal management capacity, specifically from a biodiversity perspective, appears not to be receiving adequate attention in the context of significant development potential of Angola's coastline. The current lack of EIA regulations to assess the potential impacts of proposed development, together with the lack of environmental databases, could result in the destruction of sensitive environments.

The IIM has reported capacity requirements in taxonomy in terms of developing species inventories for marine sedimentary organisms currently being impacted by oil drilling. The implementation of the NBSAP must be enabled through the further assessment and development of capacity for management of biological diversity.

The following summarises categories of training needs in Angolan institutions relevant to the implementation of the BCLME SAP.

Table 6.1. Summary of key training requirements for the various Ministries and Institutions in Angola involved in implementing the various policy action areas of the BCLME programme.

	Leadership skills	Project/ programme management	Practical training	Use of basic computer software	Use of advanced computer software	Experimental design	Fisheries management and stock assessment	Coastal zone management	Assessment, management and monitoring g of environmental impacts	Communications	Ecology	Technical training
Ministry of Fisheries												
Cabinet of Planning Studies and Statistics	X	X			X					X		
Inspectorate (includes MSC)			X	X				X		X	X	X
National Directorate of Fisheries	X	X			X	X	X	X	X	X	X	X
Institute for Marine Research (IIM)	X	X		X	X	X	X	X	X	X	X	X
Institute for the Development of Artisanal Fisheries (IPA)	X	X	X	X			X	X		X	X	X
Ministry of Urban Affairs and Environment												
National Directorate of Environment	X	X	X	X	X			X	X	X	X	X
Ministry of Petroleum												
Department of Environmental Protection	X	X	X	X	X			X	X	X	X	X
Ministry of Education												
All departments		X								X		
University of Agostino Neto												
Faculty of Science		X			X	X		X	X	X		
Cefepeches												
All departments	X		X	X			X	X		X	X	X
Helder Neto												
All departments	X		X	X			X	X		X	X	X

6.2 NAMIBIA

Sustainable Management and Utilisation of Living Marine Resources

The Ministry of Fisheries and Marine Resources (MFMR) is the lead agency in respect of the management of exploitation of living marine resources in Namibia. It comprises four sub-directorates each with its own portfolio. The Directorate of Operations is responsible for monitoring, control and surveillance, and with the assistance of the parastatal Fishery Observer Agency, appears to be doing an excellent job in this respect. The Fishery Observer Agency is able to maintain virtually complete coverage of all the larger fishing vessels operating in Namibian waters, while the Directorate of Operations undertakes regular sea, shore and air patrols, at-sea inspections and monitors a good proportion of the landed catches. Considerable effort is put into staff training but additional assistance is still required in respect of providing senior and mid-level staff with management and leadership skills and data manipulation skills for all staff members. The Directorate of Resource Management is responsible for providing information and advice required for sustainable utilisation and management of living marine resources in Namibia. Staff in this directorate are mostly well qualified academically, but many lack the necessary experience required to do their jobs successfully. The loss of a high proportion of their experienced staff in recent years, and continuing high staff turnover, has taken its toll on research output and requires that certain key functions have to be outsourced (e.g. stock assessments). Cooperation with the fishing industry is good, with industry providing the vessels and crew required for many of the stock assessment surveys. The existing staff complement within the Directorate of Resource Management needs to be boosted by filling vacant posts and through the creation of new posts, and existing training and capacity building activities need to be enhanced. The Directorate of Policy, Planning and Economics is responsible for administering fisheries legislation and regulations, which seem to be adequate for the purpose, as well as for managing the collection of fees generated by fishing activities and the collection and preparation of fisheries statistics and information. This is a relatively new Directorate and is still establishing itself in many respects. The Directorate on Aquaculture has also only recently been established and still needs to be built up into a fully operational unit. Staff positions have been identified and approved though and an assessment of basic training requirements has been drawn up.

Management of Mining and Drilling

Management of the environmental effects of mining and petroleum exploration and production activities on the marine environment in Namibia is, at present, shared between the Ministry of Mines and Energy (MME), the Ministry of Environment and Tourism (MET) and the Ministry of Agriculture, Water and Rural Development (MAWRD). Legislation governing prospecting and mining for minerals is fairly stringent but the lack of compliance monitoring, particularly in respect of minerals other than petroleum, renders it somewhat inefficient. In terms of the law, mining companies are generally required to undertake environmental assessments for both mining and prospecting and to prepare environmental management plans (EMPs) before mining commences. Mining inspectors from the Ministry of Mines and Energy and staff from the Directorate of Environmental Affairs and the Department of Water Affairs are supposed to ensure compliance with these requirements and to ensure that companies adhere to permit conditions and specifications contained within their EMPs. In practice though, severe staff shortages and lack of appropriately

trained staff in all of these agencies, means that compliance is mostly left up to the discretion of the mining companies. The staff compliment of all three of these agencies needs to be boosted dramatically and appropriate training programmes need to be implemented to enhance the capacity of existing staff as well as any new staff members.

Assessment of Environmental Variability, Ecosystem Impacts and Improvement of Predictability

Responsibility for monitoring and researching oceanographic variability off Namibia lies with the Directorate of Resource Management within the Ministry of Fisheries and Marine Resources. The subdivision Environment, within the Directorate, has certain staff dedicated for this purpose, including a number of physical and chemical oceanographers based at Swakopmund and Lüderitz. Key physicochemical and biological data are collected off the coast of Namibia by staff in this subdivision through routine as well as opportunistic monitoring projects including dedicated and opportunistic cruise, remote sensing and weather station data. In spite of a severe shortage of staff and resources, an impressive array of data has been accumulated, some spanning relatively long time periods. However, understanding of linkages between the environment and fish stocks in the northern Benguela remains poor though.

Management of Pollution

The legal and institutional framework for control of pollution in Namibia is highly fragmented and poorly coordinated. Responsibility for pollution control is shared between at least eight different government ministries and few formal mechanisms exists to facilitate cooperation between them. New legislation has been developed which would dramatically improve the situation and eliminate many of the current problems but this seems to have stalled before coming into force. The Directorate of Resource Management, Department of Water Affairs within the Ministry of Water and Rural Development is the lead agency responsible for management of any pollution reaching the sea from the land. This directorate is critically short of staff, particularly regionally based staff that can assist with monitoring and compliance activities. The Directorate of Maritime Affairs in the Ministry of Works, Transport and Communication is responsible for management of pollution that enters the sea from ships and offshore installations. This Directorate is also critically understaffed. Marine pollution is not a major issue in Namibia though, and that which does exist, is fortunately mostly localised in nature.

Maintenance of Ecosystem Health and Protection of Biological Diversity

The Ministry of Environment and Tourism (MET), Directorate of Resource Management within the Ministry of Fisheries and Marine Resources (MFMR) and relevant municipalities are collectively responsible for ensuring that coastal development activities in Namibia are environmentally sustainable. Legal and statutory protection for marine biodiversity in Namibia is somewhat scant though, and is ostensibly catered for by the Marine Resources Act, 2000. This Act is directed almost exclusively towards control and management of exploitative activities rather than protection of biodiversity. The greatest threats to marine biodiversity in Namibia is overfishing, and to a lesser extent, mining and pollution. Ultimate responsibility for conservation of marine biodiversity in Namibia lies with a small group

of staff in the Directorate for Resource Management in the Ministry for Fisheries and Marine Resources and with compliance staff responsible for control of mining and pollution.

Table 6.2.1. Summary of key training requirements for the various Ministries and Directorates in Namibia involved in implementing the various policy action areas of the BCLME programme.

	Leadership skills	Project/programme management	Practical training	Use of basic computer software	Use of advanced computer software	Experimental design	Fisheries management and stock assessment	Coastal zone management	Assessment, management and monitoring of environmental impacts	Communications	Ecology	Technical training
Ministry of Fisheries and Marine Resources												
Directorate of Operations	X	X	X	X			X				X	X
Directorate of Resource Management			X	X	X	X	X	X			X	X
Directorate of Policy, Planning and Economics[1]												
Directorate on Aquaculture			X	X	X			X	X		X	X
Fishery Observer Agency[1]												
Ministry of Environment and Tourism (Directorate of Environmental Affairs)												
Directorate of Environmental Affairs			X	X				X	X		X	X
Ministry of Agriculture, Water and Rural Development												
Department of Water Affairs			X	X				X	X			X
Ministry of Works, Transport and Communication												
Directorate of Maritime Affairs[1]												
Ministry of Mines and Energy												
Directorate of Mining			X	X				X	X		X	X
Regional Councils (Kunene, Erongo, Hardap, Karas)[1]												
Town Councils (Henties Bay, Swakopmund, Walvis Bay and Luderitz)[1]												

1. Project team members were unable to secure interviews with or obtain responses from personnel from these institutions

6.3 SOUTH AFRICA

Sustainable Management and Utilisation of Living Marine Resources

The Department of Environmental Affairs and Tourism (DEAT) is the all-encompassing government department addressing environmental issues within South Africa. The branch Marine and Coastal Management (MCM) within DEAT are the lead agents for all government related marine environmental matters within South Africa and all departments therein address sustainable management and utlisation of marine resources in various manners. A lack of human capacity within MCM is highlighted as being the most critical aspect of the organisation, exacerbated by the fact that many of the posts available are vacant, and have been so for in excess of six months, some for up to two years. All departments expressed a desire to have a structured training programme across all levels and felt that this would enhance their abilities to perform their duties effectively. Specific international training needs (e.g. stock assessment) that are usually more expensive, are not perceived to be available. MCM's infrastructure was expressed as being good to excellent with the only unanimous weakness currently being the email service provider and for some departments, research vessels were also expressed as unsuitable or insufficient.

The Provincial Government of the Western Cape, Chief Directorate: Environmental Affairs and Development Planning (DEA&DP) agreed to co-operative governance over environmental issues with the Western Cape Nature Conservation Board (WCNCB) in 2000. The majority of marine related management and utlisation of resources was delegated to WCNCB, however, no official agreement was entered into relating to marine environmental resource management by national government. This resulted in DEA&DP delegating their marine responsibility to WCNCB whose mandate did not include the marine environment. Although WCNCB have maintained limited marine management, it is the intention to formally sign an agreement of understanding between WCNCB and national government on this matter. The lack of clear policies or guidelines at provincial level have prevented effective management of marine resources. Additional staff and training will be required by WCNCB to implement effective marine management. Provincial governance of environmental matters within the Northern Cape Province is the duty of the Department of Agriculture, Land Reform, Environment and Conservation (DALEC). This provincial department only has two staff members and is thus severely lacking in human capacity and also required intensive training, specifically in marine related matters e.g. marine environmental impact assessment. Infrastructural capacity was also identified as being severely limiting.

In general, local authorities in South Africa contribute little toward management of living marine resources but some, like the Overstrand Municipality, do make an important contribution. Additional focus on human capacity, training and delegation of responsibilities to local municipalities, could greatly improve monitoring and compliance along the South African coast.

The legislation affecting coastal management in South Africa is currently fragmented and administered by a range of different government departments and agencies. Much of this legislation is either awaiting revision or replacement to incorporate coastal considerations, or is relatively new and the applications thereof have yet to be tested. The

Marine Living Resources Act principally addresses marine resource management and sustainablility and although various issues are considered to be insufficiently covered, overall the Act is considered suitable. Amendments to the Act could be used to close several loop-holes, as identified.

Management of Mining and Drilling

All laws and matters relating to mineral and energy aspects are administered under the control of the Minister of Minerals and Energy at national government level. The Department of Minerals and Energy (DME) is the official governing body for all environmental mining impacts within South Africa, however, they makes use of consultation and evaluation by several other government departments, namely; Department of Agriculture, Department of Water Affairs and Forestry, Department of Environmental Affairs and Tourism (specifically Marine and Coastal Management) and local municipalities in relation to environmental issues. The principle legislation pertaining to the mineral industry is the Minerals Act of 1991, which does not address issues relating to the marine environment. Due to a complete lack of any marine environmental expertise within the DME Mine Environmental Management sub-directorate, there is an urgent need for training in all marine related aspects including EIA and EMP evaluation. The petroleum section of mining in South Africa has, thus far, been largely ignored by DME in terms of environmental issues, due to a severe shortage of staff and suitable expertise in the sub-directorate. It is likely that the petroleum section of mining in South Africa will be delegated to the Petroleum Agency of South Africa (PASA) early in 2004. Additional staff capacity, vehicles and suitable communication equipment were expressed as being needed within the sub-directorate. Provincial government departments (Western Cape and Northern Cape) partake in addressing mining related environmental matters in evaluating EIA's and EMP's within their regions, although no departments or staff are dedicated to this role.

Assessment of Environmental Variability, Ecosystem Impacts and Improvement of Predictability

The responsibility of environmental variability, ecosystem impacts and improvement of predictability lies with The Directorate: Research and Development of Marine and Coastal Management. A specific concern raised by the relevant sub-directorates of MCM in relation to Policy Action Area C was the fact that expertise required for training in this field is only available from first world countries with very limited local or SADC region expertise being able to meet the level of training required. Insufficient staff and lack of adequate training were highlighted as crippling to the functioning of the sub-directorates. Legislation and policy, currently in existence, relating to aquaculture and the impact on health and safety of harmful algal blooms and red tides were considered to be wholly insufficient and vague. Although valuable data is regularly produced from this organisation relating to long-term monitoring, the relevant expertise for evaluation and efficient use of this data is lacking.

Management of Pollution

The institutional capacity for management of pollution within South Africa is considered to be fragmented and disjointed, making laws and policies difficult to implement. Although the legislation is well provided for, the implementation of the law is poor and fragmented with various responsibilities resting with various organisations.

There is no lead implementing agency to provide a co-ordinating role for marine pollution management. The responsibilities of marine pollution combating lies within the Chief Directorate: Resource Management, Directorate: Integrated Coastal Management and Development, Sub-Directorate: Marine and Coastal Pollution Management. This sub-directorate only has 40% of the human capacity allocated and requires specific, international training in order to fulfil its mandate. The Department of Water Affairs and Forestry (DWAF) is responsible for the management and regulation of freshwater resources in South Africa including the quality of water discharged through marine outlets. The legislation relating to this is however virtually non-existent and a lack of capacity to adequately monitor compliance to permit conditions results in very limited control over this type of marine pollution. There appears to be a gap in monitoring of seawater quality in general. The Department of Transport delegated all national responsibility for marine pollution prevention to the South African Maritime Safety Authority (SAMSA). Although this statutory body is currently undergoing re-structuring, again, human capacity is currently severely lacking in order to fulfil the assigned mandate and training from international sources, was urgently required. Due to the lack of a co-ordinating body for pollution management, the provincial governments of the Northern and Western Cape implement very limited control or monitoring of marine pollution. Local municipalities within this region are responsible for monitoring marine effluent discharge and report to DWAF. No management or mitigation is conducted at municipal level.

Maintenance of Ecosystem Health and Protection of Biological Diversity

Maintenance of ecosystem health and protection of biological diversity in South Africa is primarily the responsibility of the Department of Environmental Affairs and Tourism, and is addressed by two branches 1) Biodiversity and Conservation and 2) Marine and Coastal Management (MCM), however, the branch Marine and Coastal Management is currently the primary management body for such marine related aspects. Legislation relating to ecosystem health and protection of biological diversity was expressed as being vague and insufficient and a lack of staff capacity and training, specific to the needs of this aspect of marine management, were considered to hinder fulfilment of their roles. There is little control over non-consumptive use of the marine environment. There is currently limited direct ecosystem health monitoring or biodiversity protection undertaken at provincial government level, largely due to lack of specific policies and sufficient staff to address these issues. Addressing of specific needs for maintenance of ecosystem health and protection of biological diversity is required in terms of dedicated staff, specific training and clarification of policies and legislation.

Table 6.3.1. Summary of key training requirements for the various Ministries and Directorates in South Africa involved in implementing the various policy action areas of the BCLME programme.

	Leadership skills	Project/programme management	Practical training	Use of basic computer software	Use of advanced computer software	Experimental design	Fisheries management and stock assessment	Coastal zone management	Assessment, management and monitoring of environmental impacts	Communications	Ecology	Technical training
Marine and Coastal Management												
Directorate: Research & Development	X	X			X	X	X			X		
Chief Directorate: Monitoring & Compliance	X	X	X	X	X		X	X		X	X	
Directorate: Integrated Coastal Management & Development	X	X						X	X	X		
Directorate: Support Services			X		X							X
Department of Minerals and Energy	X	X	X					X	X	X	X	
Department Water Affairs & Forestry		X						X	X	X	X	X
Department of Environmental Affairs and Development Planning, Western Cape Province		X						X	X	X		
Western Cape Nature Conservation Board		X	X					X	X			
Department of Agriculture, Land Reform, Environment and Conservation		X	X					X	X			
South African Maritime Safety Authority			X									X
City of Cape Town	X	X				X		X	X			X

7. GAPS TO BE ADDRESSED BY THE BCLME PROGRAMME

7.1. GAPS IN POLICY & LEGISLATION

Angola

The key gaps in Angola's legislative framework are in the environmental impact management and environmental quality management areas. While the Constitution and Environmental Framework Act cover these areas, the draft EIA regulations are yet to be promulgated and pollution and waste management regulations are still to be developed. Furthermore, Angola has not developed a national set of air or water quality standards as a regulatory instrument for managing industrial (and general urban) effluent and emissions. The new Fisheries Act, currently in draft, should be reviewed in the light of the following gaps identified: 1) the extent to which artisanal fisheries interests are promoted, 2) the legal empowerment of monitoring control and surveillance officers; 3) the development of mariculture and 4) the establishment and management of marine protected areas. A key issue raised regarding the law is the extent to which the content and requirements are communicated in the fishing industry.

Within most of the relevant Ministries and related institutes there is inadequate strategy and planning to enable a systematic approach to addressing the priorities in marine and coastal management. Key gaps here include the apparent lack of a national pollution control and waste management strategy for Angola.

Namibia

Certain key gaps exist in the policy and legal framework for Namibia and are hampering management efforts in respect of control and management of pollution and environmental impacts. Namibia's Environmental Assessment Policy is very progressive and provides a useful framework for environmental management, but associated legislation for the control of environmental impacts is lacking. Development of an Environmental Management Bill began in 1996 and has been through at least six different drafts but has still not been approved by Parliament due to a lack of consensus over how environmental impacts should be managed in Namibia. A new Pollution and Waste Management Bill has also been developed and should replace some rather fragmented and antiquated legislation currently in use for the purpose. It will also allow for the consolidation of all pollution management responsibilities within a single agency – the Pollution Control and Management Agency – which will eliminate much of the current confusion over which Ministry is responsible for what. Namibia still relies on a very old Water Act developed in 1956 when the country was still being governed by South Africa, for the management of water issues, including water pollution. A new draft Water Bill is in preparation and will hopefully be completed soon. New legislation is also required for the control of pollution from ships and offshore installations, as this is not adequately covered at present.

South Africa

The legislation affecting coastal management in South Africa is currently fragmented and administered by a range of different government departments and agencies. Much of this legislation is either awaiting revision or replacement to incorporate coastal considerations or is relatively new and the applications thereof have yet to be tested. The Marine Living Resources Act principally addresses marine resource management and sustainablility and although various issues are considered to be insufficiently covered, overall the Act is considered suitable. Amendments to the Act could be used to close several loop-holes, as identified. As examples; the Marine Living Resources Act does not adequately provide for delegation of responsibilities to a suitable or appointed authority for specific issues and issues relating to mariculture have not been addressed. Various aspects of the National Environmental Management Act that have proved to be inadequate, are currently being addressed by means of amendments or regulations being published. Legislation pertaining to marine pollution is comprehensive, however, policies relating to the implementation thereof are vague and inadequate.

7.2. HUMAN CAPACITY NEEDS

Angola

The implementation of the new legislation, the National Environmental Management Plan and the National Biodiversity Strategy and Action Plans, the new IIM strategy as well as the new developing legislation, can only be implemented with due consideration of capacity requirements. It is essential that implementation plans are developed in tandem with capacity development plans, including ensuring efficient institutional structures, relationships and systems, adequate staffing and training. The implementation of these laws, strategies and plans will only be as effective as the institutions empowered to undertake the work.

While all of the agencies interviewed reported staff shortages, the Ministry of Urban Affairs and Environment is the most severely under-resourced of the responsible Angolan partnering agencies. The Ministry of Petroleum's environmental management expertise is also inadequate, even with the approval of four new staff members, specifically in the light of the speed and scale of development in the oil industry. The Ministry of Fisheries reports too few technical staff to fulfil current legal responsibilities, while it is likely that the capacity requirements for the implementation of the environmental responsibilities, being considered in the draft Water Act, have yet to considered. The critical staffing requirements have been described in section 3.3 to 3.8 above. Overall and within all responsible agencies, management and technical staffing levels are requiring significant development. The key skills within these levels of staffing include environmental impact management and environmental monitoring in the marine and coastal environments.

There appears to be a lack of critical joint planning and communication between government, industry and the research and education and training institutions to systematically address the capacity gaps. A key problem raised is the low pay of government officials and the fact that many skilled people have moved or are easily attracted to higher paying private sector jobs.

The IIM's revised strategy presents a unique opportunity to address human capacity needs, however the institute is also well-placed to build capacity in the marine and coastal sector as a whole. It is clear that a medium-term capacity development strategy is required for the marine and coastal management sector in Angola. Such a strategy would need to be developed in partnership with all relevant government agencies, local and regional training institutes regional programme partners such as BENEFIT and the BCLME Programme

Namibia

There is a critical shortage of staff in many of the Ministries and Directorates whose responsibility it is to administer the various policy action areas that make up the BCLME programme. In some respects this is a function of the numerous vacant posts existing that need to be filled (e.g. in the Ministry of Fisheries and Marine Resources), in others, posts need to be created (e.g. Directorate of Environmental Affairs in the Ministry of Environment and Tourism), while in others the relevant duties and responsibilities must still be devolved to the appropriate local authority (e.g. monitoring and control of water pollution by local authorities). A concerted effort needs to be made to create and fill positions where capacity gaps exist such that the relevant institutions can take maximum advantage of the BCLME programme under which new staff (which are likely to be inexperienced and possibly under qualified) can be trained.

South Africa

The most critical and unanimous aspect to be addressed in marine conservation organisations is that of human capacity. The majority of directorates in national, provincial and local government offices are under-staffed and functioning on minimal human resources. Many of the posts are vacant and have been for some time (e.g. Marine and Coastal Management). This is attributed to either the lengthy, complicated, bureaucratic procedures required to fill a vacant post or because there are no suitable candidates to apply for the post. Other organisations need to create additional posts to enable directorates to address all issues relating to their mandate (e.g. Department of Minerals and Energy). There is also a lack of recognised procedures and agreements that clearly delegate specific duties to relevant local or provincial authorities. If all the posts that were vacant at the time of this study were to be filled with suitably qualified persons, South Africa would be powered to start implementing sound marine and coastal management.

7.3. TRAINING NEEDS

Angola

The details of the identified training needs have been presented in sections 3.3 to 3.8. There are however key interventions that could assist local capacity development significantly over the medium to long term. The most important of these interventions is the development of capacity development strategy for the marine and coastal

management sector. Two essential parts of this strategy must be the co-ordination and rationalisation of current training programmes and institutes as well as the development of an academic marine sciences "stream".
The curricula and staffing capacity of local institutions offering technical level training in marine and coastal management (Cefepescas, Helder Neto and IPA) should be reviewed in order that they can become relevant and active partners in the implementation of a national capacity development strategy. While most marine scientists in Angola obtain academic qualifications abroad, with marine and coastal resources being the basis of one of the cornerstone industries in Angola, fisheries, there is a requirement for the development of at least a few marine science modules at the Faculty of Science, in partnership with the IIM. These modules could be developed and presented in partnership with other academic institutions based in the region. The development of such modules would attract local students into the sector and enable the IIM to identify suitable candidates to be involved in internship programmes and post-graduate studies that address Angola's research priorities. The BCLME Programme and the IIM are well placed to initiate the development of a sector capacity development strategy in Angola and should plan to engage the Ministry of Education and all other relevant partners to discuss this proposal.

The type of training that appears to be most effective is formal training courses linked to in-service-training. Almost all of the respondents interviewed indicated a preference for training to be presented locally and for in-service-training to be a key part of the strategy.

Finally, many of the organisations engaged in this study report severe budget and infrastructure constraints, the most significant of these being vessels, office space, computer hardware and software and basic communications, including telefax and email.

Namibia

A preliminary breakdown of training needs for the various Ministries and Directorates whose responsibility it is for implementing the various policy action areas of the BCLME is summarised in section 6.2. A diverse range of skills are required by staff members in the various institutions and need to be provided in as short a time as possible, using a variety of different mechanisms. Training is required at virtually all levels and for a huge variety of disciplines and cannot easily be summarised here. Rather than seeking to develop a generic training plan for all institutions it would be better to ascertain the precise needs for all staff members in the relevant institutions through further consultation with senior management in these institutions and with the staff members themselves. Once this is done, appropriate links need to be established between the institutions where training is required and those institutions that can provide such training or expertise, while at the same time seeking the necessary funding required for the purpose.

South Africa

A breakdown of training needs for various organisations expressed by interviewees is summarised in section 6.3. From this summary, it is evident that the majority of organisations and departments desire suitable project or programme management training, clearly an indication that current staff are struggling to cope with their work loads.

They also require training in coastal zone management and assessment of environmental impacts, both these aspects being highly specific skills. This suggests that many personnel are not suitably qualified to be undertaking the work they are. Fishery management and stock assessment training is urgently required by a specific group within the national government who are directly responsible for managing fisheries, again indicating the urgency in training staff to competently undertake their tasks. Various levels of practical and specialised equipment training are needed as indicated. Training in monitoring and compliance was also expressed as being urgently needed. As not one interviewee suggested that no training is needed, it can be concluded that training, at all levels of employment and across all levels of institutions, is needed within marine environmental management.

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9. LIST OF PEOPLE CONSULTED

9.1. ANGOLA

Name	Position	Organisation
Maria de Lourde Sardinha	Director: BCLME Biodiversity, Ecosystem Health and Pollution Activity Centre	BCMLE Porgramme/UNOPS
Ms Lucinda Alfredo Gourgel Baptista	Head of Human Resources	Ministry of Fisheries
Ms Filomena Mata		Institute for Marine Research (IIM)
Dr Nkosi Lyyeye		Institute for Marine Research (IIM)
Dr Filomena Vaz Velho		Institute for Marine Research (IIM)
Dr Caterina Ruby		Institute for Marine Research (IIM)
Dr Isabel Rangel		Institute for Marine Research (IIM)
Dr Francisca Delgado		Institute for Marine Research (IIM)
Dr Domingos Silva		Institute for Marine Research (IIM)
Dr Mustapha		Institute for Marine Research (IIM)
Ms Tungu Silvain		Institute for Marine Research (IIM)
Ms Evaristo Lourenco		Institute for Marine Research (IIM)
Dr Olivia Torres		Institute for Marine Research (IIM)
Dr Maria Avelina Correia Victor		Institute for Marine Research (IIM)
Dr Lia Neto		Institute for Marine Research (IIM)
Dr Julia Ferreira		Institute for Marine Research

		(IIM)
Mr Moises Longui	Director	Institute for the Development of Artisanal Fishing
Dr Augusta Martins	Head of Microbiology	Faculty of Science, University of Agostino Neto
Dr Filomena Livramento	Research Scientist	Faculty of Science, University of Agostino Neto
Dr Elissaveta Loutehauck	Head of Plant Biology	Faculty of Science, University of Agostino Neto
Mr Carlos dos Santos	Director	Ministry of Urban Planning and Environment
Ms Maria Paulina	Head of Environmental Quality Department	Ministry of Urban Planning and Environment
Ms Juliette Condes	Head of Environmental Licensing Department	Ministry of Urban Planning and Environment
Ms Antonia Costa	Human Resources of the General Sectretariat	Ministry of Urban Planning and Environment
Manuel Xavier Jr	Head of the Environmental Department	Ministry of Petroleum
Mr Lufuwiankanda Eduardo	Director: Education	Cefepeches
Mr Joaqim Bernarde	Head of Human Resources Department	Ministry of Education
Mr Neville Swiejd	Director	BENEFIT

9.2. NAMIBIA

Name	**Position**	**Organisation**
Dr Mick O'Toole	Chief Technical Adviser	BCLME Programme
Dr Neville Sweijd	Director	Benefit Programme
Ms Connie Claasens	Acting Head, Environmental Assessment Unit	Dep. Environmental Affairs, MET
Dr Burger Oelofsen	Director: Resource Management	MFMR
Mr Steven Ambambi	Deputy Director: Technical Services	MFMR
Mr Roland Roeis	PCCM Coastal Regions & Projects	Dep. Water Affairs, MAWRD
Mr Christer Alexanderson	Training Co-ordinator	SADC MCS Programme
Dr Christopher Brown	Executive Director	Namibia Nature Foundation
Dr John Barnes		Dep. Environmental Affairs, MET

Mr Teofilus Nghitila	PSC, Pollution	Dep. Environmental Affairs, MET
Mr Wessel Smit	Resource Centre	Dep. Environmental Affairs, MET
Dr Gabi Schneider	Director, Geological Survey	MME
Dr Lizette Voges		Namibia Nature Foundation/MFMR
Stephen Cederrand		SADC MCS Programme
De. Sindila Mwinya	Chief Environmental Geologist, Geological Survey	MME
Veston Malango	Chief Government Mining Engineer	Mining Directorate, MME
Japhet Iitenge	Dep. Director Pollution	Directorate Maritime Affairs, MWTC
John Rogers	General manager, Chamber of Mines of Namibia	
Emmanuel Mulunga	Petroleum Commissioner, Directorate of Petroleum	MME
Chris Batholomae	Acting Chief: Environment	DRM, MFMR
Ekkehard Klingelhoeffer	Director: Aquaculture	MFMR
Ger Kegge	Consultant	Ex-MME
Mr Dave Boyer	Consultant	Ex-MFMR
Dr Peter Tarr	Consultant	SAIEA

9.3. SOUTH AFRICA

Name	**Position**	**Organisation**
Mr Eddy Russel		UNDP
Mr Fanie Bekker	Director: Operations	Western Cape Nature Conservation Board
Dr Kas Hamman	Director: Biodiversity	Western Cape Nature Conservation Board
Mr Ashley Naidoo	Deputy Director: Research, Support and Administration	Marine and Coastal Management
Dr Johan Van Zyl	Director: Compliance	Marine and Coastal Management
Dr Rob Leslsie	Specialist Scientist: Research, Support and Administration – Stock Assessment	Marine and Coastal Management
Mr Noel Williams	Director: Subsistence Fishing Management Acting Director: Integrated Coastal Management	Marine and Coastal Management

Mr Philip de Bruyn	Deputy Director / Chief Engineer: Technical Services	Marine and Coastal Management
Dr D.E. (Niel) Malan	Deputy Director: Integrated Coastal Management	Marine and Coastal Management
Dr Larry Hutchings	Chief Specialist Scientist: Ecosystem Utilisation and Conservation	Marine and Coastal Management
Dr Johan Augustyn	Director: Research and Development	Marine and Coastal Management
Ms Teresa Akkers	Assistant Director Oceanography: Offshore Resources	Marine and Coastal Management
Dr Geoff Bailie	Assistant Director: Ocean Environment, Phys-Chem Oceanography	Marine and Coastal Management
Ms Gail Nxumalo	Senior Oceanographer: Marine and Coastal Pollution Management Acting Assistant Director: Marine and Coastal Pollution Management	Marine and Coastal Management
Mr Horst Kleinschmidt	Deputy Director General: Marine and Coastal Management	Marine and Coastal Management
Mr Phakamani Buthelezi	Chief Director: Resource Management	Marine and Coastal Management
Mr Kobus de Swart	Assistant Director: Business Economics, Economic Studies	Marine and Coastal Management
Dr Carl van der Lingen	Specialist Scientist: Offshore Resources – Surveys and Fish Behaviour	Marine and Coastal Management
Dr Grant Pitcher	Principle Specialist Scientist: Mariculture and Research Aquarium	Marine and Coastal Management
Dr Hans Verheye	Principle Specialist Scientist: Ocean Environment, Biological Oceanography	Marine and Coastal Management
Dr Andy Cockcroft	Principle Specialist Scientist: Inshore Resources	Marine and Coastal Management
Mr Chris Wilke	Control Oceanographic Technician: Inshore Resources	Marine and Coastal Management
Mr Rob Cooper	Control Oceanographic Technician: Offshore Resources	Marine and Coastal Management
Mr Anton Meyer	Environmental Officer	Department of Agriculture, Land Reform, Environment and Conservation

Mr Adnan Awad	Country Focal Point Assistant	International Maritime Organisation, GloBallast Programme
Ms Nosipho Sobekwa	Pollution Specialist – Marine	South African Maritime Safety Authority
Dr Lynn Jackson	Global Invasive Species Programme Coordinator Ex: Deputy Director: Marine and Coastal Pollution Management, MCM	Global Invasive Species Programme
Dr Ernst Baard	Manager: Scientific Services	Western Cape Nature Conservation Board
Ms Vivienne Mabille	Ex: Assistant Director: Mine Environment Management	Ex: Department of Minerals and Energy
Ms Lesley Staegemann	Director of Activity Center: Environmental Variability, Ecosystem Impacts and Improvement of Predictability, South Africa	BCLME Programme
Ms Elize van der Watt	Senior Environmentalist: Department of Minerals and Energy	Department of Minerals and Energy
Mr Gareth McConkey	Deputy Director: Water Resource Protection, Southern Cluster	Department Water Affairs & Forestry
Ms Jeanette de Jager	Environmental Management: Compliance Monitoring and Enforcement	Department of Environmental Affairs and Development Planning, Western Cape Province
Mr Jaques du Toit	Co-ordinator Coastal Livelihoods Programme	Department of Environmental Affairs and Development Planning, Western Cape Province
Mr Mark O'Bree	Interim Manager: Catchment Management Stormwater and Rivers	City of Cape Town
Mr Gregg Oelofse	Coordinator Policy and Research: Environmental Management Department	City of Cape Town

APPENDIX 1: CAPACITY AND TRAINING NEEDS ASSESSMENT QUESTIONNAIRE

Capacity and training needs assessment questionnaire

We are attempting to evaluate capacity within your organisation/department/section with respect to implementation of the key policy action areas of the Benguela Current Large Marine Ecosystem (BCLME) Programme. These are:

A: Sustainable Management and Utilisation of Living Marine Resources

B: Management of Mining and Drilling Activities

C: Assessment of Environmental Variability, Ecosystem Impacts and Improvement of Predictability

D: Management of Pollution

E: Maintenance of Ecosystem Health and Protection of Biological Diversity

Please refer to the BCLME website for further information on these policy action areas
http://www.bclme.org/resources/index.htm

Please would you assist us in this regard by answering the questions below.

1. Name: _____ Organisation: _____
   Position: _____

2. Please indicate which of the BCLME action areas your department is involved in:

   A: Sustainable Management and Utilisation of Living Marine Resources

   B: Management of Mining and Drilling Activities

   C: Assessment of Environmental Variability, Ecosystem Impacts and Improvement of Predictability

   D: Management of Pollution

   E: Maintenance of Ecosystem Health and Protection of Biological Diversity

3. How many staff members are there in your organisation/department/section? Please split them up as indicated below:

	Number of staff
Management staff	
Research staff	
Technical staff	
Administrative staff	

4. What is your opinion on the efficacy of the existing policy and legal framework designed to cover your field of management?

_____

_____

5. How would you describe the current situation at your ministry/directorate/division/agency/organisation (select a, b c or d)

   a. Existing staff compliment adequate, no need for additional training at any level

   b. Existing staff compliment adequate, but certain staff members would benefit from additional training

   c. Too few staff to fulfil assigned mandate, but existing staff have adequate training

   d. Too few staff to fulfil assigned mandate, and certain staff members would benefit from additional training

   If you selected option "b" or "d", please go to Q 6. If you selected "c" or "d" then go to Q7.

6. Please indicate at what level training is required (Options "b" and "d" from Q5). You may tick more than one box.

   a. Training required at management level

   b. Training required at operational level

   c. Training required for research staff

   d. Training required for technical staff

7. Please indicate at what level additional capacity is required (Option "c" and "d" from Q5) . You may tick more than one box.

   a. Additional management staff required

   b. Additional operational staff required

   c. Additional research staff required

   d. Additional technical staff required

8. Does your ministry/directorate/division/agency/organisation have in place a capacity development or training plan? (If yes please supply details)

9. In terms of infrastructural capacity (i.e. vehicles, vessels, office space, computers etc.), do you feel that there is insufficient resources in the following areas:

	Yes	No
Office space		
Numbers of vehicles/vessels		
Computer hardware		
Communications equipment (telephone/fax/email/radio)		
Operational budget		

10. Various models exist for training staff. Which of the following do you think would be the most appropriate/suitable model for your agency (you may select more than 1 option)?

Experts are brought in to work within your agency for a limited period (a few months up to a year) giving staff an opportunity to learn by working with these people

Staff attend training workshops either within or outside the country

Staff are given an opportunity to go on paid sabbatical – i.e. spend 6 months to a year at an approved institution working on projects/programmes that are likely to further their knowledge or training

Staff attend short training courses either within or outside the country (up to 1 month)

Staff enrol for higher degrees/diplomas at institutions within or outside the country

11. With respect to staff training please select the appropriate option(s)

a. Institutions exist within the country to which staff can be sent for further training Y/N

If yes please supply details: _____

_____

b. Institutions exist within the SADC region to which staff can be sent for further training Y/N

If yes please supply details: _____

_____

c. Expertise is available within the country which can be brought in to build capacity within your organisation Y/N

If yes please supply details: _____

_____

d. Expertise is available within the region which can be brought in to build capacity within your organisation Y/N

If yes please supply details: _____

_____

12. Please indicate the kind(s) of training that are most urgently required within your institution. You may tick as many boxes as you wish:

Leadership skills

Project/programme management

Practical training (seamanship, drivers licence, dive course, skippers course, collection of biological or physicochemical samples)

Use of basic computer software (e.g. Windows, MS word, MS Excel, Ms Access)

Use of advanced computer software (Statistics, Programming, Modelling programmes)

Experimental design (Scientific sampling programmes, sampling strategies)

Fisheries management and stock assessment

Coastal zone management

Assessment, management and Monitoring of environmental impacts

Communications (report and proposal writing, public speaking)

Ecology (life histories of marine organisms, conservation, fisheries management)

Technical training (use and maintenance of laboratory and scientific equipment)

Other (specify) _____

_____

_____

13. To what extent do you think that your organisation has or will align itself with the strategic objectives of the BCLME?

_____

_____

_____

_____

_____