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AN INVESTIGATION INTO THE DEVELOPMENT OF A MARINE AND COASTAL MINING STRATEGY FRAMEWORK FOR SOUTH AFRICA

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A dissertation submitted to the Faculty of Engineering and the Built Environment, University of the Witwatersrand in fulfillment of the requirements of the degree of Masters of Science in Engineering.

Johannesburg 2007

Declaration

I declare that this dissertation is my own, unaided work. It is being submitted for the degree of Master of Science in Engineering at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination to any other University

_____

CJF LaBuschagne (Pr LArch)

_____ day of _____ (year) _____

Abstract

The concept of marine and coastal mining is not well defined in South Africa; therefore this dissertation investigates the lack of rules in marine and coastal mining and the possible development of a marine and coastal mining strategy or policy. Subsequently, the research has resulted in five major actions and consequently a summary of the research process to identify and formulate a marine and coastal mining strategy framework. The first action was to evaluate relevant concepts in the marine and coastal environment. It also looked at the policy environment and environmental policy in mining and sustainable development. It was also imperative to evaluate strategy within the marine, coastal and mining environment on both international and national level. This resulted in the second action to analyse these evaluations. Five major gaps in the South African policy environment were identified with specific reference to marine and coastal mining.

The next question was to identify possible solutions for South Africa for these gaps, therefore the third action was aimed at formulating three options to address the marine and coastal mining gap. The option preferred is a strategy framework to implement a meaningful marine mining and coastal mining strategy. The marine and coastal mining strategy framework includes:

1) Scope, objectives and principles;
2) Marine mining strategy;
3) Coastal mining strategy; and
4) Implementation strategy.

The marine mining strategy and coastal mining strategy do not only identify actions but also identify the introduction of joint authority approach, further research, development of specific technical guidelines and dealing with conflicts. The investigation concludes by elaborating on the process followed and achieving the research goal of a strategy.

The investigation is finally rounded off by formulating five recommendations which should be considered and executed by the Department of Minerals and Energy. It includes the development and implementation of the marine and coastal mining strategy framework, conduct research on marine mining and coastal mining matters, develop guidelines for both marine mining and coastal mining, initiate the development of future rules for marine and coastal mining, and also initiate the development of mine environmental policy and an exclusive economic zone strategy.

Preface

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CHAPTER 1

Introduction

1.1 Background

The elections in 1994 and the later acceptance of the Constitution[1], set South Africa on a course for economic development. One of the aspects that were taken into consideration was the development of policies and legislation to ensure that the resources of South Africa were properly developed and managed to the benefit of all its citizens.

In particular, the development of a new mineral policy for South Africa, which was accepted by parliament in 1998, resulted in a paradigm shift away from the 1986 policy (Cawood, 2004). It was important to understand that the mineral policy of 1998 addressed 19 topics of which 15 were new (Table 1) while the 1986 policy addressed only eleven topics. The environmental policy of South Africa also underwent some changes.

With the introduction of the policy on Environmental Conservation of 1980 (DWAF & EC, 1980)[2], South Africa entered the international arena of environmental responsibility and accountability. South Africa's response was to introduce environmental legislation which was long overdue. This legislation was promulgated via the Environmental Conservation Acts, which were accepted by Parliament from 1982 to 1994.

Soon after the last Environment Conservation Amendment Act[3] was promulgated, administrators, politicians, academics and government realised that South Africa needed to go further in developing a policy for environmental management. In 1998, the National Environmental Management Act 107 0f 1998 (NEMA)[4] was approved by Parliament.

The National Policy for Environmental Management (DEAT, 1998) stimulated and influenced not only the development of NEMA, but also specific legal tools

[1] Constitution of the Republic of South Africa, 1996. Gazetted on 18 December 1996, Volume378, Gazette number 176788. Online: South African Government Portal: http://www.gov.za .
[2] Also referred to as the White Paper on Environment Conservation of 1980.
[3] Environment Conservation Amendment Act, Act 52 of 1994.
[4] National Environmental Management Act 107 of 1998. Gazetted on 27 November 1998, Volume 401, Gazette number 19519. Online: South African Government Portal: http://www,gov.za .

Table 1: Comparisons of topics of the Minerals Policy of 1986 and 1998

	Mineral Policy of 1986		Minerals Policy of 1998
1	Exploration	1	Investment and Regulatory Climate
2	Resource Management	2	Taxation
3	Exploitation	3	Mineral Rights and Prospecting information
4	Environmental	4	Small Scale Mining
5	Manpower	5	Mineral Beneficiation
6	Beneficiation	6	Minerals Marketing
7	Export Promotion	7	Research and Development
8	Investment	8	Participation in Ownership and Management
9	Co-operation	9	Mine Health and Safety
10	Self-sufficiency	10	Human Resource Development
11	Contingency	11	Housing and Living Conditions
		12	Migrant Labour
		13	Industrial Relations and Employment Conditions
		14	Downscaling
		15	Environmental Management
		16	Regional Co-operation
		17	Regulation and Promotion
		18	National, Provincial and Local Governments
		19	Stakeholder consultation
	Sources: 1. White Paper on the Mineral Policy of the RSA, 1986, DME, Pretoria 2. White Paper, A Minerals and Mining Policy for South Africa, 1998, DME, Pretoria		

for Biodiversity[5], Protected Areas[6], Air Quality[7] and Coastal Management[8]. The latter had been promulgated as a Bill in December 2006 and the outcome had to be analysed and its impact determined. The question was asked: Why coastal management ? The handbook on Coastal Zone Management (Clark, 1995) tried to answer the question by pointing out that coastal areas had different varieties of ecosystems, such as estuaries; climate factors, such as wind, as well as a marine environment and topography that required different management and planning strategies.

It had to be borne in mind that mineral resources were not only restricted to inland locations but were also found along the coast and offshore (marine environment). Minerals (Wilson & Annhaeusser, 1998) found along the coast were as follows:

1. Diamonds;
2. Titanium and zirconium;
3. Limestone;
4. Salt and phosphate;
5. Sand and gravel;
6. Clay for bricks, pottery and so forth; and
7. Aggregate like granite, dolerite and quarts.

Furthermore, in 2002, the Department of Minerals and Energy (DME) identified that the Minerals and Petroleum Resources Development Act 28 of 2002 (MPRDA)[9] still needed to address offshore mining by retaining the Exclusive Economic Zone (EEZ)[10] jurisdiction for mining and by including petroleum into the Act. Therefore, the most effective manner to address this matter was to re-word the then definition of a mining area in the proposed amendment of the MPRDA by adding “under sea and under the water “. This amendment ensured that offshore mining would be addressed and would open the way to develop frameworks and strategies for mineral development and management.

To develop new policies in South Africa required budgets, resources and time which were not always available. Since 1994 many new policies, for example the National Minerals Policy of 1998, were approved and promulgated by government. However, the time had arrived to integrate these policies. The

[5] National Environmental Management: Biodiversity Act 10 of 2004.
[6] National Environment Management: Protected Areas Act 57 of 2003.
[7] National Environmental Management: Air Quality Act 39 of 2004.
[8] White Paper on Sustainable Coastal Development of 2000.
[9] Mineral and Petroleum Resources Development Act 28 of 2002. Gazetted on 10 October 2002, Volume 448, Gazette number 23922. Online: South African Government Portal: http://www.gov.za .
[10] EEZ concept is defined and discussed in chapter 2.

European Union started the process, and integration concepts were developed to assist this process. (Lenschow, 2002; Jordan, 2005).

In conclusion, the development of a policy or framework to address the development of offshore and coastal minerals still remains a challenge and in order to achieve this goal, a process needs to be followed. Firstly, the relevant questions (problem statements) have to be asked and secondly, the adequate research approach to be followed has to be decided upon to collect information, to discuss or debate issues, and to determine whether the goal had been achieved.

1.2 Problem statements

The original idea was to investigate sand dune mining because of the attention such mining had received in the 1990s. The reasoning for investigating mining at the coast was based on the experience and knowledge the researcher gained while working in the Port Elizabeth's office of the DME, from 1998.

The starting point of the research was the proposed mining at St Lucia (Review Panel, 1993) on the North Coast of KwaZulu Natal and Wave Crest (CES, 2001) in the Eastern Cape. Another issue was diamond mining along the West Coast, where diamonds have been mined over the past 80 years. The possible impact of this mining on the biodiversity (Driver, et al., 2005) of the marine and coastal environment of the West Coast needed to be considered.

The researcher had consultations with officials of the DME when preparing the proposal for the research[11]. It was suggested that, firstly, the research had to consider the bigger picture of a policy, strategy or legislation for marine and coastal mining. Secondly, the planning and management of marine mining and coastal mining differed from terrestrial, inland mining, and if specific problems occurred, the policy was limited.

Lastly, the issue of intergovernmental co-operations effective at ground level but not at national level had to be taken into account. The use of policy integration and other tools were a possible solution. The current MPRDA did not differentiate between terrestrial, coastal and marine environments but dealt with all the various aspects as one unit. Marine mining, in particular had a different approach to aspects, such as financial provision, closure, and waste and pollution management (Lane & Carter, 1999) compared to land based mining.

[11] Officials from DME offices in CapeTown, Durban and Port Elizabeth.

On the other hand, coastal mining had to cope with different environmental factors, such as sea level rise, winds, humidity, and different rehabilitation techniques, monitoring approaches and end land use, which needed to be integrated with the Integrated Development Plan (IDP) of the municipality. Therefore, the following three statements were defined:

Statement 1: Marine and coastal mining;
Statement 2: Policy integration; and
Statement 3: Sustainable development.

1.2.1 Statement 1 – Marine and coastal mining

Although the Maritime Zones Act 15 of 1994 (MZA), NEMA and MPRDA have been implemented, the following question was asked:

Why was there no specific strategy or policy to deal with marine and coastal mining or mineral development as in the case of Australian legislation that dealt specifically with offshore minerals?

In addition, the Council for Scientific and Industrial Research (CSIR), University of Cape Town (UCT), Council for GeoScience (CGS) and the Marine and Coastal Management (MCM) Branch of the Department of Environmental Affairs and Tourism (DEAT) had conducted studies over the years on coastal and marine matters; surely, this information could have been used to develop strategies, policies or legislation.

1.2.2 Statement 2 – Policy integration

The latest South African strategies, policies and legislation addressed the issue of policy integration. Therefore the following question was asked:

Were there too many rules and cross references in strategies, policies and legislation ?

The assumption was that the Constitution of 1996 would have addressed the problem. However, national government departments applied the jurisdiction aspect given to them in terms of schedules of the Constitution to justify their own approach. Perhaps the solution would have been to develop integrated policy frameworks or strategies that would cut across any issue or matter when it involved marine and coastal mining.

1.2.3 Statement 3 - Sustainable development

Sustainable development is a new concept in South Africa, even though the country had hosted the World Summit on Sustainable Development (WSSD)

in 2002. If the Johannesburg Plan of Implementation (JPOI) outcomes for mining were taken into consideration, the following question would have to be asked:

Could the concept of sustainable development be used to develop strategies or policy frameworks ?

Perhaps an environmental sustainable framework could be used to integrate the policies and strategic plans of government with regard to coastal and marine matters.

With the three above statements in mind, the goal of this research was to determine whether a marine and coastal mining strategy or policy could be achieved. In order to achieve this goal, the research had a specific approach which dealt with the layers of the research topic, the boundaries, links to be used in the research, levels of research areas, and the limitations on the research.

1.3 Research approach

A research scope was developed to address not only the goal but also the three statements made. The scope is as follows:

1.3.1 Research topic

The title " *An investigation into the development of a marine and coastal mining strategy framework for South Africa "* indicated that the research needed to be broken down into layers to ensure that the boundary, links and areas of the research were addressed. The four layers are as follows:

Layer one: Investigative layer meant the research had to include the latest developments, concepts and issues.

Layer two: Marine and coastal layer entailed the most relevant information on marine and coastal aspects.

Layer three: Integration layer involved the possible approaches and solutions.

Layer four: Framework layer consisted of analyzing strategies and policies.

It should be noted that the physical boundary for the scope of the research extended from the seawards boundary of the EEZ to an inland boundary of about four kilometers. At first it was difficult to determine the inland boundary because of landscape features, such as estuaries, sand dunes, dune fields, beaches, flood plans locations, and there size per square kilometer differ

greatly. Another factor was the horizontal extension of the minerals on old geological sea beds or beaches, which could range from a few meters to four kilometers inland.

1.3.2 Research boundaries

For the purpose of the scope of this research, four main boundaries were identified for research purposes. Boundaries ensured that focus was maintained, and results could be used to conclude the research and make recommendations. These four boundaries link closely to the title of the research topic. They are as follows:

Mineral aspect - focus on the life cycle of a mine;
Environmental aspect - focus on environmental management;
Marine aspect - focus on marine planning; and
Coastal aspect - focus on coastal management.

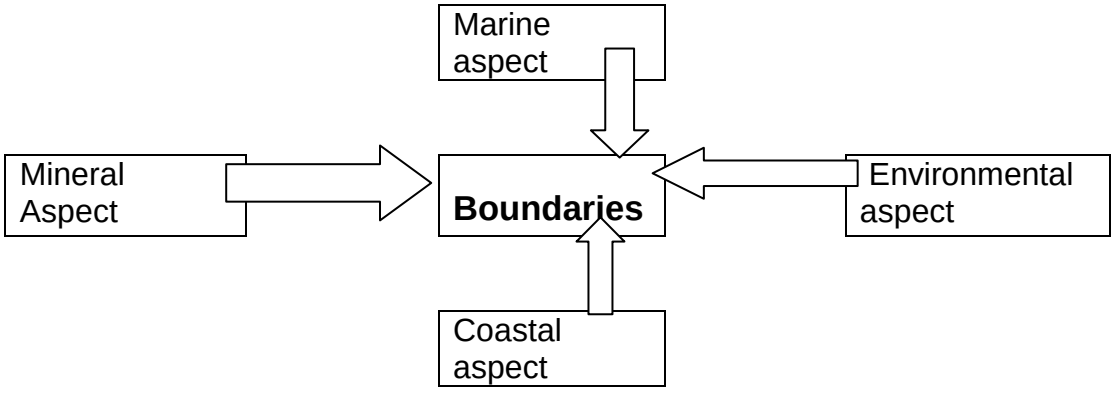


Figure 1.1 Boundaries of research

1.3.3 Research links

Besides identifying boundaries, possible links had to be established between the four boundaries otherwise also referred to as the four main aspects of the research. These links were aligned with the research topic. They are as follows:

a) Policy and legislation;
b) Planning and environmental management;
c) Sustainable development;
d) Co-ordination and integration; and
e) Marine or coastal development.

1.3.4 Research areas

Normally research areas would include international, national (South Africa) and local (provinces) levels. This scope focused on the following aspects:

- The primary approach was on national level; and
- The secondary approach was on an international level through the selection of countries for comparative analysis.

The reason for not focusing on the local level was embedded in the policies and legislation of key national department's jurisdiction in terms of the Constitution. Since the research was based on a strategic approach, national level information was sufficient. The researcher also investigated the regional level but research conducted for the Benguela Current Large Marine Ecosystem Programme (Russo et al., 2004) recommended that it would be sufficient to sort policy and legislation out on a national level then on African regional level.

Therefore, the focus was on national policies and legislation of the DME and DEAT. The DME was more concerned with minerals as an objective while DEAT concentrated on the primary objective of environment. Minerals were also closely linked with Department of Water Affairs and Forestry (DWAF), such as mine water matters, and with the Department of Science and Technology (DST), such as mining technology.

1.3.5 Research method

It was decided to follow a process approach by collecting information from DME, DEAT, CSIR, South African National Biodiversity Institute (SANBI), UCT, University of the Witwatersrand (WITS), CGS and articles (journals) in an attempt to cover all the angles of the scope of the research. The process was as follows:

1. Information had to be collected for analysis;
2. Applicable information relating to concepts, rules (policies) and strategies within the scope of the research had to be identified and analysed;
3. Information needed to be compared and gaps as well as shortcomings needed to be identified;
4. Gaps and shortcomings had to be properly defined in order to develop solutions;
5. Solutions had to be developed;
6. Options had to be formulated to address the gaps and shortcomings;

7. Implementation approach of selected option of strategy framework had to be determined; and
8. Development of a strategy framework to achieve the goal of the research had to be accomplished.

1.3.6 Research limitations

It was important to ensure that the research remains within the scope of the research topic but, sometimes, not all details could be included in the scope. In this study, the following aspects, links or boundaries are not included in the scope of this research:

a) Oil and gas was excluded since the focus was on the mineral deposits in the coastal and marine environment;

b) With sustainable development, the focus was more on environmental and governance matters because historically most policies were based on economics. Social development was not specifically referred to but was incorporated when needed;

c) Environmental and resource economics were not part of the scope of this research; and

d) The information collected and used for the research ranged mostly from January 1990 to August 2007. Information prior to 1990 was collected and used depending on the applicability thereof.

1.3.7 Research resources

To achieve the goal, resources were identified and used within the scope of the research. Therefore, the research included the following basic resources:

a) Research was conducted on the Internet to identify sources for research, such as the web sites of Australia, Canada, New Zealand, International organizations and United Nations (UN) agencies;

b) Research was conducted via the electronic – journal portal of Wits for relevant journals and articles within the scope of the research;

c) Identified articles were used to identify key authors within the scope of the research for more detailed research;

d) Books were identified and chapters analysed to assist in background reading;

e) Strategic plans were collected from DME, DEAT, DWAF and DST;

f) Investigation was done on the distribution of the marine and coastal mineral resources in South Africa (statistical perspective) as well as maps from CGS;

g) Information from DME included the collection of policies, legislation and standard available documentation;

h) Information from DEAT and their MCM Branch included the collection of policies, legislation and strategy that had been published;

i) Information from SANBI included research documents;

j) Identification of international bodies or institutes falling within the scope of the research, for example International Marine Mining Society (IMMS), International Seabed Authority (ISA) was done to collect information via their websites;

k) Consultations were arranged with individuals or key persons within the scope of the research;

l) Interviews were conducted with individuals or key persons if complex matters needed to be discussed; and

m) Networking was done with DME officials in the coastal offices to obtain information and advice.

1.4 Layout of chapters

In order to achieve the goal of the research, the information and discussions are categorised into the following chapters, excluding the literature reference chapter.

1.4.1 Chapter 1

The purpose of this chapter is firstly, to introduce the research topic, defining the problem statements and research goal, and discussing the approach to the research. The research approach identifies and discusses the research topic, boundaries, links, areas (levels), research method, limitations and resources of the research. Secondly, the last part of the chapter gives a brief and short, introduction description of the layout of all the chapters in the dissertation.

1.4.2 Chapter 2

The purpose of this chapter is firstly, to discuss offshore and onshore minerals along the coast and the role of biodiversity; secondly, to discuss and elaborate on concepts within the marine and coastal environment; thirdly, to analyze specific mineral and policy concepts which could add value to the research; fourthly, to elaborate and discuss basic concepts such as environmental management and sustainable development, in the mining environment. Lastly, maps, diagrams and cross sections are included in this chapter to ensure better understanding. The chapter concludes by mentioning aspects which could play a role in the management of the extraction minerals in the marine and coastal environment.

1.4.3 Chapter 3

The purpose of this chapter is firstly, to explore the existing rules, both internationally and nationally; secondly, to analyze certain conventions, protocols and declarations and specific South African government policies in the field of minerals, environment and coastal development; for example the White Paper on Coastal Development; lastly, to discuss national policies such as the Mineral Policy of Namibia and policies of Australia as well as the contribution of international organisations, like the IMMS, to the mining industry. The chapter concludes by identifying aspects which could have an impact on developing marine and coastal mining rules for South Africa.

1.4.4 Chapter 4

The purpose of this chapter is to discuss aspects and identify issues which derive from Chapter 2 and 3. The first part of the chapter discusses the existing approach to international agreements, current policy development and government's current strategies. The second part is about the main focus of the chapter which discuss and identifies the current national policy gaps and shortcomings in marine and coastal mining which needs to be addressed. The chapter concludes with identifying five major policy gaps.

1.4.5 Chapter 5

The purpose of this chapter is firstly, to address the gaps identified in the previous chapter and to evaluate existing international policies, strategies and initiatives in context of the identified gaps. Secondly, the grouping of the gaps into three solution groups, namely, a collective-, sector specific- and strategy group are discussed. The sector specific group is then used to formulate three strategy options to address marine and coastal mining. Lastly, the chapter discusses the initiation and development of a marine and coastal

mining strategy framework. The chapter concludes with identifying three approaches that could be used to develop the strategy framework.

1.4.6 Chapter 6

The purpose of this chapter is to address and finally set out of the marine and coastal mining strategy framework. The first part of the chapter discusses the approaches mentioned in the previous chapter and identifies the best one to be used. The chapter further discusses development and settings of such a strategy framework. The second part of the chapter sets out the framework with a marine mining strategy, coastal mining strategy and as well as an implementation strategy. The chapter concludes with a discussion and a way forward.

1.4.7 Chapter 7

The purpose of this chapter is to discuss the research outcomes of the investigation and by rounding off the investigation. Firstly, the process followed is discussed and elaborated on, and secondly, the problem statements as well as achieving the goal of the research are discussed. The chapter concludes by formulating and setting out the five recommendations.

CHAPTER 2

Present setting of concepts

2.1 Introduction

The objectives of this chapter are as follows:

a) To discuss and analyse coastal and marine minerals and the role of biodiversity;
b) To discuss and elaborate on basic concepts and definitions in the marine environment as well as the coastal environment;
c) To discuss and analyse mineral and policy concepts in the policy environment which added value to the scope of the research; and
d) To elaborate and discuss concepts, such as environmental policy in mining and sustainable development.

The research approach in formulating this chapter was first, to explore the information and developments on both international and national levels, applicable to the scope of the research. Second, the research was to interpret the information and to broadly focus on marine and coastal development, resources policy and sustainable development. Lastly, copies of maps, diagrams and cross sections were included in the text to ensure that concepts were more understandable.

2.1.1 Coastal and marine minerals in South Africa

For the purpose of this research, coastal minerals were defined as minerals, which could be found from the surf zone to five kilometers inland. Marine minerals were defined as the minerals found on the seabed from the surf zone[12] to the EEZ boundary[13] offshore. The following two sections will provide an account of coastal and marine minerals and their location in context of this research.

2.1.1.1 Coastal minerals

As already established in Chapter 1, minerals were not only restricted to inland locations as mineral resources were also found along the coast. They comprised the following:

[12] Area from the high water mark to 31, 49 meters beyond the low water mark seawards.
[13] Section 7 of the MPRDA re-affirmed the EEZ boundary for mining.

Table 2: Coastal minerals	
Mineral	Province
Clay	EC, WC (KZN isolated)
Dimension stone	EC, WC
Diamonds	NC, WC
Gypsum	NC, WC
Limestone	EC, WC
Manganese	WC
Phosphate	WC
Salt	EC, WC
Sand and gravel	EC, KZN, WC (NC isolated)
Titanium, ilminite & rutile	EC, KZN, WC
Zirconium	EC, KZN, NC, WC
EC = Eastern Cape, KZN = KwaZulu Natal, NC = Northern Cape, WP = Western Cape Source: Wilson & Anhaeusser eds., 1998	

The conclusion was that the majority of coastal minerals were found in the Western Cape with diamonds, titanium, gypsum, limestone and salt being the most prominent minerals. Building material minerals, for example dimension stone, clay, sand and gravel were mostly found in the Eastern Cape, KwaZulu Natal and Western Cape.

2.1.1.2 Marine minerals

Identifying and locating marine minerals, excluding oil and gas in the South African context were limited because of the following factors (Glasby, 2000; Garnet, 2002; Coles, et al., 2002):

a) Technology to conduct offshore exploration and prospecting;
b) Costs associated with marine mining;
c) Costs of research and development;
d) High risk of marine mining; and
e) Market for marine minerals.

In the 1970s and 1980s, a programme was lodged by DME, CGS and UCT to sample and identify seabed minerals off the continental shelf of South Africa. A series of maps (DMEA, 1986a) were produced based on the programme. The significant maps that related to this study were:

a) Texture (sand, silt, clay, mud and gravel maps were also produced);
b) Glauconite (Potash, K_2O); and
c) Phosphate (P_2O_5).

With the information provided by these maps, more exploration and prospecting were done since then. Figures 2.1 and 2.2 illustrate a specific distribution of marine diamonds and glauconite.

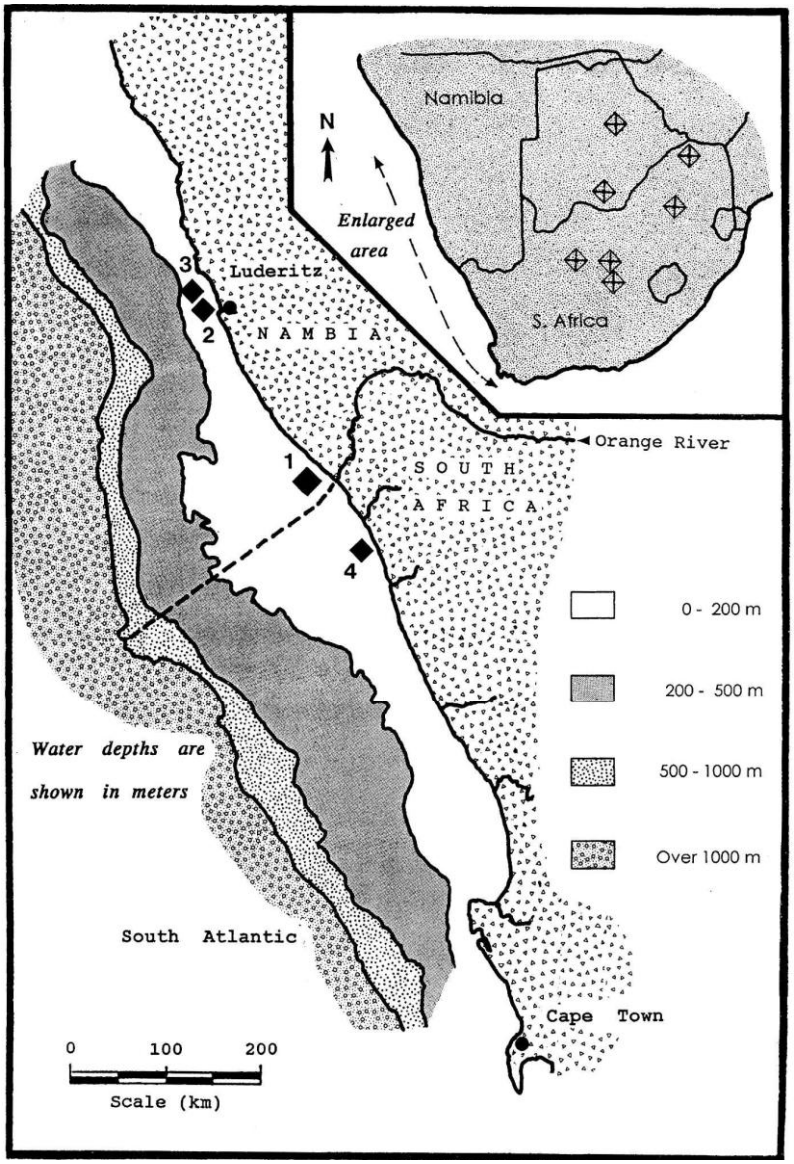


Figure 2.1 Offshore diamond deposits along the West coast of South Africa (Garnett, 2002, p 139).

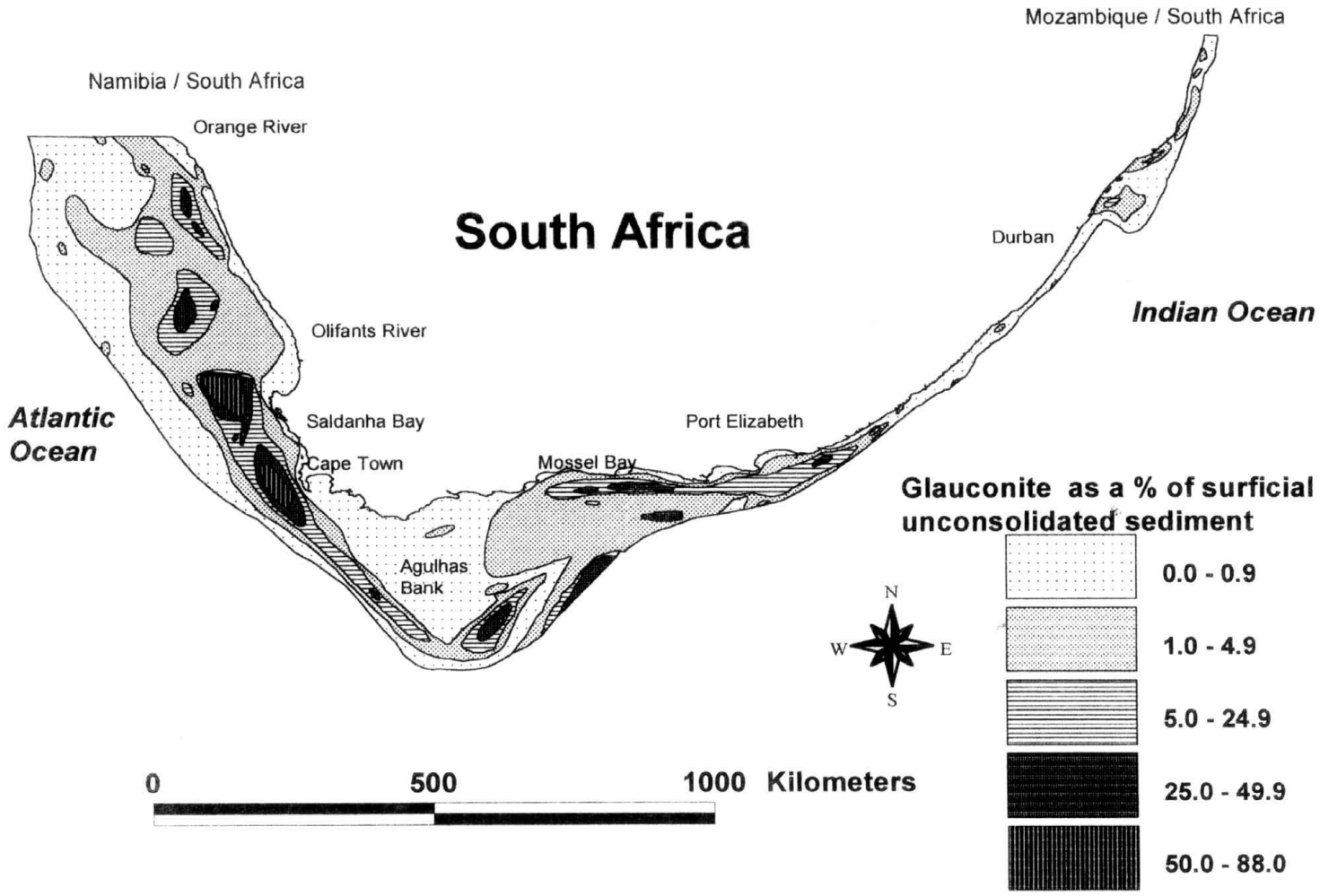


Figure 2.2 Offshore distribution of glauconite (Coles et al., 2002, p 91).

The conclusion was that the situation concerning the diamonds would retain the *status quo* as at the time of this study, and only more prospecting or drilling of the seabed or drilling of the seabed on the continental shelf or in the EEZ could change this scenario. The possibility would always exist that the market for offshore glauconite or phosphate could become economically favourable which would enable the extraction of these minerals from the seabed for local use or export.

2.1.2 Biodiversity in South Africa

The concept of biodiversity was first introduced in South Africa in 1996 as a discussion document and later that year, a Green Paper (DEAT, 1996b) was developed. In 1997, the concept was adopted as the Biodiversity Policy for South Africa. The main aims in South Africa were to ensure that:

a) Biodiversity forms part of assessment and planning;
b) Biodiversity forms part of management which included monitoring; and
c) Biodiversity could be used to determine priority conservation.

In 2004, SANBI initiated the National Spatial Biodiversity Assessment (NSBA) (Driver et al., 2005) to determine the status of the four main components of biodiversity in South Africa, namely the rivers, land, estuaries and marine components. The outcomes varied significantly and for the scope of the study, the following two aspects are important because of past conflict between mining and conservation:

- Priority conservation areas as indicated in Figure 2.3.
- Biozone protected status as indicated in Figure 2.4.

As indicated in the coastal minerals section of 2.1.1.1, most of the coastal mining is situated in priority conservation areas (Figure 2.3). Diamond mining is situated on the West coast in the Succulent Karoo and Cape floristic region while titanium mining is situated more on the East coast in the Albany thicket and Wild coast and Maputoland – Pondoland region. The recently published Bill on coastal management proposes a zone along the coast and identified areas that restrict development or activities. Whether this approach would be practical for South Africa needs to be tested.

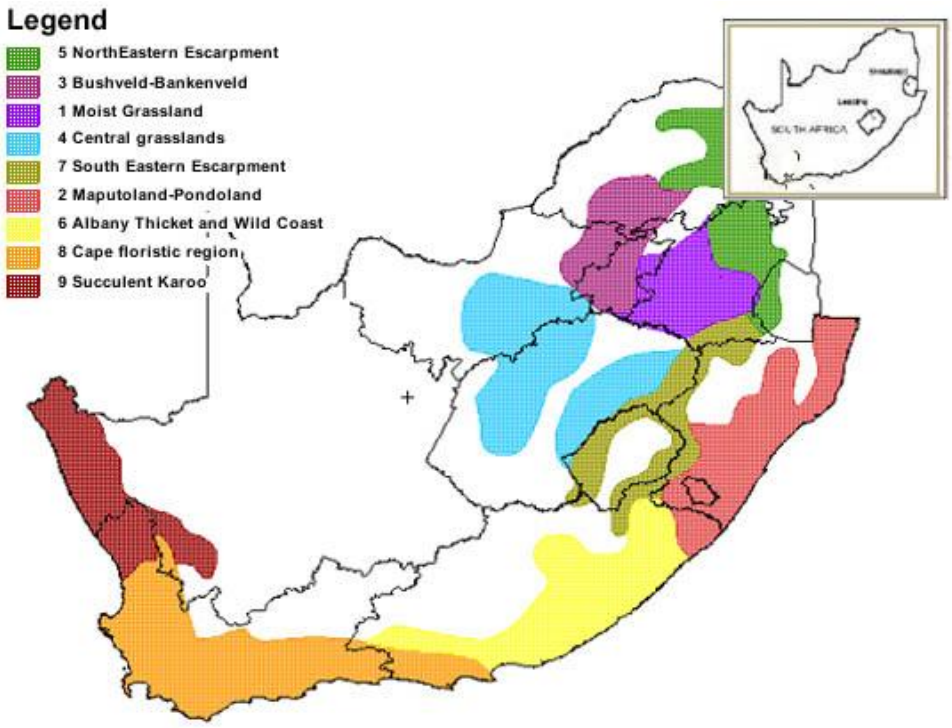


Figure 2.3 Priority conservation areas (Source: SANBI[14], 2007).

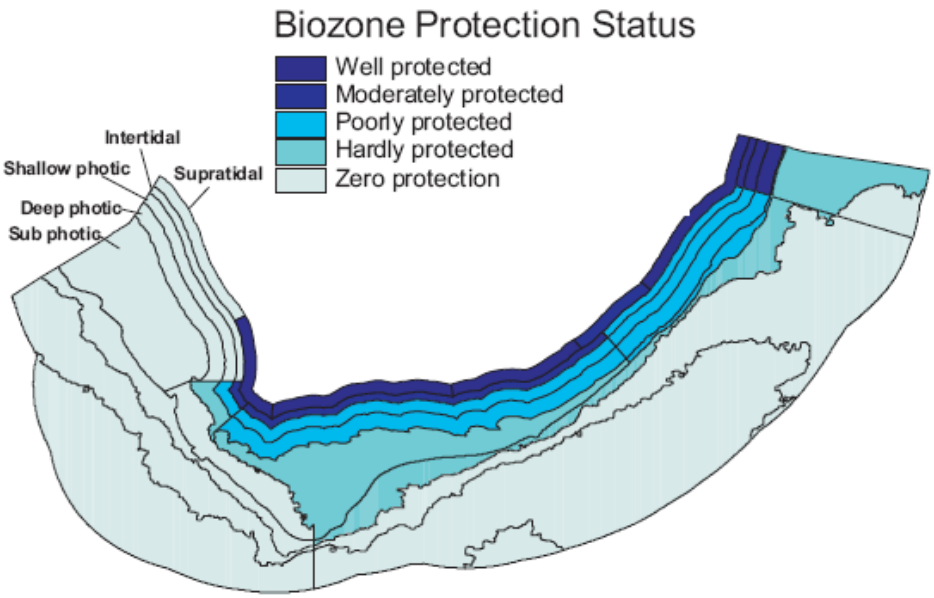


Figure 2.4 Biozone protected status (after Driver, et al., 2005, p 35).

[14] Online: http://www.sanbi.org (GIS information section) (accessed February 2007).

Figure 2.4 illustrates the marine or offshore area within the EEZ boundary. The marine ecosystem was divided into 34 biozones based on environmental data collected and information available. These various biozones are advantageous for organizing, planning, management and conservation. Therefore, Figure 2.4 indicates the current protection status of the biozones in a collective manner and clearly illustrates that biozones on the West coast or the western part of the EEZ are not protected.

2.2 Marine environment

Marine environment is a more collective concept and could be defined as the ocean in terms of fishing or offshore in terms of minerals where land meets the sea. The United Nations Convention on the Law of the Sea (UNCLOS)[15] also defined the marine environment into different zones, which were more specific, for example the territorial seas, contiguous zone, EEZ, continental shelf and high seas. Therefore, for the purposes of this research, the marine environment lies within the area of the territorial sea and EEZ and dealt with the following aspects (Morgan, et al., 1999; Ellis, 2001; Roos, 2005), which are significant to the research:

a) Topography of the seabed;
b) Depth of the ocean;
c) Temperature and oxygen status of the sea water;
d) Sea currents;
e) Density of the sea water; and
f) Biodiversity of the ocean.

The concepts and terms such as marine mining, territorial sea and EEZ, continental shelf, marine mining systems, Marine Protected Area (MPA) and sea concessions, are discussed below.

2.2.1 Marine mining

Although the literature described and referred to the marine mining concept, the researcher could not find a clear definition for marine mining. Therefore the researcher suggests that marine mining be defined as the process, operation, or more commonly as a mining system to extract minerals from the seabed from the high water mark to the EEZ boundary by using boats, vessels, ships, platforms or any other equipment. At the time of this research, marine mining occurred off the West coast of South Africa for diamonds where the offshore area had been divided into different concession areas: a

[15] UNITED NATIONS, (1982), United Nations Convention on the Law of the Sea. New York. Online: http://www.un.org/Dept/los/conventions_agreements/texts/unclos/unclos_e.pdf (accessed July 2006).

method used by the Department of Minerals and Energy to manage prospecting and mining. Section 2.2.6 provides more detail on the topic.

2.2.2 Territorial sea and exclusive economic zone

The term "territorial sea"[16] was defined in the UNCLOS as a 12-nautical mile zone in breadth, measured from the baseline away from the land. While the EEZ was defined[17] as the area which would not extend further than a 200-nautical mile zone from baseline seawards. The diagram in Figure 2.5 explains the two and other associated terms graphically as legally defined in the UNCLOS. South Africa had accepted this classification in terms of the M ZA[18], which made it legally binding, and South Africa had to comply with the terms as did other parties to the UNCLOS.

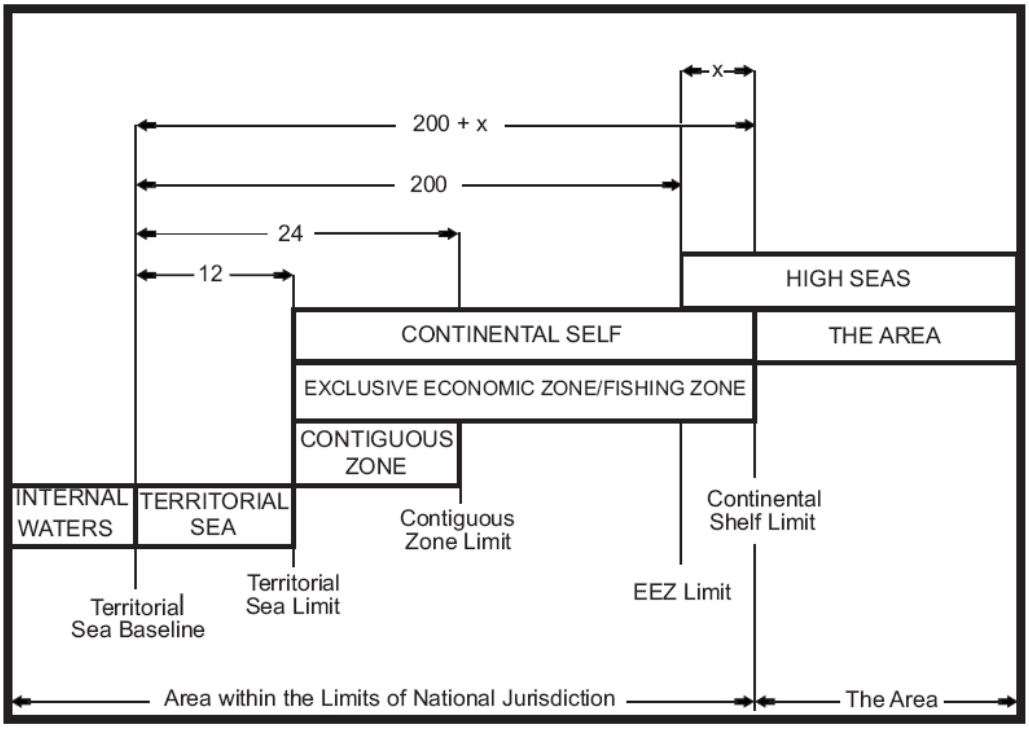


Figure 2.5 Diagram of different zones in the EEZ (Brown, 1992, p 13).

[16] Article 3 & 4 of UNCLOS.
[17] Article 55 - 57 of UNCLOS.
[18] Maritime Zones Act 15 of 1994. Gazetted 11 November 1994, Number 1952. Online: http://www.info.gov.za/documents/acts/1994.htm (accessed February 2007).

2.2.3 Continental shelf

The definition in terms of UNCLOS[19] is as follows:

“ Continental shelf of a Coastal State comprises the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baseline from which the breadth of the territorial sea is measured “

Figure 2.6 illustrates that the continental shelf and the slope of the continental terrace, which is part of the continental margin. The distances used are conceptual, especially in South Africa where the continental shelf is very narrow on the East coast and begins to widen towards the EEZ (Aghullas bank) in the South coast, and keeps a steady distance on the West coast**.** For further reference, Figure 2.2 indicates the distribution of glauconite on the shelf and slope.

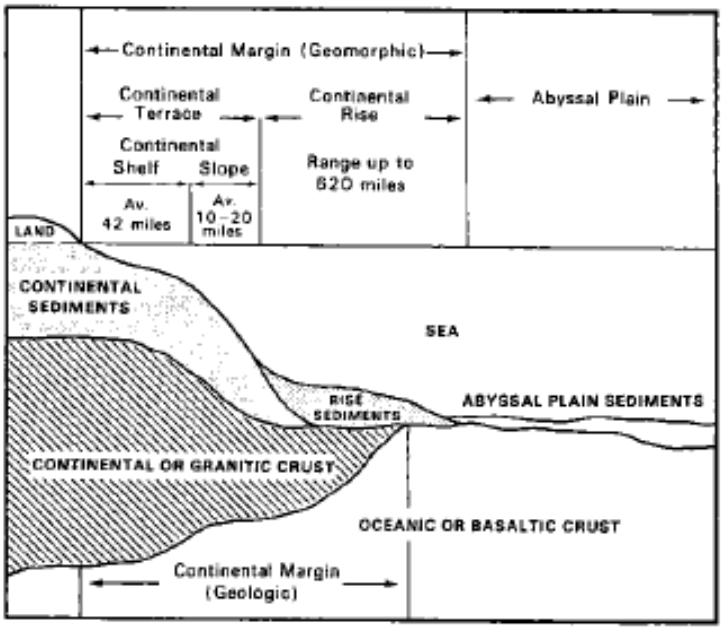


Figure 2.6 Diagram of the continental margin (Brown, 1992, p 41).

[19] Article 76 of UNCLOS.

2.2.4 Marine mining systems

As indicated in the introduction of marine mining and literature that marine mining systems are being used to extract minerals from the seabed. Marine mining differs from terrestrial mining in that the actual mining is underwater and that the mine residue is being brought either to surface for processing on ships or be shipped to shore for processing. The following five systems have been identified that are being used to extract minerals from the seabed:

a) Hydraulic system (Morgan, et al, 1999) as illustrated in Figure 2.7 was designed in the 1970s to extract manganese modules from the seabed but could also be used for other minerals. The mined mineral deposit are screened and processed by the miner on the seabed before being pumped to the mining ship at surface.

b) Continuous Line Bucket (CLB) system (Morgan et al., 1999) is illustrated in Figure 2.8. This system could be used for mining of different minerals. The concept is based on empty buckets descending and filled buckets ascending to be emptied on the surface in the mining ship.

c) Drill ship with Wirth drill (Coles, et al, 2002) as illustrated in Figure 2.9 is a more direct approach to mining the minerals and transporting it to the mining ship on the surface to be processed. The advantage of the method is that it could be used in any seabed topography.

d) Seabed crawler (Coles, et al., 2002) as illustrated in Figure 2.9 is based on the concept that the particular mineral, for instance glauconite or phosphate, is mined from the seabed and transported to the mining ship on the surface for processing. The crawler is operated from the mining ship.

e) Dragline (Coles, et al., 2002) as illustrated in Figure 2.9 is based on the concept that seabed minerals is mined by dragging the bucket to be filled and transporting to the mining ship at the surface for processing. The only advantage is that it is a low cost operation.

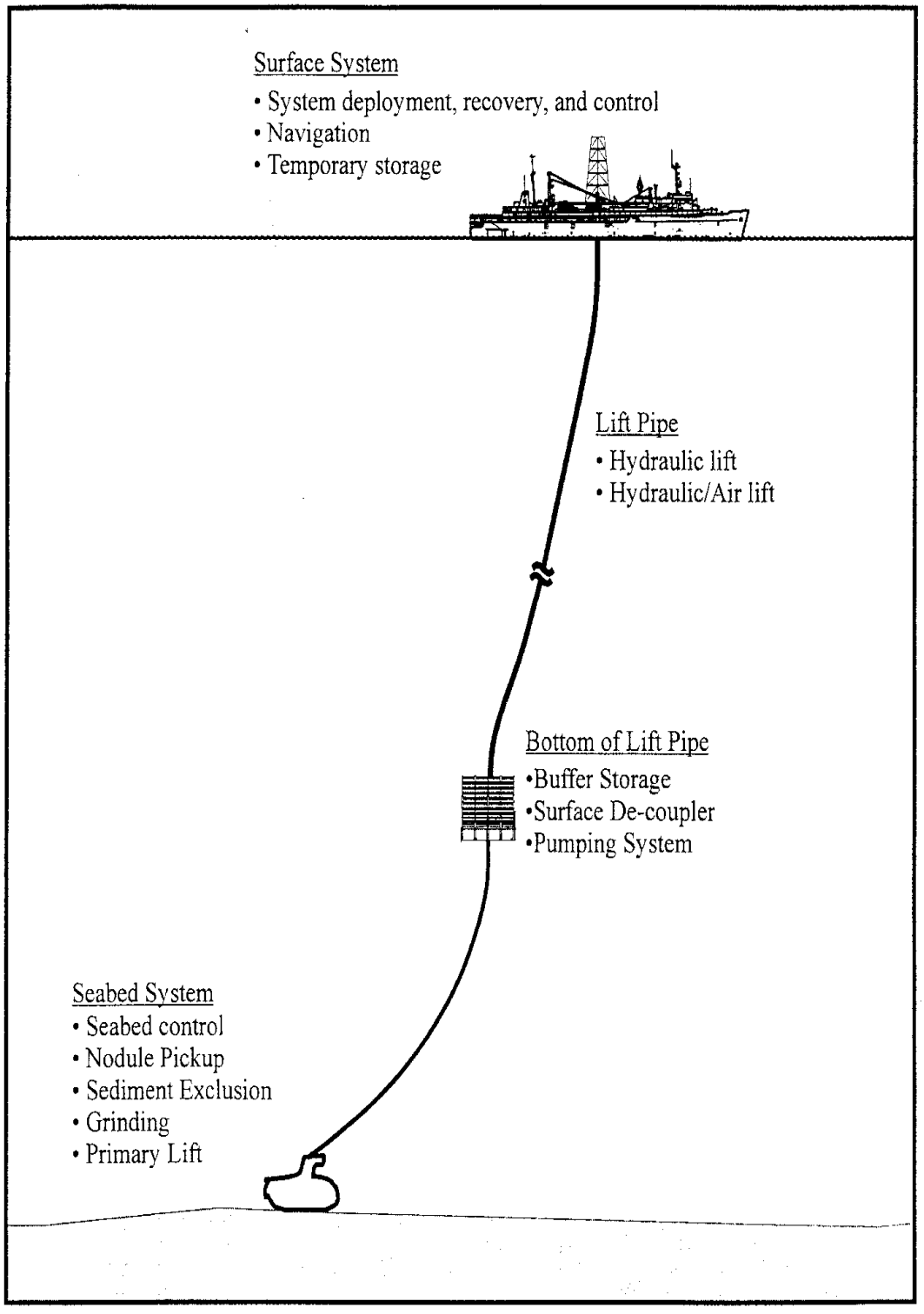


Figure 2.7 Hydraulic system (Morgan, et al., 1999, p 311).

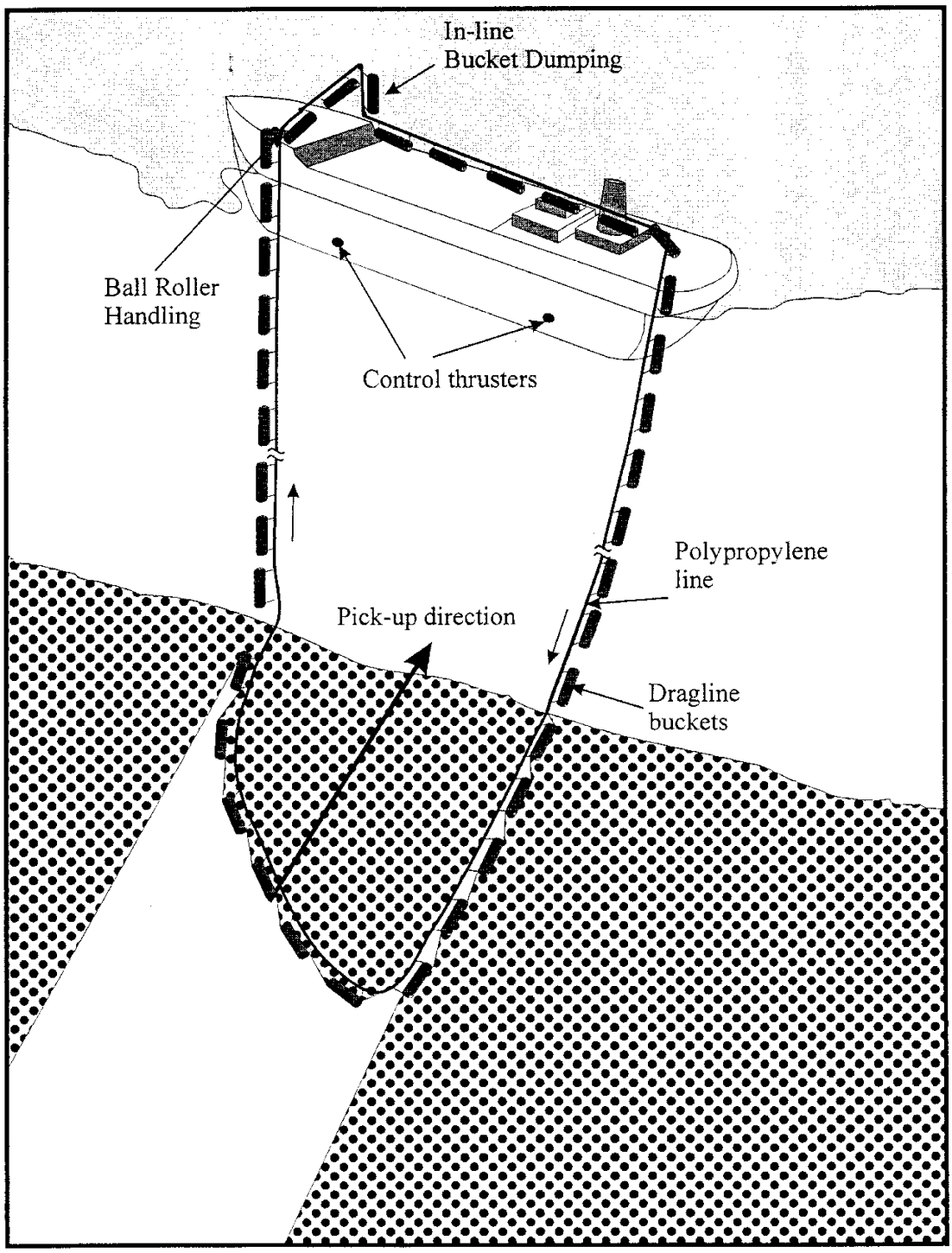


Figure 2.8 CLB system (Morgan, et al., 1999, p 315).

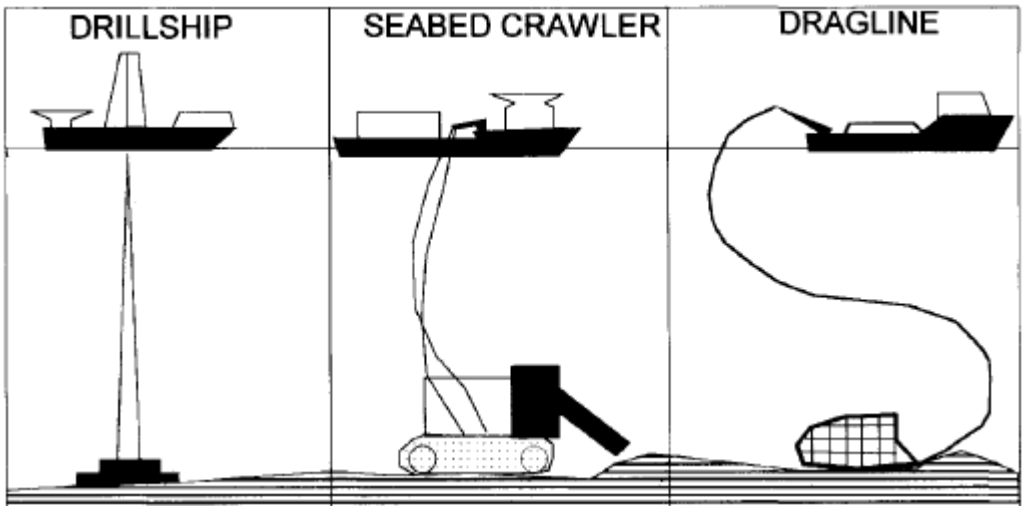


Figure 2.9 Combination of systems (after Coles, et al., 2002, p 96).

2.2.5 Marine protected areas

The concept could be defined as a marine area along the coast that was protected for mainly the aim of conservation. The objectives could vary from protecting marine species and restoring ecosystems to cultural or aesthetic values. The International Union of Conservation (IUCN) definition (Jones, 2002) provides a more comprehensive understanding of the concept:

"Any area of littoral or sub tidal terrain, together with the overlaying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the environment"

The IUCN also developed a classification system for protected areas, which includes five different categories (Preen, 1998), that have been used worldwide. The categories are (i) strict nature reserves or wilderness, (ii) national parks, (iii) national monuments, (iv) habitat management areas, (v) protected seascapes or land scopes and (vi) managed resource-protected areas. Category (v) would apply to South Africa's MPAs. In the early 2000s, MPAs were introduced into South Africa and were divided into four categories (Driver, et al, 2005) as illustrated in Figure 2.10:

Category 1 No take MPA (No extraction would be permitted).

Category 2: Other MPA (Limited extraction would be permitted).

Category 3: Closed areas (Three areas near East London).

Category 4: Proposed MPA (Namaqualand MPA).

South Africa started the process of establishing MPAs, and MCM[20] was in the process of developing a MPA policy[21] whilst SANBI was establishing a communication network for MPAs[22]. At the time of this study, many questions were raised about classification of MPAs, and criticism was voiced about developing the management plans to be implemented and maintained.

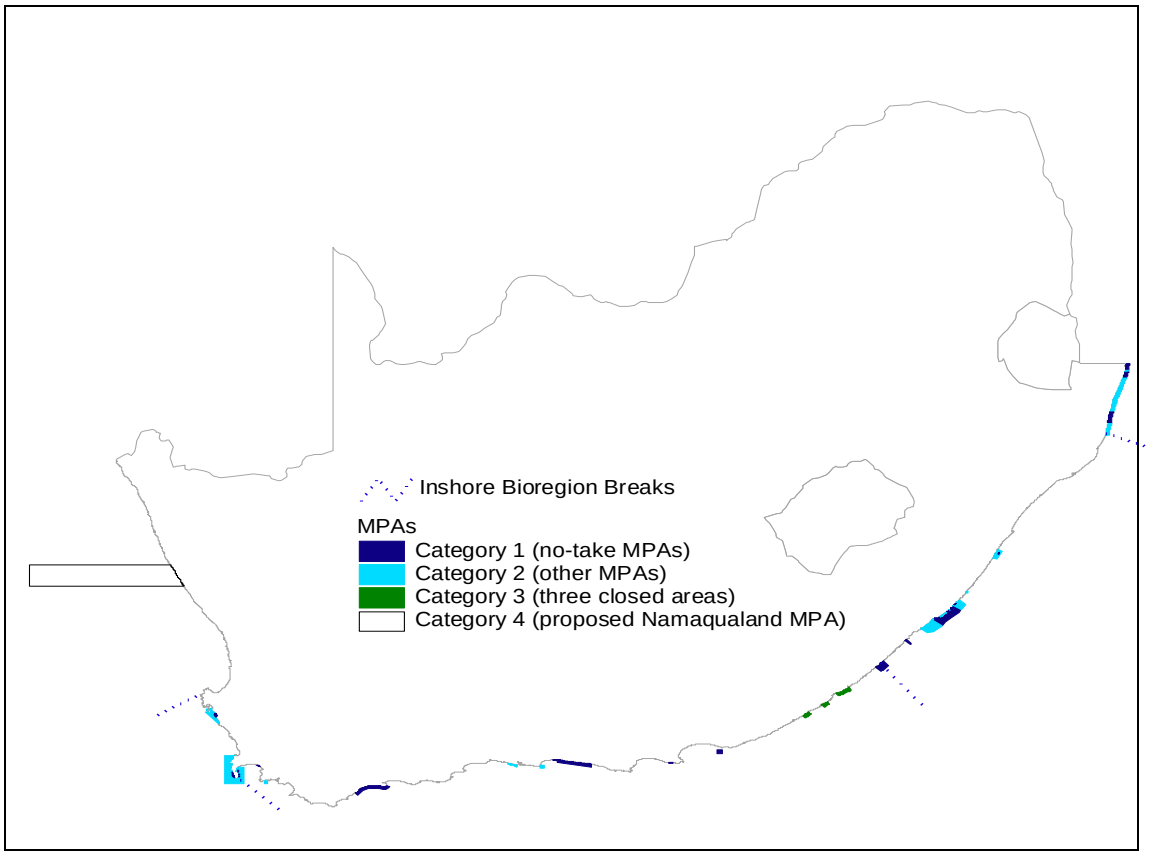


Figure 2.10 Marine protected areas (Driver et al., 2005, p 34).

[20] Marine and Coastal Management is a Branch within DEAT which is situated in Cape Town.
[21] Communication with Dr A Boyd at MCM; Cape Town, March 2007.
[22] Communication was initiated by author between DME & SANBI.

2.2.6 Sea concessions

The concept is being used by the DME to allocate sea concessions for diamond mining on the West coast of South Africa. There are four types of concession areas as illustrated in Figure 2.11:

Concession A: Stretched up to 1000 meters from land;
Concession B: Stretched over 4000 meters from where concession A ends;
Concession C: Referred to the continental shelf edge area; and
Concession D: Stretched from the shelf edge to a depth of 500 meters.

At the time of the research, the main bulk of marine mining operations[23] were located in the A and B concession areas, which included small-scale miners, and a few mines were in the C concession area, which included bigger operations like De Beers Marine. Mining operations in concession area D were non-existent at the time of the research.

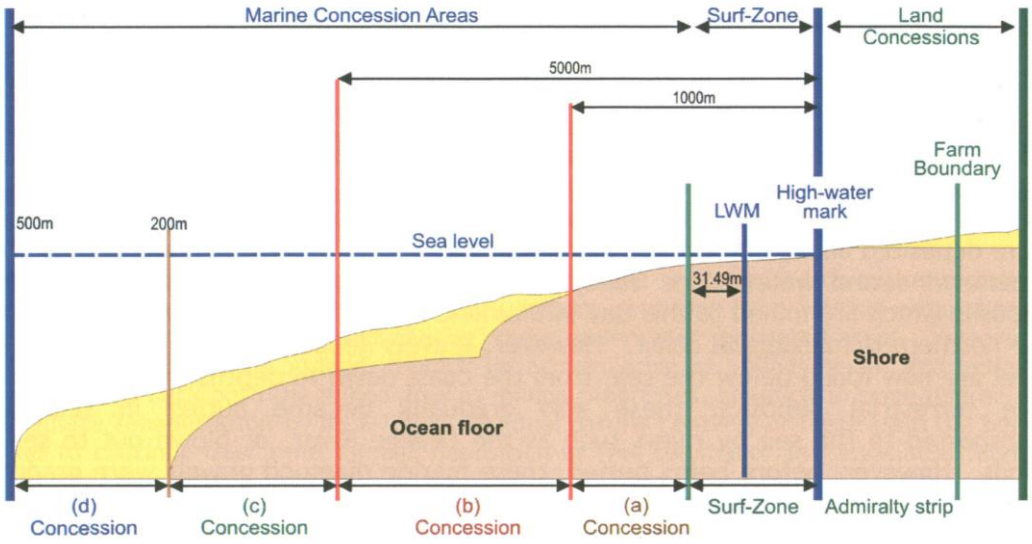


Figure 2.11 Sea concession boundaries (Penny & Pulfrich, 2004. p7).

[23] Information obtained from DME.

2.3 Coastal environment

The coastal environment differed from the inland environment because of factors (De Beers, 2000, 2002 & 2003; EEU, 1990a & 1990b)[24] and matters such as the following:

a) Impact of sea on the formation of land;
b) Role and impact of wind;
c) Impact of river water on the sea;
d) Impact and role of the ocean on the coastal climate;
e) Different biodiversities; and
f) Integration zone between land and sea.

The concepts and terms such as coastal mining, coastal features, coastal dunes, estuaries and coastal management, are discussed below.

2.3.1 Coastal mining

Although the literature referred to mining on the coast, the researcher could not find a clear definition or description for coastal mining. Therefore the researcher suggests that coastal mining could be defined as an operation, method or process to extract minerals in the coastal zone from the high water mark to five kilometers inland. At the time of this research, coastal mining occurred on the west, south and east coasts of South Africa with diamonds, titanium, gypsum, limestone and salt as the main minerals extracted. Most operations would be opencast.

2.3.2 Coastal features

Coastal mining near the beach was a sensitive issue, as experienced in the St Lucia proposed mining of sand dunes because of the negative impact it could have on the environment. The outcomes of the St Lucia (Review Panel, 1993) indicated that:

- Environmental impact studies had to be done to determine impacts;

- Sand dunes were sensitive to change and mitigation of the impacts should be compulsory; and

[24] Communication with officials in DME offices at the coast.

- Besides sand dunes, mining in estuaries for sand or / and gravel and beaches for diamonds and titanium occurred which was also a sensitive issue.

Therefore, the location of mining at the coast was the main issue and consequently, the coastal features of coastal dunes including beaches and estuaries, are discussed below.

2.3.2.1 Coastal dunes

The origin of sand dunes at the coast was defined (Tinley, 1985) as follows

"Coastal dunes form where sand deposited onshore by the sea and at rivers mouths, or exposed by a dropping sea level as in the past glacial times, dries out and is blown landward by the wind"

Coastal dunes are complex ecosystems and require effective planning and management. One of the problems in achieving such planning and management is the understanding of the ecosystems. Recent research (Martinez & Psuty, 2004) has shown the need for a more integrated approach which should differ from the original approach by separately classifying beaches and dunes. The new trend would emphasize the beach and dune as one ecosystem in terms of biology, water hydrology, vegetation and sediment movement. Therefore, planning and management had to take the whole system into account and not only the various parts.

Two prominent features of the dunes are the different areas in the dune and the vegetation types (Martinez & Psuty, 2004) in different climates along the coast. Therefore:

- Figure 2.12 indicates the different areas (zones) in a dune, such as the fore dune (primary dune), secondary dune and back dune.

- Figure 2.13 indicates the different types of plants or vegetation found on a dune on the South - east coast.

- Figure 2.14 Indicates the Fynbos vegetation found on a dune on the South or South - west coast.

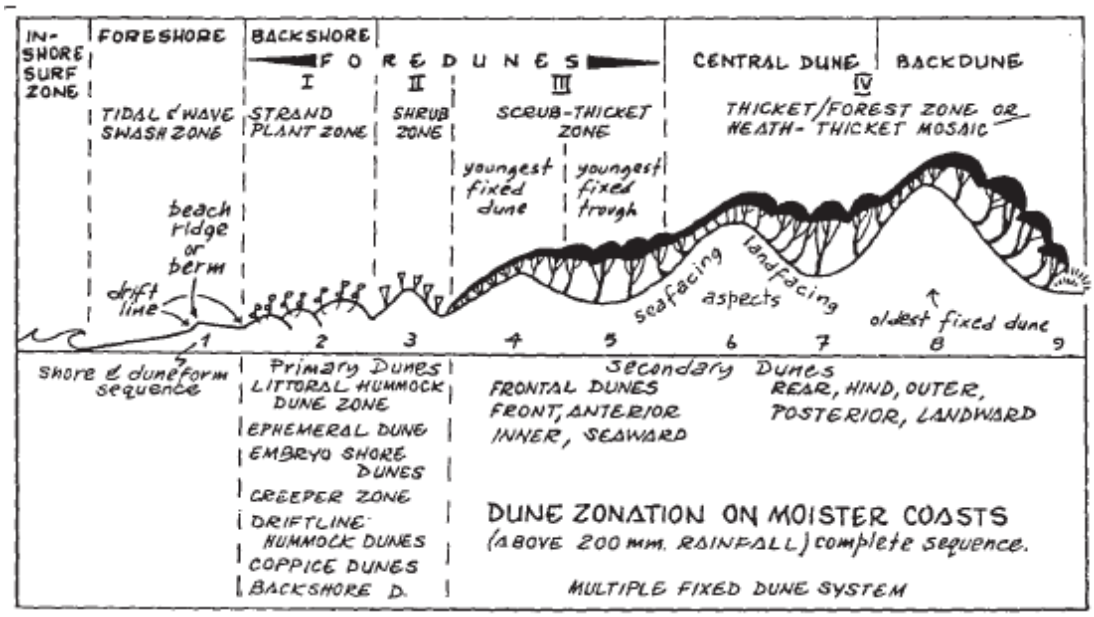


Figure 2.12 Typical coastal dune classification (after Tinley, 1985, p 6).

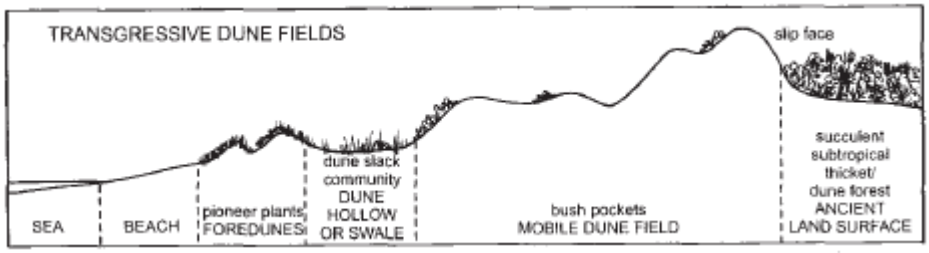


Figure 2.13 Transgressive dune vegetation type on the south-east coast (after Martinez & Psuty, 2004, p 169).

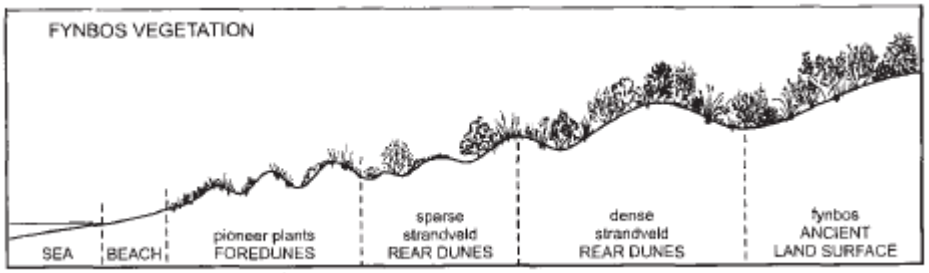


Figure 2.14 Fynbos dune vegetation type of the south coast (after Martinez & Psuty, 2004, p169).

2.3.2.2 Estuaries

The definition of estuaries in terms of the White Paper for Sustainable Coastal Development of 2000 is as follows:

"A body of water that has a connection with the sea and where fresh water derive from land drainage, is mixed with sea water"

In South Africa, there are about 259 estuaries (Turple, 2004) spread along the west, south and east coasts. Table 2 classifies the 259 estuaries into five types and across three zones, which results in approximately 13 groups of ecosystems.

Table 3: Estuary classification and amount

	Cool temperate	Warm temperate	Sub-tropical
Estuarine bay	0	1	3
Permanently open	2	28	15
River mouth	2	6	3
Estuarine lakes	9	4	2
Temporarily closed	7	88	98

Source: Driver et al., 2005

At the time of the study, the status of the estuaries in terms of the NBSA on the West coast (cold climate) and, to a lesser extent, on the East coast (subtropical) ranged mostly from highly critical to endangered, while the protection status was more evident on the South coast (warm climate) and the East coast. Therefore, the West coast would require more action for more protection before a number of the ecosystems of some of the estuaries was destroyed. A mining or rehabilitation strategy could aid such a process along the West coast.

2.3.3 Coastal management

The Integrated Coastal Zone Management (ICZM) could be described as a zone where land and sea meet and how integrated coastal planning, design and management should be implemented by the government to ensure the sustainable use of resources and the conservation of the complex environment (Clark, 1995; French, 1997). The ICZM started as a coastal programme on national level with the following four steps or criteria as a guide:

1. Formulation of a policy for ICZM;

2. Strategy planning to administer and organize the ICZM;
3. Development of a programme to formulate an implementation plan of ICZM strategy; and
4. Implementation of the ICZM through a strategy.

Besides following a process to develop an ICZM policy and implementation tools, the policy required some long-term vision, principles and objectives, which would be aligned with the national objectives and policies. South Africa started to develop an ICZM (Glavovic, 2006) in the 1970s, as a sector-based plan for industries, and in the 1980s changed it to develop a Coastal Zone Management (CZM) which was more ecology based.

In the 1990s, a new approach was formulated and a more public participation process was followed. Finally, in 2000 the concept of integrated coastal management was incorporated in the White Paper on Sustainable Coastal Development. The Integrated Coastal Management (ICM) concept moved away from the zone approach and from conservation to sustainable development. The ICM Bill[25] had been made available for comment before finally being promulgated as legislation. If the then existing approach of the Bill was retained in the Act, the mining industry would face many challenges.

2.4 Policy environment

This section investigated the major aspects in the policy environment with regard to minerals and those aspects aligned with the objectives of the research. Mineral classification, national mineral policy, policy integration and policy evaluation were all defined and are discussed below.

2.4.1 Mineral classification

In order to develop any frameworks, strategies or policies for the mining and minerals industry various aspects needed to be considered. The first aspect to be considered was the classification of the mineral resources since these resources were crucial in determining the type of mineral linked to a mining activity. These minerals were often divided into four groups (Azapagic, 2004) of uses, namely:

1. Energy minerals (coal, oil);
2. Metallic minerals (iron, copper, zinc);
3. Construction minerals (stone, aggregates, sand, gravel, gypsum); and
4. Industrial minerals (borates, calcium carbonates, kaolin, talc).

[25] National Environmental Management: Integrated Coastal Management Bill. Gazetted for public comments on 14 December 2006, Volume 498, Gazette number 29476. Online: http://www.deat.gov.za

In South Africa, this classification went further because of South Africa's strategically economic importance in providing a wide range of minerals and metals. They were divided into five categories (Jonck, et al., 2003; Robinson, et al., 2004), namely:

1. Precious minerals and metals (diamonds, gold, platinum, silver);
2. Energy minerals (uranium, coal, hydro carbon fuels);
3. Nonferrous metals and minerals (aluminum, copper, titanium, zinc);
4. Ferrous minerals (chrome, iron, manganese, vanadium); and
5. Industrial minerals (aggregate, sand, limestone, dolomite, special clays, dimension stone).

2.4.2 National mineral policy

In the mid 1990s, the need for a national approach to a mineral policy was identified (Otto, 1998) as imperative for the economy of a country. Such a National Minerals Policy (NMP) could first, give a clear statement of government's expectations and intent for the industry and second, it would provide a framework or guidance to developing legislation (Otto, 1997a & 1997b) and guidelines for implementation.

The objectives for developing and managing mineral resources would differ from country to country; therefore developing such a NMP should incorporate these objectives for such mineral resource development and management. The following six objectives[26] were identified as possible guidelines for the development of framework of an NMP, namely:

a) Scope of the policy, types of minerals available;
b) Sovereignty of the state and its role in managing the mineral resources;
c) Economics of the country, for instance what taxes needed to be paid;
d) Quality of life and the impact of mining on environment and communities;
e) Legislative framework and applicable laws for prospecting or mining; and
f) Regulatory agencies such as which authority or department regulated which aspects.

A close relationship existed between mining policy, regulation and investment; therefore, it was crucial that a mineral policy stimulated investment from a local, regional and global perspective.

[26] Summary of criteria and contents of "Mineral Policy, Legislation and Regulation".

2.4.3 Policy integration

Besides identifying a direct approach of applying standard principles to modern resources policy formulation, the use of the integration as a principle, similar to as the Environmental Policy Integration (EPI) principles, ensured that environment was addressed in developing resources policy. This approach would address the concept of using sustainable development as a framework to develop policies.

The EPI could be used in three different ways in integrating policies or legislation. The three concepts (Lenschow, 2002), with examples, were as follows:

a) Integration as an objective for example that the concept of sustainable development was the main objective for making decisions like issuing a mining right in terms of MPRDA;

b) Integration as a rule of reference for example for adopting the Integrated Environmental Management (IEM) or Environmental Impact Assessment (EIA) principles of NEMA into other legislation for instance the MPRDA; and

c) Integration as a autonomous principle for example that legislation ensured good investment by simply having a process for making decisions on an application for mining or for having guidelines to explain the rules such as the environmental policy for mining to investors integration.

2.4.4 Policy evaluation

By using policy evaluation criteria, governments could ensure that the policy would be implemented and managed. For example, the following summarised criteria (Greiner, 2000) were used to evaluate Australia's oceans policy:

a) Effectiveness and dependability of policy;
b) Precaution and efficiency of policy;
c) Provision for incentives and innovations;
d) Administrative effectiveness of policy;
e) Achievement of equity; and
f) Political and community acceptability.

The policy evaluation could also be taken further to determine whether the policy addressed the then existing principles in the national policy and to identify whether new principles were to be incorporated, for example

investment planning, cost sharing, ecosystem planning and management or responsibility.

2.5 Environmental policy for mining

This concept dealt with environmental matters and issues with regard to the mining industry. The concept also defined policies and those strategies that could be developed through consultation, research and development. For the purpose of this research, the priority areas were mine closure, pollution and waste management; environmental impact assessment and environmental management programmes were briefly discussed. These various aspects would be discussed concisely. In this study, no distinction was made between marine or coastal mining in the discussions below.

2.5.1 Mine closure

The mine closure concept had been introduced in past policies and was included in the legal framework, but many problems were experienced. Mineral and Petroleum Resources Development (MPRD) Regulations[27] addressed these problems in several ways by requiring the following:

- Closure objectives were part of EIA and Environmental Management Programme (EM Programme);
- Development of closure had to include risk assessments;
- Closure cost had to be calculated and be part of closure plan;
- End land use of mine areas had to be determined; and
- Closure plan had to be submitted for approval.

At the time of this study, DME was developing a guideline, and it had become apparent that a process needed to be followed for approval. Furthermore, the monitoring and aftercare was to be more constructive. Secondly, the development of the Regional Mine Closure Strategies (RMCS) concept, which was based on a regional and strategy approach where every closure plan had to be submitted, had to comply with the norms and standards of the RMCS for the area.

[27] Sections 61 and 62 of the Mineral and Petroleum Resources Development Regulations. Gazetted on 23 April 2004 as Regulation Gazette, Volume 466, Gazette number 26275. Online: South African Government Portal: http://www.gov.za .

2.5.2 Pollution and waste management

The concept was conceptualized with the promulgation of the MPRD Regulations that emphasized that pollution and the holder had to address waste within a mining area. The principles[28] were the following:

- To avoid or limit the generation of waste, pollution and mining residue at the source;
- To implement actions such as minimization, re-use and recycling if the generation of waste, pollution or mine residue could not be avoided; and
- To ensure that the disposal of pollution, waste or mining residue was done in a responsible manner.

Legislation also included the demarcation of mine residue into residue stockpile and residue deposit[29]. Residue stockpile referred to mine residue produced during the operations of the mine, for instance tailings and discarded dumps. Residue deposit referred to the same material, but where the mine was not operating and closure was the main objective.

Besides defining mine residue, aspects such as water management and pollution control, disposal of waste material, soil pollution and erosion control and as well as the management of residue stockpiles and deposits were addressed, In contrast, the White Paper on Integrated Pollution and Waste Management and the Waste Bill[30] had broader aims and principles than mining legislation. The policy approach was to make mining waste and pollution subject to this policy. It would be important to monitor and analyse the outcomes of the jurisdiction of waste and pollution in a mining area. Both sides raised sound policy arguments, but the implementation and monitoring would answer this jurisdiction issue in the passage of time.

2.5.3 Environmental impact assessment

The concept could be defined as a process to collect, organize, analyse, interpret, and communicate relevant information on a proposed activity's impact on the environment. The concept was first developed in the United States of America; and in the early 1990s (Clark, 1995) the following six-step process was developed:

a) Identify the project;
b) Determine the resources at risk;

[28] Section 63 of MPRD Regulations.
[29] Section 73 of MPRD Regulations.
[30] Online: South African Government Portal: http://www.info.gov.za/documents .

c) Screen or reconnoiter to determine the problems;
d) Scope by examining the possible impacts;
e) Evaluate of the alternatives; and
f) Analyze and report on aspects include Environmental Impact Reports (EIRs), EMPs[31] and Monitoring.

The approach was adopted in the IEM documents[32] and the later EIA regulations in 1995 under the Environmental Conservation Act 73 of 1989 (ECA). The MPRD Regulations, promulgated to follow a shorter process, required a scoping report, EIA report and EM Programme[33] reports for mining rights; while for a mining permit, only a Environmental Management Plan (EM Plan)[34] was required which included scoping, mini EIA and monitoring.

At the time of this study, mining was not listed in terms of the EIA Regulations of 2006 under the NEMA of 1998. DME was then in the process of integrating the EIA norms and standards under the proposed amendment Bill of the MPRDA.

2.5.4 Environmental management programme

The concept of the EM Programme was based on the EIA and had the function to ensure that the impact was managed and mitigated, and that action plans were implemented to deal with monitoring and reporting. The following key aspects[35] had to be addressed:

a) A description of mine closure objectives, historical and cultural aspects and management of impacts to be included;
b) Action plans to achieve coals and objectives;
c) Technical and management options to deal with impact;
d) Procedures for environmental emergencies and remedies;
e) Planned monitoring programme;
f) Calculated financial provision; and
g) Environmental awareness programme.

The biggest problem was that the EM Programme was not a closure plan even it required closure objectives and financial provision. EIAs and EMPs dealt with impact while mine closure dealt with risks that cover all aspects, not only environmental.

[31] Collective word for EM Plans and EM Programmes in terms of the MPRDA.
[32] Evaluation Unit at UCT produced an IEM series of 6 documents in 1992 for DEAT.
[33] Sections 49, 50 & 51 of MPRDA Regulations, mining area bigger than 1, 5 ha.
[34] Section 52 of MPRD Regulations, mining area 1, 5 ha or smaller.
[35] Section 51 of MPRD Regulations.

2.6 Sustainable development

This section discusses the aspect of understanding the concept and the strategy to implement the concept.

2.6.1 Understanding the concept

The concept was first developed and indicated in the World Commission on Environment and Development Report[36], "Our Common Future " or the more popular name, the "Brundtland Report". It was defined as follows:

"*Sustainable development is development that meets the needs of the present without comparing the ability of future generations to meet their own needs"*

After the definition was first introduced, it was taken through a number of steps by introducing it onto the global arena of the Rio Declaration of 1992 and the implementation of the concept at the World Summit of 2002 with a 2010 vision. At a more regional level, South Africa adopted the concept into the NEMA[37]. The concept was defined as follows:

"*Sustainable development means the integration of social, economic and environmental factors into planning, implementation and decision making so as to ensure that development serves present and future generations"*

Figure 2.15 illustrates the three legs of sustainable development of environment, economics and social. The concept, from a mining perspective[38] could be seen as a process to obtain balance through governance by:

- Using, conserving and protecting resources in the physical and natural environment;
- Initiating viable economic systems to ensure equity and economic growth; and
- Stimulating social and cultural systems and values towards improving health, income and living conditions of the poor majority.

[36] World Commission on Environment and Development (WCED), (1987). Our Common future: Report of the World Commission on Environment and Development. Published as an Annex to the General Assembly document A/42/427 of 2 August 1987. Online: http://www.un-documents.net/a/42-427.htm (accessed August 2007).
[37] National Environmental Management Act 107 of 1998.
[38] Diagram which re-presents the 3 legs of sustainable development with a fourth leg of Governance which was developed through the MMSD process.

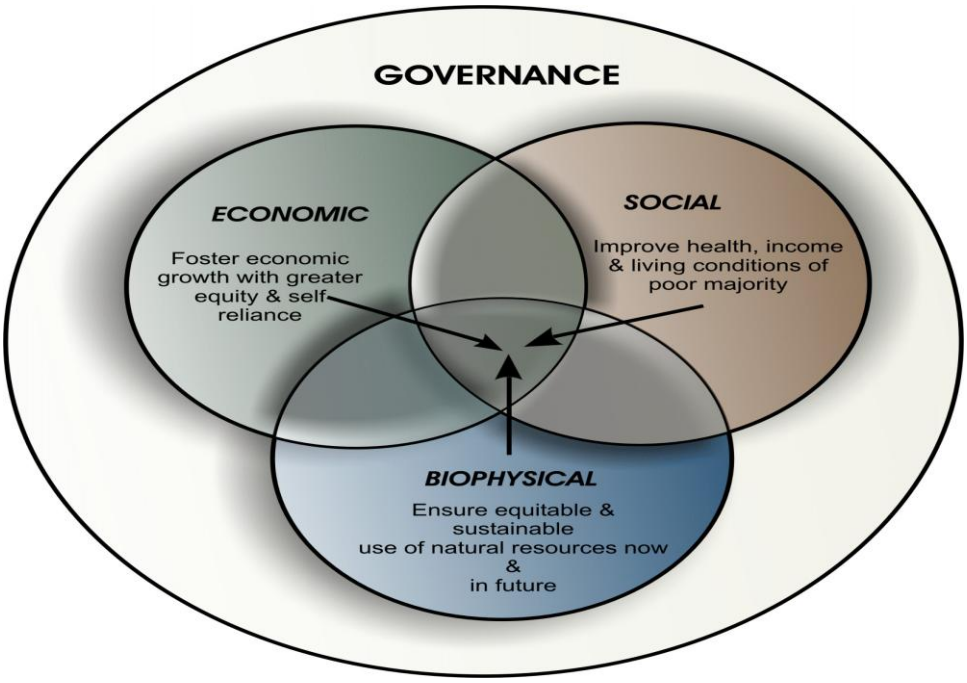


Figure 2.15 Sustainable development concept for mining (after Hoadley, Limpitlaw & Weaver, 2002, p 39).

2.6.2 Strategy approach

The outcome of the WSSD was that governments had to implement the JPOI. Paragraph 162[39] stated the following:

"States should take immediate steps to make progress in the formulation and elaboration of National Strategies for sustainable development and beginning their implementation by 2005"

In South Africa in 2004, DEAT was mandated to start a process. A task team[40] was first established and in 2005, a Government Steering Committee was formed to develop a strategy for South Africa.

[39] WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT (WSSD), (2002), Johannesburg Plan of Implementation. Report of the WSSD, Johannesburg, South Africa. Part of report no. A/CONF.199/20. Online: http://www.un.org/esa/sustdev/documents/WSSD (accessed August & November 2006).
[40] Researcher is involved in the process.

2.7 Conclusion

The concept of marine mining as well as coastal mining clearly indicates that the exploration and extraction in both marine and coastal environment have potential since economic strategic minerals gave been found in these environments. Mining in these environments needs to take certain aspects into account, which are essential for planning and management for both the government and the mining industry. With marine mining, for instance, aspects such as definitions for the exclusive economic zone, continental shelf, marine biodiversity, marine mining methods, marine conservation areas and sea concessions are essential. With coastal mining, aspects involving land biodiversity, coastal features such as beaches and estuaries and the concept of the ICM are most significant.

Collective approaches by government in developing policies, such as NMP, identifying issues with regard to pollution and waste management or mine closure and developing planning and management tools like EIA or EM Programme ensured that resources are effectively managed. Therefore, the development of a mineral policy for marine and coastal environments has not been based only on mineral classification. The NMP approach in this scenario involves policy integration, policy evaluation, concept development and sustainable development to develop such a policy.

In conclusion, the following aspects will play a significant role in the planning and managing of the exploration and extraction of minerals in both environments for South Africa. They are as follows.

a) Proper development of the marine and coastal mining concept;
b) Proper formulation of definitions in both environments;
c) Need to expand the mineral policy framework and environmental management concept to include marine and coastal mining; and
d) Development and implementation of sustainable development.

In addition, concepts and definitions are important. The role of strategies, policies and legislation or the collective word, rules, should not be under estimated. The next chapter explores the rules on international and national level, which both government and industry should comply with. The chapter further discusses the different types of South African and Australian policies, which are relevant to this study.

CHAPTER 3

Strategic Framework of Current Rules

3.1 Introduction

The objective of this chapter is to explore the current rules on international and national level by conceptually analyzing:

a) Certain conventions, protocols and declarations which were applicable to the research;
b) Specific South African government policies in the field of minerals, environment and coastal management since 1980;
c) National policies or legal frameworks (legislation) in countries such as Namibia and Australia; and
d) Role and impact of an international self regulating organization.

The focus was mainly on the South African perspective and countries selected, such as Namibia and Australia, which were selected because they had followed a process for developing a NMP similar to that of the South African NMP process. Australia was selected because of their governance approach, which was similar to that of South Africa. In South Africa, governance had been in embedded in the Constitution, whilst in Australia it was underpinned in relationships between the Commonwealth and State Governments (Glazewski & Haward, 2005).

3.2 International treaties and agreements

Many international treaties and agreements had been implemented since the founding of the UN in 1945. Most of the treaties and agreements were executed and considered as international law. Different legal instruments were developed and used, for example UN Conventions, International Conventions, Declarations and Protocols to implement these agreements. It would be impossible to discuss all of them, but for this research, certain aspects which had an impact on South Africa were selected.

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

The Convention[41] dealt with the incineration and dumping of waste at sea from ships, vessels, fixed platforms or floating platforms. For a better understanding, dumping was defined in terms of the convention as follows:

> *" a) Any deliberate disposal at sea of wastes or other matter from vessels, aircraft, platforms or other manmade structures at sea,*
> *b) Any deliberate disposal at sea from vessels, aircraft, platforms or other manmade structures at sea."*

The Convention definition of dumping excluded the disposal of waste or other matters directly arising from/or related to exploration, exploitation, and associated offshore processing of seabed mineral resources. In 1996, a Protocol[42] was developed under the Convention, and one of the main reasons for this Protocol was to include offshore abandonment into the dumping definition. The following was added:

"Any abandonment or toppling at site of platforms or man made structures at sea for the purpose of deliberate disposal".

At the time of this study, South Africa was party to the Convention. In order to ensure that South Africa was complying with the Protocol, the researcher investigated the then newly published ICM Bill[43]. Chapter 8 of the Bill addressed such compliance. Therefore, the ICM Bill could be used as legal implementation tool to ensure compliance with the Protocol.

3.2.2 International Convention on Prevention of Pollution from Ships (MARPOL, 73/78)

MARPOL (73/78) covered the prevention of pollution, such as oil or/and chemicals from ships and included coping with accidents. The International Convention for dealing with Prevention of Pollutions from Ships was first

[41] INTERGOVERNMENTAL CONFERENCE ON THE CONVENTION ON THE DUMPING OF WASTES AT SEA, (1972) Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention, 1972). Online: http://www.londonconvention.org (accessed December 2006).
[42] Online: http://www.londonconvention.org/documents/lc72/PROTOCOL.pdf (accessed December 2006).
[43] National Environment Management: Integrated Coastal Management Bill, Gazetted on 14 December 2006, Volume 496, Gazette number 29476.

adopted in 1973 at an International Maritime Organisation (IMO)[44] convention, but in 1978, the 1973 Convention was modified by a Protocol[45]. The result was that the reference to MARPOL (73/78) has become widely used in the maritime environment.

The Convention briefly includes six annexes:

Annex 1: Regulation for the prevention of pollution of oil.
Annex 2: Regulation of the control of pollution by noxious liquid substances in bulk.
Annex 3: Prevention of pollution by harmful substances carried by sea in packaged form.
Annex 4: Prevention of pollution by sewage from ships.
Annex 5: Prevention of garbage from ships.
Annex 6: Prevention of air pollution from ships.

To date, there have been many amendments to the six annexes[46], which were adopted at IMO meetings / sessions to deal with all the new issues created by new technologies and bigger ships. It remained important to keep in mind that, besides the annexes, the Convention also dealt with jurisdictions, powers and inspection administered by the IMO at international level and coastal states on a national level. Although the IMO was granted certain responsibilities, the final enforcement lay with coastal states. Not all coastal states implemented such actions; therefore, it was sometimes difficult to transpose actions at an international level to a local level.

In the 1980s, South Africa responded by developing legal tools to enforce South Africa's response to the prevention of pollution at sea. The following three Marine Pollution Acts were promulgated:

- Control and Civil Liability Act 6 of 1981;
- Prevention of Pollutions of Ships Act 2 of 1986; and
- Intervention Act 64 of 1987.

With the ever-growing demand for increased maritime traffic associated with marine mining, including petroleum, it was perhaps time for South Africa to

[44] INTERNATIONAL MARINE ORGANISATION (IMO), (1973) International Convention on Prevention of Pollution from Ships (MARPOL 73). Online: http://www.londonconvention.org/marpol_73.htm (accessed December 2006).
[45] INTERNATIONAL MARINE ORGANISATION (IMO), (1978) International Convention on Prevention of Pollution from Ships (MARPOL 78 Protocol). Online: http://www.londonconvention.org/marpol_73.htm (accessed December 2006).
[46] One of the responsibilities of IMO is to review annexes and determine implementation dates as agreed upon by member States to the IMO.

move forward and develop an oceans policy to deal with all the matters concerning planning and management of South Africa's oceans.

3.2.3 United Nations Convention on the Law of the Sea

This Convention[47] of 1982 included 320 articles and about nine annexes and dealt which planning, management, monitoring, enforcement[48] and jurisdictions aspects in the ocean environment. Some of them were the following:

a) Concept and jurisdictions of territorial sea and EEZ;
b) Definition of the continental shelf and activities on the shelf;
c) Provisions around the high seas, such as conservation;
d) Establishment of the ISA and its role;
e) An exposition of the protection and preservation of the marine environment;
f) Action against dumping of waste and pollution from ships;
g) Maritime scientific research;
h) Conditions of prospecting, exploration and exploitation of minerals; and
i) Establishment of the International Tribunal for the Law of the Sea (ITLOS) and its role in disputes.

South Africa's response was to establish a legal tool to enable it to obtain jurisdiction over the EEZ of 200 nautical miles. Consequently, the Maritime Zones Act 15 of 1994 was promulgated. It was significant that the Act referred to minerals jurisdiction within the EEZ, resulting in the MPRDA jurisdiction that included the EEZ sea boundary.

3.2.4 Rio Declaration on Environment and Development

As indicated in the title, this UN Conference was held in Rio de Janeiro, the capital of Brazil in South America in 1992. The main aim was to establish sustainable development as concept to give guidance to human needs and to set benchmarks for human progress. During this conference, the Rio Declaration[49] was adopted with 27 principles and a programme for action,

[47] UNITED NATIONS, (1982), United Nations Convention on the Law of the Sea. New York. Online http://www.un.org/Dept/los/conventions_agreements/texts/unclos/unclos_e.pdf (accessed July 2006).
[48] Enforcement body of UNCLOS is the ISA. Online: http://www.isa.org.jm (accessed October 2006).
[49] UNITED NATIONS CONFERENCE ON ENVIRONMENT AND DEVELOPMENT (UNCED), (1992). Rio Declaration on Environment and Development, Report of the UNCED. United Nations document, A/CONF.151/6. Online: http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm (accessed November 2006).

Agenda 21[50] consisted of 40 chapters that covered the social and economic dimensions, conservation and management of resources for development, the strengthening role of major groups and ways of implementation. The impact of the declaration and agenda resulted to some international development and action, for example:

a) Development of the EIA concept;
b) Establishment of the concept of integrated planning and management;
c) Establishment of the right to develop and exploit resources;
d) Introduction of the polluter pays principle;
e) Proper utilization and conservation of natural resources; and
f) Advantages of integration of environment with economics.

The impact of the declaration was more focused in South Africa and the result was that policies were developed to reflect the declarations principles, for example:

- Environmental Management Policy[51], 1998.
- Minerals and Mining Policy[52],1998.
- Water policy[53], 1998.
- Sustainable Coastal Development Policy[54], 2000.

It should be noted that there was justifiable criticism that the Declaration lacked authority over the implementation and enforcement of the social aspects. On the other hand, it led the way for the 2002 WSSD in South Africa. Rio ensured that the concept of sustainable development and some of its principles were already established. The WSSD should also not been seen as an isolated approach to resource use but that the Rio Declaration should be part of the package to deal with sustainable development of resources.

3.2.5 United Nations Convention on Biological Diversity

The Convention[55] was adopted at the same UN Conference on the Rio Declaration and Agenda 21 in 1992. The Convention had three main objectives:

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[50] UNITED NATIONS CONFERENCE ON ENVIRONMENT AND DEVELOPMENT (UNCED), (1992). Agenda 21: The United Nations Programme of Action from Rio. Report of the UNCED, UN document : A/CONF.151/26. Online: http://www.un.org/esa/sustdev/documents/agenda21/english/agenda21toc.htm (accessed December 2006).
[51] Implementation tool, National Environmental Management Act 107 of 1998.
[52] Implementation tool, Minerals and Petroleum Resources Development Act 28 of 2002.
[53] Implementation tool, National Water Act 36 of 1998.
[54] Implementation tool, Integrated Coastal Management Bill of December 2006.
[55] UNITED NATIONS CONFERENCE ON ENVIRONMENT AND DEVELOPMENT (UNCED), (1992), Convention on Biological Diversity. Online: http://www.biodiv.org (accessed April, August & December 2006).

a) Conservation of biodiversity;
b) Sustainable use of biological resources; and
c) Fair and equitable sharing of benefits arising from the use of genetic resources.

Although South Africa did not participate in the Convention, it agreed with the principles of the said Convention. Consequently, South Africa developed a policy on Biodiversity for itself[56] (Green Paper, 1996 and the White Paper, 1997) to implement the principles of the convention as required to be a member of the convention and to develop national strategies, plans and programmes for implementation.

3.2.6 World Summit on Sustainable Development

This Summit of 2002 was a follow-up on the Rio Declaration of 1992, and its purpose was to evaluate the progress made with implementing and managing sustainable development. During the Summit, it was realised that the Rio Declaration lacked the proper legal status for the enforcement of an effective implementation plan. At the Summit, the Johannesburg Declaration[57] and the JPOI were adopted to address all three pillars of sustainable development in a balanced manner and to align them with human rights and poverty, an aspect that was lacking in the Rio Declaration.

The JPOI[58] consisted of eleven chapters. They were:

Chapter 1 Introduction.
Chapter 2 Poverty eradication.
Chapter 3 Changing unsustainable patterns of consumption and production.
Chapter 4 Protecting and managing the natural resource base of economic and social development.
Chapter 5 Sustainable development in globalizing world.
Chapter 6 Health and sustainable development.
Chapter 7 Sustainable development of small island developing states.
Chapter 8 Sustainable development of Africa.
Chapter 9 Other regional initiatives.
Chapter 10 Means of Implementation.

[56] Implementation tool, Biodiversity Act 10 of 2004.
[57] WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT (WSSD), (2002). Johannesburg Declaration on Sustainable Development. Report of the WSSD, Johannesburg, South Africa. Report no. A/CONF.199/20. Online: http://www.johannesburgsummit.org (accessed August & November 2006).
[58] WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT (WSSD), (2002), Johannesburg Plan of Implementation. Report of the WSSD, Johannesburg, South Africa. Part of report no. A/CONF.199/20. Online: http://www.un.org/esa/sustdev/documents/WSSD (accessed August & November 2006).

Chapter 11 Institutional framework for sustainable development.

At the time of the study, South Africa was in the process of responding to the JPOI with the development of a national strategy. The first step was to develop a national framework for sustainable development (DEAT, 2006), which was published for comments in December 2006. The second step was to develop the National Strategy for Sustainable Development (NSSD). This strategy would have a phased implementation plan. In parallel reaction to the national process, DME decided in 2005 to start with the development of a sector-specific strategy for mining. At the time of this study, a discussion document was developed (DME, 2007) for the sector which complied with the national process.

3.3 South African policies

3.3.1 National mineral policies

3.3.1.1 Mineral Policy[59] of 1986

The policy (DMEA, 1986b) dealt with eleven different topics with strategies, at the time that was relevant to the mining industry. They were:

i. Exploration;
ii. Resource Management;
iii. Exploitation;
iv. Environmental;
v. Manpower;
vi. Beneficiation;
vii. Export;
viii. Investment;
ix. Co-operation;
x. Self-sufficiency; and
xi. Contingency.

The environmental strategy included the requirements of the community and mining industry and what; governments approach will be to address these requirements. Governments approach was briefly to:

a) Understand and implement the concept of environmental protection and conservation;
b) Adopt and endorse the principles of the National Environmental Policy (NEP) of 1980 into mining;

[59] Also referred to as the White Paper on Minerals of 1986.

c) Accept pollution problems and address air pollution;
d) Address water problems in consultation with DWAF;
e) Implement rehabilitation and monitor implementation;
f) Address mine closure in consultation of all parties concerned;
g) Consider public awareness in approvals and monitoring; and
h) Support research to upgrade environmental standards.

This policy not only addressed the investment, export, exploitation and exploration, which were normally associated with mineral development, but also included other aspects, such as labour, environment, beneficiation and resource management which were innovative concepts for the 1980s. The policy was developed to be implemented as a collective national strategy to promote mineral development. The legal framework, Minerals Act 50 of 1991, ensured the implementation of these strategies.

3.3.1.2 Mineral Policy[60] of 1998

This mineral policy (DME, 1998) addressed more issues than the Mineral Policy of 1986 and was categorized into the following six themes, together with some of the strategies underlining certain of the themes:

1. Business climate and mineral development (Investment, taxation, Information, small scale mining, beneficiation, marketing and research);
2. Participation in ownership and management;
3. People issues (mine health and safety, human resource development, migrant labour, industrial relations and downscaling);
4. Environmental management;
5. Regional co-operation; and
6. Governance (regulation; promotion; national, provincial and local government and stakeholder consultation).

Environmental management in this policy went further by addressing and identifying 12 principles to be implemented. Briefly, the principles are as follows:

1. DME would support a NEP as a framework for SA;
2. No-go options were to be considered in decision making;
3. Implementation of polluter pays principle;
4. EIA Management would be applied;
5. Interested and Affected Parties (I & AP) consultation would be undertaken;
6. Mine closure would be aligned with IDPs of local government;

[60] Also referred to as the White paper on Minerals and Mining of 1998.

7. Clear guidelines would be developed;
8. IEM would be applied in environmental management;
9. Capacity building would be undertaken with pollution, implementation, monitoring and compliance;
10. Multiple land use would be applied in planning;
11. Mining industry would need to take responsibility for reducing pollution and minimizing waste; and
12. Research would be focused on problem areas in environmental management.

The policy was taken to the next step of implementation by developing a legal framework which resulted in the promulgation of the MPRDA of 2002[61] and MPRDA Regulations in 2004[62] .

3.3.1.3 Advantages of NMP of 1998

The 1998 policy differ from the 1986 policy in which a collective national strategy was used to implement and manage mineral resources. The 1998 policy used sustainable development to plan and manage mineral resources. Aspects, such as small-scale mining, ownership, people issues involving human resource management, industrial relations and downscaling as well as research were addressed. These issues were not properly addressed in the 1986 policy. Advantages of this policy were, first, that it laid a foundation for sustainable planning and management of mineral resources. Second, mining approvals were based on sustainable principles in the MPRDA in terms of environment, economics and social issues.

3.3.2 National environmental policies

3.3.2.1 Environmental Policy[63] of 1980

This environmental policy (DWAF & EC, 1980) dealt with the concept of environmental conservation by introducing environmental impact studies and environmental education as overall policy approach for South Africa. The Policy also dealt with specific conservation aspects, such as soil conservation, marine pollution, air pollution, solid waste and littering, water pollution and noise pollution, which had a direct or indirect impact on the mining industry. A few legal instruments, such as various laws and regulations, were developed to implement the policy. For example the Environmental Conservations Acts of 1982, 1987 and the final one of 1998 led to the EIA regulations of 1995.

[61] MPRDA of 2002 was only promulgated in June 2004.
[62] Regulations was promulgated together with the MPRDA in June 2004.
[63] Also referred to as the White paper on Environment Conservation of 1980.

3.3.2.2 Environmental Policy[64] of 1998

The approach to this environmental policy (DEAT, 1998) was different and a first for South Africa as it addressed the concept of environmental management where the previous policy of 1980 dealt with environmental conservation. Furthermore, the ECA off 1989 also laid down a clear policy on implementation.

The Environmental Policy of 1998 has a clear vision, principles and strategic goals[65] to achieve environmental management. The NEP and NMP were both approved in 1998, and the result was that the implementation of NEP, NEMA, which were approved in the same year. This action had a definite impact on the formulation of mining legislation. The decision was made by DME to incorporate some aspects of NEMA into the MPRDA. A review of the NMP again was an option but not practical. Therefore, three aspects of NEMA were incorporated and adopted in the MPRDA, namely:

- Principles of NEMA[66] .
- Integrated environmental management[67] .
- Environmental impact assessment[68] .

3.3.3 National coastal policies

3.3.3.1 Coastal Zone Management Policy of 1989

This policy was developed by the Council for the Environment and consisted of three parts (Council for the Environment, 1989 & 1991):

- *Coastal Zone Management, Part 1*: Principles and objectives, 1989;

- *Coastal Zone Management, Part 2*: Guidelines for coastal land use, 1991; and

- *Coastal Zone Management, Part 3*: Integrated coastal management in SA[69].

[64] Also referred to as the White paper on Environmental Management of 1998.
[65] They are: Effective Institutional Framework, Sustainable use & Impact Management, Holistic & Integrated Planning, Participation & Partnerships, Empowerment & Education, Information Management & International co-operation.
[66] Section 2 of NEMA, 1998.
[67] Chapter 5 of NEMA, 1998.
[68] Section 24 (7) of NEMA, 1998.
[69] Literature refers to document but no copy could be obtained.

The problem with this policy was that there was no proper consultation with stakeholders; it required a more biological approach to coastal management: it was land-use oriented rather than resource-use oriented; and the concept of sustainable development was not included in the policy. The result was that no legal framework was developed and a new environmental policy framework had to be developed under the new government in 1994. Subsequently the Council for the Environment was dissolved. Thus, the new framework indicated that new and specific policies needed to be developed for coastal management, biodiversity, protected areas and air quality.

3.3.3.2 Sustainable Coastal Development Policy of 2000

This policy (CMPP, 2000)[70] dealt with the change in approach to coastal zone management in South Africa. It included a new vision, principles and themes with goals, objectives and a plan of action. The impact this policy will have on mining still needs to be assessed. The implementation of this policy through a legal framework is in the development stage and could determine different environmental management practices, norms and standards for the mining industry.

3.3.3.3 Advantages of the Coastal Development Policy of 2000

The previous coastal policy of 1989 deemed that the economic and social aspects of the coast were significant. The coast was seen as an exclusive zone in which a coastal policy had to be implemented, managed and reviewed. Therefore, the new approach swung away from an environment and zone approach towards a more integrated and sustainable coastal development approach. The word "integrated" referred to different government levels and the roles they needed to fulfill in ensuring that all resources along the South African coast were properly managed to the benefit of all. Sustainable development, on the other hand, ensured that ecosystems and communities benefited from the economic advantages of resource use.

3.4 Namibian minerals policy

3.4.1 Background

The Minerals Policy of Namibia[71] was formulated and developed in a manner similar to that of the South African Minerals and Mining Policy of 1998. The

[70] Also referred to as the White paper on Coastal Management of 2000.

[71] MINISTRY OF MINES AND ENERGY (MME), (2003). *Minerals Policy of Namibia*, Government of Namibia: Ministry of Mines and Energy, Windhoek. Online: http://www.mme.gov.na/publications.htm (accessed August & December 2006).

formulation process of the policy was done through a series of workshops that were held to identify the main themes to be addressed in the policy. During the process, cognizance was taken that certain needs had to be dealt with in the policy, namely:

- Concept of sustainable development;
- Competition due to globalisation;
- Different market forces; and
- Protection of the environment.

It was important that the policy supported the goals of second National Development Plan (2000 – 2006) of Namibia. Such support would ensure that the mining industry played an essential role in achieving and implementing the goals to the benefit of all.

3.4.2 Objectives and main themes

With the formulation and development of the policy, it was realised that the policy had to ensure that certain objectives were achieved and the minerals sector had to contribute to the socio-economic wealth of Namibia. Ten objectives were formulated with the focus on the promotion of certain themes and the assurance of the implementation and compliance with certain aspects identified in the themes.

For the purposes of the study, the themes and the main aspects were briefly mentioned below:

a) Mining industry included aspects such as the involvement of operations in large scale mining, small scale mining, marine exploration and mining;
b) Marketing and promotion included aspects such as the availability of capital markets and mineral promotion of Namibian minerals, for example diamonds;
c) Mining industry and the environment included aspects such as the issues of rehabilitation, waste and effective environmental management;
d) Human resources included aspects such as the issues of training, AIDS, affirmative action and gender, for example women in mining;
e) Research, Development and Technology included aspects such as why research and information were important, and the role of technology;

f) Governance included aspects like the matter of land use planning, development of legal instruments such as laws, regulations and strategies; and
g) Regional integration included aspects such as the issue of sharing within the Southern African Development Community (SADC) perspective, role of Namibia in the SADC context as well as the role technology and human resource development could play within SADC.

3.4.3 Lessons for both Namibia and South Africa

The mineral policies of Namibia and South Africa have both similar and divergent themes. The Namibian policy focuses strongly on the mining industry, such as marine mining (60 % of industry), environmental protection and research, development and technology while the South African policy focuses on business climate and mineral development, social issues and environmental management which were more developed in the South African mining industry than in Namibia.

The South African policy focuses on six themes, based on the outcomes of a stakeholder process while the Namibian focuses on eight themes, which results from a consultative process. The advantages of the Namibian minerals policy are as follows:

- More themes are identified which includes marine exploration and mining as well as research, development and technology; and
- Twelve objectives are identified to ensure proper implementation, to stimulate compliance and to create the environment with the objective of a regular review of minerals policy.

The disadvantage is that aspects like taxation, mineral beneficiation, migrant labour, housing, downscaling and employment conditions are sometimes mentioned but not specifically addressed as in the South African policy. The strong emphasis on the investor's business climate, social issues such as human resource development and environment in the South African minerals policy ensures that South Africa has a more sustainable development strategy approach towards minerals development rather than merely a collective national strategy for mineral development, as is the scenario of the Minerals Policy of 1986.

3.5 Australian policies

The Australian government[72] consists of a federal system, a commonwealth on national level with seven different states on a lower level. The states have more power in terms of planning, management and decision-making than the South African equivalent of provinces. During the 1960s and 1970s in Australia (Glazewski & Haward, 2005) , the interests of commonwealth over state policies were developed in compliance with international law, such as UN Conventions, International Treaties and Protocols, which were signed by the Australian government. The first reaction was to implement a legal framework for offshore oil production. The result was the Petroleum (Submerged lands) Act of 1967.

It must be noted that most states developed their own policies and legal frameworks over the years because commonwealth policies were lacking. At the time of this study, Australia faced three dilemmas in developing policies and legal frameworks on commonwealth and state level. They were as follows:

a) In many cases, Commonwealth legislation had to be implemented on a state level. The problem lay with developing and implementing a State Act to deal with the issue. Such legislation would normally be a lengthy process. In this context, the Commonwealth Offshore Minerals Act and Western Australia Offshore Minerals Act would be briefly discussed.

b) State policy and legal frameworks had been functional for decades but there was no proper Commonwealth policy in place. If a commonwealth policy was developed, a specific approach needed to be implemented to incorporate and integrate existing state policies. In this context, the national co-operative approach to integrated coastal management would be briefly discussed.

c) Implementation of international agreements required Australia to enforce them through policies, strategies and legal frameworks. The development of the policy at commonwealth level required that concerns and matters be addressed to ensure that states supported Commonwealth policies. In this context, the Oceans Policy of Australia would be briefly discussed.

[72] Literature also referred to the Australian Government as the Commonwealth and their authorities which does not include the state and their authorities. Specific references were made to state policies, strategies and legislation to cater for the specific state.

3.5.1 Offshore minerals legislation

The Offshore Minerals Act was promulgated in 1994 (Offshore Minerals Act 28 of 1994) and established as a Commonwealth Act. The response of the states was only manifested in 1998 when the State of Queensland was the first to respond. Recently, the State of Western Australia in 2003 also responded. Three other states have yet to respond.

3.5.1.1 Offshore Minerals Act of 1994

This commonwealth legislation[73] was administered by two institutions, namely the Designated Authority (State) and the Joint Authority (Commonwealth and State) while jurisdiction was from the EEZ line to three nautical miles from shore. The following aspects were identified which had policy and strategic implications for the research scope of the dissertation:

a) Types of license that could be issued for exploration and mining;
b) Obligations and conditions to license holders;
c) Tender block determined by authorities for exploration and mining;
d) Size of the blocks and the limit on amount of blocks;
e) Role and responsibilities of Designated Authority and Joint Authority;
f) Access and request for information from the authorities;
g) Use of security term to be determined or requested by authorities;
h) Matter of renewal of licenses and transfer of license to third party;
i) Authority's protection against legal action;
j) Restoration or rehabilitation of explored or mined areas;
k) Communication and co-ordination between the two authorities; and
l) Development and implementation of state legal framework for offshore minerals in the territorial sea area.

3.5.1.2 Western Australia: Offshore Minerals Act of 2003

This state legislation[74] was mainly administered by the Western Australia State government and excluded exploration of gas and oil (petroleum). The jurisdiction of the Act was from the baseline to three nautical miles from shore. The Act was similar to the Commonwealth Act but included more aspects to address matters, such as planning and management as well as the latest developments at international level. The following aspects were identified as important for policy and strategic reasons for the scope of the research:

1. Identification and explanation of basic concepts;

[73] Online:http://www.scaleplus.law.gov.za/html/comact/browse/TOCOF.htm (accessed November 2006)
[74] Online: http://www.slp.wa.gov.au/states/swans.nsf (accessed September 2006).

2. Relationship with the Environmental Protection Act;
3. Duration and extension of licenses;
4. Consultation between ministers of the state government;
5. Increased focus on administration and registration by the state of licenses;
6. Monitoring and enforcement;
7. Issuing of notices to give holders direction;
8. Safety zones; and
9. Appointment and function of inspectors.

It must be noted that the legal framework of both Acts mentioned above did not refer to end use of explored or mined areas. The environmental aspect was placed in focus, but approval and monitoring was administrated by a different state department. The role of decommissioning, mine works programme and social development were not very well addressed in these Acts. If they were addressed in other policies or Acts, reference was made as with environment, fees and royalties.

3.5.2 Integrated Coastal Zone Management Policy of 2006

The then newly drafted Commonwealth Policy (2006), *National approach to Integrated Coastal Zone Management*[75] was developed to address a collective approach to coastal zone management in Australia. The policy comprised two parts:

a) The framework addressed the purpose to set the scene for national co-operation in managing coastal issues on the bases of sustainable development. The policy cut across jurisdictions and sectors by addressing five major issues that needed collectively to be addressed and managed.

b) The implementation plan addressed six priority areas with sub areas where objectives had been developed with specific action plans, time frames and responsible authority for all sub areas.

The following implementation aspects of the implementation plan of the ICZM were highlighted which could assist South Africa develop goals to implement the Coastal Development Policy of 2000 in all sectors, including mining. They were as follows:

[75] NATIONAL RESOURCES MANAGEMENT MINISTRAIL COUNCIL, (2006). National Cooperative Approach to Integrated Coastal Zone Management, Framework and Implementation Plan. Canberra, ACT, Australia. Online: http://www.deh.gov.au/coasts/publications/framework/index.html (accessed September 2006).

a) To improve co-operation between the government levels;
b) To give policy direction to lower order government;
c) To collectively plan and manage coastal areas;
d) To collectively address issues; and
e) To promote sustainable coastal use.

3.5.3 Oceans Policy of 1998

This policy (Australia's Ocean Policy) was developed in consultation with states and local government and adopted by the Commonwealth government in 1998. The jurisdiction of the policy for the Commonwealth stretched from the line of the EEZ to the line of coastal waters and while the jurisdiction of the states stretched from the coastal waters line to base line of Australia[76].

The policy consisted of two parts:

a) *Australia's Oceans Policy 1[77],* addressed the vision and goals for this policy, oceans planning and management, implementation arrangements, principles on sustainable use, key actions and research and development.

b) *Australia's Oceans Policy 2[78], Specific sectoral measures, addressed* 12 ocean uses and impacts like offshore petroleum and minerals, role of people, a few concepts for better understanding of the ocean, protection of the oceans and the effectiveness of monitoring and reporting.

It should be noted that this policy was the direct response of Australia on implementing UN or international conventions and protocols, such as the London Convention of 1972, MARPOL 73 / 78, UNCLOS of 1982 and Agenda 21. The developing of regional marine plans and establishment of marine protected areas were tremendous efforts on the part of Australia and care should be taken to development and maintain the coasts.

[76] Agreement between Commonwealth and States
[77] COMMONWEALTH OF AUSTRALIA, (1998). Australia's Ocean Policy, Volume 1 – Caring, Understanding, Using wisely. Canberra, ACT, Australia. Online: http://www.deh.gov.au/oceans'oceans-policy/policy-publications.html (accessed September 2006).
[78] COMMONWEALTH OF AUSTRALIA, (1998). Australia's Ocean Policy, Volume 2 – Specific Sectoral Measures. Canberra, ACT, Australia. Online: http://www.deh.gov.au/oceans'oceans-policy/policy-publications.html (accessed September 2006).

3.5.4 Lessons for South Africa

The NMP of 1998 and MPRDA dealt collectively with both offshore and onshore mineral development, while Namibia addressed such matters in their NMP. Australia dealt with it as a separate policy. The advantage of handling it separately ensured that technical, scientific and legal matters were better addressed since the ecosystem differed totally from onshore. Another reason was that different policy for offshore stimulated mineral development and could be seen as an investment over a long term for both the government and potential operators.

At the time of this study, South Africa was moving towards implementing a coastal policy, and in comparison with Australia, South Africa was in a better position to implement the policy at a national level. The disadvantage of the Australian situation was that coastal policies were first developed by the states without a national approach to coastal policy. It became clear from the Australian approach that a policy had to include all levels of government not only one.

The Oceans Policy of Australia ensured that International agreements and treaties affecting the EEZ were implemented and complied with. The advantage of such a policy ensured that all resources were being effectively developed and managed and that sectorial strategy, like mining, could also be developed. At the time of this study, South Africa did not have an oceans policy or a specific strategy. Perhaps a sustainable marine resource use strategy of the South African EEZ needed to be developed.

3.4 Code for Environmental Management of Marine Mining

This code had been developed by the International Marine Mining Society (IMMS)[79] to assist multi-national companies develop practices and operate guidelines to minimize negative environmental impact. The code was developed over three years and was adopted by the IMMS in 2001: it was updated in 2002. A review of the code was due in 2007.

The objectives of the IMMS (Jones, et al, 2003) gave an indication of the commitment by the society and his members. They were as follows:

a) To promote the understanding of different aspects of marine mining;
b) To aid in the exchange of information;
c) To sponsor seminars and symposia;

[79] INTERNATIONAL MARINE MINING SOCIETY , (2001). Code for Environmental Management of Marine Mining. Online: http://www.immsoc.org/IMMS-downloads/codefeb2002.pdf (accessed August & December 2006).

d) To encourage development of marine mineral resources;
e) To assist young professionals; and
f) To encourage research.

The code referred to principles and to operating guidelines. The principles referred to the commitment the mining company had to make by implementing the code. Operating guidelines (Jones et al, 2003) on the other hand were more specific for implementation of the code and were briefly discussed:

a) Sustainable development included activities that were consistent with sustainable development and were integrated into planning, decision - making and management of the mining operations. It also promoted sustainable practices like the return of unused mineral extraction to the seabed;

b) Environmental responsibility and company ethics encouraged the company to develop a code of ethics concerning environmental management. Furthermore, this aspect had to be communicated to all concerned and training had to be conducted for implementation by employers and contractors;

c) Community partnership focused more on an appropriate stakeholder consultations and ensured that community concerns were taken into account at all the stages of mine planning and management;

d) Environmental risk management was more concerned with risk techniques and their sequence of occurrence. In order to make provision to deal with risks, the development and implementation of contingency plans to address different scenarios of risks were required;

e) Integrated environmental management needed to recognize and implement environmental management in all operations and all stages or life cycle of mine, from exploration to decommissioning;

f) Company environmental performance targets needed to be set not only to comply with legislation but to ensure internal self-performance which was to be communicated to employers and contractors in order to be achieved;

g) Environmental improvement and upgrading were important to develop strategies, to review and to audit in order to ensure that practices and operations complied with legislation and company targets set by management;

h) Rehabilitation and decommissioning required that the company had to ensure that sites which were mined and rehabilitated could be left in a safe and stable manner to be decommissioned;

i) Reporting and documentation demanded that all practices were well recorded and reported on and were accessible to all stakeholders, employees and contractors;

j) Archiving ensured that information and reports were properly archived, and accessible for future research and development; and

k) Performance reviews were necessary as the company was audited on a regular basis on its operations every three years.

The advantage of these eleven operating guidelines was to set a good basis for proper environmental management of marine mining in the industry. However, care would have to be taken that this code did not replace legislative requirements but should be seen as planning and management tool for operators to save costs, keep employees and contractors informed and promote environmental management. Therefore, the disadvantage of Industry-driven policies was that it was more of interest to the industry than to the government. The government-driven policies were more holistic in nature and followed a comprehensive consultation process, which was finally approved by government. If a marine mining policy was developed for any specific country, this code could be used as basis for such a policy, bearing in mind that economic, social and governance aspects needed to be added.

3.5 Conclusion

The existence of rules ensures that government had the mandate to plan and manage natural resources. For the minerals industry, it ensures access to resource, development of resource and long-term return on investment. The importance of international agreements, conventions and treaties should not be underestimated since these could lead to the development of national policies and legal frameworks to be implemented or complied with. In South Africa, it has led to the development of minerals, environment and coastal policies over the years. The development of both the NMP of 1998 and the Coastal Development Policy of 2000 initiated the paradigm shift to plan and manage resources for the benefit of all, not only economically but also sustainably.

An analysis of Namibian and Australian policies clearly indicated that South Africa did not lag behind in developing policies and legal frameworks. The

Coastal Development Policy of 2000 was a good indication that South African had learned lessons from Australia's coastal policy approach. The following aspects from the Namibian and Australian rules could have a significant impact on developing similar rules in South Africa:

a) Marine and coastal mining should be a theme in the NMP;
b) IMMS code could be used as basis for offshore mining;
c) NMP should include objectives and principles, not only themes;
d) NMP should support government strategies and develop initiatives; and
e) Provincial and local government should play a role along the coast in mineral development.

The research of this chapter also identified gaps for South Africa, for instance the lack of an oceans policy and offshore mining policy. Therefore, the next chapter explores the issues of policy constraints and gaps, governance matters, conceptual aspects and specific limitations. The chapter further discusses the strategic relationship between government departments and the lack of specific concepts and definitions in the marine and coastal policy environment of South Africa.

CHAPTER 4

Discussion of Current Strategies and Identification of Gaps and Shortcomings

4.1 Introduction

The previous chapters, 2 and 3, discussed the concepts and explored the rules in both the marine and coastal environment. This chapter would expound further by discussing government strategies, the gaps in national policies and shortcomings in marine and coastal mining. In order to deliberate more in depth on these aspects, the objectives of the chapter are to:

a) Discuss the considerations, responsibilities and limitations to the implementation of international agreements;
b) Discuss the approach in effect during this study to policies by creating a policy environment, by developing a framework, and by conducting the process;
c) Discuss and briefly elaborate on the then existing strategies by the South African government in order to formulate and develop national policies;
d) Discuss and identify the gaps in current national policies of minerals, environment and coastal; and
e) Discuss and analyse shortcomings in the strategy of marine mining and coastal mining.

.4.2 International agreements

4.2.1 Considerations

International agreements were implemented through Declarations, Conventions and Protocols. They were set on international level by either the UN or groups of nations and states with the same collective interest. A Declaration would be the first step, and it would address, for example, common and collective issues while the Convention was a later development of a Declaration that addressed the goals, objectives and obligations. The Protocol would be the last step and would address the implementation and

maintenance of the goals, objectives and obligations of parties[80] who signed it. Implementation involved processes, timeframes, financial planning and reporting, for example the development of a national policy.

Caution should be exercised when signing international agreements which could lead to the development of national policies. The following aspects should be taken into consideration before signing:

a) The impact of developing a new policy to comply with implementation needs to be determined since new concepts would take longer to be consulted and implemented;

b) The need to determine whether capacity and an effective budget were available to ensure that the development of the policy would be accomplished;

c) The need for assessment to determine if the development of a policy through a consultative process could be achieved within the timeframes set by the convention or protocol;

d) The understanding of goals, objectives and obligations should not be underestimated since most conventions and protocols would allow a time period before signing to consider the impact before it would come into effect; and

e) The need to determine if compliance and report back could be achieved, and if tools should also be developed to assist in executing compliance.

4.2.2 Responsibilities

When a state signed International agreements[81] , it assumed responsibility (Birnie and Boyle, 2002) to implement the goals, objectives and obligations. Second, the state undertook to regularly report on progress to a secretariat or committee, established by the International agreement. For example, South Africa signed the JPOI in 2002 and took the responsibility to implement and to report on progress to the Committee for Sustainable Development (CSD). This committee had been established to supervise the implementation and progress of the JPOI in all the states that have signed it. Implementation meant the development of a policy or strategy to address the obligations of

[80] General terminology which is used and means the state or country that signs it. Most declarations, conventions and protocols have a list of which states or countries signed.
[81] Term used in International Law when a country for example South Africa signs a United Nations Convention and becomes a party to the convention.

the international agreement or the development of legislation. The report back concentrated more on the progress of implementation, compliance with the agreement, constant reviews and meeting of obligations. Therefore, before signing an international agreement, the state should be aware of these responsibilities and be prepared to accept them.

4.2.3 Limitations

4..2.3.4 UNCLOS of 1982

South Africa signed this Convention in 1994[82] and 1994 the MZA was promulgated as a response. The Convention did not require the establishment of a government programme to develop a policy or strategy. However, it was essential to establish a set of international rules for states in marine-related environments. Rules included the limits of national jurisdiction over ocean space and different zones within the EEZ. The Convention was limited in addressing only protection and preservation of the marine environment, exploitation of resources, and seabed mining outside the EEZ. Although no goals or objectives were set to develop a policy or strategy to protect and exploit resources within the EEZ, an opportunity existed for South Africa to develop an EEZ strategy to protect and exploit resources.

4.2.3.2 JPOI of 2002

JPOI was formulated and accepted by the various states at the WSSD in 2002. Paragraph 162 required states to take action by 2005 to formulate and elaborate national strategies for sustainable development. In addition, the JPOI addressed mining, minerals and metals[83] and only identified three actions that had to be taken, namely

a) Efforts had to be supported to address impacts and benefits of mining, minerals and metals;

b) The participation of stakeholders, at all levels, had to be enhanced throughout the life cycle of mining and processing; and

c) Sustainable practices had to be fostered in providing financial, technical and capacity support for mining, processing and beneficiation.

[82] Online: http://www.mcm-deat.gov.za/international/unclos.html (accessed July 2007) and http://www.dfa.gov.za/foreign/Multilateral/inter/unclos.htm (accessed July 2007).
[83] Section 46 of JPOI.

The JPOI clearly limited a state to developing a national strategy and to responding to specific actions for mining. Marine and coastal aspects[84] on the other hand, were given specific actions. Some of the actions required were as follows:

- Promotion of integrated coastal and ocean management at national level by developing ocean policies and mechanisms for integrated coastal management;
- Establishment of marine protected areas network which will comply with international law by 2010; and
- Development of a programme to protect the marine environment from pollution caused by land-based activities.

Therefore, addressing a national strategy and the mining, marine and coastal aspects in terms of the JPOI indicated that the complexity limited the implementation. In an attempt to address the complexity, South Africa had only developed a draft National Framework for Sustainable Development (NFSD) (DEAT, 2006) since 2002 and was still far from developing, implementing and monitoring of a NSSD. Furthermore, in addition to the difficulties in developing a strategy, the current process at the time of this study had already been criticized. The first criticism was that the National Framework for Sustainable Development (NFSD) and proposed NSSD had to make provision for the development of strategies, which were sector-specific, for example minerals. The second criticism was that the proposed NSSD had to be a central government-driven strategy and not merely as an environmental strategy.

4.3 Current approach to policy development

4.3.1 Policy environment

The government needed to ensure that a policy environment was created in which policies could be developed, implemented and reviewed. However, in order for government to create such an environment, the following aspects have to be in place:

a) An effective and functional political system to ensure a democratic approach to policies. In other words, policies have to be consulted and approved by parliament;

b) Proper planning with an allocated budget for all stages of developing and implementing the policy;

[84] Section 30, 32, 33, 34 and 36 of JPOI.

c) The priority of the government department tasked to develop a policy have to comply with the political objectives and legal framework of South Africa; and

d) The role of the two economic clusters[85] was not to be underestimated since it addressed the collective development of policies, for example, the current initiative to develop an Industrial policy for South Africa.

4.2.4 Policy framework

The approach to developing policies should not only depend on the reason for the policy but also the content or the framework. The development of a framework requires the consideration of the following aspects:

a) Vision, goal and objectives of the policy have to be determined and have to comply with the legal or political framework;

b) Framework needs to address all technical, legal, scientific, research, social, economic and governance aspects;

c) Policy development has to determine different options within the scope, boundary and jurisdiction of the policy;

d) The framework needs to consider policy formulation and a consultative process to determine principles, norms and standards; and

e) Documentation to be produced during the policy process in developing and implementing the said policy has to be determined.

4.3.3 Policy process

The development of policy is characterized by a policy process under the guidance of a steering committee. It had to stipulate specific timeframes and documents to be produced and has to include the following:

a) Foresight study or research document to start the process;
b) Discussion document for public comment;
c) Green Paper which include comments and inputs by all the stakeholders on the discussion document; and

[85] Economic Cluster 1 which includes the Departments of Trade & Industry, Environmental Affairs & Tourism and Science and Technology. Economic Cluster 2 which includes the Departments of Public Enterprises, Minerals & Energy, Transport and Communication. Online: http://www.info.gov.za/speeches/briefings/2007feb.htm (accessed May & June 2007).

d) White Paper on the document has to be approved by parliament.

Although specific documents are produced in various stages in the process, the focus of processes would differ. The minerals and mining policy process started with a discussion document (DME, 1996) which focused on formulating a policy for South Africa to transform the mining industry under the new government of 1994. The objective was to obtain specific input from labour and industry.

The environment management policy process started with a Green Paper (DME, 1998a), which was conducted at the same time and was more focused on a consultative process. The aim was to develop a collective vision and to address the concept of environmental management. The coastal development policy process also began with a green paper (CMPP, 1998) which focused more on a programme approach. The main aim was to produce a policy that addressed the sustainable use and resource management in the coastal zone.

4.4 Current strategies of government

4.4.1 National competencies

The Constitution of South Africa was based on founding principles and the Bill of Rights, while the rest of the Constitution dealt with co-operative governance, parliament, president, administration and schedules. The Bill of Rights, Section 24 (a) entrenches the right to have a healthy environment while Section 24 (b) entrenches the right to environmental protection. The same section embodies the concept of sustainable development.

Besides addressing the environment aspect in the Constitution, the national competencies of government departments to develop strategies, policies and legislation are dealt with in Schedule 4. Functional areas, such as agriculture, environment, forestry, pollution control and regional planning have both a national and provincial competency while minerals and water are not mentioned, since they have only a national competency. Functional areas, for instance coastal and marine, are not mentioned since they have been deemed to be part of the functional area of environment which is administered by DEAT.

In terms of legislation that served as an implementation tool of a policy, government departments are given specific jurisdiction and boundaries. For example, the DME administered the Mine Health and Safety Act 29 of 1996, Minerals and Petroleum Resources Development Act 28 of 2002, Mining

Titles registration Amendment Act 24 of 2003, Diamond Amendment Act 29 of 2005 and Precious Metals Act 37 of 2005.

Another example was that of DEAT, which administered the Living Marine Resources Act 18 of 1998, National Environmental Management Act 107 of 1998, National Environmental Management Amendment Act 46 of 2003, Protected Areas Act 57 of 2003, National Environmental Management Amendment Act 8 of 2004, Biodiversity Act 10 of 2004 and Air Quality Act 39 of 2004. Therefore, the development of policies and legislation had to comply with the government department's competency.

4.2.2 Strategic planning

The current political system of South Africa requires that steps be taken by government departments tasked to ensure that objectives, aims and targets of policies and legislation are met. One of the tools is to use strategic planning to achieve this over a specifically identified period.

Table 4 illustrates the point where the strategic objectives of different government departments are identified and compared for the sequential five years until 2010. The relationship between the DME and DEAT clearly indicates similar objectives that are aligned with current political thinking on transformation. However, the DST has objectives that are more allied with research, technology and professional skills development.

These relationships are dominant since all three government departments lie within the economic cluster of the political system. The strategic objectives of the DWAF (DWAF, 2005) were also compared but insignificant links were found and the conclusion was that this department lay within the social cluster. Therefore, it is important that, at cluster level, not only do policies have to be developed but broad strategic objectives have to be set to influence the strategies of government.

4.4.3 Conflict

Conflict in developing policies and legislation is a common factor and would always present a problem. To resolve and manage this problem, conflict areas have to be identified. Significant areas that have been identified are discussed in this section.

4.4.3.1 Access to resources

The access to develop mineral resource sometimes requires the access to land. This means that the person who wants to mine is not necessary the

landowner or land occupier (communities), therefore notification and or agreement between the two parties is essential to comply with Section 4 (b) of the MPRDA. At the time of this study, the proposed amendments to the MPRDA wanted to remove consultation and only leave notification. Such a move meant that the communities who owned the land would only be notified.

4.4.3.2 Different responsibilities

Both the rule maker, for example the Regulator, and rule complier, for example the holder of a mining right, have different responsibilities. Conflict may arise if responsibility is not managed properly, for instance the Regulator does not develop a strategy to deal with non-compliers. On the other hand, if the responsibility is not clearly defined, for instance the holder does not understand his / her role to implement, for example the approved EM Programme, conflict will occur. Therefore, the responsibility of government and the stakeholders has to be properly addressed in policy and legislation.

4.4.3.3 Jurisdictions within government

Government departments are tasked by the Constitution or parliament to plan and manage within certain functional areas. Conflict would arise if policies are to be developed in which the jurisdiction of more than one department overlaps. Mechanisms, such as policy integration and co-ordination or co-operation, could be used to prevent or manage conflict. Conflict between government departments has to be avoided since it results into confusion and ultimately to non-compliance.

4.4.4 Integration

Integration could have a positive or negative impact on policy and should be carefully considered before implementation. The following two scenarios would illustrate the South African dilemma:

a) Normally the lead agent or the government department is tasked to develop policy would initiate integration. This approach would include a proper intergovernmental consultation, comment and agreement process. Conflict would arise when no consultation was initiated which would lead to no integration. Therefore, policies would be produced and implemented which would not be consistent with exciting policies.

Table 4: Comparison of DME, DEAT and DST strategic objectives					
	DME[1]		DEAT[2]		DST[3]
1	Actively contribute to Sustainable Development	1	Create conditions for sustainable tourism growth and development for the benefit of all South Africans	1	Uniform governance systems for research institutions
2	Redress past imbalances and bridge the gap between first and second economies	2	Promote the conservation and sustainable resource and enhance economic growth and poverty eradication	2	Deliver required outcomes within the strategic themes and portfolio and portfolio of the DST in order to give effect to the strategy and mandate of the national system of innovations
3	Implement minerals and energy economic policies and legislation	3	Protect and improve the quality and safety of the environment	3	Increase the scientific knowledge and resources to South Africa through participation in joint programmes
4	Govern the minerals and energy sector to be healthier, cleaner and safer	4	Promote a global sustainable agenda	4	Build programmes within the national system on innovation, particularly using the resources of the DST and its institutions to ensure that South Africa has an world class science and technology
5	Review and develop appropriate structures, process, systems and skills as well as the maintenance thereof	5	Transformation	5	Build partnerships and programmes to ensure the appropriate contribution of science and technology within different sectors

Sources
1. Strategic plan for 2005 / 2006 – 2009 / 2010 of the Department of Minerals and Energy, Pretoria
2. Strategic plan for 2005 / 2006 – 2009 / 2010 of the Department of Environmental Affairs and Tourism, Pretoria
3. Strategic plan for 2005/2006 – 2009 / 2010 of the Department of Science and Technology, Pretoria

b) Another integration approach would be to switch principles, concepts and definitions from one policy to another. For example, the concept of EIA and IEM were both adopted in the Minerals and Mining Policy of 1998 based on the Environmental Management Policy of 1998. The problem arose when these concepts were differently interpreted and implemented by legislation.

A sustainable approach to integration in South Africa should be a possibility and should be investigated and tested. One of the options could be ensure that policy aims and objectives would encourage integration. A second option could be to develop mechanisms or tools to support and maintain integration.

4.5 Gaps in national policies

The origin of national policies was either the requirement of an international agreement, such as a convention, or a need to address national objectives. The role of national policies, on the other hand, was closely linked with the Constitution, agenda of parliament and the addressing of policy gaps. In order to gain a better understanding of gaps and issues, the mineral, environmental and coastal policies in force at the time of the study are discussed below.

4.5.1 Minerals and Mining Policy of 1998

This policy was first formulated by the African National Congress, Draft Minerals and Energy Policy in 1994[86], and when South Africa became a democracy in the same year, the document was adopted. A discussion document and Green Paper followed, and, in November 1998, the policy was approved by parliament as a White Paper. National mineral policies were not static; they had to be reviewed constantly to address gaps, as discussed below.

4.5.1.1 Political goal

The origin of any policy was important, and using politics as a goal to develop a policy had its merits. The inherent danger was that if there was a change in government, such political goals might change the outcomes of the policy. The counter argument was that, if the political goal was part of the objectives of the policy, it would ensure that the policy was implemented to reach the political goal. Therefore, the policy had to not only have a political goal but also an approach to stimulate positive long-term impacts, for example socio-economic growth to deal with poverty and the development of marine and

[86] Online: http://www.anc.org.za/ancdocs/policy/minen.htm (accessed May 2007).

coastal mining concept to ensure sustainable mineral resource use at the coast.

4.5.1.2 Paradigm shift

The paradigm shift (Cawood, 2004) of this policy was not only politically driven but also socio-economically driven. Therefore if objectives, such as equal access, equal sharing, social upliftment and development of mineral markets, were implemented, these objectives would stimulate socio-economic development. Should these same objectives be applied to marine and coastal mining, the same benefits would be achieved. Therefore, the shift had to include marine and coastal mining.

4.5.1.3 Environment versus mineral development

These two concepts have always being causing conflict. The argument was that conservation or protection and the promotion of minerals could not co-exist (DEAT, 1996a). A fine balance had to be found for mining in the marine and coastal environment, which was more sensitive and complex than the terrestrial ecosystems. The policy in force at the time of this study addressed broad environmental management concepts but did not include the latest developments in biodiversity planning, marine management and coastal management. The development of a mine environmental policy would address this gap.

4.5.1.4 Governance

For the management of a policy by a government department to address the implementation of a policy, capacity and skills to make decisions, enforce compliance and to encourage development, strategies were essential to attract foreign as well as local investors. Investors were constantly searching for a mature investment environment, and if governance (Campbell, 2003) which included, for example a lack of policies, strategies, and management, were ineffective then investments would become too risky. Although South Africa has an active investment climate (Matshediso & Cawood, 2005), there is room for developing specific policies or strategies, for example a marine and coastal mining policy or a coastal mining strategy to stimulate mineral development.

4.5.1.5 Marine mining

The policy took into account the mineral development within the boundaries of South Africa, which included the EEZ. Research and development, for

example by Namibia[87] and Australia[88] indicated that marine mining, in particular, required a more detailed approach. In South Africa, there was either a lack of money to develop a marine mining policy, or investments were insufficient to justify a specific policy, strategy or regulations.

4.5.1.6 Concept development

Although a policy addressed a variety of concepts, experience had indicated that specific concepts had to be developed in marine and coastal mining. They were as follows:

- Enforcement and compliance (Hawke, 2002);
- Monitoring and reporting mechanisms (Jones and Morgan, 2003);
- Reclamation, remediation, recovery (Coles, et al., 2002; Penney & Pulfrich, 2004) and restoration; and
- Sea or coastal use as an end use for mine closure.

4.5.2 Environmental Management Policy of 1998

The intention of this policy was to achieve three goals in the formulation of the policy. First, the goals were to move away from environmental conservation to environmental management, second, to implement Agenda 21 principles and lastly, to comply with the Constitution of 1996. A discussion document was drawn up followed by the Green Paper. In November 1998, the policy was adopted and approved by parliament as a White Paper. National environmental policies required constant evaluation, and one of the aims was to identify gaps, which would be discussed below.

4.5.2.1 Integrated environmental management

This concept was developed in 1992 and was linked to an environmental evaluation approach (Sowman, Fuggle & Preston, 1995). The motivation was to ensure that environmental decisions were part of any planning or management decision. With the implementation of this policy, EIA became the more dominant tool instead of the IEM. The danger was that the EIA was a tool to assess impact, while IEM was linked more with constant environmental management and not only assessment.

[87] Draft Minerals Policy of Namibia of 2003.
[88] Common Wealth Act: Offshore Minerals Act 28 of 1994 and State Act of Western Australia: Offshore Minerals Act of 2003

4.5.2.2 Resource use

The policy should not be used to manage non-renewable resources, for example minerals or renewable resources, such as biodiversity. South Africa did not have a collective resource use and management policy and caution had to be exercised so that the then existing collection of policies[89] addressed that issue. It should be noted that this policy as well as the minerals and water policies were formulated and approved in parliament in 1998 to address all the resources in South Africa.

4.5.2.3 Strategic focus

The policy had a collective approach to environmental management and made provision to address specific areas[90], for example biodiversity, waste and pollution, air quality, coastal and fisheries. Specific areas, like mining and the marine environment, were not addressed. However, environmental management for mining was addressed in the Minerals and Mining Policy of 1998 and implemented by the MPRDA.

The then existing approach to marine planning and management was only towards the fisheries aspect, for example Marine Hake or Marine Lobster Policies. On the other hand, the focus of the marine policy should not only be about environment. A separate, but collective, marine or oceans policy did have merits in terms of planning and management, and should be investigated.

4.5.2.4 Protected areas

The policy also addressed conservation of terrestrial, coastal and marine environments though the establishment of protected areas. At the time of this research, the Protected Areas Act was used to declare protected areas on land while the Marine Living Resources Act 18 of 1998 (MLRA)[91] was used to declare marine protected areas. The dilemma was that a protected area could span all three environments (marine, coastal and terrestrial), which were then administered by two Acts, instead of one.

Another concern with protected areas was that it prevented prospecting and mining within a protected area. The argument was that it sterilized mineral development and beneficiation thereof. A strategy had to be developed to objectively assess both the potential of conservation and of mining before

[89] Minerals, Water, Heritage, Agriculture (soil and weeds) and Energy policies.
[90] Goal 2: Sustainable resource use and Impact Management.
[91] Marine Living Resources Act 18 of 1998. Gazetted on 27 May 1998, Volume 395, Gazette number 18930. Online: South African Government Portal: http://www.gov.za .

making a decision. At the time of this study, there was conflict with declaring a MPA along the West coast because such an area would prevent marine diamond mining which had strategic value for South Africa. Therefore, a balance had to be found between protected areas versus strategic minerals in order to have a win – win situation.

4.4.3 Sustainable Coastal Development Policy of 2000

Several attempts had been made in the past to develop a coastal policy for South Africa (Sowman, 1993). In 1997, a Coastal Management Policy Programme (CMPP) was initiated to address a new approach to coastal management. The focus was to have a sustainable development approach to integrated coastal planning and management (Glavovic, 2006). The programme produced the Green Paper and in 2000, the policy was approved by parliament as a White Paper. Coastal policies required regular review because of the complexity and variety in coastal activity. Therefore, one of the objectives for a review has to be the identification of the gaps, which would be discussed below.

4.4.3.1 Co-ordination

The difficulty of co-ordination[92] between various government departments in administering different laws and regulations is not a new problem. The constitution of 1996 gave DEAT environmental responsibilities and DME mineral responsibilities while coastal responsibility was not specific. Placing the ICM Bill of 2006 under the Environmental Management Policy of 1998 to co-ordinate approval of listed activities had to be evaluated on its merits. The main hurdle was that mining was not the responsibility of MCM, and therefore, the proposed legislation could not be used to regulate mining. On the other hand, DME could consider adopting (Vellega, 2001) the coastal principles, norms and standards in drafting the regulations for the proposed Minerals and Petroleum Resources Development Amendment Act.

4.5.3.2 Coastal zone boundaries

The establishment and implementation of coastal zone boundaries (Glavovic, 2000) were difficult because of the complexity of determining the landwards and seawards boundary. The ICM Bill addressed this difficulty and proposed mechanisms to determine the land and seawards boundary. On the other hand, the MPRDA of 2002 did not recognize of even refer to any coastal boundaries for mining. It seemed that DEAT, the administrator of the coastal zone, had already started using the term “marine and coastal mining” in their documents, the NBF for South Africa (DEAT, 2007). Therefore, co-ordination

[92] Consultation with MCM (Cape Town) in November 2006.

between government departments is essential since using these boundaries could cause confusion in the mining industry.

4.5.3.3 Coastal areas

The CMPP[93] identified 13 coastal regions along the coast, which could be categorized into three main coastal areas[94] for South Africa:

1) West coast, from the Orange river to Cape Town.
2) South coast, from the Cape Town to Buffalo City.
3) East coast, from Buffalo City[95] to the Mozambique border.

These three main coastal areas had been used to determine the vision and goals for the coastal zone. The NSBA also used this approach, with great success, to determine the biodiversity of the three areas. Therefore, this approach could be used to develop other policies or strategies, for instance developing a coastal mining policy or a coastal mining strategy.

4.6 Shortcomings

4.6.1 Coastal mining

Coastal mining was not a general term used in South Africa and could be described as the mining that occurred within the coastal zone of South Africa. The Minerals and Mining Policy in force during this study and MPRDA did not differentiate between land and coastal mining. The same concepts and rules were applied to all environments. During the research, shortcomings in coastal mining[96] were identified that had to be addressed in policies, strategies or legislation. They are discussed below.

4.6.1.1 Variation in mining methods

Mining methods differed from operation to operation due to the type of mineral, scale of operations, type of landscape and ecosystem. Mining in mobile environments, like dunes, beaches and estuaries, required that parameters of the ecosystem were included when planning to mine. Therefore, impact assessment and environmental management had to include the variation in mining methods since the then existing one-method-fits-all mining operations approach had to be avoided.

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[93] CMPP was an initiative between the South African and British Government, Department of Environmental Affairs and Tourism and the British Department of International Development.
[94] Driver, et al. (2005) used the same approach for the West, South and East Coast of South Africa.
[95] East London area in the Eastern Cape.
[96] Consultations with CSIR (Stellenbosch, November 2006), MCM (Cape Town, November 2006) and DME officials at Regional coastal offices (2005 – 2007).

4.6.1.2 Limitations

In some cases, coastal mining operations were restricted by the nature of coastal ecosystems, such as estuaries, beaches, dunes and landscapes. First, the restrictions limited the accessibility to minerals, like sand, in an estuary and second, they increased the costs to implement and maintain environmental management, like preventing wind erosion from sand dunes. Lastly, the physical impact of tides, waves and wind could limit mining operations and activities. Therefore, limitations had to be part of mine planning and environmental management

4.6.1.3 Visual impact management

One of the most critical aspects at the coast was the proper assessment of possible negative visual impact (Kruger, et al., 1997) and the management thereof. By addressing some aspects, for example sand dust, alien plants, mining waste, pollution and the rehabilitation of the site would contribute to improving positive visual impact on mining sites. On the other hand, proper enforcement and compliance with mining rules and sustainable mine closure could only contribute to the overall visual impact management of the coast. In order to resolve the matter, the Western Cape Provincial Government decided in 2003 to place more emphasis on visual impact assessment by initiating the development of a guideline. In 2005, the guideline (Oberholzer, 2005) was published with the purpose of assisting consultants and regulators address visual impact. It was hoped this initiative would lead to a better understanding of visual impact assessment and management.

4.6.1.4 Development of concepts

Rehabilitation has been used in minerals and mining policies, strategies and legislation to describe an action plan to restore a distributed surface to close a mining operation. New concepts have been developed, such as restoration, reclamation, recovery and remediation, which are not reflected in mining rules. Therefore, the opportunity exists to develop these concepts and properly define them to assist in determining the end use and closure of a mining operation at the coast.

4.6.2 Marine mining

Marine mining in South Africa was restricted to the West coast for mostly diamonds, up to depths of 200 meters[97]. The existing Minerals and Mining Policy and the MPRDA did not differentiate between land and marine mining. The same concepts and rules were applied to all environments. During the

[97] A, B and C sea concessions for mining as used by the DME.

research, shortcomings in marine mining were identified that had to be addressed in policies, strategies or legislation. They are discussed below.

4.6.2.1 Mining systems

Mining systems differed from operation to operation because of the type of mining method, mining vessel, seabed mineral, ecosystem and the depth of the operations. Different mining methods also related directly to environmental impacts (Morgan, et al., 1999) for example, comparing the size of the footprint on the seabed caused by dredging or by using a crawler. Therefore, environmental impact assessment and management had to take into account the impact of different mining methods to achieve effective environmental management.

4.6.2.2 Limitations

In some cases, marine mining operations (Morgan, et al., 1999)[98] were limited by the nature of the marine ecosystem. First, the impact of sea currents placed restrictions on mining operations and required effective management. Second, the seabed topography could restrict access to the mineral, type of mining system to be used and the approach to environmental management. Lastly, the size of the mining vessel could be restrictive since it determined the depth of operations. Therefore, effective planning had to be done to ensure that the mining vessel could mine at depths as determined by the mining plans.

4.6.2.3 Risks

Risks around exploration and extraction of minerals (Glasby, 2000; Coles, et al., 2002; Garnett, 2002) on the seabed or at the edge of the continental shelf differed from operator to operator. The following two examples illustrated typical risks that could be part of mine planning:

a) The depth of operations and the difficulties around it, for example to stabilize a mining vessel in a strong current to extract minerals at a depth of 150 meters.

b) The high cost and availability of resources to operate and manage the expensive equipment, for example professionals to operate the expensive equipment.

[98] Consultations with officials of Petroleum Agency, South Africa (PASA), De Beers Marine and CSIR.

4.6.2.4 Environmental issues

There were three basic categories of environmental issues (Ellis, 2001), which affected and determined environmental management in marine mining. First, the impact of natural environmental parameters, like sea water density on mining operations at the seabed; second, the effect of mining depth on the cost of impact assessment and environmental management since proper budgeting was required; lastly, the relationship between impact assessment and mining plans had to be understood to implement proper management. Therefore, these categories had to be addressed in not only environmental management but also in impact assessment.

4.6.2.5 Reformulation

Concepts (Roos, 2005), such as financial provision, mining area, rehabilitation, recovery, and mine closure, required reformulation since these were land-based approaches that were not conducive to the marine environment. Other concepts, like waste and pollution management, environmental impact assessment (Nath & Sharma, 2000) and environmental management, required a different approach since the mining operations at sea differed from land-based operations. Therefore, the approach towards developing specific policies and strategies had to reformulate concepts partially or totally to accommodate marine mining.

4.7 Conclusion

The signing of international agreements should be carefully considered since such agreements involve responsibilities that have to be complied with by the signatories. Consideration in signing is also linked with the limitation of the agreement, and the impact has to be carefully evaluated by the signatories for developing policies, strategies and legislation. Closely linked was the approach in force at the time of this study to develop policies, and if aspects like a policy environment, framework or process, are not available, the result would be a negative impact. Furthermore, the development of policies is bound and influenced by strategic approach of the government's political or national objectives. At the time of this research, aspects involving national competencies, strategic planning and dealing with conflict and integration, have determined the agenda.

The development of national policies has different origins and caution has to be exercised to determine the vision, goals, principles, themes and objectives of such a policy. The mineral and mining policy focuses on themes with specific objectives to achieve transformation in the mining industry, while the coastal development policy focuses on principles, goals and objectives to

achieve sustainable development of the coastal zone. On the other hand, the environmental management policy has shown that through consultation both problems and solutions have been identified which form part of a policy. Although the policies address a variety of strategic issues, the issues of marine mining and coastal mining are not addressed.

In order to ensure consistency in addressing strategic issues for South Africa, the analysis of the chapter have identified gaps which should also be evaluated to determine possible solutions. They are:

1) Exclusive economic zone strategy: the UNCLOS does not prescribe the development of the EEZ or the possibility of developing a strategy to respond or develop all resources.

2) Sustainable development strategy for mining: the JPOI does not prescribe a specific strategy with indicators for mining. However, an opportunity exists to develop such a strategy.

3) Marine or / and coastal mining: policies, strategies and legislation in force at the time of the study did not address these issues. However, a few possibilities exist to formulate and develop a collective policy or separate policies, strategies and legislation for marine as well as coastal mining.

4) Mine environmental policy: the Minerals and Mining Policy addresses environmental management. However, the opportunity exists to develop a mine environmental policy to include specific environmental management for both marine and coastal mining.

5) Oceans policy with a legal framework: marine planning and management should not be about fisheries but should take all uses and industries into account. A possibility exists for developing an oceans policy and should be considered.

Lastly, through literature search and consultation on both marine and coastal mining, shortcomings have been identified. The advantage is that these shortcomings could be used in the formulation of policies and strategies for marine and coastal mining. The next chapter will evaluate the gaps and explore the possible solutions to respond to these gaps. The chapter will further identify and discuss new directions and possible approaches to develop policies and strategies for South Africa within the scope of marine and coastal mining.

CHAPTER 5

Formulation of Solutions with Options to initiate the development of a Strategy Framework

5.1 Introduction

The previous chapter identified policy gaps and shortcomings in strategies for marine and coastal mining. This chapter will be looking, in more detail at possible solutions and options. Therefore, the objectives are to

a) Briefly address the gaps identified;
b) Evaluate the international policies or strategies of Canada, Australia and New Zealand as well as international and national initiatives;
c) Briefly discuss the possible solutions for South Africa;
d) Discuss and elaborate on the three options for marine and coastal mining;
e) Discuss strategy instruments and a strategic planning model in the development of a frameworks, strategies or policies; and
f) Elaborate on the initiation of a marine and coastal mining strategy framework.

5.2 Addressing the gaps

5.2.1 Exclusive economic zone strategy

South Africa declared its EEZ in 1977 (Hara, 1997), and by 1994, after signing the UNCLOS, the MZA was implemented. The MZA divided the South African waters into four maritime zones as per UNCLOS: namely the internal waters, territorial waters, contiguous zone and the exclusive economic zone (see Figure 2.3, Chapter 2). The main aim of MZA had been to ensure South Africa's sovereignty (Hara, 1997) over resources within the EEZ, such as minerals, petroleum and fish stocks. This approach led to the development of the Marine Fisheries Policy 0f 1997 and the MLRA of 1998 to conserve the fish stocks within the EEZ. At the WSSD, the JPOI indicated[99] that MPAs should be established within the EEZ jurisdiction.

At the time of this study, the approach was to divide the EEZ into five bioregions (Driver, et al., 2005) for the purpose of conservation and the

[99] Section 32 (a), JPOI.

establishment of a MPA network. A workshop of the Convention on Biological Diversity (CBD) Secretariat discussed the establishment of certain targets[100] for which a target date for a MPA network was set for implementation by 2012. At the time of this study, mining, on the other hand, was restricted to the sea concession areas along the west coast. Clearly, an EEZ strategy should initiate a resource use and management strategy. Secondly, it should also co-ordinate the operation of industries within the EEZ. Lastly, the strategy should be used to respond to the JPOI and CBD targets.

5.2.2 Sustainable development strategy for mining

The National Minerals Policy of 1998 presented a paradigm shift from the 1986 policy. The MPRDA directly dealt with sustainable development[101] in terms of approvals like the Mines Work Programme, EM Plan or EM Programme, and Social and Labour Plan. Other countries, for example Canada and Australia[102] started developing their national sustainable development strategies and sector-specific strategies, for example mining in the 1990s. The South African government only started to respond after the WSSD. At the time of this research, a national sustainable development strategy was being developed by DEAT concurrently with a sector-specific strategy for mining by DME.

Clearly, the implementation of both strategies required a timeframe, and the lesson of Canada's Sustainable Development Strategy for 2007 – 2009[103] indicated that the development of a framework, setting targets, crossing barriers and achieving results was time-consuming. In the mean time, mining companies used the Mineral, Mining and Sustainable Development (MMSD)[104] South African findings and the International Council for Mining and Metals (ICMM) principles[105] for sustainable development as guidelines.

5.2.3 Marine and coastal mining

The government approach in dealing with marine mining was first apparent with the promulgation of the Precious Stones Act of 1964[106] which started to

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[100] UNITED NATIONS ENVIRONMENTAL PROGRAMME (UNEP). UNEP Report: UNEP/CBD/WS-PA/SWA/1/2. Online: http://www.cbd.int/doc (accessed August 2007).
[101] Section 3 (3) of the MPRDA, 2002.
[102] ECOLOGICAL SUSTAINABLE DEVELOPMENT STEERING COMMITTEE, (1992). National Strategy for Ecological Sustainable Development. Council of Australian Governments, Canberra, ACT, Australia. Online: http://www.environment.gov.au/esd/national/strategy/index.html (accessed August 2007).
[103] NATIONAL RESOURCES CANADA (NRC), (2006). Sustainable Development Strategy 2007 - 2009, Achieving Results. Ottawa, Ontario, Canada. Online: http://www.nrcan.rncan.gc.ca/sd-dd (accessed August 2007).
[104] Report was completed in 2001 and Wits Mining School was the main driver.
[105] Online: http://www.bullion.org.za (accessed August 2007).
[106] Precious Stones Act 73 of 1964.

refer indirectly to offshore exploitation. In the 1980s, research and sampling were undertaken by DME and CGS to identify all possible seabed minerals on the continental shelf, which lay within the EEZ. The outcome revealed that there were potential mining opportunities but these required research, technology and funding. The shift of the diamond industry towards offshore mining (Clark, et al., 1999) in the late 1990s to early 2000s and availability of research, technology and funding made offshore diamond mining possible. In 1996, the DME developed an offshore EMP guideline document (DME, 1997) for diamond mining. In 1999, the offshore industry also developed a similar document (Lane & Carter, 1999). With the implementation of the MPRDA in 2004, the offshore diamond guidelines became redundant because of the change in the requirements of the EMP. Therefore, marine mining was not separately addressed in the NMP of 1998 or the MPRDA. However, the opportunity existed for developing a strategy, which could lead to a policy or regulation on marine mining.

Coastal mining was not a well-defined concept in South Africa as was marine mining. Mining along the coast was first highlighted with the objective to extract heavy minerals from sand dunes at St Lucia along the northern coast of KwaZulu Natal in the early 1990s.The outcomes were that mining was not allowed and that EIAs and EMPs had to be completed (Review Panel, 1993; Kruger, et al., 1997). Namakwa Sands (EEU, 1990a – b) along the west coast also planned a similar mining venue but decided not mine close to the beach and to rather start mining inland, about 300 meters away form the high water mark. This not only prevented mining the dunes near the high water mark but avoided conflict with the community. At the time of this study, a mining company was in the process of applying to extract heavy minerals along the Wild coast of the Eastern Cape. This application had already created conflict between the conservation approach and the economic approach of the government[107]. Clearly, with all this conflict, the opportunity existed to develop a strategy, which could lead to a regulation or policy on coastal mining.

5.2.4 Mine environmental policy

The initiation of a Mine Environmental Policy (MEP) had its merits. The NMP of 1998 addressed environmental management, but since the formulation of the policy, there had been developments in environmental management, concerning biodiversity, coastal management, air quality, protected areas and conservation. At the time of this study, the DME also had to deal with environmental issues concerning legacies, derelict and ownerless mines, and mine closure as well as enforcement and compliance problems.

[107] A government study was done in 2003 to determine a strategic approach but is still classified and not available.

The Environmental Management Policy of 1998 gave DME the mandate to develop policies and strategies, in consultation, to deal with environmental issues. Clearly, the opportunity existed to initiate a strategy to develop a MEP to address new developments in environmental management and the legacies and problems of the industry. The MEP had to include specific environmental management for marine and coastal mining.

5.2.5 Oceans policy

An oceans policy for South Africa has its merits. In the 1980s, various Marine Pollution Acts were promulgated to manage the marine environment along the South African coast. At the time of this research, the Marine Policy of 1997 and Environmental Management Policy of 1998 were used to plan and manage the oceans around South Africa. Legislation, for instance the MLRA, NEMA and Biodiversity Act, were used to implement and administer these policies.

At that time, MPAs were proclaimed along the South African coast to conserve threatened ecosystems and prevent any resource use. Clearly, the approach then had to include not only conservation and fisheries but also to consider all uses and industries. An oceans policy entailed a type of collective approach, while marine-related policies, for example hake fishing or lobster fishing, had a specific and detailed approach. The advantage of an oceans policy was to address the needs of all users, industries and to ensure that international agreements were implemented, for example the MARPOL, UNCLOS and JPOI.

5.3 Current approaches

One of the main objectives of the research was to study the policies and strategies of other countries in order to decide and plan for the South African environment. The following sections evaluated these policies and strategies.

5.3.1 Policies

5.3.1.1 Oceans Policy

The Canadian policy approach was based on a legal framework that was established in 1996 in conjunction with the Oceans Act. This Act required that an oceans management strategy be developed which was done in 2002. The main aim was to ensure the management of estuaries, coastal and marine ecosystems. Both the Act and strategy were based on three principles, namely sustainable development, integrated management and the precautionary approach.

In 2005, the Canadian Oceans Action Plan[108] was released to create and start a process of implementation. The Oceans Policy of Australia, on the other hand, was published in 1998 and focused more on the different uses, the role of industries as well as regional management plans. The policy had been severely criticized (Hinds, 2003) because of the lack of an implementation plan as in the Canadian approach. The lessons for South Africa were to establish a legal framework to develop strategies, policies and legislation for the South African oceans and to also have implementation plans with various implementation phases, priority areas and target dates. The objective had to be to manage and co-ordinate uses and different industries.

5.3.1.2 Minerals and Metals Policy

The Canadian government made a commitment to update its 1987 Minerals and Metals Policy and to include sustainable development. In 1996, the new Minerals and Metals Policy of the government of Canada[109] was published. One of the changes, besides a sustainable approach, was that mining fell within the jurisdiction of the provinces[110]. Such mining jurisdiction, including offshore mining, meant that the federal government had different roles to play. Its aim was to ensure that investment, competitiveness and benefits were implemented and maintained. Briefly, the objectives of the policy were as follows:

a) Integrate sustainable development into decision-making;
b) Promote the involvement of community;
c) Provide a framework for science and technology implementation;
d) Promote Canada as a global leader in mineral and mining products;
e) Use sustainable development to form partners; and
f) Ensure competitiveness and an investment framework.

Most of these objectives were used in the minerals industry of South Africa. The NMP of 1998 dealt with some of them but sustainable development, offshore mining and governance of mining at regional level were not the prime focus. A review should be initiated since the policy would be 10 years old in 2008.

[108] DEPARTMENT OF FISHERIES AND OCEANS CANADA, (2005). Canada's Oceans Action Plan, For Present and Future Generations. Ottawa, Ontario, Canada. Online: http://www.dfo.mpo.gc.ca (accessed August 2007).
[109] GOVERNMENT OF CANADA, (1996). The Minerals and Metals Policy of the Government of Canada, Partnerships for Sustainable Development. Ottawa, Ontario, Canada. Online: http://www.nrcan.gc.ca/mms/sdev/policy-e.htm (accessed August 2007).
[110] One of the objectives of the 1987 policy was to assist the provinces to develop offshore mining

5.3.1.3 Marine Protected Areas Policy

The MPAs in Australia were established and managed by the State, Territory or the Commonwealth Government. Each governmental level had its own policies and laws. In order to ensure consistency of defining and management of MPAs, Australia had adopted the IUCN categories[111] on the management of MPAs, which then formed part of Australian legislation. The Commonwealth government had specifically incorporated these in the Environment Protection and Biodiversity Conservation Act of 1999 and the associate Regulations in 2000. On the other hand, one of the goals of the Oceans Policy of 1998 had set the scene for the development of a MPA network of national interest. Therefore, both legislation and policy ensured a co-coordinated approach to conservation and management of marine biodiversity.

New Zealand had a specific MPA Policy and Implementation Plan of 2005[112], which was linked to a higher order government strategy, the New Zealand Biodiversity Strategy of 2000[113], and lower order legislation to act as management tools. The policy identified objectives, responsibilities, establishment of network and a specific implementation plan. The plan was based on two principles of designing and planning a network with an underlying approach of proper consultation with all users and groups. This approach avoided conflict and encouraged transparency where all understood the benefits of MPAs.

South Africa had a definite approach to determine the position of MPAs and to categorize them. The NSBA and NBF further established a platform to use this approach in planning and establishing a MPA network. What was lacking was a specific policy or legislation to establish and manage them. At the time of this study, the co-ordination within government and the various laws complicated the development of a MPA network.

[111] COMMONWEALTH OF AUSTRALIA, (1994). Australian IUCN Reserve Management Principles for Commonwealth Marine Protected Areas. Canberra, ACT, Australia. Online http://www.deh.gov.au/coasts/mpa/about/australian.ttml (accessed September 2006).
[112] DEPARTMENT OF CONSERVATION AND MINISTRY OF FISHERIES, (2005). Marine Protected Areas, Policy and Implementation Plan. Wellington, New Zealand. Online: http://www.biodiversity.govt.nz/seas/biodiversity/protected/mpa_policy.html (accessed February 2007).
[113] GOVERNMENT OF NEW ZEALAND, (2000). New Zealand Biodiversity Strategy. Wellington, New Zealand. Online: http://www.biodiversity.govt.nz/pdfs/picture/nzbs-whole.pdf (accessed February 2007).

5.3.2 Strategies

5.3.2.1 EEZ

The New Zealand government embarked on a study to identify the impact of different uses and industries within its EEZ. A report, "Offshore Options: Managing Environmental effects in New Zealand's EEZ"[114] was published in 2005. The report identified all types of activities[115] and resources, gaps in environmental management legislation of EEZ and international lessons. The outcome of the research identified four options to be considered to address environmental management with the EEZ. The options included the following:

Option 1: Voluntary approach between government and operating industries.
Option 2: Strategy to fill the gaps in current legislation.
Option 3: One law to manage all resources in the EEZ.
Option 4: Umbrella legislation to approve and manage activities in the EEZ.

The final recommendation was to follow a two-step strategy. The first step was to start with option 1 in the short term followed by the implementation of option 4 over the long term. The New Zealand approach illustrated a multidisciplinary approach in which government and industry had to be involved to manage activities and resources in the EEZ. It also highlighted the need for a specific approach to environmental management in the EEZ of South Africa because it only involved conservation and fisheries in South Africa.

5.3.2.2 Sustainable Development

Both the Australian and Canadian governments responded to the Bruntland Report of 1987 regarding the concept of sustainable development. Australia developed and released the National Strategy for Ecologically Sustainable Development[116] in 1992. The strategy addressed inter-sectorial issues, such as coastal zone management and sectorial issues, such as mining. The three objectives for mining were rehabilitation, community participation and benefits for the community. These objectives led to the development of guidelines in the 1990s. In 2006, the Sustainable Development in Mining Programme[117]

[114] MINISTRY OF THE ENVIRONMENT, (2005). Getting Our Priorities Right, The role of information in setting priorities for management of New Zealand's ocean. Wellington, New Zealand. Online: http://www.mfe.govt.nz (accessed February 2007).
[115] Shipping, petroleum, mining, fishing, research, dumping and laying and maintenance of cables
[116] ECOLOGICAL SUSTAINABLE DEVELOPMENT STEERING COMMITTEE, (1992). National Strategy for Ecological Sustainable Development. Council of Australian Governments, Canberra, ACT, Australia. Online: http://www.environment.gov.au/esd/national/strategy/index.html (accessed August 2007).
[117] Online for more information: http://www.industry.gov.au/sdmining (accessed May 2007).

was launched to review these guidelines and investigate possible new guidelines.

The Canadian response was to incorporate the concept into legislation, for example the Oceans Act of 1996 and sector policies, for example the Minerals and Mining Policy of 1996. In 1997, the first National Strategy for Sustainable Development for Canada was published. The strategy was reviewed a number of times, and in 2001, 2004 and 2006 updated versions was released. The Sustainable Development Strategy Moving Forward of 2004[118] stressed moving forward while the Sustainable Development Strategy, Achieving Results of 2006[119] focused on achieving results in the various sectors, such as fishing, mining, and energy.

The Australian and Canadian approaches differed, but the three common ground rules for South Africa were that the national and sector strategies had to support one another and secondly, the strategies had to have an implementation plan to monitor performance. Thirdly, it was not only about indicators, South Africa also needed to look at a spectrum of instruments and tools to achieve results.

5.3.3 Initiatives

5.3.3.1 International

The MMSD Southern Africa (Hoadley, Limpitlaw & Weaver, 2002) was finalised in the beginning of 2002, just before the WSSD held in mid 2002. The outcomes were that issues involving small-scale mining, social development, community involvement, regional co-operation and investors had to be dealt with. The MPRDA and its Regulations in force at the time of the study addressed them.

The Benguela Current Large Marine Ecosystem (BCLME)[120] was part of a global Large Marine Ecosystem (LME) initiative to ensure that LMEs were better managed and protected. The BCLME Programme was established in 2001 with the objective to conduct research to gain a better understanding of the Benguela current. At the time, an agreement was signed between South Africa, Namibia and Angola to establish the second phase, namely the establishment of the Benguela Current Commission. The uniqueness was

[118] NATIONAL RESOURCES CANADA (NRC), (2004). Sustainable Development Strategy, Moving forward. Ottawa, Ontario, Canada. Online: http://www.nrcan.rncan.gc.ca/sd-dd (accessed August 2007).
[119] NATIONAL RESOURCES CANADA (NRC), (2006). Sustainable Development Strategy 2007 - 2009, Achieving Results. Ottawa, Ontario, Canada. Online: http://www.nrcan.rncan.gc.ca/sd-dd (accessed August 2007).
[120] Online for more information: http://www.bclme.org (accessed August 2007).

that there would be three management committees to address research and development matters. One of them would be the Minerals and Petroleum Committee, which would give direction and advice on marine mining and petroleum development. The hope was that the research would lead to policy and strategy input for South Africa.

5.3.3.2 South Africa

The following three initiatives had been identified which could have an impact on existing policies and strategies of government: They were:

a) A draft Industrial Policy[121] with an implementation plan was published for comment by Department of Trade and Industry (DTI) in August 2007. The benefits for mining in this policy lay in the support of mineral development and mineral beneficiation, which was one of the objectives of the policy.

b) The DME embarked on a Sustainable Development through Mining (SDM) Programme[122] of three years, which started in 2005 to develop a set of guidelines to address three areas of concern: Sustainable Development, Mine Closure and Enforcement and Compliance. One of the documents, then in process, was the development of a sector strategy for sustainable development for mining.

c) The SANBI had embarked on a programme in 2007[123] to develop a MPA network for SA. One of the major conflicts was the proposed Namakwaland MPA of the West coast. It was hoped that this programme would result in better public consultation and co-operation between the various national government departments.

5.4 Solutions

Based on the evaluation of the approaches used at International level, the gaps were categorized into three main solution groups. They are briefly discussed below.

[121] Online: http://www.thedti.gov.za (accessed August 2007).
[122] SDM Programme was launched at the Chamber of Mines Conference in 2006. Online for launch: http://www.bullion.org.za/Departments/Safety&Susdevl/Conf2004/Mngomezulu.pdf (accessed August 2005) or general info on Programme, online: http://www.sdmining.co.za (accessed August 2007).
[123] Dr. Kerry Sink is the Programme Manager at SANBI in Kirstenbosch, Cape Town.

5.4.1 Collective

There was sufficient common ground for addressing the EEZ strategy and ocean policy together. In the South African context, the EEZ strategy had to initiate the process to achieve an oceans policy and finally implement a legal framework. The three-step approach would address government co-ordination, industry activities, resource uses, management of marine biodiversity and compliance with rules. The strategy and policy also had to be linked to the proposed NFSD (DEAT, 2006) for South Africa.

5.4.2 Sector specific

The mine environmental policy had it merits. However, the marine and coastal mining policies were more specific to the mining sector. The MEP concept would address all environmental management and compliance, including marine and coastal mining. On the other hand, addressing marine and coastal mining concepts would ensure that all aspects are included. Both concepts were practiced but were not well defined in DME strategies, policies and legislation. Addressing marine and coastal mining as a whole made sense since environmental management would also be addressed. This approach would ensure that government planning and rules would be established, which could attract investors and benefits for communities along the coast. The opportunity also existed to link it to the sustainable development strategy for mining, which was being developed by DME.

5.4.3 Strategy

Developing a sustainable development strategy for mining had been proven to be an effective tool in planning and managing mineral resources in developing countries. Experience and research had proved that such a mining strategy had to be linked and co-ordinated with a national framework of sustainable development. At the time of this study, South Africa was in the process of developing the framework (DEAT, 2006) and strategy (DME, 2007) and the results of the national framework and strategy for mining would be measured over time.

5.5 Options

The previous section identified three possible solutions; however, to achieve the goal of this research, the focus had to shift to the formulation of options for marine and coastal mining. Logically to formulate such options, the approach should be based on the exploration of opportunities and addressing shortcomings such as:

a) Improving environmental monitoring and reporting;
b) Developing mining guidelines for sensitive and protected areas;
c) Initiating marine and coastal mineral research;
d) Addressing the different approach to planning, decision making and managing strategies or policies; and
e) Developing new definitions for reclamation and restoration.

To achieve a more holistic approach, a shift had to be achieved and had to be the main driving force. The following three options had been formulated with the aim to address both marine and coastal mining in South Africa based on current policies and legislation frameworks.

5.5.1 Option 1: Marine and coastal mining

This option proposed that parallel strategies should be initiated and developed (Carneiro, 2007)[124] for both marine mining and coastal mining. Advantages were that the strategies could be developed and implemented in setting a framework. Secondly, the framework could be addressed under the MPRDA and even result in a regulation under the same law. Lastly, the development of two concurrent strategies would not only save money but also time. The disadvantages were that strategies had a collective approach and did not entail a specific approach for either the marine or the coastal environment. Furthermore, if the strategies led to a specific policy, it had to be decided whether the NMP of 1998 or the MPRDA had to be amended.

5.5.2 Option 2: Marine mining

This option proposed that a marine mining strategy be initiated resulting in the development of a regulation or section under the MPRDA or amendments to MPRDA Regulations. The advantages were that such a strategy had a specific approach to marine mining and its outcomes could be included by amending the NMP of 1998 with a section on marine mining. Further advantages were that it would address environmental management in a more appropriate manner and would attract investment. The disadvantages were that the development of such a strategy in isolation would be time consuming as funding could be a problem. In addition such a development could have a negative impact on the delivering of results as planned.

[124] Portugal developed two separate strategies, National Integrated Coastal Management Strategy and National Strategy for the ocean. The outcomes were that both needed to be linked to ensure integration and by setting an institutional framework for implementation. This framework would in the long run prevent the development of isolated policies from these strategies.

5.5.3 Option 3: Coastal mining

This option proposed that a coastal mining strategy be initiated which would result in the development of a regulation or section of the MPRDA. The advantages were that such a strategy had a specific approach and its outcomes could be consolidated by amending the current legislation to include coastal mining. Further advantages would be that such a strategy would address environmental planning, which could lead to improved coastal governance. The disadvantage was that developing such a strategy in isolation would be time consuming, since coastal mining was a conflict area. In addition, such development could have a negative impact on delivering the planned results.

5.6 Initiation of a marine and coastal mining strategy framework

The previous section formulated three options. The preferred one to be used was option 1 which addressed the development of a framework for the marine and coastal mining strategy. The advantages were:

1. Both marine mining as well as coastal mining are addressed in the same time frame;
2. Government resources and capacity are focused on a framework, not two individual strategies which could lead to uneven distribution of resources;
3. Focusing on a framework with strategies, opens the way to determine different approaches to initiate and develop such a strategy
4. Implementing and monitoring of framework ensures focused management , instead of managing two strategies; and
5. Link between marine mining and coastal mining stays intact.

5.6.1 Instruments

The development and implementation of frameworks, strategies or policies required instruments and tools. For the purpose of this research, the following instruments could assist in the initiation of the development of a marine and coastal mining strategy framework.

5.6.1.1 Councils and committees

International experience had shown that the establishment of councils and committees (Foster & Haward, 2003) ensured that strategies were developed, implemented, reviewed and amended, if necessary. Such councils or committees also ensured that collective decisions were made on matters that needed attention, for example reviewing the implementation plans.

5.6.1.2 Co-ordination

The role of co-ordination had been proven to be an effective instrument in strategies in the following manner: firstly, to ensure that different government levels work together on planning and management activities; secondly, to use consultation and agreements resulting from co-ordination as an instrument to develop and implement strategies.

5.6.1.3 Integration

Integration should be used as an instrument to integrate different approaches in developing a strategy and to ensure achievable outcomes, such as an effective implementation plan for a policy or a strategy. Positive factors (Morrison, McDonald & Lane, 2004), such as an economic goal, institutional arrangements, scientific objectives or social aims, would contribute to successful integration. On the other hand, negative factors, such as institutional fragmentation, lack of goals and weakly defined strategy objectives, would prevent proper integration.

5.6.1.4 Strategic planning

Strategic planning could be used in three ways. Firstly, to initiate, develop and implement a strategic plan over a specific period, for example five years, to achieve specific objectives of the strategy; secondly, to conduct strategic planning on an annual basis to measure performance and to determine the appropriate action for the following year; lastly, to use strategic planning to identify a specific approach or to determine a goal or objective that needed be achieved.

5.6.2 Model

Besides using instruments to develop a strategy, a strategic planning model (Ilbury & Sunter, 2005) could be used to ensure that the goal of the strategic planning is achieved as mentioned in section 5.6.1.4. The model includes ten steps which are divided into two phases; first phase deals with planning while the second phase deals with the execution of the first phase. Briefly, they are:

<u>First phase</u>

1) Scope of planning exercise.
2) Identify the key players.
3) Setting the rules.
4) Identify the uncertainties.
5) Determine the different scenarios.

Second phase

6) Conduct a SWOT analysis.
7) Defining the options.
8) Making decisions.
9) Set measurable outcomes.
10) Achieving the goal.

The process is of critical importance and starting an exercise with a weak scope could lead to not achieving the goal while an unclear or complex goal would not give effective direction for the planned exercise. Therefore, in line with this research, the model could be used to initiate and develop a marine and coastal mining strategy framework and also be specifically used to determine the implementation or monitoring plan of the strategy.

5.7 Summary and discussion

The research followed a process where the different concepts were discussed and the conclusion briefly pointed out that the concept of marine and coastal mining had to be considered and developed. After discussing the concepts, the rules on international and national level in the marine and coastal were analysed and compared. These comparisons led to the identification of five different policy gaps. In addition, shortcomings in marine and coastal mining were identified.

The analysis of the five gaps led to the identification of three possible solutions for South Africa. The marine and coastal mining solution resulted in the formulation of three options to address the gap of marine and coastal mining. The preferred option was to develop a combined strategy or a strategy framework to address both marine and coastal mining, a marine mining strategy and coastal mining strategy. In order to implement the preferred option, the use of instruments and a strategic planning exercise are essential. Besides this, the initiation to development the preferred framework, the approach should be clear in developing such a framework. In other words, the approach should address either the beginning points of the strategies of the framework or the entry point into the framework. Therefore the following three approaches could be used:

Fist approach:

The objective is to use existing rules to initiate and develop a framework with a marine mining strategy and coastal mining strategy.

Second approach:

The objective is to initiate a marine and coastal mining strategy framework which could lead to the development of a marine and coastal mining policy.

Third approach:

The objective is to initiate a marine and coastal mining strategy framework to either develop or amend legislation and regulations on marine and coastal mining.

The next chapter discusses the implementation of these three approaches to initiate and develop a marine and coastal mining strategy framework. The chapter also formulates a strategy for both marine and coastal mining as well as a strategy for the implementation thereof.

CHAPTER 6

Marine and Coastal Mining Strategy Framework

6.1 Introduction

The previous chapter discussed the identified policy gaps and possible solutions. It then formulated options and the initiation of strategy framework with three possible approaches. This chapter continues the discussion by addressing these approaches and the development of a marine and coastal mining strategy framework. Therefore the objectives of this chapter are to:

a) Discuss the approaches;
b) Discuss and determine the approach to develop the strategy framework; and
c) Set out the framework by addressing the marine mining, coastal mining and implementation strategy aspects.

6.2 Addressing the approaches

6.2.1 Approach 1

This approach looked at the development of a strategy framework of existing policies, strategies and legislation. The development of such a framework would entail a process of integration and coordination which could lead to the development of guidelines. The process could be summarised into the following steps:

Step 1 Existing rules should be identified and analised, and then specific rules should be selected to be used;
Step 2 Strategy framework should then be developed from the selected existing rules; and
Step 3 Specific actions of the strategy framework could lead to the development of guidelines.

The advantage would be that existing strategic rules would act as a basis for the development of framework. This framework could be a policy related or strategy related framework. In the context of this research, the most practical way would be to use this to develop a strategy related framework to resolve the gaps and shortcomings identified in marine and coastal mining.

6.2.2 Approach 2

This approach considered the standard or pre-legislation process of developing rules over the long term. It started with developing a strategy framework which would lead to a policy and, finally, legislation. The process could be summarised into the following steps:

Step 1 Strategy framework should be initiated and developed;
Step 2 Policy could be developed from the framework; and
Step 3 Legislation could be developed from the policy.

The disadvantages of this approach were that it would require time and government capacity. It had to be borne in mind that a filling a policy or legislation gaps would take time. On the other hand, the approach would give sufficient room for consultation.

6.2.3 Approach 3

This approach took into consideration the direct development of legislation and regulations form the strategy framework, without developing a policy first. Such legislation and regulations could be drawn up in a short period of time. Guidelines should be developed to implement the legislation or regulations that had been drawn up. The process could be summarised into the following steps:

Step 1 Strategy framework should be initiated and developed;
Step 2 Legislation could be developed from the framework; and
Step 3 Specific regulations could be developed from the legislation.

The disadvantage of this approach was that it was focused on planning and management, with no policy having been implemented on a higher level. The advantage was that the legal tools, such as legislation and regulations, could be applied immediately.

Therefore in the South African context, approach 1 would be the most appropriate to be used since it would not only initiate the development of a strategy framework but also indirectly, stimulate effective implementation and administration of existing rules.

6.3 Development of a strategy framework

In the South African context, the matter of marine mining and coastal mining should be dealt with in parallel, but within a strategy framework. The Namibian and Australian experiences showed that the advantage of

addressing marine (offshore) and coastal (onshore) individually ensured that technical, scientific and legal matters were better managed since the ecosystems differed totally from onshore to offshore. Another reason was that if a strategy framework which is institutional or governance based embraced both marine and coastal mining, it could stimulate mineral development. This stimulation could be regarded as an investment over a long term for both the government and potential operators.

Therefore, in developing a framework to address marine and coastal mining, the following aspects had to be most apparent in the South African context:

a) Responsibilities of the Regulators and mining industry;
b) Limits and risks of such a strategy framework;
c) Correct policy environment had to be implemented; and
d) Well-structured strategy framework.

To ensure a well-structured framework to manage marine and coastal mining, settings would have to be identified; strategy synchronized with actions and an implementation plan drawn up which is discussed below.

6.3.1 Scope

The scope of the proposed framework should not only address the role of government but also the role of the mining industry and community. At the time of this research, the government's approach was to:

1) Ensure strategic planning was done by the competent Department;
2) Establish that policies and legislation existed;
3) Ensure mechanisms were available to deal with conflict; and
4) Stimulate the promotion of integrated planning.

With above in mind, the international and national experiences (Canada and National Environmental Policies) proved that a framework had to have objectives and principles. Such objectives and principles enabled the framework to be implemented and monitored. It was important to define the responsibilities, which were sometimes defined and applied.

6.3.2 Strategies

Based on the settings approach and the experience of South Africa and Namibia with the National Minerals Policies, the use of themes and strategies would have great merit. In such a scenario, the theme of marine and coastal mining had been identified and because of environmental differences between the marine and coastal areas, the themes could be divided into

marine mining and coastal mining. In order to use this division and to apply a strategy to it, the approach would entail the following:

- Marine mining strategy.
- Coastal mining strategy.

With the two strategies in mind, the strategy would have to define the type of activity, such as marine mining, concepts involved, legal tools available, the afore-mentioned requirements and proposed actions. Such actions would ensure that the basis of the strategy would be understood and could be implemented.

6.3.3 Implementation and monitoring

Developing a marine mining strategy and coastal mining strategy with actions should not end there, a process should also be developed to ensure implementation of strategies and monitoring, if reviewing and amending strategies would be necessary. Before embarking on such a process of development, the responsible or mandated government department would have to overcome budget and capacity constraints, ensure that structures and mechanisms were in place, and that the process had definite goals to achieve. Dividing the process up into phases would ensure the goals would be achieved. Furthermore, the process should have mechanisms to deal with conflict and coordination when it occurs. Therefore to guarantee implementation, an implementation strategy should be formulated which include all the above-mentioned aspects.

6.4 Marine and Coastal Mining Strategy Framework

6.4.1 Scope, objectives and principles

6.4.1.1 Scope

The main aim was to address the issue of marine mining and coastal mining in South Africa by using a strategy framework. Therefore, first action was to identify the principal and secondary rules. The principal rules were contained in the NMP of 1998, NEP of 1998 and the Coastal Development Policy of 2000, together with their legal implementation tools. The secondary rules were found in the sustainable development strategy on mining and the NBF.

The second action was to identify the role-players for this framework. These role-players comprised the DME; Coastal Regional offices; Provincial Governments dealing with mining in the Northern Cape, Western Cape,

Eastern Cape and KwaZulu Natal; the Marine and Coastal Branch of the DEAT; the mining industry and communities along the coast.

The third action was to decide on the approach of a framework. Therefore, the approach had to manage mining in both the marine and coastal environment as separate strategies and to formulate an implementation strategy to ensure the framework could be implemented, monitored and reviewed for possible changes.

6.4.1.2 Objectives

To ensure that the strategy framework would be adhered to, the following three objectives should be complied with:

- Firstly, the main objective for this framework had to address the gap of marine and coastal mining.

- Secondly, the framework had to ensure that actions in both the marine and coastal mining strategies were implemented.

- Thirdly, the framework had to ensure that both the strategies were followed and the implementation thereof was monitored and reviewed.

6.4.1.3 Principles

To achieve the objectives, the following principles should be used as a guideline:

1) Sustainable Development for mining would ensure not only that integrated planning was used, but would also be based on sustainable development.

2) Cooperative governance would ensure that government departments, hereafter referred to as regulators or authorities, would work together on co-ordination, decision-making, compliance and enforcement.

3) The current rules would further ensure that the framework was implemented and adhered to by the different authorities, but in a collective manner.

4) Strategic management would ensure proper planning and management of resources, in this case, minerals in the marine as well as the coastal environment.

6.4.2 Marine mining strategy

The marine mining strategy included a proposed definition of marine mining, a short description of marine environment, the legal tools involved and the proposed actions that should be taken.

6.4.2.1 Definition

Marine mining was a process or operation to extract minerals from the seabed from the high water mark to the EEZ boundary by using boats, vessels, ships, platforms or any other equipment.

6.4.2.2 Marine environment

The main features were the different sea currents, winds, depth of water and surfaces of the seabed. Besides these features, the position of the mineral deposit to be extracted determined the proposed mining operation in this environment.

6.4.2.3 Legal tools

Legislation administered by DME was contained in the Mine Health and Safety Act 29 of 1996, Minerals and Petroleum Resources Development Act 28 of 2002, Mining Titles Registration Amendment Act 24 of 2003, Diamond Amendment Act 29 of 2005 and Precious Metals Act 37 of 2005.

Legislation administered by DEAT was contained in the Living Marine Resources Act 18 of 1998, National Environmental Management Act 107 of 1998, National Environmental Management Amendment Act 46 of 2003, Protected Areas Act 57 of 2003, National Environmental Management Amendment 8 of 2004, Biodiversity Act 10 of 2004 and Air Quality Act 39 of 2004.

At the time of this research, processes were in motion to amend some of the Acts, but such amendments would not have a major impact on the proposed marine mining strategy. The proposed Integrated Coastal Management Bill had not been promulgated, but it would impact on the coastal waters of South Africa regarding waste and pollution management at sea. It should be noted that the legislation mentioned was the principal legislation identified for this strategy. However, the other legislation should not be ignored.

6.4.2.4 Actions

The five main actions for marine mining should be as follow:

1. Joint authority approach

    a) The possibility of joint authority of planning and decision-making should be investigated. The goal should not only be to address co-ordination and consultation between regulators but should also manage the capacity and knowledge gaps between the different regulators involved.

    b) A joint authority approach should also consider the enforcement and compliance issues. The regulators involved would have the legal tools at their disposal. In addition, a mechanism or approach would have to be developed to deal with non compliers.

2. Research requirements

    a) Research should be conducted to gain a better understanding of the marine environment, environmental issues of marine mining and minerals available at the seabed, and the exclusive economic zone of South Africa. Outcomes of such research should be used in planning, decision-making and management.

    b) Continued research should also be conducted to collect all information available on costs of planning, management, developing knowledge and technical skills as well as environmental risks and compliance. Investigative research should be done to determine if separate marine mining legislation would be required and appropriate recommendations should be made to the responsible Minister.

    c) The IMMS Code of Environmental Management of Marine Mining should be investigated and the possibility of adopting it or some of the principles should be considered.

3. Minerals and environmental issues

    a) Mining issues, like mining method, type of mineral and access to minerals, would have to be taken into account when planning a mining project for approval. The same would be applicable to the operations and decommission stages of a mine.

b) MEP issues, such as reformulating concepts like recovery instead of rehabilitation; decommissioning instead of mine closure; financial provision for marine mining and the extent of environmental liability area, would have to be addressed. The concepts in existence at the time of the research were land-based.

4. Development of guidelines

a) The development of a mine environmental management guideline for marine mining should be combined with coastal mining.
b) The development of technical guidelines should be promoted for dredging on the seabed or within the coastal waters of South Africa and the mining of strategic minerals in marine protected areas.

5. Initiatives and conflict

a) Initiatives on international level by the BCLME Programme and a similar programme for the Agulhas were well supported. Initiatives on national or local level by the regulators, mining industry and the community should also to be supported.

b) Conflict mechanisms should be available to deal with objections to mining applications and the declaration of marine protected areas. The Regional Mining Development and Environmental Committee could be used to deal with objectives, while a Joint Authority Committee should be established to deal with the declaration of MPAs and to make recommendations to the responsible.

6.4.3 Coastal mining strategy

The coastal mining strategy included the definition of marine mining, a short description of marine environment, the legal tools involved and proposed actions that should be taken.

6.4.3.1 Definition

Coastal mining was an operation, method or process to extract minerals in the coastal zone from the high water mark to five kilometers inland. Coastal mining occurred on the west, south and east coasts of South Africa with diamonds, titanium, zircon, gypsum, limestone and salt as the main minerals being extracted.

6.4.3.2 Coastal environment

The main features in the coastal environment were coastal dunes, beaches, estuaries and flood plains. The positioning and location of the mining operation in these features had to be planned and managed carefully since matters of negative visual impact and non compliance would result in community actions to prevent or even stop mining.

6.4.3.3 Legal tools

Legislation administered by DME was the Mine Health and Safety Act 29 of 1996, Minerals and Petroleum Resources Development Act 28 of 2002, Mining Titles Registration Amendment Act 24 of 2003, Diamond Amendment Act 29 of 2005 and Precious Metals Act 37 of 2005.

Legislation administered by DEAT was the National Environmental Management Act 107 of 1998, and National Environmental Management Amendment Act 46 of 2003, Protected Areas Act 57 of 2003, National Environmental Management Amendment Act 8 of 2004, Biodiversity Act 10 of 2004 and Air Quality Act 39 of 2004.

At the time of this study, processes were in motion to amend some of the Acts, but these would not have a major impact on the proposed marine mining strategy. The proposed Integrated Coastal Management Bill had not been promulgated, but it would have an impact on the coastal zone planning and management of South Africa. It included the conservation of areas and the development of protocols for estuaries and coastal management. It should be noted that the legislation mentioned was the principal legislation identified for this strategy. Furthermore, other legislation should not be ignored, for example the Water Act 36 of 1998.

6.4.3.4 Actions

The five main actions for coastal mining should be as follow:

1. Joint authority approach

    a) The possibility of joint authority planning and decision-making should be investigated in all four coastal provinces. The goal should not only be to address co-ordination and consultation between regulators but should also be to manage the capacity and knowledge gaps between the different regulators involved.

    b) The joint authority approach should also address enforcement and compliance issues. The regulators involved would have the legal

tools at their disposal. A mechanism or approach would have to be developed to deal with non compliers.

2. Research requirements

    a) Principal research should be conducted to gain a better understanding of coastal features, such as dunes, beaches and estuaries. Mineral research should also be done on the availability of sand and gravel for the development of infrastructures. The findings of the research should be used in planning and decision-making.

    b) Continuous research should be conducted to collect information on costs of planning, management and compliance as well as the cost to deal with limitations, like access to minerals costs.

3. Minerals and environmental issues

    a) Mining issues, such as mining methods, types of mineral and access to mineral would have to be considered when planning a mining project for approval. The same would apply to the operations and closure of a mine.

    b) MEP issues, such as visual impact assessment and management as well as the development of the concepts of restoration, reclamation, and remediation would have to be taken into account. The integration of the final end use of mines with that of the Coastal Management Plan of the local authority would be addressed in the closure plan.

4. Development of guidelines

    a) Mine environmental management guidelines for coastal mining should be developed and be combined with marine mining.

    b) Drawing up of technical guidelines should be promoted for visual impact management and rehabilitation practices for mining dune, beaches, estuaries and sensitive areas, such as conservation areas.

5. Initiatives and conflict

    a) Initiatives on national or local level by the regulators, mining industry and the community should to be supported.

b) Conflict mechanisms should be available to deal with objections to mining applications and the declaration of Protected Areas. The Regional Mining Development and Environmental Committee could be used to deal with objectives, while a Joint Authority Committee should be established to deal with the declaration of protected or conservation areas and to make recommendations to the responsible Minister.

6.4.4 Implementation strategy

6.4.4.1 Prioritisation of actions

The promotion and implementation of the marine mining strategy as well as the coastal mining strategy would depend on the approach of the implementation strategy. To set the goals and phases for implementation, the five main actions of both strategies, which are similar, should be used to determine which actions would be first and second priority. The two priorities with timeframes should be as follow:

- First priority includes the minerals and environmental issues, initiatives and conflict, and joint authority approach which should be addressed in the short term of 3 years.

- Second priority includes the research requirements and the development of guidelines which should be addressed in the medium term of 5 years.

6.4.4.2 Goals

The three goals for the implementation strategy should be to:

1) Promote and implement the objectives and principles of the strategy framework which would include the marine mining strategy and coastal mining strategy.

2) Guide and provide clarity on planning and management of mining project for the regulators as well as the industry and community for both sides.

3) Ensure that priorities of actions would be implemented in a phased manner as such implementation would ensure proper monitoring and review of strategy framework.

6.4.4.3 Phases

The purpose of the phased approach would be to ensure the strategy framework was implemented and not only the strategies. In such a scenario, it would be advisable that the lead regulator or regulators were mandated and a committee was formed to oversee the implementation as well as to ensure that the objectives of the framework and goals of implementation strategy were achieved. Therefore, the implementation strategy could be divided into three phases where the first phase should deal with planning, second phase with management and the last phase with review. They are:

6.4.4.3.1 Planning

Objectives of this phase were to identify the main drivers and structures for the process. The following steps should be followed:

I. The main drivers should be identified. In this case, the Department of Minerals would be the most appropriate candidate.

II. Once the main driver was established, a committee should be established to drive the implementation strategy. The committee should include other regulators, the mining industry and the community.

III. The DME should ensure that a budget was allocated. As part of their strategic planning, capacity should be available and structures should be in place. Other Regulators should assist DME in this matter.

6.4.4.3.2 Management

The objectives of this phase were to start carrying out the implementation strategy. The following steps or actions should be followed:

I. The committee should be appointed, and a works programme established. The programme should also indicate the frequency of meetings, communication approach, report backs and timeframes.

II. The strategy framework, strategies, priorities and time groups should be analyzed for better understanding. It could happen that the committee might change the priority actions and time groups for practical reasons.

III. It would be most important for the mining industry and communities to participate.

IV. After the committee had identified the priority actions of the marine mining and coastal mining, the implementation process should start.

V. The committee would have to ensure that actions delegated to responsible persons or Regulators were monitored and reported on.

VI. The committee should periodically ensure that goals of the implementation strategy complied with the works progamme of the committee.

VII. Any conflict or limitations would have to be dealt with within the framework of the committee.

6.4.4.3.3 Review

The objective of this phase was to deal with changes and amendments to the implementation strategy. The actions and steps should be followed:

I. Changes and amendments to the implementation strategy, strategy framework or marine or coastal mining strategies should be consulted with the committee.

II. All changes and amendments should be discussed within the committee and be accepted.

III. Reporting back of responsible persons should be carefully monitored to identify possible changes or amendments.

IV. Changes and amendments should be incorporated into the framework or strategies, and a revised policy framework should be drafted.

V. The revised strategy framework should be forwarded to the Minister of Minerals and Energy for acceptance and approval.

VI. Changes in budget and capacity of DME should be consulted with the committee or *vice versa*.

VII. The Committee's last task should be when implementation had been be finalized to ensure that the goals of the implementation had been achieved. They should make recommendations on the way forward.

6.5 Discussion and way forward

The advantages of incorporating an implementation strategy into a strategy framework would ensure that the actions of strategies are implemented, and that if the framework required changes or amendments, such changes or amendments should be done. The use of a committee should make implementation and a possible review of policy framework achievable. Although the main actions involve the environment, governance and minerals, the aspects of economics, beneficiation and social and labour could be added to the actions of the strategies of the strategy framework. The way forward is that the framework or the strategies could be amended or the next step could either be to:

- Development legislation for marine mining or coastal mining;
- Development regulations for marine and / or coastal mining; or
- Amending the Minerals and Mining Policy of 1998.

The next and final chapter discusses the significant aspects of the research and expound on the three problem statements as well as discussing whether the goal of the research had been achieved. The chapter also discusses the final conclusion and recommendations.

CHAPTER 7

Discussion and Recommendations

7.1 Introduction

The purpose of this chapter is to discuss the research outcomes of the investigation and by rounding off the investigation with recommendations. In order to achieve this, the objectives of the chapter are to:

a) Discuss and deliberate on the process followed to achieve the research goal;
b) Deliberate on the problem statements and goal of the research; and
c) Set out the five recommendations.

7.2 Discussion

The first part of the discussion focuses on the process followed by deliberating on the concepts, rules, gaps, opportunities, steps of the process and research goal while the second part of the discussion, elaborates on the three problem statements and achieving the research goal.

7.2.1 Process followed

Firstly, the research on concepts indicated that the concept of sustainable development is well established and could be used in strategies, policies and frameworks. On the other hand, the research also indicated that marine mining as well as coastal mining concepts requires proper development. The development of these concepts is further supported by the presence of strategic minerals in the marine and coastal environments. To include marine mining and coastal mining concepts into legal and governance frameworks would result in proper planning and management of resources.

Secondly, the research showed the advantage of rules that would ensure that government could apply proper resource management. For the industry, it would ensure access and development of resources with a long-term return on investment. An analysis of strategies and policies of other countries

indicated that South Africa compares well in developing strategy, policy or legal frameworks. The Coastal Development Policy of 2000 is a good indication that South Africa has the ability to develop policies; therefore South Africa has the ability to develop rules on marine and coastal mining. On the other hand, looking at specific rules, research has indicated that the development of a NMP framework should include marine mining and coastal mining theme. For example, Namibia has included marine mining as a theme in there NMP.

Thirdly, the development of rules should also be driven by government strategies as well as initiatives by the mining industry, for example the IMMS Code of Environmental Management for Marine Mining. However, the research concluded that the mining industry could initiate or even establish self-regulatory frameworks but it should not replace legislative process, rather support it. In addition, government strategies are currently being used in initiatives, such as the BCLME Programme on international level or the SDM Programme on national level. The long term benefits of such programmes are not only for research but also to establish a solid foundation for future development of frameworks for rules.

In the fourth place, the research identified five gaps in the South African policy environment. They were the exclusive economic zone strategy, sustainable development strategy for mining, marine or / and coastal mining policies, strategies or legislation, mine environmental policy and lastly, oceans policy. During the study it was evident that the DME had already initiated a programme to address a sustainable strategy for mining. The issue of developing a MEP should be investigated by the DME as well as DEAT since it would also include the mine environmental management on land.

In the fifth place, the research identified that opportunities do exist for government to initiate a national strategy to develop resources within the EEZ, including mineral development. This strategy could lead to the development of specific policies, for example the DEAT could take the lead in developing an oceans policy for South Africa or the DME could development rules for marine mining. The main disadvantage of this approach is that it requires long term commitment by government.

In the sixth place, the conclusions of chapters 2 to 6 have resulted in a step-by-step process that is necessary to be followed to achieve the goal of the research. The steps were:

Step 1 Analyse the relevant concepts.
Step 2 Analyse the strategic rules.
Step 3 Analyse current strategies and polices.
Step 4 Identify gaps and shortcomings.

Step 5 Define the identified gaps.
Step 6 Develop solutions for the gaps.
Step 7 Formulate specific options to address the selected gap.
Step 8 Define the option, in this scenario, a strategy framework.
Step 9 Determine the approach for developing the framework.
Step 10 Formulate and set out the framework.
Step 11 Implementation of framework.

Lastly, the research concluded that the best solution is the development of a marine and coastal mining strategy instead of a policy. The reason is that the strategy is better suited because existing rules, concepts and government structures such steering committee for consultation could be used to develop a strategy. A policy on the other hand requires a different approach. Firstly, a policy model should be developed with themes and principles and secondly, an extensive external consultative process should be followed. Therefore, the benefits of having a marine and coastal mining strategy framework are to:

1) Ensure that both marine mining as well as coastal mining strategy is initiated, developed and implemented;
2) Set the basis for integration of rules and coordination of actions;
3) Create a platform for joint authority co-operation on national level;
4) Provide objectives and principles which could assist with future policy formulation;
5) Incorporate other aspects into the marine and coastal environment such as a biodiversity link:
6) Ensure that concurrent and parallel actions are being executed;
7) Set a foundation for future research and development for both marine as well as coastal mining; and
8) Create a flexible designed framework which could be amended and reviewed, without losing focus on marine and coastal mining

7.2.2 Problem statements and research goal

The first statement was; *Why was there no specific strategy or policy to deal with marine and coastal mining or mineral development as in the case of Australian legislation that dealt specifically with offshore minerals?*

The research has found that South Africa has the minerals and that the development of strategies, policies or frameworks in developing minerals is possible. The experiences of Namibia, Australia, Canada and Portugal have proved that not only policies could be used but also strategies and / or a framework to deal with specific matters. New technology, availability of investments and research initiatives would contribute towards developing such a framework. In the past, the focus was on dealing with mineral and

environmental issues; however, conventions and treaties of the last 10 years had placed significant focus on marine and coastal issues. Therefore, the opportunity does exist for South Africa and the DME to take the initiative to initiate and develop marine and coastal mining rules. The proposed strategy framework of the research should be used as a starting point.

The second statement was: *Were there too many rules and cross references in strategies, policies and legislation?*

The development and implementation of rules are important to ensure that proper planning and development are being done in terms of resource use and management. The research proved that there were more specific rules on both national and international level to be dealt with. After 1994, South Africa started a strategy to review and implement national policies and legal frameworks. At the time of the research, strategies were in place in South Africa on a national level to review and to replace (repeal) old pre-1994 legislation and to deal with new matters, such as ICM. Consequently, if the rules are properly analysed, the issues of integration, coordination and implementation would arise. With this in mind, the proposed strategy framework includes integration of existing rules, coordination of jurisdictions of mandated government departments and the implementation of the proposed framework.

The third statement was: *Could the concept of sustainable development be used to develop strategies or policy frameworks*?

The research showed that sustainable development is linked to the development of strategies, policies and frameworks. In context, the role of sustainable development is important in a strategy, policy or framework. Therefore, sustainable development could be used as a goal, objective, principle or indicator. The proposed strategy framework for marine and coastal mining uses sustainable development as a basic principle. Such a principle will also ensure that both the marine mining strategy and coastal mining strategy would use sustainable development as a guiding tool.

The goal of the research was: *Whether a marine and coastal mining strategy or policy could be achieved.*

The research determined the development of marine and coastal mining strategy and could be implemented by initiating a marine and coastal mining strategy framework which includes a marine mining strategy, coastal mining strategy and an implementation strategy. Therefore the development of a framework in which a strategy can be initiated, formulated, implemented and even reviewed, is indeed possible.

7.2 Recommendations

Although the research outcomes of the investigation have identified significant aspects, commenting on the problem statements and achieving the goal as well as the way forward needs to be determined. Therefore, the use of recommendations to round off the investigation will ensure that proposed actions are implemented; foundations are created for initiations as well as looking at the way forward, based on the research outcomes. It is strongly recommended that the following five recommendations should be executed or initiated by the DME.

1) Development and implementation of a marine and coastal mining strategy framework. This would ensure that mineral resources are developed within the marine and coastal mining environment, and will also improve co-operative governance with other government departments, for example DEAT.

2) Conduct research on marine mining and coastal mining matters. Marine mining should include collecting and analysing information on the marine environment for better understanding, determining development and compliance costs, as well as investigating the use of the IMMS code by government. Coastal mining should include the collection of information on coastal features such as estuaries for better understanding, availability of sand for infrastructure and determining compliance costs.

3) Development of guidelines for both marine mining as well as coastal mining. Marine mining should include the development of dredging, and mining in marine protected areas guidelines. Coastal mining should include the development of visual impact and management, and rehabilitation of beaches, dunes and estuaries guidelines.

4) Initiate the development of future rules for marine and coastal mining. The next step should be the development of either marine and coastal mining legislation, regulations or the review of the national minerals policy to include marine and coastal mining.

5) Initiate the development of mine environmental policy as well as an exclusive economical zone strategy. The DME should use this opportunity to develop specific rules for mine environmental management and take the initial lead to develop a resource development strategy for the EEZ.

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