



**SCOPING AND ENVIRONMENTAL IMPACT
ASSESSMENT FOR PROPOSED
EXPLORATION ACTIVITIES IN VARIOUS
INSHORE LICENCE BLOCKS OFF THE
SOUTH-WEST COAST OF SOUTH AFRICA**

SCOPING REPORT

Prepared for:
Petroleum Agency of South Africa

On behalf of:
Rhino Oil & Gas Exploration South Africa (Pty) Ltd

Prepared by:
CCA Environmental (Pty) Ltd





**SCOPING AND ENVIRONMENTAL IMPACT
ASSESSMENT FOR PROPOSED
EXPLORATION ACTIVITIES IN VARIOUS
INSHORE LICENCE BLOCKS OFF THE
SOUTH-WEST COAST OF SOUTH AFRICA**

SCOPING REPORT

Prepared for:
**Petroleum Agency of South Africa
7 Mispel Road
Tygerpoort Building
BELLVILLE, 7530**

On behalf of:
**Rhino Oil & Gas Exploration South Africa (Pty) Ltd
Icon Building, Suite 300
Cnr Long Street & Hans Strijdom Avenue
CAPE TOWN, 8001**

Prepared by:
**CCA Environmental (Pty) Ltd
Contact person: Jeremy Blood
Unit 39 Roeland Square, Drury Lane
CAPE TOWN, 8001
Tel: (021) 461 1118 / 9 Fax (021) 461 1120
E-mail: jeremy@ccaenvironmental.co.za**

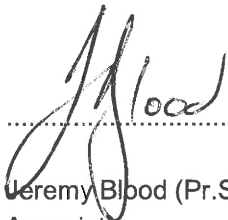


PROJECT INFORMATION

TITLE	Scoping and Environmental Impact Assessment for proposed exploration activities in various inshore licence blocks off the South-West Coast of South Africa: Scoping Report
APPLICANT	Rhino Oil & Gas Exploration South Africa (Pty) Ltd
ENVIRONMENTAL CONSULTANT	CCA Environmental (Pty) Ltd
REPORT REFERENCE	RO02IS/Scoping/Rev.0
REPORT DATE	11 September 2015

REPORT COMPILED BY: Jeremy Blood

Nicholas Arnott

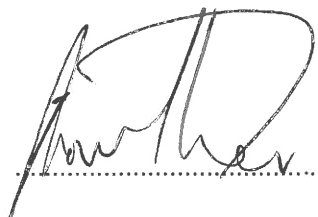


.....
Jeremy Blood (Pr.Sci.Nat.; CEAPSA)
Associate



.....
Nicholas Arnott
Senior Environmental Consultant

REPORT REVIEWED BY: Jonathan Crowther



.....
Jonathan Crowther (Pr.Sci.Nat.; CEAPSA)
Managing Director

EXPERTISE OF ENVIRONMENTAL ASSESSMENT PRACTITIONER

NAME	Jonathan Crowther
RESPONSIBILITY ON PROJECT	Project leader and quality control
DEGREE	B.Sc. Hons (Geol.), M.Sc. (Env. Sci.)
PROFESSIONAL REGISTRATION	Pr.Sci.Nat., CEAPSA
EXPERIENCE IN YEARS	27
EXPERIENCE	Jonathan Crowther has been involved in environmental consulting since 1988 and is currently the Managing Director of CCA Environmental (Pty) Ltd. He has expertise in a wide range of environmental disciplines, including Environmental Impact Assessments (EIA), Environmental Management Plans/Programmes, Environmental Planning & Review, Environmental Auditing & Monitoring, Environmental Control Officer services, and Public Consultation & Facilitation. He has project managed a number of offshore oil and gas EIAs for various exploration and production activities in South Africa and Namibia. He also has extensive experience in projects related to roads, property developments and landfill sites.

NAME	Jeremy Blood
RESPONSIBILITY ON PROJECT	Project management, report writing and specialist study review
DEGREE	B.Sc. Hons (Bot.), M.Sc. (Cons. Ecol.)
PROFESSIONAL REGISTRATION	Pr.Sci.Nat., CEAPSA
EXPERIENCE IN YEARS	16
EXPERIENCE	Jeremy Blood has been working as an environmental assessment practitioner since 1999 and has project managed a number of large-scale projects covering a range of environmental disciplines, including Environmental Impact Assessments, Environmental Management Plans/Programmes, Environmental Auditing & Monitoring and Environmental Control Officer related work in South Africa, Namibia, Mozambique and Kenya. He has expertise in a wide range of projects relating to mining (oil/gas, heavy mineral mining and borrowpits), housing/industrial developments and infrastructure projects (e.g. roads, railway line, power lines and pipelines).

NAME	Nicholas Arnott
RESPONSIBILITY ON PROJECT	Project consultant and report writing.
DEGREE	B.Sc. Hons (Earth and Geographical Science)
PROFESSIONAL REGISTRATION	-
EXPERIENCE IN YEARS	9
EXPERIENCE	Nicholas Arnott has worked as an environmental assessment practitioner since 2006 and has been involved in a number of projects covering a range of environmental disciplines, including Basic Assessments, Environmental Impact Assessments and Environmental Management Programmes. He has gained experience in a wide range of projects relating to mining, infrastructure projects (e.g. roads), housing and industrial developments.

EXECUTIVE SUMMARY

1. INTRODUCTION

1.1 OPPORTUNITY TO COMMENT

This Executive Summary provides a comprehensive synopsis of the Scoping Report prepared as part of the Scoping and Environmental Impact Assessment (S&EIA) process being undertaken for the proposal by Rhino Oil & Gas Exploration South Africa (Pty) Ltd (hereafter referred to as “Rhino”) to undertake exploration activities in various inshore licence blocks off the South-West Coast of South Africa.

The Scoping Report has been distributed for a 30-day comment period from **11 September 2015 to 1 October 2015** in order to provide Interested and Affected Parties (I&APs) with an opportunity to comment on any aspect of the proposed project and the findings of the scoping process. Copies of the full report have been made available on the CCA Environmental (Pty) Ltd (CCA) website (www.ccaenvironmental.co.za) and at the Cape Town Central Library (Drill Hall, Darling Street, Cape Town).

Any comments should be forwarded to CCA at the address, telephone/fax numbers or e-mail address shown below. For comments to be included in the updated Scoping Report, comments should reach CCA by **no later than 1 October 2015**.

CCA Environmental (Pty) Ltd
Contact person: Nicholas Arnott

Unit 39 Roeland Square, 30 Drury Lane, CAPE TOWN, 8001
PO Box 10145, Caledon Square, 7905

Tel: (021) 461 1118/9; Fax: (021) 461 1120
E-mail: nicholas@ccaenvironmental.co.za

1.2 PROJECT BACKGROUND

In April 2015, Rhino lodged an application for an Exploration Right with Petroleum Agency of South Africa (PASA) ¹ in terms of Section 79 of the Mineral and Petroleum Resources Development Act, 2002 (No. 28 of 2002) (MPRDA), as amended. PASA accepted the application on 22 May 2015.

The exploration licence area is approximately 16 190 km² in extent and is situated adjacent to the coast roughly between Saldanha Bay and Cape Agulhas and extends from the coast out to a maximum water depth of approximately 350 m (see Figure 1).

The proposed exploration programme in the exploration licence area would commence with the acquisition and collation of existing data. Thereafter, multi-beam bathymetry and two-dimensional (2D) seismic surveys would be conducted to identify potential target areas for future exploration.

¹ PASA is the designated agency, in terms of Section 70 of the MPRDA, responsible for the regulation and administration of exploration and production applications and activities.

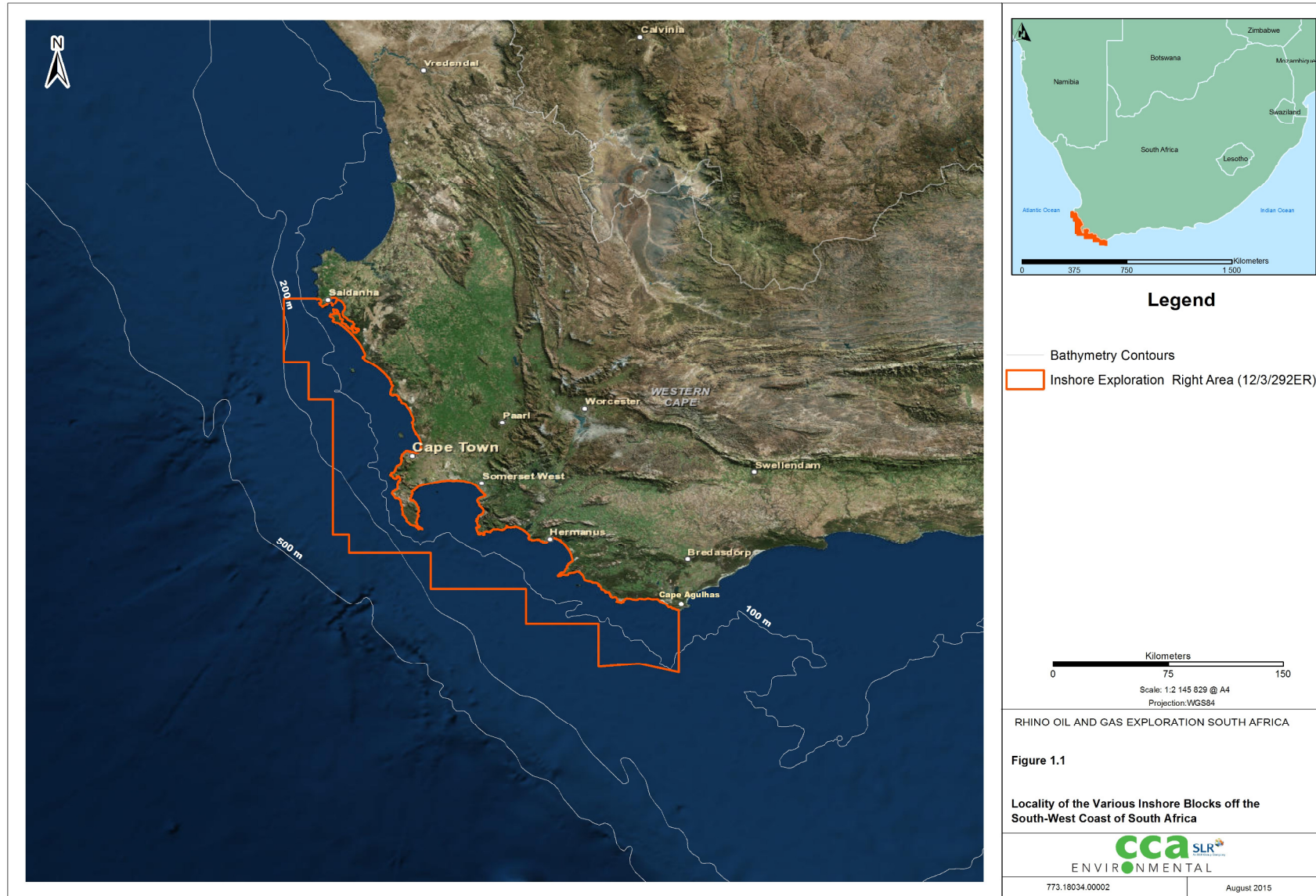


Figure 1.1: Locality of the inshore exploration licence area off the South-West Coast of South Africa.

1.3 AUTHORISATION REQUIREMENTS

The proposed exploration programme requires authorisation in terms of both the MPRDA and the National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA), as amended. These two regulatory processes are summarised below and presented in more detail in Chapter 2.

In terms of the MPRDA an Exploration Right must be issued prior to the commencement of any exploration activities. A requirement for obtaining an Exploration Right is that an applicant must comply with Chapter 5 of NEMA with regards to consultation and reporting.

In terms of the Environmental Impact Assessment (EIA) Regulations 2014, promulgated in terms of Chapter 5 of NEMA, an application for an Exploration Right requires Environmental Authorisation from the competent authority, the Minister of Mineral Resources (or delegated authority), to carry out the proposed exploration programme. In order for PASA to consider an application for Environmental Authorisation and make a recommendation to the Minister of Mineral Resources, a S&EIA process must be undertaken.

CCA has been appointed by Rhino to undertake the S&EIA process to meet the relevant requirements of the MPRDA, NEMA and Regulations thereto.

2. S&EIA PROCESS

2.1 SCOPING PHASE

2.1.1 Pre-application public participation process

The pre-application public participation process involved an open, participatory approach to ensure that I&APs were notified of the proposed project and provided a reasonable opportunity to register on the project database and provide initial comments. Steps undertaken during this phase are summarised below:

- A meeting was held with PASA on 31 July 2015. The purpose of the meeting was to discuss the legislative requirements and the approach to the S&EIA process to ensure agreement and compliance.
- A preliminary I&AP database of authorities, Non-Governmental Organisations, Community-based Organisations and other key stakeholders was compiled using other databases of previous studies undertaken in the South-West Coast offshore region. Additional I&APs were added to the database based on responses to the advertisements and notification letter, and attendees at the Information-sharing Meeting;
- A notification letter / email and Background Information Document (BID) were distributed for a 30-day registration and comment period from 5 August 2015 to 7 September 2015, which made provision for the two public holidays in August 2015;
- Advertisements announcing the proposed project, the availability of the BID, I&AP registration / comment period and Information-sharing Meeting were placed in regional (Cape Times and Die Burger) and local (Weslander, Hermanus Times and Suidernuus) newspapers; and
- An Information-sharing Meeting was held in Cape Town (Two Oceans Aquarium) on 20 August 2015.

A total of nineteen written submissions were received during the pre-application public participation process. These relate to registration on the project database, registration on the project database, the impact of exploration activities on marine fauna and the fishing industry, and the potential impact on tourism activities.

The key issues identified by the project team, with I&AP input, are summarised in Section 5. All comments received (including written correspondence and those raised at the information-sharing meeting) have been collated, and responded to, into a Comments and Responses Report.

2.1.2 Project registration

An “Application Form for Environmental Authorisation” was submitted to PASA on 31 August 2015. The application was acknowledged by PASA on 1 September 2015 (PASA reference number: 12/3/292).

2.1.3 Compilation and review of Scoping Report

This Scoping Report has been prepared in compliance with Appendix 2 of the EIA Regulations 2014 and has been informed by comments received during the pre-application public participation process. This report aims to present all information in a clear and understandable format suitable for easy interpretation by I&APs and authorities and provides an opportunity for I&APs to comment on the proposed project and findings of the scoping process to date (see Section 1.1 for details of the comment period).

2.1.4 Completion of the Scoping Phase

The following steps are envisaged for the remainder of the Scoping Phase:

- After closure of the comment period, the Scoping Report will be updated to incorporate the comments received. All comments received during the review of this Scoping Report will be assimilated and responded to in an updated Comments and Responses Report; and
- The updated Scoping Report will be submitted to PASA for acceptance.

If the Scoping Report is accepted, the project will proceed onto the EIA Phase.

2.2 EIA PHASE

2.2.1 Specialist studies

Two specialist studies will be undertaken to address the key issues that require further investigation and detailed assessment, namely: (1) the impact on marine fauna, and (2) the impact on fishing. The specialist studies will involve the gathering of data relevant to identifying and assessing environmental impacts that may occur as a result of the proposed project. These impacts will then be assessed according to pre-defined rating scales. Specialists will also recommend appropriate mitigation or optimisation measures to minimise potential impacts or enhance potential benefits, respectively.

2.2.2 Integration and Assessment

The specialist information and other relevant information will be integrated into an Environmental Impact Report (EIR), which will include an Environmental Management Programme (EMP). The EIR will be released for a 30-day comment period and all I&APs on the project database will be notified when the EIR is available for comment.

After closure of the comment period, all comments received on the draft report will be incorporated and responded to in a Comments and Responses Report. The draft report will then be updated, to which the Comments and Responses Report will be appended, and submitted to PASA for consideration and decision-making by the Minister of Mineral Resources.

The decision taken by the Minister of Mineral Resources will be advertised and distributed to all I&APs on the project database as part of the statutory appeal period.

3. PROJECT DESCRIPTION

The proposed exploration programme in the exploration licence area would commence with acquisition and collation of existing data. Thereafter multi-beam bathymetry and 2D seismic surveys would be conducted to identify potential target areas for future exploration (see Figure 2 and 3). The proposed activities associated with the exploration programme are described further below.

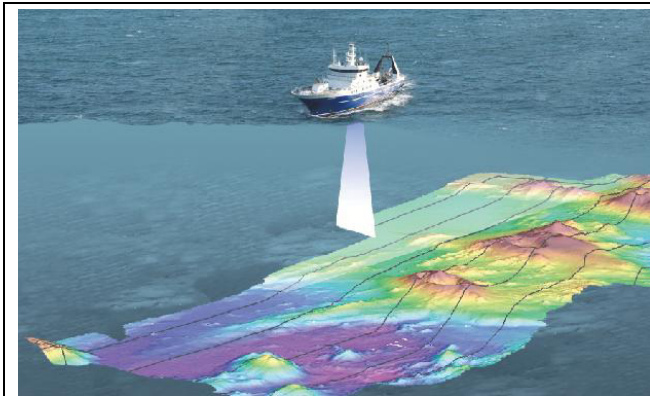


Figure 2: Illustration of a vessel using multi-beam depth/echo sounders.

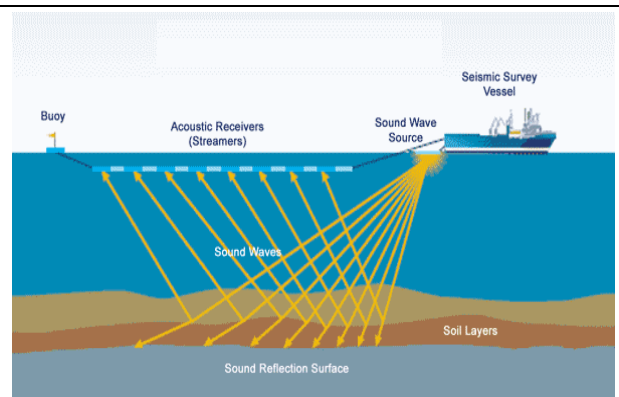


Figure 3: Principles of offshore seismic acquisition surveys.

3.1 MULTI-BEAM BATHYMETRY

3.1.1 Introduction

There are a number of different sonar surveying tools for investigating the structure of the ocean bed sediment layers (including multi-beam echo/depth sounders, depth sounders, side scan sonar and bottom profilers). The operator proposes to undertake a multi-beam bathymetry survey to produce a digital terrain model of the seafloor (Figure 2).

3.1.2 Methodology

The survey vessel would be equipped with a multi-beam echo sounder to obtain swath bathymetry and a sub-bottom profiler to image the seabed and the near surface geology within the proposed exploration licence area. The multi-beam system provides depth sounding information on either side of the vessel's track across a swath width of approximately two times the water depth.

The multi-beam echo sounder emits a fan of acoustic beams from a transducer at frequencies ranging from 10 kHz to 200 kHz and typically produces sound levels in the order of 207 db re 1µPa at 1m. The sub-bottom profiler emits an acoustic pulse from a transducer at frequencies ranging from 3 kHz to 40 kHz and typically produces sound levels in the order of 206 db re 1µPa at 1m.

3.1.3 Extent and duration

The multi-beam bathymetry survey would comprise a number of low density spaced survey lines within the proposed exploration licence area (see Figure 4). It should be noted that no multi-beam bathymetry survey acquisition would be undertaken within a 10 km buffer off the coast. It is anticipated that data acquisition would take in the order of 15 to 20 productive days to complete at a vessel speed of 4 knots.

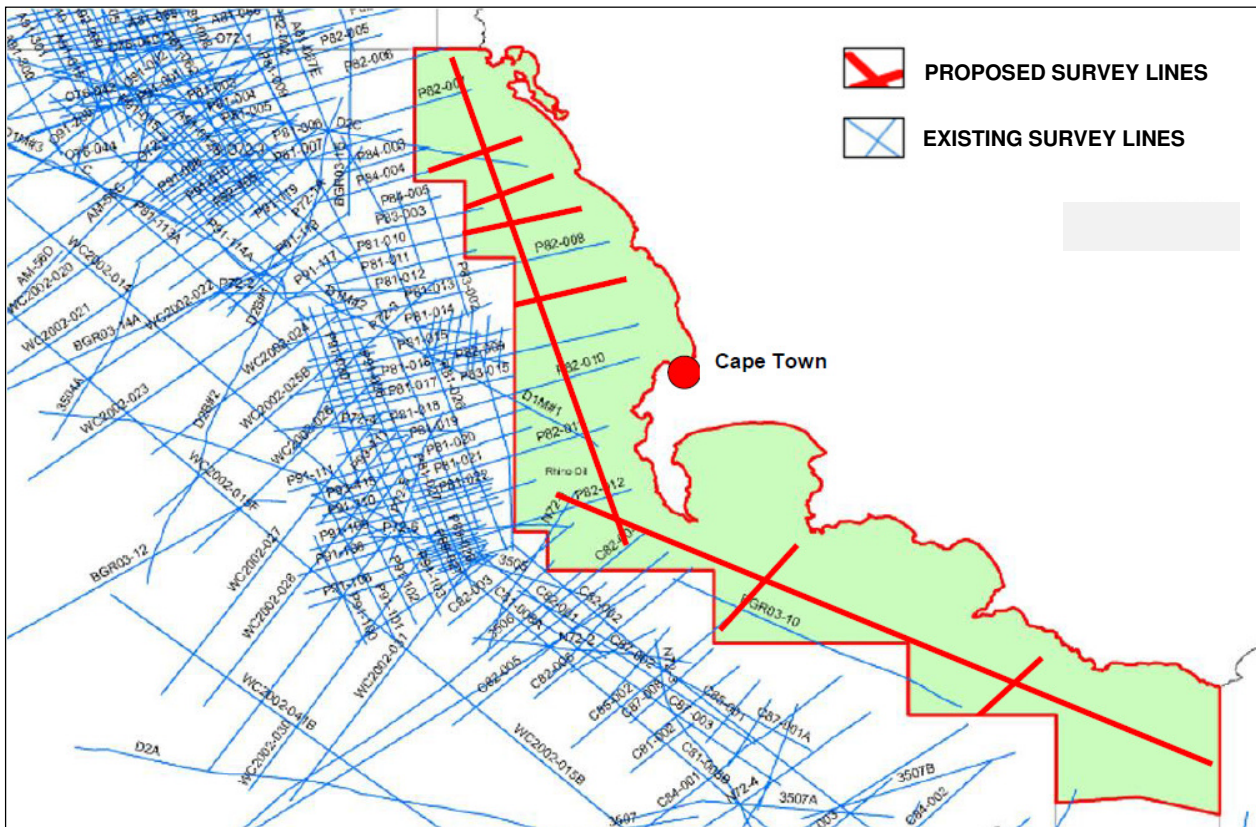


Figure 4: Indicative multi-beam bathymetry and seismic survey lines in the inshore exploration licence area.

3.2 SEISMIC SURVEYS

3.2.1 Introduction

Seismic surveys are carried out during oil and gas exploration activities in order to investigate subsea geological formations. During seismic surveys, high-level, low frequency acoustics are directed towards the seabed from near-surface sound sources towed by a seismic vessel. Signals reflected from geological interfaces below the seafloor are recorded by multiple receivers (or hydrophones) towed in a single or multiple streamer (see Figure 3). Analyses of the returned signals allow for interpretation of subsea geological formations.

Seismic surveys are undertaken to collect either 2D or 3D data. For this investigation Rhino is proposing to undertake acquisition of a 2D seismic survey only.

3.2.2 Survey methodology and airgun array

The seismic survey would involve a towed airgun array, which provides the seismic source energy for the profiling process, and a seismic wave detector system, usually known as a hydrophone streamer. The sound source or airgun array (one for 2D) would be situated some 80 m to 150 m behind the vessel at a depth of 5 m to 25 m below the surface. The single hydrophone streamer would be up to 12 000 m long. The streamer would be towed at a depth of between 6 m and 30 m and would not be visible, except for the tail-buoy at the far end of the cable.

A single airgun could typically produce sound levels in the order of 220-230 dB re 1 mPa @ 1m, while arrays produce sounds typically in the region of 250 dB re 1 mPa @ 1m. The majority of energy produced is in the 0 to 120 Hz bandwidth, although energy at much higher frequencies is also recorded. High-resolution surveys and shallow penetration surveys require relatively high frequencies of 100-1000 Hz, while the optimum wavelength for deep seismic work is in the 10-80 Hz range.

3.2.3 Extent, duration and timing

It is anticipated that the proposed 2D seismic survey would be at a minimum 160 km in total length comprising a number of low density spaced survey lines within the proposed exploration licence area (see Figure 4). As for the proposed multi-beam bathymetry survey, no seismic survey acquisition would be undertaken within a 10 km buffer off the coast. The inclusion of a 10 km buffer is based on previous seismic applications off the South and East Coasts.

Although survey commencement would ultimately depend on a permit award date, availability of seismic contractors and other factors, it is anticipated that the survey would be undertaken during the summer of 2016/2017 and would take in the order of 15 to 20 productive days to complete. The summer period has specifically been selected in order to avoid the main cetacean migration / breeding period from June to December, as well as ensuring optimal sea state and weather conditions.

3.3 EXCLUSION ZONES

Under the Convention on the International Regulations for Preventing Collisions at Sea (COLREGS, 1972, Part B, Rule 18), survey vessels that are engaged in surveying or towing operations are defined as “vessel restricted in its ability to manoeuvre” which requires that power-driven and sailing vessels give way to a vessel restricted in its ability to manoeuvre. Vessels engaged in fishing shall, so far as possible, keep out of the way of the seismic survey operation. Furthermore, under the Marine Traffic Act, 1981 (No. 2 of 1981), a vessel (including array of airguns and hydrophones) used for the purpose of exploiting the seabed falls under the definition of an “offshore installation” and as such it is protected by a 500 m safety zone. It is an offence for an unauthorised vessel to enter the safety zone. In addition to a statutory 500 m safety zone, a seismic contractor would typically request a safe operational limit (that is greater than the 500 m safety zone) that it would like other vessels to stay beyond.

At least a 500 m exclusion zone would need to be enforced around all survey vessels (including its array of airguns and hydrophones) at all times. A chase boat with appropriate radar and communications would be used during the seismic survey to warn vessels that are in danger of breaching the exclusion zone.

3.4 SUPPORT SERVICES

A support vessel may be required to perform logistics support to the seismic vessel.

Bunkering of the survey vessels is expected to be undertaken at port of operation (Cape Town or Saldanha) or at sea during the survey. Standard operating procedures for refuelling would be adhered to at all times.

4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

4.1 PHYSICAL ENVIRONMENT

The proposed exploration licence area lies within the southern zone of the Benguela Current region, which is characterised by the cool Benguela upwelling system.

Wind and weather patterns along the South-West Coast are primarily due to the South Atlantic high-pressure cell and the eastward movement of mid-latitude cyclones, south of the subcontinent. The majority of swells are generated by mid-latitude cyclones and originate from the south-west. Wave height decreases with both distance north along the West Coast and with distance offshore. Tides along the South-West Coast are subject to a simple semi-diurnal tidal regime.

The continental shelf along the West to South-West Coast is generally both wide and deep, although large variations in both depth and width occur. The shelf maintains a general north-north-west trend north of Cape Point, being narrowest in the south between Cape Columbine and Cape Point (40 km), widening to the north of Cape Columbine and widening south of Cape Point due to the presence of the Agulhas Bank.

The most important current is the Benguela current, which constitutes a broad, shallow and slow north-west flow along the west of the South African Coast between the cool coastal upwelled waters and warmer Central Atlantic surface waters further offshore. The current is driven by the moderate to strong south to south-east winds which are characteristic of the region and is most prevalent at the surface, although it does follow the major seafloor topographic features. Current velocities in continental shelf areas generally range between 10–30 cm/s.

The Benguela region is one of the world's major coastal upwelling systems. Upwelling is characterised by pulsed input of cold, nutrient rich water into the euphotic zone, and in the Benguela region results from the wind-driven offshore movement of surface waters. The surface waters are replaced by cold nutrient-rich water that upwells from depth. Once upwelled, this water warms and stabilises, and moves offshore where a thermocline usually develops. Nutrient rich upwelled water enhances primary production, and the West Coast region consequently supports substantial pelagic fisheries.

4.2 BIOLOGICAL OCEANOGRAPHY

South Africa is divided into nine bioregions. The proposed exploration licence area falls in the South-Western Cape and Agulhas Bioregions.

Communities within marine habitats are largely ubiquitous throughout the southern African South-West Coast region, being particular only to substrate type or depth zone. These biological communities consist of many hundreds of species, often displaying considerable temporal and spatial variability (even at small scales). Habitats specific to the study area include: sandy intertidal and unconsolidated subtidal substrates, intertidal rocky shores and subtidal reefs, and the water body / column.

Species diversity, abundance and biomass of benthic invertebrate macrofauna increases from the shore to 80 m depth. Further offshore to 120 m depth, the midshelf is a particularly rich benthic habitat, which acts as an important source of food for carnivores, such as cephalopods, mantis shrimp and demersal fish species. Outside of this rich zone biomass declines.

Deep water corals (depths >150 m) establish themselves below the thermocline where there is a continuous and regular supply of concentrated particulate organic matter, caused by the flow of a relatively strong

current over special topographical formations which cause eddies to form. Substantial shelf areas in the productive Benguela region should thus potentially be capable of supporting rich, cold water, benthic, filter-feeding communities.

As many as 110 species of bony and cartilaginous fish have been identified in the demersal communities on the continental shelf of the South-West Coast. Changes in fish communities occur with increasing depth, with the most substantial change in species composition occurring in the shelf break region between 300 m and 400 m depth. The shelf community (<380 m) is dominated by Cape hake. Small pelagic fish species, including the sardine/pilchard, anchovy, chub mackerel, horse mackerel and round herring, typically occur in mixed shoals of various sizes within the 200 m contour. The exploration licence area does overlap with the spawning areas for some commercially important species.

Three species of turtles, the green, leatherback and loggerhead, are found along the South-West Coast. However, only the Leatherback turtle (Critically Endangered) is likely to be encountered within the exploration licence area, but their abundance is expected to be low.

There are a total of 49 species of seabirds occurring within the southern Benguela area, of which 14 are residents species, 25 are migrants from the southern ocean and 10 are visitors from the northern hemisphere. The area between Cape Point and the Orange River supports 38% and 33% of the overall population of pelagic seabirds in winter and summer, respectively. Most of the species in the region reach highest densities offshore of the shelf break (200 to 500 m depth) with highest population levels during their non-breeding season (winter). The availability of breeding sites is an extremely important determinant in the distribution of resident seabirds. Although breeding areas are distributed along the whole coast, islands are especially important. Most of the breeding seabird species forage at sea with most birds being found relatively close inshore (10-30 km). Cape Gannets, however, are known to forage up to 140 km offshore, and African Penguins have also been recorded as far as 60 km offshore. Shore birds likely to be encountered along the coastline of the proposed exploration licence area include the African Black Oystercatcher.

The marine mammals occurring off the South-West Coast include seals and cetaceans (whales and dolphins). The marine mammal fauna of the South-West Coast comprises of 24 species of cetaceans and four seal species, of which the Cape fur seal is the most common. The proposed exploration licence area is located in a transition zone between the western boundary of the Agulhas current ecosystem of the east coast and the southern extent of the Benguela current ecosystem of the West Coast. The cetacean fauna of these ecosystems are different, especially in coastal and shelf waters (up to 200 m depth). The distribution of cetaceans can largely be split into those associated with the continental shelf and those that occur in deep, oceanic water. Importantly, species from both environments may be found on the continental slope (200 to 2 000 m) making this the most species rich area for cetaceans. The most common species within the exploration licence area are likely to be the dusky dolphins (west coast), common dolphins (south coast), long-finned pilot whales (greater than 200 m depth) and humpback whales.

4.3 HUMAN UTILISATION

There are seven commercial fisheries active on the South-West Coast of South Africa, including demersal trawl, demersal long-line (hake- and shark-directed), large pelagic long-line, small pelagic purse seine, tuna pole, traditional line fishery and West Coast rock lobster fishery. With the exception of the large pelagic long-line fishery, all other fishing effort is generally directed inshore of the 1 000 m bathycontour.

The majority of shipping traffic is located on the outer edge of the continental shelf (between 12 and 24 nm offshore) with traffic inshore of the continental shelf along the South-West Coast largely comprising fishing vessels. Therefore, vessel traffic is expected to pass through the exploration licence area.

Exploration for oil and gas is currently undertaken in a number of adjacent licence blocks off the West and South coasts. There is no current development or production activities off the South-West Coast.

A number of proposed prospecting areas for glauconite and phosphorite / phosphate are located off the South-West Coast, all of which are located inshore of the exploration licence area. Prospecting Rights have been issued for areas 251 and 257 and the prospecting rights for Agrimin1, Agrimin2 and SOM1 have expired.

The SAT3/WASC/SAFE submarine telecommunications cables pass through the proposed exploration licence area. Two disused explosives dumping grounds are also located within licence area. The majority of known wrecks along the South-West Coast are located in relatively shallow water close inshore (within the 100 m isobath).

Numerous conservation areas and a Marine Protected Area (MPA) exist along the coastline of the South-Western Cape. The proposed exploration licence area overlaps with some of these areas. Through systematic biodiversity planning to identify a potential offshore MPA network, a number of priority areas have been identified off the South African coastline for the protection of benthic and pelagic habitats. The proposed exploration licence area overlaps with the proposed Robben Island MPA.

5. KEY PROJECT ISSUES

Key issues to be addressed in the EIA Phase are summarised below.

Potential impact on marine fauna:

- Emissions from the combustion of diesel fuel for generators and other machinery used to power the vessel engines;
- Normal discharges to the marine environment from a variety of sources, including deck drainage, machinery space drainage, sewage and galley wastes from survey and support vessels;
- Localised disturbance of marine fauna due to noise and lighting from survey and support vessels; and
- Potential impacts of seismic and multi-beam bathymetry noise / pulses on marine fauna. Potential impacts could include physiological injury, behavioural avoidance of the survey area, masking of environmental sounds and communication, and indirect impacts due to effects on prey.

Potential impact on fishing:

- Decreased fishing effort and / or loss of catch due to:
 - > Disruption to fishing operations;
 - > Loss of access to fishing grounds in the proposed survey area over the survey period; and
 - > Fish avoidance (flight response) of the seismic survey area and changes in feeding behaviour.
- Loss of income due to the associated loss of catch.

Potential impact on other marine mining and exploration operations:

- Disruption of activities as a result of the imposition of a statutory safety zone around the survey vessel.

Potential impact on marine transport routes:

- Interference with shipping routes as a result of the imposition of a statutory safety zone around the survey vessel.

Potential socio-economic impacts:

- Creation of limited employment opportunities; and
- Generation of limited direct revenues associated with operational activities such as refuelling, vessel repair, etc.

Potential impact on tourism:

- Interference with tourism (mainly diving, whale watching, shark-cage diving and recreational fishing) activities off the South-West Coast as a result of the imposition of a statutory safety zone around the survey vessel; and
- Potential impacts of seismic and multi-beam bathymetry noise / pulses on divers hearing if the survey takes place in close proximity to popular dive sites.

Specialist studies will be undertaken to address those issues that require further investigation and detailed assessment. The remainder of the issues will be assessed based on experience gained from the environmental assessment of similar operations elsewhere in the region and information from the generic EMP prepared for seismic surveys in South Africa and desktop analysis.

6. SPECIALIST STUDIES

As noted earlier, two specialist studies have been identified for the EIA phase, namely: (1) the impact on marine fauna, and (2) the impact on fishing. The specific terms of reference for these studies are presented below.

6.1 MARINE FAUNA

The specific terms of reference for the marine faunal assessment are as follows:

- Provide a general description of the local marine fauna (including cetaceans, seals, turtles, seabirds, fish, invertebrates and plankton species) within the proposed exploration licence area and greater South-West Coast. The description to be based on, *inter alia*, a review of existing information and data from the international scientific literature, the Generic EMP prepared for seismic surveys in South Africa, information sourced from the internet, as well as Marine Mammal Observer (MMO) close-out reports prepared for previous surveys undertaken off the coast of South Africa;
- Identify, describe and assess the significance of potential impacts of the proposed exploration activities on the local marine fauna, including but not limited to:
 - > physiological injury;
 - > behavioural avoidance of the survey area;
 - > masking of environmental sounds and communication; and
 - > indirect impacts due to effects on prey.
- Identify practicable mitigation measures to avoid/reduce any negative impacts and indicate how these could be implemented in the start-up and management of the proposed project.

6.2 FISHERIES

The specific terms of reference for the fisheries assessment are as follows:

- Provide a general description of the fishing activities expected in the proposed exploration licence area and along the greater South-West Coast and areas adjacent to the license area in which fisheries overlap or may be affected;

- Undertake a spatial and temporal assessment of expected fishing effort and catch in the proposed exploration licence area for each sector identified;
- Determine whether there is any correlation between seismic and reported catch of the small pelagic and tuna-pole fisheries using information from surveys off the South-West Coast and taking into consideration the seasonality and variability in catches and abundance for the period for which such data are available. Fine scale environmental effects such as physical and chemical oceanographic characteristics will be excluded from this analysis.
- Assess the risk of the proposed exploration activities on the different fishing sectors taking into consideration as far as possible the historical and current performance of the key fisheries in the area and their expected natural variability;
- Assess the impact of the proposed exclusion zones around the survey vessels and potential disturbance of fish on the fishing activities based on the estimated percentage loss of catch and effort;
- Quantify the approximate economic impact of the estimated percentage loss of catch and effort calculated above for the small pelagic and tuna-pole fisheries; and
- Make recommendations for mitigation measures that could be implemented to minimise or eliminate negative impacts on and enhance any benefits to the fishing industry.

* * *

TABLE OF CONTENTS

PROJECT INFORMATION.....	i
EXPERTISE OF ENVIRONMENTAL ASSESSMENT PRACTITIONER.....	ii
EXECUTIVE SUMMARY	iii
TABLE OF CONTENTS.....	xv
ACRONYMS, ABBREVIATIONS AND UNITS	xx
1. INTRODUCTION.....	1-1
1.1 PURPOSE OF THIS REPORT AND OPPORTUNITY TO COMMENT.....	1-1
1.2 PROJECT BACKGROUND.....	1-1
1.3 AUTHORISATION REQUIREMENTS.....	1-1
1.4 TERMS OF REFERENCE	1-3
1.5 STRUCTURE OF THIS REPORT.....	1-3
1.6 OPPORTUNITY TO COMMENT.....	1-4
2. LEGISLATIVE REQUIREMENTS AND EIA PROCESS	2-1
2.1 LEGISLATIVE REQUIREMENTS	2-1
2.1.1 Overview of the “One Environmental System”	2-1
2.1.2 Mineral and Petroleum Resources Development Act, 2002.....	2-1
2.1.3 National Environmental Management Act, 1998	2-1
2.1.4 National Environmental Management: Air Quality Act, 2004	2-2
2.1.5 National Environmental Management: Waste Act, 2008.....	2-3
2.1.6 National Environmental Management: Protected Areas Act, 2003	2-3
2.1.7 Other relevant legislation	2-3
2.1.8 Guidelines and policies.....	2-4
2.2 S&EIA PROCESS	2-5
2.2.1 Study objectives.....	2-5
2.2.2 Assumptions and limitations	2-6
2.2.3 Scoping Phase.....	2-6
2.2.4 EIA Phase	2-11
3. PROJECT DESCRIPTION	3-1
3.1 NEED AND DESIRABILITY	3-1
3.2 GENERAL PROJECT INFORMATION.....	3-2
3.2.1 Exploration right holder.....	3-2
3.2.2 Licence area details.....	3-2
3.2.3 Financial provision	3-3
3.3 PROPOSED EXPLORATION PROGRAMME	3-3
3.3.1 Multi-beam bathymetry surveys.....	3-4
3.3.2 Seismic surveys.....	3-5
3.3.3 Exclusion zones.....	3-8
3.3.4 Support services	3-9
3.3.5 Environmental notification.....	3-9
3.4 PROJECT ALTERNATIVES	3-9
3.4.1 No-Go Alternative	3-11
4. THE AFFECTED ENVIRONMENT.....	4-1
4.1 MARINE ENVIRONMENT (OFFSHORE)	4-1
4.1.1 Meteorology	4-2
4.1.2 Physical oceanography.....	4-2
4.1.3 Biological oceanography.....	4-12
4.1.4 Human utilisation	4-33

5.	KEY PROJECT ISSUES	5-1
5.1	EFFECT ON MARINE FAUNA.....	5-1
5.2	EFFECT ON FISHERIES.....	5-1
5.3	EFFECT ON MARINE MINING AND EXPLORATION ACTIVITIES.....	5-2
5.4	EFFECT ON MARINE TRANSPORT ROUTES	5-2
5.5	EFFECT ON SOCIO-ECONOMIC ENVIRONMENT	5-2
5.6	EFFECT ON TOURISM	5-3
6.	SPECIALIST STUDIES	6-1
6.1	INTRODUCTION.....	6-1
6.2	TERMS OF REFERENCE FOR THE SPECIALIST STUDIES.....	6-1
6.2.1	General terms of reference for the specialist studies	6-1
6.2.2	Marine fauna.....	6-2
6.2.3	Fisheries	6-2
6.3	CONVENTION FOR ASSIGNING SIGNIFICANCE RATINGS TO IMPACTS	6-3
6.3.1	Extent.....	6-4
6.3.2	Duration	6-4
6.3.3	Intensity.....	6-5
6.3.4	Significance.....	6-5
6.3.5	Status of impact	6-6
6.3.6	Probability	6-6
6.3.7	Degree of confidence.....	6-6
6.3.8	Loss of Resources	6-6
6.3.9	Degree to which impacts can be mitigated.....	6-7
6.3.10	Reversibility of an impact.....	6-7
7.	REFERENCES.....	7-1

List of Appendices

Appendix 1:	PASA correspondence
Appendix 2:	Public Participation Process:
Appendix 2.1:	I&AP database
Appendix 2.2:	I&AP notification letter and BID
Appendix 2.3:	Advertisements
Appendix 2.4:	Notes of information-sharing meeting
Appendix 2.5:	I&AP correspondence (1st round of public participation)
Appendix 2.6:	Comments and Responses Report
Appendix 3:	Plan of Study for EIA
Appendix 4:	Undertaking by Environmental Assessment Practitioner

List of Figures

Figure 1.1	Locality of the various inshore licence blocks off the South-West Coast of South Africa.	1-2
Figure 2.1	Flow diagram showing the S&EIA process.	2-7
Figure 3.1	Illustration of a vessel using multi-beam depth/echo sounders.....	3-4
Figure 3.2	Principles of offshore seismic acquisition surveys (from fishsafe.eu).	3-5
Figure 3.3	Typical configuration for a 2D seismic survey operation. Safe operational limits are also shown.	3-6
Figure 3.4	A typical pressure signature produced on firing of an airgun.	3-7
Figure 3.5	Proposed seismic survey lines in the offshore exploration licence area.	3-8
Figure 4.1	A conceptual model of the Benguela system (after Shannon 1985).	4-1

Figure 4.2a	Voluntary Observing Ship (VOS) Wave Height vs Wave Direction data for the Cape Columbine area 32.0° to 32.9° S and 17.0° to 17.9° E (1903/11/01 to 2011/05/24; 9 111 records) (from CSIR)	4-3
Figure 2b	VOS Wave Height vs Wave Direction data for the Cape Point area 34.0° to 34.9° S and 18.0° to 18.9° E (1900/01/01 to 2011/05/24; 14 283 records) (from CSIR)	4-4
Figure 4.3	Bathymetry of the continental shelf off the West Coast of southern Africa. Approximate location of the inshore exploration licence area is also indicated.	4-6
Figure 4.4	Major features of the predominant circulation patterns and volume flows in the Benguela System, along the southern Namibian and South African west coasts (re-drawn from Shannon & Nelson 1996). Approximate location of the proposed exploration licence area is also indicated.....	4-9
Figure 4.5	The location of three major upwelling cells along the West Coast (Shannon and Nelson, 1996).....	4-10
Figure 4.6	The nine bioregions defined by the NBSA study (Lombard and Strauss 2004). The approximate location of the proposed exploration licence area is also shown.	4-12
Figure 4.7	The Exploration Area (red polygon) in relation to the South African inshore and offshore bioregions (adapted from Sink, et. al., 2012).	4-13
Figure 4.8	Schematic representation of the West Coast intertidal beach zonation (adapted from Branch & Branch 1981). Species commonly occurring on the Namaqualand beaches are listed.	4-14
Figure 4.9	Schematic representation of the West Coast intertidal zonation (adapted from Branch & Branch 1981).	4-17
Figure 4.10	Major spawning areas in the southern Benguela region (adapted from Cruikshank 1990) ..	4-22
Figure 4.11	The distribution of breeding colonies of African penguins on the South African West Coast.	4-27
Figure 4.12	Location of seabird and seal colonies and resident whale populations in relation to the proposed exploration licence areas. The location of areas identified potential offshore Marine Protected Areas by Operation Phakisa (shaded blue) are also shown.....	4-34
Figure 4.13	Schematic diagram of trawl gear typically used by demersal trawlers.....	4-35
Figure 4.14	Distribution of fishing effort by the demersal trawl fishery in relation to the proposed exploration licence area from 2000 to 2012	4-36
Figure 4.15	Diagram illustrating typical fishing gear deployed when fishing for demersal (bottom dwelling) species. Note the variation in depth of gear deployed for two different species (hake and kingklip)	4-37
Figure 4.16	Distribution of fishing effort by the hake demersal long-line sector in relation to the proposed exploration licence area	4-38
Figure 4.17	Distribution of fishing effort by the shark demersal long-line sector in relation to the proposed exploration licence area.	4-39
Figure 4.18	Typical Pelagic long-line configuration targeting tuna, swordfish and shark species	4-40
Figure 4.19	Distribution of actual lines set by the large pelagic long-line fishery in relation to the proposed exploration licence area	4-41
Figure 4.20	Typical gear configuration of a pelagic purse seine vessel targeting small pelagic species.....	4-41
Figure 4.21	Distribution of fishing effort by the small pelagic purse seine fishery in relation to the proposed exploration licence area.	4-42
Figure 4.22	Main area of fishing effort in the tuna pole fishery in relation to the proposed exploration licence area	4-43
Figure 4.23	Main area of fishing effort in the traditional line fishery in relation to the proposed exploration licence area.....	4-44
Figure 4.24	Location of the proposed exploration licence area in relation to the West Coast Rock Lobster fishery	4-45

Figure 4.25	The spatial distribution of research trawls conducted between 1985 and 2013 in relation to the proposed exploration licence area	4-46
Figure 4.26	The major shipping routes along the west coast of South Africa showing petroleum licence blocks (Data from the South African Centre for Oceanography). Approximate location of the proposed exploration licence area is also shown	4-47
Figure 4.27	Petroleum licence blocks off the West, South and East coasts of South Africa (after PASA, 2015). The proposed exploration licence area is highlighted in red	4-48
Figure 4.28	Location of glauconite and phosphorite / phosphate prospecting areas in relation to the proposed exploration licence area	4-50
Figure 4.29	Schematic of location of manganese nodules off Southern Africa, showing petroleum licence blocks (Modified from Rogers 1995). Approximate location of the proposed exploration licence area is also indicated.....	4-51
Figure 4.30	Configuration of the current African undersea cable systems, November 2014 (From http://www.manypossibilities.net).	4-52
Figure 4.31	Reserves and Marine Protected Areas on the South-West Coast in relation to the proposed exploration licence area)	4-54

List of Tables

Table 2.1	List of applicable activities in terms of Listing Notice 2 (GN No. R984).	2-2
Table 2.2	Guidelines and policies relevant to the proposed project.....	2-4
Table 2.3	Requirements of a Scoping Report in terms of the EIA Regulations 2014	2-10
Table 3.1	Co-ordinates of the of exploration licence area.....	3-3
Table 3.2	Summary of project alternatives.	3-10
Table 4.1	Mean concentrations of total suspended particulate matter (TSPM) and particulate inorganic matter (PIM) expresses as mg/ℓ from coastal waters in the Benguela.	4-11
Table 4.2	Some of the more important large migratory pelagic fish likely to occur in the offshore regions of the South Coast.	4-24
Table 4.3	Pelagic seabirds common in the southern Benguela region (Crawford et al. 1991).	4-25
Table 4.4	Breeding resident seabirds present along the West Coast (CCA & CMS 2001).	4-26
Table 4.5	Cetaceans occurrence offshore of the South-West Coast, their seasonality and likely encounter frequency.....	4-30
Table 4.6	List of marine conservation areas along the West Coast of South Africa.	4-53

LIST OF ACRONYMS, ABBREVIATIONS AND UNITS

2D	Two Dimensional
3D	Three Dimensional
ACE	African Coast to Europe
BID	Background Information Document
CCA	CCA Environmental (Pty) Ltd
CITES	Convention on International Trade in Endangered Species
cm	centimetres
cm/s	centimetres per second
CMS	Convention on Migratory Species
CO	Carbon monoxide
CO ₂	Carbon dioxide
COLREGS	Convention on the International Regulations for Preventing Collisions at Sea
DAFF	Department of Agriculture, Forestry and Fisheries
db	decibels
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
E	East
EAP	Environmental Assessment Practitioner
EASSy	Eastern Africa Submarine Cable System
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMP	Environmental Management Programme
g/m ²	grams per square metre
g/m ³	grams per cubic metre
GN	Government Notice
HSE	Health, Safety and Environmental
HWS	high water spring
I&APs	Interested & Affected Parties
IEM	Integrated Environmental Management
IEP	Integrated Energy Plan
IUCN	International Union for Conservation of Nature
km	kilometres
km ²	Square kilometres
m	Metres
m ²	Square metres
m ³	Cubic metre
MARPOL	International Convention for the Prevention of Pollution from Ships, 1973/1978
mg/l	Milligrams per litre
mm	Millimetres
MPA	Marine Protected Area
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (No. 28 of 2002)
mR/hr	Milliroentgens per hour
m/s	Metres per second
N	North
NDP	National Development Plan
NEMA	National Environmental Management Act, 1998 (No. 107 of 1998)
NEM:PAA	National Environmental Management: Protected Areas Act, 2003 (No. 57 of 2003)
NEM:WA	National Environmental Management: Waste Act, 2008 (No. 59 of 2008)
NNW	North-north-west
NO ₂	Nitrogen dioxide
NW	North-west
PASA	Petroleum Agency South Africa
PIM	Particulate Inorganic Matter
POM	Particulate Organic Matter
RSA	Republic of South Africa
S	South
S&EIA	Scoping and Environmental Impact Assessment
SAFE	South Africa Far East
SAHRA	South African Heritage Resources Agency
SAN	South African Navy

SAT3	South Atlantic Telecommunications cable no.3
SO ₂	Sulphur dioxide
SSW	South-south-west
SW	South-west
t	Tons
TAC	Total Allowable Catch
TSPM	Total Suspended Particulate Matter
UNCLOS	United Nations Convention on Law of the Sea, 1982
VMEs	Vulnerable Marine Ecosystems
VOS	Voluntary Observing Ships
W	West
WACS	West Africa Cable System
WASC	West African Submarine Cable
WSW	West-south-west
µg	Micrograms
µm	Micrometre
µg/l	Micrograms per litre
µPa	Micro Pascal
°C	Degrees Centigrade
%	Percent
‰	Parts per thousand
<	Less than
>	Greater than