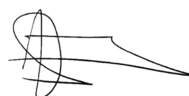


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AMENDMENT RECORD			
Rev	Draft	Date	Description
0		April 2015	New chapter. Thyspunt Site Safety Report compiled in support of Eskom's Nuclear Installation Site Licence for the Thyspunt site and submitted to the NNR in January 2017
0a		March 2024	Respond to NNR comments and update TSSR section
0b		January 2025	Respond to Eskom and NNR Comments and update TSSR section.
0c		March 2026	Footer revised to be consistent with other TSSR sections. Figure 5.6.50 Corrected.

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EXECUTIVE SUMMARY

This section of the Thyspunt Site Safety Report (TSSR) presents the characterisation of the current and expected future adjacent sea use in the Thyspunt site (the site) region.

The information contained within this section provides input into the evaluation of the potential radiological impacts of normal radioactive discharges and accidental releases to the public to inform **Chapter 7** (Potential Radiological Impact on the Public and the Environment, PRIPE) and for the purposes of emergency planning in **Chapter 8** (Emergency Planning, EP).

The results of the characterisation investigations can be summarised as follows:

- The regional shoreline to the north of the site is characterised by exposed rocky shores, mixed shores and sandy shores. Land use along this coastline is predominantly conservation and rural, with the exception of the coastal towns of Oubosstrand (51.60 km west-northwest), Eersterivierstrand (49.74 km west-northwest) and Oyster Bay (5.02 km west-northwest) and Cape St. Francis (13.23 km east), St. Francis Bay (13.9 km to west-northwest), Paradise Beach (20.71 km east-northeast), Aston Bay (23.54 km east-northeast), Marina Martinique (24.1 km east-northwest) and the larger Jeffreys Bay (26.43 km northwest), Blue Horizon Bay (59.34 km east-northeast), Beach View (65.38 km east-northeast), Sea View (67.96 km east-northeast), Kini Bay (69.61 km north northeast) and Sardinia Bay (81.13 km east-northeast).
- Marine Protected Areas (MPAs) in the site region include: Tsitsikamma MPA, Sardinia Bay_MPA and Port Elizabeth Corals MPA.
- The regional shoreline to the south of the site is characterised by exposed rocky shores, mixed shores, sandy shores and estuarine areas. Land use along this coastline is dominated by the agricultural and conservation uses.
- The site falls within the Special Sea Area declared in terms of International Convention for the Prevention of Marine Pollution from Ships of 1973, as modified by the Protocol of 1978 (MARPOL), which is focused on protection of the marine environment and resources from oil pollution. Control of the use of the sea and the seashore within the site region falls within the ambit of the Maritime Zones Act, 1995, the Sea Shore Act, 1935 and the Marine Living Resources Act, 1998.
- The main activities associated with the maritime and coastal environment are linked to the characteristics of the coastline and include fishing, collection of food, recreational and tourist activities and the processing of fish products.

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- Fishing activities presented in this section of this TSSR include commercial fishing, small-scale fishing and recreational fishing. Fish stocks are calculated by the Department of Forestry, Fisheries and the Environment (DFFE) on an annual basis and fishing allocations are made on a yearly basis. The commercial fishing yield is highly dependent on this official process and is dynamic in nature. A prediction over the lifetime of the nuclear installation(s) is not possible.

The key findings are as follow:

- Commercial fisheries present in the site region include:

Offshore fisheries

- hake deep-sea trawl;
- hake inshore trawl;
- kingklip;
- small pelagic
- horse mackerel (mid-water trawl);
- large pelagic (longline);
- (tunas, swordfish and sharks);
- South Coast rock lobster (trap).

Inshore fisheries

- demersal shark (longline);
- hake longline;
- Agulhas sole (inshore trawl);
- squid, which is a very important fishery in the site region and vicinity;

Nearshore/small-scale fisheries

- seaweed;
- hake handline;
- oysters;
- abalone;

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- traditional line fishing.

- Many of the targeted species are highly migratory and nomadic and their abundance is dependent on the available food. Any adverse impact on a particular species or within a confined geographic area could affect other fisheries along the entire South African coastline.
- The stocks of many commercially fished species are either declining or depleted and it is not possible to provide estimations of abundance and yield for the lifetime of the nuclear installation(s). In addition, due to ecological changes, there has been a southward and eastward shift in fishing activity, with the site region increasingly supporting a changing number of species. It is therefore important that data related to commercial fisheries be updated on a regular basis throughout the nuclear installation lifetime in order to understand any important trends that may occur in this industry.
- Currently, there are no mariculture facilities within the site region.
- Small-scale (previously called subsistence) fishing is difficult to quantify for the site region. The sector was recently legally created to recognise those fishers who depend on marine living resources for direct food security. Informal small-scale fishing occurs either with or without a recreational fishing licence. Informal or unregulated small-scale fishing cannot be quantified.
- Recreational fishing is popular for line fishermen along the coastline within the site region, due to the occurrence of rocky outcrops and ledges. Offshore recreational fishing in the site region targets mostly tuna species. Recreational fishermen that target line fish in particular are not permitted to sell the catch commercially and retain most of it for own consumption.
- The coastal region surrounding the site is a popular tourist destination and includes the coastal resort towns of Cape St. Francis, St. Francis Bay and Oyster Bay in the site vicinity. Recreational and tourism activities that occur along the coast include swimming, surfing, kite surfing, boating, sand boarding and recreational fishing.
- There are 30 registered facilities that process fish products in the site region. These are clustered in the town of Oyster Bay, St Francis Bay, Jeffreys Bay, Humansdorp and Gqeberha (formerly known as Port Elizabeth). The fish processing industry will continue to concentrate in harbours along the coast and nearby industrial areas. It is, however, dynamic in nature and monitoring of this fishery sector component must be updated regularly in order to maintain an accurate understanding of the sector and its development.
- Since fish caught in the site region is also processed outside of the site region, it is recommended that all fishing rights holders that potentially

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operate in the site region should be considered in the EP.

- The data presented provide adequate input for the purposes of determining the potential radiological impact on the population and the environment, set out in detail in **Chapter 7**. The description of adjacent sea use sets out the type, location and distribution of the activities and was provided to inform the determination of direct and indirect pathways that may lead to the potential radiological exposure of the population within the site region.
- The data presented provide adequate input for the purposes of the emergency planning set out in detail in **Chapter 8**:
 - Commercial activity associated with adjacent sea use occurs within the 3 km emergency zone from the nuclear installation enveloping footprint and is primarily related to the squid fishery and the area is accessible by the recreational fishery. An exclusion zone will need to be established to prohibit any recreational activities (Refer to **Chapter 9** (Physical Protection and Security)).
 - Fish processing and distribution facilities are distributed throughout the site region.
- The potential non-radiological sources of impacts on the population and environment were determined as follows:
 - desalination – The proposed mixing of the brine of the proposed desalination plant with the cooling water will result in significant dilution, and the brine will be undetectable at the outfall. Refer to **Section 5.12** (Water Supply) for details on the proposed desalination plants.
 - exclusion zone - an exclusion zone will need to be established around the Thyspunt Nuclear Installation, which will impact on sea usage in this section of the coast.
- The main activities and characteristics relevant to nuclear installation safety were determined. Hazards associated with external events of a natural origin and with the coastline and the sea are considered in **Section 5.9** (Oceanography and Coastal Engineering). The only hazard of a natural maritime origin related to the topics covered in this section concerns the loss of cooling water supply, as a result, of entrainment of marine organisms and settlement of sessile organisms, resulting in the blockage of intake pipes. The planned off-shore intake structures are expected to reduce the risk of blockage through in-growth significantly. The inclusion of a velocity cap reduces the potential for entrainment of fish significantly. The use of chlorine will also keep the cooling system free of marine growth. Potential impacts by marine organisms on the cooling water supply can be dealt with through appropriate nuclear installation design and management measures. Those aspects are

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planned to be developed by Eskom in the Safety Analysis Report for new nuclear installation(s) in the next licensing stage.

- The section concludes that a monitoring program of adjacent sea usage will need to be established for the site and maintained over the lifetime of the installation(s). It is recommended that regular review or update of this section of this TSSR take place to ensure that the data remain current and to ensure that sufficient information is available to ensure the viability of the site over its lifecycle, with specific reference to PRIPE and EP.

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5.6 ADJACENT SEA USE

5.6.1 Introduction

This section of the TSSR presents the characterisation of the current and expected future adjacent sea use in the Thyspunt site (the site) region.

This section complements the description of the site characteristics in **Section 5.3** (Ecology), **Section 5.4** (Demography), **Section 5.5** (Land and Water Use) and **Section 5.12** (Water Supply).

This report is an update of the TSSR Section 5.6, Revision 0 (Eskom, 2015) and Revision 0a (Eskom, 2024).

5.6.2 Purpose and Scope

The purpose of this section is to provide an update on adjacent sea use in the site region. The purpose of providing the adjacent sea use characteristics and activities in the site region is to:

- provide a description of the current and expected future adjacent sea use characteristics, with particular emphasis on commercial, subsistence and recreational fishery activities, together with the associated uncertainties.
- provide input to determine the potential impact of the nuclear installation(s) on the marine environment during normal nuclear installation operation (e.g. thermal plume, desalination-related brine plume), with specific reference to the evaluation in **Section 5.3**;
- provide input into the evaluation of the potential radiological impacts of normal radioactive discharges and accidental releases to the public and the environment (see **Chapter 7** and **Chapter 8**);
- identify aspects that require future monitoring during the lifetime of the nuclear installation(s) in order to provide the assurance that the viability of the site will not be compromised by possible changes in adjacent sea use during the lifetime of the nuclear installation(s);
- provide input to the evaluation of the feasibility of emergency planning for the nuclear installation(s) on the site, undertaken in **Chapter 8**.

Notes:

This section of this TSSR does not deal with activities and sea usage related to harbours and shipping lanes and associated human-induced

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hazards. Harbours are only referred to in order to characterise a particular activity related to adjacent sea use, i.e. commercial fishing activities. Harbours, shipping lanes and associated human-induced hazards are specifically addressed in detail in **Section 5.7** (Nearby Transportation, Industrial and Military Facilities).

5.6.3 Regulatory Framework

The legal and regulatory basis that guides the compilation of this TSSR is outlined in **Chapter 2** (Legal and Regulatory Basis). The current national normative acts and associated regulations specifically relevant to aspects of adjacent sea use are set out below, followed by a discussion of relevant international standards and guidelines.

5.6.3.1 Legal Requirements

The national regulations relevant to this section are The Regulations on Licensing of Sites for New Nuclear Installations, R927 (Department of Energy, 2011), which require *inter alia*:

“5. A Site Safety Report referred to in Regulation 3(2)(a) must contain the following -

- (3) The characteristics of the site relevant to the design assessment, risk and dose calculations, including inter alia:*
 - (a) external events;*
 - (e) regional development;*
 - (f) projections of the above data commensurate with the design life of the nuclear installation(s).”*

5.6.3.2 Regulations, Documents and Guidelines

In addition to the abovementioned national regulation, national and international safety standards and recommendations were also considered to ensure that this section is developed in accordance with international best-practice and included the following:

- National Nuclear Regulator, Regulatory Guide: Interim Guide for the Siting of Nuclear Facilities, RG-0011 (National Nuclear Regulator, 2016), which requires *inter alia* the following:
 - Section 6.1.1(b) *“Characteristics of the site and its environment which could influence the transfer of released radioactive materials to persons”;*

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- Section 6.1.4 *“Characteristics of the natural environment in the region that may be affected by potential radiological impacts in operational and accident conditions should be investigated”*;
- Section 8.2.3(d) *“Bodies of water used for commercial, individual and recreational fishing, including details of the aquatic species fished, their abundance and yield”*;
- Section 8.2.3(e) *“Bodies of water used for ... recreational purposes such as bathing and sailing”*;
- Section 8.2.3(h) *“Products imported or exported from the region that may form part of the food chain”*;
- Section 8.2.3(i) *“Free foods ... such as seaweed”*;
- Section 8.4.3.1(h) *“Spawning periods and feeding cycles of major fish species”*.
- International Atomic Energy Agency Safety Standards No. SSR-1, Site Evaluation for Nuclear Installations (International Atomic Energy Agency, 2019). This establishes the requirements for:
 - Paragraph 1.4(a), *“Defining the information to be used in the site evaluation process”*;
and requires evaluation of as far as it relates to adjacent sea use:
 - Paragraph 4.6(b), *“The characteristics of the site and its environment that could influence the transfer of radioactive material released from the nuclear installation to people and to the environment”*;
 - Paragraph 4.27, *“The potential for ..., chemical releases and/or thermal releases that might affect the safety of the nuclear installation ... shall be considered in the site evaluation process”*;
 - Paragraph 6.11, *“The characterization of the uses of land and water shall include investigations of the land and surface water and groundwater resources that might be used by the population or that serve as a habitat for organisms in the food chain”*
- International Atomic Energy Agency Safety Guide No. NS-G-3-2, Dispersion of Radioactive Material in Air and Water and Consideration of Population Distribution in Site Evaluations for Nuclear Power Plants (International Atomic Energy Agency, 2002), which requires consideration of, *inter alia*:

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- Section 3.3: Information necessary and relevant, *inter alia*, to relevant food chains leading to humans, to relevant habits of the population and to recreational pursuits such as water sports and fishing;
- Section 4.2: The identification of bodies of water used for commercial, individual and recreational fishing; bodies of water used for commercial purposes including navigation and recreational purposes such as bathing and sailing; products exported from the site region that may form part of the food chain; and free foods such as seaweed;
- Section 4.3: The description of the location, nature and extent of the use of water bodies in the site region, as well as a description of changes of uses of water in the site region, such as for fishing and recreational activities;
- Section 4.4: Future water uses projected over the lifetime of the nuclear installation(s) to the extent possible;
- Section 4.6: Data on different water bodies, including data on water used for fishing, the aquatic species fished, their abundance and yields; water used for commercial, individual and recreational fishing; water used for recreational purposes; number of persons engaging in swimming, boating and other recreational uses, and time spent on these activities;
- Section 4.7: If the site is located on an ocean coast, the users of the sea out to a few tens of kilometres in all directions must be identified and characterised.

In addition, international conventions that are directed at managing maritime resources that have informed this section of this TSSR include:

- MARPOL (International Maritime Organisation, 1973 & 1978) - This is one of the most important international marine environmental conventions directed at minimizing pollution of the seas, including dumping, oil and exhaust pollution. Its objective is to preserve the marine environment through the complete elimination of pollution by oil and other harmful substances and the minimisation of accidental discharge of such substances. South Africa is a party to the MARPOL.
- The International Commission for the Conservation of Atlantic Tunas (ICCAT) – This was established with the objective of maintaining the population of tuna and tuna-like fish in the Atlantic Ocean at levels that will permit maximum sustainable yields. It also aims at

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implementation of research programmes, analyses of fishing statistics and formulation of stock conservation recommendations. South Africa is a founding member of ICCAT and has been a contracting party to the convention since 1967.

- The Convention for the Conservation of the Southern Bluefin Tuna (CCSBT) (2020) – This was established with the objective to ensure, through appropriate management, the conservation and optimal utilisation of southern bluefin tuna. South Africa has been a contracting party to the convention since 2016.

5.6.3.3 Other Applicable Legislation to Adjacent Sea Use

The following national acts and international convention were also considered:

- Integrated Coastal Management Act, Act 24 of 2008 (Republic of South Africa, 2008), as it governs the establishment of a system of integrated coastal and estuarine management and defines the rights and duties in relation to coastal areas;
- Marine Living Resources Act, Act 18 of 1998 (Republic of South Africa, 1998), as it controls and manages the use of marine resources within South African waters;
- Maritime Zones Act, Act 15 of 1994 (Republic of South Africa, 1994), as it defines baselines and maritime zones within South African waters (i.e. internal waters, the territorial waters, the contiguous zones, the exclusive economic zones and the continental shelf);
- Prevention of Pollution from Ships, Act 2 of 1986 (Republic of South Africa, 1986), as it governs the discharges of oil, except for clean or segregated ballast, from all ships;
- United Nations Convention on the Law of the Sea, 1982 (UN General Assembly, 1982), as it relates to the permitted exploration and exploitation of natural resources.

5.6.4 Approach to the Characterisation

The evaluation of adjacent sea use was performed in a way that:

- determines the current and future characteristics and activities associated with the coastal and maritime environment;
- determines the current and future adjacent sea use distribution;

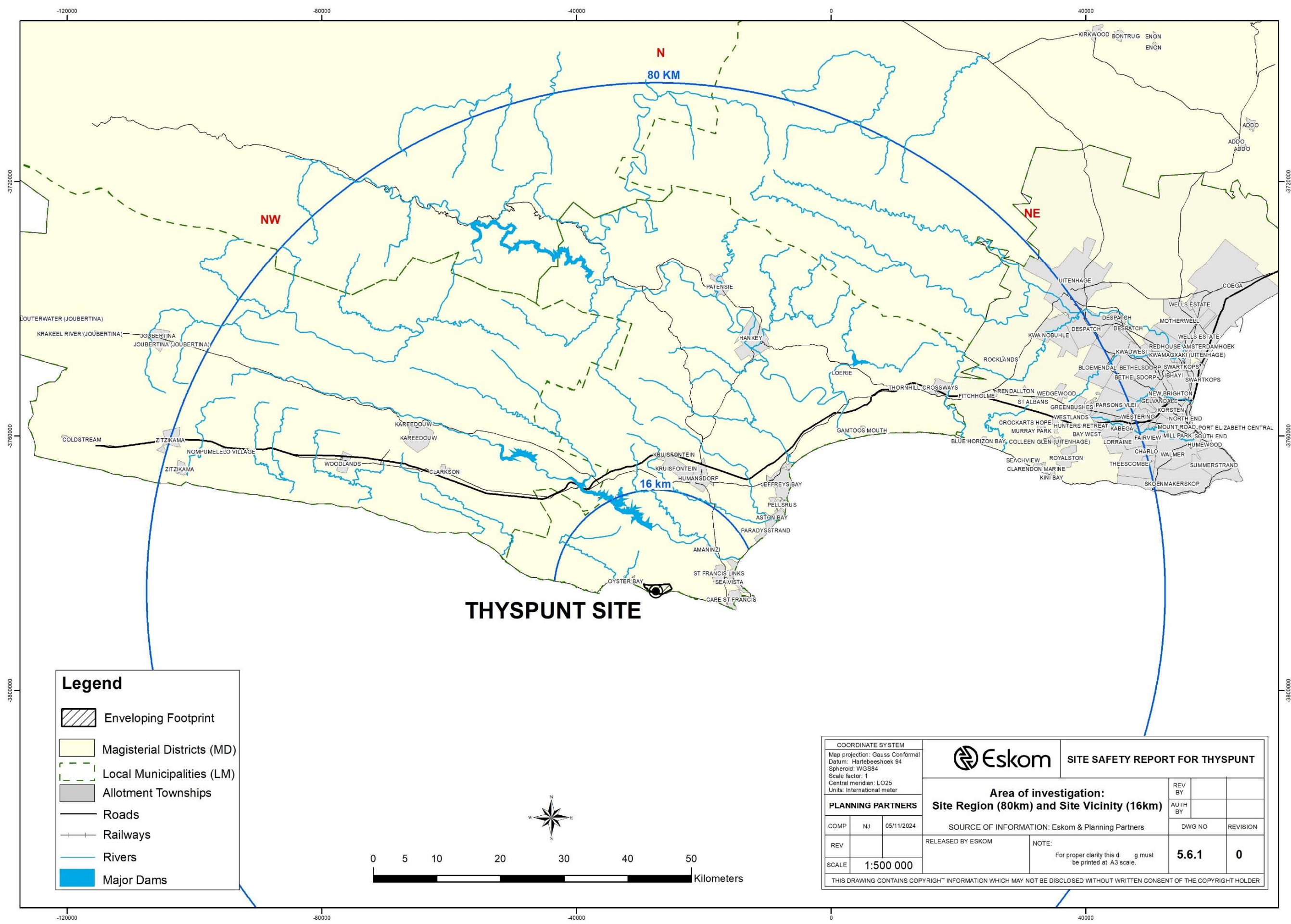
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- identifies the important adjacent sea use characteristics that are required for the evaluation of the potential consequences to the population and the environment during normal and accidental nuclear installation conditions conducted for the purpose of **Chapter 7** and **Chapter 8**;
- provides input into the identification of representative person and the identification of direct and indirect pathways for public exposure to radiological exposure and potential radioactive contamination of the food chain;
- describes the potential hazards of a natural origin that must be taken into consideration in the design of the nuclear installation(s) (with reference to **Section 5.3** and **Section 5.9**);
- provides input for the evaluation of the feasibility of the emergency plan presented in **Chapter 8**;
- presents the site reference adjacent sea use data in the surrounding site region (National Nuclear Regulator, 2016);
- identifies areas of uncertainties and management of uncertainties;
- identifies critical / important features and characteristics, as well as required future actions (e.g. additional monitoring and confirmatory studies).

5.6.4.1 Area of Investigation

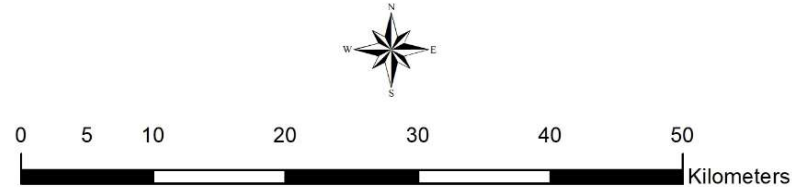
The selected area of investigation is large enough to cover the overall emergency planning zone (EPZ) radii (Eskom, 2022), which are described in **Subsection 5.6.7**.

The area covered in the characterisation includes the area situated between Tsitsikamma in the west-northwest and Summerstrand in the east-northeast, as illustrated in **Drawing 5.6.1**. This drawing illustrates the site region (defined by the 80 km radius around the site) and the site vicinity (defined by the 16 km radius around the site). The site characteristics are discussed in terms of the site region and site vicinity.



Legend

- Enveloping Footprint
- Magisterial Districts (MD)
- Local Municipalities (LM)
- Allotment Townships
- Roads
- Railways
- Rivers
- Major Dams



COORDINATE SYSTEM Map projection: Gauss Conformal Datum: Hartbeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO25 Units: International meter			SITE SAFETY REPORT FOR THYSPUNT		
PLANNING PARTNERS			Area of investigation: Site Region (80km) and Site Vicinity (16km)		
COMP	NJ	05/11/2024	SOURCE OF INFORMATION: Eskom & Planning Partners		
REV			RELEASED BY ESKOM	NOTE: For proper clarity this drawing must be printed at A3 scale.	REV BY AUTH BY DWG NO REVISION
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THIS DRAWING CONTAINS COPYRIGHT INFORMATION WHICH MAY NOT BE DISCLOSED WITHOUT WRITTEN CONSENT OF THE COPYRIGHT HOLDER					

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5.6.4.2 Topics

The following main topics are presented in this section of this TSSR:

- the coastal area and maritime zones within the national context;
- the generalised bathymetry as an indicator of the regional topography of the ocean, with reference to **Section 5.9**;
- existing and planned marine protected areas, special areas and closed areas or other declared marine conservation areas, where the harvesting of marine organisms is controlled or restricted;
- current and future coastal and maritime activities, such as fishing and harvesting of marine organisms for commercial, subsistence and recreational purposes that occur in the site region in terms of species, abundance, location and volumes caught;
- spawning periods and feeding cycles of major fish species, insofar as they are important to the commercial fisheries sectors;
- present and future recreational activities, such as tourism and eco-tourism and use of the coastal and maritime environment for recreational purposes such as sailing and bathing;
- current and future mariculture activities in the site region;
- potential effect of the nuclear installation(s) on the marine environment (thermal plume and desalination-brine plume) with reference to **Section 5.9** and **Section 5.12**, sea usage and activities, e.g. distribution of fish processing establishments, as well as recreational use of the coastline;
- potential impacts of the adjacent sea activities on the nuclear installation(s) throughout its lifetime;
- characteristics and activities that need to be taken into account in emergency planning;
- potential radiological impacts on the public and the environment (informed by **Chapter 7**) and hazards of a natural origin (informed by **Section 5.3**) that need to be considered in the design of the nuclear installation(s).

The scope of the evaluation is summarised in **Table 5.6.1** below.

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Table 5.6.1
Structure of this Site Safety Report

Topic	Site Region (80 km)	EPZ: Site Vicinity (16 km)
Coastal zone (Coastline, Islands)	<u>Subsection 5.6.5.1</u>	<u>Subsection 5.6.5.1</u>
Estuaries	<u>Subsection 5.6.5.1</u>	<u>Subsection 5.6.5.1</u>
Maritime zones	<u>Subsection 5.6.5.2</u>	
Marine Protected Areas	<u>Subsection 5.6.5.3</u>	<u>Subsection 5.6.7.1</u>
Commercial fisheries	<u>Subsection 5.6.6.1</u>	<u>Subsection 5.6.7.1</u>
Fish processing establishments	<u>Subsection 5.6.6.2</u>	<u>Subsection 5.6.7.1</u>
Commercial fishery products exported from the site region	<u>Subsection 5.6.6.3</u>	
Smallscale Fisheries in the Site Region	<u>Subsection 5.6.6.4</u>	
Mariculture in the Site Region	<u>Subsection 5.6.6.5</u>	
Impact of climate change	<u>Subsection 5.6.6.6</u>	
Recreation and tourism-related activities	<u>Subsection 5.6.6.7</u>	<u>Subsection 5.6.7.1</u>
Gas, oil and phosphate mining	<u>Subsection 5.6.6.8</u>	

5.6.4.3 Data Sources

The information presented in this section of this TSSR was obtained from official sources, national databases and regional and local studies. In cases where lack of data or limited data was identified, primary research and/or surveys were conducted. Information was obtained from the following sources:

- aerial photography and South African 1:50 000 scale topo-cadastral sheets;

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- South African naval charts, e.g. SAN MZ1 and SAN 57;
- regional coastal sensitivity maps;
- Department of Forestry Fisheries and the Environment (DFFE): Databases and reports relating to fishing stocks and rights allocations¹;
- DFFE: Fish Processing Establishments Rights Register;
- national or regional sectoral studies and reference books;
- publications and reports of scientific working groups;
- Eskom's nuclear sites investigation reports;
- primary data collection: surveys and field checks; municipal and institutional records, telephonic surveys; interviews with regional and local groups and institutions;
- evaluations being carried out in parallel or as part of this TSSR (coastal engineering, demography, land and water use, ecology and nearby transportation, industrial and military facilities).

Unless otherwise indicated in this section, the data which form the basis for defining the fishery sectors' characteristics are derived from the information provided by the DFFE, which controls and manages the use of marine resources in line with the Marine Living Resources Act, 1998 (Republic of South Africa, 1998).

The data sourcing cut-off date is 15 March 2024. However, where certain data sourced prior to the cut-off date were deemed too outdated, more up-to-date data were sourced after this date when it became available.

5.6.4.4 Presentation of Data

All data and information collected and assessed for the purpose of this section were:

- recorded and presented in tabular format (where appropriate) in terms of distance (km), while the direction is indicated by a compass sector (northeast, south-southeast, etc.) – Measurements were taken from a predefined co-ordinate defined in **Section 5.1** (Geography and Site Location) on the site that sets a constant from which all

¹ DFFE was previously called the Department of Agriculture, Forestry and Fisheries (DAFF) and the Department of Environment, Forestry and Fisheries (DEFF).

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distances relative to the site are presented in this TSSR. Direction was recorded clockwise starting with north and distance was recorded in ascending order.

- spatially presented in drawings that correspond with the respective areas of investigation.

Tabular data provided input to a Geographic Information System database for the site description.

All distances in the drawings, figures, and tables presented in this section are measured in a straight line from the site co-ordinates below, which is located at a central position on the site:

Redacted

The description of adjacent sea use is provided in terms of segments, sectors and annuli. **Figure 5.6.1** below illustrates these terms for ease of reading the document. The description is presented in terms of the site region (80 m) and site vicinity (16 km).

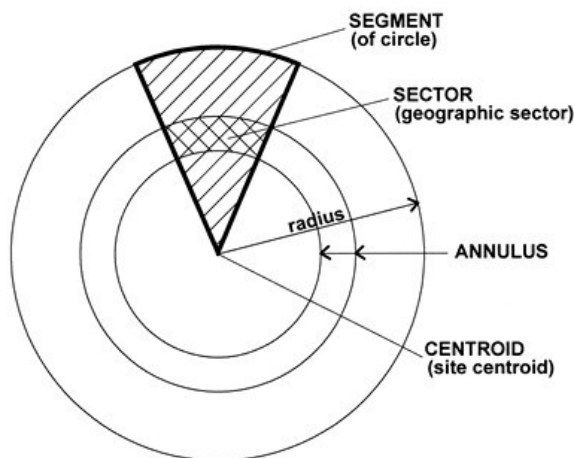


Figure 5.6.1
Illustration of Terms: Segment, Sector and Annulus

To align the analysis and presentation of data of this section with **Section 5.4** and **Section 5.5**, and its use in **Chapter 7** and **Chapter 8**, data presented in this section of this TSSR are presented in terms of the following radial grids:

- 5 km radial interval and 22.5° grid for the site region;

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- 5 km, 10 km and 16 km radii and/or a 22.5° grid for the site vicinity.

Adjacent Sea Use were further evaluated for the EPZs, i.e. Exclusion Zone (800 m), LPZ (3 km) and overall EPZ (40 km), as set out in the Technical Specification for **Section 5.6** (Eskom, 2022).

5.6.5 Description of the Coastal Zone and Maritime Area in the Site Region

The coastal zone, illustrated in **Figure 5.6.2** and compiled from the Coastal Sensitivity Atlas of South Africa (Jackson, et al., 1984), is described in terms of the characteristics of the coastline and the location of coastal towns and estuaries. For the purposes of the National Biodiversity Assessment 2018, the coast was for the first time mapped and described as a cross-realm zone, spanning the terrestrial and coastal marine realms, including all estuaries. This most current mapping for the coast is illustrated in **Figures 5.6.3** and **5.6.4**.

Together these three figures form the basis for characterising the coastal zone. A comparative evaluation of the two maps was conducted and the outcomes of the comparison are provided (Planning Partners, 2024a).

5.6.5.1 The Coastal Zone

The coastline within the site region stretches from the Tsitsikamma National Park in the west to Sardinia Bay in the east-northeast. The coastline is dominated by St. Francis Bay to the east of the site and includes the smaller bays of Slangbaai to the west and Thysbaai to the immediate east. The shoreline, as described in terms of the Coastal Sensitivity Atlas of South Africa, 1984 (Jackson, et al., 1984), consists of fine-grain sandy beaches, exposed rocky headlands, wavecut rocky platforms, coarse-grain sandy beaches and pebble/shingle beaches.

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Figure 5.6.2
Extract of the Coastal Sensitivity Map 1984: 80 km

Between Storms River Mouth at the western boundary of the site region and Cape St. Francis in the east, substrate types of coastal habitats are predominantly exposed rocky headlands, with an increase in the extent of mixed shores and sandy shores in an easterly direction between Oyster Bay and Cape St. Francis. Rocky cliffs are more common along the southern stretch of coastline. Beaches are limited in extent and, where they do occur, these are mostly pebble or shingle beaches. The St. Francis Bay coastline between the town of Cape St. Francis and the Van Stadens Estuary near Nelson Mandela Bay Municipality is predominantly sandy beaches, with some mixed shores around Jeffreys Bay (Planning Partners, 2024a).

The Coastal Sensitivity Map 2018, prepared under the auspices of SANBI, mapped and delineated the ecologically determined coast of South Africa. On the landward side, vegetation types are included in the ecologically determined coast if they are described as purely coastal or having coastal affinity and if 70 per cent of the extent is within 10 km of the shore. On the seaward side, all ecosystem types that are influenced by the land have been classified as coastal. These include marine ecosystem types up to the back of the inner shelf, the full extent of bays and all river-influenced ecosystem types. **Figure 5.6.3** represents an extract of South Africa's ecologically determined coastal zone and its key

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sub-components (Planning Partners, 2024a). The mapping of the coastal zone is represented in terms of a number of categories. To the west of the site and beyond 16 km, coastal ecosystem classifications include predominantly exposed rocky shore, very exposed rocky shore, mixed shore and a single occurrence of dissipative sandy shore.

To the west of the site, within the 16 km radius the shoreline consists of mixed shores, very exposed rocky shores, dissipative intermediate sandy shores, and exposed stromatolite shores. To the east of the site within the 16 km radius, the shoreline consists of intermediate sandy shores, dissipative sandy shores, mixed shores, very exposed stromatolite rocky shores, exposed rocky shores and very exposed rocky shores. Beyond the 16 km radius the shoreline is dominated by dissipative-intermediate sandy shores and exposed stromatolite rocky shores. Intermediate sandy shores, mixed shores, dissipative sandy shores and stromatolite mixed shores also occur (Planning Partners, 2024a) (see **Figure 5.6.3**).

The shore has been mapped in terms of sandy shores, exposed rocky shores, mixed shores, and associated estuaries, as illustrated in **Drawings 5.6.2** and **5.6.3** (Planning Partners, 2024a).

In the site region, areas previously mapped in 1984 as exposed rocky headlands and wavecut rocky platforms have now been mapped as exposed rocky shore and mixed shores in terms of the 2018 classification system. Although there is a reasonable alignment in terms of the distribution of these two classification systems, the detail in terms of specific designation of a specific portion of the coast has been refined.

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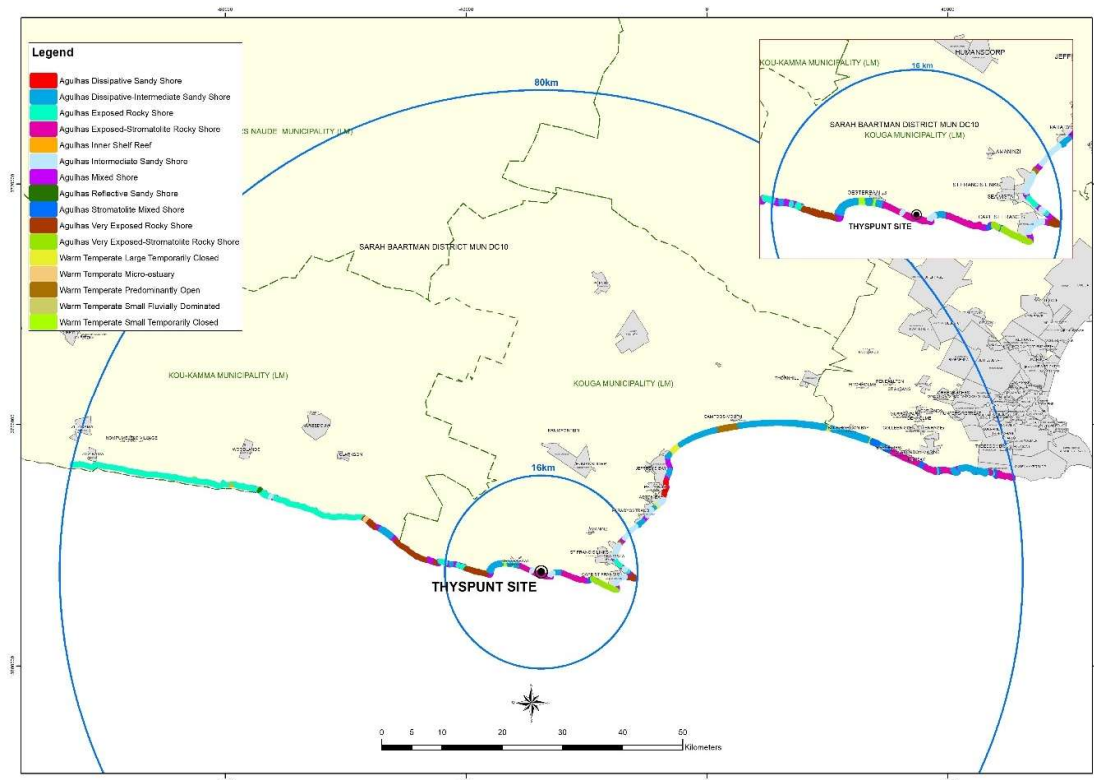


Figure 5.6.3
Extract of South Africa's Ecologically determined Coastal Zone (80 km)

Several rivers discharge into the sea along this coastline as illustrated in **Figure 5.6.4**. These are, listed from west to east, the Storms River (81.43 km west-northwest), Lloyds River (74.37 km west-northwest), Elands River (63.88 km west-northwest), Groot River (52.23 km west-northwest), Klasies River (32.42 km west-northwest), Tsitsikamma River (26.81 km north-northwest), Klipdrift River (7.07 km west-northwest), Slang River (5.29 km west-northwest), Krom River (14.89 km east-northeast), Seekoei River (22.97 km east-northeast), Kabeljous River (29.90 km northeast), Gamtoos River (39.57 km northeast), van Stadens River (56.31 km east-northeast) and the Maitland River (62.19 km east-northeast).

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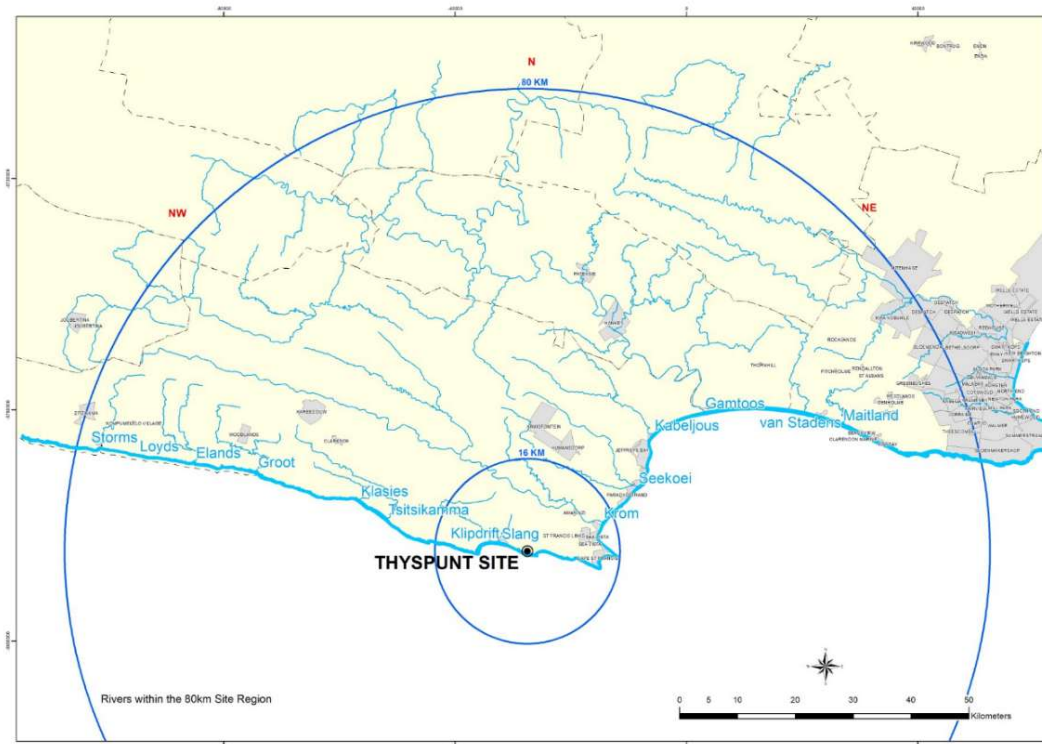


Figure 5.6.4
Rivers discharging into the Ocean: 80 km

The coastal zone to the west of the site consists of predominantly natural areas including the Tsitsikamma section of the Garden Route National Park, agriculture and small predominantly residential/coastal resort nodes, including Oubosstrand (51.60 km west-northwest), Eersterivierstrand (49.74 km west-northwest) and Oyster Bay (5.02 km west-northwest).

The coastal zone to the east of the site consists of predominantly natural areas up to the coastal resort town of Cape St. Francis (13.23 km east), from where the coastal zone is mostly built-up residential to the Kromme Estuary and includes the coastal resort town of St. Francis Bay (13.9 km east). North of the Kromme and Kabeljous estuaries the coastal zone accommodates built-up residential, with some natural areas, and includes the smaller coastal towns of Paradise Beach (20.71 km east-northeast), Aston Bay (23.54 km east-northeast), Marina Martinique (24.1 km east-northwest) and the larger Jeffreys Bay (26.43 km northwest).

The coastal zone from the Kabeljous Estuary to the Van Stadens Estuary is classified as a natural area, with some cultivated areas occurring in the

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catchment. Small residential/coastal resort nodes occur on the eastern side of the Gamtoos Estuary, i.e. the Gamtoos Mouth Resort (41.99 km northeast) and van Stadens River Resort (56.48 km east-northeast). Further west of van Stadens River Resort the coast is predominantly natural, interspaced with coastal resort towns of Blue Horizon Bay (59.34 km east-northeast), Beach View (65.38 km east-northeast), Sea View (67.96 km east-northeast), Kini Bay (69.61 km north northeast) and Sardinia Bay (81.13 km east-northeast) (Google Maps, 2023). These coastal resort towns or settlements offer a range of outdoor recreational activities, including water sports, hiking, bird and whale watching and fishing.

The coastline within the site region contains only one harbour, Port St. Francis (13.9 km east), as illustrated on **Figure 5.6.5**. Port St. Francis is a small fishing and recreational harbour that is privately owned. It is a working harbour and is home to a relatively large fleet of squid, hake and pilchard vessels. The harbour has charter boats, deep sea fishing boats and yachts. The establishment of Port St. Francis can directly be attributed to the growth of the chokka-squid industry. The port currently has 171 recreational moorings and 47 commercial moorings.

The Port of Port Elizabeth (94.1 km northeast) is the largest commercial harbour located near the site. In addition, the Port of Ngqura is located more than 100 km to the east-northeast. Both are located outside of the site region.

Small craft launching facilities are located at Oyster Bay slipway (8.38 km west-northwest), Krom Rivier launch site (11.31 km east-northeast), St. Francis Harbour Road launch site (12.33 km east), Paradise Beach launch site (19.83 km east-northeast), Dolphin Beach launch site (25.31 km northeast), Gamtoos riverbank launch site (40.50 km northeast) and Skuitbaai slipway (45.20 km west-northwest). Launching of recreational vessels also occurs directly off riverbanks and from the sandy beaches in the site vicinity, as well as from Marina Martinique (24.1 km east-northeast) (Planning Partners, 2024a).

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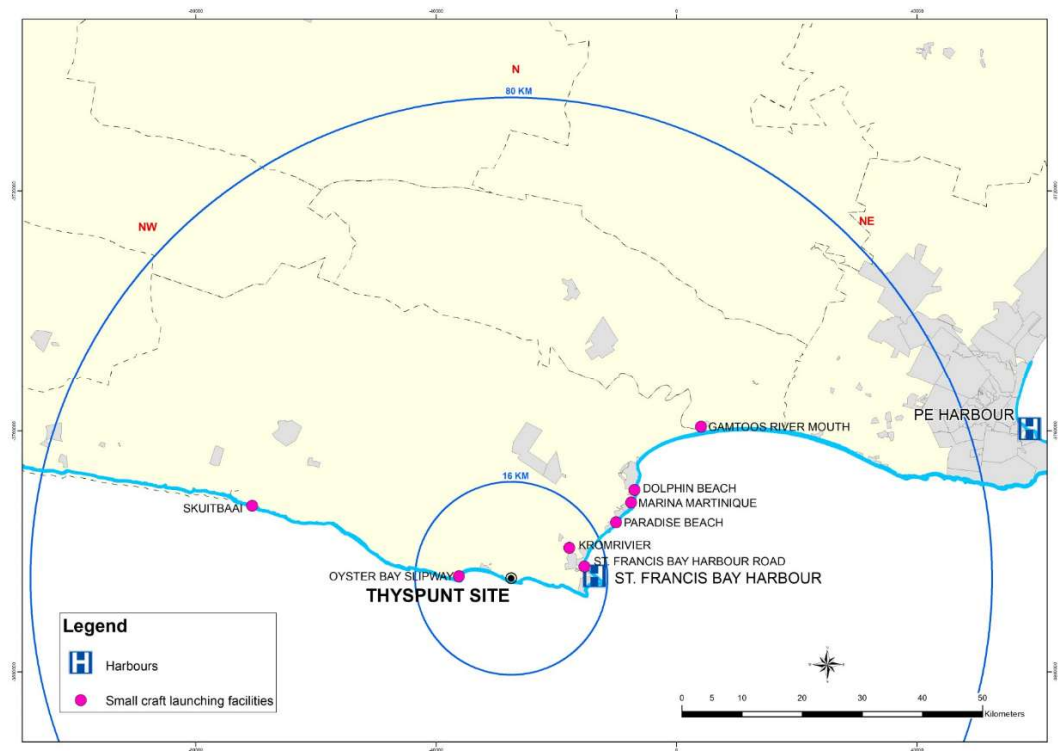
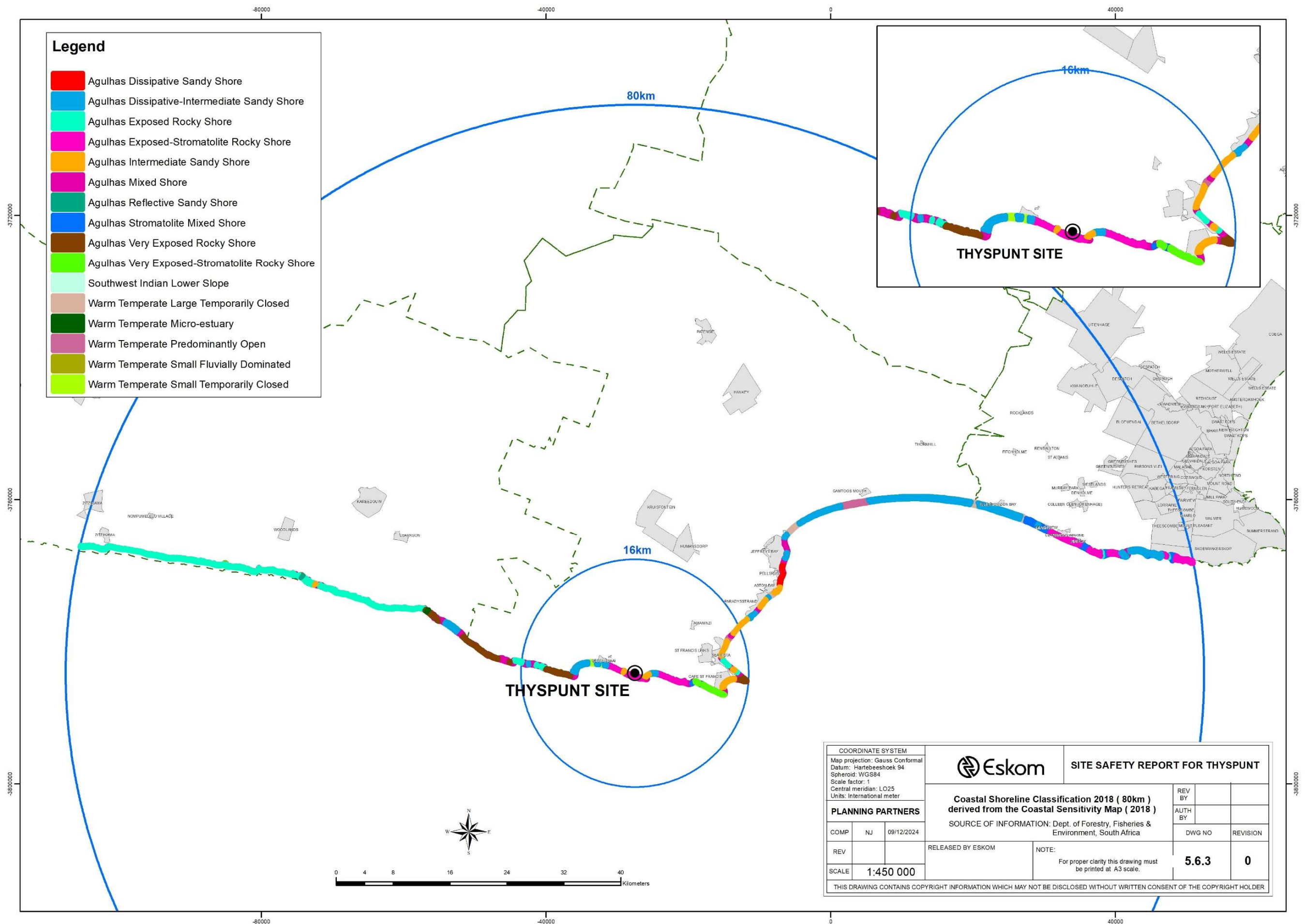


Figure 5.6.5
Harbours and Small Craft Launch Sites (80 km)





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a) The Coastline in the Site Vicinity

The coastline within the site vicinity, as described in the South African Coastal Sensitivity Atlas (Jackson, et al., 1984), is characterised by exposed rocky headlands and wavecut rocky platforms. Sandy beaches occur at Cape St. Francis, Thysbaai, Oyster Bay and Wreck Point as illustrated on **Drawing 5.6.3**, with those at Cape St. Francis and St. Francis Bay being the most accessible to the public. The area also includes significant headlands at Klippen Point to the west and Seal Point and Cape St. Francis to the east of the site.

The description of the site's coastline, prepared as part of the ecological assessment conducted for the Nuclear 1 project, indicates that the shoreline at Thyspunt consists mainly of very exposed intertidal habitat, including both rocky and sandy shores. Rocky shores are steep and strongly dissected and the exposed sandy beaches at the site consist of coarse sand.

The coastal resort towns of Cape St. Francis, St. Francis Bay and Oyster Bay are located within the site vicinity.

A unique feature within the site vicinity is the occurrence of stromatolites or 'layered rocks', which are primordial reefs formed by cyanobacteria as they layer calcium carbonate. These typically occur in intertidal pools, at the interface between freshwater seepage points and the marine penetration and date back in the fossil record at least 2.7 to 3.5 billion years. Modern stromatolites are rare on a global scale, because the ocean's chemistry has changed and is no longer rich in calcium carbonate, as well as competition between animals and algae and the bacteria that form the stromatolites. Less than 12 modern living stromatolites occur in the world, one of which is located in South Africa in the area between Cape St. Francis and Oyster Bay within the site vicinity, as illustrated in **Figure 5.6.6** (Planning Partners, 2024a).

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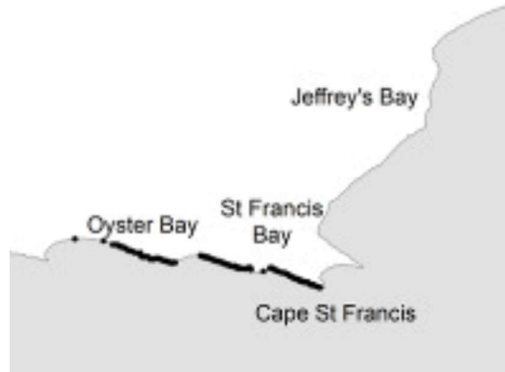


Figure 5.6.6
Distribution of Stromatolites between Cape St. Francis and Oyster Bay

b) Estuaries

The South African National Biodiversity Assessment (SA:NBA) 2018 (SANBI, 2019) Estuarine Realm identified 290 estuaries and 42 micro-estuaries nationally, which have been classified into 22 estuarine ecosystems and 3 micro-estuary types. The estuaries within the site region fall within the Warm Temperate coastal biogeographical region that stretches from the Mendwana Estuary in the Eastern Cape to the Ratel Estuary near Cape Agulhas

The SA:NBA 2018 introduced a revision of Whitfield's 1992 estuarine classification system, which consisted of five classes of estuaries (Refer to **Figure 5.6.7**) (Planning Partners, 2024a).

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1992 CLASSIFICATION	2018 CLASSIFICATION
Estuarine Lake	Estuarine Lake
Estuarine Bay	Estuarine Bay
-	Estuarine Lagoon
Permanently open	Predominantly Open
Temporarily open / closed	Large Temporarily Closed
	Small Temporarily Closed
River mouth	Large Fluvially Dominated
	Small Fluvially Dominated
-	Arid Predominantly Closed

Figure 5.6.7: Whitfield 1992 versus SANBA 2018 Classification

The revised South African classification introduced several new classes, with the classification system now consisting of nine classes and including three micro classes, as illustrated in **Figure 5.6.8**.

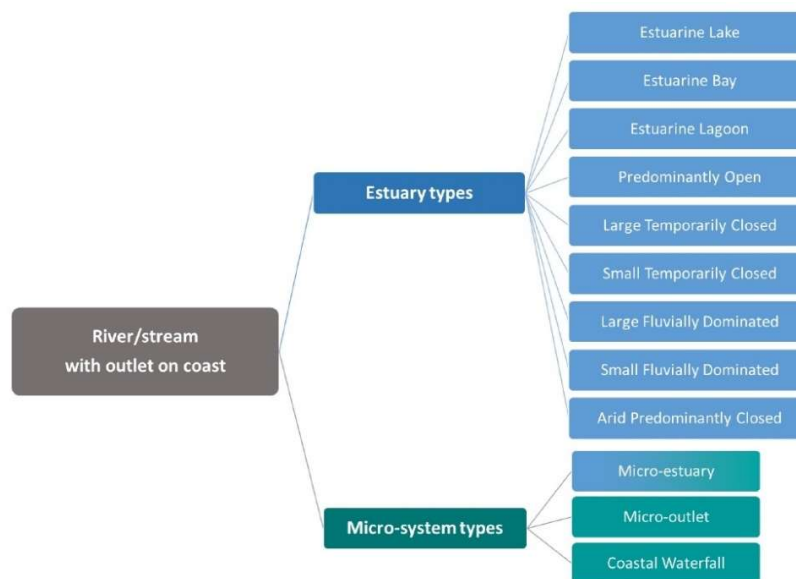


**Figure 5.6.8
SA:NBA 2018 Estuary Classification**

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A total of 12 estuaries and 7 micro-estuaries are located within the site region. Estuaries and micro-estuaries in the site region are listed below. Information is provided on the name, location, distance and direction from the site, as well as key fishing effort where available (illustrated in **Figure 5.6.9**).

- Storms Estuary – Small Fluvially Dominated: Redacted
Redacted (81.53 km west-northwest). Fishing effort in the estuary is low with an estimated 0.1 t caught in the estuary, as recorded by DEFF in 2011 and 2018. Bait collection does not occur.
- Langbos – Micro-system micro-outlet: Redacted
(74.39 km west-northwest);
- Sanddrif – Micro-system micro-outlet: Redacted
(71.25 km west-northwest);
- Elands Estuary – Small Fluvially Dominated: Redacted
Redacted (63.99 km west-northwest). Fishing effort in the estuary is low with an estimated 0.1 t caught in the estuary (Van Niekerk, et al., 2019) as recorded by DEFF in 2011 and 2018. Bait collection also occurs;
- Groot (Oos) Estuary – Small Fluvially Dominated: Redacted,
Redacted (52.38 km west-northwest). Fishing effort in the estuary is low with an estimated 0.1 t caught in the estuary. Bait collection also occurs;
- Eerste – Micro-system micro-outlet: Redacted
(46.98 km west-northwest);
- Klipdrif (Wes) – Micro-system micro-outlet: Redacted,
Redacted (43.82 km west-northwest);
- Boskloof – Micro-system micro-outlet: Redacted
(41.76 km west-northwest);
- Kaapsedrif – Micro-system micro-estuary: Redacted,
Redacted (32.47 km west-northwest);
- Tsitsikamma Estuary – Small, temporarily closed: Redacted,
Redacted (26.95 km west-northwest). Fishing effort in the estuary is low with an estimated 1.8 t caught in the estuary. Bait collection and fishing occurs. DEFF recorded fishing effort within the estuary as low in 2011 and 2018, with catch data were recorded in both years being 2 t;

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- Klipdrif (Oos) Estuary – Small, temporarily closed but is transformed and currently predominantly open: Redacted (6.66 km west-northwest). Fishing effort in the estuary is low with an estimated 0.1 t caught in the estuary. Both fishing and bait collection occur. DEFF recorded fishing effort within the estuary as low in 2011 and 2018. No catch data were recorded by DEFF in either 2011 or 2018;
- Slang Estuary – Large, temporarily closed: Redacted (5.19 km west-northwest). Fishing effort in the estuary is low with an estimated 0.1 t caught in the estuary. Both fishing and bait collection occur. DEFF recorded fishing effort within the estuary as low in 2011 and 2018. No catch data were recorded by DEFF in either 2011 or 2018;
- Kromme Estuary – Predominantly open: Redacted (15.00 km east-northeast). Fishing effort in the estuary is high with an estimated 22.1 t caught in the estuary. Both fishing and bait collection occur. DEFF recorded fishing effort within the estuary as high in 2011 and 2018, with catch data recorded as 22 t in 2011 and 2018;
- Seekoei Estuary – Large, temporarily closed: Redacted (23.10 km east-northeast). Fishing effort in the estuary is low with an estimated 0.1 t caught in the estuary. Bait collection occurs, but was not reported in the SA:NBA 2018. DEFF recorded fishing effort within the estuary as low in 2011 and 2018, with catch data amounted to 1 t in 2011 and 2018;
- Warm Temperate 1 – Micro-system micro-outlet: Redacted (25.05 km east-northeast);
- Kabeljous Estuary – Large, temporarily closed: Redacted (30.22 km northeast). Fishing effort in the estuary is low with an estimated 2.0 t caught in the estuary. DEFF recorded fishing effort within the estuary as low in 2011 and 2018, with catch data amounted to 2 t in 2011 and 2018. Bait collection also occurs. No catch data were recorded;
- Gamtoos Estuary – Predominantly open: Redacted (39.39 km northeast). Fishing effort in the estuary is high with an estimated 19.3 t caught in the estuary. DEFF recorded fishing effort within the estuary as high in 2011 and 2018, with catch data amounted to 19 t in 2011 and 2018. Bait collection also occurs, but no catch data were recorded;

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- Van Stadens Estuary – Large, temporarily closed: Redacted
Redacted (56.03 km east-northeast). Fishing effort in the estuary is low with an estimated 2.1 t caught in the estuary. DEFF recorded fishing effort within the estuary as low in 2011 and 2018, with catch data amounted to 2 t in 2011 and 2018. Bait collection also occurs, but no catch data were recorded;
- Maitland Estuary – Large, temporarily closed: Redacted
Redacted (62.31 km east-northeast). Fishing effort in the estuary is low with an estimated 0.1 t caught in the estuary. DEFF recorded fishing effort within the estuary as low in 2011 and 2018, with no catch data recorded in either 2011 or 2018. Bait collection also occurs, but no catch data were recorded.

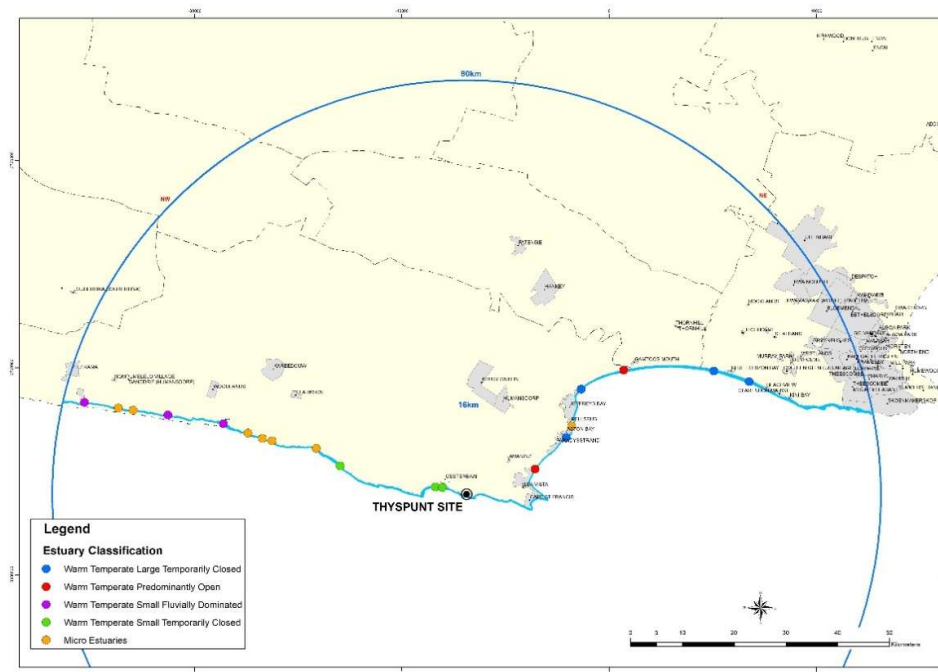


Figure 5.6.9
SA:NBA 2018 Estuary Classification

It is estimated that in 2011, approximately 1 167 t of fish were caught in the Warm Temperate region (Heuningnes to Mendwana). From 2011 to 2018, estuarine fishing effort remained stable within the site region.

In addition to their overall biodiversity value, estuaries in the Eastern Cape play an important role as fish nurseries, contributing significantly to biodiversity, estuarine fisheries and nearshore marine fisheries. The SA:NBA 2018 has ranked the importance of estuaries as fish nurseries

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within this region as follows: Elandsbos Estuary (low importance); Storms River Estuary (low importance); Elands Estuary (low importance); Groot (Oos) Estuary (low importance); Tsitsikamma Estuary (low importance); Klipdrif (Oos) Estuary (low importance); Slang Estuary (low importance); Kromme Estuary (high importance); Seekoei Estuary (medium importance); Kabeljous Estuary (medium importance); Gamtoos Estuary (high importance); Van Stadens Estuary (low importance); and the Maitland Estuary (low importance) (Planning Partners, 2024a).

5.6.5.2 Maritime Zones

The site region falls within the maritime zones defined in terms of the Maritime Zones Act, 1994 (Republic of South Africa, 1994). The Act defines baselines and the maritime zones to include the internal waters, the territorial waters, the contiguous zones, the exclusive economic zones and the continental shelf, as described below and illustrated in **Figure 5.6.10**.

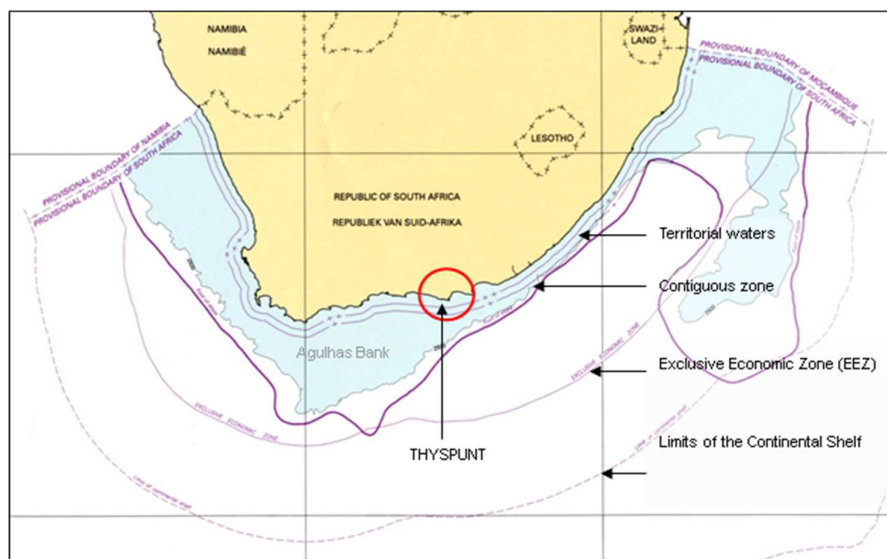


Figure 5.6.10
Baselines, Internal Waters and Territorial Waters

In principle, baselines are defined by the low water mark, unless they are defined in terms of straight lines that join the grouped coordinates mentioned in Schedule 2 of the Act, which are then the baselines of that relevant part of the coast and the outer limits shall be the outermost harbour works which form an integral part of the harbour system.

The internal waters consist of the water landward of the baselines and within the outer limits of harbours. Any law in force in the Republic,

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including the common law, shall also apply in its internal waters and the airspace above its internal waters. The right of innocent passage shall not exist in the internal waters, except if the internal waters concerned were territorial waters before the commencement of this Act on 11 November 1994. The "right of innocent passage" means the right of innocent passage referred to in Section 2 of the Marine Traffic Act, 1981 (Act No. 2 of 1981) (Republic of South Africa, 1981).

The territorial waters encompass the sea within a distance of 12 nmi (22.20 km) from the baselines. Any law in force in the Republic of South Africa (RSA), including the common law, shall also apply in its territorial waters and the airspace above its territorial waters. The right of innocent passage exists in the territorial waters.

The contiguous zone is the sea beyond the territorial waters within a distance of 24 nmi (44.45 km) from the baselines. Within the contiguous zone and the airspace above it, the RSA shall have the right to (i) exercise all the powers it considers necessary to prevent contravention of any fiscal law or any customs, emigration, immigration or sanitary law; and (ii) make such contravention punishable.

The exclusive economic zone (EEZ) encompasses the sea beyond the territorial waters within a distance of 200 nmi (370.4 km) from the baselines. The RSA has the same rights and powers in respect of all natural resources as it has with respect to its territorial waters.

The continental shelf is defined in Article 76 of the United Nations Convention on the Law of the Sea (UNCLOS) (UN General Assembly, 1982), adopted at Montego Bay on 10 December 1982. The continental shelf consists of a series of straight lines joining the co-ordinates mentioned in Schedule 3 of the Maritime Zones Act, 1994 (Republic of South Africa, 1994). South Africa has the rights to the exploration and exploitation of natural resources, as defined in paragraph 4 of Article 77 of the United Nations Convention on the Law of the Sea, 1982 (UN General Assembly, 1982). The continental shelf is also deemed to be unalienated State land (Planning Partners, 2024a). Refer to **Figure 5.6.10**.

The existing extent of South Africa's EEZ is about 1 553 000 km². South Africa has submitted requests for additional entitlements under international law to lengthen its seabed rights to specific parts of the continental shelf.

On 5 May 2009, the RSA submitted information on the limits of the Continental Shelf beyond 200 nmi from the baselines in respect of the mainland of the territory of country, to the Commission on the limits of the

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Continental Shelf, in accordance with Article 76, paragraph 8 of the UNCLOS (UN General Assembly, 1982). On conclusion of the consideration of the submission, the commission will make recommendations in accordance with Article 76 of the Convention (SANHO, 2023). It is predicted that the success of these claims will extend the continental shelf to 137 000 km² of seabed privileges to South Africa's inland EEZ and 1 108 000 km² to the EEZ nearby the Prince Edward Islands (Planning Partners, 2024a) (as illustrated in **Figure 5.6.11**).

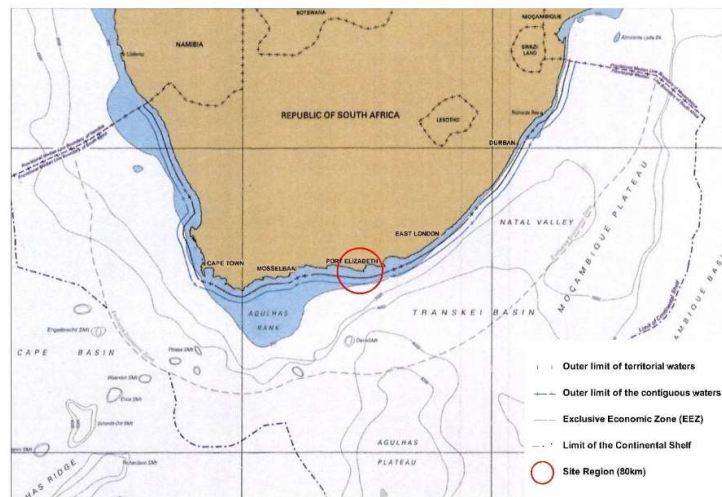


Figure 5.6.11
Contiguous Zone, Exclusive Economic Zone and Limit of the Continental Shelf

a) Rights Reserved

The RSA may in any area of the sea or the airspace above the sea, take such measures as are necessary against any vessel or aircraft in order to protect the coastline of the country or related interests, including fishing, pollution or any threat of pollution (i) resulting from a maritime casualty or an act or omission relating to such a casualty; and (ii) which may reasonably be expected to result in major harmful consequences. These consequences also include the potential consequences that may affect the safety of the nuclear installation(s) (Planning Partners, 2024a).

b) Generalised Bathymetry

The general description of the bathymetry of the sea in the site region presented in this section is based on the mapping done by the South African Navy Hydrographic Office. **Figure 5.6.12** illustrates the

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generalised bathymetry within the site region and the site vicinity. Detailed information on the inshore bathymetry is presented in **Section 5.9** (Oceanography). The data indicate that the ocean depth within the site region reaches 1 000 m below mean sea level to the south-southeast of the site. A large proportion of this area falls within the 100 m and 200 m isobaths. The 2 000 m isobath is located approximately 20 km further to the east, placing the coastline relatively close to the deep sea. The depth of the sea within the site vicinity reaches approximately 120 m. The sea within the 5 km radius is generally shallower than 50 m (Planning Partners, 2024a).

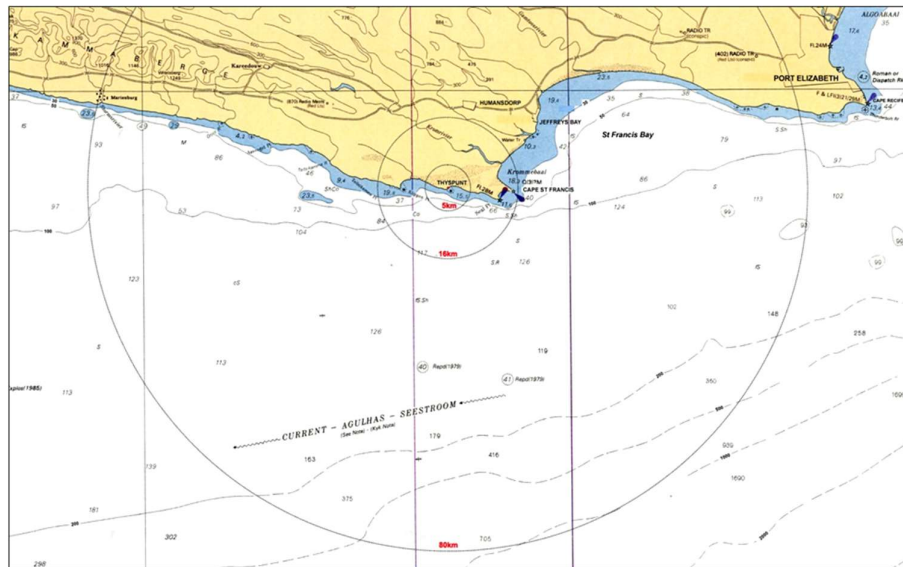


Figure 5.6.12
Generalised Bathymetry

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5.6.5.3 Protected Maritime Areas

Protected maritime areas located within the site region include Marine Protected Areas (MPAs), Special Areas and Closed Areas, declared in terms of South African legislation.

a) Marine Protected Areas within the Site Region

The United Nations Sustainable Development Goals, specifically Sustainable Development Goal 14: Conserve and sustainably use the oceans, seas and marine resources. They contribute to poverty alleviation, increase economic growth, support food and job security, maintain ecosystem resilience and are vital for coping with climate change.

Until 2014, most MPAs in South Africa were established by way of Section 43 of the Marine Living Resources Act, Act 18 of 1998 (MLRA) (Republic of South Africa, 1998). Prior to the MLRA, MPAs were declared in terms of the Sea Fisheries Act 1973 (Republic of South Africa, 1973) and 1988 (Republic of South Africa, 1988) and its various amendments. The declaration and management of MPAs are now provided for in terms of National Environment Management Act: Protected Areas Amendment Act, Act 21 of 2014 (NEM: PAA) (Republic of South Africa, 2014a), which came into effect on 2 June 2014. Note that all MPAs that were declared under the MLRA must be regarded as MPAs declared under NEM: PAA. The Act has subsequently been amended.

Section 44A(1) of the NEM: PAA sets out the general restrictions that apply within an MPA as follows: “no person may in a marine protected area —

- (a) fish or attempt to fish;
- (b) take or destroy any fauna or flora;
- (c) undertake any dredging or extraction of sand, rock, gravel or minerals unrelated to any activities referred to in Section 48(1);
- (d) discharge or deposit waste or any other polluting matter;
- (e) in any manner which results in an adverse effect on the marine environment, disturb, alter or destroy the natural environment or disturb or alter the water quality or abstract sea water;
- (f) carry on any activity which may have an adverse effect on the

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ecosystem of the area;

- (g) construct or erect any building or other structure on or over any land or water within such a marine protected area;
- (h) carry on marine aquaculture activities;
- (i) engage in bio-prospecting activities;
- (j) sink or scuttle any platform, vessel or other structure; or
- (k) undertake mineral exploration, and production of petroleum and other fossil fuels.”

Section 44A(2) of the NEM: PAA (Republic of South Africa, 2014a) makes provision for the Minister to prescribe (a) different zones to regulate different activities within a specific MPA; and (b) activities which require a permit. In terms of Section 44A(4), any zone declared in terms of Section 43 of the MLRA (Republic of South Africa, 1998), or created by regulation in terms of Section 77 of that Act which exists when the NEM: PPA 2014, takes effect, must be regarded as a zone prescribed in terms of Subsection (2).

The first MPA declared in South African waters was the Tsitsikamma MPA in 1964, on the South Coast. By 2011, 25 MPAs had been declared, covering 23 per cent of coastline’s length, but less than 0.6 per cent of the territorial seas and the EEZ of the country, including the Southern Ocean Territory.

In 2013, the Prince Edward Islands MPA was declared in the Southern Ocean, increasing overall protection of South Africa’s ocean space to approximately 12 per cent. However, shortcomings in the MPA network remained evident. Following extensive research, priority areas were identified to address gaps in protection.

These priority areas were the basis on which MPA expansion was taken forward in 2014 under Operation Phakisa as a strategic initiative to support sustainable ocean economic opportunities. In 2019 this led to the declaration of 20 new marine areas for protection in terms of the NEM: PAA and the National Protected Areas Expansion Strategy. These 20 areas included new MPAs and expansions to existing ones. The number of MPAs in the mainland’s territorial seas and EEZ was increased from 25 to 41 and the area under protection from 0.6 per cent to 5.4 per cent, with the addition of 51 477 km² of protected area estate. Overall, marine protection (mainland and Southern Ocean, including the Prince Edward Islands) is currently at 15.5 per cent.

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South Africa's new MPA network contributes to the fulfilment of South Africa's international agreements towards a target of 10 per cent marine protection by 2020. The 20 new MPAs represent ocean diversity as they include different ocean and current systems, depth zones and seabed types.

Major advances in protection include: the first protection of offshore ecosystems; protection of inshore ecosystem types that previously had no protection, like canyons, seamounts, abyss and plateaus; protection of threatened ecosystem types that had little or no protection; improved protection of fish spawning and nursery areas; and food provision for threatened species such as penguins and marine mammals.

The MPAs recorded in the site region in 2008 are illustrated in ***Figures 5.6.13*** and ***5.6.14***. These were the Tsitsikamma MPA (46.67 km to 108.68 km west-northwest) and Sardinia Bay (66.16 km to 82.06 km east-northeast), which are both coastal MPAs.

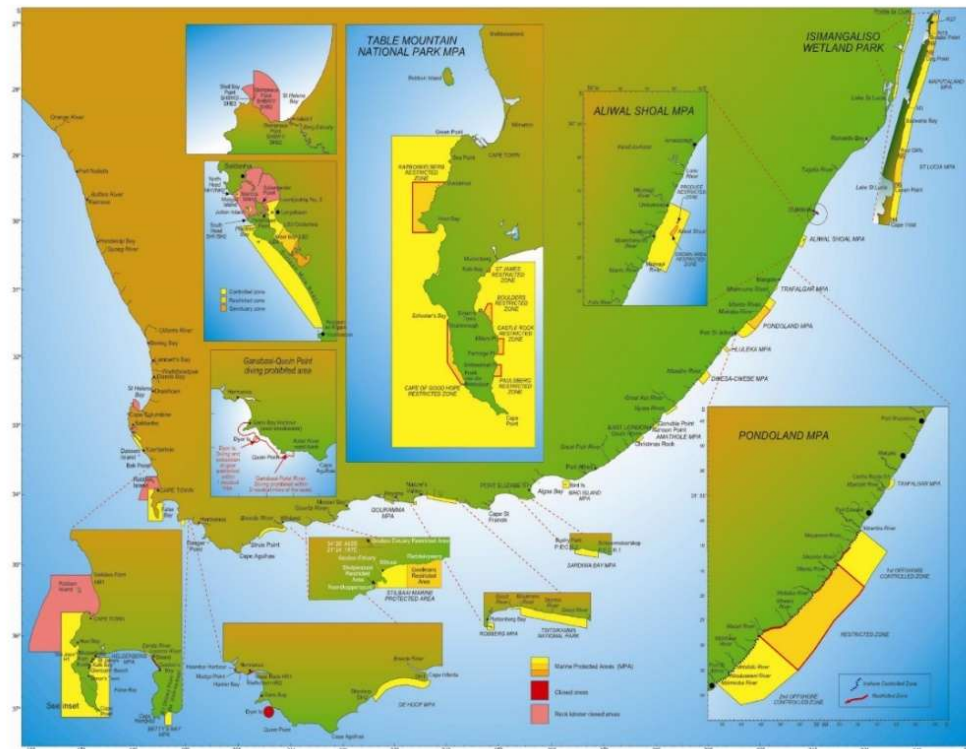


Figure 5.6.13
National MPAs recorded in 2008

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The only new MPA approved in 2019 that falls within the site region is the Port Elizabeth Corals MPA (an offshore MPA located 70 km south-southeast) (Republic of South Africa, 2019).

A new MPA declared in 2019 that falls outside but in proximity to the site region is the Addo Elephant National Park MPA (100 km east-northeast) in Algoa Bay to the east of Gqeberha, illustrated in **Figure 5.6.14**.

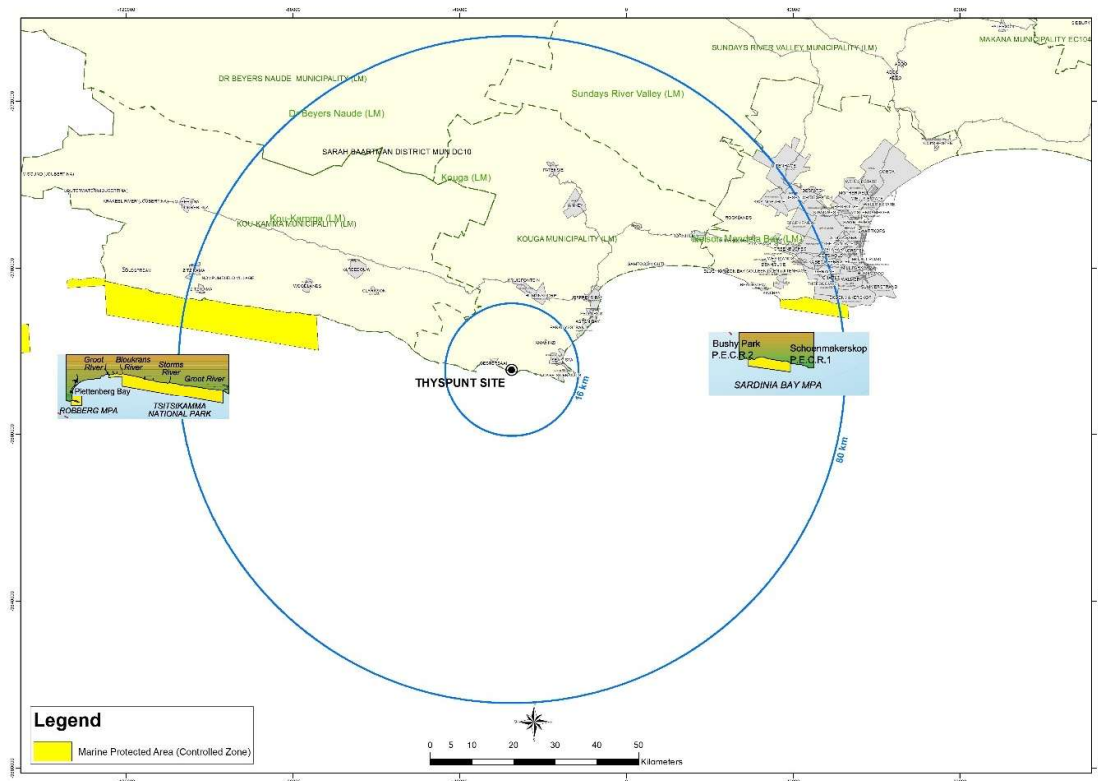


Figure 5.6.14
MPAs recorded for the Site Region in 2008

MPAs falling within the site region (wholly or partially), as well as MPAs falling in close proximity to the site region, are described in more detail below:

- **Tsitsikamma MPA** – Established in 1964, the Tsitsikamma MPA was declared on 29 December 2000. The Tsitsikamma MPA in the Eastern Cape Province is the area bounded by (i) a line beginning from the high-water mark at Die Punt, Natures Valley (Redacted), and (ii) running eastwards along the high-water mark to the right bank of the Grootrivier (East) (Redacted),

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and then (iii) running due south to a point 3 nmi offshore (Redacted), and then (iv) along a straight line running parallel to the shore to a point 3 nmi from the high-water mark (Redacted); (Redacted) measured along a line running due south from the right bank of the mouth of the Bloukrans River, and then (v) due north to a point 0.5 nmi from the high-water mark (Redacted E), and then (vi) along a straight line to a point (Redacted) due south of Die Punt, Nature's Valley, and then (vii) due north to the high-water mark at the starting point.

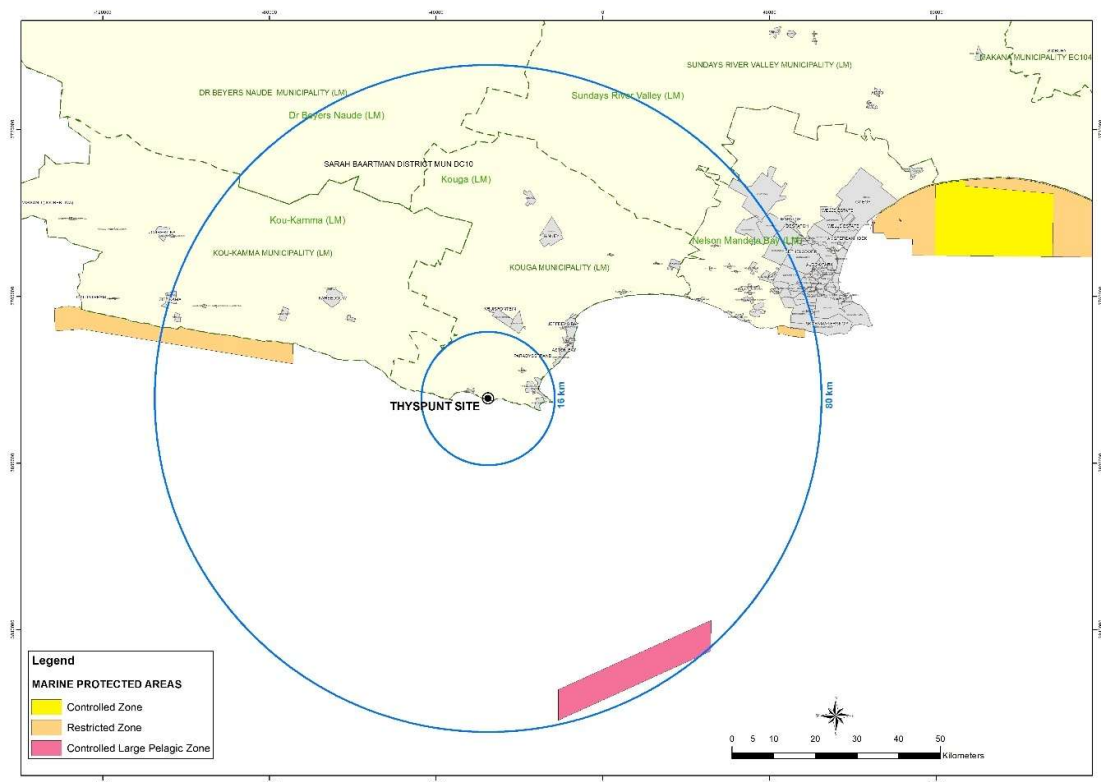


Figure 5.6.15
MPAs recorded for the Site Region in 2023

No fishing is allowed between Groot River at Oubos to Groot River at Nature's Valley, extending 3 nmi seawards from the high-water mark. No jet skis may be used anywhere in the MPA. SANParks is the management agency of the MPA (SANHO, 2023).

- Sardinia Bay MPA – Declared on 29 December 2000, the Sardinia Bay MPA in the Eastern Cape Province is the area between the high-water mark and a line 1 nmi seawards of the high-water mark, and

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between, as the eastern boundary, a line (180° true bearing) drawn from the beacon marked PECR1 situated near Schoenmakerskop and, as the western boundary, a line (180° true bearing) drawn from the beacon marked PECR2, situated near Bushy Park.

The Sardinia Bay Restricted Zone is defined by the following co-ordinates:

Redacted following the coast line to Redacted 'E and Redacted

No fishing is allowed between beacon PECR1 near Schoenmakerskop and beacon PECR2 near Bushy Park, extending 1 nmi seawards from the high-water mark. Jet skis are allowed in the MPA. The Nelson Mandela Municipality is the management agency.

- Port Elizabeth Corals MPA – This MPA was declared in 2019 (SANHO, 2023). The MPA is located within an ecologically and biologically significant area, situated offshore of Cape St. Francis, and protects a unique seabed feature. The MPA protects a deep-sea ridge and coral ecosystem, providing benefits to fisheries. Kingklip, which are a valuable fisheries resource in the site region, gather to spawn in this ridge. Deep-water coral species found in the MPA include reef-building species that make tall mounds on the slope, like giant mushroom corals (a red soft coral with enormous coral polyps) and the delicate and feathery primnoid soft corals. The MPA is situated next to a seasonal fisheries management area that protects the overexploited kingklip during their spawning time.

Port Elizabeth Corals MPA is defined by the following co-ordinates:

Redacted. The MPA is illustrated below in Figure 5.6.16 (Planning Partners, 2024a).

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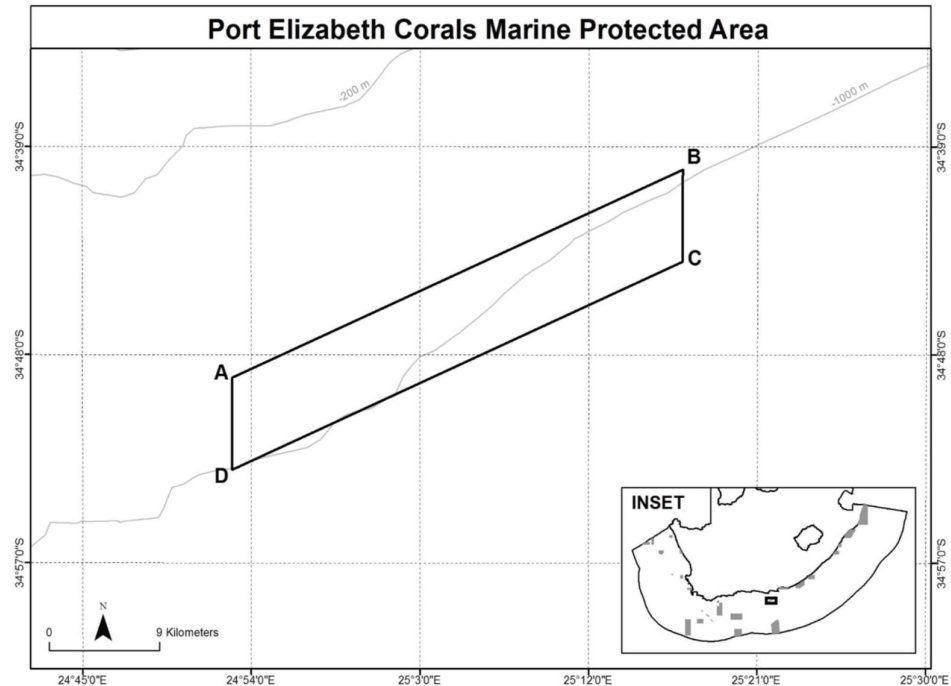


Figure 5.6.16
Port Elizabeth Corals MPA

- Addo Elephant National Park MPA – The MPA was declared in 2019. Algoa Bay has the highest percentage of endemic (not found outside of South Africa) marine invertebrates and seaweeds along the entire South African coastline, making it an excellent place to conserve biodiversity. The offshore expansion increases island protection, provides protection to the bay that is under increasing pressure, and helps to protect an interconnected system of estuary, shore, bay, reefs and islands that is important for the recovery of resources like abalone and kob. The MPA affords protection to the largest breeding colonies of Endangered African Penguins and Cape Gannets on Earth. St. Croix Island and Bird Island holds approximately 9 000 breeding pairs of African Penguins and Bird Island has approximately 60 000 pairs of Cape Gannets.

The MPA consists of the following:

- St. Croix Island offshore restricted zone: The boundary c-ordinates are

Redacted

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Redacted

- Sundays River controlled zone: The boundary co-ordinates are **Redacted** and **Redacted** following the coastline to **Redacted** and **Redacted**
- Sundays River restricted zone: The boundary co-ordinates are **Redacted** following the coastline to **Redacted** and **Redacted**
- Sundays River in-shore controlled zone: **Redacted** **Redacted** and **Redacted** following the coastline to **Redacted** and **Redacted**
- Sundays River in-shore restricted zone: The boundary co-ordinates are **Redacted** and **Redacted** **Redacted** following the coastline to **Redacted** and **Redacted**
- Sundays River offshore controlled zone: The boundary co-ordinates are **Redacted**,

Redacted

- Bird Island offshore restricted zone: The boundary co-ordinates are **Redacted**
Redacted
- Cape Padrone in-shore controlled Zone: The boundary co-ordinates are **Redacted** **Redacted** following the coastline to **Redacted** **Redacted**
- Cannon Rocks in-shore controlled zone: The boundary co-ordinates are **Redacted** **Redacted** following the coastline to **Redacted** **Redacted**

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- Cannon Rocks offshore controlled zone. The boundary co-ordinates are Redacted
Redacted
- No fishing is allowed around Bird Island in Algoa Bay within a rectangle defined by the latitudes Redacted and the longitudes Redacted. No jet skis may be used anywhere in the MPA. SANParks is the management agency together with DFFE Port Elizabeth office (Planning Partners, 2024a).

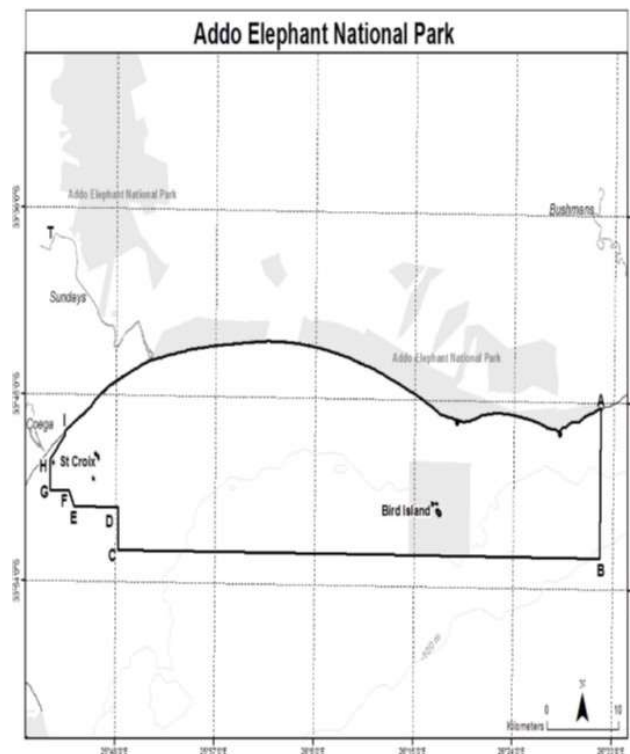


Figure 5.6.17
Addo Elephant National Park MPA

b) Special Sea Areas

The International Convention for the Prevention of Pollution of the Sea by Oil, 1973 as modified in 1978, is recognised as being the first multilateral instrument to be concluded with the prime objective of protecting the environment, by preserving the seas and coastal environment from pollution (International Maritime Organisation, 1973 &

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of special mandatory methods for the prevention of pollution of the sea from ships by oil.

The South African domestic legislation to implement this Annex 1 on Marine Pollution (Prevention of Pollution from Ships) Act 2 of 1986, is administered by the South African Maritime Safety Authority (SAMSA). The regulations govern the discharges of oil, except for clean or segregated ballast, from all ships. They require *inter alia* that all ships to be fitted with pollution prevention equipment to comply with the stringent discharge regulations (Planning Partners, 2024a).

- **Discharge of Oil or Oily Mixtures**

Discharge into the sea of oil or oily mixtures, as defined in an appendix to the Convention, is prohibited by the regulations of Annex 1, except when all the following conditions are satisfied:

- (a) From the machinery space bilges of all ships, except from those of tankers where the discharge is mixed with oil cargo residue:
 - i. The ship is not within a Special Area;
 - ii. The ship is more than 12 miles from the nearest land;
 - iii. The ship is *en-route*;
 - iv. The oil content of the effluent is less than 15 parts per million (ppm);
 - v. The ship has in operation an oil discharge monitoring and control system, oily water separating equipment, oil filtering system or other installation required by this Annex.
- (b) These restrictions do not apply to discharges of oily mixture which without dilution have an oil content not exceeding 15 ppm.
- (c) From the cargo area of an oil tanker (discharges from cargo tanks, including cargo pump rooms; and from machinery space bilges mixed with cargo oil residue):
 - i. The tanker is not within a Special Area;
 - ii. The tanker is more than 50 miles from the nearest land;
 - iii. The tanker is proceeding *en-route*;
 - iv. The instantaneous rate of discharge of oil content does not

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exceed 30 litres per mile;

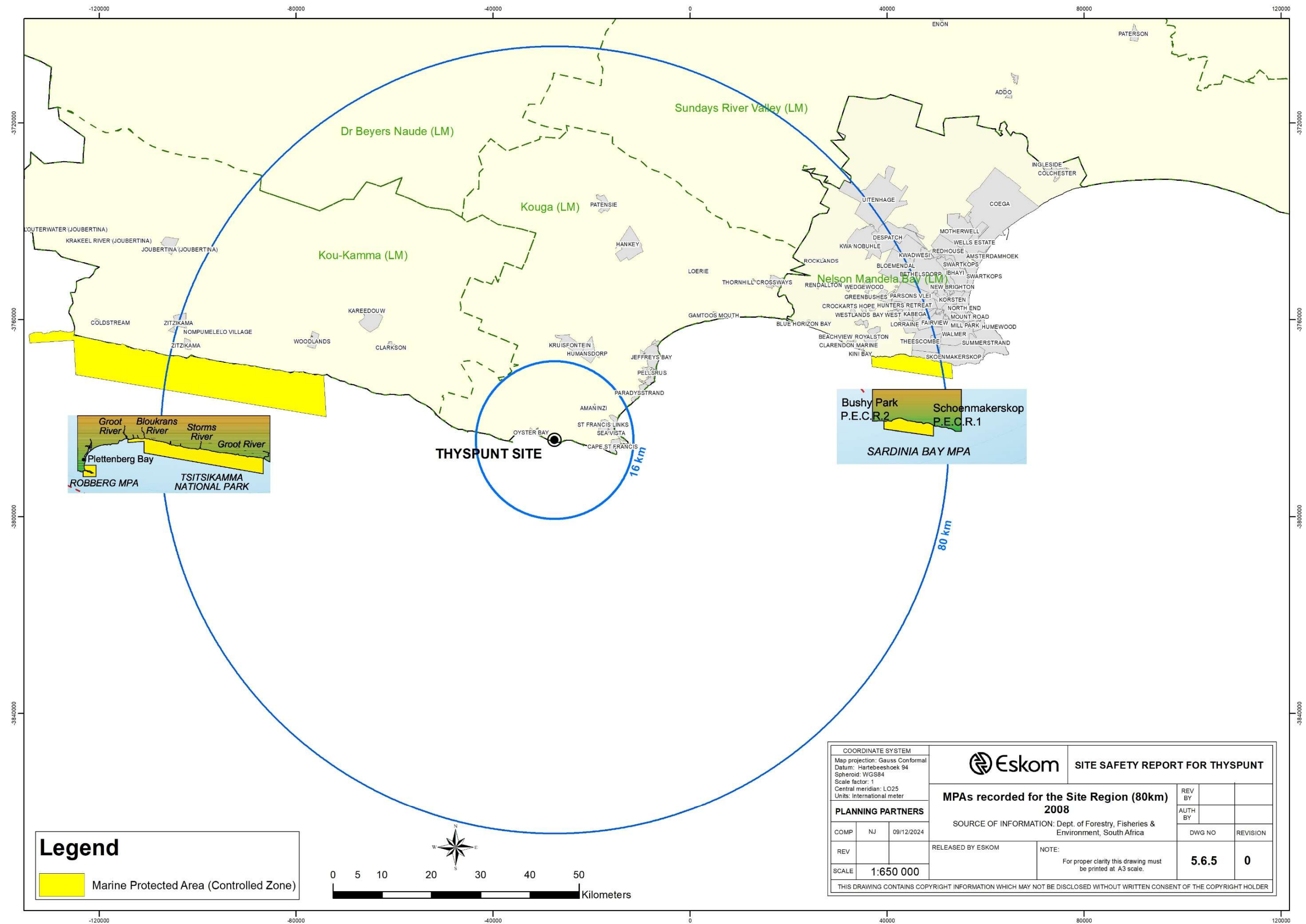
- v. The total quantity of oil discharged into the sea does not exceed for existing tankers 1/15 000 of the total quantity of the particular cargo of which the residue formed a part, and for new tankers (as defined in the new Annex) 1/30 000 of the total quantity of the particular cargo of which the residue formed a part;
- vi. The tanker has in operation, except where provided for in the Annex, an oil discharge monitoring and control system and a slop tank arrangement.

- **Shipboard Oil Pollution Emergency Plans (SOPEP)**

Regulation 26 of Annex 1 to MARPOL 73/78 requires every oil tanker of 150 Gt and above and every other vessel of 400 Gt and above, to carry on board a SOPEP approved by the vessel's flag administration. Regulation 26 came into force on 4 April 1995 for all existing vessels. The International Maritime Organisation (IMO) has produced guidelines, as IMO Resolution MEPC 54(32), for the development of SOPEPs. This regulation also applies to offshore installations engaged in gas and oil production, seaports and oil terminals (Planning Partners, 2024a).

c) Closed Areas

There are no Closed Areas within the site region (Planning Partners, 2024a).



COORDINATE SYSTEM

Map projection: Gauss Conformal
Datum: Hartbeeshoek 94
Spheroid: WGS84
Scale factor: 1
Central meridian: L025
Units: International meter

COMP

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MPAs recorded for the Site Region (80km) 2008

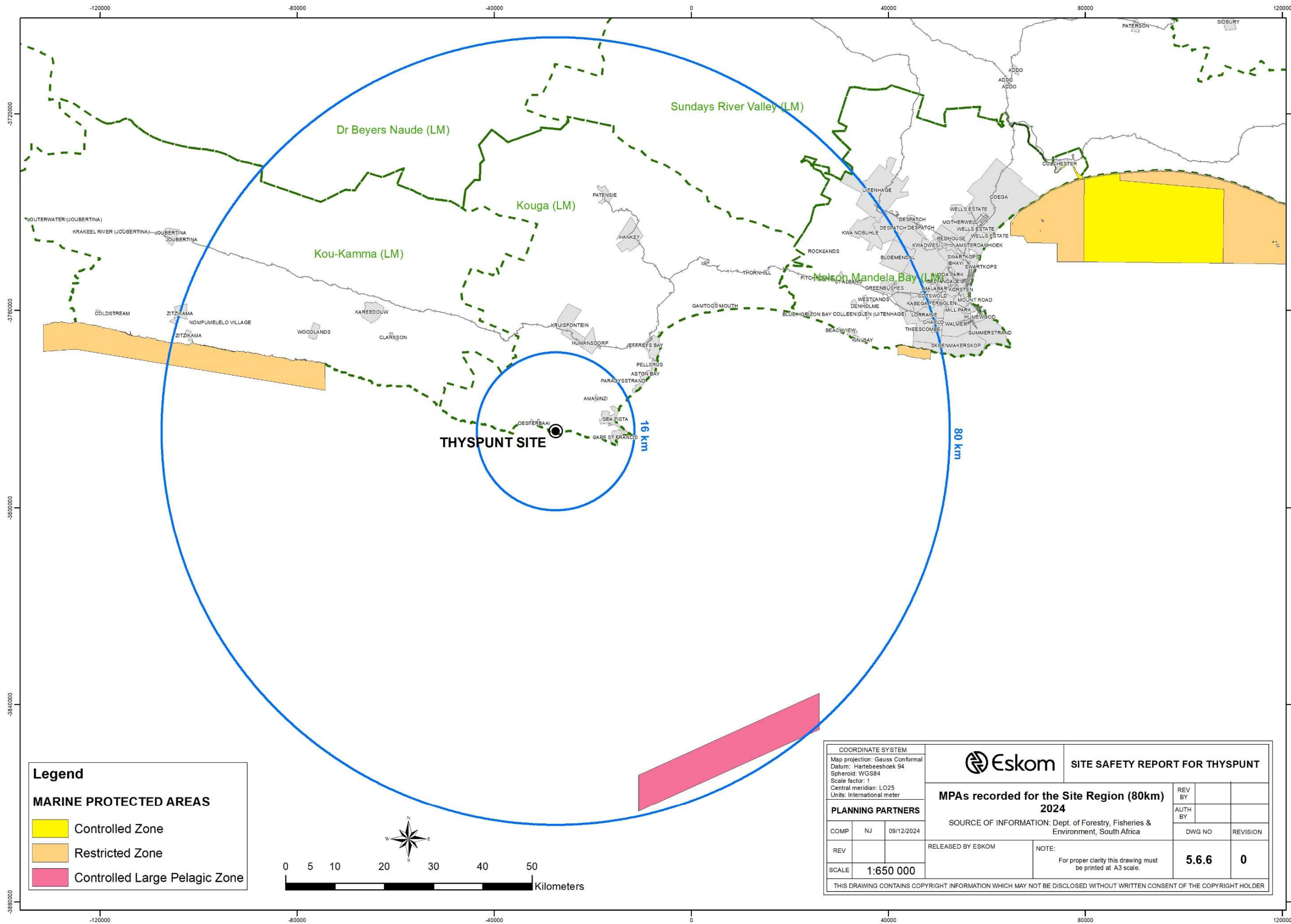
SOURCE OF INFORMATION: Dept. of Forestry, Fisheries & Environment, South Africa

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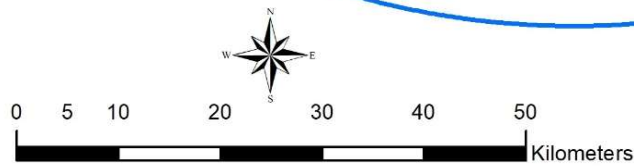
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Legend

MARINE PROTECTED AREAS

- Controlled Zone
- Restricted Zone
- Controlled Large Pelagic Zone



COORDINATE SYSTEM Map projection: Gauss Conformal Datum: Hartbeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO25 Units: International meter			SITE SAFETY REPORT FOR THYSPUNT	
PLANNING PARTNERS			MPAs recorded for the Site Region (80km) 2024	
COMP	NJ	09/12/2024	SOURCE OF INFORMATION: Dept. of Forestry, Fisheries & Environment, South Africa	
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5.6.6 Description of Sea Use Activities in the Site Region

Activities related to sea use in the site region were considered for the purposes of this TSSR. The results from the investigations are presented below in terms of the site region and site vicinity. This section focuses on the use of the marine and coastal environment for commercial, individual and recreational purposes. The main activities described include:

- The fishery sector and associated activities;
- collection of free foods;
- recreational use and tourism;
- fish processing and distribution;
- gas, oil and phosphate mining.

For the purpose of presenting adjacent sea use activities, activities are grouped as are set out in **Table 5.6.2**.

Table 5.6.2
Activities Related to Sea Use in the Site Region

Activity	Main Item
Fishery sectors and associate activities	Local commercial fishing (<u>Subsection 5.6.6.1</u>)
Processing and distribution facilities	Fish processing establishments (<u>Subsection 5.6.6.2</u>) Commercial species exported from the site region (<u>Subsections 5.6.6.1</u> and <u>5.6.6.3</u>)
Recreational use and tourism	Recreation and tourism related activities (<u>Subsection 5.6.6.7</u>)
Gas, oil and phosphate mining	Gas, oil and phosphate mining (<u>Subsection 5.6.6.8</u>)

5.6.6.1 The Commercial Fishery Sectors and Associated Activities

a) Legislative Framework

i. Marine Living Resources Act

The South African Commercial Fisheries Sector is regulated in terms of the Marine Living Resources Act, Act 18 of 1998 (MLRA) (Republic of

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South Africa, 1998). The purpose of the Act is to provide for the conservation of the marine ecosystem, the long-term sustainable utilisation of marine living resources and the orderly access to exploitation, utilisation and protection of certain marine living resources. The Act provides for the exercise of control over marine living resources in a fair and equitable manner to the benefit of all the citizens of South Africa and to provide for matters connected therewith. In terms of the Act, commercial fishing means fishing for any of the species which have been determined by the Minister in terms of Section 14 of the Act to be subject to the allowable commercial catch or total applied effort, or parts of both (Planning Partners, 2024b).

The Act defines fish to mean the marine living resources of the sea and the seashore, including any aquatic plant or animal, whether piscine or not, and any mollusc, crustacean, coral, sponge, holothurian or other echinoderm, reptile and marine mammal, and includes their eggs, larvae and all juvenile stages, but does not include sea birds and seals.

The Act recognises four types of fishing that may take place in the EEZ and the high seas:

- local fishing to include recreational and small scale fishing;
- commercial fishing;
- foreign fishing;
- high seas fishing.

It must be noted that the amended MRLA (Act 5 of 2014) (Republic of South Africa, 2014b) no longer refers to subsistence fishing, as “subsistence fisher” was deleted by section 1(e) of the amended Act, with the simultaneous insertion of the “small-scale fisheries sector” in section 1(a).

With the enactment of the MLRA in 1998, an ecosystem-based fisheries management approach was adopted in South Africa. Consequently, ecosystem-based measures were incorporated into the permit conditions of most commercial fishery sectors in terms of which fishing rights allocations are made in terms of total allowable catch (TAC), total applied effort (TAE), upper precautionary catch limit (UPCL) or a combination thereof.

In terms of the Section 27(1) of the MLRA, the Minister may by notice in the Gazette declare a harbour or a defined portion of a harbour or a defined area of the sea and the seashore to be a fishing harbour. Where the Minister desires to declare a commercial harbour or a portion of such

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harbour to be a fishing harbour, the prior approval of the Minister of Transport is required. There are no declared fishing harbours in the Eastern Cape and therefore within the site region. However, fish are landed at the following harbours within or close to the site region: Port St. Francis and Gqeberha (Planning Partners, 2024b).

Note that small craft harbours and slipways in the site region are described in detail in **Section 5.7** (Nearby Transportation, Industrial and Military Facilities). They will be referenced in this report only where relevant to a specific fishery under discussion.

ii. The Commercial Fishery Rights Allocation

Fishery rights are allocated under the MLRA, which constitutes permission to harvest a marine living resource for a specified period. Fishing rights are allocated to a specified person or entity and the transfer thereof may require the specific permission of the Minister. The policy applies to:

- The South African commercial marine fishery, which is currently composed of 22 fishing sectors: abalone, demersal shark longline, hake deep sea trawl, hake handline, hake inshore trawl, hake longline, horse mackerel, KwaZulu-Natal beach seine, KwaZulu-Natal crustacean trawl, large pelagic longline, net fishing (gillnets and beach seine), oysters, Patagonian toothfish, seaweed, small pelagic (sardine and anchovy), South Coast rock lobster, squid, traditional line fish, tuna pole and line, West Coast rock lobster (nearshore), West Coast rock lobster (offshore), and white mussels, unless the sector becomes managed under a fishing sector other than commercial fishing sector;
- to any new fisheries that may be established and commercialised.

Should any of the fishing sectors be allocated or moved to the Small-Scale fishing sector, then the Policy for the Small-Scale Fisheries Sector in South Africa published under Government Gazette No. 35455 on 20 June 2012 (DAFF, 2012) and Regulations relating to Small-Scale Fishing published under Government Gazette No. 39790 on 08 March 2016 (DAFF, 2016) shall apply.

In terms of the General Policy (DFFE, 2021), fishing rights are allocated in all sectors for a period not exceeding 15 years. Section 13 of the MLRA prescribes that “No person shall exercise any right granted in terms of Section 18 or perform any other activity in terms of the MLRA unless a permit has been issued by the Minister to such person to exercise that right or perform that activity”. Permits to exercise commercial fishing rights are issued to rights holders in terms of the provisions of Section 13

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of the MLRA and are issued for a specified period not exceeding a year.

The policy must be read in conjunction with fishery-specific policies that have been adopted for each fishery sector. At present, only South African citizens and South African controlled and owned entities are authorised to fish commercially in South Africa's EEZ.

The commercial fisheries that occur within the marine and coastal environment of the site region can be grouped into the following three categories:

- pelagic fisheries (near surface) that include pilchards, anchovy, sardines, tuna and swordfish;
- demersal fisheries (mid to deep water) that include hake and horse mackerel;
- inshore fisheries that include South Coast rock lobster, squid, abalone, line fish, white mussel, net fishing and seaweed harvesting.

For the purpose of site characterisation, the fisheries that occur in and around the site region or off the coast of the site region will be presented as follows:

- Offshore and highly capital-intensive fisheries:
 - o hake deep-sea trawl;
 - o hake inshore trawl;
 - o kingklip;
 - o small pelagic (purse seine: pilchards and anchovies);
 - o horse mackerel (mid-water trawl);
 - o large pelagic (longline) (tunas, swordfish and sharks);
 - o Patagonian toothfish (longline);
 - o South Coast rock lobster (trap).
- Inshore and capital intensive-fisheries:
 - o demersal shark (longline);
 - o tuna pole (pole and line);

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- o hake longline;
- o Agulhas sole (inshore trawl);
- o squid.
- Nearshore/small-scale commercial:
 - o seaweeds (*Gelidium*);
 - o hake handline;
 - o oysters;
 - o abalone;
 - o traditional line fishery (Planning Partners, 2024b).

b) Offshore Fisheries

i. Hake Deep-sea Trawl

Overview

The South African hake resource consists of two overlapping species, the shallow-water Cape hake *Merluccius capensis* and the deep-water hake *Merluccius paradoxus*. *Merluccius capensis* is found from southern Angola to northern KwaZulu–Natal on the east coast of South Africa. *Merluccius paradoxus* is distributed from northern Namibia to southern Mozambique.

As the common names imply, the two species differ in terms of distribution by depth. Off South Africa, the shallow water species have been recorded at depths of between 30 and 500 m, with most of the population between 100 and 300 m. Deep-water hake are found between 110 and 1 000 m, with most of the population located between 200 and 800 m. Their distribution within the EEZ is illustrated in **Figures 5.6.19** and **5.6.20**.

The distributions of both species are virtually continuous around the South African coast, and they are currently treated as single stocks of each species within South African waters. Recent genetic analyses have suggested that there is one stock of shallow-water hake in South African waters, another stock in central/northern Namibia, and a third stock that extends from southern Namibia into the northern areas of the South African West Coast (although the extent of the southward extension is currently unknown). These analyses have also suggested that *Merluccius paradoxus* is probably a single stock that extends into

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Namibia.

The western Agulhas Bank, the area between the Agulhas Bank and Elands Bay (outside of the site region), has been identified as the main spawning ground for Cape hakes and spawning occurs at depths below 100 m. The larvae would be transported to the northern nursery area.

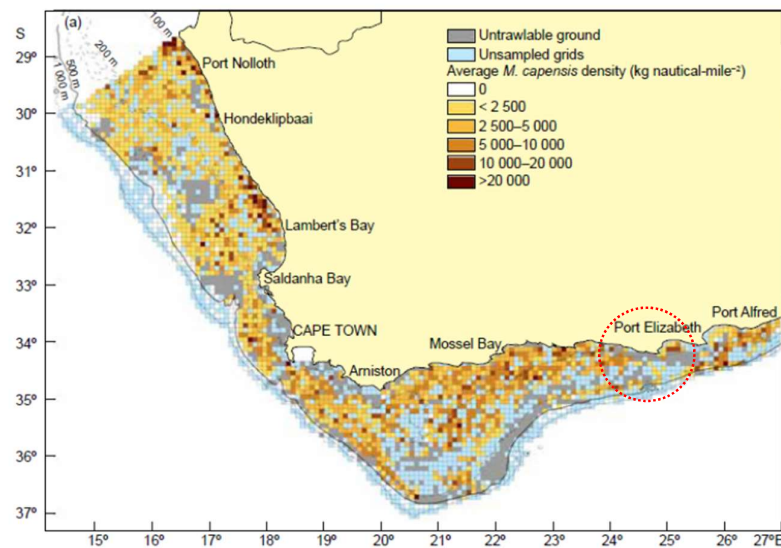


Figure 5.6.19
Distribution of Shallow Water Hake, as derived from
Fishery Independent Surveys 1986 to 2023 with the Site
Region Indicated with the Red Dashed Circle

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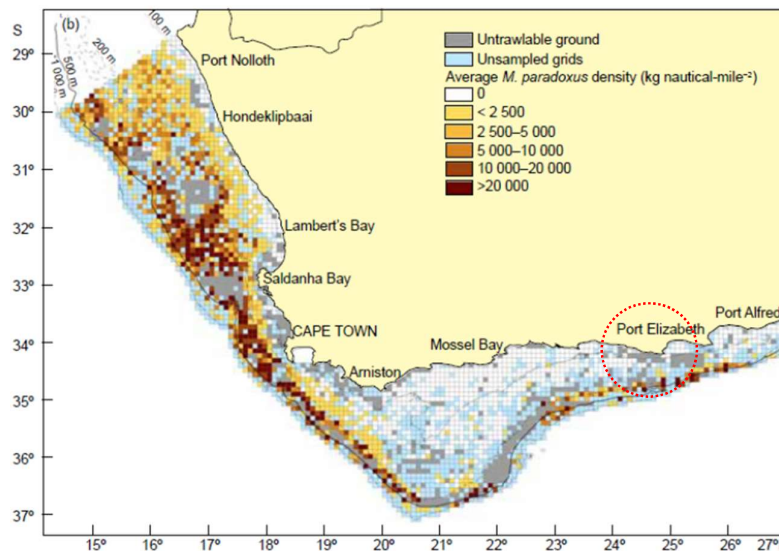


Figure 5.6.20
Distribution of Deep Water Hake as Derived from Fishery Independent Surveys 1986 to 2023 with the Site Region Indicated with the Red Dashed Circle

One known nursery area of *Merluccius paradoxus* is located over the shelf of the Orange River mouth, whereas that of *Merluccius capensis* appears to be located just north of St. Helena Bay. In the southern Benguela system, Cape hake spawn all year round with highest spawning activities occurring from August to October. The peak spawning time for *Merluccius paradoxus* is estimated to be from mid-September to early October, and the current assumption is that the peak spawning season for *Merluccius capensis* might occur earlier.

Merluccius capensis mainly feed on other small fish but may also eat squid and crustaceans. Their most common prey is small deep-water hake. Early juveniles, prey on small crustaceans such as krill and amphipods, but become more piscivorous (fish eating) with increasing size. They undertake vertical migrations in the water column at night to feed.

The hake resource is currently targeted by the following four fishing sectors, all of which operate within the site region:

- Deep-sea trawl: Operates around the entire South African coast in waters deeper than 110 m – It is currently restricted to the “trawl footprint” illustrated in **Figure 5.6.21**;
- Inshore trawl: Restricted to the South African South Coast east of

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the 20°E line of longitude – It is currently restricted to the “trawl footprint” illustrated in **Figure 5.6.21**;

- Hake longline: operates around the entire South African coast;
- Hake handline: restricted to the South African South coast east of the 20°E line of longitude.

Hake is also caught as incidental by-catch in the traditional line fish and horse mackerel-directed mid-water trawl fisheries.

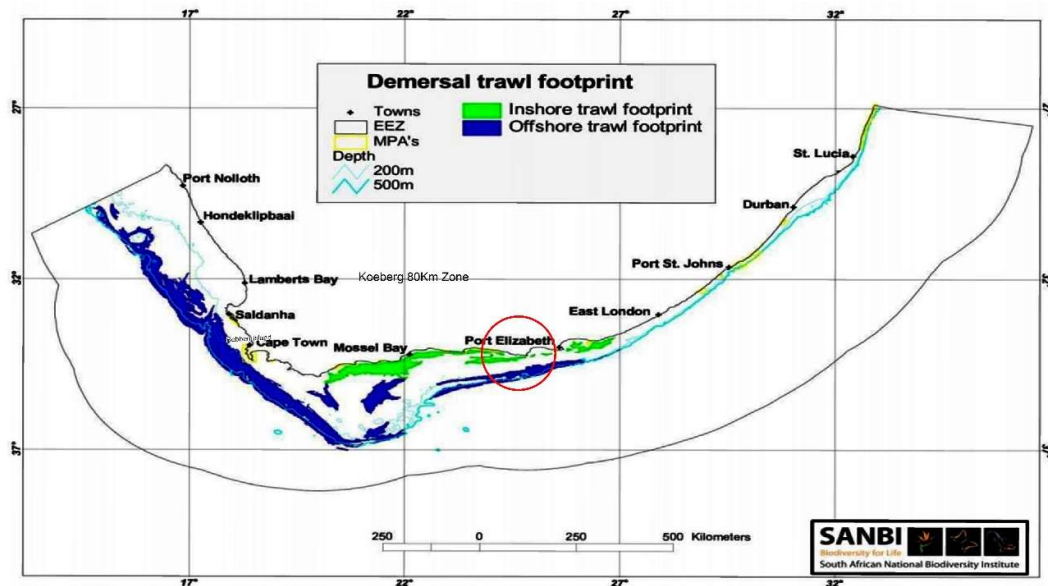


Figure 5.6.21
Demersal Trawl Footprint (with the Approximate Location of the Site Region Indicated by the Red Circle)

The deep-sea trawl fishery catches more than 80 per cent of the total annual hake TAC. Hake (both species as a collective) comprise between 80 per cent and 90 per cent of deep-sea trawl catches made on the West Coast (which mainly comprise deep-water hake) and between 60 per cent and 80 per cent of catches made on the South Coast (which are mainly shallow-water hake). The remainder of the catch is made up of various by-catch species, some of which are commercially valuable (such as monkfish and kingklip) and are retained for utilisation.

The deep-sea trawl fishery is currently the most valuable of South Africa's fisheries, constituting about R8.5 billion. The fishery sustains about 12 400 jobs (6 600 direct and 5 800 indirect) along South Africa's West and South coasts. Of these jobs, 40 per cent are held by women

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(Planning Partners, 2024b).

History and Historic Trends of the Fishery

The demersal trawl fishery dates back to the late 1890s, when small side trawlers targeted primarily Agulhas sole (*Austroglossus pectoralis*) and West Coast sole (*Austroglossus microlepis*) on soft grounds in bays and close to the coast, with hake (likely to be almost entirely *Merluccius capensis*) being caught as an incidental by-catch.

Directed fishing for hake only began towards the end of the First World War, with catches averaging at 1 000 t per annum and escalated rapidly after the Second World War with about 40 local trawlers operating in South African waters by 1948. Catch increased steadily to about 170 000 t by the early 1960. Knowledge of the large Southern African hake resource spread and lead to the incursion of foreign fleets into the South-eastern Atlantic in 1962. Catch peaked at 295 000 t in 1972. By this time, effort had extended further offshore and into Namibian waters with over 1.1 million t being caught in the South-eastern Atlantic in 1972.

Concerns relating to increased catches and decreasing catch rates led to the establishment of the International Commission for the South-East Atlantic Fisheries in 1972, to manage what had by then become an international fishery. Management measures to control the fishery however did not stem the decrease in catch rates. By 1977, the number of local trawlers operating in South African waters had expanded to about 85 and the smaller vessels based along the South Coast had increased in numbers to 49. At least 20 foreign vessels (with reports of as many as 50) operated in South African waters between 1962 and 1978.

The declaration of the 200 nmi Exclusive Fishery Zone (EFZ) by South Africa in 1977 brought the management of the South African hake resource under the direct control of the South African government, with the exclusion of foreign vessels, bar a few vessels operation under bi-lateral agreements and subject to South African restrictions, resulting in a reduction in the total catch of hake to about 50 per cent ($\pm 147\,000$ t) of that recorded in 1972.

A major source of uncertainty in the development of the hake fishery is the period over which exploitation shifted from almost entirely *Merluccius capensis* (when the fishery commenced in inshore waters) to catches being dominated by *Merluccius paradoxus* (which has been the case since about 1978) (Planning Partners, 2024b).

Management of the Fishery

With the declaration of the EFZ in 1977, a conservative management

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system was introduced to rebuild stocks to the Biomass at maximum sustainable yield (B_{MSY}). To achieve this, TAC restrictions were implemented. An Operational Management Procedure (OMP) was introduced in 1990. The hake OMP is a set of rules that specify how the hake TAC is calculated based on stock specific monitoring data. The OMP is revised every four years to account for possible revisions in datasets and understanding of resource and fishery dynamics.

As a result of the substantial overlap in distribution and the difficulty in distinguishing between the two hake species, species-specific catch and effort data are not available from the commercial fishery and the two species were initially assessed and managed as a single resource. However, the development of the longline fishery during the 1990s led to shifts in the relative exploitation rates of the two species, rendering species-combined assessments of the resource inappropriate.

Algorithms developed in 2005 to apportion the commercial hake catch between the two species were developed using research survey data, enabling the development of species-disaggregated assessment models and was used in the development of the revised OMP implemented in 2006.

The most recent OMP is OMP-2022. The development and revision of recent OMPs has had to take certification of the South African hake trawl fishery by the Marine Stewardship Council (MSC) into consideration. The fishery was first certified in 2004 and re-certified on two occasions (2010 and 2015). The South African Hake fishery received its 4th MSC re-certification in 2020 (Planning Partners, 2024b).

Status of the Resource

Since 1986, the then Fisheries Branch of the DAFF has conducted surveys of the demersal resources on the West and South coasts, the results of which provide essential inputs into the annual hake stock assessment and are also used to calculate abundance trends for other species. The results from these surveys show that the relative abundance of *Merluccius paradoxus* is much higher than that of *Merluccius capensis* on the West Coast, but that the difference in relative proportions of the two species on the South Coast is less marked. The abundance of both species of hake is much higher on the West Coast than on the South Coast; typically, the biomass on the West Coast was about twice that of the biomass on the South Coast.

The May 2018 assessment of the hake stocks indicated that the deep-water *Merluccius paradoxus* and the shallow-water *Merluccius capensis* were both above the biomass target reference point i.e. B_{MSY} . This suggests that the OMP for the hake fishery, which is designed to

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return or maintain the stocks at B_{MSY} or greater, is responding as it was intended. Included in the indices used in the OMP are the catch rates for *Merluccius capensis* and *Merluccius paradoxus*. These trends reflected a mostly stable or positive hake stock.

In the early 2000s, however, the hake fishery again experienced a decline in catch rates. Results of the species-disaggregated assessments developed in 2005 revealed that the decline was primarily attributable to a reduction in the *Merluccius paradoxus* resource to well below B_{MSY} . Although the *Merluccius capensis* resource had also declined, the estimated biomass was still above B_{MSY} . The decline was likely a response to several years of below-average recruitment for both species in the late 1990s and early 2000s. The reasons for the poor recruitment are unknown (DFFE, 2023a).

In accordance with the agreed OMP revision schedule, revised OMPs were developed in 2006 (OMP-2006), 2010 (OMP-2010), 2014 (OMP-2014) and 2018 (OMP-2018) to provide TAC recommendations for the years 2011 to 2014, 2015 to 2018 and 2019 to 2022, respectively. OMP-2010 was aimed at continuing the *Merluccius paradoxus* rebuilding strategy inherent in OMP-2006, with the objective of returning the *Merluccius paradoxus* resource to B_{MSY} by 2023. Comprehensive assessments conducted in preparation for the 2018 OMP review yielded somewhat different perceptions of resource status to those of preceding years, particularly in the case of *Merluccius paradoxus*. Previous perceptions of the status of the hake resources suggested that while the *Merluccius capensis* resource had been well above B_{MSY} since the early 1980s, the *Merluccius paradoxus* resource had declined to below B_{MSY} for most of the 2000s, recovering to only slightly above maximum sustainable yield from 2011 onwards. The assessments conducted during 2018, however, generally suggested that while the status of *Merluccius capensis* was slightly more positive than estimated previously, the *Merluccius paradoxus* resource was appreciably above B_{MSY} from 2010 onwards. More recent Reference Case assessments have conformed to this perception.

Given these results, a slightly more aggressive management strategy aimed at increasing the exploitation of the resource was considered during the 2018 review of the hake OMP. The management procedure that was adopted as OMP-2018 following an evaluation of the performance of various management strategies had the following general specifications:

- The TAC for 2019 and 2020 were set at 146 431 t per annum.
- For 2021 and 2022, the TAC for each year would be calculated as the sum of the intended species-disaggregated TACs.

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- The intended TAC for each species would be calculated as a function of the difference between a measure of the immediate past level in the abundance indices ((survey and Catch Per Unit Type (CPUE)) and a pre-specified target level.
- A 160 000 t upper “hard cap” (i.e. the TAC over the period 2019 to 2022 may not exceed 160 000 t per annum).
- The TAC may not be increased by more than 10 per cent or decreased by more than 5 per cent from one year to the next.
- A “safeguard” meta-rule that over-rides the percentage TAC decrease constraint in the event of large declines in resource abundance. This allowed the TAC to be decreased by more than 5 per cent from one year to the next, depending on the level of the *Merluccius paradoxus* resource relative to prespecified thresholds.
- An additional pre-specified *Merluccius capensis* threshold below which action would be needed to reduce the catch of this species without reducing the catch of *Merluccius paradoxus* unnecessarily.
- “Exceptional Circumstances” provisions that regulated the procedures to be followed, if future monitoring data fall outside of the range simulated in the development of the OMP.

OMP-2018 has been used to set the hake TACs for the 2019 to 2022 fishing seasons. The OMP was reviewed during 2022 as per the routine 4-year schedule of the hake OMP revision cycle.

OMP-2022 included further restrictions including:

- As for the OMP-2018, an upper cap on the TAC is imposed, so that the TAC cannot exceed 160 000 t.
- The TAC for 2023 is fixed at 138 760 t, a 5 per cent increase on the 2022 TAC. For 2024 the TAC is at least 138 760 t, i.e. the 2024 TAC may be above the 2023 TAC but may not decrease below the 2023 TAC (Planning Partners, 2024b).

Vessels and Gear

There are two components to the deep-sea trawl fleet; the factory vessels (which typically remain at sea for 30 days or more and which process and freeze the catch at sea) and the wetfish vessels (which generally fish for about 4 to 5 days before returning to port, with their catch kept on crushed

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ice).

Wetfish vessels range between 24 m and 56 m in length, while freezer vessels are usually larger, ranging up to 90 m in length.

According to a study commissioned by South African Deep-Sea Trawling Industry Association (SADSTIA), in preparation of the Fishing Rights Allocation Process (FRAP) 2020, harvesting in the hake deep-sea trawl (HDST) fishery is currently undertaken by a fleet of 51 vessels of various sizes. These vessels are either freezer trawlers or wetfish trawlers:

- There are currently 21 freezer trawlers operating in the HDST fishery, of which 11 focus on harvesting and producing (headed and gutted) frozen hake products, while the rest (10) have on-board processing facilities.
- The wetfish (or fresh fish) trawler fleet currently consists of 30 vessels. These trawlers predominantly focus on harvesting hake for further processing onshore.

These vessels collectively employ 2 036 permanent staff members, averaging approximately 40 crew members per trawler. There were a further 2 533 permanent onshore employees involved in processing landed fish, as well as a further 1 500 temporary workers associated with onshore fish processing in the fishery.

Otter trawling is the main trawling method used in the South African hake fishery. The configuration of the trawl gear is illustrated in **Figure 5.6.22** is similar for both offshore and inshore vessels, however inshore vessels are smaller and less powerful than those operating within the offshore sector.

Limitation on fishing gear imposed in terms of the 2024 permit conditions imposed by DFFE are:

- Only bottom trawl gear with a minimum cod-end mesh size of 110 mm (measured inside mesh diameter and stretched to a maximum tension of 5 kg) may be used and shall be the only fishing gear onboard the vessel.
- No bobbins, nylon rollers or other devices whatsoever, with a diameter in excess of 750 mm or a weight in excess of 200 kg shall be deployed with, or as part of, the trawl gear, except for floats and the single pair of trawl doors and the device separating trawls in the case of twin trawling.
- The use of cod-end liners is prohibited.

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- Any modification to the trawl gear configuration that will or could substantially change the fishing efficiency of the gear (e.g., a change in the mesh size; inclusion of escape panels or selector grids) shall be noted *in the* Trawl Fishing log (Planning Partners, 2024b).

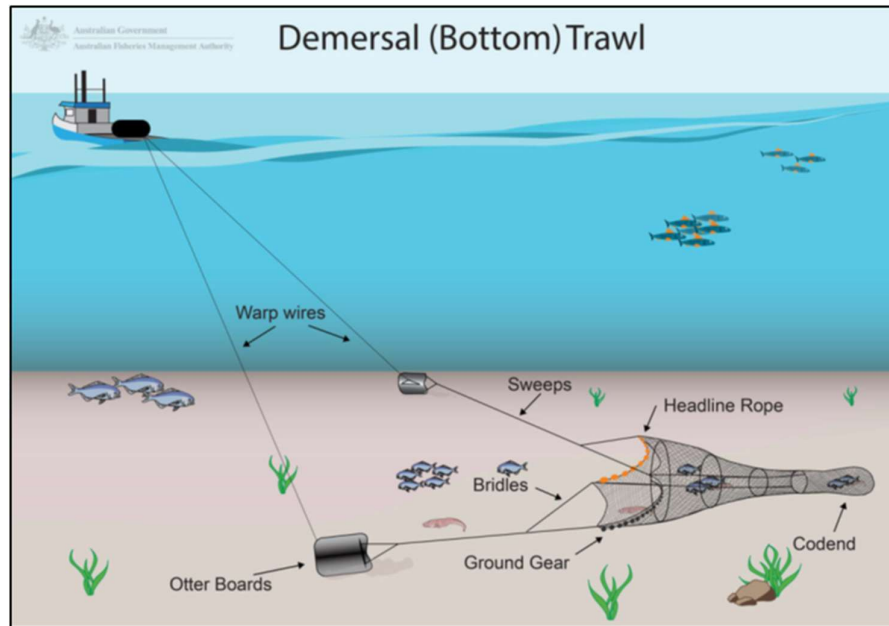


Figure 5.6.22
Typical Gear Configuration used by Offshore Demersal Trawlers Targeting Hake

Fishery Allocation and Catch Data

The TAC output from the OMP-2018 for 2022 was 132 154 t, a decrease of 5 per cent from the 2021 TAC. This decrease was mainly due to the impact of the *Merluccius paradoxus* autumn survey index in the TAC calculations, as well as the lower commercial catch rates that had been observed for *Merluccius paradoxus* on both coasts, but on the West Coast in particular. All indices except the *Merluccius capensis* South Coast (both CPUE and survey) show either an improvement or roughly similar levels compared to the previous year.

During 2021 and early 2022, the DFFE carried out a FRAP for the hake trawl fishery. This process resulted in all of the current hake trawl operators in the fishery being allocated rights for the next 15 years, and four new entrants being granted rights. The new entrants have nominated existing trawl vessels in the fleet in their rights application and the fleet size will remain stable.

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The TAC set for 2023 in terms of OMP-2022 was 138 760 t which is 5 per cent higher than in 2022. Once the TAC has been determined, a by-catch allowance for the mid-water trawl fishery is deducted (equivalent to 2 per cent of the horse mackerel TAC), following which the remainder is allocated among the four hake-directed sectors in the following proportions:

- deep-sea trawl: 0.8393 t ($\pm$ 84 per cent);
- inshore trawl: 0.0618 t ($\pm$ 6 per cent);
- hake longline: 0.0655 t ($\pm$ 6.5 per cent);
- hake handline: 0.0334 t ($\pm$ 6.5 per cent).

Within each sector, the TAC is then apportioned among rights holders according to their proportional allocations set during the FRAP.

The demersal trawl components (inshore and deep-sea) of the fishery are restricted to fishing within the “trawl footprint”. This measure was initially a voluntary measure implemented by the industry to facilitate MSC certification, and was incorporated into permit conditions as a formal management measure in 2015.

Figure 5.6.23 illustrates the historic catch data with reference to (a) the TAC introduced in 1990 and historic catch split between Cape hake *Merluccius capensis* and the deep-water hake *Merluccius paradoxus* from 1917 to 2019 (in ‘000 t); and (b) the split between the four hake fisheries for the period 1960 to 2020 (in ‘000 t) (Planning Partners, 2024b).

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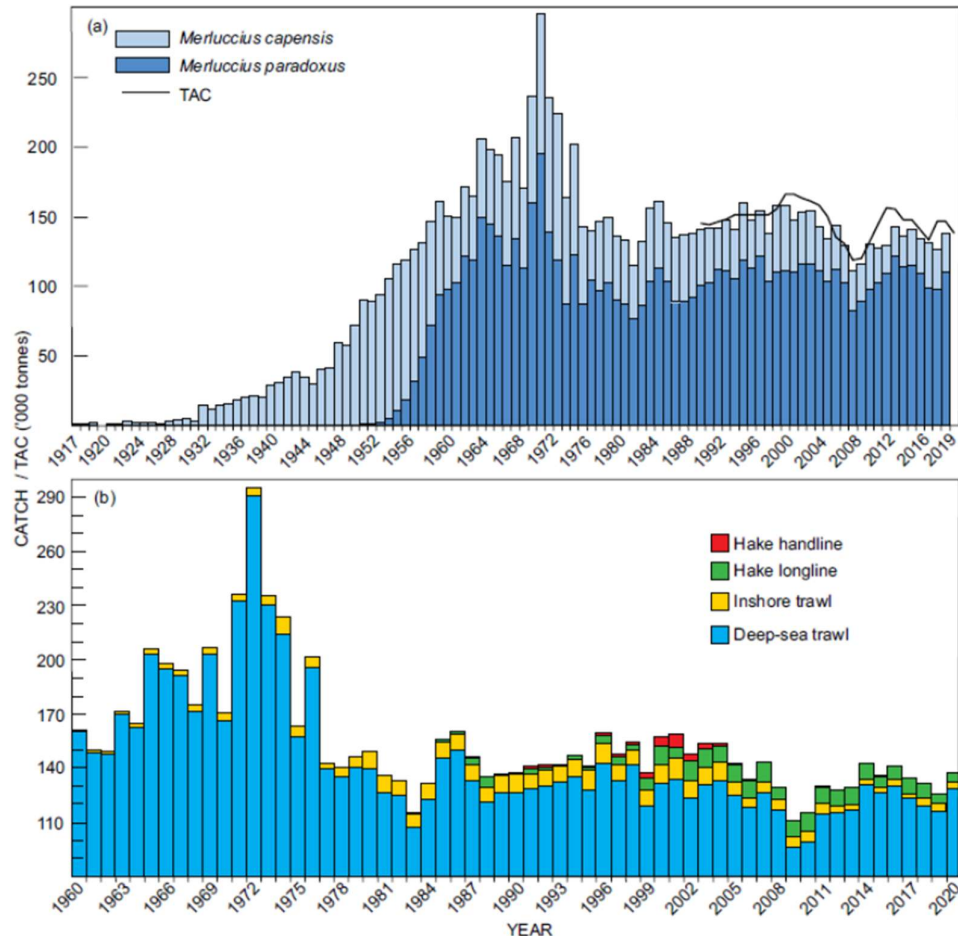


Figure 5.6.23
Historic Catch Data in '000 t (a) Split between Cape Hake
Merluccius Capensis and the Deep-water Hake
Merluccius Paradoxus (1917 to 2019) and (b) Split
between the Four Hake Fisheries (1960 to 2020)

Figures 5.6.24 and **5.6.25** illustrate the total hake TAC for all four hake fisheries relative to the hake caught in tonnes on the South Coast for the period 2007 to 2021. It illustrates the relative importance of the hake deep sea, hake inshore, hake longline fishery and hake handline fisheries on the South Coast, as well as illustrating a relatively stable TAC with an upward trend since 2018. Hakes caught in the South Coast represents on average 24.4 per cent of all hakes caught on off the South African coastline over the period.

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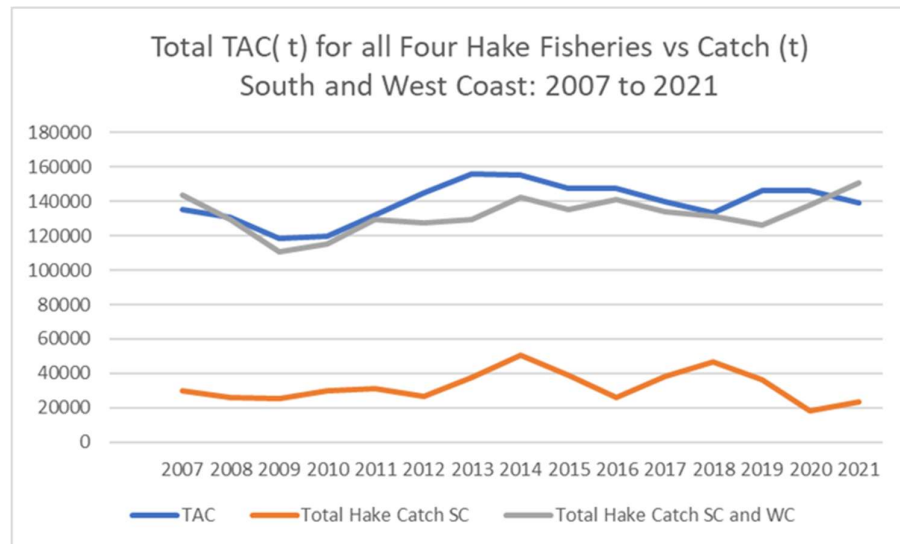


Figure 5.6.24
Hake TAC(t) for all Four Hake Fisheries Relative to the Hake caught ('000 t) on the South Coast (2007 to 2021)

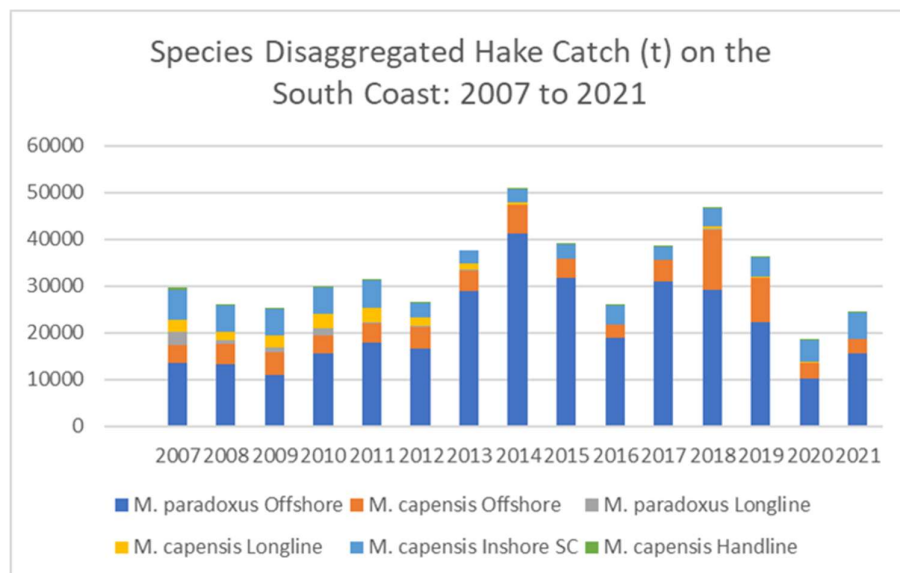


Figure 5.6.25
Species-disaggregated Hake Catch on the South Coast (2007 to 2021)

Table 5.6.3 summarises the TAC from 2007 to 2021.

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Table 5.6.3
Global TAC and Catch Data for the Deep-sea Trawl, Offshore Trawl, Longline Hake and Handline Fisheries on the South Coast (2007 to 2021)

Year	TAC	M. paradoxus		M. capensis			
		Offshore	Longline	Offshore	Longline	Inshore	Handline
2007	135 000	13488	3021	3757	2522	6 350	400
2008	130 532	13191	809	4316	1893	5 496	231
2009	118 578	10895	1069	4806	2520	5 639	265
2010	119 831	15457	1527	4055	3024	5 472	275
2011	131 780	17904	140	4086	3047	6 013	186
2012	144 671	16542	306	4584	1737	3 223	8
2013	156 075	28859	60	4475	1308	2 920	0
2014	155 280	41156	8	6286	315	2 965	1
2015	147 500	31745	18	4085	53	3 077	1
2016	147 500	18968	1	2810	2	3 973	1
2017	140 125	30961	25	4466	126	2 812	4
2018	133 119	29218	89	12863	481	3 983	24
2019	146 431	22201	20	9454	178	4 148	9
2020	146 431	10061	26	3500	177	4 536	4
2021	139 109	15597	18	2937	194	4517	10

Effort distribution for the period 2000 to 2016 is illustrated in **Figure 5.6.26**, prepared for the South African National Biodiversity Assessment 2018.

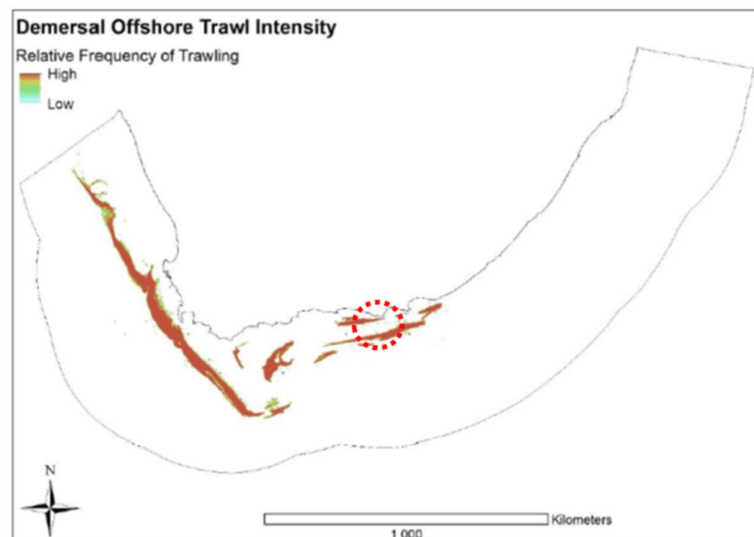


Figure 5.6.26
Demersal Trawl Intensity 2000 to 2016 with the Site Region Indicated by the Red Dashed Circle

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Closed Areas

The following spatial restrictions apply to the fishery and are illustrated in **Figure 5.6.27**:

- In the area east of 020°E longitude, no fishing shall take place in water depths of less than 110 m or within 20 nmi from the coast, whichever is the greater distance from the coast.
- In the area west of 020°E longitude, no fishing shall take place within 5 nmi of the coast.
- During the period 1 September to 30 November, no fishing shall take place within the quadrilateral described by lines joining the following four points:
A: 34°48'8 024°00'E;
B: 34°38'8 025°00'E;
C: 34°44'8 025°00'E;
D: 34°57'S 024°00'E.
- No fishing may take place outside of the areas defined as the 'Hake Trawl Ring Fence' as described in the DAFF satellite surveillance system MaxSea file "Trawl Ringfenced 2009 Release V1.ptf". This file is available for incorporation into MaxSea navigational software upon request from DAFF".
- No fishing may take place in the Marine Protected Areas as proclaimed in the Government Gazette No. 42478 dated 23 May 2019 (Planning Partners, 2024b; Republic of South Africa, 2019).

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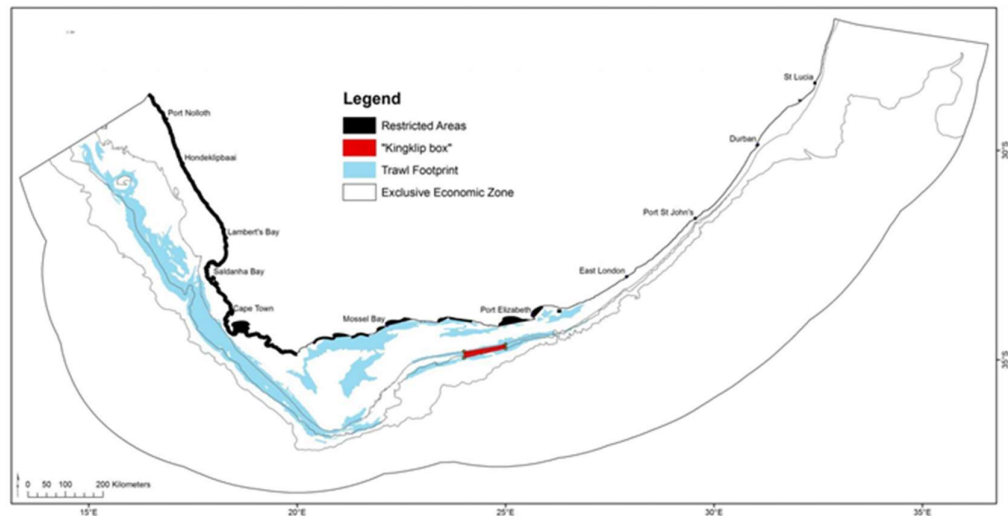


Figure 5.6.27
Spatial Extent of the Hake Trawl Fishery (Light Blue) the
Nearshore Protected Areas (Black) and Kingklip
Spawning Box (Red)

Market Destinations

Hake in either raw commodity or processed form is sold to both the domestic and export markets to a range of customers, including:

- The food service industry, which includes the sale of hake products to food service distribution channels such as restaurants, catering companies, company canteens, quick-service restaurants, hotels and government contracts.
- Large rights holders provide the retail market with a range of branded value-added products. Sales take place in large supermarket chains.
- A mixture of fresh and frozen (mainly) headed and gutted products are sold to wholesalers for further distribution into the market. Wholesalers' main customers are hawkers and traders who sell to the informal market.

Cape hake is exported across the world to Europe, America and Australia. The majority of the export volumes are either filleted (42 per cent), headed and gutted (29 per cent), or further value-add (29 per cent) products.

Domestic sales are dominated by a combination of processed products

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(55 per cent) sold into the retail market and headed and gutted products (41 per cent) sold mainly into the wholesale and food service industries.

In 2020 the contribution of these sales to the South African economy was significant, totalling R4.3 billion. Furthermore, 57 per cent of this sales value is due to export sales. This means that hake sales contribute approximately R2.5 billion in foreign earnings to the local economy (Planning Partners, 2024b).

Table 5.6.4
Summary of the Hake Deep-sea Trawl Fishery (Entire Fishery)

Duration of Rights	15 years (to 31 December 2037)
Value of the Hake Deep Sea Trawl Fishery (2021)	R6 billion
Fish Landed (Hake Deep Sea Trawl Fishery (2020)	128 269 t
Number of Jobs Sustained	7 300
Number of Vessels	45
Number of Rights Holders (as at 2023)	37
Closed Season	None

ii. Hake Inshore Trawl

Overview

The hake inshore trawl fishery operates between Cape Agulhas on the South Coast and the Great Kei River on the East Coast. Most trawling on the South Coast is on the wide continental shelf, the Agulhas Bank, and as much as 70 per cent of hake catches on this coast are *Merluccius capensis*. The inshore conditions mean the vessels can be of a smaller size and power to hake deep-sea trawl, making the hake inshore trawl fishery less capita intensive. DEFF has specified that vessels operating in the inshore fishery may not exceed 35 m in length and may not make use of heavy trawl gear.

The hake inshore trawl fishery is a dual right, mixed species fishery, meaning that rights holders are allocated rights to two species of fish, namely hake and sole. The total hake allocation in the inshore fishery is approximately 6.2 per cent of the total hake TAC.

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Vessels operating in the inshore sector usually trawl throughout the traditional inshore area, i.e. in waters shallower than the 110 m isobaths, but are not restricted from operating in deeper water. Hake is targeted further offshore in traditional grounds between 100 m and 200 m depth in fishing grounds known as the ‘Blues’ located on the Agulhas Bank.

The inshore fishery consists of 31 vessels, which operate on the South and East coasts mainly from the harbours of Mossel Bay and Gqeberha and targets *Merluccius capensis*.

Although the fishery operates continuously throughout the year, fishing effort in the site region is highest during the period October to March (Planning Partners, 2024b).

History and Historic Trends of the Fishery

Since the 1890s, the exploitation of hake in the demersal area has been the mainstay of South Africa’s fishing industry. In the early part of the twentieth century the industry was pioneered operating in the inshore part of the demersal area. Both hake species became subject to increasing levels of exploitation after the First World War.

It was however only in the 1950s that the inshore hake fishery took on a commercial face. At that stage smaller trawlers began targeting both shallow-water hake and the more valuable Agulhas sole (*Austroglossus pectoralis*) closer to the shore.

Prior to 1978 both the deep-sea and near-shore trawl sectors were largely unregulated, and participants were not restricted to a maximum catch limit. The incursion of foreign fleets during the 1960s culminated in a peak catch of close to 300 000 t in the early 1970s.

In 1978, with the declaration of the EEZ, the demersal trawl industry was formally separated into inshore and offshore sectors, and a global annual TAC was set for both hake species, to be divided between the sectors. An annual TAC was also set for Agulhas sole.

Individual quotas were introduced in 1982. Since then, an annual TAC has been set for both hake species, and a separate TAC set for Agulhas sole. Approximately 6 per cent of the global hake TAC has historically been allocated to the inshore trawl sector (Planning Partners, 2024b).

Status of the Resource

Refer to **subsection 5.6.7.1(b)(i)** above for data on the status of the resource.

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Management of the Fishery

Refer to **subsection 5.6.6.1(b)(i)** above for data on the management of the fishery.

The inshore hake fishery consists of 31 vessels that operate on the South and East coasts, mainly out of the harbours of Mossel Bay and Gqeberha. Hake inshore fishery vessels range in length from 15 m to 40 m and apply the same fishing gear as for the hake offshore fishery. Trips average three to five days in length and all catch is stored on ice. Refer further to **subsection 5.6.6.1(b)(i)** above for details on vessels and gear.

Fishery Allocation and Catch Data

Fishing rights in the hake inshore trawl fishery are granted for the maximum period of 15 years, in terms of the hake inshore trawl policy of 2015. The most recent long-term fishery rights were awarded for a 15-year period from 20 December 2016 to 31 December 2031 to 32 rights holders.

Refer to **Table 5.6.3** which sets out the annual tonnes of hake landed by the inshore fishery relative to all hake landed on the South Coast for the period 2007 to 2021. **Figure 5.6.28** illustrates the total TAC for all four hake fisheries relative to the total hake catch on the South Coast, with the proportion thereof landed by the hake inshore trawl fishery in tonnes. The fishery accounted for 19.4 per cent of the hake landed on the South Coast and 3 per cent of all hakes landed in 2021. The highest catch recorded in the fishery for the reporting period (2007 to 2021) was in 2007 when the inshore fishery landed 6 350 t.

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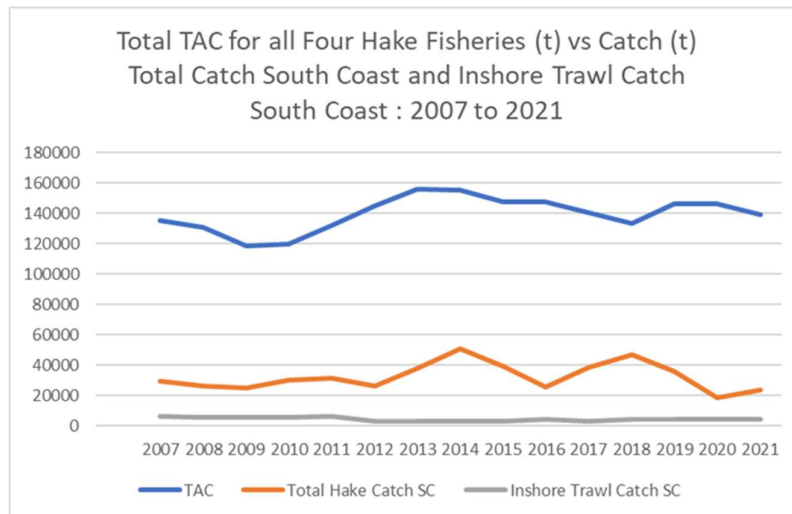


Figure 5.6.28
Hake Fishery TAC (t) vs Inshore Trawl Catch (t) Relative to the Total South Coast Hake Catch (t): 2007 to 2021

The 2022 and 2023 TAC for Cape hake inshore fishery was set at 8 575 t (0.0618 per cent) of the global hake TAC.

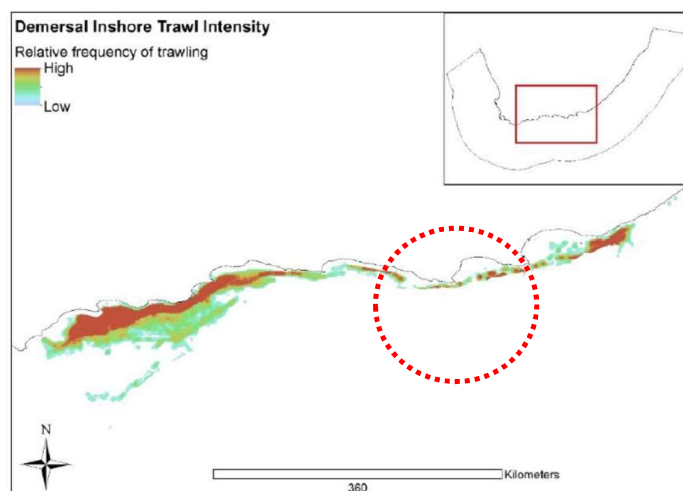


Figure 5.6.29
Demersal Inshore Trawl Intensity Relative to the Site Region Indicated by the Red Dashed Circle 2008 to 2016

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Restrictions and Closed Area

The same restrictions that apply to the hake deep sea trawl fishery apply to the hake inshore trawl fishery.

Market Destinations

Refer to **subsection 5.6.6.1(b)(i)** for information on market destinations.

Table 5.6.5
Summary of the Hake Inshore Trawl Fishery

Duration of Rights	15 years (to 31 December 2031)
Value of the Hake Inshore Trawl	R550 million
Fish Landed (Hake Inshore Trawl Fishery (2020))	4 536 t
Number of Jobs Sustained	4 500
Number of Vessels	31
Number of Rights Holders (as at 2021)	32
Closed Season	None

iii. Kingklip Fishery

Overview

Kingklip (*Genypterus capensis*) is a demersal fish that is endemic to Southern Africa. Its distribution ranges from Walvis Bay to KwaZulu-Natal. Kingklip is found at depths between 50 m and 800 m, generally in rocky areas on the continental shelf and shelf edge. Juveniles feed on benthic fish, crustaceans and squid, whereas the diet of the adults consists almost entirely of demersal fish. Kingklip move further offshore (and deeper) as they get older, with juveniles largely restricted to depths shallower than 200 m. They are relatively slow-growing and long-lived (about 25 years) and grow to lengths of up to 1.6 m. Although female kingklip grow faster than males, male fish generally reach maturity at a younger age than do females. Also, males appear to mature later along the West Coast than along the South Coast.

Spawning takes place on both the West and South coasts, generally from autumn to spring, with peak spawning between June and September. Kingklip form large aggregations to spawn and the largest known such aggregation is on the Southeast Coast near Gqeberha. Although the kingklip resource is relatively small in comparison to other exploited South African fish populations, it is an important by-catch species due to

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its high market value and it is of appreciable economic importance to several South African fisheries. Kingklip is currently mostly caught as incidental by-catch by the hake trawl and hake longline sectors.

Annual catches of kingklip (all taken as incidental by-catch by the hake trawl fleet prior to 1983) fluctuated between 400 t and 700 t in the 1930s and 1940s, and then increased steadily to a peak of 5 800 t in 1973, with most catch being taken on the West Coast.

Catches then fluctuated between about 3 000 and 5 000 t until the start of the kingklip-directed longline fishery in 1983. The substantially increased catches made by the longline sector over the period 1983 to 1989 (peaking at over 8 000 t in 1986) clearly impacted the resource and catches in both longline and trawl sectors decreased until the directed longline fishery was closed in 1990.

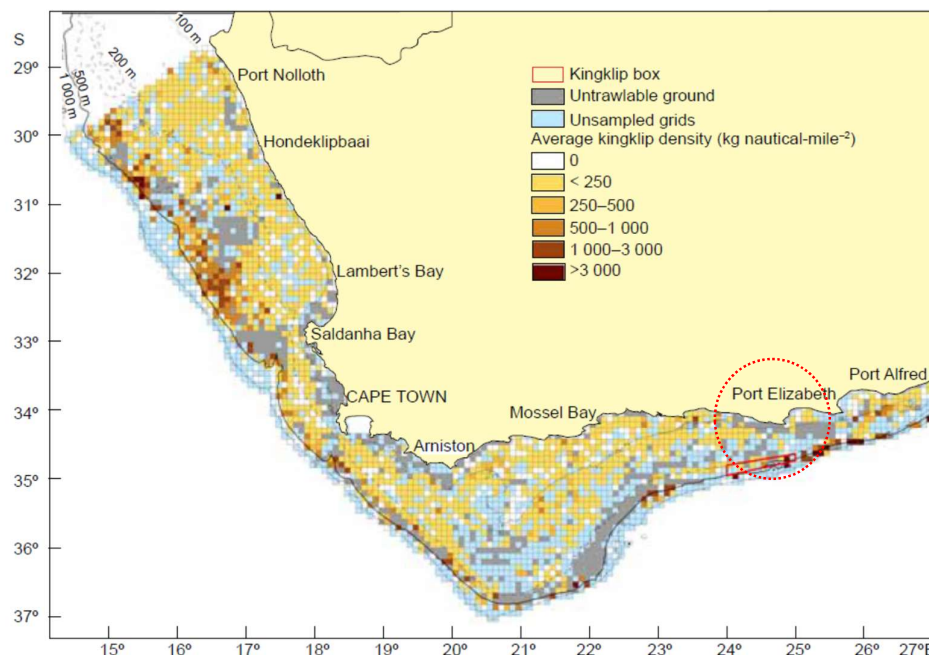


Figure 5.6.30
Distribution of Kingklip *Genypterus capensis* in South African Waters, as Derived from Fishery-independent Demersal Research Surveys

History and Historic Trends of the Fishery

An almost immediate increase in catches by the hake trawl sectors followed, reaching a peak of 4 759 t in 2002. This peak coincided with increased levels of kingklip by-catch in the hake-directed longline fishery

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that had been established in 1994. By-catch of kingklip in both the hake trawl and longline fisheries then showed a decline, prompting the introduction of an annual Precautional Upper Catch Limit (PUCL) in 2005 that has since been retained as the primary regulatory measure for the resource (Planning Partners, 2024b).

Status of the Resource

Recent research suggests that there are genetically separate stocks on the West and South coasts, but with some degree of gene flow between the two components. The 2021 assessment suggested that the South Coast component of the resource is increasing in abundance at about 1.7 per cent per annum, whereas the West Coast component is increasing at about 2.9 per cent per annum. The PUCL for this resource increased slightly in 2022. The 2021 replacement yield assessment indicated that the replacement yield for the South Coast component of the kingklip stock was 1 430 t and for the West Coast component of the kingklip stock was 2 871 t (Planning Partners, 2024b).

Management of the Fishery

The fishery is managed by the PUCL, which is a global catch limit that applies to the hake-directed sectors (trawl and longline) in which kingklip is caught as by-catch. Efforts to ensure that the PUCL is not exceeded have followed a co-management approach, with the Department interacting closely with the relevant fishing associations.

The results of the first assessment of kingklip conducted in 1992 indicated that the resource was severely depleted. A subsequent assessment undertaken in 2002 used a deterministic Age-Structured-Production-Model and indicated limited recovery (10 per cent) of the resource since the previous assessment. Projections indicated that catches of 3 000 t per annum would keep the stock relatively stable, and this was the basis for the 3 000 t PUCL introduced in 2005.

A seasonal (September to November) closed area on the shelf edge near Port Elizabeth was implemented in 2008 as a management tool to assist the recovery of the stock by protecting a spawning aggregation.

The PUCL was increased to 3 500 t for 2006 and was maintained at this level until 2014. The kingklip PUCL was increased to 5 264 t for the 2014 season based on the results of a simple replacement yield assessment of the resource conducted during 2013. The PUCL was then reduced to 4 450 t for the 2017, 2018 and 2019.

A routine update of the replacement yield assessment was consequently conducted during 2019 to provide a basis for scientific advice for the

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management of the kinglip resource. The results of the update were used to recommend a PUCL of 3 905 t for the 2020 and 2021 fishing seasons (Planning Partners, 2024b).

Vessels and Gear

Refer to **Subsection 5.6.6.1(b)(i)** above for a description of vessels and gear.

Fisheries Allocation and Catch Data

Figure 5.6.31 illustrates the annual catch on the South and the West coasts for the period 1932 to 2020 and annual catch in the hake longline and the hake trawl fisheries for the period 1980 to 2020.

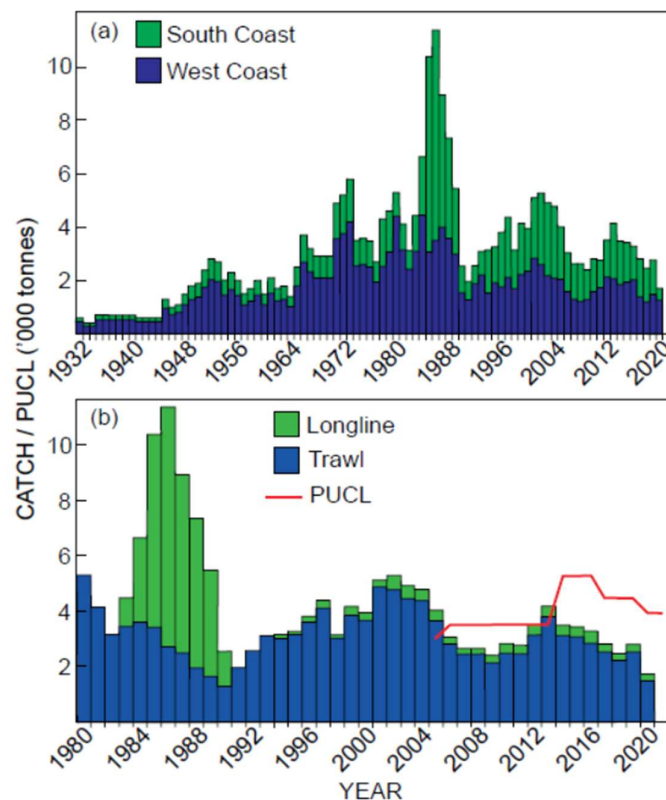


Figure 5.6.31
(a) Annual Catch on the South versus the West Coast (t): 1932 to 2020 and (b) Annual Catch Longline vs Trawl (t): 1980 to 2020

Figure 5.6.32 illustrates the catch data for kinglip on the South and West coasts in the longline and trawl sectors (Planning Partners, 2024b).

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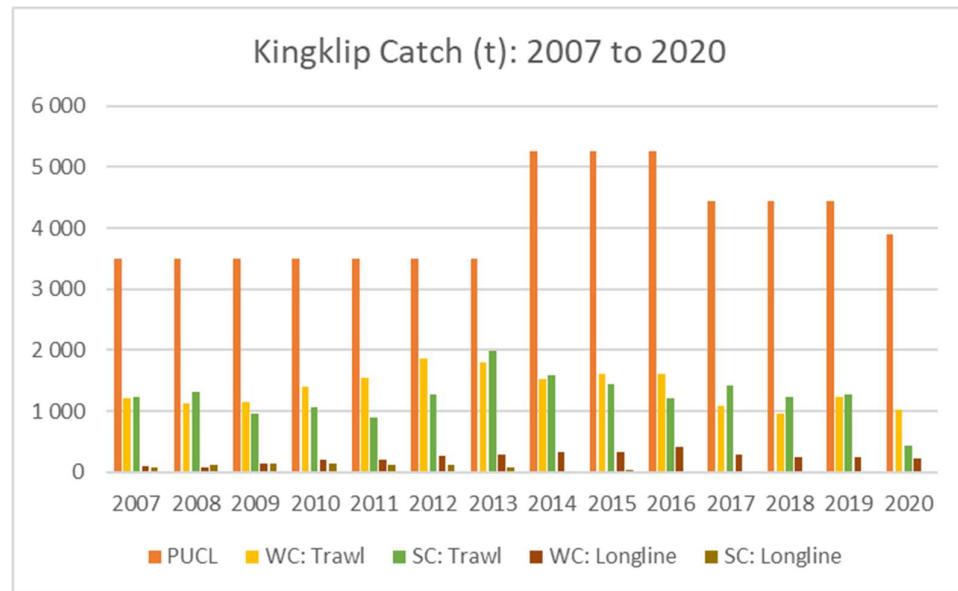


Figure 5.6.32
Kingklip Catch (t) South and West Coasts for the Trawl and Longline Fisheries: 2007 to 2020

Restrictions and Closed Areas

In terms of the 2024 fishing season permit conditions, kingklip by-catch for the trawl and line hake-directed fisheries should not exceed a PMCL of 3 733 t.

Market Destinations

Kingklip is a popular fish served in South African restaurants. A desktop study has found that limited dried kingklip bladders are exported to Malaysia.

Since kingklip is a controlled by catch species within specific fishery sectors, refer to the hake longline and hake trawl fisheries for summary tables (Planning Partners, 2024b).

iv. Small Pelagic Fisheries

Overview

Forage fish occur on the continental shelf waters between Hondeklip Bay on the West Coast and Durban on the East Coast. They generally exhibit schooling behaviour, have a small body size with rapid growth rates, have short lifespans and exhibit strong population responses to the environmental variability, which results in large fluctuations in abundance

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over space and time, even in the complete absence of fishing.

The South African small pelagic resource consists of predominantly anchovy (*Engraulis encrasicolus*), sardine (*Sardinops sagax*) and round herring (*Etrumeus whiteheadi*). These species generally account for 95 per cent of the total pelagic purse-seine catch off the South African coastline. Sardine are also found northwards along the Namibian Coast as far as Southern Angola. This latter sardine is considered to be a separate stock, separated from the South African Stock by a semi-permanent intense upwelling cell off Luderitz.

Summer biomass surveys indicate two distinct and separated sardine spawning areas, one between Hondeklip Bay and Cape Agulhas off the West Coast and the second between Mossel Bay (22°E) and Port Alfred (27°E) off the South Coast (within the site region). Sardine can spawn throughout the year with spawning off the West Coast being the highest, peaking between September and February (spring-summer) and off the South Coast being highest between June and November. Sardine also spawn off the East Coast during the winter sardine run. Eggs spawned off the West Coast are transported to nursery grounds located north of Cape Columbine via a jet current associated with a strong thermal front between cold upwelled water and warmer oceanic water flowing northward along the shelf-edge of the West Coast. Eggs spawned off the South Coast are retained in inshore nursery grounds. Eggs spawned off the South Coast are transported to the West Coast nursery area.

Anchovy and sardine have a migratory life history with adults spawning on the Agulhas bank and eggs and larvae transported to the more productive West Coast where recruitment and feeding takes place. Spawners then return to the South Coast to complete the cycle.

The small pelagic fishery catches are the largest in terms of landed mass of all fisheries sectors and constitutes the second largest catch value, second only to the hake trawl fishery and is also an important source of protein.

The fishery is multi-species with what can be defined as ‘target sectors’ namely:

- Target Fishery 1: sardine directed with anchovy, redeye and horse mackerel by-catch;
- Target Fishery 2: anchovy with juvenile sardine, redeye and horse mackerel;
- Target Fishery 3: redeye directed (with by-catch of sardine and horse mackerel);

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- Target Fishery 4: bait fishery for sardine.

The abovementioned fisheries overlap spatially and seasonally, have limits on by-catch and other measures relating to mesh size and area controls etc. This makes spatial management a critical aspect of the management of the fishery. More recently, an important development in the management of purse-seine catches in the vicinity of islands has been implemented to protect penguin feeding grounds. Currently, the majority of the fleet operate from St. Helena Bay, Laaiplek, Saldanha Bay and Hout Bay, with fewer vessels operating on the South Coast harbours of Gansbaai, Mossel Bay and Port Elizabeth. The ports of deployment correspond with the location of fish processing establishments (canning factories and fish meal plants) along the coast.

In the early years, fish processing of this fishing sector was centred around the harbour at St. Helena Bay. Since the 1990s with an eastward expansion of sardine distribution, fishing effort increased further east, particularly in the Mossel Bay area, with the establishment of a new cannery at Mossel Bay. A small portion of sardine is also taken to Gqeberha. Currently the cannery at Mossel Bay and several smaller sardine processing establishments on the South and the East coasts have access to 28 per cent of the TAC. In recent years the proportion of directed sardine caught off Gqeberha increased to 40 per cent on average over the last 5 years, mainly as a result of the unavailability of sardine in the traditional West Coast fishing grounds. Half of the sardine catch landed at Gqeberha is transported by road to Mossel Bay for processing (Planning Partners, 2024b).

History of the Fishery

The fishery began operating in 1935, but it was only in 1943 that commercial operations commenced in the St. Helena Bay area in response to an increased demand in canned products during the Second World War, with purse-seiners operating between Lambert's Bay and Cape Hangklip.

Initially, sardine and horse mackerel (*Trachurus capensis*) dominated the catch, with annual sardine catches rising from 200 000 t in the 1950s to 400 000 t in the early 1960s. Horse mackerel catches had peaked at 120 000 t in the mid-1950s and decreased to less than 300 000 t annually by the end of the 1960s. As these two stocks started to collapse, the fishery changed to using smaller-meshed purse-seine nets to target juvenile anchovy. Anchovy then dominated the catch and largely sustained the industry for the next 30 years, with catches peaking at 600 000 t in the late 1980s. The annual anchovy catch then decreased to a low of 40 000 t in 1996.

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A conservative management strategy resulted in rapid population growth and sardine catches increased to 374 000 t in the early 2000s, particularly on the South Coast. Anchovy catches also increased rapidly, resulting in total pelagic landings of 500 000 t between 2001 and 2005. Round herring catches have been reported since the mid-1960s but have never exceeded 100 000 t.

Low sardine recruitment since 2004 resulted in a rapid decline in the size of the sardine stock with sardine catches dropping to levels in the order of 90 000 t between 2008 and 2014 and to less than 40 000 t in 2017 and 2018. Following the declaration of 'Exceptional Circumstances' for sardine in December 2018 after recording a sardine survey biomass estimate which was below the range simulated during the development of OMP-18, the 2019 directed sardine TAC was only 12 250 t, with less than 1000 t landed by the end of October 2019.

The sardine catch of 2019 being only 2 100 t was the lowest recorded over the past 70 years. Sardine catches recovered to 14 800 t in 2020, 23 000 t in 2021 and 26 000 t in 2022, although more than 70 per cent of catches in 2021 and 2022 were taken on the South Coast. The current low sardine catch is insufficient for the profitable operation of the major canning facilities and the bulk of canned sardine products currently produced in South Africa contain sardine that are sourced from Morocco and elsewhere.

The anchovy catch now dominates the fishery, with average catches of around 220 000 t between 2000 and 2018. The 2019 anchovy catch of around 165 000 t was the lowest recorded since 2013 and although the 2020 anchovy catch of 285 000 t was the highest since 2012, catches in 2021 and 2022 were only 156 000 t and 172 000 t, respectively.

Round herring catches have been reported since the mid-1960s, with catch never exceeding 100 000 t by 2022. The highest recorded catch was in 2010 being 88 490 t (Planning Partners, 2024b).

Status of the Resource

The recruitment, biomass and distribution of anchovy and sardine, but also of other schooling pelagic and mesopelagic fish species such as round herring, juvenile horse mackerel, lantern and lightfish (*Lampanyctodes hectoris* and *Maurolicus walvisensis*, respectively) are assessed bi-annually using hydroacoustic surveys and consist of a summer biomass survey and a winter recruit survey.

The final results of the 2022 Pelagic biomass survey estimated the anchovy biomass estimate of 102 000 t is down from the 256 000 t estimated in 2020, and well below the long-term and most recent 5-year

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average. The coefficient of variation of the anchovy estimate (22 per cent) is within the expected range, and similar to that of 2018 and 2019. The percentage of the anchovy biomass located to the west of Cape Agulhas is 43 per cent compared to the 60 per cent in that area in 2020, however, similar to the long-term average proportion to the west of Cape Agulhas of 46 per cent.

The biomass of sardine up to Port Alfred was estimated at 569 000 t, almost three times that estimated in 2020. This estimate is the highest biomass estimated for sardine since 2013 and consequently higher than the past 5-year average, but still below the long-term average for this species. The estimate is more precise than that of estimates between 2017 and 2020, and similar to that achieved on average over the whole time-series. An increased percentage (39 per cent) of the sardine biomass was located to the west of Cape Agulhas compared to the previous 4 years. The biomass for the western area has increased by more than 300 per cent since 2020, whereas in the east it has increased by about 76 per cent. Only 18 400 t of sardine was located along the narrow shelf area east of the standard area up to Port St Johns. This represents less than 4 per cent of the total estimated sardine biomass or about 8 per cent of the sardine biomass east of Cape Agulhas.

The round herring biomass estimate of 163 000 t is slightly down from the 183 000 t estimated in 2020, and well above the long-term average of 1 000 t, but similar to the average biomass for this species over the past 5 years. The precision of the estimate is the highest since 2011 and the percentage of the round herring biomass located west of Cape Agulhas (34 per cent) is higher than the most recent four estimates as well as the long-term average. The biomass of round herring in the area to the east of Port Alfred was estimated at 40 200 t, representing less than 3 per cent of the total round herring biomass.

Figure 5.6.33 illustrates the anchovy, sardine and round herring biomass estimates for the fishing grounds east of Agulhas for the period 2007 to 2022. Note that in 2021 there were no comparative data available (DFFE, 2023b).

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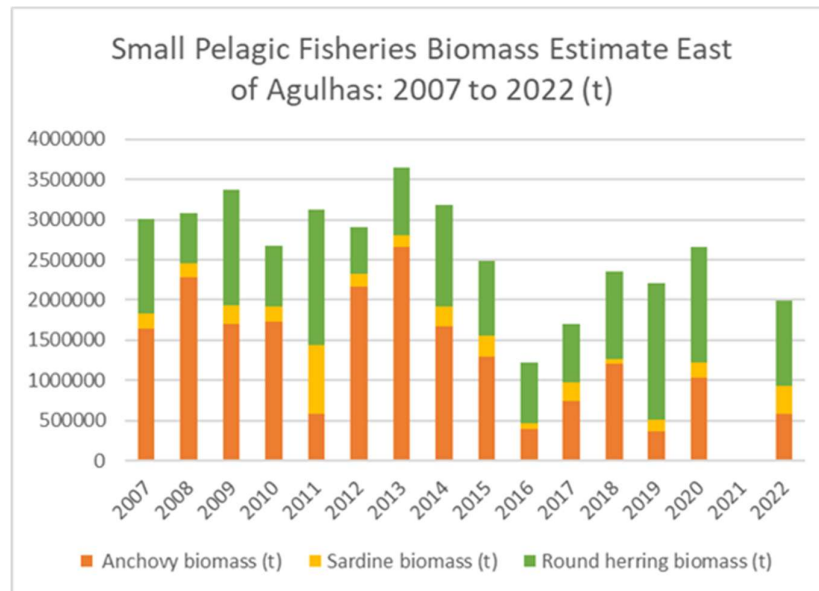


Figure 5.6.33
Biomass Estimate East of Agulhas - Anchovy, Sardine and Redeye Round Herring (2007 to 2022)

Anchovy recruitment measured in 2016 was considerably lower than the long-term average and almost half that measured in 2015. This was followed by a record high anchovy recruitment estimate of 830 billion fish in 2017, with the adult anchovy biomass in 2017 and 2018 remaining relatively stable at around 1.5 million t. The decrease of close to 50 percent in the adult anchovy biomass from 1.5 million t in 2018 to only 0.84 million t in 2019 was followed by above average anchovy recruitment in 2020 giving rise to a three-fold increase in adult biomass in that year. Recruitment of anchovy in 2021 and 2022 was again below average with a subsequent below average adult biomass of only 1 million t measured at the end of 2022.

Sardine recruitment has remained very low, with the lowest recruitment estimate in 30 years of less than 1 billion fish, of an estimated 7 billion fish in 2017, 4 billion fish in 2019 and a slight increase in sardine recruitment in 2020. Half of the recruitment estimates in the past 10 years have been lower than 5 billion fish.

Given this sustained below average recruitment, adult sardine biomass decreased further to only 91 000 t in 2018, and slightly increased to 190 000 t in 2019 and to 250 000 t in 2020. By 2022, the biomass had, increased to over 560 000 t. However, despite this recent increase, the 2022 biomass estimate is still lower than the long-term average of 844 000 t. The sardine status is categorised as between depleted and

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optimal, hence the setting of a precautionary TAC for 2023. The 2019 West Coast round herring recruitment estimate was the third highest on record and resulted in a 60 per cent increase in the biomass of adult West Coast round herring from 1.4 million t in 2018 to 2.3 million t in 2019, the highest yet recorded. Recruitment dropped substantially in 2021 and 2022 but remained above the long-term average recruitment of 13 billion fish and the adult biomass by the end of 2022 remained relatively high at over 3 million t.

Shifts in the distribution both of anchovy and sardine adults that have previously been reported on continue to be monitored.

The abrupt eastward shift of anchovy that occurred in 1996 persists in most years, with an average of 38 per cent of the adult anchovy biomass observed in the area to the west of Cape Agulhas since 1996 compared to 64 per cent on average in the years preceding the shift. Given the recent decline in the size of the anchovy population, the biomass of anchovy in this western area has declined to less than 500 000 t, a level far below that observed from 2012 to 2016. The 2022 small pelagic biomass survey located 43 per cent of the anchovy biomass to the west of Cape Agulhas compared to the 60 per cent in 2020 but is similar to the long term average proportion to the west of Cape Agulhas of 46 per cent. East of Cape Agulhas anchovy biomass located was 64 per cent (579 498 t) in the area from Mossel Bay to Port Alfred. Corresponding to the site region, the survey located 30 279 t. The 2022 biomass estimate for anchovy east of Cape Agulhas is 579 498 t, well below the long term average of 1 214 935 t.

Figure 5.6.34 illustrates the estimated abundance and recruitment of sardine, anchovy and West Coast round herring from 1984 to 2022.

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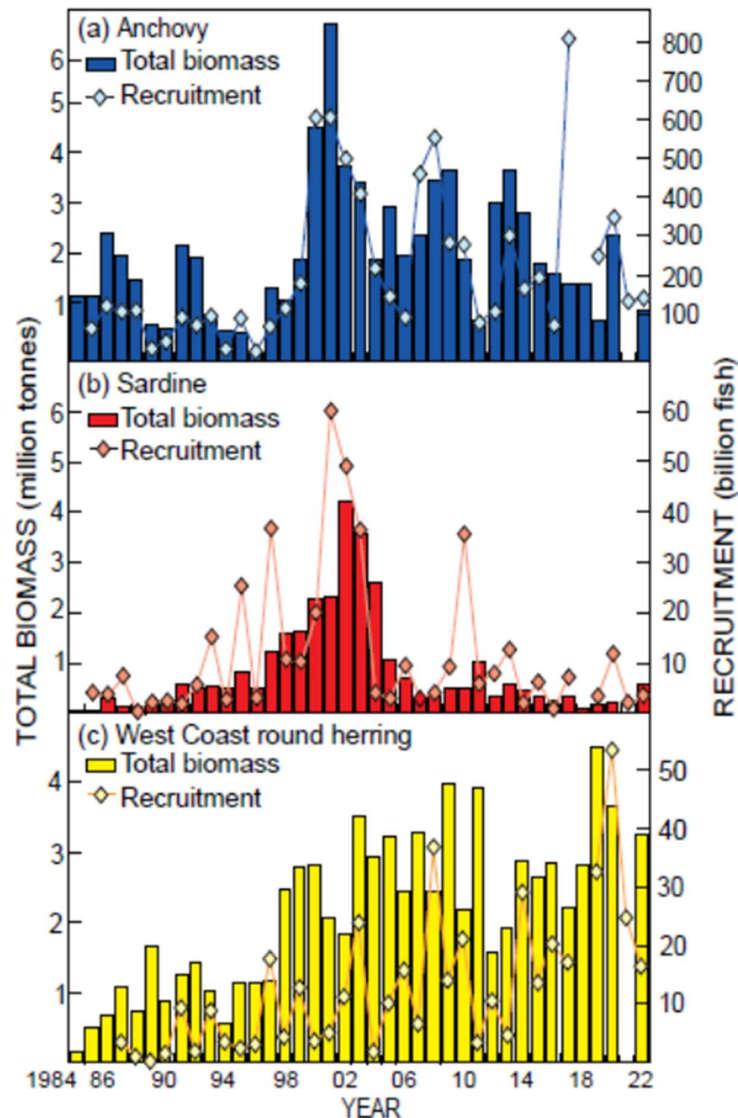


Figure 5.6.34
Estimated Abundance and Recruitment of
Sardine/Pilchard (1984 to 2022)

The percentage of the sardine biomass found in the area to the west of Cape Agulhas remains highly variable but has decreased considerably in recent years. Around 71 per cent (180 000 t) of the sardine biomass was found in the area to the west of Cape Agulhas in 2016, but this percentage decreased to 32 per cent in 2017 and subsequently to only 23 per cent (44 000 t) in 2019 and 21 per cent (52 000 t) in 2020.

Despite a large increase in the biomass of sardine in both regions in

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2022, the percentage located to the west of Cape Agulhas remains relatively low (39 per cent). This decrease in the biomass of sardine to the west of Cape Agulhas is likely to compromise future recruitment, given the relatively low transport of eggs and larvae to the West Coast nursery area from sardine spawning on the South and East coasts. The 2022 biomass survey located 61 per cent (347 987 t) of the sardine biomass to the east of Cape Agulhas, of which 322,669 t was present in the area from Mossel Bay to Port Alfred. The 2022 biomass estimate for sardine east of Cape Agulhas was 347 987 t, below the long term average of 504 657 t (Planning Partners, 2024b).

Management of the Fishery

Historically, the fisheries were managed independently. In 1971 a combined pelagic TAC was implemented and was deemed to be the most effective means of limiting over-exploitation. Species-specific TACs were introduced in 1983 to encourage diversification, protect the sardine resource and to prevent over-exploitation of anchovy. Other smaller pelagic species were designated 'non-quota' in 1983 to further encourage diversification.

The anchovy fishery was regulated since 1991 by using an OMP approach. This management system can respond rapidly to major changes in resource abundance. A joint anchovy-sardine OMP was implemented in 1994 with the aim of ensuring sustainable utilisation of both resources.

The objective of the OMP is to maximise average directed sardine and anchovy catch in the medium term subject to constraints on the extent to which TACs can vary from year to year in order to enhance industrial stability.

TACs for both species and a Total Allowable By-catch (TAB) for sardine by-catch are set at the beginning of the fishing season, based on results from the adult biomass survey of the previous November. Because the anchovy fishery is largely a recruit fishery, the TAC of anchovy and the juvenile sardine by-catch allowance is revised mid-year following completion of the recruitment survey in May/June.

In terms of OMP-18, TAC is related to biomass, which at certain points influences the allowable catch. With reference to sardine, the OMP set rules are the following:

- Where the sardine biomass is equal or more than 1.6 million t, the TAC is capped at 200 000 t.
- Where sardine biomass is considered stable, the TAC is set at

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65 000 t.

- Where sardine biomass decreases to less than 200 000 t, the absolute minimum TAC is set at 10 000 t, which was the case in 2019.

In addition to the directed sardine and anchovy TACs, several by-catch limits and PUCLs are set.

The sardine population is currently at its lowest observed level, corresponding to that surveyed approximately 35 years ago and Exceptional Circumstances have been declared. The primary objective of the Small Pelagic Scientific Working Group in providing management advice is to “assist the speedy recovery of sardine to a higher biomass level”. However, the socio-economic implications of any management recommendations also need to be considered. For this reason, the directed sardine fishery was not closed in 2019. In addition, severely constraining the small sardine by-catch with anchovy could hamper the anchovy fishery, which has consistently had high TACs in recent years in response to high anchovy abundances.

Ecosystem considerations in the fishery include closure of areas to fishing around important seabird breeding colonies (e.g. African penguin and Cape gannet) in an attempt to assess the impact of localised fishing effort on the breeding success of birds, since 2008. The alternative closures to fishing around important breeding islands was concluded between 2008 and 2020. Islands in the site region where this closure occurred were St. Croix and Bird Islands. The closed area extended 20 km around these islands, as illustrated in **Figure 5.6.35**.

The closure demonstrated some benefit to some breeding islands but not others. It was found that, although the closures may help to reduce the rate of decline of penguins, they would do little to halt the decline, being up to 10 per cent in some colonies. At the same time the closures have a financial impact on the small pelagic fishing industry.

These closures were experimental and not permanent. **Table 5.6.6** provides a schedule of closures around breeding colonies for the period 2008 to 2020 for islands located in the site region, with closed periods shown in blue hatch in **Table 5.6.6**.

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Table 5.6.6
Schedule of Closures around Breeding Colony Islands

Island	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
St. Croix													
Bird Island													

The results of the experimental closure were evaluated by an expert panel appointed by the Minister in 2022. Following on the findings of the panel the Minister announced that agreement had been reached between the conservation sector and fishery representatives for the East Coast, to prioritise areas for penguin conservation around St. Croix and Bird islands, located to the east of the site region in Algoa Bay. The agreement is to exclude fishing from 42.17 per cent and 93 per cent of core penguin foraging areas. The agreement was implemented on 1 September 2023, for a period of 10 years and to be reviewed after 6 years.

For the 2023 fishing season, closures from 1 September to 31 December 2023 in the vicinity of St. Croix and Bird islands are illustrated in **Figure 5.6.35** (Planning Partners, 2024b).

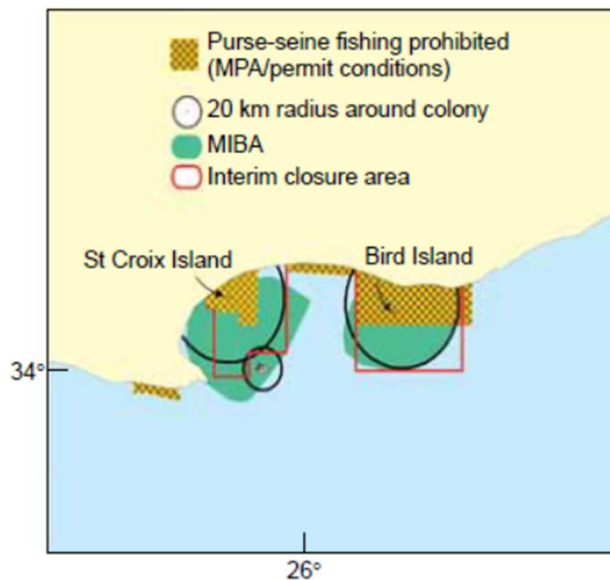


Figure 5.6.35
Marine Area Closed to the Small Pelagic Purse-seine Fisheries

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Vessels and Gear

The fleet currently consists of approximately 100 wooden, glass-reinforced plastic and steel-hulled vessels ranging in length from 11 m to 48 m. Since the targeted species are surface-shoaling and once a shoal has been located, the vessel will manoeuvre around it and encircle it with a large net, extending to a depth of 60 m to 90 m (**Figure 5.6.36**). Netting walls surround aggregated fish, preventing them from diving downwards. These are surface nets framed by lines: a float line on top and lead line at the bottom. Once the shoal has been encircled the net is pursed, hauled in and the fish pumped on board into the hold of the vessel. Vessels usually operate overnight and return to offload their catch the following day.

Data obtained from the Department of Environmental Affairs for the period 2008 to 2018, showed that between 72 and 82 vessels were active in the fishery, with 72 vessels recorded for 2018.

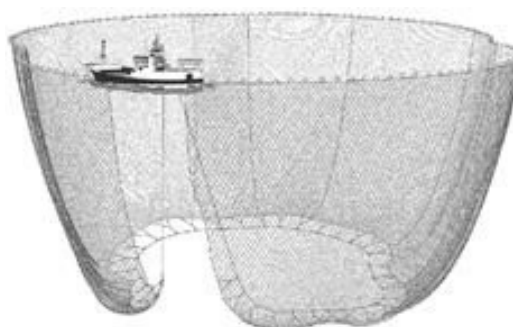


Figure 5.6.36
Small Pelagic Fisheries: Vessel and Gear

The sardine-directed fleet concentrates effort in a broad area extending from Lambert's Bay, southwards past Saldanha and Cape Town towards Cape Point and then eastwards along the coast to Mossel Bay and Gqeberha. The anchovy-directed fishery takes place predominantly on the Southwest Coast from Lambert's Bay to Kleinbaai (19.5°E) and similarly the intensity of this fishery is dependent on the availability of fish, and it is most active in the period from March to September.

Round herring (a non-quota species) is targeted when available and specifically in the early part of the year (January to March) and is distributed from Lambert's Bay to the south of Cape Point, outside of the site region. This fishery may extend further offshore than the sardine and anchovy-directed fisheries.

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The fishery operates throughout the year with a short seasonal break from mid-December to mid-January (Planning Partners, 2024b).

Fishery Allocation and Catch Data

A total of 109 long-term rights were issued for the period 2006 to 2020. There were 86 active rights holders in 2016. Fishing rights allocations range from 0.05 to 15 per cent of the TAC, per rights holder. 73 per cent of the TAC was held by rights holders from the West Coast. The total combined catch of anchovy, sardine and round herring landed by the pelagic fishery has decreased by 45 per cent from 395 000 t in 2016 to 219 000 t in 2019, due mainly to a substantial decrease in the catch of anchovy from 262 000 t in 2016 to only 166 000 t in 2019. Despite this decline, the average combined catch over the last five years of 322 000 t is only slightly lower than the long-term (1949–2019) average annual catch of 334 000 t.

Figure 5.6.37 provides an overview of historic catch data for the main species of fish caught in the small pelagic fishery from 1949 to 2021.

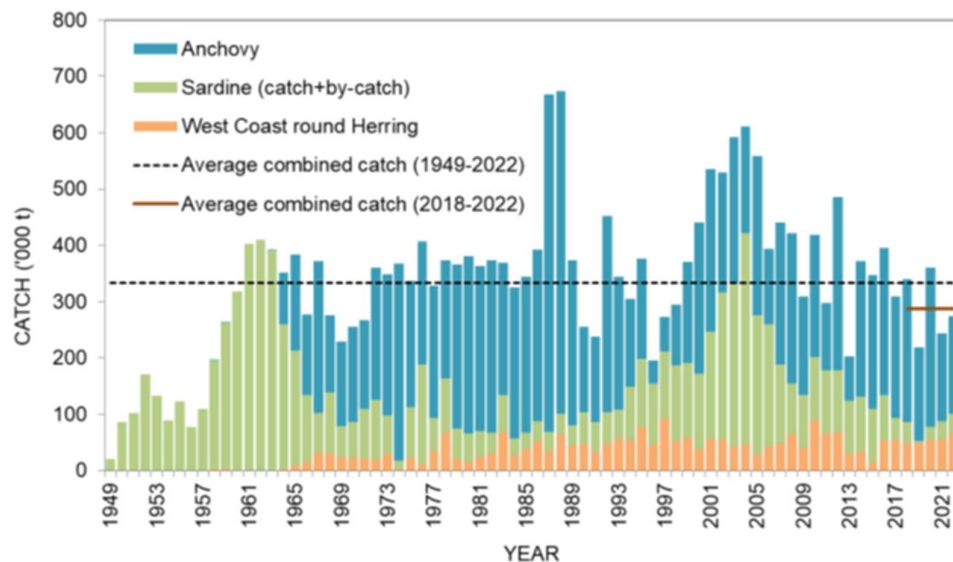


Figure 5.6.37
Small Pelagic Catch Data (1949 to 2021)

Data on TAC versus catch in the fishery are available in a report prepared by DFFE for the period 2000 to 2022. **Figure 5.6.38** illustrates the TAC, TAB and PUCL for the small pelagic fishery from 2007 to 2022.

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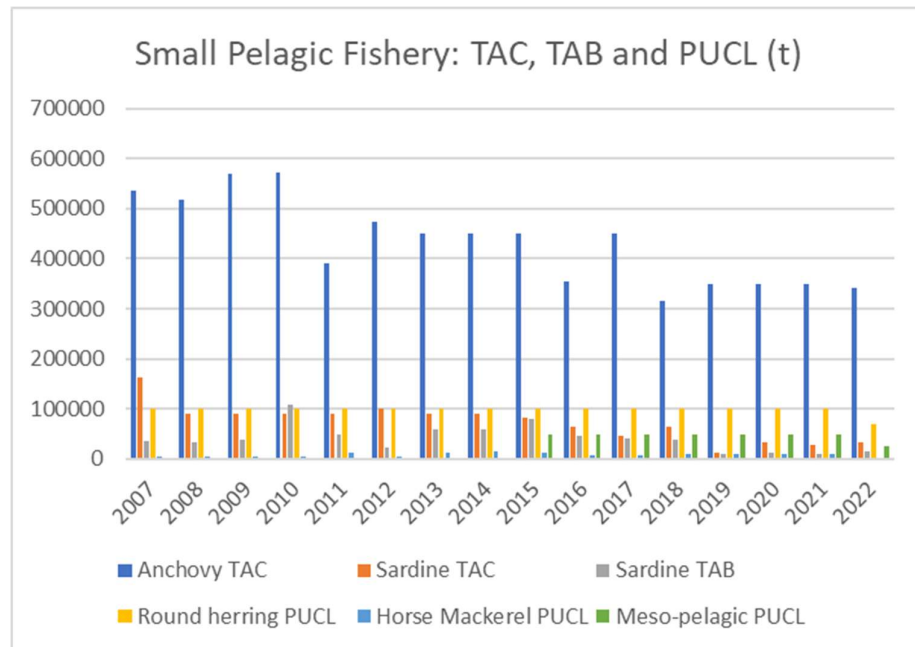


Figure 5.6.38
Small Pelagic TAC, TAB and PUCL (2007 to 2022)

From **Figure 5.6.39** is evident that the site region is of a relatively small importance to the fishery as a whole.

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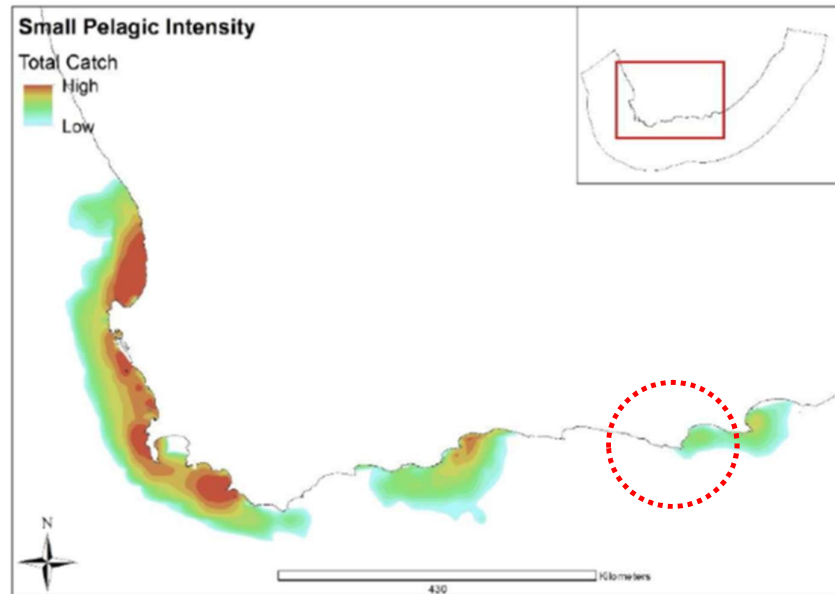


Figure 5.6.39
Small Pelagic Intensity Relative to the Site Region
Indicated by the Red Dashed Circle (2000 to 2016)

Restrictions and Closed Areas

In terms of the 2023 fishing season permit conditions for small pelagic fish, sardine and anchovy, no person shall use any purse-seine in the following areas or for any other purpose:

- (i) in Walker Bay landwards of imaginary lines drawn from (both areas are outside of the site region):
 - a) "Voorsteklip" on the Plaat (34°31.1'S, 19°22.3'E) to the beacon marked M1 at Mudge Point (34°24.0'S, 19°07.3'E), near Hawston;
 - b) The lighthouse on the southern breakwater in the fishing harbour of Gansbaai (34°35.0'S, 19°20.7'E) and a beacon marked M1 at Mudge Point, during the period 1 December to 31 January.
- (ii) landward from a straight line joining (both areas are outside of the site region):
 - a) Cape Vacca (34°20.3'S, 21°55.0'E) and the lighthouse at Cape St. Blaize (34°11.2'S, 22°09.'E);
 - b) The lighthouse at Cape St. Blaize and Gericke Point

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(34°02.3'S, 22°45.9'E).

Within the following areas around African penguin breeding colonies between 1 September and 31 December 2023:

- a) Dassen Island and Robben Island (existing MPA restrictions only, outside of the site region);
- b) in the Stony Point (Betty's Bay) area and Dyer Island (Gansbaai) area (outside the site region);
- c) in the area around St. Croix and Bird Island, which is located to the west northwest beyond the 80 km radius, in Algoa Bay and the only closed or restricted area within the site region (Planning Partners, 2024b).

Market Destinations

In recent years, the distribution of sardine has changed on an almost annual basis from being predominantly located on the South Coast in one year to being found mainly on the West Coast in the next year. This has had severe cost and logistical implications for the fishery and management of the stock as there is frequently a mismatch between the location of sardine availability and fish processing facilities, as well as between fish abundance and fishing effort, which is linked to some extent to the location of processing facilities. Catches of sardine on the South Coast have exceeded those taken on the West Coast in only four years (2005 to 2008), with the majority of those sardine caught on the South Coast being transported back to factories on the West Coast; either by large, refrigerated seawater vessels or by truck. Presently, the majority of sardine processing infrastructure is still based on the West Coast and most of the lease agreements and systems established for the offloading of sardine in Mossel Bay for road transport, by West Coast-based rights holders, during years when the sardine TACs and availability of sardine on the South Coast were high, have been discontinued. In recent times half of sardine landed have been landed at Gqeberha and are either processed there or trucked to Mossel Bay for canning.

The current low sardine TACs are insufficient for profitable operation of the major canning facilities and the bulk of canned sardine products currently produced in South Africa contain sardine that are sourced from Morocco and elsewhere.

Adult sardine are generally targeted for canning and bait. Approximately 85 per cent of the sardine catch is canned, whilst the remainder is frozen and packed in boxes for local and international bait markets.

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Anchovy and round herring are mostly reduced to fishmeal and oil and used as a protein to supplement agri- and aquafeeds.

Anchovy and round herring are processed for fishmeal and fish oils and sardine are canned or frozen for human consumption and pet food, or frozen for bait. The 10-year annual average catch is reported to be 350 000 t. 93 per cent of fishmeal and fish oil is exported, 90 per cent of frozen sardine is exported and 88 per cent of canned sardine is destined for the domestic market, with the remaining 12 per cent of canned sardine destined for export within the SADC region (Planning Partners, 2024b).

Table 5.6.7
Summary of the Small Pelagic Fishery (Entire Fishery)

Duration of Rights	15 years (up to 28 February 2036)
Value of the Small Pelagic Fishery (2023)	R210 million (pilchards) and R150 million (anchovy)
Fish Landed Small Pelagic Fishery (2022)	273 280 t
Number of Jobs Sustained	5 000
Number of Vessels	100
Number of Rights Holders (as at 2022)	67 pilchard and 80 anchovy rights holders
Closed Season	1 September and 31 December 2023 s specified around important penguin breeding colonies.

v. Horse Mackerel Mid-water Trawl

Overview

Cape horse mackerel (*Trachurus capensis*), also known as maasbanker, are semi-pelagic shoaling fish that occur on the continental shelf off Southern Africa from southern Angola to the Wild Coast. Off South Africa, adult horse mackerel are currently more abundant off the South Coast than the West Coast and the largest concentrations are found on the Agulhas Bank near the continental shelf.

Figure 5.6.40 illustrates the distribution of the Cape horse mackerel, as derived from fishery-independent demersal research surveys. Data are shown as the average density (kg/nmi²) per grid block over surveys conducted from 1986 to 2023.

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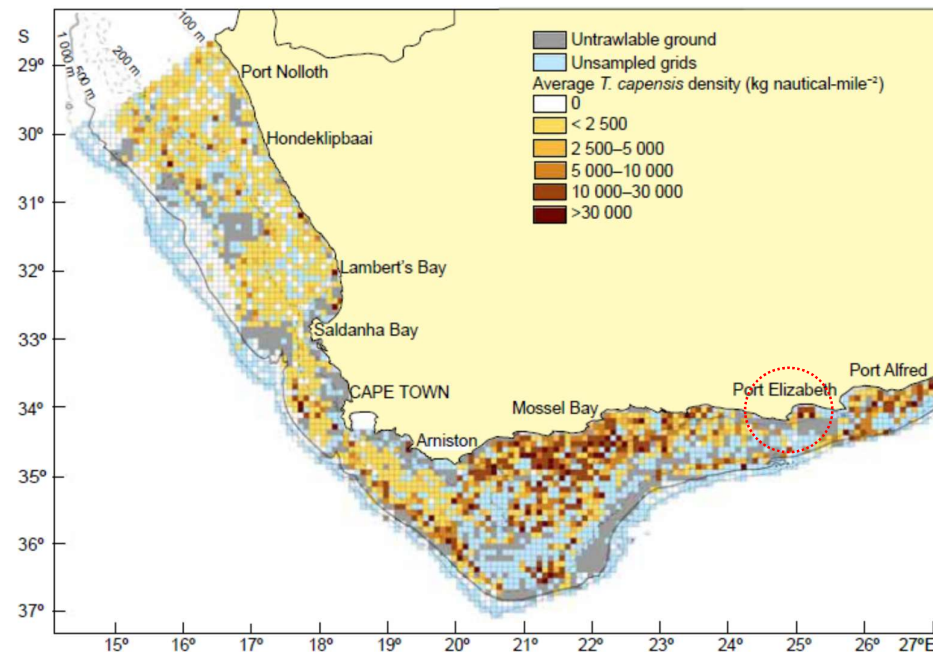


Figure 5.6.40
Distribution of Horse Mackerel in South African Waters
Derived from Fishery Independent Surveys 1986 to 2023

Juveniles are found inshore, mainly on the West Coast. Contextually, the exploitation of horse mackerel in South African waters occurs in two main areas targeted, namely (i) the West Coast where juveniles are caught and (ii) the Agulhas Bank area (Southeast Coast) where predominantly adults are caught.

The horse mackerel are known to be difficult to catch as they are strong swimmers and migrate up and down in the water column and occur from the shallowest waters out to the deep waters of the continental shelf. The South African fisheries for Cape horse mackerel are broadly separated between the following three fishery sectors:

- a targeted fishery using mid-water trawls mainly on the South Coast and the now extended area up to Cape Point;
- a second fishery using bottom trawls (typically for hake) as incidental by-catch mainly on the South Coast;
- a third fishery targeting juvenile Cape horse mackerel using purse-seine gear such as that used for sardine and anchovy, mainly on the West Coast, outside of the site region.

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Figure 5.6.41 illustrates the three horse mackerel fishery sectors relative to the site region. Current data indicate that the small pelagic purse-seine fishery targeting horse mackerel does not operate in the site region. The mid-water trawl for horse mackerel occurs in the site region, while the demersal hake trawl landing horse mackerel as a by-catch on the southern edge of the site region.

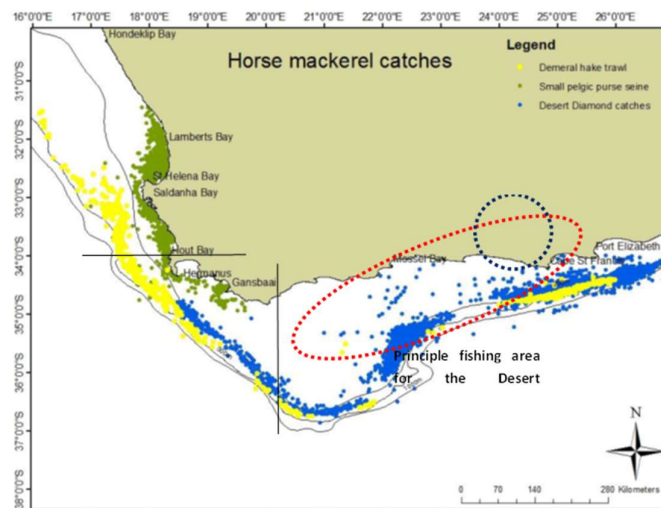


Figure 5.6.41
Distribution of Horse Mackerel Catches taken by the
Different Fishery Sectors: Directed Mid-water Trawl
Fishery, Demersal Trawl Fishery and Small Pelagic
Purse-sein Fishery, with the Site Region (80 km)
illustrated in the Dashed Blue

Cape horse mackerel generally reach 40 to 50 cm in length and become sexually mature at about 3 years of age when they are roughly 20 cm long. They feed primarily on small crustaceans such as copepods and euphausiids. The fishery operates predominantly on the edge of the Agulhas Bank, where shoals are found in commercial abundance. Fishing grounds off the South Coast are situated along the shelf break and three dominant areas can be defined. The first lies between 22 °E and 23 °E at a distance of approximately 70 nmi offshore from Mossel Bay (outside of site region) and the second extends from 24 °E to 27 °E at a distance of approximately 30 nmi offshore (within the site region). The third area lies to the south of the Agulhas Bank 21 °E and 22 °E (outside of site region). These grounds range in depth from 100 m to 400 m and isolated trawls are occasionally recorded up to 650 m. From 2017, DFFE has permitted experimental fishing to take place westward of 20°E (Planning Partners, 2024b).

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History and Historic Trends of the Fishery

Historically, large surface schools of adult Cape horse mackerel occurred on the West Coast and supported a purse-seine fishery/small pelagic fishery that made substantial catches, which peaked at 118 000 t in 1954 and declined to negligible levels in the late 1960s with a catch of only 1 400 t recorded in 1968. In the 1990s, purse-seine catches of Cape horse mackerel consisting of mostly juvenile fish showed an increasing trend with a catch of 26 000 t recorded in 1998. Concerns relating to potential impact on the trawl fishery for adult horse mackerel led to the introduction of a PUCL of 5 000 t in the purse-seine fishery in 2000. Since then, the average annual catch by the purse-seine fleet has been 3 400 t. The large surface schools of adult horse mackerel that were targeted by the early purse-seine fleet have now disappeared from the South African West Coast. The 5 000 t annual PUCL was changed to a 'PUCL3' system in 2013 to enable flexibility in horse mackerel by-catch management within the small pelagic purse-seine sector. This system, which effectively uses a three-year 'running average' catch limit approach, was developed to enable continued fishing for anchovy by the purse-seine fleet during periods of unusually high juvenile horse mackerel abundance (as was the case during 2011).

In the 1950s and 1960s, trawl catches of Cape horse mackerel were incidental to directed hake and sole. During this period, catches amounted to less than 1 000 t. The commercial fishery for Cape horse mackerel was established in the mid-1960s (Sink, et al., 2019). Trawling for horse mackerel increased significantly, notably in the 1970s by Japanese trawlers operating on the Agulhas Bank and peaked at 93 000 t in 1977 (Sink, et al., 2019). Note that DAFF recorded a catch of 116 400 t for the same year in the trawl fishery. After South Africa declared the EFZ in 1977 and foreign participation in the fishery was controlled, catches stabilised between 25 000 t and 40 000 t per annum (Sink, et al., 2019).

From the 1980s onwards, the resource was also targeted by both the South African bottom and mid-water trawl vessels (Japp, et al., 2019). Foreign fleets were finally phased out in 1992 and annual catches exclusively landed by the South African fleet declined to below 10 000 t in 1995 and 1996. With the re-establishment of the mid-water trawl fishery in 1997, annual catches have increased and fluctuated between 11 000 t and 33 000 t per year up to 2014.

Currently the fishery fleet comprises six vessels and 34 rights holders which landed a total catch of 19 555 t in 2019. The fleet is split between dual rights holders who fish horse mackerel on hake-directed trawlers and others that combine their allocation on a single large midwater trawl vessel (the FV Desert Diamond). Dual rights holders only fish when horse mackerel availability is high, and the volumes caught is a relatively small

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component of the horse mackerel TAC. The FV Desert Diamond is restricted largely (but not exclusively) to water deeper than 110 m or more than 20 nmi from the coast and predominantly in an area east of Cape Point (Planning Partners, 2024b).

Management of the Fishery

Most fisheries in South Africa are managed in terms of a TAC. However, when there is uncertainty in an assessment of a stock, which is the case with the horse mackerel resource, the fisheries management adopts the 'precautionary approach' and sets a PUCL, which has been the case for the horse mackerel fishery for the last 10 years.

The following sets out the evolution of the management of the horse mackerel resource since 1990 to date. Initially, the fishery was managed in terms of an annual TAC limit, which was set for 1990 and 1991. This TAC was based on Catch per Unit Effort (CPUE) data derived from the Japanese fleet, combined with survey biomass and egg abundance indices. With the phasing out of the foreign fleet in 1992, the Japanese CPUE time-series was terminated. In 1992, a precautionary maximum catch limit (PMCL) was set at 40 000 t and a Yield per Recruit Modelling approach was applied until 1999.

In 1999, an Age-Structured-Production-Model of the resource was developed, with biomass projections using this model indicating a PMCL of 34 000 t for the trawl fishery and a PUCL of 5 000 t for the purse-seine fishery. In 2001, the trawl PMCL was increased to 44 000 t. In 2002 the PMCL was split into two components with 12 500 t reserved as by-catch in the hake demersal trawl fishery and 31 000 t allocated to the horse mackerel directed mid-water trawl fishery, which was maintained at that level until 2012. The PUCL for the purse-seine fishery was maintained at 5 000 t until 2010.

In 2012, an OMP approach was introduced for the horse mackerel-directed mid-water trawl fishery to improve utilisation of the resource. The OMP allows for increased catches during periods of high resource abundance and incorporates a harvest control rule that adjusts the annual TAC depending on the level of current resource abundance indices relative to averages over a fixed past period. Note that this approach only applies to the mid-water trawl component of the fishery.

A portion of the horse mackerel allocation is annually set aside as a by-catch reserve in the hake trawl sectors and some is reserved as by-catch in the small pelagic purse-seine fishery. An adaptive control rule in the form of TAC was introduced in 2013. The rule uses a three year 'running average'. Effectively, the rule determines that if recent abundance indices are high compared to averages over a fixed past

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period, the TAC is increased. Conversely, if recent abundance indices are correspondingly low, the TAC is decreased. Furthermore, a vessel fishing capacity management regime has also been implemented to regulate overcapacity in the horse mackerel sector since 2012.

The 2019 assessment of the horse mackerel resource was conducted in circumstances in which the commercial CPUE index of abundance had increased to a level in 2018 that was the highest on record. Results generated by the 2019 base case operating model suggested that the Cape horse mackerel resource was at about 66 per cent of pre-exploitation biomass, and more than double the level that produces MSY. There was therefore no compelling reason to alter the management measures imposed for the previous fishing season, and all catch and effort limits set for 2019 were maintained for the 2020 fishing season. A slight decrease in the commercial CPUE index was observed in 2019. Assessments conducted in 2020 yielded results that were very similar to those obtained 2019, and the catch and effort limits imposed for the 2020 fishing season were consequently maintained for 2021 (Planning Partners, 2024b).

Status of the Resource

Data recorded by the FV Desert Diamond allows for standardisation of fishing effort, providing a key index of abundance used to assess the stock status of horse mackerel. It is noted that historically, the best data available for the assessment of horse mackerel were provided by a few large Japanese mid-water trawlers that were permitted to fish on the Agulhas Bank.

The 2017 update of the horse mackerel stock assessment incorporated additional data extending to the end of 2016. Uncertainty regarding the reasons for a continued reduction in availability/abundance (or catchability/natural mortality) remains, with the available data being uninformative on this aspect. The analyses consequently adopted the same approach as used previously, with a suite of model variants that incorporated various assumptions regarding the underlying cause of the low CPUE, in recent years. With the inclusion of additional CPUE data from the dual rights vessels, the model yielded slightly more optimistic estimates of current biomass. However, the results were broadly similar to those previously reported, with the 'catchability' models estimating current resource status at about 62 per cent of pre-exploitation spawning biomass, whereas the 'mortality' variant yielded an estimate of about 24 per cent.

According to the state of the stocks report 2020, the South African horse mackerel (*Trachurus capensis*) is classified as being in an 'optimal' state in terms of both its stock status and fishing pressure. This classification

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indicates that the current biomass level and fishing pressure are aligned with achieving the MSY. Additionally, findings from a recent OMP assessment suggest that the horse mackerel resource currently stands at approximately 69 per cent of its pre-exploitation level, which is more than double the level required amount for MSY.

Following on the assessment the 2021 the mid-water trawl TAC remained unchanged, and the directed midwater TAC was maintained at 27 670 t. The updated 2022 assessment indicated only a marginal improvement in stock status and the TAC was maintained at 27 670 t (Planning Partners, 2024b).

Vessels and Gear

The FV Desert Diamond is the only vessel which operates exclusively in the South African waters using midwater trawl. It is the largest vessel permitted to fish in South African waters.

The Desert Diamond is a 120 m long freezer trawler (Sink, et al., 2019) and has a Gross Registered Tonnage of 8 000 t. The towed gear may extend up to 1 km astern of the vessel and comprises trawl warps, net and cod-ends. Trawl warps are between 32 mm and 38 mm in diameter. The trawl doors (3.5 t each) maintain the net opening which ranges from 120 to 130 m in width and from 40 to 80 m in height. Weights in front of and along the ground-rope provide for vertical opening of the trawl, as illustrated in **Figure 5.6.42**.

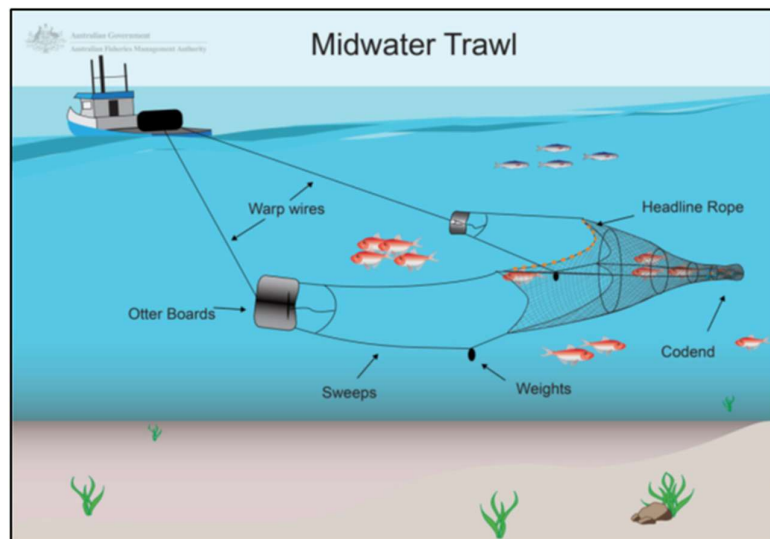


Figure 5.6.42
Schematic Diagram showing the Typical Gear
Configuration of a Horse Mackerel Mid-Water Trawler

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The cable transmitting acoustic signals from the net sounder might also provide a lifting force that maximizes the vertical trawl opening. To reduce the resistance of the gear and achieve a large opening, the front part of the trawl is usually made from very large rhombic or hexagonal meshes. The use of nearly parallel ropes instead of meshes in the front part is also a common design. Once the gear is deployed, the net is towed for several hours at a speed of 4.8 to 6.8 knots, predominantly parallel with the shelf break.

In principle, the net is dragged by a fishing vessel along any depth between the sea bed and the surface of the sea without continuously touching the bottom. In practice, mid-water trawl gear does occasionally come into contact with the seafloor. Mid-water trawling gear configuration is similar to that of demersal trawlers, except that the net is manoeuvred vertically through the water column.

The following five fishery priority areas were identified for the mid-water trawl fishery in 2018 (Norman, et al., 2018):

- Area 1: East Coast offshore of Gqeberha;
- Area 2: South of Danger Point;
- Area 3: Blues (20°E);
- Area 4: Blues (21 to 22°E);
- Area 5: Eastern Agulhas Bank.

In addition, there are a number of smaller hake trawlers carrying dual hake and horse mackerel rights (the “dual rights vessels”) (Planning Partners, 2024b).

Fisheries Allocation and Catch Data

In December 2016, the Fisheries Minister allocated 33 commercial horse mackerel fishing rights for a period of 15 years. During the previous rights allocation period (2005 to 2015), there were 14 operators. In May 2019, a further 5 rights were allocated subsequent to an administrative appeals process. In December 2020, the Western Cape High Court reviewed and set aside the entire allocation of fishing rights and quota to all 30 new entrant rights holders. In March 2022, the Minister published her decision and added 19 new entrants to the fishery. The historic 10 rights holders shared 60 per cent of the TAC and the new entrants the remaining 40 per cent.

The 2023 TAC (40 067 t) for adult horse mackerel increased by 2.5 per

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cent since 2022 and the PUCL for juvenile horse mackerel increased from the 2022 level of 12 000 t to 15 000 t, spread over 3 years.

Figure 5.6.43 illustrates the horse mackerel fishery PMCL, TAC, PUCL and the demersal reserve for the period 2007 to 2021. The data were obtained from the most recent published Status of the South African Marine Fisheries Resources (DFFE, 2023a).

Figure 5.6.43 presents the total PMCL in tonnes in the blue line. This represents the total fishery allocation for the demersal trawl, the hake by-catch allocation and the purse-seine allocation. The PUCL applied to juvenile horse mackerel catches in the purse-seine fishery for small pelagic species is represented by the orange line.

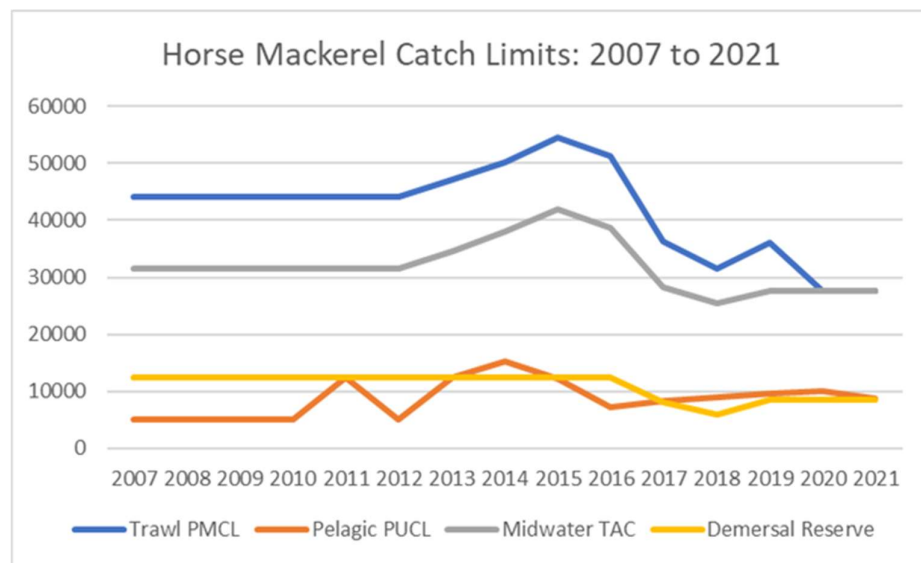


Figure 5.6.43
Horse Mackerel PMCL/TAC/PUCL/Demersal Reserve in Tonnes (2007 to 2021)

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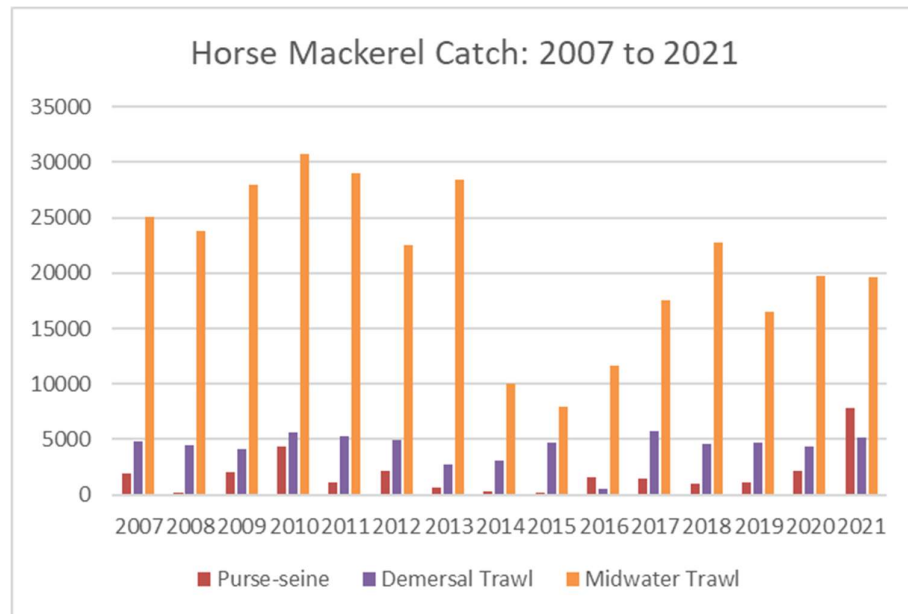


Figure 5.6.44
Cape Horse Mackerel Catch in (t) (2007 to 2021)

Figure 5.6.44 illustrates the Cape horse mackerel catch for the three fishery sectors for the period 2007 to 2021. From the graph, it is evident that the horse mackerel catch rates in the mid-water trawl decreased sharply from 2013 to 2016. However, since the FV Desert Diamond started fishing in the experimental areas west of 20°E in 2016 to allow fishing further west to a line due west of Cape Point (34° 20' S), there was a steadily increase of catch in the mid-water trawl sector.

Figure 5.6.45 illustrates the Cape Horse Mackerel midwater trawl intensity relative to the site region for the period 2008 to 2016.

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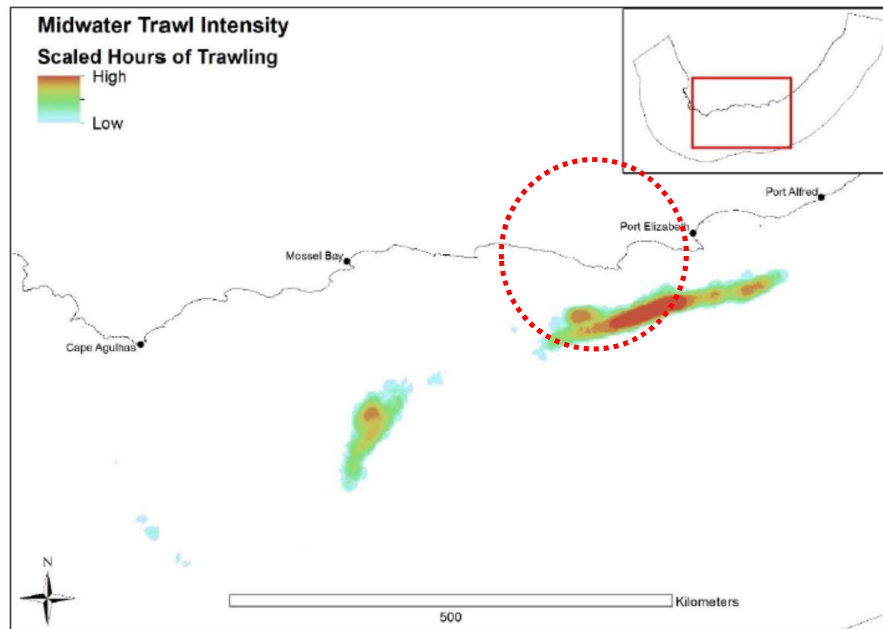


Figure 5.6.45
Cape Horse Mackerel Midwater Trawl Intensity Relative
to the Site Region Illustrated by the Dashed Red Circle
(2008 to 2016)

Closed Areas

Several fisheries target the horse mackerel and accordingly fishing restrictions in the three fisheries differ. Restrictions and closed areas are summarised as follows:

Demersal Trawl Fishery

Permit Conditions Section B: Hake, sole, horse mackerel and demersal shark for the 2024 fishing season:

- This permit is valid only in South African waters (excluding tidal lagoons, tidal rivers and estuaries), closed areas and marine protected areas as stipulated in Chapter 3 of MLRA Regulations.
- No fishing shall take place within False Bay, north of a straight line drawn from the lighthouse at Cape Hangklip to the lighthouse at Cape Point (outside the site region).
- No fishing shall take place in the MPA as proclaimed in the Government Gazette No. 42478 dated 23 May 2019 (Planning Partners, 2024b; Republic of South Africa, 2019).

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Mid-water Trawl Fishery

Sector Specific Permit Conditions Section C: Horse mackerel for the 2024 fishing season:

- This permit is valid only in South African waters (excluding tidal lagoons, tidal rivers and estuaries) east of 020°E longitude.
- No fishing may take place in water depths of less than 110 m or within 20 nmi from the coast, whichever is the greater distance from the coast.

There are also a number of effort limitations and gear restrictions including:

- The hake by-catch reserve in the horse mackerel directed midwater sector shall not exceed 553.4 t.
- The permit holder shall utilise only mid-water trawl gear with a minimum mesh size (measured inside mesh diameter and stretched to a maximum tension of 5 kgs) of 75 mm.
- The use of cod-end liners is prohibited.
- The permit holder shall only use the new bird-scaring lines for the 2024 fishing season.

In the experimental area, i.e. between 20°E longitudinal and the line drawn due west from Cape Point 34°20'S, DAFF has also set conditions that include strict limitations on by-catch. Concerns regarding the likely increased by-catch within this experimental area were raised, necessitating restrictions on key by-catch species, namely hake, sardine, redeye, round herring, sunfish, Cape fur seal, heaviside dolphin, common dolphin, dusky dolphin, African penguin, turtles, requiem sharks, hammerhead sharks and manta rays. If the limits are reached for any one of these species, mid-water trawling by the vessel would be suspended immediately and the historical spatial limits reinforced, i.e. 20°E restriction.

Purse-seine Fishery

Sector Specific Permit Conditions Section C: Hake/horse mackerel for the 2024 fishing season:

- This permit is valid only in South African waters (excluding tidal lagoons, tidal rivers and estuaries).

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- In the area east of 020°E longitude, no fishing may take place in water depths of less than 110 m or within 20 nmi from the coast, whichever is the greater distance from the coast (within the site region).
- In the area west of 020°E longitude, no fishing may take place within 5 nmi of the coast (outside of the site region).
- During the period 1 September to 30 November, no fishing may take place within the quadrilateral described by the lines joining the following four points (partly within the site region):

A: 34°48'S 024°00'E;

B: 34°38'S 025°00'E;

C: 34°44'S 025°00'E;

D: 34°57'S 024°00'E (known as the “kingklip box”).
- No fishing may take place outside of the areas defined as the ‘Hake Trawl Ring Fence’ as described in the DFFE Vessel Management System MaxSea file ‘Trawl Ringfenced 2009 Release V1.ptf’. This file is available for incorporation into MaxSea navigational software upon request from DFFE.
- No fishing may take place in the MPA as proclaimed in the Government Gazette No. 42478 dated 23 May 2019 (Planning Partners, 2024b; Republic of South Africa, 2019).

Market Destinations

Historically, the majority of horse mackerel is exported to West Africa without being landed or processed in South Africa. Currently 50 per cent of the catch is exported to African countries, including Cameroon, Nigeria, Democratic Republic of Congo, Angola and Mozambique. The other 50 per cent is exported domestically, predominantly to the northern provinces (Planning Partners, 2024b).

Table 5.6.8
Summary of the Horse Mackerel Fishery (Entire Fishery)

Duration of Rights	15 years (up to 31 December 2031)
Value of the Horse Mackerel Mid-water Trawl Fishery (2020)	R400 million (quayside)

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Fish Landed (Horse Mackerel Mid-water Trawl Fishery (2021))	19 681 t
Number of Jobs Sustained	950
Number of Vessels (2019)	6
Number of Rights Holders (Ministers allocation 31 March 2022)	29 (38 rights holders prior to the 4 December 2020 court decision)
Closed Season	None

vi. Large Pelagic Longline Fishery

Overview

Large pelagic fish resources in the waters around South Africa comprise several species, in quantities that can sustain commercial exploitation. The common commercial species include four tuna species: albacore *Thunnus alalunga*, yellowfin *Thunnus albacares*, bigeye *Thunnus obesus* and southern bluefin *Thunnus maccoyii*, as well as swordfish *Xiphias gladius*. In addition, blue shark *Prionace glauca* and shortfin mako shark *Isurus oxyrinchus* are abundant in South African waters. The distributions of these species span across all oceans, except southern bluefin tuna, which is confined to the southern hemisphere.

Two South African commercial fishing sectors target large pelagic species in the Atlantic and Indian oceans. These are the tuna pole-line and large pelagic longline fisheries. Additionally, the boat-based commercial line fishery catches tunas opportunistically and the boat-based recreational anglers undertake game fishing for tuna and billfish.

Longline fishing takes place throughout the entire EEZ and beyond. Southern bluefin tuna (*Thunnus maccoyii*), bigeye tuna (*Thunnus obesus*), yellowfin tuna (*Thunnus albacares*), albacore tuna (*Thunnus alalunga*) and swordfish (*Xiphias gladius*) are the main target species in the large pelagic longline fishery. Blue- and shortfin mako sharks (*Prionace glauca* and *Isurus oxyrinchus*) are the main by-catch species. This fishery also incidentally catches a number of other pelagic and epipelagic species, including billfish, oil-fish and escolar, as well as several pelagic shark species. The targeting and catching of tropical bigeye and yellowfin tunas has proven more successful in the Indian Ocean, resulting in a sizeable amount of the longline fishing effort being concentrated in the Indian Ocean. This sector is now the most important South African tuna sector operating in the Indian Ocean in terms of tonnage landed.

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Directed targeting of pelagic sharks is not permitted (Planning Partners, 2024b).

History and Historic Trends of the Fishery

The domestic commercial longlining for tuna has been documented from the early 1960s, with catches reaching approximately 2 000 t. The fishery rapidly declined and ceased in the mid-1960s due to the low quality bluefin and albacore tuna landed by the South African fishery. Foreign vessels continued to fish for the resource from the 1980s through to the 2000s under bi-lateral agreements.

Interest in the fishery was revived when it was demonstrated by a joint-venture agreement with Japanese vessels that tuna and swordfish could be profitably exploited in the South African waters. In 1997, 30 experimental longlining permits were issued for primarily tuna. Catches peaked at 2 500 t during the experimental phase.

The South African large pelagic longline fishery was formalised into a commercial fishery in 2005. A total of 18 swordfish-directed and 26 tuna-directed fishing rights, valid for 10 years, were issued. The fishery was restricted to 50 permits (one permit per vessel) through TAE control. The large pelagic longline fishery was initially split into swordfish and tuna-directed sub-sectors to promote the targeting of tuna and to reduce pressure on swordfish resources. By 2006, only 9 swordfish-directed longline vessels operated in the sector, resulting in the lowest annual catch since 2001 and the policy was amended in 2008.

As the local fleet had shifted from targeting exclusively swordfish to include tunas and sharks, the decision was taken in 2014 to no longer refer to the fleet as two different fishing strategies. The fishery is now referred to as the large pelagic longline fishery. Directed targeting of sharks is not permitted in the fishery and has been further dis-incentivised with the banning of wire traces since 2016.

The 10-year long-term rights issued in 2005 expired in 2015. The fishery operated under exemption rights until new fishing rights were allocated in 2017. A total of 60 commercial fishing rights were granted and a total of 34 vessels were authorised to fish in this fishery. It is noted that the allocation was preliminary, pending the outcome of the appeals process. In terms of the fishing rights register as of 2 July 2018, 59 fishing rights were issued in this fishery. The total number of active longline vessels within South African waters was 22, 18 of which were fishing in the Atlantic (West of 20°E) during 2017. These were exclusively domestic vessels, with three Japanese vessels fishing exclusively in the Indian Ocean (East of 20°E) during 2017 (Planning Partners, 2024b).

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Management of the Fishery

Large pelagic resources are highly migratory and fished by many nations. These resources are managed as a shared resource by Regional Fisheries Management Organisations (RFMOs). South Africa is a member of three RFMOs, namely (i) the International Commission for the Conservation of Atlantic Tunas (ICCAT) since 1967, with full membership, (ii) Indian Ocean Tuna Commission (IOTC) and the (iii) Commission for the Conservation of the Southern Bluefin Tuna (CCSBT) since 2016. The respective areas of management are illustrated in **Figures 5.6.46** and **47**. The site region corresponds with the IOTC and CCSBT areas of influence.

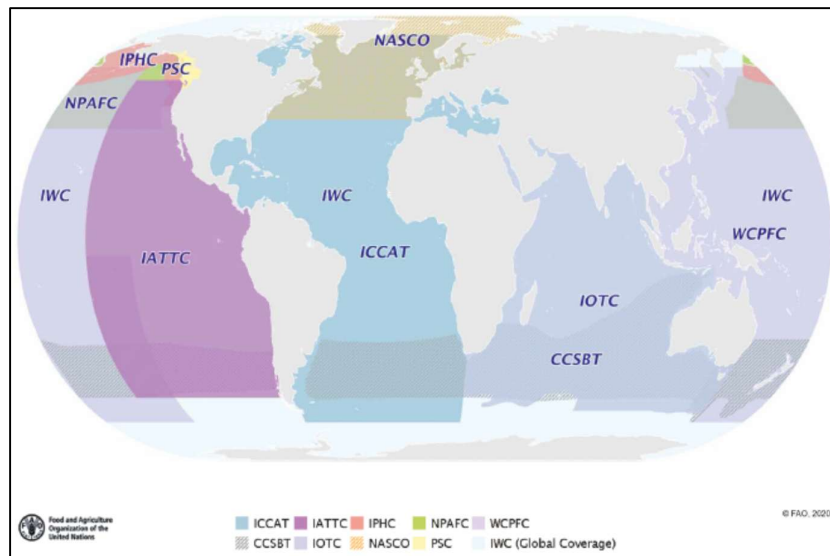


Figure 5.6.46
Regional Large Pelagic Fisheries Management Areas
(2020)

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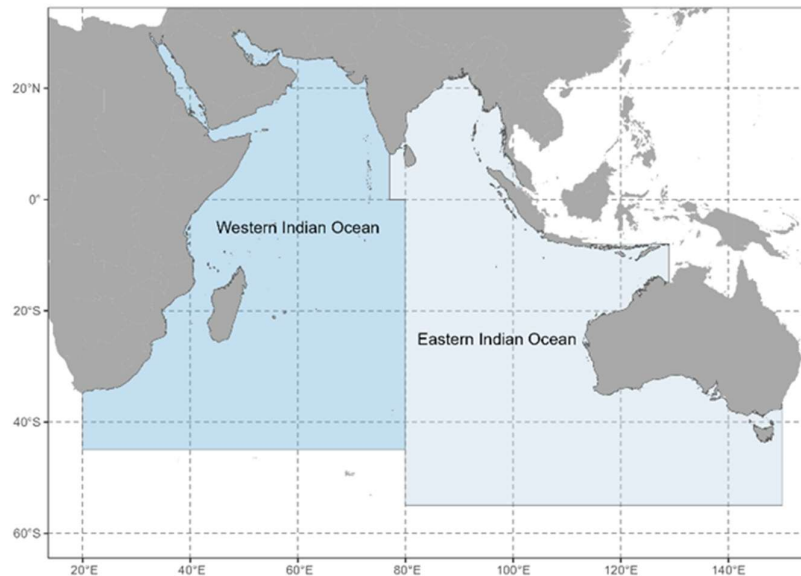


Figure 5.6.47
Regional Large Pelagic Fisheries Management Areas
(2020)

Status of the Resource

Data on stock status of species relevant to the site region was obtained from the IOTC and CCSBT web-published reporting.

In 2022 a new stock assessment was carried out for bigeye tuna in the IOTC area of competence to update the stock assessment undertaken in 2019. Spawning biomass in 2021 was estimated to be 25 per cent of the unfished levels in 2021 and 90 per cent of the level that can support MSY. On the evidence available in 2022, the bigeye tuna stock is determined to be overfished and subject to overfishing. A management procedure for Indian Ocean bigeye tuna was adopted under by the IOTC in May 2022 and was applied to determine a recommended TAC for bigeye tuna for 2024 and 2025. A review of evidence for exceptional circumstances, was also conducted following the adopted guideline. The evaluation concluded that there were no exceptional circumstances requiring either further research or management action on the TAC calculated by the management procedure. Application of the management procedure in 2022 results in a recommended TAC of 80 583 t per year for 2024 and 2025.

No new stock assessment was carried out for yellowfin tuna in 2022 and the IOCT's advice therefore is based on the 2021 assessment. The

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model used in 2021 is based on the model developed in 2018 with a series of revisions in 2018, 2019 and 2020. Overall stock status estimates do not differ substantially from the previous assessment. Spawning biomass in 2020 was estimated to be 31 per cent on average of the unfished 1950 level. Spawning biomass estimates have been generally declining over time and particularly since 2011. Spawning biomass in 2020 was estimated to be 87 per cent of the level that supports the B_{MSY} . Current fishing mortality is estimated to be 32 per cent higher than the maximum rate of fishing mortality. The probability of the stock being in the red Kobe quadrant in 2020 is estimated to be 68 per cent. On the evidence available since 2018, the yellowfin tuna stock is determined to remain overfished and subject to overfishing. The increase in catches in recent years has substantially increased the pressure on the Indian Ocean stock.

An assessment of swordfish was undertaken in 2020 using stock synthesis with fisheries data up to 2018. The two alternative models indicated that the stock was above a biomass level that would produce MSY. Spawning biomass in 2018 was estimated to be 40 to 83 per cent of the unfished levels. Most recent catches of 33 590 t in 2019 are approximately at the MSY level of 33 000 t. On the evidence available in 2020, the stock is determined to be not overfished and not subject to overfishing. The 2019 catches of 33 590 t, at the time of the assessment, were close to the MSY level of 33 000 t. Under those levels of catches, the spawning biomass was projected to remain relatively stable, with a high probability of maintaining at or above the spawning B_{MSY} for the longer term. 2021 catches of 23 917 t were significantly lower than MSY. Nevertheless, the IOCT was advised to consider limiting the catches so as not to exceed the 2018 catch level of 31 018 t to ensure that the probability of exceeding the spawning B_{MSY} target reference points in the long term remains minimal at 2 per cent. Projections indicate that an increase of 40 per cent or more from 2018 catch levels will likely result in the biomass dropping below the spawning B_{MSY} level for the longer term.

A new stock assessment was carried out for albacore in 2022 to update the assessment undertaken in 2019. The IOCT 'Stock Status Summary Report: Status of Albacore (*Thunnus alalunga*) in the Indian Ocean' notes that in relation to the Commission's interim B_{MSY} and maximum rate of fishing, mortality target reference points indicates that the stock is not overfished and is not subject to overfishing. Main fisheries (mean annual catch 2017-2021): albacore is caught using longline (84.6 per cent), followed by line (12.4 per cent) and purse seine (1.5 per cent). The remaining catches taken with other gears contributed to 1.5 per cent of the total catches in recent years. The catch estimates for 2020 (41 051 t) are below the current estimated MSY level.

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The 2020 southern bluefin stock assessment indicated that the stock remains below the level estimated to produce MSY. The assessment indicated some improvement since previous stock assessments conducted in 2017, which indicated the stock was at 13 per cent of the initial biomass. The fishing mortality rate is below the level associated with MSY. The current estimated trends indicate that the stock has been rebuilding by approximately 5 per cent per year since the low point in 2009 and the OMP-based rebuilding plan for the southern bluefin tuna appears to be on track to achieving the Extended Commission's objective. The 2023 stock assessment indicated that the Southern Bluefin Tuna total reproductive output (TRO) is at 23 per cent of its initial value as well as below the value that could produce MSY. The 2023 assessment indicated the stock has increased from a low of 10 per cent of initial total TRO in 2009. A review of indicators in 2023 shows little overall change since the previous review. Age 1 recruitment indices have decreased somewhat in recent years, but recruitment levels are above those experienced from 1980 to the early 2000s and gene-tagging based estimates of age 2 recruitment are robust. There are consistent positive trends in the age-based longline CPUE estimates across a number of fleets. The detection rate of parent-offspring pairs from the most recent close-kin mark-recapture data is consistent with an increase in adult abundance.

No new stock assessment was conducted for the skipjack tuna in 2022 and the IOCT's advice therefore is based on the 2020 assessment using data up to 2019. The final overall estimate of stock status indicates that the stock is above the adopted target for this stock and that the current exploitation rate is just below the target. The models estimate that the spawning biomass remains above its spawning B_{MSY} and the fishing mortality remains below the expected MSY with very high probability. The skipjack tuna stock is determined to be above the adopted biomass target reference point and not overfished, with fishing mortality below the adopted target fishing mortality, and not subject to overfishing. The catch limit calculated is 513 572 t for the period 2021 to 2023 (Planning Partners, 2024b).

Vessels and Gear

In 2019 it was reported that the longline fleet, with a domestic and Japanese flagged joint-venture component, currently consists of a total of 34 vessels (59 fishing rights). Currently there are 19 active vessels in the fishery, all of which are domestic.

The majority of catches taken in the northeast of the EEZ off Durban are attributed to the joint-venture vessels (currently Japanese) that are capable of fishing in the turbulent waters of the Agulhas Current due to their larger size (on average 50 m). These vessels have in recent years

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(since 2011) shifted their effort exclusively to the Indian Ocean part of the EEZ in response to the movement of southern bluefin tuna (*Thunnus maccoyii*) and bigeye tuna (*Tunnus obesus*).

The domestic component of the fleet historically fished out of the Durban and Richards Bay harbours, but vessels now operate predominantly out of the Cape Town and Hout Bay Harbours. The vessels currently in operation are typically small fibreglass or wooden hulled and have a maximum range of two weeks. This small size (on average 24 m) and short range of vessels limit the extent of their operations.

Gear consists of mono-filament mainlines of between 25 km and 100 km in length which are suspended from surface buoys and marked at each end (see **Figure 5.6.48**). As gear floats close to the water surface it would present a potential obstruction to surface navigation as well as a snagging risk to the gear array towed by the seismic survey vessel. The main fishing line is suspended about 20 m below the water surface via dropper lines connecting it to surface buoys at regular intervals. Up to 3 500 baited hooks are attached to the mainline via 20 m long trace lines, targeting fish at a depth of 40 m below the surface. Various types of buoys are used in combinations to keep the mainline near the surface and to locate it, should the line be cut or break for any reason. Each end of the line is marked by a Dahn Buoy and radar reflector, which marks the line position for later retrieval.

The smaller longline vessels carry ice whereas the larger vessels have freezers. Fish are dressed at sea and no further at-sea processing is conducted.

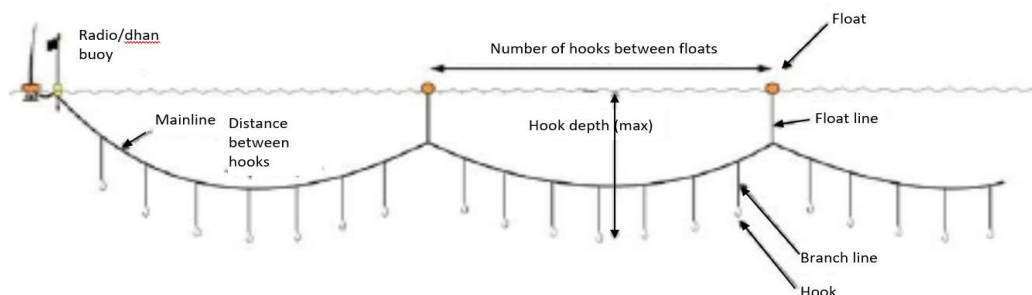


Figure 5.6.48
Large Pelagic Longline Fishery: Vessel and Gear

Lines are usually set at night and may be left drifting for a considerable length of time before retrieval, which is done by means of a powered hauler at a speed of approximately one knot. In the event of an emergency, the line may be dropped and hauled in at a later stage

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(Planning Partners, 2024b).

Fishery Allocation and Catch Data

IOTC (which manages fisheries in the Indian Ocean) and CCSBT have quota controls or a TAC for individual species. Except for southern bluefin tuna, managed by the CCSBT, all catches of tuna and tuna-like species to the east of longitude 20° E fall under IOTC. The IOTC does not manage Indian Ocean stocks by way of a TAC quota allocation, but by effort limitation i.e. TAE, which is limited to 50 vessels above 24 m overall length in the IOTC's area of competence.

In 2021, 23 longline vessels were active in the IOTC Area of Competence, which is 1 more than in 2021. Effort (hooks set) continued to increase in 2022 (1 295 129 hooks) compared to 2021 (901 104 hooks) but was still less than that of 2019 (1 355 677 hooks). 2020 is considered a low effort year. One Japanese-flagged vessel operated under joint-venture in South African waters in 2021. More fishing effort was undertaken by South African flagged vessels in 2021 resulting in a marginal increase in catches of all tuna species and a substantial increase in swordfish catch. Landings of shortfin mako and blue sharks increased despite the prohibition of wire traces and shark targeting. A total of 279 862 hooks were observed in the IOTC area of competence during 2022.

The CCSBT allocated a Southern bluefin tuna quota of 40 t for 2014 and 2015. On becoming a full member of the CCSBT in February 2015, the TAC for Southern bluefin tuna has been increased from 40 t to 160 t in 2016 and 450 t for 2017 to 2022. The TAC included a voluntary transfer of 27 t that Japan provided to South Africa for the 2018 to 2020 quota block. The TAC for 2021 to 2023 included a further increase in the TAC to South Africa was 455.3 t including a voluntary transfer of 27 t that Japan provided to South Africa.

Allocated catch limits for yellowfin tuna for the years 2023 and 2024 for South Africa is 2 000 t.

Figure 5.6.49 illustrates the map of scaled intensity of pelagic longline fishing for the period 2006 to 2016 using the annual average of the number of hooks per square kilometre.

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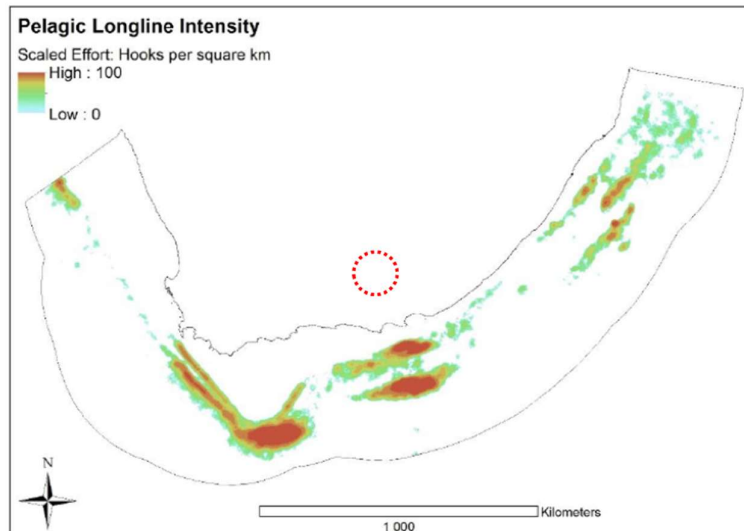


Figure 5.6.49
Scaled Intensity of Large Pelagic Longline Fishing for the
Period 2006 to 2016 using the Annual Average of the
Number of Hooks per Square Kilometre

Catch in the pelagic longline fishery for 2021 recorded by DFFE was as follow: swordfish (457.6 t), yellowfin tuna (490 t), bigeye tuna (515 t), blue sharks (81 t), albacore (375.7 t), southern bluefin tuna (132.3 t), swordfish (457.6 t) and shortfin mako shark (84.2 t).

Strategies to reduce shark targeting to direct effort towards improved tuna and billfish catch have been included in the Large Pelagic Longline Fishery Policy and the measures have been implemented since January 2017. ***Figure 5.6.50*** illustrates the distribution of the large pelagic longline fishing fleet effort in the IOTC area of competence in 2022.

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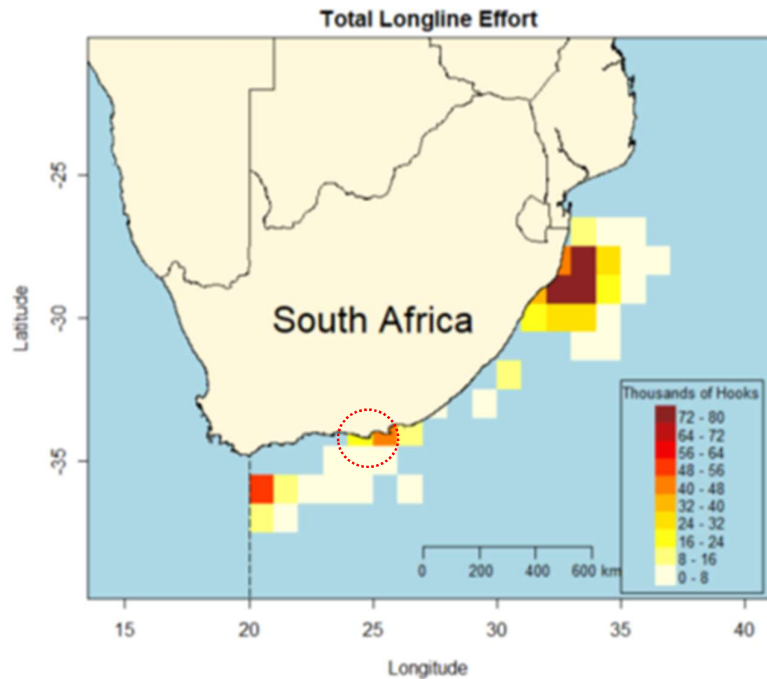
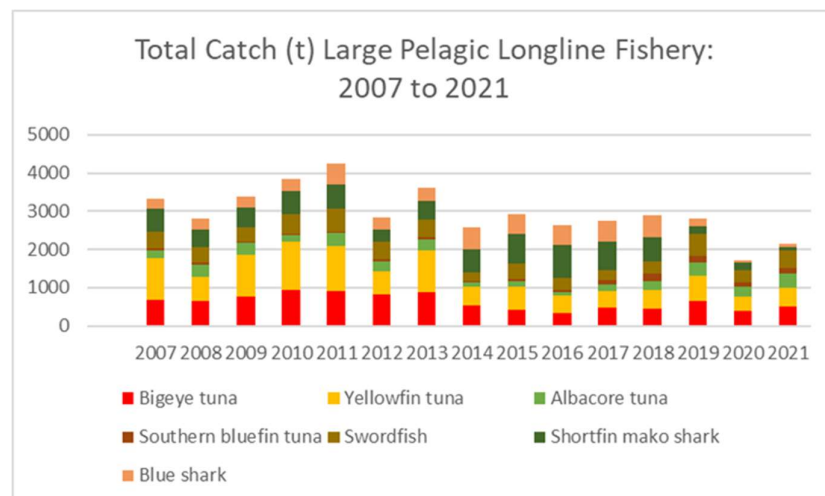


Figure 5.6.50
Map of the Distribution of Effort of the South African Large Pelagic Longline Fishing Fleet in the IOTC Area of Competence for 2022

Figure 5.6.51 illustrates the total tuna catches for South Africa for the period 2007 to 2021.



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Figure 5.6.51
Total Pelagic Longline Catch(t) for South Africa
(2007 to 2021)

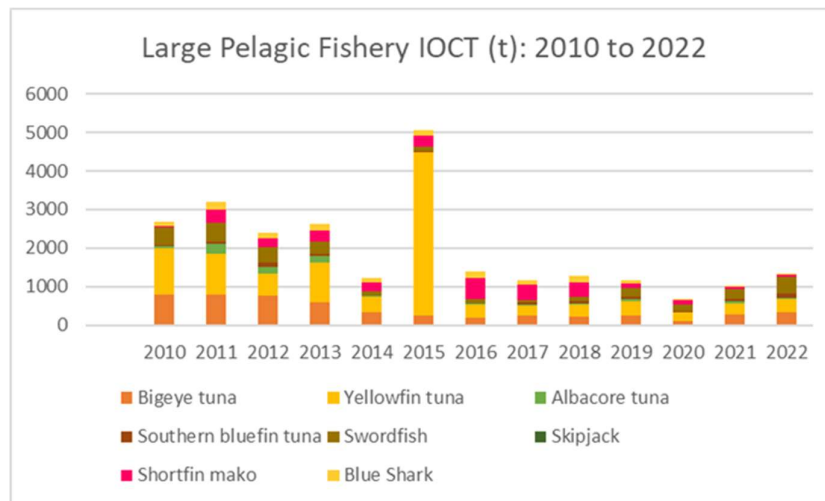


Figure 5.6.52
Annual Large Pelagic Longline Sector Catch (Tons
Round Weight Excluding Sharks and NEI) IOCT Area
of Competence (2010 to 2022)

Figure 5.6.52 illustrated the pelagic longline catch in the IOTC area of competence for the period 2007 to 2022. In 2022 there were 17 active permits operating off 23 vessels, one more than in 2021, in the IOTC area of competence. As reported to the IOTC in 2023, catch within the site region consisted of shortfin mako, blue shark, bigeye tuna and yellowfin tuna. In the period 2017 to 2022 catch in the site region and reported to the IOTC included shortfin mako, blue shark, bigeye tuna, yellowfin tuna, albacore and swordfish.

From **Figure 5.6.53** it is evident that the high fishing season in the large pelagic fishery in proximity to the site region is from May to August.

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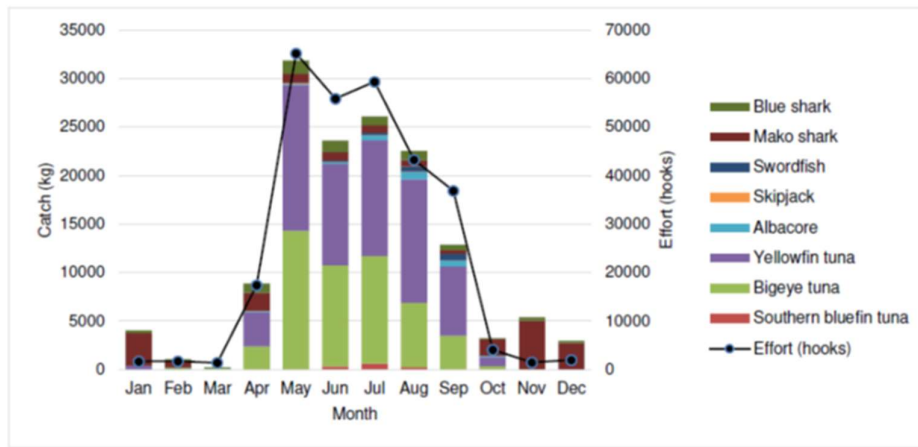


Figure 5.6.53
Large Pelagic Catch and Effort by Month in the
Vicinity of the Site (2006 to 2016)

Closed Areas

In terms of the 2018/2019 fishing season, Permit Conditions Section B: Large Pelagic Longline Fishery, the fishery includes the following restrictions:

- The permit is valid in South African waters (excluding tidal lagoons, tidal rivers and estuaries) and may be used on the high seas in conjunction with a high seas vessel license.
- Setting and retrieving of longlines can be conducted in South Africa's EEZ, except within a 12 nmi area along the entire South African coastline, excluding KwaZulu-Natal where the closed area will be extended to 20 nmi (outside of the site region).
- Fishing will be permitted in the Atlantic and Indian Ocean during the same fishing trip (west and east of 20° East longitude), provided that prior notification of movement is provided to the Department's Vessel Management System Office and senior members of the Pelagic and High Seas Fisheries Management.
- Fishing in other marine areas controlled by the South African National Parks, is subject to regulations, promulgated under the National Parks Act, 1976 (Act 57 of 1976) as amended.
- No fishing is permitted in the EEZ of other countries (Planning Partners, 2024b).

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Market Destinations

According to the South African Tuna Association, 100 per cent of the catch is exported. The main target markets are Europe, China and Japan.

Table 5.6.9
Summary of the Large Pelagic Fishery

Duration of Rights	15 years (2020 to 2034)
Value of the Large Pelagic Longline Fishery (2023)	Not known
Fish Landed Large Pelagic Longline Fishery (2021)	2 136.7 t
Number of Jobs Sustained	Not known
Number of Vessels	23 vessels in the IOTC area of competence
Number of Rights Holders (as at 2022)	17 active in the IOTC area of competence
Closed Season	None

vii. Patagonian Tooth Fish

The Patagonian toothfish (*Dissostichus eleginoides*) occurs at depths of between 70 and 1 600 m around the sub-Antarctic Islands and Seamounts, mainly between 40°S and 55°S. A longline fishery for this species operates in the South African EEZ around the Prince Edward Islands and therefore this fishery does not occur in the site region (Planning Partners, 2024b).

c) Inshore/Nearshore Fisheries

i. South Coast Rock Lobster

Overview

South Coast rock lobsters (*Palinurus gilchristi* SCRL) are endemic to the southern coast of South Africa where they occur on rocky substrata at depths of 50 to 200 m. Longline trap-fishing is labour intensive and as such each boat requires approximately 30 officers and crew. The total sea-going complement of this fleet is about 300 individuals. In addition to sea-going personnel, the sector employs approximately 100 land-based factory (processing) and administrative personnel.

This fishery operates in predominantly rocky areas in the 90 to 200 m

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depth range between Cape Point and East London. The fishery operates in commercially viable quantities in two areas of the South Coast, the first being on the Agulhas Bank approximately 200 km offshore and the second being within 50 km of the shoreline between Mossel Bay and East London. The highest effort was recorded off Mossel Bay, Gqeberha and East London, as illustrated in **Figure 5.6.54**.

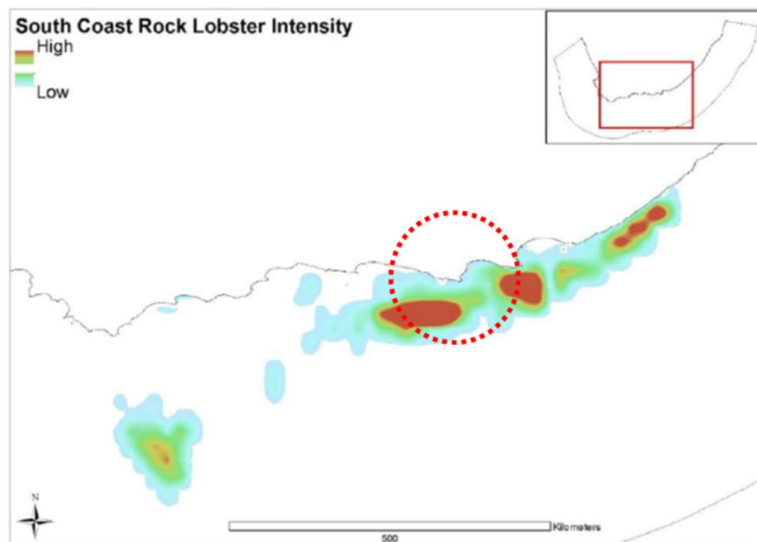


Figure 5.6.54
Fishing Effort South Coast Rock Lobster Displayed
as Annual Average Total Catch in Kilograms per
Square Kilometre Relative to the Site Region

It is now the largest rock lobster fishery in South Africa by total mass and is capital-intensive, requiring specialised equipment and large, ocean-going vessels (Planning Partners, 2024b).

History and Historic Trends of the Fishery

The SCRL was first described in 1900 and was occasionally recorded in trawler catches for sole at a depth of about 70 m. The commercial fishery commenced in 1974, after the discovery of concentrations of rock lobsters on rocky ground at a depth of around 110 m off Gqeberha. Numerous local and foreign fishing vessels converged on the fishing grounds, giving rise to the expansion of the fishery. However, foreign fishing vessels were withdrawn from the fishery in 1976, when SCRL was recognised as a species occurring wholly within South African waters. From 1977 onwards, the sector operated solely as a local commercial fishery (Planning Partners, 2024b).

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Management of the Fishery

Management of the fishery commenced in 1974 and was regulated by limiting the number of traps permitted per vessel. Catches and catch rates declined significantly between 1977 and 1979. The introduction of management measures such as reduction of effort and catches during the early 1980s resulted in some resource recovery.

An annual TAC was introduced in 1984, based on the performance of the fishery in the previous years. The TAC and limited entry stabilised the sector until the 1993/1994 season. In 1994 a more rigorous procedure for stock assessment was developed.

The fishing season for SCRL is year-round, extending from 1 October to 30 September of the following year. The management strategy is a combination of TAC and TAE. The TAC limits the total catch and is based on an annual resource assessment, whereas the TAE is measured in fishing days allocated to each vessel. A vessel may fish until its fishing days expire or its quota is filled, whichever occurs first.

The scientific recommendations for catch limits are based on an OMP which was introduced in 2008. The most recent OMP review was completed in 2019 (OMP-2019). This was used to determine the TAC and TAE for the 2019/2020– 2022/2023 fishing seasons. The objective of this OMP is to increase the spawning biomass of the resource by 30 per cent over the 20 year period from 2006 until 2025, while restricting interannual TAC fluctuations to a maximum of 5 per cent (Planning Partners, 2024b).

Status of the Resource

SCRL resource assessments introduced in 1993 to 1994 indicated that an annual catch of 477 t at the time could not be sustained. Consequently, a programme of annual TAC reductions was initiated in 1994 to 1995, reducing the TAC in steps of 25 t per year. The 2001 assessment of the resource indicated that the reductions had, however, failed to impact significantly on the trend of declining abundance. However, since then, the resource has remained relatively stable and seems to be growing in the most recent years.

Although subsequent assessments have suggested recent growth in the SCRL resource, it is still considered to be in an optimal to depleted state and fishing pressure is being maintained at light to optimal levels. The objective of the OMP for this resource is to increase its spawning biomass in the long term whilst restricting interannual fluctuations in TACs.

Scientific deliberations on the 2023/2024 TAC took place in the context

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of the following: (i) that the OMP had outlived its usefulness and needed to be revised, but time constraints had prevented this from happening; (ii) that resource indicators, primarily CPUE trends, over the last ten years had been very positive; and (iii) that the stock assessment results were very sensitive to the weighting of size data but nevertheless positive overall. The subsequent assessment by the DFFE scientific working group concluded that a TAC increase of 5 per cent would be sustainable and reasonable, and the TAC was set at 391 t for 2023/2024 (Planning Partners, 2024b).

Vessels and Gear

The SCRL fishery is conducted from vessels which range in length from 30 to 40 m and deploy between 3 500 and 6 000 plastic traps per vessel. These plastic traps are deployed along a main line roughly 2 km in length and spaced so that each line carries between 150 and 200 traps. A typical set involves the deployment of 20 such lines and the usual configuration is to deploy two sets of 20 lines which are hauled on alternative days with an average soak time of 48 hours. Fishing depth ranges from 100 to 250 m. Traps are winched collectively by line. Catch rates in the order of 1 lobster per every three traps per set are typical in this fishery, yielding catch rates in the order of 0.1 kg per trap/pull on a tail weight basis. Crew numbers per vessel vary between 25 and 40.

Those that have on-board freezing capacity remain at sea for up to 40 days per trip, while those retaining live catch remain at sea between 7 and 10 days before discharging at port. Longline trap-fishing is labour intensive and as such each boat requires approximately 30 officers and crew. The total sea-going complement of the fleet is about 300 individuals. In addition to sea-going personnel, the sector employs approximately 100 land-based factory (processing) and administrative personnel (Planning Partners, 2024b).

Fishery Allocation and Catch Data

Figure 5.6.55 illustrates the historic annual catch from 1977 to 2019.

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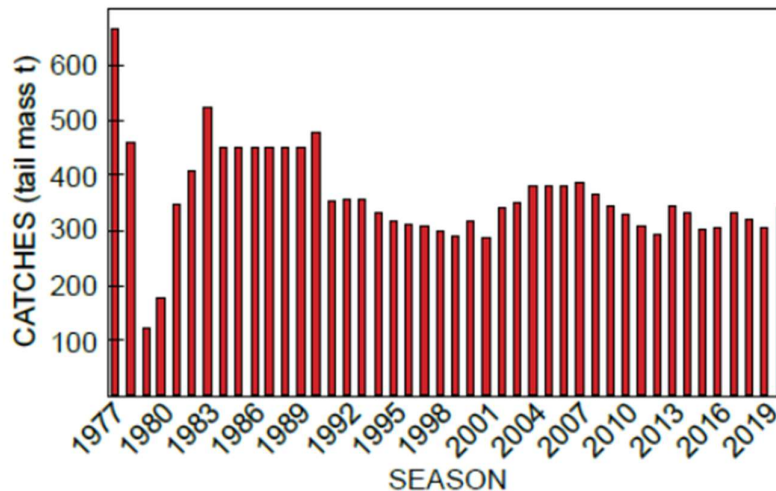


Figure 5.6.55
SCRL Catch in Tail Mass (t): 1977 to 2019

The TAC for 2019/2020 was set a 321 t tail weight. For 2020/2021 the TAC was increased to 337 t due to positive trends in CPUE in 2 out of 3 areas, viz. at Area 1E and Areas 2 + 3.

For 2021/2022 the TAC was set at 354 t due to further increases in the CPUE experienced in the fishery. During 2022 the CPUE, catch at size and stock assessment models for the resource were updated. As a result of very good indicators for the resource, the TAC for 2022/23 calculated from the OMP formula was a 5 per cent increase to 372 t. The recommended TAC set for 2022 season was therefore 372 t. The TAC for 2023/2024 has been set at 391 t. **Figure 5.6.56** illustrates catch data for the period 2007 to 2022.

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Year	TAE (allocated seadays)	Standardised CPUE (kg trap -1)		
		Area 1E	Area 1W	Area 2&3
2009/2010	2 882,00	0,73	0,86	0,63
2010/2011	2 550,00	0,85	0,88	0,70
2011/2012	2 443,00	0,60	0,80	0,70
2012/2013	2 250,00	0,56	0,66	0,72
2013/2014	2 536,00	0,89	0,97	1,05
2014/2015	2 805,00	0,84	1,06	0,95
2015/2016	2 858,00	1,22	1,10	0,76
2016/2017	2 029,00	1,02	0,91	0,71
2017/2018	2 042,00	0,99	0,99	1,04
2018/2019	2 148,00	1,51	0,78	1,17
2019/2020	2 220,00	1,53	1,21	1,37

Figure 5.6.56
TAC, TAE, Catch and Standardised CPUE (kg per trap-1)
for the Period 2006/2007 to 20019/2020

Within the site region the fishery operates throughout the year with no clear seasonality evident apart from an increase in fishing effort during November and December, as illustrated in **Figure 5.6.57** (Planning Partners, 2024b).

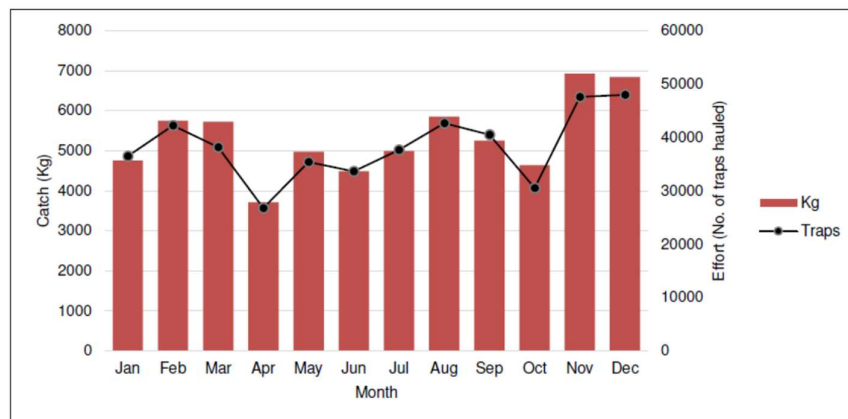


Figure 5.6.57
Fishing Effort South Coast Rock Lobster by Month
Averaged Over the Period 2006 to 2016 Within and
Around the Site Region

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Closed Areas and Restricted Areas

In terms of the current SCRL permit conditions, the permit holder shall only harvest its SCRL in the area between parallel lines of longitude passing through the mouth of the Great Kei River (28°20'E) and Cape Hangklip (18°40'E) and bounded by the South African EEZ (Planning Partners, 2024b).

Market Destinations

Products (frozen tails, whole or live lobster) are exported to the USA, Europe and the Far East. Sales are affected by seasonal overseas market trends and competition from other lobster-producing countries. The total export value in 2021 was approximately R353 million (Planning Partners, 2024b).

Table 5.6.10
Summary of the South Coast Rock Lobster Fishery

Duration of Rights	15 years (to 30 September 2037)
Value of the SCRL Fishery (2021)	R395 million
Fish Landed SCRL Fishery (2022)	359 t (assuming total allocation landed)
Number of Jobs Sustained	300 to 400
Number of Vessels	9
Number of Rights Holders (as at 2022)	10
Closed Season	None

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d) Inshore Fisheries

i. Demersal Shark (Longline)

Overview

South African chondrichthyans (including sharks, skates, rays and chimaeras) are harvested in 8 of the 16 commercial fisheries. The species are increasingly being targeted by a growing number of recreational fishers and are also captured as part of the KwaZulu-Natal bather protection programme.

The suite of demersal shark species caught in South Africa is caught across three fisheries: the demersal shark longline fishery, the inshore trawl fishery and the commercial line fishery. The demersal shark longline fishery is the only sector that consistently targets demersal sharks, with targeting in other sectors being sporadic, depending on the availability of more-valuable target species and seasonal aggregations.

The demersal shark longline fishery operates in waters generally shallower than 100 m and uses bottomset longline gear (average of 1 000 hooks per line) to target demersal sharks. The fishery operates nearshore from Cape Town to East London and predominantly catches soupfin (*Galeorhinus galeus*) and smoothhound sharks (*Mustelus mustelus*). Additional species include white-spotted smoothhound (*Mustelus palumbes*), Carcharhinus species such as the bronze whaler (*Carcharhinus brachyurus*), dusky sharks (*Carcharhinus obscurus*), as well as several skate species.

The targeting of bull sharks (*Carcharhinus leucas*), hammerhead sharks (*Sphyrna spp.*), oceanic sharks such as blue sharks (*Prionace glauca*), shortfin mako sharks (*Isurus oxyrinchus*), oceanic whitetip sharks (*Carcharhinus longimanus*) and thresher sharks (*Alopias spp.*) is prohibited in this fishery (Planning Partners, 2024b).

History and Historic Trends of the Fishery

Commercial scale exploitation of chondrichthyans was initiated in South Africa in the 1930s. Increased demand for natural vitamin A (from shark liver) after the Second World War saw annual landings exceeding 4 000 t. Although several species were targeted, soupfin shark was the most heavily fished, in particular, in fishing villages in the Western Cape. The fishery used commercial handline targeting inshore sharks for livers to be used for the production of vitamin A oil. It was not until the synthesis of vitamin A in 1967 that the demand for shark products decreased. By the 1940s, catches in soupfin sharks declined with a shift to targeting other species and have yet to return to pre-war levels.

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In the 1990s, there was renewed interest in sharks and the shark-directed longline fishery was established. The fishery split into the pelagic shark longline fishery targeting blue shark (*Prionace glauca*) and mako shark (*Isurus oxyrinchus*) and the demersal shark longline fishery targeting soupfin sharks (*Galeorhinus galeus*) and smoothhound sharks (*Mustelus mustelus*).

Longline permits for directed catching of sharks were first issued in 1991 to target both demersal and pelagic shark, with over 30 permits being issued. In 1998 the number of permits was reduced to 23 due to poor fishery performance. In 2004, the dual targeting was discontinued, and permits were further reduced to 11 and from 2008 onwards, only 6 permits were issued. As most rights holders own multiple rights in different fisheries, there are seldom more than three vessels operating at the same time. The pelagic shark longline fishery was absorbed into the large pelagic fishery in March 2011. Estimated landings of 408 t, 175 t and 88 t of shark were reported in the fishery in 2010, 2011 and 2012, respectively. The apparent drop in landed catches at the time may be attributed to a combination of effort displacement to more lucrative fisheries, target availability or a general decline in abundance.

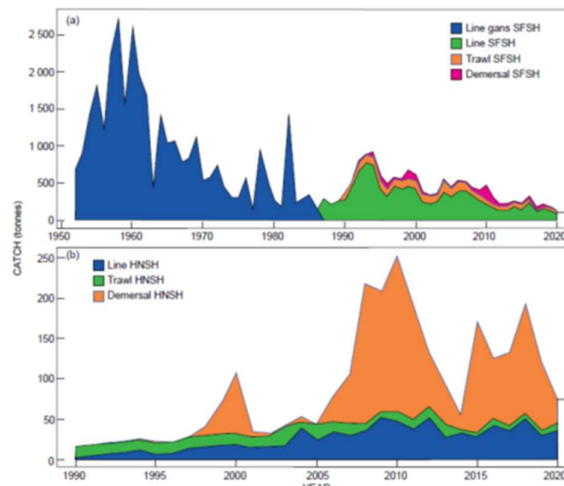


Figure 5.6.58
Total Catch (t) for (a) Soupfin Shark (1950 to 2020) and
(b) Smoothhound Shark (1990 to 2020)

Landings of smoothhound shark across all fisheries reveal large annual fluctuations around an initially increasing trend from 16 t in 1990 to 252 t in 2010. A sharp decline to 56 t in 2014 was the result of the most productive demersal shark longline vessel not fishing in that year. Catches again increased to 124 t in 2016. Landings of soupfin shark across all fisheries declined from 692 t in 1952 to 329 t in 2016 (Planning

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Partners, 2024b).

It is evident from **Figure 5.6.58**, that catch in the fishery demonstrates further decline in 2020.

Management of the Fishery

The fishery is managed on a TAE with 6 vessels currently targeting shark. Landings are monitored independently, and skippers are required to complete logbook entries per longline set. There are seldom more than three vessels operating at the same time.

The South African National Plan of Action for Sharks (NPOA-Sharks) was finalised in 2013. Amongst others, the NPOA recommended a slot limit on the catch of inshore demersal sharks of between 70 and 130 cm total length. The NPOA was reviewed in 2020. The most significant change occurred once by-catch permit conditions were introduced in 2018, which penalized vessels with high shark by-catch with mandatory observers, and this resulted in an 85 per cent reduction in shark catches in 2020. South Africa's second NPOA (NPOA-sharks II) builds on NPOA I to further improve the management of sharks (Planning Partners, 2024b).

Status of the Resource

Historically there was little co-ordinated research relating to the biology and the stock assessment of commercially viable sharks. As sharks form a minor part of landed catch of many South African fisheries, there is little cohesion between DAFFs fishery-specific Scientific Working Groups regarding the management of chondrichthyans (sharks, skates, rays and chimaeras).

Historical analysis of catch and effort data, although limited, da Silva (2007) showed that smoothhound shark was marginally over-exploited and McCord (2005) showed that soupfin shark was fully exploited.

Two recent assessments of both the smoothhound and the soupfin shark have been conducted and published in 2019 by da Silva et al and Winker et al. The assessment of smoothhound sharks found that the stock was not overfished but subject to overfishing. The assessment cautions that current fishing levels are probably imprecisely estimated. Projections indicate that current catch levels of 125 t per annum will result in the smoothhound shark stock being overfished in future.

The assessment recommends that to ensure that smoothhound shark biomass has an increasing (positive) trajectory by 2024, with an 80 per cent probability, a decrease in catch to below 75 t is required. Even at these catch rates the projected recovery of the stock, which is estimated

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to have declined by 30 per cent since 1990, will be slow.

Preliminary per-recruit calculations conducted in 2005 indicated that soupfin shark spawner biomass was at 43 per cent pre-exploitation levels. Soupfin shark stocks in South Africa is currently overfished and still subject to overfishing. A steady decline in soupfin shark biomass is evident from 1952 to 2016. At current catch levels of 329 t per annum, further depletion of the stock will occur, with possible commercial extinction before 2055.

To ensure that soupfin shark biomass has an increasing (positive) trajectory by 2024 with an 80 per cent probability, a decrease in catch to below 100 t per annum is required, which is estimated to have declined by 50 per cent, with recovery anticipated to be very slow.

Stock assessments of smoothhound and soupfin sharks show that there is a high probability that current harvest rates across the major fisheries harvesting these species are unsustainable. To allow rebuilding of the stock, total catches would need to be substantially reduced across all sectors catching these species in significant numbers to prevent the stock from declining. The most threatened shark species in South Africa, the soupfin shark, will be commercially extinct in 20 years at current fishing levels (Planning Partners, 2024b).

Vessels and Gear

Fishing vessels are smaller than 30 m in length, with a set of weighted longlines that are baited with on average 1 000 hooks (up to 2 000) and are deployed at sea depths of 50 to 100 m (Planning Partners, 2024b).

Fishery Allocation and Catch Data

In 2013, the Department allocated 6 demersal fishing rights. The fishing rights authorised a maximum of six fishing vessels access to the fishery. Each rights holder was permitted to use only one vessel. Between 2007 and 2020 an average of 98 per cent (ranging between 88 to 100 per cent) of the total catch was made by 4 vessels. The Department considered reducing the number of rights allocated during this process to aid in overall reducing the catch of these species in addition to the slot limit added to this fishery (and the commercial line-fishery) in 2020.

For the period 2010 to 2020, the demersal longline fishery was responsible for 7.6 per cent of the average annual shark catch, the commercial longline fishery accounted for 10 per cent of the average annual catch (167.9 t) and the inshore trawl fishery accounted for 30 per cent of the average annual catch. In response to the persistent targeting of pelagic sharks, the DFFE introduced permit conditions in

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2016 to reduce pelagic shark catches. This has resulted in a reported catch of pelagic sharks of 248.9 t in 2020, which is an 85 per cent reduction over a 4-year period. In 2020, the trawl fishery was responsible for 59 per cent of total shark mortality in South Africa, followed by the large pelagic longline fishery (28 per cent), commercial line fishery (11 per cent) and lastly the demersal shark longline fishery (2 per cent).

Overall, the commercial line fishery takes the largest proportion of soupfin catches, with an average of 65 per cent of catch between 2007 and 2020, followed by the trawl fishery (20 per cent) and the demersal shark longline (15 per cent). **Table 5.6.11** provides data for the period 2016 to 2019.

Table 5.6.11
Number of Smoothhound and Soupfin Shark landed 2016 to 2019

Year	Smoothhound Sharks	Soupfin Shark
2016	17 558	6 384
2017	18 298	4 741
2018	30 112	8 061
2019	11 796	830

Closed and Restricted Areas

The following spatial management measures apply in terms of the Shark Fishery Policy 2021:

- (a) No fishing shall take place east of a line drawn due south of East London Harbour (27°55' E), outside of the site region.
- (b) No fishing may take place in the Marine Protected Areas as proclaimed in the Government Gazette No. 42478 dated 23 May 2019 (Planning Partners, 2024b; Republic of South Africa, 2019).
- (c) Fishing and/or the removal or disturbance of any marine life in the National Parks is prohibited. Fishing in other marine and estuarine areas controlled by the South African National Parks, is subject to regulations promulgated under the National Parks Act, 1976 (Act 57 of 1976) as amended.
- (d) No person shall use any fishing equipment within the Bird Island Marine Protected Area, a rectangle around Bird Island in Algoa

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Bay defined by the latitudes 33°48'0S and 33°52'0S and the longitudes 026°14'5E and 026°20'0E (within the site region).

- (e) During the period 1 September to 31 December, no fishing shall take place within the quadrilateral described by lines joining the following four points (partially within the site region):

A: 34°48'S 024°00'E;

B: 34°38'S 025°00'E;

C: 34°44'S 025°00'E;

D: 34°57'S 024°00'E.

In terms of the 2023 fishing season, Permit Conditions Section B: Fishing Permit Conditions for: Hake; Sole; Horse Mackerel and Demersal Shark:

Permit holders shall not utilise or exercise any other fishing rights, permit or exemptions in any other fishery sector held on the vessel, while conducting demersal shark fishing.

The fishery may target only the following species:

- a) soupfin (*Galeorhinus galeus*);
- b) smooth-hound sharks (*Mustelus* spp.);
- c) spiny dogfish (*Squalus* spp);
- d) St. Joseph sharks (*Callorhinchus capensis*).

The fishery shall not target the following species, but if caught, can also be landed:

- a) Cape gunards (*Chelidonichthys capensis*);
- b) Jacopever (*Helicolenus dactylopterus*);
- c) smooth hammerhead (*Sphyrna zygaena*);
- d) rays and skates.

Utilize only bottom-set longline gear, which will be the only fishing gear permitted on board the vessel.

Following on the 'Review of the South African National Plan of Action for the Conservation and Management of Sharks' further restrictions have

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been included in the permit conditions in 2023, *inter alia*:

- the slot limit for soupfin, smoothhounds and requiem sharks is 70 to 130 cm total length;
- all sharks must be landed with heads and fins attached;
- all sharks below or above the slot limit have to be released with release condition recorded on logbook – Prohibited sharks must be released unless mortally wounded;
- best practice should be followed for release (Planning Partners, 2024b).

Market Destinations

In South Africa, there is very little documented local consumption of shark products, and the trade is almost entirely exported. Shark meat is primarily sent to Uruguay and re-exported to Brazil. The Republic of Korea is also a top importer of shark meat from South Africa.

Shark fins were primarily exported to the Far East for the luxury dried seafood market. The top importers of dried shark fins from South Africa included Hong Kong, Singapore, Japan and Macao (Planning Partners, 2024b).

Table 5.6.12
Summary of the Demersal Shark

Duration of Rights	15 years (2020 to 2034)
Value of the Demersal shark Fishery	Not known
Fish Landed Demersal Shark Fishery (2019)	12 626 sharks
Number of Jobs Sustained	Unknown
Number of Vessels	6
Number of Rights Holders (as at 2022)	6
Closed Season	None

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iii. Tuna Pole

The tuna pole (pole and line) fishery is one of two commercial fisheries that target tuna and tuna-like species. The South African tuna pole-line (bait boat) fleet operates in waters up to 1 000 km of the South and West coasts of South African and off Namibia from October to May. The Tuna Pole-line fishery does not operate in the site region and no effort in the IOTC area of competence occurred in 2022 (Planning Partners, 2024b).

iv. Hake Longline

Overview

Hake longline fishing takes place throughout the year along the west and southeast coasts. The fishery operates out of harbours from Port Nolloth to Gqeberha, though most of the vessels are based in Cape Town. Vessels operate in offshore and inshore waters defined by the 110 m depth contour or a distance of 20 nmi from the shore (Nyengera & Angel, 2019). It provides appreciable economic benefits to several smaller harbours such as Port Nolloth, Saldanha Bay, Hout Bay, Gansbaai and Port St. Francis.

History and historic Trends of the Fishery

Motivation for the first demersal longline (deep-water) permits were made in South Africa in 1982. Hake-directed demersal longlining is therefore a relatively new fishery, having started in the early 1990s. The fishery went through a trial experimental period between 1994 to 1996. It was formerly adopted through medium-term rights in 1998 and then full rights were applied in 2004 that were synchronised with the other hake sectors.

One of the more important outcomes of the experiment was that the longline gear selectively caught proportionately larger hake than trawl gear, that the proportion of females was higher than in trawls and that trawl gear could be deployed in hard ground areas generally not accessible to trawlers. These features of hake-directed longlining clearly differentiated the fishery from the bottom trawl spatially.

As the fishery developed, the grounds fished using longlines expanded to a point where currently there is near complete overlap of the two fisheries. Furthermore, the size of the longline-caught fish has also decreased, providing subjective evidence that the hake availability on the harder grounds initially fished by the long-liners, has declined and the size distribution of hake in longlines is now similar to the trawl fishery (Planning Partners, 2024b).

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Management of the Fishery

In the earlier years of the management of the fishery, area-based separation of hake longline was applied, i.e. splitting of the TAC between “East Coast” and “West Coast” and inshore-offshore separation similar to the inshore and deep-sea trawls. Separate rights are still (2018) allocated for the West Coast and South Coast (Norman, et al., 2018; Planning Partners, 2024b).

Vessels and Gear

The fishery is restricted to 20 000 hooks per set and only utilise bottom set longlines, which are the only gear that may be on-board a fishing vessel.

The vessels operating in this fishery are small and range from 15 to 30 m in length. The fleet targets two hake species: deep-water hake (*Merluccius paradoxus*) and shallow-water hake (*Merluccius capensis*) (Nyengera & Angel, 2019). The vessels are largely wetfish vessels that generally fish for about 6 days before returning to port, with their catch kept on crushed ice (Planning Partners, 2024b).

Fishery Allocation and Catch Data

The hake longline fishery typically catches between 5 per cent and 6 per cent of the annual hake total catch, with most of the catches over the past 5 years (more than 95 per cent each year) being made on the West Coast. Between 40 and 60 per cent of the annual hake longline catch over the past 5 years has been deep-water hake (*M. paradoxus paradoxus*). By-catch species (primarily kingklip and angelfish) contribute about 5 per cent to the total retained longline catch.

The 2006 priority fishing areas in the site region are as follows:

- Area 4: An area due south of Cape Agulhas extending towards the southern-most part of the Agulhas Bank;
- Area 5: South of Gqeberha and Cape St. Francis in an area known as the ‘Chalk Line’ which falls within the site region (Norman, et al., 2018).

The hake longline apportionment is less than 6 per cent of the TAC. In 2018, there were 123 rights holders with allocations that ranged from 10 t to 584 t. As illustrated in **Figure 5.6.59** it is evident that the hake longline fishery on the South Coast for both species represents a very small proportion of the entire South African hake fisheries, or even of the hake fishery on the South Coast.

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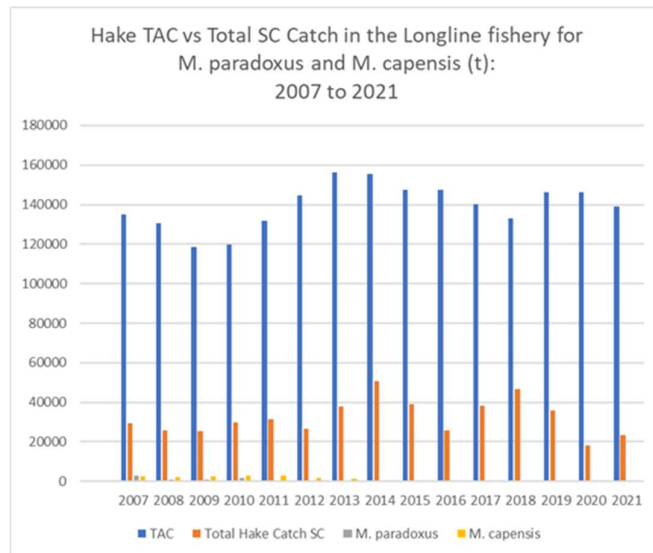


Figure 5.6.59
Hake Longline Catch (t) on the South Coast relative to
the Total Hake Catch (t) and to the South Coast Hake
Catch (t): 2007 to 2021

In 2022, rights were allocated to 89 rights holders and 45 vessels in the hake longline fishery, with allocations of between 580 t and 9 t. To promote sustainable and viable business models, the longline sector has adopted a clustering approach. Based on the 2022 hake longline rights register, these economic units attribute 73 per cent of the sectors allocation of 8 621.2 t, being combined in 20 vessels (Planning Partners, 2024b).

Restricted Areas

Restricted areas are present on the West and South coasts. On the South Coast extensive restrictions apply as set out in the Hake Longline Permit Conditions for the 2023 fishing season:

No fishing shall take place in water depths less than 110 m or less than 20 nmi from the coast, whichever is the greater distance from the coast east of 020° E longitude (within the site region).

A number of areas have been designated where no person shall use any fishing equipment. The only three areas within the site region are:

- landward of a straight line drawn from Cape St. Francis Point to the lighthouse at Cape Recife.
- within the Bird Island Marine Protected Area, a rectangle around

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Bird Island in Algoa Bay defined by the latitudes 33°48'0S and 33°52'0S and the longitudes 026°14'5E and 026°20'0E.

- During the period 1 September to 30 November, no fishing may take place within the quadrilateral described by lines joining the following four points:-

A: 34°48'S 024°00'E;

B: 34°38'S 025°00'E;

C: 34°44'S 025°00'E;

D: 34°57'S 024°00'E.

No fishing may take place in an MPA proclaimed in terms of Government Gazette No. 42478, dated 23 May 2019 (Planning Partners, 2024b; Republic of South Africa, 2019).

Market Destinations

The primary target market for the hake longline fishery is for export to the wetfish market (Nyengera & Angel, 2019), with prime quality hake destined for Europe. Hake that is not suitable for the export market, namely smaller frozen and non-prime quality fresh hake, is sold into the domestic wholesale or food service markets. Most fish are sold headed and gutted.

Table 5.6.13
Summary of the Hake Longline Fishery (Entire Fishery)

Duration of Rights (15 Years)	15 years (up to 2037)
Value of the Large Pelagic Longline Fishery (2021)	R320 million
Fish Landed Large Pelagic Longline Fishery (2022)	212 t (South Coast only)
Number of Jobs Sustained	1 495
Number of Vessels	40
Number of Rights Holders (as at 2023)	106
Closed Season	None

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v. Agulhas Sole (Inshore Trawl

Overview

The Agulhas or East Coast sole *Austroglossus pectoralis* occur mainly in the area between Cape Agulhas and Port Alfred (**Figure 5.6.60**) between depths of 10 to 120 m, although they have occasionally also been caught in deeper water during research surveys (DFFE, 2023a).

Agulhas sole is a small, but commercially important component of the mixed species inshore trawl fishery operating on the South Coast. Exploitation of Agulhas sole commenced in the 1890s and was one of the first stocks to be managed in South Africa. Initially fishing was largely directed at Agulhas sole, but the fishery gradually shifted to targeting other species as well (e.g. hake and line fish species).

The average size landed by commercial vessels is between 32.0 cm and 33.6 cm. The Agulhas sole resource is a small but commercially important component of the mixed-species inshore trawl fishery on the South Coast. The 2022 annual TAC of 400 t is estimated to be worth approximately R22 million.

Management of the fishery has since 1978 restricted its operations to the South Coast between the 20° E line of longitude and the line drawn due south from the mouth of the Great Kei River, and since the start of 2015, to the area defined as the 'Hake Trawl Ring Fence'.

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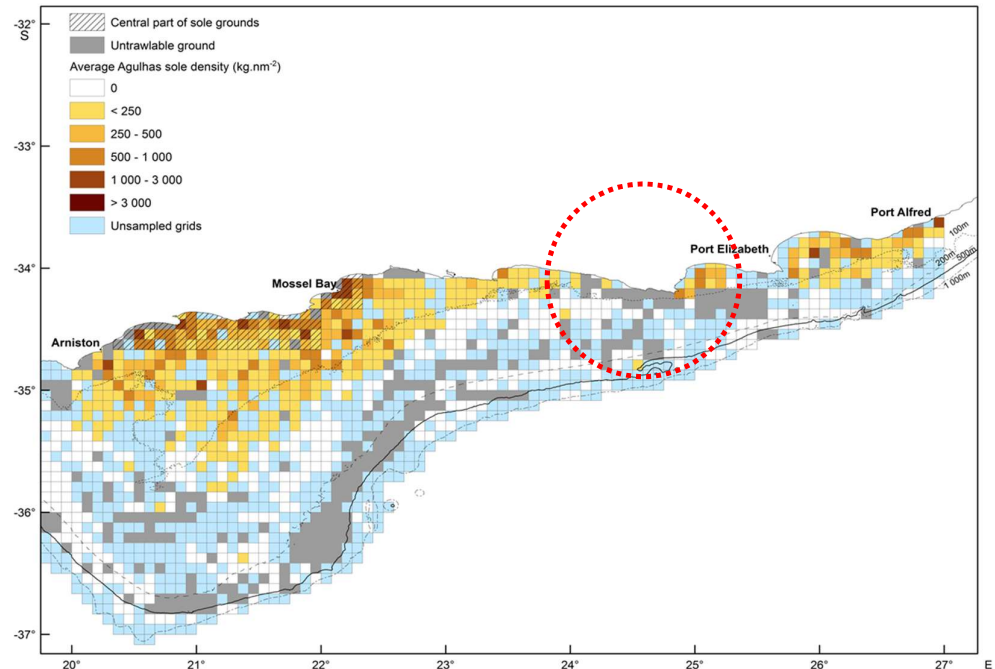


Figure 5.6.60
Distribution of the Agulhas Sole relative to the Site Region

History and Historic Trends of the Fishery

The Agulhas sole resource has been exploited since the 1890s and was one of the first fish stocks to be managed in South Africa.

Exploitation of the Agulhas sole was the economic base for the early fishery on the Cape South Coast and was the driving force for the development of the coastal fishing fleet. In the early years fishing was directed largely at Agulhas sole, but the fishery gradually shifted to targeting a number of additional species, including hake and various line fish species by the late 1970s. The first formal attempt at managing the Agulhas sole fishery was made in 1935, with the introduction of a 75 mm minimum mesh size for bottom trawl nets.

The inshore trawl fishery was formally defined as a management unit (i.e. the hake and sole inshore trawl sector) separate from the hake deepsea trawl sector in 1978. An annual TAC of 700 t was first introduced in 1978 and individual quotas were introduced in 1982. The TAC remained fairly stable thereafter, varying between 700 t and 950 t between 1982 and 1992, and was subsequently maintained at 872 t until 2016.

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Landings of Agulhas sole have declined substantially subsequent to 2000, with a slight increase in 2008 to 2010, but still well below the TAC. At that time, the decline was attributed mainly to a reduction in the overall effort deployed by the fishery, rather than a decline in the abundance of the resource. The effort reduction was primarily the result of a marked decrease in the number of active inshore vessels in the fishery over time (50 in 1979, decreasing to 32 in 2000, and 14 in 2015). The reasons for this are complex but can be largely attributable to companies not replacing old or damaged vessels due to the limited availability (and substantial costs) of suitable replacement vessels, compounded by uncertainty regarding future long-term rights allocations. Market/economic forces also resulted in changes in fishing strategies, with some rights holders moving either all or part of their hake quotas to the hake deep-sea trawl sector (with a consequent reduction in sole catch), or directing limited resources (vessels and sea days, and hence effort) to filling hake quotas rather than attempting to fill sole quotas.

Despite this marked reduction in fishing effort, an appreciable decline in the commercial CPUE (the index that has been used to monitor Agulhas sole abundance) became apparent subsequent to 2009, with CPUE reaching unusually low levels over the period 2012 to 2016. Two hypotheses were put forward, one that the decline could reflect a decrease in resource abundance; the other that this was possibly due to a decline in catchability (i.e. in the availability of sole to the fishery) (Planning Partners, 2024b).

Management of the Fishery

Following an evaluation of the results of a series of assessments in 2014, a spatial effort limitation strategy was adopted in 2015 as the primary regulatory measure, while maintaining the TAC at 872 t. This management approach was maintained for the 2016 fishing season. Following an updated assessment during 2016, the TAC was reduced to 600 t for the 2017 fishing season, and the TAE set at 15 243 fishing hours (the change in units was implemented for operational reasons). These limits were retained for the 2018 fishing season following an assessment update during 2017. The assessment conducted in 2018 indicated a slightly more optimistic status of the resource, and the effort limit imposed on the fishery in 2019 was consequently adjusted upwards by 10 per cent to 16 767 fishing hours, with an associated slight increase in the TAC to 627 t.

Following on a subsequent assessment in 2019, the resource was estimated to be above MSY level. However, given the uninformative nature of the data, coupled with only two years of higher CPUE values, a precautionary approach was adopted and the scientific advice for the 2020 fishing season was to reduce the TAC to 502 t and retain the effort

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limitation strategy imposed on the sole-directed component of the fishery. The approach was adopted in 2020, leading to a recommendation for a slightly reduced TAC of 491 t and the retention of the effort limitation strategy.

The assessment of the resource conducted in 2022, was even less optimistic than previous assessments and it was suggested that the Agulhas Sole TAC be set at 382 t for the 2023 fishing season (Planning Partners, 2024b).

Status of the Resource

The assessment conducted in 2022 concluded that the status of the resource is not as healthy as suggested by the 2020 and 2021 assessments, and that the MSY and replacement yields were lower than indicated by the 2020 and 2021 assessments, despite reduced effort in the fishery post 2004. Although further investigation is proposed, the results of the assessment indicated that while the resource is above B_{MSY} , it is not by as large an extent as previously understood. The 2022 assessment therefore further recommended that the TAC for 2024 be reduced to 257 t, in a phased reduction of the TAC, until the status of the resource is better understood (Planning Partners, 2024b).

Vessels and Gear

The inshore trawl fleet comprised 14 active vessels in 2020, of which 4 primarily target the sole resource but also rely on hake by-catch, while the remainder of the fleet targets primarily hake.

Fishery Allocation and Catch Data

Figure 5.6.61 illustrates historic catch from 1920 to 2020, with the marked reduction in catch relative to the TAC and reduced effort from 2004. **Figure 5.6.62** illustrates catch in 2021 relative to the site region.

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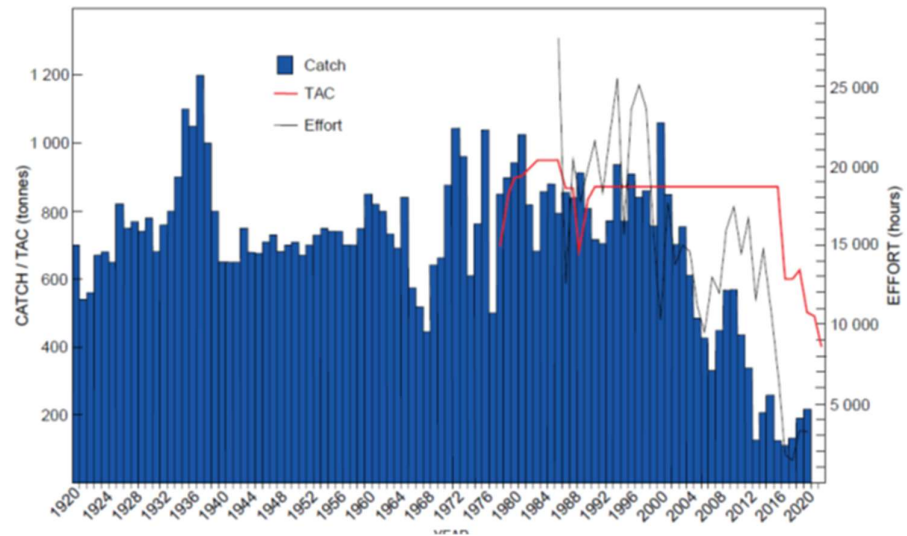


Figure 5.6.61
Historic Catch (t) 1920 to 2020

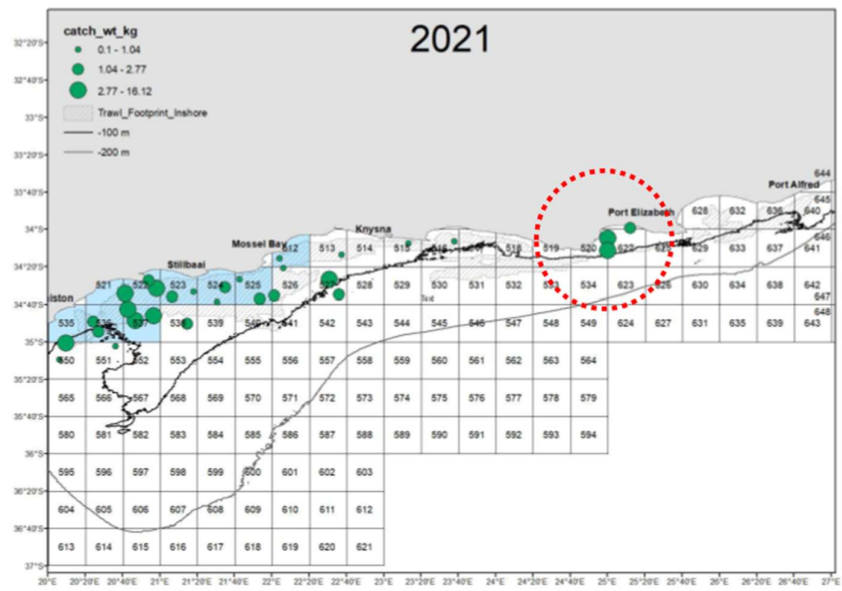


Figure 5.6.62
Catch (t) 2021 Relative to the Site Region Illustrated by the Red Circle

Figure 5.6.63 provides data on the TAC and catch in tonnes for the period 2007 to 2022.

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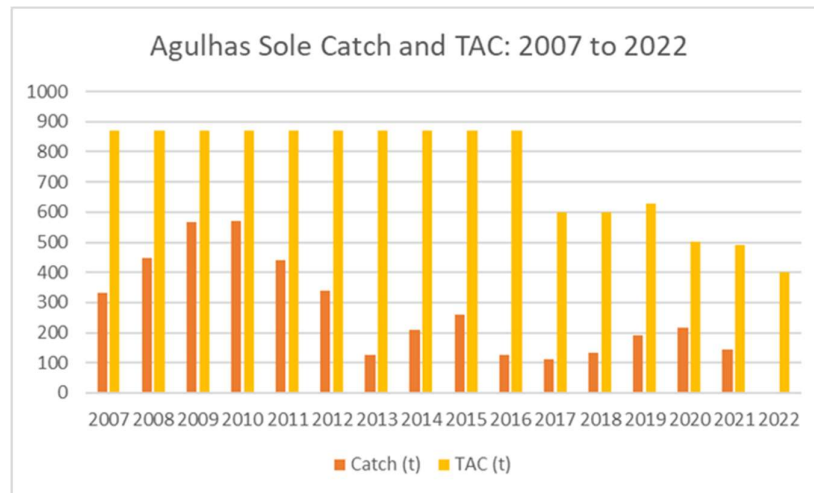


Figure 5.6.63
Agulhas Sole Catch (t) 2021 for the Period 2007 to 2021

The 2022 annual TAC of 400 t is estimated to be worth approximately R22 million (Planning Partners, 2024b).

Restricted Areas

In terms of the Fishing Permit Conditions for: Hake; Sole; Horse Mackerel and Demersal Shark, for the 2024 fishing season Section B, permits are valid only in South African waters (excluding tidal lagoons, tidal rivers and estuaries, closed areas and marine protected areas).

No fishing shall take place within False Bay, north of a straight line drawn from the lighthouse at Cape Hangklip to the lighthouse at Cape Point (outside site region).

No fishing shall take place in the Marine Protected Areas.

Table 5.6.14
Summary of the Hake Longline Fishery (Entire Fishery)

Duration of Rights(15 Years)	15 years (up to 2037)
Value of the Large Pelagic Longline Fishery (2021)	R22 million
Fish Landed Large Pelagic Longline Fishery (2022)	143 t
Number of Jobs Sustained	Not known
Number of Vessels	4 primary active vessels

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Number of Rights Holders (as at 2023)	
Closed Season	None

vi. Squid

Overview

The Cape Hope squid *Loligo reynaudii* occurs around the South African coast from Namibia to the Wild Coast region of the Eastern Cape, as illustrated in **Figure 5.6.64**. Chokka squid is fast-growing, reaching reproductive size in approximately one year or less with a potential fecundity of about 18 000 eggs. The age after hatching in males ranges from 164 to 484 days with a mean of 323 days, and in females from 125 to 478 days with a mean of 316 days, and its total lifespan is less than two years.

Chokka squid spawn throughout the year with a peak in summer. Spawning distribution is governed largely by environmental conditions and spawning occurs mostly inshore in the relatively sheltered bays off the South Coast, in waters less than 60 m depth, but occasionally in deeper waters.

The abundance of squid fluctuates widely, mainly due to biological factors such as spawning distribution and survival rates of hatchlings and juveniles, and to environmental factors such as temperature, currents, turbidity and macro-scale events such as *El Niños*.

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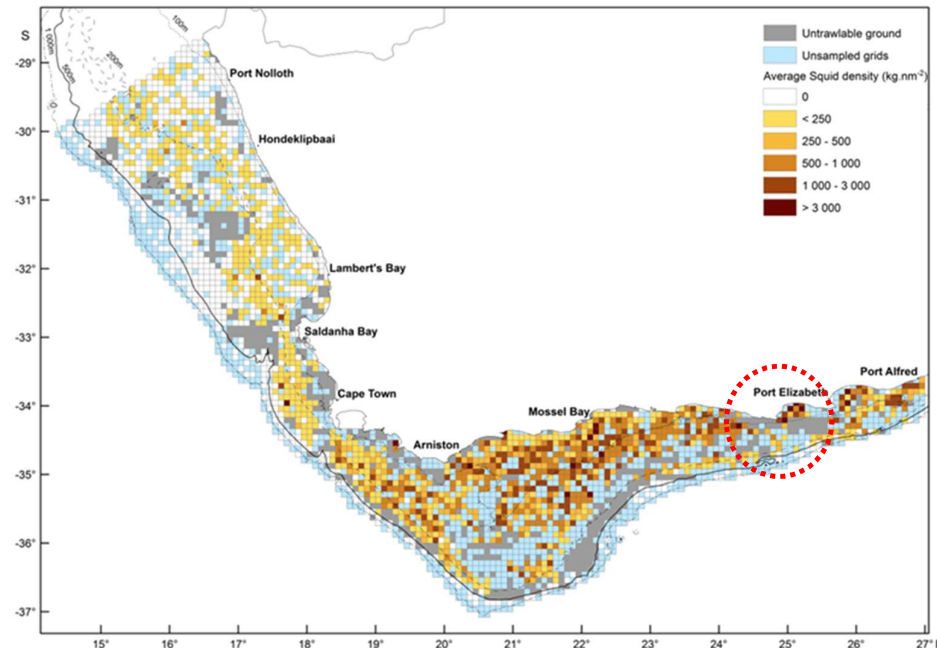


Figure 5.6.64
Distribution of Squid in South African Waters Relative to the Site Region Demarcated by the Red Circle

Squid is landed at the harbour in St. Francis Bay within the site region, and at Gqeberha, which is located to the north-east of the site, but outside of the study area.

The fishery is fairly stable and provides employment for approximately 3 000 people. The fishery is believed to generate an income of more than R480 million in a good year. It is South Africa's fourth largest fishery in monetary terms and is the most important fishery in the site region (Planning Partners, 2024b).

History and Historic Trends of the Fishery

In the 1960s and 1970s, the squid resource was heavily exploited by foreign fleets, predominantly from the Far East. With the declaration of the South African EEZ in 1977, fishing by foreign fleets were phased out in the 1980s. Squid (and other cephalopods) were initially caught by South African demersal trawl fishery as by-catch, with catch fluctuating between 200 and 800 t annually.

A commercial jig fishery for squid was formally established in 1984. Hand-held jigs are used to catch squid, making this a particularly labour-intensive fishery. Between 1986 and 1988 a licensing system was

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introduced with a view to limiting the number of boats participating in the fishery. The squid fishery has a high variability in both biomass and catches, with annual catches varying from 2 000 to over 13 000 t.

Catches in the 1990s ranged between 1 900 and 7 400 t and in the 2000s between 2 600 and 13 900 t. Catch data indicate an increase in jig catches over the period 2001 to 2004, followed by catches stabilising at approximately 9 000 t between 2005 and 2008, and then increasing again to just over 10 000 t in 2009 and 2010. Annual catches in both the jig and trawl fisheries declined after 2010, reaching its lowest level in 2013. Thereafter the fishery demonstrated a steady increase, recording a catch of almost 14 000 t in 2018, and then declined with catch in 2021 being less than 5 000 t.

Figure 5.6.65 illustrates relative annual squid catch over the longer term and demonstrates the relative importance of the squid jig fishery compared to the squid trawl fishery over time.

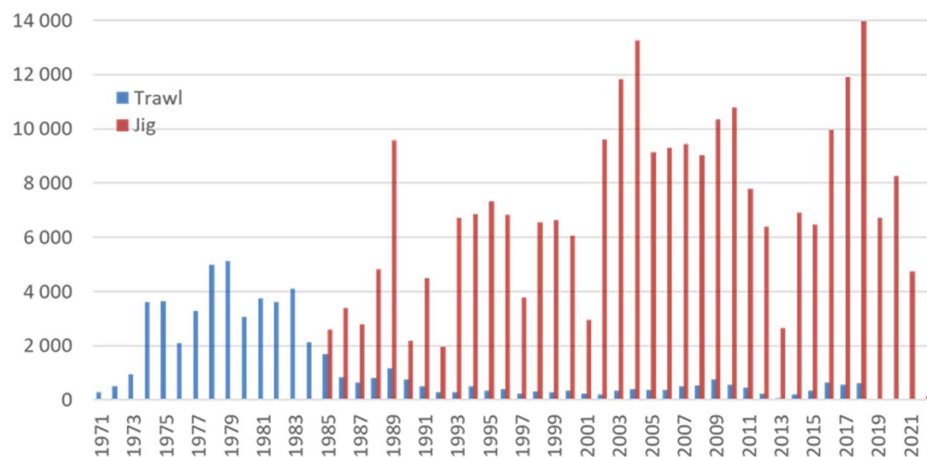


Figure 5.6.65
Annual Catches of Squid (t) as Landed by the Commercial Jig Fishery, and as By-catch in the Demersal Trawl Fishery for the Period 1985 to January 2021

The squid jig fishery makes a significant contribution to the economy of the southeastern coastal region. The fishery is seasonal, with the main season October to March, targeting adult squid in spawning aggregations. Squid fishing also takes place over the winter in deeper water where the use of lights is employed. **Figure 5.6.66** illustrates the fishing intensity in terms of average annual catch for the period 2000 to 2017.

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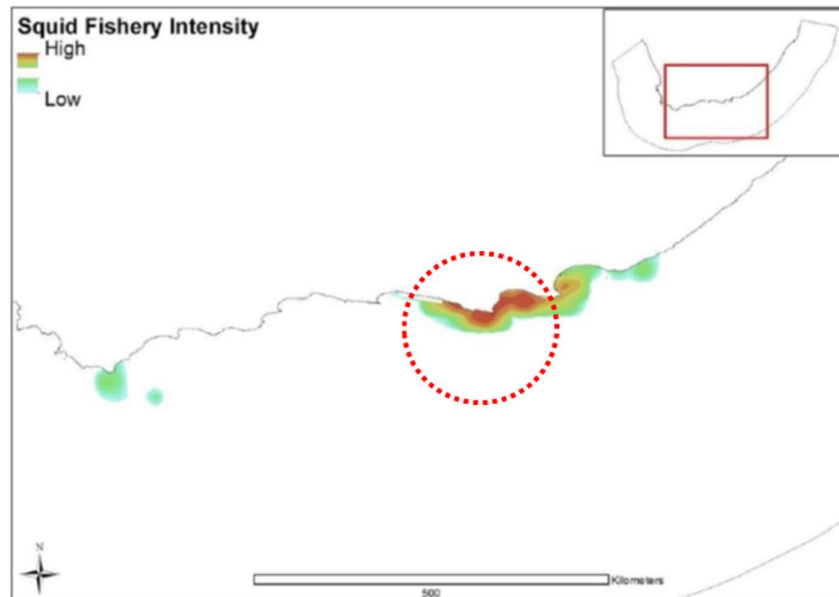


Figure 5.6.66
Squid Fishing Effort Displayed as Annual Average Catch
in Kilograms for the Period 2000 to 2017

Management of the Fishery

The fishery is effort-controlled and was historically capped at a maximum of 2 422 crew with the number of vessels commensurate with the number of persons permitted to fish. The current recommended TAE is 295 000 person-days. A mandatory 5-week closed season (October to November each year) has been implemented since 1988 with the intention of minimising the disturbance to spawning squid and improving recruitment the following year. Furthermore, an additional closed season (in the range of 4 to 5 months duration) has been implemented since 2014 to guard against the TAE being exceeded.

The current management objective for the squid fishery is to cap effort at a level which secures the greatest catch, on average, in the longer term without exposing the resource to the threat of reduction to levels at which future recruitment success might be impaired or catch rates might drop below economically viable levels.

The reporting of detailed records of the effort expended is often delayed so that a coarse early warning system has been developed, which serves as a basis to curtail fishing, as the end of the fishing season approaches and it appears that the TAE is likely to be exceeded (Planning Partners, 2024b).

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Status of the Resource

A biomass-based stock assessment model is applied to assess the status of the squid resource. Above-average recruitment had been observed over the period 2002 to 2009, but then declined to below-average levels over the period 2010 to 2013, before showing an improvement in 2014. The assessment indicated a period of declining abundance over the period 2009 to 2014, after which biomass showed an increasing trend, and the stock was estimated to be at about 41 per cent of pre-exploitation levels in 2015. The 2010 to 2013 decline in recruitment may be related to possible environmental anomalies over the 2012 to 2014 period along the South Coast.

The squid resource assessment undertaken in 2016 provided slightly more optimistic results than those obtained from the 2013 assessment, suggesting that the then current TAE of 250 000 person-days could be increased to 270 000 person-days without undue risk to the resource. At the time it was cautioned that given a crew complement of 451 fishers, the average number of days fished should not exceed 110 days to ensure that the target effort level of 270 000 person-days not be exceeded. A recommendation of this nature was subsequently submitted to DAFF Management by the Squid Scientific Working Group.

The stock assessment conducted in 2019 indicated a more positive outlook regarding resource status than did the 2016 assessment. This updated assessment of the squid resource, including data up to 2017 indicates that any effort exceeding 295 000 person-days will result in a probability exceeding 5 per cent of the biomass falling below 20 per cent of pristine in any future year. However, at the 2022 international review workshop, a revision of the stock assessment model was considered, for three reasons: (i) squid is now considered not to live beyond about one year, contrary to what is assumed in the prevailing stock assessment model; (ii) the 'annual' squid life cycle needs to be taken into account consistently in the definition of the overall season and the assessment of the resource; and (iii) the introduction of further rights holders could increase the risk of TAE overruns, requiring a review of the allocation and the management of the TAE, with implications for the stock assessment model. The international review panel considered that the current stock assessment model could continue to be used to provide management advice while the new model was under development (Planning Partners, 2024b).

Vessels and Gear

The squid fishery relies on a boat-based, dedicated local commercial jig fishery that operates mainly between the Cape of Good Hope and Port Alfred. The fishery is capital intensive and investments in vessels and fish

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processing establishments are very important. The vessels range in length from 12 to 20 m and stay at sea for typically 3 weeks at a time. The fleet operates out of Gqeberha and Port St. Francis.

Only squid jigging gear may be utilised when harvesting squid. (a squid jig is defined as a lure like object with a row or number of rows of barbless 'hooks' at one end and an 'eye' at the opposite end). Jigging operations involve the use of one or more jigs attached to a handline at the eye of the jig and moved up and down in a series of short movements in the water.

Only squid jigging gear is permitted on board the vessel when the vessel is catching. No other fishing gear, including bait sticks, is permitted on-board the vessel. Whilst operating in terms of the provisions of an allocated permit, the permit holder shall not utilise recreational fishing permits or any other fishing right/exemption allocated to it.

Directed chokka squid fishing is conducted using multiple handlines per crew member, with up to 4 jigs on each line. Depending on catch rates, the skipper will cease all fishing activity after 4 to 6 hours and all squid that have been caught by each crew member during that fishing session are weighed, graded into coarse size categories, packed into labelled trays and frozen on-board the vessel.

At the end of the fishing trip, the frozen product is offloaded and transported to a recognised fish processing establishment where the product is checked for export and weighed (Planning Partners, 2024b).

Fisheries Allocation and Catch Data

Figure 5.6.67 illustrates historic catch data for the period 2007 to 2020. The most recent long term squid fishery allocations were awarded in 2021 and the approved squid TAE for the 2021/2022 fishing season is 2 422 crew and 295 000 person-days.

In terms Section 14(2) of the MLRA 15 per cent of the squid TAE is apportioned to the small-scale fisheries sector and 85 per cent of the squid TAE to the commercial sector. The apportionment took effect from the start of the 2021/2022 squid fishing season and is reviewed at the beginning of every fishing season with the view of increasing the apportionment of the small-scale fisheries sector from a minimum of 15 per cent to a maximum not exceeding 25 per cent, without exceeding the recommended target effort level.

With the Fishing Rights Allocation Process (FRAP 2021/2022), the global TAE for the commercial sector is set at 250 750 person-days (2 077 crew) and for the small-scale sector at 44 250 person-days

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(366 crew).

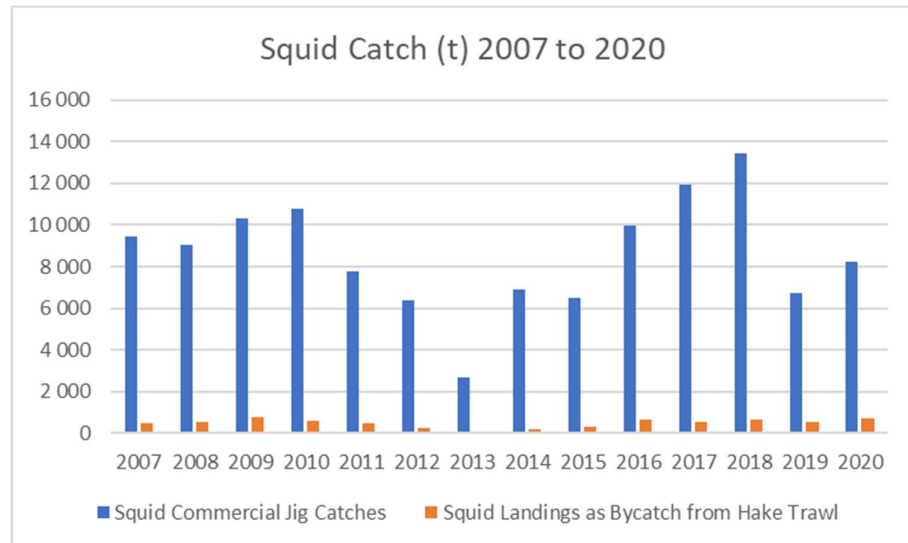


Figure 5.6.67
Annual Catches of squid (t) as Landed by the Commercial Jig Fishery, and as By-catch in the Demersal Trawl Fishery for the Period 2007 to 2020

It is noted that catches since the opening of the season in July 2023 have been poor.

Restrictions and Closed Areas

The fishing year runs from 1 May until 30 April each year. Catching of squid only starts after 12 noon on 1 July and 23 November in any year. There are three closed fishing seasons in the squid fishery during the following periods:

The first closed season is from 12h00 on 1 May 2023 to 12h00 on 1 July 2023.

The second closed season is from 12h00 on 19 October to 12h00 on 23 November in any year. The second squid closed season is stipulated in Government Notice No. R.728, Gazette No. 34596 published on 16 September 2011 (DAFF, 2011).

The third closed season is from 12h00 on 1 April 2024 until 00h00 on 30 April 2024. The commencement date of this closed season may be varied by the Department up to one month in either direction, after consultation with industry and, based on the assessment of the level of effort exerted up until 31 January 2024.

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On 19 October 2023 and 1 April 2024 respectively, at 12h00 (closure of the season), catching of squid shall cease and all vessels must proceed directly to port and shall be monitored by the vessel management system.

No vessels may have squid onboard 24 hours following closure of the squid fishing season unless the vessels' holding facilities are sealed and the person in control of the vessel is in possession of written authorisation from the local Fishery Control Officer.

The following restrictions apply in terms of areas and periods within which the fishery may be active:

- A permit is valid only in South African waters (excluding tidal lagoons, tidal rivers and estuaries).
- Fishing and the removal or disturbance of any marine life in the Tsitsikamma National Parks Marine Protected Area is prohibited.
- A vessel may not enter, fish or carry fishing gear on board in any MPA, or any other similar protected or conservation area, except where permitted by way of legislation.

A permit holder may only fish in the area and for the period noted on the permit (Planning Partners, 2024b).

Market Destinations

Chokka squid are frozen at sea in small blocks. They are landed mainly between Plettenberg Bay and Port Alfred and exported whole to European countries, most notably Italy. Squid are also used as bait by line-fishers (Planning Partners, 2024b).

Table 5.6.15: Summary of the Squid Fishery

Duration of Rights	TBC
Value of the Squid Fishery	R1 billion (SASMIA)
Fish Landed Squid Fishery (2021)	4 741 (t)
Number of Jobs Sustained	3 000 (2 451 crew and 500 land-based support staff: SASMIA)
Number of Vessels	123
Number of Rights Holders/Permits	2 443 (2020)

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Closed Season	1 st : 19 October to 23 November 2 nd : Typically, 3 months from April to June, but could be advanced/delayed depending on achievement of the TAE
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e) Nearshore Fisheries

i. Seaweed

Overview

The South African seaweed industry is predominantly based on the commercial collection of kelps and red seaweed (*Gelidium*) and small quantities of other species. Commercially exploited seaweeds occur between the Orange River (Northern Cape) and the Mtamvuna River (Eastern Cape). In the Northern and Eastern Cape, the seaweed industry is based on the collection of beach-cast kelps and the harvesting of fresh kelps. *Gelidium* species are harvested in the Eastern Cape (within the site region).

Gelidium species contain agar, a commercially valuable colloid with many food and cosmetic uses, and the only medium for cultivating bacteria in medical pathology. The *Gelidium* resource in South Africa comprises *Gelidium pristiodes*, *Gelidium pteridifolium* and *Gelidium abbottiorum*; all most abundant in the Eastern Cape, where they have been harvested from the intertidal zone since the mid-1950s.

The seaweed sector is small compared to other fisheries but is estimated to be worth R45 million and to provide 400 jobs.

History and Historic Trends of the Fishery

Commercial interest in the fishery began during the Second World War, but commercial exploitation of the resource only began in the 1950s. Historically the seaweed industry has been based on three groups of seaweed: the kelps (*Ecklonia maxima* and *Laminaria pallida*), several species of red seaweed (*Gelidium*) and the red seaweed (*Gracilaria* and *Gracilariopsis*).

Since at least 1953, beach-cast kelp of both *Ecklonia maxima* and *Laminaria pallida* have been harvested at quantities that have been determined by market demand. By 1977, a maximum harvest of approximately 5 000 t (dry weight) was reached. Since then, an annual average of 1 312 t dry weight has been collected. Yields were lower between 1993 and 1995 as a result of strong international competition from Chinese alginate producers.

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Commercially viable quantities of Gracilarioid seaweeds (*Gracilaria gracilis* and *Gracilariopsis sp.*) occur in Saldanha Bay and St. Helena Bay. Since at least 1957, commercially viable quantities of Gelidium have been harvested in the Eastern Cape. Four species (*Gracilariopsis pristoides*, *Gracilariopsis abbottiorum*, *Gracilariopsis pteridifolium* and possibly some *Gracilariopsis capense*) have historically been harvested from the intertidal and shallow subtidal zones of concession areas 1, 20, 21, 22 and 23. Currently, only *Gracilariopsis pristoides* has reasonable marketing potential. An attempt was made to extract agar in the Eastern Cape from 1978 to 1982, but this proved uneconomical.

The recent growth of the abalone farming industry has created further demand for freshly harvested kelp. In 2014, a total of 4 800 t of fresh kelp fronds had been supplied to abalone farmers and in 2021 the volume was 3 182 t. These farmers are centred in two main nodes at Cape Columbine and Hermanus and Danger Point, far beyond the site region.

Currently, *Gelidium* is the only species harvested in the site region, as a source of agar (Planning Partners, 2024b).

Management of the Fishery

The present levels and methods of exploitation have a negligible ecological effect. Exploitation levels are essentially controlled by limiting effort to only one commercial operator per concession area and through the monitoring of yields. These species are also difficult to fully remove by picking. Amounts of beach-cast kelp are not monitored for practical reasons due to the length of the coastline.

Estimates of kelp biomass are conducted based on infrared aerial photography, GIS mapping and diver-based sampling. Monthly harvesting of fresh kelp is checked against prescribed MSY, as set in annual permit conditions.

The harvesting and biology of *Gelidium pristoides* in Area 1 (which is located partly in the site region) of the Eastern Cape were comprehensively researched in the 1980s. Current monitoring is by annual inspections of certain harvested and non-harvested shores in that area and of annual biomass and density measurements at two permanent study sites. Catch returns are also monitored to ensure that yields do not exceed historical levels. The *Gelidium pristoides* resources in the former Transkei (outside of the site region) have never been quantified (Planning Partners, 2024b).

Status of the Resource

All harvested *Gelidium* were collected from Area 1, with *Gelidium*

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pristoides now comprising almost all the harvest. Inspections and measurements done in February and September 2021 indicated very healthy *Gelidium pristoides* populations, with density and biomass values well within normal limits (Planning Partners, 2024b).

Vessels and Gear

Kelp is harvested either by cutting kelp fronds/blades from boats or whole kelp plants by diving or collecting beach-cast kelp (fresh and dry). In some cases, kelp harvesting involves cutting the entire head of the kelp, rather than just the fronds or blades which kills the kelp plant. Harvesting of only the secondary blades allows the kelp to regrow (Planning Partners, 2024b).

Allocation in the Site Region

The area between the Orange and Mtamvuna rivers is divided into 23 seaweed rights areas (see **Figure 5.6.68**). Area 1 corresponds with the site region. Management of most seaweed resources is based on TAE, except for fresh kelp for which a MSY is set. The commercial season for permits and reporting of seaweed yields are 1 March of year 1 to end February of year 2. Rights to each group of seaweed is held by only one entity to prevent competitive overexploitation of the resource. Different entities may hold rights to different resources in the same area.

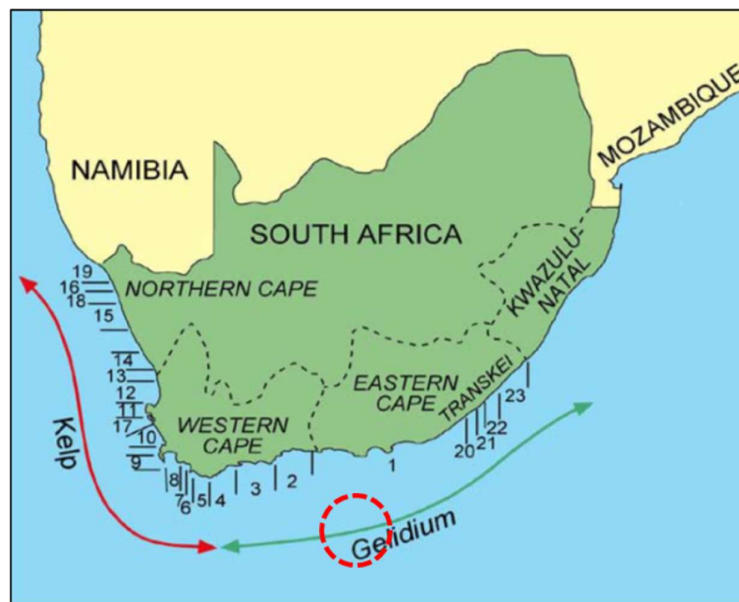


Figure 5.6.68
Seaweed Concession Areas along the South African Coastline

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In terms of the FRAP 2015 and as recorded in the fishing rights register dated July 2018, there are 15 kelp fishery rights which are mostly valid from 1 February 2017 to 29 February 2032.

Allocations to the one concession area within the site region (Area 1 (*Gelidium* Right), as stipulated in the Seaweed Fishery Policy: 2015, are the following and illustrated on **Figure 5.6.69**:

- boundaries of concession area: Kei River (32° 40' 28" S, 28° 23' 00" E) to Cape Seal (34° 01' 12" S, 23° 24' 48" E);
- functional group/genus/species: *Gelidium pristoides*, *Gelidium abbottiorum*, *Gelidium amansii*, *Gelidium pteridifolium* ("Gelidium cartilagineum / *Gelidium versicolor*");
- harvesting/collecting method: By hand (picking);
- maximum yield: Not applicable as the fishery is effort-controlled.

Figure 5.6.69 illustrates the annual kelp harvest of *Gelidium* for the period 2008 to 2021.

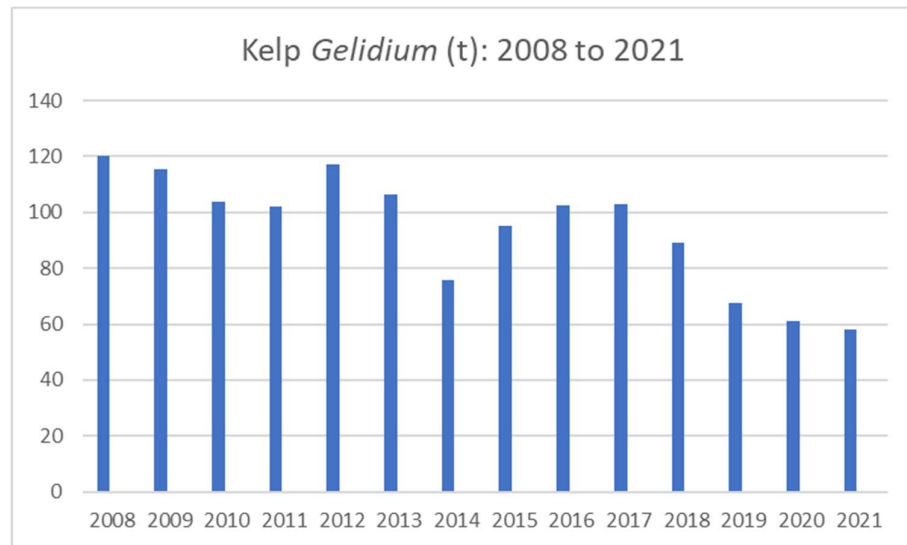


Figure 5.6.69
Annual Yield of *Gelidium*: 2008 to 2021

With reference to **Table 5.6.16**, the 2021 harvest from Area 1 (58 t dry weight) was the lowest ever recorded, mainly because of reduced demand (Planning Partners, 2024b).

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Market Destinations

Currently, around 12 719 t (52 per cent of total kelp production in South Africa, fresh weight equivalent) is dried and milled and exported to China, Japan and Europe (mainly Spain and France) for hydrocolloid alginate extraction. In total this equates to around 2 019 t dead weight. Seaweed exports do not always match harvested quantities because, in some years, material is stockpiled until prices improve. The alginate extracted from the kelp is converted into sodium alginate and used as a thickener, stabiliser, and emulsifier in food products as well as other industries (e.g. pharmaceuticals and textile printing). Some processors import the sodium alginate back to South Africa for further distribution to other African countries (e.g. Morocco, Nigeria, Ghana, Zambia), while some is sold directly to local food processing companies.

A large proportion of the harvest is exported for the extraction of gums (Planning Partners, 2024b).

Table 5.6.16: Summary of the Kelp Fishery

Duration of Rights	15 years - 2017 to 2032
Value of the Kelp Fishery	R40 million
Gelidium Harvested in the Kelp Fishery (2021)	58.1 t
Number of Jobs Sustained	1 700
Number of Vessels	N/A
Number of Rights Holders/Permits	15
Closed Season	None

ii. Hake Handline

Overview

The hake handline fishery is restricted to east of the 20°E line of longitude, within the site region, and operates only on the South Coast and targets *Merluccius capensis*.

History and Historic Trends of the Fishery

The hake handline fishery developed along the South Cape coast where, in the late 1980s, traditional line fishers began targeting hake as the demand for prime quality hake increased on the international market. Originally, hake handline fishers used deck boats that were capable of fishing overnight. As the fishery grew, some fishers started using

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skiboats, which can stay out at sea overnight, and can be winched up onto a trailer and be driven to areas closest to where the hakes are located. The deck boats were harbour bound. This introduction of skiboats significantly increased effort in the hake handline fishery, particularly as the use of these vessels allows hake hand liners to follow the hake along the South African coastline.

In the late 1980s the demand for prime quality hake had increased in the international market, in particular Europe. By the 1990s, spurred on by demand, a range of fisheries including recreational and fishers in other fisheries targeted hake. By 2000, about 5 000 t was landed, peaking at 7 300 t in 2021.

In the early 2000s when markets were lucrative the hake handline fishery operated out of harbours and from slipways along the Southern and Eastern Cape coasts.

In 2000 the Minister announced emergency measures and split the handline fishery into three fisheries: the hake handline, tuna pole and traditional line fish fisheries. The Minister also applied a TAE to the hake handline fishery for the first time. The TAE limited the number of vessels to 130 and the number of crew to 785. In addition, a PMCL of 5 000 t was applied. In 2005 vessels were restricted to 95 and crew to 742 (Planning Partners, 2024b).

Catch Data

Figure 5.6.70 illustrates the decline in the hake longline fishery catch in the period 2007 to 2021.

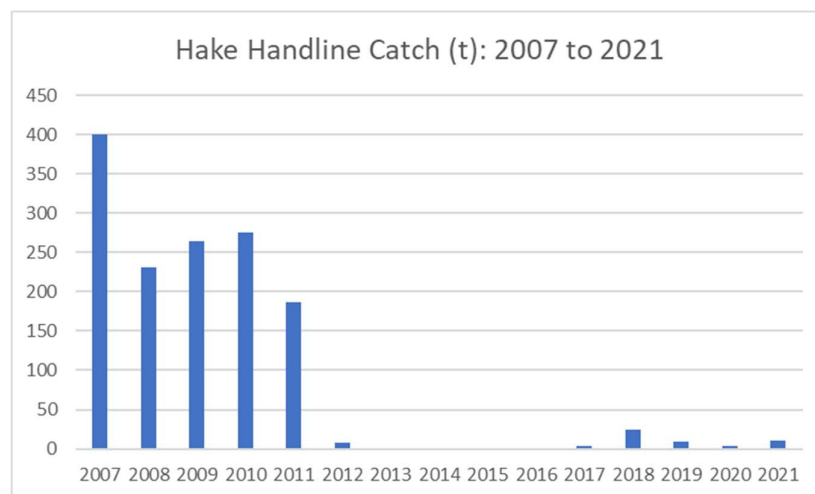


Figure 5.6.70: Hake Handline Catch (t): 2007 to 2021

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The decrease on the hake handline fishery can be attributed to a number of factors including economic and environmental factors. These include the collapse of the international markets and increased operational costs, mainly due to high fuel costs. In addition, fish has moved offshore and to areas that are difficult for small boats to fish safely. The availability of hake in the inshore areas, where the handline fishery operates is also seasonal (Planning Partners, 2024b).

Restrictions and Closed Areas

In accordance with the applicable 2023 exemption permit conditions, the following are permitted:

- Permits are valid only in South African waters (excluding tidal lagoons, tidal rivers and estuaries).
- No fishing vessel shall enter the following Marine Protected Areas: De Hoop, Robberg, Tsitsikamma (partly within site region) and Sardinia Bay. Fishing in other marine areas controlled by the South African National Parks is subject to regulations promulgated under the National Parks Act, 1976 (Act 57 of 1976) as amended.
- No fishing shall take place in the Marine Protected Areas as proclaimed in the Government Gazette No. 42478 dated 23 May 2019 (Planning Partners, 2024b; Republic of South Africa, 2019).
- The exempted permit holder may target snoek in the area bounded by Port Nolloth and an imaginary line due south from Cape Recife (within site region).

iii. Oyster Fishery

Overview

The Cape rock oyster *Striostrea margaritacea*, which is targeted in this fishery, has an extensive geographic distribution and occurs on rocky reefs from Cape Agulhas to Mozambique. These oysters are found in the intertidal zone down to about 6 m.

Harvesting takes place during spring low tides and has traditionally been restricted to the intertidal zone. In recent years, however, this has gradually been expanded towards the fringes of the subtidal zone (Planning Partners, 2024b).

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History and Historic Trends of the Fishery

The commercial fishery for oysters dates back to the late 19th Century. Prior to 1998, less than 8 individuals held concessions to harvest oysters and employed large numbers of pickers. In 2002, rights were redistributed, and medium-term (4-year) rights were allocated to 34 rights holders, the majority of whom held limited commercial rights and were allowed to employ up to three pickers each. A few rights holders held full commercial rights and could employ a maximum of 10 pickers each. In total, 114 pickers were permitted to harvest oysters during this period.

In the 2006 rights allocation process, 3-year commercial rights were allocated to 121 individuals. A large number of pickers were accommodated, and rights holders were required to harvest the oysters themselves and were no longer allocated additional effort (pickers) to assist with harvesting.

In 2015, the FRAP-2013 confirmed the previous number of harvesters and their split across the various fishing areas. In 2017, 73 rights were allocated to the new small-scale sector, leaving 72 rights for allocation to the commercial sector. During all the allocation changes in recent years, the TAE was split between the different areas so that it remained constant (Planning Partners, 2024b).

Management

The oyster fishery was previously managed as two separate fisheries related to their areas of operation: the Southern Cape Coast and the KwaZulu-Natal (KZN) Coast. Since 2002 the oyster fishery has been managed as a national fishery, with four recognised commercial oyster-harvesting areas: the Southern Cape, Gqeberha, KZN North and KZN South. Regional differences regarding regulations and harvesting patterns were retained.

The oyster fishery along the Southern Cape coast is not managed by rotational harvesting but by means of limiting the number of pickers with an unlimited daily bag limit. Recreational fishers, however, are subject to a daily bag limit. No assistant pickers are allowed. The effort has been split across areas in accordance with the extent of the accessible oyster reef. In the Gqeberha oyster fishery, no harvesting of the oyster beds is allowed, and only washed-up oysters may be collected.

Oysters are of relatively low value compared to other commercially exploited species and the fishery was not prioritised in terms of research effort and management attention. The consequence is that the TAE for the oyster fishery is currently determined according to historical effort levels and not based on the assessed stock or status of the resource.

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Plans were underway to start an assessment in 2024 lasting between 3 and 5 years, thus, a full assessment could be expected in 2030. Priority is given to the Southern Cape because of evidence of over-exploitation, while in KZN monitoring is undertaken by the Oceanographic Research Institute.

Figure 5.6.71 illustrates the commercial oyster-harvesting areas of the Southern Cape and Gqeberha (formerly known as Port Elizabeth) relative to the site region. No oyster collection zones occur in the site region.

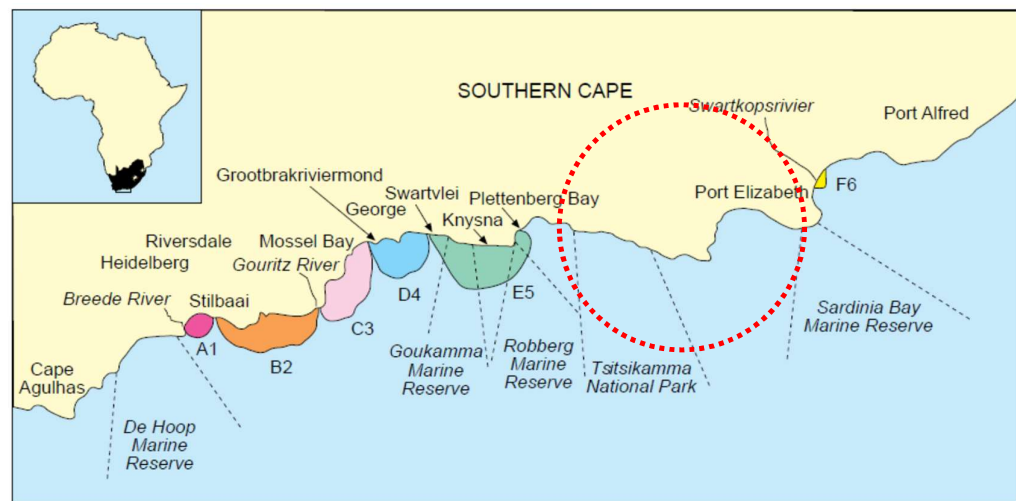


Figure 5.6.71: Oyster Collection Zones along the South Coast

Status of the Resource

In the Southern Cape there is concern that the intertidal zone is being denuded of oysters as a result of being overharvested. The oyster density and size-composition data, collected during surveys undertaken between 2000 and 2004, suggested that the intertidal oyster stock along the Southern Cape Coast appeared to be over-exploited. There were reports of divers illegally harvesting oysters from subtidal ‘mother beds’. Catches in KZN are at very low levels and have declined consistently during the last three decades. This is thought to be caused by reduced effort (non-activation of permits), poor catch reporting (especially along the KZN South Coast) or a decline in resource availability. Further research is required for an updated assessment. The oyster resource along the KZN coast is considered to be fully exploited (Planning Partners, 2024b).

Vessels and Gear

Harvesting takes place during spring low tides and has traditionally been

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restricted to the intertidal zone. In recent years, however, this has gradually been expanded towards the fringes of the subtidal zone. Oysters are dislodged from rocks by means of a pointed steel crowbar (oyster pick). Harvesters are allowed to wear a mask, snorkel and weight-belt, and commonly use an oyster pick to dislodge oysters from the rocks. The use of fins and artificial breathing apparatus is not allowed. No harvesting is permitted from the subtidal beds, which are considered to seed the intertidal oyster reefs (Planning Partners, 2024b).

TAC and Catch Data

Fishing rights in the oyster fishery are granted for a period not exceeding 15 years.

Figure 5.6.72 illustrates the historic catch data from 1972 to 2022.

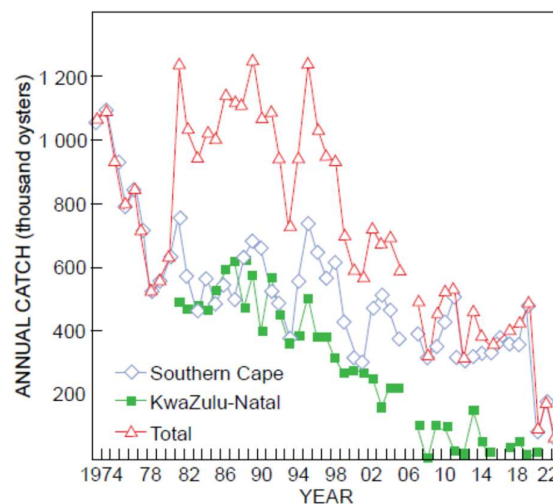


Figure 5.6.72: Oyster Catch in Numbers 1972 to 2022 (DFFE, 2023a)

For the period 2002 to 2019, TAE was restricted to 105 pickers in the Southern Cape and Gqeberha and to 40 in KZN. In 2020, the number of pickers was reduced to 51 pickers in the Southern Cape and Gqeberha and to 21 in KZN.

Figure 5.6.73 illustrates the TAE in terms of number of pickers and total catch in terms of the number of oysters harvested for the oyster fisher for the period 2007 to 2022. Note that no data were reported for KZN for 2016, when the then DAFF put a temporary hold on the oyster fishery and for 2021 and 2022 due to flooding, wastewater spillages (due to loadshedding) and toxic river runoff (due to looting events).

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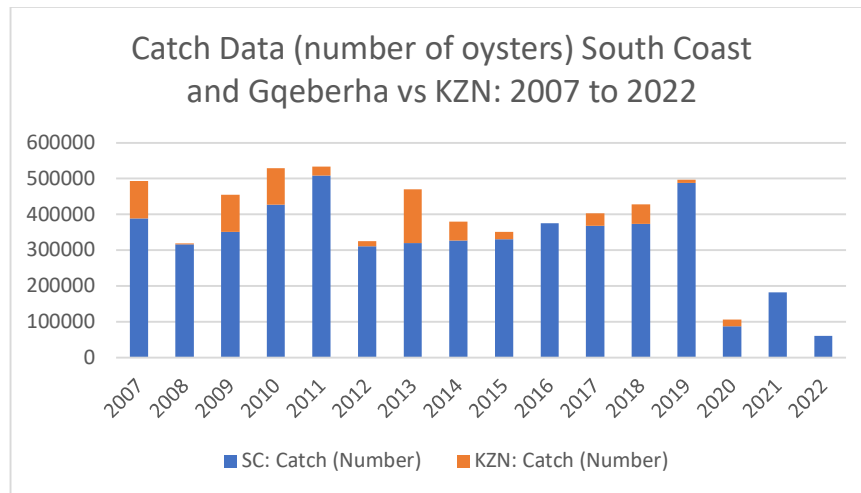


Figure 5.6.73: Oyster Catch in Numbers 1972 to 2022

The relative importance of the Southern Cape and Gqeberha oyster collection areas relative to the oyster fishery in KZN, is evident from **Figure 5.6.73**. These important oyster collection areas are located outside, but to the east-northeast and west-southwest of the site region, as illustrated in **Figure 5.6.71**.

Closed Areas and Restrictions

In accordance with current permit conditions that apply to the Southern Cape the following restrictions apply to the oyster fishery located to the east-northeast and west-southwest of the site region:

- No collecting of oysters shall take place in tidal rivers, tidal lagoons, marine reserves and national parks (except where there are areas zoned for such within the national parks).
- Oysters may only be harvested three hours prior to low tide to three hours past low tide in autumn to winter (May to August) and oysters may only be harvested four hours prior to low tide to four hours past low tide in spring to summer (September to April).

Permit holder may not use fins, floating devices and hookah or scuba gear while collecting oysters (Planning Partners, 2024b).

Market Destinations

The Cape rock oyster is solely sold in South African restaurants.

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Table 5.6.17
Summary of the Oyster Fishery

Duration of Rights	15 years (to 2031)
Value of the Oyster Fishery	Unknown
Fish Landed Oyster Fishery 2022 (Southern Cape and Gqeberha)	60 223 oysters
Number of Jobs Sustained	Unknown
Number of Vessels	None
Number of Rights Holders/Permits	51
Closed Season	None

iv. Abalone

Overview

Abalone (*Haliotis midae*) is widely distributed around the South African coastline from St. Helena Bay on the West Coast to Port St. Johns on the East Coast. It occurs in shallow waters of less than 20 m in depth but is most abundant in waters of less than 5 m in depth. Abalone reaches sexual maturity at around 7 years of age and is believed to live to an age of 30 plus years.

Historically, the resource was most abundant in the region between Cape Columbine and Quoin Point. Further along the coast eastward, the resource was considered discontinuous and sparsely distributed. Along the East Coast, experimental and subsistence permits were allocated between 2010 and 2014.

Figure 5.6.74 illustrates the abalone use rights zones. Note that the data source does not include a more detailed map of East Coast.

The status of the abalone resource is highly depleted and continues to decline in response to extremely high levels of illegal harvesting, over-allocation of TACs and ecological changes. The current commercial TAC is 50.5 t (2021/2022).

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Figure 5.6.74: Territorial Abalone Use Rights Zones

The recreational fishery was permanently closed in the 2003/2004 season. DAFF however initiated an experimental abalone fishery in False Bay and the Eastern Cape to start in 2011 and end by 2015. Seven communities within the Eastern Cape would be allocated 1.5 t each. Finding of the experiments in the Eastern Cape towards the end of 2015 had unfortunately become marred by various participants engaging in illegal harvesting.

Currently there is no commercial wild abalone fishery undertaken in the site region (Planning Partners, 2024b).

v. Traditional Line Fishery

Overview

The commercial line fishery has the largest fleet but makes up only 6 per cent of the total value of all marine fisheries (Harris, et al., 2019). Line fishing in South Africa is defined as the capture of fish with hook and line, but excludes the use of longlines. Together, the three sectors of the line fishery (commercial, recreational and small-scale/subsistence) target between 95 and 200 of South Africa's 2 200 marine fish species. Target species include temperate reef-associated seabreams (e.g. roman, hottentot seabream, santer and slinger), coastal migrants (e.g. geelbek,

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silver kob and dusky kob) and nomads (e.g. snoek and yellowtail). More than 90 per cent of the current line fish catch is derived from the aforementioned eight species.

The commercial line fishing sector is exclusively boat-based. The total number of registered vessels operating in this sector was estimated at 700 in the late 1990s, which accounted for 37 per cent of all commercial fishing boats operating in marine fisheries in South Africa. From 2006, a maximum allocation of 455 boats has been maintained, however the number of boats allocated per zone has varied. Line fishing is a low-earning, labour-intensive industry, important from a human livelihood point of view, employing an estimated 27 per cent of all fishers.

Figure 5.6.75 illustrates the relative intensity of the commercial line-fishery along the South African coastline and in the site region.

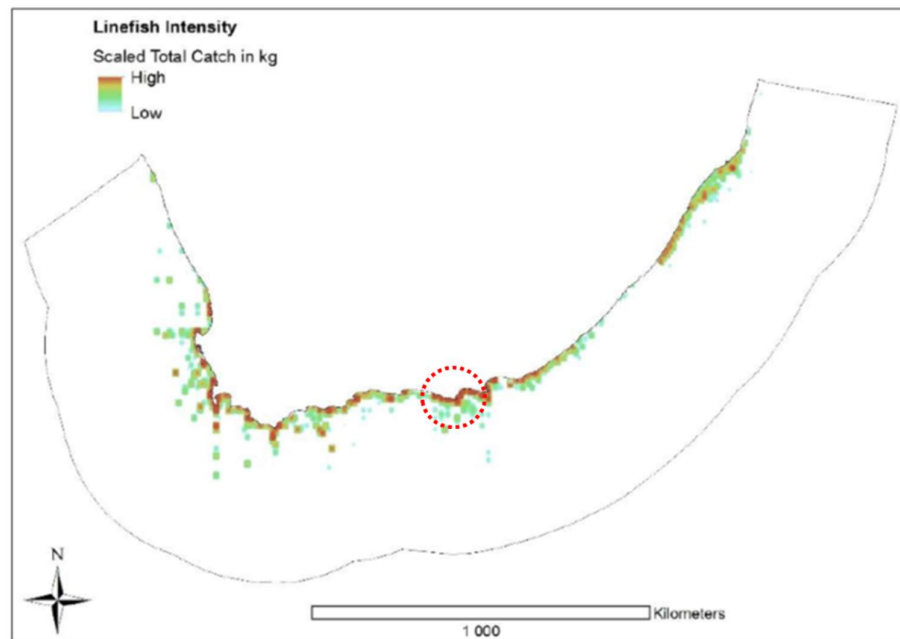


Figure 5.6.75: Distribution of the Relative Intensity (kg) of Commercial Line Fishing in South Africa, Relative to the Site Region 2000 to 2016

After the introduction of the towable ski-boat in the late 1940s, the recreational boat-based sector expanded rapidly, with an estimated minimum number of 4 000 vessels. Landings from this open-access recreational fishery are not reported throughout the region and for some areas and species, the total catch from this sector could be equivalent to that reported by the commercial sector. The recreational line fishery has

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by far the largest number of participants (more than 450 000) of all fishery sectors in South Africa and consequently has great economic value.

Recently, the small-scale/subsistence sector was legally created to recognize those fishers who depend on marine living resources for direct food security. These fishers are usually very poor coastal communities or those using simple traditional methods. There are an estimated 30 000 small-scale fishers active along the South African coastline and 85 per cent harvest line fish (Planning Partners, 2024b).

History, Historic Trends and Management of the Fishery

Line fishing in South Africa can be traced back to the fishing activities of indigenous Khoi people and European seafarers in the 1500s. Despite an abundance of fish, the fishery was slow to develop in the 1700s due to various restrictions implemented by the Dutch administration. These fishing restrictions were removed when the British came into power in 1795 and during the 1800s, boat-based line fishing developed into a thriving industry.

Fishing effort in the Cape at the turn of the 19th Century was already considerable (between 0.12 and 0.37 boats per km of coastline). This increased dramatically during the 20th Century and peaked in the 1980s and 1990s (more than 3 boats per km of coastline). The sharp increase in fishing effort, together with an increase in operational range and the rapid development in fishing technology (echosounders, nylon line, etc.), as well as the additional offtake by other fishing fleets such as trawl and purse-seine, led to overfishing of most of the line fish resources around the coast towards the end of the 20th Century.

The first comprehensive management framework for the line fishery was only introduced in 1985 when this fishery was formally recognised. However, successive research surveys indicated continuing declines in line fish resources. In December 2000, the Minister declared line fish resources to be in a state of emergency, as provided for in the MLRA, due to the critical status of many line fish stocks. Effort was reduced and fixed at 450 vessels and the hake and tuna components were developed into separate sectors. To rebuild collapsed stocks and to achieve a sustainable level of utilisation, a line fish OMP was developed in 1999 to base regulations in the line fishery on quantifiable reference points. This remains the basis of line fish management to date.

A number of regulations were put in place to manage fishing pressure on line fish resources. Due to the large number of users, launch sites and species targeted and the flexibility of the operational range, the commercial line fishery is currently managed through a TAE allocation, based on boat and crew numbers. The level of commercial effort was

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reduced to levels stipulated in the declaration of the emergency when line fish rights were allocated in 2003 (for medium terms rights) and 2005 (for long term rights). The TAE was set to reduce the total catch by 70 per cent and deemed necessary to rebuild stocks, while a small number of vessels (20 per cent) that catch 80 per cent of the fish remain active in the fishery. However, the number of rights holders that activate their rights is steadily decreasing which indicates that TAE might be exceeding the number of viable fishing units. The most recent FRAP took place in 2022. The subsequent appeals process was concluded on 25 February 2023.

The recreational fishery is managed by a number of output restrictions, such as size and bag limits, closed areas and seasons.

The small-scale fishery will also be managed through a combination of size and bag limits, closed areas and seasons. However, this sector differs in that community-based management is the core principle on which the small-scale sector is based, and local communities are encouraged and empowered to promote sustainability (Planning Partners, 2024b).

Status of the Resource

Species targeted in the line fishery display diverse life history strategies, including many traits that cause these populations to be particularly vulnerable to overfishing, e.g. long lifespans (more than 20 years), estuarine dependence, sex change and aggregating behaviour.

Assessing the status of line fish stocks has been a priority in recent years and stock assessments in 2017 indicated that the drastic reduction of fishing effort from the declaration of the 'line fish emergency' in 2000 (i.e. a subsequent reduction of approximately 70 per cent in effort by 2003), resulted in the partial recovery of some line fish species, such as the slinger (*Chrysoblephus puniceus*), santer (*Cheimerius nufar*), hottentot seabream (*Pachymetopon blochii*) and carpenter (*Argyrozona argyrozona*). However, other important stocks such as silver kob (*Argyrosomus inodorus*) and geelbek (*Atractoscion aequidens*), remain collapsed according to the line fish OMP.

Stocks of rare line fish species, such as red steenbras and dageraad, are of serious conservation concern and have been included on the International Union for Conservation of Nature threatened species list as endangered.

Line fish resources are also at risk of over-exploitation as they are directly or indirectly exploited by numerous other sectors, including the inshore and offshore trawl fisheries, tuna pole-line fishery, inshore net-fishery,

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and demersal shark longline fishery.

The yellowtail assessment suggests the stock is optimally exploited, while snoek remains under-exploited. The annual catch of the nomadic yellowtail and snoek is dependent on their availability to the nearshore line fishers and is therefore highly variable. Moreover, the inconsistent quality of yellowtail and snoek landed by the line fishery detracts from the optimal use of these important stocks. There is also considerable inter-fishery conflict around these species, which are also caught by other fisheries (i.e. trawl and hake handline fishery in the case of snoek and tuna-pole and beach-seine net-fisheries in the case of yellowtail).

Furthermore, some important line fish species, such as geelbek (*Atractoscion aequidens*), snoek (*Thyrsites atun*), yellowtail (*Seriola lalandi*) and silver kob (*Argyrosomus inodorus*) are reliant to varying degrees on small pelagic species as forage. The knock-on effects of a depleted food source on these line fish stocks were not understood.

Recent work by Parker et. al., published in 2020 indicates that the present low biomass of sardine off the South African coast is likely to have significant impacts on line fish species, that are dependent on these small pelagic prey and on the ecosystem as a whole (Planning Partners, 2024b).

Vessels and Gear

The South African line fishery is defined as that which captures fish with hook and line, but excludes the use of longlines. The traditional line fishery is defined by the use of a simple hook-and-line fishing system (excluding the use of longlines and drumlines), with a limit of 10 hooks per line (DAFF 2017). Fishing vessels generally range up to a maximum offshore distance of about 70 km, although fishing at this outer limit and beyond is sporadic.

Commercial fishing vessels range from surf-launching ski-boats of 6 to 8 m in length, to harbour-based freezer vessels (generally longer than 20 m) that can remain at sea for more than 2 weeks at a time.

Limitations imposed on vessel and crew are the following: for standard vessels a crew of 7 is permitted, while the maximum length of vessels is limited to 10 m and a maximum crew capacity of 12 applies, which includes the skipper.

Regulations issued in terms of the MLRA, has the following general restrictions placed on the fisher: no permitted fisher shall, while fishing, attach more than ten hooks to a fishing line; deploy a net in the water; fish in an estuary; engage in fishing on the authority of another fishing

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permit or right; tranship fish at sea; or exceed the maximum number of crew on the line fishing vessel, as specified on the permit (Planning Partners, 2024b).

TAE and Catch Data

TAE is managed geographically with the spatial effort of the fishery divided into three zones. Most of the catch (up to 95 per cent) is landed by the Cape commercial fishery, which operates on the continental shelf from the Namibian border on the West Coast to the Kei River in the Eastern Cape.

The fishery TAE is apportioned to the following three zones:

- Zone A: Port Nolloth to Cape Infanta;
- Zone B: Cape Infanta to Port St Johns;
- Zone C: Kwa-Zulu Natal.

The site region coincides with line fish management Zone B. Zone B extends from the Namibian border to Cape Infanta. The imaginary border line at Cape Infanta has a five nautical mile (5 nmi) buffer area on each side. In this buffer area, permit holders from the adjacent Zone A and Zone C may harvest traditional line fish.

In terms of the fishing rights register (2018), there were a total of 422 traditional line fish permit holders with permits validity ranging from 1 January 2013 to 12 December 2020.

In accordance with the Fishery Allocations appeal decision on 25 February 2023, the current TAE for FRAP 2021/2022 was set as follows:

Table 5.6.18
Allocation of the TAE in the Traditional Line Fishery
FRAP 2021/2022.

Allocation	Zone A	Zone B	Zone C
DA Allocation	236	46	43
Appeals Allocation	45	6	2
Small-scale Vessels	59	12	6

Table 5.6.19 below sets out the reported annual catch in tonnes for the eight most important line fish species caught for the period 2008 to 2021.

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Table 5.6.19
Reported Annual Catch (t) of the Eight Most Important Traditional Line Fish Species for the Period 2007 to 2021

Year	Snoek	Yellowtail	Kob	Carpenter	Slinger	Hottentot seabream	Geelbek	Santer
2007	2765	478	841	265	157	128	448	84
2008	5223	313	715	226	194	120	403	82
2009	6322	330	884	282	186	184	495	66
2010	6360	171	838	263	180	144	408	69
2011	6205	204	625	363	214	216	286	62
2012	6809	382	441	300	240	160	337	82
2013	6690	712	313	481	200	173	263	84
2014	3863	987	289	522	201	192	212	74
2015	2104	609	246	522	186	143	244	69
2016	1681	475	277	713	211	211	250	66
2017	1888	361	199	820	215	188	148	72
2018	2095	654	213	728	174	215	214	69
2019	1879	439	454	604	215	188	132	78
2020	2356	548	635	533	183	222	158	66
2021	2747	239	352	441	186	151	88	64

Figure 5.6.76 illustrates the relative volume in catch per species over the same period.

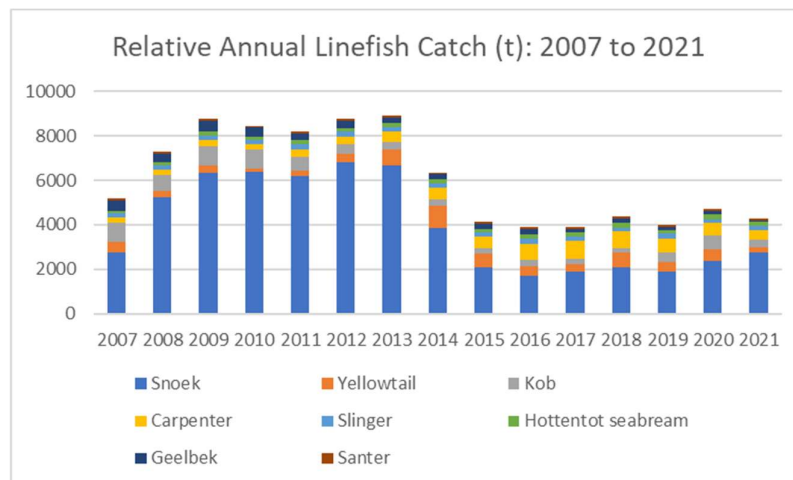


Figure 5.6.76
Average Annual Line Fish Catch (2007 to 2021)

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Based on the data analyses by Parker et. al., published in 2020, the average annual catch distribution for geelbek, silver cob, snoek and yellowtail are reproduced in **Figure 5.6.77**.

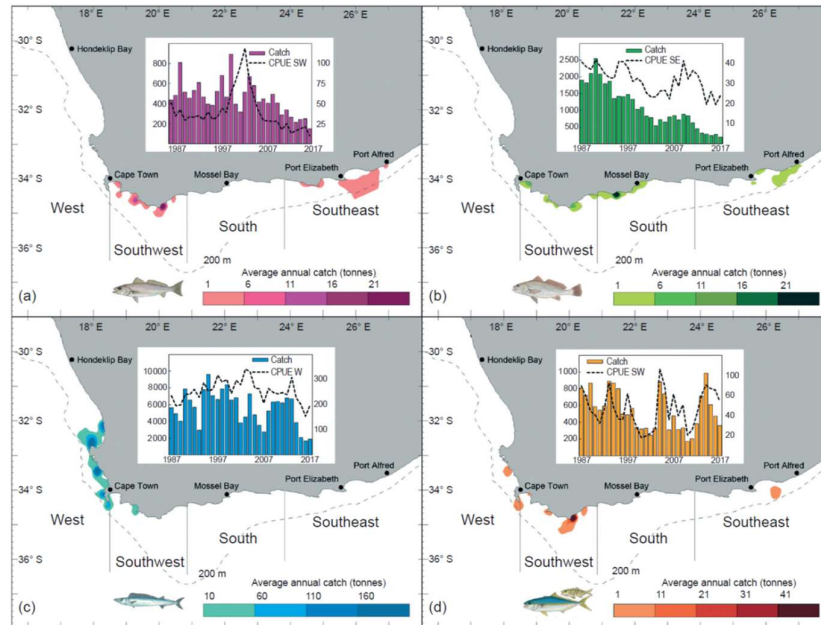


Figure 5.6.77
Average Annual Catch (1987 to 2017) (a) Geelbek, (b) Silver Cob, (c) Snoek and (d) Yellowtail

It is evident from **Figure 5.6.77** that geelbek is an important line fish species caught in the site region, but also in terms of catch distribution (Planning Partners, 2024b).

Closed Areas

Restrictions include that no permitted fisher shall attach more than ten hooks to a fishing line, deploy a net in the water, fish in an estuary, engage in fishing on the authority of another fishing permit or right, tranship fish at sea, or exceed the maximum number of crew on the line fishing vessel, as specified on the permit. Vessels are not permitted to stop or fish in an MPA or any other similar protected marine or conservation area.

Market Destinations

The target markets within the South African traditional line fishery include fish processing establishments, distributors, retailers, restaurants and directly to the public.

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Table 5.6.20
Summary of the Traditional Line Fishery

Duration of Rights	Up to 28 February 2029
Value of the Traditional Line Fishery (2022)	R105.5 million
Fish Landed Traditional Line Fishery (2021)	4 268 t
Number of Jobs Sustained	3 450 (crew upper limit) Zone B: 692 crew
Number of Vessels	455 (415 activated): Zone B: 103
Number of Rights Holders/Permits (2022)	Total 343: Zone B: 52
Closed Season	None

5.6.6.2 Fish Processing Establishments in the Site Region

The site region accommodates an important commercial fishing industry. For this reason, the location and distribution of fish processing establishments in the site region have been determined for the purposes of the TSSR (Planning Partners, 2024c).

In terms of Section 18 of the Marine Living Resources Act (Act 18 of 1998), no person shall operate a FPE unless a right to do so has been granted by the Minister. Accordingly, every person that processes fish (e.g. cleans, boxes, stores or adds value to fish) must obtain a permit from the Department of Forestry, Fisheries and the Environment, the department currently tasked with administering the Marine Living Resources Act and who also maintains the register of FPEs.

In terms of the Fishing Rights Allocation Process (FRAP, 2015) that followed the publication of the 2015 policy, 271 FPE permits were issued by the Minister, which were valid for a 15-year period from 2017 to 2032. This represents a marked reduction in the number of FPE permits issued during the 2008 FRAP process (Planning Partners, 2024c).

Data were sourced on the 2018 Fishing Rights Register for all fishery sectors. Permits were issued in 2017 and are valid for a 15-year period up to 2032. An analysis of the 2018 FPE database was conducted and a site verification process conducted in February 2024, which focused on the site vicinity and the St. Francis Bay Industrial Area.

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The proximity of FPEs to areas where marine catch is landed is important for the processing of fish and the location of these establishments tends to reflect both the location of harbours and the state of the fish stocks in the area. Fishing is an important marine activity along the Southeast Coast and within the site region. In the site region FPEs are clustered within or close to the Port of Port Elizabeth and Port St. Francis Bay, as well as certain industrial areas, most notably in St. Francis Bay and Humansdorp, as well as in Gqeberha, where these FPEs are located outside of the site region.

Table 5.6.21 and **Drawing 5.6.7** illustrate the major collection, processing and distribution points for marine products caught, i.e. FPEs, in the site region. A total of 35 FPEs are located in the site region. There are 54 FPEs located within a 100 km radius of the site including FPEs in Gqeberha and Uitenhage. It can be noted that the current identified number of FPEs is only two less than previously recorded in 2008 (Eskom, 2015). This is in keeping with the overall reduction of FPE permits allocated by the Minister following the FRAP 2015.

Of these 35 facilities located within the site region, 3 are located within the 5 km radius and 16 are located within the site vicinity (16 km). The FPE located nearest to the site is situated at Oyster Bay, 4.44 km to the north-northwest.

The results of the investigations show that the majority of the FPEs are located between 10 km and 20 km to the north-northeast, the east-northeast and east, which includes the Humansdorp Industrial Area, Port of St. Francis, St. Francis Bay Industrial Area and Jeffrey's Bay.

The results show that there are no FPEs located between the 30 and 70 km radii of the site.

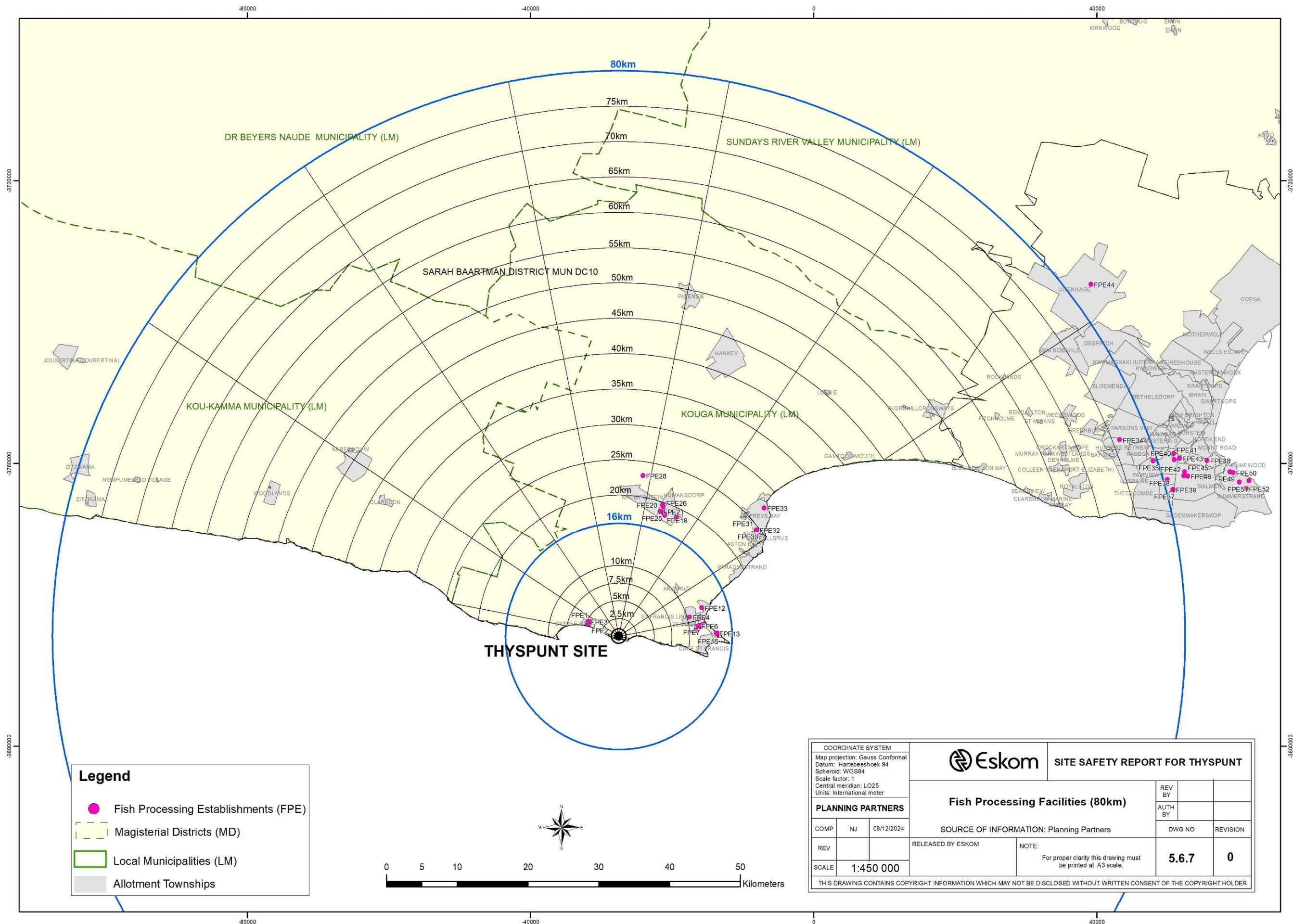
These processing facilities form the major collection and distribution points for marine products in the site region. They also form an important link in the marine products cycle that could be considered part of the food chain.

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Table 5.6.21
Number of Fish Processing Establishments by Sector
(2018)

Distance (km)	Sector											
	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW
0 – 10	-	3	-	-	-	-	-	-	-	-	-	-
10 – 20	-	-	-	11	-	3	10	-	-	-	-	-
20 – 30	-	-	1	-	5	-	-	-	-	-	-	-
30 – 40	-	-	-	-	-	-	-	-	-	-	-	-
40 – 50	-	-	-	-	-	-	-	-	-	-	-	-
50 – 60	-	-	-	-	-	-	-	-	-	-	-	-
60 – 70	-	-	-	-	-	-	-	-	-	-	-	-
70 – 80	-	-	-	-	-	2	-	-	-	-	-	-
Total in Sector	0	3	1	11	5	5	10	0	0	0	0	0

A tabulated detailed list of fish processing establishments, with the company name, location, distance and direction from the site, is presented in **Appendix A** (Planning Partners, 2024c).



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5.6.6.3 Commercial Fishery Products Exported from the Site Region

The types of fish exported from the site region is discussed under the individual commercial fishery sectors under **Subsection 5.6.6.1**. The location of fish processing establishments (FPEs) where a portion of fish products are exported from is discussed under **Subsection 5.6.6.2**.

a) Expected Trend during the Nuclear Installation Lifetime

The fish processing industry in the site region is directly related to the abundance, fishing rights allocation and possible migration of the marine resources on which it depends.

At present, the location and extent of the distribution of facilities over the lifetime of the nuclear installation(s) cannot be predicted with any level of confidence. Therefore, the information related to FPEs and exports to external markets to be presented in the TSSR needs to be periodically reviewed, at a minimum, every five to ten years.

5.6.6.4 Small-scale Fisheries in the Site Region

South Africa's small-scale fisheries are extremely diverse in terms of the people, practices and species involved. Small-scale fisheries are practiced by people in rural and urban coastal communities, who have low levels of capital and technology, and high levels of culturally-embedded knowledge and skill to target small volumes of locally-occurring species for subsistence or sale (Schultz, 2016).

In 2000, it was estimated that approximately 30 000 fishers in approximately 28 000 households were dependent on subsistence fisheries, but this was likely to be an under-estimate. In 2010 the number of people directly involved in small-scale fishing activities was estimated closer to 100 000 (Paterson, et al., 2014).

a) Legislative Framework for the Small-scale Fishery Sector

The Policy for the Small-Scale Fishing Sector in South Africa gazetted in 2012, legally recognised small-scale fishing communities' rights to access marine resources. The Marine Living Resources Act was amended in 2014 to make provision for re-distributing fishing rights in accordance with the policy (Schultz, 2016), with the Small-scale Fishing Regulations gazetted in March 2016 (Republic of South Africa, 2016).

After the department amended its legislation in 2016 to recognise the importance of small-scale fishers, the department launched an Expression of Interest process. A total of 316 communities from the four coastal provinces registered their interest and this prompted the

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department to physically visit all these co-operatives for the purpose of registration and declaration of small-scale fishers in South Africa

In 2019 the Minister granted 15-year fishing rights to small scale fishing co-operatives in the Eastern Cape, as part of the transition to the new small-scale fishing (SSF) sector. Rights were granted to 20 small-scale fishing co-operatives, with 1 591 members. The intension at the time was to grant fishing rights to a further 53 co-operatives in the Eastern Cape. The basket of species granted was made up of, squid, hake hand line, traditional line fish, seaweed, East Coast Rock Lobster and abalone ranching. By 2020 fishing rights had been granted to 72 SSF co-operatives in the Eastern Cape, by which time squid was added to the list (OneOceanhub, 2024).

b) Fishing Communities

Close to thirty geographically distinct fishing communities exist, varying in size from small villages to larger towns. In addition, many more fisher groups operate from within urbanised areas such as the Gqeberha. **Figure 5.6.68** shows the distribution of fishing communities within the site region (Paterson, et al., 2014).

Small-scale fishing is conducted close to shore with boats launched in local waters, and the duration of trips is restricted to one day. The fishing activities are labour-intensive. Men usually (but not always) do the harvesting, while women are responsible for pre- and post-harvest activities. Many fishers move between the large and small-scale sectors, making it difficult to characterise certain small-scale fishers. Their participation in these different forms of fishing depends on the time of year, weather conditions, availability of employment opportunities on commercial vessels or space on ski-boats, abundance of locally-targeted species and allocation of fishing rights (Paterson, et al., 2014).

Following a multi-species approach to the allocation of rights, means that a basket of species may be harvested or caught within particular designated areas. The site region is located with Basket Area D (**Figure 5.6.78**), which is located between Tsitsikamma to the Pondoland MPA. There are 138 different resources allocated to the basket (Masifundise Development Trust, 2014).

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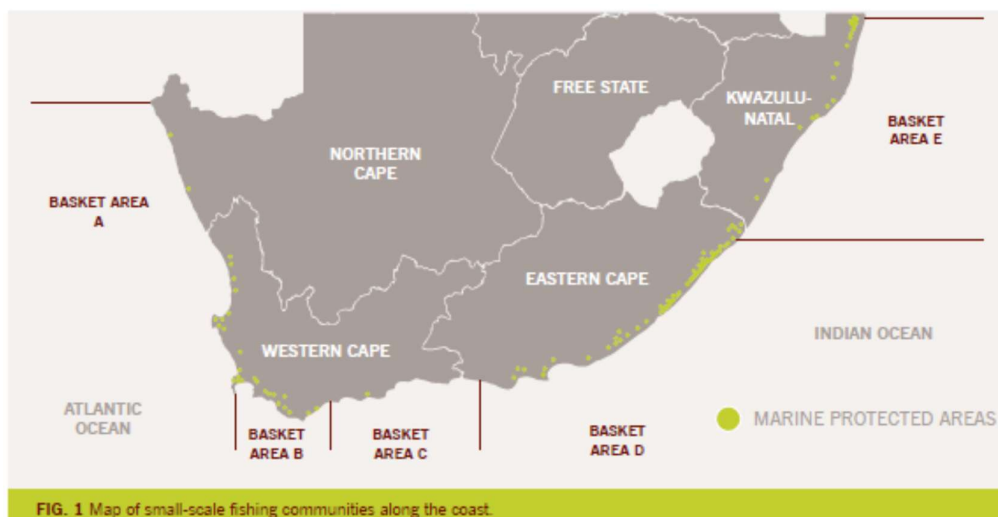


Figure 5.6.78
Basket Area D relative to the Site Region

Small-scale fisheries that use low-intensity gear and target multiple species that support local economies and food security also exist. Limited data exist for these fisheries. Recently, an attempt was made to identify all small-scale fisheries that are encompassed in the draft small-scale fisheries policy and **Table 5.6.22** sets out the data on target species, fishery sector, region or habitat and gear and/or vessel employed (Paterson, et al., 2014).

Table 5.6.22
Species Targeted, Sector, Region and Gear/Vessel by the Small-scale Fishery in the Site Region

Target Species or Species Group	Fishery Name/ Sector	Region/ Habitat	Gear/ Vessel
East Coast Sole	Commercial Inshore hake/ sole trawl	Eastern Cape: Mossel Bay to Gqeberha	Small side/beam trawlers (small vessels only)
Bait	Recreational/ Informal	All	Hand pumps/ digging
Intertidal algae (Gelidium pristoides)	Commercial algae	Rocky shore off Cape St Francis	Hand collected
Linefish (multi species)	Recreational/ informal	Shore-based, estuaries	Hand line, Cast net, rod and reel
Line fish (multi species)	Recreational/ informal	Shore based, estuaries	Hand line, cast net, rod and reel
Line fish	Recreational/	Estuaries	Gillnets / set nets

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Target Species or Species Group	Fishery Name/ Sector	Region/ Habitat	Gear/ Vessel
(stumpnose, kob, white steenbras, grunter)	informal		
Rocky shore invertebrates	Informal	Rural	Hand-picked, shore based, panga, knife, screw-driver
Sandy-shore invertebrates	Informal	Rural	Hand-picked with tools

5.6.6.5 Mariculture in the Site Region

A desktop study was conducted to obtain current data on the distribution of mariculture facilities in the site region. Data on the location of mariculture facilities, species and volumes cultured were obtained from DFFE published sources (Planning Partners, 2024d).

While it was confirmed that currently, no mariculture occurs within the site region, mariculture activities in the site region should be monitored over the lifetime of the nuclear installation(s).

5.6.6.6 Impact of Climate Change on Marine Fisheries

This section considers the most important East Coast fisheries in terms of value, employment and/or food security, namely commercial fisheries for demersal fish, small pelagic fish and WCRL and the small-scale line and net-fisheries for a wide range of species (FAO, 2018).

The effects of climate change interact with other stressors such as fishing and pollution and affect the capacity of a species to respond to these other pressures. The effects of climate change are already evident in marine ecosystems and include increases in ocean temperatures and changes in wind speed and direction, ocean chemistry and direction and strength of currents (Ortega-Cisneros, et al., 2018).

a) Climate Change Effects on the Marine Environment

i. The Agulhas Current

There is mounting evidence that the Agulhas Current is undergoing changes which could have profound effects on local climate and marine and coastal ecosystems off South Africa. Since the 1980s, sea surface temperatures in the Agulhas Current system (including on the East Coast shelf) have increased by 0.55°C per decade between 1985 and 2009 (Department of Environmental Affairs, 2013). This has caused an increase in the leakage of warm, high-salinity water into the Atlantic Ocean. An increase in the transfer of energy from the ocean to the

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atmosphere through increased evaporation has also occurred (Augustyn, et al., 2018).

ii. The Benguela Upwelling

The Benguela upwelling system located on the West Coast of Southern Africa is one of the largest eastern boundary upwelling systems in the world, making it a region of particularly high primary and secondary fish production. The Benguela is divided into northern (Namibian) and southern (South Africa) subsystems by the perennial upwelling cell located at Luderitz (Augustyn, et al., 2018).

Apart from seasonal synoptic effects, variations in El Niño Southern Oscillations and in the Southern Annular Mode are the most important source of large-scale climate variability in the tropics and middle and high latitudes in the Southern Hemisphere (Augustyn, et al., 2018).

During the austral summer, El Niño events causes warmer-than-average sea surface temperatures in the southern Benguela upwelling system. While there has been no obvious trend in the frequency or intensity of El Niño events in recent decades, there have been changes in the Southern Annular Mode, which may have resulted in a southward shift in synoptic wind systems to the south of the continent. This causes a general reduction in sea surface temperatures in the Cape Peninsula upwelling region in late summer over the past few decades (Augustyn, et al., 2018).

iii. Ocean Acidification

Global biogeochemical climate models and data analysis predict that the Benguela Current will experience corrosive and irreversible consequences of ocean acidification within the 21st century and that, through changes in the Agulhas Current and local upwelling, the East Coast will not escape these effects. There are signs that the Benguela Current may already be under strain from effects related to ocean acidification, which appear to be most severe in the inshore region of the West Coast (Augustyn, et al., 2018).

iv. Rainfall

Reductions in rainfall, an increase in water abstraction and other agricultural practices have caused river mouth closures and a reduction in the deposition of sediment in the near-shore zone, affecting species which utilise estuaries as breeding and nursery areas or rely on nutrients from sediments for growth. These processes will continue to be affected by changes in rainfall over South Africa (Augustyn, et al., 2018).

The physical and chemical changes outlined in the above could change

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the hydrobiological environment in the seas around South Africa.

b) Climate Change Effects on Marine Production

Changes in the frequency, intensity or location of upwelling can have major effects on primary, and thereby secondary, production, directly affecting the base of the marine food chain with profound effects on the ecosystem. According to Verheye et al., there is currently no strong evidence that large scale changes in primary production have in fact occurred off the West Coast in recent decades, or that the major changes in secondary production, which have occurred in the Benguela are due primarily to changes in primary production (Augustyn, et al., 2018).

The following effects of climate change are however, predicted: (a) the upwelling off the West Coast (and in coastal upwelling systems in general) is expected to intensify and (b) changes in water temperature and the wind field (including its effects on upwelling) are likely to effect the oxygen content of sea water, of which the depth, extent and persistence of oxygen-deficient water masses has serious consequences for marine life.

There is currently, no clear evidence of an increase in the extent of low-oxygen water in the St. Helena Bay region on the West Coast. An increase in WCRL 'walkouts' in the late 1980s and early 1990s in the St. Helena Bay region provided evidence of an increase in anoxic events in the nearshore zone attributed to harmful algal blooms and their increased occurrence. More recently, the presence of unprecedented red tides off the South Coast of extraordinary spatial extent appears also to be symptomatic of changing environmental conditions (Augustyn, et al., 2018).

i. Effects of Climate Change on Key Marine Resources

The following section sets out the current understanding of the impact of climate change on key marine fisheries that are located on the West and South Coasts.

Hake

Relatively little is known about the effects of environmental factors and behavioural responses on the size of the hake resource, but their longevity, wide geographical range, extensive diurnal vertical migrations, very diverse diet and ability to tolerate relatively low oxygen levels, all suggest that they should be resistant to all but extreme, prolonged environmental perturbations. There is, however, no evidence that major perturbations such as this have in fact been occurring over the hake fishing grounds in South Africa, or that there have been significant

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changes in abundance or distribution of the species in recent years (FAO, 2018).

In 2015, the demersal trawl fishery as a whole was rated as one of the least vulnerable to climate change at present, despite its high value and relatively large labour force, because of the apparent tolerance of hake to changes in the environment, and the fact that the major part of the fishery is heavily industrialised, with the financial and technical resources to adapt to changes in resource abundance and distribution (FAO, 2018). However, Ortega-Cisneros et al. (2018) who used an ecosystem model and climate projections to evaluate the effects of fishing, warming, and horizontal and vertical mixing on the Southern Benguela (West and South coasts of South Africa) ecosystem, found that warming had the greatest effect, almost always negative, on the biomass of almost all species including Cape hakes that showed biomass reductions of the order of 10 per cent to 20 per cent by 2050 compared to control simulations (Ortega-Cisneros, et al., 2018).

Small Pelagic Fisheries

Small pelagic fish species are planktivorous, short-lived and highly productive. These characteristics make them highly responsive to environmental changes. Hence, they are likely to show a relatively rapid response to climate change impacts, compared to longer lived fish. According to Alheit et al (2012), changes in small pelagic fish abundance levels and distributions elsewhere in the world have been convincingly linked to environmental variability, and small pelagic species have been characterised as “*excellent indicators of regime shifts*” (Augustyn, et al., 2018).

Changing wind fields, increasing water temperatures and stratification in marine ecosystems resulting from climate change have the potential to impact the productivity and species composition of plankton, on which small pelagic fish feed (Augustyn, et al., 2018).

Increased/decreased productivity should be beneficial/detrimental for small pelagics in a general sense, but changes in plankton community or size composition will likely impact species differently, as anchovy and round herring feed predominantly on larger zooplankton, whereas sardine feed primarily on smaller zooplankton (Augustyn, et al., 2018).

Although, previous changes in abundance and distribution of small pelagic species off South Africa have been observed, future changes as a result of climate change appear likely. However, based on current knowledge and data, predictions about climate change effects on South African small pelagic fish and the fisheries they support can only be

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speculative at this stage. Nonetheless, of the three small pelagic species, a positive response to climate change is considered most likely to be shown by anchovy, if upwelling increases result in an enhanced feeding environment (larger zooplankton) for anchovy off the West Coast and as long as the increased wind (causing increased upwelling) occurs at the ideal time in the anchovy life-cycle. The change in anchovy distribution suggests that there may also be scope for an anchovy-directed fishery off the South Coast (Augustyn, et al., 2018). However, modelling by Ortega-Cisneros et al, indicates that anchovy showed the strongest response to predicted warming of the southern Benguela, with a reduction in biomass of around 50 percent and a more marked impact off the West Coast than the South Coast of South Africa (Ortega-Cisneros, et al., 2018). The FAO predicts substantial changes in distribution and a reduction of 40-50 per cent south of 48°N for anchovy off Southern Africa (FAO, 2018).

Sardine are expected most likely to show a negative response to climate change due to (i) a change in the trophic environment (including increased dinoflagellate blooms), which may reduce sardine productivity, and (ii) the possible cessation of the sardine run due to warming and other unfavourable oceanographic conditions off KwaZulu-Natal (Augustyn, et al., 2018).

At present there is insufficient knowledge about round herring to make predictions for this species, although its trophic similarity to anchovy suggests that the two species might react in similar fashion (Augustyn, et al., 2018).

In 2015, the fishery for small pelagic fish on the West Coast and Western Agulhas Bank was rated as the second-most vulnerable to climate change because of the sensitivity of the resource to environmental perturbations, its commercial value and the large number of people employed in the fishery (FAO, 2018).

Line and Net Fisheries

The main physical impacts that directly affect South African line and net fishers include changes in precipitation and associated river run-off and changes in wind strength and direction and associated storm surges, flooding and erosion patterns. Changes in sea surface temperature and other physical properties (e.g. pH) will have a more indirect effect, as these do not necessarily influence the mechanics of the fishing operation but change the ecology and in turn the availability of the exploitable resources within comparatively small fishing habitats (Augustyn, et al., 2018).

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The small-scale fishery for line and net-fish, much of which operates off the West Coast, was rated as the most vulnerable to climate change in 2015. This fishery is sensitive to large-scale and small-scale changes in the environment. With the exception of the recreational sector, many individuals and communities involved in this fishery are poor, relatively unskilled and socially disadvantaged and have a very limited capacity to adapt to adverse changes (FAO, 2018).

Squid

Chokka squid occurs in one of the most diverse, complex and highly variable environments. Squid species are extremely fast-growing with a rapid population turnover and their physiology is able to rapidly respond to change in the environment, with temperature being a key driver. This is not necessarily true for chokka squid *L. reynaudii*. Amongst others, forecast warming of oceans might result in smaller-sized hatchlings and smaller adults. With continued warming this may result in a shorter life-span and a decrease in age/size at maturity. Increased precipitation in the hinterland is forecasted with global warming, with increased run off and increased turbidity in inshore embayments causing visibility to drop, in turn interrupting spawning by causing mating adults to disperse to clearer waters. Over the past two decades, there has been a marked decline in copepod biomass off the south coast of Africa. This change has been associated with an increase in sea surface temperature and may explain poor recruitment and therefore decrease in catches of *L. reynaudii* from 2011 to 2013. Anecdotal reports under investigation indicate that aggregates have in recent times become less dense and are easily disrupted and dispersed, possibly linked to environmental variability. Another potential problem reported by chokka squid fishermen is the smaller-sized individuals landed. *Loligo reynaudii* is a crucial component of the inshore ecosystem of South Africa and supports one of the most valuable fisheries in the country. The species response to climate change will require specific research locally before potential impacts of global climate change, can be understood (Augustyn, et al., 2018).

5.6.6.7 Recreation and Tourism-related Activities

The coastal area within the 80 km radius area of investigation, situated from the Tsitsikamma National Park in the west to Sardinia Bay in the east northeast, is a popular coastal and tourist destination.

To the east of the site the coastline is dominated by St. Francis Bay, with coastal activities concentrated around the settlements of Cape St. Francis, St. Francis Bay and Jeffreys Bay. Between the site and Jeffreys Bay, the coastline is dominated by nature reserves, farmland and small

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coastal resorts. This coastline to the east is characterised by predominantly sandy beaches, with notable estuaries that are used for tourism and recreational purpose; being the Kromme, Seekoei, Kabeljous, Gamtoos, van Stadens and Maitland estuaries. Some rocky shores occur predominantly between the site and Cape St. Francis and further east towards Nelson Mandela Bay.

To the west of the site, the coastline is less developed with large portions of the coastline accommodating either farmland or nature reserves. Small coastal resort towns including Oyster Bay and Eerste Rivier are present. This stretch of coastline is dominated by rocky shores and headlands and is therefore less accessible. Notable estuaries include the Elands, Groot (Oos), Slang and Storms estuaries.

The following sections report on recreational and tourism activities related to the coastline, coastal and marine activities that occur in the adjacent sea, with specific focus on the site vicinity, with a greater level of detail reported on. **Section 5.4** reports on the number of local and visiting people involved in recreational activities.

Data are presented on activities relating to the coastline, which include:

- land based eco-tourism;
- public coastal resort facilities;
- popular beach destinations;
- swimming;
- angling;
- bait collecting;
- beach horse riding;
- sand boarding.

Data are presented on marine activities, which include:

- water-based marine eco-tourism;
- surfing and kite surfing;
- yachting/sailing;
- jet-skiing.

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Many of these activities are conducted on an informal basis and limited existing data are therefore available. The section therefore lists the main activities and provides locational data. Where specific data are available, it is provided (Planning Partners, 2024e).

a) Coastal activities in the Area of Investigation

A total of 221.77 km of coastline is included in the area of investigation, where numerous recreational and tourism amenities and activities are present. The coastline can be broken down per municipal area as follows: (i) Kou-kamma Local Municipality: 70.24 km of coastline to the west of the site; (ii) Kouga Local Municipality: 115.58 km of coastline within the 80 km radius, of which 34.25 km is located to the west of the site and 81.33 km to the east of the site; and (iii) Nelson Mandela Bay Municipality: 35.95 km of coastline to the east of the site (Planning Partners, 2024e).

i. Land and Shore-based Coastal Eco-tourism

Eco-tourism relating to the adjacent sea use within the 80 km radius includes locations where the public has access to a beach within a protected nature area. These areas include Oyster Bay Private Nature Reserve, Huisklip Nature Reserve, Oubos-groot Rivier Nature Reserve and the Garden Route National Park (Tsitsikamma section and its associated Marine Protect Area) to the west of the site and Rebelsrus Nature Reserve, Cape St. Francis Nature Reserve and Krommensee Nature Reserve to east of the site.

The coastline between Cape St. Francis and Oyster Bay is used by hikers and cyclists, mostly accessing the trails at Cape St. Francis and moving in a westerly direction. Fishing and bird watching also occurs. Beaches in Cape St. Francis are well utilised during peak season, and in the winter months because of good surfing conditions. The coastline is also well-used by hikers and cyclists, as well as utilised for birdwatching, recreational fishing and bait collection.

From Cape St. Francis to Paradise Beach, recreational uses include surfing, fishing, birding, water-skiing, canoeing, boat cruisers, hiking and swimming. The southern side of the Kromme estuary is readily accessible by vehicle or foot. Access on the northern side is limited.

Figure 5.6.79 illustrates the different activity zones within the Kromme Estuary and Kromme / Geelhout riverine zones.

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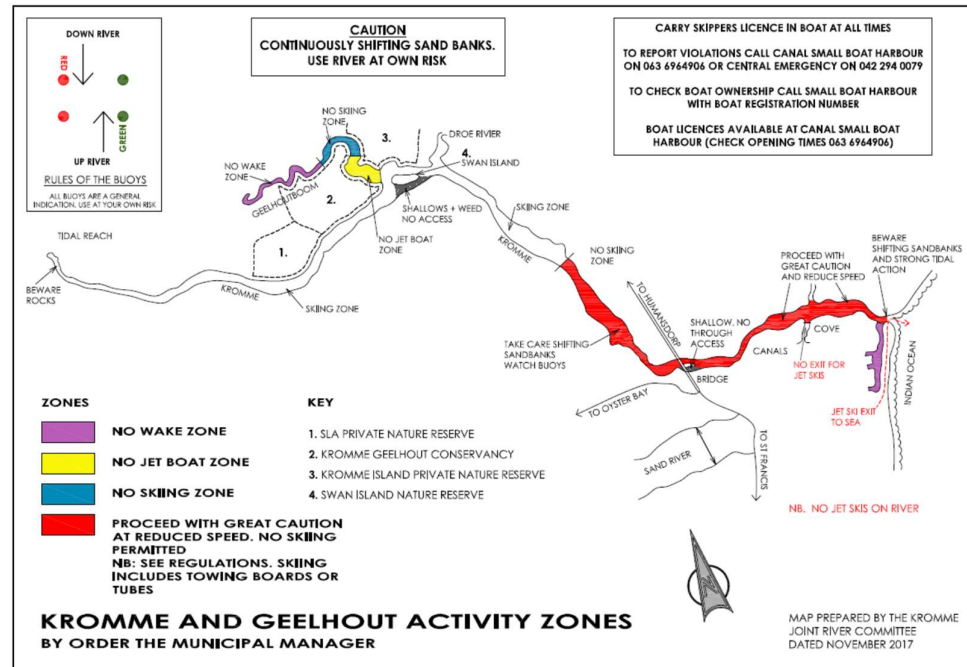


Figure 5.6.79: Kromme and Geelhout Recreational Activity Zones

From Paradise Beach to Aston Bay, recreational fishing occurs along the sandy beaches. Bait collection and recreational fishing occurs in the Seekoei Estuary. There are numerous informal pedestrian beach accesses to the beach over dunes in the Paradise Beach and Aston Bay area and walking, swimming and bird watching also take place.

Within the coastal zone, including Pellsrus up to Jeffreys Bay, recreational activities include surfing, walking, swimming and fishing. The coastline is readily accessible by road or on foot.

From Jeffreys Bay between the Kabeljous and Gamtoos Estuaries, the recreational activities include fishing, hiking trails and beach walking, horse trails and bird watching. This section of coastline is not readily accessible, with one road leading off the R102. The beach can also be accessed by the public on foot from the Kabeljous Estuary (western side). Within the Gamtoos Estuary, fishing, swimming, power boating, wind surfing-sailing, canoeing and bird watching occur. Note that jet-skiing and water-skiing are prohibited in the estuary.

From the Gamtoos rivermouth to the Van Stadens rivermouth, opportunities for recreation are dependent on ease of access. The Gamtoos Estuary is accessible via a public road, while the remainder of

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the coastal zone is not readily accessible from vehicle access points, but can be accessed on foot along the sandy beach from the Gamtoos Estuary in the west of the Van Stadens Estuary in the east. Boat access to the Gamtoos Estuary is from existing slipways/launch sites (Planning Partners, 2024e).

ii. Amenity Beaches and Tidal Pools

Popular amenity beaches in the area of investigation, to the west of the site, include the following: Wassenaars Beach (1.49 km west-northwest), Thyspunt Beach (1.61 km north), Oyster Bay Beach (4.99 km west-northwest), Eerste River Beach (46.54 km west-northwest), Oubos Strand (48,64 km west-northwest) and Storms River Beach (76.32 km west-northwest).

To the east of the site, other amenity beach include: Thysbaai (2.14 km southwest), Main Beach St. Francis Bay (12,28 km east-northeast), St. Francis Bay Beach (12.68 east-northeast), Cape St. Francis (13.43 km east), Sixty Nines Beach (13.69 km east), Old Jetty Beach (19.87 km east-northeast), Paradise Beach (21.78 km east-northeast), Aston Bay Beach (22.39 km east-northeast), Jeffreys Bay Main Beach (25,58 km northeast), Point Beach Jeffreys Bay (27.96 km northeast), Kabeljous Beach (28.96 km northeast), Van Stadens Beach (43.96 km northeast), Blue Horizon Beach (56.05 km east-northeast), Maitland Beach (58.25 km east-northeast), Beachview Beach (60.53 km east-northeast) and Sardinia Beach (74.77 km east-northeast).

Tidal pools located within the area of investigation are Granny's Pool at the slipway in St. Francis Bay (12.35 km east), Beach View Tidal Pool (65 km, east-northeast) and Seaview Tidal Pool (67 km east-northeast) (Planning Partners, 2024e).

iii. Public Coastal Resort Facilities

Public coastal resort facilities include the Wacky Water Park at Jeffreys Bay (23.61 km, northeast) and Dolphin Beach Water Park (25.34 km, northeast) (Planning Partners, 2024e).

iv. Swimming

Popular swimming beaches and lagoons in the area of investigation include Oyster Bay Beach (4.99 km west-northwest), Granny's Pool (12.35 km east), St. Francis Bay Beach (12.68 east-northeast), Cape St. Francis Beach (13.43 km east), Paradise Beach (21.78 km east-northeast), Aston Bay Beach and lagoon (22.39 km east-northeast), Pellsrus Beach (24.73 km northeast), Jeffreys Bay Main Beach (25,58 km northeast), Dolphin Beach (26.05 km northeast),

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Kabeljous Beach and lagoon (28.96 km northeast), Blue Horizon Bay Beach (56.05 km east-northeast), Maitland Beach (58.25 km east-northeast), Sardinia Bay Beach (74.77 km east-northeast) and Storms River Beach (76.32 km west-northwest).

Blue Flag beaches within the Kouga Municipality are Dolphin Beach in Jeffreys Bay and Cape St. Francis. The Blue Flag season for Dolphin Beach is 1 December 2024 to 30 April 2025 and for Cape St. Francis is 2 December 2024 to 28 February 2025. Lifeguards are on duty between 08h00 to 17h00 during the respective Blue Flag periods. From 2 December 2024 to 17 January 2025 over the annual school holidays, lifeguards will also be on duty at Oyster Bay, Granny's Pool, St. Francis Bay Main Beach, Paradise Beach, Aston Bay Beach and lagoon, Pellsrus Beach and Kabeljous Beach and Lagoon.

The Habits Survey conducted for the purpose of TSSR development in 2024 in the site vicinity collected data on time spent in and on the sea, e.g. fishing, boating, swimming, surfing, diving and time spent on the beach e.g. hiking, jogging, sunbathing, picnic and angling. The Habits Survey noted that on average, respondents spent on average 298 hours per year in the sea, on average 241 hours per year on the sea and on average 364 hours per year on the beach (Planning Partners, 2024e).

v. Angling and Recreational Fishing

According to Turpie et al., shore angling along the South African coastline is a popular recreational activity (Turpie, 2015). Historically there has been very little research and management on recreational anglers in South Africa. However, in a recent study published by Saayman in 2017 (Saayman, 2017), the number of marine recreational anglers in South Africa was estimated to be $\pm 730\,000$ in 2017. Of these, the majority $\pm 400\,000$ were marine shore-based anglers and $\pm 80\,000$ were estuarine shore-based anglers. In 2020, Murray (Murray, 2020) estimated that recreational anglers in South Africa spent an average of 20 days fishing per year. In addition, light tackle boat anglers ($\pm 150\,000$), deep sea anglers ($\pm 70\,000$) and spear fishers ($\pm 35\,000$) are also active. The total estimated catch for the South African marine recreational fishery was 8 355 t in 2017, which is larger than the $\pm 8\,000$ t in the commercial line-fishery. Of the respondents surveyed in 2017 by Saayman, 85 per cent indicated that they catch and release, while 59 per cent also eat the fish that they catch. Twelve per cent sell the fish they catch and six per cent donate it. Note that the percentages will not add up to 100 per cent as respondents indicated more than one option, and further to note that the sale of fish by recreational anglers is illegal in South Africa and the percentage sold may therefore be understated. More recent research indicates estimated $\pm 394\,280$ marine shore-based

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anglers in South Africa. According to Potts, popular fishing spots at the three major coastal municipalities of Durban, Gqeberha and Cape Town represent most of the coastal recreational angling population in South Africa.

Research conducted by Potts et al. in 2015/2016 estimated that there were $\pm 79\,400$ shore-based anglers in the Eastern Cape (Potts, 2017).

According to Turpie et al., factors that influence the spatial distribution of anglers include:

- The type of shoreline, with angling effort highest on mixed shores, followed by estuaries, sandy beaches and rocky shores, while boulder shores being less preferred;
- catch rate, i.e. at locations where anticipated catch rates were expected to be higher;
- ease of access to the shoreline;
- time of the year or the week, with higher numbers recorded during school holidays and over weekends.

The description of recreational fishing in the site region is focused on the characteristics of the shoreline and the access to recreational fishing opportunities. The main species targeted by recreational fishermen are indicated below and highlights popular locations of recreational fishing.

The main species targeted by shore anglers are bronze bream, dusky kob, white steenbras, white musselcracker and blacktail, as well as shad, leervis, Cape stumpnose, galjoen, spotted grunter, zebra and baardman. Estuarine anglers catch kob, spotted grunter and leervis in the Krom River. Rock and surf anglers fish either off headlands (for musselcracker) or off shallow bays (for bronze bream, blacktail and galjoen). Shore game fishermen fish deep waters off rocky points.

The Tsitsikamma MPA is located between 51 and 80 km in the west-northwest of the site. No fishing is allowed between the Groot River at Oubos (51 km west-northwest) towards the Groot River (in the west at Nature's Valley and extending 3 nmi seawards from the high-water mark.

The Sardinia Bay MPA is located just over 65 km east-northeast of the site and includes the 80 km radial. No fishing is allowed between beacon PECR1 near Skoenmakerskop and beacon PECR2 near Bushy Park, extending 1 nmi seawards from the high-water mark. No recreational fishing therefore occurs along these sections of the coastline within the 80 km radius.

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For the most part, recreational shore-based angling is prohibited between the Eerste and Sout rivers, which falls within the Garden Route National Park (Tsitsikamma Section). The shoreline between the western boundary of the Tsitsikamma MPA to Oyster Bay is relatively inaccessible to anglers and shore fishing is limited due to steep cliffs that characterise the coastline.

From the Groot River (51 km west-northwest) up to the beach to the west of Oyster Bay (5.5 km to the west-northwest), the coastline is dominated by isolated and stark rock formations and is fairly inaccessible to anglers. The area is regarded as rural. The beach and areas surrounding Oyster Bay are considered good fishing areas for anglers. The coastline between Oyster Bay and St. Francis Bay has many and varied fishing spots that range from shallow bays, such as Thysbaai, to deep water points. Steenbras, shad, kob and garrick are targeted by shore anglers off the beach west of Oyster Bay with its sandy beach and rocky shoreline, where galjoen, shad and kob are targeted. Garrick, yellowtail and white musselcracker are targeted off the exposed rocky shoreline east of Oyster Bay.

The area between Seal Point and the Kabeljous River mouth, which is associated with the resort towns of St. Francis Bay and Jeffreys Bay, is reasonably well-developed. Further, the coastline is reasonably accessible to recreational anglers from easily reached access points, parking areas and roads. Main species targeted from the shore include kob, shad, bronze bream, yellowtail and blacktail.

The Kabeljous River mouth is well known for kob. White steenbras and spotted grunter are also targeted. However, the stretch from the Kabeljous River east towards the Gamtoos River, the coastline, consists of sandy beaches and has a rural character. It can only be accessed by shore anglers from the Kabeljous River mouth. The main species that are targeted in this area are kob and shad.

The area between the Gamtoos River and the Maitland River consists entirely of sandy beaches and has a rural character. In the past the preferred way of access to this area was using off-road vehicles. However, the use of off-road vehicles on the beach was banned since 20 January 2002.

The Gamtoos River mouth is mostly open to the sea and is known for its kob runs. The area around the mouth is targeted for shad, garrick, white steenbras and spotted grunter. Van Stadens River mouth is located 11 km to the west of the Maitland River mouth and the sandy beaches between the two rivers are fished for white steenbras, kob and shad.

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The area between the Maitland River mouth and the Sardinia Bay MPA is characterised by a rocky shoreline, offering a variety of rock and surf fishing, with easy access from the road situated close to the shore. The main species targeted in the summer are kob and white musselcracker, and galjoen during winter months. The Maitland River mouth is fished for kob, shad and white steenbras.

The coastal area between Sardinia Bay MPA and Skoenmakerskop (80 km west-northwest), is inaccessible to anglers as it is either privately owned or forms part of the Sardinia Bay MPA.

Estuaries fished in the 80 km zone include the Krom, Kabeljous and the Gamtoos. In 2005 the extent of angling along the coast (between the Tsitsikamma National Parks and the Gamtoos River) was estimated to be about 124 939 angler days per year. More than 80 per cent of this angling activity can be attributed to local residents. Based on accessibility of the coastline, angling activity in the site region is concentrated between Jeffreys Bay and Oyster Bay, with angling activity increasing by 36.5 per cent over the December holiday period. More recent data are not known (Planning Partners, 2024e).

Figure 5.6.80 illustrates popular angling locations in the Thyspunt site vicinity.

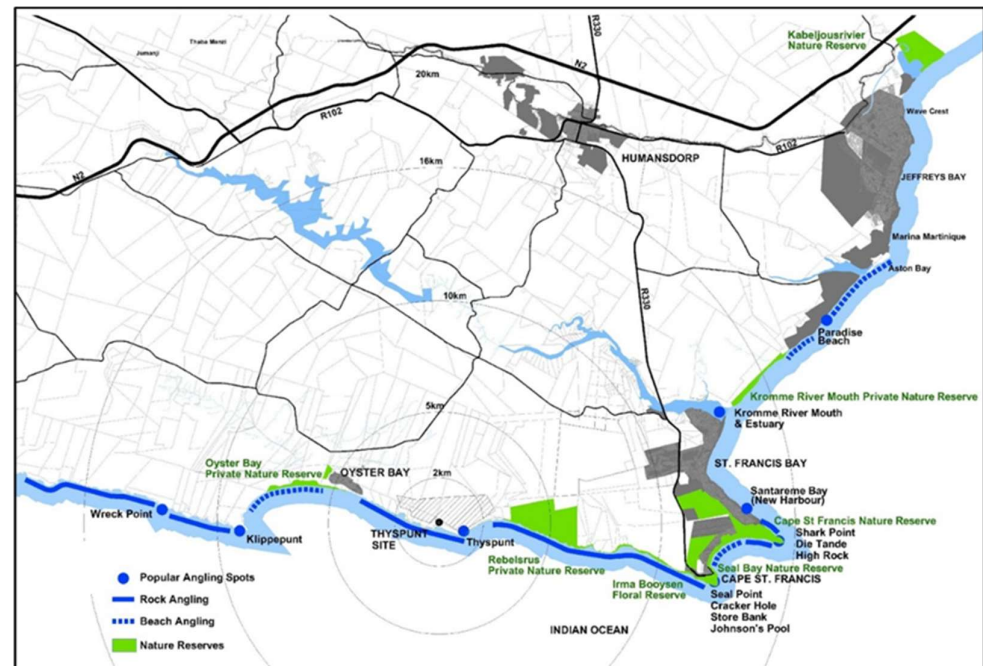


Figure 5.6.80
Popular Angling Locations in the Thyspunt Site Vicinity

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The calm waters in St. Francis Bay are not good recreational fishing waters, but fishing for spotted grunter, kob and leervis (garrick) is popular in the Krom River. Saltwater fly fishing is also popular in the estuary. Fishing for small pan fish occurs at the harbour and from the new harbour wall. There are many fishing spots between St. Francis Bay and Oyster Bay that range from shallow bays to deep water points. The gullies of the rocky shore between St. Francis Bay and Cape St. Francis are fished for blacktail, zebra, stumpnose and galjoen. Fishing spots include: Shark Point (leervis, yellowtail, musselcracker and shad), Die Tande, High Rocks and Seal Point (shad, leervis, musselcracker, red steenbras, yellowtail and yellow belly cod) (Planning Partners, 2024e).

vi. Bait collecting

Bait species are collected by both recreational and subsistence fishermen. Bait species are also collected as a source of food. Predominant bait species collected throughout the site region include the following:

- sand prawn (*Callinassa krausi*): dominant in closed estuaries and sheltered sandy areas in estuary mouths – Over 94 per cent of the prawn catch is collected by recreational fishermen, with a small percentage collected by subsistence fishermen and illegally sold to anglers. The resource is currently considered to be under-exploited.
- sand mussel (*Donax serra*): occurs on some wave-exposed beaches and is collected by subsistence and recreational fishermen as bait and for consumption between the Maitland and Gamtoos rivers, where it is considered to be under-exploited;
- blood worm (*Arenicola loveni*): found in estuaries, lagoons and sandy beaches and collected by subsistence and recreational fishermen and used as bait in the Jeffreys Bay, St. Francis Bay and Cape St. Francis area – It is heavily exploited in the Krom River and although stock assessments have not been undertaken to date, it is considered to be depleted.
- red bait (*Pyura stolonifera*): mainly collected by subsistence fishermen and recreational anglers by collecting beach caste and live harvesting off rocks – The exploitation of red bait in the region is considered to be low.
- siffies (*Haliotis spadicae*): usually found on the seaward side of reefs close to the spring low water and collected by anglers – Siffies were subjected to low levels of exploitation and are not generally targeted for food. The ban on abalone harvesting also

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applies to this species.

Within the site vicinity, sand prawn and red bait are the most popular collected bait species as they are fairly easy to collect. Although blood worm is a popular type of fish bait, it is only available and collected in the Krom River.

The marine ecology study conducted within the 5 km radius in 2008 demonstrated the presence of bait species, such as sand mussel (*Donax serra*) and alien mussel (*M. galloprovincialis*). The occurrence of alikreukel (*Turbo sarmaticus*) that is harvested in large numbers on a recreational basis was also noted in the study results (Planning Partners, 2024e).

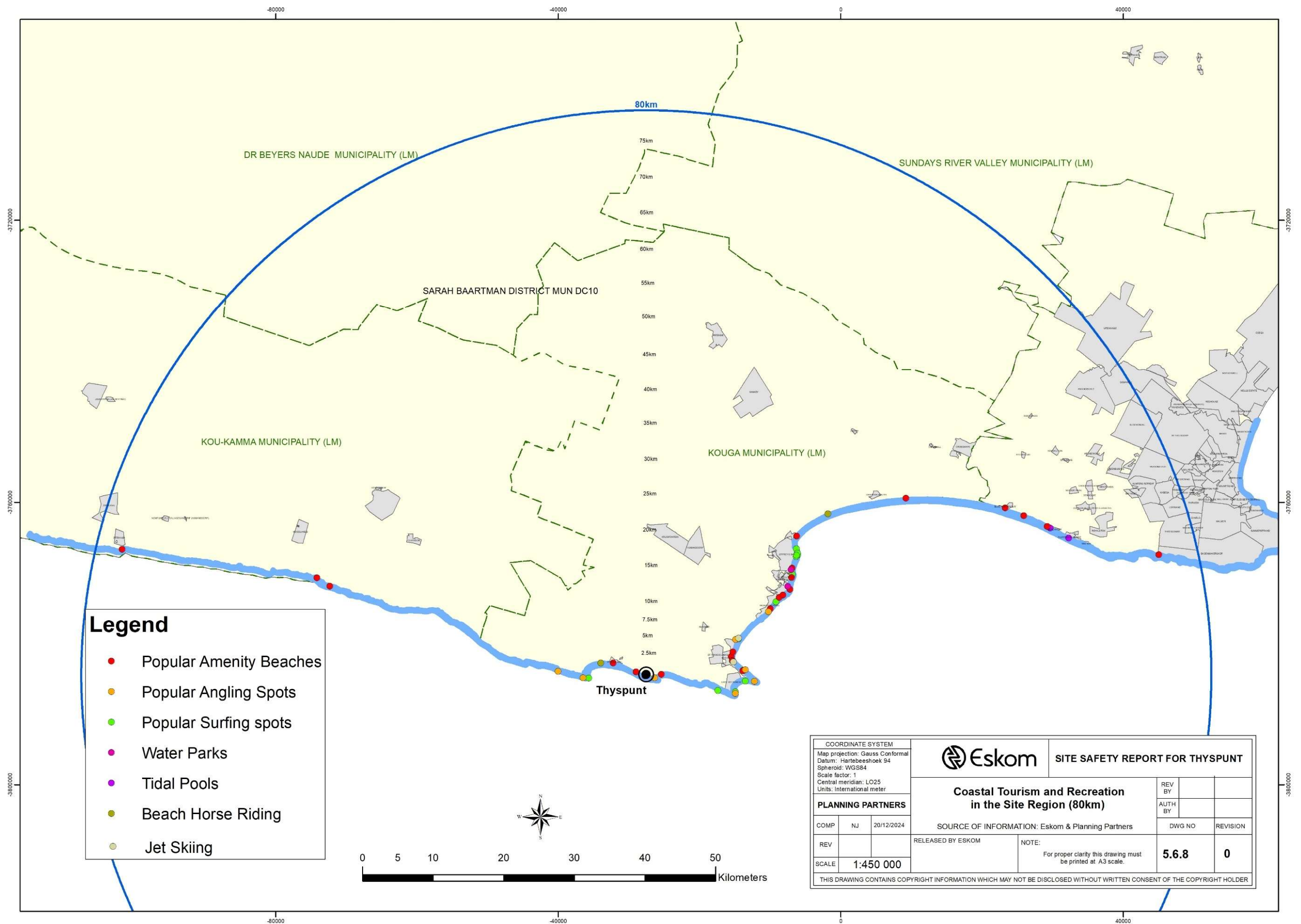
vii. Sand Boarding

Sand boarding is popular at beaches at Jeffreys Bay and Sardinia Bay, as well as on the Maitland Dunes (Planning Partners, 2024e).

viii. Other Recorded Coastal Activities

Horse riding is permitted on beaches on the following beaches: Oyster Bay, Paradise Beach and at Papiesfontein, located on the coast between the Kabeljous and Gamtoos estuaries (Planning Partners, 2024e).

Drawing 5.6.8 illustrates the distribution of key recreational activities within the area of investigation and the site region.



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b) Marine Eco-tourism and Recreational Activities in the Area of Investigation (80 km)

Nature-based eco-tourism and marine recreational activities in the area of investigation and the site region are discussed below.

i. Boat-based Whale and Dolphin Watching

Boat-based whale and dolphin watching (BBWW) is the observing of whales and dolphins' behaviour in their natural environment from sea-going vessels, while white shark cage diving (WSCD) involves observing free swimming great white sharks from vessels and/or from within a protective cage that is submerged in water. Both BBWW and WSCD are regulated commercial operations contributing to coastal and marine tourism.

The South African ocean environment has suitable ecosystems, nursery and transit areas for whales that migrate to South Africa from the Southern Ocean. The marine tourism sector benefits economically and socially from accessibility to these cetaceans (i.e. southern right, humpback and Bryde's whales and dolphins). In 2008, the Department of Environmental Affairs and Tourism (DEAT) designated 28 potential BBWW areas, which are located from Port Nolloth on the West Coast, to Sodwana Bay in the northeast coast.

Thereafter, the Department of Environmental Affairs (DEA) allocated BBWW permits in 2011, which were valid for five years to 23 BBWW operators.

In accordance with the 2017 policy on BBWW and regulations relating to Listed Threatened or Protected Marine Species issued in 2017, permits will be issued subject to the areas where BBWW is allowed as provided for in the regulations. Permits allocated may now be issued for a period of up to ten years.

In terms of Annexure 6 of the 2017 regulations, there are still 28 designated BBWW areas along the South African coastline. Of these only, St. Francis Bay is located in the site region. It should be noted that Algoa Bay in proximity to the site region is a designated BBWW area.

In 2017, DAFF allocated 18 BBWW permits along the South African Coastline, with 1 being allocated to Algoa Bay and none to Cape St. Francis (Planning Partners, 2024e).

ii. White Shark Cage Diving

South Africa is one of five global destinations for white shark cage diving

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(WSCD). It took advantage of the naturally higher local abundance of white sharks due to the occurrence of one of their most preferred food sources, namely seals. In South Africa, WSCD began in 1991 and remained unregulated until 2008 when the, then Department of Environmental Affairs and Tourism (DEAT), introduced a policy and officially designated five sites between Cape Town and Gqeberha (GNR. 724 of 4 July 2008) where WSCD operations could be permitted in the South African ocean environment. In 2011, the DEAT allocated 11 WSCD permits valid for a five-year period.

In terms of Annexure 7 of the 2017 regulations, there are still five designated WSCD areas along the South African Coastline. While Algoa Bay in the Gqeberha area is a designated WSCD area, none are located within the site region.

In terms of the 2017 Policy on WSCD, permits could be allocated for a 10-year period. Applications were called for in 2017. Following on consideration of appeals submitted, the Minister of Environmental Affairs published the final list with two permits being allocated to the Algoa Bay area (Planning Partners, 2024e).

iii. Surfing

Surfing is a popular recreational activity in the site region. Jeffreys Bay is an international surf destination. It attracts large numbers of local and international surfers to the area and also the location of a number of local surf competitions and the J-Bay Classic, a World Surf League speciality event.

To the west of the site there are few surfing spots, with Devil's Horn located at the point in Oyster Bay (8.17 km west).

To the east of the site at Cape St. Francis, the following surf spots are notable: Seal Point (12.24 km east), Ducks (14.4 km east) and Cape St. Francis (13.46 km east). Popular surf spots at St. Francis Bay are: Main Beach (12.38 km east-northeast) and Bruces Beauties (12.35 km east).

North of St. Francis Bay, one notable surf spot is located at the Kromme River mouth (13.94 km east-northeast).

Jeffreys Bay is considered to have one of the finest 'right-hander' point breaks in the world. Notable surf spots include: Phantoms (25.10 km northeast), Kitchen Windows (27.41 km northeast), Main Beach/Dolphin Beach (25.81 km northeast), Magna Tubes (27.03 km northeast), Boneyards (27.19 km northeast), Supertubes (27.65 km northeast) considered to be the single finest right-hand point break in the world,

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Salad Bowls (27.71 km northeast), Tubes (27.99 km northeast), Impossible (27.47 km northeast); The Point (28.22 km northeast) and Albatross (28.87 km northeast). Further south at Paradise Beach is Claptons Coils (20.93 km east-northeast).

From Jeffreys Bay towards Gqeberha, notable surf spots are located at Doughnuts Backreef (75.45 km east-northeast) at Sardinia Bay and Van Stadens Mouth (55.66 km east-northeast).

The World Surf League Qualifying Series (QS) J-Bay Classic was held at Supertubes in over a window period between 14 and 23 June 2024. The competition includes both international and local competitors. Other competitions on the Surfing South Africa contest calendar for 2024 that were hosted at Jeffreys Bay include the Word Kneeboard World Titles (17 August to 25 August 2024) and the Sea Harvest SA Junior Championships (25 September to 29 September 2024). The annual Ripcurl Gromsearch Seal Point contest was held at Seal Point in Cape St. Francis (20 to 22 September 2024) (Planning Partners, 2024e).

iv. Kite Surfing and Wind Surfing

Kitesurfing in South Africa is concentrated around the coastal areas, stretching from Cape Town, going up to Gqeberha and Durban. Although Cape Town has some of the best kitesurfing beaches in South Africa, over the past few years the sport has grown in popularity on Durban's beaches and along Gqeberha's Sunshine Coast. While wind conditions in the Eastern Cape are good for kitesurfing throughout the year, the peak season is from November to March, with Jeffreys Bay and St. Francis Bay being top destinations located within the site region.

Kite surfing and wind surfing occur at Seal Bay in Cape St. Francis (12.56 km east) and in the Kromme River Estuary (13.34 km east-northeast) (Planning Partners, 2024e).

v. Jet-skiing

Jet-skiing occurs in the ocean at Jeffreys Bay (12.48 km east) and at the Kromme River mouth (14.03 km east-northeast) (Planning Partners, 2024e).

vi. Water-skiing

Within the site vicinity water-skiing occurs in the active zone of the Kromme River Estuary (Planning Partners, 2024e).

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5.6.6.8 Gas, Oil and Phosphate Mining in the Site Region

Overview

Approximately 98 per cent of South Africa's exclusive economic zone is subject to a right of lease for offshore oil and gas exploration or production allocated to (i) exploration right lease areas, (ii) production right lease areas, or (iii) technical cooperation permit areas.

Figure 5.6.81 illustrates the structural elements and sedimentary basins within the maritime zone relative to the site region. The first offshore well in South Africa was drilled in 1969 with the discovery by Superior of gas and condensate in the Ga-A1 well, situated in the Pletmos Basin, which is partly situated within the site region.

Exploration drilling was most active in the period 1981 to 1991 during which period some 181 exploration wells were drilled. The Bredasdorp Basin, outside of the site region, has been the focus of most seismic and drilling activity since 1980. The results of this exploration were the discovery of several small oil and gas fields and the commercial production of oil and gas from the Bredasdorp Basin. In the Pletmos Basin there are two undeveloped gas fields and a further six gas discoveries. One oil and several gas discoveries have been made in the South African part of the Orange Basin, on the West Coast (outside of the site region) and the Ibhubesi gas field within this basin is currently being appraised and developed by Sunbird Energy (Planning Partners, 2024f).

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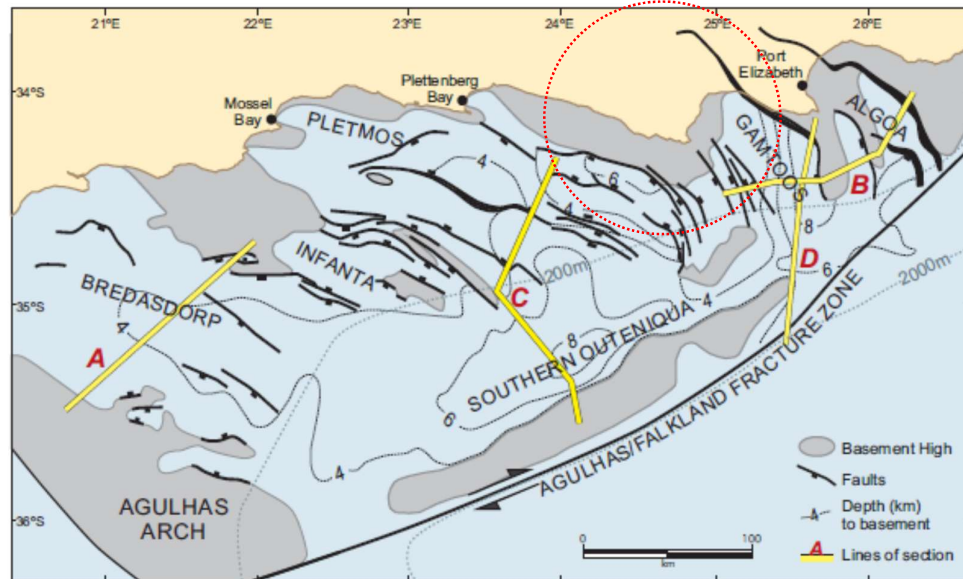


Figure 5.6.81
Structural Elements and Sedimentary Basins Relative to the Site Region

In the entire offshore area, there are currently over 300 exploration wells, including appraisal and production wells. In addition, 227 000 km of 2D and 9 700 km of 3D seismic data have been acquired since exploration began offshore.

The Southern Outeniqua Basin, outside of the site region, is highly rated for oil in the central and southern extent of the basin and more gas-prone towards the northern periphery. The Algoa Basin, also outside of the site region, includes oil, while the Gamtoos Basin, located inside the site region is shown to be gas prone and the Pletmos Basin has proven gas resources. In the Southern Outeniqua Basin significant gas reserves have recently been confirmed through the drilling of the Brulpadda and Luiperd wells by *TotalEnergies*, *Main Street*, *Qatar Petroleum* and *CNR* (Planning Partners, 2024f)..

Offshore Oil and Gas

Figure 5.6.82 indicates the relevant lease areas within the site region.

There are currently two offshore exploration rights under application in the site region, namely Sungu Sungu (322ER) where *PetroSA* is conducting an appraisal of Cretaceous shallow marine gas fields; and *New Age Algoa/Rift Petroleum* (201ER) where the prospectivity evaluation of the synrift and post rift sequences is ongoing.

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In addition, *TotalEnergies*, *Main Street*, *Qatar Petroleum* and *CNR* had a production right under application immediately to the south of the site region (013PR). Gas discoveries were made in Block 11B/12B in 2019 and 2020 through the drilling of the Brulpadda and Luiperd wells, Redacted
(Planning Partners, 2024f).

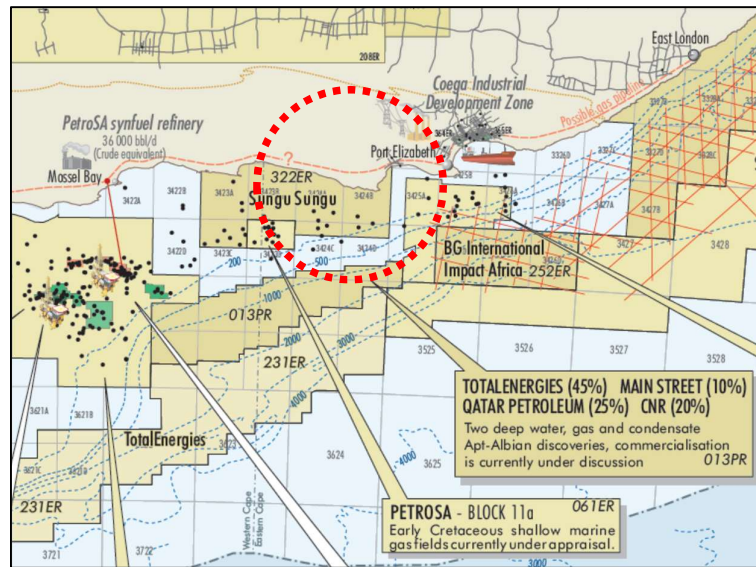


Figure 5.6.82
Petroleum Exploration and Production Activities relative to the Site Region

The project was in its approval stage and was expected to start commercial operation by 2026, with its Final Investment Decision set for approval in 2024. However, in July 2024, *TotalEnergies* gave notification that it was resigning as operator of Block 11B/12B as it appeared to be too challenging to economically develop and monetise these gas discoveries for the South African market (Daily Maverick, 2024). In addition, *TotalEnergies*, *QatarEnergy* and *CNR* gave notice to the joint venture partners that they were withdrawing from their interest in Block, 11B/12B. *Mainstreet* retained their interest in Block 11B/12B (Africa Energy, 2024).

The future extraction of the resource is therefore currently uncertain and will need to be monitored.

Figure 5.6.83 illustrates the gas field development relative to the site region.

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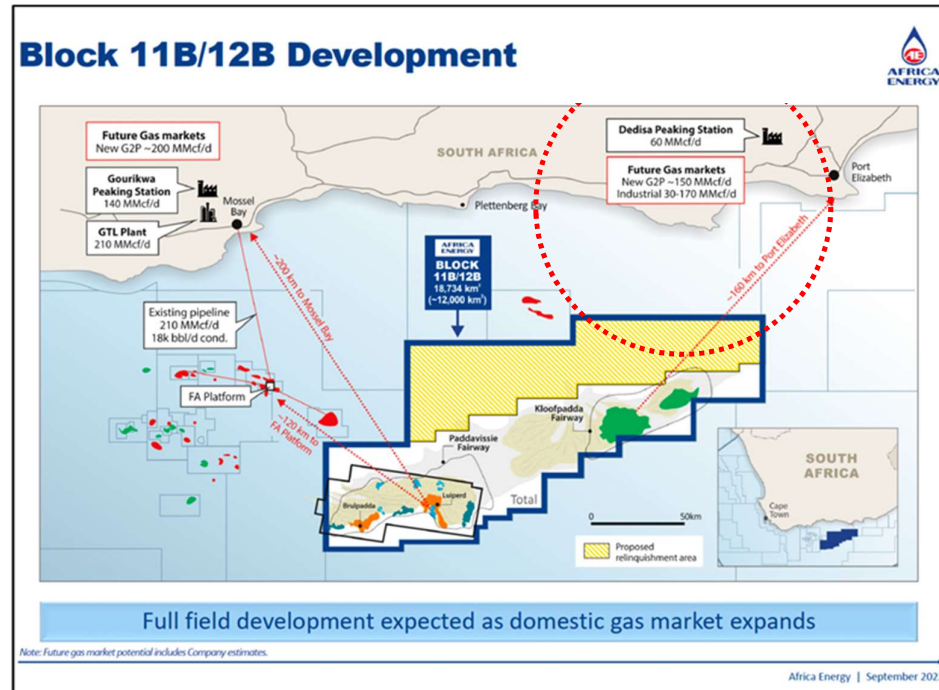


Figure 5.6.83
Block11B/12B Development indicated by the Red dashed Circle

Seismic Surveys in the Site Region

On 16 November 2023 the Department of Mineral Resources issued an environmental authorisation in respect of Proposed Speculative 3D Seismic Survey off the Southeast Coast. The proposed survey area would be up to 9 000 km² in extent within a 12 750 km permit application area (area of interest). The area of interest is located roughly between Gqeberha and a point approximately 120 km southeast of Plettenberg Bay, ranging between 45 km and 120 km from the coast in water depths between 200 m and beyond 4 000 m. The reconnaissance area is located to the south of the site and is partially located within the site region as illustrated in **Figure 5.6.84** (Planning Partners, 2024f).

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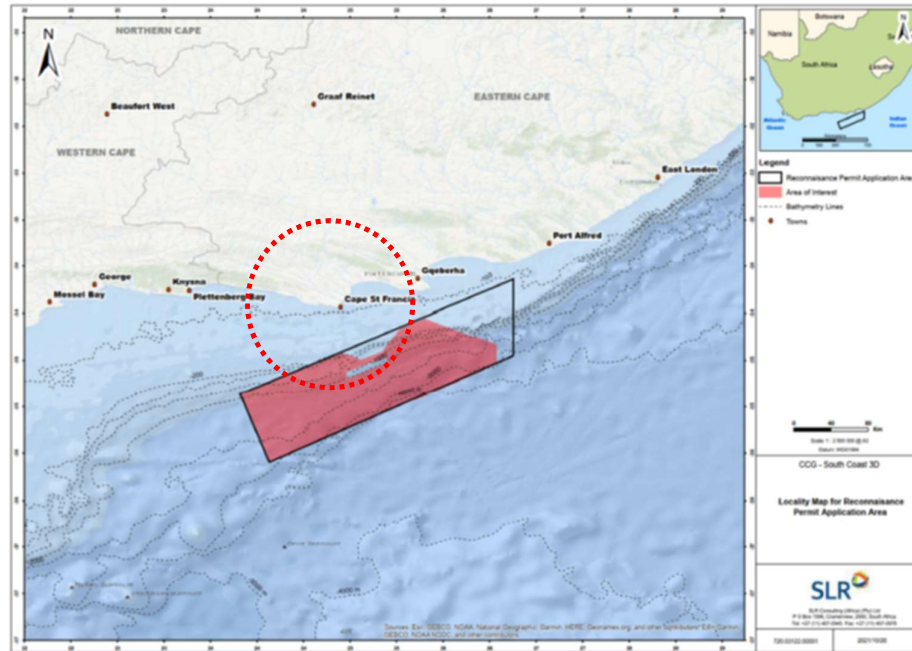


Figure 5.6.84
Petroleum Exploration and Production Activities Map

An increasing number of prospecting rights have been applied for and/or granted for offshore heavy sands with the South African exclusive economic zone. Three marine phosphate prospecting rights have been granted to date. There are however no phosphate prospecting rights within the site region.

The nearest prospecting right to the site, but outside of the site region, is the Diamond Fields International prospecting right. This phosphate prospecting right was granted by the Department of Mineral Resources on 13 January 2014. The prospecting rights is located within the Outeniqua Basin, offshore of Mossel Bay and extends over an area measuring 47 468 km². The prospecting right overlaps with the offshore marine protected areas Browns Bank Complex, Agulhas Bank Complex and Southwest Indian Seamounts. Prospecting has not yet commenced. **Figure 5.6.85** illustrates the location of this prospecting area relative to the site region (Planning Partners, 2024f).

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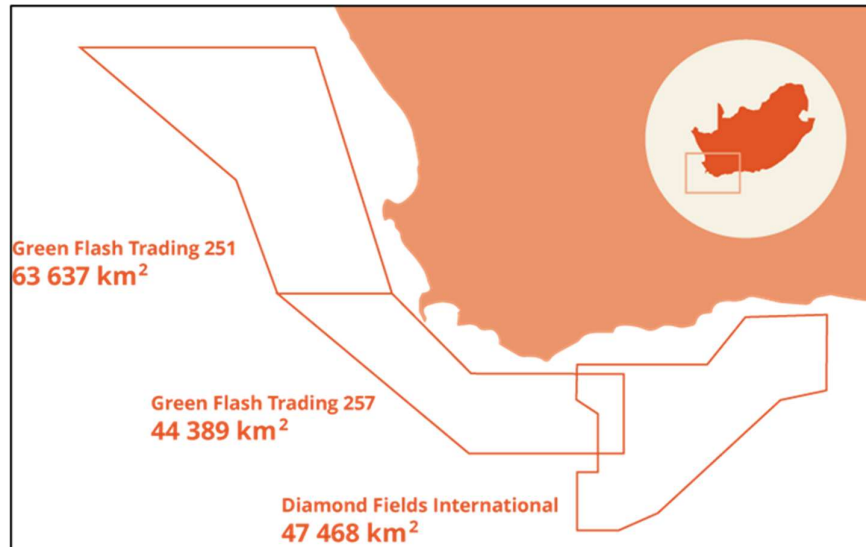


Figure 5.6.85
Marine Phosphate Prospecting Rights in South Africa

5.6.7 Adjacent Sea Use Activities within the Site EPZs

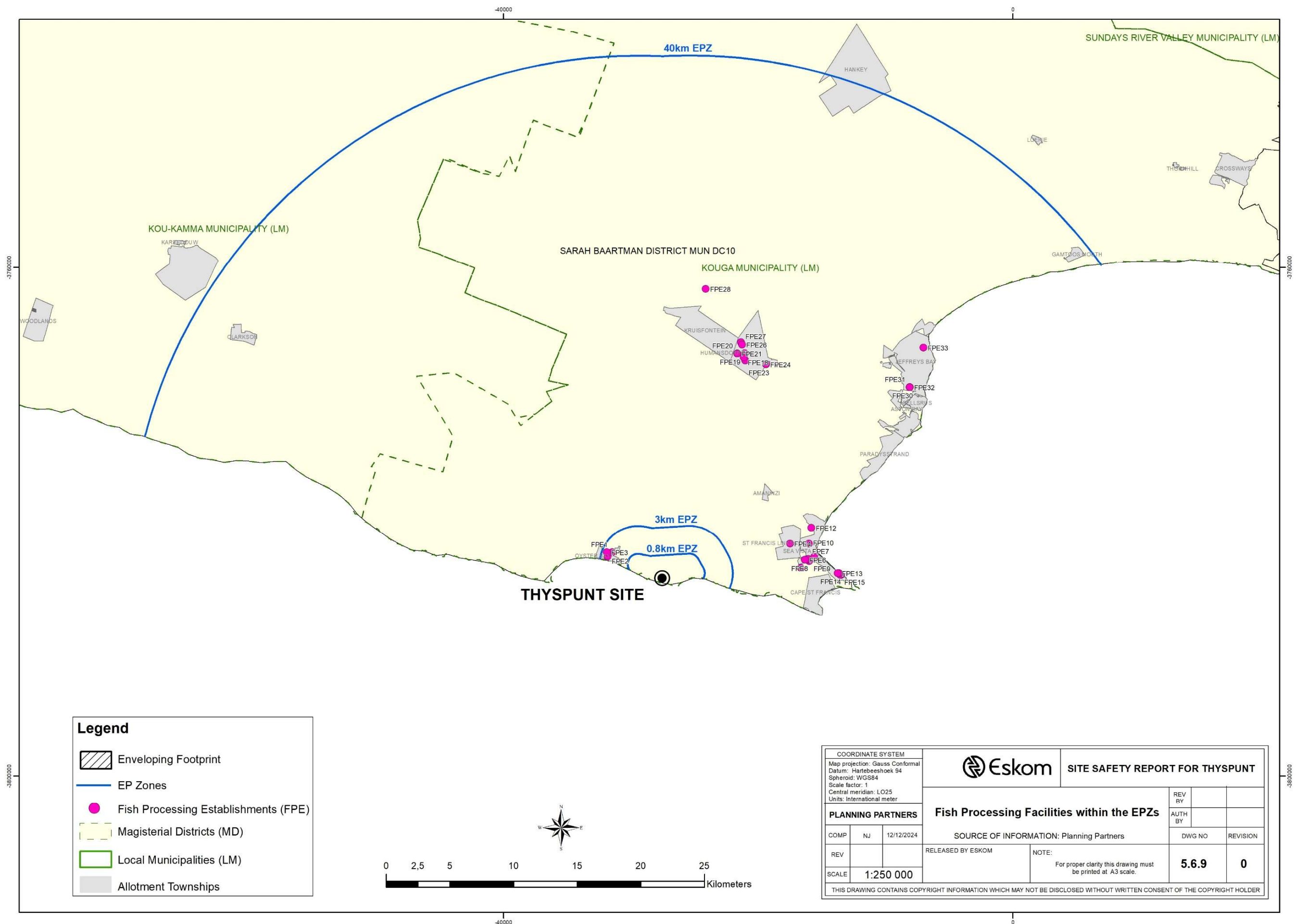
This section lists adjacent sea use relative to the EPZs to inform emergency planning.

The following data sets were analysed:

- fish processing facilities as set out in **Subsection 5.6.6.2** (refer to **Drawing 5.6.7**);
- adjacent sea use activities as set out in **Subsections 5.6.6.1, 5.6.6.3, 5.6.6.4, 5.6.6.7 and 5.6.6.8.**

5.6.7.1 Fish Processing Establishments

Based on the regional analysis of fish processing establishments (Planning Partners, 2024c), the data were analysed per sector in terms of the site EPZs. The EPZs were superimposed on the 5 km 22.5° sectoral grid and the distribution of fish processing establishments per EPZ was determined. See **Drawing 5.6.9.**



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a) 0 m to 800 m

There are no fish processing establishments located within the 0 m to 800 m nuclear site enveloping footprint, as illustrated in **Drawing 5.6.9**, as required by the regulations on site licensing (Department of Energy, 2011).

b) 800 m to 3 km

There are three fish establishments located at Oyster Bay within the 800 m to 3 km nuclear site enveloping footprint, as illustrated in **Drawing 5.6.9**.

c) 3 km to 50 km

Beyond the 3 km from the nuclear site enveloping footprint and up to the 40 km EPZ, there are a total of 30 fish processing establishments. Their distribution is concentrated within St Francis Bay and Humansdorp in the east, northeast and north-northeast, as illustrated in **Drawing 5.6.9**. They represent processing and distribution points from which contaminated food may enter the food chain. These establishments therefore need to be taken into consideration with respect to emergency and remedial measures relating to food banning and monitoring (International Atomic Energy Agency, 2002).

5.6.7.2 Activities in the Sea and Associated with the Coastline

Based on the data presented in **Subsections 5.6.6**, this section analyses activities that occur in the sea and the coastline within the 0 m to 800 m, 800 m to 3 km and 3 km to 40 km of the site enveloping footprint. The evaluation focusses on the type of activity and use, and its relative location to the site in terms of direction. The information presented informs the immediate and short-term emergency and remedial measures required for the protection of the public and the environment (International Atomic Energy Agency, 2002).

a) Activities in the Sea

Currently there no MPAs located within 0 km to 800 m nor within the 800 m to 3 km of the nuclear site enveloping footprint.

However, a seaward exclusion zone will be established and promulgated in terms of the Sea Shore Act, 1935 (Act 21 of 1935), with the purpose of controlling access to the sea and the sea-shore as described in more detail in **Chapter 9**. The seaward exclusion zone will affect the activities that occur in the sea within its area of application.

Fishing is, however, an important local activity with respect both to commercial, subsistence and recreational activities. These activities therefore need to be taken into consideration with respect to emergency and remedial measures relating to food banning, monitoring and public

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communication within the 40 km zone of the site enveloping footprint (International Atomic Energy Agency, 2002). Due to the migratory nature of fish monitoring and communication may need to be considered beyond the LPZ.

b) Activities associated with the Coastline

The section highlights characteristics that enable coastal access and lists activities that typically occur within a particular EPZ as 0 m to 800 m and 800 m to 3 km are illustrated in **Drawing 5.6.8** and 40 km of the site enveloping footprint.

i. 0 m to 800 m

The coastline is characterised by wavecut rocky platforms and a few beaches. Due to the properties being in the ownership of Eskom access to the area is already restricted and has been protected from most forms of utilisation. There are currently no commercial fishery sectors that utilise this section of the coastline. The area can however be accessed along the shoreline on foot. Some fishing for reef fish occurs, with Thyspunt itself being considered a good fishing spot by recreational anglers and its possible recreational harvest bait.

The establishment of an exclusion zone will result in restrictions on recreational activities within this zone, in accordance with the regulations on siting (Department of Energy, 2011).

ii. 800 m to 3.0 km

The stretch of coastline located to the east consists of predominantly exposed rocky headlands of the Rebelsrus Nature Reserve, and to the west wave-cut platforms and the sandy beach of Oyster Bay. Access to portions of this coastline is restricted, as the coastal properties fall within the Rebelsrus Nature Reserve and to the west belong to Eskom. The portion of Oyster Bay beach within this area can be accessed from Oyster Bay.

Rock angling occurs on the rocky headlands and wave-cut platforms, which are accessed on foot. Oyster Bay is a popular swimming beach. There is a slipway at Oyster Bay (8.38 km) that is used informally by recreational fishermen and falls outside of the 3 km of the nuclear site enveloping footprint.

Sunbathing, swimming, shore angling, and bait collection will need to be taken into consideration in emergency and remedial measures relating to food banning, temporary restrictions on access, monitoring and public communication. Refer to **Figure 5.6.86** and **Figure 5.6.87**.

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bodies are diverse and extensive as set out in **Subsection 5.6.6.7** of this SSR. All the activities referred to in this subsection will need to be taken into consideration in emergency and remedial measures and relating to food banning, ongoing monitoring and public communication.

With respect to the expected numbers of persons engaged in these activities cumulative population data are provided in **Section 5.4** of this SSR. This represents a conservative estimation of the expected numbers of persons present at any one time within the EPZ.



Figure 5.6.87
Popular Swimming Beaches Relative to the Site EPZs
within the Site Vicinity

5.6.8 Main Activities Relevant to Safety of the Nuclear Installation(s) and Potential Non-radiological Impact of the Nuclear Installation(s) on Adjacent Sea Use

Based on the site investigation, the main characteristics and activities relevant to the safety of the nuclear installation(s) and the potential non-radiological impact of the nuclear installations on the sea and the coastline, are described in terms as follows.

5.6.8.1 Impact of Marine Organisms on Nuclear Installation Cooling Water Systems

The potential hazards presented by marine biota on the nuclear installation(s) may result from entrainment of marine organisms and settlement from marine organisms in the intake pipes, resulting in the partial or total blockage of the cooling water systems. This could result in

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a loss of cooling water supply to the nuclear installation(s). This hazard will be most relevant for the operational phase of the nuclear installation(s) (Eskom, 2016). Desalination is the preferred option to ensure fresh water supply to the site and the sea water intakes structures to the desalination plant will also need to be kept clear of potential sources of blockage (refer to **Section 5.12**). Prevention and mitigation of this hazard is planned to be addressed at the design and operational stage of the facility.

a) Sessile Organisms

Colonisation by sessile organisms may result in biofouling of the cooling water uptake pipes of the nuclear installation(s).

In order to prevent or mitigate the consequences of such a hazard, chlorine will be used to keep the cooling system free of marine growth. The chlorine will be produced by means of electrolysis, and has been found to provide effective control (**Section 5.9**). The KNPS experience showed that chlorine used within the cooling system only has a localised effect on marine organisms. Existing monitoring programmes are considered adequate for observation purposes and no additional monitoring or action is required as part of this TSSR (Refer to **Section 5.3**).

Section 5.9 concludes that the nuclear installation intakes could be designed to cope and to minimise the risk of complete blockage of the intake. In the extreme case of a loss of the ultimate heat sink an alternate cooling source will be required. This will need to be considered in more detail in the design phase.

b) Jellyfish and Kelp

In 2024 a study was commissioned to update the baseline status of jellyfish along the Southern Cape Coast. Jellyfish pose a potential risk to the cooling water intake system of the nuclear installation(s). Occurrences of jellyfish ingress into the cooling water intake system at KPNS has occurred, with the most prominent events being in February 1997, June 1999, May 2005 (a separate event in March 2020 was attributed to anchovy).. The species involved, *C. fulgida* and *C. agulhensis* are known to gather in substantial numbers, forming large spawning aggregations during winter.

Although such swarms have not yet been reported from the South Coast, they can pose a risk to the nuclear installation(s) at Thyspunt. The study concluded that, as long-term regime shifts in plankton composition have been reported to favour jellyfish outbreaks and their rise, the observed increases in abundance of zooplankton along the South Coast following changes in upwelling-favourable winds may promote jellyfish blooms in the area. However, predation pressure by the relatively stable pelagic fish

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stock may be providing enough competition for the zooplankton resource for jellyfish not to gain dominance in the ecosystem as occurred off northern Namibia. While continued anthropogenic pressures on global marine ecosystems will likely see future increases in jellyfish blooms and consequently increased risks of jellyfish-related blockages at the seawater intakes, evidence supporting climate change as a driver of such increases remain inconclusive (Pulfrich, 2024).

Kelp is absent in the site region (Eskom, 2016). Refer to **Section 5.3** for more details.

Section 5.9 concludes that the nuclear installation intakes could be designed to minimise the risk of complete blockage of the intake. In the extreme case of a loss of the ultimate heat sink an alternate cooling source will be required. This will need to be considered in more detail in the design phase.

5.6.8.2 Potential Non-Radiological Impacts of the Nuclear Installation on Adjacent Sea Use

a) Increase of Water Temperature (Thermal Plume)

The site is centrally situated within the warm temperate Agulhas bioregion. The general area surrounding the site is one of high marine species richness and rates of endemism. Approximately 40 localised endemic invertebrate species have been reported within 300 km of the site. A detailed description of the marine ecology surrounding the site is also provided in **Section 5.3**. The characterisation of the thermal plume is described in **Section 5.9**.

The main areas and species that could be affected from the expected temperature increase are the pelagic fishery, line fish, squid and marine mammals and are discussed below.

The East Coast and West Coast small pelagic fishery industries are integrally linked. Any adverse impact on the fishery associated with the Thyspunt site has the potential to impact on the entire fishery along the West Coast of South Africa. However, the small pelagic fishery shoals of anchovy and sardines are highly migratory over the course of their lifecycle. They would therefore not stay inshore for any considerable length of time, where they may be affected by the warm water plume (Eskom, 2016).

The squid fishery is the pelagic fishery of greatest importance for the site region. Major spawning grounds of this species occur between Plettenberg Bay and Algoa Bay, where the species is commercially fished during the spawning season. Adult squid are adapted to a wide temperature range (between 8°C and 22°C) and are able to cope with

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rapid changes in water temperature. It is recognised that temperature is not the primary factor affecting the distribution of adults, but rather the distribution of the food source. Elevated temperatures resulting from the release of cooling water are not expected to result in lower catches in the industry plume (Eskom, 2016).

Egg capsules are deposited directly on the sea-bed and develop optimally at temperatures between 12°C and 20°C. Development is retarded and mortality rates increase at temperatures above 22°C. About 100 per cent mortality results have been recorded from temperatures rising above 24°C. If bottom sea temperatures are dramatically affected, it is likely to negatively impact on the egg beds. Modelling of the warm water plume movement is essential in estimating the extent of the thermal plume, and the impact that it would have on the commercially valuable squid species (Eskom, 2016). Modelling of the thermal plume available to date (Eskom, 2016) indicates that the extent of the plume is greatest under calm sea conditions.

Increase in sea temperature in the bottom waters (1 km off-shore) is expected to be less than 1°C (Eskom, 2016). As the nuclear installation design of the discharge system is likely to restrict the effects of elevated temperatures to adjacent sea water, it is expected that the potential impacts on squid egg capsules will be mitigated to the extent possible (Eskom, 2016).

The trawl and long-line fisheries, as well as tuna and swordfish-directed line fisheries, operate at a considerable distance offshore. Fish targeted by these sectors are not expected to be affected by the warm water plume as the plume has been modelled to dissipate within a few kilometres of the outfall, even in the calmest conditions. A mean rise in sea surface temperature of 1 °C will be limited to an area of roughly 1.6 km² for a 4 000 MWe plant. Also, no area of the seafloor will experience mean temperature increases above 1 °C (Eskom, 2016). The initial assessment was conducted for a higher generating capacity plant than is currently envisaged.

Even organisms such as oysters, which are found closer to shore and are not able to migrate as easily as fish, will not be affected, as the buoyancy of the warm water limits the ability of water to penetrate downwards to the seabed where rock lobster live. Non-migratory nearshore line fish species, such as reef dwelling fish, are not envisaged to be affected for the same reason (Eskom, 2016).

The release of warm water is not expected to have a significant effect on marine mammals, since the affected area is estimated to be relatively small and isolated and the downward penetration of the plume is limited

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by the buoyancy of the warmed water and the rapid mix with cold seawater (Eskom, 2016).

b) Potential Impacts of the Desalination Plant (Brine Plume)

Section 5.12 reports on the investigation and assessment of potable water supply sources over the various development/operational stages of the nuclear installation(s). Desalination is seen as the preferred long-term supply option, and seawater desalination plants (reverse osmosis) are to be deployed in phases during the lifecycle of the project.

Brine from the desalination plant will be discharged beyond the surf zone during nuclear installation(s) construction and co-disposed with once through cooling water discharge during the nuclear installation(s) operation.

During construction, the estimated maximum brine discharge will be 156 l/s, for which the following options were considered: through a pipe located on the upper beach profile or from a pipe located beyond the surf zone at a suitable depth. It is recommended to discharge the brine beyond the surf zone along the sandy seabed at sufficient velocities to enhance vertical mixing. Baseline monitoring and modelling of plume dispersal, which is likely to contain biocides, coagulants and neutralising agents, will be required to ensure that any environmental impacts are within predicted ranges and as approved by the regulatory authority.

During operation, the brine will be mixed with large volumes of cooling water discharged from the nuclear installation(s) (about 176 000 l/s for a 13 200 MWth installation) to minimise any impacts but is expected to be virtually undetectable (**Section 5.12**).

5.6.9 Management of Uncertainties

5.6.9.1 Current Uncertainties

The uncertainties associated with the current knowledge and understanding of adjacent sea use can be summarised as follows:

- Due to ecological changes relating to phenomena such as global warming there may be impacts of fishery species caught in the site region which may result in changes in main commercial fishery sectors that are active in the site region.
- Although small-scale fisheries practice under license from DFFE can be quantified (and requires further investigation), illegal harvesting of marine resources for subsistence purposes cannot be quantified. The majority of fish caught by recreational fishermen is for own consumption, and the volume cannot be reliably quantified within the

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site region. Data on fish consumption rates have been collected in the 2024 Habit Survey, and is reported on in **Chapter 7**.

5.6.9.2 For the Lifetime of the Nuclear Installation(s)

Future uncertainties are also envisaged, i.e.:

- Although fish stocks are calculated annually in accordance with an ecosystem approach to fisheries management, making predictions for the lifetime of the nuclear installation(s) will not be possible. Changes to individual allocations are therefore made annually. Fluctuations in biomass estimates will provide information about the allocation of fishing rights per commercially caught species from year to year. Short to medium-term predictions and associated fishery allocations published by the DFFE can be reported on, but will need to be updated on a regular basis.
- The abundance, allocation and possible migration of stocks are subject to change over the nuclear installation lifetime. As with the above, short to medium-term predictions can be reported on, but not for the lifetime of the nuclear installation(s) and will therefore need to be updated on a regular basis.
- Activities related to recreational, tourist and small-scale fishing will change over time as they are directly linked to the growth of the tourism industry and development trends in the site region. Changes with respect to numbers of persons involved in these activities are dynamic in nature and prone to change. Therefore, information included in this section of this TSSR will need to be updated on a regular basis.

5.6.10 Monitoring

5.6.10.1 Ongoing Activities

Currently no monitoring activities are being specifically implemented to inform the site characterisation set out in this section of this TSSR.

5.6.10.2 Planned Activities for the Lifetime of the Nuclear Installation(s)

Information presented in this section must be updated on a regular basis in order to maintain an adequate and accurate understanding of the marine and coastal activities within the site region.

Monitoring is also required to ensure that timely intervention by Eskom will occur where an activity poses a potential threat to the nuclear installation(s) or increases the risk to the safety of the public and the environment. More specifically:

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- To maintain an understanding of up-to-date information related to commercial fisheries, the data presented in this section will be updated at regular intervals in line with the requirements as contained in the siting regulations (Department of Energy, 2011) and safety re-evaluations/re-assessments during periodic reviews.
- To maintain an understanding of the location and extent of fish processing establishments in the site region, the data presented in this section will be updated at regular intervals.
- Sea products landed and processed in the site region are also exported nationally and internationally. Potential for exposure of an extended public exists. It is therefore important that monitoring of radionuclide concentration in marine organisms at fish processing establishments is carried out by the Eskom in order to determine the background radioactivity levels as a baseline. Monitoring during the nuclear installation operation and termination is also necessary in order to identify any trends or risks to the public over the lifetime of the nuclear installation(s).
- Information on tourism and recreational activities presented in this section will be updated at regular intervals and the emergency plan will need to be reviewed accordingly.
- Monitoring of the radionuclide concentration in marine organisms must be carried out prior to construction of the nuclear installation(s) in order to establish the radiological baseline as required by the NNR (Department of Energy, 2011).

5.6.11 Management System

The assessment and characterisation of present and future adjacent sea uses around the site and its region entailed the following components:

- desktop study;
- site investigations conducted for the purposes of this TSSR;
- data assessment and characterisation;
- use of computer software, in particular *Microsoft Excel* sheets to record data and a GIS, for the collation, interpretation and presentation of data;
- mapping and the creation of a Geographic Information System database.

A quality assurance programme for the adjacent sea use characterisation was established to control the effectiveness of the execution of the site investigation and data analysis. This conforms to the overall management system for this SSR (see **Chapter 10**) and the Eskom

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guidelines, i.e. to the appropriate grading for safety classification in terms of RD-0034 (National Nuclear Regulator, 2008) and Eskom's NSIP02189 (Eskom, 2021) classification procedure. The evaluation of the sea use adjacent to a nuclear installation site was determined as Safety Level 3, Safety Qualification 3. The required management system is described in **Chapter 10**.

The activities carried out as part of the characterisation of the site and the results achieved are presented and described in this section of this TSSR. The databases are referenced in this section of this TSSR and form part of the Geographic Information System database that was developed for this section. The results of the analyses are presented in tables and in drawings prepared for and presented in this section.

The following documents were compiled by the consultant and approved by Eskom to assist in quality assurance, and to present a clear and auditable trail showing how key decisions were made and conclusions reached:

- SRK's Integrated Quality Management System and associated Work Instructions;
- The project-specific Project Quality Plan;
- Method Statement;
- Quality Control Plans;
- Project Process Chart;
- Verification and Validation Plan;
- Verification and Validation Report.

The adjacent sea use characterisation has followed a peer review process, to ensure that the work was carried out using standard industry methodologies and approaches. The peer review was carried out by a suitably qualified, independent and experienced professional approved by Eskom. Quality assurance is therefore demonstrated through the preparation of:

- process map containing reference to various data files;
- peer review reports.

Electronic records are stored in a secure central repository with regular off-site back-up procedures and subject to Eskom's approval. The overall quality system complies with that set out in **Chapter 10**. All references cited are saved on the central repository.

Table 5.6.23 lists the activities carried out as part of the adjacent sea use characterisation with their respective links to other TSSR sections and chapters and the relevant quality control requirements.

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Table 5.6.23
Summary of Activities, Links and Quality Requirements

Activity	Links		Quality Control Requirements
	Inputs	Outputs	
Characterisation of Adjacent Sea Use	<u>Section 5.1:</u> For the site centroid. <u>Chapter 8</u> (Emergency Planning): Determination of the EPZs.	Information on existing sea use to be used in identification of potential risk to the population and the environment (<u>Chapter 7</u>) and informs the feasibility of the emergency plan (<u>Chapter 8</u>).	Drawings and tables illustrating adjacent sea use topics. Officially accepted national database. Peer Review
External Hazards of a natural origin	<u>Section 5.3</u> <u>Section 5.9</u>	Information used to describe the potential impact of marine organisms on cooling water supply (<u>Section 5.9</u>) and state mitigation measures.	Description and conclusions extracted from <u>Section 5.9</u> and <u>Section 5.3</u> . Peer Review
Impact of the nuclear installation(s) on the Environment	<u>Section 5.3</u> <u>Section 5.12</u>	Information used to describe the impact of desalination plant on the marine environment. Impact of the thermal plume on the marine environment.	Description and conclusions extracted from <u>Section 5.12</u> and <u>Section 5.3</u> . Peer Review
Determination of Exposure Pathways		Information used in <u>Chapter 7</u> , for determination of exposure pathways.	Peer Review

This section of this TSSR was developed in compliance with the applicable regulatory requirements as set out in **Table 5.6.24** below.

Table 5.6.24
Regulatory and Guidance Compliance Matrix

Act / Regulation	Regulation	Issue	Section Where Covered
Regulations (Department of Energy, 2011)	5(3)(e)	Site-specific data: regional development	<u>Subsections 5.6.5 and 5.6.6</u>
Regulations (Department of Energy, 2011)	5(7)(a)	Exclusion zone for recreational commercial activities	<u>Subsections 5.6.5.2, 5.6.5.3 and 5.6.6.17</u>
RG-0011 (National Nuclear Regulator, 2016)	6.1(1)(a), 7.1(2), 7.1(3), 7.4(1)	External natural events, i.e. biological infestation which could cause loss of function to structures, systems and components important to	<u>Subsection 5.6.8</u>

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Act / Regulation	Regulation	Issue	Section Where Covered
		nuclear safety.	
RG-0011 (National Nuclear Regulator, 2016)	6.1(1)(b), 6.4(4), 8.2(2), 8.2(3)(d), 8.2(3)(e), 8.2(3)(g), 8.2(3)(h), 8.2(3)(i), 8.2(1),	Characteristics of the site and its environment which could influence the transfer of released radioactive material to persons, e.g. form part of the food chain, including commercial, individual and recreational fishing, including details of the aquatic species fished, their abundance and yield, as well as products exported from the site region and free foods.	<u>Subsections 5.6.6.1, 5.6.6.2, 5.6.6.3, 5.6.6.4, 5.6.6.5, 5.6.6.7 and 5.6.6.8</u>
RG-0011 (National Nuclear Regulator, 2016)	8.2(4)	The present use of water which could be affected by changes in the water temperature and by radioactive material discharged from a nuclear power plant.	<u>Subsection 5.6.8.2</u>
RG-0011 (National Nuclear Regulator, 2016)	8.4.3(1)(a)	The general shore and bottom configuration in the region, and unique features of the shoreline, i.e. bathymetry.	<u>Subsection 5.6.5.1</u>
RG-0011 (National Nuclear Regulator, 2016)	8.4.3(1)(h)	Spawning periods and feeding cycles of major fish species.	<u>Subsection 5.6.6.1</u>

5.6.12 Conclusions

The main conclusions to be drawn from this investigation are:

- The characteristics of adjacent sea use of the site vicinity and the site region have been identified.
- The current and expected future adjacent sea use characteristics in the site vicinity and the site region have been determined.
- The studies have been conducted to an adequate level of detail for the purpose of **Chapter 7**.
- The studies have been conducted to an adequate level of detail for the purpose of **Chapter 8**.
- The studies undertaken to compile this section of the TSSR were

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done in compliance with regulatory requirements.

- Appropriate monitoring programmes and controls, which include regular revision of this section of this SSR, to provide on-going assurance regarding the viability of the site over its lifecycle can be established in compliance with regulatory requirements.

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Appendix A: Fish Processing Establishments in the Site Region (2018)

ID	Fish Proceession and Distribution Facility	Location	Distance	Direction
FPE1	Perigrine Trust	Oyster bay	4,44	WNW
FPE2	Brigitte Trust	Oyster bay	4,63	WNW
FPE3	Prima See Visserye Lrd	Oyster bay	4,82	WNW
FPE4	TTM Fishing (Pty) Ltd	St Francis Bay	10,39	ENE
FPE5	St Francis Sea Products (Pty) Ltd	St Francis Bay	10,90	E
FPE6	Striker Fishing Enterprises	St Francis Bay	11,29	E
FPE7	Ukuqala Trading	St Francis Bay	11,54	E
FPE8	Aspire Community Processing and Cold Storage	St Francis Bay	11,55	E
FPE9	Balobi Store	St Francis Bay	11,62	E
FPE10	Moby Dick Fishing Enterprises cc	St Francis Bay	11,82	ENE
FPE11	Fairwinds Fishing (pty) Ltd	St Francis Bay	12,05	E
FPE12	MTV Fishing cc	St Francis Bay	12,38	ENE
FPE13	LM Fisheries (Pty) Ltd	St Francis Bay	13,78	E
FPE14	Christina Fishing cc	St Francis Bay	13,88	E
FPE15	Biz Afrika 131 (Pty) Ltd	St Francis Bay	13,97	E
FPE16	Balobi Processors (Pty) Ltd	St Francis Bay	14,05	E
FPE17	Dodeka trust	Humansdorp	18,35	NNE
FPE18	Ulanda Trust	Humansdorp	18,54	NNE
FPE19	Pumula H 235 Boat (Pty) Ltd	Humansdorp	18,65	NNE
FPE20	Vukani 2 Pea 198 (pty) Ltd	Humansdorp	18,65	NNE
FPE21	Vukani H59 Boat (Pty) Ltd	Humansdorp	18,65	NNE
FPE22	Dodeka fishing cc	Humansdorp	18,71	NNE
FPE23	Humansdorp C.F.W. (Pty) Ltd	Humansdorp	18,71	NNE
FPE24	Knysna fishing Co. (Pty) Ltd	Humansdorp	18,71	NNE
FPE25	Rafel Ondernemings Bk	Humansdorp	18,87	NNE
FPE26	DMA Fishing Enter. (Pty) Ltd	Humansdorp	19,42	NNE
FPE27	D. Christy & Sons (Pty) Ltd	Humansdorp	19,59	NNE
FPE28	Starfish trust	Humansdorp	23,03	N
FPE29	Goldstone Commercial Fishing cc	Jeffreys Bay	24,58	NE
FPE30	Sangoma fishing (Pty) Ltd	Jeffreys Bay	24,58	NE
FPE31	Shehasta Trust	Jeffreys Bay	24,58	NE
FPE32	Squid Packers (Pty) Ltd	Jeffreys Bay	24,58	NE

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ID	Fish Proccession and Distribution Facility	Location	Distance	Direction
FPE33	GGA Fishing Enter. cc	Jeffreys Bay	27,40	NE
FPE34	Blue Water Fishing Enterprises (Pty) Ltd	Gqeberha	76,01	ENE
FPE35	Highland Fisheries cc	Gqeberha	79,46	ENE